WILSON ENGINEERING

CITY OF SEQUIM

City of Sequim

Water System Plan

September 2023

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This Water System Plan was prepared under the direction and supervision of the professional engineer whose seal and signature appears below, licensed in the State of Washington under Chapter 18.43 RCW. This Water System Plan represents a collaborative effort between Wilson Engineering, LLC., and City of Sequim staff.

In particular, City staff took the lead on preparing the following:

- Chapter 4 – Water Use Efficiency and Water Resource Analysis (WUE sections)
- Chapter 5 – Source Water Protection (whole chapter and associated Appendices)
- Chapter 6 – Operations and Maintenance Program (most of Chapter)
- Chapter 7 – Water System Design and Construction Standards (whole chapter and associated Appendices)
- Appendix H – Water Rights Information
- Appendix I – Coliform Monitoring Program
- Appendix J – Cross Connection Control Program



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EXECUTIVE SUMMARY

INTRODUCTION

The City of Sequim 2022 Water System Plan (Plan) provides a long-term planning strategy for the City's water utility for the 10- and 20-year planning periods. It has been prepared consistent with Department of Health requirements specified in Washington Administrative Code Chapter 246-290. This Plan represents a commitment by the City to pursue and implement the Plan's recommendations and capital improvements.

The City's water system currently consists of four sources of supply, three of which are active and regularly used for daily supply: the Infiltration Gallery, the Silberhorn Wellfield, and the Port Williams Wellfield. The Dungeness River is the fourth source of supply and is available to the City. The City's water system includes three storage reservoirs totaling 2.9 Million Gallons of active storage, four booster pump stations and approximately 77 miles of distribution and transmission main piping. The City has six pressure zones.

Significant issues discussed in the Plan include:

- The City's water rights and water right history
- Population and water demand projections and analysis of system capacity with respect to the City's ability to meet projected water system needs
- The City's successes in promoting water conservation and decreasing distribution system leakage that has contributed to the City's water system infrastructure having sufficient capacity to meet the projected 20-year demands
- Improvements to the distribution system needed to remedy deficiencies in available fire suppression flow
- Plans for distribution system expansion to serve future development in the anticipated growth areas within the City of Sequim City Limits and Urban Growth Area (UGA)
- A comprehensive capital improvement program to meet projected growth and water system needs

WATER DEMAND FORECASTING AND SYSTEM CAPACITY ANALYSIS

Population within the City of Sequim UGA is projected to grow at 3.0 percent annually for the next 20 years. Currently, the Sequim water system only serves customers within the UGA,

however not all residents in the City or UGA are on the City water system. The projected service area population is projected to be 14,855 persons in the year 2041. The projected number of Equivalent Residential Units (ERUs) that the City will need to serve in the years 2031 and 2041 are shown in Table E-1.

Table E-1 also summarizes the capacity of each component of the existing water system to serve ERUs. It demonstrates that the existing system components have sufficient capacity to serve projected demands for the 10- and 20-year projections, although Source Capacity Max Day and Storage Capacity are nearing their capacity limitations at the 20-year projection.

Table E-1 – Projected Capacity Needs and Existing System Capacity Summary

Projected Capacity Needs	**Capacity needed, not including DSL and NRW (1) (ERUs)**
Projected Capacity Needs in 2031	7,928
Projected Capacity Needs in 2041	10,655
Existing Capacity Parameter	**Capacity to serve connections after subtracting DSL and NRW(1) (ERUs)**
Source Capacity Max Day	10,789
Source Capacity Average Day	18,789
Water Rights – Annual	23,518
Water Rights – Instantaneous	17,078
Storage Capacity	>10,655
Distribution	>12,000

(1) DSL = Distribution System Leakage, NRW = Non-Revenue Water

WATER SUPPLY STRATEGY

Although Table E-1 shows that the existing sources of water supply are sufficient for the 20-year planning period projections, it is recommended (and the City is planning) to be proactive in improving its water supply sources to address operational issues and ensure sufficient capacity for the future. Planned improvements to sources are addressed below.

SILBERHORN WELLFIELD
Silberhorn Wells No. 2 and No. 3 have experienced decreasing capacity issues in recent years. Plans to drill a new deep well in this vicinity to address capacity and nitrate concentrations are discussed in the Plan.

PORT WILLIAMS WELLFIELD
The City currently has three wells at the Port Williams Wellfield site. City's water right for Port Williams Wellfield allows for the drilling of up to five wells and the withdrawal of up to 2,250 gpm, which would be an increase of 490 gpm to the current maximum withdrawal rate. The Plan addresses the drilling of a new well at this site.

DUNGENESS RIVER
The Dungeness River water is available for City use, but direct use of this surface water source would require construction of a surface water treatment facility. The Plan includes a long-term plan for construction of this facility in case it's needed.

CAPITAL IMPROVEMENT PROGRAM
A summary of the City's CIP is shown in Table E-2. A map of the location of these improvements can be seen in Figure 8-1.

Table E-2 –Capital Improvement Plan

Project No.	Project Description	Construction Year	Estimated Project Cost	Funding Source
BS-1	New 635 Zone Booster Station	2023	$1,700,000	Developer / Water Utility Cost Share
BS-2	Simdars Road Booster Station	2027	$740,000	Water Utility
ST-1	New 420 Reservoir	2036	$ 6,300,000	Water Utility
ST-2	Steel Reservoir Exterior Recoating	2022	$ 470,000	Water Utility
S-1	Port Williams Well No.4	2026	$1,300,000	Water Utility
S-2	New Deep Well	2024	$1,300,000	Water Utility
S-3	Dungeness River Surface Water Treatment Facility	2040	$20,000,000	Water Utility
S-4	Infiltration Gallery Flow Control Valve	2028	$240,000	Water Utility
MI-1	New SCADA Installation	2022 through 2024	$500,000 total over 3 years	Water Utility
MI-2	Fixed Based Automatic Meter Reading System	2023 through 2026	$634,534 total over 4 years	Water Utility
MI-3	Development of Unidirectional Flushing Program	2023	$30,000	Water Utility
MI-4	Complete Residential Meter Replacement	2031-2033	$1,000,000	Water Utility

D-1	Hammond Street Water Main	2028	$1,600,000	Developer
D-2	Brown Road Water Main	2027	$1,500,000	Water Utility
D-3	5th Avenue Water Main	2027	$320,000	Water Utility
D-4	Reservoir Road and 7th Avenue Water Main	2023	$960,000	Developer
D-5	Norman Street and Eunice Street	2025	$780,000	Water Utility
D-6	Washington Street Water Main	2028	$1,400,000	Developer
D-7	West Sequim Bay Water Main	2023	$1,800,000	Water Utility/ Grant
D-8	Washington Harbor Loop Water Main No. 1	2026	$2,000,000	Developer
D-9	Fir Street from North Sequim Avenue to North Brown Road	2026	$1,300,000	Water Utility
D-10	Brown Road from East Fir Street to East Washington Street	2026	$950,000	Developer
D-11	East Etta Street from South Sequim Avenue to South Sunnyside Avenue	2023	$400,000	Water Utility
D-12	Marlo Drive West from the End of the Existing Main to River Road	2029	$440,000	Developer
D-13	West Sequim Bay Road from Battelle to Connect with Marina Water System	2029	$1,300,000	Developer
D-14	Pressure Relief Valves	2024	$160,000	Water Utility
D-15	New Water Main from South Lee Chatsfield to Espeth Way	2029	$270,000	Developer
D-16	Washington Harbour Road to Washington Harbor Loop	2029	$540,000	Developer
D-17	Asbestos Cement/Galvanized Iron Water Main Replacement	Annual	$200,000	Water Utility
D-18	Isolation Valves on Washington Street from 5th Avenue to Sequim Avenue	2027	$260,000	Water Utility
D-19	West Prarie Street from South Sequim Avenue to South 5th Avenue	2027	$1,800,000	Water Utility
D-20	South 7th Avenue from Silberhorn Road to McCurdy Road	2024	$740,000	Water Utility
D-21	635 Zone Distribution Piping connecting new booster pump station to Emerald Highlands	2028	$3,240,000	Water Utility
D-22	Ranney Well Water Line Rehabilitation/Replacement	2027	$3,400,000	Water Utility
D-23	Water line at New Carrie Blake Park Entrance	2025	$210,000	Water Utility
D-24	Water line under new Guy Cole Parking Lot	2025	$150,000	Water Utility
D-25	Blake Ave Water Main Extension	2025	$150,000	Water Utility

FINANCIAL STRATEGY

The City completed a Rate Study in 2021 that is discussed in Chapter 9 and included in Appendix N. Chapter 9 notes that, based on current plans, the City will need to obtain additional funding through grants, loans, or revenue bonds beginning in 2026. The Rate Study recommended annual utility rate increases. The City's decision to not raise utility rates since 2020 will result in larger rate increases in the future and/or the need to secure additional funding on a shorter timeframe than would otherwise be the case. Note that inflationary pressures, particularly in 2021 and 2022, on all costs, both O&M and capital projects, will also contribute to the increased need for funds.

ACKNOWLEDGEMENTS

The complete Water System Plan that follows was a collaboration between Wilson Engineering and City staff (Operations, Engineering, Finance, Planning, and Management), and we would like to acknowledge the significant contributions from City staff that help to make this planning document accurate, thorough, and useful as the City continues to plan for and achieve its goals of providing the best possible service for its customers.

Chapter 1
WATER SYSTEM DESCRIPTION

1.1 INTRODUCTION
In accordance with Washington Administrative Code (WAC) 246-290-100 and the Washington State Department of Health (DOH), water system plans for Class A water systems need to be updated every 10 years (formerly every 6 years) or more frequently if necessary to reflect the current conditions of the water system. This Plan has been prepared to update the 2013 City of Sequim (the City) Water System Plan, using the DOH Water System Design Manual, June 2020, and the DOH Water System Planning Guidebook, August 2020. Copies of the Washington State Department of Health Project Approval Application, Water System Plan Submittal Forms and the Local Government Consistency Review Checklist are included in Appendix A.

1.2 SYSTEM OWNERSHIP AND MANAGMENT
The City of Sequim owns and operates a municipal water system which serves the majority of the incorporated City, as well as a portion of unincorporated Clallam County south of the city. The DOH water system identification number for the city is 77620-Y. A copy of the Water Facilities Inventory Form (WFI) is included in Appendix B.

The city is governed by a City Manager and a seven-member City Council. The City's current mailing address is:

City of Sequim
152 W Cedar Street
Sequim, Washington 98382

Figure 1-1 is a vicinity map of the city. Figure 1-2 shows the water system boundary, the Sequim city limits and the current urban growth area (UGA).

1.3 SYSTEM BACKGROUND

1.3.1 WATER SYSTEM HISTORY
The City is located on the Sequim prairie in the northeast portion of Clallam County, situated between the Strait of Juan de Fuca, Sequim Bay, the Dungeness River and the Olympic Mountain foothills. Original settlement on the Sequim prairie was by ancestors of current Jamestown S'Klallam Tribal Citizens. The first Europeans settled on the prairie in 1853; logging, farming, and seafood canning were the main industries. Chronic summer droughts, however, limited expansive settlement until the first irrigation system was installed, in 1895, utilizing the Dungeness River as a resource. With irrigation came the expansion of grain, root, cattle, and dairy farming, and residential growth.

The City's water system originated from early commercial development activities. In 1908, local businessman Joseph Keeler opened a hotel in the Town of Sequim, served by a spring, a well and water tower. Keeler ran pipes to other customers as requested.

The City was incorporated in 1913 with a population of 300. By 1920, Sequim had grown to 402 residents. In 1922, Sequim contracted with the Highland Irrigation District to lease water and held a special election which funded the purchase of 10 acres adjacent to the District's main irrigation canal (the City's Reservoir Road property, which includes a spring). The bond also funded construction of a reservoir and wood stave conveyance pipe about one mile long downhill into city limits. The same year, the City purchased the Keeler Water Company, establishing the first public water system serving the City. In 1924, the growing City applied to the state for a year-round water right of its own from the Dungeness River, still utilizing the Highland District's convenance. Over subsequent decades, the City constructed a separate headgate and conveyance pipes to its reservoir (first wooden, then concrete).

Throughout the last century Sequim outgrew and upgraded its water system and pursued additional sources, including infiltration galleries (aka Ranney well collectors, in the 1950s and 1970s/80s) and two wellfields (Silberhorn in the 1970s and Port Williams in the 1990s). More details of this progression may be found in Appendix H, Water Rights Information. A brief history of relatively recent distribution system improvements follows:

- In 1985-86, housing for a chlorination system was built at the infiltration gallery site and the 250,000-gallon 480 Zone above-ground reservoir was constructed on Reservoir Road.
- In 1995 the City's 1.7 million-gallon (MG) reservoir, also on Reservoir Road, was constructed and the 5th and McCurdy Booster Station was built.
- In 2008 the Solana development was constructed which is served by a 1 MG reservoir and two booster stations.
- Since 2000, the City expanded the water system to the northwest to serve the new commercial zone along Washington Street, upsized existing water mains in the downtown areas, and improved service with additional water mains for distribution and water quality.
- Since 2013 the City continued to expand the distribution network including upgrading the booster station at 5th and McCurdy.
-

The current water system base map is shown on Figure 1-2.

1.3.2 CLIMATE AND GEOGRAPHY

The Sequim prairie is generally temperate, with an average rainfall over the long term of approximately 16 inches per year. The prairie, which is in the rainshadow of the Olympic Mountain Range, gently slopes northeast toward the Strait of Juan de Fuca. Topography within the City ranges from approximately 0 to 700 feet above mean sea level (MSL). Figure 1-3 shows the topography of the Sequim area.

The land area inside the city limits is within the Dungeness River, Cassalery Creek, Gierin Creek, Bell Creek and Johnson Creek drainage basins. The Dungeness River is located west of the City and has a basin covering approximately 197 square miles. A series of glacial advances

and retreats, interrupted by periods of non-glacial deposition and erosion, resulted in alternating layers of coarse- and fine-grained hydrogeologic formations throughout the greater Sequim region. Groundwater flow within the area's aquifers generally occurs from south to north-northeast, where it discharges into Sequim Bay or the Strait of Juan de Fuca.

The primary impact from climate change on water resources in the Dungeness watershed is the shrinking of permanent glaciers and snowpack in the Olympic Mountains. Over time, reduced volume of snowmelt will result in more years with extreme low summer river flows and a gradual decline of annual aquifer recharge, which could impact water supply well yields. Increasing temperatures will result in more frequent droughts, less soil moisture, and higher risk of wildfire and associated erosion. Sea level rise could result in increased risk of salt water intrusion to wells. Finally, while annual rainfall is not expected to change greatly, increases in rain storm intensity generally means a higher fraction of storm volume turns into runoff and a lower fraction recharges the aquifer, which could impact aquifer levels over time. While these potential impacts to water resources have not been quantified at the watershed scale, the trends are known and should be considered in water supply planning. The City has an established aquifer monitoring program that is described in Chapter 4.

Regional efforts to adapt to changing water supply conditions include managed aquifer recharge as well as water storage projects advanced by water purveyors and other local, state, and tribal stakeholders. City of Sequim is a partner on two current projects: a stormwater capture and infiltration project in the County southwest of city limits near River Road (City is lead), and a large off-channel water storage reservoir project in the same area (Clallam County is lead). Both are in design stages in 2022; once either is constructed it will benefit groundwater supply in the Sequim area.

1.3.3 Soil Conditions

Figure 1-4 shows the location of the soil types within the UGA. The majority of the City of Sequim service area is made up of gravelly sandy loams of USDA Sequim or Carlsborg series.

1.3.4 Sensitive Areas

Site sensitive areas within the water service area include several classifications, shown on Figure 1-5 and described briefly below. Detailed definitions and development regulations for projects within sensitive areas are included in Sequim Municipal Code Chapter 18.

1.3.4.1 Erosion Hazard Areas

These areas are especially subject to erosion, if disturbed, and may not be well suited for high-density developments or intensive land uses. Parts of the Bell Hill area and the hills to the north and south of the City's Water Reclamation Facility (WRF) are erosion hazard areas.

1.3.4.2 Seismic Hazard Areas

Seismic hazard areas are those with low density soils that are more likely to experience greater damage due to seismic-induced subsidence, liquefaction, ground-shaking, or landslides. Seismic hazard areas are regulated mainly with respect to public safety and potential mass wasting due to an earthquake. Any water source, storage or distribution facilities in a seismic hazard area must be designed to minimize risk of harm from seismic activity. Sequim's major water facilities do

not coincide with these hazard areas; however, a seismic event could cause considerable damage to water lines in some areas that might experience significant earth movement.

1.3.4.3 Flood Hazard Areas

Flood hazard areas are regions adjacent to lakes, rivers, and streams that are prone to flooding during peak runoff periods. Flood hazard areas deserve special attention due to the sensitive nature of their ecosystems as well as the potential for damage to structures located in the floodplain.

1.3.4.4 Landslide Hazard Areas

Landslide hazard areas include areas potentially subject to risk of land movement due to a combination of geologic, topographic, and hydrologic factors. Specific buffers and building setbacks apply to any development that abuts or contains these areas. The buffers may be reduced based on special studies. With respect to water systems, these development regulations can affect the amount of buildable area (and therefore, impervious surface) and/or reduce the potential risk for landslides and mass wasting that could impact water infrastructure and natural resources. Slide hazards areas are those that are prone to unstable behavior due to steep slopes, lack of vegetation, or unconsolidated soils.

1.3.4.5 Wetlands

Wetlands are defined as areas that are inundated with water for at least part of the year. Wetlands support valuable and complex ecosystems and consequently development is severely restricted if not prohibited in most wetlands. The National Wetlands Inventory maps identify several small wetlands within the City's UGA.

There are specific buffers and allowable alterations for development within a designated wetland area. There are also requirements for special studies and determinations to be performed to identify and classify wetlands. In general, City of Sequim does not allow impacts to regulated wetlands; however, if such impacts are unavoidable, then mitigation measures are required.

1.3.4.6 Water Bodies

Lakes and streams are classified as sensitive areas due to the variety of plants and animals that they support. The City has designated stream corridor zones which are planning areas with variable width setbacks from the ordinary high water mark elevation of the stream or water course, or from the top of the bank or dike. The primary surface water features within or near the City of Sequim water service area are the Strait of Juan de Fuca, Sequim Bay, Washington Harbor, Bell Creek and the Dungeness River. The lowest reach of Johnson Creek is also inside city limits.

1.3.4.7 Fish and Wildlife Habitat

Fish and wildlife habitat is defined as areas which meet the definition of a "Fish and Wildlife Habitat Critical Area" pursuant to WAC 365-190-080(5) as well as Sequim Municipal Code Chapter 18.80 and is essential for maintaining specifically listed species in suitable habitats. Habitat Management Plans may be required to address a project's impacts, provide background information on specific species, and recommend protection and mitigation measures for those species. Minimum buffers from the critical habitat area may be required. As the main

watercourses in the area, maintaining the water quality and habitat in Bell Creek and the Dungeness River are of particular concern.

1.3.4.8 Aquifer Recharge

Critical aquifer recharge areas and pertinent development regulations to protect groundwater recharge and water quality are found in Sequim Municipal Code Chapter 18.80.100. Virtually the entire Sequim area is designated as highly susceptible and a High Aquifer Recharge Area, containing Carlsborg-Puget-Dungeness and Hoypus-Sequim-Agnew USDA soils groups, which are highly permeable.

1.4 EXISTING WATER SYSTEM

A description of the facilities currently owned and operated by the City is provided in the following sections. Figure 1-2 shows the major water system facilities on a map, and Figure 1-6 is a schematic of water system pressure zones and facilities.

1.4.1 SUPPLY SOURCES AND WATER RIGHTS

The City's four water rights are all valid, meaning that they have not been relinquished or abandoned and each is being put to beneficial use with reasonable diligence. The City currently utilizes three sources for regular, daily supply: the Infiltration Gallery, the Silberhorn Wellfield, and the Port Williams Wellfield; the River source remains available. The City's sources and water rights are summarized in Table 1-1. Drinking water supply water right documentation and detailed history are in Appendix H.

Table 1-1 Existing Source and Water Right Summary

Parameter	Dungeness River	Infiltration Gallery	Silberhorn Wellfield	Port Williams Wellfield	Total
DOH Source ID	S01[(1)]	S01[(2)]	S02	S05	
Number and/or Type of Source(s)	Surface Water	Groundwater Collection System, over 20 feet deep	3 Groundwater Wells	Up to 5 Groundwater Wells	
Year(s) Installed	Various, starting in 1919[(3)]	1977 (original gallery in 1954)	1985 and 2010	1995, 1998 and 2009	
Water Right Number, (Priority Date)	Cert. No. 1316 (May 23, 1924) Cert. of Change Vol. 1 pg. 426 (May 24, 1954) Cert. of Change Vol. 1-2 pg. 106 (Sept. 26, 1979)	Cert. No. 2102-A (Feb. 15, 1953) Cert. of Change Vol 1-1 pg. 107, (Sept. 26, 1979)	Cert. No. G2-23856 (June 12, 1975)	Permit No. G2-29239 (June 13, 1995)	
Qa, Annual Water Right (ac-ft)	None specified; diversion of 1.4 cfs = about 1,014 ac-ft annually	1,160	690	1,850[(4)]	4,714
Qi, Instantaneous Water Right (gpm)	628 (1.4 cfs)	718	700	2,250[(5)]	4,296
Total Installed Capacity (gpm)	0	718[(6)]	635[(7)]	1,760[(8)]	3,113
Current Use	Available	Daily Supply	Daily Supply	Daily Supply	

NOTES:
(1) DOH assigned both the River and the Infiltration Gallery with Source ID S01 because the River right can be used to recharge the Gallery. However, the City has been told recently by DOH that the River source will not have a unique number unless or until a surface water treatment facility is constructed. The City does have a long-term plan to construct a surface water treatment facility, as shown in Chapter 8.
(2) The City's WFI should list S01 as the Infiltration Gallery.
(3) The Dungeness River surface water intake headgate has been either independent or shared with Highland Irrigation District at different times since 1922.
(4) The water right permit ROE includes the statement that the annual volume Qa is "Supplemental to existing water rights" (see discussion in Appendix H).
(5) Conditions on withdrawal rate Qi include adaptive management to avoid long-term water level declines and impairing of senior water rights or instream resources.
(6) Infiltration gallery flows by gravity siphon. It is capable of a capacity up to its water right while providing more than sufficient concentration-contact time (CT), as discussed in Chapter 3.
(7) The total production of the Silberhorn Wellfield is limited to 635 gpm by the operational capacity of the pumping system, as discussed further in Chapter 3. The original installed capacity for all three Silberhorn wells was 780 gpm.
(8) Total capacity for three existing wells at Port Williams Wellfield.

1.4.1.1 Dungeness River

The City's first water rights date to 1924, for surface water from the Dungeness River conveyed via the Highland Irrigation District (HID) main canal to the City's Reservoir Road headgate. In 1929, the City built its own headgate for direct, gravity conveyance of River water to the reservoir via a 4.5-mile wood-stave water pipe. The City's diversion was used for several decades but the HID canal has also continued to be used at times, to convey River water to Reservoir Road and/or the City infiltration galleries' intake areas. The River is considered DOH source number S01.

To this day the Dungeness River water is available for City use from either the HID or City's Reservoir Road headgate. As explained in Appendix H, the infiltration gallery is also an additional (alternate) point of diversion for the river water right.

1.4.1.2 Infiltration Gallery

The City relies on water from an Infiltration Gallery built in 1977, which consists of a horizontal collector system made of perforated pipe buried 20-23 feet deep in a gravel filter pack east of the stream bank of the Dungeness River. The perforated pipe feeds a central collection well and water flows by gravity siphon to the City's 420 Reservoir and distribution system. The Infiltration Gallery has been identified as being hydraulically connected to the River but not as groundwater under the influence of surface water. As such, the City is required to disinfect this source by providing a concentration-contact time (CT) of 6 as described in the treatment section of Chapter 3.

The Infiltration Gallery is DOH source number S01, with a capacity to draw the Qi of the water right, 718 gpm.

1.4.1.3 Silberhorn Wellfield

The Silberhorn Wellfield, DOH source number S02, consists of three wells. Specific information on the individual wells is presented in Table 1-2. Currently, the City operates the wells on an alternating basis to equalize wear and tear. During periods of higher demand the City uses two or all three wells simultaneously. The Silberhorn wells are equipped with 40 hp, 460V, 3-phase submersible pumps which were designed with a pumping capacity of 400 gpm at 306 feet total dynamic head (TDH). The City currently operates each of these wells at a reduced pumping rate as shown in Table 1-2. The capacities of Silberhorn Wells No. 2 and 3 shown in the previous Water System Plan were both 260 gpm, but this current plan reports capacities that reflect how the system is currently operated. Operators currently limit flow from each well to maintain a comfortable water level above the well pumps. Each Silberhorn well has a below-grade vault that houses the wellhead and control valve. An onsite control building holds the control equipment, telemetry, chlorination system, and generator. The Silberhorn Wellfield pumps to the City's 1.7 MG reservoir and the 420 Zone. The Silberhorn Wellfield is equipped with a 75 kW standby generator. At least one of the wells is equipped with a pressure transducer for continuous water level monitoring.

Table 1-2 Silberhorn Wellfield

Well Number	DOH Source Number	Development Date	Capacity[3] (gpm)	Depth to First Open Interval (feet)
Silberhorn No. 1	S09	8/4/1975[1]	300	190
Silberhorn No. 2	S06	7/25/1985[2]	170	134
Silberhorn No. 3	S07	8/29/1985	165	132

(1) Well No. 1 redeveloped 3/23/2010.
(2) Well No. 2 redeveloped in 2013.
(3) Capacities are based on March 2015 Gray and Osborne report "Silberhorn Wellfield Capacity Report", although staff have adjusted capacities slightly since then, and the shown capacities are based on current operations. Capacity limitations are due to hydraulic limitations to maintain a sufficient water level above the well pumps. The water level is limiting due to restrictions in the well screens.

1.4.1.4 Port Williams Wellfield

The Port Williams Wellfield, DOH source number S05, currently consists of three wells. Information on the individual wells is presented in Table 1-3. Each well has a 100 hp, 460V, 3 phase submersible pump which was designed with a pumping capacity of approximately 600 gpm at 500-570 feet TDH. The well pump and motor was recently replaced in Wells 1 and 2. Currently, the City operates the wells on an alternating basis to reduce wear and tear on the equipment. During periods of high demand, all three wells can operate simultaneously. At least one of the wells has a pressure transducer for continuous water level monitoring.
The City's water right permit allows for the drilling of up to five wells at the Port Williams Wellfield, and includes several provisions discussed in Appendix H.

The wellfield facilities are constructed such that future wells will pump through the Control Building and will be connected to the 12-inch water main located on Port Williams Road. The Control Building houses the control equipment, telemetry, chlorination equipment, and flow meter. An on-site 200 kW generator is located outside the Control Building. Each well is equipped with an individual flow meter and pump control valve. The wells operate according to the water level in the 1.7 MG reservoir or by pressure in the 350 Zone. The wells pump directly to the 350 Zone. In order to supply the 1.7 MG Reservoir and the 420 Zone, the Port Williams Wellfield operates in tandem with the 5th and McCurdy Booster Station. When the Port Williams Wells are called to operate, the 5th and McCurdy Booster Station is activated. If pressures in the 350 Zone are sufficient, the booster station turns on to allow excess flow from the 350 Zone to be pumped to the 420 Zone and into the reservoir. In 2017 the booster station was improved to add a second pump (lead-lag configuration) and VFD pump controls to maintain appropriate 350 Zone pressure. Total withdrawal from the Port Williams Wellfield is limited to the customer demand in the 350 Zone and the capacity of the 5th and McCurdy Booster Station. Further discussion of operation of the Port Williams Wellfield and the 5th and McCurdy Booster Station is provided later in this chapter.

Table 1-3 Port Williams Wellfield

Well Number	DOH Source Number	Effective Date[1]	Capacity (gpm)	Depth (feet)
Port Williams No. 1	S03	4/12/1996	600	420
Port Williams No. 2	S04	5/21/1999	600	379
Port Williams No. 3	S08	6/23/2009	560	381

(1) Source: DOH Sentry database.

1.4.2 TREATMENT

All three of the City's sources are chlorinated. The Port Williams Wellfield utilizes 12 percent sodium hypochlorite which is injected at the Control Building. Each well has a dedicated metered injection pump which is called to operate when the well is called to run.

The Silberhorn Wellfield utilizes 12 percent sodium hypochlorite which is injected at the onsite Control Building. The metered injection pump is called to operate when one of the wells is called to run. The injection rate must be manually adjusted if the number of wells operating is changed and the rate of flow increases or decreases.

The Infiltration Gallery utilizes 12 percent sodium hypochlorite which is injected at the Infiltration Gallery Control Building. The hypochlorite pump is a metered pump which must be manually adjusted for changes in flow rate.

DOH determined that the Infiltration Gallery source is a groundwater source hydraulically connected to the surface waters of the Dungeness River. Consequently, the City must provide sufficient residual disinfectant concentration (C) and contact time (T), such that the product of C and T, known as CT, equals a minimum of 6 as required by WAC 246-290-451. A CT of greater than 6 is provided in the transmission main from the chlorination injection point at the infiltration gallery before the first customer. An analysis of the capacity to provide CT for the Infiltration Gallery is provided in Chapter 3, System Analysis.

1.4.3 PRESSURE ZONES

The City's water system is divided into six pressure zones to provide adequate service to the customers throughout the service area. The hydraulic grade lines (HGL) of the zones are labeled 350, 420, 480, 500, 680, and 775, which refer to elevations of the HGL above sea level. The HGLs of the 420, 480, and 680 Zones are set by reservoirs. The HGL of the 775 Zone is set by a booster station. The HGLs of the 350 and 500 Zones are set by pressure reducing valve (PRV) stations. All six pressures zones can be seen on Figure 1-6.

The 350 Zone is located in the northern portion of the City's service area and is the largest zone by area. The grade of this zone is set by PRVs from the 420 Zone and by the well pumps at the Port Williams Wellfield and pressure sustaining functionality of the 5th and McCurdy booster pump station.

The 420 Zone spans the width of the City's service area just south of the 350 Zone. The grade of this zone is set by the 420 Reservoir. Water is supplied to the 420 Zone and Reservoir by the Silberhorn Wellfield and the Infiltration Gallery. Supply can also be provided by the 5th and McCurdy booster pumps from the Port Williams Wellfield in the 350 Zone or from the 500 Zone via PRVs.

The 480 Zone is located in the south-central portion of the service area. The HGL is set by the 480 Reservoir, which is supplied by the 480 Booster Station from the 420 Zone. The zone is isolated from the 420 Zone by closed gate valves.

The 500, 680, and 775 Zones are located in the southeast portion of the City and serve the Solana development. Two booster stations, a reservoir, and multiple PRVs were constructed in association with this development. The 680 Zone Booster Station pumps from the 420 Zone to the 680 Zone and the Solana Reservoir. The 775 Booster Station pumps from the 680 Zone to the 775 Zone. The 500 Zone is supplied by a PRV from the 680 Zone.

1.4.4 PRV STATIONS

The City's water system is equipped with nine PRV stations that allow water to enter lower pressures zones from higher pressure zones. The majority of these stations are equipped with two valves of different sizes. The smaller valve is set to open first and provide for small or moderate demands. The larger valve is set to open if a large demand such as a fire occurs and the smaller valve cannot provide sufficient flow. Further discussion of the City's PRVs is included in Chapter 6, Operations and Maintenance.

1.4.5 STORAGE

The City currently owns and operates three reservoirs totaling 2.9 MG of active storage. The City also has a 0.5 MG ground level reservoir that is currently inactive. This reservoir would require significant rehabilitation prior to any future use. The 420 Reservoir has a capacity of 1.7 MG and serves the 420 Zone. The 480 Reservoir has a capacity of 0.2 MG and serves the 480 Zone. The Solana Reservoir has a capacity of 1 MG and serves the 680 Zone. The 480 and 420 Reservoirs, along with the 480 Booster Station and the out of service 0.5 MG reservoir are located on the same site. Table 1-4 summarizes the City's reservoirs.
The 420 Reservoir is supplied with water from the Silberhorn Wellfield and the infiltration gallery. Water in this reservoir provides storage for the 420 Zone and also provides water to the 350 Zone through PRVs. It also supplies water to the 480 Booster Station, which feeds the 0.2 MG Reservoir and the 480 Zone.

The Solana Reservoir is served by the 680 Booster Station, which was constructed as a part of the Solana development. The Solana Reservoir provides storage for the 680 Zone, serves the 775 Zone by a booster station and serves the 500 Zone, 420 Zone and 350 Zone by cascading PRVs.

Table 1-4 System Reservoir Information

Name	Material	Construc-tion Date	Overflow Elevation (ft)	Diameter (ft)	Height (ft)	Volume (gal)
0.2 MG 480 Reservoir	Concrete	1986	481	26	51	200,000
1.7 MG 420 Reservoir	Steel	1995	420	100	29	1,700,000
1.0 MG 680 Solana Reservoir	Steel	2008	680	100	18	1,000,000
					Total	2,900,000

1.4.6 BOOSTER STATIONS

The City currently owns and operates four booster stations. These stations are the 480 Booster Station (on Reservoir Rd), the 5th and McCurdy Booster Station, the 680 Booster Station (Solana) and the 775 Booster Station (Solana). The City's booster stations are used to move water between pressure zones. Table 1-5 summarizes the City's booster stations.

The 480 Booster Station is located at the 420 Reservoir site and pumps water from the 420 Reservoir to the 480 Reservoir and the 480 Zone. This booster station contains two centrifugal close coupled 5 hp pumps each, with a total pumping capacity of 150 gpm at 86 feet TDH (both pumps running).

The City's 5th and McCurdy Booster Station is located near the corner of 5th Avenue and McCurdy Street. The 5th and McCurdy Booster Station pumps water from the 350 Zone to the 420 Zone. The booster station has two 10 hp, 480V, 3 phase submersible pumps mounted with pitless adaptors. The station's pumping capacity is approximately 580 gpm at 95 feet TDH. The 5th and McCurdy Booster Station is used when supply from the Port Williams Wellfield exceeds the demands in the 350 Zone. The booster station allows excess supply to be stored in the 420 reservoir or used in the 420 Zone. Pump controls with VFDs control the booster pumps, and maintain a set pressure in the lower zone by increasing or decreasing pump speed, or turning the lead pump on or off or adding the lag pump if needed, to maintain the lower zone pressure. The booster station is called to operate when the Port Williams Wellfield is called, however, if the PRVs at 5th Avenue and McCurdy Street are open allowing flow from the upper zone to the lower zone, the booster pump will not run.

The City's 680 Booster Station is located on Simdars Road and was constructed to supply the Solana development. The 680 Booster Station pumps water from the 420 Zone to the 680 Reservoir. It is equipped with three vertical multistage booster pumps, each with a capacity of 225 gpm at 377 TDH.

The City's 775 Booster Station is located on the Solana Reservoir Site and supplies the 775 Zone. The 775 Zone is a closed zone – pressure within the system is provided by pumps and not reservoir levels. It is equipped with one low flow domestic pump, one high flow domestic pump and two fire pumps.

Table 1-5 System Booster Station Information

Name	From Zone	To Zone	Capacity	Head	Motor hp	Standby Power
5th and McCurdy Booster Station	350	420	290 gpm 290 gpm	95 ft 95 ft	10 hp 10 hp	Diesel Generator
480 Booster Station	420	480	75 gpm	86 ft	5 hp	Diesel Generator
			75 gpm(1)	86 ft	5 hp	
680 Booster Station	420	680	225 gpm	377 ft	30 hp	Propane Generator
			225 gpm	377 ft	30 hp	
			225 gpm(1)	377 ft	30 hp	
775 Booster Station	680	775	37 gpm	130 ft	2 hp	Propane Generator
			255 gpm	130 ft	15 hp	
			1000 gpm	130 ft	50 hp	
			1000 gpm(1)	130 ft	50 hp	

(1) Standby pump.

1.4.7 INTERTIES

The City water system currently has no interties with other water purveyors. Potential interties will be investigated and developed when possible with bordering water purveyors. Interties can provide systems with redundant supply if a system's sources are out of service.
Interties are possible with the Clallam County PUD's Evergreen Water System and with the Resort & Marina Water System. The Evergreen Water System is located south of the City and serves Bell Hill as well as the region west of Bell Hill in Happy Valley. The Resort & Marina Water System serves John Wayne Marina, seasonal users adjacent to the marina, and a small number of permanent residential connections at the far eastern city limits.

The City has identified several CIP items (described in Chapter 8) for piping installation projects that will accommodate future interconnections between the City and these two water systems. For the PUD, a connection is anticipated in the Solana area which will allow the City to serve the Miller Road area as well as the Emerald Highlands area. This will require the wheeling of water through the PUD system. Interties with PUD will be negotiated per the 1995 Agreement between the City and PUD. For the Resort & Marina Water System, a future intertie is anticipated when water mains from the City reach the boundary. The Resort & Marina Water System Plan anticipates connections along West Sequim Bay Road and along Washington Harbor Loop.

1.4.8 DISTRIBUTION SYSTEM

The City distribution and transmission system consists of pipe, ranging in size from 2 inch to 16-inch in diameter, as enumerated in Table 1-6.

Table 1-6 System Pipe Lengths and Size

Pipe Diameter (inches)	Approximate Length of Pipe in System (lineal ft.)
4 inch and smaller	21,691
6 inch	64,848
8 inch	171,782
10 inch	65,003
12 inch	70,098
16 inch	1,958
Unknown diameter	9,833
Total	**405,213**

(1) Date: April 2022. Source: City of Sequim GIS.

1.5 ADJACENT PURVEYORS

The City's adjacent water purveyors are shown on Figure 1-7. Table 1-7 summarizes the names and pertinent water system information for these systems. The City's adjacent purveyors include both Group A and Group B systems. Additional information on these adjacent purveyors is included in Appendix D.

Table 1-7 Adjacent Water Purveyor Information

Water System Name	DOH ID	Current Active Connections	Source Capacity (gpm)	Storage Capacity (gal)	In City/ UGA/ Outside UGA
Battelle NW Marine Lab	10351	4	100	26,000	UGA
Baywood Village Mobile Home Park	36754	52	14	10,000	Outside UGA
Deytona	19184	28	72	0	UGA
Flaura's Acres HOA	25600	53	115	0	UGA
Foxfire Lane	196893	9	30	0	UGA
Happy Valley Estates	30975	17	42	65,000	Outside UGA
Huffman Water System	00805	18	20	27,000	Outside UGA
Lee Water System	46658	86	130	22,030	Outside UGA
Palo Verde	02315	16	70	0	UGA
PUD Evergreen	24181	720	715	444,000	City/UGA/ Outside UGA
Sequim Bay Resort and Marina (Wayne)	36421	32	120	150,000	City

Sequim Elks Lodge #2642	03645	22	50	0	City
Sun Meadows HOA	04511	118	245	130,000	Outside UGA
Sunland Water District	85260	891	1,100	240,000	Outside UGA
Trowbridge Court Condo Association	00339	16	60	0	UGA
Vista Water System	58144	122	527	157,000	UGA
West Sequim Bay	54192	114	90	60,000	Outside UGA

1.6 SERVICE AREA

In accordance with the Washington State Municipal Water Law (MWL), the City is required to designate a "Service Area", a "Retail Service Area", and as applicable, areas that are potential wholesale service areas. DOH defines the first two of these areas:

Service area. The service area includes all of the following.

- The specific area in which the water system currently makes direct service connections available.
- The service area of other public water systems to which wholesale water is provided through a permanent or seasonal intertie.
- Areas planned for future water service.

Retail service area. A Retail Service Area includes the area for which the water system accepts a duty to serve. It includes the properties of all existing direct services and clustered entities, parcels that the system has an obligation to serve, and parcels that the system accepts a duty to serve. A water system is not required to provide service outside of its Retail Service Area. However, a water system may provide service outside of its RSA if its policies permit it.

The City currently serves customers within its city limits, with the exception of areas served by either the PUD, Sequim Elks Lodge 2642, or by the Marina Water System. In the future the City plans to serve is its current UGA boundaries as well as perhaps some adjacent areas outside the current UGA which it is logical for the City to serve, if requested and requirements are met for either direct or wholesale service. In addition, future service may be provided by the City to areas outside the UGA currently served by other water purveyors, if requested and requirements are met for either direct or wholesale service. A map of service areas for the City can be found on Figure 1-7. A description of these areas is detailed in the following section.

1.6.1 RETAIL SERVICE AREA

The City acknowledges that it has a duty to serve all new connections within its designated retail service area. The retail service area must include areas of existing service and areas where new service will be provided. The City defines the extent of its retail service area as the current city limits less the service areas of the Marina Water System and the Sequim Elks Lodge 2642. The

City and PUD have an Intergovernmental Water Service Area Agreement that defines policies for service between the two water systems. Appendix C contains the Intergovernmental Water Service Area Agreement.

The Intergovernmental Water Service Area Agreement, section 1.2, says "As areas are annexed into the City during the term of this Agreement, the service area boundary shall be reviewed by representatives of each party hereto…". The 2014 City of Sequim Water System Plan's retail service area differs from the retail service area shown in the current Figure 1-7, primarily with regards to areas on the south end of the City that were previously shown as outside the retail service area but inside the City limits. The current Figure 1-7 has been adjusted to align the retail service area with the City limits. The City recognizes that providing service to these areas will require development of a new, higher pressure zone for the City's system, fed by a new booster pump system and perhaps eventually a new water reservoir. These improvements are discussed in Chapter 3 and Chapter 8 – Capital Improvement Plan. The current Water System Plan provides the opportunity for review by each party per section 1.2 of the Agreement.

While the City has a duty to serve new connections within the Retail Service Area, there are five threshold factors that must be met prior to providing service. These are:

1. The City has sufficient water rights to provide service.
2. The City has sufficient capacity to serve water in a safe and reliable manner.
3. The service request is consistent with adopted local plans and development regulations.
4. Service can be provided in a timely and reasonable manner.
5. Service can be provided in accordance with City policies, specifications, and standards.

1.6.2 Service Area

The City's service area includes the UGA and adjacent areas where the City may provide logical service in the future if the UGA is expanded. The City intends to provide water service to new developments within the UGA in areas that are not served by other purveyors. The UGA boundary extends beyond the city limits in many locations surrounding the City. Portions of the UGA areas outside of the current city limits are served by the PUD. Several smaller water systems also serve within the UGA but outside the city limits. The City may acquire water systems when the area they serve becomes annexed to the City.

Service to the City's service area will be governed by the 1995 Agreement with the PUD states that "as areas are annexed into the City during the term of this Agreement, the service area boundary shall be reviewed by representatives of each party hereto, and appropriate adjustments made." The Agreement also states that as areas where the PUD currently does not serve are annexed into the City, the City will decide whether to provide service or will authorize the PUD to do so in the future. In addition, this agreement states that the City has the option to give notice to the PUD of the City's intent to assume service of areas serviced by the PUD within the city limits existing at the date of the agreement.

Decisions on whether to acquire other water systems will be made on a case-by-case basis at the request of the water system. For areas not served by the PUD, adoption of this Water System Plan defines the following guidelines the City will apply in deciding whether to acquire existing water systems:

- Acquisition must be requested by the water system, the Washington State Department of Health, or the Clallam County Health Department.
- The water system must meet the City's standards. If improvements are required in order to meet the City's standards, they will be funded by the water system requesting acquisition.
- A hydraulic analysis, funded by the water system requesting acquisition, must be completed to further identify any required improvements, and this hydraulic analysis may result in the need for the water system requesting acquisition to finance improvements to the City of Sequim's water system.
- Payment of the City's General Facilities Charge may be required, and will be evaluated on a case-by-case basis.
- Annexation into the City is required if applicable.

The City's draft Satellite Water System Program (Satellite Management Agency Program) was included as Appendix D in the Water System Plan approved in 2014 and can be accessed if needed.

1.6.3 WHOLESALE SERVICE AREA

A wholesale service area is an area where a water purveyor provides water to other water purveyors through an intertie. The City does not currently provide wholesale service to any other water systems; however, in the future there may be the opportunity to provide wholesale service to other systems through future interties. Adjacent purveyors, upon request, may be considered for wholesale service. Figure 1-7 shows logical potential wholesale customers. The Marina Water System is a case where either acquisition or wholesaling is possible, although discussions have primarily focused on acquisition of this system when City water mains reach the Marina System boundary.

1.7 SERVICE AREA AGREEMENTS

In addition to the service area acquisition procedure described above, the 1995 Agreement describes the wholesaling and wheeling of water between the City and PUD, purchase prices for transfers of facilities between the City and PUD, and standards for PUD service within the City's existing city limits and UGA. The Agreement may be terminated by either party after the tenth year of the Agreement and at 5-year intervals thereafter.

The City also has a service extension review process agreement with Clallam County to ensure orderly development of the unincorporated Sequim Urban Growth Area. Appendix C contains a copy of the Agreements with Clallam County PUD and the SERP with Clallam County.

1.8 ZONING AND FUTURE LAND USE

Existing zoning within the city limits is presented in Table 1-8. Zoning is shown in Figure 1-8. This data was obtained from the City's current Zoning map. Appendix E includes the City's future land use map and further information on planned and potential development.

Table 1-8 City of Sequim Zoning Classifications Summary

Zoning Description	Total (Acres)	Percent of Total
REGIONAL COMMERCIAL	112	3.2%
SINGLE FAMILY RESIDENTIAL	2,357	67.3%
PLANNED RESORT COMMUNITY	167	4.8%
NEIGHBORHOOD BUSINESS	8	0.2%
LIFESTYLE DISTRICT	293	8.4%
HIGH TECH. LIGHT INDUSTRIAL	47	1.3%
HEAVY COMMERCIAL / WAREHOUSE	30	0.9%
HIGHWAY COMMERCIAL	27	0.8%
ECONOMIC OPPORTUNITY AREA	140	4.0%
DOWNTOWN MIX USE II	42	1.2%
DOWNTOWN MIX USE I	75	2.1%
DOWNTOWN CORE	34	1.0%
COMMUNITY BUSINESS	129	3.7%
BYPASS	0	0.0%
AGRICULTURAL CONSERVANCY	40	1.1%
Total:	**3,501**	**100.0%**

Source: City of Sequim staff, May 16, 2022

1.9 SERVICE AREA POLICIES AND CONDITIONS OF SERVICE

The City's 2015 Comprehensive Plan Update and the City of Sequim Municipal Code (SMC) identifies policies related to the City's water system. The DOH has established a list of policies that should be addressed in a water system comprehensive plan. Table 1-9 provides a listing of these policies, definitions, associated City policies, and sources.

Table 1-9 City of Sequim Service Area Policies

Policy Name	Policy Description	City Policy	Source
Wholesaling of Water	Conditions which must be met to obtain a wholesale agreement included in the conditions of service for wholesaling of water.	Not currently applicable, but allowable with PUD in future per 1995 Agreement with PUD. Would require development of a new interlocal agreement for wholesale with other purveyors.	2022 Water System Plan, 1995 Sequim/PUD Agreement
Wheeling of Water	Conditions met for water wheeled to another system, i.e., compatible water quality, engineering, etc.	Wheeling will be considered between Sequim and PUD per the 1995 Agreement. This would require the development of a wheeling agreement between the systems following the wheeling principals of the 1995 agreement. Wheeling with other purveyors, such as the Marina Water System and the West Sequim Bay Water System will be governed by new agreements specific to those arrangements.	2022 Water System Plan, 1995 Sequim/PUD Agreement
Intertie Policy	Construction of interties between systems requires DOH approval and an intertie agreement between connected systems.	The 1995 Agreement provides for the development of interties between PUD and the City if determined to be in both system's best interests as determined by written concurrence. Interties with other purveyors would require development of new agreements.	2022 Water System Plan, 1995 Sequim/PUD Agreement

Table 1-9 City of Sequim Service Area Policies (Cont.)

Policy Name	Policy Description	City Policy	Source
Annexation Policy	How City annexation relates to the provision of water service.	Annexation or no-protest agreement required to connect to system. If City annexes area with existing PUD customer, City has discretion whether to require connection. Assume ownership of the water system infrastructure serving the property upon annexation unless provided otherwise by an existing contract for services.	SMC 13.72.025; 1995 Sequim/PUD Agreement
Direct Connection	Connection of new developments directly to existing water system.	All new developments within the city limits and UGA shall connect to the existing City or PUD water system.	2022 Water System Plan; 1995 Sequim/PUD Agreement
Satellite Management Agency Program	Ownership, service and assistance provided to systems not directly connected to the City's water system.	The City will not allow new satellite systems within the City's UGA. The City may consider providing satellite management for systems outside the UGA if the conditions of the City's Satellite Management Policy are met.(1)	City of Sequim Draft Satellite Management Program, Appendix D of 2014 Water System Plan
Surcharge for Outside Customers	City's surcharge for customers outside corporate limits.	Customers outside city limits pay a 50% surcharge on monthly water rates.	SMC Chapter 13.72 and 13.84.040
Design and Performance Standards Policy	Minimum design and performance standards for new development.	All development shall conform to the City's Streets and Utilities Development Regulations and Design Standards.	City of Sequim Utilities Development Regulations are referred to in Chapter 7 of the 2022 Water System Plan. City Design Standards are included in Appendix F.

Table 1-9 City of Sequim Service Area Policies (Cont.)

Policy Name	Policy Description	City Policy	Source
Urban Growth Areas	Responsibility of service is provided in UGA, how provided, and how financed.	Water service will be available and service extensions allowed to customers outside the city limits and within the UGA if development meets the land use plan density requirements, and development is consistent with land use policies and requirements of the City's Comprehensive Plan; Costs of water system extensions associated with new development shall be paid for by the developers.	2022 Water System Plan; SMC Chapter 13.72.025
Late-Comer Agreements	Policy on allowing latecomer agreements for those who propose to extend the water system, and provisions of pay back.	Evaluated on a case-by-case basis.	2022 Water System Plan; SMC 13.72.025F and 13.98
Oversizing Policy	City provides funds to install larger than needed facilities to allow for future development, if needed.	Evaluated on a case-by-case basis.	2022 Water System Plan
Cross-Connection Control Program	Policy on regulations of cross-connections, including steps taken if a cross-connection is discovered.	See Appendix F and Appendix J	City of Sequim Cross Connection Control Program, SMC 13.120 and Ord. 2012-013

Table 1-9 City of Sequim Service Area Policies (Cont.)

Policy Name	Policy Description	City Policy	Source
Extension Policy	Policy regarding extension of the system, including identity of responsible party. Design standards and payment included in conditions of service.	Plans for extensions must be approved by the City. All costs of line extensions are paid by the user, including construction, inspection, and City costs. Extensions of service in city limits and UGA have priority over extensions outside UGA except in cases of risk to public health.	SMC Chapter 13.72.025, 13.76.010 and 13.100
Duty To Serve	Per Municipal Water Law the City has a requirement to provide service within the retail service area.	Retail service area is defined and five threshold criteria must be met before service can be provided.	2022 Water System Plan
Connection Fees and General Facilities Charges	Connection fees and general facilities charges are collected when new connections to the system are made to cover the value of existing infrastructure.	The City sets connection fees and general facilities charges by ordinance based on financial analysis.	SMC Chapter 13.72

(1) The City has no formal Satellite Management Program or Policies, but a draft is included in Appendix D of the 2014 Water System Plan.

1.9.1 APPLICATIONS FOR NEW SERVICE

Applications for new water service from the City must meet the City's requirements as outlined in Sequim Municipal Code (SMC) Chapter 13.12. The applicant is required to submit an application in writing that contains the required information including the location of the property, the owner of the property, the address of the party paying the water bill, the size of service necessary and the purpose for which the water will be used. The applicant's service will be reviewed per the five threshold criteria presented for retail service and the City will make a determination to accept or reject the application within 30 days. If an application is rejected the applicant can appeal that decision to the City Council.

1.10 CONSISTENCY PLANNING AND PUBLIC NOTIFICATION

1.10.1 CONSISTENCY PLANNING WITH CLALLAM COUNTY

This plan has been submitted to Clallam County officials for review to ensure that the Plan is in agreement with County growth and management policies. A signed consistency checklist is available in Appendix A.

1.10.2 PUBLIC NOTIFICATION

The Plan is being made available for public comment and also made available to all adjacent water purveyors in summer 2022. The Plan is available on the City's website, and hardcopies can be available at Sequim Civic Center. Transmittal letters to adjacent purveyors as well as to DOH, and any comments received, are included in Appendix O.

1.11 RELATED PLANNING DOCUMENTS

The following documents were consulted in the preparation of this Water System Comprehensive Plan:

City of Sequim, City of Sequim Official Zoning Map, May 2017
This document was used to obtain the City's current Zoning designations.

Northwestern Territories, Inc., Sequim Bay Resort & Marina Water System, Water System Plan, May 5, 2015
This document provides information on the Sequim Bay Resort and Marina Water System (Resort and Marina System). This water system plan provides descriptions of the existing system as well as future expansion plans. The plan is written to account for the eventual transfer of water system ownership over to the City of Sequim. The Resort and Marina System is owned by the John Wayne Family and is described in further detail in the adjacent purveyors section.

Murray, Smith, & Associates, Inc., Public Utility District No. 1 of Clallam County Water System Plan, April 2017
This document provides information on the Clallam County PUD No. 1 Evergreen Water System. This water system plan provides descriptions of the existing system as well as future expansion plans.

Pacific Groundwater Group, Construction, Testing and Recommended Operation Port Williams Well #3, March 2008
This document presents a completion report for the third well at the Port Williams Wellfield. It includes information such as well logs, aquifer testing, well yield assessment and recommended well operation.

Gray & Osborne, Inc., City of Sequim Water System Plan, adopted in 2014
This document presents the City's last Water System Plan. Much of the reference documentation in the current Plan was taken from the 2014 Water System Plan.

City of Sequim, City of Sequim Comprehensive Plan Update, October 2018
This document was used to obtain the City's Urban Growth Area boundary and Optimum Land Use Map.

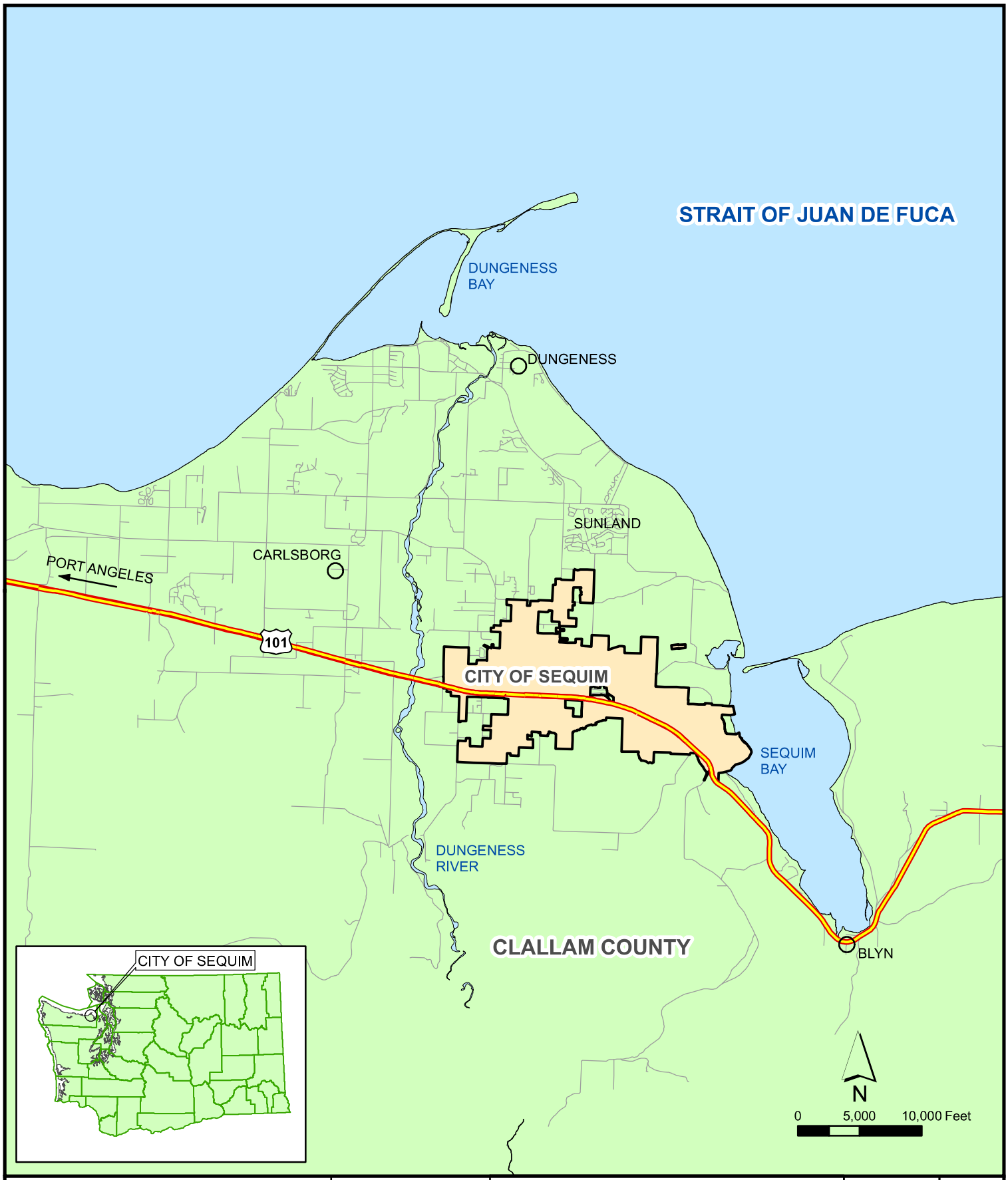
Gray & Osborne, Inc., City of Sequim Wastewater Plan, 2014
This document presents the planning efforts for the City's wastewater facilities for the future. The City has a Class A Water Reclamation Facility that provides irrigation water (and other minor uses) to various facilities throughout the City.

Gray & Osborne, Inc., Water System Improvements 1999, Operation and Maintenance Guides, Vol. I, 1999
This document provides operation and maintenance information for Port Williams Wells No. 1 and No. 2, the 5th and McCurdy Booster Station, the 1.7 MG reservoir, and the 3rd Avenue PRV Station. A general operations description, Port Williams well logs, short-term water use permit for Port Williams Well No. 1 and Well No. 2, and product information are provided.

Gray & Osborne, Inc., Silberhorn Wellfield Capacity Report, March 2015
This document investigates the Silberhorn Wellfield capacity and provides recommendations.

Gray & Osborne, Inc., Port Williams Low Level Reservoir Feasibility Study, December 2015
This document assesses the feasibility of a new reservoir to provide storage for the 350 pressure zone and the management of the Port Williams wellfield.

Robinson Noble, Inc., City of Sequim Groundwater Resources Options Study, February 2020.
This document investigates potential groundwater sources for water supply development.



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CITY OF SEQUIM

CLALLAM COUNTY WASHINGTON

2021 WATER SYSTEM PLAN

FIGURE 1-1

LOCATION MAP

DATE	SHEET
JUNE 2022	1
SCALE 1:124,000	OF 1
JOB NUMBER 2021-016	

PORT WILLIAMS WELL FIELD

SILBERHORN WELL FIELD

350/420 BOOSTER STATION

0.2 MG RESERVOIR

1.7 MG RESERVOIR

0.5 MG RESERVOIR (NOT IN SERVICE)

480 BOOSTER STATION

INFILTRATION GALLERY TRANSMISSION MAIN

SOLANA RESERVOIR & 775 BOOSTER STATION

680 BOOSTER STATION

SEQUIM BAY

N

0 1,000 2,000 Feet

LEGEND:

- Ⓑ BOOSTER STATION
- PRV
- RESERVOIR
- Ⓦ WELL
- HYDRANT

WATERLINES

PIPE SIZE

- UNKNOWN
- 2"
- 4"
- 6"
- 8"
- 10"
- 12"
- 16"
- VALVE
- CITY LIMITS
- URBAN GROWTH AREA
- RETAIL SERVICE AREA
- SERVICE AREA
- PARCELS

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DESIGNED BY	DRAWN BY	CHECKED BY
BMS	RDN	-

CITY OF SEQUIM
WASHINGTON
CLALLAM COUNTY
2021 WATER SYSTEM PLAN
FIGURE 1-2
WATER SYSTEM BASE MAP

DATE	SCALE	PROJECT
JUNE 2022	AS SHOWN	2020-016

SHEET 1 OF 1

Date: 6/15/2022 Document Name: [FIG_1-2_SYSTEM_BASE_MAP Document Path: W:\2020\2020-016 City of Sequim Utility Consult\Cad\5 - WSP Update\GIS\Projects\FIG_1-2_SYSTEM_BASE_MAP.mxd

N

0 1,000 2,000 Feet

SEQUIM BAY

LEGEND

- CITY LIMITS
- URBAN GROWTH AREA
- RETAIL SERVICE AREA
- PARCELS
- 10 FOOT CONTOURS (Source: Puget Sound LIDAR Consortium (PSLC))

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DESIGNED BY BMS	DRAWN BY RDN	CHECKED BY -	
CITY OF SEQUIM		WASHINGTON	
CLALLAM COUNTY	2021 WATER SYSTEM PLAN FIGURE 1-3 TOPOGRAPHY		
DATE JUNE 2022	SCALE AS SHOWN	PROJECT 2020-016	
SHEET 1	OF 1		

Date: 6/13/2022 Document Name: FIG_1-3_TOPOGRAPHY
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Soil information from
Natural Resources Conservation Service,
United States Department of Agriculture,
Soil Survey Geographic (SSURGO)
Database for Clallam County, WA.
Available online at
https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx
(Accessed 8/27/2021)

LEGEND

- ROADS
- URBAN GROWTH AREA
- CITY LIMITS
- RETAIL SERVICE AREA

SOILS	NAME
1	Agnew silt loam
10	Catla gravelly sandy loam
11	Catla-Hoypus complex
12	Clallam gravelly sandy loam
13	Clallam gravelly sandy loam
16	Dick loamy sand
17	Dungeness silt loam
23	Hoypus gravelly sandy loam
25	Hoypus gravelly loamy sand
3	Beaches
34	Louella gravelly loam
4	Bellingham silty clay loam
42	McKenna gravelly silt loam
43	Mukilteo muck
6	Carlsborg gravelly sandy loam
63	Sequim very gravelly sandy loam
64	Sequim-McKenna-Mukilteo complex
7	Carlsborg-Dungeness complex
75	Yeary gravelly loam
76	Yeary gravelly loam
9	Cassolary fine sandy loam
W	Water

SEQUIM BAY

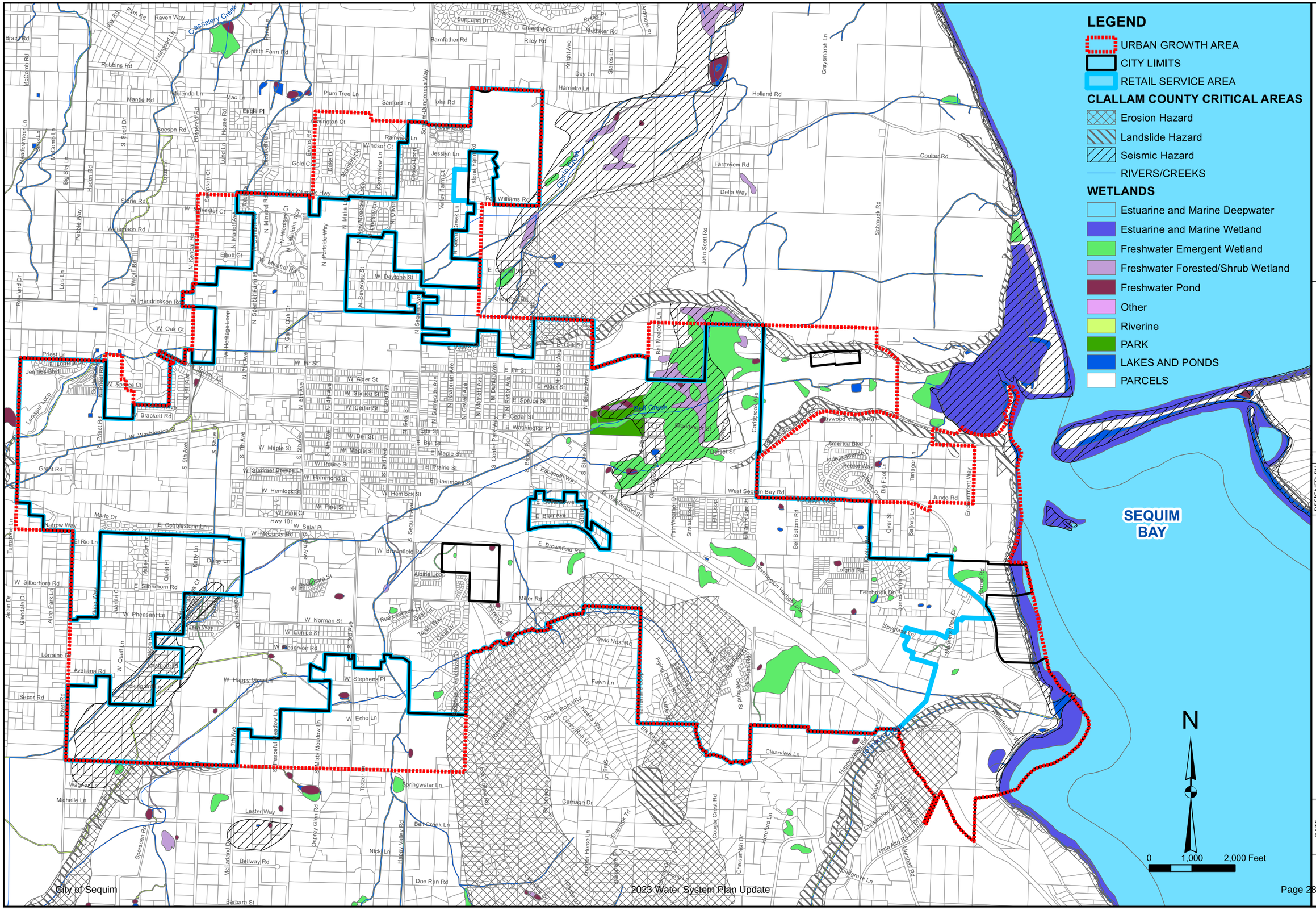
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CITY OF SEQUIM
WASHINGTON
CLALLAM COUNTY
2021 WATER SYSTEM PLAN
FIGURE 1-4
SOIL CLASSIFICATION MAP

DATE JUNE 2022	SCALE AS SHOWN	PROJECT 2020-016	
SHEET 1	OF 1		



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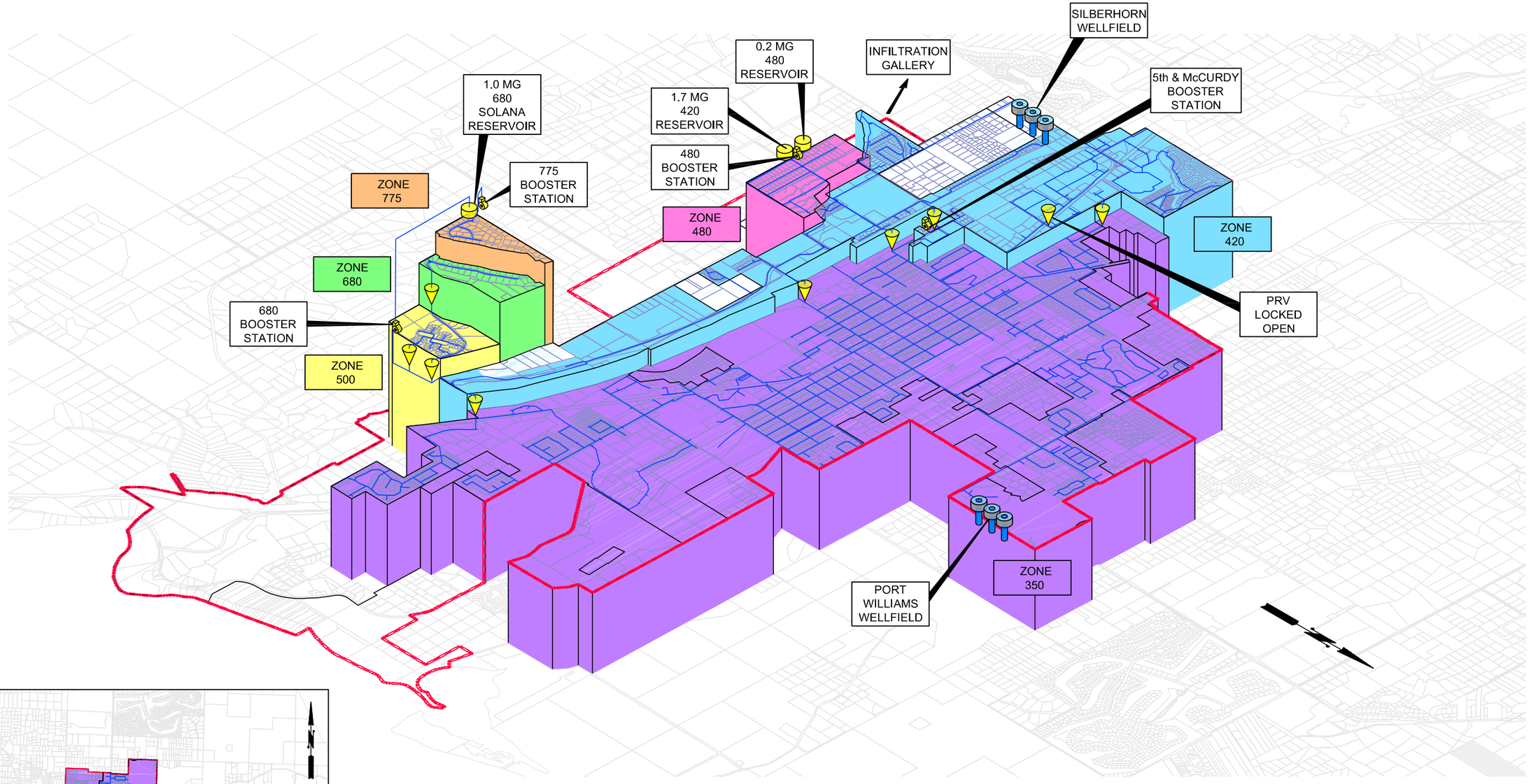
CITY OF SEQUIM

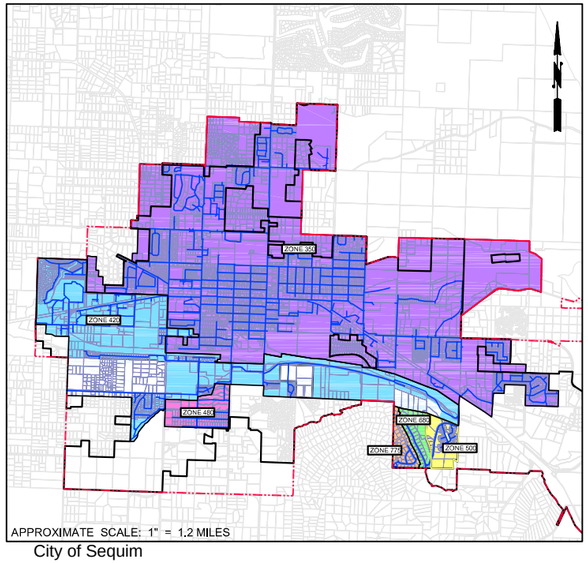
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CITY OF SEQUIM
WASHINGTON
CLALLAM COUNTY
2021 WATER SYSTEM PLAN
FIGURE 1-5
SITE SENSITIVE AREAS

DATE JUNE 2022	SCALE AS SHOWN	PROJECT 2020-016

SHEET 1 OF 1





SOURCES	CAPACITY (gpm)	ZONE
Port Williams 1	600	350
Port Williams 2	600	350
Port Williams 3	560	350
Silberhorn 1	300	420
Silberhorn 2	170	420
Silberhorn 3	165	420
Infiltration Gallery	718	420

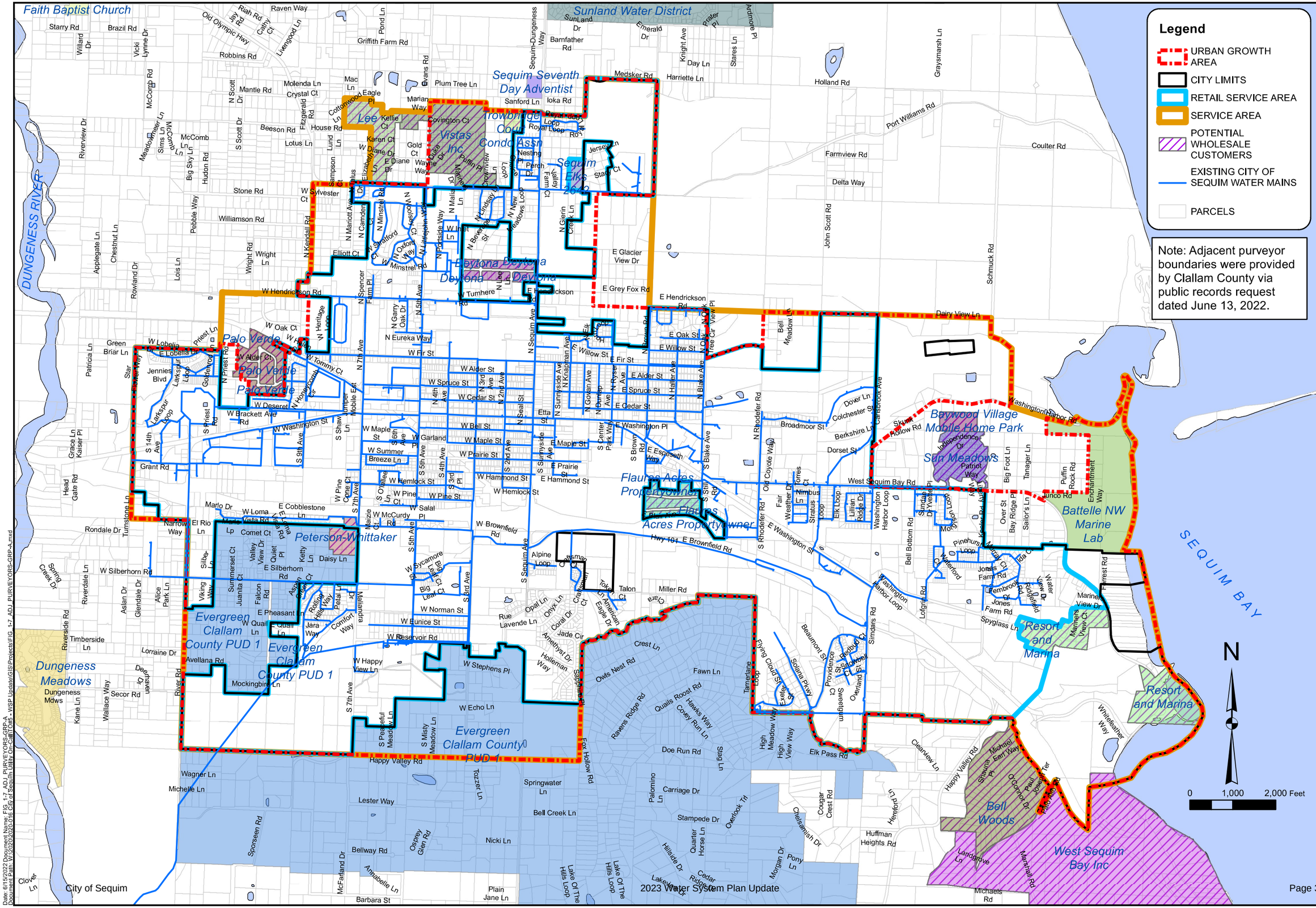
STORAGE FACILITY	CAPACITY (G)	HGL (ft)
420 Reservoir	1,700,000	420
480 Reservooir	200,000	480
Solana Reservoir	1,000,000	680

LEGEND

- RESERVOIR
- WELL
- BOOSTER STATION
- PRV
- WATER MAIN
- URBAN GROWTH AREA
- CITY LIMITS

CITY OF SEQUIM

2022 WATER SYSTEM PLAN
FIGURE 1-6
WATER SYSTEM SCHEMATIC



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LEGEND

CITY LIMITS
URBAN GROWTH AREA
RETAIL SERVICE AREA
SERVICE AREA
PARCELS

ZONING

AGRI- CON
BYPASS
CB
DC
DMU-I
DMU-II
EOA
HC
HC/W
HTLI
LD
NB
PRC
R4-8
RC
Ocean

	Zoning Description
AGRI- CON	AGRICULTURAL CONSERVANCY
BYPASS	BYPASS
CB	COMMUNITY BUSINESS
DC	DOWNTOWN CORE
DMU-I	DOWNTOWN MIX USE I
DMU-II	DOWNTOWN MIX USE II
EOA	ECONOMIC OPPORTUNITY AREA
HC	HIGHWAY COMMERCIAL
HC/W	HEAVY COMMERCIAL / WAREHOUSE
HTLI	HIGH TECH. LIGHT INDUSTRIAL
LD	LIFESTYLE DISTRICT
NB	NEIGHBORHOOD BUSINESS
PRC	PLANNED RESORT COMMUNITY
R4-8	SINGLE FAMILY RESIDENTIAL
RC	REGIONAL COMMERCIAL

N

0 1,000 2,000 Feet

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CITY OF SEQUIM

DESIGNED BY BMS | DRAWN BY RDN | CHECKED BY -

CITY OF SEQUIM
WASHINGTON
2021 WATER SYSTEM PLAN
FIGURE 1-8
CURRENT ZONING MAP

DATE JUNE 2022 | SCALE AS SHOWN | PROJECT 2020-016

SHEET 1 OF 1

Date: 6/13/2022 Document Name: FIG 1-8 11X17 CURRENT ZONING
Document Path: W:\2020\2020-016 City of Sequim Utility Dev Code - WSP Update\GIS\Projects\FIG 1-8 11X17 CURRENT ZONING.mxd

Chapter 2
BASIC PLANNING DATA

2.1 INTRODUCTION
Basic planning data essential for the assessment of the City's water demands are presented in this chapter. Information is included regarding historical growth and water demands, population projections based on growth rates established in the City's 2015-2035 Comprehensive Plan, and water demand projections. In general, the City's Comprehensive Plan anticipates 2% annual population growth over the next 20 years. Information presented in this chapter is used to evaluate the capacity of the existing system and determine future needs based on foreseeable demographic trends for the next 20 years.

2.2 EXISTING SERVICES, POPULATION, AND WATER DEMAND

2.2.1 TOTAL SERVICE CONNECTIONS
The City's total number of active service connections as of the end of 2021 was approximately 2,924 These connections represented 5,133 total units. Historical connections and units data are presented in Tables 2-1 and 2-2, respectively.

Table 2-1 City of Sequim Active Service Connections at Year End

Category	2013	2014	2015	2016	2017	2018	2019	2020	2021
Single Family Residential	1779	1814	1868	1920	2020	2138	2234	2290	2365
Multi Family Residential	52	49	49	49	55(2)	55	55	55	55
Commercial	343	340	340(1)	339	336	333	337	336	340
Hotel, Motel and RV Park	10	10	12	11	12	11	11	11	10
Public	29	30	29	28	28	28	29	29	28
Irrigation	120	114	114	109	111	114	108	95	126
Standby(3)	47	45	39	32	39	39	29	25	30
Total Active Accounts (4)	2333	2357	2412	2456	2562	2679	2774	2816	2924

(1)Commercial additional unit charge eliminated (drop of >150 commercial units in 2015, seen in Table 2-2)
(2)Reclassified adult care from commercial to multi-family (6 accounts, but increase of >350 units in 2017, seen in Table 2-2)
(3)Standby connections are those that have been temporarily shut off, either by request of the customer or by the City for non-payment
(4)The City also has 5 connections for reclaimed water used for irrigation, produced by the City's Water Reclamation Facility and completely separate from the City's potable water system

Table 2-2 City of Sequim Units[5] at Year End

Category	2013	2014	2015	2016	2017	2018	2019	2020	2021
Single Family Residential [1]	1964	2002	2033	2094	2176	2291	2385	2450	2578
Multi Family Residential [2]	1228	1212	1212	1206	1565	1580	1580	1580	1580
Commercial	491	497	333	333	333	334	334	382	386
Hotel/Motel RV	422	422	422	444	444	444	444	444	444
Public	29	30	30	28	27	27	27	27	27
Irrigation	89	102	101	99	99	99	101	103	126
Standby[3]	32	33	30	22	18	19	20	21	30
Total Active Accounts [4]	4223	4265	4131	4204	4644	4775	4871	4986	5141

(1) Single-family residential units include duplexes
(2) Multifamily residential units include any residential facility with three or more units
(3) Standby connections are those that have been temporarily shut off, either by request of the customer or by the City for non-payment
(4) The City also has 8-10 units receiving reclaimed water used for irrigation, produced by the City's Water Reclamation Facility and completely separate from the City's potable water system
(5) "Units" are tracked by the City, but Units are not precisely equivalent to Equivalent Residential Units (ERUs), which are defined by usage and are quantified later in this chapter

2.2.2 HISTORICAL RESIDENTIAL POPULATION

The City's population in 2020, as measured by the 2020 Census, was 8,024 people. The City's water system serves the majority of the population within the city limits. Some relatively small populations within the city limits are served by either the PUD or the "Resort & Marina Water System." The City has an Interlocal Agreement for service with PUD that allows for transfer of service area between the two systems. The Resort & Marina Water System's Water System Plan anticipates the eventual transfer of its service area to the City Sequim.

For the purposes of this analysis, the residential population in 2020 of the City of Sequim's water system will be assumed to be equal to the 2020 Census population. This 2020 census population is also assumed to increase proportionally with the increase in ERUs from 2020 to 2021, yielding a 2021 population of 8,419.

2.2.3 HISTORICAL WATER USE

Water production and use within the City of Sequim are metered and monitored. Water production data are collected from source meters daily and reported to DOH on a monthly basis. All service meters are read (and billed) monthly.

2.2.3.1 Production History

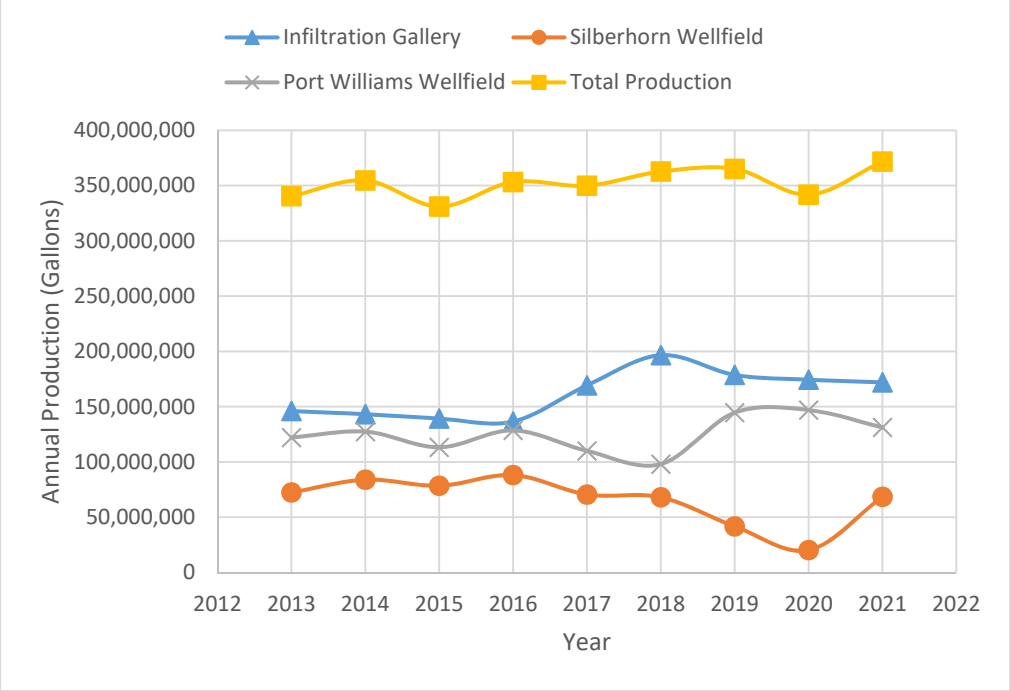
Table 2-3 presents the City's production history for its three sources for 2013 through 2021. Figure 2-1 illustrates the City's historical production for each source as well as total production.

Total production appears to be fairly stable over the past 9 years, even though the number of service connections has been increasing, indicating increasing efficiency of water use over this period. Figure 2-1 illustrates declining use of the Silberhorn Wellfield from 2018 to 2020, but an increase in 2021. It shows fairly steady use of the Infiltration Gallery. Use of the Port Williams Wellfield decreased in 2018 but increased in 2019 and 2020. The trend of declining use of the Silberhorn Wellfield continued from the previous Water System Plan, but this trend was due to decreasing use by management because of perceived screen / sanding issues that were investigated further in 2021 and were found to not be a concern. Therefore, production from the Silberhorn Wellfield increased in 2021. Since the Infiltration Gallery flows by gravity and requires no pumping, the City has reason to maximize flow from this source and has done so in recent years.

Table 2-3 Metered Water Production

Year	Annual Production (gallons)			
	Infiltration Gallery	Silberhorn Wellfield	Port Williams Wellfield	Total
2013	145,980,000	72,317,000	122,060,900	**340,357,900**
2014	143,188,000	83,954,000	127,424,100	**354,566,100**
2015	139,213,000	78,490,000	113,246,000	**330,949,000**
2016	136,529,000	88,089,228	128,542,700	**353,160,928**
2017	169,256,000	70,572,159	110,027,807	**349,855,966**
2018	196,606,000	67,970,348	98,048,176	**362,624,524**
2019	178,711,000	41,746,487	144,603,384	**365,060,871**
2020	174,403,060	20,307,532	146,918,060	**341,628,652**
2021	171,999,000	68,485,613	131,226,402	**371,711,015**

Figure 2-1 Annual Production by Source



The average and maximum day production for the City's sources for 2013 through 2021 is shown in Table 2-4. Average day is determined by dividing the total production for the year by the number of days in the year. Maximum day production numbers are obtained from the daily production records from the City's sources. The ratio of maximum day production to average day production is also shown. The ratio of maximum day production to average day production will be used to predict future maximum day demands. Since the MDD/ADD are relatively consistent, and the ratios remain consistent with the previous 2007-2011 data as well, the assumed ratio for projection calculations will be equal to 2.2, which is the maximum ratio observed since 2014.

Table 2-4 System-wide Maximum Day Production (Gallons per Day)

Year	Max Day	Max Day Production	Average Day Production	MDD/ADD Ratio
2013	August 7, 2013	2,376,800	932,487	2.5
2014	July 12, 2014	1,920,800	971,414	2.0
2015	July 18, 2015	1,755,000	906,710	1.9
2016	August 20, 2016	1,797,339	964,921	1.9
2017	September 2, 2017	2,134,189	958,509	2.2
2018	July 23, 2018	2,029,016	993,492	2.0
2019	July 31, 2019	1,838,562	1,000,167	1.8
2020	July 27, 2020	1,975,459	933,412	2.1
2021	June 28, 2021	2,099,603	1,018,365	2.1
			Average Ratio	2.1
			Assumed Ratio	**2.2**

2.2.3.2 Consumption History

The City's total water consumption for years 2013 through 2021, based on customer meter data, is presented in Table 2-5. This data was collected from records provided from the City's billing system. Water use is categorized by customer class as defined by the City's rate structure.

Reuse production is included separately in Table2-5a because while reuse is related to water demands, the reuse water source is provided by the City's Water Reclamation facility and not the potable water system. Reuse water represents water demands that do not need to be met by the potable water system. There are also two major users of reuse water that are unmetered, which are the City's reclaimed water use demonstration site and Carrie Blake Park, where the vast majority of reuse water is utilized.

The City's water consumption has been generally steady, with 2021 being the highest usage year.

Table 2-5 Consumption by Customer Class (Gallons per Year)

	2013	2014	2015	2016	2017	2018	2019	2020	2021
Single-Family Residential	114,487,474	114,929,183	111,025,504	116,902,425	113,069,077	115,669,298	116,313,768	123,992,873	137,389,676
Multifamily Residential	50,238,851	47,140,831	46,239,720	47,791,875	61,650,937	67,176,012	63,905,514	69,669,576	74,229,843
Commercial	61,429,439	59,287,579	59,153,356	60,055,956	46,474,077	49,264,805	49,304,047	44,139,257	47,249,440
Hotel, Motel and RV Park	12,626,527	10,740,703	10,031,751	10,566,242	10,807,459	11,161,362	12,075,115	11,138,764	9,804,635
Public	10,929,459	9,891,671	9,355,886	7,789,368	9,647,829	11,244,014	11,121,297	9,013,989	11,541,231
Irrigation	47,743,140	51,941,432	45,578,113	44,466,133	47,050,997	45,871,162	43,745,707	41,809,457	33,878,736
Total Potable Usage	**297,454,889**	**293,931,399**	**281,384,330**	**287,572,000**	**288,700,376**	**300,386,654**	**296,465,448**	**299,763,916**	**314,093,562**

Table 2-5a Reuse Production (Gallons per Year)

	2013	2014	2015	2016	2017	2018	2019	2020	2021
Reuse	68,645,001	52,002,521	87,989,849	80,310,561	90,458,590	83,264,626	56,709,876	83,348,189	80,881,956

2.2.3.2 Seasonal Users and Seasonal Usage Variability

The total number of users served by a water system typically varies throughout the year as residents go on vacations or visit second homes and visitors stay for business or vacation. The variability in residents was quantified by analyzing the number of standby accounts provided by the City. To develop an estimate of the number of seasonal residents, the number of accounts on standby on January 31 and June 30 were tabulated, with the assumption that the difference between the number of standby accounts at these seasons roughly approximates the number of seasonal users, residents who move to a second home during the winter months, or so-called "snowbirds." From 2014 to 2021, the average number of standby accounts in January was 43, while the average number of standby accounts in June was 23. This is interpreted to mean that the typical number of "snowbirds" is the difference of these numbers, which is 20 accounts, only 1 percent of single-family customers. This is significantly lower than the findings from the previous water system plan update, and may reflect a trend toward a decreased percentage of seasonal users. The variability in seasonal demand that can be attributed to the seasonal user population is considered negligible for this analysis.

The variability of visitors is quantified by examining water usage records and hotel occupancy data compiled by the City. Monthly hotel/motel room tax collections are collected by the City. This data shows peak occupancy in July and August, with much lower occupancy in the winter and late fall / early spring seasons. Percent occupancy is estimated at approximately 70 percent in July and August, and 15 percent in the winter months.

In general, water system demands typically follow a seasonal curve with water use being highest in summer months and lowest in winter months. Monthly consumption by customer class is illustrated in Figure 2-2 for 2017-2019 average consumption, Figure 2-3 for 2020 consumption, and Figure 2-4 for 2021 consumption. We included data from these time periods to see if any unusual trends emerged in the consumption data for 2020 or 2021 that may be related to the COVID-19 pandemic. These figures show generally similar trends, although there are likely some COVID-19 impacts reflected in the 2020 data. For example, the increase in single family residential consumption in April 2020 was likely due to increased sanitation efforts early in the pandemic. Table 2-5 shows that overall consumption for 2021 was slightly up. It does not appear that the COVID-19 pandemic resulted in a significant increase in water consumption. As is typical for Sequim and the region, consumption peaks in the summer months, especially August, while the commercial, public and hotel, motel and RV Park customer classifications show significantly less seasonal variability.

Figure 2-2 2017-19 Avg. Monthly Consumption by Customer Class

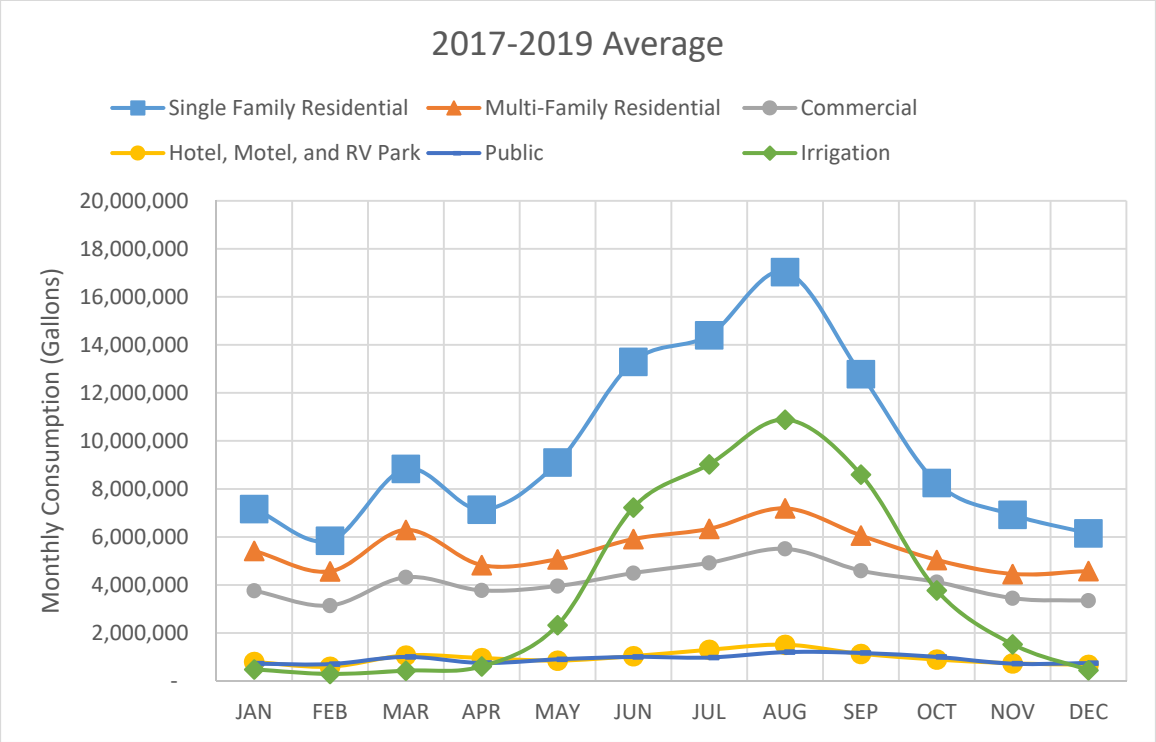


Figure 2-3 2020 Monthly Consumption by Customer Class

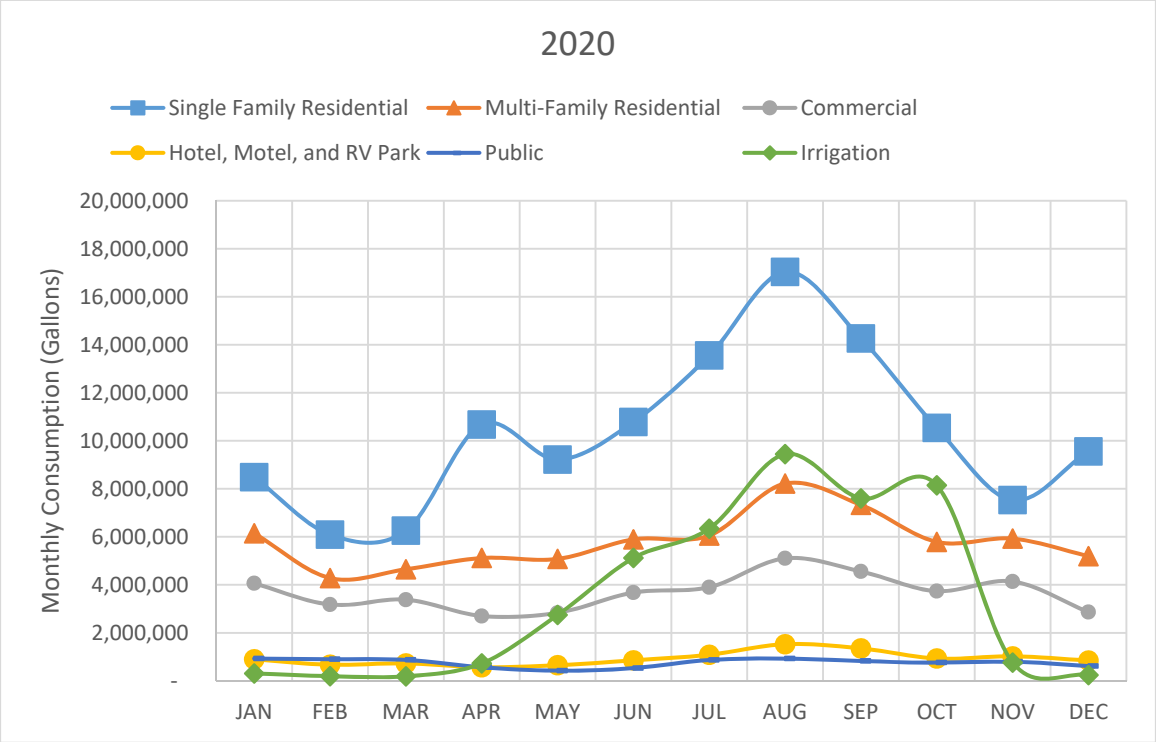
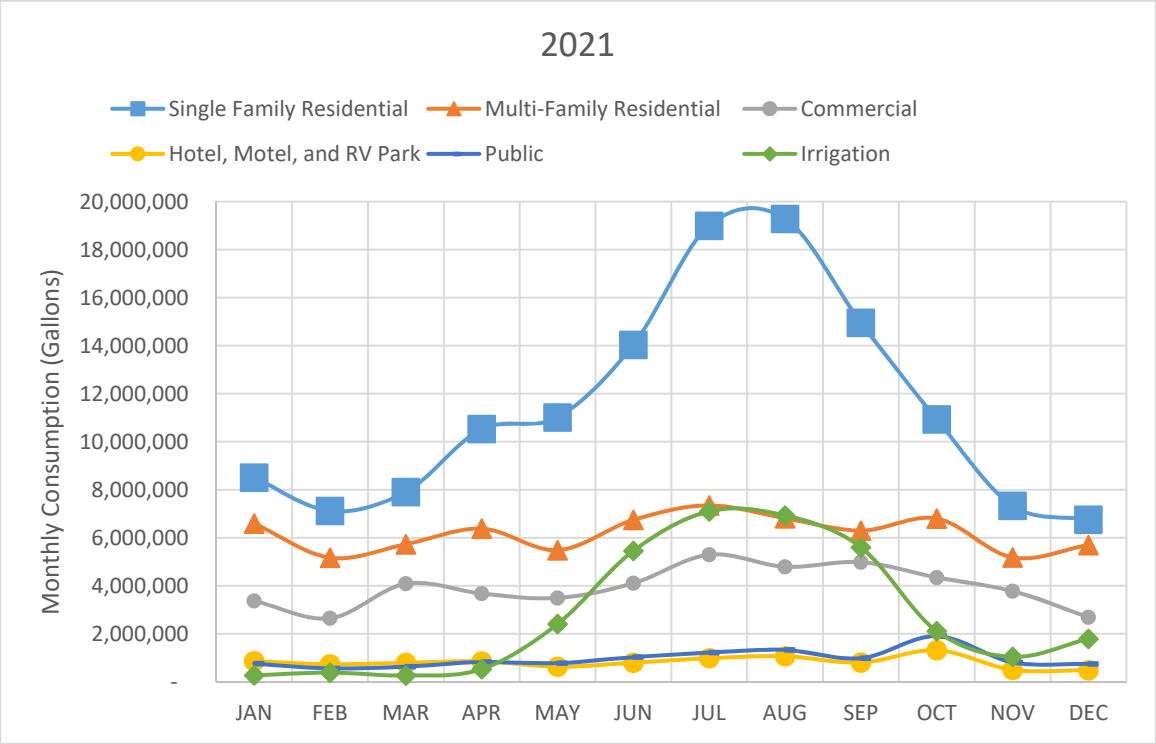


Figure 2-4 2021 Monthly Consumption by Customer Class



2.2.3.4 Distribution System Leakage

Distribution System Leakage (DSL) is defined as the difference between total source production and authorized consumption. DSL includes any water loss due to leaks, unauthorized uses such as illegal service connections, accounting errors, and inaccurate source and customer meters. DSL may also include water leaving the system if unauthorized, unmetered usage occurs such as flushing of mains, fire flows, and use by unmetered services. Authorized and metered or estimated flushing of mains, fire flow, or construction water that is appropriately accounted for is not included in DSL. The City maintains records of flushing and other unbilled, but authorized, water usage.

Table 2-6 presents the City's DSL rate for years 2013 through 2021. State regulations establish a standard for distribution system leakage of 10 percent or less based on a rolling 3-year average for compliance with the Water Use Efficiency Rule. The City currently has a 3-year rolling average DSL of 9.3 percent. Water Use Efficiency and the City's conservation plan are discussed in additional detail as a part of Chapter 4—Water Use Efficiency. Table 2-6 shows that the City's DSL remained persistently above 10% until 2020. In 2020 the meter of a significant water user was discovered to be non-functioning, which resulted in much of the decrease in DSL that year; future DSL is anticipated to remain below 10% and continue to

improve due to the City's ongoing leak detection program as well as improved billing of irrigation usage.

Table 2-6 Distribution System Leakage

Year	Total Production (gallons)	Billed Consumption (gallons)	Non-Revenue Water[1] (gallons)	DSL[2] (gallons)	DSL (percent)	3-year Rolling Average (percent)
2013	340,357,900	297,454,889	4,714,124	38,188,887	11.2%	—
2014	354,566,100	293,931,399	12,086,460	48,548,241	13.7%	—
2015	330,949,000	281,384,330	5,980,440	43,584,230	13.2%	12.7%
2016	353,160,928	287,572,000	8,680,512	56,908,416	16.1%	14.3%
2017	349,855,966	288,700,376	5,513,341	55,642,249	15.9%	15.1%
2018	362,624,524	300,386,654	6,852,505	55,385,365	15.3%	15.8%
2019	365,060,871	296,465,448	25,617,563	42,977,860	11.8%	14.3%
2020	341,628,652	299,763,916	18,135,254	23,729,482	6.9%	11.3%
2021	371,711,015	314,093,562	23,863,850	33,753,602	9.1%	9.3%

(1) Usage for purposes other than customer consumption, as recorded by City Staff. This water use is authorized but is not billed to a customer.
(2) DSL = Total Production – (Billed Consumption + Non-Revenue Water).

2.2.3.5 Equivalent Residential Units

Use of Equivalent Residential Units (ERUs) is a way to express water consumption by non-residential customers as an equivalent number of residential customers. ERUs are specific to each individual water system, and are calculated by dividing the total volume of water utilized in the single-family customer class by the total number of single-family residential (SFR) connections. This number estimates the typical single-family residential water use. The ERU concept is now further sub-categorized to ERU_{MDD} to approximate the maximum daily demand of a SFR connection, and ERU_{ADD} to approximate the average daily demand of a SFR connection. The volume of water used by other customer classes can then be divided by the single-family residential water use to determine the number of ERUs utilized by the other customer classes under either an average or maximum daily demand circumstance. The City's value of the ERU_{ADD} and ERU_{MDD} for the years 2013 through 2021 is presented in Table 2-7. The City's ERU values were highest in 2013, although the values are relatively steady over this

period. ERU_{ADD} appeared to be decreasing from 2013 to 2019 but increased in 2020, perhaps in part due to the COVID-19 pandemic and associated increased water demand throughout the year. ERU_{MDD} over this period remained fairly steady, although the 2019 and 2020 values show a decreasing trend, perhaps due to improving conservation efforts to minimize outdoor watering. Significant drought conditions in 2019 led to increased encouragement of conservation through education (flyer, newsletter, website, social media), and perhaps these efforts led to continued improvement in water conservation.

A summary of water consumption and estimated number of ERU_{ADD} units for each of the City's customer categories is presented in Table 2-8. A ratio of water use for each customer category per unit compared with the SFR ERU_{ADD} value is presented in Table 2-9. This table illustrates that for residential categories, multi-family units use significantly less water per unit than single-family. Table 2-8 shows Non-Revenue Water use was fairly high in 2019, which is a reflection of high construction activity that year.

Table 2-7 Equivalent Residential Units

Year	SFR Annual Consumption (gpd)	SFR Units at end of year (1)	ERU_{ADD} (gpd/ERU)	SFR Maximum Month	SFR Maximum Month Average Day Demand (gpd)	Estimated(2) SFR Maximum Day Demand (gpd)	ERU_{MDD} (gpd/ERU)
2013	313,664	1,964	160	July	553,027	746,587	380
2014	314,874	2,002	157	July	497,771	671,990	336
2015	304,179	2,033	150	June	501,133	676,530	333
2016	319,406	2,094	153	August	528,557	713,552	341
2017	309,778	2,176	142	August	523,706	707,004	325
2018	316,902	2,291	138	August	579,523	782,356	341
2019	318,668	2,385	134	August	545,808	736,841	309
2020	339,707	2,450	139	August	549,473	741,788	303
2021	376,410	2,578	146	August	622,032	839,743	326
		Average	**146**				**333**

(1) SFR units include duplexes.
(2) SFR MDD estimated using MDD:MMADD ratio of 1.35 as recommended by DOH Water System Design Manual.

Table 2-8 Total Number of Equivalent Residential Units, based on Average Day Demand

Year	Single-Family	Multifamily		Commercial		Hotel, Motel, RV Park		Public		Irrigation		DSL[2]		Non-Revenue Water[3]		Total
	ERUs based on ADD[1]	(gpd)	ERUs based on ADD[1]	(gpd)	ERUs based on ADD[1]	(gpd)	ERUs based on ADD[1]	(gpd)	ERUs based on ADD[1]	(gpd)	ERUs based on ADD[1]	(gpd)	ERUs based on ADD[1]	(gpd)	ERUs based on ADD[1]	ERUs based on ADD[4]
2013	1,964	137,641	862	168,300	1,054	34,593	217	29,944	187	130,803	819	104,627	655	12,915	81	5,103
2014	2,002	129,153	821	162,432	1,033	29,427	187	27,100	172	142,305	905	133,009	846	33,114	211	5,120
2015	2,033	126,684	847	162,064	1,083	27,484	184	25,633	171	124,872	835	119,409	798	16,385	110	5,152
2016	2,094	130,579	856	164,087	1,076	28,870	189	21,282	140	121,492	796	155,487	1,019	23,717	155	5,151
2017	2,176	168,907	1,186	127,326	894	29,609	208	26,432	186	128,907	905	152,445	1,071	15,105	106	5,556
2018	2,291	184,044	1,331	134,972	976	30,579	221	30,806	223	125,674	909	151,741	1,097	18,774	136	5,950
2019	2,385	175,084	1,310	135,080	1,011	33,083	248	30,469	228	119,851	897	117,748	881	70,185	525	6,079
2020	2,450	190,354	1,373	120,599	870	30,434	219	24,628	178	114,233	824	64,835	468	49,550	357	5,914
2021	2,578	203,369	1,393	129,451	887	26,862	184	31,620	217	92,818	636	92,476	633	65,380	448	5,894

(1) ERUs are calculated based on the ERU_{ADD} values presented in Table 2-7, which is based on consumption.

(2) DSL based on volume from Table 2-6.

(3) Non-Revenue Water based on volume from Table 2-6.

(4) Does not include DSL ERUs or Non-Revenue Water ERUs.

Table 2-9 ERUs based on ADD per Unit by Class (compared to SFR)

Year	Multifamily Residential	Commercial	Hotel, Motel, RV Park	Public	Irrigation
2013	0.70	2.15	0.51	6.47	9.20
2014	0.68	2.08	0.44	5.74	8.87
2015	0.70	3.25	0.44	5.71	8.26
2016	0.71	3.23	0.43	4.98	8.05
2017	0.76	2.69	0.47	6.88	9.15
2018	0.84	2.92	0.50	8.25	9.18
2019	0.83	3.03	0.56	8.45	8.88
2020	0.87	2.28	0.49	6.58	8.00
2021	0.88	2.30	0.41	8.02	5.05

2.3 FUTURE POPULATION AND WATER DEMANDS

2.3.1 PROJECTED POPULATION

Water System Plan projections are based on the 10-year and the 20-year planning period. The existing population of Sequim was estimated to be 8,024 in 2020, according to the most recent US Census. The analysis in this chapter assumes an annual growth rate of 3 percent for the City and the Sequim UGA, which is based on the current City of Sequim Comprehensive Plan growth projection for 2015-2035 of 2 percent, and a factor of safety so that the water system has plans in place to keep up with demand if growth exceeds the anticipated 2 percent. Three percent annual growth is supported by a number of different sources of data and projections, which are summarized in Appendix E.

Actual population growth for the City's Retail Service Area depends on many dynamic factors that are difficult to quantify. These include the real estate market, regional economics, and service area expansions such as through annexation or consolidation/acquisition of adjoining public water systems. Estimates beyond the 10-year planning period often differ from the eventual actual growth due to all these factors. For the City of Sequim, a number of factors complicate the long-term planning horizon. These include the lack of hard regional boundaries, the unpredictability of acquisition of neighboring water systems, and the uncertainty of future development. For these reasons, a total buildout population for the City is not presented, and this Plan considers only the 10-year and 20-year planning periods. Table 2-10 shows the projected service area population.

Table 2-10 Water Service Area Projected Population

Year	Projected Service Area Population
2021	8,419
2022	8,671
2023	8,932
2024	9,200
2025	9,476
2026	9,760
2027	10,053
2028	10,354
2029	10,665
2030	10,985
2031	11,314
2041	15,206

2.3.2 WATER DEMAND PROJECTIONS

In order to project water demands, it is assumed that water demand within the existing system boundaries will increase at a rate equivalent to the population growth rate, since we have observed in Table 2-7 that demand per ERU has remained relatively steady. The projected average daily demand for the City is shown in Table 2-11.

For planning purposes, the City's distribution system leakage is assumed to be constant at the current 3-year rolling average level of 9.3 percent. Projected water usage with conservation is discussed in Chapter 4.

Table 2-11 Projected Production without Conservation

Year	Population	ERU[1]	Average Daily Demand[2] (gallons)	Distribution System Leakage Based on ERU_{ADD}[3] (ERUs)	Distribution System Leakage Based on ERU_{MDD}[4] (ERUs)	Nonrevenue Water Based on ERU_{ADD}[5] (ERUs)	Nonrevenue Water Based on ERU_{MDD}[6] (ERUs)	Total Average Daily Production[7] (gallons)	Maximum Daily Production[8] (gallons)
2021	8,225	5,894	860,524*	633*	284*	448*	201*	1,018,386*	2,099,603*
2022	8,472	6,071	886,366	669	294	450	197	1,049,740	2,185,146
2023	8,726	6,254	913,084	689	302	463	203	1,081,276	2,250,747
2024	8,988	6,442	940,532	710	312	477	209	1,113,834	2,318,679
2025	9,257	6,636	968,856	731	321	492	216	1,147,414	2,388,609
2026	9,535	6,836	998,056	753	331	506	222	1,181,870	2,460,537
2027	9,821	7,042	1,028,132	776	341	522	229	1,217,640	2,534,796
2028	10,116	7,254	1,059,084	799	351	537	236	1,254,140	2,611,053
2029	10,419	7,472	1,090,912	823	361	553	243	1,291,808	2,689,308
2030	10,732	7,697	1,123,762	848	372	570	250	1,330,790	2,770,227
2031	11,054	7,928	1,157,488	874	383	587	258	1,370,794	2,853,477
2041	14,855	10,655	1,555,630	1,174	515	789	346	1,842,228	3,834,828

* Values are based on data collected in 2021. All other values are based on projections.

(1) Projected ERUs based on the current calculated number of ERUs (from Table 2-8) and an annual growth rate of 3 percent, and do not include DSL or NRW.

(2) Based on an average ERU_{ADD} value of 146 gpd/ERU.

(3) DSL ERUs based on $ERU_{ADD} = (ERU_{ADD}*(ERUs/(1-DSL_{Fraction}-NRW_{Fraction}))*DSL_{Fraction}/ERU_{ADD})$ and 3-year average DSL rate of 9.3%

(4) DSL ERUs based on $ERU_{MDD} = (ERU_{ADD}*(ERUs/(1-DSL_{Fraction}-NRW_{Fraction}))*DSL_{Fraction}/ERU_{MDD})$ and 3-year average DSL rate of 9.3%

(5) Nonrevenue Water (NRW) ERUs based on $ERU_{ADD} = (ERU_{ADD}*(ERUs/(1-DSL_{Fraction}-NRW_{Fraction}))*NRW_{Fraction}/ERU_{ADD})$ and 3-year average NRW rate of 6.1%

(6) NRW ERUs based on $ERU_{MDD} = (ERU_{ADD}*(ERUs/(1-DSL_{Fraction}-NRW_{Fraction}))*NRW_{Fraction}/ERU_{MDD})$ and 3-year average NRW rate of 6.1%

(7) Total Average Daily Production is calculated as ERUs plus DSL & NRW (based on ERU_{ADD}) ERUs multiplied by ERU_{ADD}

(8) Maximum Daily Production is calculated as ERUs plus DSL& NRW ERUs (based on ERU_{MDD}) multiplied by ERU_{MDD}.

Table 2-12 shows ERUs and demand projections for each pressure zone. Peak Hour Demand (PHD) is calculated based on Equation 5-1 in the DOH Water System Design Manual. The equation and variables associated with it are as follows:

$$PHD = (MDD/1440)[(C * N) + F] + 18$$

PHD = Peak Hourly Demand (gallons per minute, gpm)
C = Coefficient Associated with Ranges of ERUs
N = Number of Service Connections, ERUs
F = Factor Associated with Ranges of ERUs
MDD = Maximum Day Demand (gpd/ERU)

The MDD value is 333 gpd/ERU which is based on the average shown in Table 2-7. The N value varies depending on the projected number of ERUs in the pressure zone.

Table 2-12 ERUs based on MDD and Use by Pressure Zone

Year	Pressure Zone														
	775			680			480			420			350		
	ERUs	MDD (gpd)	PHD (gpm)	ERUs	MDD (gpd)	PHD (gpm)	ERUs	MDD (gpd)	PHD (gpm)	ERUs	MDD (gpd)	PHD (gpm)	ERUs	MDD (gpd)	PHD (gpm)
2021	29	9,657	38	54	17,982	55	194	64,602	125	2,123	706,959	856	3,979	1,325,007	1,542
2031	29	9,657	38	73	24,309	66	232	77,256	143	2,854	950,382	1,126	5,381	1,791,873	2,061
2041	29	9,657	38	99	32,967	81	232	77,256	143	3,835	1,277,055	1,489	7,321	2,437,893	2,779

Note: ERUs shown in this table include DSL and NRW ERUs.

Chapter 3
SYSTEM ANALYSIS

3.1 INTRODUCTION
Water system planning includes a careful analysis of a water utility's ability to meet minimum level of service standards for existing and future customers. This chapter covers:

- Design standards that identify criteria that are applicable to the City's water system.
- A brief summary of the City's asset inventory.
- Presentation of the legal capacity and physical capacity of the City's sources.
- A water system analysis that compares existing system infrastructure to City-adopted design standards.
- Water system deficiencies and recommended improvements.

3.2 SYSTEM DESIGN STANDARDS
The City has adopted system design and construction standards. These standards are summarized in the following sections.

3.2.1 DESIGN AND CONSTRUCTION STANDARDS
Design and construction standards and specifications set forth the material and construction requirements that contractors, developers, and the City must follow when constructing water system facility improvements. Design and construction standards and specifications for the City are the subject of Chapter 7 and the City's current code-adopted standards are included in Appendix F.

3.2.2 GENERAL FACILITY STANDARDS
Performance and design criteria typically address the sizing and reliability requirements for water system sources, storage, distribution, and fire flow. WAC 246-290 contains general criteria and standards that must be followed in development of public water systems. In addition, Washington State Department of Health (DOH) has published its *2020 Water System Design Manual* that provides specific guidance for water system design.

3.2.2.1 Average Day, Maximum Day and Peak Hour Demands
Average Day Demand (ADD) is determined from annual metered production data from City sources and is the average daily usage within the distribution system for a given year. As shown in Chapter 2, it can be broken down by usage per Equivalent Residential Unit (ERU), including ERUs that are associated with Distribution System Losses (DSL) and Non-Revenue Water (NRW). Maximum Day Demand (MDD) is determined as shown in Chapter 2 based on the highest daily usage from City sources and is the highest daily usage within the distribution system for a given year. It can also be broken down by maximum daily usage per ERU, including ERUs associated with DSL and NRW.

The water system's components are analyzed with respect to their ability to serve ERUs, based on the following demands:

Table 3-1 Demand per ERU

ERU_{ADD} (gpd/ERU)	146
ERU_{MDD} (gpd/ERU)	333

Note that the demands in Table 3-1 are based on the average values over 2013-2021 from Table 2-7. Although these values are averages, Table 2-7 shows that the values are typical or conservative with respect to the most recent five years. These values are used to analyze the capacity of the system for current and projected conditions. These demand values represent projected demands without additional conservation savings.

Also note that the demands in Table 3-1 do not inherently include Distribution System Losses (DSL) or Non-Revenue Water (NRW). These two aspects of demand need to be accounted for by assigning an applicable number of ERUs in each analysis.

Peak Hour Demand (PHD) is determined using the method presented in the *2020 Water System Design Manual*. The PHD equation (3-1) is described in Chapter 2.

3.2.2.2 Minimum System Pressure

The system needs to be designed to maintain a minimum of 30 psi in the distribution system during peak hour demand and 20 psi during fire flow conditions under maximum day demands. However, a system pressure of 45 psi is desirable during peak hour demands to meet customer expectations.

3.2.2.3 Minimum Pipe Size

The diameter of transmission mains shall be determined by hydraulic analysis. Minimum water main sizes are as follows:

- 10-inch minimum for trunk lines per SMC 17.48.050,
- 8-inch minimum when serving fire hydrants,
- 6-inch minimum may be used in localized conditions where fire hydrants are served by looped water mains, subject to City approval.

3.2.2.4 Fire Flow Standard

The City has adopted the 2018 International Fire Code (IFC) as the minimum fire flow standard (SMC 15.04.080). Fire flow must be provided while maintaining 20 psi at all service connections with operation, equalizing, and fire suppression storage volumes depleted. For general planning purposes, fire flow requirements are determined to be 3,000 gpm for 3 hours for commercial development and 1,000 gpm for 1 hour for residential development.

3.2.2.5 Valve and Hydrant Spacing

Sufficient valving should be installed to put the minimum number of customers out of service when water is turned off for maintenance or repair. The maximum distance between valves is 1,000 feet, and the City's goal is to install or maintain valves at the middle and ends of every City block, or every 450 feet, whichever is smaller. Fire hydrants on laterals should have their own auxiliary gate valve. The City's standard for hydrant spacing follows the 2018 IFC table C102.1. This table, in general, indicates that for residential areas with a 1,000 gpm fire flow requirement, average spacing between hydrants is 500 ft, and in commercial areas with a 3,000 gpm fire flow requirement, average spacing between hydrants is 400 ft.

3.2.2.6 Source Capacity and Reliability

Water systems utilizing groundwater sources must be designed such that source capacity is sufficient to meet MDD. Additionally, DOH recommends the following source reliability measures (per WSDM 3.10.5):

- Source capacity sufficient to meet MDD with 20 hours of groundwater pumping
- Two or more supply sources are available
- Source capacity sufficient to meet MDD plus capacity to replenish fire suppression storage in 72 hours (continuous, 24-hour source pumping may be assumed for replenishment)
- Source capacity sufficient to meet ADD with largest groundwater source out of service.

3.2.2.7 Storage Volumes

Storage volumes are based on Chapter 7 of the DOH Water System Design Manual. The total available storage volume must be greater than the sum of:

- Operational Storage (OS) – volume sufficient to prevent excessive pump cycling and maintain water quality.
- Equalizing Storage (ES) – volume sufficient to meet periodic peak demands that exceed source supply capacities.
- Standby Storage (SB) – volume sufficient to provide a locally adopted volume per day per ERU times a number of days selected to meet water system-determined standard of reliability. For the City of Sequim, this has been and continues to be two days times the average day demand minus source production capacity with the largest source out of service. But in no case will standby storage be less than 200 gallons per ERU.
- Fire Suppression Storage (FSS) – volume equal to the maximum adopted fire flow rate times the fire flow duration.
- Dead Storage (D) – Volume of storage that is unusable.

These storage volumes are further defined in the storage analysis section of this chapter. The City has adopted a policy of nesting standby and fire suppression storage. This allows for excluding either the SB or FSS storage component from the total required storage capacity, whichever is smaller.

3.2.2.8 System Reliability

The City has adopted the following system reliability standards:

- All water mains will be looped where feasible.
- Water main velocities will not exceed 10 feet per second at maximum day demand with fire flows.
- Storage facilities will have high- and low-level alarms.
- Standby power provisions will be available at all major pumping facilities.

3.2.3 WATER QUALITY STANDARDS

Water quality standards for the City are published by DOH as a part of WAC 246-290. The City's water quality results can be found in Appendix G. The City's water quality monitoring and reporting system is discussed in Chapter 6, Operations and Maintenance.

3.3 SYSTEM INVENTORY

The City's major facilities are described in Chapter 1

City of Sequim Public Works started implementing asset management for its water system using Cartegraph software in 2021. All assets are entered into the database with attributes to date including age (or date of installation), material, and size. City staff are starting to utilize the software to generate maintenance schedules and condition ratings. Future improvements include generating life expectancy and replacement timing/cost, and asset criticality values.

All service meter installations have been entered into the database real-time in the field since mid-2021.

3.4 CAPACITY ANALYSIS

3.4.1 SOURCE OF SUPPLY ANALYSIS

Complete descriptions of the City's sources of supply and their physical/legal capacity are provided in Chapter 1, System Description. According to the *2020 Department of Health Water System Design Manual*, source production capacity must be sufficient to supply maximum day demands. Additionally, maximum day and average day daily demands must comply with the maximum instantaneous and maximum annual withdrawal limitations of associated water rights.

3.4.1.1 Water Rights (Legal Capacity) Analysis

The history and current interpretations of the City's water rights is described in detail in Appendix H. A summary of existing water rights is provided in Table 1-1, and the Water Rights Self-Assessment (WRSA) is included in Appendix H.

As described in those documents, all of the City's water rights are primary (additive), and the maximum instantaneous flow rate and maximum annual volume are as shown in the WRSA.

The WRSA reflects the City's long-term plan to construct a surface water treatment facility to directly use the river water right within the 20-year planning horizon.

Table 3-2 provides a summary of the capacity of the City's existing water rights with respect to the number ERUs each water right could serve and totals for the water system. This analysis, as well as the remaining analyses in this chapter, is based on the usage per ERU from Table 3-1.

Table 3-2 City of Sequim Water Rights ERU Capacity

Source	Maximum Water Right Instantaneous Withdrawal (gpm)	ERU Capacity with respect to MDD	Maximum annual Withdrawal (Acre-ft)	ERU Capacity with respect to ADD
Dungeness River	628	2,716	1,014	6,200
Infiltration Gallery	718	3,105	1,160	7,093
Silberhorn Wellfield	700	3,027	690	4,219
Port Williams Wellfield	2,250	9,730	1,850	11,311
Total	**4,296**	**18,577**	**4,714**	**28,823**

Table 3-2 demonstrates that the ERU capacities of the water rights exceed the projected number of ERUs for the 20 year planning period shown in Table 2-11, including DSL and NRW ERUs.

3.4.1.2 Source Production (Physical Capacity) Analysis

Chapter 1 provides complete descriptions of the City's sources of supply including limitations on each source. Note that the installed capacity of some sources is less than the applicable water right. The total installed production capacity of the City's sources is shown in Table 1-1 as 3,113 gpm which is based on the Infiltration Gallery (718 gpm), all 3 wells at the Silberhorn Wellfield (635 gpm) and all 3 wells at the Port Williams Wellfield (1,760 gpm) operating simultaneously. The DOH Design Manual (3.10.4) recommends a reliability measure of limiting the max day pumping to reflect pumping for only 20 hours per day. For the City's sources this results in a capacity of 3,907,920 gallons per day, or 2,714 gallons per minute when averaged over a full day. As the infiltration gallery flows by gravity it is assumed to run 24 hours per day. In addition to this source not requiring pumping, a backup generator (propane) was installed at the infiltration gallery site to improve reliability of electrical equipment for the system. Table 3-3 compares the total production capacity of the sources as well as the reliable source capacity with projected maximum day production requirements through the year 2041.

Table 3-3 Maximum Day Source Production Capacity Analysis

Year	Total Production Capacity (gpm)[1]	Reliable Source Production Capacity (gpm)[2][3]	Maximum Day Production Requirement (gpm)	Total Production Capacity Surplus (gpm)	Reliable Production Capacity Surplus/(Deficit) (gpm)
2021	3,113	2,714	1,458	1,655	1,256
2022	3,113	2,714	1,517	1,596	1,196
2023	3,113	2,714	1,563	1,550	1,151
2024	3,113	2,714	1,610	1,503	1,104
2025	3,113	2,714	1,659	1,454	1,055
2026	3,113	2,714	1,709	1,404	1,005
2027	3,113	2,714	1,760	1,353	954
2028	3,113	2,714	1,813	1,300	901
2029	3,113	2,714	1,868	1,245	846
2030	3,113	2,714	1,924	1,189	790
2031	3,113	2,714	1,982	1,131	732
2041[3]	3,113	2,714	2,663	450	51

(1) Total source capacity as presented in Table 1-1.
(2) Reliable source capacity reduces the capacity of the Silberhorn and Port Williams Wellfields to represent 20 hour per day pumping.
(3) The City's 20 year plan includes adding new source production capacity, but Table 3-3 shows the analysis if no new source capacity were added.

Table 3-3 shows that the existing sources can reliably provide projected maximum day demand for the 20-year planning period, although there is very little reliable production capacity surplus by 2041. This supports the City's plan to add source production capacity prior to the year 2041.

The DOH Design Manual (3.10.5, item 4) recommends that for reliability, the system should be able to supply Average Day Demand with the largest source out of service. For the Sequim water system, the largest current source is either Port Williams Well 1 or Well 2, each of which have a capacity of 600 gpm. On an annual basis, the Infiltration Gallery is assumed to operate 75 percent of the year (see Table 3-7, note 3). Therefore, the system's annual average reliable source capacity is 2,334 gpm, or 3,360,240 gpd.

Table 3-4 Annual Average Source Production Capacity Analysis

Year	Reliable Annual Average Source Capacity (gpd)[(1)]	Annual Average Production Requirement (gpd)[(2)]	Reliable Annual Source Capacity Surplus (gpd)
2021	3,360,240	1,018,386*	2,341,854
2022	3,360,240	1,049,740	2,310,500
2023	3,360,240	1,081,276	2,278,964
2024	3,360,240	1,113,834	2,246,406
2025	3,360,240	1,147,414	2,212,826
2026	3,360,240	1,181,870	2,178,370
2027	3,360,240	1,217,640	2,142,600
2028	3,360,240	1,254,140	2,106,100
2029	3,360,240	1,291,808	2,068,432
2030	3,360,240	1,330,790	2,029,450
2031	3,360,240	1,370,794	1,989,446
2041	3,360,240	1,842,228	1,518,012

*Value based on data collected during 2021. All other values are based on projections.

(1) Includes Silberhorn Wellfield based on operational capacity of 635 gpm, Port Williams Wellfield with the largest of the three pumps out of service (1,160 gpm), and 75 percent of available Infiltration Gallery capacity (539 gpm). The reduction in Infiltration Gallery capacity is to compensate for time that the Gallery is turned off due to high turbidity, which is conservatively assumed to be 90 days per year. The reason for assuming 75 percent availability of the Infiltration Gallery instead of 85 percent (average annual availability as discussed later in Chapter 3) is to remain conservative.

(2) From Table 2-11.

Table 3-4 accounts for time that the City's Infiltration Gallery source may be offline due to high turbidity events and suggests that the City has adequate reliable source capacity to meet its projected annual average day demands through the 20-year planning period. High turbidity events have not historically occurred during peak summer use when maximum day demands usually occur, thus a reduction in the infiltration gallery source capacity for annual average source capacity analysis is appropriate but a reduction in the infiltration gallery's source capacity for maximum day demand capacity analysis is not necessary.

As mentioned previously, DOH presents water source capacity reliability measures in the Water System Design Manual. These include the ability to meet MDD while replenishing fire flow storage in 72 hours, the ability to meet MDD while pumping only 20 hours per day and the ability to meet ADD with the largest pumped source out of service. For the City's fire suppression storage requirements the 72 hour replenishment is 125 gpm. Using the City's pumped sources only 20 hours per day reduces the total reliable source production capacity from 2,714 gpm to 2,589 gpm, which still meets the maximum day production requirement through

2031, and additional source capacity is planned before 2041 to meet this recommendation, as discussed further below.

The City's potential for increasing production capacity under their current water rights include the installation of up to two additional wells at the Port Williams Wellfield, the installation of an additional/replacement well at the Silberhorn wellfield to increase instantaneous capacity up to the water right, or the construction of a new surface water treatment facility to directly utilize the Dungeness River water right.

A new well at Port Williams would likely be designed with a capacity of 600 gpm, similar to the previous three wells, although provisions would likely be in place to restrict flow to 490 gpm in order to not exceed the water right with all pumps operating. The City's water right permit for Port Williams Wellfield allows for the drilling of up to five wells and the withdrawal of up to 2,250 gpm which is 490 gpm more than the current maximum withdrawal rate of the existing wells. The City, however, may be limited by the requirements of the water rights permit if increased pumping at Port Williams is found to cause reductions in aquifer levels and effects on other water rights in the area. The City currently monitors well levels at numerous sites in the Port Williams area and reports levels to Department of Ecology. At this time no guidance has been given to the City in regards to the ability to develop Port Williams to the full permitted water right.

A new well in the Silberhorn wellfield would likely replace either Well 2 or Well 3 and be designed to provide a total Silberhorn wellfield capacity up to the instantaneous water right. This new well may be drilled in a deeper aquifer than the existing wells.

The other potential for additional source capacity under the current water rights is the construction of a new surface water treatment facility to directly utilize the Dungeness River water right. This new treatment facility could draw water directly from the City's headgate at the river or from the Highland Irrigation District main canal via the City's Reservoir Road headgate, both of which are described in Chapter 1. The facility could be located in the vicinity of either headgate, although the site near the Reservoir Road headgate is likely more advantageous with respect to transmission piping, permitting, site logistics, and backwash disposal. Construction of this facility is included in the Capital Improvement Projects at the end of the 20 year planning horizon in case it is needed to meet source reliability needs, improve system resiliency, and serve long-term growth in the areas served by the City.

Additional source of supply analysis and alternative supply analysis is discussed in Chapter 4.

3.4.1.3 Source Water Quality Analysis

The City of Sequim meets all applicable water quality regulations and generally has excellent water quality. Source and distribution system water quality results can be found in Appendix G. The only contaminants that have a primary or secondary Maximum Contaminant Level (MCL) regulation that have shown results above the State Reporting Level (SRL) are nitrate, copper, fluoride, and arsenic. Each of these contaminants is addressed individually below.

Nitrate

The Nitrate MCL is 10 mg/L. Nitrate sampling results above the SRL include source water from the Port Williams Wellfield (1.97 mg/L On 3/9/2016) and the Silberhorn Wellfield, where the following Nitrate concentrations have been measured:

Date:	Nitrate Concentration (mg/L):	Sampling location:
3/30/2017	2.82	SH Well #1
3/30/2017	2.82	SH Well #2
3/30/2017	2.82	SH Well #3
5/20/2020	1.59	Combined SH wellfield
8/25/2021	2.44	Combined SH wellfield

The City will continue to monitor nitrate concentrations and analyze any long-term trends.

Copper

Copper was detected in the infiltration gallery water at a concentration of 0.2 mg/L on 7/5/2017, which is well below the Action Level of 1.3 mg/L. The City took 31 lead and copper samples from July to August 2019 to comply with the lead and copper rule, and all samples were below the Action Level for lead and copper.

Fluoride

Fluoride has been measured in the Port Williams combined wellfield sample at a concentration of about 0.5 mg/L (3/9/2016), well below the MCL of 4 mg/L.

Arsenic

Arsenic was detected in the Port Williams combined wellfield sample at a concentration of 0.0017 mg/L on 3/9/2016. This is well below the MCL of 0.01 mg/L. The City will continue to monitor and note whether arsenic concentrations appear stable or trending upward.

3.4.1.4 Source Water Treatment Analysis

The City's Infiltration Gallery Source has been determined by DOH to be a groundwater that is hydraulically connected to surface water but not under the direct influence of surface water. As such the City is required to maintain treatment of this source through contact time with chlorine. Adequate treatment is measured by the provided CT or the product of residual chlorine disinfection concentration (C) and contact time (T). For a groundwater source that is hydraulically connected to surface water the required CT is 6. The City provides CT in the transmission main from the Infiltration Gallery to the 1.7 MG 420 Reservoir. To account for future connections to the transmission main, this analysis will count only the length of the transmission main from the Infiltration Gallery to the City's current UGA.

See Table 3-5 for the calculations of the minimum CT provided at the maximum instantaneous flow rate and minimum acceptable chlorine residual. The calculations assume a worst-case chlorine residual of the regulatory minimum distribution system residual of 0.2 mg/L, but the City typically targets a chlorine residual at the 420 reservoir of 0.4 to 0.6 mg/L.

Table 3-5 Infiltration Gallery CT Calculations

Infiltration Gallery transmission pipeline length from hypochlorite injection to UGA boundary (ft)	10,065
Infiltration Gallery transmission pipeline diameter (in)	12
Flow rate (gpm)	718
Minimum Chlorine Residual Concentration (mg/L)	0.2
Pipe volume (gal)	59,130
Time in pipe (min)	82.4
CT (min-mg/L)	16
CT greater than 6?	Yes

Table 3-5 demonstrates that the minimum CT provided greatly exceeds the requirement, and that the infiltration gallery can be operated at a flow rate up to the instantaneous water right of 718 gpm.

3.4.2 Booster Station Analysis

An open system is a pressure zone which is governed by an atmospheric storage tank, such as the 480 Reservoir, the 420 Reservoir, and the Solana Reservoir. These reservoirs serve the 480 Zone, the 420 Zone, and the 680 Zone, respectively. A closed system is a zone that is closed to the atmosphere in which pressures are controlled by a booster station. The 775 Zone is a closed system.

For open systems where the booster pump station is the sole supply to a pressure zone (such as the 680 and 480 Booster Stations), WAC 246-290-230 requires that the booster station be designed to meet the MDD for the zone with all pumps in service and meet the ADD with the largest pump out of service. For open pressure zones with adequate equalizing storage and multiple sources of supply (420 zone), the sum of all sources must meet the MDD of the pressure zone and any sequential zones served.

For closed systems (775 zone), WAC 246-290-230 requires that the booster station be designed to meet the MDD and fire flow for the zone with the largest routinely used pump out of service. It is also recommended that peak hour demands can be met with a minimum pressure of 30 psi with the largest capacity pump out of service.

3.4.2.1 775 Zone Booster Station

The 775 Zone booster station was described in Chapter 1 – Water System Description. The existing and projected ERUs, MDD, and PHD for the area served by this booster station are summarized in Table 3-6.

Table 3-6 775 Zone Booster Station Capacity Analysis

Parameter	2021	2031	2041	Buildout
Estimated ERUs	27	27	27	27
Distribution System Leakage & Nonrevenue Water as ERUs based on ERU_{MDD}	2	2	2	2
Total ERUs	29	29	29	29
Sources of Supply for 775 Zone				
775 Booster Pump #1 (gpm)	37	37	37	37
775 Booster Pump #2 (gpm)	255	255	255	255
775 Booster Pump #3 (gpm)	1000	1000	1000	1000
775 Booster Pump #4 (gpm)	1000	1000	1000	1000
Capacity with largest routinely used pump out of service (gpm)	2,037	2,037	2,037	2,037
Capacity with largest pump out of service (gpm)	1,292	1,292	1,292	1,292
MDD (gpm)	7	7	7	7
Fire Flow (gpm)	1,000	1,000	1,000	1,000
MDD + Fire Flow (gpm)	1,007	1,007	1,007	1,007
PHD (gpm)	38	38	38	38
Sufficient MDD+FF Capacity?	Yes	Yes	Yes	Yes
Sufficient PHD Capacity?	Yes	Yes	Yes	Yes

3.4.2.2 680 Zone Booster Station

The 680 Zone booster station was described in Chapter 1 – Water System Description. The existing and projected ERUs, ADD, and MDD for the area served by this booster station are summarized in Table 3-7.

Table 3-7 680 Zone Booster Station Capacity Analysis

Parameter	2021	2031	2041	Buildout
Estimated ERUs, 680 zone + 775 zone	50	68	92	98
Distribution System Leakage & Nonrevenue Water as ERUs based on ERU_{MDD}	4	5	7	8
Total ERUs	54	73	99	106
Sources of Supply for 680 Zone				
680 Booster Pump #1 (gpm)	225	225	225	225
680 Booster Pump #2 (gpm)	225	225	225	225
680 Booster Pump #3 (gpm)	225	225	225	225
Total of ALL sources supplying 680 pressure zone (gpm)	675	675	675	675
Total of ALL sources supplying 680 pressure zone with largest pump out of service (gpm)	450	450	450	450
ADD (gpm)	5	7	10	11
MDD (gpm)	12	17	23	25
Sufficient ADD Capacity with largest pump out?	Yes	Yes	Yes	Yes
Sufficient MDD Capacity?	Yes	Yes	Yes	Yes
Replenish depleted fire storage within 72 hours?	Yes	Yes	Yes	Yes

3.4.2.3 480 Zone Booster Station

The 480 Zone booster station was described in Chapter 1 – Water System Description. The existing and projected ERUs, ADD, and MDD for the area served by this booster station are summarized in Table 3-8.

Table 3-8 480 Zone Booster Station Capacity Analysis

Parameter	2021	2031	2041	Buildout
Estimated ERUs	180	215	215	303
Distribution System Leakage & Nonrevenue Water as ERUs based on ERU_{MDD}	14	17	17	24
Total ERUs	194	232	232	327
Sources of Supply for 480 Zone				
480 Booster Pump #1 (gpm)	75	75	75	75
480 Booster Pump #2 (gpm)	75	75	75	75
Total of ALL sources supplying 480 pressure zone (gpm)	150	150	150	150
Total of ALL sources supplying 480 pressure zone with largest pump out of service (gpm)	75	75	75	75
ADD (gpm)	20	24	24	33
MDD (gpm)	45	54	54	76
Sufficient ADD Capacity with largest pump out?	Yes	Yes	Yes	Yes
Sufficient MDD Capacity?	Yes	Yes	Yes	Yes
Replenish depleted fire storage within 72 hours?	Yes	Yes	Yes	Yes

The number of projected ERUs in the 480 Zone shown in Table 3-8 reflects anticipated growth within this vicinity, and the "Buildout" number of ERUs includes an additional 88 ERUs for the area bordered by Rolling Hills Way, Jara Place, and E Silberhorn Road, because this area that is currently fed by the 420 reservoir is anticipated to be changed to be fed from the 480 reservoir to improve pressure. Projects to make this change in the 480 zone are described in the Capital Improvement Plan in Chapter 8. Table 3-8 demonstrates that the existing booster station has capacity to add these 88 ERUs to the 480 zone.

3.4.2.4 5th and McCurdy Booster Station

The 5th and McCurdy booster station was described in Chapter 1 – Water System Description. It pumps water, supplied by the Port Williams Wellfield, from the 350 pressure zone to the 420 pressure zone. The 420 pressure zone (discharge pressure zone for this booster station) is an open system because of the 420 Reservoir. Therefore, booster pump sizing guidelines follow section 8.1.1 of the Water System Design Manual. Fire Flow is provided by gravity from the 420 Reservoir, not from pumping facilities. This 420 zone is also supplied with water from the Infiltration Gallery supply source and the Silberhorn Wellfield supply source. In this circumstance, all sources supplying a pressure zone should be considered when assessing the size and number of pumps needed to satisfy the demand in the open pressure zone. MDD must be supplied with all pumps in service, and ADD should be supplied with the largest pump out of service.

Table 3-9 shows the capacity for the 5th and McCurdy booster station within the context described above for the open 420 Zone that it discharges to. The existing and projected ERUs, ADD, and MDD for the area served by this booster station are summarized in Table 3-9. PHD is not included in this table because the 420 Reservoir provides adequate equalizing storage for the

zone, so pumping does not need to provide PHD. Existing ERUs were estimated based on a proportion of the pressure zone area. The table shows that there is no need for additional capacity at the 5th and McCurdy booster station to serve the 420 zone.

Table 3-9 5th and McCurdy Booster Station Capacity Analysis

Parameter	2021	2031	2041
Analysis with respect to serving the 420 zone			
Estimated ERUs for this zone and sequential zones	1,965	2,641	3,549
Distribution System Leakage & Nonrevenue Water as ERUs based on ERU_{MDD}	158	213	286
Total ERUs	2,123	2,854	3,835
Sources of Supply for 420 Zone			
Infiltration Gallery, by gravity (gpm)	718	718	718
Silberhorn Well #1 (gpm)	300	300	300
Silberhorn Well #2 (gpm)	170	170	170
Silberhorn Well #3 (gpm)	165	165	165
5th and McCurdy pump #1 (gpm)	290	290	290
5th and McCurdy pump #2 (gpm)	290	290	290
Total of ALL sources supplying 420 pressure zone (gpm)	1,933	1,933	1,933
Total of ALL sources supplying 420 pressure zone with largest pump out of service (SW#1) (gpm)	1,633	1,633	1,633
ADD (gpm)	215	289	389
MDD (gpm)	491	660	887
Sufficient ADD Capacity with largest pump out?	Yes	Yes	Yes
Sufficient MDD Capacity?	Yes	Yes	Yes
Analysis with respect to fully utilizing Port Williams Wellfield to serve the whole water system			
Estimated ERUs for 350 zone	3,929	5,281	7,097
Distribution System Leakage & Nonrevenue Water as ERUs based on ERU_{MDD}	316	425	571
Total ERUs	4,246	5,706	7,668
ADD (gpm)	430	579	777
MDD (gpm)	982	1,320	1,773
Instantaneous capacity of Port Williams wellfield (gpm)	1,760	1,760	1,760
Port Williams wellfield capacity that can't be used during ADD (gpm)	750	601	403
Port Williams wellfield capacity that can't be used during MDD (gpm)	198	0	0

In addition to analyzing the 5th and McCurdy pump station with respect to its ability to serve the 420 zone that it discharges to, Table 3-9 analyzes the pump station with respect to its ability to convey Port Williams Wellfield water to the rest of the water system. It shows that, especially during an Average Day Demand condition in the 350 zone where the Port Williams water discharges to, the pumping capacity limitation of the 5th and McCurdy pumping station of 580 gpm means that the Port Williams wellfield cannot be fully utilized because there is nowhere for the excess water to go. For this reason, a new booster pump station is proposed in the Capital Improvement Plan, Simdars Road Booster Station, to provide additional capacity to pump water from the 350 zone to the 420 zone. This new booster station will be especially important when the City proceeds with drilling additional well(s) at Port Williams so that the additional source capacity can be utilized even in situations where demand in the 350 zone is average or low.

3.4.3 STORAGE ANALYSIS

Storage requirements for the City of Sequim are determined according to the *2020 Department of Health Water System Design Manual*. Due to the difference in elevation between the City's storage facilities and the highest service address, the City is able to achieve the minimum pressure requirements of 30 psi during peak hour and 20 psi during fire flow periods. As a result of this, no dead storage is present in the City's storage facilities. The storage requirements are based on the sum of the following:

- Operational Storage
- Equalizing Storage
- Standby Storage
- Fire Suppression Storage

This storage analysis includes three reservoirs; the 1.7 MG 420 Reservoir, the 0.2 MG 480 Reservoir and the 1.0 MG Solana Reservoir. The 0.5 MG reservoir is currently inactive and not included in the storage analysis. The required storage component volumes along with the storage analysis is presented in Table 3-8.

3.4.3.1 Operational Storage

Operational storage is typically defined as the volume of the reservoir devoted to supplying the water system under normal operating conditions while the source(s) of supply are in "off" status. This volume is dependent upon the sensitivity of the reservoir level sensors and the tank configuration necessary to prevent excessive cycling of source pump motors. As the City's water system has multiple sources and reservoirs that can be operated in varying ways selecting a percentage of total storage volume to be used as operational storage provides the most flexibility for operations. For the City's system, operational storage is assumed to be 10-percent of the total available storage which provides sufficient volume for control of sources as well as acceptable water turnover in the reservoirs.

3.4.3.2 Equalizing Storage

Equalizing storage is typically used to meet periodic peak demands which exceed the sum of the supply sources for the reservoir. The volume of equalizing storage required depends on peak

system demands, the source production rate, and the mode of system operation. Sufficient equalizing storage must be provided in combination with available water sources and pumping facilities such that peak system demands can be satisfied.

Equalizing storage is calculated using the following equation:

$V_{ES} = (Q_{PH} - Q_S)*150$ minutes

V_{ES} = Equalizing storage component (gallons)
Q_{PH} = Peak hourly demand (gpm)
Q_S = Total source of supply capacity, excluding emergency sources (gpm)

Peak hour demands for each pressure zone are as presented in Table 2-12. Total source capacity is as presented in Table 1-1.

3.4.3.3 Standby Storage

Standby storage is provided in order to meet demands in the event of a system failure such as a power outage, an interruption of supply, or break in a major transmission line. The amount of emergency storage should be based on the reliability of supply and pumping equipment, standby power sources, and the anticipated length of time the system could be out of service.

Standby Storage contains a volume sufficient to provide twice the average day demand minus source production capacity with the largest source out of service based on the formula:

$V_{SB} = (N)*(2 \text{ days })* (ERU_{ADD} - (Q_S - Q_L))$

V_{SB} = Required standby storage component (gallons)
N = Number of ERUs being served by the reservoir
ERU_{ADD} = Average day demand per ERU (gal/day per ERU)
Q_S = Total source of supply capacity (gpm)
Q_L = Largest source of supply capacity (gpm)

For the purposes of these calculations, the largest source is considered the largest producing wellfield (Port Williams Wellfield), since a potential contamination or power issue has the potential to affect the whole wellfield and not just individual wells.

In no case, however, shall the standby storage volume (in gallons) be less than 200 times the number of ERUs.

The City has adopted a policy of nesting standby and fire suppression storage. This allows for excluding either the SB or FS storage component from the total required storage capacity, whichever is smaller.

3.4.3.4 Fire Suppression Storage

Fire suppression storage is provided to ensure that the volume of water required for fighting fires is available when necessary. Fire suppression storage also reduces the impact of firefighting on distribution system water pressure. The amount of water required for firefighting purposes is

specified in terms of maximum adopted rate of flow in gallons per minute (gpm) and an associated duration. Fire flows must be provided at a residual water system pressure of at least 20 psi.

Fire suppression storage is calculated using the following equation:

V_{FSS} = NFF*T

V_{FSS} = Required fire suppression storage component (gallons)
NFF = Needed fire flow (gpm)
T = Duration (minutes)

3.4.3.5 Storage Capacity Analysis

The City's water system includes three reservoirs, as shown in Table 1-4 and Figure 1-6. The water storage in the 1.7 Million Gallon 420 Reservoir and the 1.0 Million Gallon Solana Reservoir can be analyzed together because the storage from each reservoir can serve the 350 and 420 pressure zones by gravity; and pressure zones 500, 680, and 775, while fed directly through the Solana Reservoir, can reliably utilize storage in the 420 reservoir because the 680 booster station that pumps from the 420 zone to the Solana reservoir has sufficient reliability via redundant pumps and an on-site backup power supply. For that reason, the combined volume of the two reservoirs is analyzed in Table 3-10. The number of ERUs being served by these two reservoirs for the analysis comes from Table 2-11 and subtracts out the number of ERUs served by the 480 reservoir, as shown in Table 2-12.

The 480 Reservoir (0.2 Million Gallon) and its pressure zone are hydraulically independent. The 480 Reservoir is analyzed in Table 3-11.

Table 3-10 Total Storage Capacity Analysis (420 and Solana Reservoirs) (gallons)

Year	Storage Available	Operational Storage	Equalizing Storage	Standby Storage	Fire Suppression Storage[(1)]	Storage Required[(2)]	Surplus/ Deficit
2021	2,700,000	270,000	0	1,235,000	540,000	1,505,000	1,195,000
2022	2,700,000	270,000	0	1,272,000	540,000	1,542,000	1,158,000
2023	2,700,000	270,000	0	1,310,400	540,000	1,580,400	1,119,600
2024	2,700,000	270,000	0	1,349,600	540,000	1,619,600	1,080,400
2025	2,700,000	270,000	0	1,390,200	540,000	1,660,200	1,039,800
2026	2,700,000	270,000	0	1,432,200	540,000	1,702,200	997,800
2027	2,700,000	270,000	0	1,475,400	540,000	1,745,400	954,600
2028	2,700,000	270,000	0	1,521,200	540,000	1,791,200	908,800
2029	2,700,000	270,000	0	1,568,400	540,000	1,838,400	861,600
2030	2,700,000	270,000	0	1,617,000	540,000	1,887,000	813,000
2031	2,700,000	270,000	6,147	1,667,000	540,000	1,943,147	756,853
2041	2,700,000	270,000	169,095	2,254,200	540,000	2,693,295	6,705

(1) Fire flow storage based on 180 minutes x 3,000 gpm.

(2) Fire suppression storage and standby storage have been nested. The largest value is used for the calculation at required storage.

As shown in Table 3-10, the City has adequate storage capacity through 2041, although there is very little surplus storage volume by 2041. The City is planning to construct an additional reservoir near the year 2041 as it nears needing additional storage. This is discussed in further detail in Chapter 8 – Capital Improvement Plan.

Table 3-11 480 Zone Storage Capacity Analysis (gallons)

Year	Storage Available	Operational Storage	Equalizing Storage	Standby Storage	Fire Suppression Storage(1)	Storage Required(2)	Surplus/ Deficit
2021	200,000	20,000	0	56,940	60,000	80,000	120,000
2022	200,000	20,000	0	58,400	60,000	80,000	120,000
2023	200,000	20,000	0	60,444	60,000	80,444	119,556
2024	200,000	20,000	0	62,196	60,000	82,196	117,804
2025	200,000	20,000	0	64,240	60,000	84,240	115,760
2026	200,000	20,000	0	65,992	60,000	85,992	114,008
2027	200,000	20,000	0	68,036	60,000	88,036	111,964
2028	200,000	20,000	0	68,036	60,000	88,036	111,964
2029	200,000	20,000	0	68,036	60,000	88,036	111,964
2030	200,000	20,000	0	68,036	60,000	88,036	111,964
2031	200,000	20,000	0	68,036	60,000	88,036	111,964
2041	200,000	20,000	0	68,036	60,000	88,036	111,964
Buildout	200,000	20,000	5,015	95,776	60,000	120,791	79,209

(1) Fire suppression storage based on 60 minutes x 1,000 gpm.
(2) Fire suppression and standby storage have been nested. The largest value is used for the calculation of required storage.

Table 3-11 indicates that the 480 Reservoir provides sufficient storage through the planning period and through anticipated buildout of the area to be served by this reservoir. Buildout of this system includes the potential to serve the Rolling Hills Way area, as discussed in Section 3.4.2.3, which forecasts the 480 zone having a build-out service area of 303 ERUs, plus DSL and NRW for a total of 327 ERUs.

3.4.4 Facility Reliability

The reliability of the City's water system facilities is typically provided through redundancy. The following paragraphs describe the reliability of the source production facilities, reservoirs, and water mains.

3.4.4.1 Source Reliability

The City currently has three sources of supply including the Infiltration Gallery, the Silberhorn Wellfield and the Port Williams Wellfield. The Infiltration Gallery flows by gravity and would not be affected by a power outage, but a 70 kW generator was installed to provide backup power for the chlorination and ancillary systems, which include a priming pump in case the siphon loses prime. The Silberhorn Wellfield has a 200 kW generator and sufficient fuel to provide backup service for 24 hours. The Port Williams Wellfield has a 200 kW generator that is capable of operating up to two wells simultaneously.

3.4.4.2 Storage

The City has three reservoirs totaling 2.9 MG that serve the 420, 480 and 680 Zones. All zones except for the 775 Zone can be served by the City's reservoirs.

3.4.4.3 Booster Stations

The City has four booster stations. Three of these stations move water from lower zones to higher zones in order to fill the City's reservoirs. The fourth station (775 Booster Station) provides pressure and flow to a closed zone. Reliability of booster stations must account for both failures of utility power and of mechanical problems with pumps. For a booster station to be considered reliable it must have both standby power and redundant pumps.

The 480 Zone booster station contains two pumps to provide redundancy, and is equipped with an emergency generator. This zone is also served by the 480 Reservoir.

The 5th and McCurdy Booster Station, which pumps from the 350 Zone to the 420 Zone, was updated in 2017 and now contains two pumps and does include emergency power.

The City's 775 Zone is supplied by a booster station equipped with redundant pumps and is equipped with a 100 kW backup generator. The 775 Zone Booster Station is the sole source for the 775 Zone.

The City's 680 Zone booster station contains three pumps, one of which is redundant, and an 85 kW generator. The 680 Zone is also served by the Solana Reservoir.

3.4.4.4 Treatment

A discussion of the City's treatment facilities is included in Chapter 1 – System Description. The City maintains spare parts for disinfection facilities and relies on source of supply redundancy to provide disinfection reliability. In the event of a power outage the backup generators at Port Williams and Silberhorn Wellfields maintain the function of the chlorine pumps. A permanent generator was added to the Infiltration Gallery in 2020 to ensure adequate treatment at all times.

The City has historically had issues with water age and lack of turnover in the Solana Reservoir. High water age results in a low chlorine residual in water being withdrawn from the reservoir. This is an issue because the City's system is required to maintain a chlorine residual to prevent contamination. This is due to a number of factors. One issue is that the infrastructure in the Solana area was designed for growth that has not yet occurred in the area. Currently, there are many vacant properties and water demands are insufficient to promote good turnover. The second issue is that the Solana area is located at a dead end with supply coming from a single direction. The current system layout means that water reaching Solana has likely spent time in the 420 Reservoir increasing its age. The City recently installed a reservoir mixer, and development has continued in this area, so water age / turnover / chlorine residual is less of an issue now than it used to be.

3.5 HYDRAULIC MODELING PROGRAM

The City's existing water system has been analyzed using Innovyze's InfoWater hydraulic modeling program to identify areas of the distribution system that are deficient in flow and pressure. In addition, the hydraulic model was used to analyze the effects of the proposed improvements on the water system.

3.5.1 MODEL DEVELOPMENT

In order to create a realistic representation of the City's water system, the model has been created using the City's GIS based water system base map and information obtained from the City. A map detailing existing pipes and nodes is included in Appendix K, along with a hydraulic model results. Existing system demands have been determined for the City as detailed in Chapter 2, and have been distributed throughout the system nodes. The current model is based on the model developed during the previous Water System Plan update, but it has been refined to represent updated demands, upsized or new distribution mains, pumping conditions, current pressure reducing valve settings, and reservoir levels.

3.5.2 MODEL CALIBRATION

In order to verify the accuracy of the hydraulic model, field testing is needed. The calibration process involves comparing model generated results with field measurements. This is done by performing hydrant flow tests on the water system. Calibration of the model is necessary to assign/confirm accurate pipe roughness factors, discover erroneous network connections, and verify settings of pressure reducing valve stations.

3.5.2.1 Calibration Procedure

The InfoWater hydraulic model of the City's water system was calibrated using data obtained from fire hydrant tests at various locations throughout the water system. Three fire hydrant tests were conducted with the assistance of City's personnel in December 2021. During these tests, static and residual pressures were recorded as a fire hydrant was opened and flowed. Field results were used to calibrate/verify the hydraulic model.

Table 3-12 Hydrant Testing Locations

Test No.	Pressure Zone	Testing Location
1	420	Blowoff at End of W Lobelia Dr.
2	350	East End of E Hammond St.
3	680	North End of Solana Pkwy

For each hydrant test, the hydraulic model was used to generate static pressure with normal demands and residual pressure at the measured hydrant flow rate. Model output is generated at points in the model equivalent to the locations of the hydrant tests.

Model output for static pressure was generated by running the 2021 MDD model scenario. Model output for residual pressure is generated at each model hydrant test point by placing an added demand equal to the measured residual discharge and recording the resulting pressure at the adjacent/upstream hydrant (per guidance from AWWA M32).

The system pressures and pipe flow rates determined in the hydraulic analysis are dependent on the friction loss characteristics established for each pipe. Adjustments to assumptions of friction loss are made (if needed) until the hydraulic model replicates the measured field conditions. Hazen-Williams C-factors between 100 and 130 are used throughout the system. These friction

factors are typical values for most pipes and are generally conservative. However, the friction factors for the pipe also compensates for system losses through valves and pipe fittings.

To determine the flow rate at each test location the velocity of the water flowing out of the hydrant was calculated using a projectile motion equation. With the velocity and the diameter of the hydrant opening, the flow rate was estimated.

3.5.2.2 Calibration Results

The model output is produced for both static pressure and residual pressure. The values measured in the hydrant flow tests are compared to the model output values in Table 3-13.

Table 3-13 Calibration Testing Results

Test No.	Flow (gpm)	Static Pressure (psi)			Residual Pressure (psi)			ΔF – ΔM(1)
		Field	Model	Δ	Field	Model	Δ	
1	310	91	89	2	83	86	-3	5
2	870	72	78	-6	65	68	-3	-3
3	890	65	68	-3	58	62	-4	1

(1) Difference in field static and field residual pressure minus difference in modeled static and modeled residual pressure.

Field testing verified that the inherited model (from the previous water system plan update) represents the field conditions to a sufficient degree of accuracy, and adjustment of the model (pipe roughness factors, connectivity, etc.) to match observations was not necessary. The hydraulic model produced results that varied from -6 to 2 psi of actual field test data for static pressure. For almost every test, the model pressure was slightly lower than the measured pressure, so this indicates that the model should be conservative and not overestimate available flow/pressure. Modeled headlosses during hydrant flowing are within 5 psi of the measured headlosses during hydrant flowing in all cases (ΔF – ΔM). The value of ΔF – ΔM represents the relative dynamic error in model calibration.

3.5.3 Model Simulation and Results

3.5.3.1 Model Inputs and Setup

Both peak hour demand and fire flow scenarios were modeled and were based on the projected demands developed in Chapter 2. For the peak hour scenarios, the forecast peak hour demands were assigned to system junctions, and reservoir levels were set based on the depletion of operational and equalizing storage. For the fire flow scenarios, the max day demands were assigned to system junctions and reservoir levels were set based on the depletion of operation, equalizing and fire suppression storage. Reservoir levels for modeling scenarios are shown in Table 3-14. Figures 1A and 1B in Appendix K map the water system and also display the all of the junction labels.

The 2020 Water System Design manual provides guidance with respect to sources running during modeling scenarios in Section 6.1.4. This indicates that model scenarios can assume all sources are operating. However, to remain conservative the only sources modeled as active

during the peak hour demand scenarios were Port Williams Well 1 operating at 600 gpm, Silberhorn Well 1 operating at 300 gpm, and the Infiltration Gallery operating at 350 gpm.

Table 3-14 Hydraulic Model Reservoirs Levels

Peak Hour Scenarios	2021 Level (ft)	2031 Level (ft)	2041 Level (ft)
0.2 MG 480 Reservoir	45.90	45.90	45.90
1.7 MG 420 Reservoir	26.10	26.10	24.66
1.0 MG 680 Reservoir	16.20	16.20	14.76
MDD + Fire Flow Scenarios	2021 Level (ft)	2031 Level (ft)	2041 Level (ft)
0.2 MG 480 Reservoir	30.79	30.79	30.79
1.7 MG 420 Reservoir	21.50	21.50	20.06
1.0 MG 680 Reservoir	11.60	11.60	10.16

3.5.3.2 Peak Hour Demand

According to the *2020 Water System Design Manual* and WAC 246-290-230, a water system must maintain a minimum pressure of 30 psi in the distribution system under peak hour demand conditions with equalizing storage depleted. The City's existing distribution system was modeled for 2021, 2031, and 2041 peak hour demand conditions. For these scenarios, the City's distribution system was able to maintain pressures of 30 psi system wide (App. K Figures 2,3,4), with the only exception being model nodes on transmission lines or distribution facilities immediately adjacent to reservoirs where there are no customer connections. See Appendix K for complete results. Model results do show some limited areas of excessive pressure (above 100 psi) that the City may want to address in the future with pressure reducing valves.

Future system expansion has the potential to span beyond the limits of what can be served by the existing pressure zones. A majority of the areas the City would bring into its system can be adequately served by the City's existing reservoirs and pumping systems. However, this is not the case with the addition of services in the southwest region of the current city limits or UGA. The City's reservoirs are not at a sufficient elevation to serve these areas under DOH requirements. The City would be required to build additional storage in this area at a sufficient elevation or add a closed booster pump station to provide peak hour demands and the minimum pressure of 30 psi. The approximate base elevation of the reservoir should be at least 635 feet above sea level based on USGS topographic maps for the area to serve the entire potential future service area. See CIP for additional details.

3.5.3.3 Fire Flow

WAC 246-290-230 states, "If fire flow is to be provided, the distribution system shall also provide maximum day demand (MDD) plus the required fire flow at a pressure of at least 20 psi at all points throughout the distribution system, and under the condition where the designed volume of fire suppression and equalizing storage has been depleted." During fire flow modeling, all sources have been turned on and are able to flow at their capacities listed in Ch. 1 with the exception being the Infiltration Gallery. It was modeled at a flow rate of 350 gpm. A

3,000 gpm fire flow has been utilized in this model for non-residential areas and a 1,000 gpm fire flow was used for residential areas, per City of Sequim standards described in this chapter.

This Plan outlines system improvements required to meet these standards that, at this time, exceed the fire flow standards established by City ordinance. The City has adopted the 2018 International Fire Code (IFC) in the Sequim Municipal Code, as previously identified.

The 2018 IFC, Appendix B, identifies a residential minimum fire flow of 1,000 gpm for dwellings 3,600 square feet and less. This has historically, and continues to be, the minimum fire flow standard for residential areas in the City's water system.

The 2018 IFC, Appendix B, identifies fire flow standards for buildings 3,600 square feet and greater that vary from 1,500 gpm up to 8,000 gpm for extremely large facilities (85,000 square feet and greater). Extremely large facilities at the upper end of this spectrum do not exist, and are not anticipated, in the City of Sequim. The City of Sequim has historically, and continues, to design its water system to be able to provide a commercial fire flow of 3,000 gpm. Appendix K contains system maps and model results that list the available fire flow for the City's existing system under 2041 maximum day demands.

3.5.4 Recommended Distribution System Improvements

Distribution system improvements are recommended for the 10-year and 20-year planning periods. Descriptions, locations and costs of the Capital Improvement Projects are provided in Chapter 8. Project financing is discussed in Chapter 9.

3.5.4.1 Improvements to Address Fire Flow Deficiencies

As shown in Appendix K Maps, several areas of the system have fire flow deficiencies as defined by the City's design standards for the 1000 gpm and 3000 gpm requirements.

For residential areas there are 17 deficient junctions (App. K Figure 5A) that are located in the 420 Zone South of Highway 101, Along E Cobblestone Ln, and in the 480 Zone, centered around Eunice St. In order to meet the fire flow requirement of 1,000 gpm for this residential area, improvements D-3 (5th ave water main), D-4 (Reservoir Road and 7th Ave water main), D-5 (Norman Street and Eunice Street improvements) and D-12 (Marlo Drive West extension to River Road) are recommended to loop the existing water lines.

For commercial areas (App. K Figure 6), there are 104 deficient junctions (App. K Figure 7A) that are concentrated around the Walmart and Costco shopping centers on W Washington St. Other deficiencies are centered around E Washington St. near the Holiday Inn and Elk Creek Apartments. Only two junctions do not meet the minimum IFC commercial requirement of 1,500 gpm. These two junctions, J2024 and J2006, are at the end of Marlo Ave, and a dead end near Grant and River Rd. Projects are proposed to address all these deficiencies include CIP projects D-1 (Hammond Street Water Main), D-6 (Washington Street Water Main) , D12 (Marlo Drive West extension to River Road), D-16 (Washington Harbor Road to Washington Harbor Loop) and D-20 (South 7th Ave from Silberhorn Road to McCurdy Road. .

3.5.4.2 Service Area Expansion in the Southwest

In addition to the recommended improvements outlined above, the City plans to provide water service to the area in the southwest portion of the service area in the future. These improvements may eventually include a new reservoir, however there is not enough elevation in the immediate vicinity of this area to construct a reservoir that could serve the system by gravity. A reservoir to serve the system by gravity would need a Hydraulic Grade Line of at least 635 ft. The topography of the area means that a suitable site for at-grade reservoir would need to be outside the City limits to the south / southeast of the area being served, which is likely not feasible due to cost constraints. The City will build a booster station to provide water to the area at an HGL of 635. In addition, PRV stations will be required in order for this storage to be usable in other areas of the water system. These projects are addressed by improvements BS-1 and D-21.

3.5.4.3 Service Area Expansion to the East

In addition to the area to the southwest, another area within the UGA with significant opportunities for growth is located to the east of downtown and north of Highway 101. The water distribution mains for these areas will involve connecting the north and south portions of the system from West Sequim Bay Road to Washington Street. A project to provide water to this area would consist of extending waterlines along West Sequim Bay Road and Washington Harbor Loop. These projects could serve the Battelle Research Facility as well as connection with the Marina Water System. These projects are shown as improvements D-7(West Sequim Bay Water Main), D-8 (Washington Harbor Loop Water Main No. 1), D-13 (West Sequim Bay Road from Battelle to Connect with Marina Water System) and D-16 (Washington Harbor Road to Washington Harbor Loop).

3.5.4.4 Available Fire Flows with Recommended Improvements

Projected year 2041 fire flows, incorporating the improvements outlined above and as described in Chapter 8, are summarized in Appendix K. For residential areas the recommended improvements reduce the number of deficient junctions from 17 to 0 (App. K Figure 5B). Every junction is able to meet the 1,000 gpm fire flow requirement.

For commercial areas the recommended improvements reduce the number of deficient junctions from 104 to 52 (App. K Figure 7B). The improvements do address the two junctions that weren't able to meet the IFC 1500 gpm fire flow requirement. The improvements also provide at least one junction in each major deficient area to achieve a fire flow of 3000 gpm.

These projects are also sufficient to provide the transmission backbone for fire flows to the City within the 20-year planning period. However, as the City develops the hydraulic model should be revisited to verify that the system still has the ability to meet the requirements in the *2020 Water System Design Manual*. Chapter 8 presents a recommended set of improvements to meet source, storage and distribution/fire flow needs, and contains a summary of the recommended project costs.

3.6 WATER SYSTEM DEFFICIENCIES

3.6.1 SOURCE OF SUPPLY

The City has sufficient annual and instantaneous water rights, as well as current installed sources of supply, to supply water to the service area if the growth in the system occurs as anticipated through 2041.

The City will investigate additional physical installed source capacity, as that is anticipated to be the first limiting factor, potentially around 2041. The City may investigate drilling a deeper well in the Silberhorn wellfield to address nitrate and capacity limitations. The City will also investigate construction of a surface water treatment plant for direct use of the Dungeness River water right, and may also pursue up to two additional wells in the Port Williams wellfield. The City will continue to evaluate the feasibility of becoming a regional provider either through satellite management agreements or purchase of water systems and water rights in the greater Dungeness Valley. These projects are discussed in further detail in Chapter 8, Capital Improvement Plan.

3.6.2 STORAGE

The City has sufficient storage through the 20-year planning period. Depending on the rate of development, the City plans to eventually build a new reservoir to provide additional storage capacity and redundancy. This additional storage is proposed in order to serve future connections. These projects are also described in further detail in Chapter 8, Capital Improvement Plan.

3.6.3 WATER AGE

The City will continue to monitor water age and chlorine residual in the Solana reservoir and service area. Reservoir mixing and ongoing development in this area has improved the situation since the last water system plan update.

3.6.4 DISTRIBUTION SYSTEM

The operation of a municipal water system involves dynamic interactions between various water system components, including source, storage, and distribution system facilities. In addition to normal diurnal demands, infrequent demand events, such as fires, can create significant stress on a municipal water system.

Analysis of the distribution system revealed several areas with fire flow deficiencies. See previous descriptions.

3.6.5 SANITARY SURVEY

The City's most recent DOH Sanitary Survey was completed in October 2017. The survey did find significant deficiencies (primarily related to screening and sealing openings), but these deficiencies were corrected within the timeframe stipulated.

3.7 SYSTEM CAPACITY SUMMARY

Table 3-15 summarizes the source and storage capacity in terms of ERUs based on connections, and with distribution system leakage and non-revenue water. All aspects of capacity are anticipated to be sufficient through the 20-year planning period (2041). As indicated in Table 2-11, the projected number of ERUs associated with service connections is 10,904 ERUs in 2041. All system components have capacity to serve this projected need, but both source capacity for max day and storage will be approaching their capacity limitations.

Table 3-15 System Capacity Summary(1)

Capacity Parameter	ERU Capacity including DSL and NRW	ERU Capacity after subtracting DSL and NRW (2)
Source Capacity Max Day	**11,735**	**10,789**
Source Capacity Average Day	**23,015**	**18,789**
Water Rights – Annual	**28,823**	**23,518**
Water Rights – Instantaneous	**18,577**	**17,078**
Storage Capacity(3)	**>11,516**	**>10,655**
Distribution	**>12,000**	**>12,000**

(1) Data is based on 2041 projections, where applicable.

(2) ERUs associated with DSL and NRW depend on whether the analysis is with respect to ADD or MDD, as explained previously in this water system plan. They are accounted for appropriately in this table.

(3) The exact number of ERUs that could be served by the existing reservoirs was not quantified, but Table 3-10 shows that there is still a small surplus of storage in 2041, so existing storage has capacity for slightly more than the projection for 2041.

Chapter 4
WATER USE EFFICIENCY PROGRAM AND WATER RESOURCE ANALYSIS

4.1 WATER USE EFFICIENCY BACKGROUND

The Washington Legislature passed the Water Use Efficiency Act of 1989 (43.20.230 RCW), which directs Department of Health (DOH) to develop procedures and guidelines relating to water use efficiency. In response to this mandate, Department of Ecology (Ecology), the Washington Water Utilities Council, and DOH jointly published a document titled *Conservation Planning Requirements* in 1994. In 2003, the Municipal Water Supply – Efficiency Requirements Act (Municipal Water Law) was passed as Engrossed Second House Bill 1338 and amended the RCW to require additional conservation measures. The Municipal Water Law, among other things, directed DOH to develop the Water Use Efficiency Rule (WUE Rule), which was adopted in October 2006. WUE rule requirements are presented in WAC 246-290 Part 8. The WUE Rule is outlined and compliance guidance is provided in the *Water Use Efficiency Guidebook*, updated in 2017 (Third Edition, DOH pub. #331-375).

Conservation and efficiency programs developed in compliance with the WUE rule are required by DOH and by Ecology as part of a public water system water right application. Conservation must be evaluated and implemented as an alternate source of supply before state agencies approve applications for new or expanded water rights.

Conservation can be used effectively to help meet an increased demand for water, to protect the environment, to delay the development of costly infrastructure, and to ensure that water is available to meet economic and population growth consistent with the Growth Management Act by using existing supplies more efficiently. Public awareness and participation are necessary for the City to have an effective conservation plan.

The WUE Rule sets stringent requirements for public water purveyors, in particular:

1. Planning requirements, including data collection, demand forecasting, and evaluating historical WUE measures
2. Distribution leakage
3. Customer goal setting and WUE reporting

4.2 DATA COLLECTION & DEMAND FORECASTING

Collection of data on water production and use is critical to ensuring efficient use of water resources. Water use data allows the water system to calculate leakage, forecast demands, identify areas of potential efficient water use, evaluate success of existing WUE program, describe the water supply characteristics, and aid in water management decision making.

Detailed water use data and water demand forecasts for the City are presented in Chapter 2.

A summary of the City's data collection for each type of required data is presented in Table 4-1.

Table 4-1 Summary of Water Use Data Collection

Required Data Type	Frequency of Monitoring	Comments
Source of Supply / Production Meter Readings*	Monthly and Annual Totals	Meter readings collected daily and reported monthly and annually
Import from Emergency Interties	Not Applicable	Currently no emergency interties exist
Export from Emergency Interties	Not Applicable	Currently no emergency interties exist
Wholesale Water Purchased	Monthly and Annual Totals	Purchase PUD water for Eagle Crest (15 homes)
Wholesale Water Sold	Not Applicable	No wholesale water is sold
Peak Day, Peak Month	Annually	Determined from source production records
Distribution System Leakage	Annually	Calculated from City customer billing records and source meter records (See Chapter 2). City to compile data on an annual basis.
Unmetered, Unbilled Authorized Uses	Annually	Calculated from City records of flushing, testing and construction uses
Customer Service Meter Readings**	Monthly	Information from City billing records
Population Served	Annually	See Population Projections in Chapter 2
Economic Data	As Required	Water rates are set by City Ordinance
Conservation Data	Annually	Per capita water usage

*Production meter details: All City sources of supply are metered. Source meters for the Silberhorn and Port Williams wellfields are made by Krohne, model Optiflux 4100 electromagnetic mag meters. Manufacture date for all is 2011. They were calibrated when new and do not need to be recalibrated, just replaced when not reading properly. The production meters have a OPTICHECK service tool that can be used for on-site verification of flowmeter. The City will utilize this tool periodically and if flowmeter readings vary from expected values. The meter at the Infiltration Gallery is an old Sensus propeller meter. It was rebuilt about two years ago. These do not require recalibration, just replacement or rebuilding if not reading properly.

**Service meters: All customer service connections are metered. See following description.

All customer service connections have a Sensus SR2 digital touch read meter. They are a magnetic drive positive displacement meter that uses an oscillating piston. Typically, they are 5/8" x 3/4" for residential. Commercial sizes vary from 1" to 2". They come calibrated and do not require recalibration. Problems tend to be related to battery life, so when an issue arises the City swaps the old register out with the new one. Meters should last 15-20 yrs. before the registers need replacing. Service meters are installed in a meter box at minimum 6" below grade level, and with 6" separation gap from the bottom of the meter to help keep the meters from freezing during the winter months. In the same box where the meter is installed, there will be a Pressure Reducing Valve installed just past the meter to keep from over-pressurizing the residence. There is no recalibration that needs to be done and meters are maintenance free – other than the register needs to be replaced when batteries run low.

The City replaced all of the residential meters over two-years in 2011-2013. The City will include replacing residential meters on the 20-year cycle recommended by the manufacturer in the CIP Item MI-4 (see Chapter 8).

In 2022, the City's fee for water hook-up and inspection is $250.00. Water meter packages including the service meter, water meter box, and fittings, are sold by the City as follows:

- 5/8" x ¾" meter = $316.72 (the meter itself is $187.48)
- 1" meter = $299.44

4.3 DISTRIBUTION SYSTEM LEAKAGE

The WUE Rule requires that water distribution systems have a distribution system leakage (DSL) rate less than 10 percent of total finished water production. Compliance with the 10 percent requirement is determined based on a three-year rolling average. Distribution system leakage is defined as the difference between total water production and authorized consumption. Authorized consumption is the volume of water authorized for use by the water system. This includes metered water consumption by customers and known or credibly estimated unbilled or unmetered uses as well. Unmetered authorized consumption may include uses such as cleaning of reservoirs, fire fighting, and system flushing.

As shown in Chapter 2, the City's current 3-year rolling average Distribution System Leakage is below 10 percent for years 2019-2021, so a water loss control action plan is not required.

4.4 WATER CONSERVATION

Conservation has been and continues to be a constant concern for water supply managers in the relatively arid Dungeness watershed. The City of Sequim's conservation and efficiency program has been modified over the decades based on new State regulations and concerns about drought; Table 4-2 summarizes the history of setting and achieving water use efficiency goals.

The City's 1995 Water System Plan developed a water conservation program based on the 1994 DOH *Conservation Planning Requirements*. The 1995 Plan indicated that the 20-year conservation goal is a 15 percent reduction in average yearly demand and a 20 percent reduction in peak day demand. These goals remained the same in the 2000 Water Comprehensive Plan.

The City's 2008 Water System Comprehensive Plan updated the conservation program to include the changes to state guidance made when the Municipal Water Law of 2003 was implemented. The goal presented in the 2008 Plan was the reduction of the water system's ERU (Equivalent Residential Unit, which represents typical single family residential usage) by 10 percent over a 10-year period. This was to be accomplished partly by increasing utilization of reclaimed water produced at the City's Water Reclamation Facility. In 2005, the last year of historical data for the previous Plan, the ERU value was 195 gpd/unit. In 2010, 5 years into the previous conservation plan, the ERU value was 160 gpd/units. This represents an 18 percent reduction and exceeds the goals of the 2008 Plan.

Water conservation goals set in the City's 2014 Water System Plan follow:

- As a demand side goal, the City would reduce the ERU value (of 160 gpd/unit) by 10 percent over the next 10 years. The City's primary tactic for reaching this goal is the additional use of Class A reclaimed water from its Water Reclamation Facility to replace irrigation use of potable water.
    - In 2021, the usage per ERU was 146 gpd/ unit, or a 9% reduction over 10 years, so this goal was almost accomplished. Usage per ERU was more than 10% lower in 2018 and 2019, but increased slightly in 2020 and 2021.
    - Estimated water savings due to decreasing usage per ERU was approximately 260 million gallons over the past 9 years.
- As a supply side goal, the City would reduce DSL to the DOH requirement of 10 percent over the next 6 years. This will be a reduction of approximately 1 percent DSL per year.
    - DSL went from 13.7% for 2014 to 9.1% for 2021, which achieves the goal of reducing below the DOH standard of 10%. The estimated amount of water that was saved by decreasing DSL compared to the 2010 DSL is approximately 90 million gallons.

Table 4-2 Summary of WUE Goals

Plan year	Demand-side Goal	Achieved?	Supply-side Goal	Achieved?
1995	20-year goal is a 15% reduction in average yearly demand and a 20% reduction in peak day demand	(not known)	(none)	
2000	(same as 1995)	In 2005, the ERU value was 195 gpd/unit.	(none)	
2008	Reduce ERU by 10% over a 10-year period, expected to be accomplished partly by increasing use of reclaimed water.	Yes. In 2010 the ERU value was 160 gpd/ unit. This represents an 18% reduction since 2005.	(none)	
2014	(same as 2008)	Not quite. In 2021 the ERU was 146 gpd/ unit, which is a 9% reduction in 10 years.	Reduce DSL to below 10% over the next 6 years.	Yes. The City's DSL went from 13.7% for 2014 to 9.1% for 2021.
2022	Reduce ERU further, by 5% over a 10-year period, by increased conservation and use of reclaimed water.	(to be determined in 2031)	Continue to reduce DSL 3% over the next 10 years, by fixing leaks.	(to be determined in 2031)

4.5 NEW WATER USE EFFICIENCY PROGRAM

Under the WUE Rule, the City's governing body must set water use efficiency goals and measure progress each year toward meeting these goals. Goals must include a measurable outcome, address water supply or demand characteristics, and include an implementation schedule.

4.5.1 GOALS

As shown above, the City has met and exceeded its conservation goals most of the time. The City will adopt new conservation goals at the time of Plan adoption:

- As a demand side goal, the City will attempt to continue reducing the ERU value by 5 percent over the next 10 years. The City's approach to reaching this goal is through conservation education and continually increasing use of reclaimed water.
- As a supply side goal the City will continue to reduce DSL by 3% over the next 10 years, by continuing to fix leaks and replacing AC and Galvanized pipe.

4.5.2 WUE MEASURES

In addition to goals set by the City, the WUE Rule requires implementation of standard water use efficiency measures to help meet WUE goals generally. The 2017 WUE Guidebook sections 5.6 and 5.7 (and Appendix B) describes the mandatory and supplemental measures that must be implemented to meet the WUE Program requirements. WAC 246-290-810 identifies the minimum number of water use efficiency measures that must be evaluated based on system size. The City currently serves between 2,500 and 9,999 connections which means at least six supplemental measures are required in addition to several mandatory measures, listed next.

4.5.2.1 Mandatory Measures:

Implement Source Meters, Service Meters and Meter Calibration

Source meters are installed at all of the City's water sources and service meters are installed for all of the City's customers. The City has constructed a reclaimed water system that pumps Class A reclaimed water to the City for reuse. The City has converted a large portion of their currently unmetered water use to reclaimed water, thereby reducing the amount of unaccounted for water from the City's potable water system.

The City has a meter replacement program to ensure that older service meters are replaced before they begin registering water use inaccurately. The City replaces source meters and service meters when testing shows that they are registering water use inaccurately.

Implement Program Promotion and Customer Education at least once per year

First, the City uses paper bills to collect funds due as well as electronic bill pay. Bills are sent monthly and include information on the customer's historical use, and ways to save water and energy. Bills also include charges for wastewater production, if applicable. Second, the City provides information on water conservation in their monthly newsletter, on their website, and in flyers at City Hall.

Third, the City's annual Water Quality report, also known as the Consumer Confidence Report, includes water conservation tips. These provide instructions on simple ways that customers can reduce their daily water consumption. A copy of the most recent Water Quality report can be found in Appendix G.

Finally, when the Dungeness watershed is experiencing state-declared drought, additional water saving outreach is conducted by the City. A flyer "About the Drought" created in 2015 was also used in 2019 and 2020. At these times, tips on conserving are included in the City's monthly newsletter, on its website, and emailed out to list-serve subscribers. Also note that the monthly newsletter is reprinted in the Sequim Gazette.

Since the City implements outreach and education on conservation more than once per year, they will be counted as 2 supplementary measures.

Evaluate Distribution System Leakage (and Implement a Water Loss Control Action Plan if DSL >10 percent)

The City currently performs annual leak detection surveys as a part of system O&M. Leaks are repaired whenever found and the City budgets money annually for both leak detection and leak repair. The City's storage tanks are in good condition and are inspected regularly. The City's 500,000-gallon in-ground concrete reservoir, which was suspected to be leaking, is still out of service. Meters are tested and replaced as necessary depending on size. The City is currently undertaking a number of CIP projects to replace water mains which includes $200,000 per year for the replacement of asbestos cement (AC) water mains since they can be brittle and prone to leakage. Water theft is not considered to be a significant source of DSL at this time.

As detailed in Chapter 2, the City's current 3-year rolling average DSL for 2019-2021 is 9.1 percent, which meets the standard of 10 percent maximum DSL and avoids the requirement for a Water Loss Control Action Plan (WLCAP) to remain in compliance.

4.5.2.2 Supplemental Measures:

Appendix B of the 2017 WUE Guidelines lists the following examples of measures that meet WUE requirements:

> **Indoor Residential:** Toilet or urinal retrofit, Rebate program, Showerhead or faucet replacement, Indoor water audit, School outreach, Displays at fairs and events, Speakers bureau, Targeted marketing, Advertising (media), Conservation rates/pricing, Customer leak detection education (indoor leak repair), Water bill showing consumption history
>
> **Outdoor:** Workshops for landscape professionals, Soil moisture sensors, Rain sensors, Irrigation timers, Xeriscaping (low-water use landscaping), Demonstration garden, Turf replacement rebate, Landscape ordinances, Drip irrigation, Landscape water audit, Irrigating with reclaimed water
>
> **Industrial/Commercial/Institutional:** Recycling or reuse, Commercial pre-wash sprayers, Showerhead or faucet replacement, Toilet or urinal retrofit, Cooling tower improvements, Cooling systems retrofit, Air-cooled refrigeration, Water use audits (including irrigation
> systems), Water bill showing consumption history, Using reclaimed water
>
> **Others:** Water use ordinances, High efficiency shower heads, High efficiency faucet aerators, Rebate programs, etc.

From this list, City of Sequim implements the following measures, at minimum:

Conservation Pricing

The WUE rule requires that systems evaluate a rate structure that encourages conservation, and if the City implements a conservation rate structure, it can be counted as a supplementary measure. The City's inclined block water rate structure, adopted most recently by City Ordinance 2021-028, is discussed in further detail in Chapter 9 – Financial Program.

In summary, the City's base charge does not include any water usage. For residential customers, monthly usage rates are $0.00950 per cubic foot (cf) for the first 600 cf, $0.02777 for 601-1,600 cf, and $0.03509 for 1,601 or more cf. Irrigation, Commercial, and public agency customers have the same rate structure up to 1,600 cf, but do not pay a higher rate for more usage. This rate structure encourages conservation and applies to four customer classes, which counts as four supplementary measures.

Bills Showing Consumption History

The City's current software allows past water usage to be shown on the current water bill so customers can see how their water usage compares to previous billing cycles. This measure applies to four customer classes, which counts as four supplementary measures.

Use Reclaimed Water

The WUE rule requires that systems >1,000 connections evaluate wastewater reclamation opportunities; since the City implements wastewater reclamation, it can be counted as a supplementary measure. As mentioned previously, the City has installed a Water Reclamation Facility (WRF) that pumps Class A reclaimed water into the City for reuse. The City's *2008 Water Reclamation Facility Expansion Engineering Report (2008 Engineering Report)* projects an average annual flow of 2.0 mgd of reclaimed water based on 2025 design criteria. The City's primary uses of reclaimed water are for the City Shop, irrigation at the Reuse Demonstration Site at Carrie Blake Park as well as in ROW medians, and augmentation of Bell Creek stream flows. Future projects for reclaimed water use are discussed in the City's *2008 Engineering Report* and include various aquifer recharge projects, additional storage, additional augmentation of Bell Creek, and possible augmentation of Gierin Creek.

In 2021, the City used 32.6 percent of its reuse water for projects around the City, which averaged approximately 221,000 gpd. This is up from 20 percent and 120,000 gpd in 2006. Reclaimed water was mainly used by the Water Reclamation Facility (WRF), the Water Reuse Demonstration Site at Carrie Blake Park, and for other projects by the City (dust control, vehicle washing, etc.). As the City has implemented reclaimed water and is increasingly putting that water to use this can be counted as a supplementary measure. Sites that are dual-plumbed reclaimed water use sites conduct annual shutdown cross-connection tests.

Notifying Customers About Leaks on Their Property

The City currently educates customers on a number of topics which include how to identify leaks within their homes and on their property. Unusually high utility bills are flagged by the billing system and notices are sent to customers. Finance staff review for unusually high consumption activity in an effort to identify leaks, and deploy field crews immediately to investigate. This practice counts as a supplementary measure.

4.5.2.3 Summary

The WUE rule requires systems with 2,500-9,999 connections (such as Sequim) to implement at least six supplementary WUE measures. The City implements 12 supplementary measures, summarized in Table 4-3.

Table 4-3 Supplementary WUE Measures Counted

Implemented Measure	Number of Supplementary Measures Counted
Conservation Pricing	4
Bills Showing Consumption History	4
Reclaimed Water Use	1
Customer Notifications of Leaks	1
Outreach/Education (beyond 1 per year)	2 (at least)
Total City Supplementary Measures	**12**
DOH Required Measures	6

4.5.3 PROJECTED WATER SAVINGS

The City plans to meet its WUE Program Goals by implementing the WUE Measures listed above.

Note as described previously that water use per ERU has been decreasing, and the goals described in this chapter aim to continue that trend.

Anticipated water savings for the City's conservation goals are presented in Table 4-4. Based on this table, within the next ten years the City's conservation program is projected to reduce the average day demand by approximately 110,000 gallons and reduce the maximum day demand by approximately 280,000 gallons.

The City will evaluate its progress against the WUE goals when the WUE Plan is updated and new goals are set. The City may, in the future, consider additional incentives to reduce water use, such as rebate programs for showerhead or faucet replacements, or toilet or urinal retrofits. The City would perform a quantitative evaluation, including the marginal cost of water, to assess cost-effectiveness prior to implementing a rebate program.

Table 4-4 Projected Water Use With Conservation

Year	ERUs	ERU_{ADD} based on WUE goal (gpd/ERU)	Average Daily Demand (gallons)	DSL based on WUE goal (%)	Distribution System Leakage Based on ERU_{ADD} (ERUs)	Distribution System Leakage Based on ERU_{MDD} (ERUs)	Nonrevenue Water Based on ERU_{ADD} (ERUs)	Nonrevenue Water Based on ERU_{MDD} (ERUs)	Total Average Daily Production (gallons)	Maximum Daily Production (gallons)	Average Day savings due to WUE goals (gallons)	Maximum Daily Production savings due to WUE goals (gallons)
2021	5,894	146	860,524*	9.3%	633*	284*	448*	201*	1,018,386*	2,099,603*	N/A	N/A
2022	6,071	145	881,934	9.0%	645	283	448	197	1,040,714	2,093,660	9,026	91,486
2023	6,254	145	903,976	8.7%	640	281	460	202	1,062,974	2,142,339	18,302	108,408
2024	6,442	144	926,494	8.4%	635	278	472	207	1,085,704	2,191,745	28,130	126,934
2025	6,636	143	949,624	8.1%	628	276	485	213	1,108,896	2,243,121	38,518	145,488
2026	6,836	142	973,353	7.8%	621	272	497	218	1,132,541	2,294,869	49,329	165,668
2027	7,042	142	997,671	7.5%	613	269	511	224	1,156,913	2,348,536	60,727	186,260
2028	7,254	141	1,022,567	7.2%	604	265	524	230	1,181,577	2,403,160	72,563	207,893
2029	7,472	140	1,048,032	6.9%	594	261	538	236	1,206,807	2,459,031	85,001	230,277
2030	7,697	140	1,074,192	6.6%	583	256	552	242	1,232,593	2,516,125	98,197	254,102
2031	7,928	139	1,100,899	6.3%	572	251	567	249	1,259,062	2,574,725	111,732	278,752
2041	10,655	139	1,479,575	6.3%	768	337	762	334	1,692,034	3,460,054	150,194	374,774

4.6 WATER RESOURCE ANALYSIS

4.6.1 WATER SUPPLY CHARACTERISTICS

The City currently utilizes three sources for regular, daily supply: the Infiltration Gallery, the Silberhorn Wellfield, and the Port Williams Wellfield; the River source remains available. The City's sources and water rights history and current status are summarized in Chapter 1, Table 1-1, and Appendix H.

Since the City's water sources and uses are all located within Eastern WRIA No. 18, they fall under the Dungeness Water Rule (WAC 173-518). Because of the growing gap between available water supply and needs at the watershed scale, the Department of Ecology developed a MODFLOW-based numerical groundwater model for the management of groundwater resources in the governed area and this model is used to predict foreseeable effect from current and future use on other bodies of water in the Dungeness watershed.

4.6.1.1 Dungeness River

The City's first water rights date to 1924, for surface water from the Dungeness River conveyed via the Highland Irrigation District (HID) main canal to the City's Reservoir Road headgate. In 1929, the City built its own headgate for direct, gravity conveyance of River water to the reservoir via a 4.5-mile wood-stave water pipe. The City's diversion was used for several decades but the HID canal has also continued to be used at times, to convey River water to Reservoir Road and/or the City infiltration galleries' intake areas.

4.6.1.2 Infiltration Gallery

The City relies on water from an Infiltration Gallery (DOH source number S01) built in 1977, which consists of a horizontal collector system made of perforated pipe buried more than 20 feet deep in a gravel filter pack east of the stream bank of the Dungeness River. The perforated pipe feeds a central collection well and water flows by gravity siphon to Reservoir Road and the City's 420 Reservoir and distribution system. The Infiltration Gallery has been identified as being hydraulically connected to the River but is not groundwater under the direct influence of surface water. As such, the City is required to disinfect this source by providing a concentration-contact time (CT) of 6 as described in the treatment section of Chapter 3.

4.6.1.3 Silberhorn Wellfield

The Silberhorn Wellfield, DOH source number S02, consists of three wells. Specific information on the individual wells is presented in Table 1-2. During periods of higher demand the City uses two or all three wells simultaneously. The Silberhorn wells were designed with a pumping capacity of 400 gpm, but the City currently operates each of these wells at a reduced pumping rate (as shown in Table 1-2).

The capacities of Silberhorn Wells No. 2 and 3 shown in the previous Water System Plan were both 260 gpm, but these capacities have decreased as noted in Table 1-2, Note 3. Silberhorn

Well No. 1 was rescreened and redeveloped in 2010. Well No. 2 was redeveloped in 2013. Well No. 3 has not been redeveloped since it was installed in 1985.

4.6.1.4 Port Williams Wellfield

The Port Williams Wellfield, DOH source number S05, currently consists of three wells. Information on the individual wells is presented in Table 1-3. Each well has a 100 hp, 460V, 3 phase submersible pump which was designed with a pumping capacity of approximately 600 gpm at 500-570 feet TDH. During periods of high demand, all three wells can operate simultaneously. The City's water right permit allows for the drilling of up to five wells at the Port Williams Wellfield, and includes several provisions discussed in Appendix H.

4.6.2 Source of Supply Analysis / Alternatives

The City is committed to water conservation and increasing the use of its Class A reclaimed water to reduce future water supply needs. However, there may still be a need to increase and/or diversity the City's sources of supply.

4.6.2.1 Dungeness River

Today the Dungeness River water is available for City use from either the HID or City's Reservoir Road headgate. A new surface water treatment facility is needed to make direct use of the surface water source, and this new surface water treatment facility is included in the City's Capital Improvement Plan. As explained in Appendix H, the infiltration gallery is also an additional (alternate) point of diversion for the river water right, since it can be used to recharge the infiltration gallery.

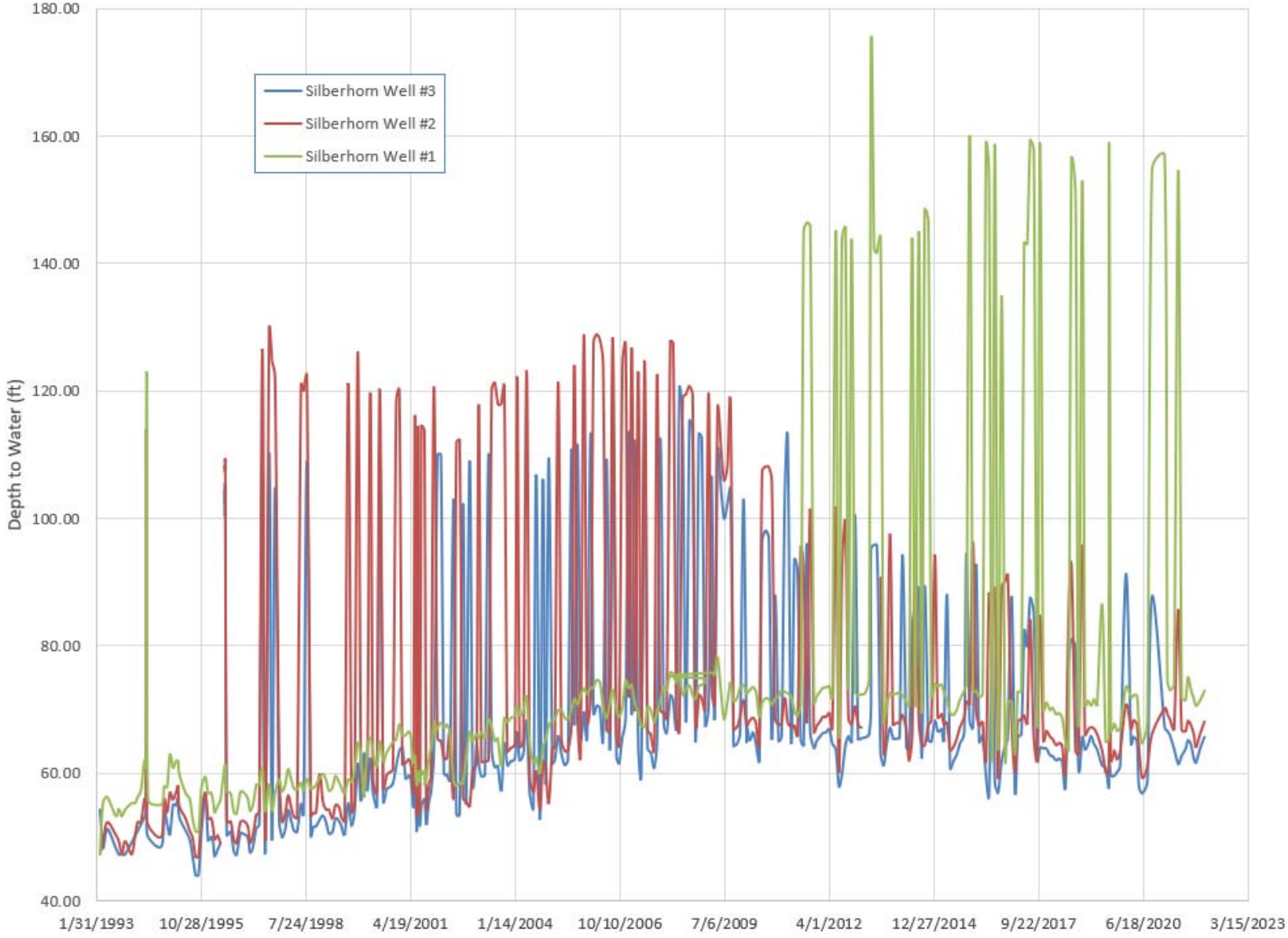
4.6.2.2 Infiltration Gallery

The Infiltration Gallery is listed as DOH source number S01, with a capacity to draw the Qi of the water right, 718 gpm. The operation of this source is subject to level and turbidity of the Dungeness River. If the river level is too low and flow out of the well is set too high the siphon can be lost and the source stops flowing, but a priming pump is available to re-establish and maintain the siphon. Additionally, if turbidity levels in the river are high, which normally occurs during the winter rain/spring snow melt season, the City will have to shut the source down until turbidity levels return to normal (<15 NTU in the river). This is accounted for in the source capacity analysis in Chapter 3.

4.6.2.3 Silberhorn Wellfield

Aquifer levels and well screen limitations (impacts to drawdown) for the Silberhorn Wellfield are primary concerns for the future reliability of the source. Aquifer levels in and around the Silberhorn Wellfield are measured monthly and were analyzed as a part of the City's 2008 Monitoring report, prepared by PGG and published December 2009. All available Silberhorn Wellfield depth to water data through early 2022 is provided in Figure 4-1. Figure 4-1 shows depth to water measurements, some of which are recorded during pumping and some of which are recorded when pumps are off, which is the reason for the spikes in the data. But this is useful to show historical trends both with pumps on and pumps off.

Figure 4-1 Silberhorn Wellfield Depth to Water Data



Long term trends shown in Figure 4-1 for the upper aquifer in the Silberhorn area have shown steady levels from 1993 to 1997, a decline (increase in depth to water) from 1998 to 2004 and a reduced level of decline from 2004 to 2008. Total declines have been 15 to 20 feet. Similar declines have been seen in wells up to a mile away. Data from 2008 to 2022 shows that depth to water when pumps are off has remained steady during this period.

At the Silberhorn Wells, long-term variations in pumping do not correlate well with variations in water level. The water level in the shallow aquifer seems to be more associated with recharge from irrigation ditches than it does with seasonal variation in pumping, as discussed further in the Gray & Osborne, Inc., Silberhorn Wellfield Capacity Report, March 2015.

The current capacity of the Silberhorn Wellfield is slightly less than the instantaneous water right. Decreases from the original design capacity of each well from 400 gpm to the current capacities shown in Table 1-2 may be partially attributable to the decrease in water level observed from 1993 to 2008. The decrease may also be partially attributable to well screen clogging over time and/or original well screen design limitations. The City may consider replacing Well No. 3 with a new well, perhaps in a deeper aquifer, to improve resiliency, hopefully decrease nitrate concerns, and fully utilize the existing water right. This is discussed in the Capital Improvement Plan – Chapter 8.

4.6.2.4 Port Williams Wellfield

One concept to address declining groundwater levels as well as operational control at the Port Williams Wellfield would be construction of a below grade reservoir or other storage facility. This was investigated in a 2015 study by Gray and Osborne, "Port Williams Low Level Reservoir Feasibility Study", which concluded that a new reservoir in this vicinity is not recommended, but replacing the Port Williams well pumps and adding VFDs was recommended. The City subsequently did replace well pumps and motors for Well 1 and Well 2 and added soft starts. The Well 3 pump and motor has not yet been replaced.

4.6.2.5 Aquifer Monitoring Program

Use of the Silberhorn and Port Williams Wellfields is dependent on aquifer drawdown. The City monitors aquifer levels on a monthly basis at the locations listed below. In most cases, static levels are recorded, but if the well pump is operating, the drawdown may be recorded instead and is noted. The City began monthly measurements at these locations in January 1996 and monitors the data to document changes in aquifer levels.

- Silberhorn Wellfield – Well 1
- Silberhorn Wellfield – Well 2
- Silberhorn Wellfield – Well 3
- D & K Rentals Well (52 River Road)
- Wynne Well (165 River Road)
- Moyle Well (131 West Silberhorn)
- D.O.T. Well (261 River Road)
- Simmons Well (304/308 River Road)
- Bagley Well (143 Aslan Drive)

- Wray Well (32 Crown View Lane)
- Ryan Well (130 Port Williams Road)
- Elks Well (143 Port Williams Road)
- Stone Irrigation Well (301 Port Williams Road)
- Port Williams Wellfield – Well 1
- Port Williams Wellfield – Well 2
- Graysmarsh Well (256 Holland Road)
- Willis Well (90 John Scott Well)
- USGS Zone 1 Monitoring Well (702 Port Williams Road - South) (weekly readings)
- USGS Zone 3 Monitoring Well (702 Port Williams Road - North) (weekly readings)

4.6.2.6 Discussion of Additional Sources of Supply

Acquisition of water rights is the greatest constraint on the development of new sources. The management of groundwater resources in the Sequim-Dungeness area is governed by WAC 173-518, and Ecology has developed a groundwater model that reflects an interpretation of the regional hydrology. This groundwater model can be used to assess the impact of source water withdrawals and determine mitigation requirements. Obtaining new water rights for source water withdrawals will be contingent upon being able to mitigate any adverse impacts.

Because WAC 173-518 requires mitigation of all defined impacts be implemented for new water allocations to be granted, the acquisition of new water rights is complex. In anticipation of potentially needing additional sources of supply, either to replace or to supplement existing sources, the City contracted with Robinson Noble to evaluate options for new ground water wells. The 2020 Robinson Noble *Groundwater Resource Options Study* identified at least four regional aquifers in the Sequim-Dungeness area, though their production potentials vary across the Sequim service area. Aquifer 1 is the shallowest and Aquifer 4 is the deepest.

The study assessed ten different sites for the aquifers likely to be present, the probable aquifer depths, the estimated production potential, the type and cost of drilling on the sites, the predicted mitigation percentages, and the general logistical acceptability of the sites. The report also identified and discussed several mitigation methods including:

a) Conversion of a shallow water right to a deeper aquifer
b) Acquisition and retirement of existing water rights
c) Infiltration of treated wastewater
d) Artificial recharge using stormwater
e) Financial contribution to the Dungeness Water Exchange
f) Cooperative regional team projects
g) City projects
h) Direct stream flow augmentation

Note that the City produces Class A Reclaimed Water and is currently using about 32.6 percent of the available reclaimed water to reduce potable water consumption. This leaves a considerable amount that can be applied to mitigation measures.

Specific approaches for groundwater source development were prepared for seven of the sites selected by the City. While no option was identified as the preferred option, the Silberhorn Well Field site offers a unique opportunity to improve the reliability of that source and potentially obtain new water allocations.

The wells of the City's Silberhorn Well Field are completed at the base of Aquifer 1. Aquifer 1 has exhibited falling water levels regionally from 1993 to 2008, as discussed previously and shown in Figure 4-1. According to the Study:

> "Groundwater recharge in the study area is primarily from infiltration and percolation of precipitation, septic drainfield return flow, infiltration of water from the Dungeness River, percolation of excess irrigation water, leakage from irrigation ditches, and leakage from streams. There are also small-scale artificial recharge projects in the study area and more such facilities are planned… "

It is hypothesized that lower water levels are "due to hydraulic changes associated with the conversion from irrigated pastures to residential properties, the lining of previously leaky irrigation canals, and the increase in impervious cover in the greater Sequim area…" It has already been suggested that a new, deeper well be constructed, and drilling a well to Aquifer 3 is a reasonable project for the City to consider. The transfer of current production from Aquifer 1 to deeper wells has an inherent mitigation benefit in that there is a substantial reduction in the potential impacts on surface water.

4.6.3 Transfer of Water between WRIAs

For the purposes of regulating water use, Ecology has divided the state into 62 areas known as Water Resource Inventory Areas (WRIAs). These areas are hydrologically defined basins which provide a context for regulation of surface and ground water. The UGA of the City of Sequim is located primarily in eastern WRIA No. 18 (Elwha/Dungeness) with a small part in the east located in WRIA No. 17 (Quilcene/Snow). The easter portion of WRIA 18 is regulated as of 2013 by WAC 173-518, the Dungeness Water Management and Instream Flow Rule. This rule sets instream flow water rights for streams in eastern WRIA 18, affects how water appropriations are assigned, and closes many surface water bodies to new consumptive uses unless impacts on existing water rights (including instream flows) are mitigated.

Generally, the City's water sources and uses are all located within WRIA No. 18. However, as future growth occurs in the eastern portion of the service area the City's water service area will span the WRIA boundary into WRIA 17. Additionally, the City plans to eventually acquire the Resort & Marina Water System, but likely not its sources which are wells in WRIA 17. There is currently no known formal limitation to transferring water through a water system between two WRIAs. The City, as a municipal water supply agency, defines its water rights place of use as its approved service area.

Chapter 5
SOURCE WATER PROTECTION

5.1 INTRODUCTION
Water supplies can be susceptible to contamination sources from activities on the land surface, so effective source water protection involves partners working together to preserve and protect a community's drinking water supply. Source water protection for groundwater and surface water supplies differ. For Group A water systems, a Wellhead Protection Program (WHPP) must be implemented for each groundwater source and a Watershed Control Program (WCP) is required for each surface water supply.

The City's active water sources include two wellfields and an infiltration gallery. All three sources are groundwater sources so "wellhead" protection information is included below. However, because the infiltration gallery is hydraulically connected with the Dungeness River, and because its Zone of Contribution is the upper watershed which is essentially undeveloped, "watershed control" information is provided for that source.

5.2 SANITARY CONTROL AREAS
A 100-foot radius sanitary control area is the front line of protection against contamination for each of the City's wells. The City owns and controls the wellhead property for all sources.

5.3 WELLHEAD PROTECTION
Groundwater quality is vulnerable to potential sources of contamination such as underground storage tanks, pesticides, accidental spills, and nitrates from septic systems or leaking wastewater collection pipes. The major components of a wellhead protection program are described below and form the basis of the chapter that follows.

- **Aquifer Susceptibility.** Describes the results of susceptibility assessments for the City's active sources. Susceptibility reflects the physical possibility for contamination of a water source.

- **Delineated Wellhead Protection Areas (WHPA).** WHPAs are based on available hydrogeological information, including an assessment of susceptibility to contamination.

- **Inventory of Potential Contaminant Sources.** The inventory contains information of all known and identifiable potential contaminant sources within each wellhead protection area.

- **Spill Response Plan.** This documentation includes spill response coordination with local first responders (HAZMAT team, fire, military police, etc.).

- **Contingency Plans.** Alternate sources of drinking water are identified in the event of source contamination. (Also see Chapter 6 on this topic.)

- **Notification of Findings.** This includes copies of the notifications sent to landowners/operators for potential contaminant sites, regulatory agencies, and state and local emergency responders (e.g., police, fire, and County health department) of the wellhead protection area boundaries, results of susceptibility assessment, inventory findings and contingency plan. (See Appendix P.)

- **Source Water Protection Area Management Plan.** This plan is used to reduce the likelihood that potential contaminant sources will pollute the drinking water supply.

5.3.1 Related Hydrological Documents

The hydrological basis of the Sequim Wellhead Protection Program is based primarily on information contained in several reports and hydrogeological investigations including:

- Pacific Groundwater Group, *Hydrogeologic Characterization and New Wellfield Location*, 1995

- Pacific Groundwater Group, *Hydrogeologic Evaluation and Wellfield Analysis, City of Sequim Stone Well #1*, 1995

- Pacific Groundwater Group, *Silberhorn Wellfield Hydraulic Evaluation and Yield Analysis*, 1996

- Pacific Groundwater Group, *Installation, Testing, and Recommended Operation, City of Sequim Port Williams Well #2*, 1998

- United States Geological Service, *Hydrogeologic Assessment of the Sequim Dungeness Area, Clallam County, Washington*, 1999,

- Pacific Groundwater Group, *Construction, Testing and Recommended Operation Port Williams Well #3*, March 2008,

- Pacific Groundwater Group, *City of Sequim 2008 Hydrologic Monitoring Report*, December 2009.

5.3.2 Aquifer Susceptibility

Completion of a susceptibility assessment is an important initial step in selecting appropriate delineation methods to define wellhead protection area boundaries. Completion of the susceptibility assessment and submittal to DOH allows for a susceptibility rating. Sources that receive low susceptibility ratings may receive susceptibility waivers from DOH to reduce the

amount of required monitoring for organic contaminants. Table 5-1 contains the susceptibility and vulnerability ratings for Sequim's active sources.

Table 5-1 Source Susceptibility and Vulnerability Ratings

Source	DOH Source No.	Susceptibility	Vulnerability
Dungeness River Infiltration Gallery	S01	High	Low
Silberhorn Wellfield	S02	Low	Low
Port Williams Wellfield	S03	Low	Low

Susceptibility ratings reflect the susceptibility of a water source to contamination from a variety of contaminant sources. The susceptibility rating is dependent on factors such as well construction, hydrogeological conditions, and distances to known or suspected contaminant sources. Drinking water wells and springs vary in their susceptibility to contaminants released at the surface. Wells with poor construction or improper surface seals have increased susceptibility to contaminant migration into the saturated zone of the well. Wells located in unconfined aquifers (the infiltration gallery) would have a higher susceptibility rating than wells which draw water from confined or partially confined aquifers (both wellfields).

5.4 WELLHEAD PROTECTION AREA DELINIATION

The purpose of a delineation is to estimate the areas on the land surface that are capable of contributing contaminants (through percolation and lateral movement) to the well production source. These areas are referred to as zones of contribution (ZOCs) and provide a basis for focusing a community's groundwater protection efforts.

The following sections summarize the local hydrogeology, the methods used for the Sequim source delineations for the Port Williams and Silberhorn Wellfields, and the resulting ZOCs.

5.4.1 LOCAL HYDROGEOLOGY

Sequim is generally underlain by six defined aquifer units deposited during glacial advance and recession in layer-cake fashion, bounded to the south by north-sloping bedrock. From shallowest to deepest, the aquifers include:

- **Unit 1:** The upper unit, commonly referred to as the "shallow" or "first aquifer," consists primarily of sand and gravel with discontinuous lenses of fine grained sediments; it generally lies within the upper 50 to 200 feet, although some thicknesses of over 250 feet have been observed. The upper portion of this unit is unsaturated. Where saturated, the aquifer is considered an unconfined or partially confined aquifer. Potential well yields range from a few tens of gallons per minute (gpm) to over 1,000 gpm. The Silberhorn wells are completed toward the bottom of this unit.

- **Unit 2:** The second unit, commonly referred to as the "upper confining bed," consists primarily of silt, clay, and fine sand that acts as an aquitard, or a layer that retards the flow of water. It is generally about 30- to 110-feet thick. Some

higher-permeability materials lie within this unit that are capable of supplying domestic quantities of water (a few gpm).

- **Unit 3:** The third unit, commonly referred to as the "middle" or "second aquifer," is a relatively thin confined aquifer which consists primarily of sands and gravels and is typically 10- to 70-feet thick. It generally lies within 100 to 300 feet below ground surface and is entirely saturated. Potential well yields from Unit 3 range from a few tens of gpm to 1,000 gpm.

- **Unit 4:** The fourth unit, commonly referred to as the "lower confining bed," consists of till and interbedded clay, silt, and fine sand that acts as an aquitard. The thickness of this unit varies broadly from between 10- to 300-feet thick with 100 feet being typical.

- **Unit 5:** The fifth unit, commonly referred to as the "lower" or "third aquifer," is a confined aquifer which consists of sand within thin lenses of sand and gravel, silt and clay. The thickness of this unit varies from 10 to 180 feet with 90 feet being typical. The fifth unit is present in the northern and eastern portions of the peninsula where bedrock is deeper. The top of Unit 5 generally lies within 300 to 400 feet of ground surface. Potential well yields in Unit 5 range from a few tens to over 1,000 gpm. The Port Williams wells are completed in this unit.

- **Unit 6:** The sixth unit, referred to by USGS as the "undifferentiated unconsolidated deposits," includes both aquitard and aquifer material. Unit 6 is not well defined as few wells are drilled to that depth to allow extrapolated interpretation. In areas it reaches a thickness of 1,000 feet. During the installation of Port Williams Well No. 3 the boring was continued past the lower aquifer into the undifferentiated deposits. Water bearing zones were encountered but potential productivity was found to be lower than in the third aquifer.

The above descriptions were based on *Construction, Testing, and Recommended Operation, Port Williams Well No. 3, City of Sequim, Washington* (PGG, 2008). Characterization of the regional hydrogeology was performed by the USGS and presented in *Hydrogeologic Assessment of the Sequim Dungeness Area, Clallam County, Washington* (Thomas et al., USGS, 1999).

5.4.2 Recharge and Discharge Zones

Recharge to the various aquifer units is dependent on several factors including inflow from uplands, precipitation recharge, irrigation leakage recharge, and river and creek leakage recharge. A report by the U.S. Geological Survey from 1999 (Thomas et al.) estimates the quantities of recharge and discharge for the aquifer system in the broader Dungeness watershed based on data collected in 1995-97. Table 5-2 summarizes the results.

Table 5-2 Aquifer Recharge Components

Recharge Component	Flow in Cubic Feet per Second (Dec. 1995-Sept. 1997)	Percentage of Total Recharge
Inflow from Uplands	14.5	18.5%
Precipitation Recharge	43.6	18.4%
Irrigation Leakage(1)	26.5	39.4%
Dungeness River Leakage	28.0	23.7%
Total	**112.7**	**100%**

(1) Irrigation leakage since 1997 will have decreased due to lining of ditches and other efficiency measures.

These results do not make a distinction between aquifer units and in which aquifer the recharge is greatest. However, several assumptions based on the nature of the aquifers can be made. For all three components except inflow from uplands, it is expected that the recharge from all sources would be greatest for the shallowest aquifer (Unit 1), the aquifer closest to the ground surface. The deeper aquifers (Units 3 and 5) would be recharged by upland inflow and by overlying aquifers.

USGS 1999 reports that discharge from the aquifers is predominately to marine waters with smaller components of discharge to creeks and a very small amount to well pumping, summarized in Table 5-3.

Table 5-3 Aquifer Discharge Components

Discharge Component	Flow in Cubic Feet per Second (Dec. 1995-Sept. 1997)	Percentage of Total Discharge
Outflow to Marine Subsurface and Springs	48.1	43%
Flow to Dungeness River	27	24%
Flow to other streams	33	29%
Net well withdrawals	4.6	4%
Total	**112.7**	**100%**

5.4.3 Specific Wellhead Protection Areas (WHPAs)

5.4.3.1 Introduction

A WHPA is defined as the surface and subsurface area surrounding a groundwater source through which potential contamination can travel and eventually reach the source. In the State of Washington, WHPAs are based on ZOCs which are derived from the time of travel required for a contaminant to move from the point of introduction into the water bearing formation to the source. The Washington Wellhead Protection Program requires a WHPA to be subdivided into five zones which include:

- A sanitary control zone of at least 100 feet, unless engineering justification supports a smaller area (WAC 246-290-135). No source of contamination may

be constructed, stored, disposed of, or applied within the sanitary control zone without the permission of DOH and the water purveyor.

- Four primary zones based on 6-month, 1-, 5-, and 10-year time of travel boundaries. These zones are referred to as the ZOC of the WHPA. (e.g., ZOC_1 – 1-year zone of contribution).

- One buffer zone (if necessary) extending from ZOC_{10} to a groundwater divide and highlighting areas where the aquifer may be particularly susceptible or vulnerable to contamination. This is not required for the City's groundwater sources.

The ZOC_{10} defines the boundary of the WHPA and defines the area to be inventoried and managed to reduce the risk of contamination.

5.4.3.2 Delineation Methods

There are four general delineation methods acceptable to DOH to determine ZOCs and WHPAs.

1. Calculated Fixed Radius (CFR)
2. Analytical Models
3. Hydrogeologic Mapping
4. Numerical Flow/Transport Models

In general, there is an increase in complexity and required input data moving down the list. However, the increase in input data and complexity generally results in greater accuracy. The CFR method is the minimum acceptable interim method of delineation for public water systems with between 100 and 1,000 connections. There are two scenarios under which the water system would be expected to upgrade their initial delineation: (1) the susceptibility assessment indicates that the system is highly susceptible, or (2) there are irregular or steep groundwater gradients in the vicinity of the well. If either of these two conditions exists, the public water supply would be expected to upgrade the initial delineation to an analytical or groundwater flow model within 5 years.

An analytical model requires basic hydrogeological information including the direction of groundwater flow, gradient, and certain physical characteristics of the aquifer. These physical characteristics include the aquifer thickness, the rate at which the aquifer will transmit water (transmissivity), and whether the aquifer is confined or unconfined.

A numerical model requires significantly more data than the other methods. In numerical modeling, a grid is superimposed over the study area. Each square in the grid, called a cell, is characterized by physical parameters which are estimated from data collected from a variety of sources. The sources may include well logs, geologic and hydrogeologic maps, geophysical data, groundwater elevation data, stream flow discharge, and meteorological data. The parameters used to define the hydrogeological characteristics of each cell in the study area include identification of the vertical relationship of each aquifer and confining layer, the

transmissivity of each aquifer, the thickness of the fine grained materials which separate the aquifers, the annual recharge, the connection between surface water and groundwater, the relationship between the model area and the areas surrounding it (boundary conditions), and lastly, the location and pumping rates of wells. The numeric method generates more accurate results than the CFR or analytical methods, but is relatively costly to develop. Consequently, numerical models are most commonly used by large utilities with complex aquifers that have the resources to collect the extensive model input data required.

5.4.3.3 Wellfield WHPA Delineations

Since the City has more than 1,000 connections, DOH requires the use of analytical models or better for ZOC delineation. For the 2008 Water System Plan, an analytical model was used to delineate the WHPAs for the Port Williams and Silberhorn wellfields. The model used was the two-dimensional analytical groundwater flow model TWODAN developed by Fitts GeoSolutions of Scarborough, Maine.

For the 2013 Water System Plan, the ZOCs for both the Silberhorn and Port Williams wellfields were updated to reflect new pumping rates and aquifer properties established at the time of development of the third Port Williams well. The analyses, again using the analytical model, were performed by Pacific Groundwater Group, subcontractor to Gray & Osborne, Inc.

Aquifer Properties

The aquifer properties were determined from a series of hydrogeological reports performed by the U.S. Geological Survey and Pacific Groundwater as listed earlier in the chapter. A summary of updated hydrogeological and pumping properties used in the analytical model for the Port Williams and Silberhorn Wellfields is contained in Table 5-4.

Table 5-4 Port Williams and Silberhorn Wellfields Hydrogeological Properties Used in TWODAN Model (for 2013 Water System Plan)

Parameter	Port Williams	Silberhorn
Groundwater Flow Direction	Northeasterly	Northerly
Hydraulic Gradient	0.010	0.010
Aquifer Thickness	88 ft	100 ft
Transmissivity	4,100 ft^2/d	7,500 ft^2/d
Pumping Rate	1,690 gpm(1)	300 gpm

(1) Modeling for the Port Williams Wellfield was performed during the development of the third well with the pumping rate based on the sustainable flow with all three wells operating. This flow rate, if sustained, results in a volume higher than the City's annual water right for this wellfield and therefore the ZOCs for Port Williams are highly conservative.

Pumping Rates

The pumping rates used for these analyses are conservative for the purposes of this Plan, but this is acceptable because these rates provide additional assurance of wellhead protection. For a conservative delineation, a pumping rate of 1,690 gpm was used for the Port Williams Wellfield for the TWODAN model. The Silberhorn Wellfield was modeled at an annual average flow of 300 gpm, an appropriately conservative rate to use for identifying long-term trends and ZOCs. Using an installed pump capacity of 520 gpm would be unnecessarily

conservative, and would simply extend the ZOCs farther into national forest land where the risk of contamination to the City's sources is very low.

Modeling Results

The results of the TWODAN modeling are graphically represented in Figure 5-2, which illustrates the 6-month, 1-, 5-, and 10-year ZOC for the Port Williams and Silberhorn Wellfields. The 10-year ZOC defines the total WHPA for each wellfield.

The shapes of the WHPAs differ due to aquifer properties, pumping rates and well depth. The Port Williams WHPA is somewhat oval in shape which is largely a function of relatively low transmissivity and greater well depth, as compared to the Silberhorn Wellfield. The Silberhorn WHPA is relatively long and narrow due to a relatively high aquifer transmissivity and relatively steep gradient. It should be noted that model results are strictly a function of model input. Actual geologic conditions may differ from the conditions used for modeling purposes. Consequently, the City advises all landowners generally about the importance of protecting drinking water quality, as all sources of contamination may pose a potential threat.

Increasing the pumping rate on either WHPA widens the WHPA more than lengthening it. As pumping is increased the aquifer supplies water to the wellhead radially from the surrounding aquifer, not just along the center axis of the WHPA.

5.5 INVENTORY OF POTENTIAL CONTAMINANT SOURCES WITHIN THE WHPAS

5.5.1 INTRODUCTION

An essential element of wellhead protection is an inventory of all potential sources of groundwater contamination in and around the delineated wellhead protection areas. The purpose of the inventory is to identify past, present, and proposed activities that may pose a threat to a source.

Other purposes for maintaining an inventory of potential contaminant sources are to help plan management strategies, establish a mailing list to notify potential contaminant sources located within the wellhead protection areas and notification of agencies regarding inventory findings. An accurate description of inventory data sources is also necessary and can be used to update the plan as required in WAC 246-290-135.

5.5.2 POTENTIAL CONTAMINANT SOURCES

Within a WHPA, there are many diverse activities that may contaminate an aquifer and potentially prevent its use as a viable drinking water source. It is important that these activities are properly inventoried and, if necessary, regulated to prevent degradation of groundwater quality. Relevant activities and sources include:

- Industrial and Commercial Activity
- Hazardous Materials Storage
- Agricultural Activities

- Underground Storage Tanks
- Septic Systems
- Dry Wells
- Stormwater
- Accidental Spill
- Confirmed or Suspected Contamination sites

A discussion of these practices and their potential effects on groundwater, and the regulatory requirements which may apply are included in the following sections.

5.5.2.1 Industrial and Commercial Activity

Industrial and commercial activity poses a potential threat to groundwater quality due to the potential use of hazardous materials within these areas. Examples include gasoline service stations and auto repair shops (petroleum fuels, heavy metals), dry cleaners (dry cleaning solvents), printers and publishers (solvents, inks, and dyes), and metal plating shops (cyanides and heavy metals). Typically, industrial or commercial activity may be regulated by the State but only for industry/commercial specific functions; however, there are no general industrial or commercial regulations regarding potential wellhead contamination. One option for a municipality to avoid having these types of activities located within WHPAs is through zoning and land use designation prohibiting industrial or commercial development within WHPAs.

5.5.2.2 Hazardous Material Storage

Hazardous material storage is a specific function of industrial/commercial activity. On the federal level, hazardous material storage and use is regulated through the Resource Conservation and Recovery Act (RCRA). At the state level, these activities are regulated by Ecology's Dangerous Waste Regulations (WAC 173-303). The state maintains a database of dangerous waste generators which can be searched by city. The phone number for the Ecology Southwestern Regional Office's Hazardous Waste and Toxics Reduction Program is (360) 407-6300. However, small quantity (less than 220 pounds) dangerous waste generators are not included in the database.

5.5.2.3 Agricultural Activity

Agricultural activity can be a concern due to the potential for bacteriological and nitrate contamination. There is also a potential for contamination by agricultural chemicals such as pesticides and herbicides. Agricultural businesses can help minimize the potential by managing animal wastes and by proper application and disposal of agricultural chemicals. RCW 90.64 – *Dairy Waste Management* specifies that dairy farms with more than 700 confined mature dairy cows or 200 mature dairy cows whose wastes are discharged to navigable, surface, or ground waters are required to complete dairy waste plans that specify how the dairy farm manages its wastes. However, most programs involving agricultural activity are voluntary and may be administered by the State Conservation Commission or the Natural Resource Conservation Service not by the water purveyor. Municipalities that work with these organizations have the opportunity to educate farmers regarding the potential impacts of the farmers' agricultural practices on the WHPA.

5.5.2.4 Underground Storage Tanks

Underground storage tanks (USTs) and leaking underground storage tanks (LUSTs) are a significant threat to groundwater quality. The majority of petroleum products stored in USTs are less dense than water and tend to migrate to the top of an aquifer (or water surface in an unconfined aquifer) when released in the vadose (unsaturated) zone or in groundwater. Petroleum products and their impurities tend to be rather mobile in aquifers with generally increasing mobility with decreasing organic content in soils. The lightest hydrocarbons (e.g., gasoline) with the highest solubility in water exhibit the greatest amount of petroleum contaminant movement. The U.S. EPA estimates that 35 percent of all USTs are leaking. The most common causes of leaks are structural failure, corrosion, improper fittings, and improper installation.

Ecology regulates USTs under WAC 173-360. The regulations require that tank owners and operators of underground storage tanks comply with the following sections of the regulations:

- Notification, reporting, and record keeping;
- Performance standards and operating closure requirements;
- Registration and licensing; and
- Financial responsibility.

The WAC allows a number of exemptions including tanks whose capacity is 110 gallons or less, farm and residential tanks with less than 1,100 gallons, heating oil tanks less than 1,100 gallons per premises, and septic tanks.

Owners and operators of all existing nonexempt USTs must have a permit from Ecology. A valid permit is a requirement for delivery of regulated substances and must be updated annually. As a condition of the permit, the owner must have completed the following requirements:

- An assessment of the tank condition by an Ecology-licensed tank service provider.
- Replacement of leaking tanks and site cleanup.
- Installation of leak detection devices.
- Proof of insurance to compensate a third party in the event of bodily injury or property damage stemming from a leaking tank. One million dollars of insurance is required for petroleum marketing facilities.

By 1998, all existing nonexempt USTs were required to provide cathodic protection and spill and overflow containment in addition to the above requirements.

Installation and replacement of USTs must meet the specifications and performance and design standards listed in the WAC. Ecology follows the federal UST guidelines, which at this time do not require double-walled tanks.

UST inspections are performed by Ecology primarily through the information developed in the permitting process. Although routine annual inspections are not performed, Ecology inspectors prioritize sites considered potentially hazardous. Technical assistance visits are also conducted at the request of the owner/operators.

Ecology maintains a database of all permitted USTs in the state, as required by the RCRA Subtitle 1. The database provides the site name and address, tank identification number, date of installation, size, tank status, and the substance stored on the site. An additional database maintained by Ecology contains information about known LUSTs and remediated LUSTs. Both databases are updated twice a year.

5.5.2.5 Septic Systems

Contaminants associated with septic tank effluent include pathogenic organisms, toxic substances, and various nitrogen compounds including ammonia and nitrate which are highly soluble in water. Most septic drain fields discharge effluent to the unsaturated zone above unconfined aquifers. Contaminants from drain fields can percolate to the saturated zone and contaminate groundwater supplies. Septic tanks within Clallam County are regulated by the Clallam County Department of Environmental Health.

5.5.2.6 Stormwater UICs and Dry Wells

Stormwater can contain many chemicals derived from road runoff. These include heavy metals such as lead, chromium, and zinc; oil and grease; pathogens; nutrients; and petroleum byproducts. Typically, the concerns regarding stormwater are related to the impacts on surface water. However, groundwater can also be adversely affected by stormwater. The City of Sequim has adopted the current Department of Ecology Stormwater Manual. The Manual establishes stormwater control measures including flow quantities and characteristics and minimum acceptable stormwater treatment practices for new and re-development.

Dry wells and other UICs discharge stormwater directly into soils and are used in areas with highly permeable soils. They have historically been used as Sequim grew as a method of readily discharging stormwater runoff from streets and parking lots. Dry wells can serve as a conduit to groundwater for contaminants contained in stormwater such as metals and petroleum byproducts. In 2011, Clallam County's study of stormwater contaminants in shallow wells in the Sequim area reported no evidence at that time.[1]

In 2021-22, the City conducted an assessment of all stormwater UICs (dry wells and infiltration trenches) looking at the susceptibility and vulnerability of individual UICs throughout the city limits. The study identified a high priority zone for retrofits and concluded there are relatively few highly vulnerable facilities but all receiving that rating shall be retrofit to limit potential groundwater contamination.

[1] http://www.clallam.net/environment/assets/applets/priestrdstormwaterreport.pdf

5.5.2.7 Accidental Spills

Accidental spills or releases of contaminants can potentially impact groundwater supplies. Potential sources of spills and leaks include USTs, accidents, and poor disposal practices. U.S. Highway 101 is a potential source of hazardous materials and it passes through the lower portion of the 10-year ZOC.

The first responder to spill incidents is the Clallam County Fire District No. 3. The Fire District team is responsible for containment and cleanup of the hazardous material. Under the terms of the City's emergency management plan, the Fire District may contact the City's Public Works Department to request additional assistance to respond to major spills.

5.5.2.8 Confirmed and Suspected Contamination Sites

Under the Model Toxics Control Act Cleanup Regulation (WAC 173-340), Ecology is responsible for ensuring that all hazardous waste sites are properly remediated. This includes confirmed and suspected sites of contamination as well as LUSTs. A separate inventory for each, which includes the status of cleanup efforts, is maintained by Ecology. Ecology conducts and initial site investigation within 90 days of learning of a potentially contaminated site. If this investigation shows that remedial action is required, the site will appear on the Confirmed and Suspected Contaminated Sites Report. The sites are also given a Washington Ranking Code BIN number between 1 and 5, with 1 indicating the greatest assessed risk to human health and the environment and 5 indicating the least. The contaminant type and the affected media, such as groundwater, are also noted. Once the remedial action has been completed, Ecology's Toxics Cleanup Program determines if the site can be removed from the list.

5.6 INVENTORY FOR SEQUIM'S WELLFIELDS

The inventory of potential contaminant sources within the WHPAs for the Port Williams and Silberhorn wellfields was compiled using information supplied by the City of Sequim, searches of Department of Ecology databases, and searches of Clallam County Department of Environmental Health databases.

5.6.1 INDUSTRIAL AND COMMERCIAL ACTIVITY

There is very little industrial activity in the City. The main commercial district is along both sides of Washington Street which runs east and west through the City (Figure 1-10). This district is within the WHPA for the Port Williams Wellfield. The Silberhorn Wellfield does not have any industrial or commercial activity within its WHPA.

5.6.2 NITRATE CONTAMINATION

Regional nitrate contamination of groundwater is a considerable concern for the Dungeness Peninsula and the City of Sequim's wellfield sources. A study by the USGS in 1996 investigated the possible nitrogen sources and nitrogen concentrations in the Dungeness watershed. The results suggest that the primary sources of nitrogen input into the groundwater are from residential fertilizers (24 percent), septic systems (21 percent), mineralization of soil organic matter (20 percent), agricultural fertilizers (20 percent), and dairy farms (8 percent). Residential land uses potentially involving fertilizer use make up most of the land in the Port Williams and Silberhorn ZOCs. Septic systems are very prevalent within the Silberhorn ZOC but relatively rare in the Port Williams ZOC because it is mostly sewered. It may be notable

that a dairy facility is located in the 5-year zone of contribution for the Port Williams Wellfield, just outside of the 1-year zone of contribution.

Regarding groundwater nitrate concentrations, the median in 1980 was 0.37 mg/L, in 1992 it was 0.55 mg/L, and in 1996 it was 0.46 mg/L. The area which had the highest increase in concentration from 1980 to 1996 was located in the east-northeast city limits and county areas beyond. Of the groundwater samples collected, 42 percent had greater than a 1.0 mg/L increase in nitrate concentration.

In 2009, Clallam County studied nitrate concentrations in shallow private wells around Sequim city limits with results ranging from undetected to 7.9 mg/L nitrate-N.[2] The highest concentrations (5.01 to 10 mg/L) were found just east of Sequim-Dungeness Way between Hendrickson and Medsker Roads; lower concentrations were found with closer proximity to the Dungeness River. Phase II of the study (2011) showed all wells sampled in central and eastern city limits had >5.0 mg/L nitrate-N; up to 70 percent of all wells sampled had >1.0 mg/L – a level that indicates groundwater vulnerability from human activities on the land surface.

The specific reason for increasing ambient groundwater nitrate concentration in the Dungeness watershed is unknown, largely because laboratory testing cannot distinguish between different nitrate sources. Some speculate that, rather than an increase in the source of nitrogen, the increasing concentration is due to less dilution resulting from the drop in the water table since 1980. This drop is at least partly due to the significant drop in irrigation diversions that historically recharged the aquifer all summer in the 20th century until around 1990. In any case, nitrates found in groundwater indicate that land uses can and do affect water quality in underlying aquifers.

The maximum contaminant level (MCL) defined and regulated by DOH is 10 mg/L. The City of Sequim's wells, deeper than most private wells, are monitored for nitrate and the City's drinking water is well within compliance with the MCL of 10 mg/L. That said, monitoring has shown an increase in nitrate for the Silberhorn Wellfield since the early to mid-1990s. Nitrate levels at these wells have since stabilized and currently fluctuate between 1 and 3 mg/L. Nitrate levels in the Port Williams Wellfield have been generally consistent, with levels less than 1 mg/L. Chapter 3 includes further discussion of distribution system water quality.

Although the City does not currently have issues with nitrates in its drinking water wells, nitrate levels in many area wells are increasing, so the City continues to monitor and track year-to-year changes to determine nitrate trends.

5.6.3 Septic Systems

Tax parcel ID numbers for those parcels which were located within the 10-year ZOC (WHPA) for the Port Williams and Silberhorn Wellfields were submitted to the Clallam County Department of Environmental Health in Port Angeles. The Department identified those parcels which contained a permitted septic tank. The Department also identified parcels with single-family residences that were present before 1985, the first year of the septic tank permit

[2] http://www.clallam.net/environment/assets/applets/GWShallowAquiferSequim.pdf

program. GIS data with the locations of the parcels of land that have known septic systems was obtained and used with the ZOC GIS data to locate how many septic systems are within each ZOC.

The wells at Silberhorn are completed at the base of the shallow aquifer, which is more susceptible to contamination in general than deeper aquifer tapped by Port Williams wells. In fact, nitrate monitoring shows that the Silberhorn Wellfield has consistently higher nitrate readings than Port Williams – though Silberhorn nitrate levels have actually decreased since 2017.

5.6.4 Dangerous Waste Generators

A search of the Ecology database for dangerous waste generators within the WHPA returned a list of 27 hazardous waste reporting facilities. All of the facilities are located within the 10-year or 5-year ZOCs of the Port Williams Wellfield and there are no facilities within the WHPA for the Silberhorn Wellfield. The Ecology database search results are shown on Figure 5-3.

5.6.5 Underground Storage Tanks

A search of the Ecology databases for USTs and LUSTs in and around the City returned a list of 12 current and/or cleaned up LUSTs and 36 operational USTs. Some of the LUSTs and USTs within city limits are located within the 10-year ZOC of the Port Williams Wellfield while none are within the Silberhorn WHPA. The Ecology database search results are shown on Figure 5-3.

5.6.6 Individual Private Wells

Improperly installed or sealed private drinking wells can also be a potential contamination source. A contaminant that is introduced to an improperly sealed well can leak into the groundwater table and influence the City's wellheads. Private wells are regulated by Clallam County Environmental Health Services and Ecology.

5.6.7 Potential Contaminant Summary

Counts of potential contamination sources in each wellfield ZOC are presented in Table 5-5. The locations and distribution of potential contaminant sources are shown in Figure 5-3.

Table 5-5 Counts of Potential Contaminant Sources within Wellfield ZOCs

JSource	ZOC	Potential Contaminant Sources[3]				
		Private Wells	Septic Tanks	UST/ LUST	Hazardous Waste	Dairy Farm
Silberhorn Wellfield	6-month	16	6	0	0	0
Silberhorn Wellfield	1-year	43	14	0	0	0
Silberhorn Wellfield	5-years	76	55	0	0	0
Silberhorn Wellfield	10-years	77	55	0	0	0
Port Williams Wellfield	6-month	13	11	0	0	0
Port Williams Wellfield	1-year	26	29	0	0	0
Port Williams Wellfield	5-years	108	165	1	3	1
Port Williams Wellfield	10-years	127	189	24	24	1

5.7 INFILTRATION GALLERY WHPA (WATERSHED CONTROL)

The infiltration gallery source is officially groundwater but it has a high susceptibility to be contaminated because of its close hydraulic connectivity with the Dungeness River. Because of this, and because the WHPA and zone of contribution to the infiltration gallery is the entire upper Dungeness watershed, source water protection involves watershed control rather than a standard delineated wellhead protection area.

Land use in the upper watershed is important because there can be point source discharges or forestry/agricultural/wildfire runoff that could potentially contaminate the river. Even so, the vulnerability of the river is considered low because there are no major contamination sources upstream.

The infiltration gallery is on a parcel of land that is zoned residential and owned by the City of Sequim. The City owns a total of 21.2 acres of land surrounding the Dungeness River at or upstream of the infiltration gallery, including the headgate of the Highland irrigation canal. Other state agencies such as the Department of Fish and Wildlife (DFWS) and the Department of Natural Resources (DNR), own 675.59 acres upstream of the Infiltration Gallery parcel. Other private owners or ownership groups for smaller parcels located further upstream in the watershed may affect water quality – these include timberlands, private residences, and ranches. Finally, there are septic systems located near the infiltration gallery, but these are downstream of the City's property.

The vast majority of the land upstream of the infiltration gallery is owned by state or federal entities: WDNR, WDFW, Olympic National Forest, or Olympic National Park. The national forest and park protect the Dungeness River from its source high in the watershed to the northern boundary of the national forest. Currently, these parcels are undeveloped but if future development were to occur, the following are some of the approved and conditional land uses allowed for land zoned commercial forest:

[3] Counts are from 2013; to be updated in July 2022

- Agriculture;
- Industrial land uses;
- Timber harvesting;
- Mineral extraction;
- Single-family residency (at a density of one dwelling per 80 acres);
- Asphalt plants;
- Outdoor shooting range; and
- Research facilities.

If any such facilities are proposed upstream, the USFS would inform the City and their potential impact on water quality should be investigated.

5.7.1 DUNGENESS RIVER WATERSHED PROTECTION

Protecting the Dungeness watershed is an important aspect to protecting water quality for municipal drinking water as well as all beneficial uses. As mentioned, almost the entire river and watershed upstream of the infiltration gallery are protected by the Olympic National Forest and Olympic National Park, so protection for the watershed is provided by the federal protection of these lands. The City's river and infiltration gallery sources have the highest susceptibility to contamination, but protection of lands upstream by the national forest reduces the vulnerability. Vulnerability is limited to regional pesticide use and application practices by forestry entities, and the potential for wildfire to exacerbate erosion, runoff and sedimentation.

The Dungeness River watershed is shown in Figure 5-1. Figure 5-2 shows the path of the Dungeness River upstream of the City's infiltration gallery as well as land ownerships between it and the national forest boundary.

5.7.2 DUNGENESS RIVER MANAGEMENT TEAM

The Dungeness River Management Team (DRMT) is a partnership of residents and other stakeholders in the Dungeness Watershed who are working together to develop and pursue implementation of locally based, long-term solutions to watershed management issues. The Team has operated since the late 1980s, coordinating solutions to water quantity, water quality, flood control, forest management, salmon recovery and other critical watershed issues.

Because the Dungeness basin represents the eastern half of Water Resources Inventory Area 18 (WRIA 18), one of 16 basins in the state listed as critical for low flows, the DRMT also serves as the East WRIA 18 watershed council, promoting flow restoration and wise water use. The DRMT produced the information contained in the WRIA 18 Watershed Plan (2005), which should be used as a resource with identifying potential risks to source water quality and land development decisions.

5.8 SPILL RESPONSE

Spill response is an important part of both an emergency management plan and a source control program. The release of hazardous materials in a wellhead protection area or watershed can create problems other than the initial contamination of the soil and surface water. If the release

to an aquifer occurs in a source's ZOC, there is the possibility that the contaminants will migrate to the well and contaminate it. Planning for spill response should reflect the needs and concerns of the City while maintaining groundwater quality.

5.8.1 Spill Response Programs

The City maintains an emergency response plan that contains procedures for responding to hazardous materials spills within the City. The first responder to spill incidents is the Clallam County Fire District No. 3, whether in city limits or in Clallam County portions of the City's WHPAs or upper Dungeness watershed. When spills or incidents are too large for the Fire District alone the Fire District may contact the City's Public Works Department to request additional assistance.

If a spill occurred in the WHPA for the infiltration gallery (upper Dungeness watershed) within state or federal jurisdiction, the first responder would be the landowner agency.

5.9 CONTINGENCY PLAN

Contingency planning is an important component of a source water protection program, however, planning alone cannot account for unanticipated incidents. The City has a great deal of flexibility with three reliable sources – four including the river source. Each source is capable of supplying a significant portion of the City's current and future demands individually. Additionally, all of the sources draw from significantly different water bearing formations: The Infiltration Gallery is recharged directly from the Dungeness River, the Silberhorn Wellfield currently draws from the base of Unit 1 (first aquifer), and the Port Williams Wellfield draws from Unit 5 (third aquifer). It is highly unlikely that a contamination event would occur that would impact more than one of these sources simultaneously. Table 5-6 summarizes the planned capacity of the City's water sources in the year 2031, at the end of the 10-year planning horizon.

Table 5-6 Water Source Capacity vs. Year 2031 Average Daily Demand

Source	Capacity (gpm) [(1)]	Maximum Instantaneous Water Right (gpm)	ADD Year 2031 (gpm)	Capacity Meets Year 2031 ADD?
Port Williams	1,760	2,250	952	Yes
Infiltration Gallery	718	718	952	No
Silberhorn	635	700	952	No

(1) Reliable capacity for each pumped source is with largest pump out of service.

Table 5-6 indicates that the only source that could meet average day demand in 2031 by itself is the Port Williams Wellfield. However, if any one source was unusable, the other two could comfortably meet average day demand. In an emergency the City could restrict irrigation and other uses to reduce daily water usage from exceeding average day demands.

5.10 NOTIFICATION OF FINDINGS

Appendix P contains the following templates for notifications about the contaminant source inventory, and dates sent:

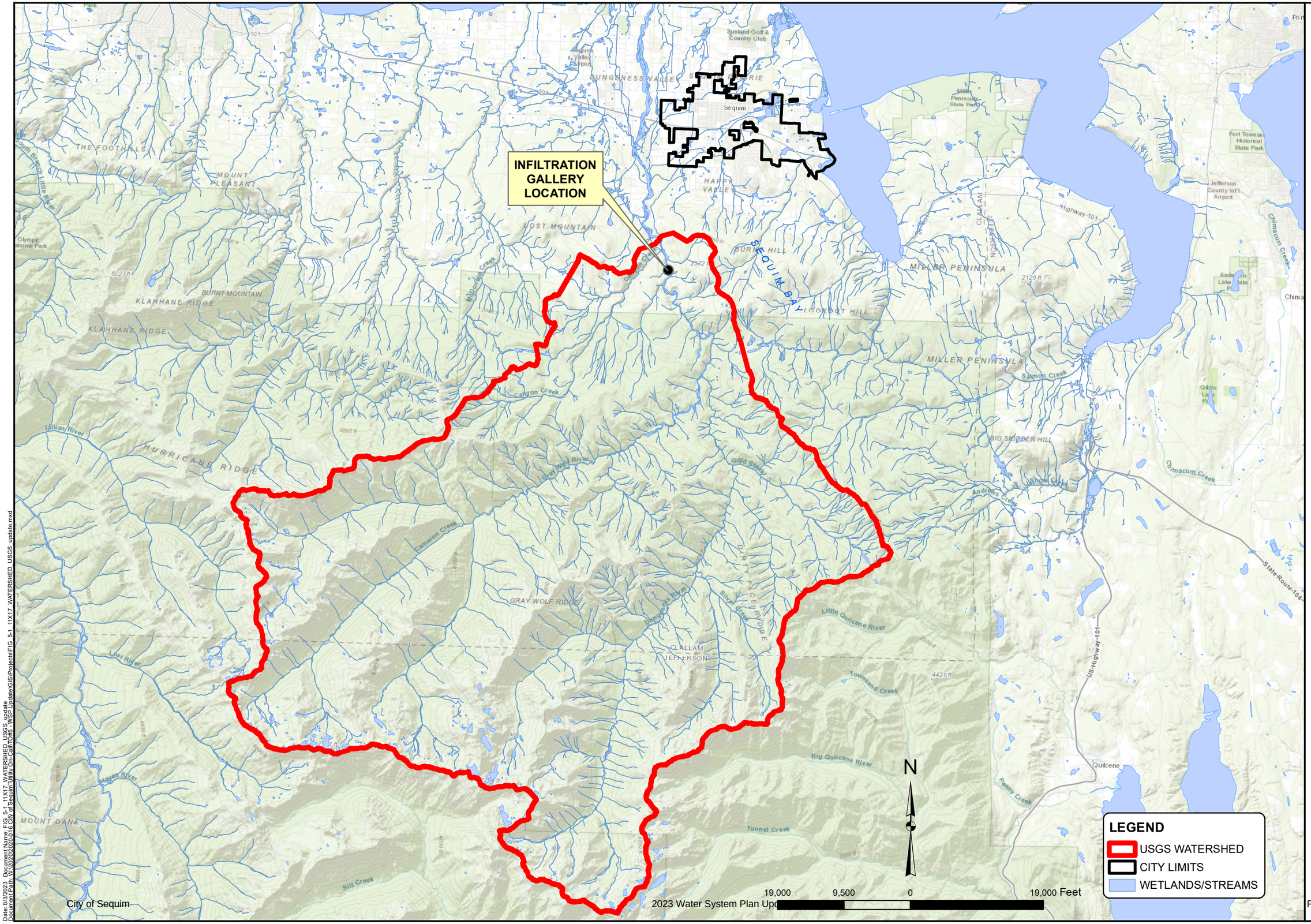
- Owners and operators of potential contaminant sites
- State and local agencies
- Local emergency responders

5.11 SOURCE WATER PROTECTION MANAGEMENT PLAN

The management of the Port Williams Wellfield will be accomplished by controlling, or conditioning, the type of development and amount of growth in the WHPA. The Port Williams Wellfield and WHPA are within the City's 20-year Urban Growth Area (UGA) boundary which allows the City good control regarding land use. The lands within the WHPA are zoned primarily for residential use but commercial use is prevalent along Washington St. There are no actual industrial zones in the City; a high-tech-light-industrial zone exists but it is outside and east of the Port Williams WHPA.

The Silberhorn WHPA is in Clallam County's jurisdiction, outside of the City's UGA boundaries. The area is residential and agricultural and, as described earlier, is characterized by single-family residences with septic tank systems. Although the City does not have direct control of the area's land uses, the City notifies the septic system property owners within the WHPA of their location within the WHPA (details listed above). This notification includes recommendations for good septic tank maintenance and practices and provide contacts information for the City and Clallam County Environmental Health. The City also alerts Environmental Health with the list of septic systems that are within the Silberhorn Wellfield ZOC.

The City's infiltration gallery is on property owned and managed by the City, but the entire upper watershed is outside the City's and the County's jurisdiction and control. However, the City would be notified through SEPA and other channels if any land uses of concern are proposed in the WHPA for the infiltration gallery.



Date: 8/3/2023 Document Name: FIG 5-1 11X17 WATERSHED USGS update
Document Path: W:\2020\2020-016 City of Sequim Dwtr Sys WSP Update\GIS\Projects\FIG 5-1 11X17 WATERSHED USGS update.mxd

City of Sequim

2023 Water System Plan Up

WILSON ENGINEERING

CITY OF SEQUIM

DESIGNED BY	DRAWN BY	CHECKED BY
-	TG	BMS

CITY OF SEQUIM

SEQUIM WASHINGTON

WATER SYSTEM PLAN
FIGURE 5-1
INFILTRATION GALLERY
WATERSHED PROTECTION AREA

DATE	SCALE	PROJECT
Aug 2023	AS SHOWN	2020-016

SHEET 1 OF 1

INFILTRATION GALLERY LOCATION

INFILTRATION GALLERY DRAINAGE AREA

SEQUIM BAY

LEGEND

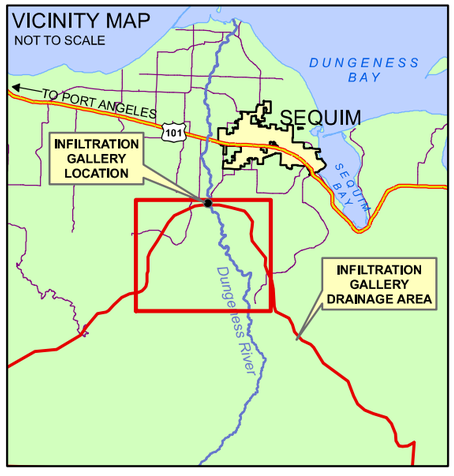
PARCELS

- PARCELS
- WETLANDS/STREAMS

OWNER

- CITY
- STATE
- DNR \ DFWS
- OLYMPIC NATIONAL FO*
- ALBERT HALLER
- CDR RANCH INC
- CEDAR LANE TRUST
- GREEN CROW TIMBER
- JLCG LLC - TIMBER CO
- MANKE FAMILY
- PENINSULA LONG RIFLE
- RD MERRILL CO
- OTHER PRIVATE

VICINITY MAP
NOT TO SCALE



N

0 1,000 2,000 4,000 Feet

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CITY OF SEQUIM

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BMS	RDN	-

CITY OF SEQUIM

SEQUIM WASHINGTON

2021 WATER SYSTEM PLAN
FIGURE 5-2
LAND OWNERSHIP WITHIN THE INFILTRATION GALLERY WATERSHED PROTECTION AREA

DATE	SCALE	PROJECT
JUNE 2022	AS SHOWN	2020-016

SHEET 1 OF 1

Date: 6/11/2022 Document Name: FIG_5-2_11X17_WATERSHED_OWNERSHIP
Document Path: W:\2020\2020-016 City of Sequim WSP Update\GIS\Projects\FIG_5-2_11X17_WATERSHED_OWNERSHIP.mxd

PORT WILLIAMS WELL FIELD

SILBERHORN WELL FIELD

STRAIT OF JUAN DE FUCA

DUNGENESS RIVER

SEQUIM BAY

Legend

- WELL
- SixMonthZOC
- OneYearZOC
- FiveYearZOC
- TenYearZOC
- CITY LIMITS
- URBAN GROWTH AREA

POTENTIAL CONTAMINATI... SITES*

- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19

Parcel with On-Site Septic

*Potential Contamination Sites shown include both active cleanup sites and completed cleanup sites.

N

2,000 1000 0 2,000 Feet

City of Sequim

2023 Water System Plan Update

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CITY OF SEQUIM

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CITY OF SEQUIM — WASHINGTON

2021 WATER SYSTEM PLAN
FIGURE 5-3
WELLHEAD ZOCs

SEQUIM

DATE	SCALE	PROJECT
JUNE 2022	AS SHOWN	2020-016

SHEET 1 OF 1

Date: 6/30/2022 Document Name: FIG_5-3_11X17_WELLHEAD_ZOCS
Document Path: W:\2020\2020016 City of Sequim Utility On Call\Base - WSP Update\GIS\Projects\FIG_5-3_11X17_WELLHEAD_ZOCS.mxd

Chapter 6
OPERATION AND MAINTENANCE PROGRAM

6.1 WATER SYSTEM MANAGEMENT AND PERSONNEL

The City of Sequim is governed by a City Manager and seven-member City Council. Water system staff include a Public Works Director, Utilities Manager and five Water Distribution Managers. The City's Public Works Director is Sarah VanAusdle; other staff members and their certification status are found in Table 6-1. The contact number for the City's public works office is (360) 683-4908. The City's emergency/after-hours phone number is (360) 912-7059.

Table 6-1 Water Operations Staff Certifications

Name	Operator No.	Position	Certification	CCS[1]
Arnold "Pete" Tjemsland	007599	Utilities Manager	WDM-2	Yes
George Priest	014964	Lead Operator	WDM-2	Yes
Matt Shackleford	015359	Water Operator	WDM-2	Yes
Ted Pulliman	016048	Water Operator	WDM-3	Yes
Devin Scott	012882	Water Operator[2]	WDM-2	Yes
James McBride	006700	WWTP Operator[2]	WDM-2	Yes
John Christianson	014829	Lead WWTP Operator[2]	WDM-3	Yes
Timmy Wright	013871	WWTP Operator[2]	WDM-2	Yes

(1) Cross-Connection Control Specialist.
(2) These staff are cross trained but are not actively working in the water department.

6.2 PROFESSIONAL GROWTH REQUIREMENTS

In order to maintain expertise for the various grades of operator certification, Washington State requires that all certified operators complete not less than three Continuing Education Units (CEU) within each 3-year period. Programs sponsored by both Washington Environmental Training Resources Center (WETRC) and the American Waterworks Association (AWWA) Pacific Northwest Subsection are the most popular source of CEUs for certified operators in Washington State.

The City's certified water system operators all complete CEUs on a regular basis. Besides providing CEUs, water system operator training is an important component in maintaining a safe and reliable water system. At a minimum, all personnel performing water system related duties will receive training in the following areas.

- Basic Water Testing
- Water Works Hydraulics
- PRV Operation and Maintenance
- Record Keeping

- Meter Reading
- Meter Installation and Maintenance
- Fire Hydrant Maintenance
- Sodium Hypochlorite Safety
- Sodium Hypochlorite Equipment Installation and Maintenance
- Confined space
- Trenching and shoring
- Traffic Flagging
- Asbestos cement pipe safety
- Cross-Connection Control

6.3 SYSTEM OPERATION AND CONTROL

6.3.1 MAJOR SYSTEM COMPONENTS & PRESSURE ZONES

The locations of the major system components are shown on Figure 1-2; Figure 1-6 includes a 3-D schematic of the system including pressure zones. The City currently utilizes three sources of supply: the Infiltration Gallery (DOH S01), the Silberhorn Wellfield (DOH S02), and the Port Williams Wellfield (DOH S05).

The Infiltration Gallery, which is a series of perforated interception pipelines buried 24 feet deep adjacent to the Dungeness River, is operated at a constant supply rate of 350 gpm as turbidity levels allow. The Infiltration Gallery also consists of a collection well, a chlorination unit, and a 12-inch transmission line with valves. The system is operated by a siphon which is primed by a diaphragm air pump. The chlorinator uses 12-percent sodium hypochlorite and is operated manually. The chlorinator continues to operate as long as the Infiltration Gallery is flowing. When the Infiltration Gallery is shut down, the chlorination unit is shut off automatically. Sodium hypochlorite is injected into the water main at the control building. The Infiltration Gallery feeds the City's 1.7 MG reservoir on Reservoir Road.

The Silberhorn Wellfield consists of three wells. The City operates each well at a maximum pumping rate of 260 gpm due to aquifer and screen limitations. Chlorination is provided by 12-percent bulk hypochlorite injected into the water main at the control building. The injection pump is triggered to come on when a pump is called. Flow from Silberhorn is measured by a flow meter in the control building. Water from the Silberhorn Wellfield is delivered to the City's 1.7 MG reservoir and the 420 pressure zone. The Silberhorn Wellfield is equipped with a standby generator.

The Port Williams Wellfield currently consists of three wells, each designed for a pumping capacity of 560 to 600 gpm. A total of up to five wells may be drilled at the Port Williams site per the water right permit. All wells in the Port Williams Wellfield pump through the Control Building and connect to the 12-inch water main located on Port Williams Road. Each well is equipped with a flow meter, and the total flow from all wells is measured with the flow meter in the Control Building. Sodium hypochlorite is injected into the water main in the Control Building to provide chlorine disinfection of the system. The existing wells can be operated

together based on the water level in the 1.7 MG reservoir or by drop of pressure at the Control Building. The wells are programmed to alternate on each pump cycle during normal operation. During high demand multiple wells will operate based on pressure in the 350 Zone. The wells pump directly to the 350 Zone. The Port Williams Wellfield is equipped with a standby generator.

Figure 1-6 shows the City's water system and pressure zones. The City has six hydraulic pressure zones in order to maintain reasonable pressures (minimum and maximum) within each zone. The hydraulic grade lines (HGL) of the zones are labeled 350, 420, 480, 500, 680 and 775, which refer to the elevation above sea level of the HGL in the zone. The HGLs of the 420, 480 and 680 Zones are set by reservoirs. The HGL of the 775 Zone is set by a booster station. The HGLs of the 350 and 500 Zones are set by pressure reducing valve (PRV) stations.

The lower zone has been designed to operate at an HGL of 350. The lower zone HGL can be varied to meet the desired operational pressures within the area by adjusting the pressure reducing valves between the 420 and 350 Zones. The 420 Zone contains the 1.7 MG reservoir. The overflow level of the 1.7 MG reservoir is 420 feet.

The 480 Zone is served by the 480 Zone Booster Station and 0.2 MG reservoir on Reservoir Road. This system is isolated from the other zones by closed gate valves.

When a Port Williams well is pumping and does not provide all of the supply required for the 350 Zone, or if the well has not been called, the PRV at 5th Avenue and McCurdy Street will open to allow water to flow from the 1.7 MG 420 Reservoir to the lower zone and the PRV will modulate to maintain the set hydraulic gradient for the zone. If the Port Williams well is pumping more than required to meet demands in the 350 Zone, the booster station at 5th Avenue and McCurdy Street will be enabled to start under certain conditions and pump water to the 1.7 MG reservoir.

The 500, 680, and 775 Zones are located in the southeast portion of the City and serve the Solana Development. Two booster stations, a reservoir, and multiple PRVs were constructed in association with this development. The 680 Zone Booster Station pumps from the 420 Zone to the 680 Zone and the 1.0 MG Solana Reservoir. The 775 Booster Station pumps from the 680 Zone to the 775 Zone. The 500 Zone is supplied by PRV from the 680 Zone.

6.4 PREVENTATIVE MAINTENANCE PROGRAM

The most cost-effective method for maintaining a water system is to provide a planned preventive maintenance (PM) program. A planned PM program can provide the optimum level of maintenance activities for the least total maintenance cost. The routine maintenance procedures for each system component are described below.

6.4.1 RESERVOIRS

Improperly maintained reservoirs can cause contamination in public water systems. This is a result of contaminants entering the reservoir through cracks or openings at the vent, overflow or drain screens. Deteriorating hatch covers and vandalism can also compromise reservoir water quality. Poorly designed and maintained reservoirs can hamper the emergency operation of a

water system. If reservoir drains are not functioning properly, it may be impossible to purge a contaminant from the system. Written documentation of reservoir maintenance must be completed with each inspection and repair, and a copy of the report retained on file.

The City of Sequim currently drains and cleans reservoirs at approximately 5-year intervals. Reservoir levels are monitored daily. An operator inspects the top of the reservoirs to look at vent screens, hatches, and other penetrations in the tops of the reservoirs once per year.

6.4.2 Well Maintenance

The City measures water levels in its monitoring well network on a consistent schedule: monthly, daily, and/or hourly, depending on whether a transducer is installed. Step-drawdown tests are conducted to track performance and the need for well rehabilitation or redevelopment. Specific Capacity (well production in gpm per ft of drawdown) is calculated at least annually, and rehabilitation / redevelopment is considered as soon as (or ideally prior to) any decrease in Specific Capacity is detected.

Wells are inspected by video on a periodic basis (at least every 5 years) to check the condition of the well casing and screen. Any issues discovered are addressed in a timely manner.

6.4.3 Distribution System Valve and Hydrant Maintenance

The City implemented a distribution valve exercising program. Valves that do not close tight are removed, repaired or replaced. An important aspect of distribution system valve maintenance is to ensure distribution valves are completely open. A partially closed valve can seriously reduce peak day operation and fire flow supply. Distribution valves are exercised every 1-4 years and fire hydrants are exercised every 1-3 years.

Pressure reducing valves (PRVs) control flow from higher zones into lower zones. The City records the upstream and downstream pressure across PRVs. To test the PRV function a downstream fire hydrant is opened to make sure the valves are operating properly. PRVs are inspected monthly and rebuilt every 1-2 years (and repaired as needed).

6.4.4 Unidirectional flushing

Protocols for distribution system maintenance by unidirectional flushing are currently under development. This new procedure will clean water mains as well as assist with leak detection. The City plans to complete a full distribution system flush approximately once every 5 years once the unidirectional flushing plan is developed. The City plans to perform the initial unidirectional flush beginning in Fall 2023.

6.4.5 Dead-End Water Lines

Dead-end water lines are susceptible to water quality problems and must be flushed regularly to remove stagnant water and debris which may have been deposited. Flushing of all dead-end mains to maintain water quality is accomplished at least twice each year (often it's every 1-2 months) or if water quality complaints occur.

6.4.6 METERS

Commercial and residential meters are read on a monthly basis and a leak detection survey is conducted every three years. Accurate water metering is an essential financial and conservation component of water system infrastructure. A substantial amount of revenue may be lost through inaccurate metering of customer accounts. Without accurate master or source meter readings, the water utility cannot determine (lost and unaccounted for water) distribution system leakage volumes. Service meters, including all residential and commercial customer meters, are tested and/or replaced according to the following schedule:

- 3/4-inch and 1-inch meters are tested every 10 years and replaced, if necessary.

Replacement is recommended if it is cheaper to replace meters than to test and, if necessary, repair meters.

- 2-inch through 4-inch meters are tested every 3 to 5 years, and replaced, if necessary.

- 4-inch and larger meters are tested every 1 to 3 years, and replaced, if necessary.

6.4.7 INVENTORY OF MATERIALS/SUPPLIES

The City maintains an inventory of parts and supplies including the materials needed to make emergency repairs. At a minimum, the materials maintained in the inventory are the materials necessary to repair leaks for every size and type of pipe in the system. Spare valves in sizes 8-inch and smaller are included in this inventory.

6.4.8 MAINTENANCE FOR GEAR

Maintenance of gear and tools required to repair water system components is conducted as needed and does not require a schedule or other routine actions.

6.4.9 OPERATION AND MAINTENANCE SCHEDULE

Table 6-2 lists the frequency of normal maintenance and operations activities.

Table 6-2 Summary of Operations and Maintenance Frequencies

Operation and Maintenance	Frequency
Clean, Repair or Drain Reservoirs	Every 5 years
Monitoring Reservoir Levels	Daily
Monitoring Well Water Levels	City wells & others: monthly (or more if transducer is installed)
Step-Drawdown Tests on Wells	As needed to check performance
Distribution System Valve Exercising	Every 1-4 years
Hydrant Exercising	Every 1-3 years
PRV Inspection	Monthly inspection and rebuild every 1-2 years; repair as needed
Service Meter testing	Variable, depending on meter size
Flushing Dead-End Water Mains	Every 6 months or as needed (usually every 1-2 months)

Commercial Meter Readings	Monthly
Residential Meter Readings	Monthly
Leak Detection Survey	Every 3 years

6.5 OPERATION AND MAINTENANCE PROJECTS

The City continually strives to increase the effectiveness and efficiency of their O&M program. The City has identified several maintenance improvement projects that will help water system staff maintain and improve the system components. These projects are briefly described below and may also be included in Chapter 8 – Capital Improvement Program.

Leak Detection Survey (M-1) (Continual or as needed)

Estimated cost: $5,000 to $10,000
Proposed year: Every 3 years

The City will continue to perform leak detection surveys every three years in order to control and reduce distribution system leakage (DSL). These leak detection surveys help identify specific sections of pipe or joints that may be defective. These joints or pipes can then be replaced or repaired and decrease the overall volume of system leakage. Leak detection surveys are competed by water system staff as time allows and in addition to normal O&M tasks.

Water Main Replacement/Leak Repair (M-2)

Estimated cost: $30,000
Proposed year: Annually

The City budgets funds annually to replace or repair leaky pipes identified during leak detection surveys described above. The City plans to expand this pipe repair program as financing allows in order to decrease DSL and increase overall operational efficiency. The water system staff will perform repairs as capability and time allows, otherwise, pipe replacement projects will be performed by a licensed contractor.

Hydrant Upgrades (M-3)

Estimated cost: $50,000
Proposed year: Annually

The City plans to address the status of existing hydrants through an annual replacement program. The City has budgeted the amount above annually in order to replace old hydrants with new models, and to bring existing hydrants up to current development standards.

Vehicles (M-4)

Estimated cost: $60,000 to $100,000
Proposed year: Annually

The City has budgeted the above amount annually to provide for new vehicles on a regularly scheduled basis, or as needed. Vehicles include maintenance trucks and cars, mowers, earth moving equipment, as well as routine maintenance associated with vehicle ownership. The City

use these vehicles to respond to water system needs, perform regular O&M duties, and for transportation and inspection purposes.

Cross-Connection Control Device Inventory (M-5)

Estimated cost: $10,000 to $15,000
Proposed year: Annually

The City's water system staff continually adds backflow prevention devices to the City's database as part of the Cross-Connection Control Program. This project includes inspecting, cataloging, and entering data for each device into the City's Backflow Protection Management Software. The City is currently integrating the backflow prevention device tracking and management database into their Cartegraph asset and operations management software for robust tracking and monitoring to ensure annual testing and follow-up if needed.

Large Control Valve Service (M-6)

Estimated cost: $5,000
Proposed year: Annually

This project includes maintenance and replacement of large control valves within the City's water system. These valves deteriorate over time and require regular maintenance or replacement. Altitude valve and pressure reducing valves (PRVs) within the system must be maintained to ensure that they are functioning properly. This project allocates funds for the regular maintenance of these operating valves.

Water System Shop Expansion (M-7)

Estimated cost: $50,000 each year for 4 years
Proposed year: 2023-2027

This project includes a multi-year expansion of the City's shop facilities. The costs shown are for the water system's portion. The City anticipates much of the cost will be covered by grants.

6.6 EMERGENCY RESPONSE PROGRAM

Water utilities have the responsibility to provide an adequate quantity and quality of water in a reliable manner at all times. To do this, utilities must reduce or eliminate the effects of natural disasters, accidents, and intentional acts of sabotage. In addition, the City has prepared a vulnerability assessment and an emergency response plan as required by law. These are on file for use by the City and are not included in this Plan for security purposes.

6.6.1 EMERGENCY PROCEDURES

Although is not possible to anticipate all potential disasters affecting the City's water system, formulating procedures to manage and remedy several common emergencies is appropriate.

The City maintains a current emergency operations center (EOC) at an existing transit station along West Cedar Street between North Sequim Avenue and North Second Avenue. Should this building become unavailable through an emergency, semi-permanent structures would be erected

at the shop site. The City is considering modifications to the transit station that would make it a more functional EOC through various types and scales of emergencies.

6.6.1.1 Water System Personnel Emergency Call-Up List

City of Sequim's Public Works Director is in charge of initiating emergency response procedures and ensuring that customers and emergency response agencies are notified. Table 6-3 is an emergency phone list for the City.

Table 6-3 Emergency Phone List (City cell numbers available upon request)

Agency/Group	Contact	Phone Number
Fire/Police	--	911
Public Works Director	Sarah VanAusdle	360-683-4908
Utility Manager	Pete Tjemsland	360-683-4908
Lead Water Operator Cross-Connection Specialist	George Priest	360-683-4908
City Shop	--	360-681-3449
After hours/on-call 24/7 access	**Security Services Northwest**	**360-912-7059**
Contractor	George Dickinson	360-683-8332
Contractor	Lakeside Industries	360-452-7803
Contractor	Interwest Construction	360-757-7574
Contractor	C&J Excavating	360-683-7741
Plumbing Supplies	Bill's Plumbing Supplies	360-683-4638 or 360-452-9084
Plumbing Supplies	Clallam Co-op	360-683-4111
Plumbing Supplies	Brothers Plumbing	360-683-9191
Pipe/Fitting Suppliers	Core & Main HD Supply	253-840-8558 360-536-1234
Pipe/Fitting Suppliers	H.D. Fowler	206-863-8600
Pipe/Fitting Suppliers	Keller Supplies	360-681-8900
Telemetry Repair and Installation	S&B, Inc.	425-644-1700
Systems Integration	TSI	425-775-5696
Control Valve and Maintenance Repair	G.C. Systems, Inc.	253-939-8322
Testing Lab	Spectra Lab	360-779-5141
Testing Lab – coliform only	Clallam Co. Environmental Health	360-417-2258
Washington State Dept. of Health	SW Regional Office	360-236-3030
Clallam County	Emergency Services	360-417-2305
Clallam County	Public Health	360-417-2274
P.U.D. #1 of Clallam County	--	360-452-9771
Utility Locates	State Wide One-Call	800-424-5555 (or 811)
Engineering consultants	Wilson Engineering	360-733-6100
Department of Ecology – Spill Response	--	360-407-6300

6.6.1.2 Bacteriological Presence Detection Procedure

Procedures for notifying system customers, the local health department, and DOH of water quality emergencies are an important component of an emergency response program. Many public water systems will occasionally detect positive coliform samples, mainly as a result of minor contamination in distribution mains or sample taps or improper bacteriological sampling procedures. However, the persistent detection of coliforms in the water supply, particularly E. coli or fecal bacteria, may require issuing a public boil water notice to ensure the health and safety of the water customers. Emergencies such as floods, earthquakes, and other disasters can affect water quality as a result of damage to water system facilities, thereby warranting a boil water order. A procedure for this included in Appendix G.

The City also maintains a current coliform monitoring plan for routine sampling of the distribution system and its water sources. A copy of the current plan, along with public notification materials, is included in Appendix I.

6.6.1.3 IOC/VOC/SOC and Inorganic Chemical/Physical Characteristics Detection Procedures

A procedure to comply with DOH requirements in the event of an inorganic chemical/physical characteristic (IOC), volatile organic chemical (VOC) or synthetic organic chemical (SOC) detection is included in Appendix G. Public notification will be implemented according to DOH requirements.

6.6.1.4 Power Failure

Various types of weather can cause loss of power, such as wind, lightning, freezing rain, and snow. The following facilities have emergency power supplies that meet the minimum requirements of Section 5.B.6 Power Considerations of the Sizing Guidelines for Public Water Supplies and can be considered a non-interrupted power source that meets the requirements of the facility:

- The Silberhorn Wellfield has a 75 kWh generator and sufficient fuel to provide back-up service for 24 hours minimum.
- The Port Williams Wellfield has a 200 kWh generator which can operate the two wells simultaneously for 24 hours minimum.
- The Infiltration Gallery feeds the water system by gravity and flow would not be affected in the event of a power failure, but a generator has been installed to operate the treatment system if necessary, for 24 hours minimum.
- Generators have been installed at reservoirs on Reservoir Rd as well as Solana that allow operation to continue for 24 hours minimum.

6.6.1.5 Severe Earthquake

Table 6-4 details the City's response to a severe earthquake.

Table 6-4 Severe Earthquake Response

System Component	Action
Wells and PRVs: Well pumps may have lost power and PRVs may be damaged	• Repair/manipulate well pumps as needed to continue supply of water to system • Check PRVs for damage
Distribution System: Distribution and transmission mains may be broken	• Isolate broken sections and repair • Consider jumper hose from one hydrant to another, to keep service going
Reservoir: Reservoir may be leaking or structurally damaged; 1.7 MG reservoir has a seismic valve which will close in the event of an earthquake	• Check reservoir for structural damage and drain if in danger of bursting • Check reservoir for cracks and leaks, and seal or drain as required

6.6.1.6 Severe Snowstorm (Immobility)

Heavy snowfall may bring motor vehicle traffic to a standstill. Employees may not be able to reach problem areas. Table 6-5 details the City's response to a severe snowstorm.

Table 6-5 Severe Snowstorm/Immobility Response

System Component	Action
Distribution System: Transportation to monitor system and make repairs will be limited	• Plow streets if necessary and if equipment is available • Have chains and other snow gear ready for maintenance equipment and vehicles • Valve locations will be kept current and made available for maintenance personnel
Reservoir: No immediate effect. Snow may prevent access.	• Plow streets if necessary and if equipment is available • Have chains and other snow gear ready for maintenance equipment and vehicles

6.6.1.7 High Water and Flooding

Heavy snow melt and/or rains cause localized flooding and/or the water table to rise. Table 6-6 details the City's response to high water and flooding.

Table 6-6 Water and Flooding Response

System Component	Action
Distribution System: water line trenches may become saturated	Check chlorine residuals throughout distribution system
Reservoirs: No effect. Reservoirs are above flood level	No action is necessary

6.6.1.8 Contamination of Water Supply

Contamination of water supply can be caused by main breaks or pollution from an isolated source. Table 6-7 details the City's response to contamination of the water system.

Table 6-7 Contamination of the Water System

Distribution System Contamination
• Close valves if possible to isolate source
• Repair and or remove source of pollution
• Flush previously contaminated section and test until free of contamination prior to resumption of use
Reservoir Contamination
• Resample to confirm contamination
• Check distribution system for presence of contamination
• Isolate reservoir from system
• Inspect vent screens, hatches, and piping to identify source of contamination
• If reservoir water is contaminated and therefore considered unsuitable for consumption, drain and clean reservoir.
• Consider disinfecting reservoir if bacteriological standards are exceeded. Follow AWWA Standards.

6.6.1.9 Water Main Breaks

In the event of a water main break, the City will follow DOH guidance in publication 331-583, Water Main Break Response Protocol for Chlorinated Systems, available here: https://doh.wa.gov/sites/default/files/legacy/Documents/Pubs//331-583.pdf . The City will initially assess the situation and identify which customers and services will be affected. The City will strategize the best course of action to minimize impact to surrounding facilities, prepare the broken main for repair, while still maintaining water service the maximum number of customers possible. If appropriate, the City will notify appropriate authorities that would alert customers of the situation. The City will repair the damage and conform with the City's Developer Standards within 48 hours.

After the main has been repaired, the system will be disinfected, flushed, and tested according to DOH requirements and guidance.

6.7 CROSS-CONNECTION CONTROL PROGRAM

The City's cross-connection control program establishes minimum standards for the City to protect the public potable water supply from possible contamination due cross connections. The Program addresses authority, responsibility, requirements, administrative procedures, minimum requirements, record keeping, and standard forms and letters. A copy of the City's cross-connection control manual is included in Appendix J.

6.8 CUSTOMER COMPLAINTS AND RECORD KEEPING

The City uses an operations management system called Cartegraph to log, file, and track customer complaints, routine maintenance, part orders, and special work orders. For each

customer complaint, a work order is created within the data management system. This work order is emailed to the appropriate department leader, who forwards the information to the appropriate utility personnel. Customer complaints are addressed in the order they are received, with special consideration given to high priority complaints or other system failures. Once addressed, a narrative is provided as to the work that was done, and whether or not this work addressed the customer complaint. If the situation is resolved, the order is closed and filed by the data management system. A hard copy of the completed work order is filed by the City and this record is maintained for at least 10 years at the City's public works department.

6.9 WATER QUALITY MONITORING

The City's water quality monitoring schedule is included in Appendix G. Also included in Appendix G is the map of applicable sampling sites.

Chapter 7
WATER SYSTEM DESIGN AND CONSTRUCTION STANDARDS

7.1 INTRODUCTION
This chapter summarizes engineering design standards for the City of Sequim water system. Title 13, Division I of the City's municipal code outlines statutes regarding the water system, use, and regulation.

7.2 DEPARTMENT OF HEALTH WATER SYSTEM DESIGN MANUAL
Requirements from the DOH Water System Design Manual published December 2020 are presented in Chapter 3.

7.3 ENGINEERING DESIGN STANDARDS
Appendix F contains the standard design drawings for water system components. Items such as permit applications, contracts/agreements, cost estimates, and easement applications for use by developers can be obtained from the City's website.

Chapter 8
CAPITAL IMPROVEMENT PLAN

8.1 INTRODUCTION
This Chapter presents the Capital Improvement Plan (CIP) for the 10-year and 20-year planning periods. Individual project descriptions are included in this chapter, and preliminary project cost estimates for applicable projects are provided in Appendix L. This CIP includes projects to address current and projected deficiencies identified in Chapter 3 as well as needed Operations and Maintenance capital expenditures discussed in Chapter 6. Figure 8-1 shows the locations of proposed distribution, storage and source improvements in the 10-year improvement plan.

Other projects may arise, in the future, which are not identified as part of the City's CIP. Such projects may be deemed necessary for ensuring water quality, preserving emergency water supply, accommodating transportation improvements proposed by other agencies, or addressing unforeseen problems with the City's water system. Due to budgetary constraints, the completion of these projects may require that the proposed completion date for projects in the CIP be rescheduled. The City retains the flexibility to reschedule proposed projects and to expand or reduce the scope of proposed projects, as best determined by the City Staff and Council when new information becomes available. Each capital improvement project should be reevaluated to consider the most recent planning efforts as the proposed completion date for the project approaches.

8.2 IDENTIFICATION OF SYSTEM IMPROVEMENTS

8.2.1 PREVIOUSLY IDENTIFIED IMPROVEMENTS
In each Water System Plan, projects are identified based on the needs of the water system, and are typically completed based on funding, development, and/or project timing. Table 8-1 lists CIP projects identified in the 2013 Water System Plan as well as their current status.

Table 8-1 Previously Identified CIP Projects

Project No.	Description	Proposed Year	Previously Estimated Cost[1]	Status
BS-1	500 gpm BS and PRVs	2019	$ 471,000	Not yet completed – project has evolved significantly: see updated BS-1 project description and estimate.
BS-2	5th and McCurdy BS Improvements	2014-2015	$ 284,000	Completed in 2017
BS-3	600 gpm BS at Simdars Road	2016-2017	$ 415,000	Not yet completed – see current CIP, BS-2
ST-1	Happy Valley Reservoir	2019	$ 3,494,000	Not yet completed – site for reservoir has changed, see current CIP, ST-1
ST-2	Port Williams Reservoir Study	2014	$ 45,000	Completed in 2015
ST-3	1.7 MG Reservoir Mixing System	2014-2015	$ 81,000	Completed in 2014
ST-4	Study for Reuse of 500,000-Gallon Reservoir	2014	$ 25,000	Not needed – City continues to consider this as available in an emergency or could be demolished once new storage is completed
S-1	Port Williams Well No. 4	2014	$ 730,000	Not yet completed – see current CIP, S-1
S-2	New Well	2019	$ 730,000	Not yet completed – see current CIP, S-2
S-3	Investigate Additional Source of Supply	2015	$ 50,000	No longer needed after considering current CIP items S-1, S-2, and S-3 and system capacity analysis
S-4	Study and Redevelop Wells 2 and 3	2014	$ 150,000	Completed in 2015
S-5	Replacement Wells 2 and 3	2019	$ 733,000	No longer needed within planning horizon
S-6	Infiltration Gallery Improvements	2017-2018	$ 633,000	No longer needed – analysis and testing showed source can produce water up to water right limitation
S-7	Investigate New Water Rights	2013	$ 300,000	No longer needed within 20-year planning period per Ch 3 analysis
D-1	Hammond Street WM	2013	$ 873,000	Not yet completed - Project will proceed upon developer funding. See current CIP, D-1
D-2	Brown Road WM	2019	$ 855,000	Not yet completed. See current CIP, D-2
D-3	5th Avenue WM	2019	$ 179,000	Not yet completed. See current CIP, D-3
D-4	Reservoir Road and 7th Avenue WM	2016-2017	$ 534,000	Not yet completed – Project will proceed upon developer funding. See current CIP, D-4
D-5	Norman Street and Eunice Street Improvements	2019	$ 435,000	Not yet completed. See current CIP, D-5

[1] Previously Estimated Costs come from the 2013 WSP, which states that they are all in 2012 dollars

Table 8-1 Previously Identified CIP Projects (Cont.)

Project No.	Description	Proposed Year	Previously Estimated Cost[2]	Status
D-6	7th Avenue WM	2019	$ 818,000	No longer needed, changed location for new reservoir
D-7	Happy Valley Road Improvements	2019	$ 1,145,000	No longer needed, changed location for new reservoir
D-8	Washington Street WM	2019	$ 759,000	Not yet completed– Project will proceed upon developer funding. See current CIP, D-6
D-9	West Sequim Bay WM	2019	$ 1,015,000	Not yet completed. See CIP, D-7
D-10	Washington Harbor Loop WM	2019	$ 1,140,000	Not yet completed– Project will proceed upon developer funding. See current CIP, D-8
D-11	Fir Street from North 5th Avenue to North Sequim Avenue	2013-2017	$ 911,000	Completed in 2019
D-12	Fir Street from North Sequim Avenue to North Brown Road	2017-2019	$ 729,000	Not yet completed. See current CIP, D-9
D-13	Brown Road from East Fir Street to East Washington Street	2016-2017	$ 530,000	Not yet completed– Project will proceed upon developer funding. See current CIP, D-10
D-14	South Sunnyside Avenue from Maple Street to East Prairie Street	2014	$ 108,000	Completed in 2014
D-15	East Etta Street from Sequim Avenue to South Sunnyside Avenue	2013-2014	$ 225,000	Not yet completed. See current CIP, D-11
D-16	Marlo Drive West from existing main to River Road	2019	$ 246,000	Not yet completed– Project will proceed upon developer funding. See current CIP, D-12
D-17	West Sequim Bay Road from Battelle	2019	$ 708,000	Not yet completed– Project will proceed upon developer funding. See current CIP, D-13
D-18	Emerald Highlands Service	2014-2015	$ 194,000	Strategy for serving Emerald Highlands has changed – see BS-1. Previous plan has been abandoned due to wheeling logistics challenges; alternate route for connection determined to be infeasible due to risk of crossing irrigation canal infrastructure in this vicinity.
D-19	Pressure Relief Valves	2015	$ 90,000	Not yet completed. See CIP, D-14
D-20	Craftsman Court PRV Station	2015	$ 50,000	No longer needed. Plan for serving Emerald Highlands has changed (See BS-1), and Craftsman Court will remain on existing pressure zone. Connection to Miller road / Coral Dr will be made, which will not be connected to Craftsman Court.

[2] Previously Estimated Costs come from the 2013 WSP, which states that they are all in 2012 dollars

Table 8-1 Previously Identified CIP Projects (Cont.)

Project No.	Description	Proposed Year	Previously Estimated Cost[3]	Status
D-21	S. Lee Chatsfield to Espeth Way	2019	$ 149,000	Not yet completed– Project will proceed upon developer funding. See current CIP, D-15
D-22	Washington Harbor Road to Washington Harbor Loop	2019	$ 303,000	Not yet completed– Project will proceed upon developer funding. See current CIP, D-16
D-23	Asbestos Cement/Galv. Iron WM Replacement and Oversizing	2013-2019	$ 2,450,000	Not yet completed. See current CIP, D-17
D-24	East Maple Street from South Sequim Avenue to South Sunnyside Avenue	2014-2015	$ 158,000	Completed in 2014
D-25	Connection across South 3rd Avenue at Sycamore Street	2014	$ 45,000	Completed in 2016
D-26	Isolation Valves on Washington Street from 5th Avenue to Sequim Avenue	2014	$ 143,300	Not yet completed. See current CIP, D-18
D-27	West Prairie from South Sequim to South 2nd Avenue	2013	$ 218,000	Not yet completed. See current CIP, D-19
D-28	South 7th Avenue from Silberhorn to McCurdy	2019	$ 411,100	Not yet completed. See current CIP, D-20
MI-1	SCADA Upgrade Report	2014	$ 50,000	Upgrade Report was completed in 2021. Provided many recommendations, which are included in current CIP MI-1
MI-2	Fixed Base Automatic Meter Reading System	2013-2014	$ 230,000	Not yet completed – see current CIP MI-2
MI-3	Complete Meter Replacement	2013	$ 50,000	Completed in 2011-2013. Meters will need to be replaced on a 20-year cycle, so again in 2031-2033. See current CIP MI-4
MI-4	Meter Sherwood Complex	2013	$ 100,000	No longer needed – has a master meter
MI-5	New Water Rights	2014-2018	$ 500,000	Water Rights were investigated, and additional water rights are not anticipated to be needed within the 20-year planning period (see Chapter 3)
MI-6	Portable Loadbank	2013	$ 55,000	Changed strategy – hiring this as a service is more cost effective

The following sections describe current CIP projects. Note that all project cost estimates are in 2022 dollars. This was done instead of trying to account for the proposed year of construction and inflation between 2022 and the proposed year because of the volatile inflation rate observed

[3] Previously Estimated Costs come from the 2013 WSP, which states that they are all in 2012 dollars

in 2021 and 2022 construction costs. As projects near kick-off in each year, inflation between 2022 and that year should be accounted for in budgeting efforts.

For CIP projects that were in the 2013 WSP and have not been completed but remain substantively the same, the 2013 project cost estimates (2012 dollars) were used but were brought to 2022 dollars. The method for inflating from 2012 to 2022 dollars was to use an average inflation for this period, based on the Mortenson construction cost index for Seattle (https://www.mortenson.com/cost-index#seattle-index). The cost index and inflation information is shown in Table 8-2.

Table 8-2 Construction Inflation Data

Year	Seattle Construction Cost Index	% Annual Inflation
2012	104	
2013	107	2.9%
2014	112	4.7%
2015	116	3.6%
2016	121	4.3%
2017	126	4.1%
2018	136	7.9%
2019	139	2.2%
2020	142	2.2%
2021	179	26.1%
2022	182	1.7%
	Average	**6.0%**

Based on this data, an annual average construction cost inflation of 6.0% was used to bring previous project cost estimates from 2012 to 2022 dollars. Projects for which this applies are not included in Appendix L because the details of the project scope and cost estimates were not re-assessed.

8.2.2 PROPOSED BOOSTER STATION IMPROVEMENTS

1. **Project Name:** New Closed Pressure Zone Booster Station
   Project Number: BS-1
   Estimated Cost: $1,700,000
   Proposed Design Year: 2022
   Proposed Construction Year: 2023

   Project Description: This project creates a new booster pump station (located at the City-owned Reservoir Road property) that will be capable of providing flow and pressure for build-out of the southwestern portion of the City in areas that are high enough in elevation that they cannot be served by either the 420 or 480 pressure zones. The

ultimate build-out area for the proposed booster station is shown in Appendix L in Figure L-1, and could include up to 1671 single-family residential ERUs. Distribution piping projects (including some PRVs) will be needed to connect this new booster pump station to the areas shown, and these piping projects will be driven by development schedules. One exception is project D-21, which will allow the booster pump station to provide service to the Emerald Highlands area, which is an existing development current served by the PUD but is within City limits. The booster station will pull water from the 420 pressure zone and discharge to a new pressure zone with a Hydraulic Grade Line of approximately 635 ft to provide both residential fire flow and peak hour demand for build-out of the service area following applicable standards for redundancy and resiliency.

2. **Project Name:** Simdars Road Booster Station
Project Number: BS-2
Estimated Cost: $740,000
Proposed Design Year: 2026
Proposed Construction Year: 2027

Project Description: This project will provide the City with additional capacity to transfer water from the Port Williams Wellfield in the 350 Zone into the 420 Zone. This project would be located near the PRV station located adjacent to Simdars Road. The proposed Simdars Road Boooster Station would have a reliable capacity of 600 gpm with three pitless booster pumps with capacities of 300 gpm each. The booster station would provide redundant supply to the Solana area, which is currently served only by a single line along Brownfield Road. This project would also improve water quality in the Solana Reservoir by allowing the City to deliver water more directly from the Port Williams Wellfield.

8.2.3 PROPOSED STORAGE IMPROVEMENTS

1. **Project Name:** New 420 Reservoir
Project Number: ST-1
Estimated Cost: $6,300,000
Proposed Design Year: 2035
Proposed Construction Year: 2036

Project Description: The current water system plan's analysis has determined that additional storage will be required at approximately the end of the 20-year planning period. In order to be ahead of that shortfall, the City plans to construct additional storage at least 5 years before it is needed.

The previous water system plan proposed the additional storage to be constructed near the intersection of 7th Avenue and Happy Valley Road, at a higher elevation than the 420 and 480 pressure zones. However, this vicinity does not provide sufficient elevation to serve the entire southern portion of the City by gravity. That is why the new 635 zone,

fed by the closed booster pump station (BS-1), is proposed to serve the higher elevation portions of the City at the south / southeast portion of the City (see BS-1 and Figure A-1).

The updated proposed location for the additional future storage (2.5 MG) is at the City-owned property on Reservoir Road. This location is proposed for a number of reasons: (1) the 635 booster pump station will pull water from the 420 zone, so 420 zone storage will be used to serve the 635 zone where much of the City's growth is anticipated; (2) the 420 zone is currently fed by a single reservoir (1.7 MG), so a redundant reservoir feeding this zone would be helpful to facilitate maintenance on the 1.7 MG reservoir; (3) the City-owned property has sufficient space for a new reservoir, likely immediately east of the 1.7 MG reservoir, and is already a City-owned property (as opposed to other locations where property or easements would need to be purchased); and (4) there is no need for new distribution or transmission piping to connect the system to this new reservoir (previous WSP CIP items D-6 and D-7).

The City may want to design and construct the new storage reservoir significantly sooner than the proposed years shown here so that the new storage facility allows the existing 1.7 MG reservoir to be taken offline temporarily to recoat the interior of that reservoir.

2. **Project Name:** Steel Reservoir Exterior Recoating
Project Number: ST-2
Estimated Cost: $470,000
Proposed Year: 2022

Project Description: This project is to recoat the exterior of both the 1.0 and 1.7 MG reservoirs. The 1.7 MG requires a complete removal of the existing coating and replacement, while the 1.0 MG tank simply requires an overcoat to extend its life. Project costs include technical specification development, bidding, inspection of coating work, and construction administration.

8.2.4 PROPOSED SOURCE IMPROVEMENTS

1. **Project Name:** Port Williams Well No. 4
Project Number: S-1
Estimated Cost: $1,300,000
Proposed Design Year: 2026
Proposed Construction Year: 2026

Project Description: The City plans to drill and develop a fourth well at the Port Williams Well Field. This project is part of the development of the Port Williams Well Field described in the City's water right permit for the Wellfield, which indicates that the City can complete the installation of up to five wells.

2. **Project Name:** New Deep Well
Project Number: S-2
Estimated Cost: $1,300,000

Proposed Design Year: 2024
Proposed Construction Year: 2024

Project Description: The City plans to drill and develop an additional well within the water system. The anticipated location of the well is in the vicinity of the Silberhorn Wellfield, although it is planned to be developed in the deepest aquifer in this area, roughly 600-700 feet deep. The cost estimate does not include the acquisition of land – if that is needed, the cost will need to be added.

3. **Project Name:** Dungeness River Surface Water Treatment Facility
Project Number: S-3
Estimated Cost: $20,000,000 (approximate)
Proposed Design Year: 2040

Project Description: In order to put the City's Dungeness River water right to direct beneficial use, the City will need to construct a new surface water treatment facility to treat the raw river water. It is anticipated that this new facility will be constructed on the City's Reservoir Road property, south of the existing reservoirs on the property, and will draw water directly from the City's headgate at the river or from the Highland Irrigation District main canal via the City's Reservoir Road headgate. Backwash could potentially be discharged to the City's sewer system where the water would be reclaimed through the existing reclamation facility, instead of needing extensive solids handling facilities at the site. The facility would be designed to utilize the full surface water right. Because this facility is planned for well beyond the 10 year planning period and because there are so many unknowns, a detailed project cost estimate was not developed at this time.

4. **Project Name:** Infiltration Gallery Flow Control Valve
Project Number: S-4
Estimated Cost: $240,000
Proposed Construction Year: 2028

Project Description: The City recently performed a comprehensive test of varying production rates of the Infiltration Gallery. This exercise highlighted the value that would be provided by having a flow control valve to adjust the production rate instead of relying on a throttled gate valve. This project will add flow control valve in new vault for automatic and remote control of infiltration gallery flow rate. See detailed cost estimate in Appendix L.

8.2.5 PROPOSED MISCELLANEOUS IMPROVEMENTS

1. **Project Name:** New SCADA Installation
Project Number: MI-1
Estimated Cost: $500,000
Proposed Design Year: Complete within 2024

Project Description: The City completed an analysis of their SCADA/telemetry system in 2021, and the report provided many recommendations. The City is planning to implement recommendations, beginning in 2022 and completing the installation during 2024. This project will connect numerous remote Public Works sites to a central location where an operator will be able to observe, record, and change process control parameters at the remote site. Detailed costs are provided in the report and are not duplicated in Appendix L.

2. **Project Name:** Fixed Based Automatic Meter Reading System
Project Number: MI-2
Estimated Cost: $634,534 total over 4 years
Proposed Implementation Year: Implement beginning in 2023

Project Description: This project will develop a fixed base automatic meter reading system that will provide near real-time usage data for the City's water connections. The City will implement installation of the system over four years. The cost estimate presented above was compiled by City staff (no detailed estimate is provided in Appendix L), and represents the water utility's share of fixed base automatic meter reading system cost.

3. **Project Name:** Development of Unidirectional Flushing Program
Project Number: MI-3
Estimated Cost: $30,000
Proposed Design Year: 2023

Project Description: This project will develop a Unidirectional Flushing Program. This will be developed utilizing the City's hydraulic model and will provide a plan for strategic unidirectional flushing to maintain the City's distribution system.

4. **Project Name:** Complete Residential Meter Replacement
Project Number: MI-4
Estimated Cost: $1,000,000 (approximate)
Proposed Implementation Year: 2031-2033

Project Description: All of the City's residential customer water meters were replaced in 2011-2013. The manufacturer recommends that meters should be replaced on a 20-year cycle, so this project accounts for replacing all meters on that 20 year cycle. Cost is approximate, but assumes City staff provides the labor and project costs are primarily material costs.

8.2.6 Proposed Operation and Maintenance Improvements

The proposed operation and maintenance projects are discussed and detailed in Chapter 6 – Operation & Maintenance Program, Section 6.5, and summarized in Table 8-7.

8.2.7 PROPOSED DISTRIBUTION SYSTEM IMPROVEMENTS

Transmission and distribution system improvements and prioritization are based on the results of the hydraulic modeling analysis, planned system expansion, the age and type of existing lines, and repair/replacement needs identified by the City. In practice, the priority of these projects will also be influenced by system expansion, fire flow requirements for existing and new commercial development, and the location of sewer and/or street improvements. Recommended transmission and distribution projects are discussed in the following section and summarized in the tables at the end of this Chapter.

1. **Project Name:** Hammond Street Water Main
   Project Number: D-1
   Estimated Cost: $1,600,000
   Proposed Design Year: 2027
   Proposed Construction Year: 2028

   Project Description: This project will provide fire flow to a new mixed use development to the south as well as improve east-west transmission in the system. The construction will consist of approximately 2,800 LF of 12-inch water main along East Hammond Street from South Sequim Avenue to South Brown Road. It is anticipated this project will be developer funded.

2. **Project Name:** Brown Road Water Main
   Project Number: D-2
   Estimated Cost: $1,500,000
   Proposed Design Year: 2026
   Proposed Construction Year: 2027

   Project Description: This project will provide additional capacity for the system to serve the east portion of the service area and provide additional transmission capacity to the system from the Port Williams Wellfield. The construction will consist of approximately 2,600 LF of 12-inch water main along Brown Road from Port Williams Road to Hendrickson Road.

3. **Project Name:** 5th Avenue Water Main
   Project Number: D-3
   Estimated Cost: $320,000
   Proposed Design Year: 2027
   Proposed Construction Year: 2027

   Project Description: This project will loop the piping in the 480 Zone and provide fire flow in the area. The areas that will be served by this water main improvement cannot currently meet the required 1,000 gpm fire flow. The construction will consist of approximately 650 LF of 8-inch water main along 5th Avenue from West Reservoir Road to West Norman Street.

4. **Project Name:** Reservoir Road and 7th Avenue Water Main
Project Number: D-4
Estimated Cost: $960,000
Proposed Design Year: 2022
Proposed Construction Year: 2023

Project Description: This project will provide additional flow into the 480 Zone and the lower zones. The area served by these improvements cannot currently meet the required 1,000 gpm fire flow. The construction will consist of approximately 1,400 LF of 12-inch water main from the 480 Reservoir along Reservoir Road to 7th Avenue and along 7th Avenue to Norman Street.

In addition, the City likely will want to connect to the existing main at Rolling Hills way and feed that vicinity from the 480 zone instead of it currently being fed by the 420 zone. Feeding that area from the 480 zone would improve pressures from approximately 40 psi to approximately 65 psi, and capacity analysis in Chapter 3 confirmed that the 480 reservoir and pump system has sufficient capacity to serve these additional connections. Existing valves would be closed at the intersections of E Silberhorn Rd and Rolling Hills Way and Petal Ln to separate the new 480 zone boundary from the 420 zone. A PRV could be installed at one of these locations if it is desired to have the ability to feed water from the 480 zone to the 420 zone, although this does not appear to be necessary.

It is anticipated that this project will proceed upon development in the 7th Ave vicinity, and will be developer funded.

5. **Project Name:** Norman Street and Eunice Street Water Main
Project Number: D-5
Estimated Cost: $780,000
Proposed Design Year: 2024
Proposed Construction Year: 2025

Project Description: This project will loop the piping in the 480 Zone and provide fire flow in the area. The area served by these improvements cannot currently meet the required 1,000 gpm fire flow. The construction will consist of approximately 1,650 LF of 8-inch water main along Norman Street and Eunice Street, to loop existing water mains in the 480 Zone. This project will connect with the water line proposed in project D-4.

6. **Project Name:** Washington Water Main
Project Number: D-6
Estimated Cost: $1,400,000
Proposed Design Year: 2027
Proposed Construction Year: 2028

Project Description: The area in the southeast of the City has been identified for significant future growth and additional transmission capacity will be needed to serve this

area. This project will be a developer extension as growth occurs. The construction will consist of approximately 2,500 LF of 12-inch water main from West Sequim Bay Road south to the existing water mains on Washington Street. It is anticipated that this project will be developer funded.

7. **Project Name:** West Sequim Bay Road to Battelle Parcel Water Main
Project Number: D-7
Estimated Cost: $1,800,000
Proposed Design Year: 2022
Proposed Construction Year: 2023

Project Description: This project will be a developer extension to provide additional supply to the Battelle Marine Research Lab as it expands. The construction will consist of approximately 3,500 LF of 12-inch water main along West Sequim Bay Road from Morgison Loop to the southern edge of the Battelle Parcel. This line will be sized to allow for future connections in the eastern portion of the system. It is anticipated that this project will be partially funded by grants. This project will coincide with a sewer CIP project along the same alignment.

8. **Project Name:** Washington Harbor Loop Water Main
Project Number: D-8
Estimated Cost: $2,000,000
Proposed Design Year: 2025
Proposed Construction Year: 2026

Project Description: This project will complete the loop to new development in the eastern portion of the water system. This project is contingent on development in this area and will be a developer extension. The construction will consist of approximately 1,350 LF of 12-inch water main along Washington Harbor Loop from Lofgren Road to Keeler Road. This project will connect to an existing main along Washington Harbor Loop owned by the Marina Water System. It is anticipated that this project will be developer funded.

9. **Project Name:** Water Main along East Fir Street from North Sequim Avenue to North Brown Road
Project Number: D-9
Estimated Cost: $1,300,000
Proposed Design Year: 2025
Proposed Construction Year: 2026

Project Description: This project will replace an existing 6-inch AC line and provide additional capacity. Construction will consist of approximately 2,650 LF of 10-inch water main along East Fir Street from North Sequim Avenue to North Brown Street.

10. **Project Name:** Water Main along Brown Road from East Fir Street to East Washington Street

Project Number: D-10
Estimated Cost: $950,000
Proposed Design Year: 2025
Proposed Construction Year: 2026

Project Description: This project will improve fire flow to commercial developments in the city center. Construction will consist of approximately 1,800 LF of 12-inch water main along Brown Road from East Fir Street to East Washington Street. It is anticipated that this project will be developer funded.

11. **Project Name:** Water Main along East Etta Street from South Sequim Avenue to South Sunnyside Avenue
Project Number: D-11
Estimated Cost: $400,000
Proposed Design Year: 2022
Proposed Construction Year: 2023

Project Description: This project will complete a loop along East Etta Street. Construction will consist of approximately 550 LF of 8-inch water main along East Etta Street from South Sequim Avenue to South Sunnyside Avenue.

12. **Project Name:** Water Main along Marlo Drive from the End of the Existing Main to River Road
Project Number: D-12
Estimated Cost: $440,000
Proposed Design Year: 2028
Proposed Construction Year: 2029

Project Description: This project will complete a loop to improve fire flows on a long 8-inch dead end line. Construction will consist of approximately 900 LF of 8-inch water main along Marlo Drive from the end of the existing main to River Road. This project will be completed as a developer extension. It is anticipated that this project will be developer funded.

13. **Project Name:** Water Main along West Sequim Bay Road from Battelle to Connect with Marina Water System
Project Number: D-13
Estimated Cost: $1,300,000
Proposed Design Year: 2028
Proposed Construction Year: 2029

Project Description: This project will be a developer extension as development occurs. The construction will consist of approximately 4,000 LF of 12-inch water main and 500 LF of 8-inch water main. A 12-inch water main will be constructed along West Sequim Bay Road from the Battelle Parcel to connect with the Existing Marina Water System Main. A 12-inch loop will be constructed through the Mariner's Outlook Subdivision

which will be connected with an 8-inch extension from Water View Drive. This project will intertie with the Marina Water System and include a pressure reducing valve to supply the Marina System's lower zone. It is anticipated that this project will be developer funded.

14. **Project Name:** Pressure Relief Valves
Project Number: D-14
Estimated Cost: $160,000
Proposed Design Year: 2023
Proposed Construction Year: 2024

Project Description: This project will construct pressure relief valve stations in the 500 Zone, 420 Zone and in the 350 Zone to provide protection from overpressure if a PRV from an upper zone is stuck open. Exact locations of these stations will be determined during design.

15. **Project Name:** New Water Main From South Lee Chatsfield to Espeth Way
Project Number: D-15
Estimated Cost: $270,000
Proposed Design Year: 2028
Proposed Construction Year: 2029

Project Description: This project will construct approximately 500 LF of 8-inch water line to connect South Lee Chatfield Avenue to Espeth Way to provide additional looping to that area. It is anticipated that this project will be developer funded.

16. **Project Name:** Water Main along From Washington Harbor Road to Washington Harbor Loop
Project Number: D-16
Estimated Cost: $540,000
Proposed Design Year: 2028
Proposed Construction Year: 2029

Project Description: This project will construct approximately 1,000 lf of 12-inch water line to connect Washington Harbor Road to Washington Harbor Loop to provide additional looping in that area. It is anticipated this project will be developer funded.

17. **Project Name:** Asbestos Cement/Galvanized Iron Water Main Replacement and Pipe Oversizing
Project Number: D-17
Estimated Cost: $200,000 per year
Proposed Project Year: 2022-2031

Project Description: This project is an annual allotment to replace undersized or failing AC and galvanized water mains throughout the distribution system with more durable and appropriately sized piping.

18. **Project Name:** Isolation Valves on Washington Street from 5th Avenue to Sequim Avenue
Project Number: D-18
Estimated Cost: $260,000
Proposed Design Year: 2026
Proposed Construction Year: 2027

Project Description: This project will add isolation valves to three intersections along Washington Street. If work must be done on the water main along Washington Street the entire street from 5th Avenue to Sequim Avenue must be shut down. This project will add four-way valve clusters to 4th Avenue, 3rd Avenue and 2nd Avenue. 8-inch valves will be installed on cross streets to allow future upsizing of 6-inch mains. Project cost estimate includes only asphalt patch repair and not complete overlay of intersections.

19. **Project Name:** Water Main along West Prairie Street from South Sequim Avenue to South 5th Avenue
Project Number: D-19
Estimated Cost: $1,800,000
Proposed Design Year: 2026
Proposed Construction Year: 2027

Project Description: This project will replace an undersized line along West Prairie Street. Construction will consist of approximately 2,650 LF of 8-inch water main along West Prairie Street from South Sequim Avenue to South 5th Avenue.

20. **Project Name:** Water Main along South 7th Avenue from Silberhorn Rd to McCurdy Road
Project Number: D-20
Estimated Cost: $740,000
Proposed Design Year: 2023
Proposed Construction Year: 2024

Project Description: This project will install a new water main along South 7th Avenue to provide additional fire flow capacity to the commercial areas of the 420 Zone north of Highway 101. Construction will consist of approximately 1,350 LF of 12-inch water main along South 7th Avenue from Silberhorn Road to McCurdy Road.

21. **Project Name:** 635 Zone Distribution Piping connecting new booster pump station to Emerald Highlands
Project Number: D-21
Estimated Cost: $3,240,000
Proposed Design Year: 2027
Proposed Construction Year: 2028

Project Description: This project will install new 12" diameter water main from the new 635 booster pump station along Reservoir Road, crossing Bell Creek, and running along Holleman Way to connect to the existing water main in the Emerald Highlands area upper pressure zone at the intersection of Holleman Way and Amethyst Dr. It will allow the new 635 booster pump station to serve the Emerald Highlands area and eventually service areas further east that need more pressure than the 420 pressure zone can provide. There is piping in place to connect the main at the north end of Coral Dr. to existing main on Miller Rd – the connection just needs to be made, while leaving the main at Craftsman Ct. as-is being fed from the 420 zone, and then the new 635 booster pump station can be feeding Miller Rd., American Eagle Dr., etc to the east that is within City Limits.

The crossing of Bell Creek will likely either need to be installed over the creek (~60 ft deep, 240 ft long span of a canyon at this location) using a pipe/utility bridge, or done via a very long directional drill under the creek. A cost estimate was developed assuming a pipe/utility bridge, and is available in Appendix L.

22. **Project Name:** Ranney Well Water Line Rehabilitation/Replacement
Project Number: D-22
Estimated Cost: $3,400,000
Proposed Design Year: 2026
Proposed Construction Year: 2027

Project Description: This project includes the rehabilitation or replacement of the more than 3 miles of existing 12" diameter AC water main from the Ranney well to the reservoirs on Reservoir Rd. A trenchless method is anticipated, either Cured-In-Place-Pipe (CIPP), sliplining, or pipe bursting. Estimated cost is very approximate – an alternatives analysis should be undertaken to assess the most advantageous method. These trenchless methods are proposed only because the Ranney Well (also known as Infiltration Gallery) transmission main can be off for relatively long durations.

23. **Project Name:** Water line at New Carrie Blake Park Entrance
Project Number: D-23
Estimated Cost: $210,000
Proposed Design Year: 2024
Proposed Construction Year: 2025

Project Description: Replace AC pipe in the Park with a new 8" PVC main.

24. **Project Name:** Water line under new Guy Cole Parking Lot
Project Number: D-24
Estimated Cost: $150,000
Proposed Design Year: 2024
Proposed Construction Year: 2025

Project Description: This project includes replacing a 6-inch AC water main near the end of its service life with a new 8-inch diameter plastic water main.

25. **Project Name:** Blake Ave Water Main Extension
Project Number: D-25
Estimated Cost: $150,000
Proposed Design Year: 2024
Proposed Construction Year: 2025

Project Description: Project includes construction of a new water main to finish the water main looping from Blake Ave. to Rhodefer Rd. Installing 550LF of 10" PVC water main from the Carrie Blake Park access road (next to pickleball courts) to Rhodefer Rd.

8.3 PROJECT COST ESTIMATES

Cost estimates have been prepared for the projects listed in this CIP. These estimates are presented in 2022 dollars. Detailed cost estimates are provided in Appendix L. Tables 8-3 through 8-8 list the various CIP projects by category. Totals include all costs associated with a project. If a project is recurring, then the cost for each year is included in the total cost estimate.

Table 8-3 Booster Station Improvement Projects

Project No.	Project Description	Construction Year	Estimated Cost in 2022 Dollars	Funding Source
BS-1	New 635 Zone Booster Station	2023	$1,700,000	Developer / Water Utility Cost Share
BS-2	Simdars Road Booster Station	2027	$740,000	Water Utility
Total			**$2,440,000**	

Table 8-4 Storage Improvement Projects

Project No.	Project Description	Additional Storage Capacity (MG)	Construction Year	Estimated Project Cost in 2022 Dollars	Funding Source
ST-1	New 420 Reservoir	2.5 MG	2036	$ 6,300,000	Water Utility
ST-2	Steel Reservoir Exterior Recoating	N/A	2022	$ 470,000	Water Utility
Total				**$ 6,770,000**	

Table 8-5 Source Improvement Projects

Project No.	Project Description	Pumping Capacity (gpm)	Construction Year	Estimated Project Cost in 2022 Dollars	Funding Source
S-1	Port Williams Well No.4	600	2026	$1,300,000	Water Utility
S-2	New Deep Well	600	2024	$1,300,000	Water Utility
S-3	Dungeness River Surface Water Treatment Facility	628	2040	$20,000,000	Water Utility
S-4	Infiltration Gallery Flow Control Valve	N/A	2028	$240,000	Water Utility
Total				**$22,840,000**	

Table 8-6 Miscellaneous Improvement Projects

Project No.	Project Description	Construction Year	Estimated Total Project Cost in 2022 Dollars	Funding Source
MI-1	New SCADA Installation	2022 through 2024	$500,000 total over 3 years	Water Utility
MI-2	Fixed Based Automatic Meter Reading System	2023 through 2026	$634,534 total over 4 years	Water Utility
MI-3	Development of Unidirectional Flushing Program	2023	$30,000	Water Utility
MI-4	Complete Residential Meter Replacement	2031-2033	$1,000,000	Water Utility
Total			**$2,164,534**	

Table 8-7 Operation and Maintenance Improvement Projects

Project No.	Project Description	Construction Year	Estimated Cost	Funding Source
M-1	Leak Detection Survey	Every 3 years	$5,000 – $10,000	Water Rates
M-2	Pipe Leak Repair/ Replacement	Annually	$30,000	Water Rates
M-3	Hydrant Upgrades	Annually	$50,000	Water Rates
M-4	Vehicles	Annually	$60,000 –$100,000	Water Rates
M-5	Cross Connection Control Device Inventory	Annually	$10,000 –$15,000	Water Rates
M-6	Large Control Valve Service	Annually	$5,000	Water Rates
M-7	Water System Shop Expansion	2023-2027	$50,000 each year for 4 years	Water Rates

Table 8-8 Distribution System Projects

Project No.	Project Description	Pipe Diameter (inches)	Pipe Length (LF)	Construction Year	Estimated Project Cost	Funding Source
D-1	Hammond Street Water Main	12	2,800	2028	$1,600,000	Developer
D-2	Brown Road Water Main	12	2,600	2027	$1,500,000	Water Utility
D-3	5th Avenue Water Main	8	650	2027	$320,000	Water Utility
D-4	Reservoir Road and 7th Avenue Water Main	12	1,400	2023	$960,000	Developer
D-5	Norman Street and Eunice Street	8	1,650	2025	$780,000	Water Utility
D-6	Washington Street Water Main	12	2,500	2028	$1,400,000	Developer
D-7	West Sequim Bay Water Main	12	3,500	2023	$1,800,000	Water Utility/ Grant
D-8	Washington Harbor Loop Water Main No. 1	12	1,350	2026	$2,000,000	Developer
D-9	Fir Street from North Sequim Avenue to North Brown Road	10	2,650	2026	$1,300,000	Water Utility
D-10	Brown Road from East Fir Street to East Washington Street	12	1,800	2026	$950,000	Developer
D-11	East Etta Street from South Sequim Avenue to South Sunnyside Avenue	8	550	2023	$400,000	Water Utility

Table 8-8 Distribution System Projects (Cont.)

Project No.	Project Description	Pipe Diameter (inches)	Pipe Length (LF)	Construction	Estimated Project Cost	Funding Source
D-12	Marlo Drive West from the End of the Existing Main to River Road	8	900	2029	$440,000	Developer
D-13	West Sequim Bay Road from Battelle to Connect with Marina Water System	8 / 12	500/ 4,000	2029	$1,300,000	Developer
D-14	Pressure Relief Valves	-	-	2024	$160,000	Water Utility
D-15	New Water Main from South Lee Chatsfield to Espeth Way	8	500	2029	$270,000	Developer
D-16	Washington Harbor Road to Washington Harbor Loop	12	1,000	2029	$540,000	Developer
D-17	Asbestos Cement/Galvanized Iron Water Main Replacement	-	-	Annual	$200,000	Water Utility
D-18	Isolation Valves on Washington Street from 5th Avenue to Sequim Avenue	-	-	2027	$260,000	Water Utility
D-19	West Prarie Street from South Sequim Avenue to South 5th Avenue	8	2,650	2027	$1,800,000	Water Utility
D-20	South 7th Avenue from Silberhorn Road to McCurdy Road	12	1,350	2024	$740,000	Water Utility
D-21	635 Zone Distribution Piping connecting new booster pump station to Emerald Highlands	12	4,600	2028	$3,240,000	Water Utility
D-22	Ranney Well Water Line Rehabilitation/Replacement	12	17,000	2027	$3,400,000	Water Utility
D-23	Water line at New Carrie Blake Park Entrance	8	1,060	2025	$210,000	Water Utility
D-24	Water line under new Guy Cole Parking Lot	8	Unknown	2025	$150,000	Water Utility
D-25	Blake Ave Water Main Extension	12	550	2025	$150,000	Water Utility
Total					**$25,870,000**	
Total of Water Utility - funded CIP Distribution System Improvements					**$16,410,000**	

PORT WILLIAMS WELL FIELD

SILBERHORN WELL FIELD

350/420 BOOSTER STATION

0.2 MG RESERVOIR

0.5 MG RESERVOIR (NOT IN SERVICE)

1.7 MG RESERVOIR

480 BOOSTER STATION

680 BOOSTER STATION

SOLANA RESERVOIR & 775 BOOSTER STATION

INFILTRATION GALLERY TRANSMISSION MAIN

S-1 S-2 S-3 S-4

D-1 D-2 D-3 D-4 D-5 D-6 D-7 D-8 D-9 D-10 D-11 D-12 D-13 D-15 D-16 D-18 D-19 D-20 D-21 D-22 D-23 ,24, & 25

BS-1 BS-2

ST-1 ST-2

SEQUIM BAY

N

0 1,000 2,000 Feet

LEGEND:

- BOOSTER STATION
- PRV
- RESERVOIR
- WELL
- HYDRANT

WATERLINES

PIPE SIZE

- UNKNOWN
- 2"
- 4"
- 6"
- 8"
- 10"
- 12"
- 16"
- VALVE
- CITY LIMITS
- URBAN GROWTH AREA
- RETAIL SERVICE AREA
- SERVICE AREA
- PARCELS
- CIP Water Main

WILSON ENGINEERING

CITY OF SEQUIM

DESIGNED BY	DRAWN BY	CHECKED BY
BMS	RDN	-

CITY OF SEQUIM
WASHINGTON
CLALLAM COUNTY
2021 WATER SYSTEM PLAN
Figure 8-1
Water System CIP Basemap

DATE	SCALE	PROJECT
JUNE 2022	AS SHOWN	2020-016

SHEET 1 OF 1

Date: 6/15/2022 Document Name: FIG_1-2_SYSTEM_BASE_MAP
Document Path: W:\2020\2020-016 City of Sequim Utility Consult\MXD\5 - WSP Update\GIS\Projects\FIG_1-2_SYSTEM_BASE_MAP.mxd

Chapter 9
FINANCIAL PROGRAM

9.1 BACKGROUND
The purpose of this section is to outline ability of the City of Sequim's water utility to remain financially viable for the next 10-year planning period and beyond. In addition, it will outline the City's plan to implement their recommended capital improvement plan (CIP), funding operation and maintenance (O&M) expenses, and meeting any debt services. This analysis also considers the historical financial condition of the utility and the utility's ability to meet future and present obligations. As part of satisfying the requirement of WAC 246-290-100(4)(j) this analysis will analyze the current rate structure with water conservation and customer affordability, consumer assistance programs, and other rate structure improvements to encourage water use efficiency. The information referenced in this chapter was sourced from the City's 2021 rate study (included in Appendix N) with recommendations from the study author to adjust the City's financial policies and reserves to be more in line with other systems. The City currently operates on a more stringent cash basis.

9.2 PAST INCOME AND EXPENSES
This section includes the current water rates set by the utility and a historical summary of financial performance as reported by the city.

9.2.1 WATER RATES
The 2022 Utility rates are shown below in Figure 9-1. These rates include a base charge and a block rate use charge. The rates charged are determined based on the type of use and location of the customer. In addition to the monthly charges, the city also collects a deposit.

Figure 9-1 Monthly Water Rates*

	USAGE RATES Billed per cubic foot			
	BASE	1 to 600 cf	601 to 1600 cf.	1601+
Single Family Residential (per unit)	$27.31	.00950	.02777	.03509
Multi-Family Residential (per unit) (3 or more units are MFR)	$25.93	.00950	.02777	.03509

		USAGE RATES Billed per cubic foot		
		BASE	1 to 600 cf	601+ cf
Irrigation, Commercial & Public	¾"	34.14	.00950	.02777
	1"	56.29		
	1½"	113.72		
	2"	182.00		
	3"	341.22		
Hotel/Motel RV sites (per unit)		$20.47	.00950	.02777

**Rates outside City limits: 1½ times ICL rate(s).*

9.2.2 Connection Fees

The 2022 connection fees are shown in Appendix N - Financial Data, Attachment A. City water utilities are authorized by RCW 35.92.025 to charge connection fees based on an equitable share of existing and planned water system costs. The current connection fees are codified in the Sequim Municipal Code (SMC 13.72.010) and are determined by the location of the meter installation, the size of the meter, and the type of connection. The city also charges an inspection fee for developer-installed meters.

9.2.3 Financial Status of Utility

The previous four years of financial data for the utility are shown in Figures 9-2 and 9-3. Figure 9- 2 provides the water utility's Revenue and Expenses for Operations while Figure 9- 3 provides the Revenue and Expenses for Capital.

Figure 9-2 Historical Revenue and Expenses - Operations

	2018 Actual	2019 Actual	2020 Actual	2021 Budget
Beginning Fund Balance	1,110,271	1,039,067	1,175,493	1,210,327
R340 - Charges for Goods & Services	2,163,360	2,299,530	2,362,724	2,353,947
R360 - Miscellaneous Revenues	15,280	19,757	14,661	14,000
R370 - Enterprise & Fiduciary	61,670	37,940	27,307	52,938
R380 - Other Increases in fund resources	1,400	96,465	29,805	50,500
R390 - Other Financing Sources	-	-	223	-
Revenues / Funding Source	2,241,710	2,453,692	2,434,719	2,471,385
E10 - Salaries & Wages	352,941	388,575	425,716	403,269
E20 - Personnel Benefits	166,822	179,114	202,312	197,280
E30 - Supplies	113,579	118,554	93,606	120,842
E40 - Service Charges	216,726	199,193	255,600	206,491
E50 - Intergovernmental Services	281,344	299,387	305,771	297,645
E60 - Capital Outlay	-	-	-	-
E90 - Other Services: Interfund	450,462	441,254	507,025	535,922
E99 - Non-Expense & Transfers	731,040	691,189	511,405	662,800
Expenses / Expenditure	2,312,914	2,317,266	2,301,436	2,424,249
Net Income	(71,204)	136,425	133,284	47,136
End Balance	1,039,067	1,175,493	1,308,776	1,257,463

Figure 9-3 Historical Revenue and Expenses - Capital

	2018 Actual	2019 Actual	2020 Actual	2021 Budget
Beginning Fund Balance	3,262,183	3,928,824	3,884,968	3,496,251
R340 - Charges for Goods & Services	-	16,388	-	-
R360 - Miscellaneous Revenues	45,899	62,884	52,712	37,000
R370 - Enterprise & Fiduciary	866,345	546,575	440,564	600,000
R380 - Other Increases in fund resources	-	30,948	16,196	100,000
R390 - Other Financing Sources	1,183,023	1,194,269	587,206	765,125
Revenues / Funding Source	2,095,267	1,851,063	1,096,679	1,502,125
E10 - Salaries & Wages	30,473	20,887	21,088	21,309
E20 - Personnel Benefits	15,123	10,602	10,657	11,310
E40 - Service Charges	420,070	326,862	258,851	165,000
E50 - Intergovernmental Services	13,098	8,176	7,332	6,000
E60 - Capital Outlay	475,834	886,734	222,116	835,000
E70 - Debt Service-Principal	60,000	157,566	141,754	100,857
E80 - Debt Service-Interest & Issuance Costs	52,625	98,748	61,231	54,883
E90 - Other Services: Interfund	315,113	385,342	204,135	196,050
E99 - Non-Expense & Transfers	46,290	-	-	492,258
Expenses / Expenditure	1,428,626	1,894,918	927,165	1,882,667
Net Income	666,641	(43,855)	169,514	(380,542)
End Balance	3,928,824	3,884,968	4,054,483	3,115,709

Based on Figures 9-2 and 9-3, the end balance for the operations fund has steadily been increasing except for a budgeted decrease in 2021 due to increased spending. The capital fund shows a similar trend for 2021 as well due to a planned capital outlay for the year.

9.3 BALANCED OPERATIONAL BUDGET

The City of Sequim has developed a 10-year plan with an updated list of Capital Improvements Projects along with their plan to fund these improvements. The following assumptions were made for the next 10 years: 0.50% growth in demand and accounts, a 2% increase in rates each year, and an ERU increase of approximately 2.5% each year. Additional assumptions can be found in the attached 10-year financial plan (see Appendix N - Financial Data, Attachment D).

The city currently operates the following funds: Operating Reserve, Capital Reserve, Debt Reserve. The city has adequate funds within their operating reserves based on their financial planning assumptions up until 2026. In 2026 and 2029 the city will need to obtain additional funding through grants or loans with revenue bonds being pursued as a last resort.

Based on these predictions, Sequim will need to raise additional funds via raising rates, through the use of general facilities charges, or obtain additional funding through a program in order to maintain a 90-day target balance for operation and maintenance. As of 2021, the capital reserve has a balance of $3,924,286. The fund is made up of several different smaller funds including system reinvestment funding, transfers from the operating reserve, capital grants, GFC revenues, bonds, loans, and interest earnings. The aforementioned items will be described in detail within section 9.3.1 and 9.5.2. Based on the planned capital outlay of $7,011,092 in the year of 2027, Sequim should plan to gather additional funding via a revenue bond or other outside funding to dedicate to the capital reserve. Although the additional debt issues for both the operating and capital reserve can be refined with the next 6-year plan, it is likely additional sources of funding can be located and secured. The debt reserve fund is currently set to a bond allocation value of $155,117 and remains at that similar level until additional reserve funding is needed – reserves for two revenue bonds are estimated to bring the total reserves to $323,438. This value will be set by the number and value and revenue bonds taken by the city.

9.3.1 Utility Revenue Sources

The water utility resources need appropriate funding capital for future capital outlays and operation and maintenance costs. The utility resources for raising additional revenue are discussed below.

9.3.1.1 Rate Revenue

Rate revenue is received from ongoing payments from customers for water service. The analysis assumes that the rate would be raised by 2.00% across the board each year beginning in 2022. The other assumptions made were a flat customer and growth of 0.50% each year based on the 2019 usage data.

9.3.1.2 Non-Rate Revenue

Non-rate revenue includes interest income and other utility charges including late fees are water charges and meter installation charges. Other utility revenue does not include growth. Interest income adjusts annually based on the operating fund balance.

9.5.1.3 Operating Cost Transfers

Any Operating Fund balance above the minimum requirement is assumed to be available to fund capital projects and is projected to be transferred to the Capital Fund. The operating fund is expected to remain above the 150-day minimum until 2026 where the excess will be transferred to the capital reserve.

9.3.1.4 Bonds

The utility may seek out a general obligation (GO) bond or a revenue bond in order to fund capital utility projects. A GO Bond has relatively low interest rates and few financial restrictions, but they are limited by the amount and use of funds. According to RCW 39.36.20 a GO bond is limited by the value of the taxable property without an additional vote. A revenue bond typically has a higher interest rate than a GO bond and require a bond reserve, but can be issued without a vote and there is no bonding limit.

9.3.1.5 General Facility Charges

The utility is able to charge a connection fee as provided by the Revised Code of Washington (RCW) 35.92.025, as a one-time charge on new customers connecting to the system. This GFC provides equity between new customers and existing customers as it provides a method for new customers to support and share in the costs that incur to their addition to the system. The charges collected also provide a source of revenue for capital projects as the fees collected can only go towards utility capital projects or to pay a debt service incurred to finance those projects. In summary the GFC is needed to provide equity between new and existing customers because in the absence of the charge, all growth-related capital costs would be collected by existing customers through charges, rates, and assessments and the addition of new customers would be subsidized by the long-time users. Equity is provided as the GFC recovers a proportionate share of the existing and future infrastructure cost from the new customer.

The city currently charges new water customers $8,184 per ERU and this is adjusted based on the development type. The City's GFCs can be seen in Appendix N - Financial Data, Attachment B. Based on the 10-year future plan the GFC should be increased slightly to $8,231 to provide for appropriate equity for new and existing customers.

9.3.1.6 Developer Contributions

Developer contributions are a variation of the GFC as provided for by RCW 35.91.020. The utility is able to require the developer to install onsite and offsite improvements to utility facilities in order to provide service for the development. Alternatively, the utility can enter into an agreement with the developer to share the cost of new improvements. The utility also has the option to charge a latecomer fee where owners of properties connecting to a developer-installed line may have to pay an additional fee as part of a recorded agreement between the city and developer.

The draft 10-year plan assumes that a developer will make contributions to both the Reservoir Road and 7th Avenue Water Main and West Sequim Bay Water Main.

9.3.1.7 Grants and Government Funding

Historically there have been government programs administered by the state or federal governments to provide grants for utility project if criteria are met, though many of these have been phased out in favor of low-cost loans. Grants and loans are available through Community Trade and Economic Development and Ecology and often times they are targeted at sewer programs, ageing and failing infrastructure, or low-income/rural communities.

The Department of Community Trade and Economic Development manages the following programs:

Community Economic Revitalization Board (CERB)

CERB primarily focuses on low-cost loans with grants available for entities that meet the required criteria. The eligible jurisdictions include cities/town, counties, Indian tribes, municipal corporations, port districts and special purpose districts. A mixture of systems are eligible including both domestic and industrial water, sanitary sewer, and storm water. The program's

priorities include creating permanent family wage jobs, connecting underserved rural communities, and financing public infrastructure projects.

Public Works Board

The Public Works Board provides low interest loans to local governments to finance public infrastructure, pre-construction, and emergency projects. Pre construction and public infrastructure projects are done through a competitive application process while the emergency loans are on an open cycle with a first come first serve basis. As part of program there is a loan forgiveness program if certain criteria are met and interest rates are based on the term length, the status of the community, and the affordability index.

Community Development Block Grants (CDBG)

CDBG grants are primarily to assist low to moderate income communities and is funded by the US Department of Housing & Urban Development. The grants can be used for planning or construction of public infrastructure, affordable housing, or economic development projects. They are often competitive and difficult to win and are awarded based on criteria including age of infrastructure, need for the project, and median household income.

Drinking Water State Revolving Fund (DWSRF)

DWSRF is a federal/state partnership managed by the Department of Health that exists to provide loans to public systems for capital improvements aimed at increasing public health protection, and provide a source of funds for other Safe Drinking Water Act activities. Projects targeted are split between construction loans, preconstruction loans, and emergency loans. Loan terms and interest rates are dependent on household income and project type with a maximum of 1.75% with a 20-year loan term.

DWSRF also offers grants for determining the feasibility of consolidating water systems to reduce the number of smaller Group A water systems. These grants are currently limited to $50,000.

9.4 CAPITAL IMPROVEMENT FUNDING PLAN

The Capital Improvement Plan is attached in Appendix N - Financial Data, Attachment D. The CIP shows major expenditures in 2027. As mentioned above, the city plans to obtain grants, loans, or bond funding in 2026 in order to adequately fund those projects in 2027.

9.5 FINANCIAL FORECAST

As part of ensuring the utility will have adequate funding for the future capital improvement projects, operations and maintenance, and sufficient reserve funds, a 10-year forecast was developed by the City of Sequim as part of the rate study. This 10-year forecast assists the city and water utility in determining the sufficiency of their revenue and rates. This is done with both a Cash Flow Test and Coverage Test which are shown below in Figures 9-4 and 9-5. In order to be sufficient both of these tests must be met each year and the test with the greatest deficiency will drive the level of needed rate increase in any given year. The sufficiency summary is shown in Figure 9-6. Additional information can be found in the rate study (Appendix N)

Figure 9-4 Cash Flow Test

Cash Flow Test	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
REVENUES											
Rate Revenue	$ 2,524,234	$ 2,536,855	$ 2,549,539	$ 2,562,287	$ 2,575,099	$ 2,587,974	$ 2,600,914	$ 2,613,919	$ 2,626,988	$ 2,640,123	$ 2,653,324
Other Non-Rate Revenue	40,958	40,958	40,958	40,958	40,958	40,958	40,958	40,958	40,958	40,958	40,958
Interest Earnings: Operating & Debt Reserve Funds	7,319	4,398	4,530	4,629	4,729	4,833	5,322	5,393	4,874	4,116	2,666
Total Revenue	$ 2,572,511	$ 2,582,211	$ 2,595,028	$ 2,607,874	$ 2,620,786	$ 2,633,765	$ 2,647,194	$ 2,660,269	$ 2,672,820	$ 2,685,197	$ 2,696,948
EXPENSES											
Cash Operating Expenses	$ 1,762,750	$ 1,827,312	$ 1,868,516	$ 1,910,784	$ 1,954,145	$ 1,998,628	$ 2,044,264	$ 2,091,084	$ 2,139,120	$ 2,188,404	$ 2,238,971
Existing Debt Service	200,271	199,447	199,199	198,875	198,476	197,252	195,928	197,004	195,480	193,756	194,432
New Debt Service	-	-	-	-	-	76,509	76,509	76,509	168,321	168,321	168,321
System Reinvestment Funding	293,410	366,001	471,573	503,263	543,543	561,645	601,657	737,438	805,567	872,605	924,206
Additions Required to Meet Min. Operating Reserve	-	-	-	-	-	-	-	-	-	-	-
Total Expenses	$ 2,256,431	$ 2,392,761	$ 2,539,288	$ 2,612,921	$ 2,696,164	$ 2,834,034	$ 2,918,358	$ 3,102,036	$ 3,308,488	$ 3,423,086	$ 3,525,930
NET CASH FLOW (DEFICIENCY)	**$ 316,080**	**$ 189,450**	**$ 55,740**	**$ (5,048)**	**$ (75,378)**	**$ (200,269)**	**$ (271,165)**	**$ (441,767)**	**$ (635,667)**	**$ (737,889)**	**$ (828,982)**

Figure 9-5 Coverage Test

Coverage Test - with GFCs		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
ALLOWABLE REVENUES												
Rate Revenue		$ 2,524,234	$ 2,536,855	$ 2,549,539	$ 2,562,287	$ 2,575,099	$ 2,587,974	$ 2,600,914	$ 2,613,919	$ 2,626,988	$ 2,640,123	$ 2,653,324
Other Revenue		40,958	40,958	40,958	40,958	40,958	40,958	40,958	40,958	40,958	40,958	40,958
GFC Revenue		600,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000
Interest Earnings - All Funds		26,941	29,318	28,171	28,591	25,150	27,214	30,404	5,393	4,874	4,116	2,666
Total Revenue		$ 3,192,133	$ 3,107,131	$ 3,118,669	$ 3,131,836	$ 3,141,207	$ 3,156,146	$ 3,172,276	$ 3,160,269	$ 3,172,820	$ 3,185,197	$ 3,196,948
EXPENSES	Include City Utility Tax?											
Cash Operating Expenses	No	$ 1,576,482	$ 1,640,113	$ 1,680,381	$ 1,721,708	$ 1,764,124	$ 1,807,657	$ 1,852,338	$ 1,898,198	$ 1,945,269	$ 1,993,585	$ 2,043,178
Revenue Bond Debt Service		116,300	116,200	116,675	117,075	117,400	193,409	192,809	194,609	285,621	284,621	286,021
Revenue Bond Coverage Requirement at 1.5		58,150	58,100	58,338	58,538	58,700	96,705	96,405	97,305	142,810	142,310	143,010
Total Expenses		$ 1,750,932	$ 1,814,413	$ 1,855,394	$ 1,897,321	$ 1,940,224	$ 2,097,771	$ 2,141,552	$ 2,190,112	$ 2,373,701	$ 2,420,516	$ 2,472,209
Coverage		13.89	12.62	12.33	12.04	11.73	6.97	6.85	6.49	4.30	4.19	4.03
COVERAGE SURPLUS (DEFICIENCY)		**$ 1,441,201**	**$ 1,292,718**	**$ 1,263,275**	**$ 1,234,515**	**$ 1,200,983**	**$ 1,058,375**	**$ 1,030,723**	**$ 970,157**	**$ 799,120**	**$ 764,681**	**$ 724,739**

Figure 9-6 Sufficiency Summary

Maximum Revenue Deficiency	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Sufficiency Test Driving the Deficiency	*None*	*None*	*None*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*
Maximum Revenue Deficiency (Surplus)	$ (316,080)	$ (189,450)	$ (55,740)	$ 5,048	$ 75,378	$ 200,269	$ 271,165	$ 441,767	$ 635,667	$ 737,889	$ 828,982
plus: Additional Tax Expense	(47,352)	(28,381)	(8,350)	756	11,292	30,002	40,623	66,180	95,228	110,542	124,189
less: Incremental Revenue From Prior Rate Increases	-	-	(50,991)	(103,516)	(157,617)	(213,332)	(270,705)	(329,778)	(390,595)	(453,202)	(517,644)
Net Revenue Deficiency (Surplus)	**$ (363,432)**	**$ (217,831)**	**$ (115,081)**	**$ (97,712)**	**$ (70,947)**	**$ 16,939**	**$ 41,082**	**$ 178,169**	**$ 340,300**	**$ 395,230**	**$ 435,527**

9.5.1 Fund Structure

The city maintains a fund structure and implements financial policies that target management of a financially viable and fiscally responsible enterprise fund utility.

The city maintains separate funds in both unrestricted and restricted reserves. The restricted reserves typically include funds set aside as part of revenue bond covenants and cannot be used for any other purposed other than payment for bond debt obligations. In addition, the city maintains a restricted fund for all GFCs which are set to go towards the capital outlays. Unrestricted funds are maintained in multiple funds as well and a summary of each fund, their allocations, and their ending balance for 2019 can be found below in Figure 9-7.

Figure 9-7 Water Funds

Water Funds: Ending Cash Balance Allocations			% Allocation				$ Allocation			
Fund Number	Fund Description	Balance as of end 2020	Debt Fund	Capital Fund	Operating Fund	Exclude	Debt Fund	Capital Fund	Operating Fund	Exclude
401-000	Water Unrestricted / Operations	$ 1,308,776	0%	0%	100%	0%	$ -	$ -	$ 1,308,776	$ -
401-004	Refundable Water Deposits	$ -	0%	0%	0%	100%	-	-	-	-
411-411	Water Restricted - GFCs	$ 2,700,006	-1.52%	102%	0%	0%		2,741,123	-	-
411-413	Water R - Replacement Reserve	$ 1,183,163	0%	100%	0%	0%	-	1,183,163	-	-
411-419	Water R - Bond Redemption	$ 155,117	100%	0%	0%	0%	155,117	-	-	-
Total		$ 5,347,062					$ 155,117	$ 3,924,286	$ 1,308,776	$ -

9.5.2 Financial Policies

The following is a summary of the key financial policies employed by the city in the 10-year forecast.

9.5.2.1 Operating Cash Reserve

The operating reserves are designed to provide additional liquidity for the city to ensure that there is adequate cash during any unstable periods such as seasonal fluctuations in billing and usage, unanticipated cash expenses, or lower than expected revenue collections. As part of the 10-year plan, a 90-day cash reserve for was targeted as a minimum amount by the authors of the rate study. The city's current policy is far more conservative and assumes 1% of ongoing revenues for economic uncertainty and an additional 1% for future liabilities which is added to the 90-day minimum and 150-day maximum. Although there is no required amount stated for cash reserves in the RCW, 90-days is a prudent target due to changing weather patterns and usage that can significantly affect revenue in both the summer and winter seasons. The city has both a minimum of 90 days set as previously mentioned and a maximum of 150 days set in order to provide adequate cushion as previously mentioned and to ensure that excess money is being properly utilized. The additional surplus of operations funds past 150 days is transferred to the capital funds to be used on any capital expenditures. The final target level of funds to be held in the operating cash reserve should be adequate for a minimum of 90 days.

The city should also consider unanticipated capital expenditures including project overruns or unexpected infrastructure failures. Industry standard practices range from maintaining a balance equal to 1% to 2% of fixed assets or a 5-year rolling average of CIP costs. To fund equipment

failure (other than catastrophic failure), the city currently has a capital reserve fund of 2.5 years of the projected CIP costs with is more conservative than 1% of fixed assets assumed by the 10-year plan.

9.5.2.2 Reserved

9.5.2.3 Debt Management

As part of the financial policy structure the city should evaluate its debt management policies determine an acceptable level of outstanding debt, debt repayment, and bond coverage. The current coverage requirements are set by the Federal Bond Buyers Index and require a 1.25 coverage requirement. The city has currently set a 1.50 coverage requirement which is more stringent than the federal requirement.

9.5.2.4 Existing Debt Service

The city currently has a total of three outstanding debt issues: two DWSRF loans with a combined annual payment of approximately $83,000 that runs through 2036; and one Revenue Bond with an annual payment of approximately $116,000 that runs through 2034.

9.5.2.5 Future Debt Service

The city plans to pursue additional funding in the form of grants, low-cost loans, or revenue bonds in order to secure shortfalls in funding over the next 10 years. The city will first target Public Works or DWSRF to fund capital projects. If they are unsuccessful in being awarded grants or low-cost loans from these sources, the city may take additional debt through revenue bonds. Any new loans or bonds will increase the future debt service.

9.6 WATER RATE EVALUATION

The City of Sequim 2021 Comprehensive Water and Sewer Utility Rate Study is included in Appendix N - Financial Data, Attachment C. Key components are noted/summarized below.

The existing water rates are covered in section 9.2.1 and the city utilizes a fixed charge with block rates along with a base charge. A 3-block increasing volume charge is utilized for residential users with increasing rates based on increased consumption. Block 1 is applied for usage from 0-600 cf, block 2 is for 601-1600 CFS, and finally block 3 is for usage greater than 1600 cf. Commercial and public rates operate on a 2-block rate with block 1 being applied between 0-600 cf and block 2 for usage greater than 600 cfs. In addition to the multiple block structure for residential and commercial properties, the city also utilizes a multiplier of 1.5 for customers outside of the city limits. The multiplier is used as there is an increased cost to maintain the additional waterlines and infrastructure that are outside of city limits. A similar principle is applied to large commercial users with their larger meters as their increased demand required by them causes the city to have install larger mains requiring increased capital and maintenance. The current cities adopted rates provide equity between the larger commercial users and residential users such that the commercial users fees are commensurate with their greater impact on the water system.

The 10-year forecast has the city planning to raise rates by 2.00% each year across the board between all users, blocks, and base rates. The existing historical rates and future planned rates from 2018 and 2030 are shown in Figure 9-8. Despite the rate study recommendations, the city Council has not adopted a rate increase since 2020.

Outside of these yearly rate increases the city could consider adopting an additional rate structure based on conserving water use as it would accomplish a reduction of inefficient use of water, collection of additional revenues, and conserving capital. A recommendation structure is adopting an inclining or seasonal block rate. As an inclining block has already been implemented a seasonal rate could be studied in the future.

Figure 9-8 Water Rates

Across-the-Board Rate Schedule	Previous 2018	Previous 2019	Existing 2020	ATB 2021	ATB 2022	ATB 2023	ATB 2024	ATB 2025	ATB 2026	ATB 2027	ATB 2028	ATB 2029	ATB 2030
Annual System-Wide Rate Increase				**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**
Monthly Fixed Charges													
Single Family Residential (per unit)	$24.77	$26.26	$27.31	$27.31	$27.86	$28.41	$28.98	$29.56	$30.15	$30.76	$31.37	$32.00	$32.64
Multi-Family Residential (per unit)	$23.52	$24.93	$25.93	$26.45	$26.98	$27.52	$28.07	$28.63	$29.20	$29.79	$30.38	$30.99	$31.61
Hotel and Motel (per unit)	$18.57	$19.68	$20.47	$20.88	$21.30	$21.72	$22.16	$22.60	$23.05	$23.51	$23.98	$24.46	$24.95
Commercial and Public Authority and Irrigation													
5/8" and 3/4"	$24.77	$26.26	$27.31	$27.86	$28.41	$28.98	$29.56	$30.15	$30.76	$31.37	$32.00	$32.64	$33.29
1"	$41.36	$43.48	$45.22	$46.12	$47.05	$47.99	$48.95	$49.93	$50.93	$51.94	$52.98	$54.04	$55.12
1-1/2"	$82.47	$87.42	$90.92	$92.74	$94.59	$96.49	$98.41	$100.38	$102.39	$104.44	$106.53	$108.66	$110.83
2"	$132.03	$139.95	$145.55	$148.46	$151.43	$154.46	$157.55	$160.70	$163.91	$167.19	$170.54	$173.95	$177.42
3"	$247.62	$262.48	$272.98	$278.44	$284.01	$289.69	$295.48	$301.39	$307.42	$313.57	$319.84	$326.24	$332.76
Volume Charge													
Single and Multi-Family Residential													
Usage up to 600 cf	$0.00861	$0.00913	$0.00950	$0.00969	$0.00988	$0.01008	$0.01028	$0.01049	$0.01070	$0.01091	$0.01113	$0.01135	$0.01158
Over 600 cf and up to 1,600 cf	$0.02547	$0.02670	$0.02777	$0.02833	$0.02889	$0.02947	$0.03006	$0.03066	$0.03127	$0.03190	$0.03254	$0.03319	$0.03385
Over 1,600 cf	$0.03183	$0.03374	$0.03509	$0.03579	$0.03651	$0.03724	$0.03798	$0.03874	$0.03952	$0.04031	$0.04111	$0.04194	$0.04277
Commercial, Public Authority, Motel/Hotel & Irrigation													
Usage up to 600 cf	$0.00861	$0.00913	$0.00950	$0.00969	$0.00988	$0.01008	$0.01028	$0.01049	$0.01070	$0.01091	$0.01113	$0.01135	$0.01158
Over 600 cf	$0.02547	$0.02670	$0.02777	$0.02833	$0.02889	$0.02947	$0.03006	$0.03066	$0.03127	$0.03190	$0.03254	$0.03319	$0.03385

9.6.1 AFFORDABILITY

A common affordability index used by agencies to prioritize low-cost loan awards and grants is whether the rates exceed 1.5% of the median household income for the demographic area. The median household income according to the latest 2020 census was $39,509. The table below shows monthly water bill for 5,000 gallons and the percentage that is of the median household income.

Table 9.6.1 City of Sequim Utility Analysis	
Utility Bill as Percent of Median Household Income	
	Water Rate Structure
Rate Type:	Fixed with Block
Base Charge	$ 27.31
Thousands of Gallons in Base Charge	$ -
Charge for 0-600 CF	$ 5.70
Charge for 601-803 CF	$ 5.63
Monthly Bill for 5,000 gallons	$ 38.64
Median Houshold Income:	$ 39,509
Monthly Median Household Income:	$ 3,292
Bill as % of Median Household Income:	1.17%

Based on the latest water rates, Sequim is currently under the 1.5% median rate for the area at current income levels. Assuming a 3.80% inflation rate for income and a 2.00% yearly rate increase as previously assumed and discussed and Sequim remains below that 1.5% rate for affordability.

Table 9.6.2 Future Affordability Analysis

Year	Inflation	Median Income	Median Monthly Income	Rate Increase	Projected Bill (5,000 gallons)	% of Monthly Income
2022	0.00%	$ 39,509	$ 3,292	0%	$ 38.64	1.17%
2023	3.80%	$ 41,010	$ 3,418	2.00%	$ 39.41	1.15%
2024	3.80%	$ 42,569	$ 3,547	2.00%	$ 40.20	1.13%
2025	3.80%	$ 44,186	$ 3,682	2.00%	$ 41.00	1.11%
2026	3.80%	$ 45,865	$ 3,822	2.00%	$ 41.82	1.09%
2027	3.80%	$ 47,608	$ 3,967	2.00%	$ 42.66	1.08%
2028	3.80%	$ 49,417	$ 4,118	2.00%	$ 43.51	1.06%
2029	3.80%	$ 51,295	$ 4,275	2.00%	$ 44.38	1.04%
2030	3.80%	$ 53,245	$ 4,437	2.00%	$ 45.27	1.02%

The City of Sequim also provides a reduced rate for qualifying low-income customers that reduces the base charge by 50%.

9.6.2 RATE COMPARISON

Similarly sized cities around Sequim include Port Angeles and Port Townsend. A comparison of their rates along with their population are listed below in Table 9.6.3.

Table 9.6.3 Future Affordability Analysis

Authority	Population	Base Rate	Cost per 5000 Gallons
Port Angeles	19,960	$ 38.50	$ 54.36
Port Townsend	10,148	$ 23.13	$ 39.48
Sequim	7,441	$ 27.31	$ 38.64

Based on the rates shown, Sequim has the lowest rate in the area with Port Townsend having a slightly higher rate. As Port Angeles serves a larger area and population, their costs for operation, maintenance, and treatment are likely larger hence their rates will be higher to compensate.

9.7 CONCLUSION

The results of the City's ten-year analysis indicate that the city has consistently planned to raise rates by 2.00% each year since the inception of its 10-year plan, but since 2020 the city has not raised rates. This will likely cause a shortfall in funds earlier than planned. In addition, the city has planned large expenditures in 2027 that will likely cause the utility to enter into debt. As part of future planning the utility should look at the alternative funding sources as mentioned in this document to assist with additional funding or plan to adjust their capital improvement timeline to spread the costs over a larger period of time.

The city will continue to review and update the key underlying assumptions that compose their multi-year financial plan to ensure that adequate revenue is collected to meet the total water utility financial obligations.

APPENDIX

APPENDIX A	-	WASHINGTON STATE DOH PROJECT APPROVAL APPLICATION AND SUBMITTAL FORM, LOCAL GOVERNMENT CONSISTENCY REVIEW CHECKLIST
APPENDIX B	-	WATER FACILITIES INVENTORY FORM
APPENDIX C	-	WATER SYSTEM AGREEMENTS
APPENDIX D	-	ADJACENT & REGIONAL WATER PURVEYORS
APPENDIX E	-	POPULATION FORECASTS – SUPPORTING DATA
APPENDIX F	-	WATER SYSTEM ENGINEERING DESIGN STANDARDS
APPENDIX G	-	WATER QUALITY RESULTS
APPENDIX H	-	WATER RIGHTS INFORMATION
APPENDIX I	-	COLIFORM MONITORING PLAN
APPENDIX J	-	CROSS-CONNECTION CONTROL
APPENDIX K	-	HYDRAULIC MODEL RESULTS
APPENDIX L	-	DETAILED CIP PROJECT COST ESTIMATES
APPENDIX M	-	SEPA DOCUMENTATION
APPENDIX N	-	FINANCIAL DATA
APPENDIX O	-	PLAN APPROVAL AND CORRESPONDENCE
APPENDIX P	-	SOURCE WATER PROTECTION LETTER TEMPLATES

APPENDIX A

WASHINGTON STATE DOH PROJECT APPROVAL APPLICATION AND SUBMITTAL FORM
&
LOCAL GOVERNMENT CONSISTENCY CHECKLIST

Drinking Water

Project Approval Application (PAA) Form

331-149 F • Revised 1/10/2022

Please complete all appropriate sections of this application form and include it with your project.

WATER SYSTEM Information

City of Sequim — Water System Name
77620 Y — PWS ID #
Water System Plan — Submittal Description
Clallam — County
A-Communinty — Classification
1,000 - 9,000 — # of Service Connections

OWNER Information

A Pete Tjemsland — Name
Enter text — Owner ID #
ptjem@sequimwa.gov — E-mail address
360.683.4908 — Phone
152 West Cedar St — Mailing address
Sequim — City
State
Zip

PROJECT CONTACT Information

Ann Soule — Name/Position
Resource Manager
asoule@sequimwa.gov — E-mail address
360.912.1635 — Phone
152 West Cedar St — Mailing address
Sequim — City
State
Zip

CONSULTING/DESIGN ENGINEER Information

Brian Smith — Name/Firm
Wilson Engineering
bsmith@wilsonengineering.com — E-mail address
360.312.3089 — Phone
805 Dupont St #7 — Mailing address
Bellingham — City
State
Zip

SMA Information

N/A — Name/SMA
Enter text — SMA #
Enter text — E-mail address
Enter text — Phone
Enter text — Mailing address
Enter text — City
State
Zip

BILLING Information*

Same as Owner — Name
Enter text — E-mail address
Enter text — Phone
Enter text — Mailing address
Enter text — City
State
Zip

GENERAL Submittal Information

☒ Check here if you need a Box.com folder set up for transferring your project to us electronically. (You will receive an invite by email after we have received the PAA form.)

Do you have projects currently under review by us? ☐ Yes ☒ No

☐ This is a new water system (if so, include a completed Water Facilities Inventory Report Form with your project).

☐ DWSRF Loan
Application # Enter Number
Loan # Enter Number

☐ Enforcement
Docket # Enter Number
Type Enter Text

☒ Water System Plan (complete Planning Information)

☐ Small Water System Management Program (complete Planning Information)

☐ Engineering (complete Engineering Information)

☐ Group B (complete Engineering Information)

☐ Satellite Management Agency Plan (complete SMA Information)

☐ Alternate Technology (complete Engineering Information)

ENGINEERING Information

Choose Project Report — Project Report Type
Choose Special Report or Plans — Special Report or Plans
Choose Predesign Study — Predesign Study
Choose Existing System Approval — Existing System Approval
Choose Construction Documents — Construction Documents
Choose Waiver — Waiver
Choose Other — Other

PLANNING Information

How many connections does system currently have? 2954

If system is private-for-profit, is it regulated by UTC? ..... ☐ Yes ☐ No

Is system expanding? ..... ☒ Yes ☐ No

- Expanding service area? ..... ☒ Yes ☐ No
- Increasing number of approved connections? ..... ☒ Yes ☐ No

If the number of connections is expected to increase, how many *new* connections are proposed in the next ten (10) years? 2034

Is your system pursuing additional water rights from Department of Ecology in the next 20 Years? ..... ☐ Yes ☒ No

Is a new intertie proposed? ..... ☐ Yes ☒ No

Is the system located in a Critical Water Supply Service Area (is there a Coordinated Water System Plan)? ..... ☐ Yes ☒ No

- If yes, have you sent a copy of the plan to the county or responsible agency for the CWSP? ..... ☐ Yes ☐ No

Are you requesting distribution main project report and construction document submittal exception? ..... ☒ Yes ☐ No

- If so, does the WSP contain standard construction specifications for distribution mains? ..... ☒ Yes ☐ No

The water system/purveyor is responsible for sending a copy of the plan to:

- Adjacent utilities for review or a letter notifying them that a copy is available for their review and where it is located. ..... ☒ Yes ☐ No
- All local governments within the service area. ..... ☒ Yes ☐ No
- County and city planning departments, one or both if applicable, adjacent water systems, etc.. ☒ Yes ☐ No

List who have you sent the WSP to for review other than ODW? ..... Clallam County

Are you proposing a change in the place of use of your water right? ..... ☐ Yes ☒ No

- If "yes," the purveyor must send a copy of the WSP or SWSMP to all local governments within the service area (county and city planning departments) for a local consistency determination. Has this been completed? ..... ☐ Yes ☐ No

What are the years of the requested plan approval period (for example 2022 to 2032)? 2022-2031

Does your plan follow your preplan checklist? ..... ☒ Yes ☐ No

SMA Information

☐ Ownership only ☐ Management and Operations only ☐ Ownership, Management & Operations

Where can we find the *SMA Notice of Intent* 331-590, in your plan ..... Enter Text

Please submit all documents electronically. We request one paper copy of planning documents be submitted to the address for your regional office below.

☐ **Eastern Regional Office**
Department of Health
16201 E Indiana Ave, Suite 1500
Spokane Valley, WA 99216
eroadmin@doh.wa.gov
Phone: 509-329-2100
Fax: 509-329-2104

☐ **Northwest Regional Office**
Department of Health
20425 72nd Ave S, Suite 310
Kent, WA 98032-2388
dw.nwro.wsprojects@doh.wa.gov
Phone: 253-395-6750
Fax: 253-395-6760

☒ **Southwest Regional Office**
Department of Health
PO Box 47823
Olympia, WA 98504-7823
swro.admin@doh.wa.gov
Phone: 360-236-3030
Fax: 360-236-3029

Washington State Department of Health

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CITY OF SEQUIM

PUBLIC WORKS
152 W. Cedar Street, Sequim, WA 98382
PH (360) 683-4908 FAX (360) 681-0552

August 15, 2022

Ms. Carol Creasey, Hydrogeologist
Clallam County Public Works
223 E. 4th Street
Port Angeles, WA 98362

SUBJ: Draft 2022 Water System Plan Update, City of Sequim

Dear Ms. Creasey:

The City's 2022 Water System Plan Update is ready for review by interested parties by browsing to the City's webpage: https://www.sequimwa.gov/356/Water

Later this month the City will submit the Plan to WA Dept. of Health (DOH) for its 90-day review. In addition, in accordance with WAC 246-290-100(7), the City is transmitting the plan to the County and all adjacent water purveyors to assess consistency with ongoing and adopted planning efforts.

Specific to Clallam County, DOH requires a "Local Government Consistency Determination" using the attached form (additional info on back). For our last plan we noticed the form was completed by EHS, so it's your call who can best make the determination. We would appreciate receiving a response within 90 days.

If you have any questions please contact me at 360-912-1635 or asoule@sequimwa.gov – or our consultant Brian Smith, P.E., with Wilson Engineering at 360-312-3089 or bsmith@wilsonengineering.com

Best regards,

Ann Soule

Ann Soule, LHG
Resource Advisor

c: Pete Tjemsland, Sequim Utilities Manager

Attached: "Local Government Consistency Determination Form"

Washington State Department of Health

Local Government Consistency Determination Form

Water System Name: City of Sequim PWS ID: 77620 Y

Planning/Engineering Document Title: Water System Plan Update Plan Date: July 2022

Local Government with Jurisdiction Conducting Review: Clallam County

Before the Department of Health (DOH) approves a planning or engineering submittal under Section 100 or Section 110, the local government must review the documentation the municipal water supplier provides to prove the submittal is consistent with **local comprehensive plans, land use plans and development regulations** (WAC 246-290-108). Submittals under Section 105 require a local consistency determination if the municipal water supplier requests a water right place-of-use expansion. The review must address the elements identified below as they relate to water service.

By signing this form, the local government reviewer confirms the document under review is consistent with applicable local plans and regulations. If the local government reviewer identifies an inconsistency, he or she should include the citation from the applicable comprehensive plan or development regulation and explain how to resolve the inconsistency, or confirm that the inconsistency is not applicable by marking N/A. See more instructions on reverse.

Local Government Consistency Statement	For use by water system: Identify the page(s) in submittal	For use by local government: Yes or Not Applicable
a) The water system service area is consistent with the adopted land use and zoning within the service area.	Pg 17; Fig 1-7, 1-8	Yes
b) The growth projection used to forecast water demand is consistent with the adopted city or county's population growth projections. If a different growth projection is used, provide an explanation of the alternative growth projection and methodology.	Pgs 45, 46; Appendix E	Yes
c) For cities and towns that provide water service: All water service area policies of the city or town described in the plan conform to all relevant utility service extension ordinances.	Pgs 14-16; Appendix C	Yes
d) Service area policies for new service connections conform to the adopted local plans and adopted development regulations of all cities and counties with jurisdiction over the service area.	Pgs 17-21	Yes
e) Other relevant elements related to water supply are addressed in the water system plan, if applicable. This may include Coordinated Water System Plans, Regional Wastewater Plans, Reclaimed Water Plans, Groundwater Management Area Plans, and the Capital Facilities Element of local comprehensive plans.	Chapters 1, 2, 4	Yes

I certify that the above statements are true to the best of my knowledge and that these specific elements are consistent with adopted local plans and development regulations.

Donella Clark — 1.19.23

Signature — Date

Donella Clark, Principal Planner, Clallam County

Printed Name, Title, & Jurisdiction

Consistency Review Guidance

For Use by Local Governments and Municipal Water Suppliers

This checklist may be used to meet the requirements of WAC 246-290-108. When using an alternative format, it must describe all of the elements; 1a), b), c), d), and e), when they apply.

For **water system plans (WSP)**, a consistency review is required for the service area and any additional areas where a municipal water supplier wants to expand its water right's place of use.

For **small water system management programs**, a consistency review is only required for areas where a municipal water supplier wants to expand its water right's place-of-use. If no water right place-of-use expansion is requested, a consistency review is not required.

For **engineering documents,** a consistency review is required for areas where a municipal water supplier wants to expand its water right's place-of-use (water system plan amendment is required). For noncommunity water systems, a consistency review is required when requesting a place-of-use expansion. All engineering documents must be submitted with a service area map (WAC 246-290-110(4)(b)(ii)).

A) Documenting Consistency: The planning or engineering document must include the following when applicable.

a) A copy of the adopted **land use/zoning** map corresponding to the service area. The uses provided in the WSP should be consistent with the adopted land use/zoning map. Include any other portions of comprehensive plans or development regulations that relate to water supply planning.

b) A copy of the **growth projections** that correspond to the service area. If the local population growth projections are not used, explain in detail why the chosen projections more accurately describe the expected growth rate. Explain how it is consistent with the adopted land use.

c) Include water service area policies and show that they are consistent with the **utility service extension ordinances** within the city or town boundaries. *This applies to cities and towns only*.

d) All **service area policies** for how new water service will be provided to new customers.

e) **Other relevant elements** the Department of Health determines are related to water supply planning. See Local Government Consistency – Other Relevant Elements, Policy B.07, September 2009.

B) Documenting an Inconsistency: Please document the inconsistency, include the citation from the comprehensive plan or development regulation, and explain how to resolve the inconsistency.

C) Documenting a Lack of Local Review for Consistency: Where the local government with jurisdiction did not provide a consistency review, document efforts made and the amount of time provided to the local government for review. Please include: name of contact, date, and efforts made (letters, phone calls, and emails). To self-certify, please contact the DOH Planner.

The Department of Health is an equal opportunity agency. For persons with disabilities, this document is available on request in other formats. To submit a request, please call 1-800-525-0127 (TTY 1-800-833-6388).

APPENDIX B

WATER FACILITIES INVENTORY FORM

WATER FACILITIES INVENTORY (WFI) FORM

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

ONE FORM PER SYSTEM

Quarter: 1
Updated: 05/12/2023
Printed: 7/12/2023
WFI Printed For: On-Demand
Submission Reason: Pop/Connect Update

RETURN TO: Central Services - WFI, PO Box 47822, Olympia, WA, 98504-7822 or email wfi@doh.wa.gov

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
77620 Y	SEQUIM CITY OF	CLALLAM	A	Comm

6. PRIMARY CONTACT NAME & MAILING ADDRESS	7. OWNER NAME & MAILING ADDRESS
A PETE P. TJEMSLAND [UTILITIES MANAGER] 152 WEST CEDAR STREET SEQUIM, WA 98382-3317	SEQUIM, CITY OF SARAH VANAUSDLE 152 WEST CEDAR STREET SEQUIM, WA 98382-3317 PW DIRECTOR
STREET ADDRESS IF DIFFERENT FROM ABOVE	**STREET ADDRESS IF DIFFERENT FROM ABOVE**
ATTN ADDRESS CITY STATE ZIP	ATTN ADDRESS CITY STATE ZIP

9. 24 HOUR PRIMARY CONTACT INFORMATION		10. OWNER CONTACT INFORMATION	
Primary Contact Daytime Phone: (360) 681-6607		Owner Daytime Phone: (360) 681-4908	
Primary Contact Mobile/Cell Phone: (360) 912-0256		Owner Mobile/Cell Phone: (360) 912-2953	
Primary Contact Evening Phone: (xxx)-xxx-xxxx		Owner Evening Phone: (xxx)-xxx-xxxx	
Fax:	E-mail: pxxxm@sequimwa.gov	Fax:	E-mail: sxxxxxxxxe@sequimwa.gov

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- [x] Not applicable (Skip to #12)
- [ ] Owned and Managed
- [ ] Managed Only
- [ ] Owned Only

SMA NAME: _____ SMA Number:

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)

- [ ] Agricultural
- [x] Commercial / Business
- [x] Day Care
- [x] Food Service/Food Permit
- [x] 1,000 or more person event for 2 or more days per year
- [x] Hospital/Clinic
- [ ] Industrial
- [x] Licensed Residential Facility
- [x] Lodging
- [x] Recreational / RV Park
- [x] Residential
- [x] School
- [ ] Temporary Farm Worker
- [x] Other (church, fire station, etc.): _____

13. WATER SYSTEM OWNERSHIP (mark only one)				14. STORAGE CAPACITY (gallons)
[ ] Association	[ ] County	[ ] Investor	[ ] Special District	
[x] City / Town	[ ] Federal	[ ] Private	[ ] State	3,400,000

- SEE NEXT PAGE FOR A COMPLETE LIST OF SOURCES -

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
77620 Y	SEQUIM CITY OF	CLALLAM	A	Comm

15	16	17	18									19			20	21						22	23	24			
	SOURCE NAME	INTERTIE	SOURCE CATEGORY									USE				TREATMENT						DEPTH		SOURCE LOCATION			
Source Number	LIST UTILITY'S NAME FOR SOURCE AND WELL TAG ID NUMBER. Example: WELL #1 XYZ456 IF SOURCE IS PURCHASED OR INTERTIED, LIST SELLER'S NAME Example: SEATTLE	INTERTIE SYSTEM ID NUMBER	WELL	WELL FIELD	WELL IN A WELL FIELD	SPRING	SPRING FIELD	SPRING IN SPRINGFIELD	SEA WATER	SURFACE WATER	RANNEY / INF. GALLERY	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
S01	Infiltration Gallery CT6 Required										X		X			Y		X						718	NE NW	12	29N	04W
S02	SH WF (S06, 07, 09)			X									X			Y		X					132	635	NE NW	25	30N	04W
S03	PT WMS WELL #1 WW AAF384				X								X			Y	X						417	600	SE NW	17	30N	03W
S04	PT WMS WELL #2 AEH961 WW 12"				X								X			Y	X						282	600	SE NW	17	30N	03W
S05	PT WMS WF (S03, 04, 08)			X									X			Y		X					282	1760	SE NW	17	30N	03W
S06	SH WELL #2 AAF389 WW 10"				X								X			Y	X						134	170	NW NW	25	30N	04W
S07	SH WELL #3 AAF390 WW 10"				X								X			Y	X						132	165	NE NW	25	30N	04W
S08	PT WMS WELL #3 BAM402 10"				X								X			Y	X						300	560	NW SE	17	30N	03W
S09	SH WELL #1 WW AAF388				X								X			Y	X						190	300	NE NW	25	30N	04W

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
77620 Y	SEQUIM CITY OF	CLALLAM	A	Comm

	ACTIVE SERVICE CONNECTIONS	DOH USE ONLY! CALCULATED ACTIVE CONNECTIONS	DOH USE ONLY! APPROVED CONNECTIONS
25. SINGLE FAMILY RESIDENCES (How many of the following do you have?)		3945	Unspecified
A. Full Time Single Family Residences (Occupied 180 days or more per year)	2365		
B. Part Time Single Family Residences (Occupied less than 180 days per year)	0		
26. MULTI-FAMILY RESIDENTIAL BUILDINGS (How many of the following do you have?)			
A. Apartment Buildings, condos, duplexes, barracks, dorms	55		
B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year	1580		
C. Part Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied less than 180 days/year	0		
27. NON-RESIDENTIAL CONNECTIONS (How many of the following do you have?)			
A. Recreational Services and/or Transient Accommodations (Campsites, RV sites, hotel/motel/overnight units)	0	0	
B. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	351	351	
28. TOTAL SERVICE CONNECTIONS		4296	

29. FULL-TIME RESIDENTIAL POPULATION

A. How many residents are served by this system 180 or more days per year? 7460

30. PART-TIME RESIDENTIAL POPULATION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. How many part-time residents are present each month?												
B. How many days per month are they present?												

31. TEMPORARY & TRANSIENT USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. How many total visitors, attendees, travelers, campers, patients or customers have access to the water system each month?	3610	4492	4813	6819	8904	10028	12113	11956	7541	4572	2722	2647
B. How many days per month is water accessible to the public?	31	28	31	30	31	30	31	31	30	31	30	31

32. REGULAR NON-RESIDENTIAL USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. If you have schools, daycares, or businesses connected to your water system, how many students, daycare children and/or employees are present each month that are NOT already included in the residential population?	6499	6499	6499	6499	6499	6499	4012	4012	6312	6312	6312	6432
B. How many days per month are they present?	31	28	31	30	31	30	31	31	30	31	30	31

33. ROUTINE COLIFORM SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	15	15	15	15	15	15	10	10	15	15	15	15

34. NITRATE SCHEDULE	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
(One Sample per source by time period)			

35. Reason for Submitting WFI:

☐ Update - Change ☐ Update - No Change ☐ Inactivate ☐ Re-Activate ☐ Name Change ☐ New System ☐ Other _____

36. I certify that the information stated on this WFI form is correct to the best of my knowledge.

SIGNATURE: _____ **DATE:** _____

PRINT NAME: _____ **TITLE:** _____

Intentionally left blank

WS ID	WS Name
77620	SEQUIM CITY OF

Total WFI Printed: 1

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Water Facilities Inventory (WFI)

Report Create Date:	7/12/2023		
Water System Id(s):	77620Y		
Print Data on Distribution Page:	ALL		
Print Copies For:	DOH Copy		
Water System Name:	ALL		
County:	-- Any --		
Region:	ALL		
Group:	ALL		
Type:	ALL		
Permit Renewal Quarter:	ALL		
Water System Is New:	ALL		
Water System Status:	ALL		
Water Status Date From:	ALL	**To**	ALL
Water System Update Date	ALL	**To**	ALL
Owner Number:	ALL		
SMA Number:	ALL		
SMA Name:	ALL		
Active Connection Count From:	ALL	**To:**	ALL
Approved Connection Count	ALL	**To:**	ALL
Full-Time Population From:	ALL	**To:**	ALL
Water System Expanding	ALL		
Source Type:	ALL		
Source Use:	ALL		
WFI Printed For:	On-Demand		

APPENDIX C

WATER SYSTEM AGREEMENTS

Contents:

- Intergovernmental Agreement with PUD No. 1 of Clallam County, 1995
- Interlocal Agreement/SERP with Clallam County, 1998
- Temporary Wholesale Water Supply Agreement with PUD, 2013

INTERGOVERNMENTAL WATER SERVICE AREA AGREEMENT

This AGREEMENT is made and entered into this 21ST day of JUNE, 19 95, by and between the City of Sequim, Washington, hereinafter called the "City," and the Public Utility District No. 1 of Clallam County, Washington, hereinafter called the "District."

WITNESSETH that:

WHEREAS, the City and the District concur that the elimination and avoidance of duplicate water system facilities would be in the best interests of their rate-paying customers; and

WHEREAS, the laws of the State of Washington, specifically Chapter 54.48 RCW and RCW 35A.14.900, contain language governing agreements between utilities regarding service territories and acquisition of facilities; and

WHEREAS, City and District representatives have met and reached an agreement on water service areas;

NOW, THEREFORE, IT IS AGREED between the parties hereto as follows:

1. Service Area Boundary:

1.1 The water service area boundary between the City and the District shall be as shown on Exhibit "A" attached hereto and made a part of this Agreement. Each utility shall have the exclusive right to provide water service to facilities lying within their respective service territories.

1.2 As areas are annexed into the City during the term of this Agreement, the service area boundary shall be reviewed by representatives of each party hereto, and appropriate adjustments made to Exhibit "A."

2. Powers:

The District shall have the right and authority to enter over, under, along, across, and upon the City rights-of-way and/or easements in accordance with the water service area boundary described in Section 1.1 and future revisions thereto. This right and authority shall be for the purpose of construction, extension, connection, repair, maintenance,

operation, and removal of facilities as authorized herein in conformity with such City, State, and Federal codes, regulations, and standards, as now enacted or hereafter amended, governing such facilities, and as further provided in Section 10.1 of this Agreement for conformance with City Standards.

3. Termination of Agreement:

After the tenth year of this Agreement and at five-year intervals thereafter, either party to this Agreement may terminate the Agreement by giving the other party written notice at least one hundred eighty (180) days before the end of the tenth year or the end of any five-year period thereafter.

4. Changes to the Agreement:

Changes in the terms and conditions of this Agreement may be made at any time upon the mutual written consent of both parties, provided, however, that revisions to Exhibit "A" as necessitated by annexations have already been agreed upon herein. Either party desiring a change shall give the other party ninety (90) days written notice. The notice shall contain the desired changes and a full explanation of the reasons for the changes. If, at the end of the 90-day period, the parties hereto cannot mutually agree to the proposed changes, the Agreement shall remain unchanged.

5. Annexations and Purchase of Certain Facilities:

5.1 Intent to Serve New Areas: As areas where District water facilities do not exist are annexed into the City, the City will decide whether to provide service to customers in the annexed area by constructing facilities or authorizing the District, if it so chooses, to plan facilities for service.

5.2 Intent to Purchase: Within sixty (60) days of the effective date of annexation of areas that are served by the District, the City will advise the District if the City intends to provide water service to the customers in the annexed area, and the date the City proposes to purchase any District facilities in the annexed area. The purchase price will be in accordance with Section 8 of this Agreement.

5.3 City Assumes District Service: The City may, at its option, give notice to the District of the City's intent to assume service of areas serviced by the District within the City limits existing at the date of this agreement and purchase any District facilities. The purchase price will be in accordance with Section 8 of this Agreement.

6. Exclusion:

All existing and future District transmission lines, major distribution feeder lines, and reservoirs as described and shown on Exhibit "A" attached hereto, and as further amended, and made a part of this Agreement, are excluded from the terms and conditions of this Agreement unless purchased in their entirety. These lines may be repaired, replaced, expanded, and upgraded to a higher capacity at any future date without regard to this Agreement.

7. Emerald Highlands Subdivision: The District and the City acknowledge that the Emerald Highlands developer has paid for installation of water mains as shown on Exhibit D. These water mains have been deeded to the City by the Emerald Highlands developer at no cost to the City. Until such time as the City has infrastructure to provide water to this development, the District shall utilize these water mains to provide water to the customers of the Emerald Highlands development. The City shall have the option to assume service responsibility to the customers within Emerald Highlands for the sole amount of severance costs (see Exhibit B). The serving utility is responsible for operation and maintenance of the water mains. Should the City exercise this option prior to May 21, 2013, the City agrees to collect the District's customary hookup fees from new customers within Emerald Highlands and forward those funds to the District. After May 21, 2013, under this option, the District will no longer collect hookup fees.

8. Purchase Formulas:

The purchase price for transfers from the District to the City shall be established pursuant to Sections 8.1 and 8.2 of

this Agreement. The meaning of the terms used in Sections 8.1 and 8.2 is set forth on Exhibit "B," attached hereto and made a part of this Agreement.

8.1 Purchase Price for Transfer of Facilities with Customers: The purchase price shall be the lesser of: a) the cost for the City to serve plus severance costs, or b) compensation based on five (5) years of net revenue plus plant value plus severance costs.

8.2 Purchase Price for Transfer of Customers Only: In situations where transfer of customers occurs with no transfer of facilities, the purchase price shall be compensation based on five (5) years of net revenue plus severance costs. (Note Section 7 exception.)

9. Water Sale and Interconnection:

The District and the City agree that in certain situations either party may provide wholesale water to the other party. This will be accommodated after completion of an agreement between the parties for interconnection conditions and water sales rate.

The parties also agree that system interconnection may be determined to be in the parties' best interests and, therefore, allowed upon written concurrence.

10. District Service Within Existing City Limits and City's Urban Growth Limits:

10.1 City Standards: Facilities constructed within the City limits and the City's urban growth limits as set forth on Exhibit "A" are to be constructed to at least the standards adopted by the City. City shall review and approve all construction plans prior to construction.

10.2 City Facilities: Facilities constructed by developers to serve areas within the City limits shall be conveyed to and owned by the City.

10.3 District Facilities: Facilities constructed by the District utilizing their own funds to provide service to District customers within the existing City limits and the City's urban growth limits shall be owned by the District.

10.4 Operation and Maintenance: The District shall be responsible to operate and maintain City-owned facilities that the District utilizes to provide water to District customers within the existing City limits, except for a wheeling agreement.

11. Wheeling Agreements:

The City and the District acknowledge that there may be certain groups of their customers located where extension of their lines would be uneconomic and duplicative of the other party's facilities.

Recognizing potential benefits to rate-paying customers, the District and City hereby agree to consider transporting water through their facilities for the other party upon request and subject to an appropriate wheeling agreement(s). Each wheeling agreement will specify the conditions and charges for this service utilizing the Wheeling Principles set forth in Exhibit "C." The parties will strive for a simple formula for wheeling charges that recognizes cost factors and utility standards. Either party may deny a request for wheeling services.

12. Hold Harmless:

The City agrees, upon completion of the transfer of service area and water facilities in accordance with this Agreement, to indemnify, defend, and hold harmless the District and its officials, employees, and agents, from and against any and all claims for damages or any other relief due to property damage, personal injury, or any other form of loss arising from accidents or injuries occurring after the date of the transfer. The City agrees to accept facilities as is with no warranty as to condition or suitability for use by the City except as otherwise provided in this Section.

The District agrees, upon completion of the transfer of service area and water facilities referenced above, to indemnify, defend, and hold harmless the City, its officials, employees, and agents, from and against any and all claims for damages or any other relief due to property damage, personal injury, or any other form of loss arising from accidents or injuries occurring

prior to the date of the transfer or occurring as a result of defects.

13. Authority:

Each party warrants that the undersigned representative has full and complete legal authority to sign for it and to commit it to the performance of the agreements set forth herein.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be duly signed and executed in two counterparts as of the day and year first above written.

ATTEST:

Michael McInnes, General Manager
PUBLIC UTILITY DISTRICT NO. 1
OF CLALLAM COUNTY

ATTEST:

CITY OF SEQUIM

EXHIBIT "B"

DEFINITIONS OF PURCHASE TERMS:

COST FOR PURCHASING PARTY TO SERVE - The estimated cost to install the necessary distribution facilities to serve the customers to be transferred at purchasing party's current construction standards and conditions.

PLANT VALUE - Current replacement cost using existing unit costs for all system facilities multiplied by the salvage factor.

Salvage Factor:

Age (Years)	Salvage Factor
1 - 3	1.00
4 - 6	0.85
7 - 11	0.65
12 - 16	0.56
17 - 21	0.51
22 - 26	0.47
27 - 31	0.43
32 +	0.35

SEVERANCE COSTS - All costs associated with transfer of customers including but not limited to removing interconnecting piping, facilities, and meters and administrative costs.

NET REVENUE - To determine net revenue, system net revenue is determined as follows, using the most recent audited financial statements:

Operating Revenue (Income Statement)
Less Purchased Water Cost (if applicable)
Less Distribution Maintenance Expenses
Less General Taxes (Income Statement)
Annual System Net Revenue

Five (5) years of net revenue is determined as follows:

$$\frac{\text{Annual System Net Revenue}}{\text{Annual System Operating Revenue}} \times \text{Transferred Customer Revenue} \times 5 \text{ years}$$

The Transferred Customer Revenue in the above calculation shall be based on such customers' usage during the most recent twelve (12) months, multiplied by the retail rate in effect for such customers at the time of transfer.

EXHIBIT "C"

WHEELING PRINCIPLES:

It is the intention of the parties that wheeling services will be granted to the requesting party when sufficient capacity exists for such service and that the party granting such service shall be fully compensated for the wheeling services provided.

1. Definitions:

"Party 1" - The utility requesting wheeling services.

"Party 2" - The utility providing wheeling services.

"Rated capacity" - The available flow in gallons per minute, so as not to adversely impact existing service connections.

"Peak load" - The highest daily average computed on a monthly basis multiplied by 2.5.

"Necessary facilities" - The facilities such as water mains, valves, pumps, meters, and pressure reducing valves that are necessary to provide service to Party 1's customers.

2. Term of Agreements:

Individual "Wheeling Agreements" shall have a term of twenty-five (25) years.

3. Termination of Agreements:

Party 1 may terminate a Wheeling Agreement at any time by giving Party 2 written notice at least sixty (60) days prior to termination. Party 2 may terminate a Wheeling Agreement either upon receiving the consent of Party 1 or if Party 1 does not timely elect to participate in capacity expansion or make payment pursuant to Section 9 of this Exhibit.

4. Changes to Agreements:

Changes in the terms and conditions of a Wheeling Agreement may be made at any time upon mutual written consent by both parties. Either party desiring a change shall give the other party one hundred eighty (180) days written notice. The notice shall contain the desired changes and a full explanation of the reasons for the changes. If, at the end of the 180-day period, the parties hereto cannot mutually agree to the proposed changes, the Agreement shall remain unchanged.

5. Wheeling Areas:

Each Wheeling Agreement shall include an exhibit showing all areas to be provided with wheeling services. Information included in the exhibit shall include the physical area to which water would be wheeled.

6. Requests for Wheeling Service:

Written requests to have wheeling services provided may be made at any time by either party. Such requests shall include a map or drawing of the area involved, the proposed source of water to be wheeled, and the amount of water to be wheeled.

7. Acceptance or Rejection of Requests for Wheeling Service:

Within thirty (30) days of receipt of a request to provide wheeling services, Party 2 shall determine if sufficient capacity exists in its facilities to carry the required additional water. The request shall include a plan as to how to interconnect the facilities of the two parties. After both parties have reviewed, and if necessary, revised the plan, and if capacity exists, both parties shall decide whether to enter into an agreement. If insufficient capacity exists, the request will be denied unless the additional provisions of Section 8 of this Exhibit are enacted.

8. Facility Costs in Order to Provide Wheeling Service:

All costs of modifying or upgrading facilities in order to provide wheeling services shall be paid for by Party 1. In addition, should Party 1 wish Party 2 to provide wheeling services when insufficient capacity exists, then all costs associated with upgrading any necessary facilities shall be borne by Party 1. Payment of costs by Party 1 shall be within thirty (30) days of invoice by Party 2 upon completion of an upgrade project.

9. Insufficient Capacity Due to Load or Customer Growth:

Each year capacity calculations shall be made by both parties for all facilities involved in providing wheeling services. If any facilities have become overloaded, Party 2 shall prepare a cost estimate to upgrade the necessary

facilities. Costs shall be split proportionately between the parties based on each party's capacity need through the section or facility. Party 1 shall then have ninety (90) days to decide whether to terminate the wheeling agreement, pay its share of the costs to upgrade the facilities, or reduce its demand on Party 2's facilities. Payment of costs by Party 1 shall be within thirty (30) days of invoice by Party 2 upon completion of an upgrade project.

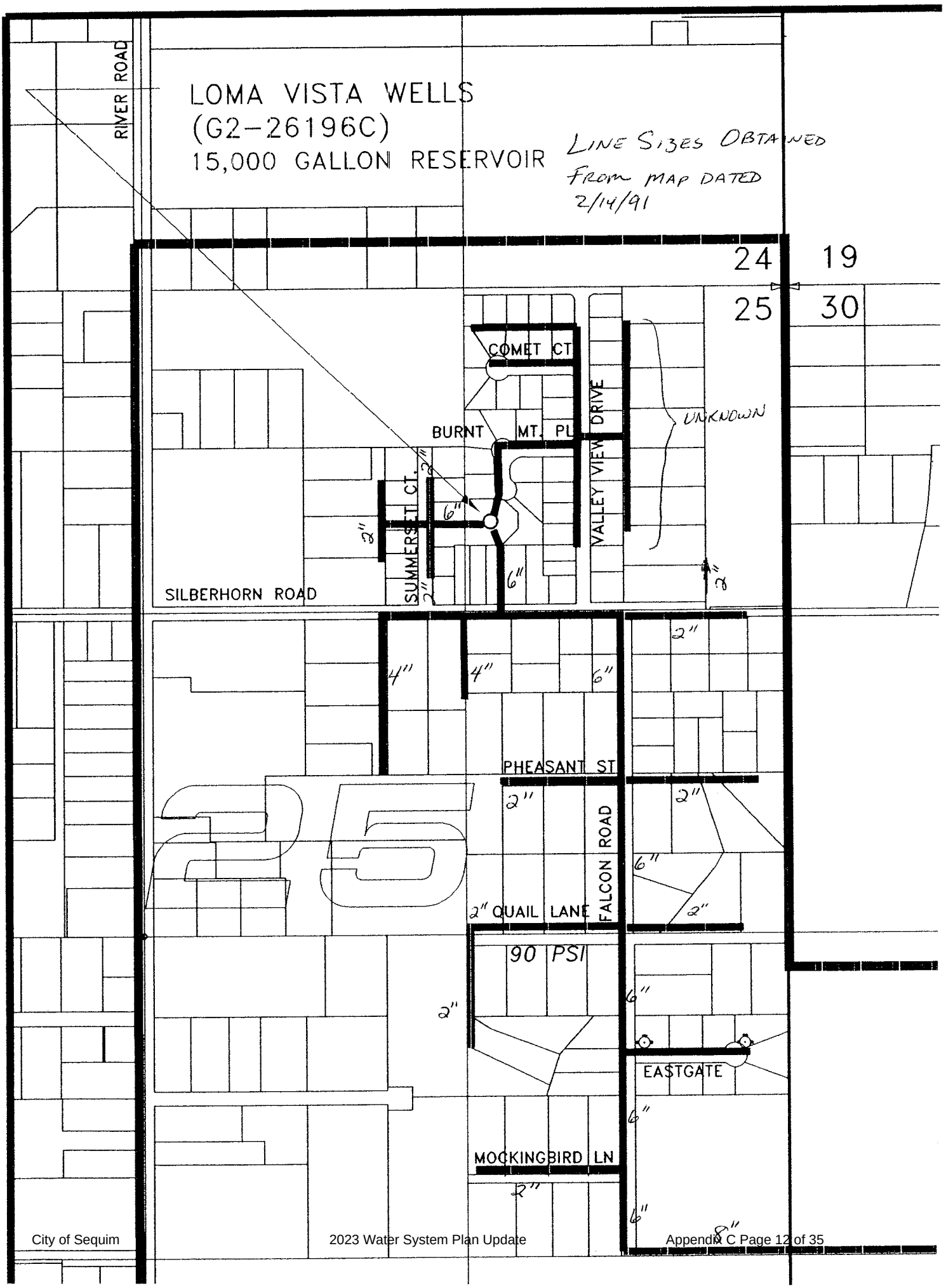
10. Wheeling Charges:

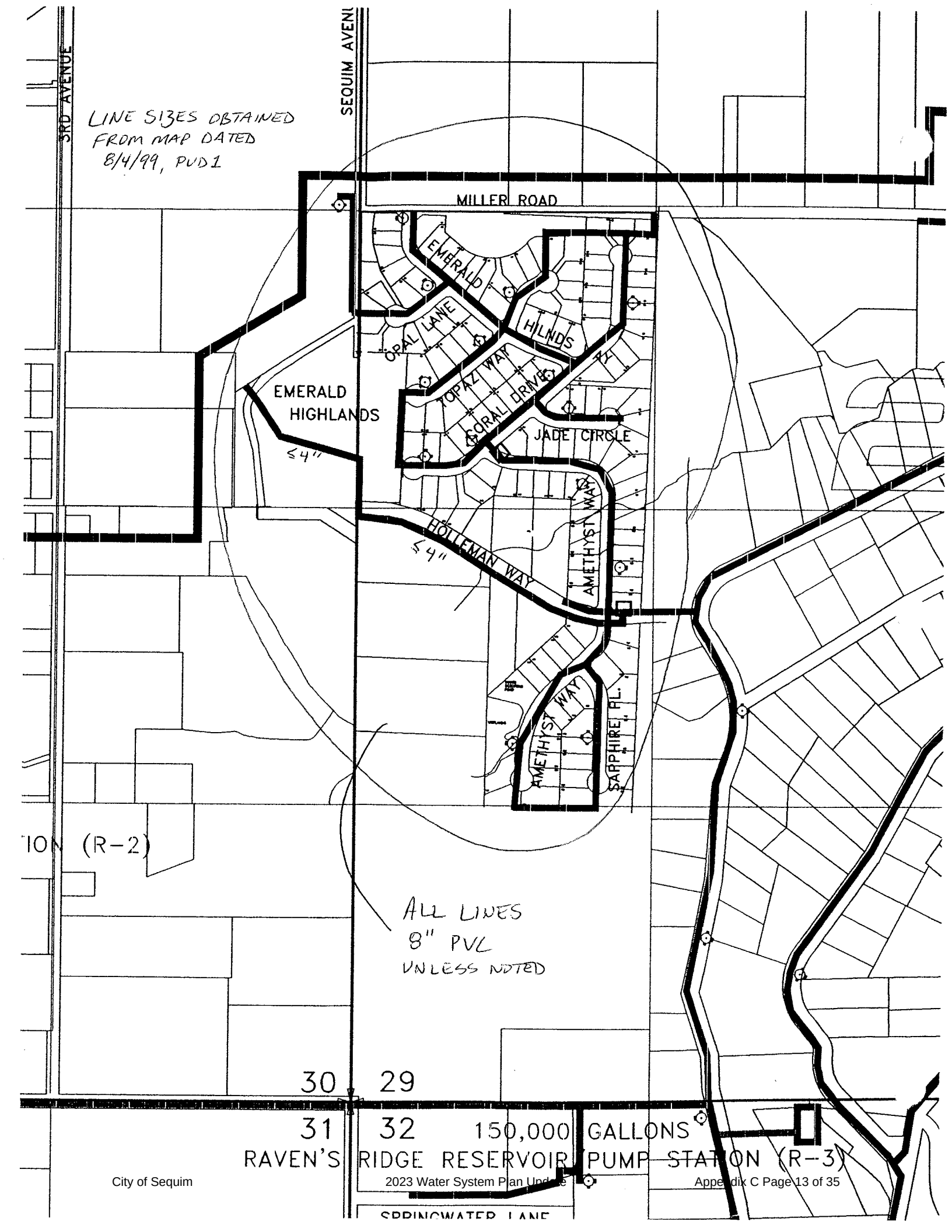
Compensation will be calculated in accordance with a formula to be established in the Wheeling Agreement and due and payable within twenty (20) days of receipt of invoice.

11. Hold Harmless:

Each Wheeling Agreement shall have a hold harmless clause.

MM/aj
1/16/95


LOMA VISTA WELLS
(G2-26196C)
15,000 GALLON RESERVOIR
LINE SIZES OBTAINED FROM MAP DATED 2/14/91
RIVER ROAD
24
19
25
30
COMET CT
BURNT MT. PL
VALLEY VIEW DRIVE
UNKNOWN
SUMMERSET CT.
SILBERHORN ROAD
PHEASANT ST
FALCON ROAD
QUAIL LANE
90 PSI
EASTGATE
MOCKINGBIRD LN
25


LINE SIZES OBTAINED FROM MAP DATED 8/4/99, PUD 1
3RD AVENUE
SEQUIM AVENU
MILLER ROAD
EMERALD
ORAL LANE
HILNDS
TOPAZ WAY
ORAL DRIVE
JADE CIRCLE
EMERALD HIGHLANDS
≤4"
≤4"
HOLLEMAN WAY
AMETHYST WAY
AMETHYST WAY
SAPPHIRE PL.
ION (R-2)
ALL LINES 8" PVC UNLESS NOTED
30
29
31
32
150,000 GALLONS
RAVEN'S RIDGE RESERVOIR PUMP STATION (R-3)
SPRINGWATER LANE

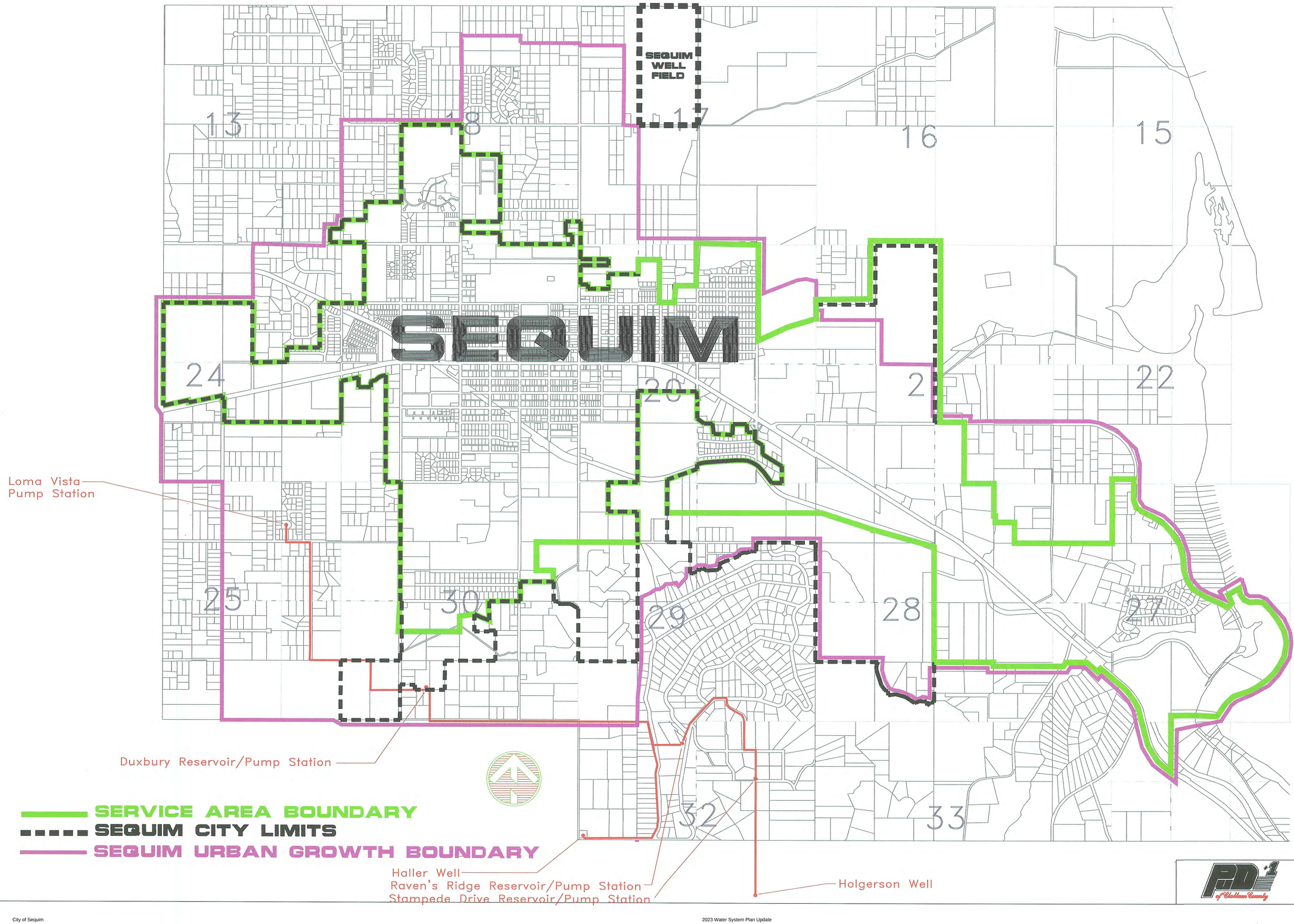


EXHIBIT "A"

DRAWN KITZ	TITLE	SERVICE AREA BOUNDARY	
DATE 5/5/95			
REV. XXXX	WORK ORDER #	Q:\WATER\PUD-EVGN.DWG	
SCALE N.T.S.	TWP. XX	RNG. XX	SEC. XX

INTERLOCAL AGREEMENT
CLALLAM COUNTY - CITY OF SEQUIM
SEQUIM URBAN GROWTH AREA

THIS AGREEMENT is entered into and between CLALLAM COUNTY, a political subdivision of the State of Washington, herein referred to as COUNTY, and the CITY OF SEQUIM, a municipal corporation, herein after referred to as the CITY.

WHEREAS, the County and City have agreed to the designation of a Sequim Urban Growth Area;

WHEREAS, the County and City have agreed to jointly prepare and adopt a comprehensive plan under the requirements of the Growth Management Act of 1990 (Chapter 36.70A RCW) for the Sequim Urban Growth Area;

WHEREAS, the City of Sequim has adopted a Comprehensive Plan to guide the character of future development within the Sequim Urban Growth Area;

WHEREAS, the County adopted the City of Sequim Comprehensive Plan for the unincorporated Sequim Urban Growth Area subject to twenty-eight (28) amendments under Ordinance No. 628, 1997;

WHEREAS, the City of Sequim Comprehensive Plan directs the County and City to prepare an interlocal agreement for the review and processing of development proposals and development of a System Expansion Review Process for the extension of utilities.

WHEREAS, the County adopted, in agreement with the City the County-Wide Planning Policies (CWPP) to guide joint planning of urban growth areas; and

WHEREAS, the CWPP advise the County and the City to develop procedures for the administration of land use regulations, review of development proposals, and extension of urban services for the unincorporated portions of the Sequim Urban Growth Area.

NOW THEREFORE, the County and City make the following agreement:

Section 1 Purpose. The purpose of this Agreement between Clallam County and the City of Sequim is to establish a procedure to ensure the orderly development of the unincorporated Sequim Urban Growth Area and to ensure the appropriate provision of urban services to such development consistent with the comprehensive plan. To implement the purpose stated above, it is the intent of this Agreement to accomplish the following:

i. Allow for the orderly development of the Sequim Urban Growth Area consistent with the comprehensive plan and the Washington State Growth Management Act, Chapter 36.70A RCW.

ii. Provide for joint coordination related to permit review and processing within the unincorporated Sequim Urban Growth Area.

iii. Establish the administration of development regulations for the unincorporated Sequim Urban Growth Area consistent with the comprehensive plan.

Section 2 Applicability. The Agreement applies to the unincorporated portions of the Sequim Urban Growth Area as designated on the Official Clallam County Comprehensive Plan Map for the Sequim-Dungeness Regional Comprehensive Plan, Title 31, Chapter 31.03 Clallam County Code. Nothing contained in this Service Agreement alters the land use powers of Clallam County and the City of Sequim.

Section 3 Definitions.

i. Comprehensive plan means a generalized coordinated land use policy statement of the county adopted pursuant to the Clallam County Charter, Growth Management Act of 1990 (Chapter 36.70A RCW) and the Planning Enabling Act (Chapter 36.70 RCW). For the purposes of this Agreement, the comprehensive plan is the joint comprehensive plan agreed upon between the County and the City.

ii. Development regulations means any controls placed on development or land use activities by the county, including but not limited to, zoning ordinances, land division ordinances, critical or sensitive area ordinances, and binding site plan ordinances.

Section 4 Comprehensive Plan. The County shall maintain administration of the comprehensive plan governing the unincorporated portions of the Sequim Urban Growth Area.

Section 5 Development Regulations. The County shall maintain administration of all its current development regulations within the unincorporated portions of the Sequim Urban Growth Area consistent with this Agreement.

Section 6 SEPA. The City agrees to assume lead agency status only for those public proposals within the unincorporated portions of the Sequim Urban Growth Area that the City initiates consistent with WAC 197-11-926. The County agrees to provide the City the opportunity to review all application materials associated with proposed actions within the Sequim Urban Growth Area prior to the issuance of a Threshold Determination pursuant to the State Environmental Policy Act (SEPA).

Section 7 Development Review Process. The County and City agree to jointly develop a development review process for land use permits and approvals in order to facilitate processing of land use applications in a timely matter and to assist applicants through the land use permit/approval process. This joint application review process shall be consistent with the comprehensive plan and the Consolidated Development Permit Process to be adopted under Chapter 26.10, Clallam County Code. The County agrees to incorporate joint application review processes as part of the adoption of development standards consistent with this Interlocal Agreement and the comprehensive plan. At a minimum, the joint application review process shall establish procedures for:

i. City participation in Clallam County pre-application meetings.

ii. Forwarding of land use applications to the City for review and comment including but not limited to: type of permits/approvals forwarded to the City for review; minimum content of forwarded application materials; length of comment period; and minimum scope of City review.

iii. The level of technical assistance and support the City will provide to the County for implementing City development standards including, but not limited to, civil

engineering plan review and inspections of facilities to be part of or connected to City infrastructure.

The County shall consider and give substantial weight to City of Sequim comments prior to issuing a decision.

Section 8 Zoning. The County agrees to seek to amend the Clallam County Zoning Code, Title 33 Clallam County Code, and Official Clallam County Zoning Map by adopting zoning land use designations and development standards that are consistent with the comprehensive plan.

Section 9 Land Divisions. Pursuant to CCC 29.30.150, Clallam County adopted the City of Sequim subdivision improvement requirements for land divisions within the unincorporated portions of the Sequim Urban Growth Area. The City agrees that any amendments to City subdivision improvement standards that will apply to land divisions within the unincorporated Sequim UGA must be jointly agreed upon by the County. The County and City agree to jointly review land division improvement requirements and adopt amended standards where appropriate for land divisions creating lot sizes equal to or greater than one-half (1/2) acre in order to preserve future redevelopment opportunities to higher urban densities.

Section 10 Sewer and Water Utilities. The County and City agree that the provision of adequate public facilities for potable water and wastewater treatment for the unincorporated portions of the Sequim Urban Growth Area shall be provided for consistent with the attached Service and Extension Review Process (Attachment A). The City shall not apply additional requirements as a condition of utility connection.

Section 11 Through the adoption of this Agreement, Clallam County shall adopt by reference the provisions of City of Sequim Resolution No. 93-9 or other mutually acceptable legislation to allow City administration of "late-comer" agreements for the installation of utility services within the unincorporated portions of the Sequim Urban Growth Area.

Section 12 Park and Recreation Level of Service (LOS) standards. The City of Sequim Comprehensive Plan has established a LOS standard for Parks and Recreation facilities located within the urban growth area. The Clallam County Countywide Planning Policies require that Parks and Recreation public facilities be established consistent with these standards to meet the needs of new development. In order to provide guidance on the establishment of these new facilities, the City shall develop a parks plan for the urban growth area which specifically addresses identified deficiencies and reconciles any identified discrepancies between both jurisdiction's Parks and Recreation LOS. The County shall participate in the preparation of this plan. The Plan shall incorporate existing and proposed regional facilities such as the Robin Hill Farm County Park, Olympic Discovery Trail, and Carrie Blake Park, and shall evaluate the location and type of neighborhood recreation facilities which are needed within the urban growth area. The resulting Plan shall be adopted by both jurisdictions. The adopted Plan shall include a joint implementation strategy and shall require the amendment of both jurisdictions capital facility plan's, as applicable. All new development or redevelopment shall provide for facilities consistent with the adopted joint Parks and Recreation Plan.

Section 13 Operation and Maintenance Pilot Program. The County agrees to initiate within one year of the adoption of this Agreement a pilot operation and maintenance program for on-site sewage systems within the Sequim Urban Growth Area. The City shall participate in the

technical development of this program. The purpose of this pilot program shall be to protect groundwater quality by encouraging property owners served by pre-existing and new on-site systems (as permitted by Section 10) to maintain and operate their systems in the most efficacious manner. The pilot program shall consider and evaluate (at a minimum) the following techniques to enhance on-site system performance:

i. The development of public information materials on best management practices associated with the operation and maintenance of on-site systems.

ii. The development of an on-site system inspection program.

iii. The creation of a data base and notification system for on-site system owners to ensure timely maintenance.

iv. The establishment of alternative and/or contract maintenance programs to be administered by the County, City, or a contracted private business.

Applicable grant funding sources to support these and other activities shall be evaluated by both the City and the County and, where appropriate jointly applied for.

Section 14 In order to better protect groundwater resources, the County and the City agree to jointly evaluate and develop an incentive program which encourages the voluntary connection of pre-existing, established development served by on-site water and/or sewer utilities to City services in areas where such services are available. The pilot program shall consider and evaluate (at a minimum) the following incentives:

i. A possible reduction in system connection charges based on the type of system.

ii. Extended financing terms for the payment of system connection charges and/or the establishment of a revolving loan program to address material and labor costs directly associated with making the connection.

iii. The establishment of jurisdictionally initiated and administered local improvement districts.

Applicable grant funding sources to support these and other activities shall be evaluated by both the City and the County and, where appropriate jointly applied for.

Section 15 The City agrees to provide the County maps in a mutually agreeable format which describe existing or planned City sewer and water utilities. The City agrees to update such maps within sixty (60) days of an amendment to the City of Sequim 6-year Capital Facilities Plan, or after installation of new water and sewer lines.

Section 16 The County and City agree to adopt development regulations necessary to implement this interlocal agreement.

The City of Sequim

Bill Thomas, Mayor
on behalf of the City Council
Date: 4-April 13, 1998

Board of Clallam County Commissioners

Carole Y. Boardman, Chair
Date: 3-23, 1998

Martha M. Ireland
Date: 3-23, 1998

Phillip Kitchel
Date: 3-23, 1998

ATTEST:

Karen Flores
Clerk of the Board

Approved As To Form:

City Attorney
Date: April 13, 1998

ATTACHMENT A

Clallam County/City of Sequim
Service Extension Review Process (SERP)

Clallam County - City of Sequim
Service Extension Review Process

Section 1 **Purpose:** The purpose of this Service and Extension Review Process (SERP) is to set forth an agreement between Clallam County and the City of Sequim on the provisions for sewer and water services within the unincorporated areas of the Sequim Urban Growth Area. The intent of the SERP is to ensure that adequate public facilities for potable water and wastewater treatment are provided in an efficient and coordinated manner within the Sequim Urban Growth Area.

Section 2 **Applicability and Process.** The SERP contains the requirements for the provision of municipal and non-municipal sewer and water utilities within the unincorporated Sequim Urban Growth Area. All development which requires a Clallam County permit or approval of sewage disposal and/or water supply utilities shall comply with the provisions of this SERP. The City of Sequim and Clallam County shall provide the public reference information (e.g., flowcharts) and amend development application procedures as necessary to facilitate the SERP.

Section 3 **Definitions.**

Accessory Dwelling Unit. A separate dwelling unit within a single family dwelling or a separate structure associated with a single family dwelling which is incidental and subordinate to the primary use of the property [CCC 33.03.010 (1)].

Administrator. The director of the Department of Community Development of Clallam County or his/her designee.

Available Municipal Utility, Sewer Utility, Water Utility. An existing municipal sewer and/or water utility main located within two hundred (200) feet of a property line or approved dryline utility , as measured along the public right-of-way or any public easement granted to municipal utilities, at the time of receipt by Clallam County of a complete application. Privately-owned utility connections to a municipal sewer and/or water public utility main are not considered available municipal utilities.

Community On-Site Sewage Disposal System. An on-site sewage disposal system as defined under Chapter 246-272 WAC, that serves two or more dwelling units.

Connection. The physical linking or "hook-up" of municipal sewer and/or water services to a subject use or property. Connection includes all buildings, habitable structures, plumbing outlets, and domestic water lines requiring municipal sewer and/or water services.

Development. For the purposes of the SERP, development means any activity located within the unincorporated Sequim Urban Growth Area which requires a permit or approval of existing or new sewage disposal and/or water supply utilities from Clallam County, including, but not limited to, land divisions, building permits, and on-site sewage permits.

Dryline Utilities. Dryline utilities includes any of a number of methods of installing utilities at the time of development for connection to a municipal distribution system at a later time.

Duplex. Two dwelling units having a common roof. [CCC 33.03.010(20)]

Dwelling Unit. Any building or any portion thereof which is intended or designed to be used, rented, leased, let or hired out to be occupied for living purposes having independent living facilities for one family including permanent provisions for living, sleeping, eating, cooking, sanitation and including accessory structures and improvements. [CCC 33.03.010(21)]

Effective Date. Ten (10) calendar days following the date Clallam County and the City of Sequim adopt the Interlocal Agreement and the Service Extension Review Process (SERP).

Existing Municipal Utility. An installed municipal water or sewer main located in the public right-of-way or public utility easement that is available for connection.

Final Plat. As set forth under Title 29 Clallam County Code.

Group Home. A facility licensed by the state which is located in a single building utilized for the full-time shelter and care of a group of unrelated people.

Land Divisions. Any applications for division of land which is subject to the Clallam County Land Division Code, Title 29, Clallam County Code, including a subdivision, Planned Unit Development, Binding Site Plan, short subdivision, or large lot subdivision.

Lot, Parcel, Tract. A lot, parcel or tract shall be an ownership of land in which the boundary is defined by a deed recorded in the County Auditor's Office and assigned a tax parcel number by the County Assessor; or a lot which has been defined by a survey recorded pursuant to Washington State surveying or platting laws and is assigned a tax parcel number by the County Assessor; or parcels recognized by resolution of the Board of County Commissioners adopted prior to the effective date of the SERP.

Municipal Services or Utilities. Sewer and water services provided by the City of Sequim. For the purposes of the SERP, municipal water services may also include the Evergreen Public Utility District water system or other public water systems that have entered into an Urban Growth Area Service Agreement with the City of Sequim.

Multiple-Family Dwelling. A building containing two or more dwelling units. For the purposes of this SERP, a group home is considered to be a multiple-family dwelling when it is occupied by thirteen or more residents, including resident staff.

Non-Municipal Utilities. Sewer and water services not defined as municipal services or utilities. Non-municipal utilities include on-site sewage systems, community on-site sewage systems, individual water supply wells, and public water systems.

Planned Municipal Utility. Are those future municipal sewer and water utilities identified and mapped in the current version of the City of Sequim wastewater and water service plans.

Pre-existing Lot. Any lot, parcel or tract established prior to the effective date of the SERP.

Public Water System. As defined and referenced under WAC 246-290-020

Residential use. For the purposes of the SERP, residential uses shall mean single-family, multi-family, and accessory dwelling units.

SERP. The Service Extension Review Process (SERP) jointly adopted by the City of Sequim and Clallam County for the provision of sewage disposal and water within the unincorporated Sequim Urban Growth Area.

Single-Family Dwelling. A dwelling unit detached from any other dwelling unit and intended for occupation by one family and including accessory improvements and uses. This definition includes manufactured homes such as mobile homes, modular homes and other homes manufactured in components or as one complete dwelling unit [CCC 33.03.010 (68)]. For the purposes of this SERP, a group home is considered to be a single-family dwelling when it is occupied by twelve (12) or fewer residents, including resident staff.

STEP System - A Septic Tank Effluent Pump (STEP) system consisting of a tank or tanks for settling and digesting wastewater solids and a pressure piping system for conveying the supernatant liquid into the municipal sewer system. STEP systems permit only sanitary wastewater to be discharged into the tank. Roof drains and other stormwater sources shall be strictly excluded.

Urban Growth Area Service Agreement. An agreement between the City and a private utility provider which establishes a defined geographic service area within the boundaries of the urban growth area. The private utility provider agrees to serve upon request by the individual property owners all parcels located within this area. The boundaries of the agreed upon service area may be located outside of the boundaries of an approved development, provided that appropriate water rights and approvals are obtained. The Urban Growth Area Service Agreement may be for sewer and/or water service.

Utilities - Private and municipal water and sewage disposal systems located within the Sequim Urban Growth Area.

Section 4 **Development Exempt from Municipal Connection.** The County and City agree that connection to municipal water and/or sewer utilities shall not be required for the types of development listed below; PROVIDED that such development is otherwise consistent with the provisions of the SERP and all other applicable County and State regulations. Development exempt from municipal service connection may request municipal services to comply with County and State requirements for sewage disposal and potable water. The County shall consider connection to municipal services to comply with public health and sanitation requirements.

i. Development not requiring approval of water supply and sewage disposal systems.

ii. One individual, detached single-family or duplex residential dwelling on a lot that is one (1) acre or greater.

iii. Any development that was connected to and served by a non-municipal utility prior to the effective date.

iv. Non-municipal water utilities that are used solely for agricultural or non-human consumption.

v. Any development issued an applicable and valid building permit prior to the effective date; provided that the permit remains applicable and valid pursuant to the Clallam County Building Code, Chapter 21.01 C.C.C; provided further, that this exemption does not apply to any lot required to be served by a municipal utility as a condition of

preliminary or final plat approval pursuant to the Clallam County Land Division Code, Title 29 C.C.C.

vi. Any development on a pre-existing lot that will be served by a public water system where such service was approved for such development as a condition of final plat approval shall not be required to connect to municipal water services.

vii. Any development on a pre-existing lot that will be served by a community on-site sewage system where such service was approved for such development as a condition of final plat approval shall not be required to connect to municipal sewer services.

viii. Accessory dwelling units allowed under the Clallam County Zoning Code, Title 33, Clallam County Code, on lots one (1) acre or larger , except where the primary residential use on the lot is connected or required to connect to municipal utilities under the SERP.

ix. Home enterprises and home based businesses permitted under the Clallam County Zoning Code, Title 33, Clallam County Code, that do not require potable water and sewage disposal beyond what could be normally expected of a single-family residence, except where the primary residential use on the property is connected or required to connect to municipal utilities under the SERP.

x. Any expansion, remodeling, or reconstruction activity of an existing structure or use that does not involve drilling of a new well or cause wastewater flows to exceed the treatment or disposal capability of the existing on-site sewage system.

xi. Development on pre-existing lots of record approved for connection to non-municipal utilities for a period of five years from the date of final plat approval.

Section 5 **Land Divisions (New Lots).** Clallam County agrees to process and condition applications for land divisions that are accepted as complete on or after the effective date as follows:

A. Non-Residential Lot. Any lot where the planned use of the lot is for a commercial, industrial, or other non-residential use shall be connected to municipal sewer and water utilities prior to final plat approval. A note shall be placed on the face of the plat that indicates what municipal services are provided and that all future development requiring such services shall be required to connect to such services prior to development approval.

B. Multi-Family Residential Lot. Any lot where the planned use of the lot is for a multi-family dwelling shall be connected to municipal sewer and water utilities prior to final plat approval. A note shall be placed on the face of the plat that indicates what municipal services are provided and that all future development requiring such services shall be required to connect to such services prior to development approval.

C. Single-Family Residential Lot Less Than 1/2 Acre. Any lot less than one-half (1/2) acre where the planned use of the lot is for a single-family dwelling shall be connected to municipal sewer and water utilities prior to final plat approval. A note shall be placed on the face of the plat that indicates what municipal services are provided and that all future development requiring such services shall be required to connect to such services prior to development approval.

D. Single-Family Residential Lot Between 1/2 and 1 Acre. Any lot between one-half (1/2) acre and one (1) acre where the planned use of the lot is for a single-family dwelling shall be connected to municipal sewer and water utilities prior to final plat approval. Land divisions that are not located within two hundred (200) feet of an available municipal utility, may be approved without connection to municipal utilities provided that all of the following criteria are met prior to final plat approval:

i. The County Health Official determines that the use of non-municipal utilities complies with all County and State requirements pertaining to sewage disposal and potable water.

ii. Non-municipal utilities are otherwise provided consistent with the SERP.

iii. A dry sanitary sewer main and water main is installed within the land division and side line sewer and water mains are provided to any lot between one-half (1/2) acre and one (1) acre. Common utility facilities associated with a public water system or community on-site sewage system shall be allowed in lieu of dryline utilities where such facilities meet the same design requirements for municipal utilities.

iv. Any lot less than one (1) acre shall connect to municipal utilities within one (1) year of notification by the City of Sequim that an existing municipal sewer and/or water utility is determined to be available as defined in Section 3. A note shall be placed on the face of the plat that cites which lots are subject to connection and which states the requirements for future connection when municipal services become available. Connection shall not be required where water services are provided by a public water system that is otherwise consistent with the SERP.

E. Single-Family Residential Lot 1 Acre or Greater. Any lot that is one (1) acre or greater where the planned use of the lot is for a single-family dwelling must obtain approval from the County Health Officer that the lot has met all State and County requirements pertaining to sewage disposal and potable water. Connection to municipal utilities is not required. Lots connected to municipal services shall be considered to comply with all State and County requirements pertaining to sewage disposal and potable water.

Any lot not connected to municipal utilities shall demonstrate that adequate accommodations have been provided for the future provision of municipal utilities. Accommodations for the future provision of municipal utilities may be demonstrated by one or more of the following methods: 1) extension of municipal services to the property line; 2) provision of dryline utilities; and/or 3) provision of municipal utility easements and right-of-ways. Notice shall be recorded on the face of the plat as follows:

> All lots [or specify individual lot numbers] shown on this [specify land division type (e.g., short plat)] have not been required to connect to [specify applicable municipal utilities]. Future development or subdivision of this property may require the provision of municipal sanitary sewer and/or domestic water services. For information on municipal utility connection standards, contact the City of Sequim for lots located within the city limits and the Clallam County Department of Community Development for lots located outside of the Sequim city limits.

Section 6 **Individual Lot Development (Pre-Existing Lot).** Unless exempted under Section 4 of the SERP, Clallam County agrees to require provisions for connection to municipal services consistent with this Section for the following types of development on a pre-existing lot of record:

i. Non-residential development;

ii. Multi-family residential development consisting of a total of three (3) or more dwelling units; and

iii. Single-family and associated accessory dwelling unit (if applicable) and duplex residential development on lots less than one (1) acre.

A. Available Municipal Utility. Where the municipal utility is an available municipal utility, connection to such utility shall be required prior to final approval of the development by Clallam County.

B. Municipal Utility Not Available. Where the municipal utility is not available, the provision for connection shall be met by either:

i. extension of and connection to municipal utilities prior to final approval of the development by Clallam County; or

ii. Installation of non-municipal utilities that are otherwise consistent with the provisions of the SERP; provided that, connection shall be required within one (1) year of notification by the City of Sequim that an existing municipal sewer and/or water utility is determined to be available as defined in Section 3.

Section 7 **Individual Lot Development (New Lot).** Development on any lot created after the effective date shall provide for connection to available municipal utilities as conditioned at the time the lot was legally established under the Clallam County Land Division Code, Title 29, Clallam County Code, or as otherwise required under the SERP.

Section 8 **STEP Systems.** Existing or new development required to connect to a municipal sewer utility, may be permitted to establish a Septic Tank Effluent Pump (STEP) wastewater system in lieu of conventional connection where consistent with the other provisions of the SERP and the below standards:

i. The STEP system shall consist of a tank or tanks for settling and digesting wastewater solids, and a pressure piping system for conveying the supernatant liquid into the City of Sequim sewer system.

ii. The STEP system shall only allow sanitary wastewater to be discharged into the tank. Roof drains and other stormwater sources shall be prohibited.

iii. Property owners will be responsible for the maintenance of all laterals and side (or building) sewer lines associated with STEP systems.

Section 9 **Non-Municipal Utilities.** Non-municipal utilities shall comply with all applicable state and local regulations . In addition, non-municipal utilities shall meet the following requirements:

i. Existing public water systems and/or community on-site sewage disposal systems shall not be allowed to expand their services to lots less than one (1) acre unless

such connection was approved prior to the effective date of the SERP by Clallam County and/or through an Urban Growth Area Service Area Agreement between the service provider and the City of Sequim, and such connection is otherwise consistent with the SERP.

ii. Extension of services by existent public water systems and/or community on-site sewage disposal systems will be reviewed to ensure that all applicable state and local regulations have been met, and that no extension of a non-municipal service by an existing non-municipal utility creates an "unservable" condition within the Sequim Urban Growth Area.

iii. Non-municipal sewage utilities allowed to serve development not otherwise exempted from connection under the SERP Agreement shall be designed and installed to be able to connect in the future to municipal sewer utilities. This may include drylining utilities for future connection or the provision of a STEP system.

iv. New, non-municipal utilities shall not be located within two hundred (200) feet of the property boundary of a designated municipal wellfield area as identified on the current wellfield area map of the municipal provider.

v. Non-municipal utilities that provide service to more than fifteen (15) connections that propose to extend services shall enter into an Urban Growth Area Service agreement between Clallam County and the City of Sequim. The Urban Growth Area Service Agreement shall be consistent with the guidelines and policies for such agreements under the Clallam County County-Wide Planning Policies, dated June 30, 1992, as amended.

vi. Accessory dwelling units must be connected to the same sewer and water utility as the primary residential unit on lots that are less than one (1) acre in size.

vii. Single-family and duplex residential development established after the effective date of the SERP on lots which are one (1) acre or greater shall provide for connection to municipal utilities consistent with this SERP when such lots are redivided pursuant to the Clallam County Land Division Code, Title 29 C.C.C. to less than one (1) acre.

viii. Development served by a failing non-municipal sewage system shall connect to an existing municipal sewer utility in accordance with the Clallam County Health Rules, C.C.H.R. 4.040 and WAC 246-272-07001, as amended. The determination of whether an on-site sewage system is failing shall be made by the County based on the definition of failure, as amended, under the State On-Site Sewage System Rules, Chapter 246-272 WAC.

Section 10 **Connection and Design Standards.** All facilities intended to be connected to a municipal utility, including dryline utilities and STEP systems, shall be designed, installed, connected, and inspected as required by the municipal service provider.

Section 11 **Waivers.** The Administrator reserves the right to waive connection requirements to municipal services for lots created prior to the effective date of the SERP which are encumbered by topographic, environmental, and/or significant technical limitations associated with the provision of services which would require the construction of facilities which are disproportionate in size and capacity to the proposed scale of development. Waivers shall not be granted in cases where failure to provide municipal utilities would have a probable adverse environmental impact.

The Administrator shall only grant waivers based on adoption of appropriate findings and conclusions. Waivers cannot be granted unless jointly agreed upon by Clallam County and the City of Sequim.

Examples of circumstances supporting the granting of a waiver may include, but shall not be limited to, the unavoidable crossing of environmentally sensitive areas such as a wetland, or the provision of services in an area containing significant topographic variations which would require major improvements such as a municipal lift station with an ultimate service area of less than 10 connections, and/or connections which would require extensive revisions to existing infrastructure.

Section 12 **Administration.** The County and City shall jointly review development subject to this SERP Agreement consistent with the development review process adopted under Section 7 of the County/City Interlocal Agreement that adopts this SERP by reference. As part of this development review process, the City shall determine whether extension of municipal services is required subject to the SERP. Where connection to municipal sewer and water services is required, the written determination shall include a statement for service commitment from the City of Sequim. The SERP standards shall be included by Clallam County as a condition of approval of the underlying development application.

Section 13 **Utility Connection and User Fees.** Utility connection and user fees shall be established by the appropriate municipal provider.

TEMPORARY WHOLESALE WATER SUPPLY AGREEMENT

This TEMPORARY WHOLESALE WATER SUPPLY AGREEMENT ("Temporary Agreement") is made and entered into by and between the City of Sequim, Washington, a municipal corporation hereinafter called the "CITY," and the Public Utility District No. 1 of Clallam County, a municipal corporation hereinafter called the "DISTRICT." The CITY and DISTRICT are sometimes referred to individually in the Temporary Agreement as "Party"; the CITY and DISTRICT are sometimes referred together in the Temporary Agreement as "Parties."

WITNESSETH:

WHEREAS, the CITY and the DISTRICT realize certain mutual benefits from cooperative efforts in the operation and maintenance of their respective water systems and desire to cooperate in planning for the future supply of their customers; and

WHEREAS, the Intergovernmental Water Service Area Agreement signed by both Parties on June 21, 1995 allows for either Party to provide wholesale water to the other Party after completion of an agreement;

WHEREAS, the CITY lacks water system facilities to serve a 16-lot subdivision (identified on the map attached hereto as Exhibit A) that is developing in the CITY's retail water service area, and the DISTRICT, through its Evergreen water system, is able to supply wholesale water to the CITY in order to serve this subdivision area;

NOW, THEREFORE, IT IS AGREED between the Parties hereto as follows:

Section 1 – Sale, Purchase, Delivery, and Use of Wholesale Water

a) DISTRICT agrees to sell and make available to the CITY, and the CITY agrees to purchase and take delivery of, wholesale water supply at the Delivery Point location provided herein.
b) The wholesale water supplied by the DISTRICT will be used by the CITY as a source of water for resale to CITY retail customers in accordance with applicable law.
c) Because a wholesale water meter does not yet exist at this location, residential water meters at the CITY's customers will be used to calculate wholesale water deliveries. However, the eventual goal for this and future agreements is to utilize master metering, whenever possible.
d) "Delivery Point" for wholesale water supply under this Temporary Agreement shall be immediately downstream of the DISTRICT's water main connection for Clara Crest Lane and immediately downstream of the DISTRICT's valved connection at the North East corner of Emerald Highlands water main on Miller Road. The approximate location of the Delivery Point is shown on Exhibit A.
e) Upon the CITY's acceptance of wholesale water at the Delivery Point, the CITY takes sole and exclusive possession, control, responsibility for the water.

Section 2 – Water Rate and Billing

a) The water rate to be paid by the CITY to the DISTRICT shall be per 100 cubic feet ("CCF") of water, delivered to each of the CITY'S residential water meters and then calculated into a combined residential water meter sheet. The CITY will prepare the Sheet and will submit it to the DISTRICT monthly for invoicing to the CITY.
b) The water rate to be paid by the CITY to the DISTRICT shall be 85% of the current Level 1 Residential water usage charge for the Evergreen Water System.
c) The period of billing for wholesale water supplied under this Temporary Agreement shall be monthly, beginning with the first month that the CITY accepted wholesale water delivery. The residential water meters will be read by the CITY and results recorded in accordance with the CITY'S applicable reading cycle. Payment to the DISTRICT by the CITY shall become due and payable within thirty (30) days from after the date of the DISTRICT's billing invoice.
d) The DISTRICT shall have the right to re-check any water meter readings that seem to not be recording accurately.

Section 3 – Water Quality

a) The water supplied by the DISTRICT to the CITY under this Temporary Agreement shall comply, at the Delivery Point, with Washington State Department of Health Drinking Water Regulations. After the CITY takes possession and ownership of the wholesale water at the Delivery Point, then the CITY is solely responsible for water quality. The CITY shall be responsible for maintaining compliance with drinking water quality standards and requirements after accepting delivery of wholesale water. The CITY shall hold the DISTRICT harmless from and against any claims, losses, or damages arising from or relating to water quality or the introduction into its system of water or other substances beyond the Delivery Point.
b) The DISTRICT or CITY will immediately notify the DISTRICT or CITY of water quality emergencies and both will coordinate public notice.
c) The CITY will administer a cross-connection program in accordance with Washington State Department of Health guidelines.

Section 4 – Quantity, Pressure and Reliability

a) The DISTRICT shall use commercially reasonable efforts to provide wholesale water to the CITY's water system at the Delivery Point.
b) At least once every 5 years, the CITY will have a leak detection survey accomplished on the water mains that will convey delivered wholesale water to CITY customer. Any leaks found will be repaired by the CITY as soon as possible and a summary report provided to the DISTRICT.

c) A reasonable residential fire flow will be provided to the CITY's water system at the Delivery Point to the extent that it is available from the DISTRICT; however, the CITY is responsible for meeting or complying with fire flow requirements.

d) It shall be the sole obligation of the CITY to operate and maintain its water system. For example and without limitation, the CITY will install and maintain pressure reducing and pressure relief valves and appurtenances as may be needed to regulate the pressure to protect and to conform to the needs of the CITY's water distribution system and its water service customers. Failure to install and maintain proper pressure control valves may result in damage to the CITY's water system or customer water systems. The DISTRICT shall not be responsible for any loss or damage related to the CITY's water system or its operation and maintenance, including for example failure of the CITY to install and maintain all pressure control valves required for system and customer protection. The CITY shall defend and indemnify the DISTRICT from and against any and all claims arising from or related to the CITY's water system or to installation, operation, or maintenance of any facilities or equipment, including any and all necessary pressure reducing and pressure relief valves.

e) The DISTRICT's system will be designed, maintained and operated by the DISTRICT in a manner consistent with reasonable municipal water system standards laws and regulations applicable to the DISTRICT, prudent utility practices, and applicable rules and regulations. However, it is understood and agreed that the DISTRICT can make no guarantee as to pressure, quantity or continuity of service because of the possibility of accidents and failures to the DISTRICT's water system. Therefore, the DISTRICT shall not be held liable for losses or damage from a deficiency or failure to supply water due to accidents, acts of God, and any conditions beyond the reasonable control of the DISTRICT. In the event of an emergency or other necessity that may disrupt wholesale water deliveries to the CITY, the DISTRICT shall notify the CITY through verbal or telephone contact, and shall restore service and make water available as soon as it can reasonably do so.

f) In the event of scheduled maintenance, alterations, extensions or connections, the DISTRICT shall provide notification to the CITY, and schedule such work to minimize the potential impacts of disruption of service to the CITY's customers.

g) In the event of a drought or other water shortage that requires the DISTRICT to implement water rationing or water shortage management plan for the DISTRICT's retail customers, the DISTRICT may proportionately require the reduction of wholesale water deliveries under this Temporary Agreement.

h) In the event of a DISTRICT water quality issue requiring notice to all users, the DISTRICT shall notify the CITY of such water quality issue and the CITY shall notify its customers and CITY users of DISTRICT wholesale water.

Section 5 – Future Capital Projects

a) The Parties acknowledge that: the DISTRICT's water storage facilities (reservoir) may require enlargement or improvement in future years in order to continue to supply wholesale water; the CITY will be collecting all connection and capital facilities charges

for CITY customers provided water under this agreement; and the Department of Health has regulatory authority over the reservoir requirements.

b) In the event that Department of Health determines, in a water system plan approval or other decision, that the DISTRICT's Evergreen (R-3) reservoir is inadequate in size due in part to wholesale supply for CITY customers under this Temporary Agreement, then the CITY will choose one of the following options:
    i. Agree to pay a proportionate share of the cost of the new (or additional) reservoir capacity; or
    ii. Provide notice to terminate this Temporary Agreement and directly provide water to CITY customers in the subdivision.
c) Following an inadequate reservoir determination by the Department of Health, the CITY and the DISTRICT will work cooperatively and make timely effort to estimate the capital costs of the necessary reservoir improvements, but in any event the CITY will provide formal notice to the DISTRCT of its choice in paragraph (b) above within 120 days of the Department of Health determination.

Section 6 – Resolution of Disputes

Any dispute that arises out of an interpretation, performance, enforcement, or any other aspect of this Temporary Agreement, shall first be addressed by a management-level meeting of the Parties to discuss the dispute and to engage in good faith negotiations. If management-level discussions do not resolve the dispute, the dispute shall be resolved by submitting the same to mediation with an agreed mediator or one selected by the Clallam County Superior Court if the Parties cannot agree. The Parties shall split evenly the costs of the mediator and each Party shall bear its own costs in mediation. If the mediation fails to resolve the dispute after a good faith effort, then either Party may commence legal action in court.

Section 7 – Term

a) This Temporary Agreement shall be effective from the date of execution by authorized representatives of both Parties and shall continue in effect until the comprehensive Wholesale Water Agreement is agreed on by both parties or until it is terminated by mutual agreement of the Parties.
b) In the event the Parties cannot mutually agree to a termination date, then this Temporary Agreement will terminate two years after one Party gives notice of termination to the other Party.

Section 8 – Uncontrollable Forces

No Party shall be considered to be in breach of this Agreement on account of any failure to perform if such failure is the result of uncontrollable forces or events that are beyond the reasonable control of the Party.

Section 9 – Entire Agreement and Interpretation.

The Parties intend for this Temporary Agreement to be construed together with the Intergovernmental Water Service Area Agreement (dated June 21, 1995). These agreements constitute the entire agreement between the Parties pertaining to the subject matter contained herein and supersede all prior and contemporaneous agreements, representations, and understandings. The Parties participated in the drafting of this Temporary Agreement. In interpreting this Temporary Agreement, no inference shall be drawn against either Party as the drafter.

Section 10 – No Waiver

No waiver of any provision of this Temporary Agreement shall be effective unless made in writing and signed by the Parties.

Section 11 – No Third Party Beneficiaries

Nothing in this Temporary Agreement is intended to confer any rights, benefits, or obligations upon any person other than the Parties. No such third-party shall have any right to enforce any of the provisions of this Temporary Agreement.

Section 12 – Assignment

Neither this Temporary Agreement nor any of the rights, interests or obligations created hereunder may be assigned, sold, or otherwise transferred in whole or in part by either Party without the prior written consent of the other Party.

Section 13 – Non-applicability to Water Service Area

This Temporary Agreement does not change or affect any water service area as defined by the Intergovernmental Water Service Area Agreement (dated June 21, 1995) as to either Party.

Section 14 – Modification of Agreement

This Temporary Agreement may be supplemented, amended, or modified only by the mutual agreement of the Parties. No supplement, amendment, or modification of this Temporary Agreement shall be binding unless it is in writing, duly approved, and signed by both parties.

Section 15 – No Special Damages

Notwithstanding any other provision of this Agreement, neither Party shall be liable under or pursuant to this Agreement for indirect, incidental, special, exemplary, punitive, or consequential damages, including but not limited to damages for lost profits, revenues or benefits.

Section 16 – Counterparts

This Agreement may be executed in one or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

Section 17 – Notice

Any and all notices, demands, waivers, consents and other communications shall be given by certified mail to the official mailing address of each Party, as follows:

Public Utility District No. 1 of Clallam County P.O. Box 1090 Port Angeles, WA 98362	City of Sequim 152 West Cedar Street Sequim, WA 98382

A Party may change the address to which notices shall be sent by giving notice of such change as provided above.

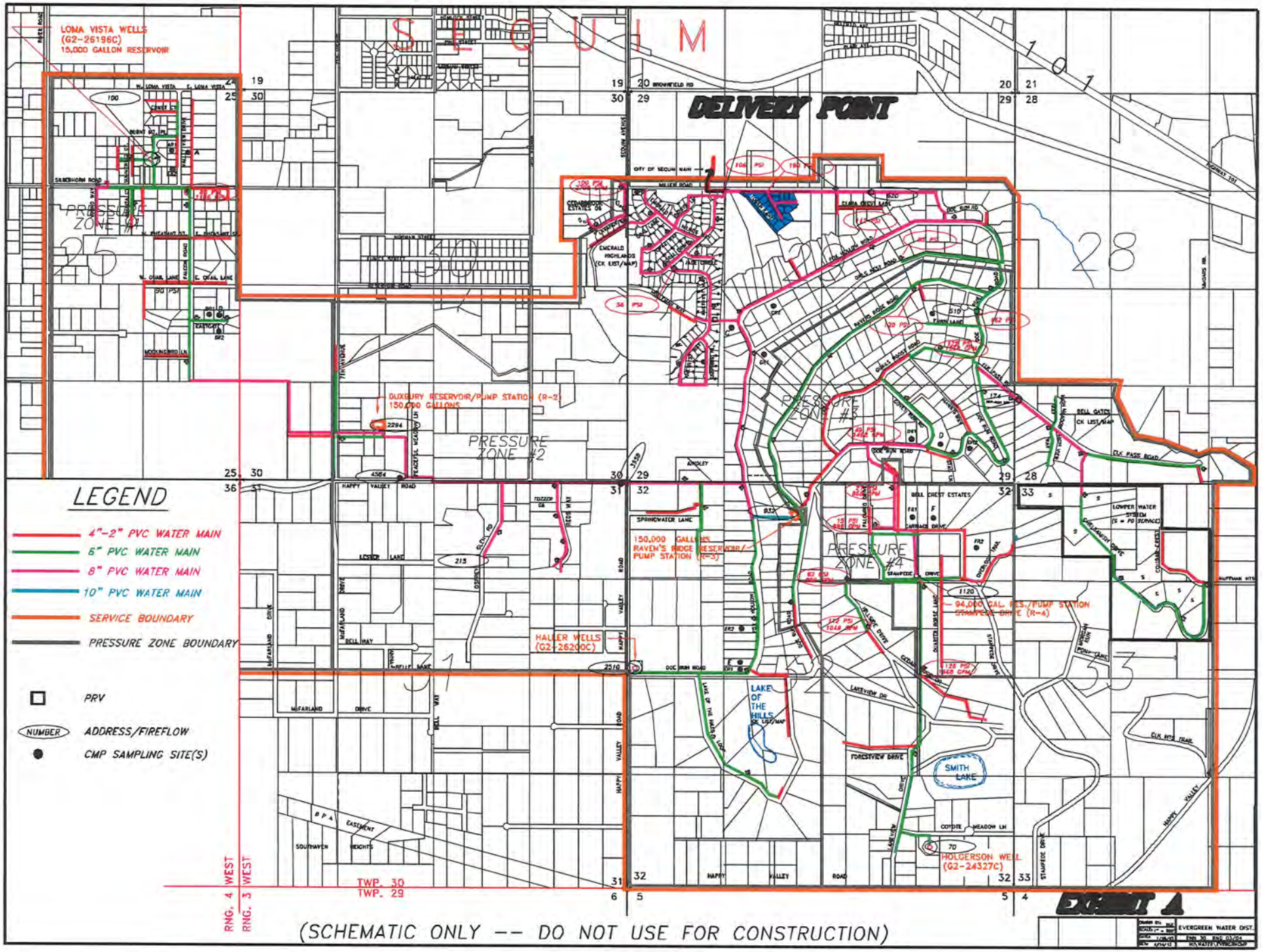
IN WITNESS WHEREOF, the Parties have caused this Temporary Agreement to be executed this 14 day of MAY, 2013

By: _____
Doug Nass, General Manager
Date: 5-14-13

By: _____
Steven Burkett, City Manager
Date: 5-14-13

Approved as to form:

_____
Craig Ritchie, City Attorney


LOMA VISTA WELLS
(G2-26196C)
15,000 GALLON RESERVOIR
SEQUIM
DELIVERY POINT
101
PRESSURE ZONE #1
PRESSURE ZONE #2
PRESSURE ZONE #3
PRESSURE ZONE #4
DUNGENESS
DUXBURY RESERVOIR/PUMP STATION (R-2)
150,000 GALLONS
150,000 GALLON RAVEN'S RIDGE RESERVOIR/PUMP STATION (R-3)
94,000 GAL. RES./PUMP STATION STAMPEDE DRIVE (R-4)
HALLER WELLS
(G2-26200C)
HOLGERSON WELL
(G2-24327C)
LAKE OF THE HILLS
SMITH LAKE
LOWER WATER SYSTEM (S = PD SERVICE)
BELL CREST ESTATES
EMERALD HIGHLANDS (CK LIST/MAP)
LEGEND
4"-2" PVC WATER MAIN
6" PVC WATER MAIN
8" PVC WATER MAIN
10" PVC WATER MAIN
SERVICE BOUNDARY
PRESSURE ZONE BOUNDARY
PRV
NUMBER
ADDRESS/FIREFLOW
CMP SAMPLING SITE(S)
TWP. 30
TWP. 29
RNG. 4 WEST
RNG. 3 WEST
(SCHEMATIC ONLY -- DO NOT USE FOR CONSTRUCTION)
EXHIBIT A
EVERGREEN WATER DIST.

APPENDIX D

ADJACENT & REGIONAL WATER PURVEYOR

INFORMATION

APPENDIX D

ADJACENT WATER PURVEYORS

The City's adjacent water purveyors are shown on Figure 1-7; Table 1-7 summarizes the names and pertinent information for these systems. The City's adjacent purveyors include both Group A and Group B systems. A summary of additional, known water purveyors in the broader region is included in the table below.

Pacific Northwest National Laboratory (PNNL, or "Battelle")
The PNNL water system is a Group A system that serves its Sequim Marine Research Operations facility. The system is currently located outside of the city limits but within the City's UGA. PNNL owns approximately 100 acres including upland and waterfront areas. The campus currently consists of 7 developed acres supporting approximately 50,000 square feet of laboratory, office, and storage space divided between the main building on the upper campus and the waterfront buildings. The facility currently employs approximately 100 people but recent projections identify potential future expansions of 180,000 to 240,000 square feet and an additional 200 to 300 employees over a 10- to 20 year timeframe.

Fresh water for the facility is currently provided by an on-site artesian well with a capacity of approximately 100 gpm. The water is pumped to a 125,000-gallon wood stave reservoir on the upland portion of the property. Fresh water is currently used for both process and domestic purposes, with process usage, which is primarily for laboratory purposes, accounting for approximately 98 percent of the total fresh water usage. In 2022, the City and PNNL are in process of designing a water main connecting PNNL to the City Water System.

Baywood Village Mobile Home Park Water System
The Baywood Village Mobile Home Park water system is a Group A system that serves an area located outside of the City's UGA to the east of the City. The system serves 52 connections. The system is served by one well, which has a capacity of approximately 14 gpm, and the system has a storage capacity of approximately 10,000 gallons.

Clallam County PUD No. 1 Evergreen Water System
The Clallam County PUD No. 1 (PUD) operates five water systems, one of which is the Evergreen Water System located south of the City's water service area. The Evergreen Water System service area, which includes areas inside and outside of the City's UGA and city limits, is shown in Figure 1-7. The Evergreen Water System was formed in 1993 by combining three smaller water systems: the Highland Hills Water System, the Del Hur Happy Valley Estates II, and the Loma Vista Water System. The Highland Hills and Del-Hur Happy Valley Estates II water systems served the Bell Hill area. The Loma Vista water system is located on Silberhorn Road.

The service area is divided into eight pressure zones. The existing system consists of six wells, four concrete reservoirs, four booster stations, and transmission and distribution system piping

which mainly consists of 4-, 6-, and 8-inch-diameter pipe. The total source capacity of the Evergreen water system's wells is approximately 920 gpm. Two of the Evergreen water system's other wells have had high manganese levels and are only used during emergencies. The total storage capacity of the system is 444,000 gallons.

The Evergreen water system also includes water service to the Emerald Highlands subdivision. Section 7 of the 1995 Agreement between the City and the PUD states that these improvements are owned by the City, and until such time as the City has infrastructure to provide water to this development, the PUD shall use these water mains to provide water service to the subdivision. The PUD is responsible for operation and maintenance of these water mains until they no longer serve the subdivision. The Agreement includes a procedure for payment of severance costs and connection fees upon the City providing service to the subdivision. A copy of the 1995 Agreement is provided in Appendix C.

Deytona Water System
The Deytona Water System is a Group A community system with 32 approved connections and serving approximately 50 people. The service area is in County UGA jurisdiction and is surrounded by city limits; some lots in the service area have individual private wells. The system has two wells, an active well 85 feet deep with a capacity of 72 gpm and an inactive well 34 feet deep with 42 gpm. This system's DOH water system identification number is 19184V. The water system has no known storage capacity.

Flaura's Acres Homeowners Association Water System
The Flaura's Acres Homeowners Association water system is a Group A community system which serves approximately 53 residential connections. The system's service area is within the City's UGA but currently outside the city limits southeast of the City core. The service area population of the water system is estimated to be approximately 150. The Association owns three wells, two of which are used only as emergency sources. The primary well has a capacity of approximately 115 gpm and is treated with rapid sand filtration. The water system currently has no storage capacity.

Foxfire Lane Water System
The Foxfire Lane Water System is a Group B system known as the Still Rd. Water System until 2009. It serves nine residential connections and has a service area population of approximately 20. The system's service area is in County UGS jurisdiction but is surrounded by the current city limits southeast of the city core. This system's DOH water system identification number is 196893. The water system's source is provided by one chlorinated well with a capacity of 30 gpm. The water system currently has no storage capacity.

Happy Valley Estates Water System
The Happy Valley Estates water system is a Group A system that serves approximately 17 residential connections. The system's service area is located outside of the City's UGA southeast of the City. The system is served by two wells, which have capacities of approximately 42 gpm and 35 gpm. The smaller well is only used seasonally. Storage is provided by a 65,000 gallon reservoir.

Huffman Water System
The Huffman water system is a Group A system that serves approximately eighteen connections, providing service to an area which encompasses 22 parcels of land. The system's service area is located outside of the City's UGA southeast of the City. The system is served by one well, which has a capacity of approximately 18 gpm. Storage is provided by a 26,150 gallon reservoir. A pressure tank regulates pressures in the system and signals the booster pumps. All pipe in the existing distribution system is PVC.

Lee Water System
The Lee Water System is owned and operated by Washington Water Service and is located outside of the City's UGA northwest of the City. Source for the water system is provided by three wells with a combined capacity of approximately 130 gpm. Auxiliary power is provided for one well in the event of a commercial power outage. The system is not chlorinated. The system's storage consists of a 22,000-gallon concrete reservoir, and the distribution system consists of 6-inch and 4-inch asbestos-cement and 2-inch PVC pipe. There are fire hydrants on the system, but are not rated for fire flow. The water system is approved to serve a total of 86 ERUs, all of which are single-family residential. All sources and connection are metered. The Lee Water System does not anticipate any growth due to lack of developable property in the vicinity.

Palo Verde Water System
The Palo Verde water system is a group A system that serves an area located outside of the city limits but within the western portion of the City's UGA. The system serves 16 connections. The system is served by one well, which has a capacity of approximately 70 gpm. Palo Verde system is not currently approved by the Department of Health to serve additional connections.

Sequim Bay Resort and Marina Water System
The Sequim Bay Resort and Marina (Marina) water system, which is currently owned by Wayne Enterprises, is located within the city limits on the southeast side of the City.

The water system has three types of service connections: the John Wayne Marina, the Sequim Bay Resort, and single-family residences. The John Wayne Marina is a 300 slip Marina, which currently has 30 residents that live aboard boats full time. The Sequim Bay resort contains 40 RV hookups, restrooms with showers, a small laundry, a caretaker's residence, an office, and eight cabins. Approximately 25 single-family residences are connected to the distribution lines from the existing reservoir. The water system source is provided by two wells and storage is provided by a 150,000 gallon reservoir. A booster pump station serves the system's upper pressure zone.

The Marina water system anticipates significant expansion in the future. Current plans for the properties in the system's service area include a resort community, which will include a hotel, a lodge, retail commercial space, multifamily residences, and single-family residences. The Sequim Bay Resort and Marina Water System is in the process of designing a water main connecting to the City Water System.

Sequim Elks Water System
The Sequim Elks water system is a Group A system that serves a single parcel located in the northern portion of the City within the city limits. The system serves approximately 22 connections, including RV hookups and a meeting building with an office. The system is served by one well, which has a capacity of approximately 50 gpm.

Sun Meadows HOA Water System
The Sun Meadows HOA water system is a Group A system that serves an area located outside of the City's UGA to the east of the City. The system serves 115 connections. The system is served by one well, which has a capacity of approximately 240 gpm, and the system has a storage capacity of approximately 130,000 gallons.

SunLand Water District
SunLand Water District is a Group A system that serves an area located outside of the City's UGA to the north of the City. The system serves 851 connections. The system is served by two wells, with a total capacity of approximately 1,100 gpm, and the system has a storage capacity of approximately 240,000 gallons. The system serves a residential area with a golf course.

Trowbridge Court Condo Association Water System
The Trowbridge Court Condo Association water system is a Group A system that serves an area located outside of the city limits but within the northern portion of the City's UGA. The system serves 16 connections. The system is served by one well, which has a capacity of approximately 60 gpm.

Vista Water System
The Vista Water System is a Group A water system located in the northern part of the City's UGA, but is outside the current city limits. The Vista water system is owned by Olympic Vista Development, Inc. The water system, which was originally called North Olympic Vista water system, was purchased from R&R Enterprises in 1991. The water system serves a total of 91 connections, all of which are single-family residential. Source for the water system is provided by two wells, each with capacities of 360 gpm. However, water rights limitations restrict instantaneous withdrawal to 152 gpm for either well and 33 acre feet per year annual withdrawal.

A 77,000 gallon concrete storage reservoir was built in 1993. The system is pressurized by two 1,000-gallon hydropneumatic tanks and two 750 gpm booster pumps. Emergency pumping is provided by a diesel powered 2,000 gpm fire flow pump. The distribution system mainly consists of 8-inch-diameter PVC pipe. Water rights are currently the restricting factor which might limit expansion. No water treatment is currently needed, however, chlorination facilities have been installed in the pump house and chlorination can be performed should the need arise.

West Sequim Bay Water System
The West Sequim Bay water system is a Group A system that serves a residential area located outside of the City's UGA to the southeast of the City. The system serves 138 connections. The system is served by two wells, which have a combined capacity of approximately 96 gpm, and the system has a storage capacity of approximately 60,000 gallons.

REGIONAL WATER PURVEYORS

Public Water Systems listed here are in eastern Clallam County but not necessarily adjacent to Sequim city limits. The list includes both Group A and B systems, when known.

Water System Name	DOH ID	# Approved Connections (6/2022)	Source Capacity (gpm)	Storage Capacity (gal)
Brandt Point	16190	21	53	16,500
Carlsborg Mobile Estates	00029	53	80	15,500
Dungeness Bay Plat	20300	211	247	99,000
Dungeness Beach	20350	92	107	N/A
Dungeness Beach Plat McAlmond Farm	33662	18	55	630
Dungeness Golf Course and Mt Vista	20453	99	800	5,000
Dungeness Heights	20425	155	610	79,000
Dungeness Meadows	20445	218	180	56,000
Elwha Place HOA	01581	40	150	N/A
Estates	08166	480	800	175,000
Forest Ridge	25949	31	75	30,000
Green Acres Mobile Home Park	29358	50	185	N/A
Jamestown on Wilcox Lane	06344	50	85	N/A
Kevca Water	29496	42	60	1,000
Madrona Ridge	50085	30	200	50,000
Mains Farm	50400	199	168	45,000
Meadowbrook Village	10774	26	50	N/A
Olympic View	05151	16	45	525
Parkwood Mobile Home Comm.	02699	212	320	55,000
PUD Carlsborg	00307	604	320	340,000
Sunland Shores	85257	62	145	N/A
Sunshine Acres	862506	492	330	260,000
Woodland Heights	98182	54	171	1,500

APPENDIX E

POPULATION FORECASTS – SUPPORTING DATA

Appendix E
Population Forecast - Supporting Data

	1990	2000	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2032	% Change in 10 years	% Change in 5 years	% Change per year	Notes
Office of Financial Management																									
Census	3,617	4,334	6,606										8,024									21.47		**2.15**	2010-2020
Estimate based on prior census				6,625	6,795	6,855	6,910	6,915	7,075	7,280	7,460	7,695		8,125									14.84	**2.97**	2016-2021
% Change per year					2.57	0.88	0.80	0.07	2.31	2.90	2.47	3.15	4.28	1.26										**2.81**	5-yr average 2016-2021
Clallam County Est.				71,600										77,750								8.59		**0.86**	2011-2021
Esri			6,826	6,792	6,808	6,979	7,107	7,200	7,279	7,386	7,547	7,692	7,806	7,871								15.89	8.13		2011-2021
				(0.50)	0.24	2.51	1.83	1.31	1.10	1.47	2.18	1.92	1.48	0.83										**1.58**	5-yr average 2016-2021
2013/14 WSP			6,606	6,821	7,043	7,270	7,504	7,744	7,990	8,244	8,505				9,620							36.59		**3.66**	2012-2022
#s used in 2013 plan																					12,989	35.02		**3.50**	2022-2032
Parks Impact Fee Study (Nov 2021)																									
% Change per year, based on DCD input														2.64	2.64	2.64	2.64	2.64	2.00	2.00				**2.64**	5-yr average 2020-2025
Projection													8,024	8,236	8,453	8,676	8,905	9,140	9,323	9,510				**2.46**	7-yr average 2020-2027
# persons per dwelling unit														1.92											Single family
														2.07											Multi-family
City DCD																									
# new residential building permits										133	115	81	56	96	33										2022 thru 5/25
# new lots created																									
City PW																									
# new lots expected to be built on														344	130	436								**303**	3-yr average

from 2021: Willow Cr 36+33; Lavender Meadows 217; Cameron Village 23+35
2022 summer: Home B 33; Legacy 97
2022 fall (2023 builds): Littlejohn 215; Foothills 85; Mariners Outlook III 30+82; Cedar Ridge III 24
2023: Logan?

N

0 1,000 2,000 Feet

SEQUIM BAY

LEGEND:

- CITY LIMITS
- URBAN GROWTH AREA
- RETAIL SERVICE AREA
- SERVICE AREA
- Potential Existing Water Service Additions
- Planned and Potential Subdivisions
- PARCELS

WILSON ENGINEERING

CITY OF SEQUIM

DESIGNED BY BMS	DRAWN BY RDN	CHECKED BY -

CITY OF SEQUIM
CLALLAM COUNTY WASHINGTON
2021 WATER SYSTEM PLAN
FIGURE E-1
GIS DATA 6-6-22

DATE JUNE 2022	SCALE AS SHOWN	PROJECT 2020-016	
SHEET 1	OF 1		

Date: 6/13/2022 Document Name: FIG_O-1_GIS_DATA_6-6-22
Document Path: W:\2020\2020-016 City of Sequim Utility On-Call\TO#5 - WSP Update\GIS\Projects\FIG_O-1_GIS_DATA_6-6-22.mxd

2015-2035 FUTURE LAND USE MAP (FLUM)

Land Use Map Designation		Related Plan Policy
AG	Agriculture Conservancy	LU 3.7.1
SFR	Single-Family Residential	LU 3.2.1 to 3.2.8; LU 3.4.1 to 3.4.7
LD	Lifestyle District	LU 3.3.1; LU 3.3.2; LU 3.3.3
NB	Neighborhood Business	LU 3.5.1
CB	Community Business	LU 3.5.2
HC	Highway Commercial	LU 3.5.4
RC	Regional Commercial	LU 3.5.3
DD	Downtown District	LU 3.3.1, 3.3.2, 3.3.4
HTLI	High Tech Light Industrial	LU 3.6.1, 3.6.2
HC/W	Heavy Commercial/Warehouse	LU 3.5.5
EOA	Economic Opportunity Area	LU 3.6.1, 3.6.2, 3.6.3
PRC	Planned Resort Community	LU 3.8.1
P	Community/Regional Park	PR 7.1.1
NP	Neighborhood Park	PR 7.1.2
OS	Open Space	
ES	Elementary School	CFU 5.10.1; PR 7.1.2
SCH	School Campus	CFU 5.10.1
✳	Neighborhood Park (Future Vicinity)	
●	Elementary School (Future Vicinity)	

0.5 0.25 0 0.5
Mile

City Limit
Urban Growth Area

2015-2035 Future Land Use Map
Adopted: 10/26/2015
Resolution: 2015-16

CITY OF SEQUIM

APPENDIX F

WATER SYSTEM ENGINEERING DESIGN STANDARDS

2022

CITY OF
SEQUIM

ENGINEERING STANDARDS

DEPARTMENT OF PUBLIC WORKS
152 W. CEDAR ST SEQUIM WA, 98382
PHONE: (360) 683-4908



7/12/2022

DIVISION 5 - WATER

FIGURE NO.	FIGURE NAME	ADOPTION DATE	RESOLUTION NO.
5-00	General Water Notes	7/11/2022	R2022-
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5-01B	Testing Information	7/11/2022	R2022-
5-02	Water Line Trench Section	7/11/2022	R2022-
5-03A	5/8", ¾" and 1" Water Services	7/11/2022	R2022-
5-03B	5/8", ¾" and 1" Water Services	7/11/2022	R2022-
5-04A	1 ½" and 2" Water Services	7/11/2022	R2022-
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5-05	Meter Box	7/11/2022	R2022-
5-06	Reserved	7/11/2022	R2022-
5-07	Thrust Blocks	7/11/2022	R2022-
5-08	Fire Hydrant Assembly	7/11/2022	R2022-
5-09	Fire Hydrant in Cut or Fill	7/11/2022	R2022-
5-10	Relocate Fire Hydrant Assembly	7/11/2022	R2022-
5-11	Wet Tap Connection	7/11/2022	R2022-
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5-13	6" and 8" Blow Off Assembly	7/11/2022	R2022-
5-14	1 IN Air and Vacuum Release Assembly	7/11/2022	R2022-
5-15	2 IN Air and Vacuum Release Assembly	7/11/2022	R2022-
5-16A	Meter Vault Assembly 3" to 10"	7/11/2022	R2022-
5-16B	Meter Vault Assembly 3" to 10"	7/11/2022	R2022-
5-17A	Double-Check Detector Assembly – 4" and Larger	7/11/2022	R2022-
5-17B	Double-Check Detector Assembly – 4" and Larger	7/11/2022	R2022-
5-18	Valve Box	7/11/2022	R2022-
5-19	Valve Box Adjustment	7/11/2022	R2022-
5-20	Valve Extension Stem	7/11/2022	R2022-
5-21	Guard Post	7/11/2022	R2022-
5-22A	Pressure Reducing Vault	7/11/2022	R2022-
5-22B	Pressure Reducing Vault	7/11/2022	R2022-
5-23	Reduced Pressure Backflow Assembly ¾" to 2"	7/11/2022	R2022-
5-24	Reduced Pressure Backflow Assembly 2 ½" and Larger	7/11/2022	R2022-
5-25	Double Check Valve Assembly 2" and Smaller	7/11/2022	R2022-
5-26	Reserved	7/11/2022	R2022-
5-27	Reserved	7/11/2022	R2022-
5-28	Reserved	7/11/2022	R2022-

GENERAL NOTES:

1. CONSTRUCTING WATER MAINS 16 INCHES IN DIAMETER AND SMALLER MUST BE IN ACCORDANCE WITH THE LATEST EDITION OF THE *STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION* DEVELOPED BY THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION (WSDOT), SPECIFICALLY SECTION 7-09 *WATER MAINS*. ANY DEVIATION FROM THESE STANDARD SPECIFICATION WILL BE CLEARLY NOTED IN THESE STANDARDS.
2. WATER MAIN PIPE MATERIAL MUST BE EITHER DUCTILE IRON CLASS 52 OR C900 PVC PRESSURE CLASS DR18 MINIMUM.
3. FOUNDATION MATERIAL MUST BE CLASS A: PER WSDOT STANDARD SPECIFICATIONS.
4. COMPACTION REQUIREMENTS: 95% PER ASTM D1557
5. TRACE WIRE INFORMATION: ALL TRACE WIRE TO BE 12 GAUGE STRANDED COPPER WIRE WITH BLUE PE INSULATION ON ALL WATER LINES & WITH UNDERGROUND SPLICE KITS ACCEPTABLE TO THE CITY.
6. METER PLACEMENT: METER SHALL BE INSTALLED IN A NON VEHICULAR TRAFFIC AREA SATISFACTORY TO THE CITY. IF THE METER MUST BE PLACED IN A VEHICULAR TRAFFIC AREA, THEN A H20 RATED LID MUST BE PROVIDED.
7. "OR EQUAL" MATERIALS ARE SUBJECT TO CITY APPROVAL.
8. ALL PIPES MUST BE NSF 61 COMPLIANT, ALL JOINTS AND FITTINGS MUST BE NSF 61 & 372 COMPLIANT.
9. ALL NEW CONNECTION 2" AND LARGER MUST HAVE A SHUTOFF VALVE; SEE FIGURE 5-04 FOR PLACEMENT.
10. ALL NEW WATER LINES MUST BE DISINFECTED PER ANSI/AWWA C651, INCLUDING BUT NOT LIMITED TO FIRE HYDRANT EXTENSIONS. SEE FIGURE 5-01.
11. ALL LINES MUST BE FLUSHED AFTER DISINFECTING PROCESS COMPLETE, AND A BACTERIOLOGICAL SAMPLE WILL BE COLLECTED BY THE CITY. SEE FIGURE 5-01.
12. ALL NEW LINES MUST BE PRESSURE TESTED. SEE FIGURE 5-01.
13. ONLY CITY REPRESENTATIVES ARE ALLOWED TO OPERATE EXISTING AND NEW TIE IN VALVES.
14. ALL TESTS MUST BE COMPLETED BEFORE CONNECTING TO THE EXISTING WATER MAIN, UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.
15. ALL VALVES LARGER THAN 2 INCHES SHALL BE RESILIENT SEAT GATE VALVES.
16. NO SERVICE CONNECTIONS SHALL BE MADE TO FIRE HYDRANT LINES UNLESS OTHERWISE APPROVED BY THE ENGINEER.

CITY OF SEQUIM

GENERAL WATER NOTES

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FIGURE
5-00

GENERAL NOTES:

1. ALL TESTING MUST BE COMPLETED AND APPROVED BEFORE ANY CONNECTION TO THE WATER MAIN OCCURS, UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER. THE ONLY EXCEPTION TO THE PREVIOUS STATEMENT IS WHEN THE DISTANCE FROM THE EXISTING PIPE TO THE NEW VALVE IS 20 FEET OR LESS.
2. ALL TESTS SHALL BE COMPLETED WITH A CITY REPRESENTATIVE ONSITE.
3. ALL EQUIPMENT NEEDED IN ORDER TO COMPLETE THE TESTS SHALL BE FURNISHED AND OPERATED BY THE CONTRACTOR.
4. PRESSURE TESTING SHALL BE LIMITED TO 1000-1500 FEET OF CONTINUOUS PIPE OR BETWEEN VALVES WHICHEVER IS A SHORTER DISTANCE. THE FIRST 1000 FEET OF PIPE MUST BE SUCCESSFULLY TESTED BEFORE ANY ADDITIONAL PIPE MAY BE PLACED.
5. ALL GAUGES AND METERS SHALL BE APPROVED BY THE CITY REPRESENTATIVE.
6. ALL MATERIALS SHALL BE INSTALLED PER MANUFACTURES SPECIFICATIONS OR PER CITY ENGINEER APPROVAL.

DISINFECTION: CHLORINE SHALL BE APPLIED IN ONE OF THE FOLLOWING MANNERS, LISTED IN ORDER OF PREFERENCE, TO SECURE A CONCENTRATION IN THE PIPE OF AT LEAST 50 MG/L.

1. INJECTION OF CHLORINE-WATER MIXTURE FROM CHLORINATING APPARATUS THROUGH CORPORATION COCK AT BEGINNING OF SECTION AFTER PIPE HAS BEEN FILLED, AND WITH WATER EXHAUSTING AT END OF SECTION AT A RATE CONTROLLED TO PRODUCE THE DESIRED CHLORINE CONCENTRATION;
2. INJECTION SIMILARLY OF A HYPOCHLORITE SOLUTION;
3. PLACEMENT OF DRY CALCIUM HYPOCHLORITE THROUGHOUT PIPELINE, AS CONSTRUCTED, IN PROPER QUANTITIES TO PRODUCE THE DESIRED DOSAGE. FILLING OF PIPELINE WITH THIS METHOD SHOULD BE AT A VERY SLOW RATE. PIPELINE SHOULD BE FILLED WITHIN 2 DAYS OF PLACING STERILIZING AGENT
4. AFTER THE DESIRED CHLORINE CONCENTRATION HAS BEEN OBTAINED THROUGHOUT THE SECTION OF LINE, THE WATER IN THE LINE SHALL BE FILLED BY THE CITY AT THE REQUEST OF THE DEVELOPER AND LEFT STANDING FOR A PERIOD OF NO LESS THAN 24 HOURS.

SEE FIGURE 5-01B FOR MORE TESTING INFORMATION

CITY OF SEQUIM

TESTING INFORMATION

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FIGURE
5-01A

PRESSURE TESTING/LEAKAGE TEST: PRESSURE TESTS SHALL BE COMPLETED IN CONJUNCTION WITH THE LEAKAGE TEST. ALL THRUST BLOCKS AND ANCHORS SHALL BE IN PLACE AND THE PIPE SHALL BE SECURED OR BURIED, BUT ALL CONNECTIONS MUST BE LEFT UNCOVERED FOR OBSERVATION. THE SYSTEM WILL THEN BE PUMPED UP TO 225 PSI FOR A TIME OF 30 MINUTES (ONCE IT REACHES PRESSURE). IF THERE IS AN ABRUPT DROP IN PRESSURE OR ANY VISIBLE LEAKS DISCOVERED IN THE 30 MINUTE PERIOD THE TEST WILL BE STOPPED AND THE ISSUE WILL BE RESOLVED. UPON COMPLETION OF THE 30 MINUTE PERIOD IF THERE ARE NO ABRUPT DROPS IN PRESSURE OR VISIBLE LEAKS, THE WATER LINE WILL BE PUMPED BACK UP TO 225 PSI THROUGH A POSITIVE DISPLACEMENT WATER METER. THE LEAKAGE TEST WILL BE DETERMINED BY THE AMOUNT OF WATER THAT IS REQUIRED TO PUMP THE WATER LINE BACK TO PRESSURE. THE AMOUNT OF WATER THAT LEAKED IN THE 30 MINUTE TIME FRAME MAY NOT EXCEED THE VALUE SPECIFIED IN THE TABLE BELOW. IF THE AMOUNT OF LEAKAGE EXCEEDS THE ALLOWABLE LEAKAGE, THE LEAK MUST BE LOCATED AND FIXED BEFORE A FOLLOW-UP TEST CAN BE COMPLETED.

ALLOWABLE LEAKAGE TABLE	
PIPE DIAM. (IN.)	GAL. PER 0.5 HOUR PER 100 FT@ 225 PSI
2	0.0056
4	0.0113
6	0.0169
8	0.0225
10	0.0282
12	0.0338
15	0.0422
18	0.0507

$$L=(SD\sqrt{P})/266400$$

WHERE:

L = ALLOWABLE LEAKAGE, GALLONS/HOUR

D = NOMINAL DIAMETER OF THE PIPE IN INCHES

P = TEST PRESSURE DURING THE LEAKAGE TEST (PSI)

S = GROSS LENGTH OF PIPE TESTED, FEET

NOTE: EQUATION IS GAL/HOUR, DIVIDE BY 2 TO GET GAL/ HALF HOUR
MULTIPLY BY 10 TO GET PER 1000 FT DATA

DECHLORINATING: THE CONTRACTOR SHALL BE RESPONSIBLE FOR DISPOSING OF DISINFECTING SOLUTION TO THE SATISFACTION OF THE CONTRACTING AGENCY AND LOCAL AUTHORITIES. AT A MINIMUM, CHLORINATED WATER SHALL BE DECHLORINATED TO A CONCENTRATION OF 0.1 PARTS PER MILLION (ppm) OR LESS, AND PH ADJUSTMENT TO WITHIN 6.5-8.5 STANDARD UNITS BEFORE DISCHARGING TO SURFACE WATERS OF THE STATE OR TO A STORM SEWER SYSTEM THAT DRAINS TO SURFACE WATERS OF THE STATE.

FLUSHING:. THE WATER MAINS SHALL BE FLUSHED AT A RATE TO PROVIDE A MINIMUM VELOCITY OF 2.5 FEET PER SECOND IN THE MAIN. ANY PERMANENT OR TEMPORARY TAP REQUIRED FOR RELEASE OF AIR, CHLORINATION, OR FLUSHING PURPOSES SHALL BE PROVIDED BY THE DEVELOPER.

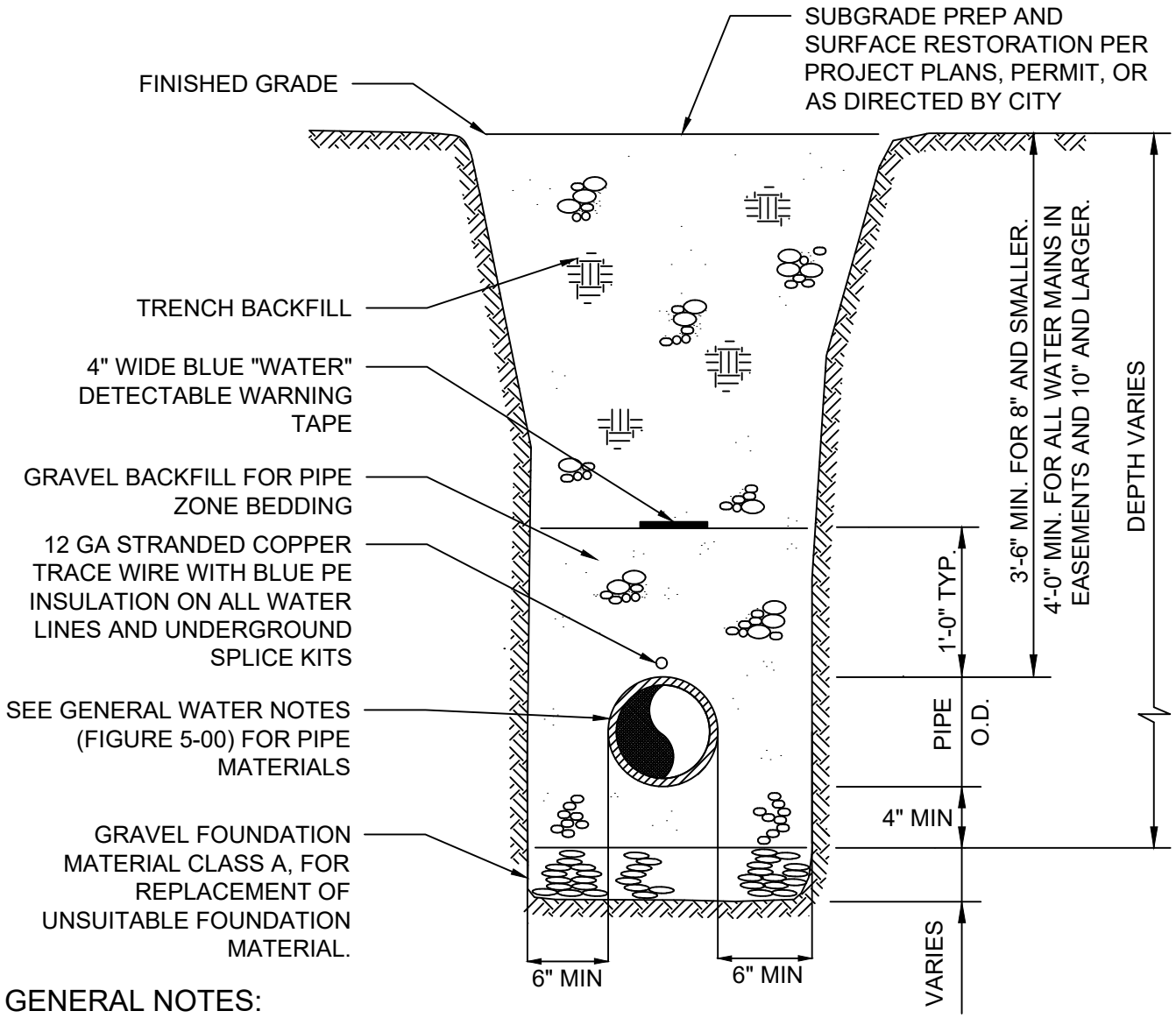
SEE 5-01A FOR MORE TESTING INFORMATION

CITY OF SEQUIM

TESTING INFORMATION

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FIGURE
5-01B



GENERAL NOTES:

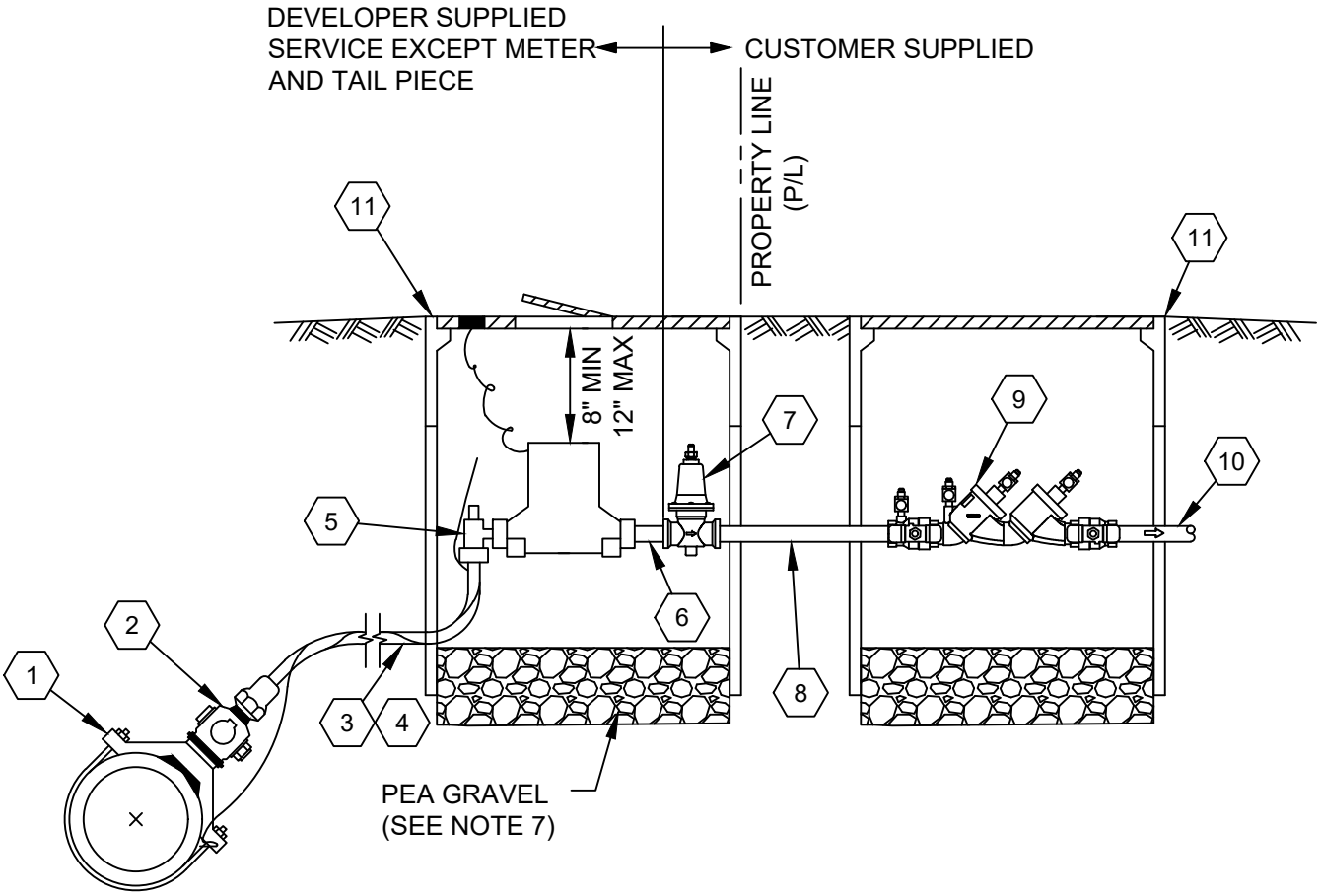
1. FOUNDATION MATERIAL, BEDDING, AND BACKFILL SHALL BE PLACED AND COMPACTED IN ACCORDANCE WITH THIS DETAIL, OR THE MOST CURRENT WSDOT STANDARD SPECIFICATIONS, AND/OR PROJECT OR PERMIT SPECIFIC REQUIREMENTS, WHICHEVER IS MOST STRINGENT.
2. FOR TRENCH BACKFILL, PLACE IN 6 INCH MAXIMUM LOOSE LIFTS AND COMPACTED TO 95% AND ±3% OF OPTIMUM MOISTURE CONTENT PER ASTM D1557. THICKER LIFTS ALLOWED ONLY WITH ENGINEER'S PRIOR WRITTEN PERMISSION.
3. DEPTH OF COVER IN EXCESS OF 7-FEET REQUIRES CITY APPROVAL.
4. CLAY OR BENTONITE DAMS SHALL BE INSTALLED ACROSS THE TRENCH AND TO THE FULL DEPTH OF THE GRANULAR MATERIAL IN ALL AREAS OF STEEP SLOPES, STREAM CROSSINGS, AND WETLANDS TO PREVENT MIGRATION OF WATER ALONG THE PIPELINE.
5. TRENCH SECTIONS FOR WATER MAINS, FIRE HYDRANTS, BLOW OFFS, AIR VALVES, WATER SERVICES, AND OTHER WATER LINE APPURTENANCES SHALL BE SIMILAR TO THIS WATER LINE TRENCH SECTION.

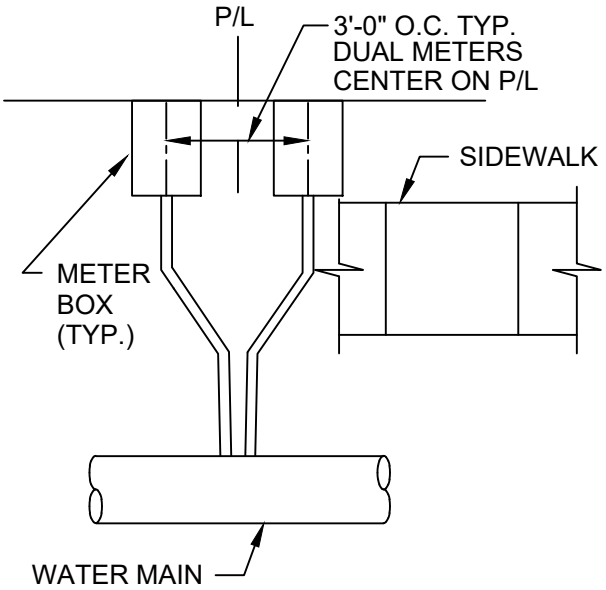
CITY OF SEQUIM

WATER LINE TRENCH SECTION

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FIGURE
5-02





PLAN

SEE FIGURE 5-03B FOR CALLOUTS AND NOTES

CITY OF SEQUIM

5/8", 3/4", AND 1" WATER SERVICES

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FIGURE
5-03A

1. SERVICE SADDLE WITH DOUBLE STAINLESS STEEL STRAPS, ROMAC 202NS OR EQUAL
2. 1" BRASS BALL CORP STOP, 300 PSI WORKING PRESSURE, MUELLER OR EQUAL, WITH STAINLESS STEEL TUBING INSERT STIFFENERS FOR 1" IPS SIDR 7 POLY TUBING
3. 1" IPS POLY WATER SERVICE TUBING, SIDR 7, ADS OR EQUAL
4. 12 GA STRANDED COPPER TRACE WIRE WITH BLUE PE INSULATION AND WITH UNDERGROUND SPLICE KITS, SPLICE TO WATER MAIN TRACE WIRE, WRAP TRACE WIRE AROUND WATER TUBING FULL LENGTH AND STORE 2' LENGTH IN METER BOX
5. 1" IPS PACKJOINT X 3/4" WITH PINCH NUT OR 1" METER SWIVEL NUT LOCKING BRASS BALL-TYPE METER ANGLE STOP, 300 PSI WORKING PRESSURE, MUELLER OR EQUAL, WITH STAINLESS STEEL TUBING INSERT STIFFENERS FOR 1" IPS SIDR 7 POLY TUBING
6. 3/4" X 5/8", 3/4", OR 1" WATER METER WITH 3/4" OR 1" TAIL PIECE (METER AND TAIL PIECE SUPPLIED BY CITY)
7. 3/4" OR 1" BRASS PRESSURE REDUCING VALVE, 300 PSI MAX INLET PRESSURE, WATTS OR EQUAL
8. 3/4" OR 1" X 12" BRONZE PIPE NIPPLE
9. 3/4" OR 1" LEAD FREE BRONZE DOUBLE CHECK VALVE BACKFLOW PREVENTER WITH SHUTOFF VALVES (FOR LOW HAZARD INSTALLATIONS), 175 PSI WORKING PRESSURE, WATTS LF007 OR EQUAL
10. CUSTOMER WATER SERVICE LINE
11. SEE FIGURE 5-05 FOR METER BOX DETAILS

GENERAL NOTES:

1. NO SPLICES IN POLY WATER SERVICE TUBING BETWEEN WATER MAIN CONNECTION AND WATER METER.
2. SERVICE FROM WATER METER TO SERVED STRUCTURE BY CUSTOMER.
3. INDIVIDUAL SERVICE REQUIRED FOR EACH STRUCTURE OR LOT.
4. METER TO BE INSTALLED BY THE CITY AT CUSTOMER'S EXPENSE.
5. PRESSURE REDUCING VALVE AND BACKFLOW PREVENTER SHALL BE INSTALLED AND MAINTAINED AT CUSTOMERS EXPENSE, INCLUDING PRE-START UP AND ANNUAL THIRD PARTY BACKFLOW PREVENTER TESTING BY A PROPERLY CERTIFIED TESTER.
6. EASEMENT PROVIDED TO CITY AROUND METERS LOCATED OUTSIDE RIGHT OF WAY.
7. PEA GRAVEL SHALL BE DEEP ENOUGH TO PROVIDE POSITIVE DRAINAGE OUT OF THE BOX.
8. METER BOXES SHALL BE INSTALLED IN A NON-VEHICULAR TRAFFIC AREA. IF METER BOXES MUST BE INSTALLED IN A VEHICULAR TRAFFIC AREA, H20 RATED LIDS MUST BE PROVIDED AS A MINIMUM.

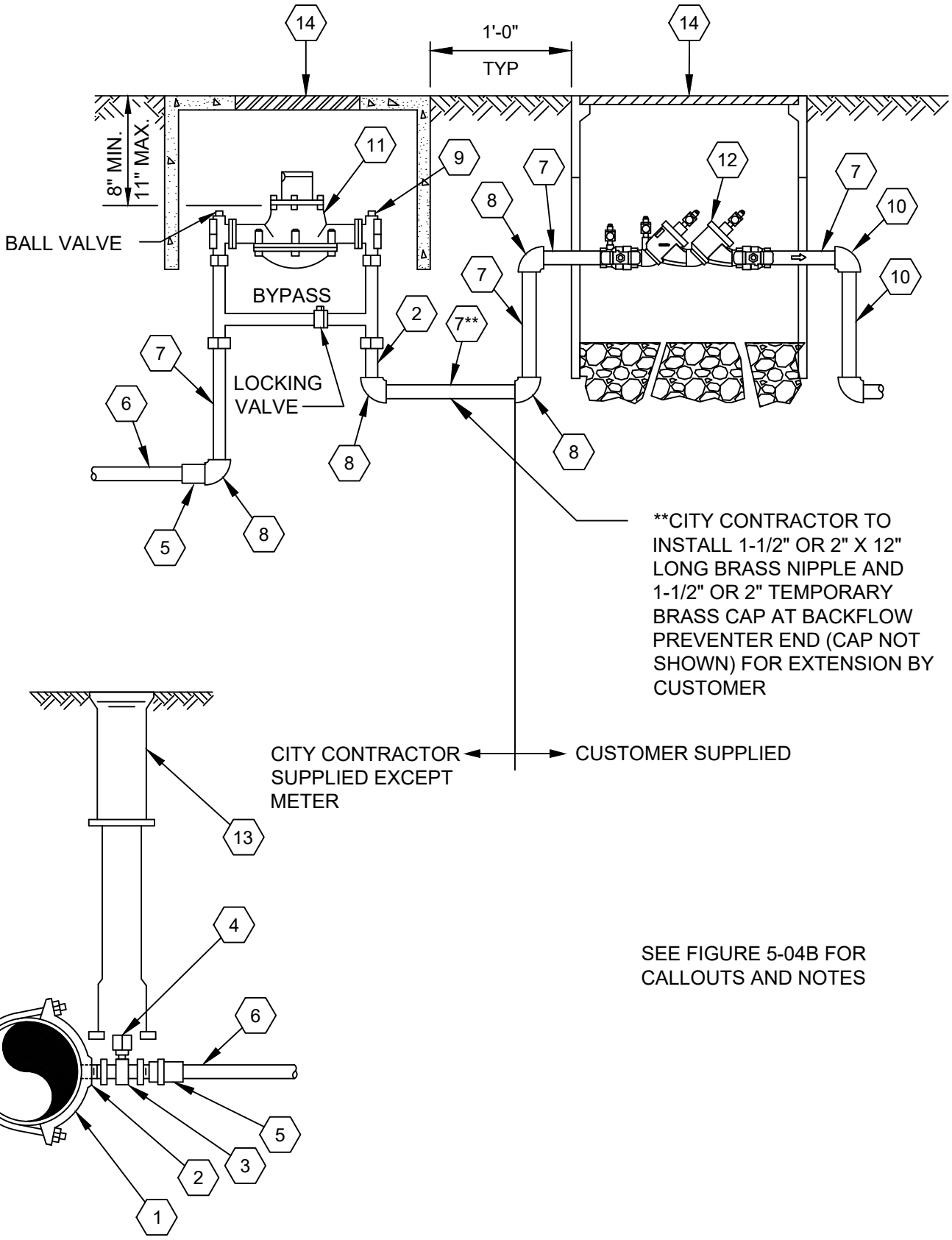
SEE FIGURE 5-03A FOR PLAN AND SECTION

CITY OF SEQUIM

5/8", 3/4", AND 1" WATER SERVICES

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FIGURE
5-03B



CITY OF SEQUIM	**1 ½", AND 2" WATER SERVICES**	REVISION NO. / DATE: 0 / 07/11/2022	FIGURE 5-04A

1. SERVICE SADDLE WITH DOUBLE STAINLESS STEEL STRAPS , ROMAC 202NS OR EQUAL
2. 1-1/2" OR 2" DIAMETER X 6" BRASS PIPE NIPPLE
3. 1-1/2" OR 2" BRASS CURB BALL VALVE, 300 PSI WORKING PRESSURE, MUELLER OR EQUAL
4. 2" BRASS WRENCH NUT ADAPTER, MUELLER OR EQUAL
5. 1-1/2" OR 2" BRASS STRAIGHT COUPLING MALE PIPE THREAD X IPS PACKJOINT WITH STAINLESS STEEL TUBING INSERT STIFFENERS FOR 1-1/2" OR 2" IPS SIDR 7 POLY TUBING, MUELLER OR EQUAL
6. 1-1/2" OR 2" IPS POLY WATER SERVICE TUBING, SIDR 7, ADS OR EQUAL
7. 1-1/2" OR 2" X LENGTH AS REQUIRED BRASS PIPE NIPPLE
8. 1-1/2" OR 2" 90 DEGREE BRASS ELBOW, CLASS 150
9. 1-1/2" OR 2" COPPER METER SETTER WITH BYPASS, VERTICAL INLET AND OUTLET, WITH 300 PSI WORKING PRESSURE LOCKING BALL VALVES AT METER INLET AND IN BYPASS AND CHECK VALVE AT METER OUTLET, MUELLER OR EQUAL
10. CUSTOMER WATER SERVICE LINE
11. 1-1/2" OR 2" WATER METER (SUPPLIED AND INSTALLED BY CITY AT CUSTOMERS EXPENSE)
12. 1-1/2" OR 2" LEAD FREE BRONZE DOUBLE CHECK VALVE BACKFLOW PREVENTER WITH SHUTOFF VALVES (FOR LOW HAZARD INSTALLATIONS), 175 PSI WORKING PRESSURE, WATTS LF007 OR EQUAL
13. CAST IRON VALVE BOX PER FIGURE 5-18
14. SEE FIGURE 5-05 FOR METER BOX DETAILS

GENERAL NOTES:

1. NO SPLICES IN 1-1/2" OR 2" POLY TUBING ALLOWED.
2. INDIVIDUAL SERVICES REQUIRED FOR EACH STRUCTURE.
3. EASEMENT PROVIDED TO CITY AROUND METERS LOCATED OUTSIDE RIGHT OF WAY.
4. ALL SERVICES SHALL HAVE WASHINGTON STATE APPROVED BACKFLOW PREVENTER LOCATED IMMEDIATELY BEHIND METER. CONFIRM LOCATION OF ASSEMBLY WITH CITY. INITIAL AND ANNUAL TESTING REQUIRED AND SUBMITTAL OF TEST RESULTS TO CITY FOR CONFIRMATION.
5. METER BOXES SHALL BE INSTALLED IN A NON-VEHICULAR TRAFFIC AREA. IF METER BOXES MUST BE INSTALLED IN VEHICULAR TRAFFIC AREA, H20 RATED LIDS MUST BE PROVIDED AS A MINIMUM.

SEE FIGURE 5-04A FOR SECTIONS

CITY OF SEQUIM

1 ½", AND 2" WATER SERVICES

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FIGURE
5-04B

PIPE CONNECTION SIZE	METER BOX
1" AND BELOW	CARSON BCF HEAVYWALL 1324, "OR EQUAL"
2"	CARSON BCF HEAVYWALL 1324, "OR EQUAL"
3" AND ABOVE	CONSULT CITY FOR PROJECT SPECIFIC SPECIFICATIONS

NOTES:

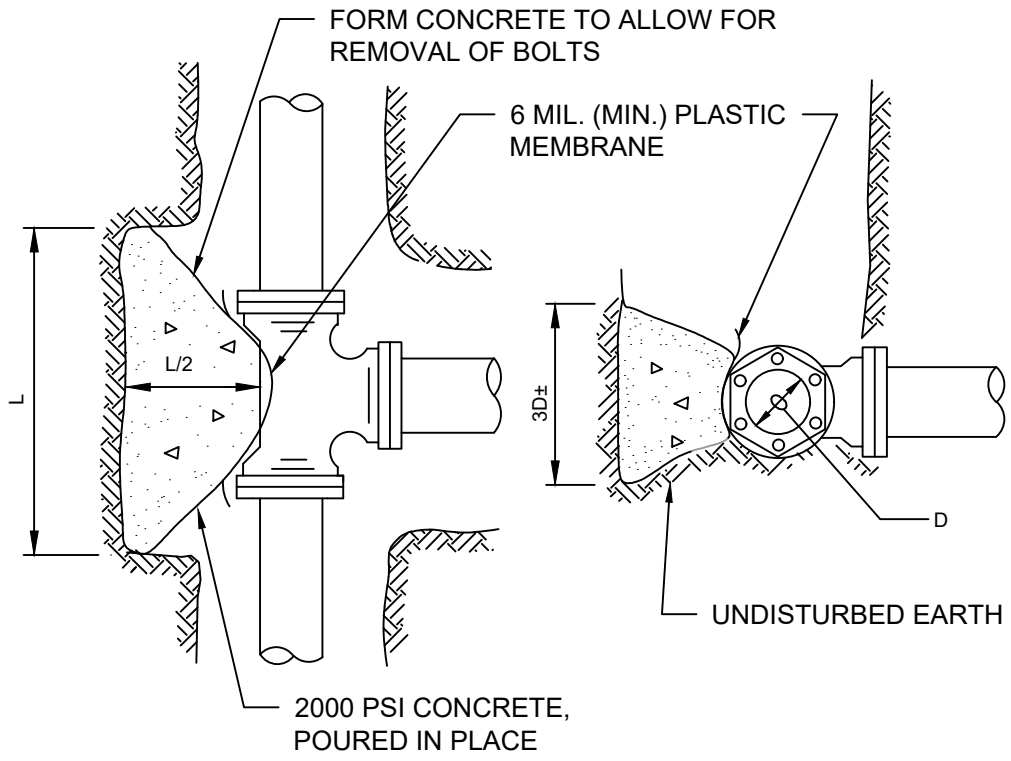
- SEE GENERAL NOTES FOR METER PLACEMENT
- ALL METER BOXES SPECIFIED ARE DESIGNED FOR NON-VEHICULAR TRAFFIC
- BOX LID WILL BE FLUSH SOLID COVER
- LID MATERIAL WILL BE SPECIFIED BY THE CITY BASED UPON PROJECT REQUIREMENTS
- "OR EQUAL" SUBJECT TO CITY APPROVAL

CITY OF SEQUIM

METER BOXES

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FIGURE 5-05



PLAN ELEVATION

MINIMUM BEARING AREA TABLE					
FITTING D	TEE	90°	45°	22 1/2°	11 1/4°
6"	4 SQ. FT.	6 SQ. FT.	3 SQ. FT.	2 SQ. FT.	2 SQ. FT.
8"	7 SQ. FT.	10 SQ. FT.	6 SQ. FT.	3 SQ. FT.	2 SQ. FT.
10"	10 SQ. FT.	15 SQ. FT.	9 SQ. FT.	5 SQ. FT.	3 SQ. FT.
12"	14 SQ. FT.	22 SQ. FT.	12 SQ. FT.	6 SQ. FT.	4 SQ. FT.
16"	25 SQ. FT.	38 SQ. FT.	21 SQ. FT.	11 SQ. FT.	7 SQ. FT.
18"	32 SQ. FT.	48 SQ. FT.	27 SQ. FT.	14 SQ. FT.	8 SQ. FT.

GENERAL NOTES:

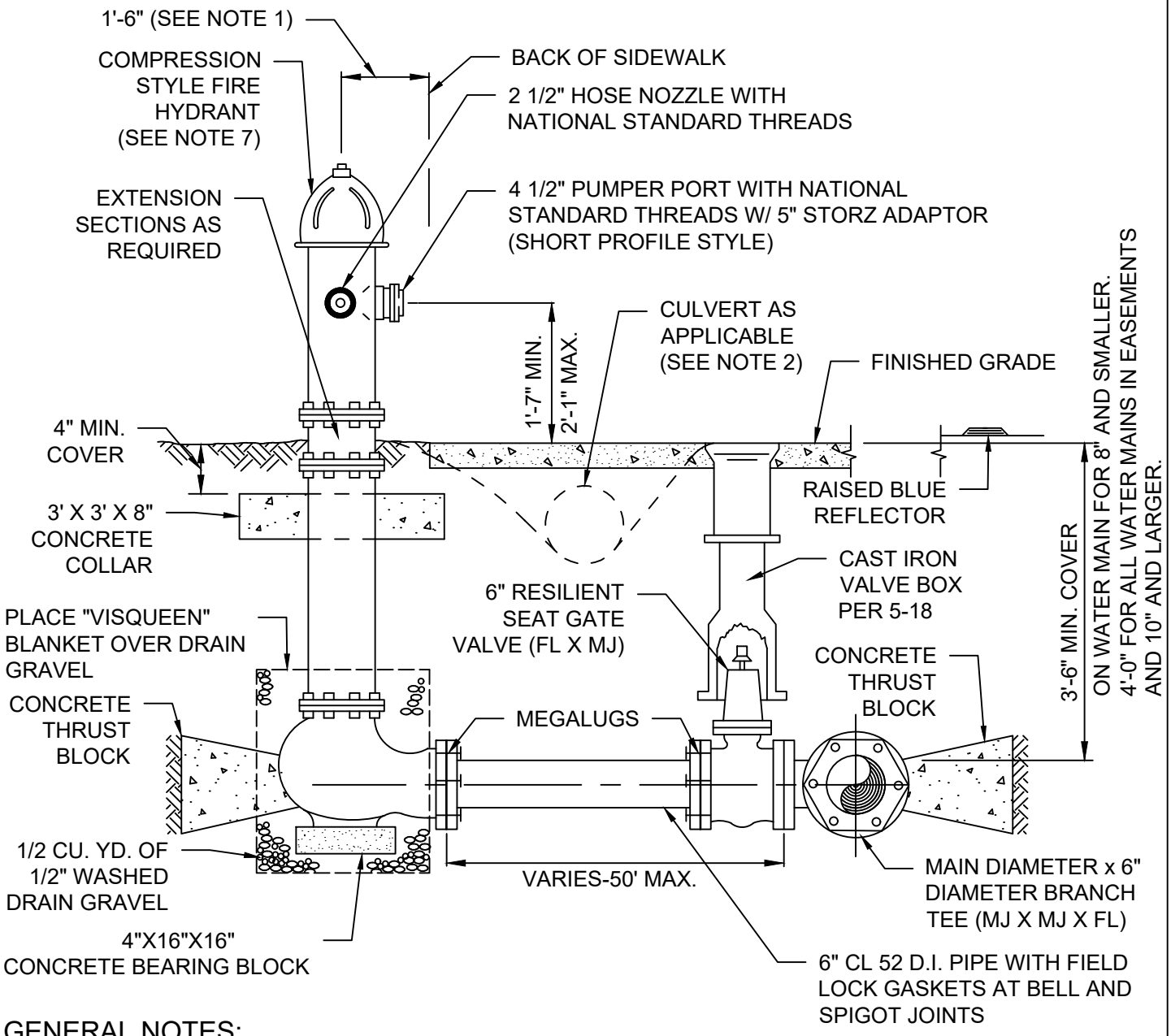
1. BEARING AREA TABLE BASED ON 250 PSI PRESSURE AND 2000 PSF SOIL BEARING. IF PRESSURE IS GREATER OR SOIL BEARING IS LESS, THE THRUST BLOCK SIZE SHALL INCREASE.
2. THIS TABLE REPRESENTS THE "MINIMUM" CONSTRUCTION STANDARDS. THE DEVELOPER'S ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING THE APPROPRIATE SIZE OF ALL THRUST BLOCKS BASED ON EXISTING AND LOCAL CONDITIONS.
3. IN LIEU OF VERTICAL ANCHOR BLOCKS, PIPE BEND JOINTS AND STRAIGHT PIPE JOINTS ON BOTH VERTICAL BENDS SHALL BE RESTRAINED FOR LENGTHS AS NECESSARY TO RESIST PIPE JOINT SEPARATION BY A SAFETY FACTOR OF 2:1, USING "MEGALUGS", FIELD LOCK GASKETS (FOR DUCTILE IRON PIPE), BELL-AND-SPIGOT JOINT RESTRAINTS (SUCH AS ROMAC 611 SYSTEMS FOR PVC C900 PIPE), OR OTHER RESTRAINT SYSTEMS ACCEPTABLE TO THE CITY.
4. THE CITY WILL USE "EBAA IRON'S RESTRAINT LENGTH CALCULATOR" AT EBAA.COM/CALCULATOR/ FOR VERIFYING ADEQUACY OF RESTRAINED JOINT LENGTHS.

CITY OF SEQUIM

THRUST BLOCKS

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FIGURE 5-07



GENERAL NOTES:

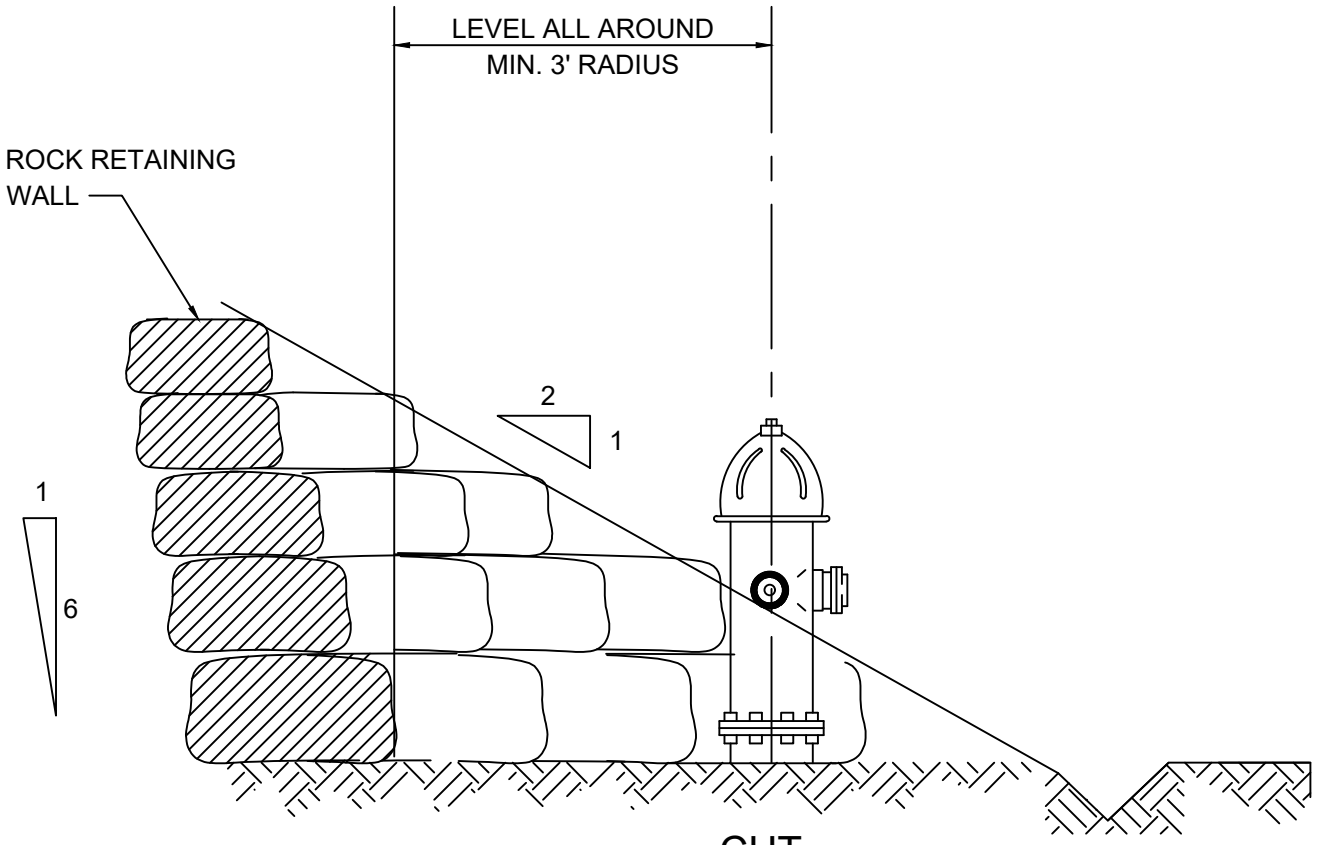
1. OR 3' FROM BACK OF CURB.
2. PROVIDE 8' MINIMUM OF CULVERT AND COVER, 12" MIN. DIA. OR EQUAL IN SIZE TO ADJACENT DITCH CROSSINGS. PIPE TO COUNTY, STATE OR CITY STANDARDS AS APPLICABLE.
3. PROVIDE MIN. 3'-0" CLEARANCE AND LEVEL AREA AROUND HYDRANT.
4. PAINT FIRE HYDRANT WITH TWO COATS SAFETY YELLOW.
5. STENCIL FOOTAGE TO VALVE ON HYDRANT UNDER PORT FACING GV.
6. REMOVE ALL CHAINS FOR FIRE HYDRANT CAPS.
7. ACCEPTABLE HYDRANTS: CLOW MEDALLION AND MUELLER CENTURION OR EAST JORDAN WATER MASTER 5CD250.
8. INSTALL BLUE FIRE HYDRANT REFLECTOR OFFSET 1 FOOT FROM ROAD CENTERLINE.
9. ALL FLANGES TORQUE TESTED TO MANUFACTURE RECOMMENDATIONS.
10. NO SERVICE CONNECTIONS SHALL BE MADE TO THE FIRE HYDRANT LINE UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.

CITY OF SEQUIM

FIRE HYDRANT ASSEMBLY

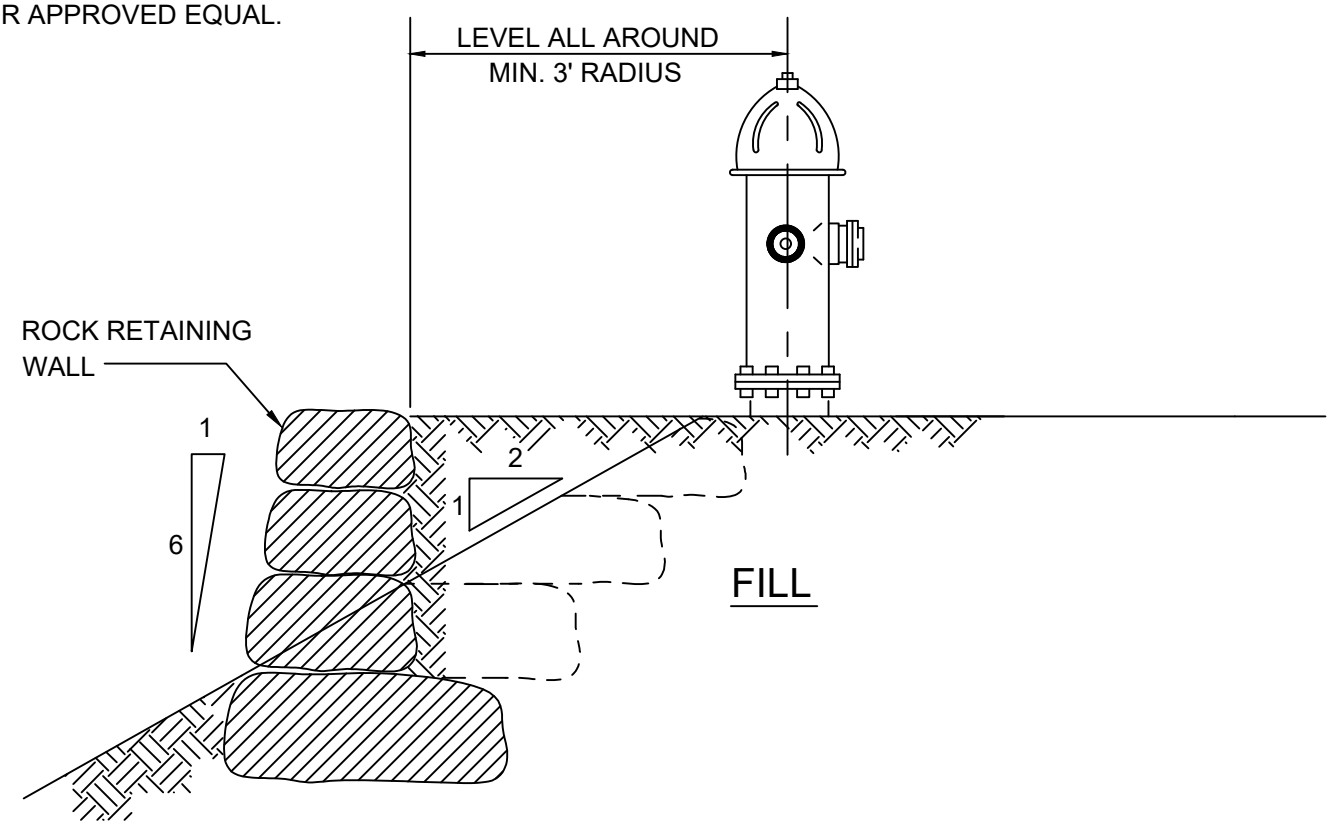
REVISION NO.	DATE
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FIGURE
5-08



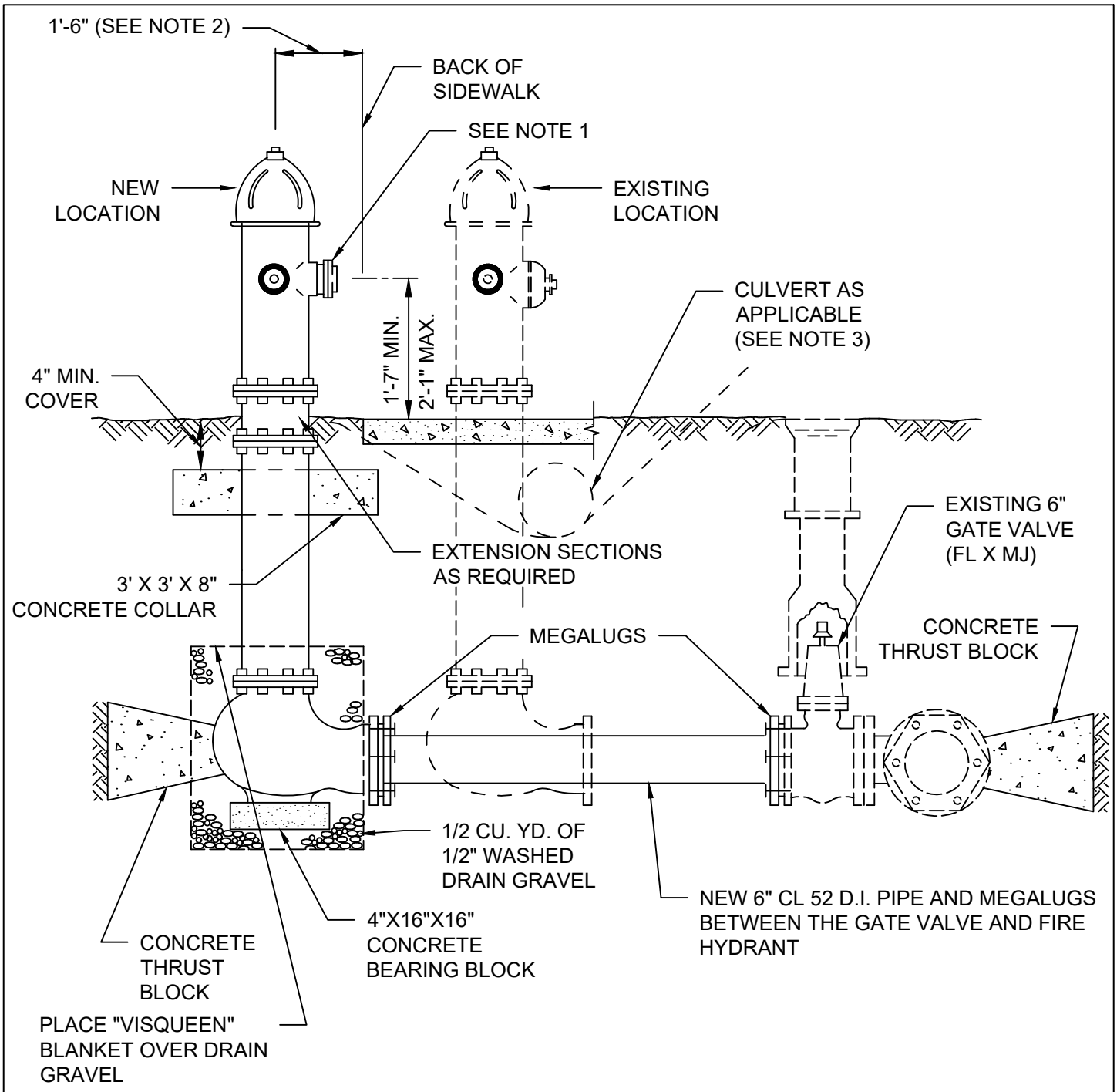
CUT

NOTE: IN CUT BANK FIBERGLASS HILLSIDE BARRIERS CAN BE CONSIDERED. PROGLASS, INC. OR APPROVED EQUAL.



FILL

CITY OF SEQUIM	**FIRE HYDRANT LOCATED IN CUT OR FILL**	REVISION NO. / DATE: 0 / 07/11/2022	FIGURE 5-09



GENERAL NOTES:

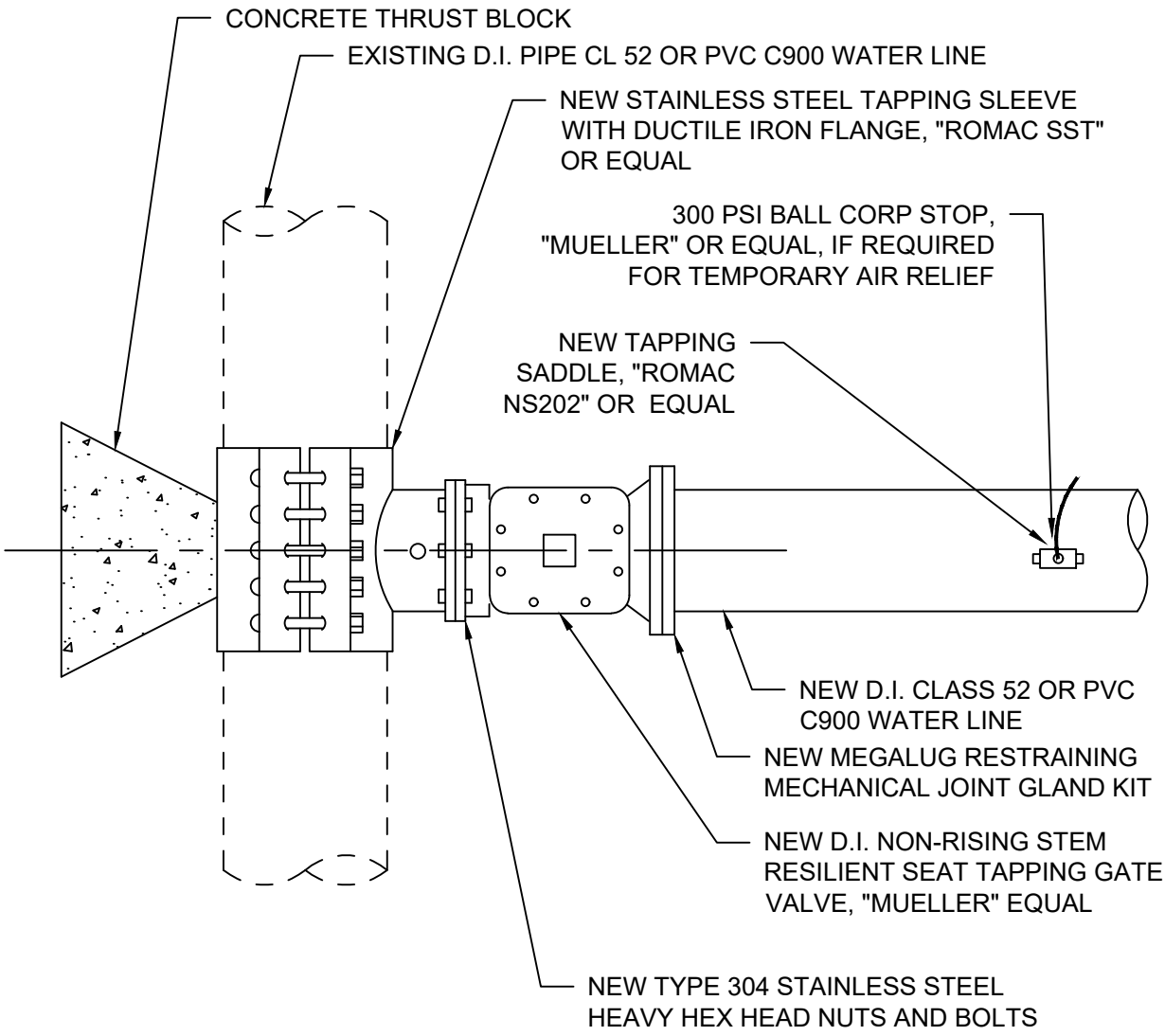
1. FIRE HYDRANT MUST MEET CITY REQUIREMENTS. FOR NEW HYDRANTS, SEE FIGURE 5-08. REPLACE WITH NEW FIRE HYDRANT IF REQUIRED.
2. OR 3' FROM BACK OF CURB.
3. PROVIDE 8' MINIMUM OF CULVERT AND COVER, 12" MIN. DIA. OR EQUAL IN SIZE TO ANY ADJACENT DITCH CROSSINGS, PIPE TO COUNTY, STATE OR CITY STANDARDS AS APPLICABLE.
4. NEW MJ GASKETS, T-BOLTS, AND NUTS SHALL BE INSTALLED AT NEW MEGALUGS. NEW FIELD LOCK GASKETS SHALL BE INSTALLED AT BELL-AND-SPIGOT JOINTS IN 6" HYDRANT LEG PIPING. ALL MUST BE TORQUE TESTED TO MANUFACTURERS RECOMMENDATIONS.

CITY OF SEQUIM

RELOCATE FIRE HYDRANT ASSEMBLY

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FIGURE
5-10



GENERAL NOTES:

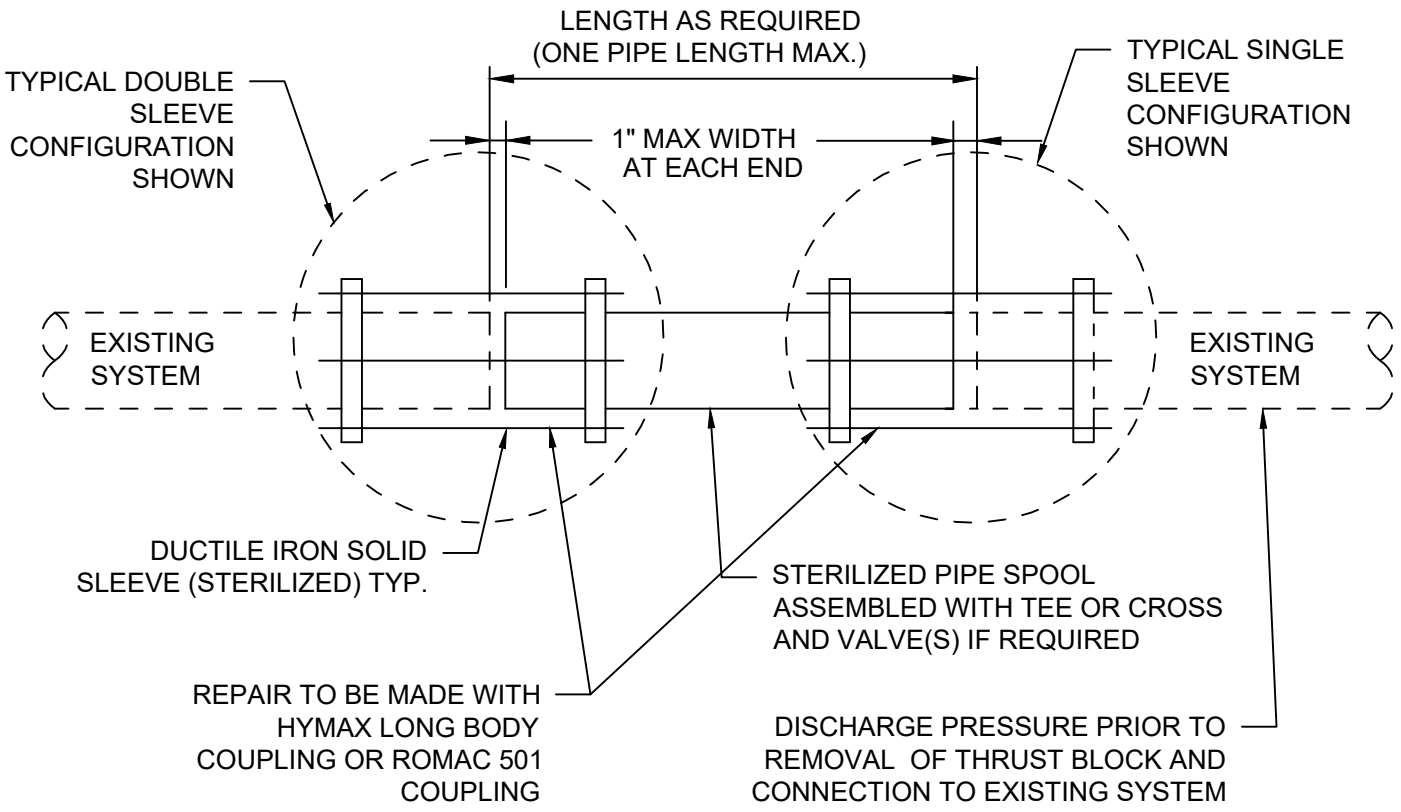
1. TAP TO BE INSTALLED AT DEVELOPERS EXPENSE UNDER CITY OBSERVATION.
2. TAPPING TEES SHALL BE AIR PRESSURE TESTED TO 100 PSI PRIOR TO TAPPING MAIN.
3. CONNECTIONS NOT ALLOWED ON FRIDAYS, SATURDAYS, SUNDAYS, HOLIDAYS, OR DAYS BEFORE HOLIDAYS.

CITY OF SEQUIM

WET TAP CONNECTION

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FIGURE
5-11



GENERAL NOTES:

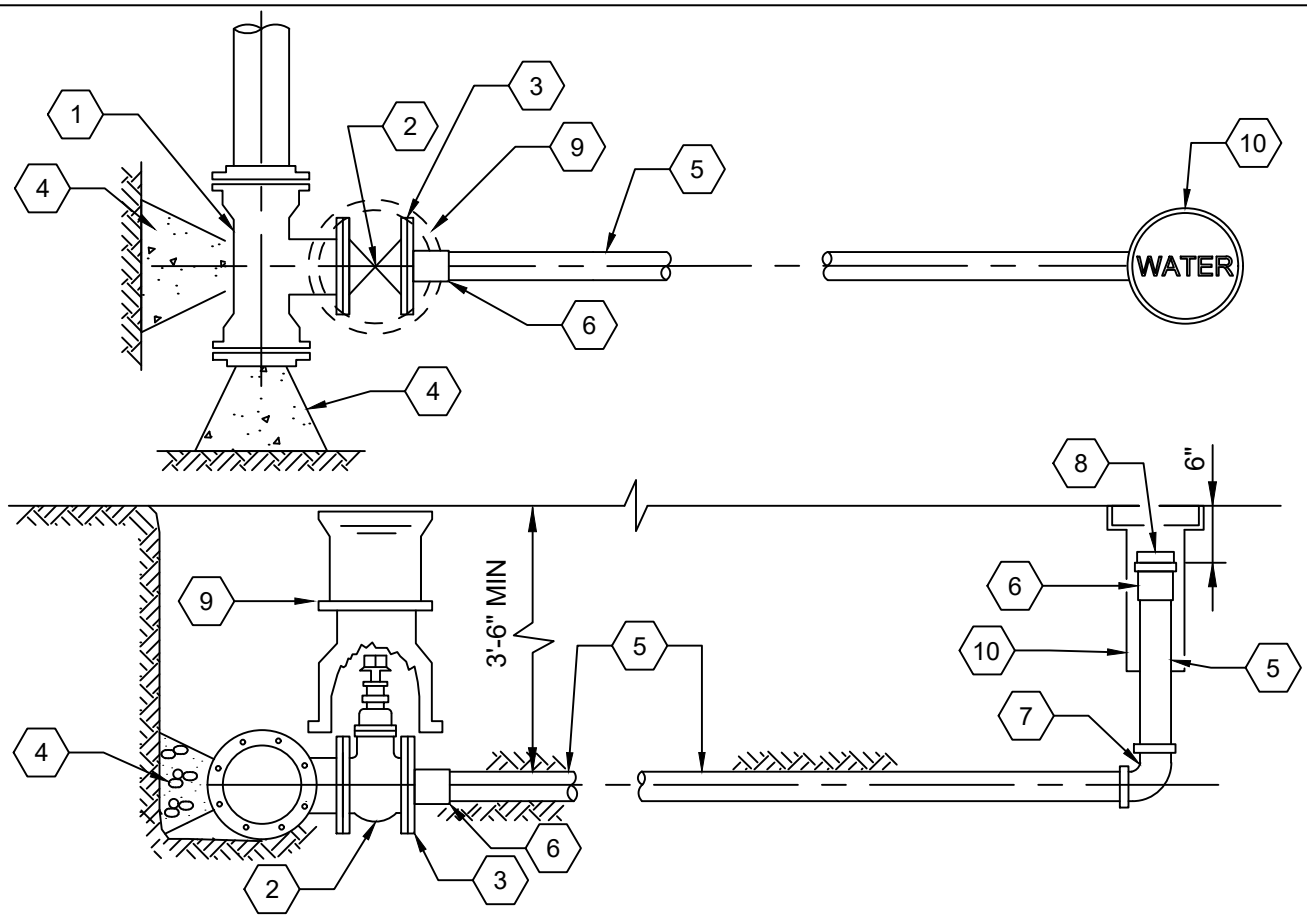
1. IN-LINE VALVE(S) IN EXISTING SYSTEM ARE REQUIRED BY THE CITY AT NEW INTERTIE LOCATIONS. VALVE(S) ARE NOT SHOWN ABOVE FOR CLARITY
2. MAXIMUM SPACES BETWEEN PIPES SHALL BE 1-INCH.
3. CONNECTIONS NOT ALLOWED ON FRIDAYS, SATURDAYS, SUNDAYS, HOLIDAYS, OR DAYS BEFORE HOLIDAYS.
4. REPAIR CAN BE MADE WITH C900 OR DUCTILE IRON PIPE.

CITY OF SEQUIM

CUT IN CONNECTION

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FIGURE
5-12



1. MJ X MJ X 4" FL D.I. TEE.
2. 4" AWWA RESILIENT SEAT GATE VALVE, FL X FL, WITH OPERATING NUT.
3. 4" DUCTILE IRON BLIND FLANGE WITH 2" DIAMETER FEMALE PIPE THREAD CONCENTRIC TAP.
4. CONCRETE THRUST BLOCK.
5. 2" IPS POLY WATER SERVICE TUBING, SIDR 7, "ADS" OR CITY OF SEQUIM ACCEPTED EQUAL.
6. 2" BRASS STRAIGHT COUPLING, MALE PIPE THREAD X IPS PACK JOINT, WITH 2 EACH STAINLESS STEEL TUBING INSERT STIFFNERS FOR 2" IPS SIDR 7 POLY TUBING, "MUELLER" OR CITY OF SEQUIM ACCEPTED EQUAL.
7. 2" BRASS QUARTER BEND COUPLING, IPS PACK JOINT X IPS PACK JOINT, WITH 2 EACH STAINLESS STEEL TUBING INSERT STIFFNERS FOR 2" IPS SIDR 7 POLY TUBING, "MUELLER" OR CITY OF SEQUIM ACCEPTED EQUAL.
8. 2" PVC FEMALE THREADED PIPE CAP, CAP INSTALLED HAND TIGHT.
9. CAST IRON VALVE BOX PER FIGURE 5-18.
10. CAST IRON VALVE BOX TOP SECTION WITH "WATER" COVER, "OLYMPIC FOUDARY" OR CITY OF SEQUIM ACCEPTED EQUAL.

GENERAL NOTES:

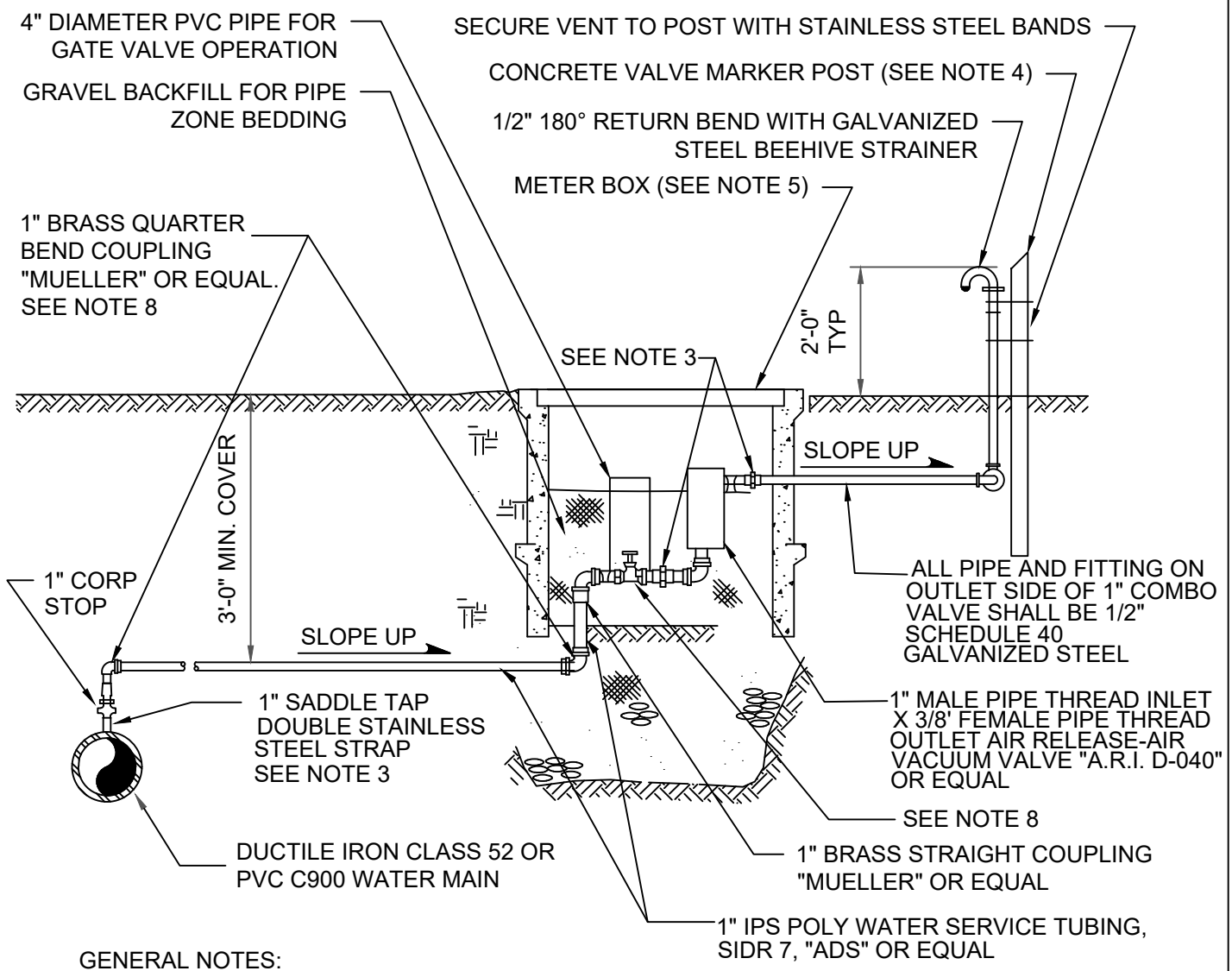
1. FOR WATER LINES LARGER THAN 8" DIAMETER, FIRE HYDRANT ASSEMBLIES SHALL BE INSTALLED AND USED AS BLOW-OFFS.

CITY OF SEQUIM

6" AND 8" WATER LINE BLOW OFF ASSEMBLY

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FIGURE 5-13



GENERAL NOTES:

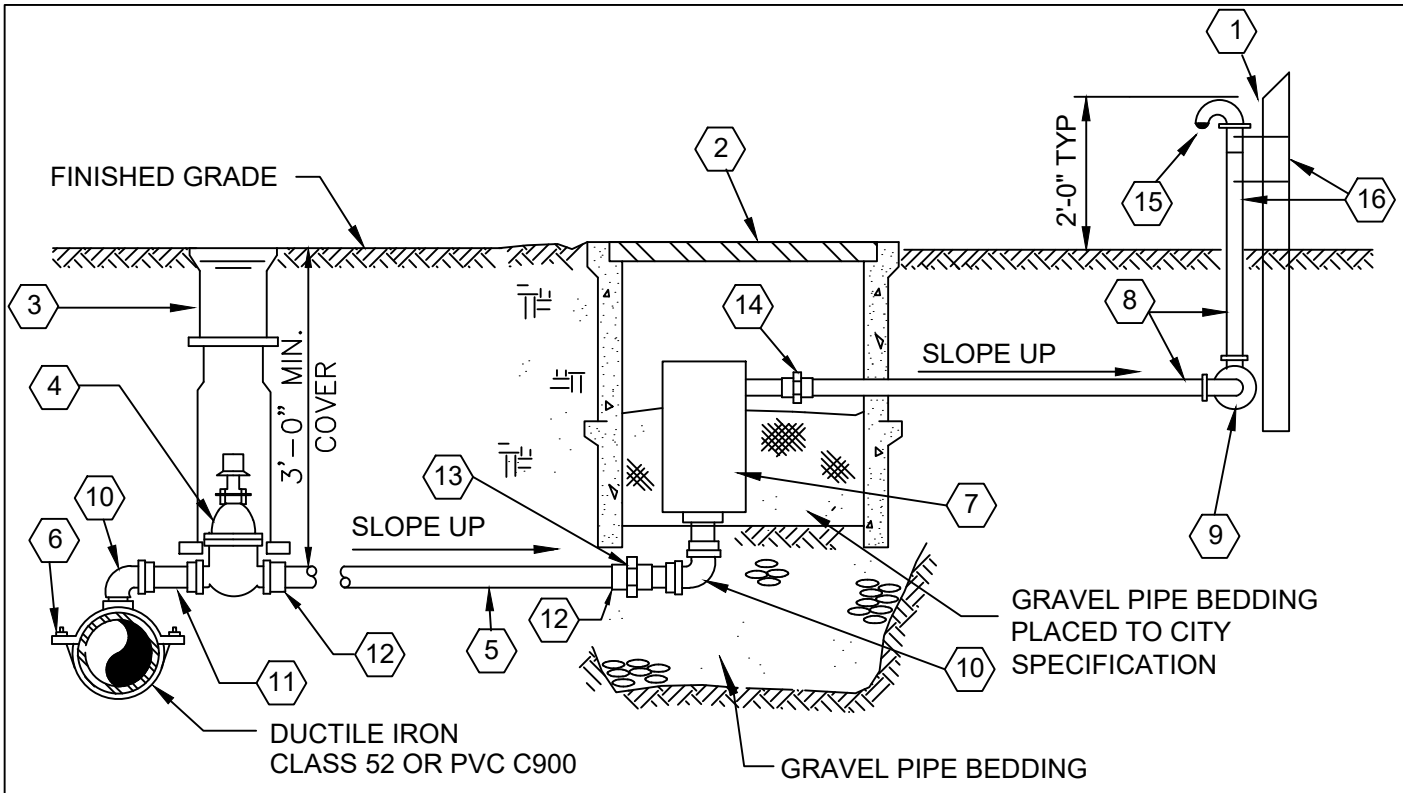
1. USE OF 1" AIR VAC REQUIRES CITY APPROVAL, 2" AIR VAC STANDARD.
2. TAP WATER MAIN AT HIGH POINT AT LOCATION DESIGNATED BY CITY.
3. FEMALE PIPE THREAD PIPING UNIONS TO BE INSTALLED ON INLET AND OUTLET AIR VALVE PIPING AS SHOWN, 1" BRASS UNION ON INLET SIDE OF AIR VALVE AND 1/2" GALVANIZED STEEL UNION ON OUTLET SIDE.
4. PAINT EXPOSED PORTION ON VENT PIPE AND MARKER POST WITH 2 COATS OF SAFETY YELLOW.
5. SEE FIGURE 5-05 FOR METER BOX DETAILS.
6. AIR VALVE ASSEMBLY METER BOX AND ABOVE-GRADE PIPING SHALL BE INSTALLED IN A NON-VEHICULAR TRAFFIC AREA SATISFACTORY TO THE CITY. IF THE METER BOX MUST BE INSTALLED IN A VEHICULAR TRAFFIC AREA A H20 RATER LID MUST BE PROVIDED AT MINIMUM.

CITY OF SEQUIM

1" AIR AND VACUUM RELEASE ASSEMBLY

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FIGURE
5-14



1. CONC. VALVE MARKER POST
2. METER BOX PER 5-05
3. CAST IRON VALVE BOX PER 5-18
4. 2" RESILIENT WEDGE GATE VALVE AWWA C509, "MUELLER" OR EQUAL
5. 2" IPS POLY WATER SERVICE TUBING, SIDR 7 "ADS" OR EQUAL
6. SERVICE SADDLE, MAIN DIAMETER AS REQUIRED WITH DOUBLE STAINLESS STEEL STRAPS, 2" FEMALE PIPE THREAD TAP, "ROMAC 202NS" OR EQUAL
7. AIR RELEASE-AIR VACUUM VALVE, 2" MALE INLET X 1-1/2" FEMALE OUTLET, "A.R.I. D-040" OR EQUAL
8. 1-1/2" SCHEDULE 40 GALVANIZED STEEL THREADED PIPE AND FITTINGS
9. 1-1/2" GALVANIZED STEEL DOUBLE 90 DEGREE ELBOW & NIPPLE SWING JOINT
10. 2" BRASS 90 DEGREE ELBOW, FEMALE THREAD BOTH ENDS WITH 2" X 3" LONG LONG BRASS MALE PIPE THREAD NIPPLE
11. 2" DIAMETER X 6" LONG BRASS MALE THREADED PIPE NIPPLE
12. 2" STRAIGHT COUPLING MALE THREADED "MUELLER" OR EQUAL, WITH STAINLESS STEEL TUBING INSERT STIFFENER
13. 2" BRASS PIPING UNION, FEMALE THREAD BOTH ENDS
14. 1-1/2" GALVANIZED STEEL PIPING UNION, FEMALE PIPE THREADS ENDS
15. 1-1/2" OPEN PATTERN RETURN BEND WITH 1-1/2" BEEHIVE STRAINER, GALVANIZED STEEL
16. PAINT EXPOSED PORTION OF VENT PIPE AND MARKER POST WITH TWO COATS OF SAFETY YELLOW. SECURE VENT TO POST WITH STAINLESS STEEL BANDS

GENERAL NOTES:

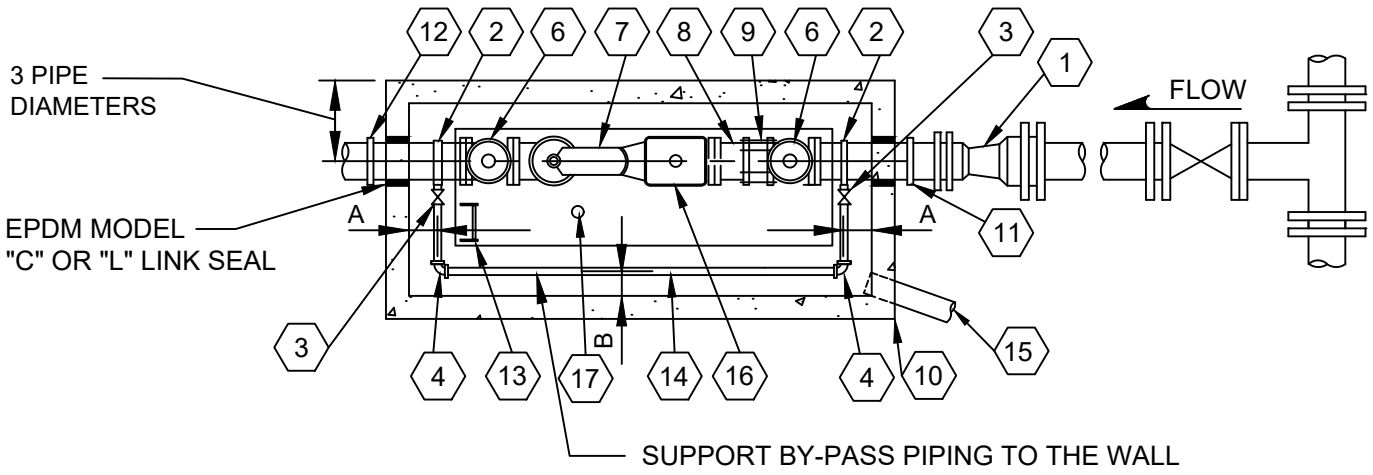
1. TAP WATER MAIN AT HIGH POINT AT LOCATION TO BE DETERMINED BY THE CITY.
2. AIR VALVE ASSEMBLY METER AND ABOVE-GRADE PIPING SHALL BE INSTALLED IN A NON-VEHICULAR AREA SATISFACTORY TO THE CITY. IF THE METER MUST BE INSTALLED IN A VEHICULAR TRAFFIC AREA, A H20 RATED LID MUST BE PROVIDED AT MINIMUM.

CITY OF SEQUIM

2" AIR AND VACUUM RELEASE ASSEMBLY

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FIGURE 5-15



PLAN

1. 4"x3" REDUCER, M.J. FOR 3" METER
2. DOUBLE STRAP SERVICE CLAMP, ROMAC 101 WITH IPS TAP, OR APPROVED EQUAL (1 1/2" OR 2" BYPASS, 4-INCH BYPASS REQUIRES D.I. TEE).
3. RESILIENT WEDGE GATE VALVE AWWA C509, "MUELLER" OR EQUAL.
4. BRASS DOUBLE FEMALE THREADED QUARTER BEND COUPLING.
5. BALL VALVE WITH PADLOCK WING OR LOCK CAP, FORD B21-444W OR B21-666 WITH LOCK CAP OR B21-777 WITH LOCK CAP. SIZED TO LINE.
6. RESILIENT SEAT GATE VALVE, FL X FL SIZED TO METER.
7. 3" TO 10" SENSUS METER FOR IRRIGATION SERVICES AND 3" TO 10" COMPOUND METER IF FOR DOMESTIC SERVICE. READ IN CUBIC FEET WITH MXU RADIO UNIT AS SPECIFIED BY CITY SHALL BE FURNISHED AND INSTALLED BY CONTRACTOR.
8. D.I. PIPE SPOOL FL X PE LENGTH TO FIT.
9. FL CPLG. ADAPT.
10. PRECAST CONCRETE VAULT, UTILITY VAULT OR APPROVED EQUAL, SEE DETAIL 5-16B FOR SIZING AND REQUIREMENTS.
11. MEGA-LUG FOLLOWER INSTALLED ON INFLOW SIDE OF VAULT WITH CONCRETE THRUST BLOCK OR SHACKLE TO THRUST BLOCK TO PREVENT MOVEMENT IF METER IS REMOVED. (BLOCK NOT SHOWN)
12. DIELECTRIC CPLG. TO BUILDING SERVICE. SIZE AS REQUIRED.
13. POLYPROPYLENE STEPS 12" O.C. COORDINATE LOCATION FOR ACCESS.
14. BY-PASS (SIZE BY TABLE BELOW).
15. 6" PVC TO CATCH BASIN OR DAYLIGHT. WHERE GRAVITY DRAIN IS NOT FEASIBLE, PROVIDE SUMP, ELECTRICAL SERVICE AND PUMP WITH DISCHARGE TO SURFACE DRAIN. PUMP SHALL BE 1/2 HP ZOELLER M-53, WITH CHECK VALVE ON DISCHARGE LINE.
16. WATER METER STRAINER (FL) SENSUS OR EQUAL.
17. 2" DIAM. HOLE DRILLED IN LID, STREET SIDE FOR MXU HOLE.

METER SIZE	MAIN-LINE	BYPASS	A	B
3"	4" DI.	1 1/2" COPPER	9"	4"
4"	4" DI.	1 1/2" COPPER	9"	4"
6"	6" DI.	2" COPPER	9"	4"
8"	8" DI.	4" DI.	14"	6"
10"	10" DI.	4" DI.	16"	6"

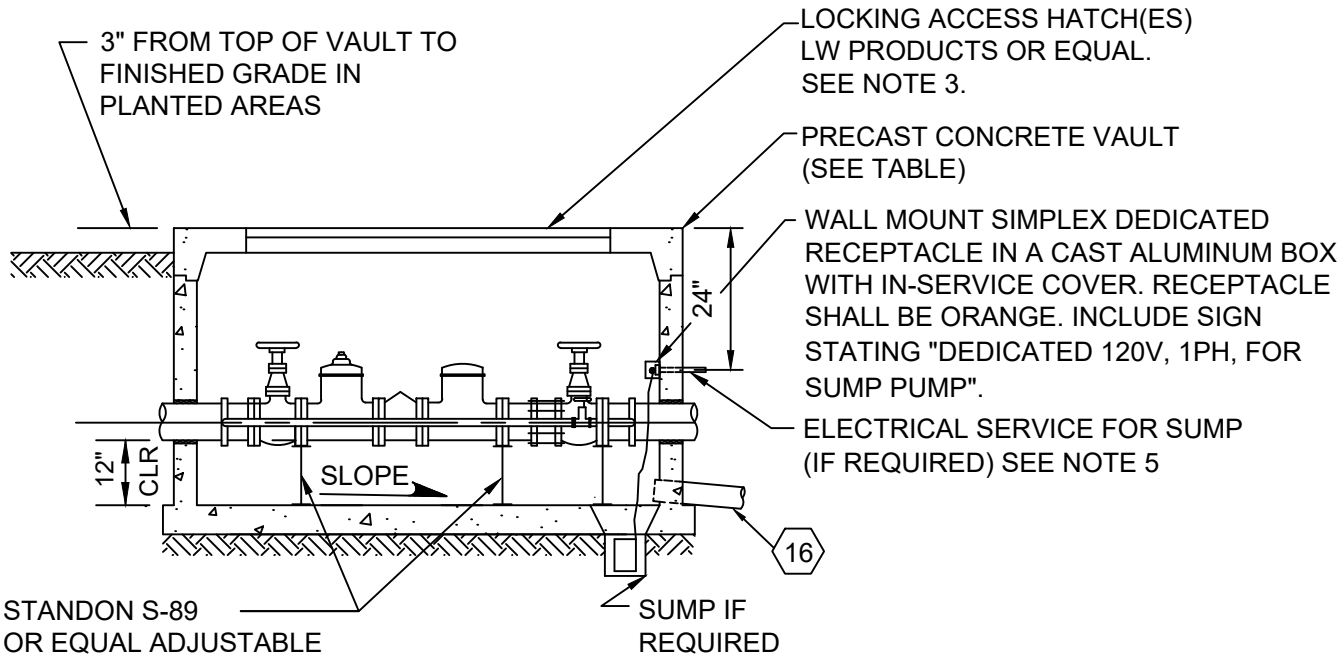
SEE 5-16B FOR ELEVATION AND NOTES.

CITY OF SEQUIM

METER VAULT ASSEMBLY 3" TO 10"

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FIGURE 5-16A



ELEVATION

SEE DETAIL 5-16A FOR CALLOUTS

METER SIZE	MAIN-LINE	MINIMUM I/S VAULT DIM. L x W x H			UTILITY VAULT CO APPROVED MODEL	MIN. HATCH OPENING
3"	4" DI.	8'-4"	4'-4"	3'-4"	4484-LA	3' x 6'
4"	4" DI.	8'-4"	4'-4"	3'-4"	4484-LA	3' x 6'
6"	6" DI.	10'-6"	5'-0"	6'-2"	5106-LA	3' x 6'
8"	8" DI.	12'-0"	6'-0"	6'-6"	612-LA	3' x 6'
10"	10" DI.	14'-0"	8'-0"	6'-6"	814-LA	3' x 6'

NOTES:

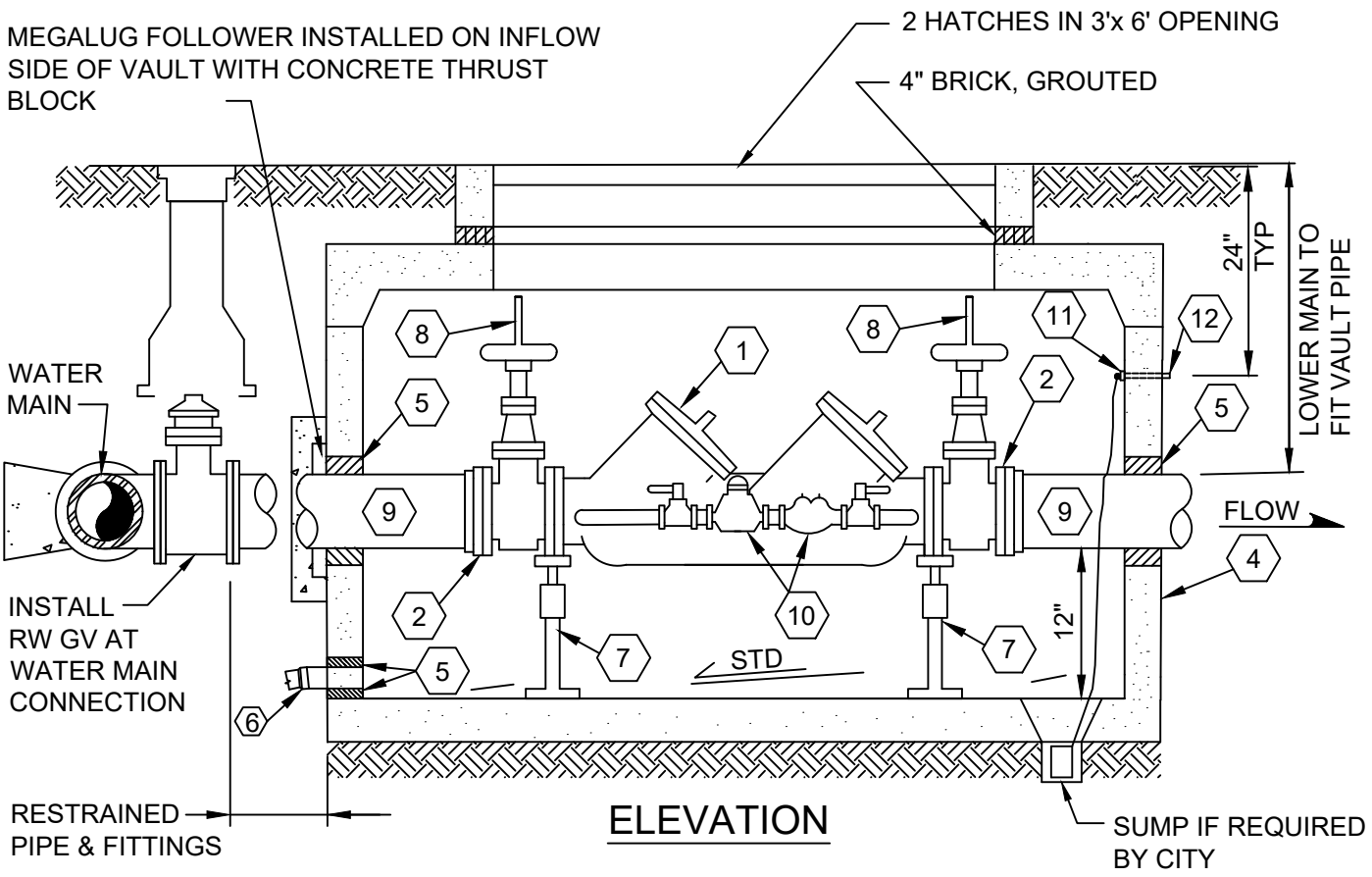
1. WASHINGTON STATE APPROVED REDUCED PRESSURE BACKFLOW PREVENTOR REQUIRED. SEE 5-24. CONFIRM INSTALLATION WITH CITY. INITIAL AND ANNUAL TEST REQUIRED.
2. METER SHALL BE INSTALLED SUCH THAT IT CAN BE READ WITHOUT ENTERING VAULT WITH ACCESS HATCH OPEN.
3. COORDINATE ORIENTATION OF HATCH(ES) TO PROVIDE CLEAR VERTICAL ACCESS TO METER ASSEMBLY, AND WITH LADDER LOCATION. VERIFY WITH CITY.
4. DRAIN DRAIN HATCH(ES) TO VAULT FLOOR WITH PVC PIPE AND FITTINGS.
5. 3/4" (MINIMUM) PVC SCH-40 CONDUIT. WIRING SHALL BE COMPLETELY SEALED 120V, UNDER GROUND. CONTRACTOR TO SEAL CONDUIT PENETRATION WITH NON-SHRINK GROUT. (NOT REQUIRED IF GRAVITY VAULT DRAIN PROVIDED).
6. EASEMENT TO BE PROVIDED TO CITY AROUND METERS LOCATED OUTSIDE RIGHT OF WAY.
7. SEE 5-16A FOR PLAN AND NOTES.

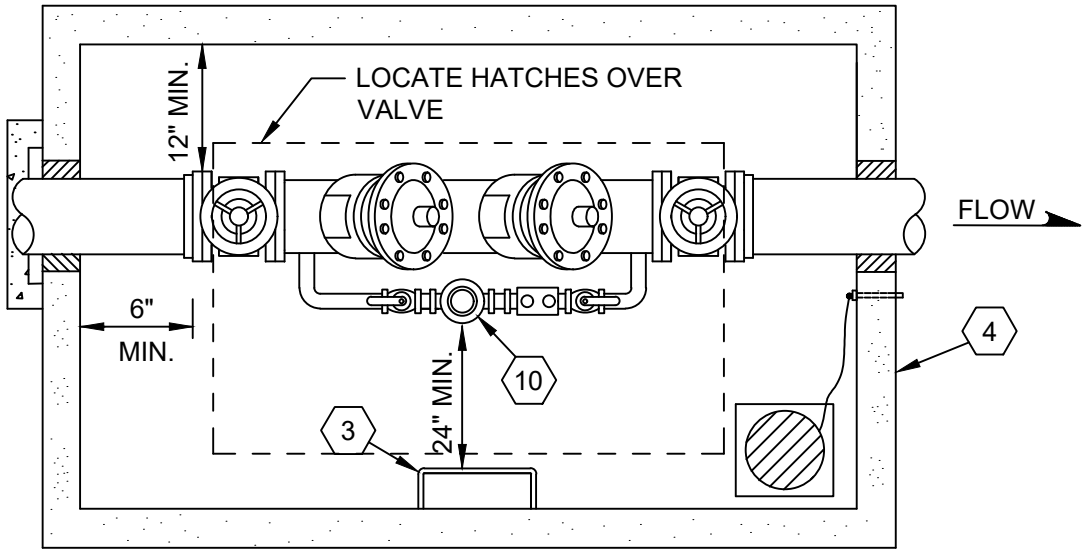
CITY OF SEQUIM

METER VAULT ASSEMBLY 3" TO 10"

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FIGURE 5-16B





SEE 5-17B FOR NOTES AND CALLOUTS

CITY OF SEQUIM

DOUBLE-CHECK DETECTOR ASSEMBLY - 4" AND LARGER

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FIGURE 5-17A

LEGEND

1. WASHINGTON STATE APPROVED DOUBLE CHECK DETECTOR ASSEMBLY (DCDA) WITH OS&Y RESILIENT SEAT GATE VALVE EA. END AND LOW FLOW BYPASS METER ASSEMBLY.
2. RESTRAINED FLANGE COUPLING ADAPTER, "ROMAC" OR EQUAL
3. GALVANIZED STEEL OR ALUMINUM LADDER, SECURED TO VAULT, SAME SIDE AS BYPASS METER.
4. VAULT:
   UTILITY VAULT CO, OR APPROVED EQUAL WITH 4" BRICK AND ADJUSTABLE COVER.
   ACCESS HATCHES:
   3'x3', LW PRODUCTS, H-2O LOAD RATED. PROVIDE DRAINS FROM HATCHES TO VAULT FLOOR.

DCDA SIZE	UTILITY VAULT CO APPROVED MODEL	MINIMUM I/S VAULT DIM. L X W X H			MIN. HATCH OPENING
4"	4484-LA	8'-4"	4'-4"	6'-2"	3' X 6'
6"	4484-LA	8'-4"	4'-4"	6'-2"	3' X 6'
8"	5106-LA	10'-6"	5'-0"	6'-2"	3' X 6'
10"	612-LA	12'-0"	6'-0"	6'-6"	3' X 6'

5. EPDM MODEL "C" OR "L" LINK SEAL.
6. DRAIN TO NEAREST CATCH BASIN. MINIMUM SLOPE 1% UNLESS OTHERWISE APPROVED. WHERE GRAVITY DRAIN IS NOT FEASIBLE, PROVIDE SUMP AND ELECTRIC PUMP WITH DISCHARGE TO SURFACE DRAIN. PUMP SHALL BE 1/2 HP ZOELLER M-53, WITH CHECK VALVE ON DISCHARGE LINE. POWER FROM SERVED FACILITY WITH GFI OUTLET IN VAULT, LOCATED ABOVE METER. SLOPE VAULT FLOOR TO DRAIN TO GRAVITY DRAIN OR SUMP.
7. STANDON S-89 OR EQUAL ADJUSTABLE PIPE SUPPORTS, BOLT TO VALVE FLANGE.
8. VALVE ASSEMBLY TO BE POSITIONED IN VAULT TO ALLOW STEMS TO EXTEND INTO ACCESS OPENING.
9. CL. 52 D.I., MJ WITH MEGALUGS.
10. LOW FLOW BYPASS METER, INCLUDING 5/8" x 3/4" SENSUS RADIO READ WATER METER W/ SENSUS AMR AND MXU RADIO UNIT, WASHINGTON STATE APPROVED DOUBLE CHECK VALVE ASSEMBLY (DCVA) AND 2 BRONZE BODY ISOLATION BALL VALVES, BRASS OR TYPE K COPPER PIPING.
11. SIMPLEX DEDICATED RECEPTACLE IN A CAST ALUMINUM BOX WITH IN SERVICE COVER. RECEPTACLE SHALL BE ORANGE. INCLUDE SIGN STATING "DEDICATED 120V, 1PH, FOR SUMP PUMP."
12. 3/4" PVC SCH-40, CONDUIT SHALL BE COMPLETELY SEALED 120V, UNDER GROUND. CONTRACTOR TO SEAL CONDUIT PENETRATION WITH NON-SHRINK GROUT.

GENERAL NOTES:

1. VAULT SHALL BE LOCATED OUTDOORS AND ACCESSIBLE TO CITY. ALTERNATE TO VAULT INSTALLATION REQUIRES CITY APPROVAL.
2. SYSTEM SHALL NOT BE PUT INTO SERVICE UNTIL DCDA IS APPROVED BY THE CITY AND TESTED/CERTIFIED BY A WASHINGTON STATE LICENSED TESTER.
3. DCDA IS CONSIDERED PART OF THE PRIVATE SYSTEM AND SHALL BE MAINTAINED BY THE PROPERTY OWNER WITH ANNUAL CERTIFICATION REQUIRED.
4. PRESSURE TEST AND DISINFECT PER A.W.W.A. STANDARDS.
5. NO BRANCH CONNECTIONS ALLOWED BETWEEN METER AND DCDA.

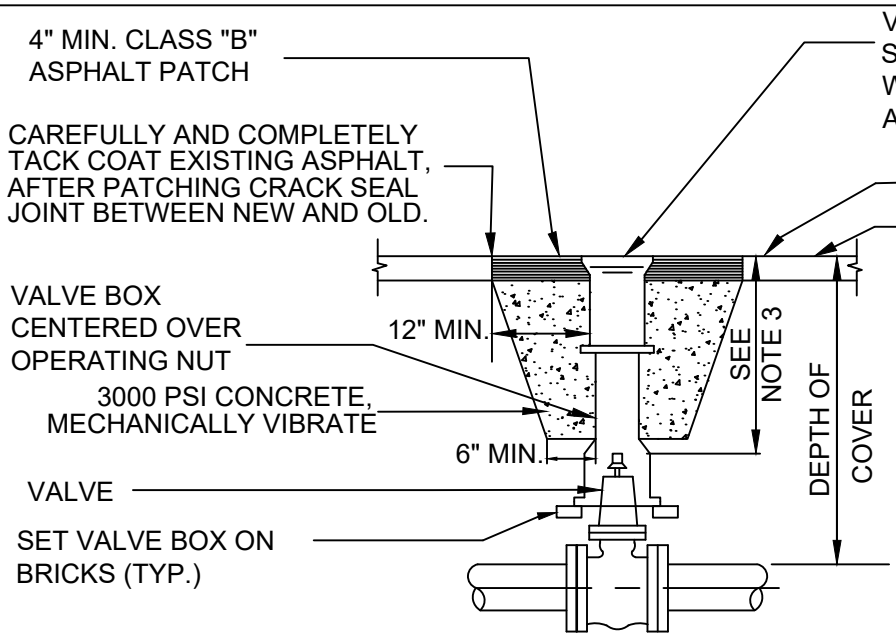
SEE FIGURE 5-17A FOR ELEVATION AND PLAN

CITY OF SEQUIM

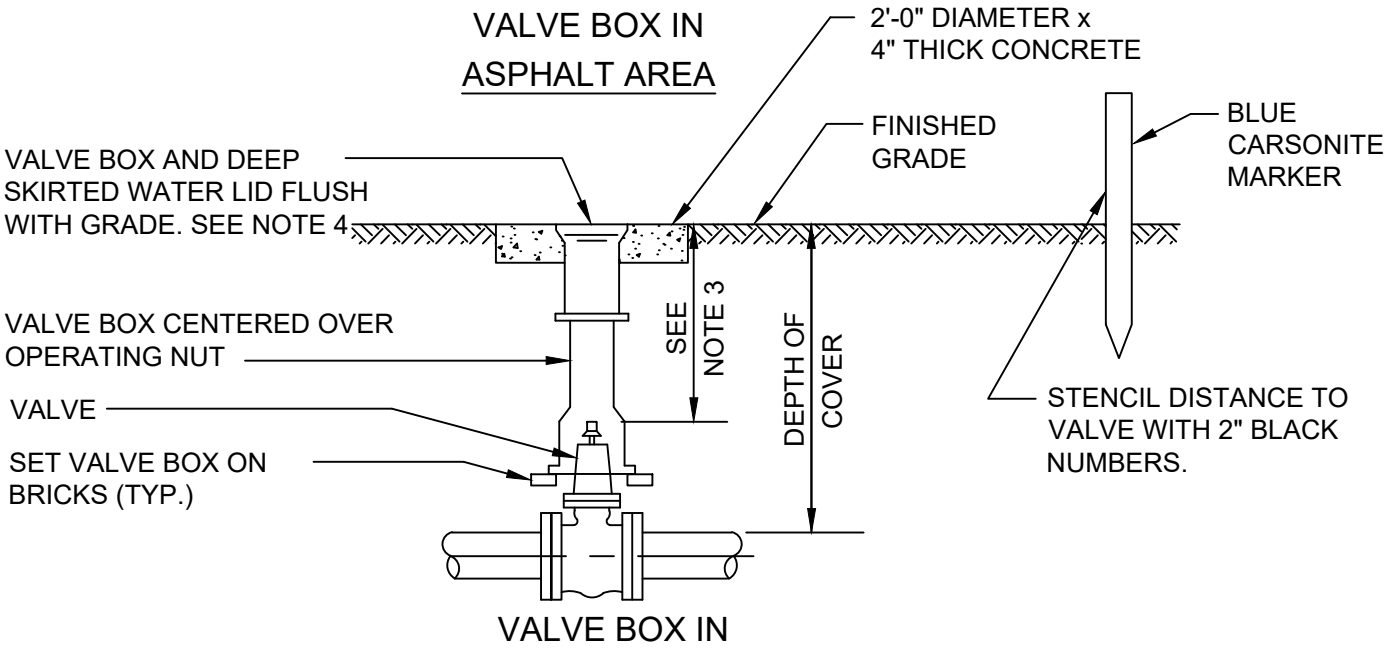
DOUBLE-CHECK DETECTOR ASSEMBLY - 4" AND LARGER

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FIGURE 5-17B



VALVE BOX IN ASPHALT AREA



VALVE BOX IN UNIMPROVED AREA (VALVE MARKER REQUIRED)

GENERAL NOTES:

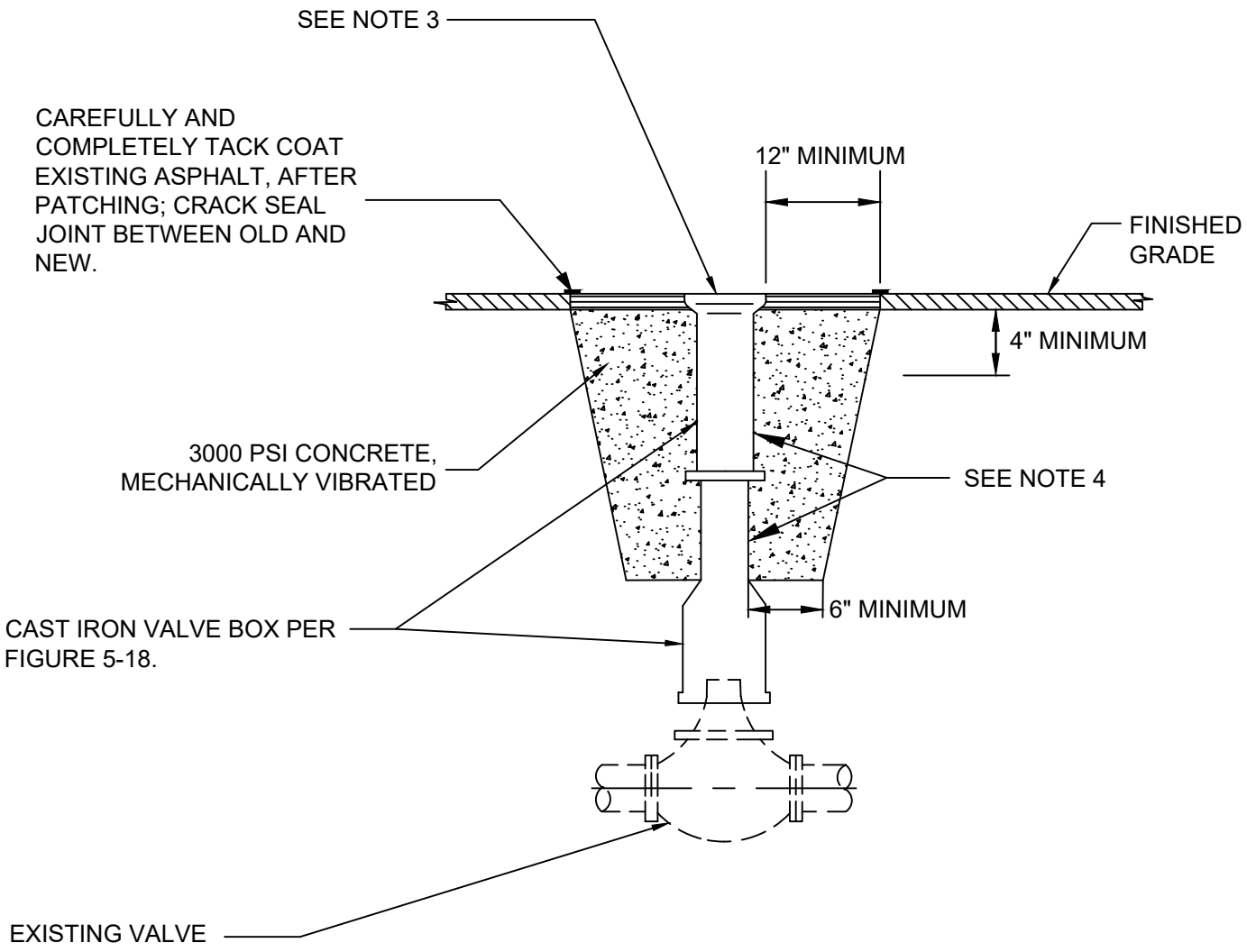
1. EACH VALVE SHALL BE PROVIDED WITH AN ADJUSTABLE CAST IRON VALVE BOX OF 5 INCHES (5") INSIDE DIAMETER. VALVE BOXES SHALL HAVE A TOP SECTION WITH AN EIGHTEEN INCH (18") MIN. LENGTH AND A BOTTOM SECTION WITH A 24" LENGTH. THE VALVE BOX SHALL BE OLYMPIC FOUNDARY No. 940 OR APPROVED EQUAL.
2. IF VALVE BOX TOP AND BOTTOM SECTIONS ARE NOT SUFFICIENTLY LONG, ALLOWING FOR A 6" MINIMUM VERTICAL OVERLAP OF THE 2 SECTIONS, THEN THE VALVE BOX SHALL BE EXTENDED AS REQUIRED WITH A SECTION OF 6" DIAMETER HUB X PLAIN END CAST IRON SOIL PIPE CUT TO THE REQUIRED LENGTH AND INSTALLED HUB DOWN BETWEEN THE VALVE BOX AND BOTTOM SECTION.
3. VALVE STEM ENTENSION REQUIRED IF TOP OF VALVE BOX TO VALUE OPERATING NUT EXCEEDS 48'.
4. VALVE BOX LID EARS SHALL BE PLACED IN LINE WITH THE PIPES SERVED.

CITY OF SEQUIM

VALVE BOX

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FIGURE 5-18



GENERAL NOTES:

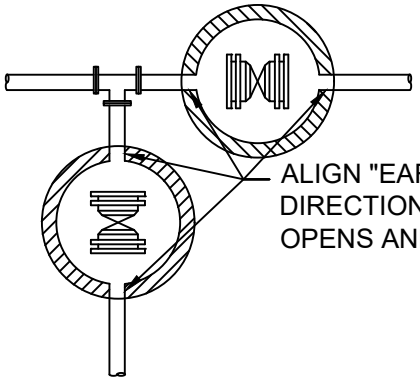
1. ALL EXISTING CONCRETE VALVE BOXES SHALL BE REPLACED WITH CAST IRON BOXES AND ADJUSTED WITH SOIL PIPE TO GRADE AS NEEDED.
2. ALIGNMENT OF THE VALVE BOX SHALL BE THE CONTRACTOR'S RESPONSIBILITY AND CARE SHALL BE TAKEN TO ENSURE THAT THE VALVE IS OPERABLE.
3. VALVE BOX LID EARS SHALL BE PLACED IN LINE WITH THE PIPE SERVED.
4. IF THE VALVE BOX TOP AND BOTOM SECTIONS ARE NOT SUFFICIENTLY LONG, ALLOWING FOR A 6" MINIMUM VERTICAL OVERALP OF THE TWO SECTIONS, THEN THE VALVE BOX SHALL BE EXTENDED. A SECTION OF 6" DIAMETER HUB X PLAIN END CAST IRON SOIL PIPE CUT TO THE REQUIRED LENGTH AND INSTALLED HUB DOWN BETWEEN THE VALVE BOX SECTIONS.

CITY OF SEQUIM

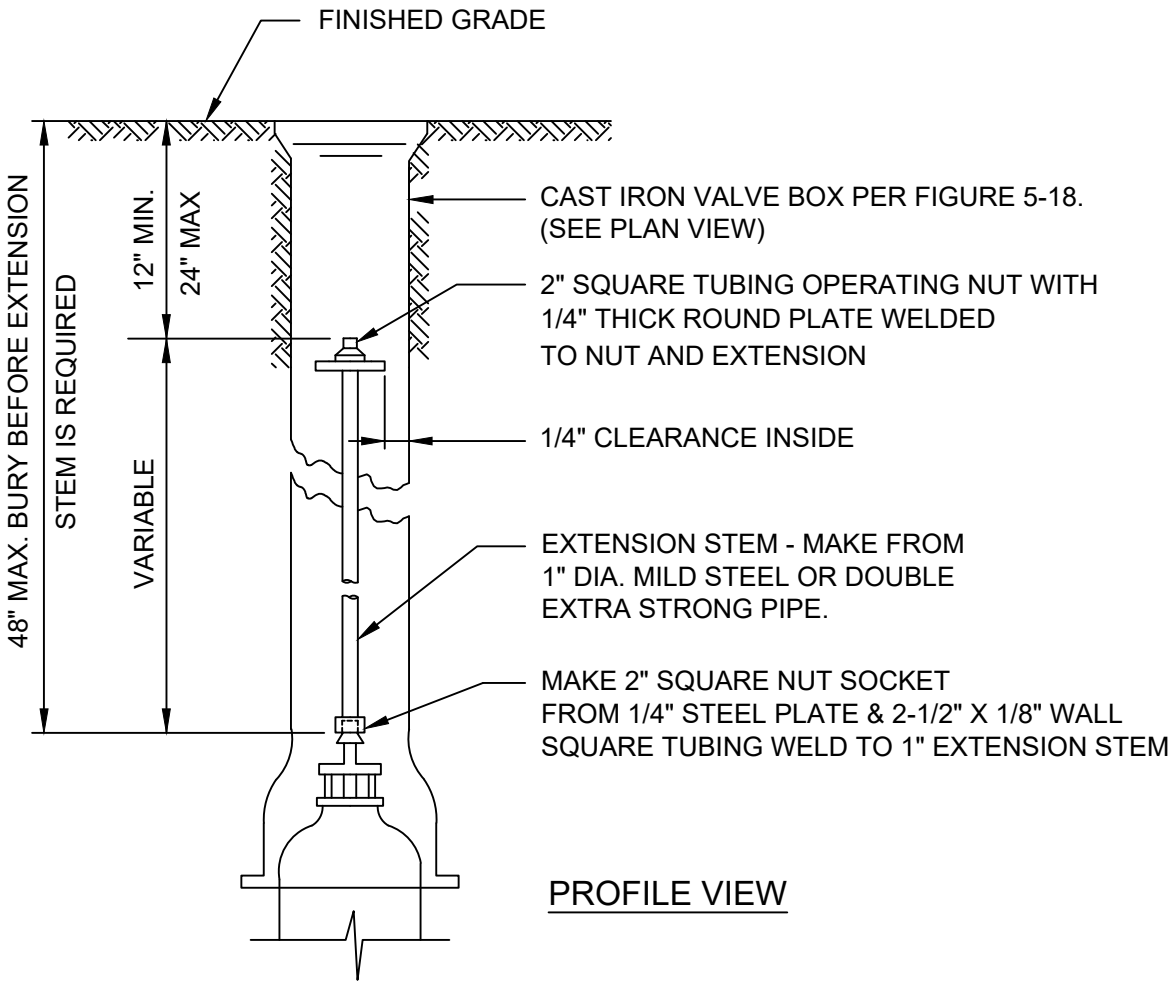
VALVE BOX ADJUSTMENT

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FIGURE
5-19



PLAN VIEW



PROFILE VIEW

GENERAL NOTES:

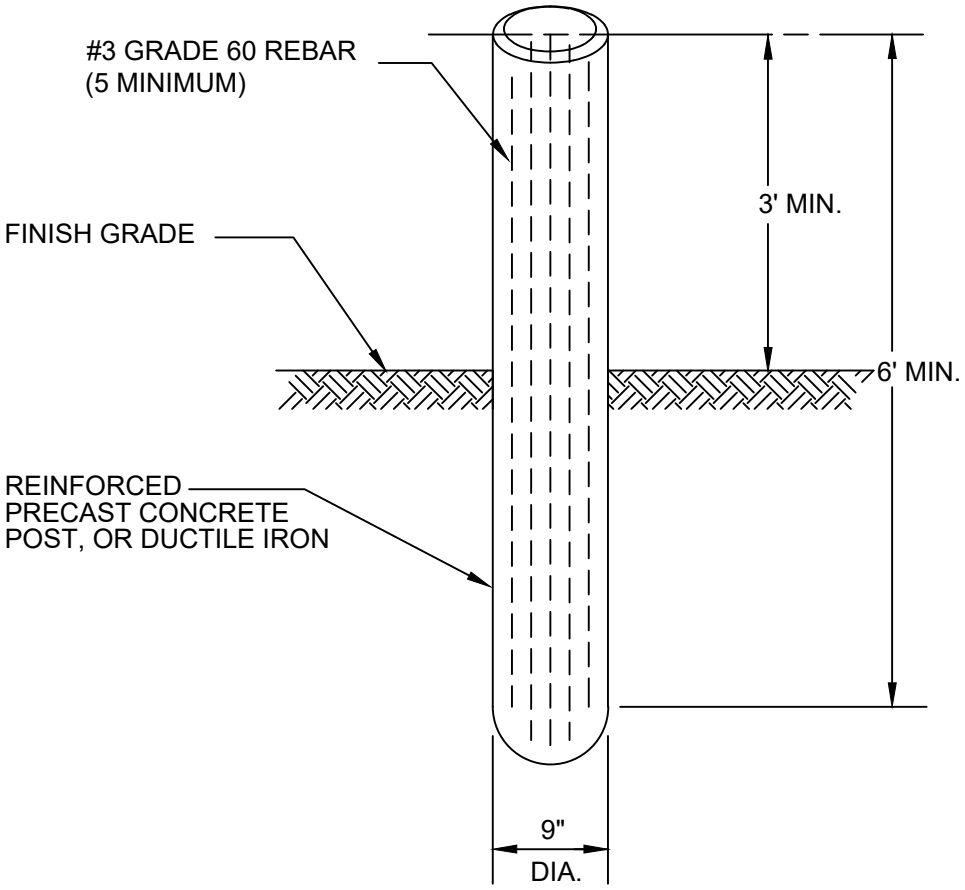
1. EXTEND TRACER WIRE ROUTING WITH EXTENSION STEM, AWAY FROM THE OPERATING NUT.

CITY OF SEQUIM

VALVE EXTENSION STEM

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FIGURE
5-20



GENERAL NOTES:

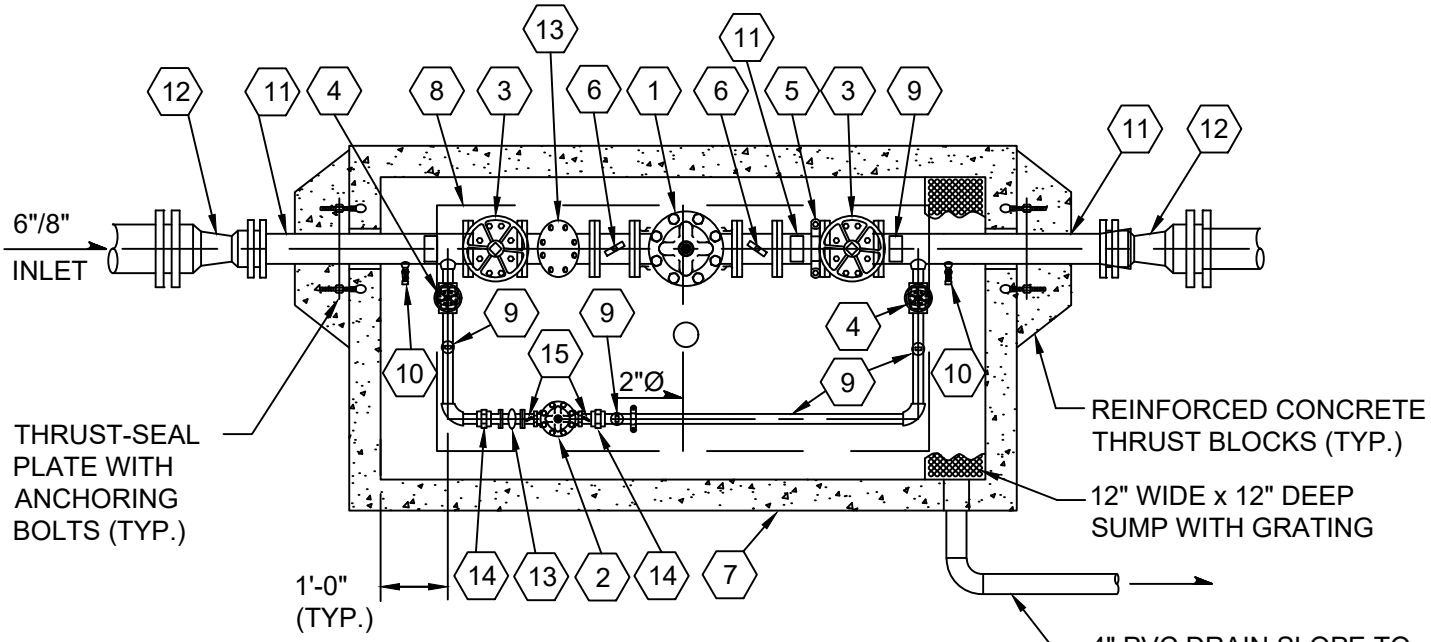
1. THE NUMBER AND CONFIGURATION OF THE GUARD POSTS SHALL BE DETERMINED BY THE CITY BASED ON FIELD CONDITIONS.
2. PAINT GUARD POSTS WITH TWO (2) COATS OF SAFETY YELLOW.
3. BACKFILL GUARD POSTS WITH GRAVEL BORROW, PLACED IN 6" LOOSE LIFTS, AND COMPACTED ALL AROUND TO 95% MINIMUM.

CITY OF SEQUIM

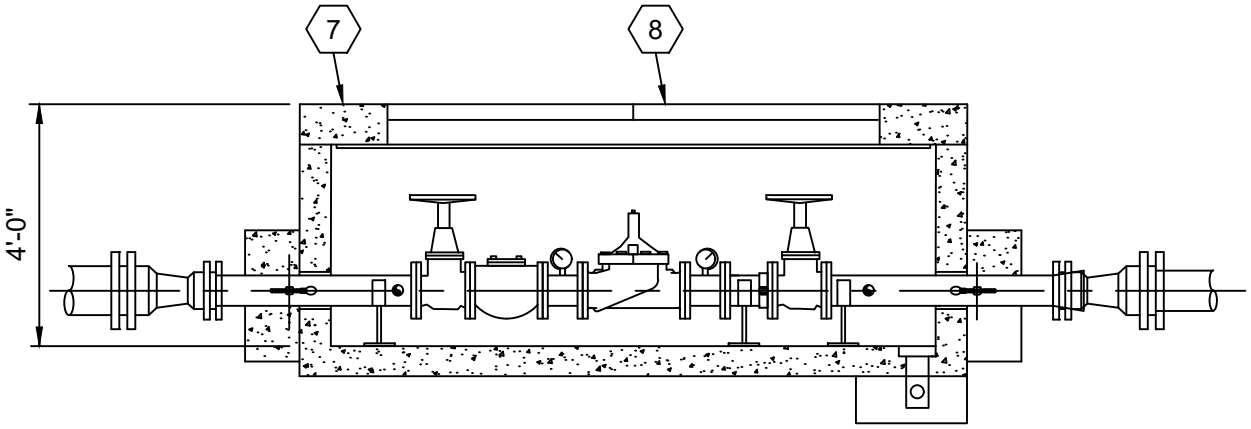
GUARD POST

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FIGURE
5-21



PLAN



SECTION

GENERAL NOTES:

1. ALTERNATE TO FIELD ASSEMBLED PRV AND IF SYSTEM AS MANUFACTURED BY CLA-VAL.

SEE FIGURE 5-22B FOR CALLOUTS AND NOTES

CITY OF SEQUIM

PRESSURE REDUCING VAULT

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FIGURE
5-22A

LEGEND

1. 6" CLA-VAL 92G-01BCSY PRESSURE REDUCING VALVE WITH X101 POSITION INDICATOR DI BODY, S.S. TRIM, #150 FL.
2. 2" CLA-VAL 90G-01BC PRESSURE REDUCING VALVE WITH X101 POSITION INDICATOR DI BODY, BRONZE TRIM - THREADED.
3. 6" D.I. RW NRS GATE VALVE WITH HANDWHEEL, #150 FL.
4. 2" MUELLER A2360-6W41 W55 RW NRS GATE VALVE WITH HANDWHEEL, THD.
5. UNIFLANGE
6. 4" 0-300 PSI PRESSURE GAUGE WITH SNUBBER AND GAUGE COCK. LOCATION SHALL BE AS SHOWN ON V-W18A ON THE TOP OF THE PIPE. GAUGE SHALL BE INSTALLED ON BOTH PRIMARY AND BYPASS PRV ASSEMBLIES (SEE ITEM 15 BELOW).
7. PRECAST CONCRETE VAULT 10'L x 5'W x 3'-7"H INSIDE, SOLID WALL WITH WHITE INTERIOR & BLACK EXTERIOR SEALANT
8. 48" X 96" DOUBLE DOOR ALUMINUM HATCH, LW PRODUCTS OR APPROVED EQUAL. H-20 RATED. DRAIN HATCH TO VAULT FLOOR.
9. ADJUSTABLE PIPE SUPPORTS
10. 3/4" HOSE BIB ASSEMBLY INSTALLED ON SADDLE TAP
11. PIPE SPOOL (FLxPE) LENGTH AS REQUIRED.
12. REDUCER (AS REQUIRED), MJ WITH MEGA-LUGS
13. WATER METER STRAINER, SENSUS OR APPROVED EQUAL.
14. UNIONS
15. 2" 0-300 PSI PRESSURE GAUGE WITH SNUBBER.

GENERAL NOTES:

1. 6" x 2" PRV ASSEMBLY SHOWN. SIZES TO BE DETERMINED BY THE CITY BASED ON DOWNSTREAM DEMANDS.
2. ALL 3" AND LARGER PIPE INSIDE WETTED SURFACES TO BE SANDBLASTED, EPOXY LINED AND COATED TO AWWA C210 AND NSF-61 SPECIFICATION. EXTERIOR COATING SHALL BE BLUE ENAMEL.
3. ALL PIPE 2" AND SMALLER TO BE BRASS.

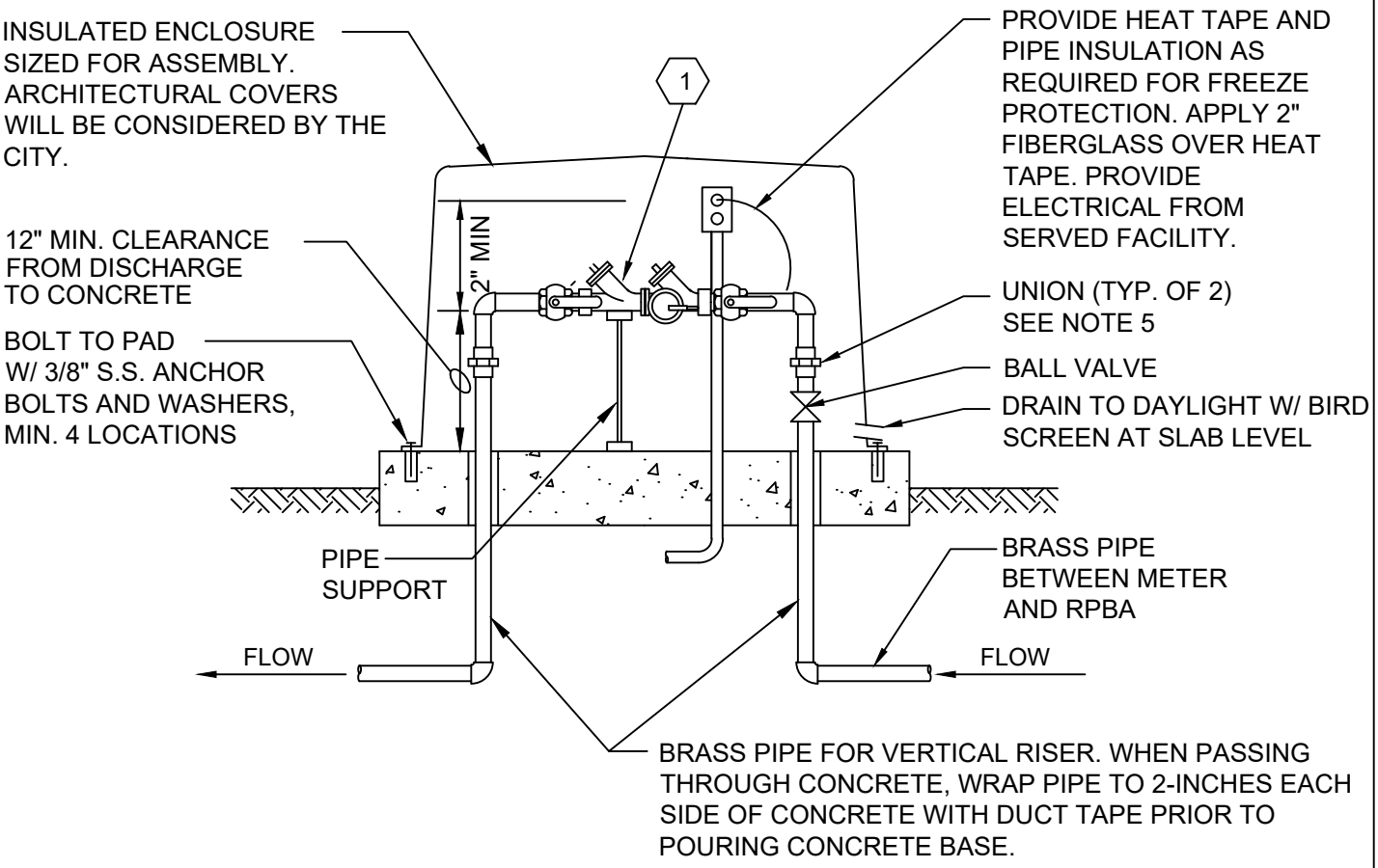
SEE FIGURE 5-22A FOR PLAN AND SECTION

CITY OF SEQUIM

PRESSURE REDUCING VAULT

REVISION NO.	DATE
0	07/11/2022

FIGURE 5-22B



1 WASHINGTON STATE APPROVED REDUCED PRESSURE BACKFLOW ASSEMBLY (RPBA) WITH TEST COCK PROTECTION AND BRONZE BODY BALL VALVE AT EACH END.

GENERAL NOTES:

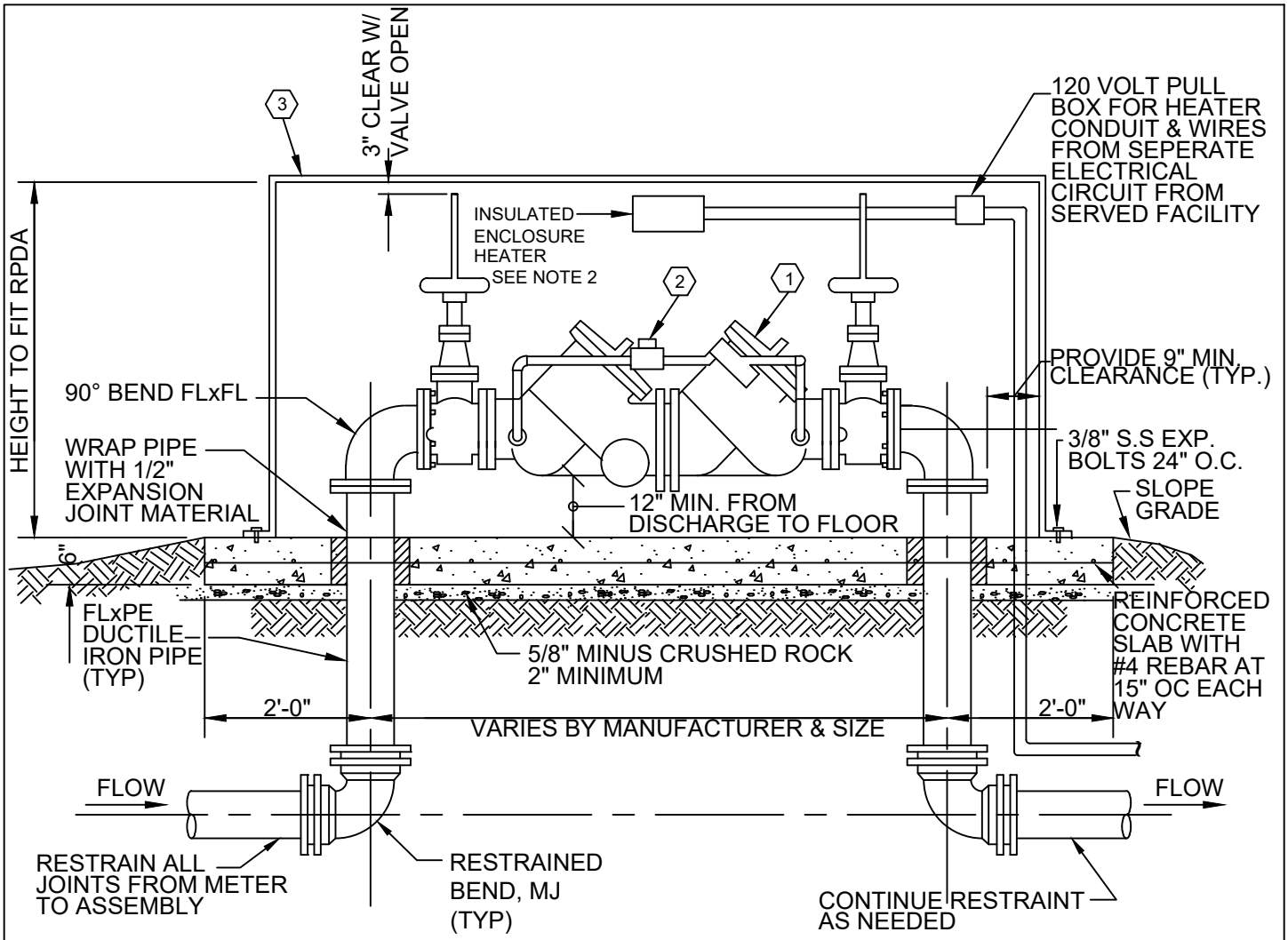
1. CONCRETE TO BE 3000 PSI (MINIMUM) MIX WITH AIR ENTRAINMENT.
2. SYSTEM SHALL NOT BE PUT INTO SERVICE UNTIL RPBA IS APPROVED BY THE CITY AND TESTED/CERTIFIED BY A WASHINGTON STATE LICENSED TESTER.
3. BY THE PROPERTY OWNER WITH ANNUAL CERTIFICATION REQUIRED. RPBA IS CONSIDERED PART OF THE PRIVATE SYSTEM AND SHALL BE MAINTAINED
4. DIELECTRIC UNIONS SHALL BE USED TO SEPARATE DISSIMILAR MATERIALS.
5. NO BRANCH CONNECTIONS ALLOWED BETWEEN METER AND RPBA.

CITY OF SEQUIM

REDUCED PRESSURE BACKFLOW ASSEMBLY ¾" TO 2"

REVISION NO.	DATE
0	07/11/2022

FIGURE 5-23



1. WASHINGTON STATE APPROVED REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA) WITH OS&Y RESILIENT SEAT GATE VALVE EACH END AND LOW FLOW METER ASSEMBLY.
2. LOW FLOW BYPASS METER, INCLUDING 5/8"x3/4" NEPTUNE OR SENSUS RADIO READ WATER METER WITH SENSUS AMR AND MXU RADIO UNIT, WASHINGTON STATE APPROVED REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA) AND 2 BRONZE BODY ISOLATION BALL VALVES, BRASS PIPING.
3. ALUMINUM INSULATED ENCLOSURE MODELS 4 THROUGH 10 FOR RESPECTIVE SIZE RPDA SHALL BE MODIFIED TO FIT ABOVE HEIGHT REQUIREMENTS. VALVE STEM SHALL NOT EXTEND OUTSIDE OF BOX.

GENERAL NOTES:

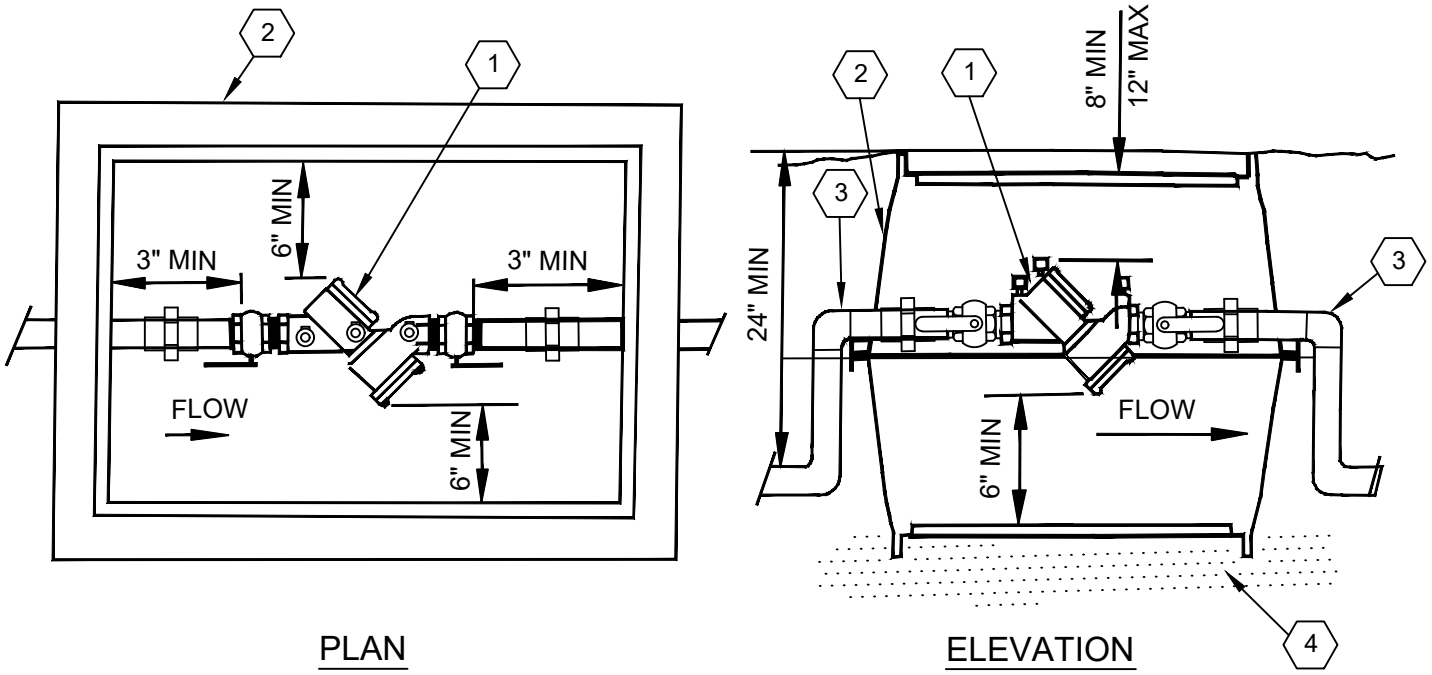
1. INSULATED ENCLOSURE TO BE LOCATED OUTDOORS AND ACCESSIBLE TO CITY. ALTERNATE LOCATION REQUIRES CITY APPROVAL.
2. HEATERS AND WIRING SHALL BE RATED AT 2,000 WATT FOR 8" AND UNDER: 3,000 WATT FOR 10".
3. CONCRETE TO BE 3000 PSI (MINIMUM) MIX WITH AIR ENTRAINMENT.
4. COMPLETE ALL WORK IN ACCORDANCE WITH STATE, CITY AND MANUFACTURER STANDARDS.
5. SYSTEM SHALL NOT BE PUT INTO SERVICE UNTIL RPDA IS APPROVED BY THE CITY AND TESTED/CERTIFIED BY A WASHINGTON STATE LICENSED TESTER.
6. RPDA IS CONSIDERED PART OF THE PRIVATE SYSTEM AND SHALL BE MAINTAINED BY THE PROPERTY OWNER WITH ANNUAL CERTIFICATION REQUIRED.
7. DRAIN TO DAYLIGHT WITH BIRD SCREEN LOCATED AT SLAB LEVEL (SIZED PER MANUFACTURERS RECOMMENDATIONS).
8. NO BRANCH CONNECTIONS ALLOWED BETWEEN METER AND RPDA.

CITY OF SEQUIM

REDUCED PRESSURE BACKFLOW ASSEMBLY 2 ½" AND LARGER

REVISION NO.	DATE
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FIGURE 5-24



PLAN ELEVATION

1. WASHINGTON STATE APPROVED DOUBLE CHECK VALVE ASSEMBLY (DCVA)
2. METER BOX. BERG VAULT CO. OF WASH NO. 2 CONCRETE, OR MID STATES PLASTICS MSBCF 1730-12 COMPOSITE. BOX SHALL BE H-20 LOAD RATED WHERE REQUIRED.
3. BENDS MAY BE LOCATED INSIDE OR OUTSIDE OF BOX SO LONG AS SUFFICIENT ROOM IS ALLOWED AT EACH END FOR VALVE OPERATION AND DCVA REPAIR OR MAINTENANCE.
4. PROVIDE FREE DRAINING BACKFILL BELOW BOX. (1/2" PEA GRAVEL).

GENERAL NOTES:

1. ALL TEST COCKS SHALL POINT UPWARDS AND HAVE BRASS PLUGS.
2. DCVA SHALL BE CENTERED IN BOX (PLAN).
3. COMPLETE ALL WORK IN ACCORDANCE WITH STATE, CITY AND MANUFACTURER STANDARDS.
4. SYSTEM SHALL NOT BE PUT INTO SERVICE UNTIL DCVA IS APPROVED BY THE CITY AND TESTED/CERTIFIED BY A WASHINGTON STATE LICENSED TESTER.
5. DCVA IS CONSIDERED PART OF A PRIVATE SYSTEM AND SHALL BE MAINTAINED BY THE PROPERTY OWNER WITH ANNUAL CERTIFICATION REQUIRED.
6. INSTALL DCVA USING UNIONS ON EACH END OF ASSEMBLY. UNIONS TO BE EXPOSED INSIDE OF BOX.
7. BOTTOM OF BOX TO BE OPEN TO DRAIN.
8. NO BRANCH CONNECTIONS ALLOWED BETWEEN METER AND DCVA.

CITY OF SEQUIM

DOUBLE CHECK VALVE ASSEMBLY - 2" AND SMALLER

REVISION NO.	DATE
0	07/11/2022

FIGURE 5-25

APPENDIX G

WATER QUALITY RESULTS

Contents:

- 2020 Consumer Confidence Report
- DOH reports of water quality test results
- Water Quality Monitoring Schedule
- Map of waterline sampling points
- Detection procedures flowcharts

2020 Consumer Confidence

Annual Water Quality Report

Water System ID No. 77620Y

For more information or questions please contact:

Public Works Department—Physical and Mailing address: 152 West Cedar Street
Phone: (360) 683-4908 Fax: (360) 681-0552 - Email: waterinfo@sequimwa.gov—Website: http://www.sequimwa.gov

Dear Water Customer:

The City of Sequim is pleased to share with you, our customers, the quality of your drinking water in this 2020 Annual Water Quality Report.

We want to be sure you know:

The City of Sequim's drinking water **meets or exceeds** all state and federal safe drinking water standards. You will find full details in this report.

History of Sequim's Water System

A study of the City of Sequim's water system was completed in 1973. As a result of this study, additional improvements were made to the City's water system. These improvements included covering the City reservoir, metering connections, and replacement of sub-standard water lines. Another report was completed in 1983 which addressed issues of water quality, water resources, and conservation. Improvements made to the City's water system, which were recommended in this report, included covering the 500,000 gallon reservoir, development of the Silberhorn Well Field, installation of a chlorination system in the intake piping, and construction of a new infiltration gallery on the Dungeness River. In 1986, a reservoir at a higher elevation was constructed and the Silberhorn Well Field was brought online. The City's 1.7 million-gallon (MG) reservoir was constructed in 1996. It provides a higher-pressure zone for the City. The Port Williams Well No. 1 was drilled and began providing drinking water in 1995. In 1998, additional pipelines were constructed and Port Williams Well No. 2 was drilled and equipped. A one million gallon reservoir on the east slope of Bell Hill was completed in 2008.



Port Williams Well No. 3 was completed and put into operation in 2009. Number 1 well at our Silberhorn well field was reconditioned and put back online in 2011. In 2013 the city replaced approximately 580 lineal feet of drinking water main lines in South Sequim Avenue and Washington Street. Our water meter replacement program for residential water meters was completed in 2013. In 2016 the City installed a water main water across South 3rd Ave. Water mains were replaced on North and South Sunnyside Ave. Water main on West Fir Street was replaced in 2019 to increase fire flow, leakage and continued the planning and engineering for the replacement of water lines and essential equipment that have either reached their service life or have inadequate capacity. These water lines and equipment will be slated for construction in 2020-2021. The city is committed to having a robust water system and will continue to improve your water system with the replacement of undersized public water lines with pipe that meets our current standards to



See Page 8 for the latest information on water testing.

Water Quality Protection Programs

The City is committed to supplying its customers with high quality drinking water. The City has adopted a Water System Plan to ensure that the drinking water supplied to its customers meets or exceeds all Federal and State standards.

The City of Sequim's Water System Plan

This plan was approved by the Sequim City Council, Department of Health (DOH) and Department of Ecology (DOE). The plan analyzes all aspects of the water system, identifying current and future plans by the City to continue to provide high quality drinking water to its customers. The City's Water System Plan must be updated every 6 years. The City completed the process of a new water system plan in 2014.

Water Conservation Program

The 2013 Water System Plan recommends many ways in which the City and its residents can help preserve and protect our water resources (see page 4 under Water Conservation).

Water Storage

Commercial and domestic demand, nesting, and emergency use water storage is provided by four reservoirs. The combined storage capacity of all four reservoirs is 3,400,000 gallons of water.

Water Quality Monitoring Requirements

Existing State law requires water systems to monitor for numerous contaminants on a regular basis. The City is in compliance with existing water quality monitoring requirements. Pages 7 through 11 indicate the water quality tests regularly performed by the City.

Wellhead Protection Program

The Water System Comprehensive Plan sets protective boundaries around the City's wells, identifies potential contamination sources around the wells and provides notification to City residents about wellhead protection.

Cross Connection Program

The city is mandated by Washington State Department of Health (DOH) to have an active cross connection program in place. In 2020, the city will continue to contact customers to achieve our full compliance with DOH cross control requirements. CCC Rules (PDF, DOH 331-355) - Washington State CCC regulations (WAC 246-290-490) and related definitions.

If you see a potential problem, let us know.

Drinking Water Wells

To protect your drinking water wells, follow the Department of Ecology's "Homeowners Guide to Well Construction." You may also refer to the Washington State Administrative Code WAC 173-160-171. Sequim welcomes input and would be happy to supply you with additional information. Feel free to contact the City Public Works staff at 152 West Cedar Street, 360-683-4908 or www.sequimwa.gov.



Upper Dungeness River

Washington's lakes, streams, and rivers play critical roles in people's lives. People rely on clean, unpolluted water for recreation, such as boating, fishing, and swimming. They also rely on clean water for DRINKING. To remain healthy, people need water that is safe to drink (see www.clallam.net for more information on WRIA 18 watershed protection).

General Health Effects Information

While traveling through the ground, groundwater dissolves some of the naturally occurring minerals that may contain substances resulting from the presence of animals or human activity. Contaminants that may be present include microbes, inorganic and organic chemicals, pesticides, herbicides, and radioactive materials. To ensure that tap water is safe to drink, the Environmental Protection Agency (EPA) prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. The FDA and Washington State Department of Agriculture regulations establish limits for contaminants in bottled water which are required to meet the same standards as public drinking water.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (1-800-426-4791).

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).





EPA Lead Statement: If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City of Sequim is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead

ODW Lead Statement: In Washington State, lead in drinking water comes primarily from materials and components used in household plumbing. The more time water has been sitting in pipes, the more dissolved metals, such as lead, it may contain. Elevated levels of lead can cause serious health problems, especially in pregnant women and young children. To help reduce potential exposure to lead: for any drinking water tap that has not been used for 6 hours or more, flush water through the tap until the water is noticeably colder before using for drinking or cooking. You can use the flushed water for watering plants, washing dishes, or general cleaning. Only use water from the cold-water tap for drinking, cooking, and especially for making baby formula. Hot water is likely to contain higher levels of lead. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water is available from EPA's Safe Drinking Water Hotline at 1-800-426-4791 or online at http://www.epa.gov/safewater/lead.

To ensure that tap water is safe to drink, the Department of Health and EPA prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The Food and Drug Administration (FDA) and the Washington Department of Agriculture regulations establish limits for contaminants in bottled water that must provide the same protection for public health.





Checking Chlorine and Pumping Levels

Water Use Efficiency Leakage Information for 2020	Million Gallons
Total Water Produced	341
Total Water Purchased	318
Unaccounted for Distribution System Water	23
Distribution System Losses as Percentage	6.81%

The table above shows the City's water production, purchased water and water system loss. This table also shows the city's commitment to conserve and to account for all water produced and eliminate all unaccounted for water.



Leak Repair

Water Conservation for You

Save Water Indoors

The average family uses 22% of their water washing clothes, 1% washing dishes, 16% using faucets, 17% showering, 27% flushing toilets, 14% on leaks, 2% taking baths, and 2% on other uses.

Save Water in the Bathroom

Check all faucets, pipes, and toilets periodically for leaks. A faucet drip or invisible leak in the toilet will add up to 15 gallons of water per day, or 105 gallons per week, which adds up to 5,475 gallons of wasted water per year. Check your flapper periodically to make sure it's a tight fit.

Install water saving shower heads. Low-flow showerheads deliver 2.5 gallons of water per minute or less and are relatively inexpensive. Older showerheads use 5 to 7 gallons per minute.

Take short showers or shallow baths. Simply taking shorter showers will save gallons of water. For long exposures to the water, a partially filled bath instead of a shower will use less water.

Install a 1.6 gallon low-flow toilet. Ultra-low flow toilets use only 1.6 gallons of water per flush. Using these could cut indoor water use by as much as 20%. Older toilets use 3.5 to 5 gallons per flush.

Check for toilet leaks. Once a year, check for toilet leaks. Remove the toilet tank cover and drip 10 drops of food coloring into the tank. After 15 minutes, check for color in the toilet bowl. If you see any color, your toilet has a leak and should be repaired immediately. Again, remember to check your flapper periodically to make sure it's a tight fit.

Don't use the toilet as a wastebasket. Using a wastebasket instead of the toilet for tissues, cleaning wipes, cloth and other bits of trash will save gallons of water that otherwise are wasted. It will also save the City staff time in finding system plug-ups, doing repairs and reduces City wastewater treatment costs. This saves you, the taxpayer, money.

Fix leaky faucets immediately. A leaky faucet may simply need a new washer. Small faucet leaks can waste 20 gallons of water per day. Large leaks can waste hundreds of gallons.

Turn off the water while shaving, brushing teeth, etc. Don't let water run when you brush your teeth, wash your face or hand, or shave. This can save 3 to 7 gallons per minute.

Water Loss in Gallons at 60 psi	
Leak this Size	Loss per Month
1/32"	6000
1/16"	25,000
1/8"	100,000
1/4"	400,000

Save Water in the Kitchen and Laundry

Fill your dishwasher. Your dishwasher uses the same amount of water whether it is full or just partially full of dishes, so be sure to fill it before you run it. Many dishwashers have a water saver cycle to save even more water.

Select proper water level laundry. Unlike your dishwasher, you can control the amount of water used by your clothes washers. Select the proper water level for each load of laundry.



City Staff Installs a New Water Meter

Water Saving Tips in the Garden



Since summertime outdoor watering is the biggest use of water (by far), we encourage City residents to reconsider your lawn…

Consider allowing your lawn to go dormant in the summer.

If you do choose to let your lawn go dormant, don't start watering it mid-summer and then stop again. This will damage grass plants.

If you need to water your lawn, do it in the early morning.

- 1" of water once/week is recommended for most of Western Washington.
- Measure the depth of watering with a shallow pan placed under sprinklers.

Also in the Garden

- Water early in the mornings to reduce evaporation losses. An occasional, ample watering is more effective than numerous, superficial watering.
- Use trickle or drip irrigation systems for watering trees, shrubs, hilly areas, or widely spaces plants.
- Collect runoff from roofs and paved areas for garden use.
- Use surface mulch around trees, shrubs, flowers and garden crops to reduce evaporation loss.
- Choose drought tolerant and native plants

More Water Saving Ideas

• Wash dishes by hand in a sink or a dishpan—uses less water than a dishwasher.

• Rinse or wash fruits and vegetables in standing, not running, sink water.

• Use the garbage disposal as efficiently as possible.

• Thaw frozen foods in the refrigerator.

• Loosen ice cubes by removing the trays a few minutes before they are needed.

• Keep a covered container for cool drinking water in the refrigerator.

• Repair faucets and toilets promptly.

• Clean sidewalk, driveway, and patio with a broom rather than by hosing off.

• Use a bucket for soapy wash water and rinse quickly with a hose when washing house windows or a car.

• Save bath, shower, and laundry water for toilet flushing if water is in extremely short supply.

• Avoid letting children play with running water.

• Super savers can also install low-flow toilets, dishwasher and clothes washer.

Source: http://www.clallam.net/waterconservation/



Questions:

How can I stay in touch with decisions that affect my drinking water?

- Newspapers
- Attend City Council Meetings
- City of Sequim website: http://www.sequimwa.gov
- DOH website: http://www.doh.wa.gov/ehp/dw/default.htm
- ECY website: http://www.edy.wa.gov/programs/wr/wrhome.html

Is bottled water cleaner and safer than tap water?

Since the Federal Food and Drug Administration regulates contaminants in bottled water and is responsible for providing the same levels of public health protection as public water systems, bottled water is not necessarily cleaner or safer than tap water.



Changing Weekly Water Flow Charts

Why is chlorine added to my drinking water?

Pursuant to state and federal laws, very small amounts of liquid chlorine in the form of Sodium Hypochlorite (NaOCl) are added to your drinking water as a disinfecting agent to protect you from disease-causing microorganisms. If you are bothered by the chlorine taste, keep a pitcher of tap water in the refrigerator. The chlorine will dissipate rapidly if the water is allowed to sit for a time.

Protecting our Water Supplies

People have grown understandably concerned about the safety of America's drinking water supply. It is a concern we all share and the City of Sequim has been working hard with our Emergency Management partners, EPA, DOE, DOH, County Health, Dungeness River Watershed, Users, Homeland Security and others in the drinking water industry to provide you with a safe and reliable water system.

Is our Drinking Water Supply Safe? YES

Your City Staff monitors:

- Daily Chlorine Checks
- Daily Turbidity (clarity of water)
- Monthly Coliforms
- Taste and Odor
- Security Surveillance at All Water Supply and Supply Areas
- Backflow Device Testing
- Inspection of All Installations and Repairs

City customers would be immediately notified if precautions were needed or warranted.

Source protection information
Washington State Department of Health Office of Drinking Water compiled Source Water Assessment Program (SWAP) data for all community PWSs in Washington. SWAP data for your PWS is online at: http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/SourceWaterProtection/Assessment.aspx

If you don't have access to the Web, we encourage you to use the Internet service available through the public library system.

What should I do if I see someone around the City's drinking water supply that looks suspicious?
Contact your local law enforcement by dialing 9-1-1 to report a suspicious event.

The Following Tests are From 2020

Test Results Summary						
Contaminant	Violation Yes/No	Level Detected	Unit Measurement	MCLG	MCL	Typical Source
Microbiological Contaminates						
Coliform Bacteria	NO	ND	Present or Absent	0	One Positive monthly sample	Natural present in the environment
Inorganic Contaminates (IOC)						
Nitrate (as Nitrogen) (SO1) Infiltration System	NO	ND	ppm	10	10	Runoff from fertilizer use; leaching from septic tanks, erosion of natural deposits
Nitrate (as Nitrogen) (SO2) Silberhorn Wellfield	NO	1.54	ppm	10	10	Runoff from fertilizer use; leaching from septic tanks, erosion of natural deposits
Nitrate (as Nitrogen) (SO5) Port Williams Wellfield	NO	0.71	ppm	10	10	Runoff from fertilizer use; leaching from septic tanks, erosion of natural deposits
Iron (SO2) Silberhorn Wellfield	NO	ND	mg/L	0.3		
Volatile Organic Contaminates (VOC) EPA Method 524.2 for State Drinking Water Compliance (Silberhorn Wellfield) (SO5)						
EPA/State Regulated	NO	ND	ppb			Natural present in the environment also found in manmade products
EPA/State Unregulated	NO	ND	ppb			Natural present in the environment also found in manmade products
EPA Regulated under Trihalo-methanes Program	NO	ND	ppb		60/80	Byproduct of drinking wa-ter disinfection
State Unregulated	NO	ND	ppb			Natural present in the environment also found in manmade products

Definitions of the above tables are located on page 12.



Local school children experience the Dungeness River

Other samples taken in 2020

Sample	Results	Method EPA	MRDL	Sample frequency
Average Free Chlorine	0.30 ppm	4500-CI G	4 ppm	Daily

Combined Average Hardness of the City's Water System (3 sources)

Analyte	Results (Combined Average)	Units
Hardness, Total (as CaCO3)	108 avg. ppm	ppb as CaCO3



The Following Tests are From August 2020

Table 3

Water Quality Data (Regulated by EPA, State and other)

Disinfection By-Product Compound Report

EPA Regulated - Under Trihalomethanes Program

EPA Method 524.2 For State Drinking Water Compliance

Disinfection Byproducts Stage 2						
Contaminant	Violation Yes/No	Level Detected	Unit Measurement	Sample Year	MCL	Typical Source
HAA (5) Site 24	NO	3.9	ppb	2019	60	Byproduct of drinking water disinfection
Total Trihalomethanes Site 24	NO	8.0	ppb	2019	80	Byproduct of drinking water disinfection
HAA (5) Site 26	NO	2.9	ppb	2019	60	Byproduct of drinking water disinfection
Total Trihalomethanes Site 26	NO	9.5	ppb	2019	80	Byproduct of drinking water disinfection

2016 RADIONUCLIDE ANALYSIS REPORT

Sample Location: Ranney Well

DOH #	ANALYTES	LAB MDA	RESULTS	UNITS	DATE ANALYZED	MCL	METHOD USED
EPA/STATE REGULATED (These analyses should be performed in order as listed)							
165	Gross Alpha		0.4	pCi/L	12/03/2015	15	TRS/E900.0
166	Radium 228		0.7	pCi/L	12/03/2015	5	PLJ/RA-05



Monitoring Levels in Local Wells

Reading the Tables

MCL (Maximum contaminant level): The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

MCLG (Maximum contaminant level goal): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

Maximum Residual Disinfectant Level (MRDL): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MFL (Million fibers per liter): Unit of measure for asbestos fibers greater than 10 mm in length.

NTU (Nephelometric turbidity unit): The unit of measure for turbidity.

PPM (Part per million): One part per million or one milligram per liter (mg/L).

Secondary MCLs: MCLs based on factors other than health effects such as taste and aesthetics.

DBPs-TTHMs (Total Trihalomethanes): Contaminants created from the reaction of chlorine and water. The result shown is samples from 2008.

DOH (Department of Health): Washington State Department of Health.

VOC: Volatile Organic Chemicals

SOC: Synthetic Organic Chemicals

Radioactive Contaminates: Can occur naturally or be the result of oil and gas production and mining activates.

SRL: (State Reporting Level) indicates the minimum reporting level required by DOH.

NA: (Not Analyzed) use in the results column for compounds not included in current analysis

ND: (Not Detected) use in the results column for compounds analyzed and not detected at a level greater or equal to the SRL.

Trigger Level: (DOH Drinking Water response level) Systems with compounds detected at concentrations in excess of this level are required to take additional samples.

Method: Is a definitive procedure that produces a test result.

Results: Is the product of performed test.

Units: Are measurements an metric form: L = Liter, mg = milligram

Water Quality Monitoring Results

The data shown in Table 2 are some of the items tested for by the City of Sequim. All the contaminants are well below the levels allowed by the state and federal agencies. Additional information on chemical analyses can be obtained by calling Sequim Public Works Department at 360-683-4908

2020 Water Quality Monitoring Schedule

Coliform Monitoring Requirements

	Mar 2020	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2020	Feb 2020
Coliform Monitoring Population	13995	14007	14020	14045	11688	11627	13854	13817	13799	13909	13979	13989
Number of Routine Samples Required	15	15	15	15	10	10	15	15	15	15	15	15

Chemical Monitoring Requirements

Distribution Monitoring

Test Panel/Analyte	# Samples Required	Compliance Period	Frequency	Last Sample Date	Next Sample Due
Lead and Copper	30	Jan 2020 - Dec 2022	standard - 3 year	09/04/2019	Aug 2022
Asbestos	0	Jan 2020 - Dec 2028	standard - 9 year	06/06/2018	
Total Trihalomethane (THM)	2	Jan 2020 - Dec 2020	reduced - 1 year	08/02/2019	Aug 2020
Halo-Acetic Acids (HAA5)	2	Jan 2020 - Dec 2020	reduced - 1 year	08/09/2019	Aug 2020

Source Monitoring

Ranney Well (SO1)

Test Panel/Analyte	# Samples Required	Compliance Period	Frequency	Last Sample Date	Next Sample Date
Nitrate	1	Jan 2020 - Dec 2020	standard - 1 year	07/17/2019	Jul 2020
Complete Inorganic (IOC)	1	Jan 2020 - Dec 2028	waiver - 9 year	07/05/2017	Jul 2026
Volatile Organics (VOC)	1	Jan 2020 - Dec 2025	waiver - 6 year	07/15/2015	Jul 2021
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	07/18/2016	
Pesticides	0	Jan 2020 - Dec 2022	waiver - 3 year	07/26/2007	
Soil Fumigants	0	Jan 2020 - Dec 2022	waiver - 3 year		
Gross alpha	1	Jan 2020 - Dec 2025	standard - 6 year	07/18/2016	Jul 2022
Radium 228	1	Jan 2020 - Dec 2025	standard - 6 year	07/18/2016	Jul 2022

Water Quality Monitoring Schedule
Continued

Source Monitoring

Silberhorn Wellfield (SO2)

Test Panel/Analyte	# Samples Required	Compliance Period	Frequency	Last Sample Date	Next Sample Date
Nitrate	1	Jan 2020 - Dec 2020	standard - 1 year	05/08/2019	Aug 2020
Complete Inorganic (IOC)	1	Jan 2020 - Dec 2028	wavier— 9 year	05/18/2011	May 2020
Iron	1	Jan 2020 – Dec 2022	Standard – 3 year	05/18/2011	May 2020
Volatile Organics (VOC)	1	Jan 2020 - Dec 2025	waiver - 6 year	06/16/2017	Jun 2023
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	07/18/2016	
Pesticides	0	Jan 2020 - Dec 2022	waiver - 3 year	07/26/2007	
Soil Fumigants	0	Jan 2020 - Dec 2022	waiver - 3 year		
Gross alpha	1	Jan 2020 - Dec 2025	standard - 6 year	05/28/2015	May 2021
Radium 228	1	Jan 2020 - Dec 2025	standard - 6 year	05/08/2015	May 2021

Source Monitoring

Port Williams Wellfield (SO5)

Test Panel/Analyte	# Samples Required	Compliance Period	Frequency	Last Sample Date	Next Sample Date
Nitrate	1	Jan 2020- Dec 2020	standard - 1 year	05/08/2019	May 2019
Complete Inorganic (IOC)	1	Jan 2020 - Dec 2028	waiver - 9 year	03/09/2016	Mar 2025
Volatile Organics (VOC)	1	Jan 2020 - Dec 2025	waiver - 6 year	06/12/2019	Jun 2025
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	07/18/2016	
Pesticides	0	Jan 2017 - Dec 2019	waiver - 3 year	11/28/2007	
Soil Fumigants	0	Jan 2020 - Dec 2022	waiver - 3 year		
Gross alpha	1	Jan 2020 - Dec 2025	standard - 6 year	11/18/2015	Nov 2021
Radium 228	1	Jan 2020 - Dec 2025	standard - 6 year	11/18/2015	Nov 2021

Current Events:

The City of Sequim completed the Water System Plan (WSP) in 2014. The WSP update is required by the Washington State Department of Health (Office of Drinking Water) every 6 years and will be completed in 2021. The WSP includes many chapters, for example: Cross connection program, water system planning, operations, sampling, sources and water use efficiency. In 2018 the City completed the construction water mains on North and South Sunnyside. 2018-2019 the City completed construction of new water main on West Fir and 5th and McCurdy Booster station. Design, engineering and construction for a portion of North 4th Ave. and North 7th Ave.

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Help

View Sample Detail - WSID 77620Y - SEQUIM CITY OF

Collect Date	7/5/2017
Lab Number	010
Lab Name	Spectra Laboratories - Kitsap, LLC
Sample Number	65001
Source	01
Analyte Group	IOC-INORGANIC CONTAMINANTS
Test Panel	IOC-COMPLETE INORGANIC ANALYSIS
Sample Location	riverwell gate
Sample Type	Post-Treatment / Finished

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0015	HARDNESS	EQ	51.4000		10.0000	mg/L
0016	CONDUCTIVITY	EQ	92.8000	700.0000	70.0000	Umhos/cm
0017	TURBIDITY	EQ	0.4500		0.1000	NTU
0019	FLUORIDE	EQ	0.1300	4.0000	0.2000	mg/L
0021	CHLORIDE	EQ	1.2600	250.0000	20.0000	mg/L
0004	ARSENIC	LT	0.0010	0.0104	0.0010	mg/L
0005	BARIUM	LT	0.1000	2.0000	0.1000	mg/L
0006	CADMIUM	LT	0.0010	0.0050	0.0010	mg/L
0007	CHROMIUM	LT	0.0070	0.1000	0.0070	mg/L
0008	IRON	LT	0.1000	0.3000	0.1000	mg/L
0009	LEAD	LT	0.0010		0.0010	mg/L
0010	MANGANESE	LT	0.0100	0.0500	0.0100	mg/L
0011	MERCURY	LT	0.0002	0.0020	0.0002	mg/L
0012	SELENIUM	LT	0.0020	0.0500	0.0020	mg/L
0013	SILVER	LT	0.1000	0.1000	0.1000	mg/L
0014	SODIUM	LT	5.0000		5.0000	mg/L
0018	COLOR	LT	15.0000	15.0000	15.0000	CU
0020	NITRATE-N	LT	0.1000	10.0000	0.5000	mg/L
0022	SULFATE	LT	50.0000	250.0000	50.0000	mg/L
0023	COPPER	LT	0.2000		0.0200	mg/L
0024	ZINC	LT	0.2000	5.0000	0.2000	mg/L
0110	BERYLLIUM	LT	0.0003	0.0040	0.0003	mg/L
0111	NICKEL	LT	0.0050	0.1000	0.0050	mg/L
0112	ANTIMONY	LT	0.0030	0.0060	0.0030	mg/L
0113	THALLIUM	LT	0.0010	0.0020	0.0010	mg/L

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Collect Date	7/5/2017
Lab Number	010
Lab Name	Spectra Laboratories - Kitsap, LLC
Sample Number	65001
Source	01
Analyte Group	IOC-INORGANIC CONTAMINANTS
Test Panel	IOC-COMPLETE INORGANIC ANALYSIS
Sample Location	riverwell gate
Sample Type	Post-Treatment / Finished

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0114	NITRITE-N	LT	0.1000	1.0000	0.1000	mg/L
0116	CYANIDE	LT	0.0500	0.2000	0.0500	mg/L
0161	TOTAL NITRATE/NITRITE	LT	0.1000		0.5000	mg/L

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View Sample Detail - WSID 77620Y - SEQUIM CITY OF

Collect Date	5/20/2020
Lab Number	010
Lab Name	Spectra Laboratories - Kitsap, LLC
Sample Number	94702
Source	02
Analyte Group	IOC-INORGANIC CONTAMINANTS
Test Panel	IOC-COMPLETE INORGANIC ANALYSIS
Sample Location	cl room
Sample Type	Post-Treatment / Finished

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0014	SODIUM	EQ	5.0500		5.0000	mg/L
0015	HARDNESS	EQ	133.0000		10.0000	mg/L
0016	CONDUCTIVITY	EQ	261.0000	700.0000	70.0000	Umhos/cm
0017	TURBIDITY	EQ	0.1000		0.1000	NTU
0020	NITRATE-N	EQ	1.5900	10.0000	0.5000	mg/L
0161	TOTAL NITRATE/NITRITE	EQ	1.5900		0.5000	mg/L
0004	ARSENIC	LT	0.0010	0.0104	0.0010	mg/L
0005	BARIUM	LT	0.1000	2.0000	0.1000	mg/L
0006	CADMIUM	LT	0.0010	0.0050	0.0010	mg/L
0007	CHROMIUM	LT	0.0070	0.1000	0.0070	mg/L
0008	IRON	LT	0.1000	0.3000	0.1000	mg/L
0009	LEAD	LT	0.0010		0.0010	mg/L
0010	MANGANESE	LT	0.0100	0.0500	0.0100	mg/L
0011	MERCURY	LT	0.0002	0.0020	0.0002	mg/L
0012	SELENIUM	LT	0.0020	0.0500	0.0020	mg/L
0013	SILVER	LT	0.1000	0.1000	0.1000	mg/L
0018	COLOR	LT	15.0000	15.0000	15.0000	CU
0021	CHLORIDE	LT	20.0000	250.0000	20.0000	mg/L
0022	SULFATE	LT	50.0000	250.0000	50.0000	mg/L
0023	COPPER	LT	0.0200		0.0200	mg/L
0024	ZINC	LT	0.2000	5.0000	0.2000	mg/L
0110	BERYLLIUM	LT	0.0003	0.0040	0.0003	mg/L
0111	NICKEL	LT	0.0050	0.1000	0.0050	mg/L
0112	ANTIMONY	LT	0.0030	0.0060	0.0030	mg/L
0113	THALLIUM	LT	0.0010	0.0020	0.0010	mg/L

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Collect Date	5/20/2020
Lab Number	010
Lab Name	Spectra Laboratories - Kitsap, LLC
Sample Number	94702
Source	02
Analyte Group	IOC-INORGANIC CONTAMINANTS
Test Panel	IOC-COMPLETE INORGANIC ANALYSIS
Sample Location	cl room
Sample Type	Post-Treatment / Finished

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0114	NITRITE-N	LT	0.1000	1.0000	0.1000	mg/L

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Collect Date	5/20/2020
Lab Number	118
Lab Name	Spectra Laboratories, LLC
Sample Number	39682
Source	02
Analyte Group	IOC-INORGANIC CONTAMINANTS
Test Panel	IOC-COMPLETE INORGANIC ANALYSIS
Sample Location	s02 cl2 room
Sample Type	Post-Treatment / Finished

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0019	FLUORIDE	LT	0.2000	4.0000	0.2000	mg/L
0116	CYANIDE	LT	0.0500	0.2000	0.0500	mg/L

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Collect Date	3/9/2016
Lab Number	010
Lab Name	Spectra Laboratories - Kitsap, LLC
Sample Number	06801
Source	03
Analyte Group	IOC-INORGANIC CONTAMINANTS
Test Panel	IOC-COMPLETE INORGANIC ANALYSIS
Sample Location	port williams control bldg office tap
Sample Type	Post-Treatment / Finished

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0004	ARSENIC	EQ	0.0017	0.0104	0.0010	mg/L
0014	SODIUM	EQ	9.4600		5.0000	mg/L
0015	HARDNESS	EQ	137.0000		10.0000	mg/L
0016	CONDUCTIVITY	EQ	297.0000	700.0000	70.0000	Umhos/cm
0017	TURBIDITY	EQ	0.2000		0.1000	NTU
0020	NITRATE-N	EQ	0.4500	10.0000	0.5000	mg/L
0021	CHLORIDE	EQ	3.2700	250.0000	20.0000	mg/L
0161	TOTAL NITRATE/NITRITE	EQ	0.4500		0.5000	mg/L
0005	BARIUM	LT	0.1000	2.0000	0.1000	mg/L
0006	CADMIUM	LT	0.0010	0.0050	0.0010	mg/L
0007	CHROMIUM	LT	0.0070	0.1000	0.0070	mg/L
0008	IRON	LT	0.1000	0.3000	0.1000	mg/L
0009	LEAD	LT	0.0010		0.0010	mg/L
0010	MANGANESE	LT	0.0100	0.0500	0.0100	mg/L
0011	MERCURY	LT	0.0002	0.0020	0.0002	mg/L
0012	SELENIUM	LT	0.0020	0.0500	0.0020	mg/L
0013	SILVER	LT	0.1000	0.1000	0.1000	mg/L
0018	COLOR	LT	15.0000	15.0000	15.0000	CU
0019	FLUORIDE	LT	0.5000	4.0000	0.2000	mg/L
0022	SULFATE	LT	50.0000	250.0000	50.0000	mg/L
0023	COPPER	LT	0.0200		0.0200	mg/L
0024	ZINC	LT	0.2000	5.0000	0.2000	mg/L
0110	BERYLLIUM	LT	0.0003	0.0040	0.0003	mg/L
0111	NICKEL	LT	0.0050	0.1000	0.0050	mg/L
0112	ANTIMONY	LT	0.0030	0.0060	0.0030	mg/L

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Collect Date	3/9/2016
Lab Number	010
Lab Name	Spectra Laboratories - Kitsap, LLC
Sample Number	06801
Source	03
Analyte Group	IOC-INORGANIC CONTAMINANTS
Test Panel	IOC-COMPLETE INORGANIC ANALYSIS
Sample Location	port williams control bldg office tap
Sample Type	Post-Treatment / Finished

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0113	THALLIUM	LT	0.0010	0.0020	0.0010	mg/L
0114	NITRITE-N	LT	0.1000	1.0000	0.1000	mg/L
0116	CYANIDE	LT	0.0500	0.2000	0.0500	mg/L

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Collect Date	3/9/2016
Lab Number	010
Lab Name	Spectra Laboratories - Kitsap, LLC
Sample Number	06703
Source	03
Analyte Group	IOC-INORGANIC CONTAMINANTS
Test Panel	NIT-NITRATE SUITE
Sample Location	port williams control bldg ot
Sample Type	Post-Treatment / Finished

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0020	NITRATE-N	EQ	1.9700	10.0000	0.5000	mg/L

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View Sample Detail - WSID 77620Y - SEQUIM CITY OF

Collect Date	3/9/2016
Lab Number	010
Lab Name	Spectra Laboratories - Kitsap, LLC
Sample Number	06801
Source	04
Analyte Group	IOC-INORGANIC CONTAMINANTS
Test Panel	IOC-COMPLETE INORGANIC ANALYSIS
Sample Location	port williams control bldg office tap
Sample Type	Post-Treatment / Finished

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0004	ARSENIC	EQ	0.0017	0.0104	0.0010	mg/L
0014	SODIUM	EQ	9.4600		5.0000	mg/L
0015	HARDNESS	EQ	137.0000		10.0000	mg/L
0016	CONDUCTIVITY	EQ	297.0000	700.0000	70.0000	Umhos/cm
0017	TURBIDITY	EQ	0.2000		0.1000	NTU
0020	NITRATE-N	EQ	0.4500	10.0000	0.5000	mg/L
0021	CHLORIDE	EQ	3.2700	250.0000	20.0000	mg/L
0161	TOTAL NITRATE/NITRITE	EQ	0.4500		0.5000	mg/L
0005	BARIUM	LT	0.1000	2.0000	0.1000	mg/L
0006	CADMIUM	LT	0.0010	0.0050	0.0010	mg/L
0007	CHROMIUM	LT	0.0070	0.1000	0.0070	mg/L
0008	IRON	LT	0.1000	0.3000	0.1000	mg/L
0009	LEAD	LT	0.0010		0.0010	mg/L
0010	MANGANESE	LT	0.0100	0.0500	0.0100	mg/L
0011	MERCURY	LT	0.0002	0.0020	0.0002	mg/L
0012	SELENIUM	LT	0.0020	0.0500	0.0020	mg/L
0013	SILVER	LT	0.1000	0.1000	0.1000	mg/L
0018	COLOR	LT	15.0000	15.0000	15.0000	CU
0019	FLUORIDE	LT	0.5000	4.0000	0.2000	mg/L
0022	SULFATE	LT	50.0000	250.0000	50.0000	mg/L
0023	COPPER	LT	0.0200		0.0200	mg/L
0024	ZINC	LT	0.2000	5.0000	0.2000	mg/L
0110	BERYLLIUM	LT	0.0003	0.0040	0.0003	mg/L
0111	NICKEL	LT	0.0050	0.1000	0.0050	mg/L
0112	ANTIMONY	LT	0.0030	0.0060	0.0030	mg/L

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Collect Date	3/9/2016
Lab Number	010
Lab Name	Spectra Laboratories - Kitsap, LLC
Sample Number	06801
Source	04
Analyte Group	IOC-INORGANIC CONTAMINANTS
Test Panel	IOC-COMPLETE INORGANIC ANALYSIS
Sample Location	port williams control bldg office tap
Sample Type	Post-Treatment / Finished

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0113	THALLIUM	LT	0.0010	0.0020	0.0010	mg/L
0114	NITRITE-N	LT	0.1000	1.0000	0.1000	mg/L
0116	CYANIDE	LT	0.0500	0.2000	0.0500	mg/L

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Collect Date	3/9/2016
Lab Number	010
Lab Name	Spectra Laboratories - Kitsap, LLC
Sample Number	06703
Source	04
Analyte Group	IOC-INORGANIC CONTAMINANTS
Test Panel	NIT-NITRATE SUITE
Sample Location	port williams control bldg ot
Sample Type	Post-Treatment / Finished

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0020	NITRATE-N	EQ	1.9700	10.0000	0.5000	mg/L

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Collect Date	3/9/2016
Lab Number	010
Lab Name	Spectra Laboratories - Kitsap, LLC
Sample Number	06801
Source	05
Analyte Group	IOC-INORGANIC CONTAMINANTS
Test Panel	IOC-COMPLETE INORGANIC ANALYSIS
Sample Location	port williams control bldg office tap
Sample Type	Post-Treatment / Finished

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0004	ARSENIC	EQ	0.0017	0.0104	0.0010	mg/L
0014	SODIUM	EQ	9.4600		5.0000	mg/L
0015	HARDNESS	EQ	137.0000		10.0000	mg/L
0016	CONDUCTIVITY	EQ	297.0000	700.0000	70.0000	Umhos/cm
0017	TURBIDITY	EQ	0.2000		0.1000	NTU
0020	NITRATE-N	EQ	0.4500	10.0000	0.5000	mg/L
0021	CHLORIDE	EQ	3.2700	250.0000	20.0000	mg/L
0161	TOTAL NITRATE/NITRITE	EQ	0.4500		0.5000	mg/L
0005	BARIUM	LT	0.1000	2.0000	0.1000	mg/L
0006	CADMIUM	LT	0.0010	0.0050	0.0010	mg/L
0007	CHROMIUM	LT	0.0070	0.1000	0.0070	mg/L
0008	IRON	LT	0.1000	0.3000	0.1000	mg/L
0009	LEAD	LT	0.0010		0.0010	mg/L
0010	MANGANESE	LT	0.0100	0.0500	0.0100	mg/L
0011	MERCURY	LT	0.0002	0.0020	0.0002	mg/L
0012	SELENIUM	LT	0.0020	0.0500	0.0020	mg/L
0013	SILVER	LT	0.1000	0.1000	0.1000	mg/L
0018	COLOR	LT	15.0000	15.0000	15.0000	CU
0019	FLUORIDE	LT	0.5000	4.0000	0.2000	mg/L
0022	SULFATE	LT	50.0000	250.0000	50.0000	mg/L
0023	COPPER	LT	0.0200		0.0200	mg/L
0024	ZINC	LT	0.2000	5.0000	0.2000	mg/L
0110	BERYLLIUM	LT	0.0003	0.0040	0.0003	mg/L
0111	NICKEL	LT	0.0050	0.1000	0.0050	mg/L
0112	ANTIMONY	LT	0.0030	0.0060	0.0030	mg/L

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Mail:
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Help

View Sample Detail - WSID 77620Y - SEQUIM CITY OF

Collect Date	3/9/2016
Lab Number	010
Lab Name	Spectra Laboratories - Kitsap, LLC
Sample Number	06801
Source	05
Analyte Group	IOC-INORGANIC CONTAMINANTS
Test Panel	IOC-COMPLETE INORGANIC ANALYSIS
Sample Location	port williams control bldg office tap
Sample Type	Post-Treatment / Finished

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0113	THALLIUM	LT	0.0010	0.0020	0.0010	mg/L
0114	NITRITE-N	LT	0.1000	1.0000	0.1000	mg/L
0116	CYANIDE	LT	0.0500	0.2000	0.0500	mg/L

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View Sample Detail - WSID 77620Y - SEQUIM CITY OF

Collect Date	3/9/2016
Lab Number	010
Lab Name	Spectra Laboratories - Kitsap, LLC
Sample Number	06703
Source	05
Analyte Group	IOC-INORGANIC CONTAMINANTS
Test Panel	NIT-NITRATE SUITE
Sample Location	port williams control bldg ot
Sample Type	Post-Treatment / Finished

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0020	NITRATE-N	EQ	1.9700	10.0000	0.5000	mg/L

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Collect Date	3/9/2016
Lab Number	010
Lab Name	Spectra Laboratories - Kitsap, LLC
Sample Number	06801
Source	08
Analyte Group	IOC-INORGANIC CONTAMINANTS
Test Panel	IOC-COMPLETE INORGANIC ANALYSIS
Sample Location	port williams control bldg office tap
Sample Type	Post-Treatment / Finished

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0004	ARSENIC	EQ	0.0017	0.0104	0.0010	mg/L
0014	SODIUM	EQ	9.4600		5.0000	mg/L
0015	HARDNESS	EQ	137.0000		10.0000	mg/L
0016	CONDUCTIVITY	EQ	297.0000	700.0000	70.0000	Umhos/cm
0017	TURBIDITY	EQ	0.2000		0.1000	NTU
0020	NITRATE-N	EQ	0.4500	10.0000	0.5000	mg/L
0021	CHLORIDE	EQ	3.2700	250.0000	20.0000	mg/L
0161	TOTAL NITRATE/NITRITE	EQ	0.4500		0.5000	mg/L
0005	BARIUM	LT	0.1000	2.0000	0.1000	mg/L
0006	CADMIUM	LT	0.0010	0.0050	0.0010	mg/L
0007	CHROMIUM	LT	0.0070	0.1000	0.0070	mg/L
0008	IRON	LT	0.1000	0.3000	0.1000	mg/L
0009	LEAD	LT	0.0010		0.0010	mg/L
0010	MANGANESE	LT	0.0100	0.0500	0.0100	mg/L
0011	MERCURY	LT	0.0002	0.0020	0.0002	mg/L
0012	SELENIUM	LT	0.0020	0.0500	0.0020	mg/L
0013	SILVER	LT	0.1000	0.1000	0.1000	mg/L
0018	COLOR	LT	15.0000	15.0000	15.0000	CU
0019	FLUORIDE	LT	0.5000	4.0000	0.2000	mg/L
0022	SULFATE	LT	50.0000	250.0000	50.0000	mg/L
0023	COPPER	LT	0.0200		0.0200	mg/L
0024	ZINC	LT	0.2000	5.0000	0.2000	mg/L
0110	BERYLLIUM	LT	0.0003	0.0040	0.0003	mg/L
0111	NICKEL	LT	0.0050	0.1000	0.0050	mg/L
0112	ANTIMONY	LT	0.0030	0.0060	0.0030	mg/L

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Help

View Sample Detail - WSID 77620Y - SEQUIM CITY OF

Collect Date	3/9/2016
Lab Number	010
Lab Name	Spectra Laboratories - Kitsap, LLC
Sample Number	06801
Source	08
Analyte Group	IOC-INORGANIC CONTAMINANTS
Test Panel	IOC-COMPLETE INORGANIC ANALYSIS
Sample Location	port williams control bldg office tap
Sample Type	Post-Treatment / Finished

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0113	THALLIUM	LT	0.0010	0.0020	0.0010	mg/L
0114	NITRITE-N	LT	0.1000	1.0000	0.1000	mg/L
0116	CYANIDE	LT	0.0500	0.2000	0.0500	mg/L

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View Sample Detail - WSID 77620Y - SEQUIM CITY OF

Collect Date	3/9/2016
Lab Number	010
Lab Name	Spectra Laboratories - Kitsap, LLC
Sample Number	06703
Source	08
Analyte Group	IOC-INORGANIC CONTAMINANTS
Test Panel	NIT-NITRATE SUITE
Sample Location	port williams control bldg ot
Sample Type	Post-Treatment / Finished

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0020	NITRATE-N	EQ	1.9700	10.0000	0.5000	mg/L

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Help

View Sample Detail - WSID 77620Y - SEQUIM CITY OF

Collect Date	7/26/2021
Lab Number	010
Lab Name	Spectra Laboratories - Kitsap, LLC
Sample Number	46001
Source	01
Analyte Group	IOC-INORGANIC CONTAMINANTS
Test Panel	NIT-NITRATE SUITE
Sample Location	s01 river well sink
Sample Type	Post-Treatment / Finished

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0020	NITRATE-N	LT	0.5000	10.0000	0.5000	mg/L

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Help

View Sample Detail - WSID 77620Y - SEQUIM CITY OF

Collect Date	8/25/2021
Lab Number	010
Lab Name	Spectra Laboratories - Kitsap, LLC
Sample Number	37101
Source	02
Analyte Group	IOC-INORGANIC CONTAMINANTS
Test Panel	NIT-NITRATE SUITE
Sample Location	silberhorn spigot
Sample Type	Post-Treatment / Finished

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0020	NITRATE-N	EQ	2.4400	10.0000	0.5000	mg/L

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View Sample Detail - WSID 77620Y - SEQUIM CITY OF

Collect Date	3/30/2017
Lab Number	010
Lab Name	Spectra Laboratories - Kitsap, LLC
Sample Number	10402
Source	06
Analyte Group	IOC-INORGANIC CONTAMINANTS
Test Panel	NIT-NITRATE SUITE
Sample Location	outside spigot ph
Sample Type	Post-Treatment / Finished

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0020	NITRATE-N	EQ	2.8200	10.0000	0.5000	mg/L

Records 1 - 1 of 1

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Help

View Sample Detail - WSID 77620Y - SEQUIM CITY OF

Collect Date	3/30/2017
Lab Number	010
Lab Name	Spectra Laboratories - Kitsap, LLC
Sample Number	10402
Source	07
Analyte Group	IOC-INORGANIC CONTAMINANTS
Test Panel	NIT-NITRATE SUITE
Sample Location	outside spigot ph
Sample Type	Post-Treatment / Finished

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0020	NITRATE-N	EQ	2.8200	10.0000	0.5000	mg/L

Records 1 - 1 of 1

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Help

View Sample Detail - WSID 77620Y - SEQUIM CITY OF

Collect Date	3/30/2017
Lab Number	010
Lab Name	Spectra Laboratories - Kitsap, LLC
Sample Number	10402
Source	09
Analyte Group	IOC-INORGANIC CONTAMINANTS
Test Panel	NIT-NITRATE SUITE
Sample Location	outside spigot ph
Sample Type	Post-Treatment / Finished

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0020	NITRATE-N	EQ	2.8200	10.0000	0.5000	mg/L

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Washington State Department of Health
Environmental Public Health
Office of Drinking Water

Water Quality Monitoring Schedule

System: SEQUIM CITY OF **PWS ID: 77620 Y** **Region: SOUTHWEST**
Contact: A Pete P Tjemsland **Group: A - Comm** **County: CLALLAM**

NOTE: To receive credit for compliance samples, you must fill out laboratory and sample paperwork completely, send your samples to a laboratory accredited by Washington State to conduct the analyses, AND ensure the results are submitted to DOH Office of Drinking Water. There is often a lag time between when you collect your sample, when we credit your system with meeting the monitoring requirement, and when we generate the new monitoring requirement.

Coliform Monitoring Requirements

	Mar 2022	Apr 2022	May 2022	Jun 2022	Jul 2022	Aug 2022	Sep 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023
Coliform Monitoring Population	13995	14007	14020	14045	11668	11627	13854	13817	13799	13909	13979	13989
Number of Routine Samples Required	15	15	15	15	10	10	15	15	15	15	15	15

- Collect samples from representative points throughout the distribution system.
- Collect required repeat samples following an unsatisfactory sample. In addition, collect a sample from each operating groundwater source.
- For systems that chlorinate, record chlorine residual (measured when the coliform sample is collected) on the coliform lab slip.

Chemical Monitoring Requirements

Distribution Monitoring

Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*	
Lead and Copper	30	Jan 2020 - Dec 2022	standard - 3 year	09/04/2019	***Aug 2022***	
Asbestos	0	Jan 2020 - Dec 2028	waiver - 9 year	06/06/2018		
Total Trihalomethane (THM)	2	Jan 2022 - Dec 2022	reduced - 1 year	08/25/2021	***Aug 2022***	
Halo-Acetic Acids (HAA5)	2	Jan 2022 - Dec 2022	reduced - 1 year	08/25/2021	***Aug 2022***	

Water Quality Monitoring Schedule

Notes on Distribution System Chemical Monitoring

For *Lead and Copper*:
- Collect samples from the COLD WATER side of a KITCHEN or BATHROOM faucet that is used daily.
- Before sampling, make sure the water has sat unused in the pipes for at least 6 hours, but no more than 12 hours (e.g. overnight).
- If you are sampling from a faucet that has hot water, make sure cold water is the last water to run through the faucet before it sits overnight.
- If your sampling frequency is annual or every 3 years, collect samples between June 1 and September 30.

For *Asbestos:* Collect the sample from one of your routine coliform sampling sites in an area of your distribution system that has asbestos concrete pipe.

For *Disinfection Byproducts (HAA5 and THM):* Collect the samples at the locations identified in your Disinfection Byproducts (DBP) monitoring plan.

Source Monitoring

- Collect 'source' chemical monitoring samples from a tap after all treatment (if any), but before entering the distribution system.
- Washington State grants monitoring waivers for various test panels /analytes. Please note that we may require some monitoring as a condition of some waivers. We have granted complete waivers for dioxin, endothal, glyphosate, diquat, and insecticides.
- Nitrate, arsenic, iron, and other individual inorganics are included as part of a Complete Inorganic (IOC) analysis when it is collected.

Source S01 *Dungeness River* *CT6 Required* *Ranney Infiltration Gallery* *Use - Permanent* *Susceptility - High*

Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*
Nitrate	1	Jan 2022 - Dec 2022	standard - 1 year	07/26/2021	***Jul 2022***
Complete Inorganic (IOC)	1	Jan 2020 - Dec 2028	waiver - 9 year	07/05/2017	Jul 2026
Volatile Organics (VOC)	1	Jan 2020 - Dec 2025	waiver - 6 year	07/26/2021	
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	07/18/2016	
Pesticides	0	Jan 2020 - Dec 2022	waiver - 3 year	07/26/2007	
Soil Fumigants	0	Jan 2020 - Dec 2022	waiver - 3 year		
Gross Alpha	1	Jan 2020 - Dec 2025	standard - 6 year	07/18/2016	***Jul 2022***
Radium 228	1	Jan 2020 - Dec 2025	standard - 6 year	07/18/2016	***Jul 2022***

Source S02 *SH WF (S06, 07, 09)* *Well Field* *Use - Permanent* *Susceptility - Moderate*

Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*
Nitrate	1	Jan 2022 - Dec 2022	standard - 1 year	08/25/2021	***Aug 2022***
Complete Inorganic (IOC)	1	Jan 2020 - Dec 2028	waiver - 9 year	05/20/2020	
Iron	1	Jan 2020 - Dec 2022	standard - 3 year	05/20/2020	

Water Quality Monitoring Schedule

Source Monitoring

- Collect 'source' chemical monitoring samples from a tap after all treatment (if any), but before entering the distribution system.
- Washington State grants monitoring waivers for various test panels /analytes. Please note that we may require some monitoring as a condition of some waivers. We have granted complete waivers for dioxin, endothal, glyphosate, diquat, and insecticides.
- Nitrate, arsenic, iron, and other individual inorganics are included as part of a Complete Inorganic (IOC) analysis when it is collected.

Source S02	*SH WF (S06, 07, 09)*	*Well Field*	*Use - Permanent*	*Susceptility - Moderate*	
Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*
Volatile Organics (VOC)	1	Jan 2020 - Dec 2025	waiver - 6 year	06/16/2017	Jun 2023
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	07/18/2016	
Pesticides	0	Jan 2020 - Dec 2022	waiver - 3 year	07/26/2007	
Soil Fumigants	0	Jan 2020 - Dec 2022	waiver - 3 year		
Gross Alpha	1	Jan 2020 - Dec 2025	standard - 6 year	05/07/2021	
Radium 228	1	Jan 2020 - Dec 2025	standard - 6 year	05/07/2021	

Source S05	*PT WMS WF (S03, 04, 08)*	*Well Field*	*Use - Permanent*	*Susceptility - Low*	
Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*
Nitrate	1	Jan 2022 - Dec 2022	standard - 1 year	05/07/2021	***May 2022***
Complete Inorganic (IOC)	1	Jan 2020 - Dec 2028	waiver - 9 year	03/09/2016	Mar 2025
Volatile Organics (VOC)	1	Jan 2020 - Dec 2025	waiver - 6 year	06/12/2019	Jun 2025
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	07/18/2016	
Pesticides	0	Jan 2020 - Dec 2022	waiver - 3 year	11/28/2007	
Soil Fumigants	0	Jan 2020 - Dec 2022	waiver - 3 year		
Gross Alpha	1	Jan 2020 - Dec 2025	standard - 6 year	11/19/2021	
Radium 228	1	Jan 2020 - Dec 2025	standard - 6 year	11/19/2021	

Water Quality Monitoring Schedule

Other Information

Other Reporting Schedules	*Due Date*
Measure chlorine residuals and submit monthly reports if your system uses continuous chlorination:	monthly
Submit Consumer Confidence Report (CCR) to customers and ODW (Community systems only):	07/01/2022
Submit CCR certification form to ODW (Community systems only):	10/01/2022
Submit Water Use Efficiency report online to ODW and to customers (Community and other municipal water systems only):	07/01/2022
Send notices of lead and copper sample results to the customers sampled:	30 days after you receive the laboratory results
Submit Certification of customer notification of lead and copper results to ODW:	90 days after you notify customers

Special Notes

None

Southwest Regional Water Quality Monitoring Contacts

For questions regarding chemical monitoring:	Sophia Petro: (360) 236-3046 or sophia.petro@doh.wa.gov
For questions regarding DBPs:	Regina Grimm, p.e.: (360) 236-3035 or regina.grimm@doh.wa.gov
For questions regarding coliform bacteria and microbial issues:	Southwest Office: (360) 236-3030 or SWRO.Coli@doh.wa.gov

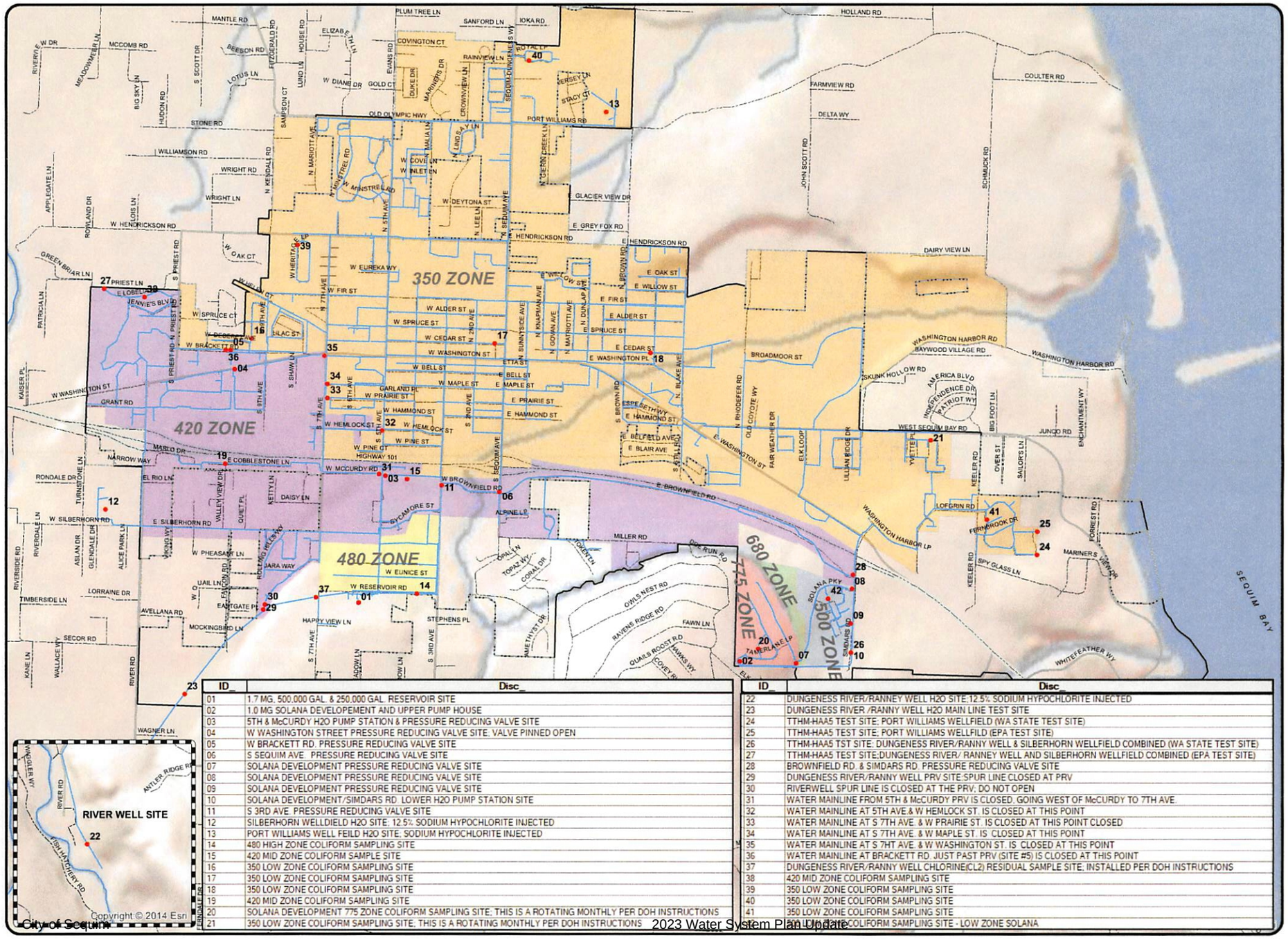
Additional Notes

The information on this monitoring schedule is valid as of the date in the upper left corner on the first page. However, the information may change with subsequent updates in our water quality monitoring database as we receive new data or revise monitoring schedules. There is often a lag time between when you collect your sample and when we credit your system with meeting the monitoring requirement.

We have not designed this monitoring schedule to display all compliance requirements. The purpose of this schedule is to assist water systems with planning for most water quality monitoring, and to allow systems to compare their records with DOH ODW records. Please be aware that this monitoring schedule does not include constituents that require a special monitoring frequency, such as monitoring affiliated with treatment.

Any inaccuracies on this schedule will not relieve the water system owner and operator of the requirement to comply with applicable regulations.

If you have any questions about your monitoring requirements, please contact the regional office staff listed above.



ID_	Disc_
01	1.7 MG, 500,000 GAL. & 250,000 GAL. RESERVOIR SITE
02	1.0 MG SOLANA DEVELOPEMENT AND UPPER PUMP HOUSE
03	5TH & McCURDY H2O PUMP STATION & PRESSURE REDUCING VALVE SITE
04	W WASHINGTON STREET PRESSURE REDUCING VALVE SITE; VALVE PINNED OPEN
05	W BRACKETT RD. PRESSURE REDUCING VALVE SITE
06	S SEQUIM AVE. PRESSURE REDUCING VALVE SITE
07	SOLANA DEVELOPMENT PRESSURE REDUCING VALVE SITE
08	SOLANA DEVELOPMENT PRESSURE REDUCING VALVE SITE
09	SOLANA DEVELOPMENT PRESSURE REDUCING VALVE SITE
10	SOLANA DEVELOPMENT/SIMDARS RD. LOWER H2O PUMP STATION SITE
11	S 3RD AVE. PRESSURE REDUCING VALVE SITE
12	SILBERHORN WELLDIELD H2O SITE; 12.5% SODIUM HYPOCHLORITE INJECTED
13	PORT WILLIAMS WELL FEILD H2O SITE; SODIUM HYPOCHLORITE INJECTED
14	480 HIGH ZONE COLIFORM SAMPLING SITE
15	420 MID ZONE COLIFORM SAMPLE SITE
16	350 LOW ZONE COLIFORM SAMPLING SITE
17	350 LOW ZONE COLIFORM SAMPLING SITE
18	350 LOW ZONE COLIFORM SAMPLING SITE
19	420 MID ZONE COLIFORM SAMPLING SITE
20	SOLANA DEVELOPMENT 775 ZONE COLIFORM SAMPLING SITE; THIS IS A ROTATING MONTHLY PER DOH INSTRUCTIONS
21	350 LOW ZONE COLIFORM SAMPLING SITE; THIS IS A ROTATING MONTHLY PER DOH INSTRUCTIONS

ID_	Disc_
22	DUNGENESS RIVER/RANNEY WELL H2O SITE;12.5% SODIUM HYPOCHLORITE INJECTED
23	DUNGENESS RIVER /RANNY WELL H2O MAIN LINE TEST SITE
24	TTHM-HAA5 TEST SITE; PORT WILLIAMS WELLFIELD (WA STATE TEST SITE)
25	TTHM-HAA5 TEST SITE; PORT WILLIAMS WELLFILD (EPA TEST SITE)
26	TTHM-HAA5 TST SITE; DUNGENESS RIVER/RANNY WELL & SILBERHORN WELLFIELD COMBINED (WA STATE TEST SITE)
27	TTHM-HAA5 TEST SITE;DUNGENESS RIVER/ RANNEY WELL AND SILBERHORN WELLFIELD COMBINED (EPA TEST SITE)
28	BROWNFIELD RD. & SIMDARS RD. PRESSURE REDUCING VALVE SITE
29	DUNGENESS RIVER/RANNY WELL PRV SITE;SPUR LINE CLOSED AT PRV
30	RIVERWELL SPUR LINE IS CLOSED AT THE PRV; DO NOT OPEN
31	WATER MAINLINE FROM 5TH & McCURDY PRV IS CLOSED, GOING WEST OF McCURDY TO 7TH AVE.
32	WATER MAINLINE AT 5TH AVE.& W HEMLOCK ST. IS CLOSED AT THIS POINT
33	WATER MAINLINE AT S 7TH AVE. & W PRAIRIE ST. IS CLOSED AT THIS POINT CLOSED
34	WATER MAINLINE AT S 7TH AVE. & W MAPLE ST. IS CLOSED AT THIS POINT
35	WATER MAINLINE AT S 7HT AVE. & W WASHINGTON ST. IS CLOSED AT THIS POINT
36	WATER MAINLINE AT BRACKETT RD. JUST PAST PRV (SITE #5) IS CLOSED AT THIS POINT
37	DUNGENESS RIVER/RANNY WELL CHLORINE(CL2) RESIDUAL SAMPLE SITE; INSTALLED PER DOH INSTRUCTIONS
38	420 MID ZONE COLIFORM SAMPLING SITE
39	350 LOW ZONE COLIFORM SAMPLING SITE
40	350 LOW ZONE COLIFORM SAMPLING SITE
41	350 LOW ZONE COLIFORM SAMPLING SITE - LOW ZONE SOLANA

CITY OF SEQUIM

WATERLINE SAMPLING POINTS

0.25 0 0.25
Mile

Legend

- TESTING POINT SITE
- WATERLINE
- UGA
- CITY LIMIT

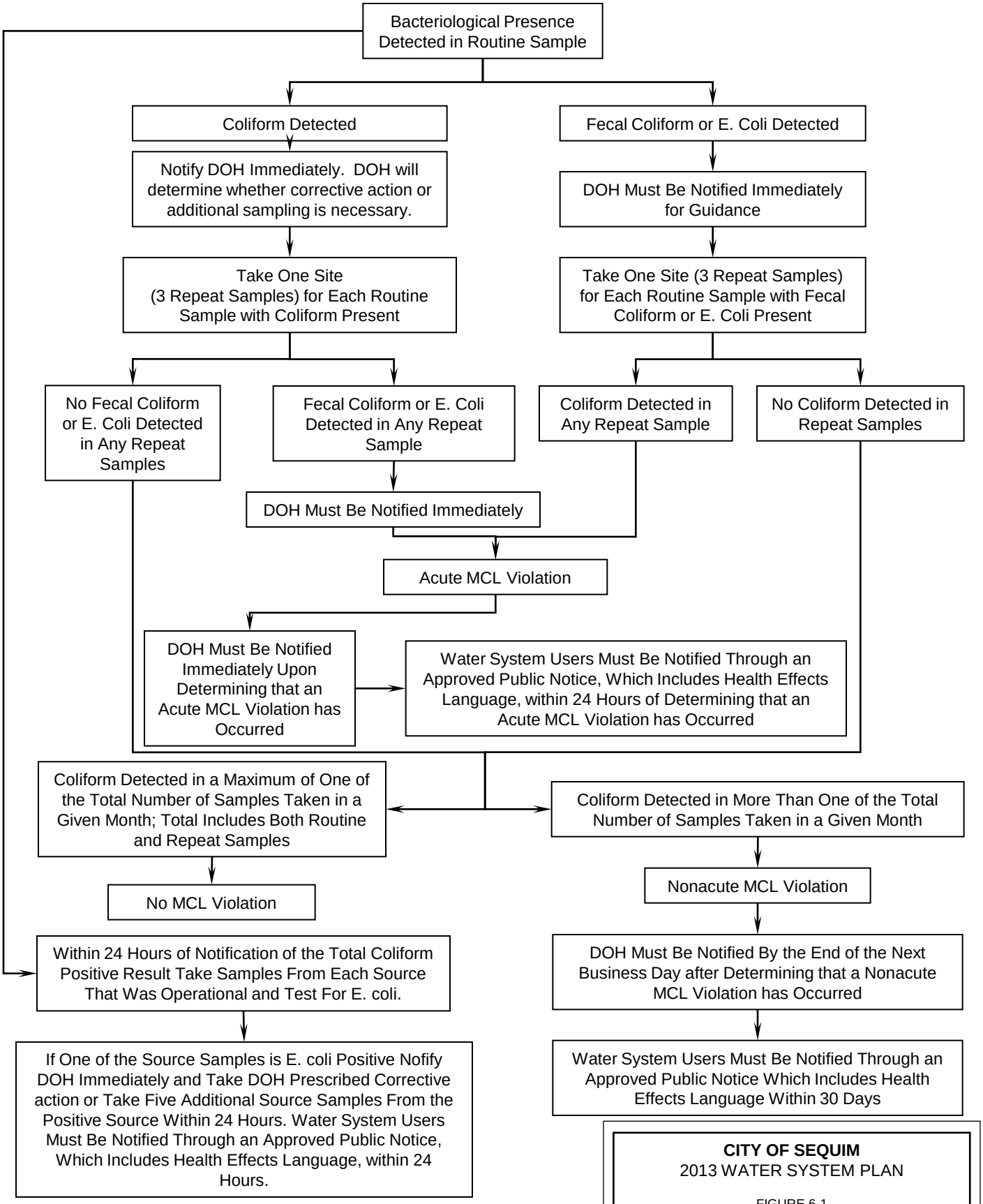
PressureZone

- 350 ZONE
- 420 ZONE
- 480 ZONE
- 500 ZONE
- 680 ZONE
- 775 ZONE

Created by: City of Sequim GIS

Printed Date: 5/15/2018

Field verification of the accuracy of any information contained in this map is the sole responsibility of the user. Parcel information was obtained from Clallam County. Parcel lines are based on available public records and existing map sources, not from field surveys. Parcel lines have been adjusted to better fit planimetric data. The parcel mapping may contain inaccuracies and should not be relied upon for site-specific analysis, property acquisition, determination of rights-of-way, property dimensions, or land area. no representation of warranty regarding the positional accuracy of any map feature is either expressed or implied by publication of this map. By accepting this map, the user releases the City of Sequim from any and all [illegible] based on information contained in this map.

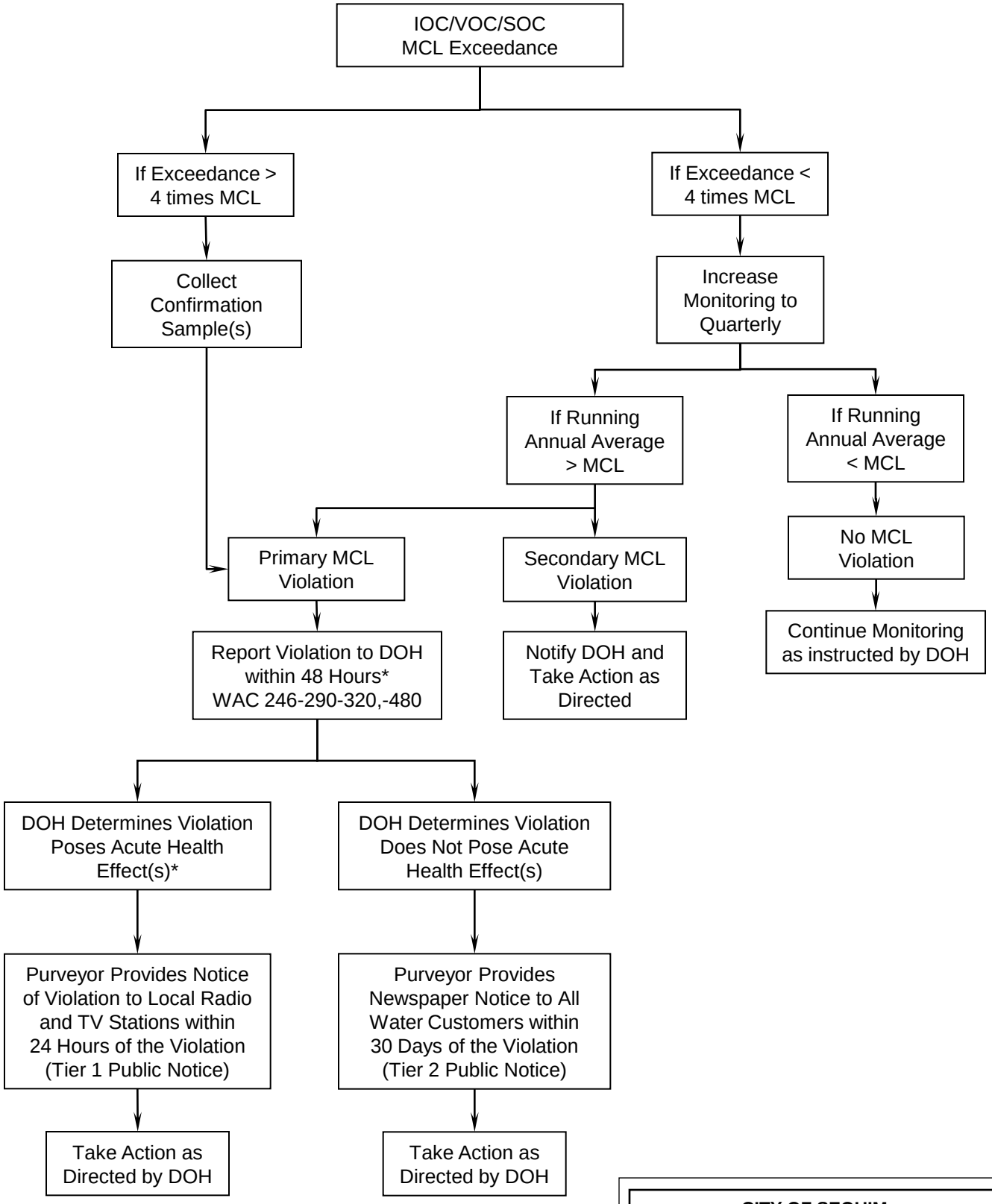


CITY OF SEQUIM
2013 WATER SYSTEM PLAN

FIGURE 6-1
BACTERIOLOGICAL PRESENCE
DETECTION PROCEDURE

DOH: Washington State Department of Health
Office of Drinking Water (360) 236-3030
After-Hours Hotline (877) 481-4901

Gray & Osborne, Inc.
CONSULTING ENGINEERS



* A violation of the 10.0 mg/L nitrate MCL constitutes an acute health effect concern. DOH must be notified immediately upon violation of the nitrate MCL.

CITY OF SEQUIM
2013 WATER SYSTEM PLAN

FIGURE 6-2
IOC/VOC/SOC
DETECTION PROCEDURE

Gray & Osborne, Inc.
CONSULTING ENGINEERS

DOH: Washington State Department of Health

WAC: Washington Administrative Code

APPENDIX H

WATER RIGHTS INFORMATION

Contents:

- Water Rights Self-Assessment
- Water Rights Tracking System Report for City of Sequim
- WA Dept. of Ecology Documentation:
    - Dungeness River Source 1924
    - Infiltration Gallery Source 1953
    - Silberhorn Wellfield Source 1975
    - Port Williams Wellfield Source 1995
    - New Source 2017
- History of the City's Water Rights Portfolio

Water Right Self-Assessment Form for Water System Plan

Water Right Permit, Certificate, or Claim # *If water right is interruptible, identify limitation in yellow section below	WFI Source # If a source has multiple water rights, list each water right on separate line	Existing Water Rights Qi= Instantaneous Flow Rate Allowed (GPM or CFS) Qa= Annual Volume Allowed (Acre-Feet/Year) This includes wholesale water sold				Current Source Production – Most Recent Calendar Year Qi = Max Instantaneous Flow Rate Withdrawn (GPM or CFS) Qa = Annual Volume Withdrawn (Acre-Feet/Year) This includes wholesale water sold				10-Year Forecasted Source Production (determined from WSP) This includes wholesale water sold				20-Year Forecasted Source Production (determined from WSP) This includes wholesale water sold			
		Primary Qi Maximum Rate Allowed	Non-Additive Qi Maximum Rate Allowed	Primary Qa Maximum Volume Allowed	Non-Additive Qa Maximum Volume Allowed	Total Qi Maximum Instantaneous Flow Rate Withdrawn	Current Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume Withdrawn	Current Excess or (Deficiency) Qa	Total Qi Maximum Instantaneous Flow Rate in 10 Years	10-Year Forecasted Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume in 10 Years	10-Year Forecasted Excess or (Deficiency) Qa	Total Qi Maximum Instantaneous Flow Rate in 20 Years	20-Year Forecasted Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume in 20 Years	20-Year Forecasted Excess or (Deficiency) Qa
Dungeness River Cert. No. 1316 (May 23, 1924) Cert. of Change Vol. 1 pg. 426 (May 24, 1954) Cert. of Change Vol. 1-2 pg. 106 (Sept. 26, 1979)	S01	628		1,014		0	628	0.0	1,014.0	0	628	0.0	1,014.0	628	0	200.0	814.0
Infiltration Gallery Cert. No. 2102-A (Feb. 15, 1953) Cert. of Change Vol 1-1 pg. 107, (Sept. 26, 1979)	S01	718		1,160		718	0	527.9	632.1	718	0	535.6	624.4	718	0	548.7	611.3
Silberhorn Wellfield Cert. No. G2-23856 (June 12, 1975)	S02	700		690		635	65	210.2	479.8	635	65	325.0	365.0	635	65	415.0	275.0
Port Williams Wellfield Permit No. G2-29239 (June 13, 1995)	S05	2,250		1,850		1,760	490	402.7	1,447.3	1,760	490	675.0	1,175.0	1,760	490	900.0	950.0
	TOTALS =	4,296		4,714		3,113	1,183	1,140.8	3,573.2	3,113	1,183	1,535.6	3,178.4	3,741	555	2,063.7	2,650.3
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
G2-30721	New	11/14/2017	1,000 gpm		2,000 Ac-ft/yr	

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	Quantities Allowed In Contract		Expiration Date of Contract	Currently Purchased Current quantity purchased through intertie				10-Year Forecasted Purchase Forecasted quantity purchased through intertie				20-Year Forecasted Purchase Forecasted quantity purchased through intertie			
	Maximum Qi Instantaneous Flow Rate	Maximum Qa Annual Volume		Maximum Qi Instantaneous Flow Rate	Current Excess or (Deficiency) Qi	Maximum Qa Annual Volume	Current Excess or (Deficiency) Qa	Maximum Qi 10-Year Forecast	Future Excess or (Deficiency) Qi	Maximum Qa 10-Year Forecast	Future Excess or (Deficiency) Qa	Maximum Qi 20-Year Forecast	Future Excess or (Deficiency) Qi	Maximum Qa 20-Year Forecast	Future Excess or (Deficiency) Qa
None															
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
None		

ADDITIONAL COMMENTS:

See narrative in Appendix H for history and current interpretations of the City of Sequim water rights; it is noted that there is disagreement with Ecology on some numbers found above.

Requested Documents Report
Department of Ecology
Water Right Tracking System
Report Generated on 1/25/2022

Report ran by: IUSR

Disclaimer: This data may not be complete or accurate. Validity of water rights documented by statements of claims can only be determined in Superior Court. Ecology cannot guarantee the validity of the water rights documented by Permits and Certificates.

Record Document Number	WR Doc ID	Certificate Number	Person or Organization	Status	Phase	Stage	Priority Date Claim First Use	Purpose of Use	Qi	UOM	Qa	WRIA	County	TRS	QQ	Q	First Source Name Listed
G2-*02996ALCWRIS	2220136	02102A	Sequim City	Inactive	Certificate	Superseded	02/16/1953	MU	718.0000	GPM	1160.0000	18	Clallam	T29.0N/R04.0W/01	SW	SW	Groundwater
G2-23856	2147769	G2-23856 C	Sequim City	Active	Certificate	Final	06/12/1975	MU	700.0000	GPM	690.0000	18	Clallam	T30.0N/R04.0W/25	NE	NW	Groundwater
G2-24179AWRIS	2153532		Sequim City	Inactive	New Application	Rejected	05/26/1976	MU	2100.0000	GPM		18	Clallam	T29.0N/R04.0W/01			Groundwater
G2-24764AWRIS	2153563		Sequim City	Inactive	New Application	Rejected	01/09/1978	MU	300.0000	GPM		18	Clallam	T30.0N/R04.0W/24			Groundwater
G2-28728	2222305		Sequim City	Inactive	New Application	Rejected	01/19/1993	MU	1946.0000	GPM		18	Clallam	T30.0N/R04.0W/25			Groundwater
G2-29239	2206400		Sequim City	Active	Permit	CC	06/13/1995	MU	2250.0000	GPM	1850.0000	18	Clallam	T30.0N/R03.0W/17			Groundwater
G2-30721	6800792		Sequim City	Active	New Application	AppAccepted	11/14/2017	MU	500.0000	GPM	1000.0000	18	Clallam	T30.0N/R04.0W/25	NE	NW	Groundwater
G2-CV1-2P107	4204174	02102A	Sequim City	Active	Certificate of Change	Final	02/16/1953	MU	718.0000	GPM	1160.0000	18	Clallam	T29.0N/R04.0W/01	SW	SW	Groundwater
S2-*01107ALCWRIS	2214826	01316A	Sequim City	Inactive	Certificate	Superseded	05/23/1924	MU	1.4000	CFS		18	Clallam	T29.0N/R04.0W/01	SW	SW	Dungeness River
S2-24267CWRIS	2207431	S2-24267 C	Sequim City	Active	Certificate	Final	08/18/1976	RE,FS	0.5000	CFS		18	Clallam	T30.0N/R03.0W/20	SE	NE	Bell Creek
S2-CV1-2P106	4193865	01316A	Sequim City	Active	Certificate of Change	Final	09/26/1979	MU	1.4000	CFS		18	Clallam	T29.0N/R04.0W/01		SW	Dungeness River
S2-CV1P426	4193856	1316	Sequim City	Inactive	Certificate of Change	Superseded	05/24/1954	MU	1.4000	CFS		18	Clallam	T29.0N/R04.0W/12	NE	NW	Dungeness River

TOTAL RECORDS: 12

REPORT CRITERIA

Last Name Or Oganization	%Sequim City%
Role	Primary
County	Clallam
WRIA	18-Elwha-Dungeness
Region	Southwest Region

LEGEND

WRIA = Water Resources Inventory Area, TRS = Township/Range/Section, Q = Quarter Section, QQ = Quarter of a Quarter Section, Qi = Instantaneous Quantity, Qa = Annual Quantity, UOM = Unit of Measure

PURPOSE of USE: CI = Commercial & Industrial Manufacturing, CO = Cooling for Industrial Processes/Equipment, DY = Dairy, DG = Domestic General, DM = Domestic Mulitple, DS = Domestic Single, DC = Dust Control, EN = Environmental Quality, FR = Fire Protection, FS = Fish Propagation, FP = Frost Protection, GP = Groundwater Preservation, HE = Heat Exchange, HP = Heat Protection for Crops, HI = Highway, IF = Instream Flow, IR = Irrigation, MI = Mining, MT = Mitigation, MU = Municipal , MS = Municipal Inter-tie System, NR = No Purpose Identified, OT = Other, PO = Power, RW = Railway, RE = Recreation and Beautification, ST = Stockwater, SR = Storage,SA = Stream Augmentation, WL = Wildlife Refuge

Form 10

*Permit No. 424

RECEIVED
MAY 23 1924
Division of Hydraulics

APPLICATION FOR A PERMIT

To Appropriate the Public Waters of the State of Washington

I, George W. O'Brien, Clerk, Town of Sequim, Washington, by order of the Council of said Town (Name of applicant) May 7, 1924

of Sequim (Postoffice), County of Clallam,

State of Washington, do hereby make application for a permit to appropriate the following described public waters of the State of Washington subject to existing rights:

If the applicant is a corporation, give date and place of incorporation incorporated as a city of the 4th Class October 31, 1913 at Olympia, Washington

1. The source of the proposed appropriation is the Dungeness River, Clallam County (Name of stream)
tributary of

2. The amount of water which the applicant intends to apply to beneficial use is two cubic feet per second.

3. The use to which the water is to be applied is a water supply for the municipal (Irrigation, power, mining, manufacturing, domestic supplies, etc.)
water system of said Town

4. Time during which water will be required each year the entire year as a continuous supply

5. The approximate point of diversion is located SW¼ SW¼ section 1, township 29 N. (Give distance and bearing to section corner)
R. 4 W. W. M., water to flow through the ditch of the Highland Irrigation District, from which district the Town is now purchasing water under a 20-year contract from July 1, 19 23
being within the (Give smallest legal subdivision) of Sec., Tp. (No. N. or S.), R. (No. E. or W.) W. M.,
in the county of Clallam, Washington.

6. The (Main ditch, canal, or pipe line) to be miles in length, terminating
in the (Smallest legal subdivision) of Sec., Tp. (No. N. or S.), R. (No. E. or W.) W. M.,
the proposed location being shown throughout on the accompanying map.

7. The name of the ditch, canal or other works is

8. Estimated cost of development necessary to fully utilize the appropriation herein asked for
$

DESCRIPTION OF WORKS.

DIVERSION WORKS—

9. (a) Height of diversion dam feet; length on top feet;
length at bottom feet; material to be used and character of construction
(Loose rock, concrete, masonry, rock and brush, timber crib, etc., wasteway over or around dam)

(b) Description of headgate
(Timber, concrete, etc.; number and size of openings)

* When storage works are contemplated a storage permit must be filed in addition to the above. These forms can be secured, together with instructions, by addressing the State Hydraulic Engineer, Olympia, Washington.

CANAL SYSTEM—

10. (*a*) *Give approximate dimensions at each point of canal where materially changed in size, stating miles from headgate. At headgate: Width on top (at water line)*.....*feet; width on bottom*.....*feet; depth of water*.....*feet; grade*.....*feet fall per one thousand feet.*

(*b*) *At*.....*miles from headgate: Width on top (at water line)*.....*feet; width on bottom*.....*feet; depth of water*.....*feet; grade*.....*feet; depth of water*.....*feet; grade*.....*feet fall per one thousand feet.*

.....

.....

.....

FILL IN THE FOLLOWING INFORMATION WHERE THE WATER IS USED FOR:

IRRIGATION—

11. *The land to be irrigated has a total area of* .....*acres, described as follows:* .....
(Give legal subdivision by section, township and range)

.....

.....

.....

.....

.....

.....

.....

.....
(If more space is required, attach separate sheet)

DUTY OF WATER—

Character of soil: Depth....., *sandy*....., *volcanic ash*....., *loam*....., *clay*....., *etc.*.....; *Annual precipitation*.....*inches; precipitation during growing season*.....*inches; Depth of irrigation water required*.....
(Expressed in feet or inches)

.....

POWER, MINING, MANUFACTURING, OR TRANSPORTATION PURPOSES—

13. (*a*) *Total amount of power to be developed*.....*H. P.*
(Theoretical horsepower)

(*b*) *Total fall to be utilized*.....*feet.*
(Head)

(*c*) *The nature of the works by means of which the power is to be developed*.....

.....

.....

(*d*) *Such works to be located in*..... *of Sec*.....,
(Legal subdivision)

Tp....., *R*.....*W. M.*
(No. N. or S.) (No. E. or W.)

(*e*) *To what stream is the water to be returned* .....

(*f*) *Locate point of return*..... *Sec*.....,

Tp....., *R*.....*W. M.*
(No. N. or S.) (No. E. or W.)

(*g*) *The use to which power is to be applied is* .....

MUNICIPAL SUPPLY—

14. *To supply the city of* Sequim (Name);

Clallam *County, having a present population of* 600,

and an estimated population of 1200 *in 19*30.

15. *Estimated present requirement* 60,000 gallons daily

16. *Estimated future requirement* 120,000 gallons daily

17. *Construction work will begin on or before* Town system completed and in full operation; water is taken from the Highland Ditch through 4-inch

18. ~~*Construction work will be completed on or before*~~ pipeinto Town reservoir, on NE¼ NE¼ SW¼ sec.30, Tp30N.R.3 W. W. M.

Duplicate maps of the proposed ditch or other works, prepared in accordance with the rules of the State Hydraulic Engineer accompany this application.

George W O'Brien
(Name of applicant)
Clerk, Town of Sequim, Washington

Signed in the presence of us as witnesses:

(1) W H Schumacher (Name), Sequim, Washington (Address of witness)

(2) J. J. Bugge (Name), " " (Address of witness)

Remarks: **The diversion of public water under this permit may be enjoyed at all times when there is unappropriated public water in the above-named stream. This is subsequent to all beneficial uses made of the waters of this stream prior to May 23, 1924, and the diversion made must be so regulated that it will not injuriously affect any right prior to that time. This is inferior to all the rights set out in Vol. 21, Page 320 of the Superior Court Journal of Clallam County, Washington, at Port Angeles, Washington**

STATE OF WASHINGTON, } ss.
COUNTY OF THURSTON. }

This is to certify that I have examined the foregoing application (Received (Date)*)*

together with the accompanying maps and data, and return the same (Date of return)

for correction or completion, as follows:

In order to retain its priority, this application must be returned to the State Hydraulic Engineer, with corrections, on or before, 19.

WITNESS my hand this day of, 19.

State Hydraulic Engineer.

STATE OF WASHINGTON, }
COUNTY OF THURSTON. } ss.

This is to certify that I have examined the foregoing application and do hereby grant the same, subject to the following limitations and conditions. If for irrigation, this appropriation shall be subject to such reasonable rotation system as may be ordered by the ~~State Hydraulic Engineer~~ State Supervisor of Hydraulics

The amount of water appropriated shall be limited to the amount which can be applied to beneficial use and not to exceed two *cubic feet per second, or its equivalent in case of rotation. The priority date of this permit is* May 23, 1924.

Actual construction work shall begin on or before September 4, 1925 *and shall thereafter be prosecuted with reasonable diligence and be completed on or before* June 1, 1926

Complete application of the water to the proposed use shall be made on or before September 1, 1926

WITNESS my hand this 4th *day of* September, *19*24.

Marion Lowe
~~State Hydraulic Engineer.~~
State Supervisor of Hydraulics

This form approved by the State Hydraulic Engineer, 1917.

Application No. 1107
Permit No. 424

PERMIT

To Appropriate the Public Waters of the State of Washington

Filed by George W. O'Brien, Clerk, Town of Sequim, Washington, by order of the Council of said Town
County of Clallam

This instrument was first received in the office of the ~~State Hydraulic Engineer,~~ State Supervisor of Hydraulics
Olympia, Washington, on the 23rd *day of* May, *1924*, *at* 8:30 *o'clock* A. *M.*

Returned to applicant for correction

Corrected Application received

Approved September 4, 1924

Recorded in Book No. Three *of Permits, on Page* 424

Marion Lowe
~~State Hydraulic Engineer.~~
State Supervisor of Hydraulics

FRANK M. LAMBORN, PUBLIC PRINTER, OLYMPIA

Before your certificate of water right is issued it will be necessary for you to fill out and file with the ~~State Hydraulic Engineer~~ a copy of each of the following reports:

1st. Progress report.
2nd. Notice of water right application.
3rd. Notice to begin construction.
4th. Notice of prosecution of work with diligence.
5th. Notice of completion of construction.
6th. Notice of application of water to a beneficial use.
7th. Proof of appropriation of water.

Upon a satisfactory showing that the appropriation has been perfected as provided by statute the ~~State Hydraulic Engineer~~ will issue a water right certificate.

(Blanks will be furnished by the office of ~~State Hydraulic Engineer.~~)

S. F. No. 369—1938—2M. 13900.

188326

VOL 7 PAGE 95

CERTIFICATE RECORD NO. 3, PAGE NO. 1316

STATE OF WASHINGTON, COUNTY OF Clallam

CERTIFICATE OF WATER RIGHT

(For rights perfected under original, enlargement or secondary permits.)

(In accordance with the provisions of Chapter 117, Laws of Washington for 1917, and the regulations of the State Supervisor of Hydraulics thereunder.)

This is to certify, that Town of Sequim *of* Sequim, *State of* Washington, *has made proof to the satisfaction of the State Supervisor of Hydraulics of Washington, of a right to the use of the waters of* Dungeness River, *a tributary of* , *for the purposes of* Municipal supply *under* Appropriation *Permit No.* 424 *issued by the State Supervisor of Hydraulics, and that said right to the use of said waters has been perfected in accordance with the laws of Washington, and is hereby confirmed by the State Supervisor of Hydraulics of Washington and entered of record in Volume* 3, *at Page* 1316, *on the* 11th *day of* March, *19*40; *that the right hereby confirmed dates from* May 23, 1924; *that the amount of water to which such right is entitled and hereby confirmed, for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed* 1.4 cubic feet per second.

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

PLACE OF USE			LEGAL SUBDIVISION	FOR IRRIGATION	
Section	Township	Range		No. Acres Described in Permit	No. Acres Actually Irrigated

LOCATION OF POWER PLANT			LEGAL SUBDIVISION	FOR POWER	
Section	Township	Range		H. P. Described in Permit	H. P. Actually Developed

Section	Township	Range	LEGAL SUBDIVISION	FOR OTHER USES
	30 N.	3 W.W.M.	Town of Sequim, Clallam County	Municipal supply

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in Section 39, Chapter 117, Session Laws 1917.

WITNESS the seal and signature of the State Supervisor of Hydraulics affixed this 11th *day of* March, *19*40.

Chas. H. Batchelor

State Supervisor of Hydraulics.

ENGINEERING DATA

O.K. [illegible]

188326

Permit No. 424

Certificate of Water Right

Recorded in the office of State Supervisor of Hydraulics, Olympia, Washington, in Book No. 3 of Water Right Certificates, on Page 1316, on the 11th day of March, 19 40

STATE OF WASHINGTON,
County of Clallam } ss.

I certify that the within was received and duly recorded by me in Volume ..... of Book of ~~Water Right Certificates~~, Page ..... on the ..... day of Filed by Sup. of Hydraulics March 13 19 40 at 12:50 P.M. - Vol 7 M.R. Page 95

STATE PRINTING PLANT

Fred. P. Henson
Boone Lowry
Deputy
D.S. Beegle

VOL 7 PAGE 96

52-CV1-2P106

4193865

CERTIFICATE OF CHANGE OF POINT OF DIVERSION OF SURFACE WATER

In accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto and rules thereunder of the State Director of Ecology.

THIS IS TO CERTIFY That the City of Sequim, Washington, has complied with all of the requirements of the Revised Code of Washington 90.03.380 and is hereby granted the right to add an additional (alternate) point of diversion of the waters of the Dungeness River as authorized under Surface Water Certificate 1316 and Certificate of Change No. 426.

That said Certificate and Certificate of Change authorizes the diversion of 1.4 cubic feet per second of water from the Dungeness River, for municipal supply continuously, from a point situated in the NE¼NW¼ of Section 12, Township 29 North, Range 4 West W.M. in Clallam County, Washington.

That they have added an additional (alternate) point of diversion for said 1.4 cubic feet per second of water at a point located approximately 500 feet north and 800 feet east from the southwest corner of Section 1, T. 29 N., R. 4 W.W.M.

Given under my hand and seal of this office at Olympia, Washington, this 26th day of September, 1979.

E. W. ASSELSTINE
Regional Manager
Department of Ecology

RECORDED:
Volume I-2, pp 106
Certificate of Change

S. F. No. 370-B—4-47—2M. 15032.

INFILTRATION GALLERY GROUND WATER

~~$5.00 examination fee should~~ accompany each application.

STATE OF WASHINGTON

DEPARTMENT OF CONSERVATION AND DEVELOPMENT

Division of Hydraulics

RECEIVED FEB 16 1953 DIV. OF WATER RESOURCES

APPLICATION FOR A PERMIT

To Appropriate Public Ground Waters OF THE STATE OF WASHINGTON

Application No. G. W. 2996

Town of Sequim

I, M. K. Snyder, Town Engineer, Authorized Representative for the Town of Sequim, Wash.
(Name of applicant)

of Sequim, Wash.
(Complete postoffice address)

do hereby make application for a permit to appropriate the following described public ground waters of the State of Washington, subject to existing rights. This application is made under the provisions of Chap. 263 of the Session Laws of 1945 of the State of Washington and subject to the rules and regulations of the Department of Conservation and Development, Division of Hydraulics.

1. *The proposed appropriation will be from* Infiltration Gallery
(Well, tunnel, infiltration trench)

located Three (3) miles South and one (1) West from Sequim
(Give approximate distance and direction from nearest city or town)

Area ..... (Leave blank) *Sub-area* ..... (Leave blank)

Zone ..... (Leave blank)

Applicant's name or number of well or other works, if any .....

2. *The quantity of water which applicant intends to apply to beneficial use is* ~~[illegible]~~ 718 *gallons per minute;* 1160 *acre feet per year.* If used full capacity all the time but this is never the case.

3. *The use or uses to which water is to be applied* Domestic Water Supply ~~with~~ Municipal supply from full capacity to as small as 200 gpm. Max Duty in case of high emergency for the next 3 years.

~~the usual Town Fire Service and Industrial Service~~
(Domestic supply, irrigation, municipal, manufacturing, industrial use, etc.)

4. *The time during which water will be required each year* ~~Throughout the year,~~ Continuously

5. *Location of well or other works for withdrawal of water: In county of* Clallam

(a) ~~Beginning~~ Approx. 1700 ft. East and 450 ft. South from NW corner Sec. 12 T. 29 N. R. 4 WWM : thence South
(Give distance and bearing from nearest corner of section or legal subdivision)

being within the ~~W¼ of NE¼ of NW¼~~ NE¼ of NW¼ *of Sec.* 12, *Twp.* 29 *N., Rge.* 4 WWM (E. or W.)
(Give smallest legal subdivision)

or (b) *If within limits of recorded platted property, town or city: Lot* ....., *Block* .....,

of .....
(Give name of plat or addition) (If within town or city, give name)

(c) *Show this location on accompanying section plat, in triplicate. Other adequate maps or drawings will be acceptable.*

6. *Name and address of owner of land on which well or works are located:*

On Right of Way owned by Town of Sequim
(Name)

Sequim, Wash.
(Address)

7. DESCRIPTION OF WORKS:

(a) Well will be ..... (Dug or drilled) *and have a diameter of* ..... *inches and an estimated depth of* ..... *feet.*

(b) Tunnels or trenches to be described: (Attach additional sheets if needed for full description.)

The Gallery will be constructed between the present channel of the Dungeness River and the high bluffs on the East side of the River at this location, low valley lands varying in width from 30 ft. to 200 or more feet and extending 1500 or more feet to "The Gorge". The Gallery will probably be 600 to 800 feet long and be well below the bottom of the River Channel elevations

At the present time, this is an experimental development attempting to secure water free from the roil and debris and dead fish carried by the River.

(c) Distribution system to be described:

(d) If pumps are to be used, give size and type:

(e) Give capacity and type of motor or engine to be used:

(f) If the location of the well, tunnel, or other works is less than one-fourth mile from a natural stream or stream channel, give the distance to the nearest point on each of such channels and the difference in elevation between the stream bed and the ground surface at the source of development:

See (b) above

(g) Ownership of each existing well or other works from which ground water is withdrawn within a radius of one-quarter mile and the distance and direction from well or other works being reported herein: Water at present drawn or taken from the Dungeness River directly for which the Town of Sequim holds a Permit for the use of 1.4 C.F.S.

(Name)	(Direction)	(Distance)
Town of Sequim	Right at the Beginning	point given in 5.

(On accompanying plat show location of the existing wells or works.)

8. SUPPLY THE FOLLOWING INFORMATION ACCORDING TO USE PROPOSED:

(a) For Municipal Supply: *To supply the city, town, or community of* Sequim *in the county of* Clallam, *having a present population of* 1200 plus, *and an estimated population of* 3000 *in 19*70 based on rate of growth of last decade.

(b) For Irrigation: *The land to be irrigated has a total area of* ..... *acres.*

(c) Legal Description of Property *on which water is to be used for all purposes other than municipal supply:* (If more space is required, attach separate sheet.)

(d) Do you have any other water rights appurtenant to the above described property? Yes

If so, from what source Dungeness River

9. *Construction work will begin on or before* Uncertain. As soon as funds can be made available, Sometime this spring.

10. *Construction work will be completed on or before* three to four months from beginning.

11. *Water will be put to complete beneficial use on or before* Most certainly as soon as completed work

M. K. Snyder
(Signature of applicant) Authorized Agent.
Town Engineer
Box 261
Sequim, Wash.

Signed in the presence of us as witnesses:

..... (Name) ..... (Address of witness)

..... (Name) ..... (Address of witness)

STATE OF WASHINGTON, }
COUNTY OF THURSTON. } ss.

This is to certify that I have examined the foregoing application, together with the accompanying maps and data, and return the same for correction or completion as follows:

.....

.....

In order to retain its priority, this application must be returned to the State Supervisor of Hydraulics, with corrections, on or before ....., *19*.....

WITNESS my hand this ..... *day of* ....., *19*.....

.....
State Supervisor of Hydraulics.

STATE OF WASHINGTON

Department of Conservation and Development

W. A. GALBRAITH, DIRECTOR

TRANSPORTATION BUILDING
OLYMPIA

ARTHUR B. LANGLIE
GOVERNOR

DIVISIONS:
FORESTRY
RECLAMATION
FLOOD CONTROL
WATER RESOURCES
MINES AND GEOLOGY
COLUMBIA BASIN PROJECT
PROGRESS AND INDUSTRY DEVELOPMENT

June 1, 1953

M. K. Snyder
Town Engineer
Sequim, Washington

Dear Sir:

Re: Ground Water Application No. 2996
Town of Sequim

For your information we enclose a copy of our findings in connection with the above numbered application.

The application has been approved and a permit will be issued in accordance with this report, upon payment of the statutory fee of $ 20.00.

Yours very truly,

Chas J Barthalet

CHAS. J. BARTHOLET, Supervisor
Division of Water Resources.

CJB:jfw
Enc.

Report of Examination on Ground Water

Received date 2-16-53 Date of exam. 5-28-53 Appli. No. 2996

Name Town of Sequim, Washington xAddressx

Type of works infiltration trench Dimensions

Progress of works not started

Quantity ~~diverted or~~ applied for 718 g.p.m. 1160 acre-feet per year

Legal sub. NE¼ NW¼ Sec. 12 Twp. 29 N. Rge. 4 W. County Clallam

Use municipal supply

Irrigation-acreage: Present 0 Planned 0 Feasible 0

Municipal: Population 3000 as of 1970

Industrial

Time pump will be operated continuously

Other water rights appurtenant to this land

Proximity to existing works, springs, wells, or streams Trench will be well below the bottom of the river channel elevations. Trench will be constructed between the present channel of the Dungeness River and the high bluffs on the east side of the river at this location. Town of Sequim holds a S.W. Permit for 1.4 c.f.s.

Area Sub-area Zone

RECOMMENDATIONS

Approved for 718 g.p.m. 1160 acre-feet per year, subject to existing water rights. (1 acre-foot 325,850 gallons.)

The quantity of water recommended for permit is based on a daily per capita use of 380 gallons per day or a total of 1160 acre-feet per year.

The applicant will furnish information to this office as to the size and type of equipment installed and the gallons per minute furnished.

Signed this 29th day of May, 1953.

Stuart E. Shumway

STUART E. SHUMWAY
Engineer

S. F. No. 7354—3-51—75C. 27751.

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION AND DEVELOPMENT
DIVISION OF WATER RESOURCES

Permit to Appropriate Public Ground Waters of the State of Washington

Book No. 6 of Ground Water Permits, on page 2826 under Application No. 2996

TOWN OF SEQUIM, WASHINGTON

~~or~~

is hereby granted a permit to appropriate the following described public ground waters of the State of Washington, subject to existing rights, and to the limitations and provisions set out herein.

Priority date of this permit is February 16, 1953

Source of the proposed ground water appropriation is an infiltration trench within ..... area, ... sub-area ..... zone. Name or number of works is .....

Quantity of water appropriated shall be limited to the amount which can be beneficially applied and not to exceed 718 gallons per minute; 1160 acre-feet per year, to be used for the following purposes: municipal supply

as more definitely set out below.

Location of the well, tunnel, or infiltration trench is approximately 1700 feet East and 450 feet South from Northwest corner of Sec. 12 being within the NE¼ of NW¼ of Sec. 12, Twp. 29 N., Rge. 4 W.W.M. county of Clallam

Use, or uses to which water is to be applied:

For municipal supply: 718 gallons per minute; 1160 acre-feet per year, to supply the town of Sequim.

For irrigation: ..... gallons per minute; ..... acre-feet per year, for the irrigation of ..... acres.

For miscellaneous uses: ..... gallons per minute; ..... acre-feet per year, for .....

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Town of Sequim, Clallam County, Washington.

DESCRIPTION OF WORKS FROM WHICH WATER IS TO BE WITHDRAWN

The well will be ..... (Dug or drilled) and have a diameter of ..... inches, and depth of ..... feet.

Description of tunnel or infiltration trench:

(Please read carefully provisions below)

Particular specifications required by the Supervisor of Water Resources for the purpose of preventing waste of public waters:

Construction work shall begin on or before June 1, 1954 and shall thereafter be prosecuted with reasonable diligence and completed on or before December 1, 1954 and complete application of water to proposed use shall be made on or before December 1, 1955

Given under my hand and the seal of this office at Olympia, Washington, this 12th day of June, 1953.

Chas. H. Baxtheet

State Supervisor of Water Resources

S. F. No. 7361—3-53—3M. 34100.

CERTIFICATE RECORD No. 5 PAGE No. 2102-A

STATE OF WASHINGTON, COUNTY OF Clallam

Certificate of Ground Water Right

Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the State Supervisor of Water Resources thereunder.

THIS IS TO CERTIFY *That* TOWN OF SEQUIM, WASHINGTON

~~of~~ , *has made proof to the satisfaction of the State Supervisor of Water Resources of Washington, of a right to the use of the ground waters of* ~~a~~ an infiltration trench *located within* the NE¼ of NW¼ of Sec. 12, Twp. 29 N., Rge. 4 W.W.M.

for the purpose of municipal supply *under and subject to provisions contained in Ground Water Permit No.* 2826 *issued by the State Supervisor of Water Resources and that said right to the use of said ground waters has been perfected in accordance with the laws of Washington, and is hereby confirmed by the State Supervisor of Water Resources of Washington and entered of record in Volume* 5 *at page* 2102-A *; that the right hereby confirmed dates from* February 16, 1953 *; that the quantity of ground water under the right hereby confirmed for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed* 718 gallons per minute; 1160 acre-feet per year for municipal supply. ~~for irrigation of~~ ~~acres~~

A description of the lands to which such ground water right is appurtenant, and the place where such water is put to beneficial use, is as follows:

Town of Sequim, Clallam County, Washington.

284464

STATE OF WASHINGTON DIVISION OF WATER RCW 90.03.290 CERTIFICATE OF CONFIRMATION

Filed for Record at the Request of Mrs Lorene Delaney
JAN - 3 1955 A.D., 19
at 2 o min. past 12 M
and recorded in vol. 9 of
page 421
ROY E. ATTEBERRY, Auditor
CLALLAM COUNTY, WASH.
By [signature] Deputy
Agnes Clark
Sequim

The right to the use of the ground water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in Sections 6 and 7, Chapter 122, Laws of 1929.

WITNESS the seal and signature of the State Supervisor of Water Resources affixed this 28th *day of* December, *19* 54.

M. B. Walker
State Supervisor of Water Resources.

ENGINEERING DATA
O.K. [signature]

Ground Water Permit No. 2826

CERTIFICATE OF GROUND WATER RIGHT

Recorded in the office of the State Supervisor of Water Resources, Olympia, Washington, in Book No. 5 of Ground Water Right Certificates, on page 2102-A, on the 28th day of December, 195 5.

STATE OF WASHINGTON,
County of } ss.

I certify that the within was received and duly recorded by me in Volume ..... of Book of Water Right Certificates, at page ....., on the ..... day of

....., 19.....

STATE PRINTING PLANT OLYMPIA, WASHINGTON

G2-CVI-2P107

4204174

CERTIFICATE OF CHANGE OF POINT OF WITHDRAWAL OF GROUND WATER

In accordance with the provisions of Chapter 263, Laws of Washington for 1945, and the regulations of the State Director of Ecology.

THIS IS TO CERTIFY That the City of Sequim, Washington, has complied with all of the requirements of the Revised Code of Washington 90.44.100 and is hereby granted the right to add an additional (alternate) point of withdrawal for 718 gallons per minute, 1360 acre-feet per year, of waters of an infiltration trench as granted under Ground Water Certificate No. 2102-A.

That said water is used for the purpose of municipal supply continuously and had been withdrawn from an infiltration trench situated approximately 450 feet south and 1700 feet east from the northwest corner of Section 12, being within Section 12, Township 29 North, Range 4 West W.M., Clallam County, Washington.

That they have added an additional (alternate) point of withdrawal at a point approximately 500 feet north and 800 feet east from the southwest corner of Section 1, T. 29 N., R. 4 W.W.M.

Given under my hand and seal of this office at Olympia, Washington, this 26th day of September, 1979.

E. W. ASSELSTINE
Regional Manager
Department of Ecology

RECORDED:
Volume I-2, pp 107
Certificate of Change

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

APPLICATION FOR PERMIT
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ SURFACE WATER ☒ GROUND WATER

$10.00 MINIMUM STATUTORY EXAMINATION FEE REQUIRED WITH APPLICATION

(GRAY BOXES FOR OFFICE USE ONLY)

APPLICATION NO.	W.R.I.A.	COUNTY	PRIORITY DATE	TIME	ACCEPTED
223856	18	05 CLALLAM	6-12-75	9:00AM	GBS

APPLICANT'S NAME: City of Sequim
TELEPHONE NUMBER: 683-4139

DATE & PLACE OF INCORPORATION IF APPLICANT IS A CORPORATION:

ADDRESS (STREET) (CITY) (STATE) (ZIP CODE): P. O. Box 295, Sequim, Washington 98382

1. SOURCE OF SUPPLY

IF SURFACE WATER	IF GROUND WATER
SOURCE (NAME OF STREAM, LAKE, SPRING, ETC.) (IF UNNAMED, SO STATE)	SOURCE (WELL, TUNNEL, INFILTRATION TRENCH, ETC.): ~~Well(s)~~
TRIBUTARY OF	SIZE AND DEPTH: To be determined
	not to exceed 10 Wells

2. USE

USE TO WHICH WATER IS TO BE APPLIED (DOMESTIC SUPPLY, IRRIGATION, MINING, MANUFACTURING, ETC.): ~~Domestic~~ Municipal Supply

CUBIC FEET PER SECOND OR GALLONS PER MINUTE: 2100 ☐ CFS ☒ GPM

ACRE FEET PER YEAR:

TIMES DURING YEAR WATER WILL BE REQUIRED: Full Time

Continuously

IF IRRIGATION, NUMBER OF ACRES	NUMBER OF HOMES OR UNITS, IF DOMESTIC	ESTIMATED POPULATION 20 YEARS FROM THIS DATE IF MUNICIPAL SUPPLY
	750	5000 +
DATE PROJECT WILL BE STARTED: Oct. 1975 (assumed)	DATE PROJECT WILL BE COMPLETED: July 1976 (estimated) 9-1-85	9-1-86

3. LOCATION OF POINT OF DIVERSION/WITHDRAWAL

ON ACCOMPANYING PLATS OR MAPS, ACCURATELY MARK AND IDENTIFY EACH POINT OF DIVERSION. GIVE MEASURED DISTANCE AND BEARING, OR NORTH-SOUTH AND EAST-WEST DISTANCES FROM NEAREST SECTION CORNER.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	COUNTY
~~NE¼ or SE¼ of NW¼~~ Good	25	30 N	4 W	Clallam

DO YOU OWN THE LAND ON WHICH THIS SOURCE IS LOCATED. IF NOT, INSERT NAME & ADDRESS OF OWNER: Property under purchase option by City of Sequim

4. IF THIS IS WITHIN THE LIMITS OF A RECORDED PLATTED PROPERTY, COMPLETE THIS SECTION

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

5. LEGAL DESCRIPTION OF PROPERTY *ON WHICH WATER IS TO BE USED*

COPY LEGAL DESCRIPTION FROM DEED; OR ATTACH COPY OF DEED. TAX STATEMENT DESCRIPTIONS ARE NOT ACCEPTABLE. ALSO OUTLINE THIS PROPERTY ON THE MAPS OR PLATS SUBMITTED WITH THIS APPLICATION.

~~City of Sequim.~~ Area Served by the City of Sequim

CONTINUE ON REVERSE SIDE

WHAT IS YOUR INTEREST IN THE PROPERTY ON WHICH THE WATER IS TO BE USED (PROPERTY OWNER, LESSEE, CONTRACT PURCHASER, ETC.)

Property under purchase option by City of Sequim

ARE THERE ANY EXISTING WATER RIGHTS APPURTENANT TO THE LAND ON WHICH THE WATER IS TO BE USED

☒ YES ☐ NO Unknown

IF YES, FROM WHAT SOURCE AND UNDER WHAT AUTHORITY

SWC 1316, GWC 2102

CERT CHANGE

IN POD 426 under Cer 1316

6. SIGNATURES

Wesley E Taft

APPLICANT'S SIGNATURE

Wesley E. Taft, City of Sequim Engineer

LEGAL LANDOWNER'S SIGNATURE

LEGAL LANDOWNER'S ADDRESS

IF 10 ACRE-FEET OR MORE OF WATER IS TO BE STORED AND/OR IF THE WATER DEPTH WILL BE 10 FEET OR MORE AT THE DEEPEST POINT, A STORAGE PERMIT MUST BE FILED IN ADDITION TO THIS PERMIT. THESE FORMS CAN BE SECURED, TOGETHER WITH INSTRUCTIONS, FROM THE DEPARTMENT OF ECOLOGY.

REMARKS (TYPE OF SYSTEM PROPOSED)

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY } *ss.*

This is to certify that I have examined the foregoing application together with the accompanying maps and data, and return the same for correction or completion as follows: .....

.....

.....

In order to retain its priority, this application must be returned to the Department of Ecology, with corrections, on or before ....., *19*.....

Witness my hand this .....*day of* ....., *19*.....

.....
Department of Ecology

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

REPORT OF EXAMINATION
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ SURFACE WATER ☒ GROUND WATER

APPLICATION NO.	PRIORITY DATE OF APPLICATION
G2-23856	June 12, 1975

NAME
CITY OF SEQUIM

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
PO Box 295	Sequim	Washington	98382

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
not to exceed 10 wells

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	2100	690

QUANTITY, TYPE OF USE, PERIOD OF USE
690 acre-feet per year municipal supply continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWL

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, E. OR W.I W.M.	W.R.I.A.	COUNTY
	25	30	4 W	18	Clallam

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY WATER TO BE USED ON

Area served by the City of Sequim.

(SEE REVERSE SIDE)

City of Sequim

DESCRIPTION OF PROPOSED WORKS

DEVELOPMENT SCHEDULE

BEGINNING DATE	COMPLETION DATE	DATE COMPLETE APPLICATION OF WATER TO BE MADE
Started	September 1, 2000	September 1, 2001

PROVISIONS AND RECOMMENDATIONS

Recorded Objections
Letters of protest were received from:

Mrs Elmer Adams
Mr & Mrs Veryl Livengood
Mr Gene Dawley
Mr & Mrs Carl Berger
Mr Richard W Rapsch

General basis of the objections was that approval of this application would result in adverse effects to the water supply of surrounding wells and may result in drying some wells up.

All objections were deemed to have been filed in a timely manner and therefore acknowledged and accepted as provided for in the statutes.

Field Investigation
A field investigation of this application was made on July 24, 1975. Extensive reviews of office records and various reports were made. Reports analized were:

1. Chlorination Plant Reports from June 1969 to August 1975.
2. Engineering Study - City of Sequim Water System prepared by Whitacre Engineers Inc., December, 1973.
3. Ground Water Investigations; R. J. Rongey Inc., April, 1975.
4. Well No. 1 Completion Tests; R. J. Rongey, August 4, 1975.

In addition the Technical Services Section, Department of Ecology was called upon to make a detailed analysis of the consultants reports in order to determine the possible future effects on the ground water aquifiers.

Findings of Fact
The City of Sequim presently receives its water supply from surface sources via the Dungeness River and an infiltration trench under Water Right Certificate No. 2102 for 718 gallons per minute, (1.6 cubic foot per second) and No. 1316 for 630 gallons per minute (1.4 cubic foot per second) for a total of 1350 gallons per minute, approximately.

In 1970 the Department of Social and Health Services upgraded their regulations, changing the requirements for covering reservoirs, and treatment of surface waters from uncontrolled water sheds. By letter of July 10, 1971, that department notified the City of Sequim of the need for certain corrective measures to the Sequim system. The further recommended that an Engineering Study be made to analize the system and recommend corrective measures. Such a study was completed by Whitacre Engineers and testing began to ultimately obtain the city water from ground water sources.

The population of Sequim, approximately 2300, is served by 810 water services or 2.84 persons per connections. With an expected population of 5,000 by the year 2000, the number of connections are expected to reach 1760.

The system is now unmetered and the daily water use per connection varies from the average 430 gallons to 2250 gallons per day. With the installation of meters, the daily use would drop from these figures to 350 and 1250 gallons per day respectively.

The system must be capable of delivering the peak use through pumping and/or storage. This would amount to 2,200,000 gallons on a metered system or, 3,960,000 gallons on an unmetered system. The pumping rate applied for and the present storage could not quite meet the peak demand on an unmetered system, but could meet the metered demand with 13.5 hours of pumping and storage.

The average peak daily use during the critical summer months would be approximately 700 gallons per day per connection or 1,232,000 gallons per day which would require 10 hours per day pumping at 2100 gallons per minute. This is the figure that will determine the most critical effects on neighboring wells.

For a metered system the average daily use of 350 gallons per connection on the yearly basis would require approximately 690 acre-feet per year.

According to the well completion report by Richard J. Rangey, it was determined that the aquifier is confined and is from 90 to 258 feet deep and the annual ground water movement in the upper portion in the order of 1100 acre-feet.

Further analysis by the Technical Services group has found that, according to calculations using a period of 90 days and pumping 10 hours per day at 2100 gallons per minute, the water level drawdown at given distances from the well field would be as follows:

500 feet from pumped well	13.68 feet
2000 feet from pumped well	8.98 feet
5280 feet from pumped well	5.69 feet
2 miles from pumped well	3.34 feet
3 miles from pumped well	1.96 feet

Because this analysis does not consider the recharging of the aquifier, these figures are considered the extreme. The actual drawdown would likely be much less.

Consideration of Objections

In checking water right and registration records, I find only the Carl Berger well to be within one-half mile of the pumped test well and drawing from the same aquifier. Most other wells are over a mile away and are taking water from the upper unrelated aquifier.

It appears from all caculations that all wells will continue to produce water with little problem.

To insure this point, the City of Sequim should make periodic well tests as development progresses through the years.

Conclusions and Recommendations

Upon complete review and analysis of all data, it appears that ample water is available for appropriation by the City of Sequim and such use will not materially affect existing rights. However, as the additional production wells are added to the well field, additional well tests and drawdown analysis should be undertaken.

Accordingly, on the basis of these findings, I recommend approval of this application, subject to the following conditions:

The application be approved for 2100 gallons per minute as an instantaineous rate throughout the year, and 690 acre-feet annually for municipal use.

That as additional wells are completed and upon the request of the Department of Ecology, additional well pump tests and drawdown analysis be made.

"The installation of an access port as described in attached Ground Water Bulletin No. 1 shall be required prior to issuance of final certificate of water right. The applicant may, for his own convenience, wish to install an airline and gage in addition to the access port."

Owing to the proximity of neighboring wells, the applicant is reminded of his responsibility toward same and advised that he may be required to regulate his withdrawal and pumping rate if existing rights are injuriously affected.

Said well shall be constructed with a water tight casing down through and sealed into an impervious layer that will insure a break in hydraulic continuity with the surface water of the upper aquifier.

"All water wells constructed within the state shall meet the minimum standards for construction and maintenance as provided under RCW 18.104 (Washington Water Well Construction Act of 1971) and Chapter 173-160 WAC (Minimum Standards for Construction and Maintenance of Water Wells)."

Use of the waters to be appropriated under this application will be for a public water supply. State Board of Health rules require every owner of a public water supply to obtain written approval from the Water Supply and Waste Section, Health Services Division, PO Box 1788, Olympia, WA 98504 prior to any new construction or alterations of a public water supply.

Further, upon completion of construction and conversion of the system from existing surface water sources, existing water rights under Certificates 2102 and 1316 now recorded under change Certificate No. 426, be placed in a reserve status as provided for in RCW 90.54.020; with such waters to be used in an emergency only and/or until such time that the reserve statue is re-reviewed by the Department of Ecology upon request of the City of Sequim.

Signed at Olympia, Washington,
this 29th day of August, 1975.

Walter Bergstrom

WALTER BERGSTROM, Resources Management
Department of Ecology

FINDINGS OF FACT AND DECISION

Upon review of the above report, I find that all facts relevant and material to the subject application have been thoroughly investigated. Furthermore, I find that water may be withdrawn for a beneficial use and that the withdrawal thereof as recommended in the above report will not impair existing rights or be detrimental to the public welfare. Therefore, it is ORDERED that, subject to existing rights and the provisions herein, permit issue under Ground Water Application Number G2-23856 for the appropriation of public ground waters in the amount and for the uses set forth in the foregoing report, in accordance with the examiner's conclusions and recommendations.

Signed at Olympia, Washington, this 29 day of August, 1975.

E. W. Asselstine
Regional Manager

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

PERMIT

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ SURFACE WATER ☒ GROUND WATER

PERMIT NUMBER	APPLICATION NUMBER	PRIORITY DATE	
G2-23856P	G2-23856	June 12, 1975	

NAME
CITY OF SEQUIM

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
PO Box 295	Sequim	Washington	98382

The applicant is, pursuant to the Report of Examination which has been accepted by the applicant, hereby granted a permit to appropriate the following described public waters of the State of Washington, subject to existing rights and to the limitations and provisions set out herein.

PUBLIC WATER TO BE APPROPRIATED

SOURCE
not to exceed 10 wells

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	2100 / 700	690

QUANTITY, TYPE OF USE, PERIOD OF USE		
690 acre-feet per year	municipal supply	continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE E. OR W.	W.M.	W.R.I.A.	COUNTY
	25	30	4 W		18	Clallam

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY WATER TO BE USED ON

Area served by the City of Sequim.

PERMIT

DESCRIPTION OF PROPOSED WORKS

DEVELOPMENT SCHEDULE

BEGINNING DATE	COMPLETION DATE	DATE COMPLETE APPLICATION OF WATER TO BE MADE
Started	September 1, 2000	September 1, 2001

PROVISIONS

The installation of an access port as described in Ground Water Bulletin No. 1 shall be required prior to issuance of final certificate of water right.

Owing to the proximity of neighboring wells, the permittee is reminded of his responsibility toward same and advised that he may be required to regulate his withdrawal and pumping rate if existing rights are injuriously affected.

"All water wells constructed within the state shall meet the minimum standards for construction and maintenance as provided under RCW 18.104 (Washington Water Well Construction Act of 1971) and Chapter 173-160 WAC (Minimum Standards for Construction and Maintenance of Water Wells)."

This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or fail to give notice to the Department of Ecology on forms provided by that Department documenting such compliance.

Given under my hand and the seal of this office at Olympia, Washington, this 31st *day of* October, *19* 75

JOHN A. BIGGS, *Director*
Department of Ecology

by E. W. Asselstine
E. W. Asselstine
Regional Manager

ENGINEERING DATA

OK P

19971001123000

FILED FOR RECORD AT THE REQUEST OF City of Sequim
RECORDED IN RECORDS, CLALLAM CO.
97 DEC -2 AM 8:53
VOL. ____ PAGE 2
KEN FOSTER, AUDITOR
CLALLAM COUNTY, WASH.
BY ____ DEPUTY

City of Sequim
152 W. Cedar St
Sequim WA 98382

WASHINGTON STATE DEPARTMENT OF ECOLOGY

STATE OF WASHINGTON
CERTIFICATE OF WATER RIGHT

Document Title: Certificate of Water Right

Agency: Department of Ecology
Southwest Regional Office
P.O. Box 47775
Olympia, WA 98504-7775

Applicant: City of Sequim
152 W Cedar St
Sequim WA

Reference Number:

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
June 12, 1975	G2-23856	G2-23856	G2-23856

This is to certify that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown, but is limited to an amount actually beneficially used.

PUBLIC WATERS TO BE APPROPRIATED

SOURCE	TRIBUTARY OF (IF SURFACE WATERS)
3 Wells	

MAX. CUBIC FEET PER SECOND	MAX. GALLONS PER MINUTE	MAX. ACRE-FEET PER YEAR
	700	690

QUANTITY/TYPE OF USE/PERIOD OF USE

690 Acre-feet per year/Municipal supply/Year-round, as needed

LEGAL DESCRIPTION OF LOCATION OF DIVERSION/WITHDRAWAL

1/4 1/4	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	W.R.I.A.	COUNTY
NE1/4 NW1/4	25	30	4W	18	Clallam

PARCEL # n/a

ADDITIONAL LEGAL IS ON PAGE 2

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

1/4 1/4	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	W.R.I.A.	COUNTY
n/a	n/a	n/a	n/a	n/a	n/a

PARCEL # n

ADDITIONAL LEGAL IS ON PAGE 2

CONTINUED LEGAL DESCRIPTION FOR LOCATION OF DIVERSION/WITHDRAWAL

Approximately 300 feet South and 750 feet West of the North quarter corner of Section 25.

CONTINUED LEGAL DESCRIPTION FOR PROPERTY ON WHICH WATER IS TO BE USED

Area served by City of Sequim.

PROVISIONS

All conditions and requirements contained in reports of examination or permits previously issued apply to this certificate unless specifically noted below.

The right to use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390, and 90.44.020.

This certificate of water right is specifically subject to relinquishment for non-use of water as provided in RCW 90.14.180.

Given under my hand and the seal of this office at Olympia, Washington, this 24th *day of* November, *1997.*

DEPARTMENT OF ECOLOGY STATE OF WASHINGTON

Tom Fitzsimmons
Department of Ecology

By J. Mike Harris, Section Supervisor

ENGINEERING DATA
OK MP
ECY 040-1-2 (Rev. 8-97)

WASHINGTON STATE DEPARTMENT OF ECOLOGY

State of Washington
Application for a Water Right

Please follow the attached instructions to avoid unnecessary delays.

For Ecology Use
Fee Paid 10.00
Date 6/13/95

Section 1. APPLICANT - PERSON, ORGANIZATION, OR WATER SYSTEM

Name City of Sequim Home Tel:( ) -
Mailing Address 152 West Cedar Street Work Tel:(360)683 - 4908
City Sequim State WA Zip+4 98382 + 3317 FAX:(360)681 - 0552

Section 2. CONTACT - PERSON TO CALL ABOUT THE APPLICATION

☐ Same as above

Name James E. Bay Home Tel:( ) -
Mailing Address 152 West Cedar Street Work Tel:(360)683 - 4908
City Sequim State WA Zip+4 98382 + 3317 FAX:(360)681 - 0552
Relationship to applicant Director of Public Works Department for City of Sequim

Section 3. STATEMENT OF INTENT

The applicant requests a permit to use not more than 2500 (☒ gallons per minute or ☐ cubic feet per second) from a ☐ surface water source or ☒ ground water source (check only one) for the purpose(s) of municipal water supply. Attach a "legal" description of the place of use. (See instructions.) *NOTE: A tax parcel number or a plat number is not sufficient.*

City of Sequim

Estimate a maximum annual quantity to be used in acre-feet per year: 2600

☐ Check if the water use is proposed for a short-term project. Indicate the period of time that the water will be needed:
From ___/___/___ to ___/___/___

Section 4. WATER SOURCE

If SURFACE WATER	If GROUNDWATER
Name the water source and indicate if stream, spring, lake, etc. If unnamed, write "unnamed spring," "unnamed stream," etc.: Number of diversions: N/A	A permit is desired for five well(s).
Source flows into (name of body of water): N/A	Size & depth of well(s): 300' to 600' deep/8" to 16" diameter

LOCATION

Enter the north-south and east-west distances in feet from the point of diversion or withdrawal to the nearest section corner:

250' north and 150' west of the center Sec. 17, T30N, R3W

¼ of	¼ of	Section	Township	Range(E/W)	County	If location of source is platted, complete below: Lot	Block	Subdivision
SE	NW	17	30N	3W	Clallam	15, 16, 17		Cactus Flat

For Ecology Use Date Received: 6/13/95 Priority Date: 6/13/95
SEPA: Exempt/Not Exempt FERC License # Dept. Of Health #
Date Accepted As Complete 6/21/95 By Date Returned By WRIA: 18

Section 5. GENERAL WATER SYSTEM INFORMATION

A. Name of system, if named: City of Sequim - Stone Property Wellfield

B. Briefly describe your proposed water system. (See instructions.)

See attached Hydrgeologic Characterization and New Well Field location City of Sequim, January 1995, Pacific Groundwater Group

C. Do you already have any water rights or claims associated with this property or system? ☐ YES ☒ NO*
PROVIDE DOCUMENTATION. *See attached letter from Pacific Groundwater Group to Marie Peter dated May 30, 1995

Section 6. DOMESTIC / PUBLIC WATER SUPPLY SYSTEM INFORMATION
(Completed for all domestic/public supply uses.)

A. Number of "connections" requested: _____ Type of connection _____
(Homes, Apartment, Recreational, etc.)

B. Are you within the area of an approved water system? ☐ YES ☐ NO
If yes, explain why you are unable to connect to the system. *Note: Regional water systems are identified by your County Health Department.*

Complete C. and D. only if the proposed water system will have fifteen or more connections.

C. Do you have a current water system plan approved by the Washington State Department of Health? ☐ YES ☒ NO*
If yes, when was it approved? _____ Please attach the current approved version of your plan.
*1993 Draft Plan reviewed by D.O.H. in 1994. Plan being finalized at this time.

D. Do you have an approved conservation plan? ☐ YES ☒ NO*
If yes, when was it approved? _____ Please attach the current approved version of your plan.
* See Comprehensive Plan

Section 7. IRRIGATION/AGRICULTURAL/FARM INFORMATION
(Complete for all irrigation and agriculture uses.)

A. Total number of acres to be irrigated: N/A

B. List total number of acres for other specified agricultural uses:

Use N/A Acres _____
Use N/A Acres _____
Use N/A Acres _____

C. Total number of acres to be covered by this application: N/A

D. Family Farm Act (Initiative Measure Number 59, November 3, 1977)
Add up the acreage in which you have a controlling interest, including only:
‡ Acreage irrigated under water rights acquired after December 8, 1977;
‡ Acreage proposed to be irrigated under this application;
‡ Acreage proposed to be irrigated under other pending application(s).

1. Is the combined acreage greater than 2000 acres? ☐ YES ☐ NO
2. Do you have a controlling interest in a Family Farm Development Permit? ☐ YES ☐ NO
If yes, enter permit no: _____

E. Farm uses:
Stockwater - Total # of animals _____ Animal type _____ (If dairy cattle, see below)
Dairy - # Milking _____ # Non-milking _____

Section 8. WATER STORAGE

Will you be using a dam, dike, or other structure to retain or store water? ☐ YES ☒ NO

NOTE: If you will be storing 10 acre-feet or more of water and/or if the water depth will be 10 feet or more at the deepest point, and some portion of the storage will be above grade, you must also apply for a reservoir permit. You can get a reservoir permit application from the Department of Ecology.

Section 9. DRIVING DIRECTIONS

Provide detailed driving instructions to the project site.

Highway 101 to City of Sequim, north on Sequim Avenue to Port Williams Road, east 2600' on Port Williams Road. Project site on north side of Port Williams Road.

Section 10. REQUIRED MAP

A. Attach a map of the project. (See instructions.)

Section 11. PROPERTY OWNERSHIP

A. Does the applicant own the land on which the water will be used? ☒ YES ☐ NO
If no, explain the applicant's interest in the place of use and provide the name(s) and address(es) of the owner(s):

B. Does the applicant own the land on which the water source is located? ☒ YES ☐ NO
If no, submit a copy of agreement:

I certify that the information above is true and accurate to the best of my knowledge. I understand that in order to process my application, I grant staff from the Department of Ecology access to the site for inspection and monitoring purposes. Even though I may have been assisted in the preparation of the above application by the employees of the Department of Ecology, all responsibility for the accuracy of the information rests with me.

Lonna L. Muirhead — Applicant (or authorized representative)

June 9, 1995 — Date

Landowner for place of use (if same as applicant, write "same")

Date

Use this page to continue your answers to any questions on the application. Please indicate section number before answer.

We are returning your application for the following reason(s):	
_____ Examination fee was not enclosed	APPLICANT PLEASE RETURN TO CASHIER, PO BOX 5128, LACEY, WA 98503-0210
_____ Section number(s) _____ is/are incomplete	APPLICANT PLEASE RETURN TO THE APPROPRIATE REGIONAL OFFICE
Explanation:	
Please provide the additional information requested above and return your application by _____ _____ *(date).*	

Ecology staff_____ Date_____

To receive this document in alternative format, contact Lisa Newman at (360) 407-6604 (Voice) or (360) 407-6006 (TDD).

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
AMENDED

REPORT OF EXAMINATION

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ **Surface Water** (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ **Ground Water** (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
June 13, 1995	G2-29239		

NAME
City of Sequim

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
152 West Cedar Street	Sequim	Washington	98382

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Five Wells

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	2250	1850

QUANTITY, TYPE OF USE, PERIOD OF USE		
1850 Acre-feet per year (supplemental to existing rights)	Municipal supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION–WITHDRAWAL
250 feet North and 150 feet West of the center of Section 17.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼ NW¼	17	30	3W	18	Clallam

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

City of Sequim including designated urban growth areas.

DESCRIPTION OF PROPOSED WORKS

Up to 5 wells completed in USGS Unit 5. Well #1: 16"X411'

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	July 1, 2014	July 1, 2015

REPORT

BACKGROUND:

Pursuant to Chapters 90.03 and 90.44 Revised Code of Washington (RCW), the City of Sequim applied for a permit to appropriate public ground water from five wells. A withdrawal rate of 2,250 gallons per minute (gpm) was requested for municipal supply. The application was assigned a priority date of June 13, 1995.

Legal notice of the proposed appropriation was published in *The Sequim Gazette* of Clallam County on June 28 and July 5, 1995. Three formal protests were received as a result of this notice:

1. C.B. Frick, a water-right holder for a well located within 1/4 mile of the City's well field, protested this application on grounds that pumping of the proposed wells may cause drawdown sufficient to impair his water right.

2. A protest letter from Sunland Water District was based on the new well field's potential to impair the District's senior water rights.

3. William Reed, representing Graysmarsh Farm, protested this application on grounds that the City's well field has the potential to adversely impact ground-water flow to springs and wetlands associated with lower Gierin Creek.

A preliminary permit was issued to allow the City to drill and test the wells, and to provide Ecology with information concerning the potential impacts of pumping. Under this permit, City of Sequim Port Williams Well #1 was drilled and tested. Aquifer-testing data were collected and analyzed by Pacific Groundwater Group (PGG).

Water Rights Summary

The City of Sequim currently holds the following water rights:

1. Surface Water Certificate #1316 for 1.4 cubic feet per second (cfs) from the Dungeness River was issued in 1924 (no annual quantity is specified).

2. Ground Water Certificate #2102-A was issued in 1953 for 718 gpm and 1,160 acre-feet per year from an infiltration trench adjacent to the Dungeness River. At the time this water right was issued, the infiltration trench was intended to replace the surface water diversion under Certificate #1316 as the primary water source, and an annual quantity (sufficient for more than 20 years of population growth) was issued accordingly. The unspecified annual quantity under Certificate #1316 is therefore not additive to that issued under Certificate #2102-A.

3. Ground Water Certificate #G2-23856 for 2,100 gpm and 690 acre-feet per year, authorizes withdrawals from the Silberhorn Well Field.

The City of Sequim currently withdraws water primarily from the infiltration trench (under Certificate #2102-A) and the Silberhorn Well Field (under Certificate #G2-23856). Existing water rights for the City of Sequim total 1,850 acre-feet per year.

During periods of high turbidity in the Dungeness River, withdrawals from the infiltration trench are curtailed and the City relies entirely on withdrawals from the Silberhorn Well Field. However, withdrawals from the Silberhorn Well Field had to be decreased due to excessive drawdown of water levels in the aquifer. Due to seasonal unreliability of the infiltration trench and the lower-than-expected production capacity of the Silberhorn field, the City needs additional instantaneous capacity to serve its growing population.

INVESTIGATIONS:

Ecology staff hydrogeologist, Kirk Sinclair, and I conducted a field examination of the project site and surrounding area on February 22, 1996. I researched pertinent Department of Ecology records of water rights, claims, and well construction reports, and reviewed the summary and analysis of aquifer-testing data for City of Sequim Port Williams Well #1 compiled by Pacific Groundwater Group. Kirk Sinclair was consulted for review of this hydrogeological information.

Drilling Information on Stone Well #1

Well head elevation:	approximately 100 feet MSL
Well depth:	411 feet
Casing diameter:	16 inches
Static water level:	50 feet MSL (on 10-11-95)
Screen depth:	258 to 411 feet

Aquifer Information

Port Williams Well #1 is located at 702 Port Williams Road in the Sequim-Dungeness Valley, approximately three miles east of the Dungeness River, and just north of the city limits of Sequim. Gierin Creek flows in a northeasterly direction and lies approximately 500 feet east of the well.

Three aquifer units and two semi-confining to confining units have been defined in the unconsolidated deposits which underlie the Sequim-Dungeness Valley. The aquifer units are designated as USGS Unit 1 (the "water-table" aquifer), USGS Unit 3 (the "upper confined" aquifer), and USGS Unit 5 (the "lower confined" aquifer).

Port Williams Well #1 is completed in USGS Unit 5 which occurs at a depth of 264 to 439 feet below ground surface at this site. Here, the water-bearing zone consists of fine sand with variable amounts of silt and gravel.

Ground-water generally flows from south to north-northeast in this area, eventually discharging to Sequim Bay or the Strait of Juan de Fuca. Water-level measurements indicate that ground water flows vertically from USGS Unit 1 to Units 3 and 5 at the well site.

Assessment of Seawater Intrusion Risk

The Port Williams Well Field is located approximately two miles from the Strait of Juan de Fuca. Although the distance from marine waters makes it unlikely that seawater intrusion would affect wells at this site, seaward wells have the potential to be impaired by withdrawals from inland wells.

There is evidence that the saltwater-freshwater interface currently lies well offshore. Near-coastal wells sampled along Dungeness Bay in 1993, including the stretch between Jamestown and Port Williams, all produced ground water with chloride concentrations under 50 mg/L (Forbes and CH2M Hill, Preliminary Assessment of Seawater Intrusion in Coastal Water Wells in Eastern Clallam and Eastern Jefferson Counties, 1993).

Based on topography, it appears that ground water at this site would normally discharges toward Dungeness Bay in the direction of Gierin Creek. To protect the aquifer from seawater intrusion, PGG recommends a monitoring program for seaward wells completed in USGS Unit 5. If monitored wells show a progressive increase in chloride levels, withdrawals from the Port Williams Well Field may need to be reduced.

Potential Effects on Surface Waters and Existing Rights

The following water rights and well construction reports are on file with the Department of Ecology:

- Eight ground-water rights have been issued for wells within a half-mile radius of Port Williams Well #1.
- Nineteen additional water rights are on record for wells occurring within a one-mile radius of Port Williams Well #1.
- The nearest certificated well completed in the same aquifer unit (USGS Unit 5) is an irrigation well owned by Cy Frick, located approximately 1/4 to 1/2 mile south of the Port Williams well site. This well

and a shallower (USGS Unit 3) well are authorized a combined withdrawal of 280 gpm and 64.5 acre-feet per year under Certificate #G2-22075.

- The 274-foot deep (Unit 3) BPOE Sequim Lodge well, located over 1/4 mile west of the Port Williams site, is authorized withdrawal of 50 gpm, 2 acre-feet per year, under Certificate #G2-26992.
- The Vista System well, under Certificate #G2-27116 (authorizing withdrawal of 152 gpm and 33 acre-feet per year), completed in USGS Unit 5, is located almost one mile west of Port Williams Well #1.
- A 581-foot deep irrigation well on Graysmarsh Farm (under Certificate #G2-27337) is situated approximately 1.5 miles northeast. This well is authorized withdrawal of 200 gpm and 80 acre-feet per year.
- Another irrigation well completed in USGS Unit 5 is located approximately 800 feet northwest of Port Williams Well #1. However, there is no record of a water right associated with this well.
- Five surface-water rights are recorded in Section 17. These authorize diversions from Gierin Creek and tributary ditches.
- Fifteen ground-water-right claims and three surface-water-right claims are recorded for Section 17.
- Numerous well construction reports are on file for wells located within a half-mile radius of the well field. Wells range in depth from 35 to 320 feet. Most are completed in USGS Unit 1. Well density is considerably higher west of the well field.

The City's wells should not impair other wells completed in USGS 5 due to the small number of wells withdrawing from this aquifer. However, pumping from USGS 5 is likely to induce some vertical leakage from USGS Unit 3. This, in turn, could induce leakage from USGS Unit 1 and surface-water bodies.

Due to the high flow of ground water discharging through USGS Unit 5 to the Straits of Juan de Fuca and the presence of two intervening aquitard units, the impact of the proposed withdrawals on USGS Unit 1 and surface-water bodies is likely to be small and dispersed over a very large area. Unacceptable impacts to water levels in USGS Unit 3 will be prevented by maintaining water levels in USGS Unit 5 so that there is no ongoing progressive decline from year to year.

Discussion of Protestants Concerns

Concerns raised by protestants of this application include water availability and the potential for seawater intrusion, impairment of existing rights, and impacts to wetlands and riparian areas associated with lower Gierin Creek.

1) Water Right Certificate #G2-00800C and #G2-00801C for Sunland Associates authorize a combined withdrawal of 540 gpm and 312 acre-feet per year from two wells completed in USGS Aquifer Unit 3. The nearer of these wells is located approximately 3/4 mile north of the Port Williams well site. Due to distance and completion in a shallower aquifer, these wells should not be affected by direct drawdown interference as a result of pumping the City's wells. Long-term drawdown effects to USGS Aquifer Unit 3 will need to be prevented by maintaining the water level in USGS Unit 5 such that there is no year-to-year decline which could induce excessive vertical leakage from USGS Unit 3.

2) At least eight surface and ground water rights are associated with Graysmarsh Farm which is located downgradient of the City's Port Williams well site. These rights authorize diversions from Gierin Creek, tributaries, and springs, as well as ground water from USGS Units 1, 3, and 5.

Riparian areas and wetlands which provide quality habitat for migratory birds and anadromous fish are also present on Graysmarsh Farm. These wetlands are maintained by sub-surface ground-water flow and springs. Gierin Creek supports coho salmon and winter steelhead. Under RCW 90.54.020, perennial rivers and streams of the state must be retained with base flows necessary to provide for preservation of fish, wildlife, and other environmental values.

Graysmarsh Farm's water rights, riparian areas, and wetlands will need to be protected by monitoring and maintaining water levels in USGS Aquifer Units 1, 3, and 5. If the City's pumping results in year-to-year water-level declines, withdrawals will need to be reduced to prevent impairment.

Because seawater intrusion, if it occurs, will first become apparent in seaward wells completed in USGS Unit 5, the 581-foot deep Graysmarsh irrigation well (under Water Right Certificate #G2-27337) will need to be monitored regularly for chloride levels.

3) Mr. Frick is the owner of three wells situated approximately 1/4 mile from the Port Williams well site. Two of these wells appear to be completed in USGS Unit 3. The third well is completed at a depth of 398 feet in USGS Aquifer Unit 5.

The two wells completed in Unit 3 should be protected as proposed for the Sunland wells. Because the Unit 5 well is the nearest certificated well completed in the same aquifer as the City's Port Williams well field, I recommend that the City specifically monitor static water levels in this well to prevent impairment of Mr. Frick's water right.

Short-term impacts from pumping at the Port Williams well site are not expected. Long-term effects can be predicted only by recording the City's withdrawals and by monitoring static water levels in USGS Units 1, 3, and 5 as the well field is developed to full capacity. Periodic analysis of monitoring data by Ecology will enable regulation of the City's withdrawals, if necessary, to prevent impairment of existing rights or surface waters.

Water Requirements

According to the 1995 City of Sequim Comprehensive Water Plan, the population of Sequim and its urban growth area may reach 15,455 by the year 2015. Per capita water consumption for the City of Sequim is currently 198 gallons per day--much higher than that of similar municipal water systems. The City of Sequim needs to implement a rigorous conservation program to more efficiently use the limited water resources available in the Sequim-Dungeness area. Sequim has drafted and begun to implement a conservation program which is expected to significantly reduce its water consumption rate. The City is also taking action to provide reclaimed water for various uses. Conservation savings are expected to provide a significant portion of Sequim's future water needs.

According to Sequim's 1995 Comprehensive Water Plan, Sequim was using only 781 of the 1,850 acre-feet per year of water already allocated under existing rights. If Sequim is able to successfully reduce per capita consumption to that of nearby municipalities such as Port Townsend and Port Angeles, it should have adequate water to serve its projected population through the year 2015. I therefore recommend that this permit be issued totally supplemental to existing water rights.

Discussion of Public Interest

The Dungeness River supports critical and depressed salmonid stocks. Any further reduction in instream flows would be detrimental to fish habitat.

Withdrawals from USGS Aquifer Unit 5 may have a small effect on surface-water systems, but because the effects will be dispersed over a large area, no impairment is expected. Furthermore, because the proposed appropriation is for supplemental supply only (no new annual quantity of water is being allocated), any adverse effect should be offset by the benefit of increased flows made possible through decreased reliance on the City's infiltration trench on the Dungeness River. With Well #1 on line, Sequim estimates that withdrawals from the infiltration trench will initially be reduced by 50%. Successful development of the well field will make it possible for the City to further reduce withdrawals from the river.

Permitting a deep-source municipal water supply for the City of Sequim and its urban growth area will prevent the continued proliferation of individual (usually shallow) wells, resulting in fewer withdrawals from shallower aquifers in the future. This will ultimately be beneficial to surface waters associated with both the Dungeness River and Gierin Creek. The municipal system will also provide greater protection of water quality and allow more efficient delivery and use of water resources in the Sequim-Dungeness Valley.

FINDINGS and CONCLUSION:

In accordance with Chapters 90.03 and 90.44 RCW, I find that water is available for appropriation from the source in question and that the appropriation is a beneficial use, and subject to the provisions below, should not impair existing rights or be detrimental to the public welfare.

RECOMMENDATIONS:

I recommend approval of this application and issuance of a permit to allow appropriation of 2,250 gpm from up to five wells completed in USGS Unit 5 at the Port Williams Well Field. Withdrawal of a maximum annual quantity of 1,850 acre-feet per year, supplemental to existing rights, shall be authorized for municipal supply. The period of use shall be year-round, as needed.

The permit shall be subject to all applicable State laws and regulations and to the following provisions:

Provisions

"This permit is subject to all terms and conditions contained in the Settlement Agreement which is incorporated into the Stipulation and Agreed Order of Dismissal of PCHB No. 97-41, dated September 8, 1997, as modified by the Order Nunc Pro Tunc, dated September 24, 1997."

"Water use under this and existing City of Sequim water rights shall not exceed 1,850 acre-feet per year."

The water appropriated under this application will be used for public water supply. The State Board of Health rules require public water supply owners to obtain written approval from the Office of Water Supply, Department of Health, Mail Stop 7822, Building 3, Olympia, Washington 98504-7822, prior to any new construction or alterations of a public water supply system.

"Ground-water withdrawals at the Port Williams Well Field shall be managed by the City of Sequim such that there are no long-term (i.e. year-to-year) declines in ground-water levels within the pumped (USGS Unit 5) or overlying (USGS Units 1 and 3) aquifers. Withdrawals shall be limited to that amount which can be sustainably withdrawn from USGS Unit 5, on an annual basis, without impairing senior rights or instream resources."

"Prior to issuance of a final water right certificate, the City of Sequim shall submit a completion report demonstrating the actual sustainable production of the Port Williams Well Field. The report shall assess actual and potential impacts to senior water rights in USGS Aquifer Units 1, 3, and 5 based on three years of actual use following full development of the well field. The instantaneous quantity authorized under this permit may be reduced prior to issuing the final water right certificate to reflect the sustainable yield from USGS Unit 5 and to protect senior rights."

"If senior water users are impaired through drawdown interference or water quality degradation as a result of operating the Port Williams Well Field, the City of Sequim shall reduce its withdrawals at the Port Williams Well Field to allow impaired users to exercise the full extent of their water rights."

Issuance of this water right is subject to the implementation of the minimum requirements established in the Conservation Planning Requirements, Guideline and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs, July 1994, and as revised.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the states water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

"The City of Sequim shall implement conservation measures as described in Chapter 9 of its July 17, 1996 Water Comprehensive Plan."

"The City of Sequim shall gradually eliminate use of surface water from the Dungeness River, except as an emergency back-up source."

REPORTED BY: Marie Peters Date: October 6, 1997

FINDINGS OF FACT AND DECISION

Upon reviewing the above report, I find all facts, relevant and material to the subject application, have been thoroughly investigated. Furthermore, I find water is available for appropriation and the appropriation as recommended, is a beneficial use and will not be detrimental to existing rights or the public welfare.

Therefore, I **ORDER** a permit be issued under Ground Water Application Number G2-29239, subject to existing rights and indicated provisions, to allow appropriation of public ground water for the amount and uses specified in the foregoing report.

Signed at Olympia, Washington, this 6th day of October ,1997.

Gale Blomstrom

Gale Blomstrom
Shorelands & Water Resources Supervisor
Southwest Regional Office

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

PERMIT

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ **Surface Water** (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ **Ground Water** (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
June 13, 1995	G2-29239	G2-29239	

NAME
City of Sequim

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
152 West Cedar Street	Sequim	Washington	98382

The applicant is, pursuant to the Report of Examination which has been accepted by the applicant, hereby granted a permit to appropriate the following described public waters of the State of Washington, subject to existing rights and to the limitations and provisions set out herein.

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Five Wells

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	2250	1850

QUANTITY, TYPE OF USE, PERIOD OF USE		
1850 Acre-feet per year (supplemental to existing rights)	Municipal supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION–WITHDRAWAL
250 feet North and 150 feet West of the center of Section 17.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼ NW¼	17	30	3W	18	Clallam

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

City of Sequim including designated urban growth areas.

DESCRIPTION OF PROPOSED WORKS

Up to 5 wells completed in USGS Unit 5. Well #1: 16"X411'

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	July 1, 2014	July 1, 2015

PROVISIONS

"This permit is subject to all terms and conditions contained in the Settlement Agreement which is incorporated into the Stipulation and Agreed Order of Dismissal of PCHB No. 97-41, dated September 8, 1997, as modified by the Order Nunc Pro Tunc, dated September 24, 1997."

"Water use under this and existing City of Sequim water rights shall not exceed 1,850 acre-feet per year."

"Ground-water withdrawals at the Port Williams Well Field shall be managed by the City of Sequim such that there are no long-term (i.e. year-to-year) declines in ground-water levels within the pumped (USGS Unit 5) or overlying (USGS Units 1 and 3) aquifers. Withdrawals shall be limited to that amount which can be sustainably withdrawn from USGS Unit 5, on an annual basis, without impairing senior rights or instream resources."

"Prior to issuance of a final water right certificate, the City of Sequim shall submit a completion report demonstrating the actual sustainable production of the Port Williams Well Field. The report shall assess actual and potential impacts to senior water rights in USGS Aquifer Units 1, 3, and 5 based on three years of actual use following full development of the well field. The instantaneous quantity authorized under this permit may be reduced prior to issuing the final water right certificate to reflect the sustainable yield from USGS Unit 5 and to protect senior rights."

"If senior water users are impaired through drawdown interference or water quality degradation as a result of operating the Port Williams Well Field, the City of Sequim shall reduce its withdrawals at the Port Williams Well Field to allow impaired users to exercise the full extent of their water rights."

Issuance of this water right is subject to the implementation of the minimum requirements established in the Conservation Planning Requirements, Guideline and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs, July 1994, and as revised.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the states water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or fail to give notice to the Department of Ecology on forms provided by that Department documenting such compliance.

Given under my hand and the seal of this office at Olympia, Washington,

this 6th *day of* October, *19* 97.

Department of Ecology

ENGINEERING DATA
OK ✓

by Jose Bonnstetter

Provisions Con't

"The City of Sequim shall implement conservation measures as described in Chapter 9 of its July 17, 1996 Water Comprehensive Plan."

"The City of Sequim shall gradually eliminate use of surface water from the Dungeness River, except as an emergency back-up source."

DEPARTMENT OF ECOLOGY
State of Washington

Application for a Water Right Permit

For Ecology Use
(Date Stamp)

A NON-REFUNDABLE MINIMUM FEE OF $50.00 MUST ACCOMPANY THIS APPLICATION FOR THE FOLLOWING:

☒ **GROUND WATER** ☐ **SURFACE WATER** ☐ **PERMANENT**
☐ **SHORT TERM** ☐ **TEMPORARY**

NO FEE REQUIRED FOR THE FOLLOWING:

☐ **DROUGHT** ☐ **COST REIMBURSEMENT**

Follow the attached instructions. Attach additional sheets as necessary.

Section 1. APPLICANT

☒ **I have participated in a pre-application conference with Ecology.**

Applicant/Business Name: City of Sequim	Phone No: 360-683-4908	Other No: 360-683-4139
Address: 152 W. Cedar St.		
City: Sequim	State: WA	Zip: 98382
Email Address (if available):		

Contact Name (if different from above): David Garlington	Phone No: 360-681-3439	Other No:
Relationship to Applicant: Public Works Director		
Address: same as above		
City:	State:	Zip:
Email Address (if available): dgarlington@sequimwa.gov		

Legal Land Owner or Part Owner Name of the Proposed Place of Use: Area served by the City of Sequim	Phone No:	Other No:
Address: n/a		
City:	State:	Zip:
Email Address (if available):		

For Ecology Use	APPLICATION NO:_____SEPA: Exempt/Not Exempt Fee Paid:_____ Check No:_____ ECY Coding: 001-001-WR1-0285-000011
Date Returned _____By_____ Priority Date _____By_____ WRIA:_____	
Pre-application interviewer:	

ECY 040-1-14 (Rev 03-2015) To request ADA accommodation including materials in a format for the visually impaired, call Ecology Water Resources Program at 360-407-6872. Persons with impaired hearing may call Washington Relay Service at 711. Persons with speech disability may call TTY at 877-833-6341.

Section 2. STATEMENT OF INTENT

Do you own the land on which the proposed point of diversion/withdrawal is located? ☒ YES ☐ NO
If no, do you have legal authority to make this application for use of another's land? ☐ YES ☐ NO

Briefly describe the purpose of your proposed project: Purposes are to meet instantaneous capacity demand under existing water rights and additional water rights to serve the City and its UGA in 20-40 years. Assuming we need to develop a new source of supply we also need to mitigate for impacts on surface water/ stream flows and minimize impairments. With both new supply and mitigation needs, we are exploring alternatives to cost-effectively accomplish both objectives, including exploration of multiple well sites (Silberhorn wellfield is proposed location) and collaborating with other water managers.

Anticipated length of time to compete your project: 5 years (by 12/31/2022 a new well source should be operational)

Water Use List all purposes for which water will be applied to a beneficial use and list quantity required for each.

Purpose(s) of Use	Rate (check one box only) ☐ Cubic Feet per Second (CFS) ☒ Gallons per Minute (GPM)	Acre-Feet per Year (AF/YR) (If known)	Period of Use (Continuously or Seasonal)
Municipal supply	500	1,000	Continuously
TOTAL:	500	1,000	

Short Term/Temporary Water Use

Is this a request for a short term project (less than four months and non-recurring)? ☐ YES ☒ NO

Is this request for a temporary permit? ☐ YES ☒ NO

If yes to either question above, indicate the dates that the water will be needed:

FROM: ____/____/____ TO: ____/____/____

Section 3. POINT OF DIVERSION OR WITHDRAWAL

(Complete A or B, and C below)

A.) If Surface Water Source	**B.) If Ground Water Source**
☐ Spring ☐ Creek ☐ River ☐ Lake ☐ Other:_____ Source Name:_____ Tributary to:_____ Number of proposed diversion points:_____ Do you have an existing diversion? ☐ YES ☐ NO	☒ Well(s) ☐ Other:_____ Well diameter & depth: Not drilled yet. Expect 12"-8" diameter (tapering) and est. 500 - 600' deep. Number of proposed points of withdrawal: 1 Do you have an existing well? ☐ YES ☒ NO If available, attach Water Well Report and pump test. Well Tag ID No. n/a

C.) Point of Diversion/Withdrawal – Legal Description

Parcel No.	¼	¼	Section	Township	Range	County
043025210150	NE	NW	25	30	04	Clallam

Lot(s)	Block(s)	Subdivision	

If known, enter the distances in feet from the point of diversion or withdrawal to the nearest section corner:

0-1,200 Feet (☐ North/☒ South) and 1,800 feet (☒ East/☐ West)

from the (☒NW ☐SW ☐NE ☐SE ☐ _____) corner of Section 25.

Parcel No.	¼	¼	Section	Township	Range	County

Lot(s)	Block(s)	Subdivision	

If known, enter the distances in feet from the point of diversion or withdrawal to the nearest section corner:

_____feet (☐ North/☐ South) and _____feet (☐ East/☐ West)

from the (☐NW ☐SW ☐NE ☐SE ☐ _____) corner of Section_____

NOTE: If more than two points of diversion/withdrawal attach additional information on a separate sheet of paper.

Section 4. PLACE OF USE

Attach a copy of the legal description of the property (on which the water will be used) taken from a real estate contract, property deed or title insurance policy, or copy it carefully in the space below.

Service area for the City of Sequim Water System, as shown in the attached map from the latest Water System Plan approved by Dept of Health.

¼	¼	Section	Twp.	Range	County	Parcel No.
					Clallam	

Do you own all the lands on which the proposed place of use is located? ☐ YES ☒ NO.

If no, do you have legal authority to make this application for use of another's land? ☒ YES ☐ NO

Provide owner name(s), address, and phone number: _____

Are there any other water rights or claims associated with this property or water system? ☒ YES ☐ NO

If yes, provide the water right and/or claim numbers: G2-23856

Attach a map of your project showing the point of diversion/withdrawal and place of use. If platted property, be sure to include a complete copy of the plat map.

Section 5. WATER SYSTEM DESCRIPTION

Describe your proposed water system (include type and size of devices used to divert or withdraw water from source): The proposed new well will assist with existing instantaneous capacity issues related to the City's Silberhorn wellfield (same site as proposed well) and provide additional supply to the water system to accommodate growth in 20-40 years.

Section 6. DOMESTIC WATER SUPPLY SYSTEM INFORMATION

(Complete A or B, and C below)

A.) Domestic Water Systems only	**B.) Municipal Water Systems only** (*defined under RCW 90.03.015*)
Projected number of connections to be served: _____ Type of connections: _____ *(e.g., home, recreational cabin)*	Present population to be served water: approx. 7,200 in 2017 Estimate future population to be served: est. 12,989 in 2032 (20 year projection)

C.) Water System Planning

Do you have a Water System Plan approved by the Washington State Department of Health, Drinking Water Division? ☒ YES ☐ NO

If yes, date plan was approved 09/22/2014 Water System Number: 77620

Name of water system: City of Sequim Water System

Are you within the service area of an existing water system? ☒ YES ☐ NO

If yes, explain why you are unable to connect to the system: Will connect to our municipal system.

Section 7. IRRIGATION/STOCKWATER/OTHER FARM USES

Irrigation

Total number of acres requested to be irrigated under this application = n/a ACRES
NOTE: Outline the area to be irrigated on your attached map.

Stockwater

List number and kind of stock: n/a

Is the proposed project for a dairy farm? ☐ YES ☐ NO

Other Proposed Farm Uses

Describe all proposed uses: n/a

Family Farm Water Act (RCW 90.66):

Calculate the acreage in which you have a controlling interest, including only:

- Acreage irrigated under water rights acquired after December 8, 1977,
- Acreage proposed to be irrigated under this application, and
- Acreage proposed to be irrigated under other pending application(s).

Is the combined acreage under existing rights greater than 6000 acres? ☐ YES ☐ NO

Do you have a controlling interest in a Family Farm Development Permit? ☐ YES ☐ NO

If yes, enter Permit No: _____

Section 8. OTHER WATER USES

Hydropower

Indicate total feet of head n/a and proposed capacity in kilowatts: _____

Describe works: n/a

Indicate all uses to which power is to be applied: n/a

FERC License No: _____

Mining/Industrial Use

Describe use, method of supplying and utilizing water: n/a

Other Use

Section 9. WATER STORAGE

Will you be using a dam, dike, or other structure to retain or store water? ☐ YES ☒ NO

Are you proposing to store more than 10 acre-feet of water? ☐ YES ☐ NO

Will the water depth be 10 feet or more? ☐ YES ☐ NO

If you answered yes to any of the above questions, please describe:

NOTE: If you will be storing 10 acre-feet or more of water and/or if the water depth will be 10 feet or more at the deepest point and some portion of the storage will be above grade, you must also complete an Application for Permit to Construct a Reservoir and a Dam Construction Permit and Application.

Section 10. DRIVING DIRECTIONS

Provide detailed driving directions to the project site:

Follow Highway 101 west to the River Road exit on the west side of Sequim and turn left (south) onto River Road.

Follow River Road south for 0.4 miles and turn right (west) onto W. Silberhorn Road.

Drive 0.15 miles west and turn right (north) into the driveway of Dr. Standard Park.

(Little League fields are occupying City wellfield property.)

Site Address: 124 W. Silberhorn Road, Sequim, WA 98382

Section 11. REQUIRED SIGNATURES

I certify that the information provided in this application is true and accurate to the best of my knowledge. I understand that in order to process my application, I grant staff from the Department of Ecology access to the site for inspection and monitoring purposes. Even though the employees of the Department of Ecology may have assisted me in the preparation of the above application, all responsibility for the accuracy of the information rests with me, the applicant.

David M. Garlington Print Name (Applicant or Authorized representative)	David Garlington Signature	11/6/17 Date
David M. Garlington Print Name (Legal Owner or Part Owner Place of Use)	David Garlington Signature	11/6/17 Date
Print Name (Legal Owner or Part Owner Place of Use)	Signature	Date

Please check the region in which the project is located:

***Submit your application to:**		
DEPARTMENT OF ECOLOGY CASHIERING SECTION PO BOX 47611 OLYMPIA, WA 98504-7611	☐ Central Regional Office 1250 W. Alder Street Union Gap, WA 98903-0009 (509) 575-2490	☐ Eastern Regional Office 4601 N. Monroe Street Spokane, WA 99205-1265 (509) 329-3400
	☐ Northwest Regional Office 3190 – 160th Avenue SE Bellevue, WA 98008-5452 (425) 649-7000	☒ Southwest Regional Office PO Box 47775 Olympia, WA 98504-7775 (360) 407-6300

If you have questions about your application, contact the Water Resources program at the regional office in which your project is located.



Port Williams Wellfield

Silberhorn Wellfield

N

0 1,000 2,000 4,000 Feet

LEGEND:

- URBAN GROWTH AREA
- CITY LIMITS
- FUTURE WHOLESALE SERVICE AREA
- FUTURE SERVICE AREA
- RETAIL SERVICE AREA
- PARCELS

ADJACENT PURVEYORS WATER SERVICE AREAS:

1. BATTELLE NORTHWEST MARINE LAB
2. BAYWOOD VILLAGE MOBILE HOME PARK
3. DEYTONA WATER SYSTEM
4. FLAURAS WATER SYSTEM
5. HAPPY VALLEY ESTATES
6. HUFFMAN WATER SYSTEM
7. LEE WATER COMPANY
8. MARINA WATER SYSTEM
9. P.U.D. EVERGREEEN WATER SYSTEM
10. PALO VERDE WATER SYSTEM
11. SEQUIM ELKS 2642
12. SUNLAND WATER DISTRICT
13. SUN MEADOWS
14. STILL ROAD WATER SYSTEM
15. TROWBRIDGE COURT CONDO ASSN
16. VISTAS INC
17. WEST SEQUIM BAY

CITY OF SEQUIM

2013 WATER SYSTEM PLAN
FIGURE 1-7
WATER SERVICE AREA AND
ADJACENT PURVEYORS

Gray & Osborne, Inc.

M:\\SEQUM\11593\GIS\FIGURE 1-7 ADJ_PURV.MXD

History of City of Sequim's Water Rights Portfolio

Prepared for the 2022 Water System Plan Update, June 2022

As briefly described in Chapter 1, the City of Sequim's water right portfolio expanded over the years to meet the City's growth. This Appendix will provide a brief background of the history of the development of the water right portfolio. The history of the portfolio demonstrates that as the City grew, it developed additional sources of supply, first by solely relying on surface water right from the Dungeness River, then adding the infiltration gallery, then adding the Silberhorn wellfield, then adding the Port Williams wellfield.

This appendix is generally organized by water right. The first part will provide the history of the City's Dungeness Surface Water Right. The second part will explain the addition of the ground water right for the infiltration gallery and related approved changes of use. The third part will address the Silberhorn wellfield water right development. Finally, this appendix will address the most recently approved water right for the Port Williams wellfield and the City's pending water right application.

Dungeness River Water Rights

In 1924, just after Clallam County Superior Court finished adjudicating Dungeness River water rights held by irrigators, Sequim applied for a surface water right for 2 cubic feet per second (cfs) from the River for municipal use. The water was to be conveyed to City property on Reservoir Road via the Highland Irrigation District (HID) main canal. This action made official the City's operations since 1922 when the City built a headgate off the HID canal and a wood-stave water main for conveyance north from the irrigation canal downhill to the City's distribution system. (Also note water system history, in Chapter 1.)

In 1929, a bond measure was passed to build the City's own headgate and 4.5-mile wood-stave water pipe for direct, gravity conveyance of River water to the City reservoir. That diversion was used for several decades, and the water right was certificated in 1940 for 1.4 cfs (cert 1316). No annual quantity was indicated, but surface water diverted year-round into a gravity system was likely constant, since the City's water right application requested "continuous supply" and the permit does not specify (nor does the certificate) a seasonal or any other flow control arrangement. Continual diversion of 1.4 cfs would be 1,014 ac-ft per year; there is indication of the need for and beneficial use of this volume from correspondence referring to milk processing in the 1920s and 1940s, consistent with the City's history of supplying water to area dairy farms.

By about 1950, Sequim's population had grown to 1,044 residents and the water system also served several commercial and industrial customers. The wood-stave pipe from the River had deteriorated beyond repair and the system was experiencing problems with turbidity and debris. In 1953, the City adopted a bond measure to move the headgate upstream and construct new diversion works, replacing the 4.5-mile wood pipe with a 12-inch asbestos concrete pipe, and constructing a larger reservoir and new 10-inch pipeline north into city limits. The City obtained the State's approval for the water right change through Certificate of Change of Point of Diversion 426 (to the new headgate) in May 1954.

During the same timeframe the City began design of its first infiltration gallery and applied for an associated groundwater right (discussed below). The City continued to invest in improvements in order to maintain its ability to use surface water under the water right.[1] To this day the Dungeness River water right is available for City use.

Infiltration Gallery Water Rights

Due to water quality issues taking surface water directly from the River into the distribution system, in 1953 the City applied for a groundwater right to withdraw water from a shallow infiltration gallery. The Department of Water Resources approved the application and issued a permit on June 12, 1953. The infiltration gallery was designed to be adjacent to the streambank of the Dungeness and about 4 feet deep. Water from the infiltration gallery was conveyed through the existing 4.5-mile pipeline into town. The State issued a water right certificate the next year (cert 2102-A), in December 1954, for 718 gpm and 1,160 ac-ft per year.

By 1975, the City's population had grown to 2,300 residents and the water department was using the infiltration gallery and surface water rights to accommodate residential and commercial needs. Also in the 1970s, the federal Safe Drinking Water Act and correspondence with state DOH signaled that the City should pursue additional water sources that could reliably meet new, stricter drinking water quality standards. In response, the City constructed a deeper infiltration gallery (20-24 feet in depth) in 1977 and began planning a wellfield to access deep groundwater supplies off Silberhorn Road.

In 1979 the City was granted a Certificate of Change of Point of Withdrawal to the new (replacement) infiltration gallery (change certificate 107 for Cert 2102-A). The infiltration gallery continues operation as explained in detail in this Water System Plan Update.

[1] Indeed, in 1979 the City was granted a Certificate of Change of Point of Diversion to the replaced infiltration gallery (change certificate 106 for Cert 1316), that being an additional (alternate) point of diversion since surface water is used to recharge the infiltration gallery at times.

Silberhorn Wellfield Water Rights

In June 1975 the City applied for a groundwater right for a wellfield at Silberhorn, "not to exceed 10 wells." Later that year, in October, Ecology issued a permit (permit G2-23856) for the requested 2,100 gpm and 690 ac-ft per year. In the Report of Examination (ROE), Ecology noted that the City of Sequim receives its water supply from the surface sources from the Dungeness River and infiltration gallery under Water Right Certificate No. 2102 for 718 gallons per minute (1.6 cubic foot per second) and No. 1316 for 630 gallons per minute (1.4 cubic foot per second) for a total of 1350 gallons per minute, approximately. Additionally, the ROE's conclusions and recommendations stated:

> ". . . upon completion of construction and conversion of the system[2] from existing surface water sources, existing water rights under Certificates 2102 and 1316 now recorded under Change Certificate No. 426, be placed in a reserve status as provided for in RCW 90.54.020; with such waters to be used in an emergency only and/or until such time that the reserve statue [sic] is re-reviewed by the Department of Ecology upon request of the City of Sequim."

However, while the City was committed to improving water quality in its distribution system; "conversion of the system from existing surface water sources"[3] was not its intent. The City's intent, as expressed in its 1953 letter to Ecology, was to keep the right available "until the growth of the Town demands greater than the requested amount." Furthermore, the City continued to rely on water from the Dungeness River and infiltration gallery for future use because of increased growth in terms of overall population and regional needs. This is apparent because in 1977, the City started construction of its new, deeper infiltration gallery in 1977 and that year submitted two water right change applications: one for surface water certificate 1316 (Dungeness River) and the second for groundwater certificate 2102-A (infiltration gallery). Both stated the purpose of the change was to "utilize a new underground infiltration system in the interest of obtaining higher quality water." On September 26, 1979, Ecology approved without condition both change applications listing the City's new infiltration gallery as an "additional (alternate)" point of surface water diversion and groundwater withdrawal, acknowledging that the City would be continuing to use both its original water rights in active, not reserve, status. There is also no mention of a non-additive relationship between the two sources in either the ROE or the change certificates; the sum of both certificates is 1,346 gpm (3 cfs) and 2,174 ac-ft.

[2] For reasons further explained below, the City maintains that its ability to use Certificates 2102 and 1316 totaling 1,346 gpm (3 cfs) to their fullest extent are limited only by DOH requirements or senior water rights holders.

[3] While Ecology meant the River and shallow infiltration gallery by "surface water sources" the City has referred to both its original, shallow infiltration gallery and the deeper replacement gallery as groundwater sources because that is what was permitted and certificated.

Twenty years later, in November 1997, a water right certificate for the Silberhorn wellfield was issued (cert G2-23856) for 3 wells and 700 gpm, one-third of the permitted pumping rate of 2,100 gpm. By this time Ecology knew the City was not relying solely on the Silberhorn Wellfield because it was developing the Port Williams wellfield, so the Qi was reduced. But the certificate incorporates wholesale "all conditions and requirements" contained in the ROE, including the Findings of Fact identifying two valid, additive permits (Certs. 1316 at 1.4 cfs and 2102-A at 1.6 cfs) and the as yet unmet condition precedent to reduce reliance on the City's surface rights and fully convert to the Silberhorn wellfield.

Port Williams Wellfield Water Rights

By 1990, the City's population reached 3,617 residents. Soon after, the Growth Management Act[4] resulted in larger city limits and defined Urban Growth Areas (UGAs) surrounding it, and the water system potential service area had grown exponentially. In 1993, the City began planning for serving a greater population and in June 1995 applied for a new groundwater right to withdraw up to 2,250 gpm and 2,600 acre-feet annually.

During this time the City was experiencing intermittent pumping capacity issues at the Silberhorn wellfield and the need for another well source at a new site became urgent, so the City began aquifer testing at an existing deep well on Port Williams Road (the Stone well). Subsequently, the City drilled its own deep test well nearby, at what is now the Port Williams wellfield.

In 1996, as the City continued testing, Ecology granted temporary water use permits for the test well. City staff corresponded with Ecology several times[5] during this period defending the need for the requested capacity and annual volume and confirming the need for continued use of all existing sources into the future.

Following an appeal and settlement agreement, in October 1997, Ecology granted a final permit[6] for the new wellfield, allowing for drilling of up to five wells at the Port Williams Wellfield and with the following provisions:

[4] The Growth Management Act requires cities to accommodate "growth that makes intensive use of land for the location of buildings, structures, and impermeable surfaces to such a degree as to be incompatible with the primary use of land for the production of food, other agricultural products, or fiber, or the extraction of mineral resources, rural uses, rural development, and natural resource lands…." RCW 36.70A.030(28). Nothing in the GMA allows cities to limit growth only to residential population; consequently, the City's water needs must accommodate all growth.

[5] Letters from Jim Bay to Marie Peter, 8/28/1996 and 1/24/1997, for example.

[6] Ecology's original ROE and permit for the Port Williams wellfield was written in March 1997 and appealed by Graysmarsh to the Pollution Control Hearings Board, stating concerns about potential impacts to senior water rights (including to its freshwater marsh managed with a tidegate). Ultimately, prior to a hearing on the merits, the

- Groundwater withdrawals at the Port Williams Wellfield shall be managed so that there are no long-term (i.e., year to year) declines in groundwater levels within the pumped (USGS Unit 5) or overlying (USGS Units 1 and 3) aquifers.

- Withdrawals shall be limited to that amount which can be sustainably withdrawn from USGS Unit 5, on an annual basis, without impairing senior rights or instream resources.[7]

- Prior to issuance of a water right certificate, the City must submit a completion report demonstrating the actual sustainable production of the Port Williams Wellfield.

- If senior water users are impaired, the City shall reduce its withdrawals at the Port Williams Wellfield to allow impaired users to exercise the full extent of their water rights.

- The City shall implement conservation measures as described by their current conservation plan.

- The City shall gradually eliminate use of water from the Dungeness River except as an emergency back-up source.

- The wellfield development must be complete by July 1, 2014, and water must be put to full use by July 1, 2015.[8]

There are two provisions in the permit that are the subject of discussions between the City and Ecology. First, the permit notes the total annual volume of 1,850 ac-ft for the Port Williams well field is "supplemental to existing water rights." [9]

The term "supplemental" is ambiguous,[10] and the City interprets the water right to be additive. Ecology states it intended it to mean "non-additive" according to a December 2020 letter to the City. Ecology's position limits the volume of the City's total Qa to two of its three certificated

parties entered into a settlement agreement in which the City agreed to a monitoring plan, reporting requirements, and criteria which would trigger further water management actions, and Ecology issued a superseding ROE in October 1997.

[7] Note that in 2006 Graysmarsh drilled a 705' irrigation well to replace its 581' East Berry Field well drilled in 1988. Correspondence indicates that both wells are determined to be in USGS Unit 5, so a water right change request was not necessary. The 1988 well is apparently available for water level monitoring.

[8] In 2014, Ecology extended this deadline to 2024.

[9] The City wanted 2,600 ac-ft annually, so the fact it did not appeal the permit written for 1,850 ac-ft supports the theory that staff interpreted "supplemental" as additive.

[10] Ecology's policy 1040, written in 2006 and later rescinded, lists four ways the term "supplemental" was used in water rights documents, making it ambiguous: additive, standby/reserve, alternate, and non-additive. The policy also indicates the term would no longer be used.

sources: 1,850 acre-feet = the Infiltration Gallery certificate (1,160 ac-ft) + the Silberhorn Wellfield certificate (690 ac-ft).

The second element of concern is Ecology's position that the Port Williams water right ROE asserts that the Dungeness River Water Right was replaced by the infiltration gallery water right. As explained earlier in this Appendix, the water rights have been maintained as separate water rights. The Port Williams water right was a new application and not a change of use of any existing applications. The City does not believe Ecology has the authority to modify an existing water right in good standing, not subject to a change of use, in a later issued new water right permit. Furthermore, Ecology's statements ignore the specific Findings and Conclusions in the 1975 Silberhorn ROE and additional supporting documentation from the late 1970s identifying these as separate water rights in good standing. The Dungeness River surface water right has never been abandoned, relinquished or replaced and is a water right in good standing as part of the City's portfolio.

Future Groundwater Source, Water Right Application No. G2-30721

This water system plan recognizes the distinct quantities of all three of the City's certificated water rights and applies its permitted water right as additive to the other three. Total instantaneous and annual quantities based on these assertions are incorporated into the capacity analysis in Chapter 3, with the understanding that the River source is available and the other three are for regular, daily supply.

That said, by 2017, the City's population was 7,108 residents[11] and the City felt the possible need for additional water rights to accommodate growth over the next 20-40 years. At that time the City was also facing instantaneous capacity issues at its Silberhorn wellfield. In 2017, the City filed an application with Ecology requesting 1,000 acre-feet of water annually for a well with a withdrawal rate of up to 500 gpm; the location of the well is not decided but will likely be a deep well drilled at the Silberhorn wellfield.

Since 2017 the City conducted a study of groundwater supply development options and closely examined its water rights portfolio. At the time of this writing, in 2022, the City is certain about its water right portfolio – its River water right is valid and the Qa in its Port Williams permit is additive – potentially making the need for new permitted water rights less urgent.

[11] In 2021 the City's population is estimated at 8,125 (OFM, 2021), an average increase of 2.97% per year. More detail on growth can be found in Chapter 3.

Conclusions

For almost 100 years the City's water right portfolio has been developed and maintained to meet the needs of its citizens and future growth in compliance with federal and state regulations – the Safe Drinking Water Act and the Growth Management Act in particular. The City has always been an active partner in water resource management at the watershed level and intends to maintain those partnerships as it continues to plan to meet its future water needs.

APPENDIX I

COLIFORM MONITORING PLAN

CITY OF SEQUIM

CLALLAM COUNTY, WASHINGTON

COLIFORM MONITORING PLAN

G&O #18495
December 2021

City of Sequim Coliform Monitoring Plan

A. System Information

Plan Date: December 2021

Water System Name Sequim, City of	**County** Clallam	**System I.D. Number** 77620Y
Name of Plan Preparer Russell Porter, P.E.	**Position** Consulting Engineer	**Daytime Phone #** (206) 284-0860
Sources: DOH Source Number, Source Name, Well Depth, Pumping Capacity	Name: Dungeness River Source #: SO1 Type: Groundwater under the influence of surface water. Well depth: N/A. System is a Ranney well which is an infiltration gallery consisting of set of percolation pipes with a central caisson 100 feet east of the Dungeness River. Capacity: Installed capacity of the infiltration gallery is 350 gpm, but system relies on hydraulic levels to maintain a gravity siphon. Provides Water To: 420 Reservoir and 420 Zone distribution system. Name: Silberhorn Wellfield Source #: SO2; Well #1 (SO9), Well #2 (SO6), Well #3 (SO7) Type: Groundwater Well Depth: Well #1 220 feet, Well #2 176 feet, Well #3 176 feet Capacity: Installed capacity is 780 gpm (260 gpm each well). Water right capacity is 700 gpm. Effective operational capacity is 520 gpm based on issues with screen and aquifer issues. Provides Water To: 420 Reservoir and 420 Zone distribution system. Name: Port Williams Wellfield Source #: SO5; Well #1 (SO3), Well #2 (SO4), Well #3 (SO8) Type: Groundwater Well Depth: Well #1 420 feet, Well #2 379 feet, Well #3 381 feet Capacity: Installed capacity is 1,760 gpm (600 gpm in Wells 1&2, 560 gpm in Well 3). Water right capacity is 2,250 gpm. Provides Water To: 350 Zone and 420 reservoir through telemetry and the 5th & McCurdy Booster Station.	

Storage: List and Describe	Name: 420 Reservoir Location: Reservoir Road Filled From: Silberhorn wellfield, Infiltration gallery, and Port Williams Wellfield Area Served: 420 Zone Capacity: 1.7 million gallons Overflow Elevation: 420 ft Height: 29 feet Diameter: 100 feet Material: Steel Name: 480 Reservoir Location: Reservoir Road Filled From: 480 Zone Booster Station Area Served: 480 Zone Capacity: 0.2 million gallons Overflow Elevation: 481 feet Height: 51 feet Diameter: 26 feet Material: Concrete Name: Solana Reservoir Location: Tamerlane Loop Filled From: 680 Zone Booster Station Area Served: 775 Zone and 680 Zone directly; 500 Zone, 420 Zone, and 350 Zone through cascading PRV's Capacity: 1.0 million gallons Overflow Elevation: 680 feet Height: 18 feet Diameter: 100 feet Material: Steel

Treatment: Source Number & Process	Name: Silberhorn Wellfield Source #: SO2 (SO6, SO7, SO9) Treatment Process: The Silberhorn Wellfield utilizes 12 percent sodium hypochlorite which is injected at the on-site Control Building. The single injection pump is called to operate when one of the wells is called to run. The pump automatically adjusts to well flow. Name: Port Williams Wellfield Source #: SO5 (SO3, SO4, SO8) Treatment Process: The Port Williams Wellfield utilizes 12 percent sodium hypochlorite which is injected at the Control Building. A single chemical feed pump is called on when a well operates and automatically adjusts to the well flow rate. Name: Dungeness River Source #: SO1 Treatment Process: The Infiltration Gallery utilizes 12 percent sodium hypochlorite which is injected at the Infiltration Gallery Control Building. The hypochlorite pump is a reciprocating positive displacement-type pump which must be manually adjusted for changes in flow rate. A CT of 6 is provided in the transmission main from the chlorination injection point at the infiltration gallery before the first customer.

Pressure Zones: Number and name	Name: 350 Zone HGL: 350 Location: City limits north of Highway Served By: PRVs from 420 Zone and by Port Williams Wellfield. Name: 420 Zone HGL: 420 Location: Central corridor between eastern and western city limits, south of Hwy 101 & north of Miller Rd & Silberhorn Rd. Served By: Silberhorn Wellfield and Infiltration Gallery. Can also be supplied by booster pumps in the Port Williams Wellfield in the 350 Zone or from the 500 Zone via PRVs. Name: 480 Zone HGL: 480 Location: North of Reservoir Road and South of Silberhorn Road between S. 3rd Avenue and River Road. Served By: 480 Zone Booster Station in the 420 Zone. 480 Zone is isolated from the 420 Zone by closed gate valves. Name: 500 Zone HGL: 500 Location: Solana Development, south of Highway 101 on Solana Parkway. Served By: 680 Zone via PRVs. Name: 680 Zone HGL: 680 Location: Solana Development, south of Highway 101 on Solana Parkway. Served By: Solana Reservoir Name: 775 Zone HGL: 775 Location: Solana Development, south of Highway 101 on Solana Parkway. Served By: 775 Booster Station, which pumps from the Solana Reservoir.

Full-Time Residential Population	As of August 2021: 8,024	
Total Service Connections	As of August 2021: 2,920	
Number of Routine Samples Required Monthly by Regulation:		**15**
Number of Sample Sites Needed to Represent the Distribution System:		**13**
***Request DOH Approval of Triggered Source Monitoring Plan?**		**Yes ☒ No ☐**

*If approval is requested a fee will be charged for the review.

B. Laboratory Information

Laboratory Name Spectra Labs	**Office Phone #** (360) 779-5141
Address 26276 Twelve Trees Lane, Suite C Poulsbo, WA 98370	**After Hours #** (360) 405-8634 (weekend pager) (360) 536-3979 (emergency)
Hours of Operation M-F 8AM – 5PM, Sat-Sun As required.	
Contact Name Angela Kaelin, Laboratory Manager; Angie Barcus, Intake Coordinator	
Emergency Laboratory Name Clallam County Environmental Health Lab	**Office Phone #** (360) 417-2258
Address 223 East 4th St Port Angeles, WA 98362	**After Hours #** N/A
Hours of Operation M-W 830AM – 330PM, Th 830AM – 1200PM	
Contact Name N/A	

C. Wholesaling of Groundwater

	Yes	No
We are a consecutive system and purchase groundwater from another water system.	☐	☒
If yes, Water System Name: _____ Contact Name: _____ Telephone Numbers: _____		
We sell groundwater to other public water systems.	☐	☒
If yes, Water System Name: _____ Contact Name: _____ Telephone Numbers: _____		

D. Routine, Repeat, and Triggered Source Sample Locations*

Location/Address for **Routine Sample Sites**	Location/Address for **Repeat Sample Sites**	Sources for **Triggered Sample Sites****
X1.	**1-1. 308 Reservoir Road**	**S02**
308 Reservoir Road	**1-2. 306 Reservoir Road**	**S05**
Sequim, WA 98382	**1-3. 310 Reservoir Road**	
480 Zone	**1-4. 200K Reservoir**	
X2.	**2-1. 22 E. Cobblestone**	**S02**
22 Cobblestone Street	**2-2. 12 E. Cobblestone**	**S05**
Sequim, WA 98382	**2-3. 32 E. Cobblestone**	
420 Zone		
X3.	**3-1. 152 W. Cedar Street**	**S02**
152 W. Cedar Street	**3-2. 144 W. Cedar Street**	**S05**
Sequim, WA 98382	**3-3. 190 W. Cedar Street**	
350 Zone		
X4.	**4-1. 872 E. Cedar Street**	**S02**
872 E. Cedar Street	**4-2. 902 E. Cedar Street**	**S05**
Sequim, WA 98382	**4-3. 862 E. Cedar Street**	
350 Zone		

Location/Address for **Routine Sample Sites**	Location/Address for **Repeat Sample Sites**	Sources for **Triggered Sample Sites****
X5.	**5-1. 51 Exeter Street**	**S02**
51 Exeter Street	**5-2. 71 Exeter Street**	**S05**
Sequim, WA 98382	**5-3. 21 Exeter Street**	
775 Zone		
X6.	**6-1. 921 S. 3rd Street**	**S02**
921 S. 3rd Avenue	**6-2. 911 S. 3rd Street**	**S05**
Sequim, WA 98382	**6-3. 900 S. 5th Street**	
420 Zone		
X7.	**7-1. 305 Honeycomb Crc**	**S02**
305 Honeycomb Circle	**7-2. 304 Honeycomb Crc**	**S05**
Sequim, WA 98382	**7-3. 309 Honeycomb Crc**	
350 Zone		
X8.	**8-1. 81 Morgison Loop**	**S02**
81 Morgison Loop	**8-2. 101 Morgison Loop**	**S05**
Sequim, WA 98382	**8-3. 61 Morgison Loop**	
350 Zone		
X9.	**9-1. 130 E Lobelia Drive**	**S02**
130 E Lobelia Drive	**9-2. 110 E Lobelia Drive**	**S05**
Sequim, WA 98382	**9-3. 150 E Lobelia Drive**	
420 Zone		

Location/Address for **Routine Sample Sites**	Location/Address for **Repeat Sample Sites**	Sources for **Triggered Sample Sites****
X10.	**10-1. 789 W Heritage Loop**	**S02**
789 W Heritage Loop	**10-2. 791 W Heritage Loop**	**S05**
Sequim, WA 98382	**10-3. 787 W Heritage Loop**	
350 Zone		
X11.	**11-1. 30 Royal Loop**	**S02**
30 Royal Loop	**11-2. 20 Royal Loop**	**S05**
Sequim, WA 98382	**11-3. 40 Royal Loop**	
350 Zone		
X12.	**12-1. 1261 Jones Farm Rd**	**S02**
1261 Jones Farm Road	**12-2. 1291 Jones Farm Rd**	**S05**
Sequim, WA 98382	**12-3. 1231 Jones Farm Rd**	
350 Zone		
X13.	**13-1. 10 Hawthorn Court**	**S02**
10 Hawthorn Court	**13-2. 21 Hawthorn Court**	**S05**
Sequim, WA 98382	**13-3. 11 Hawthorn Court**	
500 Zone		

*NOTE: If you need more than three routine samples to cover the distribution system, attach additional sheets as needed.

**** When you collect the repeats, you must sample every source that was in use when the original routine sample was collected. These are Raw Source Samples and collected before chlorination. Mark the water sample as "Raw Water" and under remarks write "Groundwater rule triggered."**

Important Notes for Sample Collector:

Samples collected on the 1st Wednesday of every month: X1, X2, X3, X4, X5, X9, X10, X11.
Samples collected on the 3rd Wednesday of every month: X6, X7, X3, X4, X8, X12, X13.

E. Reduced Triggered Source Monitoring Justification (add sheets as needed):

Silberhorn Well Field (S02) includes Sources 06, 07 and 09. Since Sources 06, 07 and 09 are all part of the Silberhorn Well Field, the City of Sequim will conduct triggered source monitoring at only one sample location at the well field instead of each individual well when necessary.

Port Williams Well Field (S05) includes Sources 03, 04 and 08. Since Sources 03, 04 and 08 are all part of the Port Williams Well Field, the City of Sequim will conduct triggered source monitoring at only one sample location at the well field instead of each individual well when necessary.

F. Routine Sample Rotation Schedule

Month	Day	Routine Site(s)	Month	Day	Routine Site(s)
January	1st Wed	X1-X5 & X09-X11	July	1st Wed	X1-X5 & X09-X11
	3rd Wed	X3-X4, X6-X08 & X12-X13		3rd Wed	X3-X4, X6-X08 & X12-X13
February	1st Wed	X1-X5 & X09-X11	August	1st Wed	X1-X5 & X09-X11
	3rd Wed	X3-X4, X6-X08 & X12-X13		3rd Wed	X3-X4, X6-X08 & X12-X13
March	1st Wed	X1-X5 & X09-X11	September	1st Wed	X1-X5 & X09-X11
	3rd Wed	X3-X4, X6-X08 & X12-X13		3rd Wed	X3-X4, X6-X08 & X12-X13
April	1st Wed	X1-X5 & X09-X11	October	1st Wed	X1-X5 & X09-X11
	3rd Wed	X3-X4, X6-X08 & X12-X13		3rd Wed	X3-X4, X6-X08 & X12-X13
May	1st Wed	X1-X5 & X09-X11	November	1st Wed	X1-X5 & X09-X11
	3rd Wed	X3-X4, X6-X08 & X12-X13		3rd Wed	X3-X4, X6-X08 & X12-X13
June	1st Wed	X1-X5 & X09-X11	December	1st Wed	X1-X5 & X09-X11
	3rd Wed	X3-X4, X6-X08 & X12-X13		3rd Wed	X3-X4, X6-X08 & X12-X13

G. Level 1 and Level 2 Assessment Contact Information

Name Pete Tjemsland (Level 1 and 2)	**Office Phone** 360-683-4908 **After Hours Phone** 360-912-0256
Address 152 W. Cedar St. Sequim, WA 98382	**Email** ptjem@sequimwa.gov
Name George Priest (Level 1 and 2)	**Office Phone** 360-683-4908 **After Hours Phone** 360-809-4408
Address 152 W. Cedar St. Sequim, WA 98382	**Email** gpriest@sequimwa.gov
Name Devin Scott (Level 1 and 2)	**Office Phone** 360-683-4908 **After Hours Phone** 360-912-1378
Address 152 W. Cedar St. Sequim, WA 98382	**Email** dscott@sequimwa.gov
Name Matt Shackelford (Level 1 and 2)	**Office Phone** 360-683-4908 **After Hours Phone** 360-912-1423
Address 152 W. Cedar St. Sequim, WA 98382	**Email** mshackelford@sequimwa.gov
Name Kevin Hergert (Level 1)	**Office Phone** 360-683-4908 **After Hours Phone** 360-912-7048
152 W. Cedar St. Sequim, WA 98382	**Email** khergert@sequimwa.gov

H. *E. coli*-Present Response

Distribution System *E. coli* Response Checklist				
Background Information	**Yes**	**No**	**N/A**	**To Do List**
We inform staff members about activities within the distribution system that could affect water quality.	x	☐	☐	☐
We document all water main breaks, construction & repair activities, and low pressure and outage incidents.	x	☐	☐	☐
We can easily access and review documentation on water main breaks, construction & repair activities, and low pressure and outage incidents.	x	☐	☐	☐
Our Cross-Connection Control Program is up-to-date.	x	☐	☐	☐
We test all cross-connection control devices annually as required, with easy access to the proper documentation.	x	☐	☐	☐
We routinely inspect all treatment facilities for proper operation.	x	☐	☐	☐
We identified one or more qualified individuals who are able to conduct a Level 2 assessment of our water system.	x	☐	☐	☐
We have procedures in place for disinfecting and flushing the water system if it becomes necessary.	x	☐	☐	☐
We can activate an emergency intertie with an adjacent water system in an emergency.	☐	x	☐	☐
We have a map of our service area boundaries.	x	☐	☐	☐
We have consumers who may not have access to bottled or boiled water.	☐	☐	x	☐
There is a sufficient supply of bottled water immediately available to our customers who are unable to boil their water.	☐	x	☐	☐
We have identified the contact person at each day care, school, medical facility, food service, and other customers who may have difficulty responding to a Health Advisory.	☐	☐	☐	x
We have messages prepared and translated into different languages to ensure our consumers will understand them.	☐	x	☐	☐
We have the capacity to print and distribute the required number of notices in a short time period.	x	☐	☐	☐
Policy Direction	**Yes**	**No**	**N/A**	**To Do List**
We have discussed the issue of *E. coli*-present sample results with our policy makers.	☐	☐	☐	x
If we find *E. coli* in a routine distribution sample, the policy makers want to wait until repeat test results are available before issuing advice to water system customers.	x	☐	☐	☐
(Cont.)				

Distribution System *E.coli* Response Checklist				
Potential Public Notice Delivery Methods	**Yes**	**No**	**N/A**	**To Do List**
It is feasible to deliver a notice going door-to-door.	x	☐	☐	☐
We have a list of all of our customers' addresses.	x	☐	☐	☐
We have a list of customer telephone numbers or access to a Reverse 9-1-1 system.	x	☐	☐	☐
We have a list of customer email addresses.	x	☐	☐	☐
We encourage our customers to remain in contact with us using social media.	x	☐	☐	☐
We have an active website we can quickly update to include important messages.	x	☐	☐	☐
Our customers drive by a single location where we could post an advisory and expect everyone to see it.	☐	x	☐	☐
We need a news release to supplement our public notification process.	x	☐	☐	☐

Distribution System *E.coli* Response Plan - Distribution

If we have *E. coli* in our distribution system, we will immediately:

1. Call DOH 360-236-3100. After hours emergency 1-877-481-4901.
2. Collect repeat and triggered source samples per Part D. See Page (8-10) for additional instructions for triggered source sampling. Collect additional investigative samples as necessary.
3. Call Charese Gainor (Coliform Water Quality Monitoring) at DOH 360-236-3045 to keep her apprised of the repeat coliform sampling and triggered groundwater sample(s). If she is not available, either call Jocelyne Gray (Assistant Regional Manager) at DOH 360-236-3024, or press 0 to be directed to talk with someone else.
4. Inspect water system facilities for proper operation.
5. Interview staff to determine whether anything unusual was happening in the water system service area, especially since the previous month's sample(s).
6. Review new construction activities, water main breaks, and pressure outages that may have occurred during the previous month.
7. Review cross-connection control plan.
8. Discuss with DOH whether to issue a Health Advisory based on the findings of steps 3-6. If necessary, issue a Health Advisory.
9. Wait for repeat samples and respond accordingly.
    a. If repeats are all satisfactory, lift Health Advisory if one was issued.
    b. In any repeat is unsatisfactory, issue a Health Advisory if not already issued. Host the DOH for an inspection and respond accordingly to inspection findings.

E. coli-Present Triggered Source Sample Response Checklist – All Sources				
Background Information	**Yes**	**No**	**N/A**	**To Do List**
We review our sanitary survey results and respond to any recommendations affecting the microbial quality of our water supply.	**x**	☐	☐	☐
We address any significant deficiencies identified during a sanitary survey.	**x**	☐	☐	☐
There are contaminant sources within our Wellhead Protection Area that could affect the microbial quality of our source water, and If yes, we can eliminate them.	x ☐	☐ **x**	☐ ☐	☐ ☐
We routinely inspect our well site(s).	**x**	☐	☐	☐
We have a good raw water sample tap installed at each source.	**x**	☐	☐	☐
After we complete work on a source, we disinfect the source, flush, and collect an investigative sample.	**x**	☐	☐	☐
Public Notice	**Yes**	**No**	**N/A**	**To Do List**
We discussed the requirement for immediate public notice of an *E. coli*-present source sample result with our water system's governing body (board of directors or commissioners) and received direction from them on our response plan.	☐	☐	☐	**x**
We discussed the requirement for immediate public notice of an *E. coli*-present source sample result with our wholesale customers and encouraged them to develop a response plan.	☐	☐	**x**	☐
We have prepared templates and a communications plan that will help us quickly distribute our messages.	☐	☐	☐	**x**

E. coli*-Present Triggered Source Sample Response Checklist – Source S02				
Alternate Sources	**Yes**	**No**	**N/A**	**To Do List**
We can stop using this source and still provide reliable water service to our customers.	x	☐	☐	☐
We have an emergency intertie with a neighboring water system that we can use until corrective action is complete (perhaps for several months).	x	☐	☐	☐
We can provide bottled water to all or part of the distribution system for an indefinite period.	x	☐	☐	☐
We can quickly replace our existing source of supply with a more protected new source.	☐	x	☐	☐
Temporary Treatment	**Yes**	**No**	**N/A**	**To Do List**
This source is continuously chlorinated, and our existing facilities can provide 4-log virus treatment (CT = 6) before the first customer. If yes, at what concentration? _____ mg/L	☐	x	☐	☐
We can quickly introduce chlorine into the water system and take advantage of the existing contact time to provide 4-log virus treatment to a large portion of the distribution system.	☐	x	☐	☐
We can reduce the production capacity of our pumps or alter the configuration of our storage quantities (operational storage) to increase the amount of time the water stays in the system before the first customer to achieve CT = 6.	☐	x	☐	☐
We can alter the demand for drinking water (maximum day or peak hour) through conservation messages to increase the time the water is in the system prior to the first customer in order to achieve 4-log virus treatment with chlorine.	☐	☐	☐	x

*NOTE: If your system has multiple sources, you may want to complete a separate checklist for each source.

E. coli*-Present Triggered Source Sample Response Checklist – Source S05				
Alternate Sources	**Yes**	**No**	**N/A**	**To Do List**
We can stop using this source and still provide reliable water service to our customers.	x	☐	☐	☐
We have an emergency intertie with a neighboring water system that we can use until corrective action is complete (perhaps for several months).	x	☐	☐	☐
We can provide bottled water to all or part of the distribution system for an indefinite period.	x	☐	☐	☐
We can quickly replace our existing source of supply with a more protected new source.	☐	x	☐	☐
Temporary Treatment	**Yes**	**No**	**N/A**	**To Do List**
This source is continuously chlorinated, and our existing facilities can provide 4-log virus treatment (CT = 6) before the first customer. If yes, at what concentration? _____ mg/L	☐	x	☐	☐
We can quickly introduce chlorine into the water system and take advantage of the existing contact time to provide 4-log virus treatment to a large portion of the distribution system.	☐	x	☐	☐
We can reduce the production capacity of our pumps or alter the configuration of our storage quantities (operational storage) to increase the amount of time the water stays in the system before the first customer to achieve CT = 6.	☐	x	☐	☐
We can alter the demand for drinking water (maximum day or peak hour) through conservation messages to increase the time the water is in the system prior to the first customer in order to achieve 4-log virus treatment with chlorine.	☐	☐	☐	x

*NOTE: If your system has multiple sources, you may want to complete a separate checklist for each source.

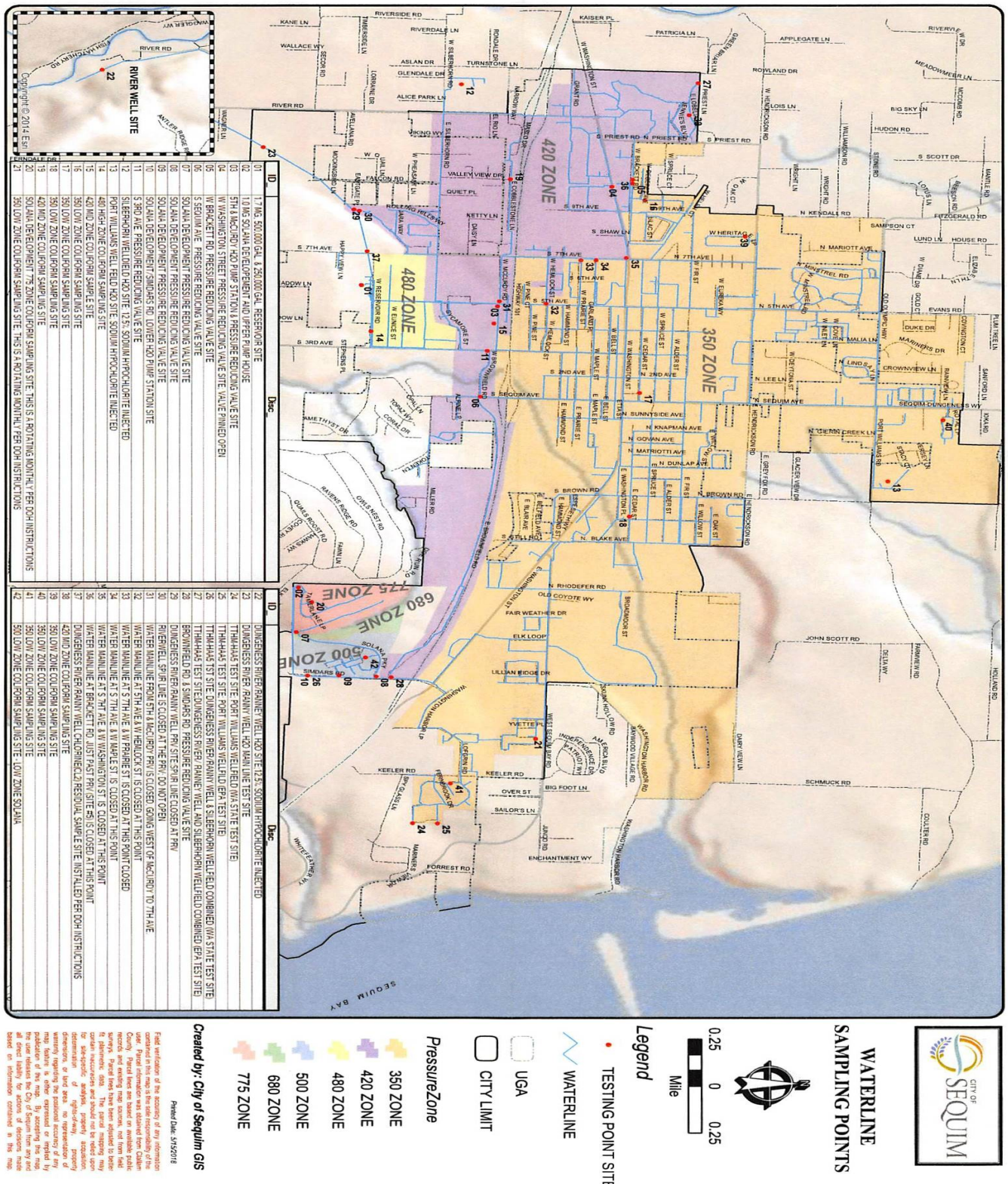
E. coli-Present Triggered Source Response Plan – Source

If we have *E. coli* in Source water we will immediately:

1. Call DOH 360-236-3100.
2. See Groundwater Rule DOH Publication 331-447 (attached).
3. Isolate each Well or Wellfield that was operating during the time of unsatisfactory sample(s).
4. Begin compliance monitoring.
5. Ask DOH to review our contact time analysis and acknowledge that we provide 4-log virus treatment before the first customer.
6. Notify customers when water has been restored.
7. Provide DOH with copies of Health Advisory notifications or any other documents they may request.

I. System Map

See attached.



Field verification of the accuracy of any information contained in this map is the sole responsibility of the user. Parcel information was obtained from Clallam County. Parcel lines are based on available public records and existing map controls, not from field surveys. Parcel lines have been adjusted to better fit planimetric data. The parcel mapping may be inaccurate and should not be used for site-specific analysis, property acquisition determination of property rights-of-way, or warranty regarding the positional accuracy of any map feature is either expressed or implied by publication of this map. By accepting this map the user releases the City of Sequim from any and all claims based on information contained in this map.

APPENDIX J

CROSS-CONNECTION CONTROL

ORDINANCE NO. 2022-018

AN ORDINANCE OF THE CITY OF SEQUIM, WASHINGTON ADOPTING THE 2022 CROSS CONNECTION CONTROL MANUAL; AMENDING CHAPTER 13.120 OF THE SEQUIM MUNICIPAL CODE AND OTHER LANGUAGE IN CONFLICT; PROVIDING FOR SEVERABILITY; AND ESTABLISHING AN EFFECTIVE DATE

WHEREAS, the City of Sequim in Ordinance 2002-013 determined that it is in the interest of the public health, safety, and welfare to implement a comprehensive cross connection control program in accordance with RCW Chapter 70.54 and Washington Administrative Code (WAC) Chapter 246-290-490; and

WHEREAS, it continues to benefit all water customers that cross connections and backflow risks to the city water supply are located, proper backflow prevention devices are installed, and a regular program of inspections and testing of backflow protection devices are conducted; and

WHEREAS, the City of Sequim has revised the Cross Connection Control Manual adopted in 2002, and the Washington State Department of Health has approved the revised Manual; and

WHEREAS, Sequim Municipal Code Chapter 13.120 should be amended to adopt the new Cross Connection Control Manual prepared in 2022 and make other needed updates; and

WHEREAS, the revised language codified in this ordinance contains no substantive standards respecting use or modification of the environment, and is therefore exempt from State Environmental Policy Act (SEPA) procedures under WAC 197-11-800;

NOW, THEREFORE, the City Council of the City of Sequim do ordain as follows:

Section 1. Amendment. Sequim Municipal Code Chapter 13.120 is amended as shown on the attached Exhibit A and incorporated in full by its reference. Sequim Municipal Code Chapter 13.112.030 is amended as shown on the attached Exhibit C and incorporated in full by its reference.

Section 2. Adoption of 2022 Cross Connection Control Manual. The City Council hereby adopts the Cross Connection Control Manual attached hereto as Exhibit B and incorporated in full by its reference.

Section 3. Corrections. The City Clerk and the codifiers of this Ordinance are authorized to make necessary clerical corrections to this Ordinance including, but not limited to, the correction of scrivener's/clerical errors, references, ordinance numbering, section/subsection numbers and any references thereto.

Section 4. Savings Clause. Those portions of Ordinance 2020-013, 2002-021, 2002-013, 2000-017, and 99-019 which are repealed or amended by this Ordinance remain in force and effect until the effective date of this Ordinance.

Such repeals and amendments must not be construed as affecting any existing right acquired under the ordinances repealed or amended, nor as affecting any proceeding instituted thereunder, nor any rule, regulation, or order promulgated thereunder, nor the administrative action taken thereunder. Notwithstanding the foregoing actions, obligations under such ordinances or permits issued thereunder and in effect on the effective date of this Ordinance continue in full force and effect, and no liability thereunder, civil or criminal, is in any way modified. Further, it is not the intention of these actions to reenact any ordinances or parts of ordinances previously repealed or amended, unless this Ordinance specifically states such intent to reenact such repealed or amended ordinances.

Section 5. Severability. If any section, subsection, paragraph, sentence, clause or phrase of this Ordinance is held to be invalid or unconstitutional by a court of competent jurisdiction, such decision does not affect the validity or constitutionality of the remaining parts of this Ordinance.

Section 6. Effective Date. This Ordinance becomes effective five days after publication of the ordinance, or a summary thereof, in the official newspaper of the City.

PASSED by the City Council of the City of Sequim at its regular meeting held the 27th day of June 2022.

Tom Ferrell, Mayor

Attest:

Maylie Clement, City Clerk

Approved as to form:

Kristina Nelson-Gross, City Attorney

Approved Date: June 27, 2022

Publication Date: July 1, 2022

Effective Date: July 6, 2022

Exhibit A

Division VII. Cross Connections

Chapter 13.120

CROSS CONNECTIONS

Sections:

13.120.005 Purpose – No duty or liability.

13.120.010 Cross connection control manual.

13.120.020 Compliance required.

13.120.030 Consumer responsibility.

13.120.040 Notification.

13.120.050 City inspection.

13.120.060 Survey request.

13.120.070 Consumer's duty to notify upon backflow incident.

13.120.080 Intentional return of used water prohibited.

13.120.090 Enforcement.

13.120.005 Purpose – No duty or liability.

A. The purpose of this Chapter is to regulate cross-connections and establish a cross-connection control program to protect the public water system from contamination via cross-connections between the public water system and the Consumer's water system. Nothing in this Chapter is intended to create or otherwise establish or designate any particular class or group of persons who will or should be especially protected or benefited by this Chapter.

B. It is the specific intent of this Chapter to place the obligation of complying with its requirements upon the permit applicant and any person owning, operating or controlling any premises, building, or structure within the scope of this Chapter. Further, no provision or term used in this Chapter is intended to impose any duty whatsoever upon the City or any of its officers, agents or employees, for whom the implementation or enforcement of this Chapter is discretionary.

C. Nothing contained in this Chapter is intended to be, nor will be, construed to create or form the basis for any liability on the part of the City or its officers, agents and employees for any injury or damage resulting from any failure to comply with the provisions of this Chapter. In addition, no liability will attach by reason or a consequence of any inspection, notice, order, certificate, permission or approval

authorized or issued or done in connection with any City action or inaction, or manner of any such action or inaction, by its officers, agents or employees in the implementation or enforcement of this Chapter.

13.120.010 Cross connection control manual.

The control, including elimination, of cross connections for all new and existing water service Consumers must ~~customers shall~~ be in accordance with the City of Sequim's Cross Connection Control Manual ("Manual"), attached ~~hereto~~ and incorporated by this~~in~~ reference, including any subsequent revisions. "Consumers" as used in this Chapter, is defined under WAC 246-290-010(52), as enacted or amended, relating to cross connections. ~~herein.~~ In addition, connections must comply with applicable regulations of the Department of Health as stated in the State of Washington Administrative Code (WAC 246-290-490) or subsequent revisions~~, shall be complied with~~. Where, in a specific case, different materials, methods or other requirements apply, the more restrictive ~~shall~~ governs. Where there is a conflict between a general requirement and a specific requirement, the specific requirement ~~shall~~ governs. Defined terms can be found in the Manual, section 3. (Ord. 2002-013)

13.120.020 Compliance required.

A. Consumers must comply with all requirements of the City's cross-connection program and all directives of the director or director's delegate regarding cross-connection prevention and/or control.

B. Consumers must comply with the City's Cross Connection Manual as it pertains to cross-connections and to take all measures necessary to prevent the contamination of the Owner's water system as directed by the Cross-Connection Control Specialist (CCCS), public works director, or designee.

C. The City may deny connection or suspend water service for failure to comply with the requirements of 1) this Chapter, 2) the directives of the director, 3) the City's Cross Connection Manual, or 4) the directives of the CCCS regarding cross-connections.

13.120.030 Consumer Responsibility.

A. Consumer is responsible for the elimination, by an air gap or approved backflow prevention assembly, of all cross-connection on Consumer's premises. Consumer must inform the City of any proposed or modified cross-connection and also any cross-connections the Consumer knows or should have known exists but which have not been found by the City.

B. It is each Consumer's responsibility to provide cross-connection control to provide at his or her sole cost for the installation, testing, repair, maintenance, and proper operation of approved backflow preventers required for the control of cross-connections between his or her premises and the City's water system, or within the premises as required by the local administrative authority, as the case may be.

13.120.040 Notification:

Consumer, upon written notification by City, must install all required backflow prevention assemblies at Consumer's sole expense.

1. Consumer must install only backflow prevention assemblies approved by the Washington State Department of Health (DOH).

2. Consumer, at Consumer's sole expense, is responsible for having backflow prevention assemblies tested by a certified BAT: 1) at the time of installation; 2) annually after installation, or more frequently repeated failures to meet test criteria are reported; and 3) and after an assembly is repaired, reinstalled or relocated or an air gap is re-plumbed or replaced by an approved RPBA.
3. Consumer must report test results within 30 calendar days on a form provided by City.

13.120.050 City Inspection:

Consumer will provide reasonable access to premises for City inspection and testing of air gap and backflow assembly devices. Failure to provide City access to inspect facilities is grounds for termination of water service (See the Manual, section 6).

1. Consumer must correct any malfunction of an installed backflow prevention assembly revealed by periodic testing within 30 calendar days from the date of testing, or otherwise as required by Director.
2. Consumer is responsible for: a) payment of all fees for permits, and device testing; b) costs for re-testing of an assembly that fails to operate correctly; and c) re-inspection due to prior non-compliance with City requirements.
3. Permit fees will be collected as specified in Sequim Municipal Code Chapter 3.68, Rates and Fees.

13.120.060 Survey request.

A. If required by the City at the time of application, the Consumer must submit plumbing plans and/or a cross-connection control survey of the premises by a City approved and Washington Department of Health certified cross-connection control specialist (CCCS).

B. The survey must assess the cross-connection hazards and list the backflow prevention provided within the premises. The results of the survey must be submitted to the City before the City will turn on water service.

C. For classes of Consumers other than single-family residential, when required by the City, the Consumer must submit a cross-connection control re-survey of the premises by the persons described above. The City may require the re-survey to be performed upon any change in use of the premises, in response to changes in the plumbing of the premises by the consumer, or periodically (annually or less frequently) where the Consumer's plumbing system is complex or subject to frequent changes in water use, as the director or director's delegate may determine.

13.120.070 Consumer's duty to notify upon backflow incident.

In the event of a backflow incident, where the public water system or the Consumer's water system has been or may have been contaminated, the Consumer must notify the cross-connection control specialist immediately.

13.120.080 Intentional return of used water prohibited.

The intentional return of used water, including but not limited to water used for heating, cooling or other purposes within the Consumer's water system, to the City's distribution system is prohibited.

13.120.090 Enforcement.

In addition to termination or suspension of water service, the City retains the right to pursue all remedies available at law or in equity.

CITY OF SEQUIM

Water Distribution System

Cross-Connection Control Manual

Program Administration, Requirements, and Implementation





Published by:

City of Sequim, Washington
Department of Public Works

Adopted by the Sequim City Council on the __ day of _____, 20___ (Ordinance _____)

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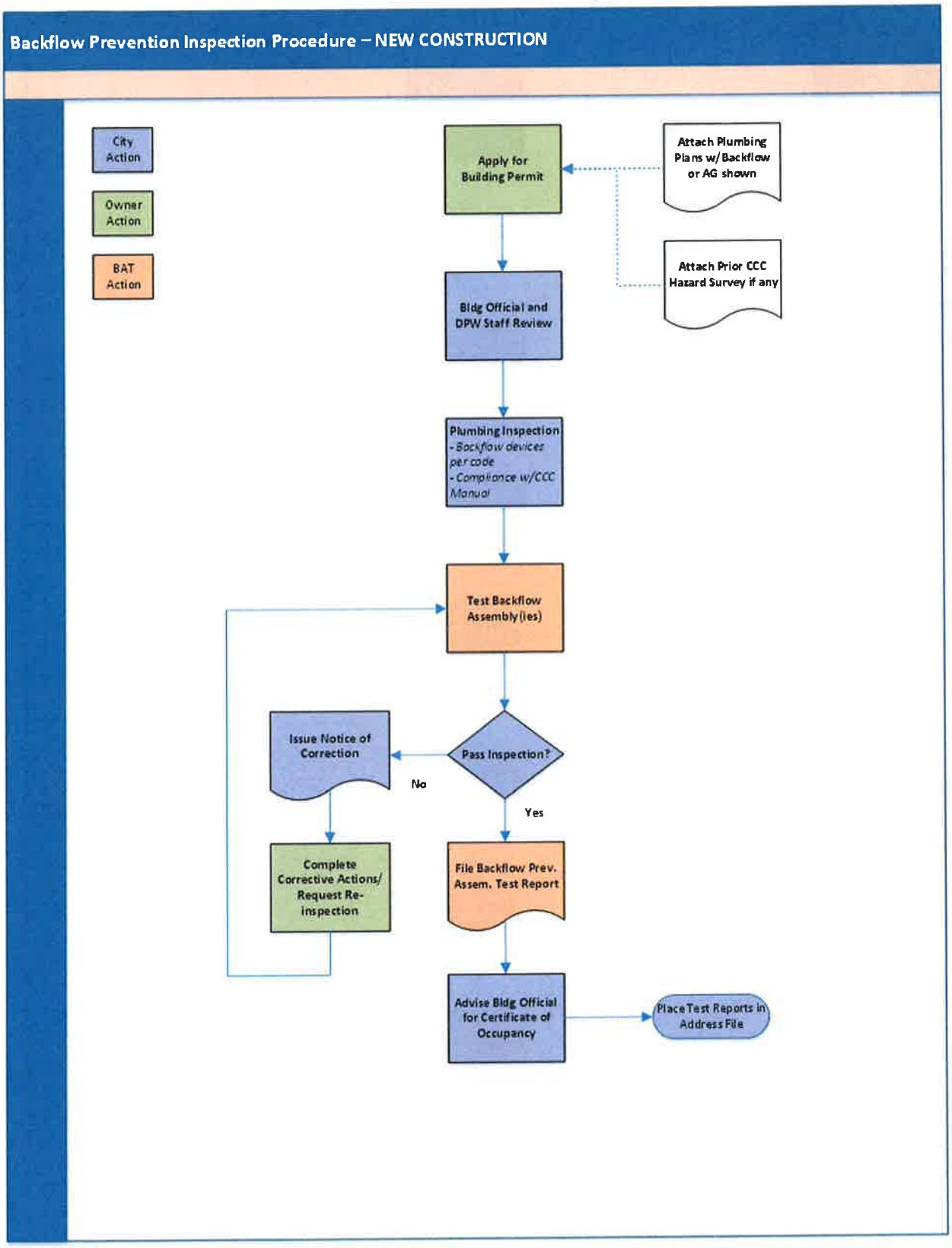
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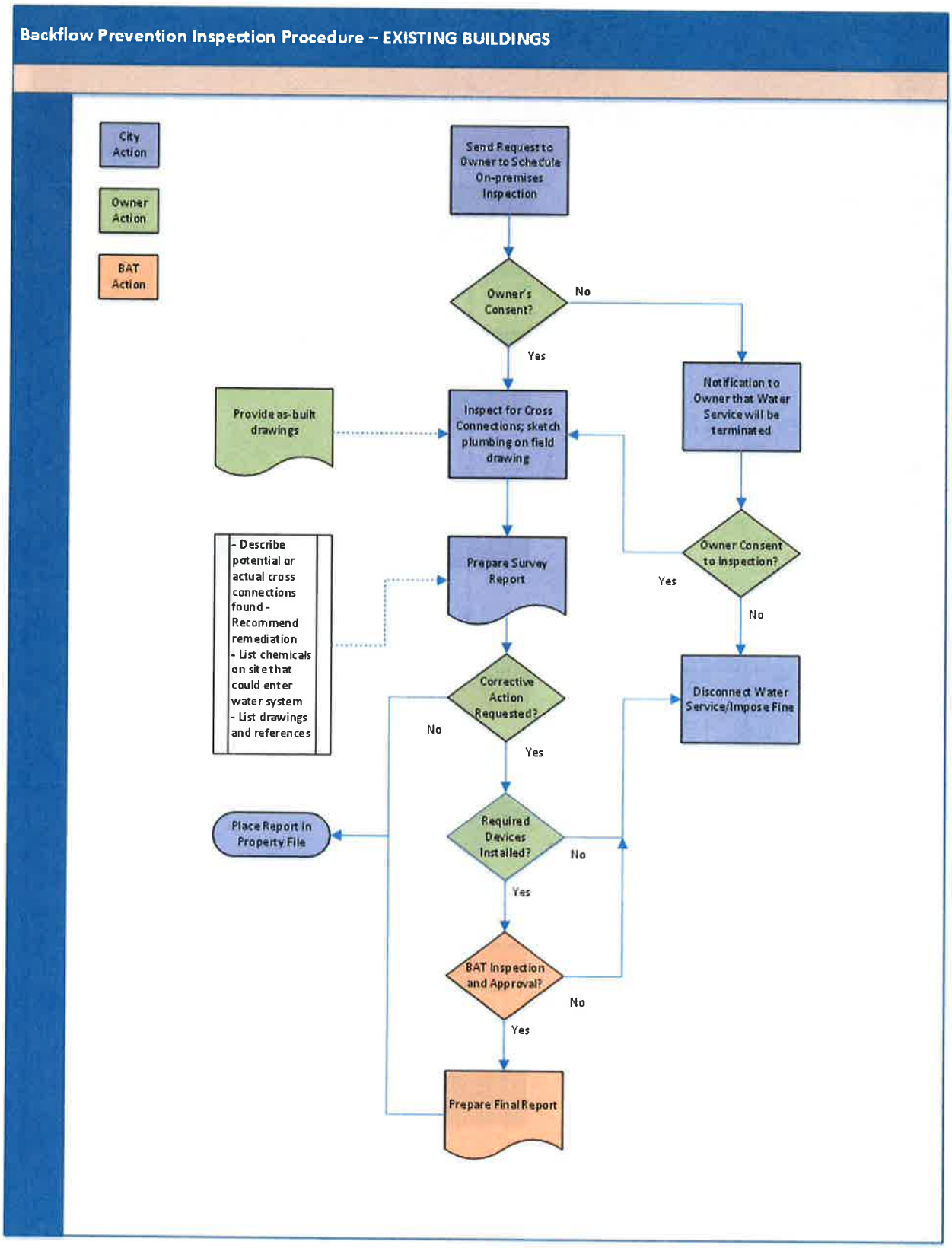
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APPENDIX

A	Cross-Connection Hazard Survey Report
B	Backflow Prevention Assembly Test Report
C	Notice of Survey of Premises

1.0 Flow Charts




Backflow Prevention Inspection Procedure – EXISTING BUILDINGS
City Action
Owner Action
BAT Action
Send Request to Owner to Schedule On-premises Inspection
Owner's Consent?
No
Yes
Notification to Owner that Water Service will be terminated
Provide as-built drawings
Inspect for Cross Connections; sketch plumbing on field drawing
Owner Consent to Inspection?
Yes
No
- Describe potential or actual cross connections found - Recommend remediation
- List chemicals on site that could enter water system
- List drawings and references
Prepare Survey Report
Corrective Action Requested?
No
Yes
Disconnect Water Service/Impose Fine
Place Report in Property File
Required Devices Installed?
No
Yes
BAT Inspection and Approval?
No
Yes
Prepare Final Report

2.0 Introduction

2.1 Authority and Administration: The City of Sequim's Cross Connection Control Program was developed in accordance with the Federal Safe Drinking Water Act of 1974, as amended, RCW Chapter 70.54, and Chapter 246-290-490 of the Washington Administrative Code – and consulting DOH's "Guidance Document: Cross-Connection Control for Small Water Systems" (March 2004, https://doh.wa.gov/sites/default/files/legacy/Documents/Pubs//331-234.pdf). The City's Program was first adopted under City of Sequim Ordnance 2002-013 (September 2002) and is codified under Chapter 13.120 of the Sequim Municipal Code.

The City of Sequim Director of Public Works (Director) is responsible for administering the provisions of the Cross Connection Control Program, and the requirements outlined in this Manual. The Director is aided in this mission by the City's Cross Connection Control Specialists, along with other staff and contractors as appropriate, to carry out the procedures and policies described herein.

2.2 Brief Explanation of Cross Connection in Water Supply Systems: A cross-connection is any actual or potential physical linkage through which contaminated water or other substances may enter the City's drinking water distribution system by backflow. For purposes of this Manual, "backflow" means the movement of water from any source into the potable water supply due to "Backsiphonage" or "Backpressure." Both terms are discussed at length later in this Manual.

Cross connections exist in all plumbing systems. For a drinking water supply to become contaminated from a cross connection, three things must happen simultaneously:

- The potable water supply piping must be unprotected (or improperly protected) from a cross connection;
- A physical cross connection must be made between the potable water supply piping and a contaminant source; and
- Backflow conditions must occur.

The effects of potable water contaminated by a cross-connected source can range from taste, odor and color impacts that are annoying but not necessarily a threat to public health, to serious contamination that can make people very sick. For this reason, the State of Washington requires public water system purveyors to have an active Cross Connection Control (CCC) Program in place. These programs can reasonably reduce the risk of contamination to drinking water systems.

2.3 Purpose of This Manual: This Manual describes standards and practices for the City of Sequim Water Utility to protect the potable water supply from pollution caused by backflow or backsiphonage from a Consumer's on-site plumbing system. The Manual describes cross-connection control operating policies, guidelines and requirements for installation, testing, and maintenance of approved backflow prevention devices, and

describes the permitting and inspection requirements for providing those devices to new, remodeled and existing homes and businesses.

Nothing in this Manual is intended to protect or benefit a particular class of Consumer; it is intended solely to protect and benefit the general public.

3.0 Definitions

3.1 Agency – means the Washington State Department of Health (DOH).

3.2 Approved – refers to an action accepted by the City of Sequim Public Works Director or City of Sequim Cross Connection Control Specialist as meeting the applicable specification stated in this Manual.

3.3 Approved Backflow Assembly List – refers to the Washington State Approved Backflow Prevention Assembly List.

3.4 Auxiliary Water Supply - means any water source to a premises other than the City of Sequim's public potable water utility.

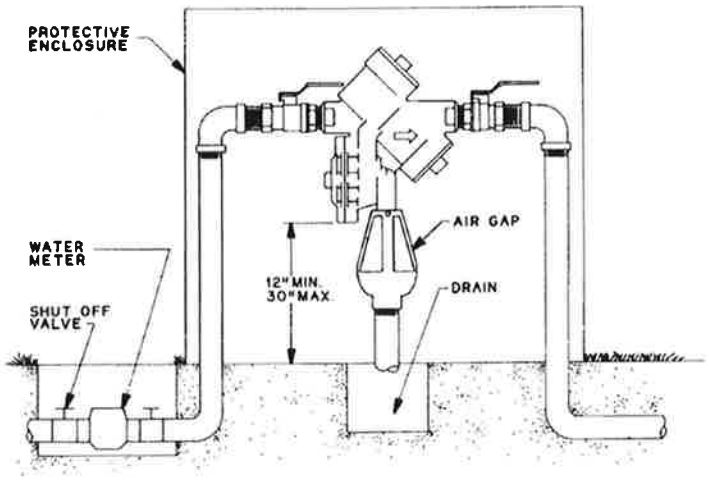
3.5 Backflow – means the undesirable reversal of flow of water or other substances through a cross-connection into the piping of a public water system, or a Consumer's potable water system.

3.6 Backflow Prevention Assembly - "assembly" refers to a Backflow Prevention Device that is designed to be inline tested and repaired, and to meet the head loss and flow requirements of the City. The "assembly" consists of the backflow prevention unit, two resilient seated shutoff valves, and test cocks.

3.7 Backflow Prevention Device - refers to a backflow preventer that is not designed for in-line testing. The following text describes the devices accepted for this purpose under City and State requirements:

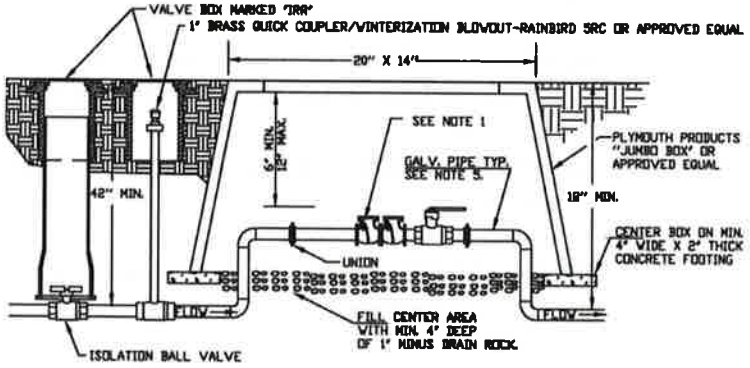
3.7.1 Air Gap (AG) – means a physical separation between the free-flowing end of a potable water supply pipeline and the overflow rim of an open or non-pressurized receiving vessel.

To qualify as an "approved air gap", the separation must be at least twice the diameter of the supply piping measured vertically from the overflow rim of the receiving vessel, and in no case be less than one inch. When located within three pipe diameters (measured horizontally) of a wall, the separation must be at least three times the diameter of the supply piping or four times the diameter of the supply piping for intersecting walls.



3.7.2 Double Check Valve Assembly (DCVA)

An Approved assembly consisting of two independently operating check valves, loaded to the closed position by springs or weights, and installed as a unit with, and between, two resilient seated shut off valves and having suitable connections for testing.



3.7.3 Reduced Pressure Backflow Assembly (RPBA)

An approved assembly with two independently operated check valves, spring loaded to the closed position, separated by a spring-loaded differential pressure relief valve loaded to the open position, and installed as a unit between two resilient seated shut off valves and four test cocks for checking water tightness of the check valves and operation of the relief valve.



3.8 Backflow Assembly Tester (BAT) – means a person holding a valid Backflow Assembly Tester certificate under WAC Chapter 246-292 WAC.

3.9 Backpressure – means backflow caused by increased pressure above the supply pressure from pumps, gravity, or other pressure sources.

3.10 Backsiphonage - means backflow caused by negative or sub-atmospheric pressure in the distribution system.

3.11 City – refers to The City of Sequim, a Washington State municipal corporation, and its duly authorized representative(s).

3.12 Contaminant - means a substance that, when present in drinking water, may adversely affect the health of people consuming the water or the aesthetic quality of the water.

3.13 Cross-Connection – means the actual or potential physical arrangement whereby the Sequim Water Utility distribution system is, or may be, connected directly or indirectly with any other water supply system, sewer, drain, conduit, pool, storage reservoir, plumbing fixture that may introduce contaminants to the City's water supply through backflow or backsiphonage.

3.14 Cross-Connection Control Specialist (CCCS) - An individual certified by the State of Washington approved by the City to carry out the provisions of the City's cross-connection control program.

3.15 Consumer – means, for purposes of cross-connection control, the owner or operator of a plumbing system connected to the City of Sequim Water Utility. Also known as "customer."

3.16 Director – means The City of Sequim Public Works Director, or designated representative(s).

3.17 Greywater - means untreated household wastewater that has not come from toilets, kitchen sinks and dishwashers. Greywater includes wastewater from bathtubs, showers, bathroom sinks, clothes washing machines and laundry tubs.

3.18 High Health Cross Connection Hazard – means a cross-connection that could degrade the quality of potable water and create a health hazard through the spread of disease-bearing organisms, sewage, industrial liquids, or waste.

3.19 In-Premise Protection – means a method of backflow prevention in which a Backflow Prevention Assembly is installed on the Consumer's internal water supply line prior to a fixture, piece of equipment or area that has been determined to have backflow potential. The installation method must effectively isolate the fixture, piece of equipment or area from the rest of the Consumer's distribution system.

3.20 Non-Potable Water – means water from any source that is not safe for human consumption.

3.21 Owner – means any person who has legal title to, or license to operate or occupy, a property upon which a cross-connection inspection will be made or upon which a cross-connection is present.

3.22 Person – means any individual, partnership, company, public or private corporation, political subdivision, or agency of the State, or of the United States, or any other legal entity.

3.23 Potable Water – means any water which is safe for human consumption.

3.24 Premise Isolation - A method of protecting a public water system by installation of approved air gaps or approved backflow prevention assemblies at or near the service connection to separate the Consumer's plumbing system from the Purveyor's distribution system.

3.25 Purveyor – means the representative in charge of the City of Sequim Water Utility.

3.26 Reclaimed Water – means effluent derived in any part from a sewage collection system that is no longer considered wastewater. Reclaimed water has been adequately treated to be suitable for a beneficial use that would not otherwise occur.

4.0 Administrative Principles

4.1 Applicability: The provisions of this Manual are applicable to all connections to the Sequim Water Utility and its constituent systems. The City recognizes there are varying degrees of risks associated with different types of premises. The Director will consider these risks when determining the applicable backflow prevention method required to mitigate the risks from a cross connection. State law requires the City, as a water system purveyor, to ensure that an approved air gap and/or Backflow Prevention Device is installed for premises isolation purposes on service connections that pose a high health cross-connection hazard, including, but not limited to, the following list:

- Agricultural (farms and dairies)
- Beverage bottling plants
- Car washes
- Chemical plants
- Commercial laundries and dry cleaners
- Premises where both reclaimed water and potable water are provided
- Film processing facilities
- Food processing plants
- Hospitals, medical centers, nursing homes, veterinary, medical and dental clinics, and blood plasma centers
- Premises with separate irrigation systems using the Purveyor's water supply and with chemical addition, such as parks, playgrounds, golf courses, and cemeteries.
- Laboratories
- Metal plating industries
- Mortuaries
- Petroleum processing or storage plants
- Piers and docks
- Radioactive material processing plants or nuclear reactors
- Survey access denied or restricted
- Wastewater lift stations and pumping stations
- Wastewater treatment plants
- Premises with an unapproved auxiliary water supply interconnected with the potable water supply

Source: WAC Chapter 246-290, Table 9

4.2 Owner Responsibility: Owner is responsible for the elimination, by an air gap or approved Backflow Prevention Assembly, of all cross-connection on their premises consistent with SMC 13.120.030

4.3 Water Service and Cross Connection Control Program: Compliance with the provisions of the City's Cross-Connection Control Program is a condition of receiving service from the Sequim Water Utility pursuant to Chapter SMC 13.120. Customers, owners, and contractors should be aware of the following general requirements:

4.3.1 Contaminant Backflow: It is unlawful for any person to allow any contaminant or pollutant to backflow from their facility and/or property into the City's water distribution system.

Any connection existing at the time that this Manual was published, or thereafter installed, that could allow backflow of any contaminants or pollutants into the City distribution system must be discontinued and eliminated. Connections that cannot be discontinued and/or eliminated require the installation of an approved Backflow Prevention Assembly (See Section 3.6 above) that must be regularly inspected and tested in accordance with the provisions of this Manual.

4.3.2 Premises Isolation: All newly constructed and newly remodeled buildings as well as irrigation service meters are required to have an approved premises isolation backflow assembly immediately downstream from the service meter. The Owner is responsible for water quality beyond the outlet end of the Premise Isolation assembly.

4.3.3 Fixture Isolation: Fixture isolation may be required for existing Consumer connections if the Director determines that such a device is adequate to protect the City's distribution system, and the Owner agrees, in writing to: a) implement and maintain the fixture isolating backflow protection to the satisfaction of the City; and, b) comply with all applicable plumbing codes, including permitting requirements. Fixture isolation assemblies must be installed in accordance with the Uniform Plumbing Code. The Owner's responsibility starts immediately downstream of the City water meter.

4.3.4 Approved Backflow Prevention Assemblies: Approved Backflow Prevention Assemblies are limited to those models listed in Washington Department of Health (DOH) Publication No. 331-090 *Cross Connection Control Rules and Definitions*. The DOH publication list also constitutes City's approved backflow device list for purposes of compliance with the requirements of this Manual.

A. CCCS may authorize continued use of an existing Backflow Prevention Assembly that is not found on the City approved list, under the following conditions:

- Owner demonstrates that The device was included on the DOH Approved Backflow Assembly List at the time of its installation.
- The assembly(ies) has/ have been properly maintained.
- The assembly(ies) are functioning properly based on testing by a BAT, and review of the BAT's test results by the City Cross-Connection Control Specialist; and
- CCCS determines that the degree of protection is satisfactory for preventing backflow contamination of the City's potable water system.

B. If an unlisted assembly does not meet the conditions stated above, is moved, or has malfunctioned and cannot be repaired using replacement parts provided by the original equipment manufacturer, it must be replaced by a device on the current DOH/City approved list.

4.3.5 Courtesy List: City will maintain a list of DOH certified Backflow Assembly Testers that may be provided to Consumers and Owners upon request.

5. Program Details

5.1 New and Remodeled Commercial Construction: As of the adoption date on the cover of this Manual, all newly constructed commercial buildings, and remodeled commercial buildings including multi-family residential buildings with more than two stories must have a premises isolation Reduced Pressure Backflow Assembly (RPBA) on the domestic water service.

5.1.1 RPBA Required: Owner of premises on which one or more of the following circumstances are present must install an approved Reduced Pressure Backflow Assembly at the service connection:

- materials dangerous to health or wherein toxic substances are handled.
- premises where entry is physically restricted so that inspections cannot confirm with reasonable certainty that cross-connections are not present.
- premises having an auxiliary water supply; and
- complex plumbing arrangements that make it impractical to verify that cross-connections are present.

5.1.2 Professional Installer: The RPBA must be installed by a Washington State licensed plumber or certified BAT. The work may be performed by Owner if done with Owner's own hands.

5.1.3 RPBA Location and Access: All premises isolation Double Check Valve Assemblies will be located immediately downstream of City water meter, according to City standards.

- Exception: Upon prior written approval of the Director or the Cross Connection Control Specialist, the RPBA may be located inside a building.

- Backflow Prevention Devices must be positioned to allow reasonable access to the installed device for testing and inspection by City.

5.1.4 RPBA Provided by the Customer (Consumer): The RPBA selected for installation must be included on City's list of approved backflow assemblies (See Section 3.3.4 above). The RPBA remains the property of the Consumer and is the maintenance responsibility of the Consumer.

5.1.5 Testing and Approval: Following installation, the RPBA must be tested and approved by a BAT before water service is initially provided, and annually thereafter.

5.2 New and Remodeled Residential Construction: City requires that all newly constructed or newly remodeled residential premises include installation of an approved DCVA.

5.2.1 Pressurization: Premises on which any substance that is not a health hazard but is under pressure to enable release to City's water system, or where a cross connection could reasonably be expected to be present, are required to have an approved DCVA installed at the service connection.

5.2.2 Chronic Backflow: Premises which have a repeated history of cross-connections being established or re-established are required to have an approved Double Check Valve Assembly installed at the service connection.

5.3 Premises Existing Prior to the CCC Program:

5.3.1 High Health Cross-Connection Hazard: Owners of pre-existing premises listed under Section 3.1 above are required to install a premises isolation Air Gap or RPBA directly downstream from the service meter.

5.3.2 Auxiliary Water Supply: Existing premises having an auxiliary water supply with no known cross-connection(s) are required to have an approved DCVA installed at the service connection.

5.3.3 Initial Inspection: City will inspect the premise and evaluate plans and documents in the City property file, if any, and inform Owner by written notice of any corrective action deemed necessary, the method of achieving the correction, and the time allowed for the correction to be made.

Generally, Owner will have up to sixty (60) calendar days to perform the corrective actions required. A shorter time period may be specified by the Director, depending upon the degree of hazard identified, and the history of the plumbing system and fittings on premises.

5.3.4 Re-inspection: Premises are subject to re-inspection, at the Owner's request, on or before the expiration date of required action described in the City's written notice procedure described in Section 6.3, below.

Premises that fail to comply with the City's request may receive written notice, via registered mail, that water service to the premise will be terminated within a period not to exceed thirty (30) calendar days.

5.3.5 Public Health Hazard Identified: If the CCCS determines that existing, on-premises conditions pose a risk to public health from potential or actual contamination of the City's water utility, water service to the offending premises could be terminated consistent with Section 6.3, below.

5.4 Installation and Testing - Minimum Requirements: Specifications for the installation and testing of all backflow prevention assemblies shall be in accordance with the current edition of the Washington DOH Cross-Connection Control Manual. In the event of conflict between the DOH Cross-Connection Control Manual and the requirements stated elsewhere in this Manual, the more restrictive requirement(s) prevail.

5.4.1 Location: All Backflow Prevention Assemblies must be installed at a location that is easily accessible for inspection and testing:

- Assemblies located in vaults must have adequate clearances and depths to allow the City to inspect and BAT to test.
- Assemblies that cannot be readily inspected must be relocated and re-plumbed as required by City; and
- Owner must contact City to ascertain site-specific requirements and standards prior to commencing installation.

5.4.2 Bypass Lines: All bypass lines parallel to a line on which a Backflow Prevention Assembly is installed must include an approved Backflow Prevention Assembly that is equal in type to the assembly required on the main line.

Double Check Detector Assembly



5.5 Special Circumstances

5.5.1 Fire Protection Systems: Premises having a fire protection system where no chemicals are allowed must have an approved DCVA or approved double check detector assembly installed at the fire service connection. Residential fire systems with a flow through system are not allowed.

5.5.2 Irrigation Systems: No Irrigation system supplied with City of Sequim water may be cross-connected to any alternative water supply. Backflow prevention at the City water service connection is required for irrigation systems under the follow circumstances:

- Premises having an irrigation system where chemicals or herbicides are used;
- Non-residential premises having an irrigation system which is subject to flooding, backpressure, elevated piping, or where compressed air is allowed; and
- Non-residential premises having an irrigation system which does not fall into one of the prior two categories are required to have a DCVA installed.

5.5.3 Reclaimed Water[1]: For purposes of this Manual, all classes of reclaimed water are considered a High Health Cross Connection Hazard. Direct connections between reclaimed water systems and potable water systems are prohibited.[2]

[1] Reclaimed water systems use wastewater treatment effluent that has been treated to be suitable for a direct beneficial use or a controlled use that would not otherwise occur. The utilization of reclaimed water is referred to as water reuse. A dual distribution system supplies two grades of water to the same service area. One of the supplies is potable water (acceptable for drinking), and the other supply is non-potable (not acceptable for drinking).

[2] See Department of Ecology publication no. 97-23.

- For connections where both reclaimed water and potable water are provided to Customer, premises isolation at the water meter by an approved AG or RPBA is required.
- In instances where Customer uses potable water to supplement a reclaimed water system, the potable water must be supplied through an approved AG that is inspected by a certified BAT annually or more often as required.

5.5.4 Greywater: For purposes of this Manual, all greywater systems are considered a High Health Cross Connection Hazard[3].

If City issues a permit for installation of a greywater system for underground landscape irrigation, City will also require premises isolation at the water meter by an approved AG or RPBA. The requirement is intended to avoid contamination from any unauthorized connection to the potable water system to supplement the greywater supply.

5.5.5 Alternative Water Sources: Owner(s) having an alternative water source, including but not limited to ditch irrigation water, private wells and recycled water, must not allow such sources to be cross-connected to the City's potable water system.

[3] A greywater system uses the effluent from untreated household wastewater that hasn't come into contact with toilet waste or food processing waste. Greywater includes wastewater from bathtubs, showers, bathroom sinks, clothes washing machines and laundry tubs. Greywater excludes wastewater from kitchen sinks and dishwashers.

6.0 Inspections and Compliance

6.1 New Construction: Upon application for a building permit, Director will require detailed plans and specifications for plumbing installation and fire sprinkler systems, including therein the location of any proposed or existing AG or Backflow Prevention Device(s) (See Appendix 2-A). Such review will include any Cross Connection Control Hazard Survey Report for the premises that may be on file with City.

6.1.1 CCC Survey: CCCS may require Customer to complete a new or revised Cross Connection Control Hazard Survey Report for a premises that is subject to a change of use, or for which a Survey form has not been previously filed.

- CCCS will determine from review of the plans, specifications, and survey report if cross-connections are already present or may be created.
- The plumbing inspection phase of new building construction will include a cross connection control inspection to document the location of all backflow prevention assemblies and/or devices, and to ascertain that such devices are installed according to plumbing code requirements, and in compliance with the requirements of this Manual.
- All backflow prevention assemblies installed internally or at the service connection must be tested by a BAT. Test results must be submitted to the Director on a Backflow Prevention Assembly Test Report form. (See Appendix 2-B).

6.1.2 Corrections: If corrective action is required, CCCS will provide comments to the City's Building Official describing such corrective measures. Owner must request a re-inspection of the installed devices when corrective actions are complete.

Results of the re-inspection must be reported in writing to the Director and City Building Official. All backflow protection deficiencies must be corrected before a Certificate of Occupancy is issued for premises.

6.2 Existing Buildings: As part of City's Cross Connection Control regulation, a systematic program of on-premises surveys will be conducted according to the following procedures:

6.2.1 Comprehensive Survey: City's intention is to survey the premises of all commercial and industrial metered Consumers to ascertain the existing status of AG and backflow prevention assemblies, or to establish the need for new or upgraded protective devices.

- City's survey schedule priority is based on the location of the potential or known hazard on the premises, and the severity of backflow contamination health hazard posed by the plumbing configuration.
- City will contact Owner by letter to request an appointment for purposes of conducting the on-premises survey, on a date not later than ten (10) business days from the date of the request letter. The letter may include an invitation to

Owner appoint an individual from his firm with knowledge of the on-premises plumbing system to accompany the CCCS.

- On the appointed date, City's CCCS will conduct a physical survey of all exposed plumbing pipe and fixtures. All lines will be sketched on a field drawing, except where intricate plumbing arrangements make it impractical to do so. In such instances, an as-built drawing may be requested from Owner. The survey is intended to determine if an actual or potential cross-connection exists, or if other conditions are present that might contaminate the potable water system.
- A written report of the survey results will be prepared as soon after the survey date as practical, and may include the following content: a) identifying information for the premises; b) description of cross-connections found, and their location; c) listing of industrial fluids, chemical, or other contaminating liquids used or pumped under pressure on the premises, and the probability of cross-connection thereof to the City water utility; d) drawings, sketches, blueprints, permit file materials and other documents referenced; e)specific recommendations for remediation of existing or potential cross connection discovered.
- CCCS will give Owner a copy of the survey report, a cover letter describing corrective action required, and a mandatory corrective action completion date.

6.2.2 Owner's Response: Owner must request a re-inspection date not later than five (5) business days prior to the corrective action completion date. At that time, the Cross-Connection Specialist will re-inspect the items that require corrective action. The results of the re-inspection must be reported in writing to the Director.

- If further corrective action is required, Engineer will establish a corrective action completion date and provide for re-inspection as previously described above.
- When all required backflow and air gap assemblies have been completed, Owner will have the device(s) tested by a BAT, and must forward the BAT's written report to City, within thirty (30) calendar days of the City's date of acceptance of the installed devices.
- In the event that a backflow assembly is not tested and approved by a BAT within the prescribed time, water service to the premises will be discontinued. Alternatively, City may hire a BAT to test the assembly in question. In such event, and bill Owner for all costs incurred. If complete payment is not received in a timely manner, water service may be disconnected for non-payment.

6.3 Enforcement: City may take appropriate corrective action when the Director determines that an actual or potential health hazard to City's water utility exists.

6.3.1 Compelling Circumstances: The City may take appropriate corrective action within its authority if:

1. A cross connection exists that is not controlled commensurate to the degree of hazard assessed by the City; or

- 2. A Consumer fails to comply with the City's requirements regarding the installation, inspection, testing, maintenance, or repair of an approved backflow preventer required by this chapter.

6.3.2 City Action: In taking corrective action the City has the right to terminate or suspend water service or pursue all remedies available at law or in equity (SMC 13.120.090). Per WAC 246-290-490 (3), the process for taking action involves hazard assessment and documentation in addition to communication with the Consumer, at minimum.

The City's corrective action may include, but is not limited to:

1. Denying or discontinuing water service to a Consumer's premises until the cross-connection hazard is eliminated or controlled to the satisfaction of the CCCS;

2. Requiring the Consumer to install an approved backflow preventer for premises isolation commensurate with the degree of hazard; or

3. The City installing an approved backflow preventer for premises isolation commensurate with the degree of hazard. (WAC 246-290-490)

For situations other than public health emergencies necessitating suspension of service, the City may take an alternate corrective action such as installing a backflow assembly.

6.3.3 Record Keeping: City will maintain written records of all actions taken to carry out the requirements of the Cross Connection Control Program, and the procedures outlined in this Manual. Except in unusual circumstances, such records will be retained in the City address file for the premises, and will be considered public, non-confidential information.

The City's records should include:

- location of the residence, business, or water service connection.
- location on premises of AG or Backflow Prevention Device or devices.
- initial CCC program inspection results and findings.
- AG or Backflow Prevention Assembly identification (manufacturer, size, model, serial number and recommended inspection and maintenance interval).
- Device installation information, including date installed, identity of the installer, water line size, water pressure, and (when applicable) hazard level and hazard(s) abated.
- Comprehensive device testing history, including initial and annual inspection results, testing method, date, BAT's name and certification number, line pressure, and notes regarding repairs completed or needed. Upon request, City will provide testing and inspection report information to DOH.

Appendix A

Cross-Connection Hazard Survey Report

«DATEDUE»

«Contact»
«NAME»
«MAIL_ADDR1»
«MAIL_ADDR2»
«CITYPROVST» «POSTALZIP»

RE: CROSS CONNECTION CONTROL SURVEY
ADDRESS: «FACADDRESS»

Dear «Salut_Last»:

The Cross Connection Control survey carried out at the subject address has shown that the following items require your attention:

«SURVEY_REQ»

The City Plumbing Inspector requires that the deficiencies described above be corrected to the satisfaction of the Plumbing Inspection Division by **«DEADLINE»**.

All devices to be installed at the direction of the Plumbing Inspection Division, shall be done under permit and tested by a Certified Tester when installed, and the annually thereafter or more frequently, if required by the Plumbing Inspection Division, in accordance with the requirements of the City Plumbing Bylaw.

Should you have any questions, please contact **City of Sequim Water Department** at 360-683-4908 or 360-809-4408.

Sincerely,

City of Sequim
Public Works

Appendix B

Backflow Prevention Assembly Test Report

BACKFLOW PREVENTION ASSEMBLY TEST REPORT

FAILED, ILLEGIBLE OR INCOMPLETE REPORTS WILL NOT BE ACCEPTED

City of Sequim reserves the right to retest any assemblies.

Backflow Assembly Testers
Please email signed copy to
backflow@sequimwa.gov

City of Sequim
152 W. Cedar Street
Sequim WA 98382

Customer and Property Information

PROPERTY ADDRESS:

BUSINESS/OWNER NAME:

CONTACT PERSON: **PHONE#:** **FAX:**

Assembly Information **NEW INSTALLATION** ☐ **EXISTING** ☐ **REPLACEMENT** ☐
OLD ASSEMBLY SERIAL NUMBER IF REPLACEMENT:

TYPE OF ASSEMBLY: **AIR GAP** ☐ **RP** ☐ **DC** ☐ **DCDA** ☐ **RPDA** ☐ **PVBA** ☐ **SPVBA** ☐

MAKE OF ASSEMBLY: **MODEL:** **SIZE:** **SERIAL:**

What hazard is being isolated? (i.e. boilers, irrigation, premises isolation):
Describe location of assembly:

Initial Test	**Double Check Assembly**				**Reduced Pressure Assembly**				**PVBA/SPVBA**			
	1st Check Valve	**psid**	**Pass** ☐ **Fail** ☐		**Relief Valve Opening Point**	**psid**	**Pass** ☐ **Fail** ☐		**Air Inlet Valve Opened**	**psid**	**Pass** ☐ **Fail** ☐	
	2nd Check Valve	**psid**	**Pass** ☐ **Fail** ☐		**2nd Ck Valve**		**Pass** ☐ **Fail** ☐		**Check Valve**	**psid**	**Pass** ☐ **Fail** ☐	
					1st Ck Valve	**psid**	**Pass** ☐ **Fail** ☐		**Air Inlet Valve Fully Opened**	**Yes** ☐	**No** ☐	
					Approved Air Gap	**Yes** ☐	**No** ☐					
Repairs & Materials Used												
Retest After Repairs	**1st Check Valve**	**psid**	**Pass** ☐ **Fail** ☐		**Relief Valve Opening Point**	**psid**	**Pass** ☐ **Fail** ☐		**Air Inlet Valve**	**psid**	**Pass** ☐ **Fail** ☐	
	2nd Check Valve	**psid**	**Pass** ☐ **Fail** ☐		**2nd Ck Valve**		**Pass** ☐ **Fail** ☐		**Check Valve**	**psid**	**Pass** ☐ **Fail** ☐	
					1st Ck Valve	**psid**	**Pass** ☐ **Fail** ☐					

Air Gap Insp. - Size of Pipe **inch** **Air Gap Separation** **inch** **Detector Meter Reading**

Line Pressure **psi** **WSDOH Approved Assembly – Yes** ☐ **No** ☐ **Service Restored – Yes** ☐ **No** ☐

COMMENTS

CERTIFIED INFORMATION

I CERTIFY THAT THIS REPORT IS ACCURATE, AND I HAVE USED *WAC* 246-290-490 APPROVED TEST METHODS AND TEST EQUIPMENT.

Tester's Name: **Cert. #:**
Test Equipment: Make: **Model:** **SN#:** **Cal. Date:**
Tester's Company Name: **Phone Number:**

Tester's Signature:_____ **Date:** _____

Appendix C

Notice of Survey of Premises

Notice of Survey of Premises
(Non-Residential/Multi-Family Residential)

Date

Customer Account Number (optional)
Customer Name
Customer Address Line 1
Customer Address Line 2

Dear City of Sequim Water System Customer:

Washington State drinking water regulations, WAC 246-290-490, require public water systems to develop and implement cross-connection control programs. Cross-connection control programs protect public health by preventing contamination of the drinking water supply. The attached brochure explains what a cross connection is and what you can do to help protect your drinking water.

As part of the cross-connection control program, our system must assess the degree of hazard posed by each of our customer's plumbing systems upon the public water system. Non-residential customers and multi-family residential customers pose a special concern, because of the greater scope and complexity of their plumbing systems, special uses of water on the premises (e.g., manufacturing), fire protection systems, etc. Depending on the hazard assessment results, you may need to have a backflow preventer installed on your service line or provide alternate protection.

A cross-connection survey needs to be conducted for us to make the hazard assessment for your premises. Please contact the city Cross Connection Control Specialist (CCCS) to schedule a survey of your facility. Failure to provide access for a survey will result in an automatic requirement of the facility in question to provide an Air Gap or Reduced Pressure Backflow Assembly immediately downstream of the service meter as per Washington State regulations.

We appreciate your cooperation in meeting this hazard survey requirement. If you have any questions, please contact us at **360-683-4908 or backflow@sequimwa.gov** .

Sincerely,

City of Sequim
Cross Connection Control
360.683.4908 or
backflow@sequimwa.gov

Exhibit C

Ancillary Code Exhibit

13.112.030 Cross-connection control and use area requirements.

A. Prior to connecting a use to the reclaimed water system, the public potable water supply shall be protected by installation of an approved ~~cross-connection control~~Backflow Prevention A~~a~~ssembly in accordance with the Water Reclamation and Reuse Standards published jointly by the Washington State Departments of Health and Ecology (1997), or subsequent revisions.

B. The reclaimed water distribution system shall include special considerations to avoid cross-connections with the potable water system, in accordance with the Water Reclamation and Reuse Standards published jointly by the Washington State Departments of Health and Ecology (1997), or subsequent revisions. The following features shall be included in reclaimed water systems to protect the public health:

1. Reclaimed water distribution systems shall be constructed with purple pipe (Pantone 522 or other shades of purple acceptable to review agencies) and embossed or integrally stamped or marked "CAUTION: RECLAIMED WATER – DO NOT DRINK" or be installed with a purple (Pantone 512 or other shades of purple acceptable to review agencies) identification tape or polyethylene vinyl wrap. The warning shall be stamped on opposite sides of the pipe and repeated every three feet or less.

2. Square valve box covers painted purple (Pantone 522 or other shades of purple acceptable to review agencies) to distinguish from potable water system valve boxes.

3. Purple strip on street curb to identify reclaimed water customer.

4. Reclaimed water meters color-coded with tape to distinguish from potable water meters (where applicable). Meters, covers and meter box covers should be cast to indicate reclaimed water. (Ord. 2020-013 § 1 (Exh. A); Ord. 2002-021 § 1; Ord. 2000-017; Ord. 99-019)

APPENDIX K

HYDRAULIC MODEL RESULTS

LEGEND:

- JUNCTION
- ACTIVE PIPE
- INACTIVE PIPE
- PUMP
- VALVE
- RESERVOIR (SIMULATED SOURCE)

FROM INFILTRATION GALLERY

4,000 2,000 0 Feet

SHEET	OF
X	X

DATE	SCALE	PROJECT
JUNE 2021	AS SHOWN	2020-016

City of Sequim
CLALLAM COUNTY WASHINGTON

FIGURE 1A:
2021 WATER SYSTEM PLAN MAP

CITY OF SEQUIM

WILSON ENGINEERING

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

N

LEGEND:

- JUNCTION
- ACTIVE PIPE
- INACTIVE PIPE
- PUMP
- VALVE
- RESERVOIR (SIMULATED SOURCE)

SHEET X OF X

DATE JUNE 2021 | SCALE AS SHOWN | PROJECT 2020-016

City of Sequim
WASHINGTON
CLALLAM COUNTY

FIGURE 1B:
2021 WATER SYSTEM PLAN MAP WITH LABELS

CITY OF SEQUIM

WILSON ENGINEERING

1,900 950 0 Feet

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

LEGEND:

- JUNCTION PRESSURE, < 30 PSI
- JUNCTION PRESSURE, 30 TO 100 PSI
- JUNCTION PRESSURE, > 100 PSI
- PIPE VELOCITY, < 10 FT/S
- PIPE VELOCITY, > 10 FT/S

4,000 2,000 0 Feet

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

SHEET X OF X

DATE JUNE 2021 | SCALE AS SHOWN | PROJECT 2020-016

City of Sequim
CLALLAM COUNTY WASHINGTON

FIGURE 2:
2021 PEAK HOUR DEMAND RESULTS

CITY OF SEQUIM

WILSON ENGINEERING

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
1	☐	J100	4.35	225.89	349.69	53.64
2	☐	J1000	1.64	213.42	346.51	57.67
3	☐	J1006	2.35	266.13	405.30	60.30
4	☐	J1008	21.92	242.31	404.10	70.10
5	☐	J1014	6.01	141.48	350.54	90.58
6	☐	J1016	3.59	126.03	350.96	97.46
7	☐	J1018	8.20	123.39	350.96	98.61
8	☐	J102	3.98	235.94	349.26	49.10
9	☐	J1020	2.77	124.45	351.14	98.22
10	☐	J1022	0.00	123.17	351.14	98.78
11	☐	J1024	0.00	94.00	352.88	112.17
12	☐	J1030	0.00	105.32	352.71	107.19
13	☐	J1032	0.00	104.17	352.88	107.76
14	☐	J1042	0.00	103.78	352.88	107.94
15	☐	J1044	0.51	268.00	416.73	64.45
16	☐	J1048	0.97	295.00	416.82	52.78
17	☐	J1050	0.94	294.00	416.80	53.21
18	☐	J1052	2.48	292.00	416.79	54.07
19	☐	J1054	5.56	295.00	416.79	52.77
20	☐	J1056	5.10	297.00	416.80	51.91
21	☐	J1058	1.25	295.00	416.80	52.78
22	☐	J106	3.08	246.33	349.29	44.62
23	☐	J1064	0.19	310.03	417.19	46.43
24	☐	J1068	0.51	305.86	417.18	48.24
25	☐	J1074	0.00	296.59	417.19	52.25
26	☐	J1076	0.83	297.28	417.19	51.96
27	☐	J108	7.23	348.60	475.39	54.94
28	☐	J1080	1.35	297.26	417.13	51.94
29	☐	J1084	2.44	311.64	417.16	45.72
30	☐	J1086	0.19	306.53	417.18	47.94
31	☐	J1088	1.00	306.53	417.18	47.94
32	☐	J1090	2.35	305.99	417.18	48.18
33	☐	J1092	0.13	320.32	417.24	42.00
34	☐	J1094	2.21	320.08	417.24	42.10
35	☐	J1096	0.00	337.99	417.29	34.36
36	☐	J1098	0.00	335.67	417.29	35.37
37	☐	J110	0.00	340.55	416.94	33.10
38	☐	J1100	0.00	345.44	417.39	31.18
39	☐	J1102	2.95	217.74	348.82	56.80
40	☐	J1106	3.22	196.86	348.70	65.79
41	☐	J1110	0.38	160.66	346.95	80.72
42	☐	J1112	0.00	163.66	347.07	79.47
43	☐	J1114	0.00	163.66	347.07	79.47
44	☐	J1116	4.18	165.59	347.25	78.71
45	☐	J1118	0.94	286.91	416.69	56.23
46	☐	J1120	10.39	302.00	416.66	49.68
47	☐	J1128	0.67	132.04	350.67	94.73
48	☐	J1130	0.88	129.03	350.67	96.04
49	☐	J1132	0.12	132.48	350.67	94.55
50	☐	J1134	0.18	131.95	350.67	94.77
51	☐	J1138	0.08	129.16	350.68	95.98

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
52	☐	J1140	1.12	126.63	350.68	97.08
53	☐	J1144	0.80	128.46	350.67	96.29
54	☐	J1146	0.56	126.97	350.68	96.93
55	☐	J1148	1.41	123.00	350.68	98.65
56	☐	J1150	0.61	125.76	350.68	97.46
57	☐	J1152	0.87	129.11	350.68	96.00
58	☐	J1154	0.82	126.90	350.68	96.96
59	☐	J1158	1.01	122.88	350.68	98.71
60	☐	J1160	0.92	121.11	350.68	99.47
61	☐	J1164	2.59	119.53	350.69	100.16
62	☐	J1166	0.62	122.55	350.68	98.85
63	☐	J1168	0.76	121.63	350.68	99.25
64	☐	J1170	2.34	268.00	416.74	64.45
65	☐	J1172	1.98	277.00	416.75	60.55
66	☐	J1174	2.09	278.00	416.77	60.13
67	☐	J1176	3.16	277.00	416.75	60.56
68	☐	J1178	3.52	267.00	416.75	64.88
69	☐	J118	14.82	312.62	475.30	70.49
70	☐	J1180	2.20	264.00	416.74	66.18
71	☐	J1182	1.02	262.00	416.74	67.05
72	☐	J1184	1.08	261.00	416.74	67.48
73	☐	J1186	1.24	261.00	416.74	67.48
74	☐	J1188	1.15	263.00	416.74	66.61
75	☐	J1190	1.51	260.00	416.74	67.91
76	☐	J1192	1.90	277.00	416.76	60.56
77	☐	J1194	1.01	277.00	416.76	60.56
78	☐	J120	2.66	240.06	351.76	48.40
79	☐	J1200	0.80	200.16	348.69	64.36
80	☐	J1204	0.76	185.71	348.61	70.58
81	☐	J1210	0.34	155.66	349.84	84.14
82	☐	J1214	0.93	157.33	349.84	83.41
83	☐	J1216	0.81	153.43	349.84	85.10
84	☐	J1218	0.83	158.58	349.84	82.87
85	☐	J122	0.00	250.00	416.89	72.31
86	☐	J1220	0.31	160.10	349.84	82.21
87	☐	J1222	0.12	161.69	349.84	81.53
88	☐	J1224	2.53	185.29	348.97	70.92
89	☐	J1226	3.42	193.06	348.96	67.55
90	☐	J1228	9.15	196.09	348.96	66.24
91	☐	J1234	2.66	185.30	348.97	70.92
92	☐	J1244	0.82	265.00	416.70	65.73
93	☐	J1246	1.60	291.00	416.73	54.48
94	☐	J1248	3.61	277.00	416.70	60.53
95	☐	J1250	1.91	285.00	416.70	57.07
96	☐	J1252	1.43	285.00	416.70	57.07
97	☐	J1254	3.70	285.00	416.71	57.07
98	☐	J1256	5.59	290.00	416.72	54.91
99	☐	J126	0.12	378.49	475.48	42.03
100	☐	J1262	11.05	281.00	416.69	58.79
101	☐	J1266	5.48	243.47	403.94	69.53
102	☐	J1268	10.39	211.86	345.89	58.08

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
103	☐	J1272	0.71	142.47	346.13	88.25
104	☐	J1274	3.15	140.40	346.05	89.11
105	☐	J1276	2.61	141.11	345.78	88.68
106	☐	J128	0.30	364.03	475.42	48.27
107	☐	J1280	0.51	138.40	345.73	89.84
108	☐	J1282	4.74	148.61	345.73	85.41
109	☐	J1284	0.71	138.39	345.73	89.84
110	☐	J1286	2.54	138.15	345.72	89.94
111	☐	J1292	5.02	122.54	344.72	96.27
112	☐	J1298	1.81	123.04	344.72	96.05
113	☐	J1300	4.03	123.35	344.81	95.96
114	☐	J1306	8.79	119.88	344.95	97.52
115	☐	J1310	2.53	119.93	344.95	97.50
116	☐	J1316	0.55	134.16	345.89	91.74
117	☐	J1320	0.20	311.01	417.19	46.01
118	☐	J1322	0.51	310.62	417.19	46.18
119	☐	J1324	1.40	313.76	417.19	44.81
120	☐	J1326	0.30	311.98	417.19	45.58
121	☐	J1328	0.00	146.58	350.17	88.21
122	☐	J134	3.58	286.03	416.69	56.61
123	☐	J1344	1.75	285.26	416.92	57.05
124	☐	J1350	10.33	281.89	416.92	58.51
125	☐	J1352	2.25	280.23	416.92	59.23
126	☐	J1354	4.74	261.07	404.01	61.94
127	☐	J1356	0.04	261.07	404.01	61.94
128	☐	J1358	8.98	262.92	404.01	61.13
129	☐	J136	0.00	391.84	417.17	10.97
130	☐	J1360	3.61	278.66	530.52	109.13
131	☐	J1364	17.52	315.67	530.59	93.12
132	☐	J1366	4.55	317.60	530.59	92.29
133	☐	J1368	1.00	289.26	530.58	104.56
134	☐	J1370	0.11	154.02	349.84	84.85
135	☐	J1372	0.14	154.82	349.84	84.50
136	☐	J1374	0.12	243.85	405.30	69.96
137	☐	J1376	5.40	246.41	405.30	68.84
138	☐	J1380	2.75	248.28	405.30	68.04
139	☐	J1382	0.00	267.62	404.07	59.12
140	☐	J1386	0.00	268.61	404.02	58.67
141	☐	J1390	0.24	267.54	530.42	113.91
142	☐	J1392	0.55	165.19	349.41	79.82
143	☐	J1394	1.01	166.02	349.40	79.46
144	☐	J1396	3.65	280.00	416.76	59.26
145	☐	J1402	1.76	277.00	416.77	60.56
146	☐	J1404	1.33	277.00	416.76	60.56
147	☐	J1406	3.59	285.00	416.77	57.09
148	☐	J1416	0.80	153.13	346.52	83.80
149	☐	J142	1.40	302.50	416.94	49.58
150	☐	J1424	0.33	215.69	346.52	56.68
151	☐	J1426	1.45	248.00	416.72	73.10
152	☐	J1428	0.00	245.00	416.72	74.40
153	☐	J1432	0.00	245.00	416.72	74.40

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
154	☐	J1436	0.25	245.00	416.72	74.40
155	☐	J144	0.00	390.33	416.94	11.53
156	☐	J1442	1.22	247.00	416.72	73.54
157	☐	J1448	0.37	256.00	416.71	69.64
158	☐	J1450	0.88	239.80	416.70	76.65
159	☐	J1452	0.94	242.90	416.70	75.30
160	☐	J1456	0.00	147.96	344.70	85.25
161	☐	J1458	0.00	144.25	344.70	86.86
162	☐	J146	3.96	387.20	475.85	38.41
163	☐	J1460	3.10	139.89	344.69	88.74
164	☐	J1462	3.58	149.33	344.69	84.65
165	☐	J1464	3.49	166.16	344.69	77.36
166	☐	J1466	13.56	165.53	344.69	77.63
167	☐	J1468	1.14	165.68	344.69	77.56
168	☐	J1470	1.69	161.51	344.69	79.37
169	☐	J1472	1.28	161.51	344.69	79.37
170	☐	J1474	4.36	160.29	344.69	79.90
171	☐	J1476	2.03	143.56	344.69	87.15
172	☐	J1478	1.78	128.63	344.69	93.62
173	☐	J148	1.81	385.92	475.74	38.92
174	☐	J1480	1.57	136.35	344.69	90.28
175	☐	J1482	0.84	149.01	344.69	84.79
176	☐	J1484	1.75	152.79	344.69	83.15
177	☐	J1490	3.90	122.57	344.70	96.25
178	☐	J1492	3.28	141.54	344.70	88.03
179	☐	J1494	2.99	141.22	344.69	88.16
180	☐	J1498	1.64	122.53	344.71	96.27
181	☐	J150	10.61	364.86	475.35	47.87
182	☐	J1500	8.43	162.89	344.68	78.77
183	☐	J1502	3.03	156.46	344.69	81.56
184	☐	J1504	4.44	158.40	344.69	80.72
185	☐	J1506	2.29	122.95	344.70	96.08
186	☐	J1508	2.72	123.01	344.70	96.06
187	☐	J1510	2.40	129.66	344.69	93.17
188	☐	J1512	1.24	130.50	344.69	92.81
189	☐	J1514	0.00	180.61	344.72	71.11
190	☐	J1516	0.00	196.28	344.72	64.32
191	☐	J1518	2.85	177.39	344.74	72.51
192	☐	J152	7.27	363.45	475.36	48.49
193	☐	J1520	1.35	190.07	344.74	67.02
194	☐	J1522	0.00	164.45	344.76	78.13
195	☐	J1524	0.00	158.58	344.76	80.67
196	☐	J1526	2.23	183.41	344.74	69.90
197	☐	J1528	1.20	198.29	344.75	63.46
198	☐	J1530	1.47	195.44	344.75	64.69
199	☐	J1532	3.67	210.43	344.75	58.20
200	☐	J1534	1.46	215.27	344.78	56.12
201	☐	J1536	2.09	221.73	344.78	53.32
202	☐	J1538	0.64	205.08	344.79	60.54
203	☐	J1540	0.55	188.01	344.80	67.93
204	☐	J1542	1.77	207.39	344.78	59.53

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
205	☐	J1546	2.00	209.45	348.74	60.35
206	☐	J1550	1.37	210.59	348.74	59.86
207	☐	J1552	0.49	293.13	405.02	48.48
208	☐	J1554	1.02	283.81	405.02	52.52
209	☐	J1556	10.21	270.30	405.02	58.38
210	☐	J1558	0.58	268.41	405.02	59.20
211	☐	J156	0.00	393.80	417.04	10.07
212	☐	J1560	0.43	266.01	405.03	60.24
213	☐	J1562	0.83	252.20	405.03	66.22
214	☐	J1564	33.18	209.03	405.03	84.93
215	☐	J1568	3.15	258.87	416.68	68.38
216	☐	J1570	0.56	193.49	344.80	65.56
217	☐	J1572	0.00	190.98	344.83	66.66
218	☐	J1574	2.52	141.85	350.44	90.38
219	☐	J1576	3.91	150.46	350.42	86.64
220	☐	J1578	2.10	148.54	350.43	87.48
221	☐	J158	0.00	389.93	417.05	11.75
222	☐	J1582	4.81	142.62	350.34	90.01
223	☐	J1584	0.21	139.80	350.46	91.28
224	☐	J1588	0.45	141.56	347.13	89.07
225	☐	J1590	1.20	141.99	347.13	88.89
226	☐	J1592	1.65	145.89	347.13	87.20
227	☐	J1594	0.80	153.78	347.26	83.83
228	☐	J1596	0.62	155.37	347.34	83.18
229	☐	J1598	0.30	157.27	347.34	82.36
230	☐	J160	0.00	398.97	475.88	33.33
231	☐	J1600	1.72	158.94	347.40	81.66
232	☐	J1602	0.57	302.62	417.18	49.64
233	☐	J1604	1.11	304.87	417.19	48.67
234	☐	J1608	2.08	306.22	417.19	48.08
235	☐	J1610	5.38	154.41	346.09	83.06
236	☐	J1612	0.65	149.48	346.09	85.19
237	☐	J1614	0.12	117.02	350.69	101.25
238	☐	J1616	3.19	114.32	350.69	102.42
239	☐	J1618	2.51	109.22	350.68	104.63
240	☐	J1620	6.58	108.22	350.68	105.06
241	☐	J1622	3.45	399.42	531.04	57.03
242	☐	J1624	6.57	517.51	677.71	69.41
243	☐	J1626	9.16	580.88	789.83	90.54
244	☐	J1628	0.00	660.00	789.85	56.26
245	☐	J1632	2.65	303.94	530.58	98.20
246	☐	J1634	0.00	660.00	678.20	7.88
247	☐	J1638	4.43	613.44	789.84	76.43
248	☐	J1644	6.26	267.77	404.01	59.03
249	☐	J1646	2.09	125.85	344.78	94.86
250	☐	J1648	2.27	128.05	344.78	93.91
251	☐	J1650	0.00	266.00	404.01	59.80
252	☐	J1652	0.00	266.00	530.58	114.64
253	☐	J1654	0.11	653.87	789.84	58.91
254	☐	J1656	2.88	653.48	789.84	59.08
255	☐	J166	0.00	400.51	475.90	32.67

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
256	☐	J1660	0.00	660.00	678.19	7.88
257	☐	J1662	0.00	660.00	678.19	7.88
258	☐	J1664	1.00	283.59	530.56	107.01
259	☐	J1666	1.09	276.63	530.56	110.03
260	☐	J1668	3.55	274.00	530.56	111.17
261	☐	J1670	1.08	122.51	344.78	96.31
262	☐	J1672	15.28	117.70	344.74	98.38
263	☐	J1678	0.36	171.28	347.58	76.39
264	☐	J1680	2.50	171.79	347.64	76.20
265	☐	J1682	3.02	171.54	347.58	76.28
266	☐	J1686	4.77	297.04	417.13	52.03
267	☐	J1698	4.97	268.66	416.68	64.14
268	☐	J1700	1.30	268.61	416.68	64.16
269	☐	J1702	9.37	274.35	416.68	61.67
270	☐	J1704	1.78	255.25	416.68	69.95
271	☐	J1706	8.52	262.25	416.68	66.92
272	☐	J1712	4.64	212.00	416.72	88.70
273	☐	J1714	2.69	210.00	416.72	89.57
274	☐	J1716	1.35	205.00	416.72	91.74
275	☐	J1718	1.12	212.00	416.72	88.70
276	☐	J1720	1.16	230.00	416.72	80.90
277	☐	J1722	1.57	261.00	416.72	67.47
278	☐	J1724	2.20	250.00	416.72	72.24
279	☐	J1726	1.07	252.00	416.72	71.37
280	☐	J1728	1.75	245.00	416.72	74.40
281	☐	J1730	2.01	235.00	416.72	78.74
282	☐	J1734	5.25	238.00	416.73	77.44
283	☐	J1742	8.28	218.00	416.72	86.10
284	☐	J1746	1.52	213.00	416.72	88.27
285	☐	J1750	0.71	242.00	416.72	75.70
286	☐	J1752	0.00	234.00	416.72	79.17
287	☐	J1754	30.32	244.35	345.33	43.75
288	☐	J1760	1.40	152.19	346.31	84.11
289	☐	J1762	1.15	146.83	346.09	86.34
290	☐	J1764	2.13	148.51	346.09	85.61
291	☐	J1768	0.65	138.57	345.73	89.76
292	☐	J1774	3.89	133.45	346.01	92.10
293	☐	J178	0.00	393.73	416.95	10.06
294	☐	J1780	1.44	138.84	346.47	89.96
295	☐	J1782	0.42	140.94	345.73	88.74
296	☐	J1784	0.48	150.32	345.73	84.67
297	☐	J1786	7.92	123.63	345.32	96.06
298	☐	J1788	3.97	131.70	345.32	92.56
299	☐	J1790	0.08	122.89	344.79	96.15
300	☐	J1792	7.12	128.36	344.78	93.78
301	☐	J1794	2.14	131.27	344.78	92.51
302	☐	J1798	0.53	216.84	348.65	57.11
303	☐	J18	1.58	144.33	346.56	87.63
304	☐	J1800	0.92	217.16	348.65	56.98
305	☐	J1802	2.12	196.02	348.40	66.03
306	☐	J1804	1.37	155.73	349.84	84.11

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
307	☐	J1806	2.23	157.96	349.84	83.14
308	☐	J1808	5.09	172.91	349.38	76.46
309	☐	J1810	1.95	165.12	349.38	79.84
310	☐	J1812	2.84	167.01	349.39	79.02
311	☐	J1814	1.60	175.03	349.37	75.54
312	☐	J1816	1.27	169.66	349.38	77.87
313	☐	J182	0.00	394.41	417.00	9.79
314	☐	J1822	2.28	166.92	349.38	79.06
315	☐	J1826	0.39	190.67	348.95	68.59
316	☐	J1828	1.03	266.00	416.70	65.30
317	☐	J1830	0.42	266.00	416.70	65.30
318	☐	J1832	0.00	258.00	416.69	68.76
319	☐	J1834	4.33	275.67	416.69	61.10
320	☐	J1836	16.25	275.56	416.69	61.15
321	☐	J1838	7.57	264.15	416.69	66.10
322	☐	J1840	3.79	275.00	416.69	61.39
323	☐	J1842	0.32	126.79	350.96	97.13
324	☐	J1844	1.71	303.42	530.58	98.43
325	☐	J1846	8.39	322.96	530.56	89.96
326	☐	J1848	4.37	333.62	530.57	85.34
327	☐	J1850	1.39	302.42	530.58	98.86
328	☐	J1852	7.31	584.48	789.83	88.98
329	☐	J1854	0.00	460.56	677.76	94.11
330	☐	J1858	0.00	346.11	678.19	143.89
331	☐	J186	0.00	391.87	416.94	10.86
332	☐	J1860	0.00	345.26	678.19	144.26
333	☐	J1862	0.00	352.19	678.19	141.26
334	☐	J1864	0.00	352.96	678.19	140.92
335	☐	J1866	10.72	209.07	345.89	59.28
336	☐	J1870	9.78	232.86	345.02	48.60
337	☐	J1872	1.85	199.16	344.44	62.95
338	☐	J1874	5.53	210.18	344.44	58.18
339	☐	J1878	20.69	194.61	344.43	64.92
340	☐	J1882	5.59	198.25	344.44	63.34
341	☐	J1884	31.70	189.87	344.42	66.97
342	☐	J1886	4.67	199.26	344.44	62.91
343	☐	J1890	12.53	200.07	344.43	62.55
344	☐	J1892	73.15	226.48	344.40	51.10
345	☐	J1894	3.04	238.25	344.50	46.04
346	☐	J1896	5.60	214.36	344.47	56.37
347	☐	J1898	5.11	234.76	344.47	47.54
348	☐	J1902	7.43	239.15	344.46	45.63
349	☐	J1904	3.71	244.20	344.49	43.46
350	☐	J1906	3.36	237.50	344.49	46.36
351	☐	J1908	7.63	219.18	344.76	54.41
352	☐	J1910	1.01	228.87	344.76	50.21
353	☐	J1912	3.85	227.33	344.76	50.88
354	☐	J1914	8.40	216.38	344.76	55.63
355	☐	J1920	13.75	239.11	345.01	45.89
356	☐	J1922	7.34	237.77	345.01	46.47
357	☐	J1924	16.59	242.84	345.33	44.41

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
358		J1934	10.09	184.24	348.66	71.24
359		J1936	3.96	186.73	348.91	70.27
360		J1938	2.20	187.66	348.95	69.89
361		J1940	0.67	190.98	348.95	68.45
362		J1942	1.76	243.42	408.10	71.36
363		J1944	2.15	230.46	405.34	75.78
364		J1946	6.13	245.99	406.36	69.49
365		J1950	0.00	242.76	408.07	71.63
366		J1952	0.00	242.38	352.07	47.53
367		J1954	1.14	270.00	416.70	63.56
368		J1956	3.41	272.00	416.70	62.70
369		J1958	0.00	255.00	416.72	70.07
370		J1962	0.00	254.00	416.72	70.51
371		J1968	2.08	290.00	416.72	54.91
372		J1970	4.03	253.03	416.69	70.91
373		J1974	2.79	299.67	417.13	50.90
374		J1976	3.64	178.97	347.73	73.13
375		J1978	0.58	171.84	347.61	76.16
376		J1980	19.85	177.12	348.17	74.12
377		J1986	1.41	190.40	348.78	68.63
378		J1990	0.56	193.48	348.77	67.29
379		J1992	1.26	195.52	348.77	66.41
380		J1996	1.44	280.00	416.76	59.26
381		J1998	3.87	285.00	416.76	57.09
382		J20	2.35	151.83	346.80	84.48
383		J200	0.00	388.46	416.94	12.34
384		J2000	1.82	291.00	416.78	54.50
385		J2006	3.78	295.00	416.78	52.77
386		J2008	10.27	285.00	416.69	57.06
387		J2010	11.65	290.00	416.72	54.91
388		J2012	2.94	203.61	344.76	61.16
389		J2014	2.39	202.36	344.76	61.70
390		J2016	5.25	219.71	344.44	54.05
391		J2020	0.00	305.00	416.66	48.38
392		J2022	0.29	302.00	416.66	49.68
393		J2024	6.55	301.00	416.66	50.11
394		J2028	3.43	171.26	349.48	77.22
395		J2030	0.42	159.65	349.63	82.32
396		J2032	3.15	156.59	349.50	83.59
397		J2034	1.52	157.56	349.53	83.18
398		J2036	0.11	156.39	349.53	83.69
399		J2038	4.97	166.39	349.49	79.34
400		J2044	1.44	255.88	416.68	69.68
401		J2046	1.74	256.70	416.68	69.32
402		J2048	1.00	267.19	416.68	64.78
403		J2050	0.00	118.27	350.69	100.71
404		J2052	0.14	117.00	350.69	101.26
405		J2054	1.91	220.11	348.65	55.69
406		J2056	0.77	232.54	348.65	50.31
407		J206	0.00	389.71	416.94	11.80
408		J2062	2.48	231.40	416.69	80.29

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
409	☐	J2064	8.28	235.79	416.69	78.38
410	☐	J2068	1.97	220.55	348.83	55.58
411	☐	J2070	1.53	222.27	348.84	54.84
412	☐	J2072	1.25	221.72	348.84	55.08
413	☐	J2074	4.40	218.03	348.81	56.67
414	☐	J2078	6.94	225.32	348.84	53.52
415	☐	J208	0.00	390.45	416.94	11.48
416	☐	J2082	6.75	293.47	475.30	78.79
417	☐	J2084	3.20	288.46	475.30	80.96
418	☐	J2090	18.98	107.24	344.87	102.97
419	☐	J2092	11.23	110.19	344.88	101.69
420	☐	J2094	9.48	112.01	344.87	100.90
421	☐	J2096	3.85	109.22	344.87	102.11
422	☐	J2098	0.00	85.35	344.65	112.35
423	☐	J210	0.00	391.07	416.94	11.21
424	☐	J2100	15.26	85.61	344.65	112.24
425	☐	J2102	1.49	161.54	347.50	80.58
426	☐	J2104	0.00	490.00	423.97	-28.61
427	☐	J2106	0.46	322.50	417.25	41.06
428	☐	J2108	2.53	317.77	417.23	43.10
429	☐	J2110	2.39	318.04	417.23	42.98
430	☐	J2114	9.00	184.46	344.91	69.52
431	☐	J212	0.19	303.07	416.94	49.34
432	☐	J2122	1.77	195.76	344.91	64.63
433	☐	J2124	2.75	170.32	344.91	75.65
434	☐	J2126	1.82	193.13	344.91	65.76
435	☐	J2128	6.19	176.98	344.91	72.77
436	☐	J2130	5.06	181.47	344.91	70.82
437	☐	J2134	0.00	338.30	417.30	34.23
438	☐	J2136	3.21	379.00	475.48	41.81
439	☐	J2138	0.00	380.68	475.48	41.08
440	☐	J214	6.39	270.49	416.79	63.39
441	☐	J2140	14.69	231.88	344.67	48.87
442	☐	J2142	12.03	183.06	344.67	70.02
443	☐	J2144	9.34	196.17	344.67	64.35
444	☐	J2146	0.14	214.91	344.67	56.22
445	☐	J2148	7.11	213.93	344.67	56.65
446	☐	J2150	0.71	210.31	344.67	58.22
447	☐	J2152	0.32	208.12	344.67	59.17
448	☐	J2154	1.60	200.51	344.67	62.46
449	☐	J2156	0.49	199.99	344.67	62.69
450	☐	J2158	3.45	200.38	344.67	62.52
451	☐	J2160	1.71	199.99	344.67	62.69
452	☐	J2162	7.94	139.13	344.94	89.17
453	☐	J2168	21.57	75.87	344.64	116.46
454	☐	J2172	29.00	70.69	344.64	118.71
455	☐	J2176	2.56	68.63	344.65	119.60
456	☐	J2180	3.15	69.65	344.65	119.16
457	☐	J2184	2.64	71.26	344.66	118.46
458	☐	J2188	3.96	88.68	344.67	110.92
459	☐	J2190	10.46	95.11	344.67	108.13

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
460		J2198	2.19	262.00	416.69	67.03
461		J22	3.03	146.62	346.55	86.63
462		J220	1.22	277.42	416.75	60.37
463		J2200	3.55	258.00	416.69	68.76
464		J2202	2.96	271.00	416.72	63.14
465		J2204	0.00	260.00	416.72	67.91
466		J2206	0.76	269.00	416.72	64.01
467		J2208	2.90	271.00	416.72	63.14
468		J2210	2.39	269.00	416.72	64.01
469		J2212	13.37	224.18	404.30	78.04
470		J2214	17.89	226.68	404.28	76.95
471		J2216	0.00	239.41	346.54	46.42
472		J2220	0.00	256.90	346.80	38.95
473		J2222	0.00	258.05	403.88	63.19
474		J2224	8.70	167.86	348.74	78.38
475		J2226	1.76	161.73	348.74	81.03
476		J2228	1.27	129.49	350.71	95.85
477		J2230	0.56	134.33	350.67	93.74
478		J2232	0.87	129.07	350.71	96.04
479		J2234	1.68	132.48	350.71	94.56
480		J2238	4.87	168.60	349.18	78.25
481		J224	0.81	270.74	416.79	63.29
482		J2240	8.72	164.62	349.25	80.00
483		J2248	1.35	148.85	346.14	85.48
484		J2250	0.40	153.16	346.14	83.62
485		J2252	0.87	153.53	346.14	83.46
486		J2254	0.24	149.48	345.73	85.03
487		J2256	0.52	151.31	345.73	84.24
488		J2260	0.53	137.61	345.73	90.18
489		J2264	6.64	194.76	348.77	66.73
490		J2266	5.28	206.81	348.77	61.51
491		J2272	0.00	295.00	416.79	52.77
492		J2276	3.58	171.90	349.38	76.90
493		J2280	0.56	165.43	349.38	79.70
494		J2284	1.26	168.63	349.38	78.32
495		J2288	1.02	168.94	349.38	78.18
496		J2290	2.33	169.76	349.38	77.83
497		J2296	0.63	167.27	349.38	78.91
498		J230	1.77	295.20	416.93	52.74
499		J2300	1.06	169.82	349.44	77.83
500		J2304	6.83	166.53	349.20	79.15
501		J2306	8.65	173.16	349.16	76.26
502		J2308	4.74	159.06	349.49	82.51
503		J2310	2.99	149.09	346.54	85.56
504		J2312	0.00	105.02	352.88	107.40
505		J2314	4.36	203.40	348.72	62.97
506		J2316	0.00	341.09	416.94	32.87
507		J2318	0.36	292.83	416.92	53.77
508		J2324	0.00	395.63	417.09	9.30
509		J2326	0.00	379.48	416.94	16.23
510		J2330	9.01	304.15	416.94	48.87

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
511	☐	J2332	8.06	276.98	416.75	60.56
512	☐	J2336	0.24	260.04	416.88	67.96
513	☐	J2338	0.33	213.73	348.65	58.46
514	☐	J2340	0.99	238.27	416.69	77.31
515	☐	J2344	2.50	227.74	348.94	52.51
516	☐	J2346	2.28	246.86	348.94	44.23
517	☐	J2348	1.62	218.47	348.81	56.48
518	☐	J2350	1.46	228.49	350.45	52.85
519	☐	J2352	5.32	316.57	475.36	68.80
520	☐	J2354	5.19	210.39	348.83	59.99
521	☐	J2356	2.85	213.64	349.61	58.92
522	☐	J2358	1.26	198.28	348.41	65.05
523	☐	J236	0.24	292.58	416.92	53.88
524	☐	J2360	4.34	208.35	348.53	60.74
525	☐	J2362	1.79	129.63	346.51	93.98
526	☐	J2364	0.49	243.85	405.30	69.96
527	☐	J2366	0.00	103.47	352.88	108.07
528	☐	J2368	1.55	290.00	416.80	54.94
529	☐	J2370	1.02	160.66	346.95	80.72
530	☐	J2372	0.84	191.94	348.67	67.91
531	☐	J2374	1.87	258.45	403.93	63.04
532	☐	J2376	1.03	140.67	350.43	90.89
533	☐	J2378	1.09	280.47	416.92	59.13
534	☐	J238	2.72	296.63	416.92	52.12
535	☐	J2382	1.46	114.32	350.69	102.42
536	☐	J2384	0.00	658.31	678.19	8.61
537	☐	J2388	6.93	198.68	344.90	63.36
538	☐	J2390	2.65	236.79	345.01	46.89
539	☐	J2392	3.02	195.52	348.77	66.41
540	☐	J2394	0.20	255.88	416.68	69.68
541	☐	J2396	0.00	85.35	344.65	112.35
542	☐	J2398	25.91	196.82	344.91	64.17
543	☐	J24	3.04	153.89	346.81	83.59
544	☐	J240	0.56	258.39	416.88	68.68
545	☐	J2400	1.18	166.52	349.38	79.23
546	☐	J2402	6.70	313.02	475.30	70.32
547	☐	J2404	4.24	340.59	475.39	58.41
548	☐	J2406	5.35	218.66	344.90	54.70
549	☐	J2408	0.00	258.00	416.70	68.76
550	☐	J2410	0.00	100.00	352.88	109.57
551	☐	J2412	0.39	247.13	348.94	44.11
552	☐	J2414	3.74	248.16	416.68	73.02
553	☐	J2416	2.98	263.53	416.68	66.36
554	☐	J2418	0.49	123.00	344.78	96.10
555	☐	J242	1.51	253.65	416.88	70.73
556	☐	J2420	2.23	122.91	344.79	96.14
557	☐	J2422	0.19	119.50	344.95	97.69
558	☐	J2424	0.51	138.92	350.54	91.69
559	☐	J2426	1.94	137.10	350.61	92.52
560	☐	J2428	1.85	212.08	348.66	59.18
561	☐	J2430	1.13	290.00	416.78	54.93

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
562	☐	J2432	0.97	265.76	416.68	65.40
563	☐	J2434	0.00	308.85	417.19	46.94
564	☐	J2436	0.00	305.53	417.18	48.38
565	☐	J2438	0.00	302.92	417.18	49.51
566	☐	J244	1.32	262.94	416.88	66.70
567	☐	J2440	2.45	246.04	405.30	69.01
568	☐	J2442	5.09	240.93	344.46	44.86
569	☐	J2444	0.00	269.58	530.47	113.04
570	☐	J2446	0.00	462.00	531.21	29.99
571	☐	J2448	0.00	462.00	677.67	93.45
572	☐	J2450	0.00	474.45	677.71	88.07
573	☐	J2460	2.63	284.47	416.69	57.29
574	☐	J2462	0.00	313.22	416.94	44.94
575	☐	J2464	0.00	307.46	404.01	41.83
576	☐	J2466	0.00	313.43	678.19	158.05
577	☐	J2468	0.00	231.41	405.34	75.36
578	☐	J2470	0.00	232.59	348.44	50.20
579	☐	J2472	0.00	231.31	405.34	75.41
580	☐	J2474	0.00	232.16	348.44	50.38
581	☐	J2476	3.92	220.00	348.81	55.81
582	☐	J2478	0.00	250.00	351.71	44.07
583	☐	J248	0.00	250.00	416.89	72.31
584	☐	J2480	0.00	250.00	416.89	72.31
585	☐	J2482	1.87	281.00	530.58	108.14
586	☐	J2484	0.86	302.00	416.66	49.68
587	☐	J2486	10.28	206.00	344.44	59.99
588	☐	J2488	0.00	250.00	351.71	44.07
589	☐	J2490	0.00	250.00	416.89	72.31
590	☐	J2492	0.08	247.00	416.71	73.54
591	☐	J2494	0.00	245.00	348.65	44.91
592	☐	J2496	0.00	125.93	345.53	95.15
593	☐	J2498	0.00	268.34	530.42	113.56
594	☐	J250	0.69	256.00	416.89	69.71
595	☐	J2500	0.00	660.00	789.85	56.26
596	☐	J2502	0.00	280.47	416.92	59.13
597	☐	J2506	0.00	255.00	416.89	70.15
598	☐	J2508	0.00	250.00	351.71	44.07
599	☐	J2510	0.00	250.00	351.71	44.07
600	☐	J2512	0.00	300.00	417.02	50.71
601	☐	J2514	0.00	241.00	348.65	46.64
602	☐	J2516	0.00	216.68	348.65	57.18
603	☐	J2522	0.00	362.14	475.35	49.06
604	☐	J2524	0.00	181.98	344.67	70.50
605	☐	J2526	0.00	155.27	344.92	82.17
606	☐	J254	0.00	250.00	416.89	72.31
607	☐	J256	0.00	250.00	416.89	72.31
608	☐	J258	0.00	250.00	351.71	44.07
609	☐	J2592	0.00	189.59	348.37	68.80
610	☐	J2594	0.00	189.59	348.31	68.77
611	☐	J2598	2.20	179.67	348.42	73.12
612	☐	J26	1.84	152.78	346.34	83.87

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
613	☐	J260	1.28	217.60	348.68	56.80
614	☐	J2600	0.00	194.50	348.77	66.85
615	☐	J2606	0.53	201.00	348.77	64.03
616	☐	J2608	0.53	197.00	348.77	65.76
617	☐	J2610	0.53	197.00	348.77	65.76
618	☐	J2612	0.53	202.00	348.77	63.60
619	☐	J2614	0.53	196.00	348.77	66.20
620	☐	J2616	0.00	195.00	348.77	66.63
621	☐	J2618	1.72	133.00	350.77	94.36
622	☐	J262	2.70	218.39	348.67	56.45
623	☐	J2620	1.72	128.00	350.85	96.56
624	☐	J2622	1.72	131.00	350.79	95.23
625	☐	J2624	1.72	137.00	350.69	92.59
626	☐	J2626	1.72	133.00	350.71	94.33
627	☐	J2628	1.72	131.00	350.71	95.20
628	☐	J2630	1.72	145.00	350.64	89.10
629	☐	J2632	1.72	148.00	350.67	87.82
630	☐	J2634	1.72	145.00	350.68	89.12
631	☐	J2636	1.72	137.00	350.68	92.59
632	☐	J2638	1.72	137.00	350.68	92.59
633	☐	J264	1.45	243.37	416.69	75.10
634	☐	J2640	1.72	134.00	350.68	93.89
635	☐	J2642	1.72	144.00	350.68	89.55
636	☐	J2644	1.72	137.00	350.69	92.59
637	☐	J2646	0.00	149.85	350.61	86.99
638	☐	J2650	1.78	187.97	348.22	69.44
639	☐	J2652	1.78	0.00	348.17	150.86
640	☐	J266	2.00	220.30	416.69	85.09
641	☐	J268	8.03	207.14	348.69	61.33
642	☐	J274	0.88	236.99	348.65	48.38
643	☐	J276	4.29	226.08	348.65	53.11
644	☐	J28	2.70	156.87	346.69	82.25
645	☐	J282	1.53	218.31	348.65	56.48
646	☐	J284	1.16	218.38	348.65	56.45
647	☐	J288	0.99	218.75	348.65	56.29
648	☐	J290	1.16	225.44	348.65	53.38
649	☐	J292	0.84	233.91	348.65	49.71
650	☐	J294	1.55	223.31	348.65	54.31
651	☐	J296	1.18	231.72	348.65	50.66
652	☐	J30	1.09	151.69	346.57	84.44
653	☐	J302	0.44	235.00	348.65	49.24
654	☐	J306	0.00	228.00	348.65	52.28
655	☐	J312	2.14	228.59	348.65	52.02
656	☐	J314	1.63	225.77	348.65	53.24
657	☐	J316	6.18	217.52	348.65	56.82
658	☐	J32	0.87	161.63	347.03	80.34
659	☐	J322	3.16	213.60	348.66	58.52
660	☐	J324	1.82	222.28	348.84	54.84
661	☐	J326	0.23	214.09	348.80	58.37
662	☐	J328	2.90	246.99	416.68	73.53
663	☐	J330	1.98	236.47	348.94	48.73

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
664	☐	J332	1.50	235.07	348.94	49.34
665	☐	J334	3.09	269.04	349.29	34.77
666	☐	J336	2.47	260.22	349.29	38.59
667	☐	J34	0.00	105.02	352.88	107.40
668	☐	J340	6.03	242.08	416.68	75.66
669	☐	J342	3.26	234.97	348.94	49.38
670	☐	J348	1.70	253.32	348.94	41.43
671	☐	J352	2.15	242.55	348.94	46.10
672	☐	J356	4.02	230.20	349.09	51.51
673	☐	J36	0.00	106.19	353.87	107.32
674	☐	J360	1.43	251.36	349.29	42.44
675	☐	J362	3.42	224.93	348.94	53.74
676	☐	J370	1.91	230.32	348.94	51.40
677	☐	J374	1.56	211.03	348.69	59.64
678	☐	J376	3.13	218.47	348.68	56.42
679	☐	J378	2.45	205.01	348.69	62.25
680	☐	J38	0.00	342.90	417.36	32.26
681	☐	J384	1.60	206.30	348.69	61.70
682	☐	J386	2.44	197.31	348.70	65.60
683	☐	J388	0.70	207.87	348.69	61.01
684	☐	J392	1.78	213.97	348.80	58.42
685	☐	J394	2.21	215.67	348.69	57.63
686	☐	J396	1.90	208.58	348.69	60.71
687	☐	J398	3.08	210.54	348.69	59.86
688	☐	J40	0.00	378.00	418.84	17.70
689	☐	J400	0.71	219.83	348.68	55.83
690	☐	J406	0.20	209.70	348.69	60.22
691	☐	J408	3.35	212.39	348.69	59.06
692	☐	J410	1.24	207.10	348.69	61.35
693	☐	J414	0.95	209.00	348.69	60.53
694	☐	J42	1.18	240.00	348.65	47.08
695	☐	J422	0.50	210.17	348.69	60.02
696	☐	J430	5.59	202.50	348.71	63.35
697	☐	J432	3.57	195.21	348.70	66.51
698	☐	J436	2.09	204.24	348.70	62.59
699	☐	J438	1.16	209.91	348.69	60.13
700	☐	J440	0.72	198.09	348.70	65.26
701	☐	J442	2.12	198.54	348.70	65.06
702	☐	J444	1.81	204.00	348.70	62.70
703	☐	J446	0.87	192.58	348.91	67.74
704	☐	J448	1.59	189.51	348.97	69.09
705	☐	J450	1.60	193.06	348.90	67.52
706	☐	J454	4.37	197.35	348.90	65.66
707	☐	J46	0.00	320.00	417.27	42.15
708	☐	J464	3.47	186.36	349.02	70.48
709	☐	J468	2.67	240.14	351.71	48.34
710	☐	J470	12.17	210.86	348.44	59.61
711	☐	J472	1.82	231.15	405.30	75.46
712	☐	J474	0.00	377.88	415.80	16.43
713	☐	J476	4.41	363.77	475.42	48.38
714	☐	J478	3.41	291.07	416.92	54.53

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
715	☐	J48	10.85	294.24	417.12	53.24
716	☐	J480	1.05	287.22	416.92	56.20
717	☐	J482	4.36	309.15	475.31	72.00
718	☐	J484	2.52	315.08	475.35	69.45
719	☐	J486	5.30	311.71	475.31	70.89
720	☐	J490	6.26	282.46	416.92	58.26
721	☐	J492	3.17	277.86	416.92	60.25
722	☐	J494	3.36	286.75	416.92	56.41
723	☐	J496	3.95	166.23	348.14	78.82
724	☐	J50	0.92	248.00	348.65	43.61
725	☐	J500	1.69	179.07	348.11	73.25
726	☐	J502	1.34	183.05	348.33	71.62
727	☐	J504	1.83	189.59	348.37	68.80
728	☐	J510	2.35	179.67	348.13	72.99
729	☐	J512	2.03	186.16	348.42	70.31
730	☐	J514	2.40	188.33	348.19	69.27
731	☐	J516	5.73	176.43	348.19	74.42
732	☐	J518	0.87	185.10	348.44	70.78
733	☐	J52	0.93	235.00	348.65	49.24
734	☐	J520	5.00	199.45	348.80	64.71
735	☐	J522	5.10	203.26	348.89	63.10
736	☐	J526	2.17	207.20	348.80	61.35
737	☐	J528	2.52	192.01	348.61	67.86
738	☐	J530	1.62	194.95	348.61	66.58
739	☐	J532	5.02	198.87	348.60	64.88
740	☐	J534	5.32	205.77	349.11	62.11
741	☐	J536	5.36	202.39	348.59	63.35
742	☐	J538	4.96	208.94	349.36	60.85
743	☐	J54	0.00	325.00	417.83	40.22
744	☐	J540	5.23	205.63	348.58	61.94
745	☐	J542	1.15	213.64	349.61	58.92
746	☐	J544	3.32	216.48	350.04	57.87
747	☐	J546	5.09	217.08	349.68	57.45
748	☐	J548	4.10	220.70	349.68	55.89
749	☐	J550	3.20	220.47	349.91	56.09
750	☐	J554	5.44	231.45	349.71	51.24
751	☐	J556	3.43	216.68	349.67	57.62
752	☐	J564	2.26	228.70	350.42	52.74
753	☐	J568	5.35	213.81	348.83	58.51
754	☐	J574	2.80	194.51	348.31	66.64
755	☐	J578	0.19	198.01	348.40	65.17
756	☐	J580	4.23	208.35	348.53	60.74
757	☐	J586	2.15	191.42	348.31	67.98
758	☐	J588	2.64	194.91	348.61	66.60
759	☐	J592	1.93	188.38	348.41	69.34
760	☐	J594	3.96	191.40	348.61	68.12
761	☐	J598	4.73	182.02	348.60	72.18
762	☐	J600	5.80	189.21	348.66	69.09
763	☐	J602	5.09	188.14	348.61	69.53
764	☐	J604	2.76	195.95	348.70	66.19
765	☐	J606	11.34	177.88	348.60	73.97

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
766	☐	J608	11.60	185.91	348.64	70.51
767	☐	J610	5.60	190.10	348.67	68.71
768	☐	J612	4.91	195.87	348.67	66.21
769	☐	J614	1.37	207.31	348.80	61.31
770	☐	J616	2.47	200.53	348.69	64.20
771	☐	J62	0.00	322.00	417.96	41.58
772	☐	J620	2.60	198.95	348.69	64.88
773	☐	J622	2.15	191.88	348.67	67.94
774	☐	J624	2.52	191.43	348.67	68.13
775	☐	J626	4.60	174.61	348.57	75.38
776	☐	J628	4.74	180.51	348.54	72.81
777	☐	J630	2.48	185.88	348.61	70.51
778	☐	J632	2.61	184.91	348.61	70.93
779	☐	J634	3.91	177.77	348.57	74.00
780	☐	J64	0.00	322.00	417.96	41.58
781	☐	J640	0.52	156.99	346.77	82.23
782	☐	J642	2.46	163.74	346.95	79.38
783	☐	J644	1.31	185.62	348.15	70.42
784	☐	J646	1.25	174.84	347.68	74.89
785	☐	J648	7.57	187.33	348.18	69.70
786	☐	J652	1.72	182.98	348.16	71.58
787	☐	J654	0.95	156.99	346.77	82.23
788	☐	J656	7.49	162.86	346.77	79.69
789	☐	J658	3.19	159.01	347.30	81.59
790	☐	J66	0.00	315.00	418.35	44.78
791	☐	J660	1.39	161.53	347.52	80.59
792	☐	J662	2.92	164.10	347.28	79.37
793	☐	J664	2.90	167.88	347.62	77.88
794	☐	J666	1.30	168.02	347.18	77.63
795	☐	J668	2.94	171.83	347.18	75.98
796	☐	J670	1.41	178.49	348.11	73.49
797	☐	J672	2.73	169.28	347.45	77.20
798	☐	J674	4.52	172.38	348.06	76.12
799	☐	J676	2.29	146.12	346.80	86.96
800	☐	J678	2.90	160.49	347.13	80.87
801	☐	J68	0.00	315.00	418.37	44.79
802	☐	J680	3.13	155.26	347.16	83.15
803	☐	J682	0.89	149.94	347.02	85.40
804	☐	J686	2.52	156.63	347.00	82.49
805	☐	J688	1.98	163.30	347.09	79.63
806	☐	J690	1.63	158.95	347.00	81.48
807	☐	J694	1.88	169.31	347.18	77.07
808	☐	J696	1.28	149.19	347.13	85.77
809	☐	J698	2.98	153.37	347.26	84.01
810	☐	J70	0.00	315.00	418.35	44.78
811	☐	J700	1.41	150.68	347.06	85.09
812	☐	J702	1.37	157.61	349.41	83.11
813	☐	J704	0.86	155.31	349.41	84.10
814	☐	J708	1.59	157.84	349.41	83.00
815	☐	J710	0.93	163.79	349.41	80.43
816	☐	J712	1.66	160.48	349.41	81.86

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
817	☐	J716	1.25	160.78	349.62	81.82
818	☐	J72	0.00	318.00	418.15	43.40
819	☐	J722	2.22	169.83	349.48	77.84
820	☐	J724	1.28	169.50	349.48	77.99
821	☐	J726	6.67	186.86	348.90	70.21
822	☐	J728	3.20	188.50	348.80	69.46
823	☐	J730	3.07	183.06	348.80	71.82
824	☐	J734	0.68	190.21	348.78	68.71
825	☐	J738	3.09	180.52	348.80	72.92
826	☐	J74	0.00	318.00	418.15	43.40
827	☐	J742	1.59	174.62	349.47	75.76
828	☐	J744	1.59	172.54	349.48	76.67
829	☐	J746	1.03	174.66	349.48	75.75
830	☐	J748	1.70	170.40	349.48	77.59
831	☐	J750	3.01	176.45	349.47	74.97
832	☐	J752	0.20	172.13	349.46	76.84
833	☐	J754	1.16	174.01	349.46	76.02
834	☐	J756	4.36	177.46	349.29	74.45
835	☐	J758	1.28	171.23	349.44	77.22
836	☐	J76	2.14	186.73	349.04	70.33
837	☐	J770	1.62	167.23	349.45	78.95
838	☐	J772	0.51	164.11	349.41	80.29
839	☐	J774	1.78	168.54	349.48	78.40
840	☐	J776	0.95	172.42	349.46	76.71
841	☐	J78	4.99	183.86	349.10	71.60
842	☐	J780	1.41	175.97	349.46	75.17
843	☐	J782	0.30	172.50	349.46	76.68
844	☐	J784	1.52	173.81	349.46	76.11
845	☐	J786	0.76	170.05	349.44	77.73
846	☐	J788	0.24	170.93	349.44	77.35
847	☐	J792	1.59	160.84	349.41	81.71
848	☐	J794	0.87	165.73	349.41	79.59
849	☐	J796	0.00	153.04	349.84	85.27
850	☐	J798	0.00	103.67	352.71	107.91
851	☐	J80	7.29	196.91	348.74	65.79
852	☐	J800	1.28	133.85	350.74	93.98
853	☐	J802	2.42	134.22	350.72	93.81
854	☐	J804	0.68	140.85	350.68	90.92
855	☐	J808	1.27	162.35	349.41	81.05
856	☐	J810	1.19	154.77	349.41	84.34
857	☐	J812	1.76	153.43	349.41	84.92
858	☐	J814	1.44	145.37	350.64	88.95
859	☐	J816	0.00	114.08	350.69	102.52
860	☐	J818	1.21	182.06	346.52	71.26
861	☐	J82	0.68	189.55	348.78	69.00
862	☐	J820	1.70	182.76	346.52	70.96
863	☐	J822	1.26	178.16	346.52	72.95
864	☐	J824	1.26	179.08	346.52	72.55
865	☐	J830	2.47	127.18	345.53	94.61
866	☐	J832	0.06	121.92	344.72	96.54
867	☐	J834	1.51	140.46	345.73	88.94

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
868	☐	J836	1.59	135.65	345.73	91.03
869	☐	J84	4.43	157.91	349.32	82.93
870	☐	J840	9.77	127.51	346.21	94.76
871	☐	J842	1.33	126.21	346.37	95.40
872	☐	J844	22.88	111.37	346.30	101.79
873	☐	J848	0.33	139.67	346.45	89.60
874	☐	J850	1.01	152.28	346.34	84.09
875	☐	J852	0.08	151.31	346.56	84.60
876	☐	J854	1.21	132.84	345.88	92.31
877	☐	J856	2.77	131.16	346.22	93.19
878	☐	J858	1.45	147.42	346.17	86.12
879	☐	J86	4.05	171.39	348.57	76.77
880	☐	J860	1.05	140.01	346.11	89.30
881	☐	J862	1.89	144.64	346.17	87.32
882	☐	J864	29.06	153.95	345.94	83.19
883	☐	J866	1.40	142.92	345.78	87.90
884	☐	J868	1.16	151.83	346.33	84.28
885	☐	J870	0.26	151.25	346.31	84.52
886	☐	J872	1.91	152.96	346.18	83.72
887	☐	J874	2.78	149.53	346.33	85.27
888	☐	J876	1.14	135.58	345.92	91.14
889	☐	J878	0.34	132.84	345.88	92.31
890	☐	J88	2.99	244.69	416.88	74.61
891	☐	J880	1.78	133.52	346.22	92.17
892	☐	J882	2.52	137.56	346.38	90.48
893	☐	J884	1.14	136.90	345.94	90.58
894	☐	J886	1.08	134.67	346.00	91.57
895	☐	J888	2.01	135.32	346.04	91.31
896	☐	J890	0.82	139.33	346.40	89.72
897	☐	J892	1.22	133.02	345.84	92.22
898	☐	J898	2.44	132.48	346.20	92.60
899	☐	J90	4.37	242.33	416.88	75.63
900	☐	J902	1.96	129.86	346.51	93.87
901	☐	J904	1.72	141.78	346.52	88.71
902	☐	J906	1.50	134.39	346.51	91.91
903	☐	J908	2.60	129.69	346.51	93.95
904	☐	J912	3.03	129.80	346.51	93.90
905	☐	J914	1.85	133.04	346.51	92.50
906	☐	J918	1.69	134.09	346.49	92.03
907	☐	J92	1.79	207.08	348.80	61.41
908	☐	J920	1.93	144.53	346.54	87.53
909	☐	J922	2.86	138.16	346.48	90.26
910	☐	J924	1.09	150.96	346.55	84.75
911	☐	J926	0.21	139.54	346.46	89.66
912	☐	J928	1.66	143.45	346.52	87.99
913	☐	J930	1.77	143.68	346.52	87.89
914	☐	J932	1.38	141.61	346.52	88.79
915	☐	J934	1.56	139.76	346.52	89.59
916	☐	J936	1.19	135.19	346.51	91.57
917	☐	J938	0.27	134.76	346.51	91.75
918	☐	J94	1.74	213.89	348.80	58.45

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
919	☐	J940	3.79	123.72	346.51	96.54
920	☐	J942	6.31	126.19	346.50	95.46
921	☐	J944	2.00	126.73	346.36	95.17
922	☐	J948	1.71	134.09	346.49	92.03
923	☐	J956	1.22	139.33	346.45	89.75
924	☐	J958	2.25	133.65	346.50	92.23
925	☐	J96	2.09	208.80	348.73	60.63
926	☐	J960	4.61	126.95	346.47	95.12
927	☐	J962	2.32	126.05	346.40	95.47
928	☐	J968	4.34	125.86	346.21	95.48
929	☐	J972	1.71	122.24	346.51	97.18
930	☐	J974	0.34	120.44	346.51	97.96
931	☐	J976	0.94	123.37	346.51	96.69
932	☐	J978	1.45	120.17	346.51	98.08
933	☐	J980	2.42	124.77	346.51	96.08
934	☐	J982	1.34	183.93	346.52	70.45
935	☐	J986	0.15	162.91	346.52	79.56
936	☐	J988	0.95	168.37	346.52	77.19
937	☐	J992	0.72	199.54	346.52	63.68
938	☐	J996	2.50	202.53	346.52	62.39
939	☐	J998	0.32	212.12	346.52	58.23

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
1	☐	P-1000	V8036	J2220	27.15	8.00	130.00	0.00	0.00
2	☐	P-1001	J2224	J2226	543.88	10.00	130.00	1.76	0.01
3	☐	P-1002	J2228	J2232	36.08	8.00	130.00	58.38	0.37
4	☐	P-1003	J2232	J2234	369.49	8.00	130.00	1.68	0.01
5	☐	P-1008	J2248	J2250	438.28	4.00	130.00	-0.58	0.01
6	☐	P-1009	J2252	J2250	17.65	4.00	130.00	1.76	0.04
7	☐	P-101	J18	J20	452.30	6.00	130.00	-69.19	0.79
8	☐	P-1010	J2254	J2256	104.22	4.00	130.00	0.52	0.01
9	☐	P-1011	J1784	J2254	69.42	8.00	130.00	0.76	0.00
10	☐	P-1012	J2260	J1782	75.58	8.00	130.00	1.65	0.01
11	☐	P-1013	J594	J528	151.89	8.00	130.00	4.89	0.03
12	☐	P-1019	J574	J514	507.66	8.00	130.00	98.24	0.63
13	☐	P-102	J22	J24	493.28	6.00	130.00	-69.82	0.79
14	☐	P-1020	J1054	J2272	708.76	8.00	130.00	0.00	0.00
15	☐	P-1021	J1822	J2400	137.27	8.00	130.00	11.87	0.08
16	☐	P-1022	J2276	J2284	222.80	8.00	130.00	-1.25	0.01
17	☐	P-1023	J2280	J2400	224.61	8.00	130.00	-3.70	0.02
18	☐	P-1025	J2288	J1816	90.71	8.00	130.00	3.65	0.02
19	☐	P-1026	J2290	J1816	91.82	8.00	130.00	-2.33	0.01
20	☐	P-103	J26	J28	473.01	8.00	130.00	-176.30	1.13
21	☐	P-1030	J2304	J2306	1,354.79	8.00	130.00	26.69	0.17
22	☐	P-104	J30	J32	817.06	8.00	130.00	-153.46	0.98
23	☐	P-105	J34	J2312	0.13	8.00	130.00	0.00	0.00
24	☐	P-106	J38	J1100	186.89	12.00	130.00	-237.66	0.67
25	☐	P-107	J42	J2494	348.44	10.00	130.00	0.00	0.00
26	☐	P-108	J46	J2434	2,763.26	10.00	130.00	57.58	0.24
27	☐	P-109	J50	J2514	350.27	6.00	130.00	-0.92	0.01
28	☐	P-110	J54	J46	842.74	10.00	130.00	300.00	1.23
29	☐	P-111	J74	J64	285.83	10.00	130.00	300.00	1.23
30	☐	P-113	J62	J64	37.85	10.00	130.00	0.00	0.00
31	☐	P-114	J66	J70	11.07	10.00	130.00	0.00	0.00
32	☐	P-115	J68	J70	21.51	10.00	130.00	300.00	1.23
33	☐	P-116	J72	J74	28.35	10.00	130.00	0.00	0.00
34	☐	P-118	J76	J78	353.57	8.00	130.00	-80.03	0.51
35	☐	P-119	J80	J82	538.52	8.00	130.00	-53.17	0.34
36	☐	P-121	J88	J90	135.52	8.00	130.00	4.37	0.03
37	☐	P-122	J92	J94	650.14	10.00	130.00	-13.76	0.06
38	☐	P-123	J96	J2314	649.93	8.00	130.00	22.22	0.14
39	☐	P-124	J100	J102	671.85	6.00	130.00	76.73	0.87
40	☐	P-125	J106	J554	671.62	6.00	130.00	-75.73	0.86
41	☐	P-126	J108	J2404	1,246.05	6.00	130.00	4.24	0.05
42	☐	P-129	J120	J468	29.22	12.00	130.00	834.51	2.37
43	☐	P-130	J148	J2136	1,291.50	8.00	130.00	86.37	0.55
44	☐	P-131	J128	J476	5.49	6.00	130.00	-60.74	0.69
45	☐	P-132	J328	J1704	363.09	12.00	130.00	2.41	0.01
46	☐	P-133	J136	J38	1,078.48	12.00	130.00	-237.66	0.67
47	☐	P-134	J110	J2326	583.72	10.00	130.00	-2.21	0.01
48	☐	P-135	J142	J2462	223.32	8.00	130.00	-6.48	0.04
49	☐	P-136	J146	J148	547.48	8.00	130.00	88.17	0.56
50	☐	P-137	J150	J2522	455.69	6.00	130.00	-10.61	0.12
51	☐	P-138	J182	J178	254.03	12.00	130.00	237.67	0.67

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
52	☐	P-139	J158	J136	662.62	12.00	130.00	-237.66	0.67
53	☐	P-140	J160	J146	139.40	8.00	130.00	92.13	0.59
54	☐	P-141	J166	T5000	46.10	12.00	130.00	-92.13	0.26
55	☐	P-142	J166	J160	92.65	8.00	130.00	92.13	0.59
56	☐	P-150	J186	J178	50.07	12.00	130.00	-237.67	0.67
57	☐	P-162	J186	J210	17.18	12.00	130.00	237.67	0.67
58	☐	P-163	J208	J200	75.53	10.00	130.00	2.21	0.01
59	☐	P-164	J210	J144	81.94	8.00	130.00	9.54	0.06
60	☐	P-165	J48	J2330	1,290.92	10.00	130.00	128.75	0.53
61	☐	P-166	J214	J2332	315.40	8.00	130.00	73.25	0.47
62	☐	P-167	J134	J2332	502.49	8.00	130.00	-63.97	0.41
63	☐	P-168	J220	J2332	182.39	8.00	130.00	-1.22	0.01
64	☐	P-169	J224	J214	179.90	4.00	130.00	-0.81	0.02
65	☐	P-171	J230	J2330	390.86	8.00	130.00	-27.91	0.18
66	☐	P-172	J212	J110	677.79	10.00	130.00	-5.27	0.02
67	☐	P-173	J230	J236	185.63	8.00	130.00	26.14	0.17
68	☐	P-174	J236	J238	118.51	6.00	130.00	2.72	0.03
69	☐	P-175	J240	J242	184.28	8.00	130.00	8.88	0.06
70	☐	P-176	J240	J244	251.44	4.00	130.00	1.32	0.03
71	☐	P-178	J248	J250	7.66	8.00	130.00	-58.26	0.37
72	☐	P-181	J2336	J122	33.50	8.00	130.00	-91.44	0.58
73	☐	P-182	J242	J88	320.73	8.00	130.00	7.37	0.05
74	☐	P-184	J260	J262	206.64	6.00	130.00	22.38	0.25
75	☐	P-185	J264	J2062	668.15	12.00	130.00	24.10	0.07
76	☐	P-186	J268	J2428	790.10	6.00	130.00	16.79	0.19
77	☐	P-187	J264	J2340	216.86	8.00	130.00	-25.99	0.17
78	☐	P-188	J276	J274	883.02	6.00	130.00	2.85	0.03
79	☐	P-189	J2516	J282	321.76	6.00	130.00	1.62	0.02
80	☐	P-190	J284	J2516	125.80	6.00	130.00	-8.37	0.10
81	☐	P-191	J288	J290	469.94	6.00	130.00	2.35	0.03
82	☐	P-192	J284	J288	292.09	6.00	130.00	3.33	0.04
83	☐	P-193	J292	J294	442.21	6.00	130.00	-0.84	0.01
84	☐	P-194	J290	J296	373.24	6.00	130.00	2.67	0.03
85	☐	P-195	J274	J42	385.53	10.00	130.00	1.97	0.01
86	☐	P-197	J302	J52	130.47	6.00	130.00	1.84	0.02
87	☐	P-198	J302	J42	172.98	6.00	130.00	-0.79	0.01
88	☐	P-199	J296	J302	107.39	6.00	130.00	1.49	0.02
89	☐	P-202	J294	J290	340.67	6.00	130.00	1.49	0.02
90	☐	P-203	J290	J306	152.56	6.00	130.00	0.00	0.00
91	☐	P-204	J294	J284	349.09	6.00	130.00	-3.88	0.04
92	☐	P-206	J282	J316	654.25	6.00	130.00	-6.37	0.07
93	☐	P-207	J312	J314	202.83	6.00	130.00	-2.14	0.02
94	☐	P-208	J282	J2054	81.43	6.00	130.00	6.45	0.07
95	☐	P-209	J316	J276	709.46	6.00	130.00	7.14	0.08
96	☐	P-210	J262	J316	320.72	6.00	130.00	19.68	0.22
97	☐	P-211	J2428	J322	176.27	6.00	130.00	3.16	0.04
98	☐	P-212	J324	J2072	41.08	10.00	130.00	104.48	0.43
99	☐	P-213	J266	J340	625.38	8.00	130.00	11.34	0.07
100	☐	P-214	J330	J332	79.42	6.00	130.00	-2.73	0.03
101	☐	P-215	J334	J336	517.79	4.00	130.00	-3.09	0.08
102	☐	P-216	J2078	J324	663.44	6.00	130.00	-7.01	0.08

		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
103	☐	P-217	J342	J2344	480.50	8.00	130.00	-9.04	0.06
104	☐	P-219	J330	J348	650.12	6.00	130.00	0.74	0.01
105	☐	P-220	J328	J2412	15.09	8.00	130.00	0.00	0.00
106	☐	P-221	J352	J2412	283.53	8.00	130.00	-2.15	0.01
107	☐	P-223	J356	J362	338.25	8.00	130.00	134.40	0.86
108	☐	P-224	J106	J102	315.28	8.00	130.00	65.66	0.42
109	☐	P-225	J336	J360	313.00	8.00	130.00	-5.56	0.04
110	☐	P-226	J360	J106	164.74	8.00	130.00	-6.99	0.04
111	☐	P-227	J102	J356	349.89	8.00	130.00	138.41	0.88
112	☐	P-228	J2344	J362	222.93	8.00	130.00	-17.67	0.11
113	☐	P-232	J332	J370	261.51	6.00	130.00	-4.23	0.05
114	☐	P-234	J362	J324	307.08	8.00	130.00	113.30	0.72
115	☐	P-235	J374	J376	928.79	8.00	130.00	8.62	0.06
116	☐	P-236	J378	J384	276.26	6.00	130.00	-4.00	0.05
117	☐	P-237	J268	J432	1,321.06	6.00	130.00	-3.39	0.04
118	☐	P-238	J384	J386	1,072.03	8.00	130.00	-14.05	0.09
119	☐	P-239	J388	J422	281.28	8.00	130.00	5.00	0.03
120	☐	P-240	J266	J2476	31.50	8.00	130.00	0.00	0.00
121	☐	P-241	J268	J394	671.04	8.00	130.00	18.86	0.12
122	☐	P-242	J396	J398	200.76	6.00	130.00	5.31	0.06
123	☐	P-243	J394	J260	197.34	8.00	130.00	18.88	0.12
124	☐	P-244	J260	J376	149.07	8.00	130.00	-4.79	0.03
125	☐	P-245	J376	J400	310.93	8.00	130.00	0.71	0.00
126	☐	P-246	J400	J266	35.03	8.00	130.00	0.00	0.00
127	☐	P-247	J398	J394	272.83	6.00	130.00	2.23	0.03
128	☐	P-249	J406	J408	123.68	6.00	130.00	3.35	0.04
129	☐	P-250	J410	J396	125.48	6.00	130.00	7.21	0.08
130	☐	P-251	J406	J414	125.48	8.00	130.00	0.95	0.01
131	☐	P-254	J384	J410	62.24	6.00	130.00	8.45	0.10
132	☐	P-258	J422	J406	62.24	8.00	130.00	4.50	0.03
133	☐	P-261	J268	J430	431.64	8.00	130.00	-40.30	0.26
134	☐	P-263	J430	J80	378.83	8.00	130.00	-45.88	0.29
135	☐	P-264	J386	J432	259.16	6.00	130.00	-2.81	0.03
136	☐	P-265	J96	J436	299.08	8.00	130.00	59.93	0.38
137	☐	P-266	J438	J388	113.63	8.00	130.00	-11.35	0.07
138	☐	P-267	J374	J438	171.35	8.00	130.00	-10.18	0.06
139	☐	P-268	J436	J378	382.79	6.00	130.00	15.50	0.18
140	☐	P-269	J388	J378	57.32	8.00	130.00	-17.05	0.11
141	☐	P-270	J440	J386	63.14	8.00	130.00	13.67	0.09
142	☐	P-271	J442	J440	32.98	8.00	130.00	14.40	0.09
143	☐	P-272	J444	J442	291.36	8.00	130.00	16.51	0.11
144	☐	P-273	J436	J444	25.49	8.00	130.00	42.33	0.27
145	☐	P-274	J446	J1940	213.79	8.00	130.00	-90.96	0.58
146	☐	P-275	J450	J446	59.38	8.00	130.00	-86.13	0.55
147	☐	P-276	J432	J450	287.99	6.00	130.00	-80.15	0.91
148	☐	P-278	J454	J450	197.90	6.00	130.00	-4.37	0.05
149	☐	P-282	J448	J464	307.99	8.00	130.00	-74.42	0.47
150	☐	P-284	J470	J2470	1,144.25	10.00	130.00	0.00	0.00
151	☐	P-285	J108	J128	277.62	8.00	130.00	-60.45	0.39
152	☐	P-286	J120	J1952	172.04	12.00	130.00	-837.17	2.37
153	☐	P-287	J476	J126	323.79	8.00	130.00	-83.04	0.53

		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
154	☐	P-288	J478	J480	107.11	8.00	130.00	13.85	0.09
155	☐	P-289	J482	J484	191.19	6.00	130.00	-41.13	0.47
156	☐	P-290	J118	J486	448.89	8.00	130.00	-21.52	0.14
157	☐	P-292	J490	J492	545.46	8.00	130.00	3.17	0.02
158	☐	P-293	J480	J494	38.83	8.00	130.00	12.80	0.08
159	☐	P-294	J494	J490	128.13	8.00	130.00	9.44	0.06
160	☐	P-295	J496	J86	472.89	8.00	130.00	-198.61	1.27
161	☐	P-296	J518	J500	472.89	8.00	130.00	172.16	1.10
162	☐	P-297	J502	J504	476.07	2.00	130.00	-1.34	0.14
163	☐	P-299	J512	J2598	487.73	4.00	130.00	2.20	0.06
164	☐	P-300	J514	J516	639.10	8.00	130.00	5.73	0.04
165	☐	P-301	J518	J512	153.57	10.00	130.00	114.14	0.47
166	☐	P-302	J520	J522	310.93	12.00	130.00	-306.09	0.87
167	☐	P-304	J528	J530	160.20	6.00	130.00	2.37	0.03
168	☐	P-305	J532	J534	665.09	2.00	130.00	-4.75	0.48
169	☐	P-306	J536	J538	665.09	2.00	130.00	-5.89	0.60
170	☐	P-307	J540	J2356	662.66	6.00	130.00	-123.82	1.41
171	☐	P-308	J538	J2356	332.23	12.00	130.00	-518.89	1.47
172	☐	P-309	J546	J548	325.99	6.00	130.00	-5.09	0.06
173	☐	P-310	J544	J550	230.58	6.00	130.00	72.04	0.82
174	☐	P-312	J100	J554	337.22	6.00	130.00	-24.86	0.28
175	☐	P-313	J556	J548	384.35	4.00	130.00	-3.43	0.09
176	☐	P-314	J548	J100	319.49	6.00	130.00	-12.62	0.14
177	☐	P-315	J550	J100	436.33	6.00	130.00	68.84	0.78
178	☐	P-317	J544	J564	270.49	12.00	130.00	-722.08	2.05
179	☐	P-318	J564	J2350	20.93	12.00	130.00	-724.33	2.05
180	☐	P-319	J534	J568	649.03	2.00	130.00	3.48	0.35
181	☐	P-321	J568	J2354	330.38	6.00	130.00	-1.87	0.02
182	☐	P-322	J534	J538	341.05	12.00	130.00	-508.04	1.44
183	☐	P-324	J522	J534	332.96	12.00	130.00	-494.50	1.40
184	☐	P-325	J574	J578	331.14	8.00	130.00	-104.01	0.66
185	☐	P-326	J536	J540	332.22	6.00	130.00	9.72	0.11
186	☐	P-327	J540	J2358	654.88	6.00	130.00	48.30	0.55
187	☐	P-328	J580	J2360	0.02	8.00	130.00	-4.23	0.03
188	☐	P-329	J540	J2360	327.97	8.00	130.00	80.01	0.51
189	☐	P-330	J470	J2358	328.64	8.00	130.00	59.27	0.38
190	☐	P-331	J586	J532	663.17	2.00	130.00	-3.44	0.35
191	☐	P-332	J574	J536	663.17	2.00	130.00	-3.39	0.35
192	☐	P-333	J532	J536	341.05	6.00	130.00	12.57	0.14
193	☐	P-334	J530	J588	42.62	6.00	130.00	18.91	0.21
194	☐	P-335	J588	J532	289.33	6.00	130.00	16.27	0.18
195	☐	P-336	J586	J574	342.33	8.00	130.00	-6.35	0.04
196	☐	P-338	J512	J592	182.74	10.00	130.00	109.91	0.45
197	☐	P-339	J592	J2592	81.80	10.00	130.00	218.96	0.89
198	☐	P-340	J504	J586	197.99	8.00	130.00	103.94	0.66
199	☐	P-341	J594	J520	669.56	10.00	130.00	-188.73	0.77
200	☐	P-342	J598	J600	665.09	2.00	130.00	-1.44	0.15
201	☐	P-343	J602	J604	665.09	8.00	130.00	-71.04	0.45
202	☐	P-344	J606	J608	705.46	10.00	130.00	-77.15	0.32
203	☐	P-345	J610	J612	353.66	6.00	130.00	-12.60	0.14
204	☐	P-346	J608	J600	344.77	6.00	130.00	-21.44	0.24

		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
205	☐	P-347	J520	J526	661.25	10.00	130.00	7.29	0.03
206	☐	P-348	J600	J612	674.46	2.00	130.00	-0.68	0.07
207	☐	P-349	J604	J1106	90.30	8.00	130.00	-28.71	0.18
208	☐	P-350	J616	J2314	273.42	6.00	130.00	-30.56	0.35
209	☐	P-352	J612	J620	271.10	6.00	130.00	-18.20	0.21
210	☐	P-353	J622	J604	278.58	8.00	130.00	-59.97	0.38
211	☐	P-354	J604	J520	345.98	8.00	130.00	-105.05	0.67
212	☐	P-355	J600	J624	303.98	8.00	130.00	-28.00	0.18
213	☐	P-356	J608	J610	655.93	10.00	130.00	-67.30	0.27
214	☐	P-357	J86	J626	313.58	8.00	130.00	12.78	0.08
215	☐	P-358	J606	J598	312.67	6.00	130.00	-6.01	0.07
216	☐	P-359	J518	J594	651.75	10.00	130.00	-180.45	0.74
217	☐	P-360	J626	J598	663.17	2.00	130.00	-1.10	0.11
218	☐	P-361	J628	J602	663.21	8.00	130.00	-59.88	0.38
219	☐	P-362	J630	J602	290.04	6.00	130.00	-5.51	0.06
220	☐	P-363	J602	J594	346.11	6.00	130.00	0.57	0.01
221	☐	P-364	J598	J632	278.90	6.00	130.00	-10.40	0.12
222	☐	P-365	J634	J628	318.99	8.00	130.00	51.58	0.33
223	☐	P-366	J628	J518	354.13	8.00	130.00	106.72	0.68
224	☐	P-368	J626	J634	324.35	8.00	130.00	9.29	0.06
225	☐	P-369	J606	J86	663.17	10.00	130.00	71.82	0.29
226	☐	P-371	J640	J654	2.83	8.00	130.00	-179.52	1.15
227	☐	P-372	J644	J1976	422.05	8.00	130.00	207.35	1.32
228	☐	P-373	J514	J648	323.06	8.00	130.00	27.42	0.18
229	☐	P-374	J648	J1980	547.75	8.00	130.00	19.85	0.13
230	☐	P-375	J652	J644	251.89	8.00	130.00	37.95	0.24
231	☐	P-376	J652	J510	257.98	8.00	130.00	72.18	0.46
232	☐	P-377	J654	J656	397.77	8.00	130.00	7.49	0.05
233	☐	P-378	J28	J640	107.20	8.00	130.00	-179.00	1.14
234	☐	P-379	J658	J2102	323.54	6.00	130.00	-76.87	0.87
235	☐	P-380	J662	J664	332.86	6.00	130.00	-98.96	1.12
236	☐	P-381	J666	J668	332.86	6.00	130.00	-3.01	0.03
237	☐	P-382	J670	J672	788.22	8.00	130.00	188.26	1.20
238	☐	P-383	J660	J664	674.97	2.00	130.00	-1.92	0.20
239	☐	P-384	J496	J674	674.97	8.00	130.00	63.62	0.41
240	☐	P-385	J664	J674	358.95	6.00	130.00	-109.72	1.25
241	☐	P-386	J674	J500	635.16	8.00	130.00	-50.62	0.32
242	☐	P-387	J500	J670	53.16	12.00	130.00	119.85	0.34
243	☐	P-388	J664	J668	372.46	2.00	130.00	5.94	0.61
244	☐	P-389	J660	J496	358.95	6.00	130.00	-131.04	1.49
245	☐	P-391	J678	J680	674.97	2.00	130.00	-1.03	0.11
246	☐	P-392	J682	J686	674.97	6.00	130.00	15.76	0.18
247	☐	P-393	J658	J662	674.97	6.00	130.00	14.19	0.16
248	☐	P-394	J686	J678	330.29	6.00	130.00	-58.81	0.67
249	☐	P-395	J688	J690	330.29	6.00	130.00	47.40	0.54
250	☐	P-396	J672	J32	520.02	8.00	130.00	185.52	1.18
251	☐	P-397	J688	J678	372.14	2.00	130.00	-1.67	0.17
252	☐	P-398	J662	J666	372.46	6.00	130.00	47.88	0.54
253	☐	P-399	J666	J688	339.29	6.00	130.00	47.72	0.54
254	☐	P-401	J666	J694	140.74	6.00	130.00	1.88	0.02
255	☐	P-402	J678	J662	339.29	6.00	130.00	-62.35	0.71

		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
256	☐	P-403	J24	J20	373.21	2.00	130.00	0.75	0.08
257	☐	P-404	J686	J690	371.82	6.00	130.00	-3.36	0.04
258	☐	P-405	J24	J690	323.39	6.00	130.00	-73.61	0.84
259	☐	P-406	J690	J32	260.19	6.00	130.00	-31.19	0.35
260	☐	P-407	J20	J686	323.39	6.00	130.00	-75.41	0.86
261	☐	P-410	J696	J698	497.95	6.00	130.00	-46.80	0.53
262	☐	P-411	J700	J680	294.94	6.00	130.00	-55.34	0.63
263	☐	P-412	J680	J658	339.29	6.00	130.00	-59.49	0.68
264	☐	P-413	J676	J682	323.39	6.00	130.00	-79.48	0.90
265	☐	P-414	J696	J700	355.43	6.00	130.00	42.21	0.48
266	☐	P-415	J682	J700	35.36	6.00	130.00	-96.13	1.09
267	☐	P-416	J702	J704	290.07	6.00	130.00	1.47	0.02
268	☐	P-417	J792	J708	358.86	6.00	130.00	1.81	0.02
269	☐	P-418	J710	J712	361.08	6.00	130.00	5.04	0.06
270	☐	P-419	J770	J716	603.97	8.00	130.00	-104.73	0.67
271	☐	P-421	J722	J724	137.26	8.00	130.00	-4.96	0.03
272	☐	P-422	J726	J728	487.53	8.00	130.00	84.68	0.54
273	☐	P-423	J730	J728	314.44	8.00	130.00	-6.16	0.04
274	☐	P-424	J728	J82	156.20	8.00	130.00	75.33	0.48
275	☐	P-425	J82	J734	90.92	8.00	130.00	21.49	0.14
276	☐	P-428	J738	J730	211.73	8.00	130.00	-3.09	0.02
277	☐	P-430	J1224	J726	333.57	8.00	130.00	91.35	0.58
278	☐	P-431	J742	J744	907.92	8.00	130.00	-20.71	0.13
279	☐	P-432	J746	J748	338.68	8.00	130.00	-1.03	0.01
280	☐	P-433	J750	J742	267.41	8.00	130.00	-19.12	0.12
281	☐	P-434	J748	J722	97.81	8.00	130.00	-2.73	0.02
282	☐	P-435	J752	J754	196.21	4.00	130.00	1.16	0.03
283	☐	P-436	J756	J1814	191.09	8.00	130.00	-131.48	0.84
284	☐	P-437	J78	J756	477.73	8.00	130.00	-127.11	0.81
285	☐	P-438	J78	J1224	311.85	8.00	130.00	130.51	0.83
286	☐	P-441	J78	J2306	945.80	10.00	130.00	-88.41	0.36
287	☐	P-442	J770	J1392	246.63	8.00	130.00	74.70	0.48
288	☐	P-443	J724	J774	173.85	8.00	130.00	-6.24	0.04
289	☐	P-444	J776	J752	80.21	8.00	130.00	-11.51	0.07
290	☐	P-445	J780	J750	119.89	8.00	130.00	-16.11	0.10
291	☐	P-446	J782	J784	194.53	4.00	130.00	1.52	0.04
292	☐	P-448	J786	J2300	44.49	8.00	130.00	-27.35	0.17
293	☐	P-449	J788	J786	55.23	8.00	130.00	-26.59	0.17
294	☐	P-450	J758	J788	78.75	8.00	130.00	-26.36	0.17
295	☐	P-451	J758	J776	169.39	8.00	130.00	-72.44	0.46
296	☐	P-452	J792	J710	239.04	6.00	130.00	-6.25	0.07
297	☐	P-453	J772	J794	117.42	6.00	130.00	0.87	0.01
298	☐	P-454	J702	J792	255.59	6.00	130.00	-2.84	0.03
299	☐	P-455	J716	J2030	98.65	10.00	130.00	-105.98	0.43
300	☐	P-456	J798	J1030	76.98	12.00	130.00	0.00	0.00
301	☐	P-457	J802	J804	1,000.92	12.00	130.00	105.78	0.30
302	☐	P-458	J84	J2240	602.95	10.00	130.00	117.49	0.48
303	☐	P-459	J708	J712	241.00	6.00	130.00	-2.11	0.02
304	☐	P-460	J712	J808	268.09	6.00	130.00	1.27	0.01
305	☐	P-461	J810	J708	251.65	6.00	130.00	-2.33	0.03
306	☐	P-462	J704	J810	60.82	6.00	130.00	-1.14	0.01

		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
307	☐	P-463	J704	J812	118.76	6.00	130.00	1.76	0.02
308	☐	P-464	J814	J2646	425.81	12.00	130.00	161.98	0.46
309	☐	P-465	J804	J814	434.20	12.00	130.00	163.42	0.46
310	☐	P-466	J802	J800	41.35	10.00	130.00	-275.46	1.13
311	☐	P-467	J818	J820	55.87	8.00	130.00	2.00	0.01
312	☐	P-468	J822	J824	87.15	8.00	130.00	4.47	0.03
313	☐	P-469	J986	J1416	619.10	12.00	130.00	-13.39	0.04
314	☐	P-470	J830	J2496	52.90	10.00	130.00	-2.47	0.01
315	☐	P-473	J842	J844	1,063.40	6.00	130.00	22.88	0.26
316	☐	P-474	J890	J848	145.06	8.00	130.00	-119.14	0.76
317	☐	P-475	J850	J30	341.94	6.00	130.00	-78.19	0.89
318	☐	P-476	J854	J1774	217.71	8.00	130.00	-157.64	1.01
319	☐	P-477	J858	J1272	125.33	8.00	130.00	104.48	0.67
320	☐	P-478	J858	J862	326.73	8.00	130.00	1.89	0.01
321	☐	P-479	J864	J866	675.75	8.00	130.00	95.30	0.61
322	☐	P-480	J868	J858	560.51	8.00	130.00	107.81	0.69
323	☐	P-481	J870	J872	286.35	8.00	130.00	138.22	0.88
324	☐	P-482	J872	J2252	77.42	8.00	130.00	136.30	0.87
325	☐	P-483	J874	J868	285.32	6.00	130.00	-2.78	0.03
326	☐	P-484	J26	J850	105.47	12.00	130.00	34.58	0.10
327	☐	P-485	J870	J26	72.39	8.00	130.00	-139.88	0.89
328	☐	P-486	J850	J868	26.63	8.00	130.00	111.76	0.71
329	☐	P-487	J876	J1316	113.04	8.00	130.00	94.19	0.60
330	☐	P-488	J880	J882	468.32	8.00	130.00	-115.80	0.74
331	☐	P-489	J884	J886	215.94	8.00	130.00	-96.48	0.62
332	☐	P-490	J884	J876	109.78	8.00	130.00	95.34	0.61
333	☐	P-491	J860	J888	255.90	8.00	130.00	99.57	0.64
334	☐	P-493	J890	J882	38.68	8.00	130.00	118.32	0.76
335	☐	P-494	J888	J886	190.95	8.00	130.00	97.56	0.62
336	☐	P-495	J892	J1286	255.14	10.00	130.00	248.51	1.02
337	☐	P-498	J902	J904	661.45	10.00	130.00	-34.18	0.14
338	☐	P-499	J906	J908	319.44	8.00	130.00	-2.96	0.02
339	☐	P-501	J914	J928	669.66	8.00	130.00	-26.53	0.17
340	☐	P-502	J918	J948	0.02	8.00	130.00	-25.50	0.16
341	☐	P-503	J922	J22	658.72	8.00	130.00	-61.11	0.39
342	☐	P-504	J924	J926	659.68	8.00	130.00	70.02	0.45
343	☐	P-505	J928	J904	323.61	6.00	130.00	-1.88	0.02
344	☐	P-506	J22	J920	373.21	6.00	130.00	8.66	0.10
345	☐	P-507	J852	J924	17.03	6.00	130.00	74.09	0.84
346	☐	P-508	J920	J930	303.47	6.00	130.00	21.64	0.25
347	☐	P-509	J932	J934	325.77	10.00	130.00	30.19	0.12
348	☐	P-510	J904	J932	28.39	10.00	130.00	34.57	0.14
349	☐	P-512	J936	J938	27.66	8.00	130.00	-1.19	0.01
350	☐	P-513	J906	J938	60.78	8.00	130.00	1.46	0.01
351	☐	P-514	J940	J942	323.52	6.00	130.00	16.19	0.18
352	☐	P-515	J902	J914	323.52	6.00	130.00	12.43	0.14
353	☐	P-516	J944	J922	637.26	6.00	130.00	-39.01	0.44
354	☐	P-517	J942	J914	639.89	8.00	130.00	-17.02	0.11
355	☐	P-518	J960	J918	643.55	8.00	130.00	-34.04	0.22
356	☐	P-519	J918	J922	367.09	8.00	130.00	33.10	0.21
357	☐	P-521	J922	J1780	166.44	8.00	130.00	52.33	0.33

		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
358	☐	P-524	J848	J956	18.39	8.00	130.00	-119.47	0.76
359	☐	P-525	J958	J918	272.74	6.00	130.00	17.84	0.20
360	☐	P-526	J960	J962	200.07	6.00	130.00	56.33	0.64
361	☐	P-527	J856	J968	326.94	6.00	130.00	14.11	0.16
362	☐	P-528	J962	J842	67.10	6.00	130.00	54.02	0.61
363	☐	P-529	J944	J856	282.54	6.00	130.00	66.82	0.76
364	☐	P-533	J968	J840	120.49	6.00	130.00	9.77	0.11
365	☐	P-534	J942	J960	350.06	6.00	130.00	26.90	0.31
366	☐	P-535	J972	J974	150.08	8.00	130.00	-0.65	0.00
367	☐	P-536	J976	J2362	639.89	4.00	130.00	-1.34	0.03
368	☐	P-537	J940	J902	639.89	10.00	130.00	-15.22	0.06
369	☐	P-538	J912	J978	639.89	8.00	130.00	6.80	0.04
370	☐	P-539	J912	J908	299.01	8.00	130.00	9.05	0.06
371	☐	P-540	J902	J2362	28.39	8.00	130.00	4.58	0.03
372	☐	P-541	J908	J972	489.81	8.00	130.00	3.49	0.02
373	☐	P-542	J972	J980	215.90	8.00	130.00	2.42	0.02
374	☐	P-543	J978	J974	299.01	8.00	130.00	0.99	0.01
375	☐	P-544	J976	J978	325.77	8.00	130.00	-4.36	0.03
376	☐	P-545	J940	J976	28.39	8.00	130.00	-4.77	0.03
377	☐	P-546	J982	J992	334.90	8.00	130.00	5.51	0.04
378	☐	P-547	J986	J988	153.03	8.00	130.00	13.24	0.08
379	☐	P-549	J988	J822	287.59	8.00	130.00	5.73	0.04
380	☐	P-550	J820	J982	305.66	8.00	130.00	0.30	0.00
381	☐	P-551	J992	J998	322.36	8.00	130.00	2.29	0.01
382	☐	P-552	J992	J996	150.70	8.00	130.00	2.50	0.02
383	☐	P-555	J998	J1000	111.49	8.00	130.00	1.64	0.01
384	☐	P-556	J474	J206	1,422.99	16.00	130.00	-1,139.99	1.82
385	☐	P-558	J1006	J2364	306.88	12.00	130.00	-2.35	0.01
386	☐	P-559	J472	J1564	1,139.77	12.00	130.00	277.41	0.79
387	☐	P-560	J2368	J1048	160.12	12.00	130.00	-199.22	0.57
388	☐	P-561	J2424	J1014	366.69	8.00	130.00	6.01	0.04
389	☐	P-562	J1016	J1018	772.47	8.00	130.00	8.20	0.05
390	☐	P-563	J1020	J1022	161.17	8.00	130.00	0.00	0.00
391	☐	P-564	J1024	J2366	390.46	8.00	130.00	0.00	0.00
392	☐	P-571	J1048	J1050	296.86	8.00	130.00	42.22	0.27
393	☐	P-572	J1052	J1054	373.13	10.00	130.00	39.95	0.16
394	☐	P-573	J1052	J1050	142.48	8.00	130.00	-34.94	0.22
395	☐	P-575	J2434	J1064	26.78	8.00	130.00	15.40	0.10
396	☐	P-576	J2436	J1068	27.03	8.00	130.00	-12.28	0.08
397	☐	P-578	J1074	J1076	26.82	8.00	130.00	0.00	0.00
398	☐	P-579	J1686	J1080	51.52	8.00	130.00	4.15	0.03
399	☐	P-580	J1686	J1084	418.42	8.00	130.00	-54.77	0.35
400	☐	P-581	J1084	J1086	220.79	8.00	130.00	-57.21	0.37
401	☐	P-582	J1088	J1090	30.79	8.00	130.00	2.35	0.02
402	☐	P-583	J1086	J1088	1.97	8.00	130.00	-57.40	0.37
403	☐	P-584	J1092	J1094	42.41	8.00	130.00	2.21	0.01
404	☐	P-585	J1092	J1096	674.21	8.00	130.00	-53.34	0.34
405	☐	P-586	J1096	J1098	59.26	8.00	130.00	0.00	0.00
406	☐	P-587	J1096	J2134	31.64	8.00	130.00	-53.34	0.34
407	☐	P-588	J1102	J2354	669.45	8.00	130.00	-18.20	0.12
408	☐	P-590	J1110	J2370	0.04	10.00	130.00	-0.38	0.00

		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
409	☐	P-591	J1114	J1116	215.38	8.00	130.00	-191.82	1.22
410	☐	P-592	J1118	J1120	2,842.58	8.00	130.00	18.08	0.12
411	☐	P-594	J2426	J2230	341.08	8.00	130.00	-79.52	0.51
412	☐	P-595	J1128	J1130	278.00	8.00	130.00	-10.36	0.07
413	☐	P-596	J1128	J1132	30.00	8.00	130.00	-14.54	0.09
414	☐	P-597	J1132	J1134	48.00	8.00	130.00	-14.66	0.09
415	☐	P-598	J1134	J1138	190.97	8.00	130.00	-14.84	0.09
416	☐	P-600	J1138	J1152	20.75	8.00	130.00	-14.92	0.10
417	☐	P-602	J1144	J1146	138.32	8.00	130.00	-12.04	0.08
418	☐	P-603	J1146	J1140	18.13	8.00	130.00	-12.60	0.08
419	☐	P-604	J1140	J1148	286.30	8.00	130.00	-15.22	0.10
420	☐	P-605	J1148	J1150	369.70	8.00	130.00	3.18	0.02
421	☐	P-606	J1152	J1154	203.85	8.00	130.00	-14.28	0.09
422	☐	P-607	J1154	J1150	91.13	8.00	130.00	-15.10	0.10
423	☐	P-609	J1150	J1158	238.59	8.00	130.00	-12.53	0.08
424	☐	P-610	J1158	J1160	341.74	8.00	130.00	-13.54	0.09
425	☐	P-611	J1160	J1164	174.82	8.00	130.00	-35.65	0.23
426	☐	P-612	J1148	J1166	34.38	8.00	130.00	-19.82	0.13
427	☐	P-613	J1166	J1168	133.92	8.00	130.00	-20.43	0.13
428	☐	P-614	J1168	J1160	72.57	8.00	130.00	-21.20	0.14
429	☐	P-615	J1044	J1170	105.10	8.00	130.00	-41.69	0.27
430	☐	P-616	J1170	J1172	405.09	8.00	130.00	-32.25	0.21
431	☐	P-617	J1172	J1192	185.57	8.00	130.00	-34.23	0.22
432	☐	P-618	J1176	J1178	460.39	8.00	130.00	23.51	0.15
433	☐	P-619	J1178	J1180	289.68	8.00	130.00	19.99	0.13
434	☐	P-620	J1180	J1182	88.60	8.00	130.00	17.79	0.11
435	☐	P-621	J1182	J1184	122.87	8.00	130.00	16.77	0.11
436	☐	P-622	J1184	J1186	120.82	8.00	130.00	15.69	0.10
437	☐	P-623	J1170	J1188	183.00	8.00	130.00	-11.79	0.08
438	☐	P-624	J1188	J1190	215.27	8.00	130.00	-12.94	0.08
439	☐	P-625	J1190	J1186	85.74	8.00	130.00	-14.45	0.09
440	☐	P-626	J1192	J1194	43.70	8.00	130.00	1.01	0.01
441	☐	P-628	J444	J1200	658.94	8.00	130.00	24.01	0.15
442	☐	P-629	J1200	J2372	667.51	8.00	130.00	30.51	0.19
443	☐	P-630	J2372	J1204	666.10	8.00	130.00	56.96	0.36
444	☐	P-631	J1204	J634	657.62	8.00	130.00	46.20	0.29
445	☐	P-632	J1200	J620	54.15	8.00	130.00	20.80	0.13
446	☐	P-633	J1200	J616	45.53	8.00	130.00	-28.09	0.18
447	☐	P-634	J624	J2372	31.02	8.00	130.00	-30.52	0.19
448	☐	P-635	J622	J2372	43.09	8.00	130.00	57.82	0.37
449	☐	P-636	J630	J1204	33.17	8.00	130.00	3.02	0.02
450	☐	P-637	J632	J1204	54.54	8.00	130.00	-13.02	0.08
451	☐	P-638	J796	J1370	952.13	12.00	130.00	7.19	0.02
452	☐	P-639	J1210	J1216	237.19	12.00	130.00	-1.44	0.00
453	☐	P-640	J1214	J1216	209.98	8.00	130.00	-1.10	0.01
454	☐	P-641	J1218	J1214	104.80	8.00	130.00	-0.17	0.00
455	☐	P-642	J1220	J1218	161.77	8.00	130.00	0.66	0.00
456	☐	P-643	J1220	J1210	285.43	10.00	130.00	-1.09	0.00
457	☐	P-644	J1222	J1220	108.74	10.00	130.00	-0.12	0.00
458	☐	P-645	J1224	J1234	46.96	10.00	130.00	36.62	0.15
459	☐	P-646	J1226	J1228	260.83	8.00	130.00	9.15	0.06

		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
460	☐	P-650	J1244	J2408	234.83	10.00	130.00	15.88	0.06
461	☐	P-651	J2008	J1248	394.13	10.00	130.00	-13.24	0.05
462	☐	P-652	J1246	J1968	133.26	8.00	130.00	48.67	0.31
463	☐	P-653	J1244	J1828	76.64	10.00	130.00	-22.62	0.09
464	☐	P-654	J1252	J1254	210.63	10.00	130.00	-27.41	0.11
465	☐	P-655	J2368	J1052	297.13	10.00	130.00	7.50	0.03
466	☐	P-656	J2430	J1246	510.36	10.00	130.00	100.97	0.41
467	☐	P-657	J1256	J2010	356.36	10.00	130.00	45.11	0.18
468	☐	P-659	J486	J482	25.88	6.00	130.00	-26.82	0.30
469	☐	P-660	J1008	J2374	1,576.88	12.00	130.00	177.49	0.50
470	☐	P-661	J1266	J2216	75.71	12.00	130.00	0.00	0.00
471	☐	P-662	J1268	J1924	1,159.03	12.00	130.00	408.31	1.16
472	☐	P-663	J1272	J1274	234.24	2.00	130.00	3.15	0.32
473	☐	P-664	J866	J1276	163.65	8.00	130.00	2.61	0.02
474	☐	P-666	J1280	J1768	27.94	8.00	130.00	-85.89	0.55
475	☐	P-667	J834	J2260	139.61	8.00	130.00	-1.51	0.01
476	☐	P-668	J1286	J2496	613.37	12.00	130.00	325.34	0.92
477	☐	P-669	J1298	J832	36.39	10.00	130.00	-1.81	0.01
478	☐	P-673	J2422	J1306	21.12	10.00	130.00	86.99	0.36
479	☐	P-674	J2422	J1310	25.77	10.00	130.00	62.97	0.26
480	☐	P-678	J1320	J1064	128.74	8.00	130.00	-15.21	0.10
481	☐	P-679	J1322	J1320	72.00	8.00	130.00	-15.01	0.10
482	☐	P-680	J1322	J1324	164.36	6.00	130.00	1.70	0.02
483	☐	P-681	J1324	J1326	33.00	6.00	130.00	0.30	0.00
484	☐	P-682	J1068	J1322	267.00	8.00	130.00	-12.80	0.08
485	☐	P-690	J1350	J2502	29.84	8.00	130.00	-10.33	0.07
486	☐	P-692	J1266	J1354	330.20	12.00	130.00	-259.27	0.74
487	☐	P-693	J1356	J1358	31.10	12.00	130.00	15.24	0.04
488	☐	P-694	J1354	J1356	1.15	12.00	130.00	-264.01	0.75
489	☐	P-695	J1360	J1364	420.77	12.00	130.00	-237.24	0.67
490	☐	P-696	J1364	J1366	204.37	12.00	130.00	77.48	0.22
491	☐	P-697	J1366	J1844	349.10	12.00	130.00	72.93	0.21
492	☐	P-698	J1368	J1664	203.63	8.00	130.00	51.55	0.33
493	☐	P-699	J1370	J1372	25.23	10.00	130.00	3.74	0.02
494	☐	P-700	J1374	J2364	0.06	10.00	130.00	-0.12	0.00
495	☐	P-701	J2440	J1380	85.55	8.00	130.00	2.75	0.02
496	☐	P-702	V8018	J1382	11.61	8.00	130.00	279.29	1.78
497	☐	P-703	J1386	J1382	31.05	8.00	130.00	-279.29	1.78
498	☐	P-704	J2444	J2498	27.35	8.00	130.00	279.53	1.78
499	☐	P-705	J1392	J1394	125.58	8.00	130.00	60.56	0.39
500	☐	P-706	J1054	J2000	191.66	8.00	130.00	34.39	0.22
501	☐	P-707	J1396	J1996	226.82	12.00	130.00	-9.99	0.03
502	☐	P-710	J1402	J1404	169.50	8.00	130.00	43.30	0.28
503	☐	P-711	J1404	J1176	117.54	8.00	130.00	26.67	0.17
504	☐	P-712	J1996	J1404	172.47	8.00	130.00	-15.30	0.10
505	☐	P-716	J988	J982	334.77	8.00	130.00	6.56	0.04
506	☐	P-718	J904	J676	493.28	6.00	130.00	-72.36	0.82
507	☐	P-721	J998	J1424	50.69	6.00	130.00	0.33	0.00
508	☐	P-723	J1448	J2492	277.77	8.00	130.00	-0.37	0.00
509	☐	P-726	J1442	J1436	53.73	8.00	130.00	-1.22	0.01
510	☐	P-728	J1450	J2492	641.76	8.00	130.00	-28.80	0.18

		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
511	☐	P-730	J1450	J1452	151.34	8.00	130.00	0.94	0.01
512	☐	P-731	J1458	J1456	86.96	12.00	130.00	-64.95	0.18
513	☐	P-732	J1458	J1460	170.51	8.00	130.00	43.18	0.28
514	☐	P-733	J1460	J1494	199.45	12.00	130.00	27.14	0.08
515	☐	P-734	J1462	J1464	243.53	12.00	130.00	20.57	0.06
516	☐	P-735	J1464	J1466	157.53	12.00	130.00	13.56	0.04
517	☐	P-736	J1464	J1468	174.06	12.00	130.00	3.51	0.01
518	☐	P-737	J1468	J1470	212.08	12.00	130.00	5.58	0.02
519	☐	P-738	J1472	J1470	0.43	8.00	130.00	-1.28	0.01
520	☐	P-739	J1474	J1476	428.31	8.00	130.00	-1.75	0.01
521	☐	P-740	J1476	J1478	221.56	8.00	130.00	-3.79	0.02
522	☐	P-741	J1478	J1480	421.22	8.00	130.00	-5.57	0.04
523	☐	P-742	J1480	J1460	181.66	8.00	130.00	-12.94	0.08
524	☐	P-743	J1480	J1482	359.12	8.00	130.00	5.80	0.04
525	☐	P-744	J1482	J1468	308.38	8.00	130.00	3.21	0.02
526	☐	P-745	J1482	J1484	191.01	4.00	130.00	1.75	0.04
527	☐	P-747	J1490	J1492	649.14	10.00	130.00	-18.49	0.08
528	☐	P-748	J1492	J1458	56.72	10.00	130.00	-21.77	0.09
529	☐	P-750	J1498	J1502	783.13	10.00	130.00	49.04	0.20
530	☐	P-751	J1502	J1504	335.33	10.00	130.00	-14.01	0.06
531	☐	P-752	J1504	J1512	554.43	8.00	130.00	-18.45	0.12
532	☐	P-753	J832	J1498	138.28	10.00	130.00	117.14	0.48
533	☐	P-754	J1508	J1506	155.75	10.00	130.00	9.79	0.04
534	☐	P-755	J1510	J1512	39.49	8.00	130.00	-2.40	0.02
535	☐	P-756	J1456	J1514	901.50	12.00	130.00	-64.95	0.18
536	☐	P-757	J1514	J1516	758.12	12.00	130.00	0.00	0.00
537	☐	P-758	J1514	J1518	164.05	8.00	130.00	-64.95	0.41
538	☐	P-759	J1518	J1520	247.76	8.00	130.00	-26.40	0.17
539	☐	P-760	J1518	J1522	386.27	8.00	130.00	-41.41	0.26
540	☐	P-761	J1522	J1524	123.48	8.00	130.00	0.00	0.00
541	☐	P-762	J1520	J1526	159.05	6.00	130.00	2.23	0.03
542	☐	P-763	J1528	J1530	166.52	6.00	130.00	1.47	0.02
543	☐	P-764	J1532	J1528	184.56	8.00	130.00	32.66	0.21
544	☐	P-765	J1528	J1520	251.84	8.00	130.00	29.98	0.19
545	☐	P-766	J1532	J1534	569.33	8.00	130.00	-36.33	0.23
546	☐	P-767	J1534	J1536	165.38	8.00	130.00	-37.79	0.24
547	☐	P-768	J1536	J1538	141.73	8.00	130.00	-39.88	0.25
548	☐	P-769	J1538	J1570	269.65	8.00	130.00	-40.53	0.26
549	☐	P-770	J1540	J1542	313.26	8.00	130.00	43.18	0.28
550	☐	P-771	J1542	J1522	480.37	8.00	130.00	41.41	0.26
551	☐	P-774	J326	J94	16.04	8.00	130.00	103.10	0.66
552	☐	P-775	J1546	J96	42.25	8.00	130.00	84.24	0.54
553	☐	P-776	J1546	J1550	344.37	8.00	130.00	1.37	0.01
554	☐	P-777	J1552	J1554	191.02	8.00	130.00	-0.49	0.00
555	☐	P-778	J1554	J1556	168.23	8.00	130.00	3.46	0.02
556	☐	P-779	J1558	J1554	155.34	8.00	130.00	4.96	0.03
557	☐	P-780	J1558	J1560	26.92	8.00	130.00	-5.55	0.04
558	☐	P-781	J1560	J1562	258.46	8.00	130.00	-5.97	0.04
559	☐	P-782	J1562	J1556	361.15	8.00	130.00	6.75	0.04
560	☐	P-783	J1564	J1562	864.55	8.00	130.00	13.56	0.09
561	☐	P-784	J102	J2414	322.91	8.00	130.00	0.00	0.00

		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
562	☐	P-785	J1570	J1572	134.90	8.00	130.00	-84.81	0.54
563	☐	P-786	J1574	J1576	748.14	8.00	130.00	31.76	0.20
564	☐	P-788	J1582	J1576	904.13	8.00	130.00	-56.62	0.36
565	☐	P-789	J1576	J1578	175.16	8.00	130.00	-28.77	0.18
566	☐	P-790	J1574	J1584	167.35	8.00	130.00	-65.15	0.42
567	☐	P-791	J1584	J2424	165.76	10.00	130.00	-238.31	0.97
568	☐	P-792	J796	J1328	847.89	10.00	130.00	-223.71	0.91
569	☐	P-793	J1582	J2376	367.59	10.00	130.00	-171.91	0.70
570	☐	P-794	J696	J1592	274.41	10.00	130.00	3.30	0.01
571	☐	P-795	J1590	J1592	1,004.69	12.00	130.00	-0.73	0.00
572	☐	P-796	J698	J1594	368.67	12.00	130.00	-49.78	0.14
573	☐	P-797	J1596	J1598	299.88	12.00	130.00	0.30	0.00
574	☐	P-798	J1596	J1600	201.53	6.00	130.00	-51.49	0.58
575	☐	P-799	J1594	J1596	267.23	6.00	130.00	-50.58	0.57
576	☐	P-800	J1602	J1604	148.03	8.00	130.00	-39.84	0.25
577	☐	P-801	J1604	J1076	1,339.95	8.00	130.00	0.83	0.01
578	☐	P-802	J2438	J1602	45.02	8.00	130.00	-39.27	0.25
579	☐	P-803	J1604	J1608	67.11	8.00	130.00	-41.78	0.27
580	☐	P-804	J1610	J1612	340.20	8.00	130.00	3.93	0.03
581	☐	P-805	J1614	J2382	274.57	8.00	130.00	13.74	0.09
582	☐	P-806	J1618	J1620	157.02	8.00	130.00	-2.51	0.02
583	☐	P-807	J1622	J2446	488.33	12.00	130.00	-335.69	0.95
584	☐	P-808	J1626	J1638	935.68	8.00	130.00	-7.36	0.05
585	☐	P-810	J1634	J1662	10.16	12.00	130.00	366.16	1.04
586	☐	P-811	J1626	J1638	629.70	8.00	130.00	-9.11	0.06
587	☐	P-812	J2448	V8026	51.18	8.00	130.00	0.00	0.00
588	☐	P-813	J1644	J1358	706.16	8.00	130.00	-6.26	0.04
589	☐	P-814	J1646	J1648	348.32	12.00	130.00	-1.04	0.00
590	☐	P-815	V8022	J1650	41.97	8.00	130.00	0.00	0.00
591	☐	P-816	J1654	J1656	33.81	8.00	130.00	2.88	0.02
592	☐	P-818	J1660	J1662	28.88	8.00	130.00	-23.90	0.15
593	☐	P-819	J1664	J1666	168.31	4.00	130.00	4.65	0.12
594	☐	P-820	J1666	J1668	68.93	4.00	130.00	3.55	0.09
595	☐	P-821	J1670	J1672	191.32	4.00	130.00	15.28	0.39
596	☐	P-822	J2418	J1670	87.45	10.00	130.00	16.37	0.07
597	☐	P-823	J646	J1680	170.28	8.00	130.00	100.40	0.64
598	☐	P-824	J1116	J1678	361.95	8.00	130.00	-196.01	1.25
599	☐	P-825	J1678	J1978	34.31	8.00	130.00	-199.38	1.27
600	☐	P-826	J1678	J1682	51.57	8.00	130.00	3.02	0.02
601	☐	P-828	J48	J1686	201.12	8.00	130.00	-45.86	0.29
602	☐	P-829	J1364	J1622	1,374.78	12.00	130.00	-332.24	0.94
603	☐	P-832	J2432	J1700	192.93	8.00	130.00	15.63	0.10
604	☐	P-833	J1700	J1702	419.97	8.00	130.00	9.37	0.06
605	☐	P-834	J1704	J1706	307.72	8.00	130.00	8.52	0.05
606	☐	P-836	J1396	J1734	720.50	8.00	130.00	35.32	0.23
607	☐	P-837	J1714	J1716	678.72	10.00	130.00	4.10	0.02
608	☐	P-838	J1718	J1724	587.85	10.00	130.00	7.72	0.03
609	☐	P-839	J1722	J1726	292.60	10.00	130.00	-1.57	0.01
610	☐	P-840	J1726	J1728	413.10	10.00	130.00	1.31	0.01
611	☐	P-841	J1728	J1730	304.17	10.00	130.00	-1.15	0.00
612	☐	P-842	J1720	J1716	355.31	10.00	130.00	-2.75	0.01

		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
613	☐	P-847	J1728	J1750	114.02	10.00	130.00	0.71	0.00
614	☐	P-848	J1720	J1752	304.07	10.00	130.00	0.00	0.00
615	☐	P-849	J1754	J1924	38.24	10.00	130.00	-30.32	0.12
616	☐	P-852	J1760	J870	21.08	10.00	130.00	-1.40	0.01
617	☐	P-853	J1612	J1762	219.94	8.00	130.00	1.15	0.01
618	☐	P-854	J1612	J1764	23.40	8.00	130.00	2.13	0.01
619	☐	P-856	J866	J1768	591.57	10.00	130.00	91.28	0.37
620	☐	P-857	J1286	J1284	158.15	12.00	130.00	-79.37	0.23
621	☐	P-858	J892	J878	24.24	8.00	130.00	-249.73	1.59
622	☐	P-861	J898	J880	78.42	8.00	130.00	-114.02	0.73
623	☐	P-863	J1782	J1784	111.98	8.00	130.00	1.24	0.01
624	☐	P-864	J1786	J1788	293.07	8.00	130.00	3.97	0.03
625	☐	P-865	J1790	J2420	168.53	8.00	130.00	15.85	0.10
626	☐	P-866	J1794	J1648	40.98	8.00	130.00	-2.14	0.01
627	☐	P-867	J1798	J1800	330.88	6.00	130.00	0.92	0.01
628	☐	P-868	J578	J1802	86.71	6.00	130.00	2.12	0.02
629	☐	P-869	J1804	J1806	386.32	8.00	130.00	1.09	0.01
630	☐	P-870	J1804	J1806	353.83	8.00	130.00	1.14	0.01
631	☐	P-871	J1372	J1804	77.56	8.00	130.00	3.60	0.02
632	☐	P-872	J1808	J1816	257.68	8.00	130.00	-11.10	0.07
633	☐	P-873	J1394	J1812	101.29	8.00	130.00	59.55	0.38
634	☐	P-874	J1812	J1810	257.09	8.00	130.00	27.16	0.17
635	☐	P-875	J1814	J1808	314.73	10.00	130.00	-35.56	0.15
636	☐	P-879	J1826	J1226	355.29	8.00	130.00	-21.39	0.14
637	☐	P-880	J1828	J1830	46.09	10.00	130.00	0.42	0.00
638	☐	P-881	J1832	J2198	203.70	10.00	130.00	7.94	0.03
639	☐	P-882	J1834	J1836	48.28	8.00	130.00	16.25	0.10
640	☐	P-883	J1838	J1840	668.63	10.00	130.00	-9.42	0.04
641	☐	P-884	J1842	J1016	81.85	8.00	130.00	11.79	0.08
642	☐	P-885	J1844	J1846	206.32	4.00	130.00	8.39	0.21
643	☐	P-886	J1848	J1850	217.87	4.00	130.00	-4.37	0.11
644	☐	P-887	J1852	J1626	212.75	8.00	130.00	-7.31	0.05
645	☐	P-889	J1858	J1860	29.01	8.00	130.00	0.00	0.00
646	☐	P-890	J1862	J1864	22.64	4.00	130.00	0.00	0.00
647	☐	P-891	J1268	J1866	34.88	4.00	130.00	10.72	0.27
648	☐	P-892	J1572	J2388	367.25	8.00	130.00	-84.81	0.54
649	☐	P-893	J1870	J2406	255.99	10.00	130.00	247.60	1.01
650	☐	P-894	J1874	J1878	461.36	8.00	130.00	20.69	0.13
651	☐	P-896	J1882	J1884	662.21	8.00	130.00	31.70	0.20
652	☐	P-897	J1886	J1872	14.27	10.00	130.00	108.53	0.44
653	☐	P-898	J1890	J1892	568.01	10.00	130.00	73.15	0.30
654	☐	P-899	J1886	J1896	269.37	10.00	130.00	-103.19	0.42
655	☐	P-900	J1896	J1898	348.56	8.00	130.00	5.11	0.03
656	☐	P-901	J2442	J1902	167.55	8.00	130.00	7.43	0.05
657	☐	P-902	J1904	J1906	183.26	8.00	130.00	3.36	0.02
658	☐	P-903	J1908	J1912	225.88	8.00	130.00	-7.63	0.05
659	☐	P-904	J1912	J2012	485.14	8.00	130.00	-12.49	0.08
660	☐	P-905	J2388	J2406	397.20	8.00	130.00	-11.46	0.07
661	☐	P-906	J1920	J2390	71.48	8.00	130.00	-13.75	0.09
662	☐	P-907	J1924	J1870	810.55	12.00	130.00	361.41	1.03
663	☐	P-911	J1934	J610	388.09	6.00	130.00	-10.09	0.11

		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
664	☐	P-912	J446	J1936	492.06	12.00	130.00	3.96	0.01
665	☐	P-913	J1938	J1940	223.19	12.00	130.00	-2.20	0.01
666	☐	P-914	J1942	J1946	879.20	8.00	130.00	301.06	1.92
667	☐	P-916	J1950	V8002	17.48	6.00	130.00	0.00	0.00
668	☐	P-917	J1954	J1956	116.30	6.00	130.00	3.41	0.04
669	☐	P-922	J1080	J1974	353.72	6.00	130.00	2.79	0.03
670	☐	P-923	J1976	J1978	477.56	8.00	130.00	102.06	0.65
671	☐	P-925	J734	J1986	149.85	8.00	130.00	20.81	0.13
672	☐	P-927	J1990	J2392	177.96	8.00	130.00	9.56	0.06
673	☐	P-928	J1870	J2390	285.34	8.00	130.00	23.75	0.15
674	☐	P-929	J1996	J1998	403.60	8.00	130.00	3.87	0.02
675	☐	P-931	J2430	J2006	307.76	6.00	130.00	3.78	0.04
676	☐	P-932	J2008	J2010	671.32	8.00	130.00	-33.47	0.21
677	☐	P-933	J2012	J2014	20.90	8.00	130.00	2.39	0.02
678	☐	P-934	J1886	J2016	688.09	8.00	130.00	-10.01	0.06
679	☐	P-936	J2022	J1120	76.03	8.00	130.00	-7.69	0.05
680	☐	P-937	J2022	J2484	197.58	8.00	130.00	7.40	0.05
681	☐	P-938	J744	J2028	114.45	8.00	130.00	-22.30	0.14
682	☐	P-939	J2028	J2308	1,280.24	8.00	130.00	-11.96	0.08
683	☐	P-940	J2032	J2038	686.56	8.00	130.00	25.37	0.16
684	☐	P-941	J2034	J2036	64.03	8.00	130.00	0.11	0.00
685	☐	P-942	J2038	J774	206.59	10.00	130.00	69.91	0.29
686	☐	P-943	J2414	J2394	834.73	8.00	130.00	-1.28	0.01
687	☐	P-944	J2044	J2394	0.02	8.00	130.00	-1.44	0.01
688	☐	P-945	J1568	J2416	202.42	8.00	130.00	-5.61	0.04
689	☐	P-946	J2050	J2052	253.64	8.00	130.00	0.00	0.00
690	☐	P-947	J2054	J2056	1,784.84	6.00	130.00	0.77	0.01
691	☐	P-949	J2062	J2064	142.91	8.00	130.00	8.28	0.05
692	☐	P-951	J2070	J2072	42.05	8.00	130.00	-30.21	0.19
693	☐	P-953	J2068	J2070	170.05	8.00	130.00	-28.75	0.18
694	☐	P-954	J484	J2352	28.32	6.00	130.00	-43.65	0.50
695	☐	P-955	J212	J142	7.25	6.00	130.00	30.41	0.35
696	☐	P-956	J2082	J2084	139.54	6.00	130.00	3.20	0.04
697	☐	P-957	J254	J2378	1,028.58	8.00	130.00	-33.19	0.21
698	☐	P-959	J1306	J2092	1,311.00	10.00	130.00	78.19	0.32
699	☐	P-960	J2092	J2094	110.37	8.00	130.00	9.48	0.06
700	☐	P-961	J2096	J2396	1,529.37	6.00	130.00	34.65	0.39
701	☐	P-962	J2100	J2396	75.35	10.00	130.00	-15.26	0.06
702	☐	P-963	J2102	J1600	305.83	6.00	130.00	53.21	0.60
703	☐	P-964	J40	J2104	10,365.41	12.00	110.00	-350.00	0.99
704	☐	P-965	J1608	J2108	740.61	8.00	130.00	-43.86	0.28
705	☐	P-966	J2108	J2110	656.37	10.00	130.00	12.14	0.05
706	☐	P-967	J1310	J2162	349.24	10.00	130.00	60.43	0.25
707	☐	P-968	J2114	J2398	708.85	10.00	130.00	15.14	0.06
708	☐	P-970	J2122	J2126	43.30	10.00	130.00	-12.54	0.05
709	☐	P-971	J2126	J2130	496.13	10.00	130.00	-17.11	0.07
710	☐	P-973	J2106	J2134	493.39	8.00	130.00	-58.99	0.38
711	☐	P-974	J2136	J2138	111.18	8.00	130.00	0.00	0.00
712	☐	P-975	J1500	J2524	761.14	12.00	130.00	51.59	0.15
713	☐	P-976	J2142	J2158	358.80	8.00	130.00	11.61	0.07
714	☐	P-977	J2146	J2148	36.18	8.00	130.00	7.11	0.05

		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
715	☐	P-978	J2150	J2152	11.73	8.00	130.00	0.32	0.00
716	☐	P-979	J2154	J2156	31.36	8.00	130.00	0.49	0.00
717	☐	P-980	J2158	J2160	100.54	8.00	130.00	1.71	0.01
718	☐	P-990	J2198	J2200	361.67	8.00	130.00	3.55	0.02
719	☐	P-992	J2202	J2206	203.29	8.00	130.00	-2.96	0.02
720	☐	P-993	J2206	J2208	87.31	8.00	130.00	2.90	0.02
721	☐	P-994	J2206	J2210	40.61	8.00	130.00	2.39	0.02
722	☐	P-995	J2212	J2214	484.96	6.00	130.00	17.89	0.20
723	☐	P-996	J920	J18	40.98	6.00	130.00	-67.61	0.77
724	☐	P-997	J930	J928	47.08	6.00	130.00	19.87	0.23
725	☐	P-998	J914	J958	77.33	6.00	130.00	20.08	0.23
726	☐	P-999	J2216	J2220	68.30	8.00	130.00	-429.42	2.74
727	☐	P1001	J2510	J2488	2.24	12.00	130.00	0.00	0.00
728	☐	P1003	J2510	J2508	11.82	12.00	130.00	0.00	0.00
729	☐	P1005	J2478	J258	16.54	12.00	130.00	0.00	0.00
730	☐	P1007	J2508	V8052	1.23	12.00	130.00	0.00	0.00
731	☐	P1009	V8052	J258	1.56	12.00	130.00	0.00	0.00
732	☐	P101	J1940	J1826	2.56	8.00	130.00	-93.82	0.60
733	☐	P1011	J2512	J46	1,371.19	12.00	130.00	-242.42	0.69
734	☐	P1013	J2514	J52	379.69	6.00	130.00	-0.92	0.01
735	☐	P1015	J2516	J1798	32.32	6.00	130.00	-9.99	0.11
736	☐	P103	J464	J76	33.69	6.00	130.00	-77.89	0.88
737	☐	P1031	J2522	J152	530.57	6.00	130.00	-10.61	0.12
738	☐	P1039	J644	J514	312.79	8.00	130.00	-62.69	0.40
739	☐	P1041	J610	J432	661.01	10.00	130.00	-70.39	0.29
740	☐	P1045	J2524	J2142	208.24	12.00	130.00	51.59	0.15
741	☐	P1047	J1280	J836	331.91	8.00	130.00	5.29	0.03
742	☐	P1049	J836	J2260	159.13	8.00	130.00	3.70	0.02
743	☐	P105	J1944	J472	63.35	10.00	130.00	292.78	1.20
744	☐	P1051	J2526	J2128	325.13	10.00	130.00	52.50	0.21
745	☐	P107	J1942	J474	2,385.64	12.00	130.00	-1,139.99	3.23
746	☐	P109	J1950	J1942	15.52	12.00	130.00	-837.17	2.37
747	☐	P111	V8004	J1952	6.57	12.00	130.00	837.17	2.37
748	☐	P1129	J2592	J504	26.39	8.00	130.00	107.11	0.68
749	☐	P1131	J2592	J2594	48.75	6.00	130.00	111.85	1.27
750	☐	P1133	J2594	J652	469.78	8.00	130.00	111.85	0.71
751	☐	P1135	J586	J2650	309.05	8.00	130.00	111.58	0.71
752	☐	P1141	J1246	J1256	363.25	10.00	130.00	50.70	0.21
753	☐	P1147	J2008	J1262	333.76	10.00	130.00	36.44	0.15
754	☐	P1157	J670	J510	162.53	8.00	130.00	-69.82	0.45
755	☐	P1159	J2264	J2600	304.35	8.00	130.00	2.64	0.02
756	☐	P1161	J2600	J2608	247.33	8.00	130.00	2.64	0.02
757	☐	P1163	J2608	J2606	343.72	8.00	130.00	0.53	0.00
758	☐	P1165	J2608	J2610	162.34	8.00	130.00	1.58	0.01
759	☐	P1167	J2610	J2612	376.09	8.00	130.00	0.53	0.00
760	☐	P1169	J2610	J2614	173.72	8.00	130.00	0.53	0.00
761	☐	P1171	J2600	J2616	186.11	8.00	130.00	0.00	0.00
762	☐	P1173	J1842	J2620	126.90	8.00	130.00	196.48	1.25
763	☐	P1175	J2618	J2622	174.50	8.00	130.00	-58.18	0.37
764	☐	P1177	J2622	J2620	177.08	8.00	130.00	-117.98	0.75
765	☐	P1179	J2620	J2628	885.45	8.00	130.00	76.78	0.49

		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
766	☐	P1181	J2622	J2626	883.12	8.00	130.00	58.07	0.37
767	☐	P1183	J2618	J2624	888.77	8.00	130.00	56.46	0.36
768	☐	P1185	J804	J2624	131.12	8.00	130.00	-58.31	0.37
769	☐	P1187	J2624	J2626	187.52	8.00	130.00	-48.74	0.31
770	☐	P1189	J2626	J2628	192.73	8.00	130.00	-29.75	0.19
771	☐	P1191	J2628	J2644	411.99	8.00	130.00	45.31	0.29
772	☐	P1193	J2644	J2642	268.85	8.00	130.00	28.73	0.18
773	☐	P1199	J2634	J2632	169.59	8.00	130.00	34.96	0.22
774	☐	P1201	J2642	J2634	213.56	8.00	130.00	25.81	0.16
775	☐	P1203	J2632	J2630	208.33	8.00	130.00	70.59	0.45
776	☐	P1205	J2634	J2636	735.41	8.00	130.00	-10.87	0.07
777	☐	P1207	J2642	J2638	731.94	8.00	130.00	1.19	0.01
778	☐	P1209	J2644	J2640	719.55	8.00	130.00	14.86	0.09
779	☐	P1211	J2636	J2638	236.98	8.00	130.00	-12.60	0.08
780	☐	P1213	J2638	J2640	250.05	8.00	130.00	-13.13	0.08
781	☐	P1215	J2630	J2624	883.68	8.00	130.00	-45.16	0.29
782	☐	P1217	J2632	J2626	885.60	8.00	130.00	-37.35	0.24
783	☐	P1219	J2646	J84	765.51	8.00	130.00	276.01	1.76
784	☐	P1221	J2630	J2646	109.42	8.00	130.00	114.03	0.73
785	☐	P1225	J2650	J644	210.09	8.00	130.00	108.01	0.69
786	☐	P1227	J2650	J2652	381.65	2.00	130.00	1.78	0.18
787	☐	P1229	PW_WELL_ONE	PW_WELL_1	64.45	6.00	130.00	600.00	6.81
788	☐	P1231	PW_WELL_1	J36	74.03	8.00	130.00	600.00	3.83
789	☐	P129	J526	J614	8.74	10.00	130.00	34.03	0.14
790	☐	P131	J1106	J2314	574.15	8.00	130.00	-31.93	0.20
791	☐	P133	J92	J614	12.03	6.00	130.00	-32.67	0.37
792	☐	P137	J654	J2370	209.20	8.00	130.00	-187.96	1.20
793	☐	P139	J1976	J646	196.84	8.00	130.00	101.65	0.65
794	☐	P143	J2102	J660	9.32	6.00	130.00	-131.57	1.49
795	☐	P145	J1814	J758	268.25	8.00	130.00	-97.52	0.62
796	☐	P15	J1100	J40	2,941.46	12.00	110.00	-350.00	0.99
797	☐	P153	J1392	J772	163.62	8.00	130.00	13.60	0.09
798	☐	P155	J752	J782	18.38	8.00	130.00	-12.88	0.08
799	☐	P157	J782	J780	176.11	8.00	130.00	-14.70	0.09
800	☐	P159	J2300	J770	222.01	8.00	130.00	-28.41	0.18
801	☐	P161	J710	J772	47.97	6.00	130.00	-12.22	0.14
802	☐	P163	J2030	J796	589.54	10.00	130.00	-216.52	0.88
803	☐	P165	J1020	J1842	177.57	12.00	130.00	597.23	1.69
804	☐	P167	J1030	J1020	1,598.36	12.00	130.00	600.00	1.70
805	☐	P169	J1842	J800	501.18	12.00	130.00	388.64	1.10
806	☐	P17	J1428	J1962	421.46	10.00	130.00	-32.18	0.13
807	☐	P171	J2238	J2306	322.47	10.00	130.00	70.38	0.29
808	☐	P173	J2240	J2304	501.90	10.00	130.00	108.77	0.44
809	☐	P175	J2304	J2238	304.12	10.00	130.00	75.25	0.31
810	☐	P179	J800	J2228	302.39	10.00	130.00	111.90	0.46
811	☐	P181	J1164	J1614	282.05	10.00	130.00	14.00	0.06
812	☐	P183	J1614	J2052	93.79	10.00	130.00	0.14	0.00
813	☐	P185	J2052	J816	218.00	10.00	130.00	0.00	0.00
814	☐	P187	J2228	J1164	894.41	10.00	130.00	52.24	0.21
815	☐	P189	J1416	J934	350.42	12.00	130.00	-14.19	0.04
816	☐	P19	J1432	J1428	44.02	10.00	130.00	-29.25	0.12

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
817	☐	P191	J1300	J1790	132.70	10.00	130.00	156.81	0.64
818	☐	P193	J1786	J2422	524.08	10.00	130.00	310.98	1.27
819	☐	P195	J1790	J2418	16.97	10.00	130.00	140.87	0.58
820	☐	P197	J30	J852	21.06	6.00	130.00	74.18	0.84
821	☐	P199	J898	J856	338.93	8.00	130.00	-49.95	0.32
822	☐	P201	J1774	J898	309.05	8.00	130.00	-161.53	1.03
823	☐	P203	J1272	J860	102.53	8.00	130.00	100.61	0.64
824	☐	P205	J1610	J864	400.55	8.00	130.00	124.36	0.79
825	☐	P207	J2252	J1610	114.15	8.00	130.00	133.68	0.85
826	☐	P209	J1316	J878	73.47	8.00	130.00	93.65	0.60
827	☐	P21	J64	J54	194.19	10.00	130.00	300.00	1.23
828	☐	P211	J934	J912	660.98	8.00	130.00	14.45	0.09
829	☐	P213	J948	J920	657.76	8.00	130.00	-52.70	0.34
830	☐	P215	J924	J22	243.17	6.00	130.00	2.98	0.03
831	☐	P217	J818	J824	228.28	8.00	130.00	-3.21	0.02
832	☐	P219	J918	J948	0.02	8.00	130.00	-25.50	0.16
833	☐	P221	J1780	J926	86.55	8.00	130.00	50.89	0.32
834	☐	P223	J926	J956	15.35	8.00	130.00	120.70	0.77
835	☐	P225	J842	J944	103.92	6.00	130.00	29.81	0.34
836	☐	P227	J206	J2324	289.56	16.00	130.00	-914.07	1.46
837	☐	P23	J70	J74	302.16	10.00	130.00	300.00	1.23
838	☐	P231	J1564	J2212	4,363.53	12.00	130.00	230.67	0.65
839	☐	P233	J2212	J1008	1,589.82	12.00	130.00	199.41	0.57
840	☐	P235	J1048	J2512	1,125.87	12.00	130.00	-242.42	0.69
841	☐	P237	J1032	J2312	68.87	12.00	130.00	0.00	0.00
842	☐	P239	J1958	J2204	186.61	10.00	130.00	-32.18	0.13
843	☐	P241	J1962	J1958	101.81	10.00	130.00	-32.18	0.13
844	☐	P243	J2204	J1044	480.80	10.00	130.00	-41.18	0.17
845	☐	P245	J1050	J1058	76.98	8.00	130.00	6.35	0.04
846	☐	P247	J1058	J1056	166.37	8.00	130.00	5.10	0.03
847	☐	P249	J1088	J2110	456.71	8.00	130.00	-60.75	0.39
848	☐	P251	J2110	J1092	122.06	8.00	130.00	-51.00	0.33
849	☐	P253	J2134	J1100	295.27	8.00	130.00	-112.34	0.72
850	☐	P255	J522	J530	670.12	8.00	130.00	129.13	0.82
851	☐	P257	J530	J592	654.94	8.00	130.00	110.98	0.71
852	☐	P259	J1114	J1112	0.00	10.00	130.00	0.00	0.00
853	☐	P261	J2230	J1128	138.23	8.00	130.00	-24.24	0.15
854	☐	P263	J1152	J1140	345.92	8.00	130.00	-1.51	0.01
855	☐	P265	J1130	J1144	71.38	8.00	130.00	-11.24	0.07
856	☐	P267	J1192	J1174	370.08	8.00	130.00	-37.14	0.24
857	☐	P271	J1216	J1370	486.76	12.00	130.00	-3.34	0.01
858	☐	P273	J1234	J1226	738.84	10.00	130.00	33.96	0.14
859	☐	P277	J1248	J1954	254.46	10.00	130.00	-1.37	0.01
860	☐	P279	J1954	J1244	208.91	10.00	130.00	-5.92	0.02
861	☐	P281	J1254	J1248	1,190.90	8.00	130.00	15.48	0.10
862	☐	P283	J1968	J1254	308.08	8.00	130.00	46.59	0.30
863	☐	P285	J1252	J1250	139.73	10.00	130.00	1.91	0.01
864	☐	P287	J1828	J1252	1,206.41	10.00	130.00	-24.07	0.10
865	☐	P289	J264	J1970	250.13	10.00	130.00	8.38	0.03
866	☐	P29	J2224	J86	345.57	8.00	130.00	143.63	0.92
867	☐	P291	J1834	J1262	644.97	10.00	130.00	-14.37	0.06

		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
868	☐	P293	J1838	J1834	400.79	10.00	130.00	6.21	0.03
869	☐	P295	J1970	J1838	399.82	10.00	130.00	4.36	0.02
870	☐	P297	J482	J2082	519.31	6.00	130.00	9.95	0.11
871	☐	P301	J2216	J1268	1,222.63	12.00	130.00	429.42	1.22
872	☐	P303	J1768	J1282	315.42	8.00	130.00	4.74	0.03
873	☐	P305	J1280	J1284	14.22	8.00	130.00	80.09	0.51
874	☐	P309	J832	J1292	43.56	10.00	130.00	5.02	0.02
875	☐	P31	J84	J2224	1,000.63	8.00	130.00	154.08	0.98
876	☐	P313	J1356	J1386	37.55	12.00	130.00	-279.29	0.79
877	☐	P315	V8020	J1386	14.89	12.00	130.00	0.00	0.00
878	☐	P319	J1844	J1368	218.09	12.00	130.00	62.83	0.18
879	☐	P321	J1664	J1360	727.58	8.00	130.00	45.90	0.29
880	☐	P323	J1406	J1396	384.74	8.00	130.00	28.98	0.18
881	☐	P325	J2000	J1406	523.05	8.00	130.00	32.57	0.21
882	☐	P329	J1174	J1402	84.23	8.00	130.00	45.06	0.29
883	☐	P33	J2478	J2508	16.93	12.00	130.00	0.00	0.00
884	☐	P335	J1494	J1462	216.36	12.00	130.00	24.14	0.07
885	☐	P337	J1470	J1474	210.45	8.00	130.00	2.61	0.02
886	☐	P339	J1502	J1500	182.60	10.00	130.00	60.02	0.25
887	☐	P341	J1512	J1506	234.74	8.00	130.00	-22.09	0.14
888	☐	P343	J1498	J1508	179.07	10.00	130.00	66.46	0.27
889	☐	P345	J1506	J1490	184.58	10.00	130.00	-14.59	0.06
890	☐	P347	J1570	J1540	124.59	8.00	130.00	43.72	0.28
891	☐	P349	J94	J1546	290.30	8.00	130.00	87.61	0.56
892	☐	P35	J468	J2510	1,246.35	12.00	130.00	0.00	0.00
893	☐	P353	J1578	J1574	634.49	8.00	130.00	-30.88	0.20
894	☐	P355	J1328	J1582	454.35	10.00	130.00	-223.71	0.91
895	☐	P357	J1590	J1588	108.57	10.00	130.00	0.45	0.00
896	☐	P359	J1592	J1590	273.79	10.00	130.00	0.92	0.00
897	☐	P361	J1620	J2382	847.40	8.00	130.00	-4.35	0.03
898	☐	P363	J1638	J1654	367.28	8.00	130.00	-20.91	0.13
899	☐	P365	J1654	J2500	283.97	8.00	130.00	-23.89	0.15
900	☐	P367	J1368	J1850	232.78	8.00	130.00	8.41	0.05
901	☐	P369	J1644	J1650	42.57	8.00	130.00	0.00	0.00
902	☐	P37	J2136	J126	23.64	8.00	130.00	83.16	0.53
903	☐	P371	V8024	J1650	18.63	8.00	130.00	0.00	0.00
904	☐	P373	J1652	J2482	112.02	8.00	130.00	0.00	0.00
905	☐	P375	J1850	J1632	268.77	8.00	130.00	2.65	0.02
906	☐	P377	J1858	J2466	301.48	8.00	130.00	0.00	0.00
907	☐	P379	J1862	J1858	118.07	8.00	130.00	0.00	0.00
908	☐	P381	J1662	J1854	1,256.71	12.00	130.00	342.26	0.97
909	☐	P383	J1854	J2450	133.87	12.00	130.00	342.26	0.97
910	☐	P387	J1978	J1680	126.39	8.00	130.00	-97.90	0.62
911	☐	P389	J1700	J1698	123.20	8.00	130.00	4.97	0.03
912	☐	P39	J476	J152	1,316.15	6.00	130.00	17.89	0.20
913	☐	P391	J1714	J1712	606.90	10.00	130.00	4.64	0.02
914	☐	P393	J1718	J1714	165.31	10.00	130.00	11.43	0.05
915	☐	P395	J1734	J1742	1,010.40	10.00	130.00	30.07	0.12
916	☐	P397	J1742	J1746	300.26	10.00	130.00	21.79	0.09
917	☐	P399	J1746	J1718	211.77	10.00	130.00	20.26	0.08
918	☐	P401	J1724	J1730	474.57	10.00	130.00	1.57	0.01

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
919	☐	P403	J1730	J1720	151.51	10.00	130.00	-1.58	0.01
920	☐	P405	J1726	J1724	62.71	10.00	130.00	-3.95	0.02
921	☐	P409	J878	J854	0.02	8.00	130.00	-156.43	1.00
922	☐	P41	J1118	J134	30.68	12.00	130.00	-60.39	0.17
923	☐	P411	J1646	J1792	33.46	8.00	130.00	7.12	0.05
924	☐	P413	J1648	J2420	656.54	8.00	130.00	-5.45	0.03
925	☐	P415	J1816	J1822	258.64	8.00	130.00	-11.06	0.07
926	☐	P417	J1822	J1810	174.20	8.00	130.00	-25.21	0.16
927	☐	P419	J1812	J1808	433.71	8.00	130.00	29.55	0.19
928	☐	P421	J1840	J1262	415.52	10.00	130.00	-11.02	0.05
929	☐	P423	J2198	J1840	311.52	10.00	130.00	2.20	0.01
930	☐	P425	J1874	J1882	316.34	10.00	130.00	26.57	0.11
931	☐	P427	J1882	J2486	278.82	10.00	130.00	-10.72	0.04
932	☐	P429	J1894	J1904	121.70	10.00	130.00	87.63	0.36
933	☐	P43	J1704	J2432	304.28	12.00	130.00	-7.89	0.02
934	☐	P431	J1904	J2442	516.46	10.00	130.00	80.56	0.33
935	☐	P433	J1914	J1894	809.49	10.00	130.00	204.57	0.84
936	☐	P435	J2016	J1874	180.52	10.00	130.00	52.78	0.22
937	☐	P439	J1872	J1890	167.31	10.00	130.00	85.68	0.35
938	☐	P443	J1896	J1894	309.12	10.00	130.00	-113.90	0.47
939	☐	P445	J1912	J1910	226.65	8.00	130.00	1.01	0.01
940	☐	P447	J2012	J1914	226.92	8.00	130.00	-17.82	0.11
941	☐	P449	J1946	J1944	534.50	8.00	130.00	294.93	1.88
942	☐	P45	J2048	J2460	310.98	12.00	130.00	-38.75	0.11
943	☐	P451	J2264	J1990	222.70	8.00	130.00	-9.28	0.06
944	☐	P453	J2266	J2392	1,328.62	8.00	130.00	-2.35	0.02
945	☐	P455	J2022	J2020	98.76	10.00	130.00	0.00	0.00
946	☐	P457	J2028	J2308	985.98	8.00	130.00	-13.77	0.09
947	☐	P459	J2032	J2034	286.21	8.00	130.00	-59.00	0.38
948	☐	P461	J2034	J2030	313.01	8.00	130.00	-110.13	0.70
949	☐	P463	J2038	J2034	595.33	8.00	130.00	-49.50	0.32
950	☐	P465	J774	J776	481.23	10.00	130.00	61.88	0.25
951	☐	P467	J2074	J2068	1,057.69	8.00	130.00	-26.77	0.17
952	☐	P469	J2070	J2078	660.24	8.00	130.00	-0.07	0.00
953	☐	P471	J2092	J2096	166.65	10.00	130.00	57.48	0.23
954	☐	P473	J2096	J2090	161.62	10.00	130.00	18.98	0.08
955	☐	P475	J2168	J2172	358.68	10.00	130.00	-2.18	0.01
956	☐	P477	J2172	J2176	602.90	10.00	130.00	-31.18	0.13
957	☐	P479	J2176	J2180	299.35	10.00	130.00	-33.74	0.14
958	☐	P481	J2180	J2184	230.94	10.00	130.00	-36.89	0.15
959	☐	P483	J2184	J2188	729.69	10.00	130.00	-39.53	0.16
960	☐	P485	J2188	J2190	133.89	10.00	130.00	-43.48	0.18
961	☐	P487	J2190	J1508	1,069.68	10.00	130.00	-53.94	0.22
962	☐	P489	J2108	J2106	176.26	8.00	130.00	-58.53	0.37
963	☐	P49	J156	J158	29.68	12.00	130.00	-237.66	0.67
964	☐	P491	J2128	J2114	221.43	10.00	130.00	24.13	0.10
965	☐	P493	J2162	J2526	674.67	10.00	130.00	52.50	0.21
966	☐	P497	J2126	J2124	381.41	10.00	130.00	2.75	0.01
967	☐	P499	J2130	J2128	221.79	10.00	130.00	-22.17	0.09
968	☐	P501	J2142	J2144	617.32	12.00	130.00	27.95	0.08
969	☐	P503	J2144	J2140	834.66	12.00	130.00	14.69	0.04

		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
970	☐	P505	J2146	J2144	146.77	8.00	130.00	-3.92	0.03
971	☐	P507	J2150	J2146	48.24	8.00	130.00	3.33	0.02
972	☐	P509	J2154	J2150	167.81	8.00	130.00	4.36	0.03
973	☐	P51	J166	J156	69.32	12.00	130.00	0.00	0.00
974	☐	P511	J2158	J2154	191.84	8.00	130.00	6.45	0.04
975	☐	P513	J2206	J2204	286.87	8.00	130.00	-9.01	0.06
976	☐	P515	V8038	J2220	14.50	8.00	130.00	429.42	2.74
977	☐	P517	J2222	J2374	14.53	8.00	130.00	-429.42	2.74
978	☐	P519	J2232	J2230	421.92	8.00	130.00	55.84	0.36
979	☐	P521	J2250	J2248	259.91	4.00	130.00	0.77	0.02
980	☐	P527	J2288	J2276	179.80	8.00	130.00	2.32	0.01
981	☐	P531	J2284	J2296	264.71	8.00	130.00	-2.51	0.02
982	☐	P533	J2296	J2280	125.65	6.00	130.00	-3.14	0.04
983	☐	P535	J2308	J2032	469.04	8.00	130.00	-30.48	0.19
984	☐	P537	J928	J2310	484.79	4.00	130.00	-6.44	0.16
985	☐	P539	J2310	J676	323.60	2.00	130.00	-4.83	0.49
986	☐	P541	J2310	J20	349.99	2.00	130.00	-4.61	0.47
987	☐	P543	J2312	J36	139.72	8.00	130.00	-600.00	3.83
988	☐	P545	J2312	J1030	173.62	12.00	130.00	600.00	1.70
989	☐	P549	J2314	J92	320.93	6.00	130.00	-44.63	0.51
990	☐	P553	J2316	J144	673.08	8.00	130.00	-9.54	0.06
991	☐	P555	J2318	J478	274.82	8.00	130.00	17.26	0.11
992	☐	P557	J2318	J1344	80.31	8.00	130.00	5.57	0.04
993	☐	P565	J156	J182	274.17	12.00	130.00	237.67	0.67
994	☐	P569	J2324	T5002	22.49	16.00	130.00	-914.07	1.46
995	☐	P579	J2330	J212	30.96	10.00	130.00	91.82	0.38
996	☐	P59	J208	J206	7.61	12.00	130.00	225.92	0.64
997	☐	P591	J2336	J214	521.93	8.00	130.00	80.45	0.51
998	☐	P593	J2336	J240	160.85	8.00	130.00	10.76	0.07
999	☐	P599	J2340	J274	56.44	8.00	130.00	0.00	0.00
1000	☐	P609	J2344	J370	197.46	6.00	130.00	6.14	0.07
1001	☐	P61	J210	J208	14.94	12.00	130.00	228.13	0.65
1002	☐	P611	J2346	J342	497.68	8.00	130.00	-5.78	0.04
1003	☐	P613	J2346	J348	239.26	6.00	130.00	0.95	0.01
1004	☐	P615	J2348	J392	399.32	8.00	130.00	16.84	0.11
1005	☐	P617	J2348	J2074	103.34	8.00	130.00	-22.38	0.14
1006	☐	P619	J2350	J468	698.26	12.00	130.00	-831.83	2.36
1007	☐	P621	J2350	J554	633.54	6.00	130.00	106.04	1.20
1008	☐	P623	J2352	J108	487.29	8.00	130.00	-48.98	0.31
1009	☐	P627	J2354	J526	326.24	6.00	130.00	28.91	0.33
1010	☐	P629	J2354	J522	657.11	8.00	130.00	-54.18	0.35
1011	☐	P63	J250	J2502	1,030.79	10.00	130.00	-58.95	0.24
1012	☐	P631	J2356	J542	0.05	6.00	130.00	1.15	0.01
1013	☐	P633	J2356	J544	383.20	12.00	130.00	-646.72	1.83
1014	☐	P635	J2358	J578	8.30	8.00	130.00	106.31	0.68
1015	☐	P639	J2360	J470	650.63	8.00	130.00	71.44	0.46
1016	☐	P643	J2362	J932	661.45	4.00	130.00	-3.00	0.08
1017	☐	P645	J2362	J912	325.77	8.00	130.00	4.44	0.03
1018	☐	P647	J2364	J472	346.38	12.00	130.00	-13.55	0.04
1019	☐	P649	J2364	J2440	170.86	10.00	130.00	10.59	0.04
1020	☐	P65	J236	J2318	8.38	8.00	130.00	23.18	0.15

2021 PHD Pipe Report

		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
1021	☐	P651	J2366	J1032	206.43	12.00	130.00	0.00	0.00
1022	☐	P653	J2366	J1042	33.97	8.00	130.00	0.00	0.00
1023	☐	P655	J2368	J1174	926.85	12.00	130.00	84.30	0.24
1024	☐	P659	J2370	J1114	416.39	10.00	130.00	-191.82	0.78
1025	☐	P661	J2370	J642	219.94	8.00	130.00	2.46	0.02
1026	☐	P667	J2374	J1266	36.51	12.00	130.00	-253.79	0.72
1027	☐	P673	J2376	J1584	152.99	10.00	130.00	-172.94	0.71
1028	☐	P675	J2378	J1352	244.27	8.00	130.00	-1.58	0.01
1029	☐	P677	J2378	J142	281.87	8.00	130.00	-35.49	0.23
1030	☐	P679	J1426	J1428	74.32	8.00	130.00	-2.92	0.02
1031	☐	P681	J1426	J1436	149.05	8.00	130.00	1.47	0.01
1032	☐	P683	J2382	J1620	724.12	8.00	130.00	4.74	0.03
1033	☐	P685	J2382	J1616	0.03	8.00	130.00	3.19	0.02
1034	☐	P687	J2384	J1862	2,322.92	8.00	130.00	0.00	0.00
1035	☐	P689	J2384	J1660	141.02	8.00	130.00	0.00	0.00
1036	☐	P69	J248	J254	2.13	10.00	130.00	-33.18	0.14
1037	☐	P697	J2388	J1870	705.86	8.00	130.00	-80.28	0.51
1038	☐	P699	J2390	J1922	147.40	8.00	130.00	7.34	0.05
1039	☐	P703	J2392	J2266	889.37	8.00	130.00	2.92	0.02
1040	☐	P705	J2392	J1992	0.04	8.00	130.00	1.26	0.01
1041	☐	P707	J2394	J2416	318.17	8.00	130.00	-4.66	0.03
1042	☐	P709	J2394	J2046	43.82	8.00	130.00	1.74	0.01
1043	☐	P711	J2396	J2098	0.00	6.00	130.00	0.00	0.00
1044	☐	P713	J2396	J2168	873.30	10.00	130.00	19.39	0.08
1045	☐	P717	J2398	J2122	246.52	10.00	130.00	-10.77	0.04
1046	☐	P719	J2400	J2288	211.04	8.00	130.00	6.99	0.04
1047	☐	P723	J200	J2326	74.50	10.00	130.00	2.21	0.01
1048	☐	P73	J2062	J266	688.60	12.00	130.00	13.34	0.04
1049	☐	P731	RES9000	V8000	19.04	12.00	130.00	350.00	0.99
1050	☐	P733	V8000	J2104	17.42	12.00	130.00	350.00	0.99
1051	☐	P735	V8002	J1952	17.52	6.00	130.00	0.00	0.00
1052	☐	P737	J1950	V8004	7.52	12.00	130.00	837.16	2.37
1053	☐	P739	J2402	J118	602.10	8.00	130.00	-6.70	0.04
1054	☐	P743	J2406	J1914	333.30	10.00	130.00	230.79	0.94
1055	☐	P745	J1450	J2340	140.86	8.00	130.00	26.98	0.17
1056	☐	P747	J1432	V8006	65.81	10.00	130.00	0.00	0.00
1057	☐	P749	V8006	J2494	63.47	10.00	130.00	0.00	0.00
1058	☐	P751	J1432	V8008	34.30	10.00	130.00	0.00	0.00
1059	☐	P753	V8008	J2494	33.51	10.00	130.00	0.00	0.00
1060	☐	P755	J2408	J1832	26.05	10.00	130.00	0.00	0.00
1061	☐	P757	J1832	J264	741.33	10.00	130.00	7.94	0.03
1062	☐	P759	J2408	V8010	13.00	10.00	130.00	0.00	0.00
1063	☐	P761	V8010	J1832	13.00	10.00	130.00	0.00	0.00
1064	☐	P763	J2408	V8012	13.00	10.00	130.00	15.88	0.06
1065	☐	P765	V8012	J1832	13.00	10.00	130.00	15.88	0.06
1066	☐	P773	J2410	J1042	616.97	8.00	130.00	0.00	0.00
1067	☐	P775	J1990	J1986	370.85	8.00	130.00	-19.39	0.12
1068	☐	P777	J1102	J392	286.10	10.00	130.00	88.27	0.36
1069	☐	P779	J2412	J2346	105.39	8.00	130.00	-2.54	0.02
1070	☐	P781	J2414	J1568	351.94	8.00	130.00	-2.46	0.02
1071	☐	P783	J2416	J2048	445.89	8.00	130.00	-13.25	0.08

		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
1072	☐	P785	J2418	J832	480.89	10.00	130.00	124.02	0.51
1073	☐	P787	J2420	J1646	310.92	8.00	130.00	8.17	0.05
1074	☐	P789	J2422	J1300	649.18	10.00	130.00	160.84	0.66
1075	☐	P79	J1798	J2338	146.50	6.00	130.00	-11.44	0.13
1076	☐	P791	J2424	J2426	170.90	10.00	130.00	-244.83	1.00
1077	☐	P793	J2426	J802	473.96	10.00	130.00	-167.25	0.68
1078	☐	P795	J2428	J2338	535.83	6.00	130.00	11.77	0.13
1079	☐	P797	J2430	J2368	171.26	10.00	130.00	-105.88	0.43
1080	☐	P799	J2432	J2048	24.57	12.00	130.00	-24.50	0.07
1081	☐	P801	J2434	J2436	196.56	10.00	130.00	42.18	0.17
1082	☐	P803	J2436	J2438	215.44	10.00	130.00	54.47	0.22
1083	☐	P805	J2438	J48	804.49	10.00	130.00	93.74	0.38
1084	☐	P807	J2440	J1376	504.51	10.00	130.00	5.40	0.02
1085	☐	P809	J2442	J2016	426.03	10.00	130.00	68.04	0.28
1086	☐	P811	J2498	V8018	10.56	8.00	130.00	279.29	1.78
1087	☐	P813	J2444	V8020	14.63	12.00	130.00	0.00	0.00
1088	☐	P815	J2444	J1360	195.51	12.00	130.00	-279.53	0.79
1089	☐	P817	J1652	V8022	44.14	8.00	130.00	0.00	0.00
1090	☐	P819	J1652	V8024	20.84	8.00	130.00	0.00	0.00
1091	☐	P821	V8028	J2446	11.67	8.00	130.00	335.69	2.14
1092	☐	P823	J2448	J2450	15.20	8.00	130.00	-335.69	2.14
1093	☐	P825	V8026	J2446	54.78	8.00	130.00	0.00	0.00
1094	☐	P827	J2448	V8028	10.96	8.00	130.00	335.69	2.14
1095	☐	P829	J2450	J1624	1,977.38	8.00	130.00	6.57	0.04
1096	☐	P83	J2054	J314	404.28	6.00	130.00	3.77	0.04
1097	☐	P831	SOLANA_RES	J1634	6.85	12.00	130.00	366.16	1.04
1098	☐	P843	J2222	V8036	26.31	8.00	130.00	0.00	0.00
1099	☐	P845	J2222	V8038	13.70	8.00	130.00	429.42	2.74
1100	☐	P865	J1344	J1352	101.01	8.00	130.00	3.82	0.02
1101	☐	P867	J2460	J1118	633.02	12.00	130.00	-41.37	0.12
1102	☐	P869	J2462	J2316	454.54	8.00	130.00	-6.48	0.04
1103	☐	P87	J392	J326	33.42	10.00	130.00	103.32	0.42
1104	☐	P871	J2464	J1644	645.32	8.00	130.00	0.00	0.00
1105	☐	P873	U7000	J2466	32.79	8.00	130.00	0.00	0.00
1106	☐	P875	J2464	U7000	32.05	8.00	130.00	0.00	0.00
1107	☐	P877	J2464	U7002	36.70	8.00	130.00	0.00	0.00
1108	☐	P879	U7002	J2466	37.18	8.00	130.00	0.00	0.00
1109	☐	P881	J1660	U7006	24.17	12.00	130.00	0.00	0.00
1110	☐	P883	U7006	J1628	21.19	12.00	130.00	0.00	0.00
1111	☐	P885	J1660	U7004	21.34	12.00	130.00	0.00	0.00
1112	☐	P887	U7004	J1628	18.93	12.00	130.00	0.00	0.00
1113	☐	P889	J1660	U7008	24.22	12.00	130.00	1,191.51	3.38
1114	☐	P89	J2072	J1102	309.20	10.00	130.00	73.02	0.30
1115	☐	P891	U7008	J1628	20.96	12.00	130.00	1,191.51	3.38
1116	☐	P893	J248	J122	9.01	10.00	130.00	91.44	0.37
1117	☐	P895	J182	U7012	211.62	12.00	130.00	0.00	0.00
1118	☐	P897	U7012	J160	37.65	4.00	130.00	0.00	0.00
1119	☐	P899	J2468	J1944	138.42	10.00	130.00	0.00	0.00
1120	☐	P901	J2470	J2468	38.40	10.00	130.00	0.00	0.00
1121	☐	P903	J2468	J2472	16.34	10.00	130.00	0.00	0.00
1122	☐	P905	J2472	V8044	19.24	10.00	130.00	0.00	0.00

		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
1123	☐	P907	V8044	J2474	18.75	10.00	130.00	0.00	0.00
1124	☐	P909	J2474	J2470	17.25	10.00	130.00	0.00	0.00
1125	☐	P91	J340	J328	307.95	8.00	130.00	5.31	0.03
1126	☐	P911	SILBERHORN_1	SILB_1_FCV	60.11	8.00	130.00	300.00	1.91
1127	☐	P913	SILB_1_FCV	J68	58.60	8.00	130.00	300.00	1.91
1128	☐	P915	SILBERHORN_2	SILB_2_FCV	54.74	8.00	130.00	0.00	0.00
1129	☐	P917	SILB_2_FCV	J72	48.80	8.00	130.00	0.00	0.00
1130	☐	P919	SILBERHORN_3	SILB_3_FCV	50.55	8.00	130.00	0.00	0.00
1131	☐	P921	SILB_3_FCV	J62	44.22	8.00	130.00	0.00	0.00
1132	☐	P923	J2476	J2348	894.59	8.00	130.00	-3.92	0.03
1133	☐	P925	J2472	V8046	31.89	10.00	130.00	0.00	0.00
1134	☐	P927	V8046	J2474	32.21	10.00	130.00	0.00	0.00
1135	☐	P929	J2478	J122	17.42	12.00	130.00	0.00	0.00
1136	☐	P93	J2078	J340	659.87	6.00	130.00	0.00	0.00
1137	☐	P931	J2480	J254	20.04	8.00	130.00	0.00	0.00
1138	☐	P933	J2480	J2506	6.56	8.00	130.00	0.00	0.00
1139	☐	P935	J2480	V8014	6.51	8.00	130.00	0.00	0.00
1140	☐	P937	V8014	J2478	7.07	8.00	130.00	0.00	0.00
1141	☐	P939	J2480	V8016	6.23	8.00	130.00	0.00	0.00
1142	☐	P941	V8016	J2478	7.47	8.00	130.00	0.00	0.00
1143	☐	P943	J258	U7010	6.40	4.00	130.00	0.00	0.00
1144	☐	P945	U7010	J256	6.31	4.00	130.00	0.00	0.00
1145	☐	P947	J2482	J1368	346.09	8.00	130.00	-1.87	0.01
1146	☐	P949	J2484	J2024	563.90	8.00	130.00	6.55	0.04
1147	☐	P951	J2486	J1872	588.20	10.00	130.00	-21.00	0.09
1148	☐	P953	J2488	J258	7.27	12.00	130.00	0.00	0.00
1149	☐	P955	J2488	U7014	6.80	4.00	130.00	0.00	0.00
1150	☐	P957	U7014	J2490	5.97	4.00	130.00	0.00	0.00
1151	☐	P959	J2490	J256	7.54	4.00	130.00	0.00	0.00
1152	☐	P961	J2492	J1432	58.83	8.00	130.00	-29.25	0.19
1153	☐	P963	J2494	J1432	48.57	10.00	130.00	0.00	0.00
1154	☐	P965	J2496	J1786	274.39	10.00	130.00	322.87	1.32
1155	☐	P967	J2498	J1390	24.84	8.00	130.00	0.24	0.00
1156	☐	P969	V8048	J1660	28.07	8.00	130.00	1,167.62	7.45
1157	☐	P971	J1628	V8048	24.93	8.00	130.00	1,167.62	7.45
1158	☐	P973	J1628	J2500	15.80	8.00	130.00	23.89	0.15
1159	☐	P975	J2480	J2478	100.00	1.00	20.00	0.00	0.00
1160	☐	P977	J2222	J2220	100.00	1.00	20.00	0.00	0.00
1161	☐	P979	J1950	J1952	100.00	1.00	20.00	0.00	0.00
1162	☐	P981	J1652	J1650	100.00	1.00	20.00	0.00	0.00
1163	☐	P983	J110	J2316	5.73	6.00	130.00	-3.06	0.03
1164	☐	P985	J2502	J2378	11.62	8.00	130.00	-2.79	0.02
1165	☐	P987	J2502	J212	281.89	10.00	130.00	-66.49	0.27
1166	☐	P989	PW_WELL_TWO	PW_WELL_2	15.00	6.00	130.00	0.00	0.00
1167	☐	P99	J1826	J448	123.94	8.00	130.00	-72.82	0.46
1168	☐	P991	PW_WELL_2	J1024	34.49	8.00	130.00	0.00	0.00
1169	☐	P993	PW_WELL_THREE	PW_WELL_3	15.00	6.00	130.00	0.00	0.00
1170	☐	P995	PW_WELL_3	J2410	30.51	8.00	130.00	0.00	0.00
1171	☐	P997	V8050	J2506	3.94	8.00	130.00	0.00	0.00
1172	☐	P999	J256	V8050	4.65	8.00	130.00	0.00	0.00

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
1	☐	P-1000	0.00	0.00	Open	0
2	☐	P-1001	0.00	0.00	Open	0
3	☐	P-1002	0.00	0.09	Open	0
4	☐	P-1003	0.00	0.00	Open	0
5	☐	P-1008	0.00	0.00	Open	0
6	☐	P-1009	0.00	0.01	Open	0
7	☐	P-101	0.24	0.53	Open	0
8	☐	P-1010	0.00	0.00	Open	0
9	☐	P-1011	0.00	0.00	Open	0
10	☐	P-1012	0.00	0.00	Open	0
11	☐	P-1013	0.00	0.00	Open	0
12	☐	P-1019	0.13	0.25	Open	0
13	☐	P-102	0.26	0.54	Open	0
14	☐	P-1020	0.00	0.00	Open	0
15	☐	P-1021	0.00	0.00	Open	0
16	☐	P-1022	0.00	0.00	Open	0
17	☐	P-1023	0.00	0.00	Open	0
18	☐	P-1025	0.00	0.00	Open	0
19	☐	P-1026	0.00	0.00	Open	0
20	☐	P-103	0.35	0.73	Open	0
21	☐	P-1030	0.03	0.02	Open	0
22	☐	P-104	0.46	0.57	Open	0
23	☐	P-105	0.00	0.00	Open	0
24	☐	P-106	0.03	0.18	Open	0
25	☐	P-107	0.00	0.00	Open	0
26	☐	P-108	0.09	0.03	Open	0
27	☐	P-109	0.00	0.00	Open	0
28	☐	P-110	0.56	0.66	Open	0
29	☐	P-111	0.19	0.66	Open	0
30	☐	P-113	0.00	0.00	Open	0
31	☐	P-114	0.00	0.00	Open	0
32	☐	P-115	0.01	0.66	Open	0
33	☐	P-116	0.00	0.00	Open	0
34	☐	P-118	0.06	0.17	Open	0
35	☐	P-119	0.04	0.08	Open	0
36	☐	P-121	0.00	0.00	Open	0
37	☐	P-122	0.00	0.00	Open	0
38	☐	P-123	0.01	0.02	Open	0
39	☐	P-124	0.43	0.64	Open	0
40	☐	P-125	0.42	0.62	Open	0
41	☐	P-126	0.00	0.00	Open	0
42	☐	P-129	0.05	1.81	Open	0
43	☐	P-130	0.25	0.20	Open	0
44	☐	P-131	0.00	0.41	Open	0
45	☐	P-132	0.00	0.00	Open	0
46	☐	P-133	0.19	0.18	Open	0
47	☐	P-134	0.00	0.00	Open	0
48	☐	P-135	0.00	0.00	Open	0
49	☐	P-136	0.11	0.20	Open	0
50	☐	P-137	0.01	0.02	Open	0
51	☐	P-138	0.04	0.18	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
52	☐	P-139	0.12	0.18	Open	0
53	☐	P-140	0.03	0.22	Open	0
54	☐	P-141	0.00	0.03	Open	0
55	☐	P-142	0.02	0.22	Open	0
56	☐	P-150	0.01	0.18	Open	0
57	☐	P-162	0.00	0.18	Open	0
58	☐	P-163	0.00	0.00	Open	0
59	☐	P-164	0.00	0.00	Open	0
60	☐	P-165	0.18	0.14	Open	0
61	☐	P-166	0.05	0.14	Open	0
62	☐	P-167	0.06	0.11	Open	0
63	☐	P-168	0.00	0.00	Open	0
64	☐	P-169	0.00	0.00	Open	0
65	☐	P-171	0.01	0.02	Open	0
66	☐	P-172	0.00	0.00	Open	0
67	☐	P-173	0.00	0.02	Open	0
68	☐	P-174	0.00	0.00	Open	0
69	☐	P-175	0.00	0.00	Open	0
70	☐	P-176	0.00	0.00	Open	0
71	☐	P-178	0.00	0.10	Open	0
72	☐	P-181	0.01	0.22	Open	0
73	☐	P-182	0.00	0.00	Open	0
74	☐	P-184	0.01	0.07	Open	0
75	☐	P-185	0.00	0.00	Open	0
76	☐	P-186	0.03	0.04	Open	0
77	☐	P-187	0.00	0.02	Open	0
78	☐	P-188	0.00	0.00	Open	0
79	☐	P-189	0.00	0.00	Open	0
80	☐	P-190	0.00	0.01	Open	0
81	☐	P-191	0.00	0.00	Open	0
82	☐	P-192	0.00	0.00	Open	0
83	☐	P-193	0.00	0.00	Open	0
84	☐	P-194	0.00	0.00	Open	0
85	☐	P-195	0.00	0.00	Open	0
86	☐	P-197	0.00	0.00	Open	0
87	☐	P-198	0.00	0.00	Open	0
88	☐	P-199	0.00	0.00	Open	0
89	☐	P-202	0.00	0.00	Open	0
90	☐	P-203	0.00	0.00	Open	0
91	☐	P-204	0.00	0.00	Open	0
92	☐	P-206	0.00	0.01	Open	0
93	☐	P-207	0.00	0.00	Open	0
94	☐	P-208	0.00	0.01	Open	0
95	☐	P-209	0.01	0.01	Open	0
96	☐	P-210	0.02	0.05	Open	0
97	☐	P-211	0.00	0.00	Open	0
98	☐	P-212	0.00	0.09	Open	0
99	☐	P-213	0.00	0.00	Open	0
100	☐	P-214	0.00	0.00	Open	0
101	☐	P-215	0.01	0.01	Open	0
102	☐	P-216	0.01	0.01	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
103	☐	P-217	0.00	0.00	Open	0
104	☐	P-219	0.00	0.00	Open	0
105	☐	P-220	0.00	0.00	Closed	0
106	☐	P-221	0.00	0.00	Open	0
107	☐	P-223	0.15	0.44	Open	0
108	☐	P-224	0.04	0.12	Open	0
109	☐	P-225	0.00	0.00	Open	0
110	☐	P-226	0.00	0.00	Open	0
111	☐	P-227	0.16	0.47	Open	0
112	☐	P-228	0.00	0.01	Open	0
113	☐	P-232	0.00	0.00	Open	0
114	☐	P-234	0.10	0.32	Open	0
115	☐	P-235	0.00	0.00	Open	0
116	☐	P-236	0.00	0.00	Open	0
117	☐	P-237	0.00	0.00	Open	0
118	☐	P-238	0.01	0.01	Open	0
119	☐	P-239	0.00	0.00	Open	0
120	☐	P-240	0.00	0.00	Closed	0
121	☐	P-241	0.01	0.01	Open	0
122	☐	P-242	0.00	0.00	Open	0
123	☐	P-243	0.00	0.01	Open	0
124	☐	P-244	0.00	0.00	Open	0
125	☐	P-245	0.00	0.00	Open	0
126	☐	P-246	0.00	0.00	Closed	0
127	☐	P-247	0.00	0.00	Open	0
128	☐	P-249	0.00	0.00	Open	0
129	☐	P-250	0.00	0.01	Open	0
130	☐	P-251	0.00	0.00	Open	0
131	☐	P-254	0.00	0.01	Open	0
132	☐	P-258	0.00	0.00	Open	0
133	☐	P-261	0.02	0.05	Open	0
134	☐	P-263	0.02	0.06	Open	0
135	☐	P-264	0.00	0.00	Open	0
136	☐	P-265	0.03	0.10	Open	0
137	☐	P-266	0.00	0.00	Open	0
138	☐	P-267	0.00	0.00	Open	0
139	☐	P-268	0.01	0.03	Open	0
140	☐	P-269	0.00	0.01	Open	0
141	☐	P-270	0.00	0.01	Open	0
142	☐	P-271	0.00	0.01	Open	0
143	☐	P-272	0.00	0.01	Open	0
144	☐	P-273	0.00	0.05	Open	0
145	☐	P-274	0.05	0.22	Open	0
146	☐	P-275	0.01	0.19	Open	0
147	☐	P-276	0.20	0.69	Open	0
148	☐	P-278	0.00	0.00	Open	0
149	☐	P-282	0.05	0.15	Open	0
150	☐	P-284	0.00	0.00	Open	0
151	☐	P-285	0.03	0.10	Open	0
152	☐	P-286	0.31	1.82	Open	0
153	☐	P-287	0.06	0.18	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
154	☐	P-288	0.00	0.01	Open	0
155	☐	P-289	0.04	0.20	Open	0
156	☐	P-290	0.01	0.01	Open	0
157	☐	P-292	0.00	0.00	Open	0
158	☐	P-293	0.00	0.01	Open	0
159	☐	P-294	0.00	0.00	Open	0
160	☐	P-295	0.43	0.92	Open	0
161	☐	P-296	0.33	0.70	Open	0
162	☐	P-297	0.04	0.08	Open	0
163	☐	P-299	0.00	0.01	Open	0
164	☐	P-300	0.00	0.00	Open	0
165	☐	P-301	0.02	0.11	Open	0
166	☐	P-302	0.09	0.28	Open	0
167	☐	P-304	0.00	0.00	Open	0
168	☐	P-305	0.52	0.78	Open	0
169	☐	P-306	0.77	1.16	Open	0
170	☐	P-307	1.03	1.55	Open	0
171	☐	P-308	0.25	0.75	Open	0
172	☐	P-309	0.00	0.00	Open	0
173	☐	P-310	0.13	0.57	Open	0
174	☐	P-312	0.03	0.08	Open	0
175	☐	P-313	0.01	0.01	Open	0
176	☐	P-314	0.01	0.02	Open	0
177	☐	P-315	0.23	0.52	Open	0
178	☐	P-317	0.38	1.39	Open	0
179	☐	P-318	0.03	1.39	Open	0
180	☐	P-319	0.28	0.44	Open	0
181	☐	P-321	0.00	0.00	Open	0
182	☐	P-322	0.25	0.72	Open	0
183	☐	P-324	0.23	0.69	Open	0
184	☐	P-325	0.09	0.28	Open	0
185	☐	P-326	0.00	0.01	Open	0
186	☐	P-327	0.18	0.27	Open	0
187	☐	P-328	0.00	0.00	Open	0
188	☐	P-329	0.06	0.17	Open	0
189	☐	P-330	0.03	0.10	Open	0
190	☐	P-331	0.28	0.43	Open	0
191	☐	P-332	0.28	0.42	Open	0
192	☐	P-333	0.01	0.02	Open	0
193	☐	P-334	0.00	0.05	Open	0
194	☐	P-335	0.01	0.04	Open	0
195	☐	P-336	0.00	0.00	Open	0
196	☐	P-338	0.02	0.10	Open	0
197	☐	P-339	0.03	0.37	Open	0
198	☐	P-340	0.05	0.28	Open	0
199	☐	P-341	0.19	0.28	Open	0
200	☐	P-342	0.06	0.09	Open	0
201	☐	P-343	0.09	0.14	Open	0
202	☐	P-344	0.04	0.05	Open	0
203	☐	P-345	0.01	0.02	Open	0
204	☐	P-346	0.02	0.06	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
205	☐	P-347	0.00	0.00	Open	0
206	☐	P-348	0.01	0.02	Open	0
207	☐	P-349	0.00	0.03	Open	0
208	☐	P-350	0.03	0.12	Open	0
209	☐	P-352	0.01	0.04	Open	0
210	☐	P-353	0.03	0.10	Open	0
211	☐	P-354	0.10	0.28	Open	0
212	☐	P-355	0.01	0.02	Open	0
213	☐	P-356	0.03	0.04	Open	0
214	☐	P-357	0.00	0.01	Open	0
215	☐	P-358	0.00	0.01	Open	0
216	☐	P-359	0.17	0.26	Open	0
217	☐	P-360	0.03	0.05	Open	0
218	☐	P-361	0.07	0.10	Open	0
219	☐	P-362	0.00	0.00	Open	0
220	☐	P-363	0.00	0.00	Open	0
221	☐	P-364	0.00	0.02	Open	0
222	☐	P-365	0.02	0.08	Open	0
223	☐	P-366	0.10	0.29	Open	0
224	☐	P-368	0.00	0.00	Open	0
225	☐	P-369	0.03	0.05	Open	0
226	☐	P-371	0.00	0.76	Open	0
227	☐	P-372	0.42	0.99	Open	0
228	☐	P-373	0.01	0.02	Open	0
229	☐	P-374	0.01	0.01	Open	0
230	☐	P-375	0.01	0.04	Open	0
231	☐	P-376	0.04	0.14	Open	0
232	☐	P-377	0.00	0.00	Open	0
233	☐	P-378	0.08	0.75	Open	0
234	☐	P-379	0.21	0.64	Open	0
235	☐	P-380	0.34	1.02	Open	0
236	☐	P-381	0.00	0.00	Open	0
237	☐	P-382	0.65	0.83	Open	0
238	☐	P-383	0.10	0.15	Open	0
239	☐	P-384	0.08	0.11	Open	0
240	☐	P-385	0.44	1.24	Open	0
241	☐	P-386	0.05	0.07	Open	0
242	☐	P-387	0.00	0.05	Open	0
243	☐	P-388	0.44	1.18	Open	0
244	☐	P-389	0.62	1.72	Open	0
245	☐	P-391	0.03	0.05	Open	0
246	☐	P-392	0.02	0.03	Open	0
247	☐	P-393	0.02	0.03	Open	0
248	☐	P-394	0.13	0.39	Open	0
249	☐	P-395	0.09	0.26	Open	0
250	☐	P-396	0.42	0.81	Open	0
251	☐	P-397	0.04	0.11	Open	0
252	☐	P-398	0.10	0.27	Open	0
253	☐	P-399	0.09	0.26	Open	0
254	☐	P-401	0.00	0.00	Open	0
255	☐	P-402	0.15	0.43	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
256	☐	P-403	0.01	0.03	Open	0
257	☐	P-404	0.00	0.00	Open	0
258	☐	P-405	0.19	0.59	Open	0
259	☐	P-406	0.03	0.12	Open	0
260	☐	P-407	0.20	0.62	Open	0
261	☐	P-410	0.13	0.26	Open	0
262	☐	P-411	0.10	0.35	Open	0
263	☐	P-412	0.14	0.40	Open	0
264	☐	P-413	0.22	0.68	Open	0
265	☐	P-414	0.08	0.21	Open	0
266	☐	P-415	0.03	0.97	Open	0
267	☐	P-416	0.00	0.00	Open	0
268	☐	P-417	0.00	0.00	Open	0
269	☐	P-418	0.00	0.00	Open	0
270	☐	P-419	0.17	0.28	Open	0
271	☐	P-421	0.00	0.00	Open	0
272	☐	P-422	0.09	0.19	Open	0
273	☐	P-423	0.00	0.00	Open	0
274	☐	P-424	0.02	0.15	Open	0
275	☐	P-425	0.00	0.01	Open	0
276	☐	P-428	0.00	0.00	Open	0
277	☐	P-430	0.07	0.22	Open	0
278	☐	P-431	0.01	0.01	Open	0
279	☐	P-432	0.00	0.00	Open	0
280	☐	P-433	0.00	0.01	Open	0
281	☐	P-434	0.00	0.00	Open	0
282	☐	P-435	0.00	0.00	Open	0
283	☐	P-436	0.08	0.43	Open	0
284	☐	P-437	0.19	0.40	Open	0
285	☐	P-438	0.13	0.42	Open	0
286	☐	P-441	0.07	0.07	Open	0
287	☐	P-442	0.04	0.15	Open	0
288	☐	P-443	0.00	0.00	Open	0
289	☐	P-444	0.00	0.00	Open	0
290	☐	P-445	0.00	0.01	Open	0
291	☐	P-446	0.00	0.00	Open	0
292	☐	P-448	0.00	0.02	Open	0
293	☐	P-449	0.00	0.02	Open	0
294	☐	P-450	0.00	0.02	Open	0
295	☐	P-451	0.02	0.14	Open	0
296	☐	P-452	0.00	0.01	Open	0
297	☐	P-453	0.00	0.00	Open	0
298	☐	P-454	0.00	0.00	Open	0
299	☐	P-455	0.01	0.10	Open	0
300	☐	P-456	0.00	0.00	Open	0
301	☐	P-457	0.04	0.04	Open	0
302	☐	P-458	0.07	0.12	Open	0
303	☐	P-459	0.00	0.00	Open	0
304	☐	P-460	0.00	0.00	Open	0
305	☐	P-461	0.00	0.00	Open	0
306	☐	P-462	0.00	0.00	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
307		P-463	0.00	0.00	Open	0
308		P-464	0.04	0.09	Open	0
309		P-465	0.04	0.09	Open	0
310		P-466	0.02	0.57	Open	0
311		P-467	0.00	0.00	Open	0
312		P-468	0.00	0.00	Open	0
313		P-469	0.00	0.00	Open	0
314		P-470	0.00	0.00	Open	0
315		P-473	0.07	0.07	Open	0
316		P-474	0.05	0.36	Open	0
317		P-475	0.23	0.66	Open	0
318		P-476	0.13	0.60	Open	0
319		P-477	0.03	0.28	Open	0
320		P-478	0.00	0.00	Open	0
321		P-479	0.16	0.23	Open	0
322		P-480	0.17	0.30	Open	0
323		P-481	0.13	0.47	Open	0
324		P-482	0.04	0.46	Open	0
325		P-483	0.00	0.00	Open	0
326		P-484	0.00	0.01	Open	0
327		P-485	0.03	0.48	Open	0
328		P-486	0.01	0.32	Open	0
329		P-487	0.03	0.23	Open	0
330		P-488	0.16	0.34	Open	0
331		P-489	0.05	0.24	Open	0
332		P-490	0.03	0.24	Open	0
333		P-491	0.07	0.25	Open	0
334		P-493	0.01	0.35	Open	0
335		P-494	0.05	0.25	Open	0
336		P-495	0.12	0.47	Open	0
337		P-498	0.01	0.01	Open	0
338		P-499	0.00	0.00	Open	0
339		P-501	0.01	0.02	Open	0
340		P-502	0.00	0.00	Open	0
341		P-503	0.07	0.10	Open	0
342		P-504	0.09	0.13	Open	0
343		P-505	0.00	0.00	Open	0
344		P-506	0.00	0.01	Open	0
345		P-507	0.01	0.60	Open	0
346		P-508	0.02	0.06	Open	0
347		P-509	0.00	0.01	Open	0
348		P-510	0.00	0.01	Open	0
349		P-512	0.00	0.00	Open	0
350		P-513	0.00	0.00	Open	0
351		P-514	0.01	0.04	Open	0
352		P-515	0.01	0.02	Open	0
353		P-516	0.12	0.18	Open	0
354		P-517	0.01	0.01	Open	0
355		P-518	0.02	0.03	Open	0
356		P-519	0.01	0.03	Open	0
357		P-521	0.01	0.08	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
358	☐	P-524	0.01	0.36	Open	0
359	☐	P-525	0.01	0.04	Open	0
360	☐	P-526	0.07	0.36	Open	0
361	☐	P-527	0.01	0.03	Open	0
362	☐	P-528	0.02	0.33	Open	0
363	☐	P-529	0.14	0.49	Open	0
364	☐	P-533	0.00	0.01	Open	0
365	☐	P-534	0.03	0.09	Open	0
366	☐	P-535	0.00	0.00	Open	0
367	☐	P-536	0.00	0.00	Open	0
368	☐	P-537	0.00	0.00	Open	0
369	☐	P-538	0.00	0.00	Open	0
370	☐	P-539	0.00	0.00	Open	0
371	☐	P-540	0.00	0.00	Open	0
372	☐	P-541	0.00	0.00	Open	0
373	☐	P-542	0.00	0.00	Open	0
374	☐	P-543	0.00	0.00	Open	0
375	☐	P-544	0.00	0.00	Open	0
376	☐	P-545	0.00	0.00	Open	0
377	☐	P-546	0.00	0.00	Open	0
378	☐	P-547	0.00	0.01	Open	0
379	☐	P-549	0.00	0.00	Open	0
380	☐	P-550	0.00	0.00	Open	0
381	☐	P-551	0.00	0.00	Open	0
382	☐	P-552	0.00	0.00	Open	0
383	☐	P-555	0.00	0.00	Open	0
384	☐	P-556	1.13	0.80	Open	0
385	☐	P-558	0.00	0.00	Open	0
386	☐	P-559	0.27	0.24	Open	0
387	☐	P-560	0.02	0.13	Open	0
388	☐	P-561	0.00	0.00	Open	0
389	☐	P-562	0.00	0.00	Open	0
390	☐	P-563	0.00	0.00	Open	0
391	☐	P-564	0.00	0.00	Open	0
392	☐	P-571	0.02	0.05	Open	0
393	☐	P-572	0.01	0.02	Open	0
394	☐	P-573	0.01	0.04	Open	0
395	☐	P-575	0.00	0.01	Open	0
396	☐	P-576	0.00	0.00	Open	0
397	☐	P-578	0.00	0.00	Open	0
398	☐	P-579	0.00	0.00	Open	0
399	☐	P-580	0.04	0.08	Open	0
400	☐	P-581	0.02	0.09	Open	0
401	☐	P-582	0.00	0.00	Open	0
402	☐	P-583	0.00	0.09	Open	0
403	☐	P-584	0.00	0.00	Open	0
404	☐	P-585	0.05	0.08	Open	0
405	☐	P-586	0.00	0.00	Open	0
406	☐	P-587	0.00	0.08	Open	0
407	☐	P-588	0.01	0.01	Open	0
408	☐	P-590	0.00	0.00	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
409	☐	P-591	0.18	0.86	Open	0
410	☐	P-592	0.03	0.01	Open	0
411	☐	P-594	0.06	0.17	Open	0
412	☐	P-595	0.00	0.00	Open	0
413	☐	P-596	0.00	0.01	Open	0
414	☐	P-597	0.00	0.01	Open	0
415	☐	P-598	0.00	0.01	Open	0
416	☐	P-600	0.00	0.01	Open	0
417	☐	P-602	0.00	0.01	Open	0
418	☐	P-603	0.00	0.01	Open	0
419	☐	P-604	0.00	0.01	Open	0
420	☐	P-605	0.00	0.00	Open	0
421	☐	P-606	0.00	0.01	Open	0
422	☐	P-607	0.00	0.01	Open	0
423	☐	P-609	0.00	0.01	Open	0
424	☐	P-610	0.00	0.01	Open	0
425	☐	P-611	0.01	0.04	Open	0
426	☐	P-612	0.00	0.01	Open	0
427	☐	P-613	0.00	0.01	Open	0
428	☐	P-614	0.00	0.01	Open	0
429	☐	P-615	0.01	0.05	Open	0
430	☐	P-616	0.01	0.03	Open	0
431	☐	P-617	0.01	0.04	Open	0
432	☐	P-618	0.01	0.02	Open	0
433	☐	P-619	0.00	0.01	Open	0
434	☐	P-620	0.00	0.01	Open	0
435	☐	P-621	0.00	0.01	Open	0
436	☐	P-622	0.00	0.01	Open	0
437	☐	P-623	0.00	0.00	Open	0
438	☐	P-624	0.00	0.01	Open	0
439	☐	P-625	0.00	0.01	Open	0
440	☐	P-626	0.00	0.00	Open	0
441	☐	P-628	0.01	0.02	Open	0
442	☐	P-629	0.02	0.03	Open	0
443	☐	P-630	0.06	0.09	Open	0
444	☐	P-631	0.04	0.06	Open	0
445	☐	P-632	0.00	0.01	Open	0
446	☐	P-633	0.00	0.02	Open	0
447	☐	P-634	0.00	0.03	Open	0
448	☐	P-635	0.00	0.09	Open	0
449	☐	P-636	0.00	0.00	Open	0
450	☐	P-637	0.00	0.01	Open	0
451	☐	P-638	0.00	0.00	Open	0
452	☐	P-639	0.00	0.00	Open	0
453	☐	P-640	0.00	0.00	Open	0
454	☐	P-641	0.00	0.00	Open	0
455	☐	P-642	0.00	0.00	Open	0
456	☐	P-643	0.00	0.00	Open	0
457	☐	P-644	0.00	0.00	Open	0
458	☐	P-645	0.00	0.01	Open	0
459	☐	P-646	0.00	0.00	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
460	☐	P-650	0.00	0.00	Open	0
461	☐	P-651	0.00	0.00	Open	0
462	☐	P-652	0.01	0.07	Open	0
463	☐	P-653	0.00	0.01	Open	0
464	☐	P-654	0.00	0.01	Open	0
465	☐	P-655	0.00	0.00	Open	0
466	☐	P-656	0.05	0.09	Open	0
467	☐	P-657	0.01	0.02	Open	0
468	☐	P-659	0.00	0.09	Open	0
469	☐	P-660	0.16	0.10	Open	0
470	☐	P-661	0.00	0.00	Closed	0
471	☐	P-662	0.56	0.48	Open	0
472	☐	P-663	0.09	0.36	Open	0
473	☐	P-664	0.00	0.00	Open	0
474	☐	P-666	0.01	0.19	Open	0
475	☐	P-667	0.00	0.00	Open	0
476	☐	P-668	0.19	0.32	Open	0
477	☐	P-669	0.00	0.00	Open	0
478	☐	P-673	0.00	0.07	Open	0
479	☐	P-674	0.00	0.04	Open	0
480	☐	P-678	0.00	0.01	Open	0
481	☐	P-679	0.00	0.01	Open	0
482	☐	P-680	0.00	0.00	Open	0
483	☐	P-681	0.00	0.00	Open	0
484	☐	P-682	0.00	0.01	Open	0
485	☐	P-690	0.00	0.00	Open	0
486	☐	P-692	0.07	0.21	Open	0
487	☐	P-693	0.00	0.00	Open	0
488	☐	P-694	0.00	0.21	Open	0
489	☐	P-695	0.07	0.18	Open	0
490	☐	P-696	0.00	0.02	Open	0
491	☐	P-697	0.01	0.02	Open	0
492	☐	P-698	0.02	0.08	Open	0
493	☐	P-699	0.00	0.00	Open	0
494	☐	P-700	0.00	0.00	Open	0
495	☐	P-701	0.00	0.00	Open	0
496	☐	P-702	0.02	1.72	Open	0
497	☐	P-703	0.05	1.72	Open	0
498	☐	P-704	0.05	1.72	Open	0
499	☐	P-705	0.01	0.10	Open	0
500	☐	P-706	0.01	0.04	Open	0
501	☐	P-707	0.00	0.00	Open	0
502	☐	P-710	0.01	0.05	Open	0
503	☐	P-711	0.00	0.02	Open	0
504	☐	P-712	0.00	0.01	Open	0
505	☐	P-716	0.00	0.00	Open	0
506	☐	P-718	0.28	0.57	Open	0
507	☐	P-721	0.00	0.00	Open	0
508	☐	P-723	0.00	0.00	Open	0
509	☐	P-726	0.00	0.00	Open	0
510	☐	P-728	0.02	0.03	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
511	☐	P-730	0.00	0.00	Open	0
512	☐	P-731	0.00	0.02	Open	0
513	☐	P-732	0.01	0.05	Open	0
514	☐	P-733	0.00	0.00	Open	0
515	☐	P-734	0.00	0.00	Open	0
516	☐	P-735	0.00	0.00	Open	0
517	☐	P-736	0.00	0.00	Open	0
518	☐	P-737	0.00	0.00	Open	0
519	☐	P-738	0.00	0.00	Open	0
520	☐	P-739	0.00	0.00	Open	0
521	☐	P-740	0.00	0.00	Open	0
522	☐	P-741	0.00	0.00	Open	0
523	☐	P-742	0.00	0.01	Open	0
524	☐	P-743	0.00	0.00	Open	0
525	☐	P-744	0.00	0.00	Open	0
526	☐	P-745	0.00	0.00	Open	0
527	☐	P-747	0.00	0.00	Open	0
528	☐	P-748	0.00	0.01	Open	0
529	☐	P-750	0.02	0.02	Open	0
530	☐	P-751	0.00	0.00	Open	0
531	☐	P-752	0.01	0.01	Open	0
532	☐	P-753	0.02	0.12	Open	0
533	☐	P-754	0.00	0.00	Open	0
534	☐	P-755	0.00	0.00	Open	0
535	☐	P-756	0.01	0.02	Open	0
536	☐	P-757	0.00	0.00	Open	0
537	☐	P-758	0.02	0.12	Open	0
538	☐	P-759	0.01	0.02	Open	0
539	☐	P-760	0.02	0.05	Open	0
540	☐	P-761	0.00	0.00	Open	0
541	☐	P-762	0.00	0.00	Open	0
542	☐	P-763	0.00	0.00	Open	0
543	☐	P-764	0.01	0.03	Open	0
544	☐	P-765	0.01	0.03	Open	0
545	☐	P-766	0.02	0.04	Open	0
546	☐	P-767	0.01	0.04	Open	0
547	☐	P-768	0.01	0.05	Open	0
548	☐	P-769	0.01	0.05	Open	0
549	☐	P-770	0.02	0.05	Open	0
550	☐	P-771	0.02	0.05	Open	0
551	☐	P-774	0.00	0.27	Open	0
552	☐	P-775	0.01	0.19	Open	0
553	☐	P-776	0.00	0.00	Open	0
554	☐	P-777	0.00	0.00	Open	0
555	☐	P-778	0.00	0.00	Open	0
556	☐	P-779	0.00	0.00	Open	0
557	☐	P-780	0.00	0.00	Open	0
558	☐	P-781	0.00	0.00	Open	0
559	☐	P-782	0.00	0.00	Open	0
560	☐	P-783	0.01	0.01	Open	0
561	☐	P-784	0.00	0.00	Closed	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
562	☐	P-785	0.03	0.19	Open	0
563	☐	P-786	0.02	0.03	Open	0
564	☐	P-788	0.08	0.09	Open	0
565	☐	P-789	0.00	0.03	Open	0
566	☐	P-790	0.02	0.12	Open	0
567	☐	P-791	0.07	0.43	Open	0
568	☐	P-792	0.33	0.38	Open	0
569	☐	P-793	0.09	0.24	Open	0
570	☐	P-794	0.00	0.00	Open	0
571	☐	P-795	0.00	0.00	Open	0
572	☐	P-796	0.00	0.01	Open	0
573	☐	P-797	0.00	0.00	Open	0
574	☐	P-798	0.06	0.30	Open	0
575	☐	P-799	0.08	0.30	Open	0
576	☐	P-800	0.01	0.05	Open	0
577	☐	P-801	0.00	0.00	Open	0
578	☐	P-802	0.00	0.05	Open	0
579	☐	P-803	0.00	0.05	Open	0
580	☐	P-804	0.00	0.00	Open	0
581	☐	P-805	0.00	0.01	Open	0
582	☐	P-806	0.00	0.00	Open	0
583	☐	P-807	0.16	0.34	Open	0
584	☐	P-808	0.00	0.00	Open	0
585	☐	P-810	0.00	0.40	Open	0
586	☐	P-811	0.00	0.00	Open	0
587	☐	P-812	0.00	0.00	Open	0
588	☐	P-813	0.00	0.00	Open	0
589	☐	P-814	0.00	0.00	Open	0
590	☐	P-815	0.00	0.00	Open	0
591	☐	P-816	0.00	0.00	Open	0
592	☐	P-818	0.00	0.02	Open	0
593	☐	P-819	0.00	0.03	Open	0
594	☐	P-820	0.00	0.02	Open	0
595	☐	P-821	0.04	0.23	Open	0
596	☐	P-822	0.00	0.00	Open	0
597	☐	P-823	0.04	0.26	Open	0
598	☐	P-824	0.32	0.89	Open	0
599	☐	P-825	0.03	0.92	Open	0
600	☐	P-826	0.00	0.00	Open	0
601	☐	P-828	0.01	0.06	Open	0
602	☐	P-829	0.45	0.33	Open	0
603	☐	P-832	0.00	0.01	Open	0
604	☐	P-833	0.00	0.00	Open	0
605	☐	P-834	0.00	0.00	Open	0
606	☐	P-836	0.03	0.04	Open	0
607	☐	P-837	0.00	0.00	Open	0
608	☐	P-838	0.00	0.00	Open	0
609	☐	P-839	0.00	0.00	Open	0
610	☐	P-840	0.00	0.00	Open	0
611	☐	P-841	0.00	0.00	Open	0
612	☐	P-842	0.00	0.00	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
613	☐	P-847	0.00	0.00	Open	0
614	☐	P-848	0.00	0.00	Open	0
615	☐	P-849	0.00	0.01	Open	0
616	☐	P-852	0.00	0.00	Open	0
617	☐	P-853	0.00	0.00	Open	0
618	☐	P-854	0.00	0.00	Open	0
619	☐	P-856	0.04	0.07	Open	0
620	☐	P-857	0.00	0.02	Open	0
621	☐	P-858	0.03	1.40	Open	0
622	☐	P-861	0.03	0.33	Open	0
623	☐	P-863	0.00	0.00	Open	0
624	☐	P-864	0.00	0.00	Open	0
625	☐	P-865	0.00	0.01	Open	0
626	☐	P-866	0.00	0.00	Open	0
627	☐	P-867	0.00	0.00	Open	0
628	☐	P-868	0.00	0.00	Open	0
629	☐	P-869	0.00	0.00	Open	0
630	☐	P-870	0.00	0.00	Open	0
631	☐	P-871	0.00	0.00	Open	0
632	☐	P-872	0.00	0.00	Open	0
633	☐	P-873	0.01	0.10	Open	0
634	☐	P-874	0.01	0.02	Open	0
635	☐	P-875	0.00	0.01	Open	0
636	☐	P-879	0.01	0.01	Open	0
637	☐	P-880	0.00	0.00	Open	0
638	☐	P-881	0.00	0.00	Open	0
639	☐	P-882	0.00	0.01	Open	0
640	☐	P-883	0.00	0.00	Open	0
641	☐	P-884	0.00	0.01	Open	0
642	☐	P-885	0.02	0.08	Open	0
643	☐	P-886	0.01	0.02	Open	0
644	☐	P-887	0.00	0.00	Open	0
645	☐	P-889	0.00	0.00	Open	0
646	☐	P-890	0.00	0.00	Open	0
647	☐	P-891	0.00	0.12	Open	0
648	☐	P-892	0.07	0.19	Open	0
649	☐	P-893	0.12	0.46	Open	0
650	☐	P-894	0.01	0.01	Open	0
651	☐	P-896	0.02	0.03	Open	0
652	☐	P-897	0.00	0.10	Open	0
653	☐	P-898	0.03	0.05	Open	0
654	☐	P-899	0.02	0.09	Open	0
655	☐	P-900	0.00	0.00	Open	0
656	☐	P-901	0.00	0.00	Open	0
657	☐	P-902	0.00	0.00	Open	0
658	☐	P-903	0.00	0.00	Open	0
659	☐	P-904	0.00	0.01	Open	0
660	☐	P-905	0.00	0.00	Open	0
661	☐	P-906	0.00	0.01	Open	0
662	☐	P-907	0.31	0.38	Open	0
663	☐	P-911	0.01	0.01	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
664	☐	P-912	0.00	0.00	Open	0
665	☐	P-913	0.00	0.00	Open	0
666	☐	P-914	1.74	1.98	Open	0
667	☐	P-916	0.00	0.00	Open	0
668	☐	P-917	0.00	0.00	Open	0
669	☐	P-922	0.00	0.00	Open	0
670	☐	P-923	0.13	0.27	Open	0
671	☐	P-925	0.00	0.01	Open	0
672	☐	P-927	0.00	0.00	Open	0
673	☐	P-928	0.01	0.02	Open	0
674	☐	P-929	0.00	0.00	Open	0
675	☐	P-931	0.00	0.00	Open	0
676	☐	P-932	0.02	0.03	Open	0
677	☐	P-933	0.00	0.00	Open	0
678	☐	P-934	0.00	0.00	Open	0
679	☐	P-936	0.00	0.00	Open	0
680	☐	P-937	0.00	0.00	Open	0
681	☐	P-938	0.00	0.02	Open	0
682	☐	P-939	0.01	0.01	Open	0
683	☐	P-940	0.01	0.02	Open	0
684	☐	P-941	0.00	0.00	Open	0
685	☐	P-942	0.01	0.04	Open	0
686	☐	P-943	0.00	0.00	Open	0
687	☐	P-944	0.00	0.00	Open	0
688	☐	P-945	0.00	0.00	Open	0
689	☐	P-946	0.00	0.00	Open	0
690	☐	P-947	0.00	0.00	Open	0
691	☐	P-949	0.00	0.00	Open	0
692	☐	P-951	0.00	0.03	Open	0
693	☐	P-953	0.00	0.03	Open	0
694	☐	P-954	0.01	0.23	Open	0
695	☐	P-955	0.00	0.12	Open	0
696	☐	P-956	0.00	0.00	Open	0
697	☐	P-957	0.03	0.03	Open	0
698	☐	P-959	0.07	0.05	Open	0
699	☐	P-960	0.00	0.00	Open	0
700	☐	P-961	0.22	0.15	Open	0
701	☐	P-962	0.00	0.00	Open	0
702	☐	P-963	0.10	0.32	Open	0
703	☐	P-964	5.12	0.49	Open	0
704	☐	P-965	0.04	0.06	Open	0
705	☐	P-966	0.00	0.00	Open	0
706	☐	P-967	0.01	0.03	Open	0
707	☐	P-968	0.00	0.00	Open	0
708	☐	P-970	0.00	0.00	Open	0
709	☐	P-971	0.00	0.00	Open	0
710	☐	P-973	0.05	0.10	Open	0
711	☐	P-974	0.00	0.00	Open	0
712	☐	P-975	0.01	0.01	Open	0
713	☐	P-976	0.00	0.00	Open	0
714	☐	P-977	0.00	0.00	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
715	☐	P-978	0.00	0.00	Open	0
716	☐	P-979	0.00	0.00	Open	0
717	☐	P-980	0.00	0.00	Open	0
718	☐	P-990	0.00	0.00	Open	0
719	☐	P-992	0.00	0.00	Open	0
720	☐	P-993	0.00	0.00	Open	0
721	☐	P-994	0.00	0.00	Open	0
722	☐	P-995	0.02	0.04	Open	0
723	☐	P-996	0.02	0.51	Open	0
724	☐	P-997	0.00	0.05	Open	0
725	☐	P-998	0.00	0.05	Open	0
726	☐	P-999	0.26	3.82	Open	0
727	☐	P1001	0.00	0.00	Closed	0
728	☐	P1003	0.00	0.00	Open	0
729	☐	P1005	0.00	0.00	Closed	0
730	☐	P1007	0.00	0.00	Open	0
731	☐	P1009	0.00	0.00	Open	0
732	☐	P101	0.00	0.23	Open	0
733	☐	P1011	0.25	0.18	Open	0
734	☐	P1013	0.00	0.00	Open	0
735	☐	P1015	0.00	0.02	Open	0
736	☐	P103	0.02	0.66	Open	0
737	☐	P1031	0.01	0.02	Open	0
738	☐	P1039	0.03	0.11	Open	0
739	☐	P1041	0.03	0.05	Open	0
740	☐	P1045	0.00	0.01	Open	0
741	☐	P1047	0.00	0.00	Open	0
742	☐	P1049	0.00	0.00	Open	0
743	☐	P105	0.04	0.63	Open	0
744	☐	P1051	0.01	0.03	Open	0
745	☐	P107	7.71	3.23	Open	0
746	☐	P109	0.03	1.82	Open	0
747	☐	P111	0.01	1.83	Open	0
748	☐	P1129	0.01	0.29	Open	0
749	☐	P1131	0.06	1.28	Open	0
750	☐	P1133	0.15	0.32	Open	0
751	☐	P1135	0.10	0.31	Open	0
752	☐	P1141	0.01	0.02	Open	0
753	☐	P1147	0.00	0.01	Open	0
754	☐	P1157	0.02	0.13	Open	0
755	☐	P1159	0.00	0.00	Open	0
756	☐	P1161	0.00	0.00	Open	0
757	☐	P1163	0.00	0.00	Open	0
758	☐	P1165	0.00	0.00	Open	0
759	☐	P1167	0.00	0.00	Open	0
760	☐	P1169	0.00	0.00	Open	0
761	☐	P1171	0.00	0.00	Open	0
762	☐	P1173	0.11	0.90	Open	0
763	☐	P1175	0.02	0.09	Open	0
764	☐	P1177	0.06	0.35	Open	0
765	☐	P1179	0.14	0.16	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
766	☐	P1181	0.08	0.09	Open	0
767	☐	P1183	0.08	0.09	Open	0
768	☐	P1185	0.01	0.09	Open	0
769	☐	P1187	0.01	0.07	Open	0
770	☐	P1189	0.01	0.03	Open	0
771	☐	P1191	0.02	0.06	Open	0
772	☐	P1193	0.01	0.03	Open	0
773	☐	P1199	0.01	0.04	Open	0
774	☐	P1201	0.00	0.02	Open	0
775	☐	P1203	0.03	0.13	Open	0
776	☐	P1205	0.00	0.00	Open	0
777	☐	P1207	0.00	0.00	Open	0
778	☐	P1209	0.01	0.01	Open	0
779	☐	P1211	0.00	0.01	Open	0
780	☐	P1213	0.00	0.01	Open	0
781	☐	P1215	0.05	0.06	Open	0
782	☐	P1217	0.04	0.04	Open	0
783	☐	P1219	1.29	1.68	Open	0
784	☐	P1221	0.04	0.33	Open	0
785	☐	P1225	0.06	0.30	Open	0
786	☐	P1227	0.05	0.13	Open	0
787	☐	P1229	1.86	28.80	Open	0
788	☐	P1231	0.53	7.09	Open	0
789	☐	P129	0.00	0.01	Open	0
790	☐	P131	0.02	0.03	Open	0
791	☐	P133	0.00	0.13	Open	0
792	☐	P137	0.17	0.83	Open	0
793	☐	P139	0.05	0.26	Open	0
794	☐	P143	0.02	1.73	Open	0
795	☐	P145	0.07	0.25	Open	0
796	☐	P15	1.45	0.49	Open	0
797	☐	P153	0.00	0.01	Open	0
798	☐	P155	0.00	0.01	Open	0
799	☐	P157	0.00	0.01	Open	0
800	☐	P159	0.01	0.03	Open	0
801	☐	P161	0.00	0.02	Open	0
802	☐	P163	0.21	0.36	Open	0
803	☐	P165	0.17	0.98	Open	0
804	☐	P167	1.57	0.98	Open	0
805	☐	P169	0.22	0.44	Open	0
806	☐	P17	0.00	0.01	Open	0
807	☐	P171	0.01	0.05	Open	0
808	☐	P173	0.05	0.10	Open	0
809	☐	P175	0.02	0.05	Open	0
810	☐	P179	0.03	0.11	Open	0
811	☐	P181	0.00	0.00	Open	0
812	☐	P183	0.00	0.00	Open	0
813	☐	P185	0.00	0.00	Open	0
814	☐	P187	0.02	0.03	Open	0
815	☐	P189	0.00	0.00	Open	0
816	☐	P19	0.00	0.01	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
817	☐	P191	0.03	0.20	Open	0
818	☐	P193	0.37	0.71	Open	0
819	☐	P195	0.00	0.16	Open	0
820	☐	P197	0.01	0.60	Open	0
821	☐	P199	0.02	0.07	Open	0
822	☐	P201	0.19	0.62	Open	0
823	☐	P203	0.03	0.26	Open	0
824	☐	P205	0.15	0.38	Open	0
825	☐	P207	0.05	0.44	Open	0
826	☐	P209	0.02	0.23	Open	0
827	☐	P21	0.13	0.66	Open	0
828	☐	P211	0.00	0.01	Open	0
829	☐	P213	0.05	0.08	Open	0
830	☐	P215	0.00	0.00	Open	0
831	☐	P217	0.00	0.00	Open	0
832	☐	P219	0.00	0.00	Open	0
833	☐	P221	0.01	0.07	Open	0
834	☐	P223	0.01	0.36	Open	0
835	☐	P225	0.01	0.11	Open	0
836	☐	P227	0.15	0.53	Open	0
837	☐	P23	0.20	0.66	Open	0
838	☐	P231	0.73	0.17	Open	0
839	☐	P233	0.20	0.13	Open	0
840	☐	P235	0.21	0.18	Open	0
841	☐	P237	0.00	0.00	Open	0
842	☐	P239	0.00	0.01	Open	0
843	☐	P241	0.00	0.01	Open	0
844	☐	P243	0.01	0.02	Open	0
845	☐	P245	0.00	0.00	Open	0
846	☐	P247	0.00	0.00	Open	0
847	☐	P249	0.05	0.10	Open	0
848	☐	P251	0.01	0.07	Open	0
849	☐	P253	0.09	0.32	Open	0
850	☐	P255	0.28	0.41	Open	0
851	☐	P257	0.20	0.31	Open	0
852	☐	P259	0.00	0.00	Open	0
853	☐	P261	0.00	0.02	Open	0
854	☐	P263	0.00	0.00	Open	0
855	☐	P265	0.00	0.00	Open	0
856	☐	P267	0.02	0.04	Open	0
857	☐	P271	0.00	0.00	Open	0
858	☐	P273	0.01	0.01	Open	0
859	☐	P277	0.00	0.00	Open	0
860	☐	P279	0.00	0.00	Open	0
861	☐	P281	0.01	0.01	Open	0
862	☐	P283	0.02	0.06	Open	0
863	☐	P285	0.00	0.00	Open	0
864	☐	P287	0.01	0.01	Open	0
865	☐	P289	0.00	0.00	Open	0
866	☐	P29	0.17	0.50	Open	0
867	☐	P291	0.00	0.00	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
868	☐	P293	0.00	0.00	Open	0
869	☐	P295	0.00	0.00	Open	0
870	☐	P297	0.01	0.01	Open	0
871	☐	P301	0.65	0.53	Open	0
872	☐	P303	0.00	0.00	Open	0
873	☐	P305	0.00	0.17	Open	0
874	☐	P309	0.00	0.00	Open	0
875	☐	P31	0.57	0.57	Open	0
876	☐	P313	0.01	0.24	Open	0
877	☐	P315	0.00	0.00	Open	0
878	☐	P319	0.00	0.02	Open	0
879	☐	P321	0.04	0.06	Open	0
880	☐	P323	0.01	0.03	Open	0
881	☐	P325	0.02	0.03	Open	0
882	☐	P329	0.00	0.06	Open	0
883	☐	P33	0.00	0.00	Open	0
884	☐	P335	0.00	0.00	Open	0
885	☐	P337	0.00	0.00	Open	0
886	☐	P339	0.01	0.03	Open	0
887	☐	P341	0.00	0.02	Open	0
888	☐	P343	0.01	0.04	Open	0
889	☐	P345	0.00	0.00	Open	0
890	☐	P347	0.01	0.06	Open	0
891	☐	P349	0.06	0.20	Open	0
892	☐	P35	0.00	0.00	Open	0
893	☐	P353	0.02	0.03	Open	0
894	☐	P355	0.17	0.38	Open	0
895	☐	P357	0.00	0.00	Open	0
896	☐	P359	0.00	0.00	Open	0
897	☐	P361	0.00	0.00	Open	0
898	☐	P363	0.01	0.01	Open	0
899	☐	P365	0.01	0.02	Open	0
900	☐	P367	0.00	0.00	Open	0
901	☐	P369	0.00	0.00	Open	0
902	☐	P37	0.00	0.18	Open	0
903	☐	P371	0.00	0.00	Open	0
904	☐	P373	0.00	0.00	Open	0
905	☐	P375	0.00	0.00	Open	0
906	☐	P377	0.00	0.00	Open	0
907	☐	P379	0.00	0.00	Open	0
908	☐	P381	0.44	0.35	Open	0
909	☐	P383	0.05	0.35	Open	0
910	☐	P387	0.03	0.25	Open	0
911	☐	P389	0.00	0.00	Open	0
912	☐	P39	0.06	0.04	Open	0
913	☐	P391	0.00	0.00	Open	0
914	☐	P393	0.00	0.00	Open	0
915	☐	P395	0.01	0.01	Open	0
916	☐	P397	0.00	0.01	Open	0
917	☐	P399	0.00	0.00	Open	0
918	☐	P401	0.00	0.00	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
919	☐	P403	0.00	0.00	Open	0
920	☐	P405	0.00	0.00	Open	0
921	☐	P409	0.00	1.35	Open	0
922	☐	P41	0.00	0.01	Open	0
923	☐	P411	0.00	0.00	Open	0
924	☐	P413	0.00	0.00	Open	0
925	☐	P415	0.00	0.00	Open	0
926	☐	P417	0.00	0.02	Open	0
927	☐	P419	0.01	0.03	Open	0
928	☐	P421	0.00	0.00	Open	0
929	☐	P423	0.00	0.00	Open	0
930	☐	P425	0.00	0.01	Open	0
931	☐	P427	0.00	0.00	Open	0
932	☐	P429	0.01	0.07	Open	0
933	☐	P43	0.00	0.00	Open	0
934	☐	P431	0.03	0.06	Open	0
935	☐	P433	0.26	0.33	Open	0
936	☐	P435	0.00	0.03	Open	0
937	☐	P439	0.01	0.07	Open	0
938	☐	P443	0.03	0.11	Open	0
939	☐	P445	0.00	0.00	Open	0
940	☐	P447	0.00	0.01	Open	0
941	☐	P449	1.02	1.90	Open	0
942	☐	P45	0.00	0.01	Open	0
943	☐	P451	0.00	0.00	Open	0
944	☐	P453	0.00	0.00	Open	0
945	☐	P455	0.00	0.00	Open	0
946	☐	P457	0.01	0.01	Open	0
947	☐	P459	0.03	0.10	Open	0
948	☐	P461	0.10	0.31	Open	0
949	☐	P463	0.04	0.07	Open	0
950	☐	P465	0.02	0.04	Open	0
951	☐	P467	0.02	0.02	Open	0
952	☐	P469	0.00	0.00	Open	0
953	☐	P471	0.01	0.03	Open	0
954	☐	P473	0.00	0.00	Open	0
955	☐	P475	0.00	0.00	Open	0
956	☐	P477	0.01	0.01	Open	0
957	☐	P479	0.00	0.01	Open	0
958	☐	P481	0.00	0.01	Open	0
959	☐	P483	0.01	0.02	Open	0
960	☐	P485	0.00	0.02	Open	0
961	☐	P487	0.03	0.03	Open	0
962	☐	P489	0.02	0.10	Open	0
963	☐	P49	0.01	0.18	Open	0
964	☐	P491	0.00	0.01	Open	0
965	☐	P493	0.02	0.03	Open	0
966	☐	P497	0.00	0.00	Open	0
967	☐	P499	0.00	0.01	Open	0
968	☐	P501	0.00	0.00	Open	0
969	☐	P503	0.00	0.00	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
970	☐	P505	0.00	0.00	Open	0
971	☐	P507	0.00	0.00	Open	0
972	☐	P509	0.00	0.00	Open	0
973	☐	P51	0.00	0.00	Closed	0
974	☐	P511	0.00	0.00	Open	0
975	☐	P513	0.00	0.00	Open	0
976	☐	P515	0.06	3.82	Open	0
977	☐	P517	0.06	3.82	Open	0
978	☐	P519	0.04	0.09	Open	0
979	☐	P521	0.00	0.00	Open	0
980	☐	P527	0.00	0.00	Open	0
981	☐	P531	0.00	0.00	Open	0
982	☐	P533	0.00	0.00	Open	0
983	☐	P535	0.01	0.03	Open	0
984	☐	P537	0.02	0.05	Open	0
985	☐	P539	0.26	0.80	Open	0
986	☐	P541	0.26	0.74	Open	0
987	☐	P543	0.99	7.09	Open	0
988	☐	P545	0.17	0.98	Open	0
989	☐	P549	0.08	0.23	Open	0
990	☐	P553	0.00	0.00	Open	0
991	☐	P555	0.00	0.01	Open	0
992	☐	P557	0.00	0.00	Open	0
993	☐	P565	0.05	0.18	Open	0
994	☐	P569	0.01	0.53	Open	0
995	☐	P579	0.00	0.07	Open	0
996	☐	P59	0.00	0.16	Open	0
997	☐	P591	0.09	0.17	Open	0
998	☐	P593	0.00	0.00	Open	0
999	☐	P599	0.00	0.00	Closed	0
1000	☐	P609	0.00	0.01	Open	0
1001	☐	P61	0.00	0.16	Open	0
1002	☐	P611	0.00	0.00	Open	0
1003	☐	P613	0.00	0.00	Open	0
1004	☐	P615	0.00	0.01	Open	0
1005	☐	P617	0.00	0.02	Open	0
1006	☐	P619	1.26	1.80	Open	0
1007	☐	P621	0.74	1.16	Open	0
1008	☐	P623	0.03	0.07	Open	0
1009	☐	P627	0.03	0.10	Open	0
1010	☐	P629	0.05	0.08	Open	0
1011	☐	P63	0.03	0.03	Open	0
1012	☐	P631	0.00	0.00	Open	0
1013	☐	P633	0.43	1.13	Open	0
1014	☐	P635	0.00	0.29	Open	0
1015	☐	P639	0.09	0.14	Open	0
1016	☐	P643	0.01	0.01	Open	0
1017	☐	P645	0.00	0.00	Open	0
1018	☐	P647	0.00	0.00	Open	0
1019	☐	P649	0.00	0.00	Open	0
1020	☐	P65	0.00	0.02	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
1021	☐	P651	0.00	0.00	Open	0
1022	☐	P653	0.00	0.00	Open	0
1023	☐	P655	0.02	0.03	Open	0
1024	☐	P659	0.12	0.29	Open	0
1025	☐	P661	0.00	0.00	Open	0
1026	☐	P667	0.01	0.20	Open	0
1027	☐	P673	0.04	0.24	Open	0
1028	☐	P675	0.00	0.00	Open	0
1029	☐	P677	0.01	0.04	Open	0
1030	☐	P679	0.00	0.00	Open	0
1031	☐	P681	0.00	0.00	Open	0
1032	☐	P683	0.00	0.00	Open	0
1033	☐	P685	0.00	0.00	Open	0
1034	☐	P687	0.00	0.00	Open	0
1035	☐	P689	0.00	0.00	Open	0
1036	☐	P69	0.00	0.01	Open	0
1037	☐	P697	0.12	0.17	Open	0
1038	☐	P699	0.00	0.00	Open	0
1039	☐	P703	0.00	0.00	Open	0
1040	☐	P705	0.00	0.00	Open	0
1041	☐	P707	0.00	0.00	Open	0
1042	☐	P709	0.00	0.00	Open	0
1043	☐	P711	0.00	0.00	Open	0
1044	☐	P713	0.00	0.00	Open	0
1045	☐	P717	0.00	0.00	Open	0
1046	☐	P719	0.00	0.00	Open	0
1047	☐	P723	0.00	0.00	Open	0
1048	☐	P73	0.00	0.00	Open	0
1049	☐	P731	0.01	0.36	Open	0
1050	☐	P733	0.01	0.36	Open	0
1051	☐	P735	0.00	0.00	Open	0
1052	☐	P737	0.01	1.82	Open	0
1053	☐	P739	0.00	0.00	Open	0
1054	☐	P743	0.14	0.41	Open	0
1055	☐	P745	0.00	0.02	Open	0
1056	☐	P747	0.00	0.00	Open	0
1057	☐	P749	0.00	0.00	Open	0
1058	☐	P751	0.00	0.00	Open	0
1059	☐	P753	0.00	0.00	Open	0
1060	☐	P755	0.00	0.00	Closed	0
1061	☐	P757	0.00	0.00	Open	0
1062	☐	P759	0.00	0.00	Open	0
1063	☐	P761	0.00	0.00	Open	0
1064	☐	P763	0.00	0.00	Open	0
1065	☐	P765	0.00	0.00	Open	0
1066	☐	P773	0.00	0.00	Open	0
1067	☐	P775	0.00	0.01	Open	0
1068	☐	P777	0.02	0.07	Open	0
1069	☐	P779	0.00	0.00	Open	0
1070	☐	P781	0.00	0.00	Open	0
1071	☐	P783	0.00	0.01	Open	0

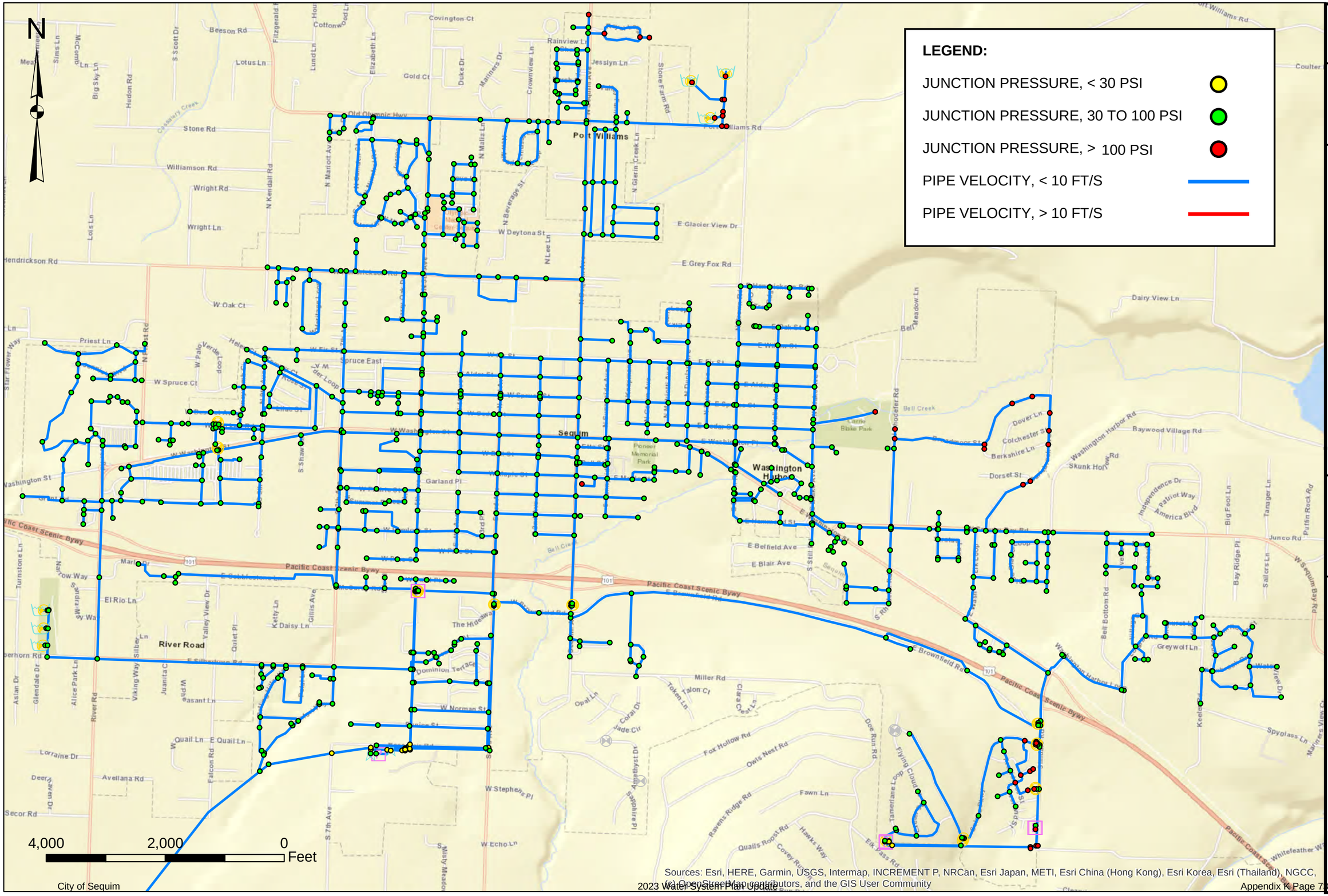
		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
1072	☐	P785	0.06	0.13	Open	0
1073	☐	P787	0.00	0.00	Open	0
1074	☐	P789	0.14	0.21	Open	0
1075	☐	P79	0.00	0.02	Open	0
1076	☐	P791	0.08	0.45	Open	0
1077	☐	P793	0.11	0.22	Open	0
1078	☐	P795	0.01	0.02	Open	0
1079	☐	P797	0.02	0.10	Open	0
1080	☐	P799	0.00	0.00	Open	0
1081	☐	P801	0.00	0.02	Open	0
1082	☐	P803	0.01	0.03	Open	0
1083	☐	P805	0.06	0.08	Open	0
1084	☐	P807	0.00	0.00	Open	0
1085	☐	P809	0.02	0.04	Open	0
1086	☐	P811	0.02	1.72	Open	0
1087	☐	P813	0.00	0.00	Open	0
1088	☐	P815	0.05	0.24	Open	0
1089	☐	P817	0.00	0.00	Open	0
1090	☐	P819	0.00	0.00	Open	0
1091	☐	P821	0.03	2.42	Open	0
1092	☐	P823	0.04	2.42	Open	0
1093	☐	P825	0.00	0.00	Open	0
1094	☐	P827	0.03	2.42	Open	0
1095	☐	P829	0.00	0.00	Open	0
1096	☐	P83	0.00	0.00	Open	0
1097	☐	P831	0.00	0.39	Open	0
1098	☐	P843	0.00	0.00	Open	0
1099	☐	P845	0.05	3.82	Open	0
1100	☐	P865	0.00	0.00	Open	0
1101	☐	P867	0.00	0.01	Open	0
1102	☐	P869	0.00	0.00	Open	0
1103	☐	P87	0.00	0.09	Open	0
1104	☐	P871	0.00	0.00	Open	0
1105	☐	P873	0.00	0.00	Open	0
1106	☐	P875	0.00	0.00	Open	0
1107	☐	P877	0.00	0.00	Open	0
1108	☐	P879	0.00	0.00	Open	0
1109	☐	P881	0.00	0.00	Open	0
1110	☐	P883	0.00	0.00	Open	0
1111	☐	P885	0.00	0.00	Open	0
1112	☐	P887	0.00	0.00	Open	0
1113	☐	P889	0.08	3.51	Open	0
1114	☐	P89	0.01	0.05	Open	0
1115	☐	P891	0.07	3.51	Open	0
1116	☐	P893	0.00	0.07	Open	0
1117	☐	P895	0.00	0.00	Open	0
1118	☐	P897	0.00	0.00	Open	0
1119	☐	P899	0.00	0.00	Open	0
1120	☐	P901	0.00	0.00	Closed	0
1121	☐	P903	0.00	0.00	Open	0
1122	☐	P905	0.00	0.00	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
1123	☐	P907	0.00	0.00	Open	0
1124	☐	P909	0.00	0.00	Open	0
1125	☐	P91	0.00	0.00	Open	0
1126	☐	P911	0.12	1.96	Open	0
1127	☐	P913	0.12	1.96	Open	0
1128	☐	P915	0.00	0.00	Open	0
1129	☐	P917	0.00	0.00	Open	0
1130	☐	P919	0.00	0.00	Open	0
1131	☐	P921	0.00	0.00	Open	0
1132	☐	P923	0.00	0.00	Open	0
1133	☐	P925	0.00	0.00	Open	0
1134	☐	P927	0.00	0.00	Open	0
1135	☐	P929	0.00	0.00	Closed	0
1136	☐	P93	0.00	0.00	Closed	0
1137	☐	P931	0.00	0.00	Open	0
1138	☐	P933	0.00	0.00	Open	0
1139	☐	P935	0.00	0.00	Open	0
1140	☐	P937	0.00	0.00	Open	0
1141	☐	P939	0.00	0.00	Open	0
1142	☐	P941	0.00	0.00	Open	0
1143	☐	P943	0.00	0.00	Open	0
1144	☐	P945	0.00	0.00	Open	0
1145	☐	P947	0.00	0.00	Open	0
1146	☐	P949	0.00	0.00	Open	0
1147	☐	P951	0.00	0.00	Open	0
1148	☐	P953	0.00	0.00	Open	0
1149	☐	P955	0.00	0.00	Open	0
1150	☐	P957	0.00	0.00	Open	0
1151	☐	P959	0.00	0.00	Open	0
1152	☐	P961	0.00	0.03	Open	0
1153	☐	P963	0.00	0.00	Closed	0
1154	☐	P965	0.21	0.76	Open	0
1155	☐	P967	0.00	0.00	Open	0
1156	☐	P969	0.68	24.34	Open	0
1157	☐	P971	0.61	24.34	Open	0
1158	☐	P973	0.00	0.02	Open	0
1159	☐	P975	0.00	0.00	Closed	0
1160	☐	P977	0.00	0.00	Closed	0
1161	☐	P979	0.00	0.00	Closed	0
1162	☐	P981	0.00	0.00	Closed	0
1163	☐	P983	0.00	0.00	Open	0
1164	☐	P985	0.00	0.00	Open	0
1165	☐	P987	0.01	0.04	Open	0
1166	☐	P989	0.00	0.00	Open	0
1167	☐	P99	0.02	0.14	Open	0
1168	☐	P991	0.00	0.00	Open	0
1169	☐	P993	0.00	0.00	Open	0
1170	☐	P995	0.00	0.00	Open	0
1171	☐	P997	0.00	0.00	Open	0
1172	☐	P999	0.00	0.00	Open	0

		ID	Flow (gpm)	Elevation (ft)	Head (ft)	% Full (%)	Level (ft)	Overflow Volume (ft3)	Total Overflow Volume (ft3)
1	☐	SOLANA_RES	-366.16	662.00	678.20	90.00	16.20	0.00	0.00
2	☐	T5000	-92.13	430.00	475.90	90.00	45.90	0.00	0.00
3	☐	T5002	-914.07	391.00	417.10	90.00	26.10	0.00	0.00

		ID	Diameter (in)	Elevation (ft)	Upstream Pressure (psi)	Downstream Pressure (psi)	Flow (gpm)
1	☐	PW_WELL_1	6.00	106.00	116.62	107.63	600.00
2	☐	PW_WELL_2	6.00	94.00	122.62	112.17	0.00
3	☐	PW_WELL_3	6.00	100.00	120.02	109.57	0.00
4	☐	SILB_1_FCV	6.00	310.00	51.94	47.00	300.00
5	☐	SILB_2_FCV	6.00	310.00	52.00	46.86	0.00
6	☐	SILB_3_FCV	6.00	310.00	52.00	46.78	0.00
7	☐	V8000	12.00	490.00	-0.00	-28.61	350.00
8	☐	V8002	2.00	239.00	73.26	48.99	0.00
9	☐	V8004	8.00	239.00	73.25	49.00	837.16
10	☐	V8006	8.00	239.00	77.00	47.51	0.00
11	☐	V8008	2.00	239.00	77.00	47.51	0.00
12	☐	V8010	2.00	230.00	80.89	80.89	0.00
13	☐	V8012	6.00	230.00	80.89	80.89	15.88
14	☐	V8014	8.00	250.00	72.31	44.07	0.00
15	☐	V8016	2.00	250.00	72.31	44.07	0.00
16	☐	V8018	2.00	254.00	119.77	65.04	279.29
17	☐	V8020	6.00	254.00	119.79	65.00	0.00
18	☐	V8022	2.00	266.00	114.64	59.80	0.00
19	☐	V8024	6.00	266.00	114.64	59.80	0.00
20	☐	V8026	2.00	462.00	93.45	29.99	0.00
21	☐	V8028	8.00	462.00	93.44	30.00	335.69
22	☐	V8036	3.00	243.00	69.71	44.98	0.00
23	☐	V8038	8.00	243.00	69.69	45.00	429.42
24	☐	V8044	6.00	222.00	79.44	54.79	0.00
25	☐	V8046	2.00	222.00	79.44	54.79	0.00
26	☐	V8048	8.00	660.00	56.00	8.18	1,167.62
27	☐	V8050	6.00	250.00	72.31	72.31	0.00
28	☐	V8052	6.00	250.00	44.07	44.07	0.00

		ID	Velocity (ft/s)	Headloss (ft)	Status	Setting
1	☐	PW_WELL_1	6.81	20.75	Active	600.00
2	☐	PW_WELL_2	0.00	0.00	Closed	0.00
3	☐	PW_WELL_3	0.00	0.00	Closed	0.00
4	☐	SILB_1_FCV	3.40	11.40	Active	300.00
5	☐	SILB_2_FCV	0.00	0.00	Closed	0.00
6	☐	SILB_3_FCV	0.00	0.00	Closed	0.00
7	☐	V8000	0.99	66.02	Active	350.00
8	☐	V8002	0.00	0.00	Closed	0.00
9	☐	V8004	5.34	55.97	Active	49.00
10	☐	V8006	0.00	0.00	Closed	45.00
11	☐	V8008	0.00	0.00	Closed	0.00
12	☐	V8010	0.00	0.00	Closed	0.00
13	☐	V8012	0.18	0.01	Open	0.00
14	☐	V8014	0.00	0.00	Closed	44.00
15	☐	V8016	0.00	0.00	Closed	0.00
16	☐	V8018	28.52	126.31	Open	68.00
17	☐	V8020	0.00	0.00	Closed	52.00
18	☐	V8022	0.00	0.00	Closed	0.00
19	☐	V8024	0.00	0.00	Closed	0.00
20	☐	V8026	0.00	0.00	Closed	0.00
21	☐	V8028	2.14	146.41	Active	30.00
22	☐	V8036	0.00	0.00	Closed	0.00
23	☐	V8038	2.74	56.97	Active	45.00
24	☐	V8044	0.00	0.00	Closed	53.00
25	☐	V8046	0.00	0.00	Closed	0.00
26	☐	V8048	7.45	110.36	Active	56.00
27	☐	V8050	0.00	0.00	Open	78.00
28	☐	V8052	0.00	0.00	Open	40.00



City of Sequim

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

SHEET X	OF X	
DATE JUNE 2021	SCALE AS SHOWN	PROJECT 2020-016

City of Sequim WASHINGTON
CLALLAM COUNTY

FIGURE 3:
2031 PEAK HOUR DEMAND RESULTS

CITY OF SEQUIM

WILSON ENGINEERING

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
1	☐	J100	5.76	225.89	347.55	52.72
2	☐	J1000	2.17	213.42	342.64	55.99
3	☐	J1006	3.12	266.13	389.74	53.56
4	☐	J1008	29.02	242.31	385.11	61.88
5	☐	J1014	7.96	141.48	346.76	88.95
6	☐	J1016	4.75	126.03	347.18	95.82
7	☐	J1018	10.86	123.39	347.18	96.97
8	☐	J102	5.27	235.94	346.70	47.99
9	☐	J1020	3.67	124.45	347.36	96.58
10	☐	J1022	0.00	123.17	347.36	97.14
11	☐	J1024	0.00	94.00	349.10	110.54
12	☐	J1030	0.00	105.32	348.93	105.55
13	☐	J1032	0.00	104.17	349.10	106.13
14	☐	J1042	0.00	103.78	349.10	106.30
15	☐	J1044	0.68	268.00	415.64	63.97
16	☐	J1048	1.29	295.00	415.77	52.33
17	☐	J1050	1.24	294.00	415.74	52.75
18	☐	J1052	3.29	292.00	415.74	53.61
19	☐	J1054	7.37	295.00	415.73	52.31
20	☐	J1056	6.75	297.00	415.74	51.45
21	☐	J1058	1.65	295.00	415.74	52.32
22	☐	J106	4.08	246.33	346.77	43.52
23	☐	J1064	0.25	310.03	416.47	46.12
24	☐	J1068	0.68	305.86	416.47	47.93
25	☐	J1074	0.00	296.59	416.49	51.95
26	☐	J1076	1.10	297.28	416.49	51.66
27	☐	J108	9.57	348.60	475.04	54.78
28	☐	J1080	1.79	297.26	416.46	51.65
29	☐	J1084	3.23	311.64	416.51	45.44
30	☐	J1086	0.25	306.53	416.54	47.67
31	☐	J1088	1.32	306.53	416.54	47.67
32	☐	J1090	3.12	305.99	416.54	47.90
33	☐	J1092	0.17	320.32	416.62	41.73
34	☐	J1094	2.93	320.08	416.62	41.83
35	☐	J1096	0.00	337.99	416.72	34.11
36	☐	J1098	0.00	335.67	416.72	35.12
37	☐	J110	0.00	340.55	416.46	32.89
38	☐	J1100	0.00	345.44	416.90	30.96
39	☐	J1102	3.90	217.74	345.82	55.50
40	☐	J1106	4.27	196.86	345.55	64.43
41	☐	J1110	0.50	160.66	343.25	79.12
42	☐	J1112	0.00	163.66	343.40	77.88
43	☐	J1114	0.00	163.66	343.40	77.88
44	☐	J1116	5.54	165.59	343.64	77.15
45	☐	J1118	1.24	286.91	415.61	55.77
46	☐	J1120	13.76	302.00	415.55	49.20
47	☐	J1128	0.88	132.04	346.89	93.09
48	☐	J1130	1.16	129.03	346.89	94.40
49	☐	J1132	0.16	132.48	346.89	92.91
50	☐	J1134	0.24	131.95	346.89	93.13
51	☐	J1138	0.11	129.16	346.89	94.34

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
52		J1140	1.48	126.63	346.89	95.44
53		J1144	1.05	128.46	346.89	94.65
54		J1146	0.74	126.97	346.89	95.29
55		J1148	1.87	123.00	346.89	97.01
56		J1150	0.80	125.76	346.89	95.82
57		J1152	1.15	129.11	346.89	94.36
58		J1154	1.09	126.90	346.89	95.32
59		J1158	1.34	122.88	346.89	97.07
60		J1160	1.21	121.11	346.90	97.83
61		J1164	3.43	119.53	346.90	98.52
62		J1166	0.82	122.55	346.89	97.21
63		J1168	1.01	121.63	346.89	97.61
64		J1170	3.10	268.00	415.65	63.98
65		J1172	2.63	277.00	415.67	60.08
66		J1174	2.77	278.00	415.70	59.67
67		J1176	4.19	277.00	415.67	60.09
68		J1178	4.66	267.00	415.66	64.41
69		J118	19.63	312.62	474.89	70.31
70		J1180	2.91	264.00	415.66	65.71
71		J1182	1.35	262.00	415.65	66.58
72		J1184	1.43	261.00	415.65	67.01
73		J1186	1.64	261.00	415.65	67.01
74		J1188	1.53	263.00	415.65	66.14
75		J1190	2.00	260.00	415.65	67.44
76		J1192	2.52	277.00	415.68	60.09
77		J1194	1.34	277.00	415.68	60.09
78		J120	3.53	240.06	351.56	48.31
79		J1200	1.05	200.16	345.46	62.96
80		J1204	1.01	185.71	345.37	69.18
81		J1210	0.46	155.66	346.10	82.52
82		J1214	1.23	157.33	346.10	81.79
83		J1216	1.07	153.43	346.10	83.48
84		J1218	1.10	158.58	346.10	81.25
85		J122	0.00	250.00	416.05	71.95
86		J1220	0.41	160.10	346.10	80.59
87		J1222	0.16	161.69	346.10	79.91
88		J1224	3.35	185.29	345.47	69.41
89		J1226	4.53	193.06	345.47	66.04
90		J1228	12.12	196.09	345.47	64.73
91		J1234	3.53	185.30	345.47	69.40
92		J1244	1.09	265.00	415.59	65.25
93		J1246	2.12	291.00	415.65	54.01
94		J1248	4.78	277.00	415.59	60.05
95		J1250	2.53	285.00	415.61	56.59
96		J1252	1.89	285.00	415.61	56.59
97		J1254	4.90	285.00	415.61	56.59
98		J1256	7.40	290.00	415.63	54.44
99		J126	0.16	378.49	475.19	41.90
100		J1262	14.64	281.00	415.59	58.32
101		J1266	7.26	243.47	384.35	61.04
102		J1268	13.76	211.86	344.64	57.53

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
103	☐	J1272	0.94	142.47	342.24	86.56
104	☐	J1274	4.17	140.40	342.10	87.40
105	☐	J1276	3.46	141.11	341.85	86.98
106	☐	J128	0.39	364.03	475.09	48.12
107	☐	J1280	0.68	138.40	341.80	88.13
108	☐	J1282	6.28	148.61	341.80	83.71
109	☐	J1284	0.94	138.39	341.80	88.13
110	☐	J1286	3.37	138.15	341.79	88.24
111	☐	J1292	6.64	122.54	340.90	94.62
112	☐	J1298	2.39	123.04	340.90	94.40
113	☐	J1300	5.34	123.35	340.94	94.28
114	☐	J1306	11.65	119.88	341.02	95.82
115	☐	J1310	3.35	119.93	341.02	95.80
116	☐	J1316	0.72	134.16	341.97	90.05
117	☐	J1320	0.27	311.01	416.47	45.70
118	☐	J1322	0.68	310.62	416.47	45.87
119	☐	J1324	1.86	313.76	416.47	44.51
120	☐	J1326	0.39	311.98	416.47	45.27
121	☐	J1328	0.00	146.58	346.41	86.58
122	☐	J134	4.74	286.03	415.61	56.14
123	☐	J1344	2.31	285.26	416.29	56.77
124	☐	J1350	13.68	281.89	416.28	58.23
125	☐	J1352	2.97	280.23	416.29	58.95
126	☐	J1354	6.28	261.07	384.43	53.45
127	☐	J1356	0.05	261.07	384.43	53.45
128	☐	J1358	11.90	262.92	384.43	52.65
129	☐	J136	0.00	391.84	416.75	10.79
130	☐	J1360	4.78	278.66	530.36	109.06
131	☐	J1364	23.20	315.67	530.45	93.06
132	☐	J1366	6.03	317.60	530.44	92.23
133	☐	J1368	1.32	289.26	530.43	104.50
134	☐	J1370	0.14	154.02	346.10	83.23
135	☐	J1372	0.19	154.82	346.10	82.88
136	☐	J1374	0.16	243.85	389.74	63.22
137	☐	J1376	7.15	246.41	389.74	62.10
138	☐	J1380	3.64	248.28	389.74	61.29
139	☐	J1382	0.00	267.62	384.50	50.64
140	☐	J1386	0.00	268.61	384.44	50.19
141	☐	J1390	0.31	267.54	530.25	113.83
142	☐	J1392	0.72	165.19	345.72	78.22
143	☐	J1394	1.34	166.02	345.71	77.86
144	☐	J1396	4.83	280.00	415.67	58.79
145	☐	J1402	2.33	277.00	415.69	60.09
146	☐	J1404	1.76	277.00	415.68	60.09
147	☐	J1406	4.75	285.00	415.69	56.63
148	☐	J1416	1.05	153.13	342.64	82.12
149	☐	J142	1.86	302.50	416.34	49.33
150	☐	J1424	0.44	215.69	342.64	55.01
151	☐	J1426	1.92	248.00	415.62	72.63
152	☐	J1428	0.00	245.00	415.62	73.93
153	☐	J1432	0.00	245.00	415.62	73.93

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
154	☐	J1436	0.33	245.00	415.62	73.93
155	☐	J144	0.00	390.33	416.57	11.37
156	☐	J1442	1.62	247.00	415.62	73.06
157	☐	J1448	0.49	256.00	415.62	69.16
158	☐	J1450	1.16	239.80	415.60	76.17
159	☐	J1452	1.24	242.90	415.60	74.83
160	☐	J1456	0.00	147.96	341.03	83.66
161	☐	J1458	0.00	144.25	341.02	85.26
162	☐	J146	5.24	387.20	475.81	38.39
163	☐	J1460	4.11	139.89	341.01	87.15
164	☐	J1462	4.74	149.33	341.00	83.05
165	☐	J1464	4.63	166.16	341.00	75.76
166	☐	J1466	17.96	165.53	341.00	76.03
167	☐	J1468	1.51	165.68	341.00	75.97
168	☐	J1470	2.24	161.51	341.00	77.77
169	☐	J1472	1.70	161.51	341.00	77.77
170	☐	J1474	5.78	160.29	341.00	78.30
171	☐	J1476	2.69	143.56	341.00	85.55
172	☐	J1478	2.36	128.63	341.00	92.02
173	☐	J148	2.39	385.92	475.62	38.87
174	☐	J1480	2.08	136.35	341.00	88.68
175	☐	J1482	1.12	149.01	341.00	83.19
176	☐	J1484	2.31	152.79	341.00	81.55
177	☐	J1490	5.16	122.57	340.92	94.61
178	☐	J1492	4.34	141.54	341.01	86.43
179	☐	J1494	3.97	141.22	341.00	86.57
180	☐	J1498	2.17	122.53	340.89	94.61
181	☐	J150	14.06	364.86	474.97	47.71
182	☐	J1500	11.16	162.89	340.86	77.12
183	☐	J1502	4.01	156.46	340.87	79.91
184	☐	J1504	5.89	158.40	340.87	79.06
185	☐	J1506	3.04	122.95	340.90	94.44
186	☐	J1508	3.60	123.01	340.89	94.41
187	☐	J1510	3.18	129.66	340.89	91.52
188	☐	J1512	1.64	130.50	340.89	91.16
189	☐	J1514	0.00	180.61	341.14	69.56
190	☐	J1516	0.00	196.28	341.14	62.77
191	☐	J1518	3.78	177.39	341.28	71.01
192	☐	J152	9.63	363.45	475.00	48.33
193	☐	J1520	1.79	190.07	341.32	65.54
194	☐	J1522	0.00	164.45	341.40	76.67
195	☐	J1524	0.00	158.58	341.40	79.21
196	☐	J1526	2.96	183.41	341.32	68.42
197	☐	J1528	1.59	198.29	341.37	62.00
198	☐	J1530	1.95	195.44	341.37	63.23
199	☐	J1532	4.86	210.43	341.41	56.75
200	☐	J1534	1.94	215.27	341.54	54.71
201	☐	J1536	2.77	221.73	341.58	51.93
202	☐	J1538	0.85	205.08	341.62	59.16
203	☐	J1540	0.72	188.01	341.65	66.57
204	☐	J1542	2.35	207.39	341.55	58.13

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
205	☐	J1546	2.64	209.45	345.60	58.99
206	☐	J1550	1.81	210.59	345.60	58.50
207	☐	J1552	0.65	293.13	388.80	41.45
208	☐	J1554	1.35	283.81	388.80	45.49
209	☐	J1556	13.52	270.30	388.80	51.35
210	☐	J1558	0.77	268.41	388.80	52.17
211	☐	J156	0.00	393.80	416.66	9.91
212	☐	J1560	0.57	266.01	388.80	53.21
213	☐	J1562	1.10	252.20	388.80	59.19
214	☐	J1564	43.95	209.03	388.81	77.90
215	☐	J1568	4.17	258.87	415.58	67.90
216	☐	J1570	0.74	193.49	341.69	64.22
217	☐	J1572	0.00	190.98	341.84	65.36
218	☐	J1574	3.34	141.85	346.67	88.75
219	☐	J1576	5.18	150.46	346.64	85.01
220	☐	J1578	2.79	148.54	346.65	85.84
221	☐	J158	0.00	389.93	416.66	11.59
222	☐	J1582	6.37	142.62	346.57	88.37
223	☐	J1584	0.28	139.80	346.69	89.64
224	☐	J1588	0.60	141.56	343.43	87.47
225	☐	J1590	1.59	141.99	343.43	87.28
226	☐	J1592	2.19	145.89	343.43	85.60
227	☐	J1594	1.05	153.78	343.60	82.25
228	☐	J1596	0.82	155.37	343.70	81.60
229	☐	J1598	0.39	157.27	343.70	80.78
230	☐	J160	0.00	398.97	475.86	33.32
231	☐	J1600	2.28	158.94	343.78	80.09
232	☐	J1602	0.76	302.62	416.48	49.34
233	☐	J1604	1.46	304.87	416.49	48.37
234	☐	J1608	2.75	306.22	416.50	47.79
235	☐	J1610	7.13	154.41	342.18	81.36
236	☐	J1612	0.87	149.48	342.18	83.50
237	☐	J1614	0.16	117.02	346.90	99.61
238	☐	J1616	4.22	114.32	346.90	100.77
239	☐	J1618	3.32	109.22	346.90	102.99
240	☐	J1620	8.72	108.22	346.90	103.42
241	☐	J1622	4.56	399.42	531.00	57.01
242	☐	J1624	8.70	517.51	677.59	69.36
243	☐	J1626	12.14	580.88	789.82	90.53
244	☐	J1628	0.00	660.00	789.84	56.26
245	☐	J1632	3.51	303.94	530.43	98.14
246	☐	J1634	0.00	660.00	678.20	7.88
247	☐	J1638	5.87	613.44	789.82	76.42
248	☐	J1644	8.29	267.77	384.42	50.54
249	☐	J1646	2.77	125.85	340.92	93.19
250	☐	J1648	3.01	128.05	340.92	92.24
251	☐	J1650	0.00	266.00	384.42	51.31
252	☐	J1652	0.00	266.00	530.43	114.58
253	☐	J1654	0.14	653.87	789.83	58.91
254	☐	J1656	3.81	653.48	789.83	59.08
255	☐	J166	0.00	400.51	475.90	32.66

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
256	☐	J1660	0.00	660.00	678.19	7.88
257	☐	J1662	0.00	660.00	678.19	7.88
258	☐	J1664	1.32	283.59	530.41	106.95
259	☐	J1666	1.45	276.63	530.40	109.96
260	☐	J1668	4.71	274.00	530.40	111.10
261	☐	J1670	1.43	122.51	340.92	94.64
262	☐	J1672	20.24	117.70	340.85	96.69
263	☐	J1678	0.47	171.28	344.06	74.86
264	☐	J1680	3.31	171.79	344.14	74.68
265	☐	J1682	4.00	171.54	344.06	74.75
266	☐	J1686	6.31	297.04	416.46	51.75
267	☐	J1698	6.58	268.66	415.59	63.66
268	☐	J1700	1.72	268.61	415.59	63.68
269	☐	J1702	12.40	274.35	415.58	61.20
270	☐	J1704	2.36	255.25	415.59	69.47
271	☐	J1706	11.29	262.25	415.59	66.44
272	☐	J1712	6.14	212.00	415.61	88.22
273	☐	J1714	3.56	210.00	415.61	89.09
274	☐	J1716	1.79	205.00	415.61	91.26
275	☐	J1718	1.48	212.00	415.61	88.22
276	☐	J1720	1.54	230.00	415.61	80.42
277	☐	J1722	2.08	261.00	415.61	66.99
278	☐	J1724	2.91	250.00	415.61	71.76
279	☐	J1726	1.42	252.00	415.61	70.89
280	☐	J1728	2.31	245.00	415.61	73.92
281	☐	J1730	2.66	235.00	415.61	78.26
282	☐	J1734	6.96	238.00	415.63	76.97
283	☐	J1742	10.97	218.00	415.61	85.63
284	☐	J1746	2.01	213.00	415.61	87.79
285	☐	J1750	0.94	242.00	415.61	75.22
286	☐	J1752	0.00	234.00	415.61	78.69
287	☐	J1754	40.15	244.35	343.34	42.89
288	☐	J1760	1.86	152.19	342.45	82.44
289	☐	J1762	1.53	146.83	342.18	84.65
290	☐	J1764	2.82	148.51	342.18	83.92
291	☐	J1768	0.87	138.57	341.80	88.06
292	☐	J1774	5.15	133.45	342.09	90.40
293	☐	J178	0.00	393.73	416.60	9.91
294	☐	J1780	1.90	138.84	342.60	88.29
295	☐	J1782	0.55	140.94	341.80	87.03
296	☐	J1784	0.63	150.32	341.80	82.97
297	☐	J1786	10.48	123.63	341.39	94.35
298	☐	J1788	5.26	131.70	341.39	90.86
299	☐	J1790	0.11	122.89	340.92	94.47
300	☐	J1792	9.43	128.36	340.92	92.10
301	☐	J1794	2.83	131.27	340.92	90.84
302	☐	J1798	0.71	216.84	345.28	55.65
303	☐	J18	2.09	144.33	342.71	85.96
304	☐	J1800	1.21	217.16	345.28	55.51
305	☐	J1802	2.80	196.02	345.19	64.63
306	☐	J1804	1.81	155.73	346.10	82.49

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
307		J1806	2.96	157.96	346.10	81.52
308		J1808	6.74	172.91	345.69	74.87
309		J1810	2.58	165.12	345.70	78.25
310		J1812	3.76	167.01	345.70	77.43
311		J1814	2.12	175.03	345.69	73.95
312		J1816	1.68	169.66	345.69	76.28
313		J182	0.00	394.41	416.63	9.63
314		J1822	3.02	166.92	345.70	77.47
315		J1826	0.52	190.67	345.47	67.08
316		J1828	1.37	266.00	415.60	64.82
317		J1830	0.55	266.00	415.60	64.82
318		J1832	0.00	258.00	415.59	68.28
319		J1834	5.73	275.67	415.59	60.63
320		J1836	21.52	275.56	415.58	60.67
321		J1838	10.03	264.15	415.59	65.62
322		J1840	5.02	275.00	415.59	60.92
323		J1842	0.42	126.79	347.19	95.50
324		J1844	2.27	303.42	530.43	98.37
325		J1846	11.11	322.96	530.41	89.89
326		J1848	5.79	333.62	530.42	85.27
327		J1850	1.84	302.42	530.43	98.80
328		J1852	9.68	584.48	789.82	88.97
329		J1854	0.00	460.56	677.65	94.07
330		J1858	0.00	346.11	678.19	143.89
331		J186	0.00	391.87	416.59	10.71
332		J1860	0.00	345.26	678.19	144.26
333		J1862	0.00	352.19	678.19	141.26
334		J1864	0.00	352.96	678.19	140.92
335		J1866	14.20	209.07	344.63	58.74
336		J1870	12.95	232.86	342.58	47.54
337		J1872	2.46	199.16	341.53	61.69
338		J1874	7.32	210.18	341.53	56.91
339		J1878	27.40	194.61	341.51	63.65
340		J1882	7.40	198.25	341.52	62.08
341		J1884	41.98	189.87	341.49	65.70
342		J1886	6.19	199.26	341.53	61.64
343		J1890	16.59	200.07	341.51	61.28
344		J1892	96.88	226.48	341.46	49.82
345		J1894	4.03	238.25	341.63	44.79
346		J1896	7.41	214.36	341.57	55.12
347		J1898	6.77	234.76	341.57	46.28
348		J1902	9.84	239.15	341.56	44.38
349		J1904	4.91	244.20	341.61	42.21
350		J1906	4.45	237.50	341.61	45.11
351		J1908	10.10	219.18	342.06	53.24
352		J1910	1.34	228.87	342.06	49.05
353		J1912	5.10	227.33	342.06	49.71
354		J1914	11.13	216.38	342.07	54.46
355		J1920	18.21	239.11	342.57	44.83
356		J1922	9.73	237.77	342.57	45.41
357		J1924	21.97	242.84	343.34	43.54

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
358		J1934	13.36	184.24	345.37	69.82
359		J1936	5.24	186.73	345.45	68.77
360		J1938	2.91	187.66	345.47	68.38
361		J1940	0.88	190.98	345.47	66.94
362		J1942	2.33	243.42	398.98	67.40
363		J1944	2.85	230.46	389.87	69.07
364		J1946	8.12	245.99	393.26	63.81
365		J1950	0.00	242.76	398.93	67.67
366		J1952	0.00	242.38	352.07	47.53
367		J1954	1.51	270.00	415.59	63.09
368		J1956	4.52	272.00	415.59	62.22
369		J1958	0.00	255.00	415.63	69.60
370		J1962	0.00	254.00	415.63	70.03
371		J1968	2.75	290.00	415.63	54.44
372		J1970	5.34	253.03	415.59	70.43
373		J1974	3.70	299.67	416.46	50.61
374		J1976	4.82	178.97	344.27	71.62
375		J1978	0.77	171.84	344.10	74.64
376		J1980	26.29	177.12	344.84	72.67
377		J1986	1.87	190.40	345.35	67.14
378		J1990	0.74	193.48	345.34	65.80
379		J1992	1.67	195.52	345.34	64.92
380		J1996	1.90	280.00	415.67	58.79
381		J1998	5.13	285.00	415.67	56.62
382		J20	3.12	151.83	343.01	82.84
383		J200	0.00	388.46	416.57	12.18
384		J2000	2.41	291.00	415.72	54.04
385		J2006	5.01	295.00	415.71	52.30
386		J2008	13.60	285.00	415.59	56.59
387		J2010	15.42	290.00	415.62	54.43
388		J2012	3.89	203.61	342.07	59.99
389		J2014	3.16	202.36	342.07	60.54
390		J2016	6.96	219.71	341.53	52.79
391		J2020	0.00	305.00	415.55	47.90
392		J2022	0.38	302.00	415.55	49.20
393		J2024	8.67	301.00	415.55	49.64
394		J2028	4.55	171.26	345.77	75.61
395		J2030	0.55	159.65	345.90	80.70
396		J2032	4.17	156.59	345.79	81.98
397		J2034	2.01	157.56	345.81	81.57
398		J2036	0.14	156.39	345.81	82.08
399		J2038	6.58	166.39	345.78	77.73
400		J2044	1.90	255.88	415.58	69.20
401		J2046	2.30	256.70	415.58	68.85
402		J2048	1.32	267.19	415.59	64.30
403		J2050	0.00	118.27	346.90	99.07
404		J2052	0.19	117.00	346.90	99.62
405		J2054	2.53	220.11	345.28	54.23
406		J2056	1.02	232.54	345.28	48.85
407		J206	0.00	389.71	416.59	11.65
408		J2062	3.29	231.40	415.59	79.81

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
409	☐	J2064	10.97	235.79	415.59	77.90
410	☐	J2068	2.61	220.55	345.84	54.29
411	☐	J2070	2.03	222.27	345.85	53.55
412	☐	J2072	1.65	221.72	345.85	53.78
413	☐	J2074	5.82	218.03	345.79	55.36
414	☐	J2078	9.19	225.32	345.85	52.23
415	☐	J208	0.00	390.45	416.59	11.33
416	☐	J2082	8.94	293.47	474.90	78.61
417	☐	J2084	4.23	288.46	474.90	80.78
418	☐	J2090	25.14	107.24	340.92	101.26
419	☐	J2092	14.87	110.19	340.93	99.98
420	☐	J2094	12.56	112.01	340.93	99.19
421	☐	J2096	5.10	109.22	340.92	100.40
422	☐	J2098	0.00	85.35	340.75	110.66
423	☐	J210	0.00	391.07	416.59	11.06
424	☐	J2100	20.21	85.61	340.75	110.55
425	☐	J2102	1.97	161.54	343.91	79.02
426	☐	J2104	0.00	490.00	423.48	-28.83
427	☐	J2106	0.61	322.50	416.64	40.79
428	☐	J2108	3.35	317.77	416.61	42.83
429	☐	J2110	3.16	318.04	416.61	42.71
430	☐	J2114	11.91	184.46	340.95	67.81
431	☐	J212	0.25	303.07	416.34	49.08
432	☐	J2122	2.35	195.76	340.95	62.91
433	☐	J2124	3.64	170.32	340.95	73.94
434	☐	J2126	2.41	193.13	340.95	64.05
435	☐	J2128	8.20	176.98	340.96	71.05
436	☐	J2130	6.71	181.47	340.95	69.11
437	☐	J2134	0.00	338.30	416.73	33.98
438	☐	J2136	4.25	379.00	475.20	41.68
439	☐	J2138	0.00	380.68	475.20	40.95
440	☐	J214	8.47	270.49	415.84	62.98
441	☐	J2140	19.45	231.88	340.84	47.21
442	☐	J2142	15.93	183.06	340.84	68.36
443	☐	J2144	12.37	196.17	340.84	62.68
444	☐	J2146	0.19	214.91	340.84	54.56
445	☐	J2148	9.41	213.93	340.84	54.99
446	☐	J2150	0.94	210.31	340.84	56.56
447	☐	J2152	0.42	208.12	340.84	57.51
448	☐	J2154	2.12	200.51	340.84	60.80
449	☐	J2156	0.65	199.99	340.84	61.03
450	☐	J2158	4.56	200.38	340.84	60.86
451	☐	J2160	2.27	199.99	340.84	61.03
452	☐	J2162	10.51	139.13	341.00	87.47
453	☐	J2168	28.57	75.87	340.74	114.77
454	☐	J2172	38.40	70.69	340.75	117.02
455	☐	J2176	3.38	68.63	340.76	117.92
456	☐	J2180	4.17	69.65	340.77	117.48
457	☐	J2184	3.49	71.26	340.78	116.78
458	☐	J2188	5.24	88.68	340.81	109.25
459	☐	J2190	13.85	95.11	340.82	106.47

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
460		J2198	2.90	262.00	415.59	66.55
461		J22	4.01	146.62	342.70	84.96
462		J220	1.62	277.42	415.74	59.93
463		J2200	4.71	258.00	415.59	68.28
464		J2202	3.92	271.00	415.63	62.67
465		J2204	0.00	260.00	415.63	67.43
466		J2206	1.01	269.00	415.63	63.53
467		J2208	3.84	271.00	415.63	62.67
468		J2210	3.16	269.00	415.63	63.53
469		J2212	17.71	224.18	385.98	70.11
470		J2214	23.69	226.68	385.94	69.01
471		J2216	0.00	239.41	346.13	46.24
472		J2220	0.00	256.90	346.73	38.92
473		J2222	0.00	258.05	384.22	54.67
474		J2224	11.52	167.86	345.38	76.92
475		J2226	2.33	161.73	345.38	79.58
476		J2228	1.68	129.49	346.93	94.21
477		J2230	0.74	134.33	346.89	92.10
478		J2232	1.15	129.07	346.93	94.40
479		J2234	2.22	132.48	346.93	92.92
480		J2238	6.45	168.60	345.62	76.71
481		J224	1.07	270.74	415.84	62.87
482		J2240	11.55	164.62	345.69	78.46
483		J2248	1.79	148.85	342.24	83.80
484		J2250	0.54	153.16	342.24	81.93
485		J2252	1.15	153.53	342.24	81.77
486		J2254	0.31	149.48	341.80	83.33
487		J2256	0.69	151.31	341.80	82.54
488		J2260	0.71	137.61	341.80	88.47
489		J2264	8.80	194.76	345.34	65.24
490		J2266	6.99	206.81	345.34	60.03
491		J2272	0.00	295.00	415.73	52.31
492		J2276	4.74	171.90	345.69	75.31
493		J2280	0.74	165.43	345.69	78.11
494		J2284	1.67	168.63	345.69	76.72
495		J2288	1.35	168.94	345.69	76.59
496		J2290	3.08	169.76	345.69	76.23
497		J2296	0.83	167.27	345.69	77.31
498		J230	2.35	295.20	416.31	52.48
499		J2300	1.40	169.82	345.74	76.23
500		J2304	9.05	166.53	345.64	77.61
501		J2306	11.46	173.16	345.61	74.72
502		J2308	6.28	159.06	345.77	80.90
503		J2310	3.97	149.09	342.68	83.88
504		J2312	0.00	105.02	349.10	105.76
505		J2314	5.78	203.40	345.57	61.60
506		J2316	0.00	341.09	416.46	32.66
507		J2318	0.47	292.83	416.29	53.50
508		J2324	0.00	395.63	417.06	9.29
509		J2326	0.00	379.48	416.56	16.07
510		J2330	11.93	304.15	416.34	48.61

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
511		J2332	10.67	276.98	415.74	60.13
512		J2336	0.31	260.04	416.03	67.59
513		J2338	0.44	213.73	345.28	57.00
514		J2340	1.31	238.27	415.59	76.84
515		J2344	3.31	227.74	346.06	51.27
516		J2346	3.02	246.86	346.06	42.99
517		J2348	2.14	218.47	345.79	55.17
518		J2350	1.94	228.49	349.03	52.23
519		J2352	7.05	316.57	474.99	68.64
520		J2354	6.88	210.39	345.84	58.69
521		J2356	3.78	213.64	347.39	57.95
522		J2358	1.67	198.28	345.19	63.66
523		J236	0.31	292.58	416.29	53.61
524		J2360	5.74	208.35	345.38	59.38
525		J2362	2.38	129.63	342.64	92.30
526		J2364	0.65	243.85	389.74	63.22
527		J2366	0.00	103.47	349.10	106.43
528		J2368	2.05	290.00	415.74	54.48
529		J2370	1.35	160.66	343.25	79.12
530		J2372	1.12	191.94	345.45	66.52
531		J2374	2.47	258.45	384.34	54.55
532		J2376	1.37	140.67	346.65	89.25
533		J2378	1.45	280.47	416.28	58.85
534		J238	3.60	296.63	416.29	51.85
535		J2382	1.94	114.32	346.90	100.77
536		J2384	0.00	658.31	678.19	8.61
537		J2388	9.18	198.68	342.23	62.20
538		J2390	3.51	236.79	342.57	45.84
539		J2392	4.00	195.52	345.34	64.92
540		J2394	0.27	255.88	415.58	69.20
541		J2396	0.00	85.35	340.75	110.66
542		J2398	34.31	196.82	340.95	62.45
543		J24	4.03	153.89	343.03	81.95
544		J240	0.74	258.39	416.03	68.31
545		J2400	1.56	166.52	345.69	77.64
546		J2402	8.88	313.02	474.89	70.14
547		J2404	5.62	340.59	475.03	58.26
548		J2406	7.08	218.66	342.30	53.57
549		J2408	0.00	258.00	415.59	68.29
550		J2410	0.00	100.00	349.10	107.94
551		J2412	0.52	247.13	346.06	42.86
552		J2414	4.96	248.16	415.58	72.54
553		J2416	3.95	263.53	415.58	65.88
554		J2418	0.65	123.00	340.92	94.43
555		J242	2.00	253.65	416.03	70.36
556		J2420	2.96	122.91	340.92	94.46
557		J2422	0.25	119.50	341.02	95.99
558		J2424	0.68	138.92	346.76	90.06
559		J2426	2.57	137.10	346.83	90.88
560		J2428	2.46	212.08	345.30	57.72
561		J2430	1.50	290.00	415.71	54.47

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
562	☐	J2432	1.29	265.76	415.59	64.92
563	☐	J2434	0.00	308.85	416.47	46.63
564	☐	J2436	0.00	305.53	416.47	48.07
565	☐	J2438	0.00	302.92	416.47	49.20
566	☐	J244	1.75	262.94	416.03	66.33
567	☐	J2440	3.24	246.04	389.74	62.27
568	☐	J2442	6.74	240.93	341.56	43.60
569	☐	J2444	0.00	269.58	530.31	112.97
570	☐	J2446	0.00	462.00	531.20	29.98
571	☐	J2448	0.00	462.00	677.55	93.40
572	☐	J2450	0.00	474.45	677.59	88.02
573	☐	J2460	3.48	284.47	415.59	56.81
574	☐	J2462	0.00	313.22	416.38	44.70
575	☐	J2464	0.00	307.46	384.42	33.35
576	☐	J2466	0.00	313.43	678.19	158.05
577	☐	J2468	0.00	231.41	389.87	68.66
578	☐	J2470	0.00	232.59	345.24	48.81
579	☐	J2472	0.00	231.31	389.87	68.71
580	☐	J2474	0.00	232.16	345.24	49.00
581	☐	J2476	5.19	220.00	345.79	54.50
582	☐	J2478	0.00	250.00	351.54	44.00
583	☐	J248	0.00	250.00	416.05	71.95
584	☐	J2480	0.00	250.00	416.04	71.95
585	☐	J2482	2.47	281.00	530.43	108.08
586	☐	J2484	1.13	302.00	415.55	49.20
587	☐	J2486	13.61	206.00	341.52	58.72
588	☐	J2488	0.00	250.00	351.54	44.00
589	☐	J2490	0.00	250.00	416.04	71.95
590	☐	J2492	0.11	247.00	415.62	73.06
591	☐	J2494	0.00	245.00	345.27	43.45
592	☐	J2496	0.00	125.93	341.60	93.45
593	☐	J2498	0.00	268.34	530.25	113.49
594	☐	J250	0.91	256.00	416.06	69.35
595	☐	J2500	0.00	660.00	789.84	56.26
596	☐	J2502	0.00	280.47	416.28	58.85
597	☐	J2506	0.00	255.00	416.04	69.78
598	☐	J2508	0.00	250.00	351.54	44.00
599	☐	J2510	0.00	250.00	351.54	44.00
600	☐	J2512	0.00	300.00	416.08	50.30
601	☐	J2514	0.00	241.00	345.27	45.18
602	☐	J2516	0.00	216.68	345.28	55.72
603	☐	J2522	0.00	362.14	474.98	48.89
604	☐	J2524	0.00	181.98	340.84	68.84
605	☐	J2526	0.00	155.27	340.97	80.46
606	☐	J254	0.00	250.00	416.05	71.95
607	☐	J256	0.00	250.00	416.04	71.95
608	☐	J258	0.00	250.00	351.54	44.00
609	☐	J2592	0.00	189.59	345.12	67.39
610	☐	J2594	0.00	189.59	345.03	67.35
611	☐	J2598	2.91	179.67	345.17	71.71
612	☐	J26	2.44	152.78	342.49	82.20

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
613	☐	J260	1.70	217.60	345.34	55.35
614	☐	J2600	0.00	194.50	345.34	65.36
615	☐	J2606	0.70	201.00	345.34	62.54
616	☐	J2608	0.70	197.00	345.34	64.28
617	☐	J2610	0.70	197.00	345.34	64.28
618	☐	J2612	0.70	202.00	345.34	62.11
619	☐	J2614	0.70	196.00	345.34	64.71
620	☐	J2616	0.00	195.00	345.34	65.14
621	☐	J2618	2.28	133.00	347.00	92.73
622	☐	J262	3.57	218.39	345.32	55.00
623	☐	J2620	2.28	128.00	347.07	94.93
624	☐	J2622	2.28	131.00	347.02	93.60
625	☐	J2624	2.28	137.00	346.92	90.96
626	☐	J2626	2.28	133.00	346.94	92.70
627	☐	J2628	2.28	131.00	346.94	93.57
628	☐	J2630	2.28	145.00	346.88	87.47
629	☐	J2632	2.28	148.00	346.90	86.18
630	☐	J2634	2.28	145.00	346.91	87.49
631	☐	J2636	2.28	137.00	346.91	90.95
632	☐	J2638	2.28	137.00	346.91	90.95
633	☐	J264	1.92	243.37	415.59	74.62
634	☐	J2640	2.28	134.00	346.91	92.26
635	☐	J2642	2.28	144.00	346.91	87.92
636	☐	J2644	2.28	137.00	346.92	90.96
637	☐	J2646	0.00	149.85	346.85	85.36
638	☐	J2650	2.36	187.97	344.90	68.00
639	☐	J2652	2.36	0.00	344.82	149.41
640	☐	J266	2.64	220.30	415.59	84.62
641	☐	J268	10.64	207.14	345.34	59.88
642	☐	J274	1.16	236.99	345.27	46.92
643	☐	J276	5.68	226.08	345.28	51.65
644	☐	J28	3.57	156.87	342.92	80.62
645	☐	J282	2.03	218.31	345.28	55.02
646	☐	J284	1.54	218.38	345.28	54.98
647	☐	J288	1.31	218.75	345.28	54.82
648	☐	J290	1.54	225.44	345.28	51.92
649	☐	J292	1.12	233.91	345.28	48.25
650	☐	J294	2.05	223.31	345.28	52.85
651	☐	J296	1.56	231.72	345.27	49.20
652	☐	J30	1.45	151.69	342.73	82.78
653	☐	J302	0.58	235.00	345.27	47.78
654	☐	J306	0.00	228.00	345.28	50.82
655	☐	J312	2.83	228.59	345.28	50.56
656	☐	J314	2.16	225.77	345.28	51.78
657	☐	J316	8.18	217.52	345.29	55.36
658	☐	J32	1.15	161.63	343.32	78.73
659	☐	J322	4.19	213.60	345.30	57.06
660	☐	J324	2.41	222.28	345.86	53.55
661	☐	J326	0.30	214.09	345.77	57.06
662	☐	J328	3.84	246.99	415.59	73.05
663	☐	J330	2.63	236.47	346.06	47.49

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
664	☐	J332	1.98	235.07	346.06	48.09
665	☐	J334	4.09	269.04	346.76	33.68
666	☐	J336	3.27	260.22	346.77	37.50
667	☐	J34	0.00	105.02	349.10	105.76
668	☐	J340	7.98	242.08	415.59	75.18
669	☐	J342	4.31	234.97	346.06	48.14
670	☐	J348	2.25	253.32	346.06	40.19
671	☐	J352	2.85	242.55	346.06	44.85
672	☐	J356	5.32	230.20	346.37	50.34
673	☐	J36	0.00	106.19	350.09	105.68
674	☐	J360	1.89	251.36	346.77	41.34
675	☐	J362	4.53	224.93	346.07	52.49
676	☐	J370	2.53	230.32	346.06	50.15
677	☐	J374	2.06	211.03	345.37	58.21
678	☐	J376	4.14	218.47	345.35	54.98
679	☐	J378	3.24	205.01	345.39	60.82
680	☐	J38	0.00	342.90	416.88	32.06
681	☐	J384	2.12	206.30	345.39	60.27
682	☐	J386	3.23	197.31	345.42	64.18
683	☐	J388	0.93	207.87	345.38	59.58
684	☐	J392	2.36	213.97	345.78	57.11
685	☐	J394	2.93	215.67	345.34	56.19
686	☐	J396	2.52	208.58	345.37	59.27
687	☐	J398	4.08	210.54	345.36	58.42
688	☐	J40	0.00	378.00	418.35	17.48
689	☐	J400	0.94	219.83	345.35	54.39
690	☐	J406	0.27	209.70	345.38	58.79
691	☐	J408	4.44	212.39	345.38	57.63
692	☐	J410	1.64	207.10	345.38	59.92
693	☐	J414	1.26	209.00	345.38	59.09
694	☐	J42	1.56	240.00	345.27	45.62
695	☐	J422	0.66	210.17	345.38	58.59
696	☐	J430	7.40	202.50	345.34	61.89
697	☐	J432	4.72	195.21	345.39	65.08
698	☐	J436	2.77	204.24	345.47	61.19
699	☐	J438	1.54	209.91	345.38	58.70
700	☐	J440	0.96	198.09	345.43	63.84
701	☐	J442	2.80	198.54	345.43	63.65
702	☐	J444	2.39	204.00	345.46	61.29
703	☐	J446	1.15	192.58	345.45	66.24
704	☐	J448	2.11	189.51	345.48	67.58
705	☐	J450	2.12	193.06	345.45	66.03
706	☐	J454	5.79	197.35	345.44	64.17
707	☐	J46	0.00	320.00	416.47	41.80
708	☐	J464	4.60	186.36	345.50	68.96
709	☐	J468	3.54	240.14	351.48	48.24
710	☐	J470	16.12	210.86	345.24	58.23
711	☐	J472	2.41	231.15	389.74	68.72
712	☐	J474	0.00	377.88	414.33	15.79
713	☐	J476	5.84	363.77	475.09	48.23
714	☐	J478	4.52	291.07	416.29	54.25

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
715	☐	J48	14.37	294.24	416.45	52.95
716	☐	J480	1.39	287.22	416.29	55.93
717	☐	J482	5.78	309.15	474.91	71.82
718	☐	J484	3.34	315.08	474.97	69.28
719	☐	J486	7.02	311.71	474.91	70.71
720	☐	J490	8.29	282.46	416.28	57.99
721	☐	J492	4.20	277.86	416.28	59.98
722	☐	J494	4.45	286.75	416.28	56.13
723	☐	J496	5.23	166.23	344.74	77.35
724	☐	J50	1.21	248.00	345.27	42.15
725	☐	J500	2.24	179.07	344.74	71.79
726	☐	J502	1.78	183.05	345.05	70.19
727	☐	J504	2.42	189.59	345.11	67.39
728	☐	J510	3.12	179.67	344.77	71.54
729	☐	J512	2.69	186.16	345.18	68.90
730	☐	J514	3.18	188.33	344.86	67.83
731	☐	J516	7.59	176.43	344.86	72.98
732	☐	J518	1.15	185.10	345.20	69.37
733	☐	J52	1.23	235.00	345.27	47.78
734	☐	J520	6.63	199.45	345.77	63.40
735	☐	J522	6.75	203.26	345.96	61.83
736	☐	J526	2.88	207.20	345.77	60.04
737	☐	J528	3.34	192.01	345.46	66.49
738	☐	J530	2.14	194.95	345.47	65.22
739	☐	J532	6.64	198.87	345.47	63.52
740	☐	J534	7.05	205.77	346.41	60.94
741	☐	J536	7.10	202.39	345.47	62.00
742	☐	J538	6.56	208.94	346.90	59.78
743	☐	J54	0.00	325.00	417.03	39.88
744	☐	J540	6.93	205.63	345.47	60.59
745	☐	J542	1.53	213.64	347.39	57.95
746	☐	J544	4.39	216.48	348.24	57.09
747	☐	J546	6.74	217.08	347.53	56.53
748	☐	J548	5.43	220.70	347.54	54.96
749	☐	J550	4.23	220.47	347.99	55.25
750	☐	J554	7.21	231.45	347.60	50.33
751	☐	J556	4.55	216.68	347.53	56.69
752	☐	J564	2.99	228.70	348.97	52.11
753	☐	J568	7.08	213.81	345.84	57.21
754	☐	J574	3.71	194.51	345.04	65.23
755	☐	J578	0.25	198.01	345.19	63.77
756	☐	J580	5.60	208.35	345.38	59.38
757	☐	J586	2.85	191.42	345.04	66.56
758	☐	J588	3.49	194.91	345.47	65.24
759	☐	J592	2.55	188.38	345.16	67.93
760	☐	J594	5.24	191.40	345.46	66.75
761	☐	J598	6.26	182.02	345.34	70.77
762	☐	J600	7.68	189.21	345.43	67.69
763	☐	J602	6.74	188.14	345.41	68.14
764	☐	J604	3.65	195.95	345.54	64.82
765	☐	J606	15.02	177.88	345.32	72.55

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
766		J608	15.36	185.91	345.36	69.09
767		J610	7.41	190.10	345.38	67.28
768		J612	6.50	195.87	345.42	64.80
769		J614	1.81	207.31	345.77	60.00
770		J616	3.27	200.53	345.47	62.80
771		J62	0.00	322.00	417.16	41.23
772		J620	3.45	198.95	345.46	63.48
773		J622	2.85	191.88	345.47	66.55
774		J624	3.34	191.43	345.45	66.74
775		J626	6.09	174.61	345.29	73.95
776		J628	6.28	180.51	345.29	71.40
777		J630	3.29	185.88	345.37	69.11
778		J632	3.46	184.91	345.37	69.53
779		J634	5.18	177.77	345.30	72.59
780		J64	0.00	322.00	417.16	41.23
781		J640	0.69	156.99	343.02	80.61
782		J642	3.26	163.74	343.25	77.78
783		J644	1.73	185.62	344.82	68.98
784		J646	1.65	174.84	344.20	73.38
785		J648	10.03	187.33	344.85	68.25
786		J652	2.28	182.98	344.83	70.13
787		J654	1.26	156.99	343.03	80.61
788		J656	9.92	162.86	343.03	78.07
789		J658	4.22	159.01	343.65	80.00
790		J66	0.00	315.00	417.55	44.43
791		J660	1.84	161.53	343.93	79.04
792		J662	3.87	164.10	343.62	77.79
793		J664	3.84	167.88	344.07	76.34
794		J666	1.72	168.02	343.49	76.03
795		J668	3.89	171.83	343.49	74.38
796		J670	1.87	178.49	344.74	72.04
797		J672	3.62	169.28	343.88	75.65
798		J674	5.98	172.38	344.66	74.65
799		J676	3.04	146.12	343.01	85.31
800		J678	3.84	160.49	343.43	79.27
801		J68	0.00	315.00	417.56	44.44
802		J680	4.14	155.26	343.47	81.55
803		J682	1.18	149.94	343.30	83.78
804		J686	3.34	156.63	343.27	80.87
805		J688	2.63	163.30	343.38	78.03
806		J690	2.16	158.95	343.27	79.87
807		J694	2.49	169.31	343.49	75.47
808		J696	1.70	149.19	343.43	84.16
809		J698	3.95	153.37	343.59	82.42
810		J70	0.00	315.00	417.55	44.43
811		J700	1.87	150.68	343.34	83.48
812		J702	1.81	157.61	345.71	81.50
813		J704	1.13	155.31	345.71	82.50
814		J708	2.11	157.84	345.71	81.40
815		J710	1.23	163.79	345.71	78.83
816		J712	2.20	160.48	345.71	80.26

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
817		J716	1.65	160.78	345.90	80.21
818		J72	0.00	318.00	417.35	43.05
819		J722	2.94	169.83	345.77	76.23
820		J724	1.70	169.50	345.77	76.38
821		J726	8.83	186.86	345.42	68.70
822		J728	4.23	188.50	345.37	67.97
823		J730	4.06	183.06	345.37	70.33
824		J734	0.90	190.21	345.35	67.22
825		J738	4.09	180.52	345.37	71.43
826		J74	0.00	318.00	417.35	43.05
827		J742	2.11	174.62	345.76	74.15
828		J744	2.11	172.54	345.77	75.06
829		J746	1.37	174.66	345.77	74.14
830		J748	2.25	170.40	345.77	75.99
831		J750	3.98	176.45	345.76	73.36
832		J752	0.27	172.13	345.75	75.23
833		J754	1.54	174.01	345.75	74.42
834		J756	5.78	177.46	345.65	72.88
835		J758	1.70	171.23	345.74	75.61
836		J76	2.83	186.73	345.52	68.80
837		J770	2.14	167.23	345.75	77.35
838		J772	0.68	164.11	345.72	78.69
839		J774	2.36	168.54	345.77	76.79
840		J776	1.26	172.42	345.75	75.10
841		J78	6.61	183.86	345.55	70.06
842		J780	1.87	175.97	345.76	73.57
843		J782	0.39	172.50	345.75	75.07
844		J784	2.01	173.81	345.75	74.50
845		J786	1.01	170.05	345.74	76.13
846		J788	0.31	170.93	345.74	75.74
847		J792	2.11	160.84	345.71	80.11
848		J794	1.15	165.73	345.72	77.99
849		J796	0.00	153.04	346.10	83.65
850		J798	0.00	103.67	348.93	106.27
851		J80	9.65	196.91	345.34	64.32
852		J800	1.70	133.85	346.97	92.34
853		J802	3.21	134.22	346.94	92.17
854		J804	0.90	140.85	346.91	89.29
855		J808	1.68	162.35	345.71	79.45
856		J810	1.57	154.77	345.71	82.73
857		J812	2.33	153.43	345.71	83.32
858		J814	1.90	145.37	346.88	87.32
859		J816	0.00	114.08	346.90	100.88
860		J818	1.61	182.06	342.64	69.58
861		J82	0.90	189.55	345.35	67.51
862		J820	2.25	182.76	342.64	69.28
863		J822	1.67	178.16	342.64	71.27
864		J824	1.67	179.08	342.64	70.87
865		J830	3.27	127.18	341.60	92.90
866		J832	0.08	121.92	340.90	94.88
867		J834	2.00	140.46	341.80	87.24

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
868	☐	J836	2.11	135.65	341.80	89.33
869	☐	J84	5.87	157.91	345.77	81.40
870	☐	J840	12.94	127.51	342.29	93.07
871	☐	J842	1.76	126.21	342.47	93.71
872	☐	J844	30.30	111.37	342.35	100.08
873	☐	J848	0.44	139.67	342.57	87.92
874	☐	J850	1.34	152.28	342.49	82.42
875	☐	J852	0.11	151.31	342.71	82.94
876	☐	J854	1.61	132.84	341.95	90.61
877	☐	J856	3.67	131.16	342.31	91.49
878	☐	J858	1.92	147.42	342.28	84.44
879	☐	J86	5.37	171.39	345.28	75.34
880	☐	J860	1.39	140.01	342.21	87.62
881	☐	J862	2.50	144.64	342.28	85.64
882	☐	J864	38.48	153.95	342.01	81.49
883	☐	J866	1.86	142.92	341.85	86.20
884	☐	J868	1.54	151.83	342.48	82.61
885	☐	J870	0.35	151.25	342.45	82.84
886	☐	J872	2.53	152.96	342.28	82.04
887	☐	J874	3.68	149.53	342.48	83.60
888	☐	J876	1.51	135.58	342.00	89.44
889	☐	J878	0.46	132.84	341.95	90.61
890	☐	J88	3.97	244.69	416.03	74.24
891	☐	J880	2.36	133.52	342.32	90.47
892	☐	J882	3.34	137.56	342.50	88.80
893	☐	J884	1.51	136.90	342.03	88.88
894	☐	J886	1.43	134.67	342.09	89.87
895	☐	J888	2.66	135.32	342.14	89.62
896	☐	J890	1.09	139.33	342.52	88.04
897	☐	J892	1.62	133.02	341.92	90.52
898	☐	J898	3.23	132.48	342.29	90.91
899	☐	J90	5.79	242.33	416.03	75.26
900	☐	J902	2.60	129.86	342.64	92.20
901	☐	J904	2.28	141.78	342.65	87.04
902	☐	J906	1.98	134.39	342.64	90.23
903	☐	J908	3.45	129.69	342.64	92.27
904	☐	J912	4.01	129.80	342.64	92.22
905	☐	J914	2.46	133.04	342.63	90.82
906	☐	J918	2.24	134.09	342.62	90.36
907	☐	J92	2.38	207.08	345.76	60.09
908	☐	J920	2.55	144.53	342.69	85.86
909	☐	J922	3.79	138.16	342.61	88.59
910	☐	J924	1.45	150.96	342.70	83.08
911	☐	J926	0.28	139.54	342.59	87.98
912	☐	J928	2.20	143.45	342.65	86.31
913	☐	J930	2.35	143.68	342.65	86.22
914	☐	J932	1.83	141.61	342.65	87.11
915	☐	J934	2.06	139.76	342.64	87.91
916	☐	J936	1.57	135.19	342.64	89.89
917	☐	J938	0.36	134.76	342.64	90.07
918	☐	J94	2.30	213.89	345.76	57.14

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
919	☐	J940	5.02	123.72	342.64	94.86
920	☐	J942	8.36	126.19	342.62	93.78
921	☐	J944	2.64	126.73	342.46	93.48
922	☐	J948	2.27	134.09	342.62	90.36
923	☐	J956	1.62	139.33	342.58	88.07
924	☐	J958	2.97	133.65	342.63	90.55
925	☐	J96	2.77	208.80	345.58	59.27
926	☐	J960	6.11	126.95	342.59	93.43
927	☐	J962	3.07	126.05	342.50	93.79
928	☐	J968	5.74	125.86	342.30	93.78
929	☐	J972	2.27	122.24	342.64	95.50
930	☐	J974	0.46	120.44	342.64	96.28
931	☐	J976	1.24	123.37	342.64	95.01
932	☐	J978	1.92	120.17	342.64	96.40
933	☐	J980	3.21	124.77	342.64	94.40
934	☐	J982	1.78	183.93	342.64	68.77
935	☐	J986	0.20	162.91	342.64	77.88
936	☐	J988	1.26	168.37	342.64	75.51
937	☐	J992	0.96	199.54	342.64	62.00
938	☐	J996	3.31	202.53	342.64	60.71
939	☐	J998	0.42	212.12	342.64	56.55

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
1	☐	P-1000	V8036	J2220	27.15	8.00	130.00	0.00	0.00
2	☐	P-1001	J2224	J2226	543.88	10.00	130.00	2.33	0.01
3	☐	P-1002	J2228	J2232	36.08	8.00	130.00	60.60	0.39
4	☐	P-1003	J2232	J2234	369.49	8.00	130.00	2.22	0.01
5	☐	P-1008	J2248	J2250	438.28	4.00	130.00	-0.77	0.02
6	☐	P-1009	J2252	J2250	17.65	4.00	130.00	2.33	0.06
7	☐	P-101	J18	J20	452.30	6.00	130.00	-78.78	0.89
8	☐	P-1010	J2254	J2256	104.22	4.00	130.00	0.69	0.02
9	☐	P-1011	J1784	J2254	69.42	8.00	130.00	1.01	0.01
10	☐	P-1012	J2260	J1782	75.58	8.00	130.00	2.19	0.01
11	☐	P-1013	J594	J528	151.89	8.00	130.00	-19.42	0.12
12	☐	P-1019	J574	J514	507.66	8.00	130.00	119.47	0.76
13	☐	P-102	J22	J24	493.28	6.00	130.00	-79.06	0.90
14	☐	P-1020	J1054	J2272	708.76	8.00	130.00	0.00	0.00
15	☐	P-1021	J1822	J2400	137.27	8.00	130.00	9.04	0.06
16	☐	P-1022	J2276	J2284	222.80	8.00	130.00	-0.12	0.00
17	☐	P-1023	J2280	J2400	224.61	8.00	130.00	-3.36	0.02
18	☐	P-1025	J2288	J1816	90.71	8.00	130.00	-1.85	0.01
19	☐	P-1026	J2290	J1816	91.82	8.00	130.00	-3.08	0.02
20	☐	P-103	J26	J28	473.01	8.00	130.00	-199.13	1.27
21	☐	P-1030	J2304	J2306	1,354.79	8.00	130.00	26.13	0.17
22	☐	P-104	J30	J32	817.06	8.00	130.00	-174.63	1.11
23	☐	P-105	J34	J2312	0.13	8.00	130.00	0.00	0.00
24	☐	P-106	J38	J1100	186.89	12.00	130.00	-194.15	0.55
25	☐	P-107	J42	J2494	348.44	10.00	130.00	0.00	0.00
26	☐	P-108	J46	J2434	2,763.26	10.00	130.00	-5.04	0.02
27	☐	P-109	J50	J2514	350.27	6.00	130.00	-1.21	0.01
28	☐	P-110	J54	J46	842.74	10.00	130.00	300.00	1.23
29	☐	P-111	J74	J64	285.83	10.00	130.00	300.00	1.23
30	☐	P-113	J62	J64	37.85	10.00	130.00	0.00	0.00
31	☐	P-114	J66	J70	11.07	10.00	130.00	0.00	0.00
32	☐	P-115	J68	J70	21.51	10.00	130.00	300.00	1.23
33	☐	P-116	J72	J74	28.35	10.00	130.00	0.00	0.00
34	☐	P-118	J76	J78	353.57	8.00	130.00	-62.34	0.40
35	☐	P-119	J80	J82	538.52	8.00	130.00	-22.98	0.15
36	☐	P-121	J88	J90	135.52	8.00	130.00	5.79	0.04
37	☐	P-122	J92	J94	650.14	10.00	130.00	-6.85	0.03
38	☐	P-123	J96	J2314	649.93	8.00	130.00	22.72	0.15
39	☐	P-124	J100	J102	671.85	6.00	130.00	110.93	1.26
40	☐	P-125	J106	J554	671.62	6.00	130.00	-109.25	1.24
41	☐	P-126	J108	J2404	1,246.05	6.00	130.00	5.62	0.06
42	☐	P-129	J120	J468	29.22	12.00	130.00	1,075.48	3.05
43	☐	P-130	J148	J2136	1,291.50	8.00	130.00	114.38	0.73
44	☐	P-131	J128	J476	5.49	6.00	130.00	-80.45	0.91
45	☐	P-132	J328	J1704	363.09	12.00	130.00	-12.81	0.04
46	☐	P-133	J136	J38	1,078.48	12.00	130.00	-194.15	0.55
47	☐	P-134	J110	J2326	583.72	10.00	130.00	-145.95	0.60
48	☐	P-135	J142	J2462	223.32	8.00	130.00	-80.82	0.52
49	☐	P-136	J146	J148	547.48	8.00	130.00	116.77	0.75
50	☐	P-137	J150	J2522	455.69	6.00	130.00	-14.06	0.16
51	☐	P-138	J182	J178	254.03	12.00	130.00	194.15	0.55

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
52	☐	P-139	J158	J136	662.62	12.00	130.00	-194.15	0.55
53	☐	P-140	J160	J146	139.40	8.00	130.00	122.01	0.78
54	☐	P-141	J166	T5000	46.10	12.00	130.00	-122.01	0.35
55	☐	P-142	J166	J160	92.65	8.00	130.00	122.01	0.78
56	☐	P-150	J186	J178	50.07	12.00	130.00	-194.15	0.55
57	☐	P-162	J186	J210	17.18	12.00	130.00	194.15	0.55
58	☐	P-163	J208	J200	75.53	10.00	130.00	145.95	0.60
59	☐	P-164	J210	J144	81.94	8.00	130.00	80.14	0.51
60	☐	P-165	J48	J2330	1,290.92	10.00	130.00	96.29	0.39
61	☐	P-166	J214	J2332	315.40	8.00	130.00	113.01	0.72
62	☐	P-167	J134	J2332	502.49	8.00	130.00	-100.72	0.64
63	☐	P-168	J220	J2332	182.39	8.00	130.00	-1.62	0.01
64	☐	P-169	J224	J214	179.90	4.00	130.00	-1.07	0.03
65	☐	P-171	J230	J2330	390.86	8.00	130.00	-57.07	0.36
66	☐	P-172	J212	J110	677.79	10.00	130.00	-145.27	0.59
67	☐	P-173	J230	J236	185.63	8.00	130.00	54.73	0.35
68	☐	P-174	J236	J238	118.51	6.00	130.00	3.60	0.04
69	☐	P-175	J240	J242	184.28	8.00	130.00	11.76	0.08
70	☐	P-176	J240	J244	251.44	4.00	130.00	1.75	0.04
71	☐	P-178	J248	J250	7.66	8.00	130.00	-164.32	1.05
72	☐	P-181	J2336	J122	33.50	8.00	130.00	-137.11	0.88
73	☐	P-182	J242	J88	320.73	8.00	130.00	9.76	0.06
74	☐	P-184	J260	J262	206.64	6.00	130.00	31.24	0.35
75	☐	P-185	J264	J2062	668.15	12.00	130.00	15.92	0.05
76	☐	P-186	J268	J2428	790.10	6.00	130.00	20.63	0.23
77	☐	P-187	J264	J2340	216.86	8.00	130.00	-28.80	0.18
78	☐	P-188	J276	J274	883.02	6.00	130.00	4.24	0.05
79	☐	P-189	J2516	J282	321.76	6.00	130.00	1.01	0.01
80	☐	P-190	J284	J2516	125.80	6.00	130.00	-10.62	0.12
81	☐	P-191	J288	J290	469.94	6.00	130.00	2.89	0.03
82	☐	P-192	J284	J288	292.09	6.00	130.00	4.19	0.05
83	☐	P-193	J292	J294	442.21	6.00	130.00	-1.12	0.01
84	☐	P-194	J290	J296	373.24	6.00	130.00	3.06	0.03
85	☐	P-195	J274	J42	385.53	10.00	130.00	3.08	0.01
86	☐	P-197	J302	J52	130.47	6.00	130.00	2.44	0.03
87	☐	P-198	J302	J42	172.98	6.00	130.00	-1.52	0.02
88	☐	P-199	J296	J302	107.39	6.00	130.00	1.50	0.02
89	☐	P-202	J294	J290	340.67	6.00	130.00	1.72	0.02
90	☐	P-203	J290	J306	152.56	6.00	130.00	0.00	0.00
91	☐	P-204	J294	J284	349.09	6.00	130.00	-4.88	0.06
92	☐	P-206	J282	J316	654.25	6.00	130.00	-9.56	0.11
93	☐	P-207	J312	J314	202.83	6.00	130.00	-2.83	0.03
94	☐	P-208	J282	J2054	81.43	6.00	130.00	8.55	0.10
95	☐	P-209	J316	J276	709.46	6.00	130.00	9.92	0.11
96	☐	P-210	J262	J316	320.72	6.00	130.00	27.67	0.31
97	☐	P-211	J2428	J322	176.27	6.00	130.00	4.19	0.05
98	☐	P-212	J324	J2072	41.08	10.00	130.00	155.55	0.64
99	☐	P-213	J266	J340	625.38	8.00	130.00	-0.99	0.01
100	☐	P-214	J330	J332	79.42	6.00	130.00	-3.61	0.04
101	☐	P-215	J334	J336	517.79	4.00	130.00	-4.09	0.10
102	☐	P-216	J2078	J324	663.44	6.00	130.00	-10.36	0.12

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
103	☐	P-217	J342	J2344	480.50	8.00	130.00	-11.97	0.08
104	☐	P-219	J330	J348	650.12	6.00	130.00	0.99	0.01
105	☐	P-220	J328	J2412	15.09	8.00	130.00	0.00	0.00
106	☐	P-221	J352	J2412	283.53	8.00	130.00	-2.85	0.02
107	☐	P-223	J356	J362	338.25	8.00	130.00	196.26	1.25
108	☐	P-224	J106	J102	315.28	8.00	130.00	95.91	0.61
109	☐	P-225	J336	J360	313.00	8.00	130.00	-7.37	0.05
110	☐	P-226	J360	J106	164.74	8.00	130.00	-9.25	0.06
111	☐	P-227	J102	J356	349.89	8.00	130.00	201.58	1.29
112	☐	P-228	J2344	J362	222.93	8.00	130.00	-23.40	0.15
113	☐	P-232	J332	J370	261.51	6.00	130.00	-5.60	0.06
114	☐	P-234	J362	J324	307.08	8.00	130.00	168.32	1.07
115	☐	P-235	J374	J376	928.79	8.00	130.00	30.72	0.20
116	☐	P-236	J378	J384	276.26	6.00	130.00	-2.45	0.03
117	☐	P-237	J268	J432	1,321.06	6.00	130.00	-16.85	0.19
118	☐	P-238	J384	J386	1,072.03	8.00	130.00	-31.53	0.20
119	☐	P-239	J388	J422	281.28	8.00	130.00	6.63	0.04
120	☐	P-240	J266	J2476	31.50	8.00	130.00	0.00	0.00
121	☐	P-241	J268	J394	671.04	8.00	130.00	-8.49	0.05
122	☐	P-242	J396	J398	200.76	6.00	130.00	22.80	0.26
123	☐	P-243	J394	J260	197.34	8.00	130.00	7.31	0.05
124	☐	P-244	J260	J376	149.07	8.00	130.00	-25.64	0.16
125	☐	P-245	J376	J400	310.93	8.00	130.00	0.94	0.01
126	☐	P-246	J400	J266	35.03	8.00	130.00	0.00	0.00
127	☐	P-247	J398	J394	272.83	6.00	130.00	18.72	0.21
128	☐	P-249	J406	J408	123.68	6.00	130.00	4.44	0.05
129	☐	P-250	J410	J396	125.48	6.00	130.00	25.32	0.29
130	☐	P-251	J406	J414	125.48	8.00	130.00	1.26	0.01
131	☐	P-254	J384	J410	62.24	6.00	130.00	26.96	0.31
132	☐	P-258	J422	J406	62.24	8.00	130.00	5.97	0.04
133	☐	P-261	J268	J430	431.64	8.00	130.00	-5.94	0.04
134	☐	P-263	J430	J80	378.83	8.00	130.00	-13.33	0.09
135	☐	P-264	J386	J432	259.16	6.00	130.00	28.07	0.32
136	☐	P-265	J96	J436	299.08	8.00	130.00	121.29	0.77
137	☐	P-266	J438	J388	113.63	8.00	130.00	-34.33	0.22
138	☐	P-267	J374	J438	171.35	8.00	130.00	-32.78	0.21
139	☐	P-268	J436	J378	382.79	6.00	130.00	42.67	0.48
140	☐	P-269	J388	J378	57.32	8.00	130.00	-41.88	0.27
141	☐	P-270	J440	J386	63.14	8.00	130.00	62.82	0.40
142	☐	P-271	J442	J440	32.98	8.00	130.00	63.78	0.41
143	☐	P-272	J444	J442	291.36	8.00	130.00	66.58	0.42
144	☐	P-273	J436	J444	25.49	8.00	130.00	75.84	0.48
145	☐	P-274	J446	J1940	213.79	8.00	130.00	-53.22	0.34
146	☐	P-275	J450	J446	59.38	8.00	130.00	-46.83	0.30
147	☐	P-276	J432	J450	287.99	6.00	130.00	-38.91	0.44
148	☐	P-278	J454	J450	197.90	6.00	130.00	-5.79	0.07
149	☐	P-282	J448	J464	307.99	8.00	130.00	-54.91	0.35
150	☐	P-284	J470	J2470	1,144.25	10.00	130.00	0.00	0.00
151	☐	P-285	J108	J128	277.62	8.00	130.00	-80.05	0.51
152	☐	P-286	J120	J1952	172.04	12.00	130.00	-1,079.01	3.06
153	☐	P-287	J476	J126	323.79	8.00	130.00	-109.97	0.70

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
154	☐	P-288	J478	J480	107.11	8.00	130.00	18.34	0.12
155	☐	P-289	J482	J484	191.19	6.00	130.00	-54.47	0.62
156	☐	P-290	J118	J486	448.89	8.00	130.00	-28.50	0.18
157	☐	P-292	J490	J492	545.46	8.00	130.00	4.20	0.03
158	☐	P-293	J480	J494	38.83	8.00	130.00	16.95	0.11
159	☐	P-294	J494	J490	128.13	8.00	130.00	12.50	0.08
160	☐	P-295	J496	J86	472.89	8.00	130.00	-222.41	1.42
161	☐	P-296	J518	J500	472.89	8.00	130.00	204.25	1.30
162	☐	P-297	J502	J504	476.07	2.00	130.00	-1.78	0.18
163	☐	P-299	J512	J2598	487.73	4.00	130.00	2.91	0.07
164	☐	P-300	J514	J516	639.10	8.00	130.00	7.59	0.05
165	☐	P-301	J518	J512	153.57	10.00	130.00	123.49	0.50
166	☐	P-302	J520	J522	310.93	12.00	130.00	-453.20	1.29
167	☐	P-304	J528	J530	160.20	6.00	130.00	-22.75	0.26
168	☐	P-305	J532	J534	665.09	2.00	130.00	-6.55	0.67
169	☐	P-306	J536	J538	665.09	2.00	130.00	-8.21	0.84
170	☐	P-307	J540	J2356	662.66	6.00	130.00	-173.75	1.97
171	☐	P-308	J538	J2356	332.23	12.00	130.00	-749.76	2.13
172	☐	P-309	J546	J548	325.99	6.00	130.00	-6.74	0.08
173	☐	P-310	J544	J550	230.58	6.00	130.00	102.43	1.16
174	☐	P-312	J100	J554	337.22	6.00	130.00	-35.21	0.40
175	☐	P-313	J556	J548	384.35	4.00	130.00	-4.55	0.12
176	☐	P-314	J548	J100	319.49	6.00	130.00	-16.72	0.19
177	☐	P-315	J550	J100	436.33	6.00	130.00	98.20	1.11
178	☐	P-317	J544	J564	270.49	12.00	130.00	-1,035.64	2.94
179	☐	P-318	J564	J2350	20.93	12.00	130.00	-1,038.63	2.95
180	☐	P-319	J534	J568	649.03	2.00	130.00	5.08	0.52
181	☐	P-321	J568	J2354	330.38	6.00	130.00	-2.01	0.02
182	☐	P-322	J534	J538	341.05	12.00	130.00	-734.98	2.08
183	☐	P-324	J522	J534	332.96	12.00	130.00	-716.30	2.03
184	☐	P-325	J574	J578	331.14	8.00	130.00	-132.94	0.85
185	☐	P-326	J536	J540	332.22	6.00	130.00	-1.69	0.02
186	☐	P-327	J540	J2358	654.88	6.00	130.00	62.02	0.70
187	☐	P-328	J580	J2360	0.02	8.00	130.00	-5.60	0.04
188	☐	P-329	J540	J2360	327.97	8.00	130.00	103.11	0.66
189	☐	P-330	J470	J2358	328.64	8.00	130.00	75.64	0.48
190	☐	P-331	J586	J532	663.17	2.00	130.00	-4.31	0.44
191	☐	P-332	J574	J536	663.17	2.00	130.00	-4.30	0.44
192	☐	P-333	J532	J536	341.05	6.00	130.00	1.49	0.02
193	☐	P-334	J530	J588	42.62	6.00	130.00	9.39	0.11
194	☐	P-335	J588	J532	289.33	6.00	130.00	5.90	0.07
195	☐	P-336	J586	J574	342.33	8.00	130.00	-14.05	0.09
196	☐	P-338	J512	J592	182.74	10.00	130.00	117.88	0.48
197	☐	P-339	J592	J2592	81.80	10.00	130.00	255.55	1.04
198	☐	P-340	J504	J586	197.99	8.00	130.00	118.42	0.76
199	☐	P-341	J594	J520	669.56	10.00	130.00	-248.63	1.02
200	☐	P-342	J598	J600	665.09	2.00	130.00	-1.82	0.19
201	☐	P-343	J602	J604	665.09	8.00	130.00	-87.72	0.56
202	☐	P-344	J606	J608	705.46	10.00	130.00	-79.79	0.33
203	☐	P-345	J610	J612	353.66	6.00	130.00	-29.78	0.34
204	☐	P-346	J608	J600	344.77	6.00	130.00	-40.73	0.46

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
205	☐	P-347	J520	J526	661.25	10.00	130.00	31.19	0.13
206	☐	P-348	J600	J612	674.46	2.00	130.00	0.58	0.06
207	☐	P-349	J604	J1106	90.30	8.00	130.00	-29.99	0.19
208	☐	P-350	J616	J2314	273.42	6.00	130.00	-56.95	0.65
209	☐	P-352	J612	J620	271.10	6.00	130.00	-35.70	0.41
210	☐	P-353	J622	J604	278.58	8.00	130.00	-105.36	0.67
211	☐	P-354	J604	J520	345.98	8.00	130.00	-166.75	1.06
212	☐	P-355	J600	J624	303.98	8.00	130.00	-50.81	0.32
213	☐	P-356	J608	J610	655.93	10.00	130.00	-54.41	0.22
214	☐	P-357	J86	J626	313.58	8.00	130.00	-30.26	0.19
215	☐	P-358	J606	J598	312.67	6.00	130.00	-22.48	0.26
216	☐	P-359	J518	J594	651.75	10.00	130.00	-228.50	0.93
217	☐	P-360	J626	J598	663.17	2.00	130.00	-1.44	0.15
218	☐	P-361	J628	J602	663.21	8.00	130.00	-82.55	0.53
219	☐	P-362	J630	J602	290.04	6.00	130.00	-32.75	0.37
220	☐	P-363	J602	J594	346.11	6.00	130.00	-34.31	0.39
221	☐	P-364	J598	J632	278.90	6.00	130.00	-28.36	0.32
222	☐	P-365	J634	J628	318.99	8.00	130.00	24.12	0.15
223	☐	P-366	J628	J518	354.13	8.00	130.00	100.39	0.64
224	☐	P-368	J626	J634	324.35	8.00	130.00	-34.91	0.22
225	☐	P-369	J606	J86	663.17	10.00	130.00	87.25	0.36
226	☐	P-371	J640	J654	2.83	8.00	130.00	-203.40	1.30
227	☐	P-372	J644	J1976	422.05	8.00	130.00	240.25	1.53
228	☐	P-373	J514	J648	323.06	8.00	130.00	36.31	0.23
229	☐	P-374	J648	J1980	547.75	8.00	130.00	26.29	0.17
230	☐	P-375	J652	J644	251.89	8.00	130.00	40.36	0.26
231	☐	P-376	J652	J510	257.98	8.00	130.00	90.28	0.58
232	☐	P-377	J654	J656	397.77	8.00	130.00	9.92	0.06
233	☐	P-378	J28	J640	107.20	8.00	130.00	-202.71	1.29
234	☐	P-379	J658	J2102	323.54	6.00	130.00	-88.18	1.00
235	☐	P-380	J662	J664	332.86	6.00	130.00	-114.90	1.30
236	☐	P-381	J666	J668	332.86	6.00	130.00	-3.00	0.03
237	☐	P-382	J670	J672	788.22	8.00	130.00	219.01	1.40
238	☐	P-383	J660	J664	674.97	2.00	130.00	-2.31	0.24
239	☐	P-384	J496	J674	674.97	8.00	130.00	65.62	0.42
240	☐	P-385	J664	J674	358.95	6.00	130.00	-127.94	1.45
241	☐	P-386	J674	J500	635.16	8.00	130.00	-68.30	0.44
242	☐	P-387	J500	J670	53.16	12.00	130.00	133.71	0.38
243	☐	P-388	J664	J668	372.46	2.00	130.00	6.89	0.70
244	☐	P-389	J660	J496	358.95	6.00	130.00	-151.56	1.72
245	☐	P-391	J678	J680	674.97	2.00	130.00	-1.12	0.11
246	☐	P-392	J682	J686	674.97	6.00	130.00	16.24	0.18
247	☐	P-393	J658	J662	674.97	6.00	130.00	15.49	0.18
248	☐	P-394	J686	J678	330.29	6.00	130.00	-66.71	0.76
249	☐	P-395	J688	J690	330.29	6.00	130.00	53.26	0.60
250	☐	P-396	J672	J32	520.02	8.00	130.00	215.39	1.37
251	☐	P-397	J688	J678	372.14	2.00	130.00	-1.90	0.19
252	☐	P-398	J662	J666	372.46	6.00	130.00	55.19	0.63
253	☐	P-399	J666	J688	339.29	6.00	130.00	53.99	0.61
254	☐	P-401	J666	J694	140.74	6.00	130.00	2.49	0.03
255	☐	P-402	J678	J662	339.29	6.00	130.00	-71.33	0.81

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
256	☐	P-403	J24	J20	373.21	2.00	130.00	0.95	0.10
257	☐	P-404	J686	J690	371.82	6.00	130.00	-6.67	0.08
258	☐	P-405	J24	J690	323.39	6.00	130.00	-84.04	0.95
259	☐	P-406	J690	J32	260.19	6.00	130.00	-39.61	0.45
260	☐	P-407	J20	J686	323.39	6.00	130.00	-86.29	0.98
261	☐	P-410	J696	J698	497.95	6.00	130.00	-53.38	0.61
262	☐	P-411	J700	J680	294.94	6.00	130.00	-63.22	0.72
263	☐	P-412	J680	J658	339.29	6.00	130.00	-68.47	0.78
264	☐	P-413	J676	J682	323.39	6.00	130.00	-91.23	1.04
265	☐	P-414	J696	J700	355.43	6.00	130.00	47.31	0.54
266	☐	P-415	J682	J700	35.36	6.00	130.00	-108.65	1.23
267	☐	P-416	J702	J704	290.07	6.00	130.00	1.95	0.02
268	☐	P-417	J792	J708	358.86	6.00	130.00	2.40	0.03
269	☐	P-418	J710	J712	361.08	6.00	130.00	6.68	0.08
270	☐	P-419	J770	J716	603.97	8.00	130.00	-97.42	0.62
271	☐	P-421	J722	J724	137.26	8.00	130.00	-6.56	0.04
272	☐	P-422	J726	J728	487.53	8.00	130.00	64.72	0.41
273	☐	P-423	J730	J728	314.44	8.00	130.00	-8.15	0.05
274	☐	P-424	J728	J82	156.20	8.00	130.00	52.33	0.33
275	☐	P-425	J82	J734	90.92	8.00	130.00	28.45	0.18
276	☐	P-428	J738	J730	211.73	8.00	130.00	-4.09	0.03
277	☐	P-430	J1224	J726	333.57	8.00	130.00	73.55	0.47
278	☐	P-431	J742	J744	907.92	8.00	130.00	-17.24	0.11
279	☐	P-432	J746	J748	338.68	8.00	130.00	-1.37	0.01
280	☐	P-433	J750	J742	267.41	8.00	130.00	-15.13	0.10
281	☐	P-434	J748	J722	97.81	8.00	130.00	-3.62	0.02
282	☐	P-435	J752	J754	196.21	4.00	130.00	1.54	0.04
283	☐	P-436	J756	J1814	191.09	8.00	130.00	-93.80	0.60
284	☐	P-437	J78	J756	477.73	8.00	130.00	-88.02	0.56
285	☐	P-438	J78	J1224	311.85	8.00	130.00	101.81	0.65
286	☐	P-441	J78	J2306	945.80	10.00	130.00	-82.74	0.34
287	☐	P-442	J770	J1392	246.63	8.00	130.00	67.97	0.43
288	☐	P-443	J724	J774	173.85	8.00	130.00	-8.26	0.05
289	☐	P-444	J776	J752	80.21	8.00	130.00	-5.05	0.03
290	☐	P-445	J780	J750	119.89	8.00	130.00	-11.15	0.07
291	☐	P-446	J782	J784	194.53	4.00	130.00	2.01	0.05
292	☐	P-448	J786	J2300	44.49	8.00	130.00	-25.91	0.17
293	☐	P-449	J788	J786	55.23	8.00	130.00	-24.90	0.16
294	☐	P-450	J758	J788	78.75	8.00	130.00	-24.58	0.16
295	☐	P-451	J758	J776	169.39	8.00	130.00	-56.90	0.36
296	☐	P-452	J792	J710	239.04	6.00	130.00	-8.27	0.09
297	☐	P-453	J772	J794	117.42	6.00	130.00	1.15	0.01
298	☐	P-454	J702	J792	255.59	6.00	130.00	-3.76	0.04
299	☐	P-455	J716	J2030	98.65	10.00	130.00	-99.07	0.40
300	☐	P-456	J798	J1030	76.98	12.00	130.00	0.00	0.00
301	☐	P-457	J802	J804	1,000.92	12.00	130.00	92.97	0.26
302	☐	P-458	J84	J2240	602.95	10.00	130.00	121.26	0.50
303	☐	P-459	J708	J712	241.00	6.00	130.00	-2.79	0.03
304	☐	P-460	J712	J808	268.09	6.00	130.00	1.68	0.02
305	☐	P-461	J810	J708	251.65	6.00	130.00	-3.08	0.04
306	☐	P-462	J704	J810	60.82	6.00	130.00	-1.51	0.02

2031 PHD Pipe Report

		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
307	☐	P-463	J704	J812	118.76	6.00	130.00	2.33	0.03
308	☐	P-464	J814	J2646	425.81	12.00	130.00	147.40	0.42
309	☐	P-465	J804	J814	434.20	12.00	130.00	149.31	0.42
310	☐	P-466	J802	J800	41.35	10.00	130.00	-266.26	1.09
311	☐	P-467	J818	J820	55.87	8.00	130.00	2.65	0.02
312	☐	P-468	J822	J824	87.15	8.00	130.00	5.92	0.04
313	☐	P-469	J986	J1416	619.10	12.00	130.00	-17.74	0.05
314	☐	P-470	J830	J2496	52.90	10.00	130.00	-3.27	0.01
315	☐	P-473	J842	J844	1,063.40	6.00	130.00	30.30	0.34
316	☐	P-474	J890	J848	145.06	8.00	130.00	-128.74	0.82
317	☐	P-475	J850	J30	341.94	6.00	130.00	-81.98	0.93
318	☐	P-476	J854	J1774	217.71	8.00	130.00	-160.69	1.03
319	☐	P-477	J858	J1272	125.33	8.00	130.00	112.85	0.72
320	☐	P-478	J858	J862	326.73	8.00	130.00	2.50	0.02
321	☐	P-479	J864	J866	675.75	8.00	130.00	95.79	0.61
322	☐	P-480	J868	J858	560.51	8.00	130.00	117.28	0.75
323	☐	P-481	J870	J872	286.35	8.00	130.00	152.63	0.97
324	☐	P-482	J872	J2252	77.42	8.00	130.00	150.10	0.96
325	☐	P-483	J874	J868	285.32	6.00	130.00	-3.68	0.04
326	☐	P-484	J26	J850	105.47	12.00	130.00	41.86	0.12
327	☐	P-485	J870	J26	72.39	8.00	130.00	-154.83	0.99
328	☐	P-486	J850	J868	26.63	8.00	130.00	122.50	0.78
329	☐	P-487	J876	J1316	113.04	8.00	130.00	99.24	0.63
330	☐	P-488	J880	J882	468.32	8.00	130.00	-124.32	0.79
331	☐	P-489	J884	J886	215.94	8.00	130.00	-102.26	0.65
332	☐	P-490	J884	J876	109.78	8.00	130.00	100.75	0.64
333	☐	P-491	J860	J888	255.90	8.00	130.00	106.35	0.68
334	☐	P-493	J890	J882	38.68	8.00	130.00	127.65	0.81
335	☐	P-494	J888	J886	190.95	8.00	130.00	103.69	0.66
336	☐	P-495	J892	J1286	255.14	10.00	130.00	255.52	1.04
337	☐	P-498	J902	J904	661.45	10.00	130.00	-39.79	0.16
338	☐	P-499	J906	J908	319.44	8.00	130.00	-3.92	0.03
339	☐	P-501	J914	J928	669.66	8.00	130.00	-29.06	0.19
340	☐	P-502	J918	J948	0.02	8.00	130.00	-28.96	0.18
341	☐	P-503	J922	J22	658.72	8.00	130.00	-70.25	0.45
342	☐	P-504	J924	J926	659.68	8.00	130.00	79.70	0.51
343	☐	P-505	J928	J904	323.61	6.00	130.00	1.99	0.02
344	☐	P-506	J22	J920	373.21	6.00	130.00	14.73	0.17
345	☐	P-507	J852	J924	17.03	6.00	130.00	91.09	1.03
346	☐	P-508	J920	J930	303.47	6.00	130.00	28.68	0.33
347	☐	P-509	J932	J934	325.77	10.00	130.00	37.25	0.15
348	☐	P-510	J904	J932	28.39	10.00	130.00	42.56	0.17
349	☐	P-512	J936	J938	27.66	8.00	130.00	-1.57	0.01
350	☐	P-513	J906	J938	60.78	8.00	130.00	1.94	0.01
351	☐	P-514	J940	J942	323.52	6.00	130.00	17.06	0.19
352	☐	P-515	J902	J914	323.52	6.00	130.00	12.15	0.14
353	☐	P-516	J944	J922	637.26	6.00	130.00	-44.19	0.50
354	☐	P-517	J942	J914	639.89	8.00	130.00	-19.89	0.13
355	☐	P-518	J960	J918	643.55	8.00	130.00	-40.56	0.26
356	☐	P-519	J918	J922	367.09	8.00	130.00	31.01	0.20
357	☐	P-521	J922	J1780	166.44	8.00	130.00	53.29	0.34

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
358	☐	P-524	J848	J956	18.39	8.00	130.00	-129.18	0.82
359	☐	P-525	J958	J918	272.74	6.00	130.00	15.88	0.18
360	☐	P-526	J960	J962	200.07	6.00	130.00	63.04	0.72
361	☐	P-527	J856	J968	326.94	6.00	130.00	18.68	0.21
362	☐	P-528	J962	J842	67.10	6.00	130.00	59.97	0.68
363	☐	P-529	J944	J856	282.54	6.00	130.00	69.46	0.79
364	☐	P-533	J968	J840	120.49	6.00	130.00	12.94	0.15
365	☐	P-534	J942	J960	350.06	6.00	130.00	28.59	0.32
366	☐	P-535	J972	J974	150.08	8.00	130.00	-1.77	0.01
367	☐	P-536	J976	J2362	639.89	4.00	130.00	-1.59	0.04
368	☐	P-537	J940	J902	639.89	10.00	130.00	-17.97	0.07
369	☐	P-538	J912	J978	639.89	8.00	130.00	7.91	0.05
370	☐	P-539	J912	J908	299.01	8.00	130.00	11.07	0.07
371	☐	P-540	J902	J2362	28.39	8.00	130.00	7.08	0.05
372	☐	P-541	J908	J972	489.81	8.00	130.00	3.71	0.02
373	☐	P-542	J972	J980	215.90	8.00	130.00	3.21	0.02
374	☐	P-543	J978	J974	299.01	8.00	130.00	2.23	0.01
375	☐	P-544	J976	J978	325.77	8.00	130.00	-3.76	0.02
376	☐	P-545	J940	J976	28.39	8.00	130.00	-4.10	0.03
377	☐	P-546	J982	J992	334.90	8.00	130.00	7.30	0.05
378	☐	P-547	J986	J988	153.03	8.00	130.00	17.53	0.11
379	☐	P-549	J988	J822	287.59	8.00	130.00	7.59	0.05
380	☐	P-550	J820	J982	305.66	8.00	130.00	0.40	0.00
381	☐	P-551	J992	J998	322.36	8.00	130.00	3.04	0.02
382	☐	P-552	J992	J996	150.70	8.00	130.00	3.31	0.02
383	☐	P-555	J998	J1000	111.49	8.00	130.00	2.17	0.01
384	☐	P-556	J474	J206	1,422.99	16.00	130.00	-1,653.94	2.64
385	☐	P-558	J1006	J2364	306.88	12.00	130.00	-3.12	0.01
386	☐	P-559	J472	J1564	1,139.77	12.00	130.00	541.30	1.54
387	☐	P-560	J2368	J1048	160.12	12.00	130.00	-250.42	0.71
388	☐	P-561	J2424	J1014	366.69	8.00	130.00	7.96	0.05
389	☐	P-562	J1016	J1018	772.47	8.00	130.00	10.86	0.07
390	☐	P-563	J1020	J1022	161.17	8.00	130.00	0.00	0.00
391	☐	P-564	J1024	J2366	390.46	8.00	130.00	0.00	0.00
392	☐	P-571	J1048	J1050	296.86	8.00	130.00	53.33	0.34
393	☐	P-572	J1052	J1054	373.13	10.00	130.00	51.62	0.21
394	☐	P-573	J1052	J1050	142.48	8.00	130.00	-43.68	0.28
395	☐	P-575	J2434	J1064	26.78	8.00	130.00	0.83	0.01
396	☐	P-576	J2436	J1068	27.03	8.00	130.00	3.29	0.02
397	☐	P-578	J1074	J1076	26.82	8.00	130.00	0.00	0.00
398	☐	P-579	J1686	J1080	51.52	8.00	130.00	5.49	0.04
399	☐	P-580	J1686	J1084	418.42	8.00	130.00	-65.54	0.42
400	☐	P-581	J1084	J1086	220.79	8.00	130.00	-68.77	0.44
401	☐	P-582	J1088	J1090	30.79	8.00	130.00	3.12	0.02
402	☐	P-583	J1086	J1088	1.97	8.00	130.00	-69.02	0.44
403	☐	P-584	J1092	J1094	42.41	8.00	130.00	2.93	0.02
404	☐	P-585	J1092	J1096	674.21	8.00	130.00	-73.68	0.47
405	☐	P-586	J1096	J1098	59.26	8.00	130.00	0.00	0.00
406	☐	P-587	J1096	J2134	31.64	8.00	130.00	-73.68	0.47
407	☐	P-588	J1102	J2354	669.45	8.00	130.00	-29.68	0.19
408	☐	P-590	J1110	J2370	0.04	10.00	130.00	-0.50	0.00

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
409	☐	P-591	J1114	J1116	215.38	8.00	130.00	-219.69	1.40
410	☐	P-592	J1118	J1120	2,842.58	8.00	130.00	23.94	0.15
411	☐	P-594	J2426	J2230	341.08	8.00	130.00	-76.41	0.49
412	☐	P-595	J1128	J1130	278.00	8.00	130.00	-8.48	0.05
413	☐	P-596	J1128	J1132	30.00	8.00	130.00	-12.31	0.08
414	☐	P-597	J1132	J1134	48.00	8.00	130.00	-12.47	0.08
415	☐	P-598	J1134	J1138	190.97	8.00	130.00	-12.71	0.08
416	☐	P-600	J1138	J1152	20.75	8.00	130.00	-12.82	0.08
417	☐	P-602	J1144	J1146	138.32	8.00	130.00	-10.70	0.07
418	☐	P-603	J1146	J1140	18.13	8.00	130.00	-11.44	0.07
419	☐	P-604	J1140	J1148	286.30	8.00	130.00	-13.97	0.09
420	☐	P-605	J1148	J1150	369.70	8.00	130.00	2.98	0.02
421	☐	P-606	J1152	J1154	203.85	8.00	130.00	-12.92	0.08
422	☐	P-607	J1154	J1150	91.13	8.00	130.00	-14.01	0.09
423	☐	P-609	J1150	J1158	238.59	8.00	130.00	-11.83	0.08
424	☐	P-610	J1158	J1160	341.74	8.00	130.00	-13.17	0.08
425	☐	P-611	J1160	J1164	174.82	8.00	130.00	-35.03	0.22
426	☐	P-612	J1148	J1166	34.38	8.00	130.00	-18.82	0.12
427	☐	P-613	J1166	J1168	133.92	8.00	130.00	-19.63	0.13
428	☐	P-614	J1168	J1160	72.57	8.00	130.00	-20.64	0.13
429	☐	P-615	J1044	J1170	105.10	8.00	130.00	-49.59	0.32
430	☐	P-616	J1170	J1172	405.09	8.00	130.00	-39.65	0.25
431	☐	P-617	J1172	J1192	185.57	8.00	130.00	-42.28	0.27
432	☐	P-618	J1176	J1178	460.39	8.00	130.00	28.56	0.18
433	☐	P-619	J1178	J1180	289.68	8.00	130.00	23.90	0.15
434	☐	P-620	J1180	J1182	88.60	8.00	130.00	20.99	0.13
435	☐	P-621	J1182	J1184	122.87	8.00	130.00	19.63	0.13
436	☐	P-622	J1184	J1186	120.82	8.00	130.00	18.20	0.12
437	☐	P-623	J1170	J1188	183.00	8.00	130.00	-13.04	0.08
438	☐	P-624	J1188	J1190	215.27	8.00	130.00	-14.56	0.09
439	☐	P-625	J1190	J1186	85.74	8.00	130.00	-16.56	0.11
440	☐	P-626	J1192	J1194	43.70	8.00	130.00	1.34	0.01
441	☐	P-628	J444	J1200	658.94	8.00	130.00	6.87	0.04
442	☐	P-629	J1200	J2372	667.51	8.00	130.00	20.33	0.13
443	☐	P-630	J2372	J1204	666.10	8.00	130.00	67.58	0.43
444	☐	P-631	J1204	J634	657.62	8.00	130.00	64.21	0.41
445	☐	P-632	J1200	J620	54.15	8.00	130.00	39.15	0.25
446	☐	P-633	J1200	J616	45.53	8.00	130.00	-53.67	0.34
447	☐	P-634	J624	J2372	31.02	8.00	130.00	-54.15	0.35
448	☐	P-635	J622	J2372	43.09	8.00	130.00	102.51	0.65
449	☐	P-636	J630	J1204	33.17	8.00	130.00	29.46	0.19
450	☐	P-637	J632	J1204	54.54	8.00	130.00	-31.82	0.20
451	☐	P-638	J796	J1370	952.13	12.00	130.00	9.52	0.03
452	☐	P-639	J1210	J1216	237.19	12.00	130.00	-1.90	0.01
453	☐	P-640	J1214	J1216	209.98	8.00	130.00	-1.45	0.01
454	☐	P-641	J1218	J1214	104.80	8.00	130.00	-0.22	0.00
455	☐	P-642	J1220	J1218	161.77	8.00	130.00	0.88	0.01
456	☐	P-643	J1220	J1210	285.43	10.00	130.00	-1.44	0.01
457	☐	P-644	J1222	J1220	108.74	10.00	130.00	-0.16	0.00
458	☐	P-645	J1224	J1234	46.96	10.00	130.00	24.91	0.10
459	☐	P-646	J1226	J1228	260.83	8.00	130.00	12.12	0.08

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
460	☐	P-650	J1244	J2408	234.83	10.00	130.00	17.43	0.07
461	☐	P-651	J2008	J1248	394.13	10.00	130.00	-15.53	0.06
462	☐	P-652	J1246	J1968	133.26	8.00	130.00	58.85	0.38
463	☐	P-653	J1244	J1828	76.64	10.00	130.00	-26.50	0.11
464	☐	P-654	J1252	J1254	210.63	10.00	130.00	-32.84	0.13
465	☐	P-655	J2368	J1052	297.13	10.00	130.00	11.23	0.05
466	☐	P-656	J2430	J1246	510.36	10.00	130.00	123.35	0.50
467	☐	P-657	J1256	J2010	356.36	10.00	130.00	54.98	0.22
468	☐	P-659	J486	J482	25.88	6.00	130.00	-35.52	0.40
469	☐	P-660	J1008	J2374	1,576.88	12.00	130.00	408.97	1.16
470	☐	P-661	J1266	J2216	75.71	12.00	130.00	0.00	0.00
471	☐	P-662	J1268	J1924	1,159.03	12.00	130.00	644.76	1.83
472	☐	P-663	J1272	J1274	234.24	2.00	130.00	4.17	0.43
473	☐	P-664	J866	J1276	163.65	8.00	130.00	3.46	0.02
474	☐	P-666	J1280	J1768	27.94	8.00	130.00	-83.33	0.53
475	☐	P-667	J834	J2260	139.61	8.00	130.00	-2.00	0.01
476	☐	P-668	J1286	J2496	613.37	12.00	130.00	326.85	0.93
477	☐	P-669	J1298	J832	36.39	10.00	130.00	-2.39	0.01
478	☐	P-673	J2422	J1306	21.12	10.00	130.00	100.01	0.41
479	☐	P-674	J2422	J1310	25.77	10.00	130.00	83.39	0.34
480	☐	P-678	J1320	J1064	128.74	8.00	130.00	-0.58	0.00
481	☐	P-679	J1322	J1320	72.00	8.00	130.00	-0.31	0.00
482	☐	P-680	J1322	J1324	164.36	6.00	130.00	2.25	0.03
483	☐	P-681	J1324	J1326	33.00	6.00	130.00	0.39	0.00
484	☐	P-682	J1068	J1322	267.00	8.00	130.00	2.62	0.02
485	☐	P-690	J1350	J2502	29.84	8.00	130.00	-13.68	0.09
486	☐	P-692	J1266	J1354	330.20	12.00	130.00	-273.46	0.78
487	☐	P-693	J1356	J1358	31.10	12.00	130.00	20.19	0.06
488	☐	P-694	J1354	J1356	1.15	12.00	130.00	-279.74	0.79
489	☐	P-695	J1360	J1364	420.77	12.00	130.00	-256.61	0.73
490	☐	P-696	J1364	J1366	204.37	12.00	130.00	90.29	0.26
491	☐	P-697	J1366	J1844	349.10	12.00	130.00	84.26	0.24
492	☐	P-698	J1368	J1664	203.63	8.00	130.00	55.94	0.36
493	☐	P-699	J1370	J1372	25.23	10.00	130.00	4.96	0.02
494	☐	P-700	J1374	J2364	0.06	10.00	130.00	-0.16	0.00
495	☐	P-701	J2440	J1380	85.55	8.00	130.00	3.64	0.02
496	☐	P-702	V8018	J1382	11.61	8.00	130.00	299.98	1.91
497	☐	P-703	J1386	J1382	31.05	8.00	130.00	-299.98	1.91
498	☐	P-704	J2444	J2498	27.35	8.00	130.00	300.29	1.92
499	☐	P-705	J1392	J1394	125.58	8.00	130.00	49.24	0.31
500	☐	P-706	J1054	J2000	191.66	8.00	130.00	44.26	0.28
501	☐	P-707	J1396	J1996	226.82	12.00	130.00	-14.52	0.04
502	☐	P-710	J1402	J1404	169.50	8.00	130.00	56.06	0.36
503	☐	P-711	J1404	J1176	117.54	8.00	130.00	32.74	0.21
504	☐	P-712	J1996	J1404	172.47	8.00	130.00	-21.55	0.14
505	☐	P-716	J988	J982	334.77	8.00	130.00	8.69	0.06
506	☐	P-718	J904	J676	493.28	6.00	130.00	-82.65	0.94
507	☐	P-721	J998	J1424	50.69	6.00	130.00	0.44	0.01
508	☐	P-723	J1448	J2492	277.77	8.00	130.00	-0.49	0.00
509	☐	P-726	J1442	J1436	53.73	8.00	130.00	-1.62	0.01
510	☐	P-728	J1450	J2492	641.76	8.00	130.00	-32.51	0.21

2031 PHD Pipe Report

		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
511	☐	P-730	J1450	J1452	151.34	8.00	130.00	1.24	0.01
512	☐	P-731	J1458	J1456	86.96	12.00	130.00	-190.02	0.54
513	☐	P-732	J1458	J1460	170.51	8.00	130.00	57.18	0.36
514	☐	P-733	J1460	J1494	199.45	12.00	130.00	35.94	0.10
515	☐	P-734	J1462	J1464	243.53	12.00	130.00	27.24	0.08
516	☐	P-735	J1464	J1466	157.53	12.00	130.00	17.96	0.05
517	☐	P-736	J1464	J1468	174.06	12.00	130.00	4.65	0.01
518	☐	P-737	J1468	J1470	212.08	12.00	130.00	7.39	0.02
519	☐	P-738	J1472	J1470	0.43	8.00	130.00	-1.70	0.01
520	☐	P-739	J1474	J1476	428.31	8.00	130.00	-2.32	0.01
521	☐	P-740	J1476	J1478	221.56	8.00	130.00	-5.01	0.03
522	☐	P-741	J1478	J1480	421.22	8.00	130.00	-7.37	0.05
523	☐	P-742	J1480	J1460	181.66	8.00	130.00	-17.13	0.11
524	☐	P-743	J1480	J1482	359.12	8.00	130.00	7.68	0.05
525	☐	P-744	J1482	J1468	308.38	8.00	130.00	4.25	0.03
526	☐	P-745	J1482	J1484	191.01	4.00	130.00	2.31	0.06
527	☐	P-747	J1490	J1492	649.14	10.00	130.00	-128.50	0.52
528	☐	P-748	J1492	J1458	56.72	10.00	130.00	-132.84	0.54
529	☐	P-750	J1498	J1502	783.13	10.00	130.00	55.66	0.23
530	☐	P-751	J1502	J1504	335.33	10.00	130.00	-27.84	0.11
531	☐	P-752	J1504	J1512	554.43	8.00	130.00	-33.72	0.22
532	☐	P-753	J832	J1498	138.28	10.00	130.00	66.32	0.27
533	☐	P-754	J1508	J1506	155.75	10.00	130.00	-81.76	0.33
534	☐	P-755	J1510	J1512	39.49	8.00	130.00	-3.18	0.02
535	☐	P-756	J1456	J1514	901.50	12.00	130.00	-190.02	0.54
536	☐	P-757	J1514	J1516	758.12	12.00	130.00	0.00	0.00
537	☐	P-758	J1514	J1518	164.05	8.00	130.00	-190.02	1.21
538	☐	P-759	J1518	J1520	247.76	8.00	130.00	-82.31	0.53
539	☐	P-760	J1518	J1522	386.27	8.00	130.00	-111.49	0.71
540	☐	P-761	J1522	J1524	123.48	8.00	130.00	0.00	0.00
541	☐	P-762	J1520	J1526	159.05	6.00	130.00	2.96	0.03
542	☐	P-763	J1528	J1530	166.52	6.00	130.00	1.95	0.02
543	☐	P-764	J1532	J1528	184.56	8.00	130.00	90.61	0.58
544	☐	P-765	J1528	J1520	251.84	8.00	130.00	87.07	0.56
545	☐	P-766	J1532	J1534	569.33	8.00	130.00	-95.47	0.61
546	☐	P-767	J1534	J1536	165.38	8.00	130.00	-97.41	0.62
547	☐	P-768	J1536	J1538	141.73	8.00	130.00	-100.18	0.64
548	☐	P-769	J1538	J1570	269.65	8.00	130.00	-101.03	0.64
549	☐	P-770	J1540	J1542	313.26	8.00	130.00	113.83	0.73
550	☐	P-771	J1542	J1522	480.37	8.00	130.00	111.49	0.71
551	☐	P-774	J326	J94	16.04	8.00	130.00	160.38	1.02
552	☐	P-775	J1546	J96	42.25	8.00	130.00	146.78	0.94
553	☐	P-776	J1546	J1550	344.37	8.00	130.00	1.81	0.01
554	☐	P-777	J1552	J1554	191.02	8.00	130.00	-0.65	0.00
555	☐	P-778	J1554	J1556	168.23	8.00	130.00	4.58	0.03
556	☐	P-779	J1558	J1554	155.34	8.00	130.00	6.57	0.04
557	☐	P-780	J1558	J1560	26.92	8.00	130.00	-7.35	0.05
558	☐	P-781	J1560	J1562	258.46	8.00	130.00	-7.91	0.05
559	☐	P-782	J1562	J1556	361.15	8.00	130.00	8.94	0.06
560	☐	P-783	J1564	J1562	864.55	8.00	130.00	17.96	0.11
561	☐	P-784	J102	J2414	322.91	8.00	130.00	0.00	0.00

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
562	☐	P-785	J1570	J1572	134.90	8.00	130.00	-216.32	1.38
563	☐	P-786	J1574	J1576	748.14	8.00	130.00	31.61	0.20
564	☐	P-788	J1582	J1576	904.13	8.00	130.00	-54.53	0.35
565	☐	P-789	J1576	J1578	175.16	8.00	130.00	-28.09	0.18
566	☐	P-790	J1574	J1584	167.35	8.00	130.00	-65.83	0.42
567	☐	P-791	J1584	J2424	165.76	10.00	130.00	-235.28	0.96
568	☐	P-792	J796	J1328	847.89	10.00	130.00	-215.95	0.88
569	☐	P-793	J1582	J2376	367.59	10.00	130.00	-167.80	0.69
570	☐	P-794	J696	J1592	274.41	10.00	130.00	4.38	0.02
571	☐	P-795	J1590	J1592	1,004.69	12.00	130.00	-0.97	0.00
572	☐	P-796	J698	J1594	368.67	12.00	130.00	-57.33	0.16
573	☐	P-797	J1596	J1598	299.88	12.00	130.00	0.39	0.00
574	☐	P-798	J1596	J1600	201.53	6.00	130.00	-59.60	0.68
575	☐	P-799	J1594	J1596	267.23	6.00	130.00	-58.39	0.66
576	☐	P-800	J1602	J1604	148.03	8.00	130.00	-66.84	0.43
577	☐	P-801	J1604	J1076	1,339.95	8.00	130.00	1.10	0.01
578	☐	P-802	J2438	J1602	45.02	8.00	130.00	-66.09	0.42
579	☐	P-803	J1604	J1608	67.11	8.00	130.00	-69.41	0.44
580	☐	P-804	J1610	J1612	340.20	8.00	130.00	5.21	0.03
581	☐	P-805	J1614	J2382	274.57	8.00	130.00	18.20	0.12
582	☐	P-806	J1618	J1620	157.02	8.00	130.00	-3.32	0.02
583	☐	P-807	J1622	J2446	488.33	12.00	130.00	-374.66	1.06
584	☐	P-808	J1626	J1638	935.68	8.00	130.00	-9.75	0.06
585	☐	P-810	J1634	J1662	10.16	12.00	130.00	414.93	1.18
586	☐	P-811	J1626	J1638	629.70	8.00	130.00	-12.07	0.08
587	☐	P-812	J2448	V8026	51.18	8.00	130.00	0.00	0.00
588	☐	P-813	J1644	J1358	706.16	8.00	130.00	-8.29	0.05
589	☐	P-814	J1646	J1648	348.32	12.00	130.00	-1.38	0.00
590	☐	P-815	V8022	J1650	41.97	8.00	130.00	0.00	0.00
591	☐	P-816	J1654	J1656	33.81	8.00	130.00	3.81	0.02
592	☐	P-818	J1660	J1662	28.88	8.00	130.00	-31.64	0.20
593	☐	P-819	J1664	J1666	168.31	4.00	130.00	6.15	0.16
594	☐	P-820	J1666	J1668	68.93	4.00	130.00	4.71	0.12
595	☐	P-821	J1670	J1672	191.32	4.00	130.00	20.24	0.52
596	☐	P-822	J2418	J1670	87.45	10.00	130.00	21.67	0.09
597	☐	P-823	J646	J1680	170.28	8.00	130.00	115.94	0.74
598	☐	P-824	J1116	J1678	361.95	8.00	130.00	-225.23	1.44
599	☐	P-825	J1678	J1978	34.31	8.00	130.00	-229.70	1.47
600	☐	P-826	J1678	J1682	51.57	8.00	130.00	4.00	0.03
601	☐	P-828	J48	J1686	201.12	8.00	130.00	-53.74	0.34
602	☐	P-829	J1364	J1622	1,374.78	12.00	130.00	-370.10	1.05
603	☐	P-832	J2432	J1700	192.93	8.00	130.00	20.70	0.13
604	☐	P-833	J1700	J1702	419.97	8.00	130.00	12.40	0.08
605	☐	P-834	J1704	J1706	307.72	8.00	130.00	11.29	0.07
606	☐	P-836	J1396	J1734	720.50	8.00	130.00	46.78	0.30
607	☐	P-837	J1714	J1716	678.72	10.00	130.00	5.44	0.02
608	☐	P-838	J1718	J1724	587.85	10.00	130.00	10.23	0.04
609	☐	P-839	J1722	J1726	292.60	10.00	130.00	-2.08	0.01
610	☐	P-840	J1726	J1728	413.10	10.00	130.00	1.74	0.01
611	☐	P-841	J1728	J1730	304.17	10.00	130.00	-1.52	0.01
612	☐	P-842	J1720	J1716	355.31	10.00	130.00	-3.64	0.01

		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
613	☐	P-847	J1728	J1750	114.02	10.00	130.00	0.94	0.00
614	☐	P-848	J1720	J1752	304.07	10.00	130.00	0.00	0.00
615	☐	P-849	J1754	J1924	38.24	10.00	130.00	-40.15	0.16
616	☐	P-852	J1760	J870	21.08	10.00	130.00	-1.86	0.01
617	☐	P-853	J1612	J1762	219.94	8.00	130.00	1.53	0.01
618	☐	P-854	J1612	J1764	23.40	8.00	130.00	2.82	0.02
619	☐	P-856	J866	J1768	591.57	10.00	130.00	90.47	0.37
620	☐	P-857	J1286	J1284	158.15	12.00	130.00	-74.70	0.21
621	☐	P-858	J892	J878	24.24	8.00	130.00	-257.14	1.64
622	☐	P-861	J898	J880	78.42	8.00	130.00	-121.95	0.78
623	☐	P-863	J1782	J1784	111.98	8.00	130.00	1.64	0.01
624	☐	P-864	J1786	J1788	293.07	8.00	130.00	5.26	0.03
625	☐	P-865	J1790	J2420	168.53	8.00	130.00	21.00	0.13
626	☐	P-866	J1794	J1648	40.98	8.00	130.00	-2.83	0.02
627	☐	P-867	J1798	J1800	330.88	6.00	130.00	1.21	0.01
628	☐	P-868	J578	J1802	86.71	6.00	130.00	2.80	0.03
629	☐	P-869	J1804	J1806	386.32	8.00	130.00	1.44	0.01
630	☐	P-870	J1804	J1806	353.83	8.00	130.00	1.51	0.01
631	☐	P-871	J1372	J1804	77.56	8.00	130.00	4.77	0.03
632	☐	P-872	J1808	J1816	257.68	8.00	130.00	-0.85	0.01
633	☐	P-873	J1394	J1812	101.29	8.00	130.00	47.90	0.31
634	☐	P-874	J1812	J1810	257.09	8.00	130.00	22.11	0.14
635	☐	P-875	J1814	J1808	314.73	10.00	130.00	-16.14	0.07
636	☐	P-879	J1826	J1226	355.29	8.00	130.00	-4.73	0.03
637	☐	P-880	J1828	J1830	46.09	10.00	130.00	0.55	0.00
638	☐	P-881	J1832	J2198	203.70	10.00	130.00	12.85	0.05
639	☐	P-882	J1834	J1836	48.28	8.00	130.00	21.52	0.14
640	☐	P-883	J1838	J1840	668.63	10.00	130.00	-10.54	0.04
641	☐	P-884	J1842	J1016	81.85	8.00	130.00	15.61	0.10
642	☐	P-885	J1844	J1846	206.32	4.00	130.00	11.11	0.28
643	☐	P-886	J1848	J1850	217.87	4.00	130.00	-5.79	0.15
644	☐	P-887	J1852	J1626	212.75	8.00	130.00	-9.68	0.06
645	☐	P-889	J1858	J1860	29.01	8.00	130.00	0.00	0.00
646	☐	P-890	J1862	J1864	22.64	4.00	130.00	0.00	0.00
647	☐	P-891	J1268	J1866	34.88	4.00	130.00	14.20	0.36
648	☐	P-892	J1572	J2388	367.25	8.00	130.00	-216.32	1.38
649	☐	P-893	J1870	J2406	255.99	10.00	130.00	394.90	1.61
650	☐	P-894	J1874	J1878	461.36	8.00	130.00	27.40	0.17
651	☐	P-896	J1882	J1884	662.21	8.00	130.00	41.98	0.27
652	☐	P-897	J1886	J1872	14.27	10.00	130.00	143.73	0.59
653	☐	P-898	J1890	J1892	568.01	10.00	130.00	96.88	0.40
654	☐	P-899	J1886	J1896	269.37	10.00	130.00	-136.66	0.56
655	☐	P-900	J1896	J1898	348.56	8.00	130.00	6.77	0.04
656	☐	P-901	J2442	J1902	167.55	8.00	130.00	9.84	0.06
657	☐	P-902	J1904	J1906	183.26	8.00	130.00	4.45	0.03
658	☐	P-903	J1908	J1912	225.88	8.00	130.00	-10.10	0.06
659	☐	P-904	J1912	J2012	485.14	8.00	130.00	-16.54	0.11
660	☐	P-905	J2388	J2406	397.20	8.00	130.00	-82.17	0.52
661	☐	P-906	J1920	J2390	71.48	8.00	130.00	-18.21	0.12
662	☐	P-907	J1924	J1870	810.55	12.00	130.00	582.63	1.65
663	☐	P-911	J1934	J610	388.09	6.00	130.00	-13.36	0.15

		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
664	☐	P-912	J446	J1936	492.06	12.00	130.00	5.24	0.01
665	☐	P-913	J1938	J1940	223.19	12.00	130.00	-2.91	0.01
666	☐	P-914	J1942	J1946	879.20	8.00	130.00	572.62	3.65
667	☐	P-916	J1950	V8002	17.48	6.00	130.00	0.00	0.00
668	☐	P-917	J1954	J1956	116.30	6.00	130.00	4.52	0.05
669	☐	P-922	J1080	J1974	353.72	6.00	130.00	3.70	0.04
670	☐	P-923	J1976	J1978	477.56	8.00	130.00	117.84	0.75
671	☐	P-925	J734	J1986	149.85	8.00	130.00	27.56	0.18
672	☐	P-927	J1990	J2392	177.96	8.00	130.00	12.65	0.08
673	☐	P-928	J1870	J2390	285.34	8.00	130.00	31.45	0.20
674	☐	P-929	J1996	J1998	403.60	8.00	130.00	5.13	0.03
675	☐	P-931	J2430	J2006	307.76	6.00	130.00	5.01	0.06
676	☐	P-932	J2008	J2010	671.32	8.00	130.00	-39.55	0.25
677	☐	P-933	J2012	J2014	20.90	8.00	130.00	3.16	0.02
678	☐	P-934	J1886	J2016	688.09	8.00	130.00	-13.25	0.08
679	☐	P-936	J2022	J1120	76.03	8.00	130.00	-10.18	0.07
680	☐	P-937	J2022	J2484	197.58	8.00	130.00	9.81	0.06
681	☐	P-938	J744	J2028	114.45	8.00	130.00	-19.35	0.12
682	☐	P-939	J2028	J2308	1,280.24	8.00	130.00	-11.11	0.07
683	☐	P-940	J2032	J2038	686.56	8.00	130.00	23.12	0.15
684	☐	P-941	J2034	J2036	64.03	8.00	130.00	0.14	0.00
685	☐	P-942	J2038	J774	206.59	10.00	130.00	63.73	0.26
686	☐	P-943	J2414	J2394	834.73	8.00	130.00	-1.70	0.01
687	☐	P-944	J2044	J2394	0.02	8.00	130.00	-1.90	0.01
688	☐	P-945	J1568	J2416	202.42	8.00	130.00	-7.43	0.05
689	☐	P-946	J2050	J2052	253.64	8.00	130.00	0.00	0.00
690	☐	P-947	J2054	J2056	1,784.84	6.00	130.00	1.02	0.01
691	☐	P-949	J2062	J2064	142.91	8.00	130.00	10.97	0.07
692	☐	P-951	J2070	J2072	42.05	8.00	130.00	-43.98	0.28
693	☐	P-953	J2068	J2070	170.05	8.00	130.00	-43.12	0.28
694	☐	P-954	J484	J2352	28.32	6.00	130.00	-57.81	0.66
695	☐	P-955	J212	J142	7.25	6.00	130.00	10.70	0.12
696	☐	P-956	J2082	J2084	139.54	6.00	130.00	4.23	0.05
697	☐	P-957	J254	J2378	1,028.58	8.00	130.00	-93.09	0.59
698	☐	P-959	J1306	J2092	1,311.00	10.00	130.00	88.36	0.36
699	☐	P-960	J2092	J2094	110.37	8.00	130.00	12.56	0.08
700	☐	P-961	J2096	J2396	1,529.37	6.00	130.00	30.69	0.35
701	☐	P-962	J2100	J2396	75.35	10.00	130.00	-20.21	0.08
702	☐	P-963	J2102	J1600	305.83	6.00	130.00	61.88	0.70
703	☐	P-964	J40	J2104	10,365.41	12.00	110.00	-350.00	0.99
704	☐	P-965	J1608	J2108	740.61	8.00	130.00	-72.16	0.46
705	☐	P-966	J2108	J2110	656.37	10.00	130.00	6.04	0.02
706	☐	P-967	J1310	J2162	349.24	10.00	130.00	80.04	0.33
707	☐	P-968	J2114	J2398	708.85	10.00	130.00	20.04	0.08
708	☐	P-970	J2122	J2126	43.30	10.00	130.00	-16.61	0.07
709	☐	P-971	J2126	J2130	496.13	10.00	130.00	-22.66	0.09
710	☐	P-973	J2106	J2134	493.39	8.00	130.00	-82.17	0.52
711	☐	P-974	J2136	J2138	111.18	8.00	130.00	0.00	0.00
712	☐	P-975	J1500	J2524	761.14	12.00	130.00	68.33	0.19
713	☐	P-976	J2142	J2158	358.80	8.00	130.00	15.38	0.10
714	☐	P-977	J2146	J2148	36.18	8.00	130.00	9.41	0.06

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
715	☐	P-978	J2150	J2152	11.73	8.00	130.00	0.42	0.00
716	☐	P-979	J2154	J2156	31.36	8.00	130.00	0.65	0.00
717	☐	P-980	J2158	J2160	100.54	8.00	130.00	2.27	0.01
718	☐	P-990	J2198	J2200	361.67	8.00	130.00	4.71	0.03
719	☐	P-992	J2202	J2206	203.29	8.00	130.00	-3.92	0.03
720	☐	P-993	J2206	J2208	87.31	8.00	130.00	3.84	0.02
721	☐	P-994	J2206	J2210	40.61	8.00	130.00	3.16	0.02
722	☐	P-995	J2212	J2214	484.96	6.00	130.00	23.69	0.27
723	☐	P-996	J920	J18	40.98	6.00	130.00	-76.68	0.87
724	☐	P-997	J930	J928	47.08	6.00	130.00	26.33	0.30
725	☐	P-998	J914	J958	77.33	6.00	130.00	18.86	0.21
726	☐	P-999	J2216	J2220	68.30	8.00	130.00	-672.71	4.29
727	☐	P1001	J2510	J2488	2.24	12.00	130.00	0.00	0.00
728	☐	P1003	J2510	J2508	11.82	12.00	130.00	-120.29	0.34
729	☐	P1005	J2478	J258	16.54	12.00	130.00	0.00	0.00
730	☐	P1007	J2508	V8052	1.23	12.00	130.00	0.00	0.00
731	☐	P1009	V8052	J258	1.56	12.00	130.00	0.00	0.00
732	☐	P101	J1940	J1826	2.56	8.00	130.00	-57.01	0.36
733	☐	P1011	J2512	J46	1,371.19	12.00	130.00	-305.04	0.87
734	☐	P1013	J2514	J52	379.69	6.00	130.00	-1.21	0.01
735	☐	P1015	J2516	J1798	32.32	6.00	130.00	-11.63	0.13
736	☐	P103	J464	J76	33.69	6.00	130.00	-59.51	0.68
737	☐	P1031	J2522	J152	530.57	6.00	130.00	-14.06	0.16
738	☐	P1039	J644	J514	312.79	8.00	130.00	-72.40	0.46
739	☐	P1041	J610	J432	661.01	10.00	130.00	-45.41	0.19
740	☐	P1045	J2524	J2142	208.24	12.00	130.00	68.33	0.19
741	☐	P1047	J1280	J836	331.91	8.00	130.00	7.00	0.04
742	☐	P1049	J836	J2260	159.13	8.00	130.00	4.90	0.03
743	☐	P105	J1944	J472	63.35	10.00	130.00	561.65	2.29
744	☐	P1051	J2526	J2128	325.13	10.00	130.00	69.52	0.28
745	☐	P107	J1942	J474	2,385.64	12.00	130.00	-1,653.94	4.69
746	☐	P109	J1950	J1942	15.52	12.00	130.00	-1,078.99	3.06
747	☐	P111	V8004	J1952	6.57	12.00	130.00	1,079.01	3.06
748	☐	P1129	J2592	J504	26.39	8.00	130.00	122.63	0.78
749	☐	P1131	J2592	J2594	48.75	6.00	130.00	132.92	1.51
750	☐	P1133	J2594	J652	469.78	8.00	130.00	132.92	0.85
751	☐	P1135	J586	J2650	309.05	8.00	130.00	133.94	0.85
752	☐	P1141	J1246	J1256	363.25	10.00	130.00	62.38	0.25
753	☐	P1147	J2008	J1262	333.76	10.00	130.00	41.48	0.17
754	☐	P1157	J670	J510	162.53	8.00	130.00	-87.17	0.56
755	☐	P1159	J2264	J2600	304.35	8.00	130.00	3.49	0.02
756	☐	P1161	J2600	J2608	247.33	8.00	130.00	3.49	0.02
757	☐	P1163	J2608	J2606	343.72	8.00	130.00	0.70	0.00
758	☐	P1165	J2608	J2610	162.34	8.00	130.00	2.09	0.01
759	☐	P1167	J2610	J2612	376.09	8.00	130.00	0.70	0.00
760	☐	P1169	J2610	J2614	173.72	8.00	130.00	0.70	0.00
761	☐	P1171	J2600	J2616	186.11	8.00	130.00	0.00	0.00
762	☐	P1173	J1842	J2620	126.90	8.00	130.00	193.05	1.23
763	☐	P1175	J2618	J2622	174.50	8.00	130.00	-56.99	0.36
764	☐	P1177	J2622	J2620	177.08	8.00	130.00	-115.75	0.74
765	☐	P1179	J2620	J2628	885.45	8.00	130.00	75.02	0.48

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
766	☐	P1181	J2622	J2626	883.12	8.00	130.00	56.47	0.36
767	☐	P1183	J2618	J2624	888.77	8.00	130.00	54.71	0.35
768	☐	P1185	J804	J2624	131.12	8.00	130.00	-57.24	0.37
769	☐	P1187	J2624	J2626	187.52	8.00	130.00	-46.80	0.30
770	☐	P1189	J2626	J2628	192.73	8.00	130.00	-28.31	0.18
771	☐	P1191	J2628	J2644	411.99	8.00	130.00	44.43	0.28
772	☐	P1193	J2644	J2642	268.85	8.00	130.00	27.62	0.18
773	☐	P1199	J2634	J2632	169.59	8.00	130.00	30.72	0.20
774	☐	P1201	J2642	J2634	213.56	8.00	130.00	23.45	0.15
775	☐	P1203	J2632	J2630	208.33	8.00	130.00	64.15	0.41
776	☐	P1205	J2634	J2636	735.41	8.00	130.00	-9.56	0.06
777	☐	P1207	J2642	J2638	731.94	8.00	130.00	1.89	0.01
778	☐	P1209	J2644	J2640	719.55	8.00	130.00	14.52	0.09
779	☐	P1211	J2636	J2638	236.98	8.00	130.00	-11.85	0.08
780	☐	P1213	J2638	J2640	250.05	8.00	130.00	-12.24	0.08
781	☐	P1215	J2630	J2624	883.68	8.00	130.00	-41.98	0.27
782	☐	P1217	J2632	J2626	885.60	8.00	130.00	-35.71	0.23
783	☐	P1219	J2646	J84	765.51	8.00	130.00	251.25	1.60
784	☐	P1221	J2630	J2646	109.42	8.00	130.00	103.85	0.66
785	☐	P1225	J2650	J644	210.09	8.00	130.00	129.22	0.82
786	☐	P1227	J2650	J2652	381.65	2.00	130.00	2.36	0.24
787	☐	P1229	PW_WELL_ONE	PW_WELL_1	64.45	6.00	130.00	600.00	6.81
788	☐	P1231	PW_WELL_1	J36	74.03	8.00	130.00	600.00	3.83
789	☐	P129	J526	J614	8.74	10.00	130.00	71.59	0.29
790	☐	P131	J1106	J2314	574.15	8.00	130.00	-34.25	0.22
791	☐	P133	J92	J614	12.03	6.00	130.00	-69.78	0.79
792	☐	P137	J654	J2370	209.20	8.00	130.00	-214.57	1.37
793	☐	P139	J1976	J646	196.84	8.00	130.00	117.59	0.75
794	☐	P143	J2102	J660	9.32	6.00	130.00	-152.03	1.73
795	☐	P145	J1814	J758	268.25	8.00	130.00	-79.78	0.51
796	☐	P15	J1100	J40	2,941.46	12.00	110.00	-350.00	0.99
797	☐	P153	J1392	J772	163.62	8.00	130.00	18.01	0.11
798	☐	P155	J752	J782	18.38	8.00	130.00	-6.86	0.04
799	☐	P157	J782	J780	176.11	8.00	130.00	-9.27	0.06
800	☐	P159	J2300	J770	222.01	8.00	130.00	-27.31	0.17
801	☐	P161	J710	J772	47.97	6.00	130.00	-16.18	0.18
802	☐	P163	J2030	J796	589.54	10.00	130.00	-206.43	0.84
803	☐	P165	J1020	J1842	177.57	12.00	130.00	596.33	1.69
804	☐	P167	J1030	J1020	1,598.36	12.00	130.00	600.00	1.70
805	☐	P169	J1842	J800	501.18	12.00	130.00	387.24	1.10
806	☐	P17	J1428	J1962	421.46	10.00	130.00	-36.98	0.15
807	☐	P171	J2238	J2306	322.47	10.00	130.00	68.07	0.28
808	☐	P173	J2240	J2304	501.90	10.00	130.00	109.70	0.45
809	☐	P175	J2304	J2238	304.12	10.00	130.00	74.52	0.30
810	☐	P179	J800	J2228	302.39	10.00	130.00	119.28	0.49
811	☐	P181	J1164	J1614	282.05	10.00	130.00	18.54	0.08
812	☐	P183	J1614	J2052	93.79	10.00	130.00	0.19	0.00
813	☐	P185	J2052	J816	218.00	10.00	130.00	0.00	0.00
814	☐	P187	J2228	J1164	894.41	10.00	130.00	57.00	0.23
815	☐	P189	J1416	J934	350.42	12.00	130.00	-18.79	0.05
816	☐	P19	J1432	J1428	44.02	10.00	130.00	-33.11	0.14

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
817	☐	P191	J1300	J1790	132.70	10.00	130.00	118.86	0.49
818	☐	P193	J1786	J2422	524.08	10.00	130.00	307.84	1.26
819	☐	P195	J1790	J2418	16.97	10.00	130.00	97.75	0.40
820	☐	P197	J30	J852	21.06	6.00	130.00	91.20	1.03
821	☐	P199	J898	J856	338.93	8.00	130.00	-47.11	0.30
822	☐	P201	J1774	J898	309.05	8.00	130.00	-165.83	1.06
823	☐	P203	J1272	J860	102.53	8.00	130.00	107.74	0.69
824	☐	P205	J1610	J864	400.55	8.00	130.00	134.28	0.86
825	☐	P207	J2252	J1610	114.15	8.00	130.00	146.62	0.94
826	☐	P209	J1316	J878	73.47	8.00	130.00	98.51	0.63
827	☐	P21	J64	J54	194.19	10.00	130.00	300.00	1.23
828	☐	P211	J934	J912	660.98	8.00	130.00	16.39	0.10
829	☐	P213	J948	J920	657.76	8.00	130.00	-60.19	0.38
830	☐	P215	J924	J22	243.17	6.00	130.00	9.94	0.11
831	☐	P217	J818	J824	228.28	8.00	130.00	-4.25	0.03
832	☐	P219	J918	J948	0.02	8.00	130.00	-28.96	0.18
833	☐	P221	J1780	J926	86.55	8.00	130.00	51.38	0.33
834	☐	P223	J926	J956	15.35	8.00	130.00	130.80	0.83
835	☐	P225	J842	J944	103.92	6.00	130.00	27.91	0.32
836	☐	P227	J206	J2324	289.56	16.00	130.00	-1,685.88	2.69
837	☐	P23	J70	J74	302.16	10.00	130.00	300.00	1.23
838	☐	P231	J1564	J2212	4,363.53	12.00	130.00	479.39	1.36
839	☐	P233	J2212	J1008	1,589.82	12.00	130.00	438.00	1.24
840	☐	P235	J1048	J2512	1,125.87	12.00	130.00	-305.04	0.87
841	☐	P237	J1032	J2312	68.87	12.00	130.00	0.00	0.00
842	☐	P239	J1958	J2204	186.61	10.00	130.00	-36.98	0.15
843	☐	P241	J1962	J1958	101.81	10.00	130.00	-36.98	0.15
844	☐	P243	J2204	J1044	480.80	10.00	130.00	-48.91	0.20
845	☐	P245	J1050	J1058	76.98	8.00	130.00	8.40	0.05
846	☐	P247	J1058	J1056	166.37	8.00	130.00	6.75	0.04
847	☐	P249	J1088	J2110	456.71	8.00	130.00	-73.46	0.47
848	☐	P251	J2110	J1092	122.06	8.00	130.00	-70.58	0.45
849	☐	P253	J2134	J1100	295.27	8.00	130.00	-155.85	0.99
850	☐	P255	J522	J530	670.12	8.00	130.00	174.50	1.11
851	☐	P257	J530	J592	654.94	8.00	130.00	140.22	0.89
852	☐	P259	J1114	J1112	0.00	10.00	130.00	0.00	0.00
853	☐	P261	J2230	J1128	138.23	8.00	130.00	-19.92	0.13
854	☐	P263	J1152	J1140	345.92	8.00	130.00	-1.04	0.01
855	☐	P265	J1130	J1144	71.38	8.00	130.00	-9.65	0.06
856	☐	P267	J1192	J1174	370.08	8.00	130.00	-46.14	0.29
857	☐	P271	J1216	J1370	486.76	12.00	130.00	-4.42	0.01
858	☐	P273	J1234	J1226	738.84	10.00	130.00	21.38	0.09
859	☐	P277	J1248	J1954	254.46	10.00	130.00	-1.96	0.01
860	☐	P279	J1954	J1244	208.91	10.00	130.00	-7.99	0.03
861	☐	P281	J1254	J1248	1,190.90	8.00	130.00	18.35	0.12
862	☐	P283	J1968	J1254	308.08	8.00	130.00	56.09	0.36
863	☐	P285	J1252	J1250	139.73	10.00	130.00	2.53	0.01
864	☐	P287	J1828	J1252	1,206.41	10.00	130.00	-28.42	0.12
865	☐	P289	J264	J1970	250.13	10.00	130.00	15.54	0.06
866	☐	P29	J2224	J86	345.57	8.00	130.00	110.27	0.70
867	☐	P291	J1834	J1262	644.97	10.00	130.00	-16.52	0.07

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
868	☐	P293	J1838	J1834	400.79	10.00	130.00	10.72	0.04
869	☐	P295	J1970	J1838	399.82	10.00	130.00	10.21	0.04
870	☐	P297	J482	J2082	519.31	6.00	130.00	13.17	0.15
871	☐	P301	J2216	J1268	1,222.63	12.00	130.00	672.71	1.91
872	☐	P303	J1768	J1282	315.42	8.00	130.00	6.28	0.04
873	☐	P305	J1280	J1284	14.22	8.00	130.00	75.65	0.48
874	☐	P309	J832	J1292	43.56	10.00	130.00	6.64	0.03
875	☐	P31	J84	J2224	1,000.63	8.00	130.00	124.12	0.79
876	☐	P313	J1356	J1386	37.55	12.00	130.00	-299.98	0.85
877	☐	P315	V8020	J1386	14.89	12.00	130.00	0.00	0.00
878	☐	P319	J1844	J1368	218.09	12.00	130.00	70.88	0.20
879	☐	P321	J1664	J1360	727.58	8.00	130.00	48.46	0.31
880	☐	P323	J1406	J1396	384.74	8.00	130.00	37.09	0.24
881	☐	P325	J2000	J1406	523.05	8.00	130.00	41.85	0.27
882	☐	P329	J1174	J1402	84.23	8.00	130.00	58.39	0.37
883	☐	P33	J2478	J2508	16.93	12.00	130.00	120.29	0.34
884	☐	P335	J1494	J1462	216.36	12.00	130.00	31.97	0.09
885	☐	P337	J1470	J1474	210.45	8.00	130.00	3.46	0.02
886	☐	P339	J1502	J1500	182.60	10.00	130.00	79.49	0.32
887	☐	P341	J1512	J1506	234.74	8.00	130.00	-38.54	0.25
888	☐	P343	J1498	J1508	179.07	10.00	130.00	8.48	0.03
889	☐	P345	J1506	J1490	184.58	10.00	130.00	-123.33	0.50
890	☐	P347	J1570	J1540	124.59	8.00	130.00	114.56	0.73
891	☐	P349	J94	J1546	290.30	8.00	130.00	151.24	0.97
892	☐	P35	J468	J2510	1,246.35	12.00	130.00	-120.29	0.34
893	☐	P353	J1578	J1574	634.49	8.00	130.00	-30.88	0.20
894	☐	P355	J1328	J1582	454.35	10.00	130.00	-215.95	0.88
895	☐	P357	J1590	J1588	108.57	10.00	130.00	0.60	0.00
896	☐	P359	J1592	J1590	273.79	10.00	130.00	1.22	0.00
897	☐	P361	J1620	J2382	847.40	8.00	130.00	-5.77	0.04
898	☐	P363	J1638	J1654	367.28	8.00	130.00	-27.69	0.18
899	☐	P365	J1654	J2500	283.97	8.00	130.00	-31.64	0.20
900	☐	P367	J1368	J1850	232.78	8.00	130.00	11.14	0.07
901	☐	P369	J1644	J1650	42.57	8.00	130.00	0.00	0.00
902	☐	P37	J2136	J126	23.64	8.00	130.00	110.13	0.70
903	☐	P371	V8024	J1650	18.63	8.00	130.00	0.00	0.00
904	☐	P373	J1652	J2482	112.02	8.00	130.00	0.00	0.00
905	☐	P375	J1850	J1632	268.77	8.00	130.00	3.51	0.02
906	☐	P377	J1858	J2466	301.48	8.00	130.00	0.00	0.00
907	☐	P379	J1862	J1858	118.07	8.00	130.00	0.00	0.00
908	☐	P381	J1662	J1854	1,256.71	12.00	130.00	383.29	1.09
909	☐	P383	J1854	J2450	133.87	12.00	130.00	383.29	1.09
910	☐	P387	J1978	J1680	126.39	8.00	130.00	-112.63	0.72
911	☐	P389	J1700	J1698	123.20	8.00	130.00	6.58	0.04
912	☐	P39	J476	J152	1,316.15	6.00	130.00	23.69	0.27
913	☐	P391	J1714	J1712	606.90	10.00	130.00	6.14	0.03
914	☐	P393	J1718	J1714	165.31	10.00	130.00	15.13	0.06
915	☐	P395	J1734	J1742	1,010.40	10.00	130.00	39.82	0.16
916	☐	P397	J1742	J1746	300.26	10.00	130.00	28.85	0.12
917	☐	P399	J1746	J1718	211.77	10.00	130.00	26.84	0.11
918	☐	P401	J1724	J1730	474.57	10.00	130.00	2.08	0.01

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
919	☐	P403	J1730	J1720	151.51	10.00	130.00	-2.10	0.01
920	☐	P405	J1726	J1724	62.71	10.00	130.00	-5.24	0.02
921	☐	P409	J878	J854	0.02	8.00	130.00	-159.08	1.02
922	☐	P41	J1118	J134	30.68	12.00	130.00	-95.98	0.27
923	☐	P411	J1646	J1792	33.46	8.00	130.00	9.43	0.06
924	☐	P413	J1648	J2420	656.54	8.00	130.00	-7.22	0.05
925	☐	P415	J1816	J1822	258.64	8.00	130.00	-7.47	0.05
926	☐	P417	J1822	J1810	174.20	8.00	130.00	-19.53	0.12
927	☐	P419	J1812	J1808	433.71	8.00	130.00	22.03	0.14
928	☐	P421	J1840	J1262	415.52	10.00	130.00	-10.32	0.04
929	☐	P423	J2198	J1840	311.52	10.00	130.00	5.24	0.02
930	☐	P425	J1874	J1882	316.34	10.00	130.00	35.18	0.14
931	☐	P427	J1882	J2486	278.82	10.00	130.00	-14.19	0.06
932	☐	P429	J1894	J1904	121.70	10.00	130.00	116.05	0.47
933	☐	P43	J1704	J2432	304.28	12.00	130.00	-26.46	0.08
934	☐	P431	J1904	J2442	516.46	10.00	130.00	106.69	0.44
935	☐	P433	J1914	J1894	809.49	10.00	130.00	270.93	1.11
936	☐	P435	J2016	J1874	180.52	10.00	130.00	69.90	0.29
937	☐	P439	J1872	J1890	167.31	10.00	130.00	113.47	0.46
938	☐	P443	J1896	J1894	309.12	10.00	130.00	-150.84	0.62
939	☐	P445	J1912	J1910	226.65	8.00	130.00	1.34	0.01
940	☐	P447	J2012	J1914	226.92	8.00	130.00	-23.59	0.15
941	☐	P449	J1946	J1944	534.50	8.00	130.00	564.50	3.60
942	☐	P45	J2048	J2460	310.98	12.00	130.00	-67.32	0.19
943	☐	P451	J2264	J1990	222.70	8.00	130.00	-12.29	0.08
944	☐	P453	J2266	J2392	1,328.62	8.00	130.00	-3.12	0.02
945	☐	P455	J2022	J2020	98.76	10.00	130.00	0.00	0.00
946	☐	P457	J2028	J2308	985.98	8.00	130.00	-12.79	0.08
947	☐	P459	J2032	J2034	286.21	8.00	130.00	-57.46	0.37
948	☐	P461	J2034	J2030	313.01	8.00	130.00	-106.81	0.68
949	☐	P463	J2038	J2034	595.33	8.00	130.00	-47.19	0.30
950	☐	P465	J774	J776	481.23	10.00	130.00	53.10	0.22
951	☐	P467	J2074	J2068	1,057.69	8.00	130.00	-40.50	0.26
952	☐	P469	J2070	J2078	660.24	8.00	130.00	-1.16	0.01
953	☐	P471	J2092	J2096	166.65	10.00	130.00	60.93	0.25
954	☐	P473	J2096	J2090	161.62	10.00	130.00	25.14	0.10
955	☐	P475	J2168	J2172	358.68	10.00	130.00	-18.09	0.07
956	☐	P477	J2172	J2176	602.90	10.00	130.00	-56.49	0.23
957	☐	P479	J2176	J2180	299.35	10.00	130.00	-59.88	0.24
958	☐	P481	J2180	J2184	230.94	10.00	130.00	-64.05	0.26
959	☐	P483	J2184	J2188	729.69	10.00	130.00	-67.54	0.28
960	☐	P485	J2188	J2190	133.89	10.00	130.00	-72.78	0.30
961	☐	P487	J2190	J1508	1,069.68	10.00	130.00	-86.63	0.35
962	☐	P489	J2108	J2106	176.26	8.00	130.00	-81.55	0.52
963	☐	P49	J156	J158	29.68	12.00	130.00	-194.15	0.55
964	☐	P491	J2128	J2114	221.43	10.00	130.00	31.96	0.13
965	☐	P493	J2162	J2526	674.67	10.00	130.00	69.52	0.28
966	☐	P497	J2126	J2124	381.41	10.00	130.00	3.64	0.01
967	☐	P499	J2130	J2128	221.79	10.00	130.00	-29.36	0.12
968	☐	P501	J2142	J2144	617.32	12.00	130.00	37.02	0.11
969	☐	P503	J2144	J2140	834.66	12.00	130.00	19.45	0.06

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
970	☐	P505	J2146	J2144	146.77	8.00	130.00	-5.19	0.03
971	☐	P507	J2150	J2146	48.24	8.00	130.00	4.41	0.03
972	☐	P509	J2154	J2150	167.81	8.00	130.00	5.78	0.04
973	☐	P51	J166	J156	69.32	12.00	130.00	0.00	0.00
974	☐	P511	J2158	J2154	191.84	8.00	130.00	8.55	0.05
975	☐	P513	J2206	J2204	286.87	8.00	130.00	-11.93	0.08
976	☐	P515	V8038	J2220	14.50	8.00	130.00	672.71	4.29
977	☐	P517	J2222	J2374	14.53	8.00	130.00	-672.71	4.29
978	☐	P519	J2232	J2230	421.92	8.00	130.00	57.23	0.37
979	☐	P521	J2250	J2248	259.91	4.00	130.00	1.02	0.03
980	☐	P527	J2288	J2276	179.80	8.00	130.00	4.62	0.03
981	☐	P531	J2284	J2296	264.71	8.00	130.00	-1.79	0.01
982	☐	P533	J2296	J2280	125.65	6.00	130.00	-2.62	0.03
983	☐	P535	J2308	J2032	469.04	8.00	130.00	-30.18	0.19
984	☐	P537	J928	J2310	484.79	4.00	130.00	-6.92	0.18
985	☐	P539	J2310	J676	323.60	2.00	130.00	-5.54	0.57
986	☐	P541	J2310	J20	349.99	2.00	130.00	-5.34	0.55
987	☐	P543	J2312	J36	139.72	8.00	130.00	-600.00	3.83
988	☐	P545	J2312	J1030	173.62	12.00	130.00	600.00	1.70
989	☐	P549	J2314	J92	320.93	6.00	130.00	-74.25	0.84
990	☐	P553	J2316	J144	673.08	8.00	130.00	-80.14	0.51
991	☐	P555	J2318	J478	274.82	8.00	130.00	22.85	0.15
992	☐	P557	J2318	J1344	80.31	8.00	130.00	27.48	0.18
993	☐	P565	J156	J182	274.17	12.00	130.00	194.15	0.55
994	☐	P569	J2324	T5002	22.49	16.00	130.00	-1,685.88	2.69
995	☐	P579	J2330	J212	30.96	10.00	130.00	27.28	0.11
996	☐	P59	J208	J206	7.61	12.00	130.00	-31.94	0.09
997	☐	P591	J2336	J214	521.93	8.00	130.00	122.55	0.78
998	☐	P593	J2336	J240	160.85	8.00	130.00	14.24	0.09
999	☐	P599	J2340	J274	56.44	8.00	130.00	0.00	0.00
1000	☐	P609	J2344	J370	197.46	6.00	130.00	8.13	0.09
1001	☐	P61	J210	J208	14.94	12.00	130.00	114.01	0.32
1002	☐	P611	J2346	J342	497.68	8.00	130.00	-7.65	0.05
1003	☐	P613	J2346	J348	239.26	6.00	130.00	1.26	0.01
1004	☐	P615	J2348	J392	399.32	8.00	130.00	27.35	0.17
1005	☐	P617	J2348	J2074	103.34	8.00	130.00	-34.68	0.22
1006	☐	P619	J2350	J468	698.26	12.00	130.00	-1,192.23	3.38
1007	☐	P621	J2350	J554	633.54	6.00	130.00	151.67	1.72
1008	☐	P623	J2352	J108	487.29	8.00	130.00	-64.86	0.41
1009	☐	P627	J2354	J526	326.24	6.00	130.00	43.28	0.49
1010	☐	P629	J2354	J522	657.11	8.00	130.00	-81.85	0.52
1011	☐	P63	J250	J2502	1,030.79	10.00	130.00	-165.24	0.67
1012	☐	P631	J2356	J542	0.05	6.00	130.00	1.53	0.02
1013	☐	P633	J2356	J544	383.20	12.00	130.00	-928.81	2.63
1014	☐	P635	J2358	J578	8.30	8.00	130.00	136.00	0.87
1015	☐	P639	J2360	J470	650.63	8.00	130.00	91.76	0.59
1016	☐	P643	J2362	J932	661.45	4.00	130.00	-3.49	0.09
1017	☐	P645	J2362	J912	325.77	8.00	130.00	6.60	0.04
1018	☐	P647	J2364	J472	346.38	12.00	130.00	-17.94	0.05
1019	☐	P649	J2364	J2440	170.86	10.00	130.00	14.02	0.06
1020	☐	P65	J236	J2318	8.38	8.00	130.00	50.81	0.32

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
1021	☐	P651	J2366	J1032	206.43	12.00	130.00	0.00	0.00
1022	☐	P653	J2366	J1042	33.97	8.00	130.00	0.00	0.00
1023	☐	P655	J2368	J1174	926.85	12.00	130.00	107.30	0.30
1024	☐	P659	J2370	J1114	416.39	10.00	130.00	-219.69	0.90
1025	☐	P661	J2370	J642	219.94	8.00	130.00	3.26	0.02
1026	☐	P667	J2374	J1266	36.51	12.00	130.00	-266.20	0.76
1027	☐	P673	J2376	J1584	152.99	10.00	130.00	-169.17	0.69
1028	☐	P675	J2378	J1352	244.27	8.00	130.00	-22.20	0.14
1029	☐	P677	J2378	J142	281.87	8.00	130.00	-89.66	0.57
1030	☐	P679	J1426	J1428	74.32	8.00	130.00	-3.87	0.02
1031	☐	P681	J1426	J1436	149.05	8.00	130.00	1.95	0.01
1032	☐	P683	J2382	J1620	724.12	8.00	130.00	6.28	0.04
1033	☐	P685	J2382	J1616	0.03	8.00	130.00	4.22	0.03
1034	☐	P687	J2384	J1862	2,322.92	8.00	130.00	0.00	0.00
1035	☐	P689	J2384	J1660	141.02	8.00	130.00	0.00	0.00
1036	☐	P69	J248	J254	2.13	10.00	130.00	27.22	0.11
1037	☐	P697	J2388	J1870	705.86	8.00	130.00	-143.33	0.91
1038	☐	P699	J2390	J1922	147.40	8.00	130.00	9.73	0.06
1039	☐	P703	J2392	J2266	889.37	8.00	130.00	3.87	0.02
1040	☐	P705	J2392	J1992	0.04	8.00	130.00	1.67	0.01
1041	☐	P707	J2394	J2416	318.17	8.00	130.00	-6.17	0.04
1042	☐	P709	J2394	J2046	43.82	8.00	130.00	2.30	0.01
1043	☐	P711	J2396	J2098	0.00	6.00	130.00	0.00	0.00
1044	☐	P713	J2396	J2168	873.30	10.00	130.00	10.48	0.04
1045	☐	P717	J2398	J2122	246.52	10.00	130.00	-14.27	0.06
1046	☐	P719	J2400	J2288	211.04	8.00	130.00	4.12	0.03
1047	☐	P723	J200	J2326	74.50	10.00	130.00	145.95	0.60
1048	☐	P73	J2062	J266	688.60	12.00	130.00	1.66	0.00
1049	☐	P731	RES9000	V8000	19.04	12.00	130.00	350.00	0.99
1050	☐	P733	V8000	J2104	17.42	12.00	130.00	350.00	0.99
1051	☐	P735	V8002	J1952	17.52	6.00	130.00	0.00	0.00
1052	☐	P737	J1950	V8004	7.52	12.00	130.00	1,078.99	3.06
1053	☐	P739	J2402	J118	602.10	8.00	130.00	-8.88	0.06
1054	☐	P743	J2406	J1914	333.30	10.00	130.00	305.65	1.25
1055	☐	P745	J1450	J2340	140.86	8.00	130.00	30.10	0.19
1056	☐	P747	J1432	V8006	65.81	10.00	130.00	0.00	0.00
1057	☐	P749	V8006	J2494	63.47	10.00	130.00	0.00	0.00
1058	☐	P751	J1432	V8008	34.30	10.00	130.00	0.00	0.00
1059	☐	P753	V8008	J2494	33.51	10.00	130.00	0.00	0.00
1060	☐	P755	J2408	J1832	26.05	10.00	130.00	0.00	0.00
1061	☐	P757	J1832	J264	741.33	10.00	130.00	4.58	0.02
1062	☐	P759	J2408	V8010	13.00	10.00	130.00	0.00	0.00
1063	☐	P761	V8010	J1832	13.00	10.00	130.00	0.00	0.00
1064	☐	P763	J2408	V8012	13.00	10.00	130.00	17.43	0.07
1065	☐	P765	V8012	J1832	13.00	10.00	130.00	17.43	0.07
1066	☐	P773	J2410	J1042	616.97	8.00	130.00	0.00	0.00
1067	☐	P775	J1990	J1986	370.85	8.00	130.00	-25.68	0.16
1068	☐	P777	J1102	J392	286.10	10.00	130.00	135.70	0.55
1069	☐	P779	J2412	J2346	105.39	8.00	130.00	-3.37	0.02
1070	☐	P781	J2414	J1568	351.94	8.00	130.00	-3.26	0.02
1071	☐	P783	J2416	J2048	445.89	8.00	130.00	-17.55	0.11

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
1072	☐	P785	J2418	J832	480.89	10.00	130.00	75.43	0.31
1073	☐	P787	J2420	J1646	310.92	8.00	130.00	10.82	0.07
1074	☐	P789	J2422	J1300	649.18	10.00	130.00	124.19	0.51
1075	☐	P79	J1798	J2338	146.50	6.00	130.00	-13.55	0.15
1076	☐	P791	J2424	J2426	170.90	10.00	130.00	-243.92	1.00
1077	☐	P793	J2426	J802	473.96	10.00	130.00	-170.08	0.69
1078	☐	P795	J2428	J2338	535.83	6.00	130.00	13.99	0.16
1079	☐	P797	J2430	J2368	171.26	10.00	130.00	-129.85	0.53
1080	☐	P799	J2432	J2048	24.57	12.00	130.00	-48.44	0.14
1081	☐	P801	J2434	J2436	196.56	10.00	130.00	-5.87	0.02
1082	☐	P803	J2436	J2438	215.44	10.00	130.00	-9.17	0.04
1083	☐	P805	J2438	J48	804.49	10.00	130.00	56.92	0.23
1084	☐	P807	J2440	J1376	504.51	10.00	130.00	7.15	0.03
1085	☐	P809	J2442	J2016	426.03	10.00	130.00	90.11	0.37
1086	☐	P811	J2498	V8018	10.56	8.00	130.00	299.98	1.91
1087	☐	P813	J2444	V8020	14.63	12.00	130.00	0.00	0.00
1088	☐	P815	J2444	J1360	195.51	12.00	130.00	-300.29	0.85
1089	☐	P817	J1652	V8022	44.14	8.00	130.00	0.00	0.00
1090	☐	P819	J1652	V8024	20.84	8.00	130.00	0.00	0.00
1091	☐	P821	V8028	J2446	11.67	8.00	130.00	374.66	2.39
1092	☐	P823	J2448	J2450	15.20	8.00	130.00	-374.58	2.39
1093	☐	P825	V8026	J2446	54.78	8.00	130.00	0.00	0.00
1094	☐	P827	J2448	V8028	10.96	8.00	130.00	374.58	2.39
1095	☐	P829	J2450	J1624	1,977.38	8.00	130.00	8.70	0.06
1096	☐	P83	J2054	J314	404.28	6.00	130.00	4.99	0.06
1097	☐	P831	SOLANA_RES	J1634	6.85	12.00	130.00	414.93	1.18
1098	☐	P843	J2222	V8036	26.31	8.00	130.00	0.00	0.00
1099	☐	P845	J2222	V8038	13.70	8.00	130.00	672.71	4.29
1100	☐	P865	J1344	J1352	101.01	8.00	130.00	25.17	0.16
1101	☐	P867	J2460	J1118	633.02	12.00	130.00	-70.80	0.20
1102	☐	P869	J2462	J2316	454.54	8.00	130.00	-80.82	0.52
1103	☐	P87	J392	J326	33.42	10.00	130.00	160.68	0.66
1104	☐	P871	J2464	J1644	645.32	8.00	130.00	0.00	0.00
1105	☐	P873	U7000	J2466	32.79	8.00	130.00	0.00	0.00
1106	☐	P875	J2464	U7000	32.05	8.00	130.00	0.00	0.00
1107	☐	P877	J2464	U7002	36.70	8.00	130.00	0.00	0.00
1108	☐	P879	U7002	J2466	37.18	8.00	130.00	0.00	0.00
1109	☐	P881	J1660	U7006	24.17	12.00	130.00	0.00	0.00
1110	☐	P883	U7006	J1628	21.19	12.00	130.00	0.00	0.00
1111	☐	P885	J1660	U7004	21.34	12.00	130.00	0.00	0.00
1112	☐	P887	U7004	J1628	18.93	12.00	130.00	0.00	0.00
1113	☐	P889	J1660	U7008	24.22	12.00	130.00	1,191.56	3.38
1114	☐	P89	J2072	J1102	309.20	10.00	130.00	109.92	0.45
1115	☐	P891	U7008	J1628	20.96	12.00	130.00	1,191.56	3.38
1116	☐	P893	J248	J122	9.01	10.00	130.00	137.11	0.56
1117	☐	P895	J182	U7012	211.62	12.00	130.00	0.00	0.00
1118	☐	P897	U7012	J160	37.65	4.00	130.00	0.00	0.00
1119	☐	P899	J2468	J1944	138.42	10.00	130.00	0.00	0.00
1120	☐	P901	J2470	J2468	38.40	10.00	130.00	0.00	0.00
1121	☐	P903	J2468	J2472	16.34	10.00	130.00	0.00	0.00
1122	☐	P905	J2472	V8044	19.24	10.00	130.00	0.00	0.00

		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
1123	☐	P907	V8044	J2474	18.75	10.00	130.00	0.00	0.00
1124	☐	P909	J2474	J2470	17.25	10.00	130.00	0.00	0.00
1125	☐	P91	J340	J328	307.95	8.00	130.00	-8.97	0.06
1126	☐	P911	SILBERHORN_1	SILB_1_FCV	60.11	8.00	130.00	300.00	1.91
1127	☐	P913	SILB_1_FCV	J68	58.60	8.00	130.00	300.00	1.91
1128	☐	P915	SILBERHORN_2	SILB_2_FCV	54.74	8.00	130.00	0.00	0.00
1129	☐	P917	SILB_2_FCV	J72	48.80	8.00	130.00	0.00	0.00
1130	☐	P919	SILBERHORN_3	SILB_3_FCV	50.55	8.00	130.00	0.00	0.00
1131	☐	P921	SILB_3_FCV	J62	44.22	8.00	130.00	0.00	0.00
1132	☐	P923	J2476	J2348	894.59	8.00	130.00	-5.19	0.03
1133	☐	P925	J2472	V8046	31.89	10.00	130.00	0.00	0.00
1134	☐	P927	V8046	J2474	32.21	10.00	130.00	0.00	0.00
1135	☐	P929	J2478	J122	17.42	12.00	130.00	0.00	0.00
1136	☐	P93	J2078	J340	659.87	6.00	130.00	0.00	0.00
1137	☐	P931	J2480	J254	20.04	8.00	130.00	-120.31	0.77
1138	☐	P933	J2480	J2506	6.56	8.00	130.00	0.00	0.00
1139	☐	P935	J2480	V8014	6.51	8.00	130.00	120.31	0.77
1140	☐	P937	V8014	J2478	7.07	8.00	130.00	120.29	0.77
1141	☐	P939	J2480	V8016	6.23	8.00	130.00	0.00	0.00
1142	☐	P941	V8016	J2478	7.47	8.00	130.00	0.00	0.00
1143	☐	P943	J258	U7010	6.40	4.00	130.00	0.00	0.00
1144	☐	P945	U7010	J256	6.31	4.00	130.00	0.00	0.00
1145	☐	P947	J2482	J1368	346.09	8.00	130.00	-2.47	0.02
1146	☐	P949	J2484	J2024	563.90	8.00	130.00	8.67	0.06
1147	☐	P951	J2486	J1872	588.20	10.00	130.00	-27.81	0.11
1148	☐	P953	J2488	J258	7.27	12.00	130.00	0.00	0.00
1149	☐	P955	J2488	U7014	6.80	4.00	130.00	0.00	0.00
1150	☐	P957	U7014	J2490	5.97	4.00	130.00	0.00	0.00
1151	☐	P959	J2490	J256	7.54	4.00	130.00	0.00	0.00
1152	☐	P961	J2492	J1432	58.83	8.00	130.00	-33.11	0.21
1153	☐	P963	J2494	J1432	48.57	10.00	130.00	0.00	0.00
1154	☐	P965	J2496	J1786	274.39	10.00	130.00	323.58	1.32
1155	☐	P967	J2498	J1390	24.84	8.00	130.00	0.31	0.00
1156	☐	P969	V8048	J1660	28.07	8.00	130.00	1,159.92	7.40
1157	☐	P971	J1628	V8048	24.93	8.00	130.00	1,159.92	7.40
1158	☐	P973	J1628	J2500	15.80	8.00	130.00	31.64	0.20
1159	☐	P975	J2480	J2478	100.00	1.00	20.00	0.00	0.00
1160	☐	P977	J2222	J2220	100.00	1.00	20.00	0.00	0.00
1161	☐	P979	J1950	J1952	100.00	1.00	20.00	0.00	0.00
1162	☐	P981	J1652	J1650	100.00	1.00	20.00	0.00	0.00
1163	☐	P983	J110	J2316	5.73	6.00	130.00	0.68	0.01
1164	☐	P985	J2502	J2378	11.62	8.00	130.00	-17.32	0.11
1165	☐	P987	J2502	J212	281.89	10.00	130.00	-161.60	0.66
1166	☐	P989	PW_WELL_TWO	PW_WELL_2	15.00	6.00	130.00	0.00	0.00
1167	☐	P99	J1826	J448	123.94	8.00	130.00	-52.80	0.34
1168	☐	P991	PW_WELL_2	J1024	34.49	8.00	130.00	0.00	0.00
1169	☐	P993	PW_WELL_THREE	PW_WELL_3	15.00	6.00	130.00	0.00	0.00
1170	☐	P995	PW_WELL_3	J2410	30.51	8.00	130.00	0.00	0.00
1171	☐	P997	V8050	J2506	3.94	8.00	130.00	0.00	0.00
1172	☐	P999	J256	V8050	4.65	8.00	130.00	0.00	0.00

2031 PHD Pipe Report

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
1	☐	P-1000	0.00	0.00	Open	0
2	☐	P-1001	0.00	0.00	Open	0
3	☐	P-1002	0.00	0.10	Open	0
4	☐	P-1003	0.00	0.00	Open	0
5	☐	P-1008	0.00	0.00	Open	0
6	☐	P-1009	0.00	0.01	Open	0
7	☐	P-101	0.30	0.67	Open	0
8	☐	P-1010	0.00	0.00	Open	0
9	☐	P-1011	0.00	0.00	Open	0
10	☐	P-1012	0.00	0.00	Open	0
11	☐	P-1013	0.00	0.01	Open	0
12	☐	P-1019	0.18	0.36	Open	0
13	☐	P-102	0.33	0.67	Open	0
14	☐	P-1020	0.00	0.00	Open	0
15	☐	P-1021	0.00	0.00	Open	0
16	☐	P-1022	0.00	0.00	Open	0
17	☐	P-1023	0.00	0.00	Open	0
18	☐	P-1025	0.00	0.00	Open	0
19	☐	P-1026	0.00	0.00	Open	0
20	☐	P-103	0.44	0.92	Open	0
21	☐	P-1030	0.03	0.02	Open	0
22	☐	P-104	0.59	0.72	Open	0
23	☐	P-105	0.00	0.00	Open	0
24	☐	P-106	0.02	0.12	Open	0
25	☐	P-107	0.00	0.00	Open	0
26	☐	P-108	0.00	0.00	Open	0
27	☐	P-109	0.00	0.00	Open	0
28	☐	P-110	0.56	0.66	Open	0
29	☐	P-111	0.19	0.66	Open	0
30	☐	P-113	0.00	0.00	Open	0
31	☐	P-114	0.00	0.00	Open	0
32	☐	P-115	0.01	0.66	Open	0
33	☐	P-116	0.00	0.00	Open	0
34	☐	P-118	0.04	0.11	Open	0
35	☐	P-119	0.01	0.02	Open	0
36	☐	P-121	0.00	0.00	Open	0
37	☐	P-122	0.00	0.00	Open	0
38	☐	P-123	0.01	0.02	Open	0
39	☐	P-124	0.85	1.26	Open	0
40	☐	P-125	0.83	1.23	Open	0
41	☐	P-126	0.01	0.01	Open	0
42	☐	P-129	0.08	2.90	Open	0
43	☐	P-130	0.43	0.33	Open	0
44	☐	P-131	0.00	0.70	Open	0
45	☐	P-132	0.00	0.00	Open	0
46	☐	P-133	0.13	0.12	Open	0
47	☐	P-134	0.10	0.17	Open	0
48	☐	P-135	0.04	0.17	Open	0
49	☐	P-136	0.19	0.34	Open	0
50	☐	P-137	0.01	0.03	Open	0
51	☐	P-138	0.03	0.12	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
52	☐	P-139	0.08	0.12	Open	0
53	☐	P-140	0.05	0.37	Open	0
54	☐	P-141	0.00	0.05	Open	0
55	☐	P-142	0.03	0.37	Open	0
56	☐	P-150	0.01	0.12	Open	0
57	☐	P-162	0.00	0.12	Open	0
58	☐	P-163	0.01	0.17	Open	0
59	☐	P-164	0.01	0.17	Open	0
60	☐	P-165	0.10	0.08	Open	0
61	☐	P-166	0.10	0.32	Open	0
62	☐	P-167	0.13	0.26	Open	0
63	☐	P-168	0.00	0.00	Open	0
64	☐	P-169	0.00	0.00	Open	0
65	☐	P-171	0.04	0.09	Open	0
66	☐	P-172	0.12	0.17	Open	0
67	☐	P-173	0.02	0.08	Open	0
68	☐	P-174	0.00	0.00	Open	0
69	☐	P-175	0.00	0.00	Open	0
70	☐	P-176	0.00	0.00	Open	0
71	☐	P-178	0.00	0.65	Open	0
72	☐	P-181	0.02	0.46	Open	0
73	☐	P-182	0.00	0.00	Open	0
74	☐	P-184	0.02	0.12	Open	0
75	☐	P-185	0.00	0.00	Open	0
76	☐	P-186	0.04	0.06	Open	0
77	☐	P-187	0.01	0.03	Open	0
78	☐	P-188	0.00	0.00	Open	0
79	☐	P-189	0.00	0.00	Open	0
80	☐	P-190	0.00	0.02	Open	0
81	☐	P-191	0.00	0.00	Open	0
82	☐	P-192	0.00	0.00	Open	0
83	☐	P-193	0.00	0.00	Open	0
84	☐	P-194	0.00	0.00	Open	0
85	☐	P-195	0.00	0.00	Open	0
86	☐	P-197	0.00	0.00	Open	0
87	☐	P-198	0.00	0.00	Open	0
88	☐	P-199	0.00	0.00	Open	0
89	☐	P-202	0.00	0.00	Open	0
90	☐	P-203	0.00	0.00	Open	0
91	☐	P-204	0.00	0.00	Open	0
92	☐	P-206	0.01	0.01	Open	0
93	☐	P-207	0.00	0.00	Open	0
94	☐	P-208	0.00	0.01	Open	0
95	☐	P-209	0.01	0.01	Open	0
96	☐	P-210	0.03	0.10	Open	0
97	☐	P-211	0.00	0.00	Open	0
98	☐	P-212	0.01	0.20	Open	0
99	☐	P-213	0.00	0.00	Open	0
100	☐	P-214	0.00	0.00	Open	0
101	☐	P-215	0.01	0.02	Open	0
102	☐	P-216	0.01	0.02	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
103	☐	P-217	0.00	0.01	Open	0
104	☐	P-219	0.00	0.00	Open	0
105	☐	P-220	0.00	0.00	Closed	0
106	☐	P-221	0.00	0.00	Open	0
107	☐	P-223	0.30	0.90	Open	0
108	☐	P-224	0.07	0.24	Open	0
109	☐	P-225	0.00	0.00	Open	0
110	☐	P-226	0.00	0.00	Open	0
111	☐	P-227	0.33	0.94	Open	0
112	☐	P-228	0.00	0.02	Open	0
113	☐	P-232	0.00	0.00	Open	0
114	☐	P-234	0.21	0.67	Open	0
115	☐	P-235	0.03	0.03	Open	0
116	☐	P-236	0.00	0.00	Open	0
117	☐	P-237	0.05	0.04	Open	0
118	☐	P-238	0.03	0.03	Open	0
119	☐	P-239	0.00	0.00	Open	0
120	☐	P-240	0.00	0.00	Closed	0
121	☐	P-241	0.00	0.00	Open	0
122	☐	P-242	0.01	0.07	Open	0
123	☐	P-243	0.00	0.00	Open	0
124	☐	P-244	0.00	0.02	Open	0
125	☐	P-245	0.00	0.00	Open	0
126	☐	P-246	0.00	0.00	Closed	0
127	☐	P-247	0.01	0.05	Open	0
128	☐	P-249	0.00	0.00	Open	0
129	☐	P-250	0.01	0.08	Open	0
130	☐	P-251	0.00	0.00	Open	0
131	☐	P-254	0.01	0.09	Open	0
132	☐	P-258	0.00	0.00	Open	0
133	☐	P-261	0.00	0.00	Open	0
134	☐	P-263	0.00	0.01	Open	0
135	☐	P-264	0.03	0.10	Open	0
136	☐	P-265	0.11	0.37	Open	0
137	☐	P-266	0.00	0.04	Open	0
138	☐	P-267	0.01	0.03	Open	0
139	☐	P-268	0.08	0.22	Open	0
140	☐	P-269	0.00	0.05	Open	0
141	☐	P-270	0.01	0.11	Open	0
142	☐	P-271	0.00	0.11	Open	0
143	☐	P-272	0.04	0.12	Open	0
144	☐	P-273	0.00	0.15	Open	0
145	☐	P-274	0.02	0.08	Open	0
146	☐	P-275	0.00	0.06	Open	0
147	☐	P-276	0.05	0.18	Open	0
148	☐	P-278	0.00	0.01	Open	0
149	☐	P-282	0.03	0.08	Open	0
150	☐	P-284	0.00	0.00	Open	0
151	☐	P-285	0.05	0.17	Open	0
152	☐	P-286	0.50	2.92	Open	0
153	☐	P-287	0.10	0.31	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
154	☐	P-288	0.00	0.01	Open	0
155	☐	P-289	0.06	0.34	Open	0
156	☐	P-290	0.01	0.03	Open	0
157	☐	P-292	0.00	0.00	Open	0
158	☐	P-293	0.00	0.01	Open	0
159	☐	P-294	0.00	0.01	Open	0
160	☐	P-295	0.53	1.13	Open	0
161	☐	P-296	0.46	0.96	Open	0
162	☐	P-297	0.06	0.13	Open	0
163	☐	P-299	0.01	0.01	Open	0
164	☐	P-300	0.00	0.00	Open	0
165	☐	P-301	0.02	0.13	Open	0
166	☐	P-302	0.18	0.59	Open	0
167	☐	P-304	0.01	0.07	Open	0
168	☐	P-305	0.94	1.41	Open	0
169	☐	P-306	1.43	2.15	Open	0
170	☐	P-307	1.92	2.90	Open	0
171	☐	P-308	0.49	1.49	Open	0
172	☐	P-309	0.00	0.01	Open	0
173	☐	P-310	0.25	1.09	Open	0
174	☐	P-312	0.05	0.15	Open	0
175	☐	P-313	0.01	0.02	Open	0
176	☐	P-314	0.01	0.04	Open	0
177	☐	P-315	0.44	1.01	Open	0
178	☐	P-317	0.73	2.70	Open	0
179	☐	P-318	0.06	2.72	Open	0
180	☐	P-319	0.57	0.88	Open	0
181	☐	P-321	0.00	0.00	Open	0
182	☐	P-322	0.49	1.43	Open	0
183	☐	P-324	0.45	1.37	Open	0
184	☐	P-325	0.14	0.44	Open	0
185	☐	P-326	0.00	0.00	Open	0
186	☐	P-327	0.28	0.43	Open	0
187	☐	P-328	0.00	0.00	Open	0
188	☐	P-329	0.09	0.27	Open	0
189	☐	P-330	0.05	0.15	Open	0
190	☐	P-331	0.43	0.65	Open	0
191	☐	P-332	0.43	0.65	Open	0
192	☐	P-333	0.00	0.00	Open	0
193	☐	P-334	0.00	0.01	Open	0
194	☐	P-335	0.00	0.01	Open	0
195	☐	P-336	0.00	0.01	Open	0
196	☐	P-338	0.02	0.12	Open	0
197	☐	P-339	0.04	0.49	Open	0
198	☐	P-340	0.07	0.35	Open	0
199	☐	P-341	0.31	0.47	Open	0
200	☐	P-342	0.09	0.13	Open	0
201	☐	P-343	0.13	0.20	Open	0
202	☐	P-344	0.04	0.06	Open	0
203	☐	P-345	0.04	0.11	Open	0
204	☐	P-346	0.07	0.20	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
205	☐	P-347	0.01	0.01	Open	0
206	☐	P-348	0.01	0.02	Open	0
207	☐	P-349	0.00	0.03	Open	0
208	☐	P-350	0.10	0.37	Open	0
209	☐	P-352	0.04	0.15	Open	0
210	☐	P-353	0.08	0.28	Open	0
211	☐	P-354	0.23	0.66	Open	0
212	☐	P-355	0.02	0.07	Open	0
213	☐	P-356	0.02	0.03	Open	0
214	☐	P-357	0.01	0.03	Open	0
215	☐	P-358	0.02	0.07	Open	0
216	☐	P-359	0.26	0.40	Open	0
217	☐	P-360	0.06	0.08	Open	0
218	☐	P-361	0.12	0.18	Open	0
219	☐	P-362	0.04	0.13	Open	0
220	☐	P-363	0.05	0.14	Open	0
221	☐	P-364	0.03	0.10	Open	0
222	☐	P-365	0.01	0.02	Open	0
223	☐	P-366	0.09	0.26	Open	0
224	☐	P-368	0.01	0.04	Open	0
225	☐	P-369	0.04	0.07	Open	0
226	☐	P-371	0.00	0.96	Open	0
227	☐	P-372	0.55	1.30	Open	0
228	☐	P-373	0.01	0.04	Open	0
229	☐	P-374	0.01	0.02	Open	0
230	☐	P-375	0.01	0.05	Open	0
231	☐	P-376	0.05	0.21	Open	0
232	☐	P-377	0.00	0.00	Open	0
233	☐	P-378	0.10	0.95	Open	0
234	☐	P-379	0.27	0.83	Open	0
235	☐	P-380	0.45	1.35	Open	0
236	☐	P-381	0.00	0.00	Open	0
237	☐	P-382	0.86	1.10	Open	0
238	☐	P-383	0.14	0.20	Open	0
239	☐	P-384	0.08	0.12	Open	0
240	☐	P-385	0.59	1.65	Open	0
241	☐	P-386	0.08	0.13	Open	0
242	☐	P-387	0.00	0.06	Open	0
243	☐	P-388	0.58	1.55	Open	0
244	☐	P-389	0.81	2.25	Open	0
245	☐	P-391	0.04	0.05	Open	0
246	☐	P-392	0.02	0.04	Open	0
247	☐	P-393	0.02	0.03	Open	0
248	☐	P-394	0.16	0.49	Open	0
249	☐	P-395	0.11	0.32	Open	0
250	☐	P-396	0.55	1.06	Open	0
251	☐	P-397	0.05	0.14	Open	0
252	☐	P-398	0.13	0.35	Open	0
253	☐	P-399	0.11	0.33	Open	0
254	☐	P-401	0.00	0.00	Open	0
255	☐	P-402	0.19	0.56	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
256	☐	P-403	0.01	0.04	Open	0
257	☐	P-404	0.00	0.01	Open	0
258	☐	P-405	0.24	0.76	Open	0
259	☐	P-406	0.05	0.19	Open	0
260	☐	P-407	0.26	0.79	Open	0
261	☐	P-410	0.16	0.33	Open	0
262	☐	P-411	0.13	0.45	Open	0
263	☐	P-412	0.18	0.52	Open	0
264	☐	P-413	0.28	0.88	Open	0
265	☐	P-414	0.09	0.26	Open	0
266	☐	P-415	0.04	1.22	Open	0
267	☐	P-416	0.00	0.00	Open	0
268	☐	P-417	0.00	0.00	Open	0
269	☐	P-418	0.00	0.01	Open	0
270	☐	P-419	0.15	0.24	Open	0
271	☐	P-421	0.00	0.00	Open	0
272	☐	P-422	0.06	0.11	Open	0
273	☐	P-423	0.00	0.00	Open	0
274	☐	P-424	0.01	0.08	Open	0
275	☐	P-425	0.00	0.03	Open	0
276	☐	P-428	0.00	0.00	Open	0
277	☐	P-430	0.05	0.15	Open	0
278	☐	P-431	0.01	0.01	Open	0
279	☐	P-432	0.00	0.00	Open	0
280	☐	P-433	0.00	0.01	Open	0
281	☐	P-434	0.00	0.00	Open	0
282	☐	P-435	0.00	0.00	Open	0
283	☐	P-436	0.04	0.23	Open	0
284	☐	P-437	0.10	0.20	Open	0
285	☐	P-438	0.08	0.27	Open	0
286	☐	P-441	0.06	0.06	Open	0
287	☐	P-442	0.03	0.13	Open	0
288	☐	P-443	0.00	0.00	Open	0
289	☐	P-444	0.00	0.00	Open	0
290	☐	P-445	0.00	0.00	Open	0
291	☐	P-446	0.00	0.01	Open	0
292	☐	P-448	0.00	0.02	Open	0
293	☐	P-449	0.00	0.02	Open	0
294	☐	P-450	0.00	0.02	Open	0
295	☐	P-451	0.02	0.09	Open	0
296	☐	P-452	0.00	0.01	Open	0
297	☐	P-453	0.00	0.00	Open	0
298	☐	P-454	0.00	0.00	Open	0
299	☐	P-455	0.01	0.09	Open	0
300	☐	P-456	0.00	0.00	Open	0
301	☐	P-457	0.03	0.03	Open	0
302	☐	P-458	0.07	0.12	Open	0
303	☐	P-459	0.00	0.00	Open	0
304	☐	P-460	0.00	0.00	Open	0
305	☐	P-461	0.00	0.00	Open	0
306	☐	P-462	0.00	0.00	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
307	☐	P-463	0.00	0.00	Open	0
308	☐	P-464	0.03	0.07	Open	0
309	☐	P-465	0.03	0.07	Open	0
310	☐	P-466	0.02	0.53	Open	0
311	☐	P-467	0.00	0.00	Open	0
312	☐	P-468	0.00	0.00	Open	0
313	☐	P-469	0.00	0.00	Open	0
314	☐	P-470	0.00	0.00	Open	0
315	☐	P-473	0.12	0.11	Open	0
316	☐	P-474	0.06	0.41	Open	0
317	☐	P-475	0.25	0.72	Open	0
318	☐	P-476	0.13	0.62	Open	0
319	☐	P-477	0.04	0.32	Open	0
320	☐	P-478	0.00	0.00	Open	0
321	☐	P-479	0.16	0.24	Open	0
322	☐	P-480	0.19	0.35	Open	0
323	☐	P-481	0.16	0.56	Open	0
324	☐	P-482	0.04	0.54	Open	0
325	☐	P-483	0.00	0.00	Open	0
326	☐	P-484	0.00	0.01	Open	0
327	☐	P-485	0.04	0.58	Open	0
328	☐	P-486	0.01	0.37	Open	0
329	☐	P-487	0.03	0.25	Open	0
330	☐	P-488	0.18	0.38	Open	0
331	☐	P-489	0.06	0.27	Open	0
332	☐	P-490	0.03	0.26	Open	0
333	☐	P-491	0.07	0.29	Open	0
334	☐	P-493	0.02	0.40	Open	0
335	☐	P-494	0.05	0.27	Open	0
336	☐	P-495	0.13	0.49	Open	0
337	☐	P-498	0.01	0.02	Open	0
338	☐	P-499	0.00	0.00	Open	0
339	☐	P-501	0.02	0.03	Open	0
340	☐	P-502	0.00	0.00	Open	0
341	☐	P-503	0.09	0.13	Open	0
342	☐	P-504	0.11	0.17	Open	0
343	☐	P-505	0.00	0.00	Open	0
344	☐	P-506	0.01	0.03	Open	0
345	☐	P-507	0.01	0.88	Open	0
346	☐	P-508	0.03	0.10	Open	0
347	☐	P-509	0.00	0.01	Open	0
348	☐	P-510	0.00	0.02	Open	0
349	☐	P-512	0.00	0.00	Open	0
350	☐	P-513	0.00	0.00	Open	0
351	☐	P-514	0.01	0.04	Open	0
352	☐	P-515	0.01	0.02	Open	0
353	☐	P-516	0.15	0.23	Open	0
354	☐	P-517	0.01	0.01	Open	0
355	☐	P-518	0.03	0.05	Open	0
356	☐	P-519	0.01	0.03	Open	0
357	☐	P-521	0.01	0.08	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
358	☐	P-524	0.01	0.41	Open	0
359	☐	P-525	0.01	0.03	Open	0
360	☐	P-526	0.09	0.44	Open	0
361	☐	P-527	0.02	0.05	Open	0
362	☐	P-528	0.03	0.40	Open	0
363	☐	P-529	0.15	0.53	Open	0
364	☐	P-533	0.00	0.02	Open	0
365	☐	P-534	0.04	0.10	Open	0
366	☐	P-535	0.00	0.00	Open	0
367	☐	P-536	0.00	0.00	Open	0
368	☐	P-537	0.00	0.00	Open	0
369	☐	P-538	0.00	0.00	Open	0
370	☐	P-539	0.00	0.00	Open	0
371	☐	P-540	0.00	0.00	Open	0
372	☐	P-541	0.00	0.00	Open	0
373	☐	P-542	0.00	0.00	Open	0
374	☐	P-543	0.00	0.00	Open	0
375	☐	P-544	0.00	0.00	Open	0
376	☐	P-545	0.00	0.00	Open	0
377	☐	P-546	0.00	0.00	Open	0
378	☐	P-547	0.00	0.01	Open	0
379	☐	P-549	0.00	0.00	Open	0
380	☐	P-550	0.00	0.00	Open	0
381	☐	P-551	0.00	0.00	Open	0
382	☐	P-552	0.00	0.00	Open	0
383	☐	P-555	0.00	0.00	Open	0
384	☐	P-556	2.26	1.58	Open	0
385	☐	P-558	0.00	0.00	Open	0
386	☐	P-559	0.93	0.81	Open	0
387	☐	P-560	0.03	0.19	Open	0
388	☐	P-561	0.00	0.00	Open	0
389	☐	P-562	0.00	0.00	Open	0
390	☐	P-563	0.00	0.00	Open	0
391	☐	P-564	0.00	0.00	Open	0
392	☐	P-571	0.02	0.08	Open	0
393	☐	P-572	0.01	0.03	Open	0
394	☐	P-573	0.01	0.06	Open	0
395	☐	P-575	0.00	0.00	Open	0
396	☐	P-576	0.00	0.00	Open	0
397	☐	P-578	0.00	0.00	Open	0
398	☐	P-579	0.00	0.00	Open	0
399	☐	P-580	0.05	0.12	Open	0
400	☐	P-581	0.03	0.13	Open	0
401	☐	P-582	0.00	0.00	Open	0
402	☐	P-583	0.00	0.12	Open	0
403	☐	P-584	0.00	0.00	Open	0
404	☐	P-585	0.10	0.15	Open	0
405	☐	P-586	0.00	0.00	Open	0
406	☐	P-587	0.00	0.15	Open	0
407	☐	P-588	0.02	0.03	Open	0
408	☐	P-590	0.00	0.00	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
409	☐	P-591	0.24	1.10	Open	0
410	☐	P-592	0.05	0.02	Open	0
411	☐	P-594	0.05	0.16	Open	0
412	☐	P-595	0.00	0.00	Open	0
413	☐	P-596	0.00	0.01	Open	0
414	☐	P-597	0.00	0.01	Open	0
415	☐	P-598	0.00	0.01	Open	0
416	☐	P-600	0.00	0.01	Open	0
417	☐	P-602	0.00	0.00	Open	0
418	☐	P-603	0.00	0.01	Open	0
419	☐	P-604	0.00	0.01	Open	0
420	☐	P-605	0.00	0.00	Open	0
421	☐	P-606	0.00	0.01	Open	0
422	☐	P-607	0.00	0.01	Open	0
423	☐	P-609	0.00	0.00	Open	0
424	☐	P-610	0.00	0.01	Open	0
425	☐	P-611	0.01	0.04	Open	0
426	☐	P-612	0.00	0.01	Open	0
427	☐	P-613	0.00	0.01	Open	0
428	☐	P-614	0.00	0.01	Open	0
429	☐	P-615	0.01	0.07	Open	0
430	☐	P-616	0.02	0.05	Open	0
431	☐	P-617	0.01	0.05	Open	0
432	☐	P-618	0.01	0.03	Open	0
433	☐	P-619	0.01	0.02	Open	0
434	☐	P-620	0.00	0.01	Open	0
435	☐	P-621	0.00	0.01	Open	0
436	☐	P-622	0.00	0.01	Open	0
437	☐	P-623	0.00	0.01	Open	0
438	☐	P-624	0.00	0.01	Open	0
439	☐	P-625	0.00	0.01	Open	0
440	☐	P-626	0.00	0.00	Open	0
441	☐	P-628	0.00	0.00	Open	0
442	☐	P-629	0.01	0.01	Open	0
443	☐	P-630	0.08	0.12	Open	0
444	☐	P-631	0.07	0.11	Open	0
445	☐	P-632	0.00	0.05	Open	0
446	☐	P-633	0.00	0.08	Open	0
447	☐	P-634	0.00	0.08	Open	0
448	☐	P-635	0.01	0.27	Open	0
449	☐	P-636	0.00	0.03	Open	0
450	☐	P-637	0.00	0.03	Open	0
451	☐	P-638	0.00	0.00	Open	0
452	☐	P-639	0.00	0.00	Open	0
453	☐	P-640	0.00	0.00	Open	0
454	☐	P-641	0.00	0.00	Open	0
455	☐	P-642	0.00	0.00	Open	0
456	☐	P-643	0.00	0.00	Open	0
457	☐	P-644	0.00	0.00	Open	0
458	☐	P-645	0.00	0.01	Open	0
459	☐	P-646	0.00	0.01	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
460	☐	P-650	0.00	0.00	Open	0
461	☐	P-651	0.00	0.00	Open	0
462	☐	P-652	0.01	0.10	Open	0
463	☐	P-653	0.00	0.01	Open	0
464	☐	P-654	0.00	0.01	Open	0
465	☐	P-655	0.00	0.00	Open	0
466	☐	P-656	0.07	0.13	Open	0
467	☐	P-657	0.01	0.03	Open	0
468	☐	P-659	0.00	0.15	Open	0
469	☐	P-660	0.76	0.48	Open	0
470	☐	P-661	0.00	0.00	Closed	0
471	☐	P-662	1.30	1.12	Open	0
472	☐	P-663	0.14	0.61	Open	0
473	☐	P-664	0.00	0.00	Open	0
474	☐	P-666	0.01	0.18	Open	0
475	☐	P-667	0.00	0.00	Open	0
476	☐	P-668	0.20	0.32	Open	0
477	☐	P-669	0.00	0.00	Open	0
478	☐	P-673	0.00	0.09	Open	0
479	☐	P-674	0.00	0.06	Open	0
480	☐	P-678	0.00	0.00	Open	0
481	☐	P-679	0.00	0.00	Open	0
482	☐	P-680	0.00	0.00	Open	0
483	☐	P-681	0.00	0.00	Open	0
484	☐	P-682	0.00	0.00	Open	0
485	☐	P-690	0.00	0.01	Open	0
486	☐	P-692	0.08	0.23	Open	0
487	☐	P-693	0.00	0.00	Open	0
488	☐	P-694	0.00	0.24	Open	0
489	☐	P-695	0.09	0.20	Open	0
490	☐	P-696	0.01	0.03	Open	0
491	☐	P-697	0.01	0.03	Open	0
492	☐	P-698	0.02	0.09	Open	0
493	☐	P-699	0.00	0.00	Open	0
494	☐	P-700	0.00	0.00	Open	0
495	☐	P-701	0.00	0.00	Open	0
496	☐	P-702	0.02	1.97	Open	0
497	☐	P-703	0.06	1.96	Open	0
498	☐	P-704	0.05	1.97	Open	0
499	☐	P-705	0.01	0.07	Open	0
500	☐	P-706	0.01	0.06	Open	0
501	☐	P-707	0.00	0.00	Open	0
502	☐	P-710	0.01	0.09	Open	0
503	☐	P-711	0.00	0.03	Open	0
504	☐	P-712	0.00	0.01	Open	0
505	☐	P-716	0.00	0.00	Open	0
506	☐	P-718	0.36	0.73	Open	0
507	☐	P-721	0.00	0.00	Open	0
508	☐	P-723	0.00	0.00	Open	0
509	☐	P-726	0.00	0.00	Open	0
510	☐	P-728	0.02	0.03	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
511	☐	P-730	0.00	0.00	Open	0
512	☐	P-731	0.01	0.12	Open	0
513	☐	P-732	0.02	0.09	Open	0
514	☐	P-733	0.00	0.01	Open	0
515	☐	P-734	0.00	0.00	Open	0
516	☐	P-735	0.00	0.00	Open	0
517	☐	P-736	0.00	0.00	Open	0
518	☐	P-737	0.00	0.00	Open	0
519	☐	P-738	0.00	0.00	Open	0
520	☐	P-739	0.00	0.00	Open	0
521	☐	P-740	0.00	0.00	Open	0
522	☐	P-741	0.00	0.00	Open	0
523	☐	P-742	0.00	0.01	Open	0
524	☐	P-743	0.00	0.00	Open	0
525	☐	P-744	0.00	0.00	Open	0
526	☐	P-745	0.00	0.01	Open	0
527	☐	P-747	0.09	0.14	Open	0
528	☐	P-748	0.01	0.15	Open	0
529	☐	P-750	0.02	0.03	Open	0
530	☐	P-751	0.00	0.01	Open	0
531	☐	P-752	0.02	0.03	Open	0
532	☐	P-753	0.01	0.04	Open	0
533	☐	P-754	0.01	0.06	Open	0
534	☐	P-755	0.00	0.00	Open	0
535	☐	P-756	0.11	0.12	Open	0
536	☐	P-757	0.00	0.00	Open	0
537	☐	P-758	0.14	0.84	Open	0
538	☐	P-759	0.04	0.18	Open	0
539	☐	P-760	0.12	0.31	Open	0
540	☐	P-761	0.00	0.00	Open	0
541	☐	P-762	0.00	0.00	Open	0
542	☐	P-763	0.00	0.00	Open	0
543	☐	P-764	0.04	0.21	Open	0
544	☐	P-765	0.05	0.20	Open	0
545	☐	P-766	0.13	0.24	Open	0
546	☐	P-767	0.04	0.24	Open	0
547	☐	P-768	0.04	0.26	Open	0
548	☐	P-769	0.07	0.26	Open	0
549	☐	P-770	0.10	0.33	Open	0
550	☐	P-771	0.15	0.31	Open	0
551	☐	P-774	0.01	0.61	Open	0
552	☐	P-775	0.02	0.52	Open	0
553	☐	P-776	0.00	0.00	Open	0
554	☐	P-777	0.00	0.00	Open	0
555	☐	P-778	0.00	0.00	Open	0
556	☐	P-779	0.00	0.00	Open	0
557	☐	P-780	0.00	0.00	Open	0
558	☐	P-781	0.00	0.00	Open	0
559	☐	P-782	0.00	0.00	Open	0
560	☐	P-783	0.01	0.01	Open	0
561	☐	P-784	0.00	0.00	Closed	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
562	☐	P-785	0.14	1.07	Open	0
563	☐	P-786	0.02	0.03	Open	0
564	☐	P-788	0.08	0.08	Open	0
565	☐	P-789	0.00	0.02	Open	0
566	☐	P-790	0.02	0.12	Open	0
567	☐	P-791	0.07	0.42	Open	0
568	☐	P-792	0.31	0.36	Open	0
569	☐	P-793	0.08	0.23	Open	0
570	☐	P-794	0.00	0.00	Open	0
571	☐	P-795	0.00	0.00	Open	0
572	☐	P-796	0.00	0.01	Open	0
573	☐	P-797	0.00	0.00	Open	0
574	☐	P-798	0.08	0.40	Open	0
575	☐	P-799	0.10	0.38	Open	0
576	☐	P-800	0.02	0.12	Open	0
577	☐	P-801	0.00	0.00	Open	0
578	☐	P-802	0.01	0.12	Open	0
579	☐	P-803	0.01	0.13	Open	0
580	☐	P-804	0.00	0.00	Open	0
581	☐	P-805	0.00	0.01	Open	0
582	☐	P-806	0.00	0.00	Open	0
583	☐	P-807	0.20	0.41	Open	0
584	☐	P-808	0.00	0.00	Open	0
585	☐	P-810	0.01	0.50	Open	0
586	☐	P-811	0.00	0.01	Open	0
587	☐	P-812	0.00	0.00	Open	0
588	☐	P-813	0.00	0.00	Open	0
589	☐	P-814	0.00	0.00	Open	0
590	☐	P-815	0.00	0.00	Open	0
591	☐	P-816	0.00	0.00	Open	0
592	☐	P-818	0.00	0.03	Open	0
593	☐	P-819	0.01	0.04	Open	0
594	☐	P-820	0.00	0.03	Open	0
595	☐	P-821	0.07	0.39	Open	0
596	☐	P-822	0.00	0.00	Open	0
597	☐	P-823	0.06	0.34	Open	0
598	☐	P-824	0.42	1.16	Open	0
599	☐	P-825	0.04	1.20	Open	0
600	☐	P-826	0.00	0.00	Open	0
601	☐	P-828	0.02	0.08	Open	0
602	☐	P-829	0.55	0.40	Open	0
603	☐	P-832	0.00	0.01	Open	0
604	☐	P-833	0.00	0.01	Open	0
605	☐	P-834	0.00	0.00	Open	0
606	☐	P-836	0.05	0.06	Open	0
607	☐	P-837	0.00	0.00	Open	0
608	☐	P-838	0.00	0.00	Open	0
609	☐	P-839	0.00	0.00	Open	0
610	☐	P-840	0.00	0.00	Open	0
611	☐	P-841	0.00	0.00	Open	0
612	☐	P-842	0.00	0.00	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
613	☐	P-847	0.00	0.00	Open	0
614	☐	P-848	0.00	0.00	Open	0
615	☐	P-849	0.00	0.02	Open	0
616	☐	P-852	0.00	0.00	Open	0
617	☐	P-853	0.00	0.00	Open	0
618	☐	P-854	0.00	0.00	Open	0
619	☐	P-856	0.04	0.07	Open	0
620	☐	P-857	0.00	0.02	Open	0
621	☐	P-858	0.04	1.48	Open	0
622	☐	P-861	0.03	0.37	Open	0
623	☐	P-863	0.00	0.00	Open	0
624	☐	P-864	0.00	0.00	Open	0
625	☐	P-865	0.00	0.01	Open	0
626	☐	P-866	0.00	0.00	Open	0
627	☐	P-867	0.00	0.00	Open	0
628	☐	P-868	0.00	0.00	Open	0
629	☐	P-869	0.00	0.00	Open	0
630	☐	P-870	0.00	0.00	Open	0
631	☐	P-871	0.00	0.00	Open	0
632	☐	P-872	0.00	0.00	Open	0
633	☐	P-873	0.01	0.07	Open	0
634	☐	P-874	0.00	0.02	Open	0
635	☐	P-875	0.00	0.00	Open	0
636	☐	P-879	0.00	0.00	Open	0
637	☐	P-880	0.00	0.00	Open	0
638	☐	P-881	0.00	0.00	Open	0
639	☐	P-882	0.00	0.02	Open	0
640	☐	P-883	0.00	0.00	Open	0
641	☐	P-884	0.00	0.01	Open	0
642	☐	P-885	0.03	0.13	Open	0
643	☐	P-886	0.01	0.04	Open	0
644	☐	P-887	0.00	0.00	Open	0
645	☐	P-889	0.00	0.00	Open	0
646	☐	P-890	0.00	0.00	Open	0
647	☐	P-891	0.01	0.20	Open	0
648	☐	P-892	0.39	1.07	Open	0
649	☐	P-893	0.28	1.10	Open	0
650	☐	P-894	0.01	0.02	Open	0
651	☐	P-896	0.03	0.05	Open	0
652	☐	P-897	0.00	0.17	Open	0
653	☐	P-898	0.05	0.08	Open	0
654	☐	P-899	0.04	0.15	Open	0
655	☐	P-900	0.00	0.00	Open	0
656	☐	P-901	0.00	0.00	Open	0
657	☐	P-902	0.00	0.00	Open	0
658	☐	P-903	0.00	0.00	Open	0
659	☐	P-904	0.00	0.01	Open	0
660	☐	P-905	0.07	0.18	Open	0
661	☐	P-906	0.00	0.01	Open	0
662	☐	P-907	0.76	0.93	Open	0
663	☐	P-911	0.01	0.03	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
664	☐	P-912	0.00	0.00	Open	0
665	☐	P-913	0.00	0.00	Open	0
666	☐	P-914	5.72	6.50	Open	0
667	☐	P-916	0.00	0.00	Open	0
668	☐	P-917	0.00	0.00	Open	0
669	☐	P-922	0.00	0.00	Open	0
670	☐	P-923	0.17	0.35	Open	0
671	☐	P-925	0.00	0.02	Open	0
672	☐	P-927	0.00	0.01	Open	0
673	☐	P-928	0.01	0.03	Open	0
674	☐	P-929	0.00	0.00	Open	0
675	☐	P-931	0.00	0.00	Open	0
676	☐	P-932	0.03	0.05	Open	0
677	☐	P-933	0.00	0.00	Open	0
678	☐	P-934	0.00	0.01	Open	0
679	☐	P-936	0.00	0.00	Open	0
680	☐	P-937	0.00	0.00	Open	0
681	☐	P-938	0.00	0.01	Open	0
682	☐	P-939	0.01	0.00	Open	0
683	☐	P-940	0.01	0.02	Open	0
684	☐	P-941	0.00	0.00	Open	0
685	☐	P-942	0.01	0.04	Open	0
686	☐	P-943	0.00	0.00	Open	0
687	☐	P-944	0.00	0.00	Open	0
688	☐	P-945	0.00	0.00	Open	0
689	☐	P-946	0.00	0.00	Open	0
690	☐	P-947	0.00	0.00	Open	0
691	☐	P-949	0.00	0.00	Open	0
692	☐	P-951	0.00	0.06	Open	0
693	☐	P-953	0.01	0.05	Open	0
694	☐	P-954	0.01	0.38	Open	0
695	☐	P-955	0.00	0.02	Open	0
696	☐	P-956	0.00	0.00	Open	0
697	☐	P-957	0.23	0.22	Open	0
698	☐	P-959	0.09	0.07	Open	0
699	☐	P-960	0.00	0.01	Open	0
700	☐	P-961	0.18	0.12	Open	0
701	☐	P-962	0.00	0.00	Open	0
702	☐	P-963	0.13	0.43	Open	0
703	☐	P-964	5.12	0.49	Open	0
704	☐	P-965	0.10	0.14	Open	0
705	☐	P-966	0.00	0.00	Open	0
706	☐	P-967	0.02	0.06	Open	0
707	☐	P-968	0.00	0.00	Open	0
708	☐	P-970	0.00	0.00	Open	0
709	☐	P-971	0.00	0.01	Open	0
710	☐	P-973	0.09	0.18	Open	0
711	☐	P-974	0.00	0.00	Open	0
712	☐	P-975	0.01	0.02	Open	0
713	☐	P-976	0.00	0.01	Open	0
714	☐	P-977	0.00	0.00	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
715	☐	P-978	0.00	0.00	Open	0
716	☐	P-979	0.00	0.00	Open	0
717	☐	P-980	0.00	0.00	Open	0
718	☐	P-990	0.00	0.00	Open	0
719	☐	P-992	0.00	0.00	Open	0
720	☐	P-993	0.00	0.00	Open	0
721	☐	P-994	0.00	0.00	Open	0
722	☐	P-995	0.04	0.07	Open	0
723	☐	P-996	0.03	0.64	Open	0
724	☐	P-997	0.00	0.09	Open	0
725	☐	P-998	0.00	0.05	Open	0
726	☐	P-999	0.60	8.77	Open	0
727	☐	P1001	0.00	0.00	Closed	0
728	☐	P1003	0.00	0.05	Open	0
729	☐	P1005	0.00	0.00	Closed	0
730	☐	P1007	0.00	0.00	Open	0
731	☐	P1009	0.00	0.00	Open	0
732	☐	P101	0.00	0.10	Open	0
733	☐	P1011	0.39	0.28	Open	0
734	☐	P1013	0.00	0.00	Open	0
735	☐	P1015	0.00	0.02	Open	0
736	☐	P103	0.01	0.40	Open	0
737	☐	P1031	0.01	0.03	Open	0
738	☐	P1039	0.04	0.14	Open	0
739	☐	P1041	0.01	0.02	Open	0
740	☐	P1045	0.00	0.02	Open	0
741	☐	P1047	0.00	0.00	Open	0
742	☐	P1049	0.00	0.00	Open	0
743	☐	P105	0.13	2.12	Open	0
744	☐	P1051	0.01	0.04	Open	0
745	☐	P107	15.35	6.44	Open	0
746	☐	P109	0.05	2.92	Open	0
747	☐	P111	0.02	2.92	Open	0
748	☐	P1129	0.01	0.37	Open	0
749	☐	P1131	0.09	1.77	Open	0
750	☐	P1133	0.20	0.44	Open	0
751	☐	P1135	0.14	0.44	Open	0
752	☐	P1141	0.01	0.04	Open	0
753	☐	P1147	0.01	0.02	Open	0
754	☐	P1157	0.03	0.20	Open	0
755	☐	P1159	0.00	0.00	Open	0
756	☐	P1161	0.00	0.00	Open	0
757	☐	P1163	0.00	0.00	Open	0
758	☐	P1165	0.00	0.00	Open	0
759	☐	P1167	0.00	0.00	Open	0
760	☐	P1169	0.00	0.00	Open	0
761	☐	P1171	0.00	0.00	Open	0
762	☐	P1173	0.11	0.87	Open	0
763	☐	P1175	0.02	0.09	Open	0
764	☐	P1177	0.06	0.34	Open	0
765	☐	P1179	0.13	0.15	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
766	☐	P1181	0.08	0.09	Open	0
767	☐	P1183	0.07	0.08	Open	0
768	☐	P1185	0.01	0.09	Open	0
769	☐	P1187	0.01	0.06	Open	0
770	☐	P1189	0.00	0.02	Open	0
771	☐	P1191	0.02	0.06	Open	0
772	☐	P1193	0.01	0.02	Open	0
773	☐	P1199	0.00	0.03	Open	0
774	☐	P1201	0.00	0.02	Open	0
775	☐	P1203	0.02	0.11	Open	0
776	☐	P1205	0.00	0.00	Open	0
777	☐	P1207	0.00	0.00	Open	0
778	☐	P1209	0.01	0.01	Open	0
779	☐	P1211	0.00	0.00	Open	0
780	☐	P1213	0.00	0.01	Open	0
781	☐	P1215	0.05	0.05	Open	0
782	☐	P1217	0.03	0.04	Open	0
783	☐	P1219	1.08	1.41	Open	0
784	☐	P1221	0.03	0.28	Open	0
785	☐	P1225	0.09	0.41	Open	0
786	☐	P1227	0.08	0.21	Open	0
787	☐	P1229	1.86	28.80	Open	0
788	☐	P1231	0.53	7.09	Open	0
789	☐	P129	0.00	0.05	Open	0
790	☐	P131	0.02	0.04	Open	0
791	☐	P133	0.01	0.54	Open	0
792	☐	P137	0.22	1.06	Open	0
793	☐	P139	0.07	0.35	Open	0
794	☐	P143	0.02	2.27	Open	0
795	☐	P145	0.05	0.17	Open	0
796	☐	P15	1.45	0.49	Open	0
797	☐	P153	0.00	0.01	Open	0
798	☐	P155	0.00	0.00	Open	0
799	☐	P157	0.00	0.00	Open	0
800	☐	P159	0.01	0.02	Open	0
801	☐	P161	0.00	0.04	Open	0
802	☐	P163	0.20	0.33	Open	0
803	☐	P165	0.17	0.97	Open	0
804	☐	P167	1.57	0.98	Open	0
805	☐	P169	0.22	0.44	Open	0
806	☐	P17	0.01	0.01	Open	0
807	☐	P171	0.01	0.04	Open	0
808	☐	P173	0.05	0.10	Open	0
809	☐	P175	0.02	0.05	Open	0
810	☐	P179	0.04	0.12	Open	0
811	☐	P181	0.00	0.00	Open	0
812	☐	P183	0.00	0.00	Open	0
813	☐	P185	0.00	0.00	Open	0
814	☐	P187	0.03	0.03	Open	0
815	☐	P189	0.00	0.00	Open	0
816	☐	P19	0.00	0.01	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
817	☐	P191	0.02	0.12	Open	0
818	☐	P193	0.36	0.69	Open	0
819	☐	P195	0.00	0.08	Open	0
820	☐	P197	0.02	0.88	Open	0
821	☐	P199	0.02	0.06	Open	0
822	☐	P201	0.20	0.66	Open	0
823	☐	P203	0.03	0.29	Open	0
824	☐	P205	0.18	0.44	Open	0
825	☐	P207	0.06	0.52	Open	0
826	☐	P209	0.02	0.25	Open	0
827	☐	P21	0.13	0.66	Open	0
828	☐	P211	0.01	0.01	Open	0
829	☐	P213	0.07	0.10	Open	0
830	☐	P215	0.00	0.01	Open	0
831	☐	P217	0.00	0.00	Open	0
832	☐	P219	0.00	0.00	Open	0
833	☐	P221	0.01	0.08	Open	0
834	☐	P223	0.01	0.42	Open	0
835	☐	P225	0.01	0.10	Open	0
836	☐	P227	0.48	1.64	Open	0
837	☐	P23	0.20	0.66	Open	0
838	☐	P231	2.83	0.65	Open	0
839	☐	P233	0.87	0.55	Open	0
840	☐	P235	0.32	0.28	Open	0
841	☐	P237	0.00	0.00	Open	0
842	☐	P239	0.00	0.01	Open	0
843	☐	P241	0.00	0.01	Open	0
844	☐	P243	0.01	0.02	Open	0
845	☐	P245	0.00	0.00	Open	0
846	☐	P247	0.00	0.00	Open	0
847	☐	P249	0.07	0.15	Open	0
848	☐	P251	0.02	0.13	Open	0
849	☐	P253	0.17	0.58	Open	0
850	☐	P255	0.48	0.72	Open	0
851	☐	P257	0.31	0.48	Open	0
852	☐	P259	0.00	0.00	Open	0
853	☐	P261	0.00	0.01	Open	0
854	☐	P263	0.00	0.00	Open	0
855	☐	P265	0.00	0.00	Open	0
856	☐	P267	0.02	0.06	Open	0
857	☐	P271	0.00	0.00	Open	0
858	☐	P273	0.00	0.00	Open	0
859	☐	P277	0.00	0.00	Open	0
860	☐	P279	0.00	0.00	Open	0
861	☐	P281	0.01	0.01	Open	0
862	☐	P283	0.03	0.09	Open	0
863	☐	P285	0.00	0.00	Open	0
864	☐	P287	0.01	0.01	Open	0
865	☐	P289	0.00	0.00	Open	0
866	☐	P29	0.11	0.31	Open	0
867	☐	P291	0.00	0.00	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
868		P293	0.00	0.00	Open	0
869		P295	0.00	0.00	Open	0
870		P297	0.01	0.02	Open	0
871		P301	1.49	1.22	Open	0
872		P303	0.00	0.00	Open	0
873		P305	0.00	0.15	Open	0
874		P309	0.00	0.00	Open	0
875		P31	0.38	0.38	Open	0
876		P313	0.01	0.27	Open	0
877		P315	0.00	0.00	Open	0
878		P319	0.00	0.02	Open	0
879		P321	0.05	0.07	Open	0
880		P323	0.02	0.04	Open	0
881		P325	0.03	0.05	Open	0
882		P329	0.01	0.09	Open	0
883		P33	0.00	0.05	Open	0
884		P335	0.00	0.00	Open	0
885		P337	0.00	0.00	Open	0
886		P339	0.01	0.06	Open	0
887		P341	0.01	0.04	Open	0
888		P343	0.00	0.00	Open	0
889		P345	0.02	0.13	Open	0
890		P347	0.04	0.33	Open	0
891		P349	0.16	0.55	Open	0
892		P35	0.06	0.05	Open	0
893		P353	0.02	0.03	Open	0
894		P355	0.16	0.36	Open	0
895		P357	0.00	0.00	Open	0
896		P359	0.00	0.00	Open	0
897		P361	0.00	0.00	Open	0
898		P363	0.01	0.02	Open	0
899		P365	0.01	0.03	Open	0
900		P367	0.00	0.00	Open	0
901		P369	0.00	0.00	Open	0
902		P37	0.01	0.31	Open	0
903		P371	0.00	0.00	Open	0
904		P373	0.00	0.00	Open	0
905		P375	0.00	0.00	Open	0
906		P377	0.00	0.00	Open	0
907		P379	0.00	0.00	Open	0
908		P381	0.54	0.43	Open	0
909		P383	0.06	0.43	Open	0
910		P387	0.04	0.32	Open	0
911		P389	0.00	0.00	Open	0
912		P39	0.10	0.07	Open	0
913		P391	0.00	0.00	Open	0
914		P393	0.00	0.00	Open	0
915		P395	0.02	0.02	Open	0
916		P397	0.00	0.01	Open	0
917		P399	0.00	0.01	Open	0
918		P401	0.00	0.00	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
919	☐	P403	0.00	0.00	Open	0
920	☐	P405	0.00	0.00	Open	0
921	☐	P409	0.00	1.35	Open	0
922	☐	P41	0.00	0.03	Open	0
923	☐	P411	0.00	0.00	Open	0
924	☐	P413	0.00	0.00	Open	0
925	☐	P415	0.00	0.00	Open	0
926	☐	P417	0.00	0.01	Open	0
927	☐	P419	0.01	0.02	Open	0
928	☐	P421	0.00	0.00	Open	0
929	☐	P423	0.00	0.00	Open	0
930	☐	P425	0.00	0.01	Open	0
931	☐	P427	0.00	0.00	Open	0
932	☐	P429	0.01	0.11	Open	0
933	☐	P43	0.00	0.00	Open	0
934	☐	P431	0.05	0.10	Open	0
935	☐	P433	0.44	0.55	Open	0
936	☐	P435	0.01	0.04	Open	0
937	☐	P439	0.02	0.11	Open	0
938	☐	P443	0.06	0.19	Open	0
939	☐	P445	0.00	0.00	Open	0
940	☐	P447	0.00	0.02	Open	0
941	☐	P449	3.39	6.33	Open	0
942	☐	P45	0.01	0.02	Open	0
943	☐	P451	0.00	0.01	Open	0
944	☐	P453	0.00	0.00	Open	0
945	☐	P455	0.00	0.00	Open	0
946	☐	P457	0.01	0.01	Open	0
947	☐	P459	0.03	0.09	Open	0
948	☐	P461	0.09	0.29	Open	0
949	☐	P463	0.04	0.06	Open	0
950	☐	P465	0.01	0.03	Open	0
951	☐	P467	0.05	0.05	Open	0
952	☐	P469	0.00	0.00	Open	0
953	☐	P471	0.01	0.03	Open	0
954	☐	P473	0.00	0.01	Open	0
955	☐	P475	0.00	0.00	Open	0
956	☐	P477	0.02	0.03	Open	0
957	☐	P479	0.01	0.03	Open	0
958	☐	P481	0.01	0.04	Open	0
959	☐	P483	0.03	0.04	Open	0
960	☐	P485	0.01	0.05	Open	0
961	☐	P487	0.07	0.07	Open	0
962	☐	P489	0.03	0.18	Open	0
963	☐	P49	0.00	0.12	Open	0
964	☐	P491	0.00	0.01	Open	0
965	☐	P493	0.03	0.04	Open	0
966	☐	P497	0.00	0.00	Open	0
967	☐	P499	0.00	0.01	Open	0
968	☐	P501	0.00	0.01	Open	0
969	☐	P503	0.00	0.00	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
970	☐	P505	0.00	0.00	Open	0
971	☐	P507	0.00	0.00	Open	0
972	☐	P509	0.00	0.00	Open	0
973	☐	P51	0.00	0.00	Closed	0
974	☐	P511	0.00	0.00	Open	0
975	☐	P513	0.00	0.01	Open	0
976	☐	P515	0.13	8.77	Open	0
977	☐	P517	0.13	8.77	Open	0
978	☐	P519	0.04	0.09	Open	0
979	☐	P521	0.00	0.00	Open	0
980	☐	P527	0.00	0.00	Open	0
981	☐	P531	0.00	0.00	Open	0
982	☐	P533	0.00	0.00	Open	0
983	☐	P535	0.01	0.03	Open	0
984	☐	P537	0.03	0.05	Open	0
985	☐	P539	0.34	1.04	Open	0
986	☐	P541	0.34	0.97	Open	0
987	☐	P543	0.99	7.09	Open	0
988	☐	P545	0.17	0.98	Open	0
989	☐	P549	0.19	0.60	Open	0
990	☐	P553	0.11	0.17	Open	0
991	☐	P555	0.00	0.02	Open	0
992	☐	P557	0.00	0.02	Open	0
993	☐	P565	0.03	0.12	Open	0
994	☐	P569	0.04	1.64	Open	0
995	☐	P579	0.00	0.01	Open	0
996	☐	P59	0.00	0.00	Open	0
997	☐	P591	0.20	0.37	Open	0
998	☐	P593	0.00	0.01	Open	0
999	☐	P599	0.00	0.00	Closed	0
1000	☐	P609	0.00	0.01	Open	0
1001	☐	P61	0.00	0.05	Open	0
1002	☐	P611	0.00	0.00	Open	0
1003	☐	P613	0.00	0.00	Open	0
1004	☐	P615	0.01	0.02	Open	0
1005	☐	P617	0.00	0.04	Open	0
1006	☐	P619	2.45	3.51	Open	0
1007	☐	P621	1.43	2.26	Open	0
1008	☐	P623	0.06	0.12	Open	0
1009	☐	P627	0.07	0.22	Open	0
1010	☐	P629	0.12	0.18	Open	0
1011	☐	P63	0.23	0.22	Open	0
1012	☐	P631	0.00	0.00	Open	0
1013	☐	P633	0.85	2.21	Open	0
1014	☐	P635	0.00	0.45	Open	0
1015	☐	P639	0.14	0.22	Open	0
1016	☐	P643	0.01	0.02	Open	0
1017	☐	P645	0.00	0.00	Open	0
1018	☐	P647	0.00	0.00	Open	0
1019	☐	P649	0.00	0.00	Open	0
1020	☐	P65	0.00	0.07	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
1021	☐	P651	0.00	0.00	Open	0
1022	☐	P653	0.00	0.00	Open	0
1023	☐	P655	0.04	0.04	Open	0
1024	☐	P659	0.15	0.37	Open	0
1025	☐	P661	0.00	0.00	Open	0
1026	☐	P667	0.01	0.22	Open	0
1027	☐	P673	0.04	0.23	Open	0
1028	☐	P675	0.00	0.02	Open	0
1029	☐	P677	0.06	0.21	Open	0
1030	☐	P679	0.00	0.00	Open	0
1031	☐	P681	0.00	0.00	Open	0
1032	☐	P683	0.00	0.00	Open	0
1033	☐	P685	0.00	0.00	Open	0
1034	☐	P687	0.00	0.00	Open	0
1035	☐	P689	0.00	0.00	Open	0
1036	☐	P69	0.00	0.00	Open	0
1037	☐	P697	0.35	0.50	Open	0
1038	☐	P699	0.00	0.00	Open	0
1039	☐	P703	0.00	0.00	Open	0
1040	☐	P705	0.00	0.00	Open	0
1041	☐	P707	0.00	0.00	Open	0
1042	☐	P709	0.00	0.00	Open	0
1043	☐	P711	0.00	0.00	Open	0
1044	☐	P713	0.00	0.00	Open	0
1045	☐	P717	0.00	0.00	Open	0
1046	☐	P719	0.00	0.00	Open	0
1047	☐	P723	0.01	0.17	Open	0
1048	☐	P73	0.00	0.00	Open	0
1049	☐	P731	0.01	0.36	Open	0
1050	☐	P733	0.01	0.36	Open	0
1051	☐	P735	0.00	0.00	Open	0
1052	☐	P737	0.02	2.92	Open	0
1053	☐	P739	0.00	0.00	Open	0
1054	☐	P743	0.23	0.69	Open	0
1055	☐	P745	0.00	0.03	Open	0
1056	☐	P747	0.00	0.00	Open	0
1057	☐	P749	0.00	0.00	Open	0
1058	☐	P751	0.00	0.00	Open	0
1059	☐	P753	0.00	0.00	Open	0
1060	☐	P755	0.00	0.00	Closed	0
1061	☐	P757	0.00	0.00	Open	0
1062	☐	P759	0.00	0.00	Open	0
1063	☐	P761	0.00	0.00	Open	0
1064	☐	P763	0.00	0.00	Open	0
1065	☐	P765	0.00	0.00	Open	0
1066	☐	P773	0.00	0.00	Open	0
1067	☐	P775	0.01	0.02	Open	0
1068	☐	P777	0.04	0.15	Open	0
1069	☐	P779	0.00	0.00	Open	0
1070	☐	P781	0.00	0.00	Open	0
1071	☐	P783	0.00	0.01	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
1072	☐	P785	0.02	0.05	Open	0
1073	☐	P787	0.00	0.00	Open	0
1074	☐	P789	0.08	0.13	Open	0
1075	☐	P79	0.00	0.03	Open	0
1076	☐	P791	0.08	0.45	Open	0
1077	☐	P793	0.11	0.23	Open	0
1078	☐	P795	0.01	0.03	Open	0
1079	☐	P797	0.02	0.14	Open	0
1080	☐	P799	0.00	0.01	Open	0
1081	☐	P801	0.00	0.00	Open	0
1082	☐	P803	0.00	0.00	Open	0
1083	☐	P805	0.02	0.03	Open	0
1084	☐	P807	0.00	0.00	Open	0
1085	☐	P809	0.03	0.07	Open	0
1086	☐	P811	0.02	1.96	Open	0
1087	☐	P813	0.00	0.00	Open	0
1088	☐	P815	0.05	0.27	Open	0
1089	☐	P817	0.00	0.00	Open	0
1090	☐	P819	0.00	0.00	Open	0
1091	☐	P821	0.03	2.97	Open	0
1092	☐	P823	0.05	2.96	Open	0
1093	☐	P825	0.00	0.00	Open	0
1094	☐	P827	0.03	2.96	Open	0
1095	☐	P829	0.01	0.00	Open	0
1096	☐	P83	0.00	0.00	Open	0
1097	☐	P831	0.00	0.50	Open	0
1098	☐	P843	0.00	0.00	Open	0
1099	☐	P845	0.12	8.77	Open	0
1100	☐	P865	0.00	0.02	Open	0
1101	☐	P867	0.01	0.02	Open	0
1102	☐	P869	0.08	0.17	Open	0
1103	☐	P87	0.01	0.21	Open	0
1104	☐	P871	0.00	0.00	Open	0
1105	☐	P873	0.00	0.00	Open	0
1106	☐	P875	0.00	0.00	Open	0
1107	☐	P877	0.00	0.00	Open	0
1108	☐	P879	0.00	0.00	Open	0
1109	☐	P881	0.00	0.00	Open	0
1110	☐	P883	0.00	0.00	Open	0
1111	☐	P885	0.00	0.00	Open	0
1112	☐	P887	0.00	0.00	Open	0
1113	☐	P889	0.08	3.51	Open	0
1114	☐	P89	0.03	0.10	Open	0
1115	☐	P891	0.07	3.51	Open	0
1116	☐	P893	0.00	0.16	Open	0
1117	☐	P895	0.00	0.00	Open	0
1118	☐	P897	0.00	0.00	Open	0
1119	☐	P899	0.00	0.00	Open	0
1120	☐	P901	0.00	0.00	Closed	0
1121	☐	P903	0.00	0.00	Open	0
1122	☐	P905	0.00	0.00	Open	0

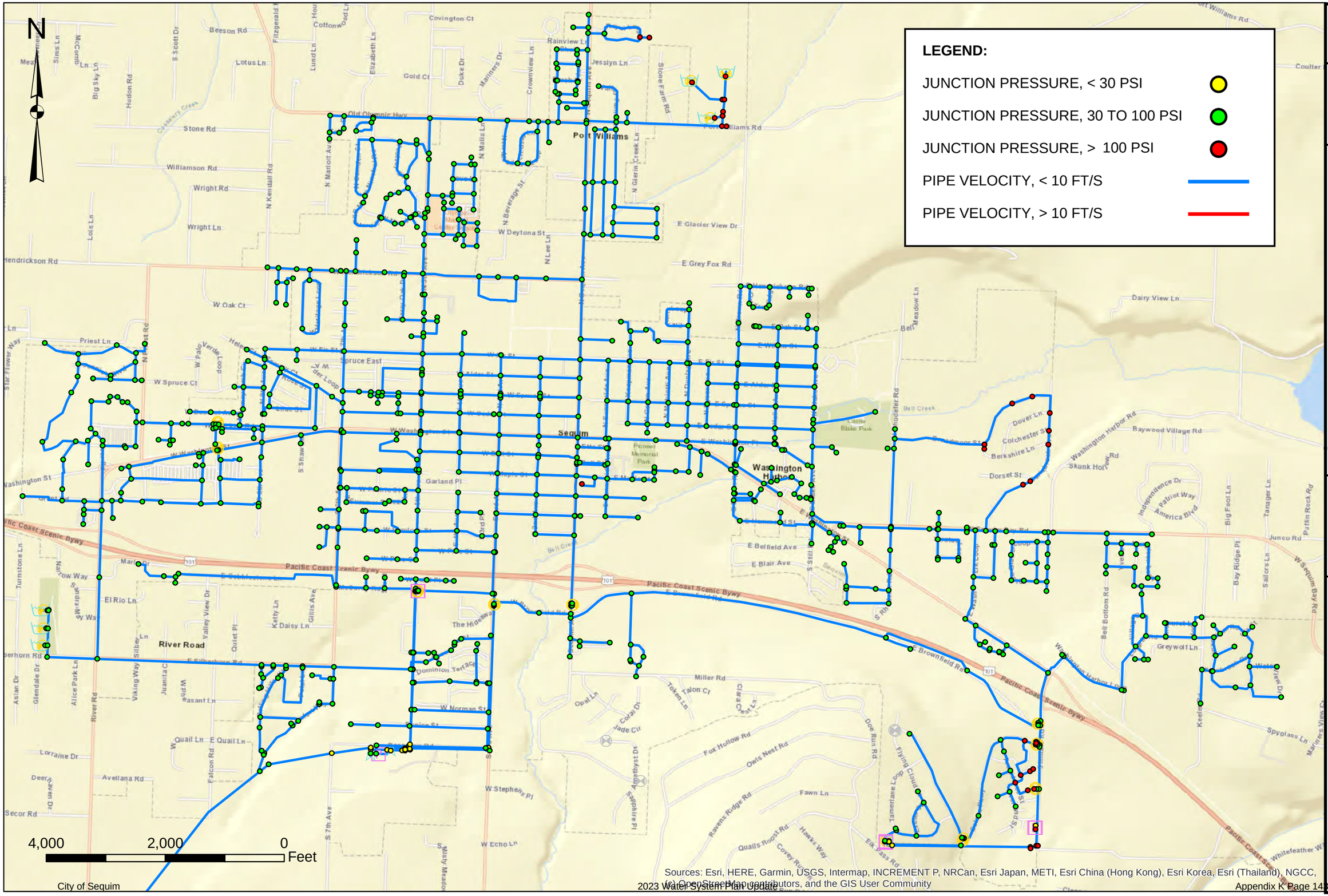
		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
1123	☐	P907	0.00	0.00	Open	0
1124	☐	P909	0.00	0.00	Open	0
1125	☐	P91	0.00	0.00	Open	0
1126	☐	P911	0.12	1.96	Open	0
1127	☐	P913	0.12	1.96	Open	0
1128	☐	P915	0.00	0.00	Open	0
1129	☐	P917	0.00	0.00	Open	0
1130	☐	P919	0.00	0.00	Open	0
1131	☐	P921	0.00	0.00	Open	0
1132	☐	P923	0.00	0.00	Open	0
1133	☐	P925	0.00	0.00	Open	0
1134	☐	P927	0.00	0.00	Open	0
1135	☐	P929	0.00	0.00	Closed	0
1136	☐	P93	0.00	0.00	Closed	0
1137	☐	P931	0.01	0.36	Open	0
1138	☐	P933	0.00	0.00	Open	0
1139	☐	P935	0.00	0.36	Open	0
1140	☐	P937	0.00	0.36	Open	0
1141	☐	P939	0.00	0.00	Open	0
1142	☐	P941	0.00	0.00	Open	0
1143	☐	P943	0.00	0.00	Open	0
1144	☐	P945	0.00	0.00	Open	0
1145	☐	P947	0.00	0.00	Open	0
1146	☐	P949	0.00	0.00	Open	0
1147	☐	P951	0.00	0.01	Open	0
1148	☐	P953	0.00	0.00	Open	0
1149	☐	P955	0.00	0.00	Open	0
1150	☐	P957	0.00	0.00	Open	0
1151	☐	P959	0.00	0.00	Open	0
1152	☐	P961	0.00	0.03	Open	0
1153	☐	P963	0.00	0.00	Closed	0
1154	☐	P965	0.21	0.76	Open	0
1155	☐	P967	0.00	0.00	Open	0
1156	☐	P969	0.67	24.04	Open	0
1157	☐	P971	0.60	24.04	Open	0
1158	☐	P973	0.00	0.03	Open	0
1159	☐	P975	0.00	0.00	Closed	0
1160	☐	P977	0.00	0.00	Closed	0
1161	☐	P979	0.00	0.00	Closed	0
1162	☐	P981	0.00	0.00	Closed	0
1163	☐	P983	0.00	0.00	Open	0
1164	☐	P985	0.00	0.01	Open	0
1165	☐	P987	0.06	0.21	Open	0
1166	☐	P989	0.00	0.00	Open	0
1167	☐	P99	0.01	0.08	Open	0
1168	☐	P991	0.00	0.00	Open	0
1169	☐	P993	0.00	0.00	Open	0
1170	☐	P995	0.00	0.00	Open	0
1171	☐	P997	0.00	0.00	Open	0
1172	☐	P999	0.00	0.00	Open	0

		ID	Flow (gpm)	Elevation (ft)	Head (ft)	% Full (%)	Level (ft)	Overflow Volume (ft3)
1	☐	SOLANA_RES	-414.93	662.00	678.20	90.00	16.20	0.00
2	☐	T5000	-122.01	430.00	475.90	90.00	45.90	0.00
3	☐	T5002	-1,685.88	391.00	417.10	90.00	26.10	0.00

		ID	Total Overflow Volume (ft3)
1	☐	SOLANA_RES	0.00
2	☐	T5000	0.00
3	☐	T5002	0.00

		ID	Diameter (in)	Elevation (ft)	Upstream Pressure (psi)	Downstream Pressure (psi)	Flow (gpm)
1	☐	PW_WELL_1	6.00	106.00	116.62	105.99	600.00
2	☐	PW_WELL_2	6.00	94.00	122.62	110.54	0.00
3	☐	PW_WELL_3	6.00	100.00	120.02	107.94	0.00
4	☐	SILB_1_FCV	6.00	310.00	51.94	46.66	300.00
5	☐	SILB_2_FCV	6.00	310.00	52.00	46.51	0.00
6	☐	SILB_3_FCV	6.00	310.00	52.00	46.43	0.00
7	☐	V8000	12.00	490.00	-0.00	-28.82	350.00
8	☐	V8002	2.00	239.00	69.30	48.99	0.00
9	☐	V8004	8.00	239.00	69.29	49.00	1,078.99
10	☐	V8006	8.00	239.00	76.53	46.05	0.00
11	☐	V8008	2.00	239.00	76.53	46.05	0.00
12	☐	V8010	2.00	230.00	80.42	80.42	0.00
13	☐	V8012	6.00	230.00	80.42	80.42	17.43
14	☐	V8014	8.00	250.00	71.95	44.00	120.31
15	☐	V8016	2.00	250.00	71.95	44.00	0.00
16	☐	V8018	2.00	254.00	119.69	56.55	299.98
17	☐	V8020	6.00	254.00	119.72	56.52	0.00
18	☐	V8022	2.00	266.00	114.58	51.31	0.00
19	☐	V8024	6.00	266.00	114.58	51.31	0.00
20	☐	V8026	2.00	462.00	93.40	29.98	0.00
21	☐	V8028	8.00	462.00	93.38	30.00	374.58
22	☐	V8036	3.00	243.00	61.19	44.94	0.00
23	☐	V8038	8.00	243.00	61.14	45.00	672.71
24	☐	V8044	6.00	222.00	72.74	53.40	0.00
25	☐	V8046	2.00	222.00	72.74	53.40	0.00
26	☐	V8048	8.00	660.00	56.00	8.17	1,159.92
27	☐	V8050	6.00	250.00	71.95	71.95	0.00
28	☐	V8052	6.00	250.00	44.00	44.00	0.00

		ID	Velocity (ft/s)	Headloss (ft)	Status	Setting
1	☐	PW_WELL_1	6.81	24.53	Active	600.00
2	☐	PW_WELL_2	0.00	0.00	Closed	0.00
3	☐	PW_WELL_3	0.00	0.00	Closed	0.00
4	☐	SILB_1_FCV	3.40	12.21	Active	300.00
5	☐	SILB_2_FCV	0.00	0.00	Closed	0.00
6	☐	SILB_3_FCV	0.00	0.00	Closed	0.00
7	☐	V8000	0.99	66.51	Active	350.00
8	☐	V8002	0.00	0.00	Closed	0.00
9	☐	V8004	6.89	46.83	Active	49.00
10	☐	V8006	0.00	0.00	Closed	45.00
11	☐	V8008	0.00	0.00	Closed	0.00
12	☐	V8010	0.00	0.00	Closed	0.00
13	☐	V8012	0.20	0.01	Open	0.00
14	☐	V8014	0.77	64.50	Active	44.00
15	☐	V8016	0.00	0.00	Closed	0.00
16	☐	V8018	30.64	145.71	Open	68.00
17	☐	V8020	0.00	0.00	Closed	52.00
18	☐	V8022	0.00	0.00	Closed	0.00
19	☐	V8024	0.00	0.00	Closed	0.00
20	☐	V8026	0.00	0.00	Closed	0.00
21	☐	V8028	2.39	146.28	Active	30.00
22	☐	V8036	0.00	0.00	Closed	0.00
23	☐	V8038	4.29	37.24	Active	45.00
24	☐	V8044	0.00	0.00	Closed	53.00
25	☐	V8046	0.00	0.00	Closed	0.00
26	☐	V8048	7.40	110.38	Active	56.00
27	☐	V8050	0.00	0.00	Open	78.00
28	☐	V8052	0.00	0.00	Open	40.00



SHEET X OF X

DATE JUNE 2021

SCALE AS SHOWN

PROJECT 2020-016

City of Sequim

CLALLAM COUNTY WASHINGTON

FIGURE 4:
2041 PEAK HOUR DEMAND RESULTS

CITY OF SEQUIM

WILSON ENGINEERING

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
1	☐	J100	7.57	225.89	345.89	52.00
2	☐	J1000	2.85	213.42	338.68	54.27
3	☐	J1006	4.10	266.13	376.65	47.89
4	☐	J1008	38.14	242.31	373.88	57.01
5	☐	J1014	10.47	141.48	343.66	87.61
6	☐	J1016	6.25	126.03	344.08	94.48
7	☐	J1018	14.27	123.39	344.08	95.62
8	☐	J102	6.93	235.94	344.69	47.12
9	☐	J1020	4.82	124.45	344.26	95.24
10	☐	J1022	0.00	123.17	344.26	95.80
11	☐	J1024	0.00	94.00	346.00	109.19
12	☐	J1030	0.00	105.32	345.83	104.21
13	☐	J1032	0.00	104.17	346.00	104.78
14	☐	J1042	0.00	103.78	346.00	104.95
15	☐	J1044	0.89	268.00	411.76	62.29
16	☐	J1048	1.70	295.00	412.03	50.71
17	☐	J1050	1.63	294.00	411.98	51.12
18	☐	J1052	4.32	292.00	411.97	51.98
19	☐	J1054	9.68	295.00	411.95	50.67
20	☐	J1056	8.87	297.00	411.98	49.82
21	☐	J1058	2.17	295.00	411.98	50.69
22	☐	J106	5.36	246.33	344.79	42.67
23	☐	J1064	0.33	310.03	413.73	44.93
24	☐	J1068	0.89	305.86	413.74	46.75
25	☐	J1074	0.00	296.59	413.84	50.80
26	☐	J1076	1.45	297.28	413.84	50.51
27	☐	J108	12.58	348.60	474.48	54.54
28	☐	J1080	2.36	297.26	413.82	50.50
29	☐	J1084	4.24	311.64	413.93	44.32
30	☐	J1086	0.33	306.53	413.99	46.56
31	☐	J1088	1.74	306.53	413.99	46.56
32	☐	J1090	4.10	305.99	413.99	46.80
33	☐	J1092	0.23	320.32	414.18	40.67
34	☐	J1094	3.85	320.08	414.18	40.77
35	☐	J1096	0.00	337.99	414.41	33.11
36	☐	J1098	0.00	335.67	414.41	34.12
37	☐	J110	0.00	340.55	414.22	31.92
38	☐	J1100	0.00	345.44	414.83	30.07
39	☐	J1102	5.13	217.74	343.49	54.49
40	☐	J1106	5.61	196.86	343.07	63.35
41	☐	J1110	0.66	160.66	339.70	77.58
42	☐	J1112	0.00	163.66	339.95	76.38
43	☐	J1114	0.00	163.66	339.95	76.38
44	☐	J1116	7.28	165.59	340.33	75.71
45	☐	J1118	1.63	286.91	411.82	54.13
46	☐	J1120	18.08	302.00	411.74	47.55
47	☐	J1128	1.16	132.04	343.78	91.75
48	☐	J1130	1.53	129.03	343.78	93.05
49	☐	J1132	0.21	132.48	343.78	91.56
50	☐	J1134	0.31	131.95	343.78	91.79
51	☐	J1138	0.14	129.16	343.78	93.00

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
52		J1140	1.94	126.63	343.78	94.09
53		J1144	1.39	128.46	343.78	93.30
54		J1146	0.97	126.97	343.78	93.95
55		J1148	2.46	123.00	343.79	95.67
56		J1150	1.05	125.76	343.79	94.47
57		J1152	1.51	129.11	343.78	93.02
58		J1154	1.43	126.90	343.79	93.98
59		J1158	1.76	122.88	343.79	95.72
60		J1160	1.59	121.11	343.79	96.49
61		J1164	4.51	119.53	343.79	97.17
62		J1166	1.08	122.55	343.79	95.86
63		J1168	1.32	121.63	343.79	96.26
64		J1170	4.08	268.00	411.78	62.30
65		J1172	3.45	277.00	411.82	58.42
66		J1174	3.64	278.00	411.89	58.02
67		J1176	5.50	277.00	411.84	58.43
68		J1178	6.12	267.00	411.81	62.75
69		J118	25.80	312.62	474.23	70.03
70		J1180	3.83	264.00	411.80	64.04
71		J1182	1.78	262.00	411.80	64.91
72		J1184	1.88	261.00	411.79	65.34
73		J1186	2.15	261.00	411.79	65.34
74		J1188	2.01	263.00	411.78	64.47
75		J1190	2.63	260.00	411.79	65.77
76		J1192	3.31	277.00	411.84	58.43
77		J1194	1.76	277.00	411.84	58.43
78		J120	4.63	240.06	351.45	48.26
79		J1200	1.39	200.16	342.91	61.85
80		J1204	1.32	185.71	342.81	68.07
81		J1210	0.60	155.66	343.07	81.21
82		J1214	1.61	157.33	343.07	80.48
83		J1216	1.41	153.43	343.07	82.17
84		J1218	1.45	158.58	343.07	79.94
85		J122	0.00	250.00	412.98	70.62
86		J1220	0.54	160.10	343.07	79.28
87		J1222	0.21	161.69	343.07	78.59
88		J1224	4.41	185.29	342.69	68.20
89		J1226	5.96	193.06	342.69	64.84
90		J1228	15.93	196.09	342.69	63.52
91		J1234	4.63	185.30	342.69	68.20
92		J1244	1.43	265.00	411.71	63.57
93		J1246	2.79	291.00	411.81	52.35
94		J1248	6.29	277.00	411.71	58.37
95		J1250	3.33	285.00	411.73	54.91
96		J1252	2.48	285.00	411.73	54.91
97		J1254	6.43	285.00	411.73	54.91
98		J1256	9.72	290.00	411.78	52.77
99		J126	0.21	378.49	474.72	41.70
100		J1262	19.24	281.00	411.70	56.63
101		J1266	9.54	243.47	373.57	56.37
102		J1268	18.08	211.86	342.99	56.82

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
103	☐	J1272	1.24	142.47	338.10	84.77
104	☐	J1274	5.48	140.40	337.86	85.56
105	☐	J1276	4.55	141.11	337.49	85.09
106	☐	J128	0.52	364.03	474.55	47.89
107	☐	J1280	0.89	138.40	337.42	86.23
108	☐	J1282	8.25	148.61	337.42	81.81
109	☐	J1284	1.24	138.39	337.41	86.24
110	☐	J1286	4.43	138.15	337.41	86.34
111	☐	J1292	8.73	122.54	336.11	92.54
112	☐	J1298	3.14	123.04	336.11	92.32
113	☐	J1300	7.01	123.35	336.16	92.21
114	☐	J1306	15.31	119.88	336.27	93.76
115	☐	J1310	4.41	119.93	336.27	93.74
116	☐	J1316	0.95	134.16	337.68	88.19
117	☐	J1320	0.35	311.01	413.73	44.51
118	☐	J1322	0.89	310.62	413.73	44.68
119	☐	J1324	2.44	313.76	413.73	43.32
120	☐	J1326	0.52	311.98	413.73	44.09
121	☐	J1328	0.00	146.58	343.34	85.26
122	☐	J134	6.23	286.03	411.83	54.51
123	☐	J1344	3.04	285.26	413.62	55.62
124	☐	J1350	17.98	281.89	413.60	57.07
125	☐	J1352	3.91	280.23	413.62	57.80
126	☐	J1354	8.25	261.07	373.95	48.91
127	☐	J1356	0.06	261.07	373.96	48.92
128	☐	J1358	15.64	262.92	373.96	48.11
129	☐	J136	0.00	391.84	414.78	9.94
130	☐	J1360	6.29	278.66	527.72	107.92
131	☐	J1364	30.49	315.67	528.11	92.05
132	☐	J1366	7.92	317.60	528.09	91.21
133	☐	J1368	1.74	289.26	528.04	103.46
134	☐	J1370	0.19	154.02	343.07	81.92
135	☐	J1372	0.25	154.82	343.07	81.57
136	☐	J1374	0.21	243.85	376.65	57.54
137	☐	J1376	9.39	246.41	376.64	56.43
138	☐	J1380	4.78	248.28	376.65	55.62
139	☐	J1382	0.00	267.62	374.07	46.12
140	☐	J1386	0.00	268.61	374.00	45.67
141	☐	J1390	0.41	267.54	527.42	112.60
142	☐	J1392	0.95	165.19	342.76	76.94
143	☐	J1394	1.76	166.02	342.75	76.58
144	☐	J1396	6.35	280.00	411.85	57.13
145	☐	J1402	3.06	277.00	411.88	58.44
146	☐	J1404	2.32	277.00	411.85	58.43
147	☐	J1406	6.25	285.00	411.88	54.98
148	☐	J1416	1.39	153.13	338.68	80.40
149	☐	J142	2.44	302.50	413.75	48.20
150	☐	J1424	0.58	215.69	338.68	53.29
151	☐	J1426	2.52	248.00	411.69	70.93
152	☐	J1428	0.00	245.00	411.69	72.23
153	☐	J1432	0.00	245.00	411.69	72.23

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
154	☐	J1436	0.43	245.00	411.69	72.23
155	☐	J144	0.00	390.33	414.68	10.55
156	☐	J1442	2.13	247.00	411.69	71.36
157	☐	J1448	0.64	256.00	411.69	67.46
158	☐	J1450	1.53	239.80	411.69	74.48
159	☐	J1452	1.63	242.90	411.69	73.14
160	☐	J1456	0.00	147.96	336.41	81.66
161	☐	J1458	0.00	144.25	336.39	83.26
162	☐	J146	6.89	387.20	475.75	38.37
163	☐	J1460	5.40	139.89	336.36	85.13
164	☐	J1462	6.23	149.33	336.36	81.04
165	☐	J1464	6.08	166.16	336.36	73.75
166	☐	J1466	23.60	165.53	336.36	74.02
167	☐	J1468	1.99	165.68	336.36	73.95
168	☐	J1470	2.94	161.51	336.36	75.76
169	☐	J1472	2.23	161.51	336.36	75.76
170	☐	J1474	7.59	160.29	336.36	76.29
171	☐	J1476	3.54	143.56	336.36	83.54
172	☐	J1478	3.10	128.63	336.36	90.01
173	☐	J148	3.14	385.92	475.44	38.79
174	☐	J1480	2.73	136.35	336.36	86.67
175	☐	J1482	1.47	149.01	336.36	81.18
176	☐	J1484	3.04	152.79	336.36	79.54
177	☐	J1490	6.78	122.57	336.18	92.56
178	☐	J1492	5.71	141.54	336.37	84.42
179	☐	J1494	5.21	141.22	336.36	84.55
180	☐	J1498	2.85	122.53	336.11	92.54
181	☐	J150	18.47	364.86	474.36	47.44
182	☐	J1500	14.67	162.89	336.06	75.03
183	☐	J1502	5.27	156.46	336.07	77.83
184	☐	J1504	7.74	158.40	336.08	76.99
185	☐	J1506	3.99	122.95	336.13	92.37
186	☐	J1508	4.74	123.01	336.11	92.33
187	☐	J1510	4.18	129.66	336.11	89.45
188	☐	J1512	2.15	130.50	336.11	89.09
189	☐	J1514	0.00	180.61	336.62	67.60
190	☐	J1516	0.00	196.28	336.62	60.81
191	☐	J1518	4.96	177.39	336.89	69.11
192	☐	J152	12.66	363.45	474.40	48.07
193	☐	J1520	2.36	190.07	336.98	63.66
194	☐	J1522	0.00	164.45	337.13	74.82
195	☐	J1524	0.00	158.58	337.13	77.36
196	☐	J1526	3.89	183.41	336.98	66.54
197	☐	J1528	2.09	198.29	337.08	60.14
198	☐	J1530	2.57	195.44	337.08	61.37
199	☐	J1532	6.39	210.43	337.16	54.91
200	☐	J1534	2.54	215.27	337.42	52.93
201	☐	J1536	3.64	221.73	337.49	50.16
202	☐	J1538	1.12	205.08	337.57	57.41
203	☐	J1540	0.95	188.01	337.62	64.83
204	☐	J1542	3.08	207.39	337.42	56.34

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
205	☐	J1546	3.48	209.45	343.14	57.93
206	☐	J1550	2.38	210.59	343.14	57.43
207	☐	J1552	0.85	293.13	375.99	35.90
208	☐	J1554	1.78	283.81	375.99	39.94
209	☐	J1556	17.77	270.30	375.99	45.80
210	☐	J1558	1.01	268.41	375.99	46.62
211	☐	J156	0.00	393.80	414.76	9.08
212	☐	J1560	0.74	266.01	375.99	47.66
213	☐	J1562	1.45	252.20	375.99	53.64
214	☐	J1564	57.75	209.03	376.01	72.35
215	☐	J1568	5.48	258.87	411.76	66.25
216	☐	J1570	0.97	193.49	337.70	62.49
217	☐	J1572	0.00	190.98	337.98	63.69
218	☐	J1574	4.39	141.85	343.58	87.41
219	☐	J1576	6.81	150.46	343.55	83.67
220	☐	J1578	3.66	148.54	343.56	84.50
221	☐	J158	0.00	389.93	414.76	10.76
222	☐	J1582	8.38	142.62	343.49	87.04
223	☐	J1584	0.37	139.80	343.60	88.30
224	☐	J1588	0.79	141.56	339.90	85.94
225	☐	J1590	2.09	141.99	339.90	85.75
226	☐	J1592	2.88	145.89	339.90	84.06
227	☐	J1594	1.39	153.78	340.15	80.75
228	☐	J1596	1.08	155.37	340.31	80.13
229	☐	J1598	0.52	157.27	340.31	79.31
230	☐	J160	0.00	398.97	475.84	33.31
231	☐	J1600	3.00	158.94	340.43	78.64
232	☐	J1602	0.99	302.62	413.79	48.17
233	☐	J1604	1.92	304.87	413.84	47.22
234	☐	J1608	3.62	306.22	413.86	46.64
235	☐	J1610	9.37	154.41	338.00	79.55
236	☐	J1612	1.14	149.48	338.00	81.69
237	☐	J1614	0.21	117.02	343.79	98.26
238	☐	J1616	5.54	114.32	343.79	99.43
239	☐	J1618	4.36	109.22	343.79	101.64
240	☐	J1620	11.46	108.22	343.79	102.07
241	☐	J1622	6.00	399.42	530.31	56.71
242	☐	J1624	11.44	517.51	674.40	67.98
243	☐	J1626	15.95	580.88	789.78	90.52
244	☐	J1628	0.00	660.00	789.82	56.25
245	☐	J1632	4.61	303.94	528.04	97.10
246	☐	J1634	0.00	660.00	676.75	7.26
247	☐	J1638	7.72	613.44	789.79	76.41
248	☐	J1644	10.90	267.77	373.95	46.01
249	☐	J1646	3.64	125.85	336.14	91.12
250	☐	J1648	3.95	128.05	336.14	90.16
251	☐	J1650	0.00	266.00	373.95	46.78
252	☐	J1652	0.00	266.00	528.04	113.54
253	☐	J1654	0.19	653.87	789.80	58.90
254	☐	J1656	5.01	653.48	789.80	59.07
255	☐	J166	0.00	400.51	475.90	32.66

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
256	☐	J1660	0.00	660.00	676.73	7.25
257	☐	J1662	0.00	660.00	676.73	7.25
258	☐	J1664	1.74	283.59	527.96	105.89
259	☐	J1666	1.90	276.63	527.95	108.90
260	☐	J1668	6.19	274.00	527.95	110.04
261	☐	J1670	1.88	122.51	336.14	92.57
262	☐	J1672	26.60	117.70	336.02	94.60
263	☐	J1678	0.62	171.28	341.00	73.54
264	☐	J1680	4.34	171.79	341.14	73.38
265	☐	J1682	5.25	171.54	341.00	73.43
266	☐	J1686	8.29	297.04	413.82	50.60
267	☐	J1698	8.65	268.66	411.76	62.01
268	☐	J1700	2.25	268.61	411.76	62.03
269	☐	J1702	16.30	274.35	411.76	59.54
270	☐	J1704	3.10	255.25	411.76	67.81
271	☐	J1706	14.83	262.25	411.76	64.78
272	☐	J1712	8.07	212.00	411.74	86.55
273	☐	J1714	4.67	210.00	411.74	87.41
274	☐	J1716	2.36	205.00	411.74	89.58
275	☐	J1718	1.94	212.00	411.74	86.55
276	☐	J1720	2.03	230.00	411.74	78.75
277	☐	J1722	2.73	261.00	411.74	65.31
278	☐	J1724	3.83	250.00	411.74	70.08
279	☐	J1726	1.86	252.00	411.74	69.21
280	☐	J1728	3.04	245.00	411.74	72.25
281	☐	J1730	3.50	235.00	411.74	76.58
282	☐	J1734	9.14	238.00	411.77	75.30
283	☐	J1742	14.42	218.00	411.75	83.95
284	☐	J1746	2.65	213.00	411.74	86.11
285	☐	J1750	1.24	242.00	411.74	73.55
286	☐	J1752	0.00	234.00	411.74	77.01
287	☐	J1754	52.77	244.35	340.71	41.75
288	☐	J1760	2.44	152.19	338.41	80.69
289	☐	J1762	2.01	146.83	338.00	82.83
290	☐	J1764	3.70	148.51	338.00	82.11
291	☐	J1768	1.14	138.57	337.42	86.16
292	☐	J1774	6.76	133.45	337.85	88.57
293	☐	J178	0.00	393.73	414.74	9.10
294	☐	J1780	2.50	138.84	338.61	86.56
295	☐	J1782	0.72	140.94	337.42	85.13
296	☐	J1784	0.83	150.32	337.42	81.07
297	☐	J1786	13.78	123.63	336.81	92.37
298	☐	J1788	6.91	131.70	336.81	88.87
299	☐	J1790	0.14	122.89	336.14	92.40
300	☐	J1792	12.39	128.36	336.14	90.03
301	☐	J1794	3.72	131.27	336.14	88.77
302	☐	J1798	0.93	216.84	342.71	54.54
303	☐	J18	2.75	144.33	338.79	84.26
304	☐	J1800	1.59	217.16	342.71	54.40
305	☐	J1802	3.68	196.02	343.36	63.84
306	☐	J1804	2.38	155.73	343.07	81.18

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
307	☐	J1806	3.89	157.96	343.07	80.21
308	☐	J1808	8.85	172.91	342.75	73.59
309	☐	J1810	3.39	165.12	342.75	76.97
310	☐	J1812	4.94	167.01	342.75	76.15
311	☐	J1814	2.79	175.03	342.75	72.67
312	☐	J1816	2.21	169.66	342.75	75.00
313	☐	J182	0.00	394.41	414.75	8.81
314	☐	J1822	3.97	166.92	342.75	76.19
315	☐	J1826	0.68	190.67	342.70	65.88
316	☐	J1828	1.80	266.00	411.71	63.14
317	☐	J1830	0.72	266.00	411.71	63.14
318	☐	J1832	0.00	258.00	411.70	66.60
319	☐	J1834	7.53	275.67	411.69	58.94
320	☐	J1836	28.28	275.56	411.69	58.99
321	☐	J1838	13.18	264.15	411.69	63.93
322	☐	J1840	6.60	275.00	411.70	59.23
323	☐	J1842	0.56	126.79	344.08	94.15
324	☐	J1844	2.98	303.42	528.06	97.34
325	☐	J1846	14.60	322.96	528.01	88.85
326	☐	J1848	7.61	333.62	528.03	84.24
327	☐	J1850	2.42	302.42	528.04	97.76
328	☐	J1852	12.72	584.48	789.78	88.96
329	☐	J1854	0.00	460.56	674.64	92.76
330	☐	J1858	0.00	346.11	676.73	143.26
331	☐	J186	0.00	391.87	414.74	9.91
332	☐	J1860	0.00	345.26	676.73	143.63
333	☐	J1862	0.00	352.19	676.73	140.62
334	☐	J1864	0.00	352.96	676.73	140.29
335	☐	J1866	18.66	209.07	342.98	58.02
336	☐	J1870	17.02	232.86	339.38	46.16
337	☐	J1872	3.23	199.16	337.61	59.99
338	☐	J1874	9.62	210.18	337.61	55.21
339	☐	J1878	36.01	194.61	337.59	61.95
340	☐	J1882	9.72	198.25	337.60	60.38
341	☐	J1884	55.17	189.87	337.54	63.99
342	☐	J1886	8.13	199.26	337.61	59.95
343	☐	J1890	21.80	200.07	337.58	59.58
344	☐	J1892	127.32	226.48	337.50	48.11
345	☐	J1894	5.30	238.25	337.78	43.12
346	☐	J1896	9.74	214.36	337.68	53.43
347	☐	J1898	8.89	234.76	337.68	44.60
348	☐	J1902	12.93	239.15	337.67	42.69
349	☐	J1904	6.45	244.20	337.75	40.54
350	☐	J1906	5.85	237.50	337.75	43.44
351	☐	J1908	13.28	219.18	338.50	51.70
352	☐	J1910	1.76	228.87	338.50	47.50
353	☐	J1912	6.70	227.33	338.50	48.17
354	☐	J1914	14.62	216.38	338.51	52.92
355	☐	J1920	23.93	239.11	339.37	43.44
356	☐	J1922	12.78	237.77	339.37	44.02
357	☐	J1924	28.88	242.84	340.71	42.41

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
358		J1934	17.56	184.24	342.70	68.66
359		J1936	6.89	186.73	342.70	67.58
360		J1938	3.83	187.66	342.70	67.18
361		J1940	1.16	190.98	342.70	65.74
362		J1942	3.06	243.42	391.10	63.99
363		J1944	3.74	230.46	376.74	63.38
364		J1946	10.67	245.99	382.08	58.97
365		J1950	0.00	242.76	391.04	64.25
366		J1952	0.00	242.38	352.06	47.53
367		J1954	1.99	270.00	411.71	61.40
368		J1956	5.94	272.00	411.71	60.54
369		J1958	0.00	255.00	411.72	67.91
370		J1962	0.00	254.00	411.71	68.34
371		J1968	3.62	290.00	411.78	52.77
372		J1970	7.01	253.03	411.69	68.75
373		J1974	4.86	299.67	413.82	49.46
374		J1976	6.33	178.97	341.34	70.35
375		J1978	1.01	171.84	341.07	73.33
376		J1980	34.55	177.12	342.30	71.57
377		J1986	2.46	190.40	342.64	65.97
378		J1990	0.97	193.48	342.63	64.63
379		J1992	2.19	195.52	342.63	63.74
380		J1996	2.50	280.00	411.85	57.13
381		J1998	6.74	285.00	411.85	54.96
382		J20	4.10	151.83	339.26	81.21
383		J200	0.00	388.46	414.68	11.36
384		J2000	3.16	291.00	411.93	52.40
385		J2006	6.58	295.00	411.92	50.66
386		J2008	17.87	285.00	411.71	54.90
387		J2010	20.27	290.00	411.77	52.76
388		J2012	5.11	203.61	338.51	58.45
389		J2014	4.16	202.36	338.51	58.99
390		J2016	9.14	219.71	337.62	51.09
391		J2020	0.00	305.00	411.74	46.25
392		J2022	0.50	302.00	411.74	47.55
393		J2024	11.40	301.00	411.73	47.98
394		J2028	5.98	171.26	342.78	74.32
395		J2030	0.72	159.65	342.90	79.40
396		J2032	5.48	156.59	342.80	80.68
397		J2034	2.65	157.56	342.82	80.28
398		J2036	0.19	156.39	342.82	80.78
399		J2038	8.65	166.39	342.79	76.44
400		J2044	2.50	255.88	411.76	67.54
401		J2046	3.02	256.70	411.76	67.19
402		J2048	1.74	267.19	411.77	62.65
403		J2050	0.00	118.27	343.79	97.72
404		J2052	0.25	117.00	343.79	98.27
405		J2054	3.33	220.11	342.71	53.12
406		J2056	1.34	232.54	342.71	47.74
407		J206	0.00	389.71	414.74	10.85
408		J2062	4.32	231.40	411.70	78.12

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
409	☐	J2064	14.42	235.79	411.70	76.22
410	☐	J2068	3.43	220.55	343.51	53.28
411	☐	J2070	2.67	222.27	343.52	52.54
412	☐	J2072	2.17	221.72	343.53	52.78
413	☐	J2074	7.65	218.03	343.44	54.34
414	☐	J2078	12.08	225.32	343.52	51.22
415	☐	J208	0.00	390.45	414.74	10.52
416	☐	J2082	11.75	293.47	474.24	78.33
417	☐	J2084	5.56	288.46	474.24	80.49
418	☐	J2090	33.04	107.24	336.11	99.17
419	☐	J2092	19.55	110.19	336.12	97.90
420	☐	J2094	16.51	112.01	336.12	97.11
421	☐	J2096	6.70	109.22	336.11	98.31
422	☐	J2098	0.00	85.35	335.85	108.54
423	☐	J210	0.00	391.07	414.73	10.25
424	☐	J2100	26.56	85.61	335.85	108.43
425	☐	J2102	2.59	161.54	340.63	77.60
426	☐	J2104	0.00	490.00	421.41	-29.72
427	☐	J2106	0.81	322.50	414.21	39.74
428	☐	J2108	4.41	317.77	414.14	41.76
429	☐	J2110	4.16	318.04	414.14	41.64
430	☐	J2114	15.66	184.46	336.16	65.73
431	☐	J212	0.33	303.07	413.75	47.96
432	☐	J2122	3.08	195.76	336.15	60.83
433	☐	J2124	4.78	170.32	336.15	71.86
434	☐	J2126	3.16	193.13	336.15	61.97
435	☐	J2128	10.78	176.98	336.16	68.97
436	☐	J2130	8.81	181.47	336.16	67.03
437	☐	J2134	0.00	338.30	414.42	32.98
438	☐	J2136	5.59	379.00	474.74	41.48
439	☐	J2138	0.00	380.68	474.74	40.75
440	☐	J214	11.13	270.49	412.45	61.51
441	☐	J2140	25.57	231.88	336.02	45.13
442	☐	J2142	20.93	183.06	336.03	66.28
443	☐	J2144	16.26	196.17	336.02	60.60
444	☐	J2146	0.25	214.91	336.02	52.48
445	☐	J2148	12.37	213.93	336.02	52.90
446	☐	J2150	1.24	210.31	336.02	54.47
447	☐	J2152	0.56	208.12	336.02	55.42
448	☐	J2154	2.79	200.51	336.02	58.72
449	☐	J2156	0.85	199.99	336.02	58.94
450	☐	J2158	6.00	200.38	336.02	58.77
451	☐	J2160	2.98	199.99	336.02	58.94
452	☐	J2162	13.82	139.13	336.23	85.40
453	☐	J2168	37.54	75.87	335.85	112.65
454	☐	J2172	50.47	70.69	335.86	114.90
455	☐	J2176	4.45	68.63	335.89	115.80
456	☐	J2180	5.48	69.65	335.91	115.37
457	☐	J2184	4.59	71.26	335.92	114.68
458	☐	J2188	6.89	88.68	335.97	107.15
459	☐	J2190	18.20	95.11	335.99	104.37

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
460	☐	J2198	3.81	262.00	411.70	64.86
461	☐	J22	5.27	146.62	338.77	83.26
462	☐	J220	2.13	277.42	412.18	58.39
463	☐	J2200	6.19	258.00	411.70	66.60
464	☐	J2202	5.15	271.00	411.72	60.98
465	☐	J2204	0.00	260.00	411.73	65.74
466	☐	J2206	1.32	269.00	411.72	61.84
467	☐	J2208	5.05	271.00	411.72	60.98
468	☐	J2210	4.16	269.00	411.72	61.84
469	☐	J2212	23.27	224.18	374.33	65.06
470	☐	J2214	31.13	226.68	374.28	63.95
471	☐	J2216	0.00	239.41	345.59	46.01
472	☐	J2220	0.00	256.90	346.63	38.88
473	☐	J2222	0.00	258.05	373.31	49.94
474	☐	J2224	15.14	167.86	342.66	75.74
475	☐	J2226	3.06	161.73	342.66	78.40
476	☐	J2228	2.21	129.49	343.83	92.87
477	☐	J2230	0.97	134.33	343.78	90.75
478	☐	J2232	1.51	129.07	343.82	93.05
479	☐	J2234	2.92	132.48	343.82	91.57
480	☐	J2238	8.48	168.60	342.77	75.47
481	☐	J224	1.41	270.74	412.45	61.40
482	☐	J2240	15.18	164.62	342.83	77.22
483	☐	J2248	2.36	148.85	338.09	82.00
484	☐	J2250	0.70	153.16	338.10	80.13
485	☐	J2252	1.51	153.53	338.10	79.97
486	☐	J2254	0.41	149.48	337.42	81.43
487	☐	J2256	0.91	151.31	337.42	80.64
488	☐	J2260	0.93	137.61	337.42	86.58
489	☐	J2264	11.56	194.76	342.63	64.07
490	☐	J2266	9.18	206.81	342.63	58.85
491	☐	J2272	0.00	295.00	411.95	50.67
492	☐	J2276	6.23	171.90	342.75	74.03
493	☐	J2280	0.97	165.43	342.75	76.83
494	☐	J2284	2.19	168.63	342.75	75.45
495	☐	J2288	1.78	168.94	342.75	75.31
496	☐	J2290	4.05	169.76	342.75	74.95
497	☐	J2296	1.10	167.27	342.75	76.04
498	☐	J230	3.08	295.20	413.67	51.33
499	☐	J2300	1.84	169.82	342.77	74.94
500	☐	J2304	11.89	166.53	342.79	76.37
501	☐	J2306	15.06	173.16	342.76	73.49
502	☐	J2308	8.25	159.06	342.79	79.61
503	☐	J2310	5.21	149.09	338.73	82.17
504	☐	J2312	0.00	105.02	346.00	104.41
505	☐	J2314	7.59	203.40	343.09	60.53
506	☐	J2316	0.00	341.09	414.22	31.69
507	☐	J2318	0.62	292.83	413.63	52.34
508	☐	J2324	0.00	395.63	415.59	8.65
509	☐	J2326	0.00	379.48	414.63	15.23
510	☐	J2330	15.68	304.15	413.75	47.49

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
511	☐	J2332	14.02	276.98	412.18	58.58
512	☐	J2336	0.41	260.04	412.94	66.25
513	☐	J2338	0.58	213.73	342.71	55.89
514	☐	J2340	1.72	238.27	411.69	75.15
515	☐	J2344	4.34	227.74	343.81	50.29
516	☐	J2346	3.97	246.86	343.80	42.01
517	☐	J2348	2.81	218.47	343.44	54.15
518	☐	J2350	2.54	228.49	347.98	51.78
519	☐	J2352	9.27	316.57	474.38	68.38
520	☐	J2354	9.04	210.39	343.52	57.69
521	☐	J2356	4.96	213.64	345.77	57.25
522	☐	J2358	2.19	198.28	343.38	62.87
523	☐	J236	0.41	292.58	413.63	52.45
524	☐	J2360	7.55	208.35	343.76	58.68
525	☐	J2362	3.12	129.63	338.67	90.58
526	☐	J2364	0.85	243.85	376.65	57.54
527	☐	J2366	0.00	103.47	346.00	105.09
528	☐	J2368	2.69	290.00	411.97	52.85
529	☐	J2370	1.78	160.66	339.70	77.58
530	☐	J2372	1.47	191.94	342.90	65.41
531	☐	J2374	3.25	258.45	373.53	49.87
532	☐	J2376	1.80	140.67	343.56	87.91
533	☐	J2378	1.90	280.47	413.60	57.69
534	☐	J238	4.74	296.63	413.63	50.70
535	☐	J2382	2.54	114.32	343.79	99.43
536	☐	J2384	0.00	658.31	676.73	7.98
537	☐	J2388	12.06	198.68	338.74	60.69
538	☐	J2390	4.61	236.79	339.37	44.45
539	☐	J2392	5.25	195.52	342.63	63.74
540	☐	J2394	0.35	255.88	411.76	67.54
541	☐	J2396	0.00	85.35	335.85	108.54
542	☐	J2398	45.09	196.82	336.15	60.37
543	☐	J24	5.30	153.89	339.29	80.33
544	☐	J240	0.97	258.39	412.94	66.97
545	☐	J2400	2.05	166.52	342.75	76.36
546	☐	J2402	11.67	313.02	474.23	69.85
547	☐	J2404	7.38	340.59	474.47	58.01
548	☐	J2406	9.31	218.66	338.89	52.09
549	☐	J2408	0.00	258.00	411.71	66.60
550	☐	J2410	0.00	100.00	346.00	106.59
551	☐	J2412	0.68	247.13	343.80	41.89
552	☐	J2414	6.52	248.16	411.76	70.89
553	☐	J2416	5.19	263.53	411.76	64.23
554	☐	J2418	0.85	123.00	336.14	92.35
555	☐	J242	2.63	253.65	412.93	69.02
556	☐	J2420	3.89	122.91	336.14	92.39
557	☐	J2422	0.33	119.50	336.27	93.93
558	☐	J2424	0.89	138.92	343.66	88.71
559	☐	J2426	3.37	137.10	343.74	89.54
560	☐	J2428	3.23	212.08	342.69	56.60
561	☐	J2430	1.97	290.00	411.93	52.83

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
562	☐	J2432	1.70	265.76	411.77	63.27
563	☐	J2434	0.00	308.85	413.73	45.44
564	☐	J2436	0.00	305.53	413.74	46.89
565	☐	J2438	0.00	302.92	413.78	48.03
566	☐	J244	2.30	262.94	412.93	64.99
567	☐	J2440	4.26	246.04	376.65	56.59
568	☐	J2442	8.85	240.93	337.67	41.92
569	☐	J2444	0.00	269.58	527.47	111.74
570	☐	J2446	0.00	462.00	531.10	29.94
571	☐	J2448	0.00	462.00	674.24	91.96
572	☐	J2450	0.00	474.45	674.41	86.64
573	☐	J2460	4.57	284.47	411.79	55.16
574	☐	J2462	0.00	313.22	413.91	43.63
575	☐	J2464	0.00	307.46	373.95	28.81
576	☐	J2466	0.00	313.43	676.73	157.42
577	☐	J2468	0.00	231.41	376.68	62.94
578	☐	J2470	0.00	232.59	344.30	48.40
579	☐	J2472	0.00	231.31	376.67	62.98
580	☐	J2474	0.00	232.16	344.31	48.59
581	☐	J2476	6.83	220.00	343.44	53.48
582	☐	J2478	0.00	250.00	351.54	44.00
583	☐	J248	0.00	250.00	412.98	70.62
584	☐	J2480	0.00	250.00	412.96	70.61
585	☐	J2482	3.25	281.00	528.04	107.04
586	☐	J2484	1.49	302.00	411.74	47.55
587	☐	J2486	17.89	206.00	337.60	57.02
588	☐	J2488	0.00	250.00	351.54	44.00
589	☐	J2490	0.00	250.00	412.96	70.61
590	☐	J2492	0.14	247.00	411.69	71.36
591	☐	J2494	0.00	245.00	342.85	42.40
592	☐	J2496	0.00	125.93	337.12	91.51
593	☐	J2498	0.00	268.34	527.42	112.26
594	☐	J250	1.20	256.00	412.99	68.02
595	☐	J2500	0.00	660.00	789.82	56.25
596	☐	J2502	0.00	280.47	413.60	57.69
597	☐	J2506	0.00	255.00	412.96	68.44
598	☐	J2508	0.00	250.00	351.54	44.00
599	☐	J2510	0.00	250.00	351.53	43.99
600	☐	J2512	0.00	300.00	412.62	48.80
601	☐	J2514	0.00	241.00	342.81	44.11
602	☐	J2516	0.00	216.68	342.71	54.61
603	☐	J2522	0.00	362.14	474.38	48.63
604	☐	J2524	0.00	181.98	336.03	66.75
605	☐	J2526	0.00	155.27	336.18	78.39
606	☐	J254	0.00	250.00	412.98	70.62
607	☐	J256	0.00	250.00	412.96	70.61
608	☐	J258	0.00	250.00	351.54	44.00
609	☐	J2592	0.00	189.59	342.66	66.32
610	☐	J2594	0.00	189.59	342.53	66.27
611	☐	J2598	3.83	179.67	342.69	70.64
612	☐	J26	3.21	152.78	338.48	80.46

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
613	☐	J260	2.23	217.60	342.72	54.21
614	☐	J2600	0.00	194.50	342.63	64.18
615	☐	J2606	0.92	201.00	342.63	61.37
616	☐	J2608	0.92	197.00	342.63	63.10
617	☐	J2610	0.92	197.00	342.63	63.10
618	☐	J2612	0.92	202.00	342.63	60.93
619	☐	J2614	0.92	196.00	342.63	63.53
620	☐	J2616	0.00	195.00	342.63	63.97
621	☐	J2618	3.00	133.00	343.90	91.39
622	☐	J262	4.70	218.39	342.72	53.87
623	☐	J2620	3.00	128.00	343.98	93.58
624	☐	J2622	3.00	131.00	343.92	92.26
625	☐	J2624	3.00	137.00	343.84	89.62
626	☐	J2626	3.00	133.00	343.85	91.36
627	☐	J2628	3.00	131.00	343.85	92.23
628	☐	J2630	3.00	145.00	343.80	86.14
629	☐	J2632	3.00	148.00	343.82	84.85
630	☐	J2634	3.00	145.00	343.82	86.15
631	☐	J2636	3.00	137.00	343.82	89.62
632	☐	J2638	3.00	137.00	343.82	89.62
633	☐	J264	2.52	243.37	411.70	72.94
634	☐	J2640	3.00	134.00	343.82	90.92
635	☐	J2642	3.00	144.00	343.82	86.58
636	☐	J2644	3.00	137.00	343.83	89.62
637	☐	J2646	0.00	149.85	343.77	84.03
638	☐	J2650	3.10	187.97	342.38	66.91
639	☐	J2652	3.10	0.00	342.25	148.30
640	☐	J266	3.48	220.30	411.70	82.93
641	☐	J268	13.98	207.14	342.69	58.73
642	☐	J274	1.53	236.99	342.83	45.86
643	☐	J276	7.47	226.08	342.76	50.56
644	☐	J28	4.70	156.87	339.18	78.99
645	☐	J282	2.67	218.31	342.71	53.90
646	☐	J284	2.03	218.38	342.72	53.88
647	☐	J288	1.72	218.75	342.73	53.72
648	☐	J290	2.03	225.44	342.74	50.83
649	☐	J292	1.47	233.91	342.73	47.15
650	☐	J294	2.69	223.31	342.73	51.75
651	☐	J296	2.05	231.72	342.79	48.12
652	☐	J30	1.90	151.69	338.83	81.09
653	☐	J302	0.77	235.00	342.81	46.71
654	☐	J306	0.00	228.00	342.74	49.72
655	☐	J312	3.72	228.59	342.71	49.45
656	☐	J314	2.83	225.77	342.71	50.67
657	☐	J316	10.76	217.52	342.72	54.25
658	☐	J32	1.51	161.63	339.75	77.18
659	☐	J322	5.50	213.60	342.69	55.94
660	☐	J324	3.16	222.28	343.54	52.54
661	☐	J326	0.39	214.09	343.42	56.04
662	☐	J328	5.05	246.99	411.76	71.39
663	☐	J330	3.45	236.47	343.80	46.51

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
664	☐	J332	2.61	235.07	343.80	47.11
665	☐	J334	5.38	269.04	344.78	32.82
666	☐	J336	4.30	260.22	344.79	36.64
667	☐	J34	0.00	105.02	346.00	104.41
668	☐	J340	10.49	242.08	411.73	73.51
669	☐	J342	5.67	234.97	343.81	47.16
670	☐	J348	2.96	253.32	343.80	39.21
671	☐	J352	3.74	242.55	343.80	43.87
672	☐	J356	6.99	230.20	344.23	49.41
673	☐	J36	0.00	106.19	346.99	104.34
674	☐	J360	2.48	251.36	344.79	40.49
675	☐	J362	5.96	224.93	343.82	51.51
676	☐	J370	3.33	230.32	343.81	49.17
677	☐	J374	2.71	211.03	342.76	57.08
678	☐	J376	5.44	218.47	342.73	53.84
679	☐	J378	4.26	205.01	342.78	59.69
680	☐	J38	0.00	342.90	414.82	31.17
681	☐	J384	2.79	206.30	342.78	59.13
682	☐	J386	4.24	197.31	342.81	63.05
683	☐	J388	1.22	207.87	342.77	58.45
684	☐	J392	3.10	213.97	343.43	56.09
685	☐	J394	3.85	215.67	342.72	55.05
686	☐	J396	3.31	208.58	342.75	58.14
687	☐	J398	5.36	210.54	342.74	57.28
688	☐	J40	0.00	378.00	416.28	16.59
689	☐	J400	1.24	219.83	342.73	53.25
690	☐	J406	0.35	209.70	342.77	57.66
691	☐	J408	5.83	212.39	342.77	56.49
692	☐	J410	2.15	207.10	342.77	58.79
693	☐	J414	1.65	209.00	342.77	57.96
694	☐	J42	2.05	240.00	342.84	44.56
695	☐	J422	0.87	210.17	342.77	57.46
696	☐	J430	9.72	202.50	342.67	60.73
697	☐	J432	6.21	195.21	342.72	63.92
698	☐	J436	3.64	204.24	342.92	60.09
699	☐	J438	2.03	209.91	342.77	57.57
700	☐	J440	1.26	198.09	342.83	62.71
701	☐	J442	3.68	198.54	342.83	62.52
702	☐	J444	3.14	204.00	342.91	60.19
703	☐	J446	1.51	192.58	342.70	65.05
704	☐	J448	2.77	189.51	342.70	66.37
705	☐	J450	2.79	193.06	342.70	64.84
706	☐	J454	7.61	197.35	342.70	62.98
707	☐	J46	0.00	320.00	413.35	40.45
708	☐	J464	6.04	186.36	342.70	67.75
709	☐	J468	4.65	240.14	351.34	48.18
710	☐	J470	21.18	210.86	343.76	57.59
711	☐	J472	3.16	231.15	376.65	63.04
712	☐	J474	0.00	377.88	411.71	14.66
713	☐	J476	7.67	363.77	474.56	48.00
714	☐	J478	5.94	291.07	413.62	53.10

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
715	☐	J48	18.89	294.24	413.78	51.79
716	☐	J480	1.82	287.22	413.62	54.77
717	☐	J482	7.59	309.15	474.26	71.54
718	☐	J484	4.39	315.08	474.36	69.02
719	☐	J486	9.23	311.71	474.25	70.43
720	☐	J490	10.90	282.46	413.62	56.83
721	☐	J492	5.52	277.86	413.62	58.82
722	☐	J494	5.85	286.75	413.62	54.97
723	☐	J496	6.87	166.23	341.90	76.12
724	☐	J50	1.59	248.00	342.81	41.08
725	☐	J500	2.94	179.07	342.02	70.61
726	☐	J502	2.34	183.05	342.55	69.11
727	☐	J504	3.19	189.59	342.65	66.32
728	☐	J510	4.10	179.67	342.09	70.38
729	☐	J512	3.54	186.16	342.70	67.83
730	☐	J514	4.18	188.33	342.34	66.73
731	☐	J516	9.97	176.43	342.34	71.89
732	☐	J518	1.51	185.10	342.71	68.29
733	☐	J52	1.61	235.00	342.81	46.71
734	☐	J520	8.71	199.45	343.44	62.39
735	☐	J522	8.87	203.26	343.72	60.86
736	☐	J526	3.79	207.20	343.42	59.02
737	☐	J528	4.39	192.01	343.08	65.46
738	☐	J530	2.81	194.95	343.17	64.22
739	☐	J532	8.73	198.87	343.33	62.60
740	☐	J534	9.27	205.77	344.37	60.05
741	☐	J536	9.33	202.39	343.53	61.16
742	☐	J538	8.63	208.94	345.06	58.98
743	☐	J54	0.00	325.00	413.90	38.52
744	☐	J540	9.10	205.63	343.77	59.85
745	☐	J542	2.01	213.64	345.77	57.25
746	☐	J544	5.77	216.48	346.91	56.51
747	☐	J546	8.85	217.08	345.86	55.80
748	☐	J548	7.14	220.70	345.87	54.24
749	☐	J550	5.56	220.47	346.54	54.62
750	☐	J554	9.47	231.45	345.96	49.62
751	☐	J556	5.98	216.68	345.85	55.97
752	☐	J564	3.93	228.70	347.91	51.65
753	☐	J568	9.31	213.81	343.52	56.21
754	☐	J574	4.88	194.51	342.74	64.23
755	☐	J578	0.33	198.01	343.36	62.98
756	☐	J580	7.36	208.35	343.76	58.68
757	☐	J586	3.74	191.42	342.63	65.52
758	☐	J588	4.59	194.91	343.19	64.25
759	☐	J592	3.35	188.38	342.69	66.86
760	☐	J594	6.89	191.40	343.06	65.71
761	☐	J598	8.23	182.02	342.73	69.63
762	☐	J600	10.09	189.21	342.85	66.57
763	☐	J602	8.85	188.14	342.91	67.06
764	☐	J604	4.80	195.95	343.07	63.75
765	☐	J606	19.73	177.88	342.66	71.40

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
766	☐	J608	20.19	185.91	342.70	67.94
767	☐	J610	9.74	190.10	342.71	66.13
768	☐	J612	8.54	195.87	342.81	63.67
769	☐	J614	2.38	207.31	343.42	58.98
770	☐	J616	4.30	200.53	342.91	61.70
771	☐	J62	0.00	322.00	414.03	39.88
772	☐	J620	4.53	198.95	342.90	62.37
773	☐	J622	3.74	191.88	342.93	65.45
774	☐	J624	4.39	191.43	342.90	65.63
775	☐	J626	8.01	174.61	342.66	72.82
776	☐	J628	8.25	180.51	342.74	70.30
777	☐	J630	4.32	185.88	342.81	68.00
778	☐	J632	4.55	184.91	342.81	68.42
779	☐	J634	6.81	177.77	342.73	71.48
780	☐	J64	0.00	322.00	414.03	39.88
781	☐	J640	0.91	156.99	339.34	79.01
782	☐	J642	4.28	163.74	339.70	76.24
783	☐	J644	2.28	185.62	342.23	67.86
784	☐	J646	2.17	174.84	341.23	72.09
785	☐	J648	13.18	187.33	342.32	67.16
786	☐	J652	3.00	182.98	342.23	69.00
787	☐	J654	1.65	156.99	339.34	79.01
788	☐	J656	13.03	162.86	339.34	76.47
789	☐	J658	5.54	159.01	340.23	78.52
790	☐	J66	0.00	315.00	414.42	43.08
791	☐	J660	2.42	161.53	340.66	77.62
792	☐	J662	5.09	164.10	340.20	76.31
793	☐	J664	5.05	167.88	340.90	74.97
794	☐	J666	2.25	168.02	340.00	74.52
795	☐	J668	5.11	171.83	340.00	72.87
796	☐	J670	2.46	178.49	342.01	70.85
797	☐	J672	4.76	169.28	340.63	74.25
798	☐	J674	7.86	172.38	341.83	73.42
799	☐	J676	3.99	146.12	339.25	83.69
800	☐	J678	5.05	160.49	339.91	77.74
801	☐	J68	0.00	315.00	414.44	43.09
802	☐	J680	5.44	155.26	339.96	80.03
803	☐	J682	1.55	149.94	339.69	82.22
804	☐	J686	4.39	156.63	339.66	79.31
805	☐	J688	3.45	163.30	339.83	76.49
806	☐	J690	2.83	158.95	339.67	78.31
807	☐	J694	3.27	169.31	340.00	73.96
808	☐	J696	2.23	149.19	339.90	82.63
809	☐	J698	5.19	153.37	340.14	80.93
810	☐	J70	0.00	315.00	414.42	43.08
811	☐	J700	2.46	150.68	339.76	81.92
812	☐	J702	2.38	157.61	342.75	80.22
813	☐	J704	1.49	155.31	342.75	81.22
814	☐	J708	2.77	157.84	342.75	80.12
815	☐	J710	1.61	163.79	342.75	77.54
816	☐	J712	2.90	160.48	342.75	78.98

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
817	☐	J716	2.17	160.78	342.90	78.91
818	☐	J72	0.00	318.00	414.22	41.69
819	☐	J722	3.87	169.83	342.78	74.94
820	☐	J724	2.23	169.50	342.78	75.09
821	☐	J726	11.60	186.86	342.67	67.51
822	☐	J728	5.56	188.50	342.65	66.80
823	☐	J730	5.34	183.06	342.65	69.15
824	☐	J734	1.18	190.21	342.65	66.05
825	☐	J738	5.38	180.52	342.65	70.25
826	☐	J74	0.00	318.00	414.22	41.69
827	☐	J742	2.77	174.62	342.78	72.86
828	☐	J744	2.77	172.54	342.78	73.77
829	☐	J746	1.80	174.66	342.78	72.85
830	☐	J748	2.96	170.40	342.78	74.69
831	☐	J750	5.23	176.45	342.78	72.07
832	☐	J752	0.35	172.13	342.78	73.94
833	☐	J754	2.03	174.01	342.78	73.13
834	☐	J756	7.59	177.46	342.74	71.62
835	☐	J758	2.23	171.23	342.77	74.33
836	☐	J76	3.72	186.73	342.71	67.59
837	☐	J770	2.81	167.23	342.78	76.06
838	☐	J772	0.89	164.11	342.75	77.41
839	☐	J774	3.10	168.54	342.79	75.50
840	☐	J776	1.65	172.42	342.78	73.81
841	☐	J78	8.69	183.86	342.72	68.84
842	☐	J780	2.46	175.97	342.78	72.28
843	☐	J782	0.52	172.50	342.78	73.78
844	☐	J784	2.65	173.81	342.78	73.21
845	☐	J786	1.32	170.05	342.77	74.84
846	☐	J788	0.41	170.93	342.77	74.46
847	☐	J792	2.77	160.84	342.75	78.82
848	☐	J794	1.51	165.73	342.75	76.70
849	☐	J796	0.00	153.04	343.07	82.34
850	☐	J798	0.00	103.67	345.83	104.93
851	☐	J80	12.68	196.91	342.66	63.15
852	☐	J800	2.23	133.85	343.87	91.00
853	☐	J802	4.22	134.22	343.85	90.83
854	☐	J804	1.18	140.85	343.82	87.95
855	☐	J808	2.21	162.35	342.75	78.16
856	☐	J810	2.07	154.77	342.75	81.45
857	☐	J812	3.06	153.43	342.75	82.03
858	☐	J814	2.50	145.37	343.80	85.98
859	☐	J816	0.00	114.08	343.79	99.53
860	☐	J818	2.11	182.06	338.68	67.86
861	☐	J82	1.18	189.55	342.65	66.34
862	☐	J820	2.96	182.76	338.68	67.56
863	☐	J822	2.19	178.16	338.68	69.55
864	☐	J824	2.19	179.08	338.68	69.16
865	☐	J830	4.30	127.18	337.12	90.96
866	☐	J832	0.10	121.92	336.11	92.81
867	☐	J834	2.63	140.46	337.42	85.34

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
868	☐	J836	2.77	135.65	337.42	87.43
869	☐	J84	7.72	157.91	342.90	80.16
870	☐	J840	17.00	127.51	338.15	91.27
871	☐	J842	2.32	126.21	338.42	91.95
872	☐	J844	39.82	111.37	338.22	98.29
873	☐	J848	0.58	139.67	338.58	86.19
874	☐	J850	1.76	152.28	338.48	80.68
875	☐	J852	0.14	151.31	338.80	81.24
876	☐	J854	2.11	132.84	337.65	88.74
877	☐	J856	4.82	131.16	338.18	89.70
878	☐	J858	2.52	147.42	338.16	82.65
879	☐	J86	7.05	171.39	342.60	74.18
880	☐	J860	1.82	140.01	338.05	85.81
881	☐	J862	3.29	144.64	338.16	83.85
882	☐	J864	50.58	153.95	337.73	79.63
883	☐	J866	2.44	142.92	337.49	84.31
884	☐	J868	2.03	151.83	338.46	80.87
885	☐	J870	0.46	151.25	338.41	81.10
886	☐	J872	3.33	152.96	338.16	80.25
887	☐	J874	4.84	149.53	338.46	81.86
888	☐	J876	1.99	135.58	337.72	87.59
889	☐	J878	0.60	132.84	337.65	88.74
890	☐	J88	5.21	244.69	412.93	72.90
891	☐	J880	3.10	133.52	338.20	88.69
892	☐	J882	4.39	137.56	338.47	87.05
893	☐	J884	1.99	136.90	337.77	87.03
894	☐	J886	1.88	134.67	337.86	88.04
895	☐	J888	3.50	135.32	337.94	87.80
896	☐	J890	1.43	139.33	338.49	86.30
897	☐	J892	2.13	133.02	337.60	88.64
898	☐	J898	4.24	132.48	338.15	89.12
899	☐	J90	7.61	242.33	412.93	73.92
900	☐	J902	3.41	129.86	338.68	90.48
901	☐	J904	3.00	141.78	338.69	85.32
902	☐	J906	2.61	134.39	338.67	88.51
903	☐	J908	4.53	129.69	338.67	90.55
904	☐	J912	5.27	129.80	338.67	90.50
905	☐	J914	3.23	133.04	338.67	89.10
906	☐	J918	2.94	134.09	338.65	88.64
907	☐	J92	3.12	207.08	343.40	59.07
908	☐	J920	3.35	144.53	338.75	84.16
909	☐	J922	4.99	138.16	338.63	86.86
910	☐	J924	1.90	150.96	338.78	81.38
911	☐	J926	0.37	139.54	338.60	86.25
912	☐	J928	2.90	143.45	338.69	84.60
913	☐	J930	3.08	143.68	338.70	84.50
914	☐	J932	2.40	141.61	338.69	85.39
915	☐	J934	2.71	139.76	338.68	86.20
916	☐	J936	2.07	135.19	338.67	88.17
917	☐	J938	0.48	134.76	338.67	88.35
918	☐	J94	3.02	213.89	343.40	56.12

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
919	☐	J940	6.60	123.72	338.67	93.14
920	☐	J942	10.98	126.19	338.65	92.06
921	☐	J944	3.48	126.73	338.41	91.72
922	☐	J948	2.98	134.09	338.65	88.64
923	☐	J956	2.13	139.33	338.59	86.34
924	☐	J958	3.91	133.65	338.66	88.83
925	☐	J96	3.64	208.80	343.11	58.20
926	☐	J960	8.03	126.95	338.60	91.71
927	☐	J962	4.03	126.05	338.46	92.04
928	☐	J968	7.55	125.86	338.16	91.99
929	☐	J972	2.98	122.24	338.67	93.78
930	☐	J974	0.60	120.44	338.67	94.56
931	☐	J976	1.63	123.37	338.67	93.29
932	☐	J978	2.52	120.17	338.67	94.68
933	☐	J980	4.22	124.77	338.67	92.69
934	☐	J982	2.34	183.93	338.68	67.05
935	☐	J986	0.27	162.91	338.68	76.16
936	☐	J988	1.65	168.37	338.68	73.80
937	☐	J992	1.26	199.54	338.68	60.29
938	☐	J996	4.34	202.53	338.68	58.99
939	☐	J998	0.56	212.12	338.68	54.84

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
1	☐	P-1000	V8036	J2220	27.15	8.00	130.00	0.00	0.00
2	☐	P-1001	J2224	J2226	543.88	10.00	130.00	3.06	0.01
3	☐	P-1002	J2228	J2232	36.08	8.00	130.00	62.91	0.40
4	☐	P-1003	J2232	J2234	369.49	8.00	130.00	2.92	0.02
5	☐	P-1008	J2248	J2250	438.28	4.00	130.00	-1.01	0.03
6	☐	P-1009	J2252	J2250	17.65	4.00	130.00	3.06	0.08
7	☐	P-101	J18	J20	452.30	6.00	130.00	-99.76	1.13
8	☐	P-1010	J2254	J2256	104.22	4.00	130.00	0.91	0.02
9	☐	P-1011	J1784	J2254	69.42	8.00	130.00	1.32	0.01
10	☐	P-1012	J2260	J1782	75.58	8.00	130.00	2.88	0.02
11	☐	P-1013	J594	J528	151.89	8.00	130.00	-65.92	0.42
12	☐	P-1019	J574	J514	507.66	8.00	130.00	182.48	1.16
13	☐	P-102	J22	J24	493.28	6.00	130.00	-100.01	1.13
14	☐	P-1020	J1054	J2272	708.76	8.00	130.00	0.00	0.00
15	☐	P-1021	J1822	J2400	137.27	8.00	130.00	6.59	0.04
16	☐	P-1022	J2276	J2284	222.80	8.00	130.00	0.56	0.00
17	☐	P-1023	J2280	J2400	224.61	8.00	130.00	-3.70	0.02
18	☐	P-1025	J2288	J1816	90.71	8.00	130.00	-7.73	0.05
19	☐	P-1026	J2290	J1816	91.82	8.00	130.00	-4.05	0.03
20	☐	P-103	J26	J28	473.01	8.00	130.00	-257.07	1.64
21	☐	P-1030	J2304	J2306	1,354.79	8.00	130.00	23.37	0.15
22	☐	P-104	J30	J32	817.06	8.00	130.00	-221.76	1.42
23	☐	P-105	J34	J2312	0.13	8.00	130.00	0.00	0.00
24	☐	P-106	J38	J1100	186.89	12.00	130.00	-102.12	0.29
25	☐	P-107	J42	J2494	348.44	10.00	130.00	-68.29	0.28
26	☐	P-108	J46	J2434	2,763.26	10.00	130.00	-128.64	0.53
27	☐	P-109	J50	J2514	350.27	6.00	130.00	-1.59	0.02
28	☐	P-110	J54	J46	842.74	10.00	130.00	300.00	1.23
29	☐	P-111	J74	J64	285.83	10.00	130.00	300.00	1.23
30	☐	P-113	J62	J64	37.85	10.00	130.00	0.00	0.00
31	☐	P-114	J66	J70	11.07	10.00	130.00	0.00	0.00
32	☐	P-115	J68	J70	21.51	10.00	130.00	300.00	1.23
33	☐	P-116	J72	J74	28.35	10.00	130.00	0.00	0.00
34	☐	P-118	J76	J78	353.57	8.00	130.00	-34.87	0.22
35	☐	P-119	J80	J82	538.52	8.00	130.00	19.13	0.12
36	☐	P-121	J88	J90	135.52	8.00	130.00	7.61	0.05
37	☐	P-122	J92	J94	650.14	10.00	130.00	9.75	0.04
38	☐	P-123	J96	J2314	649.93	8.00	130.00	24.48	0.16
39	☐	P-124	J100	J102	671.85	6.00	130.00	133.53	1.52
40	☐	P-125	J106	J554	671.62	6.00	130.00	-131.57	1.49
41	☐	P-126	J108	J2404	1,246.05	6.00	130.00	7.38	0.08
42	☐	P-129	J120	J468	29.22	12.00	130.00	1,199.04	3.40
43	☐	P-130	J148	J2136	1,291.50	8.00	130.00	150.32	0.96
44	☐	P-131	J128	J476	5.49	6.00	130.00	-105.72	1.20
45	☐	P-132	J328	J1704	363.09	12.00	130.00	-57.38	0.16
46	☐	P-133	J136	J38	1,078.48	12.00	130.00	-102.12	0.29
47	☐	P-134	J110	J2326	583.72	10.00	130.00	-308.82	1.26
48	☐	P-135	J142	J2462	223.32	8.00	130.00	-170.71	1.09
49	☐	P-136	J146	J148	547.48	8.00	130.00	153.47	0.98
50	☐	P-137	J150	J2522	455.69	6.00	130.00	-18.47	0.21
51	☐	P-138	J182	J178	254.03	12.00	130.00	102.12	0.29

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
52	☐	P-139	J158	J136	662.62	12.00	130.00	-102.12	0.29
53	☐	P-140	J160	J146	139.40	8.00	130.00	160.36	1.02
54	☐	P-141	J166	T5000	46.10	12.00	130.00	-160.36	0.45
55	☐	P-142	J166	J160	92.65	8.00	130.00	160.36	1.02
56	☐	P-150	J186	J178	50.07	12.00	130.00	-102.12	0.29
57	☐	P-162	J186	J210	17.18	12.00	130.00	102.12	0.29
58	☐	P-163	J208	J200	75.53	10.00	130.00	308.82	1.26
59	☐	P-164	J210	J144	81.94	8.00	130.00	169.05	1.08
60	☐	P-165	J48	J2330	1,290.92	10.00	130.00	47.58	0.19
61	☐	P-166	J214	J2332	315.40	8.00	130.00	189.07	1.21
62	☐	P-167	J134	J2332	502.49	8.00	130.00	-172.91	1.10
63	☐	P-168	J220	J2332	182.39	8.00	130.00	-2.13	0.01
64	☐	P-169	J224	J214	179.90	4.00	130.00	-1.41	0.04
65	☐	P-171	J230	J2330	390.86	8.00	130.00	-90.68	0.58
66	☐	P-172	J212	J110	677.79	10.00	130.00	-307.16	1.25
67	☐	P-173	J230	J236	185.63	8.00	130.00	87.60	0.56
68	☐	P-174	J236	J238	118.51	6.00	130.00	4.74	0.05
69	☐	P-175	J240	J242	184.28	8.00	130.00	15.45	0.10
70	☐	P-176	J240	J244	251.44	4.00	130.00	2.30	0.06
71	☐	P-178	J248	J250	7.66	8.00	130.00	-281.05	1.79
72	☐	P-181	J2336	J122	33.50	8.00	130.00	-220.74	1.41
73	☐	P-182	J242	J88	320.73	8.00	130.00	12.83	0.08
74	☐	P-184	J260	J262	206.64	6.00	130.00	5.41	0.06
75	☐	P-185	J264	J2062	668.15	12.00	130.00	-19.63	0.06
76	☐	P-186	J268	J2428	790.10	6.00	130.00	-5.52	0.06
77	☐	P-187	J264	J2340	216.86	8.00	130.00	10.41	0.07
78	☐	P-188	J276	J274	883.02	6.00	130.00	-26.39	0.30
79	☐	P-189	J2516	J282	321.76	6.00	130.00	5.02	0.06
80	☐	P-190	J284	J2516	125.80	6.00	130.00	22.37	0.25
81	☐	P-191	J288	J290	469.94	6.00	130.00	-14.10	0.16
82	☐	P-192	J284	J288	292.09	6.00	130.00	-12.38	0.14
83	☐	P-193	J292	J294	442.21	6.00	130.00	-1.47	0.02
84	☐	P-194	J290	J296	373.24	6.00	130.00	-32.30	0.37
85	☐	P-195	J274	J42	385.53	10.00	130.00	-27.92	0.11
86	☐	P-197	J302	J52	130.47	6.00	130.00	3.21	0.04
87	☐	P-198	J302	J42	172.98	6.00	130.00	-38.32	0.43
88	☐	P-199	J296	J302	107.39	6.00	130.00	-34.35	0.39
89	☐	P-202	J294	J290	340.67	6.00	130.00	-16.18	0.18
90	☐	P-203	J290	J306	152.56	6.00	130.00	0.00	0.00
91	☐	P-204	J294	J284	349.09	6.00	130.00	12.02	0.14
92	☐	P-206	J282	J316	654.25	6.00	130.00	-8.88	0.10
93	☐	P-207	J312	J314	202.83	6.00	130.00	-3.72	0.04
94	☐	P-208	J282	J2054	81.43	6.00	130.00	11.23	0.13
95	☐	P-209	J316	J276	709.46	6.00	130.00	-18.93	0.21
96	☐	P-210	J262	J316	320.72	6.00	130.00	0.71	0.01
97	☐	P-211	J2428	J322	176.27	6.00	130.00	5.50	0.06
98	☐	P-212	J324	J2072	41.08	10.00	130.00	181.53	0.74
99	☐	P-213	J266	J340	625.38	8.00	130.00	-41.85	0.27
100	☐	P-214	J330	J332	79.42	6.00	130.00	-4.75	0.05
101	☐	P-215	J334	J336	517.79	4.00	130.00	-5.38	0.14
102	☐	P-216	J2078	J324	663.44	6.00	130.00	-12.25	0.14

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
103	☐	P-217	J342	J2344	480.50	8.00	130.00	-15.73	0.10
104	☐	P-219	J330	J348	650.12	6.00	130.00	1.30	0.01
105	☐	P-220	J328	J2412	15.09	8.00	130.00	0.00	0.00
106	☐	P-221	J352	J2412	283.53	8.00	130.00	-3.74	0.02
107	☐	P-223	J356	J362	338.25	8.00	130.00	233.66	1.49
108	☐	P-224	J106	J102	315.28	8.00	130.00	114.05	0.73
109	☐	P-225	J336	J360	313.00	8.00	130.00	-9.68	0.06
110	☐	P-226	J360	J106	164.74	8.00	130.00	-12.16	0.08
111	☐	P-227	J102	J356	349.89	8.00	130.00	240.66	1.54
112	☐	P-228	J2344	J362	222.93	8.00	130.00	-30.76	0.20
113	☐	P-232	J332	J370	261.51	6.00	130.00	-7.36	0.08
114	☐	P-234	J362	J324	307.08	8.00	130.00	196.95	1.26
115	☐	P-235	J374	J376	928.79	8.00	130.00	35.13	0.22
116	☐	P-236	J378	J384	276.26	6.00	130.00	2.31	0.03
117	☐	P-237	J268	J432	1,321.06	6.00	130.00	-11.51	0.13
118	☐	P-238	J384	J386	1,072.03	8.00	130.00	-32.84	0.21
119	☐	P-239	J388	J422	281.28	8.00	130.00	8.71	0.06
120	☐	P-240	J266	J2476	31.50	8.00	130.00	0.00	0.00
121	☐	P-241	J268	J394	671.04	8.00	130.00	-38.49	0.25
122	☐	P-242	J396	J398	200.76	6.00	130.00	26.89	0.31
123	☐	P-243	J394	J260	197.34	8.00	130.00	-20.80	0.13
124	☐	P-244	J260	J376	149.07	8.00	130.00	-28.45	0.18
125	☐	P-245	J376	J400	310.93	8.00	130.00	1.24	0.01
126	☐	P-246	J400	J266	35.03	8.00	130.00	0.00	0.00
127	☐	P-247	J398	J394	272.83	6.00	130.00	21.54	0.24
128	☐	P-249	J406	J408	123.68	6.00	130.00	5.83	0.07
129	☐	P-250	J410	J396	125.48	6.00	130.00	30.20	0.34
130	☐	P-251	J406	J414	125.48	8.00	130.00	1.65	0.01
131	☐	P-254	J384	J410	62.24	6.00	130.00	32.35	0.37
132	☐	P-258	J422	J406	62.24	8.00	130.00	7.84	0.05
133	☐	P-261	J268	J430	431.64	8.00	130.00	41.54	0.27
134	☐	P-263	J430	J80	378.83	8.00	130.00	31.82	0.20
135	☐	P-264	J386	J432	259.16	6.00	130.00	57.36	0.65
136	☐	P-265	J96	J436	299.08	8.00	130.00	163.09	1.04
137	☐	P-266	J438	J388	113.63	8.00	130.00	-39.87	0.25
138	☐	P-267	J374	J438	171.35	8.00	130.00	-37.84	0.24
139	☐	P-268	J436	J378	382.79	6.00	130.00	56.36	0.64
140	☐	P-269	J388	J378	57.32	8.00	130.00	-49.79	0.32
141	☐	P-270	J440	J386	63.14	8.00	130.00	94.44	0.60
142	☐	P-271	J442	J440	32.98	8.00	130.00	95.70	0.61
143	☐	P-272	J444	J442	291.36	8.00	130.00	99.38	0.63
144	☐	P-273	J436	J444	25.49	8.00	130.00	103.08	0.66
145	☐	P-274	J446	J1940	213.79	8.00	130.00	3.20	0.02
146	☐	P-275	J450	J446	59.38	8.00	130.00	11.60	0.07
147	☐	P-276	J432	J450	287.99	6.00	130.00	22.01	0.25
148	☐	P-278	J454	J450	197.90	6.00	130.00	-7.61	0.09
149	☐	P-282	J448	J464	307.99	8.00	130.00	-25.11	0.16
150	☐	P-284	J470	J2470	1,144.25	10.00	130.00	-248.85	1.02
151	☐	P-285	J108	J128	277.62	8.00	130.00	-105.21	0.67
152	☐	P-286	J120	J1952	172.04	12.00	130.00	-1,203.67	3.41
153	☐	P-287	J476	J126	323.79	8.00	130.00	-144.53	0.92

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
154	☐	P-288	J478	J480	107.11	8.00	130.00	24.10	0.15
155	☐	P-289	J482	J484	191.19	6.00	130.00	-71.59	0.81
156	☐	P-290	J118	J486	448.89	8.00	130.00	-37.46	0.24
157	☐	P-292	J490	J492	545.46	8.00	130.00	5.52	0.04
158	☐	P-293	J480	J494	38.83	8.00	130.00	22.28	0.14
159	☐	P-294	J494	J490	128.13	8.00	130.00	16.42	0.10
160	☐	P-295	J496	J86	472.89	8.00	130.00	-258.69	1.65
161	☐	P-296	J518	J500	472.89	8.00	130.00	255.06	1.63
162	☐	P-297	J502	J504	476.07	2.00	130.00	-2.34	0.24
163	☐	P-299	J512	J2598	487.73	4.00	130.00	3.83	0.10
164	☐	P-300	J514	J516	639.10	8.00	130.00	9.97	0.06
165	☐	P-301	J518	J512	153.57	10.00	130.00	73.60	0.30
166	☐	P-302	J520	J522	310.93	12.00	130.00	-564.43	1.60
167	☐	P-304	J528	J530	160.20	6.00	130.00	-70.30	0.80
168	☐	P-305	J532	J534	665.09	2.00	130.00	-6.91	0.71
169	☐	P-306	J536	J538	665.09	2.00	130.00	-8.52	0.87
170	☐	P-307	J540	J2356	662.66	6.00	130.00	-177.49	2.01
171	☐	P-308	J538	J2356	332.23	12.00	130.00	-907.34	2.57
172	☐	P-309	J546	J548	325.99	6.00	130.00	-8.85	0.10
173	☐	P-310	J544	J550	230.58	6.00	130.00	126.62	1.44
174	☐	P-312	J100	J554	337.22	6.00	130.00	-42.02	0.48
175	☐	P-313	J556	J548	384.35	4.00	130.00	-5.98	0.15
176	☐	P-314	J548	J100	319.49	6.00	130.00	-21.97	0.25
177	☐	P-315	J550	J100	436.33	6.00	130.00	121.05	1.37
178	☐	P-317	J544	J564	270.49	12.00	130.00	-1,224.19	3.47
179	☐	P-318	J564	J2350	20.93	12.00	130.00	-1,228.12	3.48
180	☐	P-319	J534	J568	649.03	2.00	130.00	6.26	0.64
181	☐	P-321	J568	J2354	330.38	6.00	130.00	-3.05	0.03
182	☐	P-322	J534	J538	341.05	12.00	130.00	-890.20	2.53
183	☐	P-324	J522	J534	332.96	12.00	130.00	-867.76	2.46
184	☐	P-325	J574	J578	331.14	8.00	130.00	-294.14	1.88
185	☐	P-326	J536	J540	332.22	6.00	130.00	-80.79	0.92
186	☐	P-327	J540	J2358	654.88	6.00	130.00	73.56	0.83
187	☐	P-328	J580	J2360	0.02	8.00	130.00	-7.36	0.05
188	☐	P-329	J540	J2360	327.97	8.00	130.00	14.03	0.09
189	☐	P-330	J470	J2358	328.64	8.00	130.00	226.78	1.45
190	☐	P-331	J586	J532	663.17	2.00	130.00	-5.61	0.57
191	☐	P-332	J574	J536	663.17	2.00	130.00	-6.00	0.61
192	☐	P-333	J532	J536	341.05	6.00	130.00	-73.98	0.84
193	☐	P-334	J530	J588	42.62	6.00	130.00	-61.96	0.70
194	☐	P-335	J588	J532	289.33	6.00	130.00	-66.55	0.76
195	☐	P-336	J586	J574	342.33	8.00	130.00	-112.78	0.72
196	☐	P-338	J512	J592	182.74	10.00	130.00	66.24	0.27
197	☐	P-339	J592	J2592	81.80	10.00	130.00	238.58	0.97
198	☐	P-340	J504	J586	197.99	8.00	130.00	69.07	0.44
199	☐	P-341	J594	J520	669.56	10.00	130.00	-275.77	1.13
200	☐	P-342	J598	J600	665.09	2.00	130.00	-2.21	0.23
201	☐	P-343	J602	J604	665.09	8.00	130.00	-97.14	0.62
202	☐	P-344	J606	J608	705.46	10.00	130.00	-80.45	0.33
203	☐	P-345	J610	J612	353.66	6.00	130.00	-48.11	0.55
204	☐	P-346	J608	J600	344.77	6.00	130.00	-62.20	0.71

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
205	☐	P-347	J520	J526	661.25	10.00	130.00	62.46	0.26
206	☐	P-348	J600	J612	674.46	2.00	130.00	1.25	0.13
207	☐	P-349	J604	J1106	90.30	8.00	130.00	-29.85	0.19
208	☐	P-350	J616	J2314	273.42	6.00	130.00	-77.56	0.88
209	☐	P-352	J612	J620	271.10	6.00	130.00	-55.40	0.63
210	☐	P-353	J622	J604	278.58	8.00	130.00	-145.41	0.93
211	☐	P-354	J604	J520	345.98	8.00	130.00	-217.50	1.39
212	☐	P-355	J600	J624	303.98	8.00	130.00	-75.76	0.48
213	☐	P-356	J608	J610	655.93	10.00	130.00	-38.44	0.16
214	☐	P-357	J86	J626	313.58	8.00	130.00	-84.43	0.54
215	☐	P-358	J606	J598	312.67	6.00	130.00	-41.73	0.47
216	☐	P-359	J518	J594	651.75	10.00	130.00	-271.00	1.11
217	☐	P-360	J626	J598	663.17	2.00	130.00	-1.56	0.16
218	☐	P-361	J628	J602	663.21	8.00	130.00	-98.72	0.63
219	☐	P-362	J630	J602	290.04	6.00	130.00	-53.35	0.61
220	☐	P-363	J602	J594	346.11	6.00	130.00	-63.79	0.72
221	☐	P-364	J598	J632	278.90	6.00	130.00	-49.32	0.56
222	☐	P-365	J634	J628	318.99	8.00	130.00	-31.30	0.20
223	☐	P-366	J628	J518	354.13	8.00	130.00	59.17	0.38
224	☐	P-368	J626	J634	324.35	8.00	130.00	-90.87	0.58
225	☐	P-369	J606	J86	663.17	10.00	130.00	102.45	0.42
226	☐	P-371	J640	J654	2.83	8.00	130.00	-262.68	1.68
227	☐	P-372	J644	J1976	422.05	8.00	130.00	311.10	1.99
228	☐	P-373	J514	J648	323.06	8.00	130.00	47.72	0.30
229	☐	P-374	J648	J1980	547.75	8.00	130.00	34.55	0.22
230	☐	P-375	J652	J644	251.89	8.00	130.00	15.26	0.10
231	☐	P-376	J652	J510	257.98	8.00	130.00	145.72	0.93
232	☐	P-377	J654	J656	397.77	8.00	130.00	13.03	0.08
233	☐	P-378	J28	J640	107.20	8.00	130.00	-261.77	1.67
234	☐	P-379	J658	J2102	323.54	6.00	130.00	-110.24	1.25
235	☐	P-380	J662	J664	332.86	6.00	130.00	-146.22	1.66
236	☐	P-381	J666	J668	332.86	6.00	130.00	-3.64	0.04
237	☐	P-382	J670	J672	788.22	8.00	130.00	281.92	1.80
238	☐	P-383	J660	J664	674.97	2.00	130.00	-3.07	0.31
239	☐	P-384	J496	J674	674.97	8.00	130.00	61.58	0.39
240	☐	P-385	J664	J674	358.95	6.00	130.00	-163.09	1.85
241	☐	P-386	J674	J500	635.16	8.00	130.00	-109.37	0.70
242	☐	P-387	J500	J670	53.16	12.00	130.00	142.75	0.40
243	☐	P-388	J664	J668	372.46	2.00	130.00	8.75	0.89
244	☐	P-389	J660	J496	358.95	6.00	130.00	-190.24	2.16
245	☐	P-391	J678	J680	674.97	2.00	130.00	-1.34	0.14
246	☐	P-392	J682	J686	674.97	6.00	130.00	18.91	0.21
247	☐	P-393	J658	J662	674.97	6.00	130.00	18.30	0.21
248	☐	P-394	J686	J678	330.29	6.00	130.00	-83.81	0.95
249	☐	P-395	J688	J690	330.29	6.00	130.00	66.58	0.76
250	☐	P-396	J672	J32	520.02	8.00	130.00	277.16	1.77
251	☐	P-397	J688	J678	372.14	2.00	130.00	-2.36	0.24
252	☐	P-398	J662	J666	372.46	6.00	130.00	69.55	0.79
253	☐	P-399	J666	J688	339.29	6.00	130.00	67.67	0.77
254	☐	P-401	J666	J694	140.74	6.00	130.00	3.27	0.04
255	☐	P-402	J678	J662	339.29	6.00	130.00	-89.87	1.02

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
256	☐	P-403	J24	J20	373.21	2.00	130.00	1.27	0.13
257	☐	P-404	J686	J690	371.82	6.00	130.00	-11.06	0.13
258	☐	P-405	J24	J690	323.39	6.00	130.00	-106.58	1.21
259	☐	P-406	J690	J32	260.19	6.00	130.00	-53.89	0.61
260	☐	P-407	J20	J686	323.39	6.00	130.00	-109.39	1.24
261	☐	P-410	J696	J698	497.95	6.00	130.00	-66.90	0.76
262	☐	P-411	J700	J680	294.94	6.00	130.00	-79.61	0.90
263	☐	P-412	J680	J658	339.29	6.00	130.00	-86.40	0.98
264	☐	P-413	J676	J682	323.39	6.00	130.00	-115.61	1.31
265	☐	P-414	J696	J700	355.43	6.00	130.00	58.92	0.67
266	☐	P-415	J682	J700	35.36	6.00	130.00	-136.07	1.54
267	☐	P-416	J702	J704	290.07	6.00	130.00	2.57	0.03
268	☐	P-417	J792	J708	358.86	6.00	130.00	3.16	0.04
269	☐	P-418	J710	J712	361.08	6.00	130.00	8.78	0.10
270	☐	P-419	J770	J716	603.97	8.00	130.00	-86.48	0.55
271	☐	P-421	J722	J724	137.26	8.00	130.00	-8.63	0.06
272	☐	P-422	J726	J728	487.53	8.00	130.00	35.72	0.23
273	☐	P-423	J730	J728	314.44	8.00	130.00	-10.72	0.07
274	☐	P-424	J728	J82	156.20	8.00	130.00	19.44	0.12
275	☐	P-425	J82	J734	90.92	8.00	130.00	37.40	0.24
276	☐	P-428	J738	J730	211.73	8.00	130.00	-5.38	0.03
277	☐	P-430	J1224	J726	333.57	8.00	130.00	47.32	0.30
278	☐	P-431	J742	J744	907.92	8.00	130.00	-11.86	0.08
279	☐	P-432	J746	J748	338.68	8.00	130.00	-1.80	0.01
280	☐	P-433	J750	J742	267.41	8.00	130.00	-9.09	0.06
281	☐	P-434	J748	J722	97.81	8.00	130.00	-4.76	0.03
282	☐	P-435	J752	J754	196.21	4.00	130.00	2.03	0.05
283	☐	P-436	J756	J1814	191.09	8.00	130.00	-41.73	0.27
284	☐	P-437	J78	J756	477.73	8.00	130.00	-34.14	0.22
285	☐	P-438	J78	J1224	311.85	8.00	130.00	58.38	0.37
286	☐	P-441	J78	J2306	945.80	10.00	130.00	-67.80	0.28
287	☐	P-442	J770	J1392	246.63	8.00	130.00	57.34	0.37
288	☐	P-443	J724	J774	173.85	8.00	130.00	-10.86	0.07
289	☐	P-444	J776	J752	80.21	8.00	130.00	4.15	0.03
290	☐	P-445	J780	J750	119.89	8.00	130.00	-3.86	0.02
291	☐	P-446	J782	J784	194.53	4.00	130.00	2.65	0.07
292	☐	P-448	J786	J2300	44.49	8.00	130.00	-24.49	0.16
293	☐	P-449	J788	J786	55.23	8.00	130.00	-23.16	0.15
294	☐	P-450	J758	J788	78.75	8.00	130.00	-22.75	0.15
295	☐	P-451	J758	J776	169.39	8.00	130.00	-34.79	0.22
296	☐	P-452	J792	J710	239.04	6.00	130.00	-10.87	0.12
297	☐	P-453	J772	J794	117.42	6.00	130.00	1.51	0.02
298	☐	P-454	J702	J792	255.59	6.00	130.00	-4.94	0.06
299	☐	P-455	J716	J2030	98.65	10.00	130.00	-88.66	0.36
300	☐	P-456	J798	J1030	76.98	12.00	130.00	0.00	0.00
301	☐	P-457	J802	J804	1,000.92	12.00	130.00	79.39	0.23
302	☐	P-458	J84	J2240	602.95	10.00	130.00	118.41	0.48
303	☐	P-459	J708	J712	241.00	6.00	130.00	-3.67	0.04
304	☐	P-460	J712	J808	268.09	6.00	130.00	2.21	0.03
305	☐	P-461	J810	J708	251.65	6.00	130.00	-4.05	0.05
306	☐	P-462	J704	J810	60.82	6.00	130.00	-1.99	0.02

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
307	☐	P-463	J704	J812	118.76	6.00	130.00	3.06	0.03
308	☐	P-464	J814	J2646	425.81	12.00	130.00	131.15	0.37
309	☐	P-465	J804	J814	434.20	12.00	130.00	133.66	0.38
310	☐	P-466	J802	J800	41.35	10.00	130.00	-254.97	1.04
311	☐	P-467	J818	J820	55.87	8.00	130.00	3.48	0.02
312	☐	P-468	J822	J824	87.15	8.00	130.00	7.78	0.05
313	☐	P-469	J986	J1416	619.10	12.00	130.00	-23.31	0.07
314	☐	P-470	J830	J2496	52.90	10.00	130.00	-4.30	0.02
315	☐	P-473	J842	J844	1,063.40	6.00	130.00	39.82	0.45
316	☐	P-474	J890	J848	145.06	8.00	130.00	-161.66	1.03
317	☐	P-475	J850	J30	341.94	6.00	130.00	-100.42	1.14
318	☐	P-476	J854	J1774	217.71	8.00	130.00	-198.58	1.27
319	☐	P-477	J858	J1272	125.33	8.00	130.00	143.00	0.91
320	☐	P-478	J858	J862	326.73	8.00	130.00	3.29	0.02
321	☐	P-479	J864	J866	675.75	8.00	130.00	119.25	0.76
322	☐	P-480	J868	J858	560.51	8.00	130.00	148.81	0.95
323	☐	P-481	J870	J872	286.35	8.00	130.00	193.95	1.24
324	☐	P-482	J872	J2252	77.42	8.00	130.00	190.62	1.22
325	☐	P-483	J874	J868	285.32	6.00	130.00	-4.84	0.05
326	☐	P-484	J26	J850	105.47	12.00	130.00	57.02	0.16
327	☐	P-485	J870	J26	72.39	8.00	130.00	-196.85	1.26
328	☐	P-486	J850	J868	26.63	8.00	130.00	155.68	0.99
329	☐	P-487	J876	J1316	113.04	8.00	130.00	125.11	0.80
330	☐	P-488	J880	J882	468.32	8.00	130.00	-155.85	0.99
331	☐	P-489	J884	J886	215.94	8.00	130.00	-129.08	0.82
332	☐	P-490	J884	J876	109.78	8.00	130.00	127.09	0.81
333	☐	P-491	J860	J888	255.90	8.00	130.00	134.46	0.86
334	☐	P-493	J890	J882	38.68	8.00	130.00	160.23	1.02
335	☐	P-494	J888	J886	190.95	8.00	130.00	130.96	0.84
336	☐	P-495	J892	J1286	255.14	10.00	130.00	317.90	1.30
337	☐	P-498	J902	J904	661.45	10.00	130.00	-50.57	0.21
338	☐	P-499	J906	J908	319.44	8.00	130.00	-5.15	0.03
339	☐	P-501	J914	J928	669.66	8.00	130.00	-36.45	0.23
340	☐	P-502	J918	J948	0.02	8.00	130.00	-36.75	0.23
341	☐	P-503	J922	J22	658.72	8.00	130.00	-89.72	0.57
342	☐	P-504	J924	J926	659.68	8.00	130.00	101.86	0.65
343	☐	P-505	J928	J904	323.61	6.00	130.00	3.90	0.04
344	☐	P-506	J22	J920	373.21	6.00	130.00	20.55	0.23
345	☐	P-507	J852	J924	17.03	6.00	130.00	119.29	1.35
346	☐	P-508	J920	J930	303.47	6.00	130.00	37.72	0.43
347	☐	P-509	J932	J934	325.77	10.00	130.00	48.09	0.20
348	☐	P-510	J904	J932	28.39	10.00	130.00	54.92	0.22
349	☐	P-512	J936	J938	27.66	8.00	130.00	-2.07	0.01
350	☐	P-513	J906	J938	60.78	8.00	130.00	2.54	0.02
351	☐	P-514	J940	J942	323.52	6.00	130.00	21.10	0.24
352	☐	P-515	J902	J914	323.52	6.00	130.00	14.55	0.17
353	☐	P-516	J944	J922	637.26	6.00	130.00	-56.13	0.64
354	☐	P-517	J942	J914	639.89	8.00	130.00	-25.47	0.16
355	☐	P-518	J960	J918	643.55	8.00	130.00	-52.18	0.33
356	☐	P-519	J918	J922	367.09	8.00	130.00	36.78	0.23
357	☐	P-521	J922	J1780	166.44	8.00	130.00	65.38	0.42

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
358	☐	P-524	J848	J956	18.39	8.00	130.00	-162.24	1.04
359	☐	P-525	J958	J918	272.74	6.00	130.00	18.39	0.21
360	☐	P-526	J960	J962	200.07	6.00	130.00	79.73	0.90
361	☐	P-527	J856	J968	326.94	6.00	130.00	24.55	0.28
362	☐	P-528	J962	J842	67.10	6.00	130.00	75.70	0.86
363	☐	P-529	J944	J856	282.54	6.00	130.00	86.22	0.98
364	☐	P-533	J968	J840	120.49	6.00	130.00	17.00	0.19
365	☐	P-534	J942	J960	350.06	6.00	130.00	35.58	0.40
366	☐	P-535	J972	J974	150.08	8.00	130.00	-2.61	0.02
367	☐	P-536	J976	J2362	639.89	4.00	130.00	-2.03	0.05
368	☐	P-537	J940	J902	639.89	10.00	130.00	-23.00	0.09
369	☐	P-538	J912	J978	639.89	8.00	130.00	10.04	0.06
370	☐	P-539	J912	J908	299.01	8.00	130.00	14.27	0.09
371	☐	P-540	J902	J2362	28.39	8.00	130.00	9.62	0.06
372	☐	P-541	J908	J972	489.81	8.00	130.00	4.59	0.03
373	☐	P-542	J972	J980	215.90	8.00	130.00	4.22	0.03
374	☐	P-543	J978	J974	299.01	8.00	130.00	3.21	0.02
375	☐	P-544	J976	J978	325.77	8.00	130.00	-4.31	0.03
376	☐	P-545	J940	J976	28.39	8.00	130.00	-4.70	0.03
377	☐	P-546	J982	J992	334.90	8.00	130.00	9.60	0.06
378	☐	P-547	J986	J988	153.03	8.00	130.00	23.04	0.15
379	☐	P-549	J988	J822	287.59	8.00	130.00	9.97	0.06
380	☐	P-550	J820	J982	305.66	8.00	130.00	0.52	0.00
381	☐	P-551	J992	J998	322.36	8.00	130.00	3.99	0.03
382	☐	P-552	J992	J996	150.70	8.00	130.00	4.34	0.03
383	☐	P-555	J998	J1000	111.49	8.00	130.00	2.85	0.02
384	☐	P-556	J474	J206	1,422.99	16.00	130.00	-1,939.05	3.09
385	☐	P-558	J1006	J2364	306.88	12.00	130.00	-4.10	0.01
386	☐	P-559	J472	J1564	1,139.77	12.00	130.00	442.31	1.25
387	☐	P-560	J2368	J1048	160.12	12.00	130.00	-352.26	1.00
388	☐	P-561	J2424	J1014	366.69	8.00	130.00	10.47	0.07
389	☐	P-562	J1016	J1018	772.47	8.00	130.00	14.27	0.09
390	☐	P-563	J1020	J1022	161.17	8.00	130.00	0.00	0.00
391	☐	P-564	J1024	J2366	390.46	8.00	130.00	0.00	0.00
392	☐	P-571	J1048	J1050	296.86	8.00	130.00	74.69	0.48
393	☐	P-572	J1052	J1054	373.13	10.00	130.00	72.37	0.30
394	☐	P-573	J1052	J1050	142.48	8.00	130.00	-62.01	0.40
395	☐	P-575	J2434	J1064	26.78	8.00	130.00	-29.66	0.19
396	☐	P-576	J2436	J1068	27.03	8.00	130.00	35.08	0.22
397	☐	P-578	J1074	J1076	26.82	8.00	130.00	0.00	0.00
398	☐	P-579	J1686	J1080	51.52	8.00	130.00	7.22	0.05
399	☐	P-580	J1686	J1084	418.42	8.00	130.00	-101.86	0.65
400	☐	P-581	J1084	J1086	220.79	8.00	130.00	-106.11	0.68
401	☐	P-582	J1088	J1090	30.79	8.00	130.00	4.10	0.03
402	☐	P-583	J1086	J1088	1.97	8.00	130.00	-106.44	0.68
403	☐	P-584	J1092	J1094	42.41	8.00	130.00	3.85	0.02
404	☐	P-585	J1092	J1096	674.21	8.00	130.00	-117.07	0.75
405	☐	P-586	J1096	J1098	59.26	8.00	130.00	0.00	0.00
406	☐	P-587	J1096	J2134	31.64	8.00	130.00	-117.07	0.75
407	☐	P-588	J1102	J2354	669.45	8.00	130.00	-42.83	0.27
408	☐	P-590	J1110	J2370	0.04	10.00	130.00	-0.66	0.00

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
409	☐	P-591	J1114	J1116	215.38	8.00	130.00	-284.09	1.81
410	☐	P-592	J1118	J1120	2,842.58	8.00	130.00	31.46	0.20
411	☐	P-594	J2426	J2230	341.08	8.00	130.00	-71.05	0.45
412	☐	P-595	J1128	J1130	278.00	8.00	130.00	-5.71	0.04
413	☐	P-596	J1128	J1132	30.00	8.00	130.00	-8.99	0.06
414	☐	P-597	J1132	J1134	48.00	8.00	130.00	-9.20	0.06
415	☐	P-598	J1134	J1138	190.97	8.00	130.00	-9.51	0.06
416	☐	P-600	J1138	J1152	20.75	8.00	130.00	-9.65	0.06
417	☐	P-602	J1144	J1146	138.32	8.00	130.00	-8.63	0.06
418	☐	P-603	J1146	J1140	18.13	8.00	130.00	-9.60	0.06
419	☐	P-604	J1140	J1148	286.30	8.00	130.00	-11.93	0.08
420	☐	P-605	J1148	J1150	369.70	8.00	130.00	2.64	0.02
421	☐	P-606	J1152	J1154	203.85	8.00	130.00	-10.78	0.07
422	☐	P-607	J1154	J1150	91.13	8.00	130.00	-12.21	0.08
423	☐	P-609	J1150	J1158	238.59	8.00	130.00	-10.62	0.07
424	☐	P-610	J1158	J1160	341.74	8.00	130.00	-12.38	0.08
425	☐	P-611	J1160	J1164	174.82	8.00	130.00	-33.40	0.21
426	☐	P-612	J1148	J1166	34.38	8.00	130.00	-17.03	0.11
427	☐	P-613	J1166	J1168	133.92	8.00	130.00	-18.11	0.12
428	☐	P-614	J1168	J1160	72.57	8.00	130.00	-19.43	0.12
429	☐	P-615	J1044	J1170	105.10	8.00	130.00	-85.21	0.54
430	☐	P-616	J1170	J1172	405.09	8.00	130.00	-63.06	0.40
431	☐	P-617	J1172	J1192	185.57	8.00	130.00	-66.52	0.42
432	☐	P-618	J1176	J1178	460.39	8.00	130.00	46.62	0.30
433	☐	P-619	J1178	J1180	289.68	8.00	130.00	40.49	0.26
434	☐	P-620	J1180	J1182	88.60	8.00	130.00	36.67	0.23
435	☐	P-621	J1182	J1184	122.87	8.00	130.00	34.89	0.22
436	☐	P-622	J1184	J1186	120.82	8.00	130.00	33.00	0.21
437	☐	P-623	J1170	J1188	183.00	8.00	130.00	-26.22	0.17
438	☐	P-624	J1188	J1190	215.27	8.00	130.00	-28.23	0.18
439	☐	P-625	J1190	J1186	85.74	8.00	130.00	-30.85	0.20
440	☐	P-626	J1192	J1194	43.70	8.00	130.00	1.76	0.01
441	☐	P-628	J444	J1200	658.94	8.00	130.00	0.56	0.00
442	☐	P-629	J1200	J2372	667.51	8.00	130.00	12.50	0.08
443	☐	P-630	J2372	J1204	666.10	8.00	130.00	72.55	0.46
444	☐	P-631	J1204	J634	657.62	8.00	130.00	66.38	0.42
445	☐	P-632	J1200	J620	54.15	8.00	130.00	59.93	0.38
446	☐	P-633	J1200	J616	45.53	8.00	130.00	-73.25	0.47
447	☐	P-634	J624	J2372	31.02	8.00	130.00	-80.14	0.51
448	☐	P-635	J622	J2372	43.09	8.00	130.00	141.66	0.90
449	☐	P-636	J630	J1204	33.17	8.00	130.00	49.03	0.31
450	☐	P-637	J632	J1204	54.54	8.00	130.00	-53.87	0.34
451	☐	P-638	J796	J1370	952.13	12.00	130.00	12.51	0.04
452	☐	P-639	J1210	J1216	237.19	12.00	130.00	-2.50	0.01
453	☐	P-640	J1214	J1216	209.98	8.00	130.00	-1.91	0.01
454	☐	P-641	J1218	J1214	104.80	8.00	130.00	-0.29	0.00
455	☐	P-642	J1220	J1218	161.77	8.00	130.00	1.15	0.01
456	☐	P-643	J1220	J1210	285.43	10.00	130.00	-1.90	0.01
457	☐	P-644	J1222	J1220	108.74	10.00	130.00	-0.21	0.00
458	☐	P-645	J1224	J1234	46.96	10.00	130.00	6.65	0.03
459	☐	P-646	J1226	J1228	260.83	8.00	130.00	15.93	0.10

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
460	☐	P-650	J1244	J2408	234.83	10.00	130.00	25.18	0.10
461	☐	P-651	J2008	J1248	394.13	10.00	130.00	-22.28	0.09
462	☐	P-652	J1246	J1968	133.26	8.00	130.00	81.49	0.52
463	☐	P-653	J1244	J1828	76.64	10.00	130.00	-37.38	0.15
464	☐	P-654	J1252	J1254	210.63	10.00	130.00	-45.72	0.19
465	☐	P-655	J2368	J1052	297.13	10.00	130.00	14.69	0.06
466	☐	P-656	J2430	J1246	510.36	10.00	130.00	169.82	0.69
467	☐	P-657	J1256	J2010	356.36	10.00	130.00	75.81	0.31
468	☐	P-659	J486	J482	25.88	6.00	130.00	-46.69	0.53
469	☐	P-660	J1008	J2374	1,576.88	12.00	130.00	268.40	0.76
470	☐	P-661	J1266	J2216	75.71	12.00	130.00	0.00	0.00
471	☐	P-662	J1268	J1924	1,159.03	12.00	130.00	871.93	2.47
472	☐	P-663	J1272	J1274	234.24	2.00	130.00	5.48	0.56
473	☐	P-664	J866	J1276	163.65	8.00	130.00	4.55	0.03
474	☐	P-666	J1280	J1768	27.94	8.00	130.00	-102.87	0.66
475	☐	P-667	J834	J2260	139.61	8.00	130.00	-2.63	0.02
476	☐	P-668	J1286	J2496	613.37	12.00	130.00	405.01	1.15
477	☐	P-669	J1298	J832	36.39	10.00	130.00	-3.14	0.01
478	☐	P-673	J2422	J1306	21.12	10.00	130.00	128.63	0.53
479	☐	P-674	J2422	J1310	25.77	10.00	130.00	109.59	0.45
480	☐	P-678	J1320	J1064	128.74	8.00	130.00	29.99	0.19
481	☐	P-679	J1322	J1320	72.00	8.00	130.00	30.34	0.19
482	☐	P-680	J1322	J1324	164.36	6.00	130.00	2.96	0.03
483	☐	P-681	J1324	J1326	33.00	6.00	130.00	0.52	0.01
484	☐	P-682	J1068	J1322	267.00	8.00	130.00	34.19	0.22
485	☐	P-690	J1350	J2502	29.84	8.00	130.00	-17.98	0.11
486	☐	P-692	J1266	J1354	330.20	12.00	130.00	-653.05	1.85
487	☐	P-693	J1356	J1358	31.10	12.00	130.00	26.54	0.08
488	☐	P-694	J1354	J1356	1.15	12.00	130.00	-661.30	1.88
489	☐	P-695	J1360	J1364	420.77	12.00	130.00	-579.28	1.64
490	☐	P-696	J1364	J1366	204.37	12.00	130.00	170.28	0.48
491	☐	P-697	J1366	J1844	349.10	12.00	130.00	162.36	0.46
492	☐	P-698	J1368	J1664	203.63	8.00	130.00	125.14	0.80
493	☐	P-699	J1370	J1372	25.23	10.00	130.00	6.52	0.03
494	☐	P-700	J1374	J2364	0.06	10.00	130.00	-0.21	0.00
495	☐	P-701	J2440	J1380	85.55	8.00	130.00	4.78	0.03
496	☐	P-702	V8018	J1382	11.61	8.00	130.00	307.69	1.96
497	☐	P-703	J1386	J1382	31.05	8.00	130.00	-307.69	1.96
498	☐	P-704	J2444	J2498	27.35	8.00	130.00	308.10	1.97
499	☐	P-705	J1392	J1394	125.58	8.00	130.00	32.73	0.21
500	☐	P-706	J1054	J2000	191.66	8.00	130.00	62.69	0.40
501	☐	P-707	J1396	J1996	226.82	12.00	130.00	-14.55	0.04
502	☐	P-710	J1402	J1404	169.50	8.00	130.00	78.23	0.50
503	☐	P-711	J1404	J1176	117.54	8.00	130.00	52.12	0.33
504	☐	P-712	J1996	J1404	172.47	8.00	130.00	-23.79	0.15
505	☐	P-716	J988	J982	334.77	8.00	130.00	11.42	0.07
506	☐	P-718	J904	J676	493.28	6.00	130.00	-104.60	1.19
507	☐	P-721	J998	J1424	50.69	6.00	130.00	0.58	0.01
508	☐	P-723	J1448	J2492	277.77	8.00	130.00	-0.64	0.00
509	☐	P-726	J1442	J1436	53.73	8.00	130.00	-2.13	0.01
510	☐	P-728	J1450	J2492	641.76	8.00	130.00	5.53	0.04

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
511	☐	P-730	J1450	J1452	151.34	8.00	130.00	1.63	0.01
512	☐	P-731	J1458	J1456	86.96	12.00	130.00	-274.29	0.78
513	☐	P-732	J1458	J1460	170.51	8.00	130.00	75.15	0.48
514	☐	P-733	J1460	J1494	199.45	12.00	130.00	47.23	0.13
515	☐	P-734	J1462	J1464	243.53	12.00	130.00	35.79	0.10
516	☐	P-735	J1464	J1466	157.53	12.00	130.00	23.60	0.07
517	☐	P-736	J1464	J1468	174.06	12.00	130.00	6.11	0.02
518	☐	P-737	J1468	J1470	212.08	12.00	130.00	9.71	0.03
519	☐	P-738	J1472	J1470	0.43	8.00	130.00	-2.23	0.01
520	☐	P-739	J1474	J1476	428.31	8.00	130.00	-3.05	0.02
521	☐	P-740	J1476	J1478	221.56	8.00	130.00	-6.59	0.04
522	☐	P-741	J1478	J1480	421.22	8.00	130.00	-9.69	0.06
523	☐	P-742	J1480	J1460	181.66	8.00	130.00	-22.52	0.14
524	☐	P-743	J1480	J1482	359.12	8.00	130.00	10.10	0.06
525	☐	P-744	J1482	J1468	308.38	8.00	130.00	5.59	0.04
526	☐	P-745	J1482	J1484	191.01	4.00	130.00	3.04	0.08
527	☐	P-747	J1490	J1492	649.14	10.00	130.00	-193.43	0.79
528	☐	P-748	J1492	J1458	56.72	10.00	130.00	-199.14	0.81
529	☐	P-750	J1498	J1502	783.13	10.00	130.00	70.98	0.29
530	☐	P-751	J1502	J1504	335.33	10.00	130.00	-38.76	0.16
531	☐	P-752	J1504	J1512	554.43	8.00	130.00	-46.50	0.30
532	☐	P-753	J832	J1498	138.28	10.00	130.00	65.40	0.27
533	☐	P-754	J1508	J1506	155.75	10.00	130.00	-129.83	0.53
534	☐	P-755	J1510	J1512	39.49	8.00	130.00	-4.18	0.03
535	☐	P-756	J1456	J1514	901.50	12.00	130.00	-274.29	0.78
536	☐	P-757	J1514	J1516	758.12	12.00	130.00	0.00	0.00
537	☐	P-758	J1514	J1518	164.05	8.00	130.00	-274.29	1.75
538	☐	P-759	J1518	J1520	247.76	8.00	130.00	-119.35	0.76
539	☐	P-760	J1518	J1522	386.27	8.00	130.00	-159.91	1.02
540	☐	P-761	J1522	J1524	123.48	8.00	130.00	0.00	0.00
541	☐	P-762	J1520	J1526	159.05	6.00	130.00	3.89	0.04
542	☐	P-763	J1528	J1530	166.52	6.00	130.00	2.57	0.03
543	☐	P-764	J1532	J1528	184.56	8.00	130.00	130.25	0.83
544	☐	P-765	J1528	J1520	251.84	8.00	130.00	125.60	0.80
545	☐	P-766	J1532	J1534	569.33	8.00	130.00	-136.64	0.87
546	☐	P-767	J1534	J1536	165.38	8.00	130.00	-139.19	0.89
547	☐	P-768	J1536	J1538	141.73	8.00	130.00	-142.83	0.91
548	☐	P-769	J1538	J1570	269.65	8.00	130.00	-143.94	0.92
549	☐	P-770	J1540	J1542	313.26	8.00	130.00	162.99	1.04
550	☐	P-771	J1542	J1522	480.37	8.00	130.00	159.91	1.02
551	☐	P-774	J326	J94	16.04	8.00	130.00	190.34	1.21
552	☐	P-775	J1546	J96	42.25	8.00	130.00	191.21	1.22
553	☐	P-776	J1546	J1550	344.37	8.00	130.00	2.38	0.02
554	☐	P-777	J1552	J1554	191.02	8.00	130.00	-0.85	0.01
555	☐	P-778	J1554	J1556	168.23	8.00	130.00	6.01	0.04
556	☐	P-779	J1558	J1554	155.34	8.00	130.00	8.64	0.06
557	☐	P-780	J1558	J1560	26.92	8.00	130.00	-9.65	0.06
558	☐	P-781	J1560	J1562	258.46	8.00	130.00	-10.40	0.07
559	☐	P-782	J1562	J1556	361.15	8.00	130.00	11.76	0.08
560	☐	P-783	J1564	J1562	864.55	8.00	130.00	23.60	0.15
561	☐	P-784	J102	J2414	322.91	8.00	130.00	0.00	0.00

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
562	☐	P-785	J1570	J1572	134.90	8.00	130.00	-308.86	1.97
563	☐	P-786	J1574	J1576	748.14	8.00	130.00	30.94	0.20
564	☐	P-788	J1582	J1576	904.13	8.00	130.00	-50.88	0.32
565	☐	P-789	J1576	J1578	175.16	8.00	130.00	-26.74	0.17
566	☐	P-790	J1574	J1584	167.35	8.00	130.00	-65.73	0.42
567	☐	P-791	J1584	J2424	165.76	10.00	130.00	-227.68	0.93
568	☐	P-792	J796	J1328	847.89	10.00	130.00	-202.28	0.83
569	☐	P-793	J1582	J2376	367.59	10.00	130.00	-159.78	0.65
570	☐	P-794	J696	J1592	274.41	10.00	130.00	5.75	0.02
571	☐	P-795	J1590	J1592	1,004.69	12.00	130.00	-1.28	0.00
572	☐	P-796	J698	J1594	368.67	12.00	130.00	-72.09	0.20
573	☐	P-797	J1596	J1598	299.88	12.00	130.00	0.52	0.00
574	☐	P-798	J1596	J1600	201.53	6.00	130.00	-75.07	0.85
575	☐	P-799	J1594	J1596	267.23	6.00	130.00	-73.48	0.83
576	☐	P-800	J1602	J1604	148.03	8.00	130.00	-115.17	0.74
577	☐	P-801	J1604	J1076	1,339.95	8.00	130.00	1.45	0.01
578	☐	P-802	J2438	J1602	45.02	8.00	130.00	-114.18	0.73
579	☐	P-803	J1604	J1608	67.11	8.00	130.00	-118.54	0.76
580	☐	P-804	J1610	J1612	340.20	8.00	130.00	6.85	0.04
581	☐	P-805	J1614	J2382	274.57	8.00	130.00	23.91	0.15
582	☐	P-806	J1618	J1620	157.02	8.00	130.00	-4.36	0.03
583	☐	P-807	J1622	J2446	488.33	12.00	130.00	-786.04	2.23
584	☐	P-808	J1626	J1638	935.68	8.00	130.00	-12.81	0.08
585	☐	P-810	J1634	J1662	10.16	12.00	130.00	838.72	2.38
586	☐	P-811	J1626	J1638	629.70	8.00	130.00	-15.86	0.10
587	☐	P-812	J2448	V8026	51.18	8.00	130.00	0.00	0.00
588	☐	P-813	J1644	J1358	706.16	8.00	130.00	-10.90	0.07
589	☐	P-814	J1646	J1648	348.32	12.00	130.00	-1.81	0.01
590	☐	P-815	V8022	J1650	41.97	8.00	130.00	0.00	0.00
591	☐	P-816	J1654	J1656	33.81	8.00	130.00	5.01	0.03
592	☐	P-818	J1660	J1662	28.88	8.00	130.00	-41.58	0.27
593	☐	P-819	J1664	J1666	168.31	4.00	130.00	8.09	0.21
594	☐	P-820	J1666	J1668	68.93	4.00	130.00	6.19	0.16
595	☐	P-821	J1670	J1672	191.32	4.00	130.00	26.60	0.68
596	☐	P-822	J2418	J1670	87.45	10.00	130.00	28.48	0.12
597	☐	P-823	J646	J1680	170.28	8.00	130.00	150.07	0.96
598	☐	P-824	J1116	J1678	361.95	8.00	130.00	-291.37	1.86
599	☐	P-825	J1678	J1978	34.31	8.00	130.00	-297.24	1.90
600	☐	P-826	J1678	J1682	51.57	8.00	130.00	5.25	0.03
601	☐	P-828	J48	J1686	201.12	8.00	130.00	-86.35	0.55
602	☐	P-829	J1364	J1622	1,374.78	12.00	130.00	-780.05	2.21
603	☐	P-832	J2432	J1700	192.93	8.00	130.00	27.20	0.17
604	☐	P-833	J1700	J1702	419.97	8.00	130.00	16.30	0.10
605	☐	P-834	J1704	J1706	307.72	8.00	130.00	14.83	0.09
606	☐	P-836	J1396	J1734	720.50	8.00	130.00	61.48	0.39
607	☐	P-837	J1714	J1716	678.72	10.00	130.00	7.14	0.03
608	☐	P-838	J1718	J1724	587.85	10.00	130.00	13.44	0.05
609	☐	P-839	J1722	J1726	292.60	10.00	130.00	-2.73	0.01
610	☐	P-840	J1726	J1728	413.10	10.00	130.00	2.29	0.01
611	☐	P-841	J1728	J1730	304.17	10.00	130.00	-1.99	0.01
612	☐	P-842	J1720	J1716	355.31	10.00	130.00	-4.79	0.02

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
613	☐	P-847	J1728	J1750	114.02	10.00	130.00	1.24	0.01
614	☐	P-848	J1720	J1752	304.07	10.00	130.00	0.00	0.00
615	☐	P-849	J1754	J1924	38.24	10.00	130.00	-52.77	0.22
616	☐	P-852	J1760	J870	21.08	10.00	130.00	-2.44	0.01
617	☐	P-853	J1612	J1762	219.94	8.00	130.00	2.01	0.01
618	☐	P-854	J1612	J1764	23.40	8.00	130.00	3.70	0.02
619	☐	P-856	J866	J1768	591.57	10.00	130.00	112.26	0.46
620	☐	P-857	J1286	J1284	158.15	12.00	130.00	-91.54	0.26
621	☐	P-858	J892	J878	24.24	8.00	130.00	-320.03	2.04
622	☐	P-861	J898	J880	78.42	8.00	130.00	-152.74	0.97
623	☐	P-863	J1782	J1784	111.98	8.00	130.00	2.15	0.01
624	☐	P-864	J1786	J1788	293.07	8.00	130.00	6.91	0.04
625	☐	P-865	J1790	J2420	168.53	8.00	130.00	27.59	0.18
626	☐	P-866	J1794	J1648	40.98	8.00	130.00	-3.72	0.02
627	☐	P-867	J1798	J1800	330.88	6.00	130.00	1.59	0.02
628	☐	P-868	J578	J1802	86.71	6.00	130.00	3.68	0.04
629	☐	P-869	J1804	J1806	386.32	8.00	130.00	1.90	0.01
630	☐	P-870	J1804	J1806	353.83	8.00	130.00	1.99	0.01
631	☐	P-871	J1372	J1804	77.56	8.00	130.00	6.27	0.04
632	☐	P-872	J1808	J1816	257.68	8.00	130.00	12.34	0.08
633	☐	P-873	J1394	J1812	101.29	8.00	130.00	30.97	0.20
634	☐	P-874	J1812	J1810	257.09	8.00	130.00	15.61	0.10
635	☐	P-875	J1814	J1808	314.73	10.00	130.00	10.78	0.04
636	☐	P-879	J1826	J1226	355.29	8.00	130.00	19.87	0.13
637	☐	P-880	J1828	J1830	46.09	10.00	130.00	0.72	0.00
638	☐	P-881	J1832	J2198	203.70	10.00	130.00	14.60	0.06
639	☐	P-882	J1834	J1836	48.28	8.00	130.00	28.28	0.18
640	☐	P-883	J1838	J1840	668.63	10.00	130.00	-15.16	0.06
641	☐	P-884	J1842	J1016	81.85	8.00	130.00	20.52	0.13
642	☐	P-885	J1844	J1846	206.32	4.00	130.00	14.60	0.37
643	☐	P-886	J1848	J1850	217.87	4.00	130.00	-7.61	0.19
644	☐	P-887	J1852	J1626	212.75	8.00	130.00	-12.72	0.08
645	☐	P-889	J1858	J1860	29.01	8.00	130.00	0.00	0.00
646	☐	P-890	J1862	J1864	22.64	4.00	130.00	0.00	0.00
647	☐	P-891	J1268	J1866	34.88	4.00	130.00	18.66	0.48
648	☐	P-892	J1572	J2388	367.25	8.00	130.00	-308.86	1.97
649	☐	P-893	J1870	J2406	255.99	10.00	130.00	533.88	2.18
650	☐	P-894	J1874	J1878	461.36	8.00	130.00	36.01	0.23
651	☐	P-896	J1882	J1884	662.21	8.00	130.00	55.17	0.35
652	☐	P-897	J1886	J1872	14.27	10.00	130.00	188.90	0.77
653	☐	P-898	J1890	J1892	568.01	10.00	130.00	127.32	0.52
654	☐	P-899	J1886	J1896	269.37	10.00	130.00	-179.61	0.73
655	☐	P-900	J1896	J1898	348.56	8.00	130.00	8.89	0.06
656	☐	P-901	J2442	J1902	167.55	8.00	130.00	12.93	0.08
657	☐	P-902	J1904	J1906	183.26	8.00	130.00	5.85	0.04
658	☐	P-903	J1908	J1912	225.88	8.00	130.00	-13.28	0.08
659	☐	P-904	J1912	J2012	485.14	8.00	130.00	-21.74	0.14
660	☐	P-905	J2388	J2406	397.20	8.00	130.00	-122.88	0.78
661	☐	P-906	J1920	J2390	71.48	8.00	130.00	-23.93	0.15
662	☐	P-907	J1924	J1870	810.55	12.00	130.00	790.28	2.24
663	☐	P-911	J1934	J610	388.09	6.00	130.00	-17.56	0.20

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
664	☐	P-912	J446	J1936	492.06	12.00	130.00	6.89	0.02
665	☐	P-913	J1938	J1940	223.19	12.00	130.00	-3.83	0.01
666	☐	P-914	J1942	J1946	879.20	8.00	130.00	732.32	4.67
667	☐	P-916	J1950	V8002	17.48	6.00	130.00	0.00	0.00
668	☐	P-917	J1954	J1956	116.30	6.00	130.00	5.94	0.07
669	☐	P-922	J1080	J1974	353.72	6.00	130.00	4.86	0.06
670	☐	P-923	J1976	J1978	477.56	8.00	130.00	152.53	0.97
671	☐	P-925	J734	J1986	149.85	8.00	130.00	36.22	0.23
672	☐	P-927	J1990	J2392	177.96	8.00	130.00	16.63	0.11
673	☐	P-928	J1870	J2390	285.34	8.00	130.00	41.33	0.26
674	☐	P-929	J1996	J1998	403.60	8.00	130.00	6.74	0.04
675	☐	P-931	J2430	J2006	307.76	6.00	130.00	6.58	0.07
676	☐	P-932	J2008	J2010	671.32	8.00	130.00	-55.54	0.35
677	☐	P-933	J2012	J2014	20.90	8.00	130.00	4.16	0.03
678	☐	P-934	J1886	J2016	688.09	8.00	130.00	-17.42	0.11
679	☐	P-936	J2022	J1120	76.03	8.00	130.00	-13.38	0.09
680	☐	P-937	J2022	J2484	197.58	8.00	130.00	12.89	0.08
681	☐	P-938	J744	J2028	114.45	8.00	130.00	-14.64	0.09
682	☐	P-939	J2028	J2308	1,280.24	8.00	130.00	-9.58	0.06
683	☐	P-940	J2032	J2038	686.56	8.00	130.00	19.87	0.13
684	☐	P-941	J2034	J2036	64.03	8.00	130.00	0.19	0.00
685	☐	P-942	J2038	J774	206.59	10.00	130.00	54.55	0.22
686	☐	P-943	J2414	J2394	834.73	8.00	130.00	-2.23	0.01
687	☐	P-944	J2044	J2394	0.02	8.00	130.00	-2.50	0.02
688	☐	P-945	J1568	J2416	202.42	8.00	130.00	-9.77	0.06
689	☐	P-946	J2050	J2052	253.64	8.00	130.00	0.00	0.00
690	☐	P-947	J2054	J2056	1,784.84	6.00	130.00	1.34	0.02
691	☐	P-949	J2062	J2064	142.91	8.00	130.00	14.42	0.09
692	☐	P-951	J2070	J2072	42.05	8.00	130.00	-53.87	0.34
693	☐	P-953	J2068	J2070	170.05	8.00	130.00	-51.37	0.33
694	☐	P-954	J484	J2352	28.32	6.00	130.00	-75.98	0.86
695	☐	P-955	J212	J142	7.25	6.00	130.00	-19.50	0.22
696	☐	P-956	J2082	J2084	139.54	6.00	130.00	5.56	0.06
697	☐	P-957	J254	J2378	1,028.58	8.00	130.00	-159.03	1.02
698	☐	P-959	J1306	J2092	1,311.00	10.00	130.00	113.32	0.46
699	☐	P-960	J2092	J2094	110.37	8.00	130.00	16.51	0.11
700	☐	P-961	J2096	J2396	1,529.37	6.00	130.00	37.53	0.43
701	☐	P-962	J2100	J2396	75.35	10.00	130.00	-26.56	0.11
702	☐	P-963	J2102	J1600	305.83	6.00	130.00	78.07	0.89
703	☐	P-964	J40	J2104	10,365.41	12.00	110.00	-350.00	0.99
704	☐	P-965	J1608	J2108	740.61	8.00	130.00	-122.16	0.78
705	☐	P-966	J2108	J2110	656.37	10.00	130.00	3.43	0.01
706	☐	P-967	J1310	J2162	349.24	10.00	130.00	105.19	0.43
707	☐	P-968	J2114	J2398	708.85	10.00	130.00	26.34	0.11
708	☐	P-970	J2122	J2126	43.30	10.00	130.00	-21.83	0.09
709	☐	P-971	J2126	J2130	496.13	10.00	130.00	-29.78	0.12
710	☐	P-973	J2106	J2134	493.39	8.00	130.00	-130.80	0.83
711	☐	P-974	J2136	J2138	111.18	8.00	130.00	0.00	0.00
712	☐	P-975	J1500	J2524	761.14	12.00	130.00	89.80	0.25
713	☐	P-976	J2142	J2158	358.80	8.00	130.00	20.21	0.13
714	☐	P-977	J2146	J2148	36.18	8.00	130.00	12.37	0.08

		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
715	☐	P-978	J2150	J2152	11.73	8.00	130.00	0.56	0.00
716	☐	P-979	J2154	J2156	31.36	8.00	130.00	0.85	0.01
717	☐	P-980	J2158	J2160	100.54	8.00	130.00	2.98	0.02
718	☐	P-990	J2198	J2200	361.67	8.00	130.00	6.19	0.04
719	☐	P-992	J2202	J2206	203.29	8.00	130.00	-5.15	0.03
720	☐	P-993	J2206	J2208	87.31	8.00	130.00	5.05	0.03
721	☐	P-994	J2206	J2210	40.61	8.00	130.00	4.16	0.03
722	☐	P-995	J2212	J2214	484.96	6.00	130.00	31.13	0.35
723	☐	P-996	J920	J18	40.98	6.00	130.00	-97.01	1.10
724	☐	P-997	J930	J928	47.08	6.00	130.00	34.64	0.39
725	☐	P-998	J914	J958	77.33	6.00	130.00	22.30	0.25
726	☐	P-999	J2216	J2220	68.30	8.00	130.00	-908.66	5.80
727	☐	P1001	J2510	J2488	2.24	12.00	130.00	0.00	0.00
728	☐	P1003	J2510	J2508	11.82	12.00	130.00	-219.35	0.62
729	☐	P1005	J2478	J258	16.54	12.00	130.00	0.00	0.00
730	☐	P1007	J2508	V8052	1.23	12.00	130.00	0.00	0.00
731	☐	P1009	V8052	J258	1.56	12.00	130.00	0.00	0.00
732	☐	P101	J1940	J1826	2.56	8.00	130.00	-1.78	0.01
733	☐	P1011	J2512	J46	1,371.19	12.00	130.00	-428.64	1.22
734	☐	P1013	J2514	J52	379.69	6.00	130.00	-1.59	0.02
735	☐	P1015	J2516	J1798	32.32	6.00	130.00	17.36	0.20
736	☐	P103	J464	J76	33.69	6.00	130.00	-31.15	0.35
737	☐	P1031	J2522	J152	530.57	6.00	130.00	-18.47	0.21
738	☐	P1039	J644	J514	312.79	8.00	130.00	-120.61	0.77
739	☐	P1041	J610	J432	661.01	10.00	130.00	-17.64	0.07
740	☐	P1045	J2524	J2142	208.24	12.00	130.00	89.80	0.25
741	☐	P1047	J1280	J836	331.91	8.00	130.00	9.21	0.06
742	☐	P1049	J836	J2260	159.13	8.00	130.00	6.43	0.04
743	☐	P105	J1944	J472	63.35	10.00	130.00	469.05	1.92
744	☐	P1051	J2526	J2128	325.13	10.00	130.00	91.37	0.37
745	☐	P107	J1942	J474	2,385.64	12.00	130.00	-1,939.05	5.50
746	☐	P109	J1950	J1942	15.52	12.00	130.00	-1,203.67	3.41
747	☐	P111	V8004	J1952	6.57	12.00	130.00	1,203.67	3.41
748	☐	P1129	J2592	J504	26.39	8.00	130.00	74.60	0.48
749	☐	P1131	J2592	J2594	48.75	6.00	130.00	163.98	1.86
750	☐	P1133	J2594	J652	469.78	8.00	130.00	163.98	1.05
751	☐	P1135	J586	J2650	309.05	8.00	130.00	183.72	1.17
752	☐	P1141	J1246	J1256	363.25	10.00	130.00	85.54	0.35
753	☐	P1147	J2008	J1262	333.76	10.00	130.00	59.95	0.24
754	☐	P1157	J670	J510	162.53	8.00	130.00	-141.63	0.90
755	☐	P1159	J2264	J2600	304.35	8.00	130.00	4.59	0.03
756	☐	P1161	J2600	J2608	247.33	8.00	130.00	4.59	0.03
757	☐	P1163	J2608	J2606	343.72	8.00	130.00	0.92	0.01
758	☐	P1165	J2608	J2610	162.34	8.00	130.00	2.75	0.02
759	☐	P1167	J2610	J2612	376.09	8.00	130.00	0.92	0.01
760	☐	P1169	J2610	J2614	173.72	8.00	130.00	0.92	0.01
761	☐	P1171	J2600	J2616	186.11	8.00	130.00	0.00	0.00
762	☐	P1173	J1842	J2620	126.90	8.00	130.00	189.50	1.21
763	☐	P1175	J2618	J2622	174.50	8.00	130.00	-55.69	0.36
764	☐	P1177	J2622	J2620	177.08	8.00	130.00	-113.38	0.72
765	☐	P1179	J2620	J2628	885.45	8.00	130.00	73.11	0.47

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
766	☐	P1181	J2622	J2626	883.12	8.00	130.00	54.69	0.35
767	☐	P1183	J2618	J2624	888.77	8.00	130.00	52.69	0.34
768	☐	P1185	J804	J2624	131.12	8.00	130.00	-55.44	0.35
769	☐	P1187	J2624	J2626	187.52	8.00	130.00	-44.26	0.28
770	☐	P1189	J2626	J2628	192.73	8.00	130.00	-26.53	0.17
771	☐	P1191	J2628	J2644	411.99	8.00	130.00	43.58	0.28
772	☐	P1193	J2644	J2642	268.85	8.00	130.00	26.38	0.17
773	☐	P1199	J2634	J2632	169.59	8.00	130.00	25.57	0.16
774	☐	P1201	J2642	J2634	213.56	8.00	130.00	20.67	0.13
775	☐	P1203	J2632	J2630	208.33	8.00	130.00	56.54	0.36
776	☐	P1205	J2634	J2636	735.41	8.00	130.00	-7.91	0.05
777	☐	P1207	J2642	J2638	731.94	8.00	130.00	2.71	0.02
778	☐	P1209	J2644	J2640	719.55	8.00	130.00	14.20	0.09
779	☐	P1211	J2636	J2638	236.98	8.00	130.00	-10.91	0.07
780	☐	P1213	J2638	J2640	250.05	8.00	130.00	-11.20	0.07
781	☐	P1215	J2630	J2624	883.68	8.00	130.00	-38.50	0.25
782	☐	P1217	J2632	J2626	885.60	8.00	130.00	-33.96	0.22
783	☐	P1219	J2646	J84	765.51	8.00	130.00	223.19	1.42
784	☐	P1221	J2630	J2646	109.42	8.00	130.00	92.04	0.59
785	☐	P1225	J2650	J644	210.09	8.00	130.00	177.51	1.13
786	☐	P1227	J2650	J2652	381.65	2.00	130.00	3.10	0.32
787	☐	P1229	PW_WELL_ONE	PW_WELL_1	64.45	6.00	130.00	600.00	6.81
788	☐	P1231	PW_WELL_1	J36	74.03	8.00	130.00	600.00	3.83
789	☐	P129	J526	J614	8.74	10.00	130.00	111.37	0.45
790	☐	P131	J1106	J2314	574.15	8.00	130.00	-35.45	0.23
791	☐	P133	J92	J614	12.03	6.00	130.00	-108.99	1.24
792	☐	P137	J654	J2370	209.20	8.00	130.00	-277.36	1.77
793	☐	P139	J1976	J646	196.84	8.00	130.00	152.25	0.97
794	☐	P143	J2102	J660	9.32	6.00	130.00	-190.89	2.17
795	☐	P145	J1814	J758	268.25	8.00	130.00	-55.30	0.35
796	☐	P15	J1100	J40	2,941.46	12.00	110.00	-350.00	0.99
797	☐	P153	J1392	J772	163.62	8.00	130.00	23.66	0.15
798	☐	P155	J752	J782	18.38	8.00	130.00	1.77	0.01
799	☐	P157	J782	J780	176.11	8.00	130.00	-1.40	0.01
800	☐	P159	J2300	J770	222.01	8.00	130.00	-26.33	0.17
801	☐	P161	J710	J772	47.97	6.00	130.00	-21.26	0.24
802	☐	P163	J2030	J796	589.54	10.00	130.00	-189.76	0.78
803	☐	P165	J1020	J1842	177.57	12.00	130.00	595.18	1.69
804	☐	P167	J1030	J1020	1,598.36	12.00	130.00	600.00	1.70
805	☐	P169	J1842	J800	501.18	12.00	130.00	384.60	1.09
806	☐	P17	J1428	J1962	421.46	10.00	130.00	-68.64	0.28
807	☐	P171	J2238	J2306	322.47	10.00	130.00	59.49	0.24
808	☐	P173	J2240	J2304	501.90	10.00	130.00	103.23	0.42
809	☐	P175	J2304	J2238	304.12	10.00	130.00	67.97	0.28
810	☐	P179	J800	J2228	302.39	10.00	130.00	127.40	0.52
811	☐	P181	J1164	J1614	282.05	10.00	130.00	24.37	0.10
812	☐	P183	J1614	J2052	93.79	10.00	130.00	0.25	0.00
813	☐	P185	J2052	J816	218.00	10.00	130.00	0.00	0.00
814	☐	P187	J2228	J1164	894.41	10.00	130.00	62.28	0.25
815	☐	P189	J1416	J934	350.42	12.00	130.00	-24.70	0.07
816	☐	P19	J1432	J1428	44.02	10.00	130.00	-63.55	0.26

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
817	☐	P191	J1300	J1790	132.70	10.00	130.00	134.45	0.55
818	☐	P193	J1786	J2422	524.08	10.00	130.00	380.02	1.55
819	☐	P195	J1790	J2418	16.97	10.00	130.00	106.71	0.44
820	☐	P197	J30	J852	21.06	6.00	130.00	119.44	1.36
821	☐	P199	J898	J856	338.93	8.00	130.00	-56.84	0.36
822	☐	P201	J1774	J898	309.05	8.00	130.00	-205.35	1.31
823	☐	P203	J1272	J860	102.53	8.00	130.00	136.28	0.87
824	☐	P205	J1610	J864	400.55	8.00	130.00	169.83	1.08
825	☐	P207	J2252	J1610	114.15	8.00	130.00	186.05	1.19
826	☐	P209	J1316	J878	73.47	8.00	130.00	124.15	0.79
827	☐	P21	J64	J54	194.19	10.00	130.00	300.00	1.23
828	☐	P211	J934	J912	660.98	8.00	130.00	20.68	0.13
829	☐	P213	J948	J920	657.76	8.00	130.00	-76.48	0.49
830	☐	P215	J924	J22	243.17	6.00	130.00	15.53	0.18
831	☐	P217	J818	J824	228.28	8.00	130.00	-5.59	0.04
832	☐	P219	J918	J948	0.02	8.00	130.00	-36.75	0.23
833	☐	P221	J1780	J926	86.55	8.00	130.00	62.88	0.40
834	☐	P223	J926	J956	15.35	8.00	130.00	164.37	1.05
835	☐	P225	J842	J944	103.92	6.00	130.00	33.56	0.38
836	☐	P227	J206	J2324	289.56	16.00	130.00	-2,314.80	3.69
837	☐	P23	J70	J74	302.16	10.00	130.00	300.00	1.23
838	☐	P231	J1564	J2212	4,363.53	12.00	130.00	360.95	1.02
839	☐	P233	J2212	J1008	1,589.82	12.00	130.00	306.54	0.87
840	☐	P235	J1048	J2512	1,125.87	12.00	130.00	-428.64	1.22
841	☐	P237	J1032	J2312	68.87	12.00	130.00	0.00	0.00
842	☐	P239	J1958	J2204	186.61	10.00	130.00	-68.64	0.28
843	☐	P241	J1962	J1958	101.81	10.00	130.00	-68.64	0.28
844	☐	P243	J2204	J1044	480.80	10.00	130.00	-84.32	0.34
845	☐	P245	J1050	J1058	76.98	8.00	130.00	11.05	0.07
846	☐	P247	J1058	J1056	166.37	8.00	130.00	8.87	0.06
847	☐	P249	J1088	J2110	456.71	8.00	130.00	-112.27	0.72
848	☐	P251	J2110	J1092	122.06	8.00	130.00	-113.00	0.72
849	☐	P253	J2134	J1100	295.27	8.00	130.00	-247.88	1.58
850	☐	P255	J522	J530	670.12	8.00	130.00	186.85	1.19
851	☐	P257	J530	J592	654.94	8.00	130.00	175.69	1.12
852	☐	P259	J1114	J1112	0.00	10.00	130.00	0.00	0.00
853	☐	P261	J2230	J1128	138.23	8.00	130.00	-13.54	0.09
854	☐	P263	J1152	J1140	345.92	8.00	130.00	-0.38	0.00
855	☐	P265	J1130	J1144	71.38	8.00	130.00	-7.24	0.05
856	☐	P267	J1192	J1174	370.08	8.00	130.00	-71.59	0.46
857	☐	P271	J1216	J1370	486.76	12.00	130.00	-5.81	0.02
858	☐	P273	J1234	J1226	738.84	10.00	130.00	2.02	0.01
859	☐	P277	J1248	J1954	254.46	10.00	130.00	-2.85	0.01
860	☐	P279	J1954	J1244	208.91	10.00	130.00	-10.77	0.04
861	☐	P281	J1254	J1248	1,190.90	8.00	130.00	25.72	0.16
862	☐	P283	J1968	J1254	308.08	8.00	130.00	77.87	0.50
863	☐	P285	J1252	J1250	139.73	10.00	130.00	3.33	0.01
864	☐	P287	J1828	J1252	1,206.41	10.00	130.00	-39.90	0.16
865	☐	P289	J264	J1970	250.13	10.00	130.00	17.27	0.07
866	☐	P29	J2224	J86	345.57	8.00	130.00	78.86	0.50
867	☐	P291	J1834	J1262	644.97	10.00	130.00	-23.57	0.10

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
868	☐	P293	J1838	J1834	400.79	10.00	130.00	12.24	0.05
869	☐	P295	J1970	J1838	399.82	10.00	130.00	10.26	0.04
870	☐	P297	J482	J2082	519.31	6.00	130.00	17.31	0.20
871	☐	P301	J2216	J1268	1,222.63	12.00	130.00	908.66	2.58
872	☐	P303	J1768	J1282	315.42	8.00	130.00	8.25	0.05
873	☐	P305	J1280	J1284	14.22	8.00	130.00	92.78	0.59
874	☐	P309	J832	J1292	43.56	10.00	130.00	8.73	0.04
875	☐	P31	J84	J2224	1,000.63	8.00	130.00	97.06	0.62
876	☐	P313	J1356	J1386	37.55	12.00	130.00	-687.90	1.95
877	☐	P315	V8020	J1386	14.89	12.00	130.00	380.21	1.08
878	☐	P319	J1844	J1368	218.09	12.00	130.00	144.77	0.41
879	☐	P321	J1664	J1360	727.58	8.00	130.00	115.32	0.74
880	☐	P323	J1406	J1396	384.74	8.00	130.00	53.28	0.34
881	☐	P325	J2000	J1406	523.05	8.00	130.00	59.53	0.38
882	☐	P329	J1174	J1402	84.23	8.00	130.00	81.29	0.52
883	☐	P33	J2478	J2508	16.93	12.00	130.00	219.35	0.62
884	☐	P335	J1494	J1462	216.36	12.00	130.00	42.02	0.12
885	☐	P337	J1470	J1474	210.45	8.00	130.00	4.54	0.03
886	☐	P339	J1502	J1500	182.60	10.00	130.00	104.46	0.43
887	☐	P341	J1512	J1506	234.74	8.00	130.00	-52.83	0.34
888	☐	P343	J1498	J1508	179.07	10.00	130.00	-8.43	0.03
889	☐	P345	J1506	J1490	184.58	10.00	130.00	-186.65	0.76
890	☐	P347	J1570	J1540	124.59	8.00	130.00	163.94	1.05
891	☐	P349	J94	J1546	290.30	8.00	130.00	197.06	1.26
892	☐	P35	J468	J2510	1,246.35	12.00	130.00	-219.35	0.62
893	☐	P353	J1578	J1574	634.49	8.00	130.00	-30.40	0.19
894	☐	P355	J1328	J1582	454.35	10.00	130.00	-202.28	0.83
895	☐	P357	J1590	J1588	108.57	10.00	130.00	0.79	0.00
896	☐	P359	J1592	J1590	273.79	10.00	130.00	1.60	0.01
897	☐	P361	J1620	J2382	847.40	8.00	130.00	-7.58	0.05
898	☐	P363	J1638	J1654	367.28	8.00	130.00	-36.39	0.23
899	☐	P365	J1654	J2500	283.97	8.00	130.00	-41.58	0.27
900	☐	P367	J1368	J1850	232.78	8.00	130.00	14.65	0.09
901	☐	P369	J1644	J1650	42.57	8.00	130.00	0.00	0.00
902	☐	P37	J2136	J126	23.64	8.00	130.00	144.74	0.92
903	☐	P371	V8024	J1650	18.63	8.00	130.00	0.00	0.00
904	☐	P373	J1652	J2482	112.02	8.00	130.00	0.00	0.00
905	☐	P375	J1850	J1632	268.77	8.00	130.00	4.61	0.03
906	☐	P377	J1858	J2466	301.48	8.00	130.00	0.00	0.00
907	☐	P379	J1862	J1858	118.07	8.00	130.00	0.00	0.00
908	☐	P381	J1662	J1854	1,256.71	12.00	130.00	797.14	2.26
909	☐	P383	J1854	J2450	133.87	12.00	130.00	797.14	2.26
910	☐	P387	J1978	J1680	126.39	8.00	130.00	-145.73	0.93
911	☐	P389	J1700	J1698	123.20	8.00	130.00	8.65	0.06
912	☐	P39	J476	J152	1,316.15	6.00	130.00	31.13	0.35
913	☐	P391	J1714	J1712	606.90	10.00	130.00	8.07	0.03
914	☐	P393	J1718	J1714	165.31	10.00	130.00	19.89	0.08
915	☐	P395	J1734	J1742	1,010.40	10.00	130.00	52.34	0.21
916	☐	P397	J1742	J1746	300.26	10.00	130.00	37.92	0.15
917	☐	P399	J1746	J1718	211.77	10.00	130.00	35.27	0.14
918	☐	P401	J1724	J1730	474.57	10.00	130.00	2.73	0.01

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
919	☐	P403	J1730	J1720	151.51	10.00	130.00	-2.76	0.01
920	☐	P405	J1726	J1724	62.71	10.00	130.00	-6.88	0.03
921	☐	P409	J878	J854	0.02	8.00	130.00	-196.47	1.25
922	☐	P41	J1118	J134	30.68	12.00	130.00	-166.69	0.47
923	☐	P411	J1646	J1792	33.46	8.00	130.00	12.39	0.08
924	☐	P413	J1648	J2420	656.54	8.00	130.00	-9.48	0.06
925	☐	P415	J1816	J1822	258.64	8.00	130.00	-1.66	0.01
926	☐	P417	J1822	J1810	174.20	8.00	130.00	-12.22	0.08
927	☐	P419	J1812	J1808	433.71	8.00	130.00	10.42	0.07
928	☐	P421	J1840	J1262	415.52	10.00	130.00	-17.15	0.07
929	☐	P423	J2198	J1840	311.52	10.00	130.00	4.61	0.02
930	☐	P425	J1874	J1882	316.34	10.00	130.00	46.24	0.19
931	☐	P427	J1882	J2486	278.82	10.00	130.00	-18.65	0.08
932	☐	P429	J1894	J1904	121.70	10.00	130.00	152.52	0.62
933	☐	P43	J1704	J2432	304.28	12.00	130.00	-75.32	0.21
934	☐	P431	J1904	J2442	516.46	10.00	130.00	140.21	0.57
935	☐	P433	J1914	J1894	809.49	10.00	130.00	356.06	1.45
936	☐	P435	J2016	J1874	180.52	10.00	130.00	91.87	0.38
937	☐	P439	J1872	J1890	167.31	10.00	130.00	149.12	0.61
938	☐	P443	J1896	J1894	309.12	10.00	130.00	-198.25	0.81
939	☐	P445	J1912	J1910	226.65	8.00	130.00	1.76	0.01
940	☐	P447	J2012	J1914	226.92	8.00	130.00	-31.01	0.20
941	☐	P449	J1946	J1944	534.50	8.00	130.00	721.64	4.61
942	☐	P45	J2048	J2460	310.98	12.00	130.00	-129.02	0.37
943	☐	P451	J2264	J1990	222.70	8.00	130.00	-16.15	0.10
944	☐	P453	J2266	J2392	1,328.62	8.00	130.00	-4.10	0.03
945	☐	P455	J2022	J2020	98.76	10.00	130.00	0.00	0.00
946	☐	P457	J2028	J2308	985.98	8.00	130.00	-11.03	0.07
947	☐	P459	J2032	J2034	286.21	8.00	130.00	-54.21	0.35
948	☐	P461	J2034	J2030	313.01	8.00	130.00	-100.38	0.64
949	☐	P463	J2038	J2034	595.33	8.00	130.00	-43.33	0.28
950	☐	P465	J774	J776	481.23	10.00	130.00	40.59	0.17
951	☐	P467	J2074	J2068	1,057.69	8.00	130.00	-47.94	0.31
952	☐	P469	J2070	J2078	660.24	8.00	130.00	-0.17	0.00
953	☐	P471	J2092	J2096	166.65	10.00	130.00	77.27	0.32
954	☐	P473	J2096	J2090	161.62	10.00	130.00	33.04	0.13
955	☐	P475	J2168	J2172	358.68	10.00	130.00	-26.58	0.11
956	☐	P477	J2172	J2176	602.90	10.00	130.00	-77.05	0.31
957	☐	P479	J2176	J2180	299.35	10.00	130.00	-81.50	0.33
958	☐	P481	J2180	J2184	230.94	10.00	130.00	-86.98	0.36
959	☐	P483	J2184	J2188	729.69	10.00	130.00	-91.57	0.37
960	☐	P485	J2188	J2190	133.89	10.00	130.00	-98.46	0.40
961	☐	P487	J2190	J1508	1,069.68	10.00	130.00	-116.66	0.48
962	☐	P489	J2108	J2106	176.26	8.00	130.00	-130.00	0.83
963	☐	P49	J156	J158	29.68	12.00	130.00	-102.12	0.29
964	☐	P491	J2128	J2114	221.43	10.00	130.00	42.00	0.17
965	☐	P493	J2162	J2526	674.67	10.00	130.00	91.37	0.37
966	☐	P497	J2126	J2124	381.41	10.00	130.00	4.78	0.02
967	☐	P499	J2130	J2128	221.79	10.00	130.00	-38.59	0.16
968	☐	P501	J2142	J2144	617.32	12.00	130.00	48.65	0.14
969	☐	P503	J2144	J2140	834.66	12.00	130.00	25.57	0.07

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
970	☐	P505	J2146	J2144	146.77	8.00	130.00	-6.83	0.04
971	☐	P507	J2150	J2146	48.24	8.00	130.00	5.79	0.04
972	☐	P509	J2154	J2150	167.81	8.00	130.00	7.59	0.05
973	☐	P51	J166	J156	69.32	12.00	130.00	0.00	0.00
974	☐	P511	J2158	J2154	191.84	8.00	130.00	11.23	0.07
975	☐	P513	J2206	J2204	286.87	8.00	130.00	-15.68	0.10
976	☐	P515	V8038	J2220	14.50	8.00	130.00	908.66	5.80
977	☐	P517	J2222	J2374	14.53	8.00	130.00	-908.66	5.80
978	☐	P519	J2232	J2230	421.92	8.00	130.00	58.48	0.37
979	☐	P521	J2250	J2248	259.91	4.00	130.00	1.34	0.03
980	☐	P527	J2288	J2276	179.80	8.00	130.00	6.79	0.04
981	☐	P531	J2284	J2296	264.71	8.00	130.00	-1.63	0.01
982	☐	P533	J2296	J2280	125.65	6.00	130.00	-2.73	0.03
983	☐	P535	J2308	J2032	469.04	8.00	130.00	-28.87	0.18
984	☐	P537	J928	J2310	484.79	4.00	130.00	-8.61	0.22
985	☐	P539	J2310	J676	323.60	2.00	130.00	-7.02	0.72
986	☐	P541	J2310	J20	349.99	2.00	130.00	-6.80	0.69
987	☐	P543	J2312	J36	139.72	8.00	130.00	-600.00	3.83
988	☐	P545	J2312	J1030	173.62	12.00	130.00	600.00	1.70
989	☐	P549	J2314	J92	320.93	6.00	130.00	-96.12	1.09
990	☐	P553	J2316	J144	673.08	8.00	130.00	-169.05	1.08
991	☐	P555	J2318	J478	274.82	8.00	130.00	30.04	0.19
992	☐	P557	J2318	J1344	80.31	8.00	130.00	51.79	0.33
993	☐	P565	J156	J182	274.17	12.00	130.00	102.12	0.29
994	☐	P569	J2324	T5002	22.49	16.00	130.00	-2,314.80	3.69
995	☐	P579	J2330	J212	30.96	10.00	130.00	-58.78	0.24
996	☐	P59	J208	J206	7.61	12.00	130.00	-375.75	1.07
997	☐	P591	J2336	J214	521.93	8.00	130.00	201.60	1.29
998	☐	P593	J2336	J240	160.85	8.00	130.00	18.72	0.12
999	☐	P599	J2340	J274	56.44	8.00	130.00	0.00	0.00
1000	☐	P609	J2344	J370	197.46	6.00	130.00	10.69	0.12
1001	☐	P61	J210	J208	14.94	12.00	130.00	-66.92	0.19
1002	☐	P611	J2346	J342	497.68	8.00	130.00	-10.06	0.06
1003	☐	P613	J2346	J348	239.26	6.00	130.00	1.66	0.02
1004	☐	P615	J2348	J392	399.32	8.00	130.00	30.65	0.20
1005	☐	P617	J2348	J2074	103.34	8.00	130.00	-40.28	0.26
1006	☐	P619	J2350	J468	698.26	12.00	130.00	-1,413.73	4.01
1007	☐	P621	J2350	J554	633.54	6.00	130.00	183.07	2.08
1008	☐	P623	J2352	J108	487.29	8.00	130.00	-85.25	0.54
1009	☐	P627	J2354	J526	326.24	6.00	130.00	52.70	0.60
1010	☐	P629	J2354	J522	657.11	8.00	130.00	-107.61	0.69
1011	☐	P63	J250	J2502	1,030.79	10.00	130.00	-282.25	1.15
1012	☐	P631	J2356	J542	0.05	6.00	130.00	2.01	0.02
1013	☐	P633	J2356	J544	383.20	12.00	130.00	-1,091.80	3.10
1014	☐	P635	J2358	J578	8.30	8.00	130.00	298.15	1.90
1015	☐	P639	J2360	J470	650.63	8.00	130.00	-0.88	0.01
1016	☐	P643	J2362	J932	661.45	4.00	130.00	-4.43	0.11
1017	☐	P645	J2362	J912	325.77	8.00	130.00	8.90	0.06
1018	☐	P647	J2364	J472	346.38	12.00	130.00	-23.58	0.07
1019	☐	P649	J2364	J2440	170.86	10.00	130.00	18.43	0.08
1020	☐	P65	J236	J2318	8.38	8.00	130.00	82.44	0.53

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
1021	☐	P651	J2366	J1032	206.43	12.00	130.00	0.00	0.00
1022	☐	P653	J2366	J1042	33.97	8.00	130.00	0.00	0.00
1023	☐	P655	J2368	J1174	926.85	12.00	130.00	156.52	0.44
1024	☐	P659	J2370	J1114	416.39	10.00	130.00	-284.09	1.16
1025	☐	P661	J2370	J642	219.94	8.00	130.00	4.28	0.03
1026	☐	P667	J2374	J1266	36.51	12.00	130.00	-643.51	1.83
1027	☐	P673	J2376	J1584	152.99	10.00	130.00	-161.58	0.66
1028	☐	P675	J2378	J1352	244.27	8.00	130.00	-44.84	0.29
1029	☐	P677	J2378	J142	281.87	8.00	130.00	-148.77	0.95
1030	☐	P679	J1426	J1428	74.32	8.00	130.00	-5.09	0.03
1031	☐	P681	J1426	J1436	149.05	8.00	130.00	2.57	0.02
1032	☐	P683	J2382	J1620	724.12	8.00	130.00	8.25	0.05
1033	☐	P685	J2382	J1616	0.03	8.00	130.00	5.54	0.04
1034	☐	P687	J2384	J1862	2,322.92	8.00	130.00	0.00	0.00
1035	☐	P689	J2384	J1660	141.02	8.00	130.00	0.00	0.00
1036	☐	P69	J248	J254	2.13	10.00	130.00	60.31	0.25
1037	☐	P697	J2388	J1870	705.86	8.00	130.00	-198.04	1.26
1038	☐	P699	J2390	J1922	147.40	8.00	130.00	12.78	0.08
1039	☐	P703	J2392	J2266	889.37	8.00	130.00	5.09	0.03
1040	☐	P705	J2392	J1992	0.04	8.00	130.00	2.19	0.01
1041	☐	P707	J2394	J2416	318.17	8.00	130.00	-8.10	0.05
1042	☐	P709	J2394	J2046	43.82	8.00	130.00	3.02	0.02
1043	☐	P711	J2396	J2098	0.00	6.00	130.00	0.00	0.00
1044	☐	P713	J2396	J2168	873.30	10.00	130.00	10.97	0.04
1045	☐	P717	J2398	J2122	246.52	10.00	130.00	-18.75	0.08
1046	☐	P719	J2400	J2288	211.04	8.00	130.00	0.84	0.01
1047	☐	P723	J200	J2326	74.50	10.00	130.00	308.82	1.26
1048	☐	P73	J2062	J266	688.60	12.00	130.00	-38.37	0.11
1049	☐	P731	RES9000	V8000	19.04	12.00	130.00	350.00	0.99
1050	☐	P733	V8000	J2104	17.42	12.00	130.00	350.00	0.99
1051	☐	P735	V8002	J1952	17.52	6.00	130.00	0.00	0.00
1052	☐	P737	J1950	V8004	7.52	12.00	130.00	1,203.67	3.41
1053	☐	P739	J2402	J118	602.10	8.00	130.00	-11.67	0.07
1054	☐	P743	J2406	J1914	333.30	10.00	130.00	401.70	1.64
1055	☐	P745	J1450	J2340	140.86	8.00	130.00	-8.69	0.06
1056	☐	P747	J1432	V8006	65.81	10.00	130.00	68.29	0.28
1057	☐	P749	V8006	J2494	63.47	10.00	130.00	68.29	0.28
1058	☐	P751	J1432	V8008	34.30	10.00	130.00	0.00	0.00
1059	☐	P753	V8008	J2494	33.51	10.00	130.00	0.00	0.00
1060	☐	P755	J2408	J1832	26.05	10.00	130.00	0.00	0.00
1061	☐	P757	J1832	J264	741.33	10.00	130.00	10.58	0.04
1062	☐	P759	J2408	V8010	13.00	10.00	130.00	0.00	0.00
1063	☐	P761	V8010	J1832	13.00	10.00	130.00	0.00	0.00
1064	☐	P763	J2408	V8012	13.00	10.00	130.00	25.18	0.10
1065	☐	P765	V8012	J1832	13.00	10.00	130.00	25.18	0.10
1066	☐	P773	J2410	J1042	616.97	8.00	130.00	0.00	0.00
1067	☐	P775	J1990	J1986	370.85	8.00	130.00	-33.75	0.22
1068	☐	P777	J1102	J392	286.10	10.00	130.00	163.19	0.67
1069	☐	P779	J2412	J2346	105.39	8.00	130.00	-4.43	0.03
1070	☐	P781	J2414	J1568	351.94	8.00	130.00	-4.29	0.03
1071	☐	P783	J2416	J2048	445.89	8.00	130.00	-23.06	0.15

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		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
1072	☐	P785	J2418	J832	480.89	10.00	130.00	77.38	0.32
1073	☐	P787	J2420	J1646	310.92	8.00	130.00	14.22	0.09
1074	☐	P789	J2422	J1300	649.18	10.00	130.00	141.47	0.58
1075	☐	P79	J1798	J2338	146.50	6.00	130.00	14.83	0.17
1076	☐	P791	J2424	J2426	170.90	10.00	130.00	-239.04	0.98
1077	☐	P793	J2426	J802	473.96	10.00	130.00	-171.36	0.70
1078	☐	P795	J2428	J2338	535.83	6.00	130.00	-14.25	0.16
1079	☐	P797	J2430	J2368	171.26	10.00	130.00	-178.36	0.73
1080	☐	P799	J2432	J2048	24.57	12.00	130.00	-104.21	0.30
1081	☐	P801	J2434	J2436	196.56	10.00	130.00	-98.98	0.40
1082	☐	P803	J2436	J2438	215.44	10.00	130.00	-134.06	0.55
1083	☐	P805	J2438	J48	804.49	10.00	130.00	-19.88	0.08
1084	☐	P807	J2440	J1376	504.51	10.00	130.00	9.39	0.04
1085	☐	P809	J2442	J2016	426.03	10.00	130.00	118.43	0.48
1086	☐	P811	J2498	V8018	10.56	8.00	130.00	307.69	1.96
1087	☐	P813	J2444	V8020	14.63	12.00	130.00	380.20	1.08
1088	☐	P815	J2444	J1360	195.51	12.00	130.00	-688.30	1.95
1089	☐	P817	J1652	V8022	44.14	8.00	130.00	0.00	0.00
1090	☐	P819	J1652	V8024	20.84	8.00	130.00	0.00	0.00
1091	☐	P821	V8028	J2446	11.67	8.00	130.00	786.04	5.02
1092	☐	P823	J2448	J2450	15.20	8.00	130.00	-785.70	5.01
1093	☐	P825	V8026	J2446	54.78	8.00	130.00	0.00	0.00
1094	☐	P827	J2448	V8028	10.96	8.00	130.00	785.70	5.01
1095	☐	P829	J2450	J1624	1,977.38	8.00	130.00	11.44	0.07
1096	☐	P83	J2054	J314	404.28	6.00	130.00	6.56	0.07
1097	☐	P831	SOLANA_RES	J1634	6.85	12.00	130.00	838.72	2.38
1098	☐	P843	J2222	V8036	26.31	8.00	130.00	0.00	0.00
1099	☐	P845	J2222	V8038	13.70	8.00	130.00	908.66	5.80
1100	☐	P865	J1344	J1352	101.01	8.00	130.00	48.75	0.31
1101	☐	P867	J2460	J1118	633.02	12.00	130.00	-133.59	0.38
1102	☐	P869	J2462	J2316	454.54	8.00	130.00	-170.71	1.09
1103	☐	P87	J392	J326	33.42	10.00	130.00	190.73	0.78
1104	☐	P871	J2464	J1644	645.32	8.00	130.00	0.00	0.00
1105	☐	P873	U7000	J2466	32.79	8.00	130.00	0.00	0.00
1106	☐	P875	J2464	U7000	32.05	8.00	130.00	0.00	0.00
1107	☐	P877	J2464	U7002	36.70	8.00	130.00	0.00	0.00
1108	☐	P879	U7002	J2466	37.18	8.00	130.00	0.00	0.00
1109	☐	P881	J1660	U7006	24.17	12.00	130.00	0.00	0.00
1110	☐	P883	U7006	J1628	21.19	12.00	130.00	0.00	0.00
1111	☐	P885	J1660	U7004	21.34	12.00	130.00	0.00	0.00
1112	☐	P887	U7004	J1628	18.93	12.00	130.00	0.00	0.00
1113	☐	P889	J1660	U7008	24.22	12.00	130.00	1,177.56	3.34
1114	☐	P89	J2072	J1102	309.20	10.00	130.00	125.49	0.51
1115	☐	P891	U7008	J1628	20.96	12.00	130.00	1,177.56	3.34
1116	☐	P893	J248	J122	9.01	10.00	130.00	220.74	0.90
1117	☐	P895	J182	U7012	211.62	12.00	130.00	0.00	0.00
1118	☐	P897	U7012	J160	37.65	4.00	130.00	0.00	0.00
1119	☐	P899	J2468	J1944	138.42	10.00	130.00	-248.85	1.02
1120	☐	P901	J2470	J2468	38.40	10.00	130.00	0.00	0.00
1121	☐	P903	J2468	J2472	16.34	10.00	130.00	248.85	1.02
1122	☐	P905	J2472	V8044	19.24	10.00	130.00	248.85	1.02

		ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)
1123	☐	P907	V8044	J2474	18.75	10.00	130.00	248.85	1.02
1124	☐	P909	J2474	J2470	17.25	10.00	130.00	248.85	1.02
1125	☐	P91	J340	J328	307.95	8.00	130.00	-52.33	0.33
1126	☐	P911	SILBERHORN_1	SILB_1_FCV	60.11	8.00	130.00	300.00	1.91
1127	☐	P913	SILB_1_FCV	J68	58.60	8.00	130.00	300.00	1.91
1128	☐	P915	SILBERHORN_2	SILB_2_FCV	54.74	8.00	130.00	0.00	0.00
1129	☐	P917	SILB_2_FCV	J72	48.80	8.00	130.00	0.00	0.00
1130	☐	P919	SILBERHORN_3	SILB_3_FCV	50.55	8.00	130.00	0.00	0.00
1131	☐	P921	SILB_3_FCV	J62	44.22	8.00	130.00	0.00	0.00
1132	☐	P923	J2476	J2348	894.59	8.00	130.00	-6.83	0.04
1133	☐	P925	J2472	V8046	31.89	10.00	130.00	0.00	0.00
1134	☐	P927	V8046	J2474	32.21	10.00	130.00	0.00	0.00
1135	☐	P929	J2478	J122	17.42	12.00	130.00	0.00	0.00
1136	☐	P93	J2078	J340	659.87	6.00	130.00	0.00	0.00
1137	☐	P931	J2480	J254	20.04	8.00	130.00	-219.34	1.40
1138	☐	P933	J2480	J2506	6.56	8.00	130.00	0.00	0.00
1139	☐	P935	J2480	V8014	6.51	8.00	130.00	219.34	1.40
1140	☐	P937	V8014	J2478	7.07	8.00	130.00	219.34	1.40
1141	☐	P939	J2480	V8016	6.23	8.00	130.00	0.00	0.00
1142	☐	P941	V8016	J2478	7.47	8.00	130.00	0.00	0.00
1143	☐	P943	J258	U7010	6.40	4.00	130.00	0.00	0.00
1144	☐	P945	U7010	J256	6.31	4.00	130.00	0.00	0.00
1145	☐	P947	J2482	J1368	346.09	8.00	130.00	-3.25	0.02
1146	☐	P949	J2484	J2024	563.90	8.00	130.00	11.40	0.07
1147	☐	P951	J2486	J1872	588.20	10.00	130.00	-36.55	0.15
1148	☐	P953	J2488	J258	7.27	12.00	130.00	0.00	0.00
1149	☐	P955	J2488	U7014	6.80	4.00	130.00	0.00	0.00
1150	☐	P957	U7014	J2490	5.97	4.00	130.00	0.00	0.00
1151	☐	P959	J2490	J256	7.54	4.00	130.00	0.00	0.00
1152	☐	P961	J2492	J1432	58.83	8.00	130.00	4.74	0.03
1153	☐	P963	J2494	J1432	48.57	10.00	130.00	0.00	0.00
1154	☐	P965	J2496	J1786	274.39	10.00	130.00	400.70	1.64
1155	☐	P967	J2498	J1390	24.84	8.00	130.00	0.41	0.00
1156	☐	P969	V8048	J1660	28.07	8.00	130.00	1,135.98	7.25
1157	☐	P971	J1628	V8048	24.93	8.00	130.00	1,135.98	7.25
1158	☐	P973	J1628	J2500	15.80	8.00	130.00	41.58	0.27
1159	☐	P975	J2480	J2478	100.00	1.00	20.00	0.00	0.00
1160	☐	P977	J2222	J2220	100.00	1.00	20.00	0.00	0.00
1161	☐	P979	J1950	J1952	100.00	1.00	20.00	0.00	0.00
1162	☐	P981	J1652	J1650	100.00	1.00	20.00	0.00	0.00
1163	☐	P983	J110	J2316	5.73	6.00	130.00	1.67	0.02
1164	☐	P985	J2502	J2378	11.62	8.00	130.00	-32.67	0.21
1165	☐	P987	J2502	J212	281.89	10.00	130.00	-267.55	1.09
1166	☐	P989	PW_WELL_TWO	PW_WELL_2	15.00	6.00	130.00	0.00	0.00
1167	☐	P99	J1826	J448	123.94	8.00	130.00	-22.34	0.14
1168	☐	P991	PW_WELL_2	J1024	34.49	8.00	130.00	0.00	0.00
1169	☐	P993	PW_WELL_THREE	PW_WELL_3	15.00	6.00	130.00	0.00	0.00
1170	☐	P995	PW_WELL_3	J2410	30.51	8.00	130.00	0.00	0.00
1171	☐	P997	V8050	J2506	3.94	8.00	130.00	0.00	0.00
1172	☐	P999	J256	V8050	4.65	8.00	130.00	0.00	0.00

2041 PHD Pipe Report

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
1	☐	P-1000	0.00	0.00	Open	0
2	☐	P-1001	0.00	0.00	Open	0
3	☐	P-1002	0.00	0.11	Open	0
4	☐	P-1003	0.00	0.00	Open	0
5	☐	P-1008	0.00	0.00	Open	0
6	☐	P-1009	0.00	0.01	Open	0
7	☐	P-101	0.47	1.04	Open	0
8	☐	P-1010	0.00	0.00	Open	0
9	☐	P-1011	0.00	0.00	Open	0
10	☐	P-1012	0.00	0.00	Open	0
11	☐	P-1013	0.02	0.12	Open	0
12	☐	P-1019	0.40	0.78	Open	0
13	☐	P-102	0.51	1.04	Open	0
14	☐	P-1020	0.00	0.00	Open	0
15	☐	P-1021	0.00	0.00	Open	0
16	☐	P-1022	0.00	0.00	Open	0
17	☐	P-1023	0.00	0.00	Open	0
18	☐	P-1025	0.00	0.00	Open	0
19	☐	P-1026	0.00	0.00	Open	0
20	☐	P-103	0.70	1.48	Open	0
21	☐	P-1030	0.02	0.02	Open	0
22	☐	P-104	0.92	1.12	Open	0
23	☐	P-105	0.00	0.00	Open	0
24	☐	P-106	0.01	0.04	Open	0
25	☐	P-107	0.01	0.04	Open	0
26	☐	P-108	0.38	0.14	Open	0
27	☐	P-109	0.00	0.00	Open	0
28	☐	P-110	0.56	0.66	Open	0
29	☐	P-111	0.19	0.66	Open	0
30	☐	P-113	0.00	0.00	Open	0
31	☐	P-114	0.00	0.00	Open	0
32	☐	P-115	0.01	0.66	Open	0
33	☐	P-116	0.00	0.00	Open	0
34	☐	P-118	0.01	0.04	Open	0
35	☐	P-119	0.01	0.01	Open	0
36	☐	P-121	0.00	0.00	Open	0
37	☐	P-122	0.00	0.00	Open	0
38	☐	P-123	0.01	0.02	Open	0
39	☐	P-124	1.20	1.78	Open	0
40	☐	P-125	1.16	1.73	Open	0
41	☐	P-126	0.01	0.01	Open	0
42	☐	P-129	0.10	3.55	Open	0
43	☐	P-130	0.71	0.55	Open	0
44	☐	P-131	0.01	1.15	Open	0
45	☐	P-132	0.00	0.01	Open	0
46	☐	P-133	0.04	0.04	Open	0
47	☐	P-134	0.41	0.70	Open	0
48	☐	P-135	0.15	0.69	Open	0
49	☐	P-136	0.31	0.57	Open	0
50	☐	P-137	0.02	0.05	Open	0
51	☐	P-138	0.01	0.04	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
52	☐	P-139	0.02	0.04	Open	0
53	☐	P-140	0.09	0.62	Open	0
54	☐	P-141	0.00	0.09	Open	0
55	☐	P-142	0.06	0.62	Open	0
56	☐	P-150	0.00	0.04	Open	0
57	☐	P-162	0.00	0.04	Open	0
58	☐	P-163	0.05	0.70	Open	0
59	☐	P-164	0.06	0.68	Open	0
60	☐	P-165	0.03	0.02	Open	0
61	☐	P-166	0.26	0.84	Open	0
62	☐	P-167	0.36	0.71	Open	0
63	☐	P-168	0.00	0.00	Open	0
64	☐	P-169	0.00	0.00	Open	0
65	☐	P-171	0.08	0.21	Open	0
66	☐	P-172	0.47	0.69	Open	0
67	☐	P-173	0.04	0.20	Open	0
68	☐	P-174	0.00	0.00	Open	0
69	☐	P-175	0.00	0.01	Open	0
70	☐	P-176	0.00	0.01	Open	0
71	☐	P-178	0.01	1.74	Open	0
72	☐	P-181	0.04	1.11	Open	0
73	☐	P-182	0.00	0.01	Open	0
74	☐	P-184	0.00	0.00	Open	0
75	☐	P-185	0.00	0.00	Open	0
76	☐	P-186	0.00	0.00	Open	0
77	☐	P-187	0.00	0.00	Open	0
78	☐	P-188	0.08	0.09	Open	0
79	☐	P-189	0.00	0.00	Open	0
80	☐	P-190	0.01	0.07	Open	0
81	☐	P-191	0.01	0.03	Open	0
82	☐	P-192	0.01	0.02	Open	0
83	☐	P-193	0.00	0.00	Open	0
84	☐	P-194	0.05	0.13	Open	0
85	☐	P-195	0.00	0.01	Open	0
86	☐	P-197	0.00	0.00	Open	0
87	☐	P-198	0.03	0.18	Open	0
88	☐	P-199	0.02	0.14	Open	0
89	☐	P-202	0.01	0.04	Open	0
90	☐	P-203	0.00	0.00	Open	0
91	☐	P-204	0.01	0.02	Open	0
92	☐	P-206	0.01	0.01	Open	0
93	☐	P-207	0.00	0.00	Open	0
94	☐	P-208	0.00	0.02	Open	0
95	☐	P-209	0.03	0.05	Open	0
96	☐	P-210	0.00	0.00	Open	0
97	☐	P-211	0.00	0.00	Open	0
98	☐	P-212	0.01	0.26	Open	0
99	☐	P-213	0.03	0.05	Open	0
100	☐	P-214	0.00	0.00	Open	0
101	☐	P-215	0.02	0.03	Open	0
102	☐	P-216	0.01	0.02	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
103	☐	P-217	0.00	0.01	Open	0
104	☐	P-219	0.00	0.00	Open	0
105	☐	P-220	0.00	0.00	Closed	0
106	☐	P-221	0.00	0.00	Open	0
107	☐	P-223	0.42	1.24	Open	0
108	☐	P-224	0.10	0.33	Open	0
109	☐	P-225	0.00	0.00	Open	0
110	☐	P-226	0.00	0.01	Open	0
111	☐	P-227	0.46	1.31	Open	0
112	☐	P-228	0.01	0.03	Open	0
113	☐	P-232	0.00	0.01	Open	0
114	☐	P-234	0.28	0.90	Open	0
115	☐	P-235	0.03	0.04	Open	0
116	☐	P-236	0.00	0.00	Open	0
117	☐	P-237	0.03	0.02	Open	0
118	☐	P-238	0.04	0.03	Open	0
119	☐	P-239	0.00	0.00	Open	0
120	☐	P-240	0.00	0.00	Closed	0
121	☐	P-241	0.03	0.04	Open	0
122	☐	P-242	0.02	0.09	Open	0
123	☐	P-243	0.00	0.01	Open	0
124	☐	P-244	0.00	0.03	Open	0
125	☐	P-245	0.00	0.00	Open	0
126	☐	P-246	0.00	0.00	Closed	0
127	☐	P-247	0.02	0.06	Open	0
128	☐	P-249	0.00	0.01	Open	0
129	☐	P-250	0.01	0.11	Open	0
130	☐	P-251	0.00	0.00	Open	0
131	☐	P-254	0.01	0.13	Open	0
132	☐	P-258	0.00	0.00	Open	0
133	☐	P-261	0.02	0.05	Open	0
134	☐	P-263	0.01	0.03	Open	0
135	☐	P-264	0.10	0.37	Open	0
136	☐	P-265	0.19	0.64	Open	0
137	☐	P-266	0.01	0.05	Open	0
138	☐	P-267	0.01	0.04	Open	0
139	☐	P-268	0.14	0.36	Open	0
140	☐	P-269	0.00	0.07	Open	0
141	☐	P-270	0.01	0.23	Open	0
142	☐	P-271	0.01	0.24	Open	0
143	☐	P-272	0.07	0.25	Open	0
144	☐	P-273	0.01	0.27	Open	0
145	☐	P-274	0.00	0.00	Open	0
146	☐	P-275	0.00	0.00	Open	0
147	☐	P-276	0.02	0.06	Open	0
148	☐	P-278	0.00	0.01	Open	0
149	☐	P-282	0.01	0.02	Open	0
150	☐	P-284	0.54	0.47	Open	0
151	☐	P-285	0.08	0.28	Open	0
152	☐	P-286	0.61	3.57	Open	0
153	☐	P-287	0.16	0.51	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
154	☐	P-288	0.00	0.02	Open	0
155	☐	P-289	0.11	0.56	Open	0
156	☐	P-290	0.02	0.04	Open	0
157	☐	P-292	0.00	0.00	Open	0
158	☐	P-293	0.00	0.02	Open	0
159	☐	P-294	0.00	0.01	Open	0
160	☐	P-295	0.71	1.49	Open	0
161	☐	P-296	0.69	1.45	Open	0
162	☐	P-297	0.10	0.21	Open	0
163	☐	P-299	0.01	0.02	Open	0
164	☐	P-300	0.00	0.00	Open	0
165	☐	P-301	0.01	0.05	Open	0
166	☐	P-302	0.27	0.88	Open	0
167	☐	P-304	0.09	0.54	Open	0
168	☐	P-305	1.04	1.56	Open	0
169	☐	P-306	1.53	2.30	Open	0
170	☐	P-307	2.00	3.02	Open	0
171	☐	P-308	0.70	2.12	Open	0
172	☐	P-309	0.00	0.01	Open	0
173	☐	P-310	0.37	1.61	Open	0
174	☐	P-312	0.07	0.21	Open	0
175	☐	P-313	0.02	0.04	Open	0
176	☐	P-314	0.02	0.06	Open	0
177	☐	P-315	0.65	1.49	Open	0
178	☐	P-317	1.00	3.69	Open	0
179	☐	P-318	0.08	3.71	Open	0
180	☐	P-319	0.84	1.30	Open	0
181	☐	P-321	0.00	0.00	Open	0
182	☐	P-322	0.70	2.04	Open	0
183	☐	P-324	0.65	1.95	Open	0
184	☐	P-325	0.63	1.89	Open	0
185	☐	P-326	0.23	0.70	Open	0
186	☐	P-327	0.39	0.59	Open	0
187	☐	P-328	0.00	0.00	Open	0
188	☐	P-329	0.00	0.01	Open	0
189	☐	P-330	0.38	1.17	Open	0
190	☐	P-331	0.70	1.06	Open	0
191	☐	P-332	0.80	1.20	Open	0
192	☐	P-333	0.20	0.60	Open	0
193	☐	P-334	0.02	0.43	Open	0
194	☐	P-335	0.14	0.49	Open	0
195	☐	P-336	0.11	0.32	Open	0
196	☐	P-338	0.01	0.04	Open	0
197	☐	P-339	0.04	0.43	Open	0
198	☐	P-340	0.03	0.13	Open	0
199	☐	P-341	0.38	0.57	Open	0
200	☐	P-342	0.13	0.19	Open	0
201	☐	P-343	0.16	0.24	Open	0
202	☐	P-344	0.04	0.06	Open	0
203	☐	P-345	0.10	0.27	Open	0
204	☐	P-346	0.15	0.43	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
205	☐	P-347	0.02	0.04	Open	0
206	☐	P-348	0.04	0.07	Open	0
207	☐	P-349	0.00	0.03	Open	0
208	☐	P-350	0.18	0.65	Open	0
209	☐	P-352	0.09	0.35	Open	0
210	☐	P-353	0.14	0.51	Open	0
211	☐	P-354	0.37	1.08	Open	0
212	☐	P-355	0.05	0.15	Open	0
213	☐	P-356	0.01	0.01	Open	0
214	☐	P-357	0.06	0.19	Open	0
215	☐	P-358	0.06	0.21	Open	0
216	☐	P-359	0.36	0.55	Open	0
217	☐	P-360	0.07	0.10	Open	0
218	☐	P-361	0.17	0.25	Open	0
219	☐	P-362	0.09	0.33	Open	0
220	☐	P-363	0.16	0.45	Open	0
221	☐	P-364	0.08	0.28	Open	0
222	☐	P-365	0.01	0.03	Open	0
223	☐	P-366	0.03	0.10	Open	0
224	☐	P-368	0.07	0.22	Open	0
225	☐	P-369	0.06	0.09	Open	0
226	☐	P-371	0.00	1.54	Open	0
227	☐	P-372	0.89	2.10	Open	0
228	☐	P-373	0.02	0.07	Open	0
229	☐	P-374	0.02	0.04	Open	0
230	☐	P-375	0.00	0.01	Open	0
231	☐	P-376	0.13	0.52	Open	0
232	☐	P-377	0.00	0.01	Open	0
233	☐	P-378	0.16	1.53	Open	0
234	☐	P-379	0.40	1.25	Open	0
235	☐	P-380	0.70	2.11	Open	0
236	☐	P-381	0.00	0.00	Open	0
237	☐	P-382	1.38	1.75	Open	0
238	☐	P-383	0.23	0.35	Open	0
239	☐	P-384	0.07	0.10	Open	0
240	☐	P-385	0.93	2.58	Open	0
241	☐	P-386	0.19	0.30	Open	0
242	☐	P-387	0.00	0.07	Open	0
243	☐	P-388	0.90	2.41	Open	0
244	☐	P-389	1.23	3.43	Open	0
245	☐	P-391	0.05	0.08	Open	0
246	☐	P-392	0.03	0.05	Open	0
247	☐	P-393	0.03	0.04	Open	0
248	☐	P-394	0.25	0.75	Open	0
249	☐	P-395	0.16	0.49	Open	0
250	☐	P-396	0.88	1.70	Open	0
251	☐	P-397	0.08	0.21	Open	0
252	☐	P-398	0.20	0.53	Open	0
253	☐	P-399	0.17	0.51	Open	0
254	☐	P-401	0.00	0.00	Open	0
255	☐	P-402	0.29	0.86	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
256	☐	P-403	0.03	0.07	Open	0
257	☐	P-404	0.01	0.02	Open	0
258	☐	P-405	0.38	1.17	Open	0
259	☐	P-406	0.09	0.33	Open	0
260	☐	P-407	0.40	1.23	Open	0
261	☐	P-410	0.25	0.50	Open	0
262	☐	P-411	0.20	0.68	Open	0
263	☐	P-412	0.27	0.80	Open	0
264	☐	P-413	0.44	1.36	Open	0
265	☐	P-414	0.14	0.39	Open	0
266	☐	P-415	0.07	1.85	Open	0
267	☐	P-416	0.00	0.00	Open	0
268	☐	P-417	0.00	0.00	Open	0
269	☐	P-418	0.00	0.01	Open	0
270	☐	P-419	0.12	0.20	Open	0
271	☐	P-421	0.00	0.00	Open	0
272	☐	P-422	0.02	0.04	Open	0
273	☐	P-423	0.00	0.00	Open	0
274	☐	P-424	0.00	0.01	Open	0
275	☐	P-425	0.00	0.04	Open	0
276	☐	P-428	0.00	0.00	Open	0
277	☐	P-430	0.02	0.06	Open	0
278	☐	P-431	0.00	0.00	Open	0
279	☐	P-432	0.00	0.00	Open	0
280	☐	P-433	0.00	0.00	Open	0
281	☐	P-434	0.00	0.00	Open	0
282	☐	P-435	0.00	0.01	Open	0
283	☐	P-436	0.01	0.05	Open	0
284	☐	P-437	0.02	0.04	Open	0
285	☐	P-438	0.03	0.09	Open	0
286	☐	P-441	0.04	0.04	Open	0
287	☐	P-442	0.02	0.09	Open	0
288	☐	P-443	0.00	0.00	Open	0
289	☐	P-444	0.00	0.00	Open	0
290	☐	P-445	0.00	0.00	Open	0
291	☐	P-446	0.00	0.01	Open	0
292	☐	P-448	0.00	0.02	Open	0
293	☐	P-449	0.00	0.02	Open	0
294	☐	P-450	0.00	0.02	Open	0
295	☐	P-451	0.01	0.04	Open	0
296	☐	P-452	0.00	0.02	Open	0
297	☐	P-453	0.00	0.00	Open	0
298	☐	P-454	0.00	0.00	Open	0
299	☐	P-455	0.01	0.07	Open	0
300	☐	P-456	0.00	0.00	Open	0
301	☐	P-457	0.02	0.02	Open	0
302	☐	P-458	0.07	0.12	Open	0
303	☐	P-459	0.00	0.00	Open	0
304	☐	P-460	0.00	0.00	Open	0
305	☐	P-461	0.00	0.00	Open	0
306	☐	P-462	0.00	0.00	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
307	☐	P-463	0.00	0.00	Open	0
308	☐	P-464	0.03	0.06	Open	0
309	☐	P-465	0.03	0.06	Open	0
310	☐	P-466	0.02	0.49	Open	0
311	☐	P-467	0.00	0.00	Open	0
312	☐	P-468	0.00	0.00	Open	0
313	☐	P-469	0.00	0.00	Open	0
314	☐	P-470	0.00	0.00	Open	0
315	☐	P-473	0.20	0.19	Open	0
316	☐	P-474	0.09	0.63	Open	0
317	☐	P-475	0.36	1.05	Open	0
318	☐	P-476	0.20	0.92	Open	0
319	☐	P-477	0.06	0.50	Open	0
320	☐	P-478	0.00	0.00	Open	0
321	☐	P-479	0.24	0.36	Open	0
322	☐	P-480	0.30	0.54	Open	0
323	☐	P-481	0.25	0.88	Open	0
324	☐	P-482	0.07	0.85	Open	0
325	☐	P-483	0.00	0.00	Open	0
326	☐	P-484	0.00	0.01	Open	0
327	☐	P-485	0.07	0.90	Open	0
328	☐	P-486	0.02	0.58	Open	0
329	☐	P-487	0.04	0.39	Open	0
330	☐	P-488	0.27	0.58	Open	0
331	☐	P-489	0.09	0.41	Open	0
332	☐	P-490	0.04	0.40	Open	0
333	☐	P-491	0.11	0.44	Open	0
334	☐	P-493	0.02	0.61	Open	0
335	☐	P-494	0.08	0.42	Open	0
336	☐	P-495	0.19	0.74	Open	0
337	☐	P-498	0.02	0.02	Open	0
338	☐	P-499	0.00	0.00	Open	0
339	☐	P-501	0.03	0.04	Open	0
340	☐	P-502	0.00	0.00	Open	0
341	☐	P-503	0.14	0.21	Open	0
342	☐	P-504	0.18	0.27	Open	0
343	☐	P-505	0.00	0.00	Open	0
344	☐	P-506	0.02	0.06	Open	0
345	☐	P-507	0.02	1.45	Open	0
346	☐	P-508	0.05	0.17	Open	0
347	☐	P-509	0.01	0.02	Open	0
348	☐	P-510	0.00	0.03	Open	0
349	☐	P-512	0.00	0.00	Open	0
350	☐	P-513	0.00	0.00	Open	0
351	☐	P-514	0.02	0.06	Open	0
352	☐	P-515	0.01	0.03	Open	0
353	☐	P-516	0.23	0.36	Open	0
354	☐	P-517	0.01	0.02	Open	0
355	☐	P-518	0.05	0.08	Open	0
356	☐	P-519	0.01	0.04	Open	0
357	☐	P-521	0.02	0.12	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
358	☐	P-524	0.01	0.63	Open	0
359	☐	P-525	0.01	0.05	Open	0
360	☐	P-526	0.14	0.69	Open	0
361	☐	P-527	0.03	0.08	Open	0
362	☐	P-528	0.04	0.62	Open	0
363	☐	P-529	0.22	0.79	Open	0
364	☐	P-533	0.00	0.04	Open	0
365	☐	P-534	0.05	0.15	Open	0
366	☐	P-535	0.00	0.00	Open	0
367	☐	P-536	0.00	0.01	Open	0
368	☐	P-537	0.00	0.01	Open	0
369	☐	P-538	0.00	0.00	Open	0
370	☐	P-539	0.00	0.01	Open	0
371	☐	P-540	0.00	0.00	Open	0
372	☐	P-541	0.00	0.00	Open	0
373	☐	P-542	0.00	0.00	Open	0
374	☐	P-543	0.00	0.00	Open	0
375	☐	P-544	0.00	0.00	Open	0
376	☐	P-545	0.00	0.00	Open	0
377	☐	P-546	0.00	0.00	Open	0
378	☐	P-547	0.00	0.02	Open	0
379	☐	P-549	0.00	0.00	Open	0
380	☐	P-550	0.00	0.00	Open	0
381	☐	P-551	0.00	0.00	Open	0
382	☐	P-552	0.00	0.00	Open	0
383	☐	P-555	0.00	0.00	Open	0
384	☐	P-556	3.03	2.13	Open	0
385	☐	P-558	0.00	0.00	Open	0
386	☐	P-559	0.64	0.56	Open	0
387	☐	P-560	0.06	0.37	Open	0
388	☐	P-561	0.00	0.00	Open	0
389	☐	P-562	0.01	0.01	Open	0
390	☐	P-563	0.00	0.00	Open	0
391	☐	P-564	0.00	0.00	Open	0
392	☐	P-571	0.04	0.15	Open	0
393	☐	P-572	0.02	0.05	Open	0
394	☐	P-573	0.02	0.11	Open	0
395	☐	P-575	0.00	0.03	Open	0
396	☐	P-576	0.00	0.04	Open	0
397	☐	P-578	0.00	0.00	Open	0
398	☐	P-579	0.00	0.00	Open	0
399	☐	P-580	0.11	0.27	Open	0
400	☐	P-581	0.06	0.29	Open	0
401	☐	P-582	0.00	0.00	Open	0
402	☐	P-583	0.00	0.28	Open	0
403	☐	P-584	0.00	0.00	Open	0
404	☐	P-585	0.23	0.34	Open	0
405	☐	P-586	0.00	0.00	Open	0
406	☐	P-587	0.01	0.34	Open	0
407	☐	P-588	0.04	0.05	Open	0
408	☐	P-590	0.00	0.00	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
409	☐	P-591	0.38	1.78	Open	0
410	☐	P-592	0.09	0.03	Open	0
411	☐	P-594	0.05	0.14	Open	0
412	☐	P-595	0.00	0.00	Open	0
413	☐	P-596	0.00	0.00	Open	0
414	☐	P-597	0.00	0.00	Open	0
415	☐	P-598	0.00	0.00	Open	0
416	☐	P-600	0.00	0.00	Open	0
417	☐	P-602	0.00	0.00	Open	0
418	☐	P-603	0.00	0.00	Open	0
419	☐	P-604	0.00	0.01	Open	0
420	☐	P-605	0.00	0.00	Open	0
421	☐	P-606	0.00	0.00	Open	0
422	☐	P-607	0.00	0.01	Open	0
423	☐	P-609	0.00	0.00	Open	0
424	☐	P-610	0.00	0.01	Open	0
425	☐	P-611	0.01	0.03	Open	0
426	☐	P-612	0.00	0.01	Open	0
427	☐	P-613	0.00	0.01	Open	0
428	☐	P-614	0.00	0.01	Open	0
429	☐	P-615	0.02	0.19	Open	0
430	☐	P-616	0.04	0.11	Open	0
431	☐	P-617	0.02	0.12	Open	0
432	☐	P-618	0.03	0.06	Open	0
433	☐	P-619	0.01	0.05	Open	0
434	☐	P-620	0.00	0.04	Open	0
435	☐	P-621	0.00	0.04	Open	0
436	☐	P-622	0.00	0.03	Open	0
437	☐	P-623	0.00	0.02	Open	0
438	☐	P-624	0.01	0.02	Open	0
439	☐	P-625	0.00	0.03	Open	0
440	☐	P-626	0.00	0.00	Open	0
441	☐	P-628	0.00	0.00	Open	0
442	☐	P-629	0.00	0.01	Open	0
443	☐	P-630	0.09	0.14	Open	0
444	☐	P-631	0.08	0.12	Open	0
445	☐	P-632	0.01	0.10	Open	0
446	☐	P-633	0.01	0.14	Open	0
447	☐	P-634	0.01	0.17	Open	0
448	☐	P-635	0.02	0.49	Open	0
449	☐	P-636	0.00	0.07	Open	0
450	☐	P-637	0.00	0.08	Open	0
451	☐	P-638	0.00	0.00	Open	0
452	☐	P-639	0.00	0.00	Open	0
453	☐	P-640	0.00	0.00	Open	0
454	☐	P-641	0.00	0.00	Open	0
455	☐	P-642	0.00	0.00	Open	0
456	☐	P-643	0.00	0.00	Open	0
457	☐	P-644	0.00	0.00	Open	0
458	☐	P-645	0.00	0.00	Open	0
459	☐	P-646	0.00	0.01	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
460	☐	P-650	0.00	0.01	Open	0
461	☐	P-651	0.00	0.01	Open	0
462	☐	P-652	0.02	0.18	Open	0
463	☐	P-653	0.00	0.01	Open	0
464	☐	P-654	0.00	0.02	Open	0
465	☐	P-655	0.00	0.00	Open	0
466	☐	P-656	0.12	0.23	Open	0
467	☐	P-657	0.02	0.05	Open	0
468	☐	P-659	0.01	0.25	Open	0
469	☐	P-660	0.35	0.22	Open	0
470	☐	P-661	0.00	0.00	Closed	0
471	☐	P-662	2.28	1.97	Open	0
472	☐	P-663	0.24	1.02	Open	0
473	☐	P-664	0.00	0.00	Open	0
474	☐	P-666	0.01	0.27	Open	0
475	☐	P-667	0.00	0.00	Open	0
476	☐	P-668	0.29	0.48	Open	0
477	☐	P-669	0.00	0.00	Open	0
478	☐	P-673	0.00	0.14	Open	0
479	☐	P-674	0.00	0.10	Open	0
480	☐	P-678	0.00	0.03	Open	0
481	☐	P-679	0.00	0.03	Open	0
482	☐	P-680	0.00	0.00	Open	0
483	☐	P-681	0.00	0.00	Open	0
484	☐	P-682	0.01	0.04	Open	0
485	☐	P-690	0.00	0.01	Open	0
486	☐	P-692	0.38	1.15	Open	0
487	☐	P-693	0.00	0.00	Open	0
488	☐	P-694	0.00	1.20	Open	0
489	☐	P-695	0.39	0.92	Open	0
490	☐	P-696	0.02	0.10	Open	0
491	☐	P-697	0.03	0.09	Open	0
492	☐	P-698	0.08	0.39	Open	0
493	☐	P-699	0.00	0.00	Open	0
494	☐	P-700	0.00	0.00	Open	0
495	☐	P-701	0.00	0.00	Open	0
496	☐	P-702	0.02	2.06	Open	0
497	☐	P-703	0.06	2.06	Open	0
498	☐	P-704	0.06	2.06	Open	0
499	☐	P-705	0.00	0.03	Open	0
500	☐	P-706	0.02	0.11	Open	0
501	☐	P-707	0.00	0.00	Open	0
502	☐	P-710	0.03	0.16	Open	0
503	☐	P-711	0.01	0.08	Open	0
504	☐	P-712	0.00	0.02	Open	0
505	☐	P-716	0.00	0.00	Open	0
506	☐	P-718	0.56	1.13	Open	0
507	☐	P-721	0.00	0.00	Open	0
508	☐	P-723	0.00	0.00	Open	0
509	☐	P-726	0.00	0.00	Open	0
510	☐	P-728	0.00	0.00	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
511	☐	P-730	0.00	0.00	Open	0
512	☐	P-731	0.02	0.23	Open	0
513	☐	P-732	0.03	0.15	Open	0
514	☐	P-733	0.00	0.01	Open	0
515	☐	P-734	0.00	0.01	Open	0
516	☐	P-735	0.00	0.00	Open	0
517	☐	P-736	0.00	0.00	Open	0
518	☐	P-737	0.00	0.00	Open	0
519	☐	P-738	0.00	0.00	Open	0
520	☐	P-739	0.00	0.00	Open	0
521	☐	P-740	0.00	0.00	Open	0
522	☐	P-741	0.00	0.00	Open	0
523	☐	P-742	0.00	0.02	Open	0
524	☐	P-743	0.00	0.00	Open	0
525	☐	P-744	0.00	0.00	Open	0
526	☐	P-745	0.00	0.01	Open	0
527	☐	P-747	0.19	0.29	Open	0
528	☐	P-748	0.02	0.31	Open	0
529	☐	P-750	0.04	0.05	Open	0
530	☐	P-751	0.01	0.01	Open	0
531	☐	P-752	0.03	0.06	Open	0
532	☐	P-753	0.01	0.04	Open	0
533	☐	P-754	0.02	0.14	Open	0
534	☐	P-755	0.00	0.00	Open	0
535	☐	P-756	0.21	0.23	Open	0
536	☐	P-757	0.00	0.00	Open	0
537	☐	P-758	0.27	1.66	Open	0
538	☐	P-759	0.09	0.36	Open	0
539	☐	P-760	0.24	0.61	Open	0
540	☐	P-761	0.00	0.00	Open	0
541	☐	P-762	0.00	0.00	Open	0
542	☐	P-763	0.00	0.00	Open	0
543	☐	P-764	0.08	0.42	Open	0
544	☐	P-765	0.10	0.39	Open	0
545	☐	P-766	0.26	0.46	Open	0
546	☐	P-767	0.08	0.47	Open	0
547	☐	P-768	0.07	0.50	Open	0
548	☐	P-769	0.14	0.50	Open	0
549	☐	P-770	0.20	0.63	Open	0
550	☐	P-771	0.29	0.61	Open	0
551	☐	P-774	0.01	0.84	Open	0
552	☐	P-775	0.04	0.85	Open	0
553	☐	P-776	0.00	0.00	Open	0
554	☐	P-777	0.00	0.00	Open	0
555	☐	P-778	0.00	0.00	Open	0
556	☐	P-779	0.00	0.00	Open	0
557	☐	P-780	0.00	0.00	Open	0
558	☐	P-781	0.00	0.00	Open	0
559	☐	P-782	0.00	0.00	Open	0
560	☐	P-783	0.02	0.02	Open	0
561	☐	P-784	0.00	0.00	Closed	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
562	☐	P-785	0.28	2.07	Open	0
563	☐	P-786	0.02	0.03	Open	0
564	☐	P-788	0.07	0.07	Open	0
565	☐	P-789	0.00	0.02	Open	0
566	☐	P-790	0.02	0.12	Open	0
567	☐	P-791	0.07	0.40	Open	0
568	☐	P-792	0.27	0.32	Open	0
569	☐	P-793	0.08	0.21	Open	0
570	☐	P-794	0.00	0.00	Open	0
571	☐	P-795	0.00	0.00	Open	0
572	☐	P-796	0.01	0.02	Open	0
573	☐	P-797	0.00	0.00	Open	0
574	☐	P-798	0.12	0.61	Open	0
575	☐	P-799	0.16	0.59	Open	0
576	☐	P-800	0.05	0.33	Open	0
577	☐	P-801	0.00	0.00	Open	0
578	☐	P-802	0.01	0.33	Open	0
579	☐	P-803	0.02	0.35	Open	0
580	☐	P-804	0.00	0.00	Open	0
581	☐	P-805	0.00	0.02	Open	0
582	☐	P-806	0.00	0.00	Open	0
583	☐	P-807	0.79	1.62	Open	0
584	☐	P-808	0.01	0.01	Open	0
585	☐	P-810	0.02	1.83	Open	0
586	☐	P-811	0.01	0.01	Open	0
587	☐	P-812	0.00	0.00	Open	0
588	☐	P-813	0.00	0.00	Open	0
589	☐	P-814	0.00	0.00	Open	0
590	☐	P-815	0.00	0.00	Open	0
591	☐	P-816	0.00	0.00	Open	0
592	☐	P-818	0.00	0.05	Open	0
593	☐	P-819	0.01	0.07	Open	0
594	☐	P-820	0.00	0.04	Open	0
595	☐	P-821	0.12	0.65	Open	0
596	☐	P-822	0.00	0.01	Open	0
597	☐	P-823	0.09	0.54	Open	0
598	☐	P-824	0.67	1.86	Open	0
599	☐	P-825	0.07	1.93	Open	0
600	☐	P-826	0.00	0.00	Open	0
601	☐	P-828	0.04	0.20	Open	0
602	☐	P-829	2.20	1.60	Open	0
603	☐	P-832	0.00	0.02	Open	0
604	☐	P-833	0.00	0.01	Open	0
605	☐	P-834	0.00	0.01	Open	0
606	☐	P-836	0.08	0.10	Open	0
607	☐	P-837	0.00	0.00	Open	0
608	☐	P-838	0.00	0.00	Open	0
609	☐	P-839	0.00	0.00	Open	0
610	☐	P-840	0.00	0.00	Open	0
611	☐	P-841	0.00	0.00	Open	0
612	☐	P-842	0.00	0.00	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
613	☐	P-847	0.00	0.00	Open	0
614	☐	P-848	0.00	0.00	Open	0
615	☐	P-849	0.00	0.03	Open	0
616	☐	P-852	0.00	0.00	Open	0
617	☐	P-853	0.00	0.00	Open	0
618	☐	P-854	0.00	0.00	Open	0
619	☐	P-856	0.06	0.11	Open	0
620	☐	P-857	0.00	0.03	Open	0
621	☐	P-858	0.05	2.22	Open	0
622	☐	P-861	0.04	0.56	Open	0
623	☐	P-863	0.00	0.00	Open	0
624	☐	P-864	0.00	0.00	Open	0
625	☐	P-865	0.00	0.02	Open	0
626	☐	P-866	0.00	0.00	Open	0
627	☐	P-867	0.00	0.00	Open	0
628	☐	P-868	0.00	0.00	Open	0
629	☐	P-869	0.00	0.00	Open	0
630	☐	P-870	0.00	0.00	Open	0
631	☐	P-871	0.00	0.00	Open	0
632	☐	P-872	0.00	0.01	Open	0
633	☐	P-873	0.00	0.03	Open	0
634	☐	P-874	0.00	0.01	Open	0
635	☐	P-875	0.00	0.00	Open	0
636	☐	P-879	0.00	0.01	Open	0
637	☐	P-880	0.00	0.00	Open	0
638	☐	P-881	0.00	0.00	Open	0
639	☐	P-882	0.00	0.02	Open	0
640	☐	P-883	0.00	0.00	Open	0
641	☐	P-884	0.00	0.01	Open	0
642	☐	P-885	0.04	0.21	Open	0
643	☐	P-886	0.01	0.06	Open	0
644	☐	P-887	0.00	0.01	Open	0
645	☐	P-889	0.00	0.00	Open	0
646	☐	P-890	0.00	0.00	Open	0
647	☐	P-891	0.01	0.34	Open	0
648	☐	P-892	0.76	2.07	Open	0
649	☐	P-893	0.49	1.93	Open	0
650	☐	P-894	0.02	0.04	Open	0
651	☐	P-896	0.06	0.09	Open	0
652	☐	P-897	0.00	0.28	Open	0
653	☐	P-898	0.08	0.14	Open	0
654	☐	P-899	0.07	0.26	Open	0
655	☐	P-900	0.00	0.00	Open	0
656	☐	P-901	0.00	0.01	Open	0
657	☐	P-902	0.00	0.00	Open	0
658	☐	P-903	0.00	0.01	Open	0
659	☐	P-904	0.01	0.02	Open	0
660	☐	P-905	0.15	0.38	Open	0
661	☐	P-906	0.00	0.02	Open	0
662	☐	P-907	1.33	1.64	Open	0
663	☐	P-911	0.02	0.04	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
664	☐	P-912	0.00	0.00	Open	0
665	☐	P-913	0.00	0.00	Open	0
666	☐	P-914	9.02	10.26	Open	0
667	☐	P-916	0.00	0.00	Open	0
668	☐	P-917	0.00	0.01	Open	0
669	☐	P-922	0.00	0.00	Open	0
670	☐	P-923	0.27	0.56	Open	0
671	☐	P-925	0.01	0.04	Open	0
672	☐	P-927	0.00	0.01	Open	0
673	☐	P-928	0.01	0.05	Open	0
674	☐	P-929	0.00	0.00	Open	0
675	☐	P-931	0.00	0.01	Open	0
676	☐	P-932	0.06	0.09	Open	0
677	☐	P-933	0.00	0.00	Open	0
678	☐	P-934	0.01	0.01	Open	0
679	☐	P-936	0.00	0.01	Open	0
680	☐	P-937	0.00	0.01	Open	0
681	☐	P-938	0.00	0.01	Open	0
682	☐	P-939	0.00	0.00	Open	0
683	☐	P-940	0.01	0.01	Open	0
684	☐	P-941	0.00	0.00	Open	0
685	☐	P-942	0.01	0.03	Open	0
686	☐	P-943	0.00	0.00	Open	0
687	☐	P-944	0.00	0.00	Open	0
688	☐	P-945	0.00	0.00	Open	0
689	☐	P-946	0.00	0.00	Open	0
690	☐	P-947	0.00	0.00	Open	0
691	☐	P-949	0.00	0.01	Open	0
692	☐	P-951	0.00	0.08	Open	0
693	☐	P-953	0.01	0.07	Open	0
694	☐	P-954	0.02	0.63	Open	0
695	☐	P-955	0.00	0.05	Open	0
696	☐	P-956	0.00	0.01	Open	0
697	☐	P-957	0.62	0.61	Open	0
698	☐	P-959	0.14	0.11	Open	0
699	☐	P-960	0.00	0.01	Open	0
700	☐	P-961	0.26	0.17	Open	0
701	☐	P-962	0.00	0.01	Open	0
702	☐	P-963	0.20	0.66	Open	0
703	☐	P-964	5.12	0.49	Open	0
704	☐	P-965	0.28	0.37	Open	0
705	☐	P-966	0.00	0.00	Open	0
706	☐	P-967	0.03	0.10	Open	0
707	☐	P-968	0.01	0.01	Open	0
708	☐	P-970	0.00	0.00	Open	0
709	☐	P-971	0.00	0.01	Open	0
710	☐	P-973	0.21	0.42	Open	0
711	☐	P-974	0.00	0.00	Open	0
712	☐	P-975	0.02	0.03	Open	0
713	☐	P-976	0.00	0.01	Open	0
714	☐	P-977	0.00	0.01	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
715	☐	P-978	0.00	0.00	Open	0
716	☐	P-979	0.00	0.00	Open	0
717	☐	P-980	0.00	0.00	Open	0
718	☐	P-990	0.00	0.00	Open	0
719	☐	P-992	0.00	0.00	Open	0
720	☐	P-993	0.00	0.00	Open	0
721	☐	P-994	0.00	0.00	Open	0
722	☐	P-995	0.06	0.12	Open	0
723	☐	P-996	0.04	0.99	Open	0
724	☐	P-997	0.01	0.15	Open	0
725	☐	P-998	0.01	0.06	Open	0
726	☐	P-999	1.04	15.30	Open	0
727	☐	P1001	0.00	0.00	Closed	0
728	☐	P1003	0.00	0.15	Open	0
729	☐	P1005	0.00	0.00	Closed	0
730	☐	P1007	0.00	0.00	Open	0
731	☐	P1009	0.00	0.00	Open	0
732	☐	P101	0.00	0.00	Open	0
733	☐	P1011	0.72	0.53	Open	0
734	☐	P1013	0.00	0.00	Open	0
735	☐	P1015	0.00	0.04	Open	0
736	☐	P103	0.00	0.12	Open	0
737	☐	P1031	0.02	0.05	Open	0
738	☐	P1039	0.11	0.36	Open	0
739	☐	P1041	0.00	0.00	Open	0
740	☐	P1045	0.01	0.03	Open	0
741	☐	P1047	0.00	0.00	Open	0
742	☐	P1049	0.00	0.00	Open	0
743	☐	P105	0.10	1.52	Open	0
744	☐	P1051	0.02	0.07	Open	0
745	☐	P107	20.61	8.64	Open	0
746	☐	P109	0.06	3.57	Open	0
747	☐	P111	0.02	3.57	Open	0
748	☐	P1129	0.00	0.15	Open	0
749	☐	P1131	0.13	2.61	Open	0
750	☐	P1133	0.30	0.64	Open	0
751	☐	P1135	0.24	0.79	Open	0
752	☐	P1141	0.02	0.06	Open	0
753	☐	P1147	0.01	0.03	Open	0
754	☐	P1157	0.08	0.49	Open	0
755	☐	P1159	0.00	0.00	Open	0
756	☐	P1161	0.00	0.00	Open	0
757	☐	P1163	0.00	0.00	Open	0
758	☐	P1165	0.00	0.00	Open	0
759	☐	P1167	0.00	0.00	Open	0
760	☐	P1169	0.00	0.00	Open	0
761	☐	P1171	0.00	0.00	Open	0
762	☐	P1173	0.11	0.84	Open	0
763	☐	P1175	0.02	0.09	Open	0
764	☐	P1177	0.06	0.32	Open	0
765	☐	P1179	0.13	0.14	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
766	☐	P1181	0.07	0.08	Open	0
767	☐	P1183	0.07	0.08	Open	0
768	☐	P1185	0.01	0.09	Open	0
769	☐	P1187	0.01	0.06	Open	0
770	☐	P1189	0.00	0.02	Open	0
771	☐	P1191	0.02	0.06	Open	0
772	☐	P1193	0.01	0.02	Open	0
773	☐	P1199	0.00	0.02	Open	0
774	☐	P1201	0.00	0.01	Open	0
775	☐	P1203	0.02	0.09	Open	0
776	☐	P1205	0.00	0.00	Open	0
777	☐	P1207	0.00	0.00	Open	0
778	☐	P1209	0.00	0.01	Open	0
779	☐	P1211	0.00	0.00	Open	0
780	☐	P1213	0.00	0.00	Open	0
781	☐	P1215	0.04	0.04	Open	0
782	☐	P1217	0.03	0.03	Open	0
783	☐	P1219	0.87	1.14	Open	0
784	☐	P1221	0.02	0.22	Open	0
785	☐	P1225	0.16	0.74	Open	0
786	☐	P1227	0.14	0.35	Open	0
787	☐	P1229	1.86	28.80	Open	0
788	☐	P1231	0.53	7.09	Open	0
789	☐	P129	0.00	0.10	Open	0
790	☐	P131	0.02	0.04	Open	0
791	☐	P133	0.01	1.22	Open	0
792	☐	P137	0.36	1.70	Open	0
793	☐	P139	0.11	0.56	Open	0
794	☐	P143	0.03	3.46	Open	0
795	☐	P145	0.02	0.09	Open	0
796	☐	P15	1.45	0.49	Open	0
797	☐	P153	0.00	0.02	Open	0
798	☐	P155	0.00	0.00	Open	0
799	☐	P157	0.00	0.00	Open	0
800	☐	P159	0.00	0.02	Open	0
801	☐	P161	0.00	0.06	Open	0
802	☐	P163	0.17	0.28	Open	0
803	☐	P165	0.17	0.97	Open	0
804	☐	P167	1.57	0.98	Open	0
805	☐	P169	0.22	0.43	Open	0
806	☐	P17	0.02	0.04	Open	0
807	☐	P171	0.01	0.03	Open	0
808	☐	P173	0.05	0.09	Open	0
809	☐	P175	0.01	0.04	Open	0
810	☐	P179	0.04	0.14	Open	0
811	☐	P181	0.00	0.01	Open	0
812	☐	P183	0.00	0.00	Open	0
813	☐	P185	0.00	0.00	Open	0
814	☐	P187	0.03	0.04	Open	0
815	☐	P189	0.00	0.00	Open	0
816	☐	P19	0.00	0.04	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
817		P191	0.02	0.15	Open	0
818		P193	0.54	1.03	Open	0
819		P195	0.00	0.10	Open	0
820		P197	0.03	1.45	Open	0
821		P199	0.03	0.09	Open	0
822		P201	0.30	0.97	Open	0
823		P203	0.05	0.46	Open	0
824		P205	0.27	0.68	Open	0
825		P207	0.09	0.81	Open	0
826		P209	0.03	0.38	Open	0
827		P21	0.13	0.66	Open	0
828		P211	0.01	0.01	Open	0
829		P213	0.10	0.16	Open	0
830		P215	0.01	0.03	Open	0
831		P217	0.00	0.00	Open	0
832		P219	0.00	0.00	Open	0
833		P221	0.01	0.11	Open	0
834		P223	0.01	0.64	Open	0
835		P225	0.01	0.14	Open	0
836		P227	0.86	2.95	Open	0
837		P23	0.20	0.66	Open	0
838		P231	1.68	0.38	Open	0
839		P233	0.45	0.28	Open	0
840		P235	0.59	0.53	Open	0
841		P237	0.00	0.00	Open	0
842		P239	0.01	0.04	Open	0
843		P241	0.00	0.04	Open	0
844		P243	0.03	0.06	Open	0
845		P245	0.00	0.00	Open	0
846		P247	0.00	0.00	Open	0
847		P249	0.15	0.32	Open	0
848		P251	0.04	0.32	Open	0
849		P253	0.41	1.38	Open	0
850		P255	0.55	0.82	Open	0
851		P257	0.48	0.73	Open	0
852		P259	0.00	0.00	Open	0
853		P261	0.00	0.01	Open	0
854		P263	0.00	0.00	Open	0
855		P265	0.00	0.00	Open	0
856		P267	0.05	0.14	Open	0
857		P271	0.00	0.00	Open	0
858		P273	0.00	0.00	Open	0
859		P277	0.00	0.00	Open	0
860		P279	0.00	0.00	Open	0
861		P281	0.02	0.02	Open	0
862		P283	0.05	0.16	Open	0
863		P285	0.00	0.00	Open	0
864		P287	0.02	0.02	Open	0
865		P289	0.00	0.00	Open	0
866		P29	0.06	0.17	Open	0
867		P291	0.00	0.01	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
868	☐	P293	0.00	0.00	Open	0
869	☐	P295	0.00	0.00	Open	0
870	☐	P297	0.02	0.04	Open	0
871	☐	P301	2.60	2.12	Open	0
872	☐	P303	0.00	0.00	Open	0
873	☐	P305	0.00	0.23	Open	0
874	☐	P309	0.00	0.00	Open	0
875	☐	P31	0.24	0.24	Open	0
876	☐	P313	0.05	1.27	Open	0
877	☐	P315	0.01	0.42	Open	0
878	☐	P319	0.02	0.07	Open	0
879	☐	P321	0.24	0.33	Open	0
880	☐	P323	0.03	0.08	Open	0
881	☐	P325	0.05	0.10	Open	0
882	☐	P329	0.01	0.17	Open	0
883	☐	P33	0.00	0.15	Open	0
884	☐	P335	0.00	0.01	Open	0
885	☐	P337	0.00	0.00	Open	0
886	☐	P339	0.02	0.09	Open	0
887	☐	P341	0.02	0.08	Open	0
888	☐	P343	0.00	0.00	Open	0
889	☐	P345	0.05	0.28	Open	0
890	☐	P347	0.08	0.64	Open	0
891	☐	P349	0.26	0.90	Open	0
892	☐	P35	0.19	0.15	Open	0
893	☐	P353	0.02	0.03	Open	0
894	☐	P355	0.15	0.32	Open	0
895	☐	P357	0.00	0.00	Open	0
896	☐	P359	0.00	0.00	Open	0
897	☐	P361	0.00	0.00	Open	0
898	☐	P363	0.01	0.04	Open	0
899	☐	P365	0.01	0.05	Open	0
900	☐	P367	0.00	0.01	Open	0
901	☐	P369	0.00	0.00	Open	0
902	☐	P37	0.01	0.51	Open	0
903	☐	P371	0.00	0.00	Open	0
904	☐	P373	0.00	0.00	Open	0
905	☐	P375	0.00	0.00	Open	0
906	☐	P377	0.00	0.00	Open	0
907	☐	P379	0.00	0.00	Open	0
908	☐	P381	2.09	1.67	Open	0
909	☐	P383	0.22	1.67	Open	0
910	☐	P387	0.07	0.52	Open	0
911	☐	P389	0.00	0.00	Open	0
912	☐	P39	0.16	0.12	Open	0
913	☐	P391	0.00	0.00	Open	0
914	☐	P393	0.00	0.00	Open	0
915	☐	P395	0.03	0.03	Open	0
916	☐	P397	0.00	0.01	Open	0
917	☐	P399	0.00	0.01	Open	0
918	☐	P401	0.00	0.00	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
919	☐	P403	0.00	0.00	Open	0
920	☐	P405	0.00	0.00	Open	0
921	☐	P409	0.00	0.00	Open	0
922	☐	P41	0.00	0.09	Open	0
923	☐	P411	0.00	0.00	Open	0
924	☐	P413	0.00	0.00	Open	0
925	☐	P415	0.00	0.00	Open	0
926	☐	P417	0.00	0.01	Open	0
927	☐	P419	0.00	0.00	Open	0
928	☐	P421	0.00	0.00	Open	0
929	☐	P423	0.00	0.00	Open	0
930	☐	P425	0.01	0.02	Open	0
931	☐	P427	0.00	0.00	Open	0
932	☐	P429	0.02	0.19	Open	0
933	☐	P43	0.01	0.02	Open	0
934	☐	P431	0.08	0.16	Open	0
935	☐	P433	0.74	0.91	Open	0
936	☐	P435	0.01	0.07	Open	0
937	☐	P439	0.03	0.18	Open	0
938	☐	P443	0.10	0.31	Open	0
939	☐	P445	0.00	0.00	Open	0
940	☐	P447	0.01	0.03	Open	0
941	☐	P449	5.34	9.98	Open	0
942	☐	P45	0.02	0.06	Open	0
943	☐	P451	0.00	0.01	Open	0
944	☐	P453	0.00	0.00	Open	0
945	☐	P455	0.00	0.00	Open	0
946	☐	P457	0.00	0.00	Open	0
947	☐	P459	0.02	0.08	Open	0
948	☐	P461	0.08	0.26	Open	0
949	☐	P463	0.03	0.05	Open	0
950	☐	P465	0.01	0.02	Open	0
951	☐	P467	0.07	0.07	Open	0
952	☐	P469	0.00	0.00	Open	0
953	☐	P471	0.01	0.05	Open	0
954	☐	P473	0.00	0.01	Open	0
955	☐	P475	0.00	0.01	Open	0
956	☐	P477	0.03	0.05	Open	0
957	☐	P479	0.02	0.06	Open	0
958	☐	P481	0.02	0.07	Open	0
959	☐	P483	0.05	0.07	Open	0
960	☐	P485	0.01	0.08	Open	0
961	☐	P487	0.12	0.12	Open	0
962	☐	P489	0.07	0.42	Open	0
963	☐	P49	0.00	0.04	Open	0
964	☐	P491	0.00	0.02	Open	0
965	☐	P493	0.05	0.07	Open	0
966	☐	P497	0.00	0.00	Open	0
967	☐	P499	0.00	0.01	Open	0
968	☐	P501	0.01	0.01	Open	0
969	☐	P503	0.00	0.00	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
970	☐	P505	0.00	0.00	Open	0
971	☐	P507	0.00	0.00	Open	0
972	☐	P509	0.00	0.00	Open	0
973	☐	P51	0.00	0.00	Closed	0
974	☐	P511	0.00	0.00	Open	0
975	☐	P513	0.00	0.01	Open	0
976	☐	P515	0.22	15.30	Open	0
977	☐	P517	0.22	15.30	Open	0
978	☐	P519	0.04	0.10	Open	0
979	☐	P521	0.00	0.00	Open	0
980	☐	P527	0.00	0.00	Open	0
981	☐	P531	0.00	0.00	Open	0
982	☐	P533	0.00	0.00	Open	0
983	☐	P535	0.01	0.03	Open	0
984	☐	P537	0.04	0.08	Open	0
985	☐	P539	0.52	1.61	Open	0
986	☐	P541	0.53	1.51	Open	0
987	☐	P543	0.99	7.09	Open	0
988	☐	P545	0.17	0.98	Open	0
989	☐	P549	0.31	0.97	Open	0
990	☐	P553	0.46	0.68	Open	0
991	☐	P555	0.01	0.03	Open	0
992	☐	P557	0.01	0.08	Open	0
993	☐	P565	0.01	0.04	Open	0
994	☐	P569	0.07	2.95	Open	0
995	☐	P579	0.00	0.03	Open	0
996	☐	P59	0.00	0.41	Open	0
997	☐	P591	0.49	0.94	Open	0
998	☐	P593	0.00	0.01	Open	0
999	☐	P599	0.00	0.00	Closed	0
1000	☐	P609	0.00	0.02	Open	0
1001	☐	P61	0.00	0.02	Open	0
1002	☐	P611	0.00	0.00	Open	0
1003	☐	P613	0.00	0.00	Open	0
1004	☐	P615	0.01	0.03	Open	0
1005	☐	P617	0.00	0.05	Open	0
1006	☐	P619	3.36	4.81	Open	0
1007	☐	P621	2.02	3.20	Open	0
1008	☐	P623	0.09	0.19	Open	0
1009	☐	P627	0.10	0.32	Open	0
1010	☐	P629	0.19	0.29	Open	0
1011	☐	P63	0.61	0.59	Open	0
1012	☐	P631	0.00	0.00	Open	0
1013	☐	P633	1.14	2.98	Open	0
1014	☐	P635	0.02	1.94	Open	0
1015	☐	P639	0.00	0.00	Open	0
1016	☐	P643	0.02	0.02	Open	0
1017	☐	P645	0.00	0.00	Open	0
1018	☐	P647	0.00	0.00	Open	0
1019	☐	P649	0.00	0.00	Open	0
1020	☐	P65	0.00	0.18	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
1021	☐	P651	0.00	0.00	Open	0
1022	☐	P653	0.00	0.00	Open	0
1023	☐	P655	0.08	0.08	Open	0
1024	☐	P659	0.25	0.60	Open	0
1025	☐	P661	0.00	0.00	Open	0
1026	☐	P667	0.04	1.12	Open	0
1027	☐	P673	0.03	0.21	Open	0
1028	☐	P675	0.01	0.06	Open	0
1029	☐	P677	0.15	0.54	Open	0
1030	☐	P679	0.00	0.00	Open	0
1031	☐	P681	0.00	0.00	Open	0
1032	☐	P683	0.00	0.00	Open	0
1033	☐	P685	0.00	0.00	Open	0
1034	☐	P687	0.00	0.00	Open	0
1035	☐	P689	0.00	0.00	Open	0
1036	☐	P69	0.00	0.04	Open	0
1037	☐	P697	0.64	0.91	Open	0
1038	☐	P699	0.00	0.01	Open	0
1039	☐	P703	0.00	0.00	Open	0
1040	☐	P705	0.00	0.00	Open	0
1041	☐	P707	0.00	0.00	Open	0
1042	☐	P709	0.00	0.00	Open	0
1043	☐	P711	0.00	0.00	Open	0
1044	☐	P713	0.00	0.00	Open	0
1045	☐	P717	0.00	0.00	Open	0
1046	☐	P719	0.00	0.00	Open	0
1047	☐	P723	0.05	0.70	Open	0
1048	☐	P73	0.00	0.01	Open	0
1049	☐	P731	0.01	0.36	Open	0
1050	☐	P733	0.01	0.36	Open	0
1051	☐	P735	0.00	0.00	Open	0
1052	☐	P737	0.03	3.57	Open	0
1053	☐	P739	0.00	0.00	Open	0
1054	☐	P743	0.38	1.14	Open	0
1055	☐	P745	0.00	0.00	Open	0
1056	☐	P747	0.00	0.04	Open	0
1057	☐	P749	0.00	0.04	Open	0
1058	☐	P751	0.00	0.00	Open	0
1059	☐	P753	0.00	0.00	Open	0
1060	☐	P755	0.00	0.00	Closed	0
1061	☐	P757	0.00	0.00	Open	0
1062	☐	P759	0.00	0.00	Open	0
1063	☐	P761	0.00	0.00	Open	0
1064	☐	P763	0.00	0.01	Open	0
1065	☐	P765	0.00	0.01	Open	0
1066	☐	P773	0.00	0.00	Open	0
1067	☐	P775	0.01	0.03	Open	0
1068	☐	P777	0.06	0.21	Open	0
1069	☐	P779	0.00	0.00	Open	0
1070	☐	P781	0.00	0.00	Open	0
1071	☐	P783	0.01	0.02	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
1072	☐	P785	0.03	0.05	Open	0
1073	☐	P787	0.00	0.01	Open	0
1074	☐	P789	0.11	0.16	Open	0
1075	☐	P79	0.00	0.03	Open	0
1076	☐	P791	0.07	0.44	Open	0
1077	☐	P793	0.11	0.23	Open	0
1078	☐	P795	0.02	0.03	Open	0
1079	☐	P797	0.04	0.25	Open	0
1080	☐	P799	0.00	0.04	Open	0
1081	☐	P801	0.02	0.08	Open	0
1082	☐	P803	0.03	0.15	Open	0
1083	☐	P805	0.00	0.00	Open	0
1084	☐	P807	0.00	0.00	Open	0
1085	☐	P809	0.05	0.12	Open	0
1086	☐	P811	0.02	2.06	Open	0
1087	☐	P813	0.01	0.42	Open	0
1088	☐	P815	0.25	1.27	Open	0
1089	☐	P817	0.00	0.00	Open	0
1090	☐	P819	0.00	0.00	Open	0
1091	☐	P821	0.14	11.69	Open	0
1092	☐	P823	0.18	11.69	Open	0
1093	☐	P825	0.00	0.00	Open	0
1094	☐	P827	0.13	11.68	Open	0
1095	☐	P829	0.01	0.00	Open	0
1096	☐	P83	0.00	0.01	Open	0
1097	☐	P831	0.01	1.83	Open	0
1098	☐	P843	0.00	0.00	Open	0
1099	☐	P845	0.21	15.30	Open	0
1100	☐	P865	0.01	0.07	Open	0
1101	☐	P867	0.04	0.06	Open	0
1102	☐	P869	0.31	0.69	Open	0
1103	☐	P87	0.01	0.29	Open	0
1104	☐	P871	0.00	0.00	Open	0
1105	☐	P873	0.00	0.00	Open	0
1106	☐	P875	0.00	0.00	Open	0
1107	☐	P877	0.00	0.00	Open	0
1108	☐	P879	0.00	0.00	Open	0
1109	☐	P881	0.00	0.00	Open	0
1110	☐	P883	0.00	0.00	Open	0
1111	☐	P885	0.00	0.00	Open	0
1112	☐	P887	0.00	0.00	Open	0
1113	☐	P889	0.08	3.43	Open	0
1114	☐	P89	0.04	0.13	Open	0
1115	☐	P891	0.07	3.43	Open	0
1116	☐	P893	0.00	0.38	Open	0
1117	☐	P895	0.00	0.00	Open	0
1118	☐	P897	0.00	0.00	Open	0
1119	☐	P899	0.06	0.47	Open	0
1120	☐	P901	0.00	0.00	Closed	0
1121	☐	P903	0.01	0.47	Open	0
1122	☐	P905	0.01	0.47	Open	0

		ID	Headloss (ft)	HL/1000 (ft/k-ft)	Status	Flow Reversal Count
1123	☐	P907	0.01	0.47	Open	0
1124	☐	P909	0.01	0.47	Open	0
1125	☐	P91	0.02	0.08	Open	0
1126	☐	P911	0.12	1.96	Open	0
1127	☐	P913	0.12	1.96	Open	0
1128	☐	P915	0.00	0.00	Open	0
1129	☐	P917	0.00	0.00	Open	0
1130	☐	P919	0.00	0.00	Open	0
1131	☐	P921	0.00	0.00	Open	0
1132	☐	P923	0.00	0.00	Open	0
1133	☐	P925	0.00	0.00	Open	0
1134	☐	P927	0.00	0.00	Open	0
1135	☐	P929	0.00	0.00	Closed	0
1136	☐	P93	0.00	0.00	Closed	0
1137	☐	P931	0.02	1.10	Open	0
1138	☐	P933	0.00	0.00	Open	0
1139	☐	P935	0.01	1.10	Open	0
1140	☐	P937	0.01	1.10	Open	0
1141	☐	P939	0.00	0.00	Open	0
1142	☐	P941	0.00	0.00	Open	0
1143	☐	P943	0.00	0.00	Open	0
1144	☐	P945	0.00	0.00	Open	0
1145	☐	P947	0.00	0.00	Open	0
1146	☐	P949	0.00	0.00	Open	0
1147	☐	P951	0.01	0.01	Open	0
1148	☐	P953	0.00	0.00	Open	0
1149	☐	P955	0.00	0.00	Open	0
1150	☐	P957	0.00	0.00	Open	0
1151	☐	P959	0.00	0.00	Open	0
1152	☐	P961	0.00	0.00	Open	0
1153	☐	P963	0.00	0.00	Closed	0
1154	☐	P965	0.31	1.13	Open	0
1155	☐	P967	0.00	0.00	Open	0
1156	☐	P969	0.65	23.13	Open	0
1157	☐	P971	0.58	23.13	Open	0
1158	☐	P973	0.00	0.05	Open	0
1159	☐	P975	0.00	0.00	Closed	0
1160	☐	P977	0.00	0.00	Closed	0
1161	☐	P979	0.00	0.00	Closed	0
1162	☐	P981	0.00	0.00	Closed	0
1163	☐	P983	0.00	0.00	Open	0
1164	☐	P985	0.00	0.03	Open	0
1165	☐	P987	0.15	0.54	Open	0
1166	☐	P989	0.00	0.00	Open	0
1167	☐	P99	0.00	0.02	Open	0
1168	☐	P991	0.00	0.00	Open	0
1169	☐	P993	0.00	0.00	Open	0
1170	☐	P995	0.00	0.00	Open	0
1171	☐	P997	0.00	0.00	Open	0
1172	☐	P999	0.00	0.00	Open	0

		ID	Flow (gpm)	Elevation (ft)	Head (ft)	% Full (%)	Level (ft)	Overflow Volume (ft3)
1	☐	SOLANA_RES	-838.72	662.00	676.76	82.00	14.76	0.00
2	☐	T5000	-160.36	430.00	475.90	90.00	45.90	0.00
3	☐	T5002	-2,314.80	391.00	415.66	85.03	24.66	0.00

		ID	Total Overflow Volume (ft3)
1	☐	SOLANA_RES	0.00
2	☐	T5000	0.00
3	☐	T5002	0.00

		ID	Diameter (in)	Elevation (ft)	Upstream Pressure (psi)	Downstream Pressure (psi)	Flow (gpm)
1	☐	PW_WELL_1	6.00	106.00	116.62	104.65	600.00
2	☐	PW_WELL_2	6.00	94.00	122.62	109.19	0.00
3	☐	PW_WELL_3	6.00	100.00	120.02	106.59	0.00
4	☐	SILB_1_FCV	6.00	310.00	51.94	45.30	300.00
5	☐	SILB_2_FCV	6.00	310.00	52.00	45.16	0.00
6	☐	SILB_3_FCV	6.00	310.00	52.00	45.08	0.00
7	☐	V8000	12.00	490.00	-0.00	-29.72	350.00
8	☐	V8002	2.00	239.00	65.88	48.99	0.00
9	☐	V8004	8.00	239.00	65.87	49.00	1,203.67
10	☐	V8006	8.00	239.00	74.83	45.00	68.29
11	☐	V8008	2.00	239.00	74.83	45.00	0.00
12	☐	V8010	2.00	230.00	78.73	78.73	0.00
13	☐	V8012	6.00	230.00	78.73	78.73	25.18
14	☐	V8014	8.00	250.00	70.61	44.00	219.34
15	☐	V8016	2.00	250.00	70.61	44.00	0.00
16	☐	V8018	2.00	254.00	118.46	52.04	307.69
17	☐	V8020	6.00	254.00	118.49	52.00	380.20
18	☐	V8022	2.00	266.00	113.54	46.78	0.00
19	☐	V8024	6.00	266.00	113.54	46.78	0.00
20	☐	V8026	2.00	462.00	91.96	29.94	0.00
21	☐	V8028	8.00	462.00	91.91	30.00	785.70
22	☐	V8036	3.00	243.00	56.46	44.90	0.00
23	☐	V8038	8.00	243.00	56.37	45.00	908.66
24	☐	V8044	6.00	222.00	67.01	53.00	248.85
25	☐	V8046	2.00	222.00	67.02	53.00	0.00
26	☐	V8048	8.00	660.00	56.00	7.53	1,135.98
27	☐	V8050	6.00	250.00	70.61	70.61	0.00
28	☐	V8052	6.00	250.00	44.00	44.00	0.00

		ID	Velocity (ft/s)	Headloss (ft)	Status	Setting
1	☐	PW_WELL_1	6.81	27.63	Active	600.00
2	☐	PW_WELL_2	0.00	0.00	Closed	0.00
3	☐	PW_WELL_3	0.00	0.00	Closed	0.00
4	☐	SILB_1_FCV	3.40	15.33	Active	300.00
5	☐	SILB_2_FCV	0.00	0.00	Closed	0.00
6	☐	SILB_3_FCV	0.00	0.00	Closed	0.00
7	☐	V8000	0.99	68.58	Active	350.00
8	☐	V8002	0.00	0.00	Closed	0.00
9	☐	V8004	7.68	38.93	Active	49.00
10	☐	V8006	0.44	68.84	Active	45.00
11	☐	V8008	0.00	0.00	Closed	0.00
12	☐	V8010	0.00	0.00	Closed	0.00
13	☐	V8012	0.29	0.01	Open	0.00
14	☐	V8014	1.40	61.40	Active	44.00
15	☐	V8016	0.00	0.00	Closed	0.00
16	☐	V8018	31.42	153.30	Open	68.00
17	☐	V8020	4.31	153.46	Active	52.00
18	☐	V8022	0.00	0.00	Closed	0.00
19	☐	V8024	0.00	0.00	Closed	0.00
20	☐	V8026	0.00	0.00	Closed	0.00
21	☐	V8028	5.01	142.87	Active	30.00
22	☐	V8036	0.00	0.00	Closed	0.00
23	☐	V8038	5.80	26.25	Active	45.00
24	☐	V8044	2.82	32.34	Active	53.00
25	☐	V8046	0.00	0.00	Closed	0.00
26	☐	V8048	7.25	111.86	Active	56.00
27	☐	V8050	0.00	0.00	Open	78.00
28	☐	V8052	0.00	0.00	Open	40.00

LEGEND:

- JUNCTION MEETS MDD + 1000 GPM FF REQUIREMENT
- JUNCTION DOES NOT MEET MDD + 1000 GPM FF REQUIREMENT
- INACTIVE JUNCTION
- ACTIVE PIPE
- INACTIVE PIPE

N

4,000 2,000 0 Feet

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

SHEET X OF X

DATE JUNE 2021 | SCALE AS SHOWN | PROJECT 2020-016

City of Sequim
WASHINGTON
CLALLAM COUNTY

FIGURE 5A: 2041 MAXIMUM DAY DEMAND + 1000 GPM FF

CITY OF SEQUIM

WILSON ENGINEERING

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
1	☐	J100	1,004.46	3,210.25	J334	17.73	32.80	20.00	2,950.92	24.67
2	☐	J1000	1,001.67	1,627.96	J1000	20.00	41.90	20.00	1,627.96	20.00
3	☐	J1006	1,002.42	3,006.53	J1552	16.24	34.82	20.00	2,727.96	25.18
4	☐	J1014	1,006.17	3,837.41	J1014	20.00	87.28	20.00	3,837.40	20.10
5	☐	J1016	1,003.70	5,014.32	J1016	20.00	97.57	20.00	5,014.33	20.00
6	☐	J1018	1,008.42	3,225.52	J1018	20.00	92.50	20.00	3,225.52	20.03
7	☐	J102	1,004.09	3,172.27	J334	7.02	31.42	20.00	2,209.25	33.64
8	☐	J1020	1,002.83	5,344.65	J2632	16.07	88.68	20.00	5,226.97	24.31
9	☐	J1022	1,000.00	4,701.27	J1022	20.00	98.46	20.00	4,701.28	20.00
10	☐	J1030	1,000.00	5,114.26	J1030	20.00	108.74	20.00	5,114.26	20.01
11	☐	J1044	1,000.53	2,705.81	J54	17.79	36.75	20.00	2,570.52	23.99
12	☐	J1048	1,001.00	2,685.71	J54	17.46	36.67	20.00	2,533.26	23.35
13	☐	J1050	1,000.96	2,563.84	J1056	18.70	44.83	20.00	2,508.62	21.30
14	☐	J1052	1,002.54	2,659.30	J54	18.04	36.69	20.00	2,540.62	22.75
15	☐	J1054	1,005.72	2,478.94	J1054	20.00	45.35	20.00	2,478.93	20.06
16	☐	J1056	1,005.23	2,147.30	J1056	20.00	42.88	20.00	2,147.30	20.03
17	☐	J1058	1,001.28	2,410.41	J1056	19.13	44.21	20.00	2,375.28	20.91
18	☐	J106	1,003.15	2,502.52	J334	10.16	30.29	20.00	1,873.37	29.84
19	☐	J1064	1,000.20	3,503.60	J1324	19.51	40.57	20.00	3,465.48	20.52
20	☐	J1068	1,000.53	3,709.69	J1324	17.52	40.63	20.00	3,518.72	22.57
21	☐	J1074	1,000.00	1,572.28	J1074	20.00	37.01	20.00	1,572.28	20.04
22	☐	J1076	1,000.87	1,578.69	J1076	20.00	36.93	20.00	1,578.69	20.02
23	☐	J108	1,007.41	1,086.09	J2138	12.77	15.43	20.00	859.31	29.46
24	☐	J1080	1,001.40	3,708.26	J1974	18.96	46.06	20.00	3,639.11	21.07
25	☐	J1096	1,000.00	2,851.05	J1096	20.00	30.39	20.00	2,851.05	20.00
26	☐	J1098	1,000.00	2,624.18	J1098	20.00	30.93	20.00	2,624.18	20.01
27	☐	J1102	1,003.03	6,231.56	J334	10.13	33.81	20.00	4,875.95	34.35
28	☐	J1106	1,003.30	6,836.80	J334	16.59	34.14	20.00	6,246.05	27.75
29	☐	J1110	1,000.39	4,499.60	J642	18.67	74.61	20.00	4,444.17	21.34
30	☐	J1112	1,000.00	4,460.98	J1112	20.00	74.74	20.00	4,460.98	19.97
31	☐	J1114	1,000.00	4,460.98	J1114	20.00	74.74	20.00	4,460.98	19.97
32	☐	J1116	1,004.29	4,517.41	J1116	20.00	74.16	20.00	4,517.41	19.98
33	☐	J1118	1,000.96	2,667.00	J2020	12.15	40.32	20.00	2,314.77	27.84
34	☐	J1120	1,010.66	978.78	J2020	18.70	17.06	20.00	952.88	21.30
35	☐	J1128	1,000.69	4,766.87	J1128	20.00	94.04	20.00	4,766.87	20.01

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
36	☐	J1130	1,000.90	4,533.82	J1130	20.00	94.76	20.00	4,533.82	20.00
37	☐	J1132	1,000.12	4,706.67	J1132	20.00	93.74	20.00	4,706.68	20.00
38	☐	J1134	1,000.18	4,652.80	J1134	20.00	93.85	20.00	4,652.81	20.00
39	☐	J1138	1,000.10	4,638.48	J1138	20.00	94.96	20.00	4,638.48	20.00
40	☐	J1140	1,001.16	4,647.23	J1140	20.00	96.00	20.00	4,647.24	20.00
41	☐	J1144	1,000.81	4,542.42	J1144	20.00	95.02	20.00	4,542.42	20.00
42	☐	J1146	1,000.57	4,626.73	J1146	20.00	95.82	20.00	4,626.74	20.00
43	☐	J1148	1,001.46	4,683.06	J1148	20.00	97.57	20.00	4,683.06	20.00
44	☐	J1150	1,000.63	4,609.68	J1150	20.00	96.28	20.00	4,609.68	20.00
45	☐	J1152	1,000.89	4,648.14	J1152	20.00	94.99	20.00	4,648.15	20.00
46	☐	J1154	1,000.85	4,569.05	J1154	20.00	95.72	20.00	4,569.06	20.00
47	☐	J1158	1,001.04	4,493.69	J1158	20.00	97.18	20.00	4,493.67	20.17
48	☐	J1160	1,000.94	4,749.21	J1160	20.00	98.50	20.00	4,749.21	20.00
49	☐	J1164	1,002.65	4,812.99	J1164	20.00	99.28	20.00	4,813.00	20.01
50	☐	J1166	1,000.63	4,666.37	J1166	20.00	97.72	20.00	4,666.37	20.00
51	☐	J1168	1,000.79	4,683.28	J1168	20.00	98.14	20.00	4,683.28	20.00
52	☐	J1170	1,002.40	2,751.10	J54	17.04	36.74	20.00	2,571.08	25.19
53	☐	J1172	1,002.03	2,580.85	J54	19.79	36.73	20.00	2,567.63	20.39
54	☐	J1174	1,002.14	2,857.59	J54	14.86	36.71	20.00	2,555.63	27.45
55	☐	J1176	1,003.24	2,645.48	J54	18.58	36.71	20.00	2,558.56	22.42
56	☐	J1178	1,003.62	2,603.15	J54	19.38	36.72	20.00	2,564.71	21.22
57	☐	J118	1,015.22	1,051.42	J2138	14.23	15.43	20.00	867.07	32.70
58	☐	J1180	1,002.26	2,608.76	J54	19.31	36.72	20.00	2,566.13	21.38
59	☐	J1182	1,001.04	2,633.70	J54	18.90	36.72	20.00	2,565.67	22.21
60	☐	J1184	1,001.10	2,653.90	J54	18.59	36.73	20.00	2,566.70	22.83
61	☐	J1186	1,001.26	2,669.77	J54	18.34	36.73	20.00	2,567.73	23.28
62	☐	J1188	1,001.18	2,726.93	J54	17.42	36.73	20.00	2,569.33	24.83
63	☐	J1190	1,001.55	2,700.35	J54	17.85	36.73	20.00	2,568.58	24.21
64	☐	J1192	1,001.95	2,617.98	J54	19.14	36.72	20.00	2,564.67	21.51
65	☐	J1194	1,001.04	2,547.35	J1194	20.00	52.00	20.00	2,547.35	20.03
66	☐	J120	1,002.73	8,454.45	J334	16.23	35.60	20.00	7,866.36	25.35
67	☐	J1200	1,000.81	6,508.65	J334	18.80	34.14	20.00	6,293.01	22.97
68	☐	J1204	1,000.79	6,888.17	J334	16.97	34.19	20.00	6,354.27	27.67
69	☐	J1210	1,000.35	3,775.54	J1222	17.74	78.36	20.00	3,711.55	22.31
70	☐	J1214	1,000.96	3,620.95	J1214	20.00	79.78	20.00	3,620.95	20.03

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
71		J1216	1,000.83	3,864.06	J1222	16.42	78.51	20.00	3,762.13	23.62
72		J1218	1,000.85	3,591.90	J1218	20.00	79.19	20.00	3,591.90	20.03
73		J1220	1,000.31	3,625.94	J1222	19.31	78.02	20.00	3,606.74	20.72
74		J1222	1,000.12	3,521.67	J1222	20.00	77.73	20.00	3,521.67	20.03
75		J1224	1,002.60	5,206.18	J1224	20.00	69.48	20.00	5,206.18	20.00
76		J1226	1,003.52	4,712.68	J1228	18.69	64.42	20.00	4,649.72	21.37
77		J1228	1,009.38	3,491.13	J1228	20.00	62.32	20.00	3,491.13	20.01
78		J1234	1,002.73	5,167.31	J1234	20.00	69.44	20.00	5,167.32	20.00
79		J1244	1,000.85	2,918.66	J54	15.13	36.89	20.00	2,625.04	28.08
80		J1246	1,001.65	2,609.19	J54	19.61	36.80	20.00	2,584.49	20.60
81		J1248	1,003.72	2,772.71	J54	17.68	36.90	20.00	2,628.73	23.77
82		J1250	1,001.97	2,474.84	J1250	20.00	48.69	20.00	2,474.85	20.03
83		J1252	1,001.46	2,550.95	J1252	20.00	49.07	20.00	2,550.95	20.03
84		J1254	1,003.80	2,580.47	J1254	20.00	49.20	20.00	2,580.47	20.04
85		J1256	1,005.72	2,533.10	J1256	20.00	47.22	20.00	2,533.10	20.04
86		J126	1,000.12	878.53	J2138	19.22	15.43	20.00	852.02	20.79
87		J1262	1,011.35	2,754.66	J54	18.43	36.93	20.00	2,655.77	22.52
88		J1266	1,005.62	4,610.08	J1552	13.56	39.22	20.00	4,297.94	29.44
89		J1268	1,010.68	3,918.49	J1754	6.62	41.57	20.00	3,177.39	33.77
90		J1272	1,000.73	4,388.86	J2140	16.50	45.52	20.00	4,079.76	28.19
91		J1276	1,002.67	4,030.52	J2140	16.65	45.00	20.00	3,755.75	27.98
92		J128	1,000.31	980.69	J2138	16.07	15.43	20.00	852.22	24.63
93		J1280	1,000.53	5,342.93	J2140	-6.57	44.84	20.00	3,616.63	54.10
94		J1282	1,004.88	3,670.46	J2140	19.63	44.86	20.00	3,640.69	21.00
95		J1284	1,000.73	5,392.51	J2140	-7.78	44.83	20.00	3,606.34	54.83
96		J1286	1,002.60	5,483.46	J2140	-9.90	44.81	20.00	3,591.37	56.08
97		J1292	1,005.15	4,481.68	J2140	-23.60	42.52	20.00	2,615.37	66.01
98		J1298	1,001.85	4,481.35	J2140	-23.68	42.52	20.00	2,612.07	65.91
99		J1300	1,004.13	4,617.27	J2140	-20.10	42.93	20.00	2,764.18	64.39
100		J1306	1,009.03	4,936.94	J2140	-20.80	43.38	20.00	2,935.40	65.64
101		J1310	1,002.60	4,914.22	J2140	-20.30	43.38	20.00	2,931.17	65.41
102		J1316	1,000.57	5,366.77	J2140	-2.06	45.10	20.00	3,814.42	52.03
103		J1320	1,000.20	3,277.28	J1324	19.77	40.28	20.00	3,260.05	20.24
104		J1322	1,000.53	3,256.51	J1324	18.64	40.12	20.00	3,160.38	21.36
105		J1324	1,001.44	1,774.74	J1324	20.00	34.82	20.00	1,774.75	20.00

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
106	☐	J1326	1,000.31	1,687.22	J1326	20.00	34.53	20.00	1,687.21	19.97
107	☐	J1328	1,000.00	4,728.99	J1328	20.00	87.19	20.00	4,728.99	20.00
108	☐	J134	1,003.68	2,686.87	J2020	11.81	40.33	20.00	2,320.02	28.19
109	☐	J1354	1,004.86	4,402.35	J1644	17.10	46.01	20.00	2,901.80	48.61
110	☐	J1356	1,000.04	4,397.68	J1644	17.09	46.01	20.00	2,896.18	48.62
111	☐	J1358	1,009.22	4,361.65	J2464	0.70	28.78	20.00	3,359.14	39.30
112	☐	J1360	1,003.70	4,928.80	J2446	-13.20	29.84	20.00	3,897.30	67.21
113	☐	J1364	1,017.97	4,763.75	J2446	-6.01	29.84	20.00	3,892.94	55.53
114	☐	J1366	1,004.68	4,676.95	J2446	-3.14	29.84	20.00	3,880.45	52.51
115	☐	J1368	1,001.02	4,782.23	J2446	-7.41	29.84	20.00	3,878.09	60.48
116	☐	J1370	1,000.10	4,051.73	J1222	16.68	79.05	20.00	3,953.42	23.38
117	☐	J1372	1,000.16	4,015.60	J1222	17.91	79.05	20.00	3,953.48	22.17
118	☐	J1374	1,000.12	3,635.40	J1552	6.56	34.82	20.00	2,725.66	37.00
119	☐	J1376	1,005.55	2,903.52	J1552	17.71	34.82	20.00	2,731.08	24.29
120	☐	J1380	1,002.81	3,075.27	J1552	15.27	34.82	20.00	2,728.35	27.79
121	☐	J1390	1,000.24	4,808.72	J2446	-8.50	29.84	20.00	3,922.85	64.01
122	☐	J1392	1,000.57	4,077.53	J794	19.77	77.18	20.00	4,069.89	20.27
123	☐	J1394	1,001.04	4,063.95	J1394	20.00	77.04	20.00	4,063.95	20.04
124	☐	J1396	1,003.74	2,581.72	J1998	18.49	49.01	20.00	2,525.78	21.58
125	☐	J1402	1,001.81	2,803.09	J54	15.84	36.71	20.00	2,556.19	26.32
126	☐	J1404	1,001.36	2,740.90	J54	16.91	36.71	20.00	2,555.00	24.91
127	☐	J1406	1,003.70	2,433.86	J1406	20.00	48.58	20.00	2,433.86	20.03
128	☐	J1416	1,000.83	3,816.50	J1424	-7.11	50.16	20.00	2,770.57	47.12
129	☐	J1424	1,000.33	1,559.32	J1424	20.00	40.17	20.00	1,559.32	20.00
130	☐	J1426	1,001.49	2,779.89	J54	16.77	36.79	20.00	2,584.00	26.68
131	☐	J1436	1,000.26	2,612.17	J54	19.53	36.79	20.00	2,582.76	21.13
132	☐	J1442	1,001.26	2,527.17	J1442	20.00	62.50	20.00	2,527.17	20.02
133	☐	J1448	1,000.37	2,421.95	J1448	20.00	58.59	20.00	2,421.95	20.02
134	☐	J1450	1,000.90	3,146.68	J54	11.06	36.90	20.00	2,628.25	35.95
135	☐	J1452	1,000.96	2,843.25	J54	16.49	36.90	20.00	2,628.31	27.43
136	☐	J1456	1,000.00	4,031.56	J2140	-5.26	43.14	20.00	2,813.69	51.13
137	☐	J1458	1,000.00	4,088.61	J2140	-6.85	43.12	20.00	2,804.94	52.90
138	☐	J146	1,004.07	2,610.60	J146	20.00	29.66	20.00	2,610.60	20.01
139	☐	J1460	1,003.19	3,627.91	J2140	3.80	43.12	20.00	2,808.13	45.41
140	☐	J1462	1,003.68	3,426.89	J2140	8.16	43.12	20.00	2,808.62	39.42

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
141		J1464	1,003.58	3,182.93	J2140	13.18	43.12	20.00	2,808.52	31.42
142		J1466	1,013.92	3,157.49	J2140	13.90	43.12	20.00	2,818.86	30.51
143		J1468	1,001.18	3,171.71	J2140	13.36	43.12	20.00	2,806.12	31.23
144		J1470	1,001.73	3,189.30	J2140	13.02	43.12	20.00	2,806.67	32.06
145		J1472	1,001.32	3,188.04	J2140	13.03	43.12	20.00	2,806.26	32.03
146		J1474	1,004.46	3,043.62	J2140	15.95	43.12	20.00	2,809.40	27.83
147		J1476	1,002.08	3,132.91	J2140	14.15	43.12	20.00	2,807.02	31.92
148		J1478	1,001.83	3,322.37	J2140	10.31	43.12	20.00	2,806.77	39.27
149		J148	1,001.85	1,364.08	J148	20.00	25.12	20.00	1,364.08	20.00
150		J1480	1,001.61	3,506.50	J2140	6.41	43.12	20.00	2,806.55	43.21
151		J1482	1,000.87	3,228.79	J2140	12.20	43.12	20.00	2,805.81	34.37
152		J1490	1,004.01	4,488.42	J2140	-22.75	42.64	20.00	2,647.38	65.80
153		J1492	1,003.36	4,136.08	J2140	-8.32	43.08	20.00	2,794.57	54.35
154		J1494	1,003.07	3,562.82	J2140	5.22	43.12	20.00	2,808.01	43.76
155		J1498	1,001.67	4,536.75	J2140	-26.97	42.43	20.00	2,580.32	67.27
156		J150	1,010.89	433.39	J150	20.00	-57.00	20.00	433.39	20.00
157		J1500	1,008.65	3,381.47	J2140	-9.90	40.85	20.00	2,207.01	49.90
158		J1502	1,003.11	3,631.29	J2140	-12.69	41.39	20.00	2,313.31	52.69
159		J1504	1,004.56	3,543.18	J2140	-8.31	41.56	20.00	2,353.97	50.21
160		J1506	1,002.36	4,513.40	J2140	-25.19	42.51	20.00	2,606.42	66.56
161		J1508	1,002.79	4,515.09	J2140	-25.48	42.49	20.00	2,601.04	66.58
162		J1510	1,002.46	3,909.19	J2140	-12.19	42.16	20.00	2,509.69	59.03
163		J1512	1,001.26	4,018.56	J2140	-15.29	42.16	20.00	2,508.49	60.38
164		J1514	1,000.00	3,514.75	J2140	8.33	43.39	20.00	2,903.72	35.24
165		J1516	1,000.00	2,993.66	J2140	18.39	43.39	20.00	2,903.72	22.45
166		J152	1,007.47	542.77	J150	19.38	-24.67	20.00	534.04	20.63
167		J1546	1,002.05	6,462.82	J334	16.17	34.05	20.00	5,837.47	27.64
168		J1550	1,001.40	3,480.09	J1550	20.00	55.75	20.00	3,475.77	20.00
169		J1552	1,000.51	1,219.85	J1552	20.00	25.12	20.00	1,219.85	20.00
170		J1554	1,001.04	1,466.69	J1552	15.96	26.63	20.00	1,312.53	24.04
171		J1556	1,010.48	1,678.19	J1552	10.83	26.96	20.00	1,344.31	29.42
172		J1558	1,000.59	1,702.28	J1552	9.84	26.98	20.00	1,335.80	30.37
173		J1560	1,000.43	1,738.50	J1552	8.87	27.03	20.00	1,339.80	31.38
174		J1562	1,000.85	2,006.37	J1552	2.27	27.70	20.00	1,389.62	37.74
175		J1564	1,034.06	4,491.66	J1552	-16.44	34.72	20.00	2,650.64	56.44

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
176	☐	J1568	1,003.23	2,267.92	J1568	20.00	55.66	20.00	2,267.92	19.99
177	☐	J1574	1,002.60	4,618.84	J1576	18.73	85.53	20.00	4,581.25	21.31
178	☐	J1576	1,004.01	4,297.77	J1576	20.00	84.94	20.00	4,297.77	20.00
179	☐	J1578	1,002.16	4,188.06	J1578	20.00	85.45	20.00	4,188.07	20.00
180	☐	J1582	1,004.94	4,895.87	J1582	20.00	89.24	20.00	4,895.88	20.01
181	☐	J1584	1,000.22	5,021.12	J1576	15.96	86.11	20.00	4,900.69	24.09
182	☐	J1588	1,000.45	2,797.36	J1588	20.00	78.05	20.00	2,797.36	20.00
183	☐	J1590	1,001.22	2,838.99	J1590	20.00	78.15	20.00	2,839.00	20.00
184	☐	J1592	1,001.69	2,839.73	J1592	20.00	76.71	20.00	2,839.73	20.00
185	☐	J1602	1,000.59	4,091.62	J1324	18.28	41.04	20.00	3,942.59	21.91
186	☐	J1604	1,001.14	3,738.34	J1604	20.00	44.26	20.00	3,738.35	20.00
187	☐	J1608	1,002.14	3,621.58	J1608	20.00	43.57	20.00	3,621.58	20.00
188	☐	J1610	1,005.53	4,236.14	J2140	18.36	45.48	20.00	4,087.85	23.85
189	☐	J1612	1,000.67	3,280.32	J1612	20.00	76.69	20.00	3,280.32	20.00
190	☐	J1614	1,000.12	4,508.60	J2050	19.46	99.06	20.00	4,495.28	20.70
191	☐	J1616	1,003.26	3,837.69	J1616	20.00	98.54	20.00	3,837.69	20.07
192	☐	J1618	1,002.58	3,267.57	J1618	20.00	97.76	20.00	3,267.57	20.02
193	☐	J1620	1,006.75	3,505.58	J1618	19.57	99.00	20.00	3,497.13	20.47
194	☐	J1622	1,003.54	4,381.26	J2446	1.93	29.84	20.00	3,808.44	39.82
195	☐	J1624	1,006.75	1,688.85	J1624	20.00	48.50	20.00	1,688.85	20.00
196	☐	J1626	1,009.40	1,917.93	J1654	3.80	56.18	20.00	1,707.27	39.18
197	☐	J1632	1,002.73	3,650.53	J1632	20.00	90.32	20.00	3,650.53	20.00
198	☐	J1638	1,004.54	1,816.94	J1654	11.42	56.18	20.00	1,702.41	29.59
199	☐	J1644	1,006.43	2,278.44	J2464	2.80	23.12	20.00	1,272.65	37.20
200	☐	J1646	1,002.14	3,611.74	J2140	3.24	42.84	20.00	2,729.96	48.60
201	☐	J1648	1,002.32	3,569.77	J2140	4.18	42.84	20.00	2,730.14	47.28
202	☐	J1654	1,000.12	1,697.97	J1654	20.00	56.18	20.00	1,697.97	20.00
203	☐	J1656	1,002.95	1,693.33	J1656	20.00	56.08	20.00	1,693.34	20.00
204	☐	J1664	1,001.02	4,672.63	J2446	-3.12	29.84	20.00	3,880.67	56.68
205	☐	J1670	1,001.10	4,465.77	J2140	-17.81	42.83	20.00	2,724.81	63.58
206	☐	J1678	1,000.37	4,778.49	J1678	20.00	72.38	20.00	4,778.50	19.99
207	☐	J1680	1,002.56	4,668.91	J1680	20.00	72.09	20.00	4,668.91	19.99
208	☐	J1682	1,003.11	4,466.86	J1682	20.00	71.86	20.00	4,466.87	19.99
209	☐	J1686	1,004.90	4,062.73	J1084	18.84	41.68	20.00	3,962.36	21.39
210	☐	J1698	1,005.09	2,421.90	J2020	19.05	40.58	20.00	2,375.61	21.45

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
211		J1700	1,001.34	2,590.93	J2020	15.34	40.58	20.00	2,371.85	26.31
212		J1702	1,009.62	2,047.25	J1702	20.00	48.56	20.00	2,047.25	19.99
213		J1704	1,001.83	3,152.98	J2020	2.38	40.66	20.00	2,390.31	39.22
214		J1706	1,008.75	2,518.16	J2020	17.49	40.66	20.00	2,397.23	23.89
215		J1712	1,004.76	2,014.81	J1722	5.41	48.83	20.00	1,735.46	36.19
216		J1714	1,002.75	2,130.49	J1722	-1.30	48.83	20.00	1,733.45	41.55
217		J1716	1,001.40	2,133.37	J1722	-2.66	48.55	20.00	1,716.75	43.19
218		J1718	1,001.14	2,134.07	J1722	-1.23	48.93	20.00	1,737.13	41.23
219		J1720	1,001.20	1,947.58	J1722	7.45	48.40	20.00	1,708.34	32.73
220		J1722	1,001.61	1,655.74	J1722	20.00	47.39	20.00	1,655.74	20.00
221		J1724	1,002.26	1,795.10	J1722	15.25	48.26	20.00	1,701.67	24.75
222		J1726	1,001.10	1,772.38	J1722	16.10	48.17	20.00	1,695.57	23.89
223		J1728	1,001.79	1,821.14	J1722	13.85	48.26	20.00	1,701.04	26.24
224		J1730	1,002.06	1,911.83	J1722	9.22	48.33	20.00	1,705.25	30.86
225		J1734	1,005.39	2,264.36	J1722	10.03	53.20	20.00	2,037.78	29.97
226		J1742	1,008.52	2,198.14	J1722	1.37	50.35	20.00	1,829.83	38.63
227		J1746	1,001.57	2,168.16	J1722	-0.80	49.51	20.00	1,771.45	40.79
228		J1750	1,000.73	1,826.99	J1722	13.49	48.26	20.00	1,699.98	26.72
229		J1752	1,000.00	1,868.35	J1722	11.70	48.40	20.00	1,707.14	28.82
230		J1760	1,001.44	5,046.74	J2140	12.10	45.66	20.00	4,331.81	34.91
231		J1762	1,001.18	2,930.51	J1762	20.00	76.10	20.00	2,930.51	20.00
232		J1764	1,002.18	3,246.52	J1764	20.00	76.93	20.00	3,246.52	20.00
233		J1768	1,000.67	5,250.53	J2140	-4.34	44.86	20.00	3,636.49	52.64
234		J1774	1,003.99	5,386.80	J2140	1.77	45.29	20.00	4,003.09	49.10
235		J1780	1,001.47	5,536.01	J1424	2.07	53.15	20.00	4,393.09	43.25
236		J1782	1,000.43	3,216.41	J2256	15.50	74.99	20.00	3,093.60	24.50
237		J1784	1,000.49	2,922.79	J2256	19.57	74.11	20.00	2,911.72	20.43
238		J1786	1,008.12	5,256.67	J2140	-17.49	44.05	20.00	3,207.07	63.35
239		J1788	1,004.07	3,858.64	J2140	10.20	44.05	20.00	3,203.01	39.85
240		J1790	1,000.08	4,590.97	J2140	-21.00	42.84	20.00	2,727.90	64.88
241		J1792	1,007.32	3,513.47	J2140	5.53	42.84	20.00	2,735.13	45.81
242		J1794	1,002.20	3,443.87	J2140	6.92	42.84	20.00	2,730.02	43.80
243		J1798	1,000.55	2,609.99	J1798	20.00	49.82	20.00	2,610.00	19.97
244		J18	1,001.63	4,613.16	J1424	12.33	52.84	20.00	4,121.94	32.09
245		J1800	1,000.94	1,509.86	J1800	20.00	39.03	20.00	1,509.86	19.99

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
246	☐	J1802	1,002.18	3,607.95	J1802	20.00	61.04	20.00	3,607.95	20.01
247	☐	J1804	1,001.42	3,787.26	J1806	19.03	79.98	20.00	3,760.09	21.00
248	☐	J1806	1,002.30	3,517.09	J1806	20.00	79.16	20.00	3,517.09	20.02
249	☐	J1808	1,005.23	4,148.44	J1808	20.00	74.42	20.00	4,148.44	20.04
250	☐	J1810	1,002.01	3,908.77	J1810	20.00	77.00	20.00	3,908.77	20.02
251	☐	J1812	1,002.91	4,088.03	J1812	20.00	76.68	20.00	4,088.03	20.04
252	☐	J1814	1,001.65	4,317.72	J1814	20.00	73.88	20.00	4,317.72	20.06
253	☐	J1816	1,001.30	3,866.70	J2276	19.47	74.14	20.00	3,849.55	20.55
254	☐	J1822	1,002.34	3,876.92	J2276	19.64	74.17	20.00	3,865.14	20.39
255	☐	J1826	1,000.39	4,994.73	J1826	20.00	66.92	20.00	4,994.73	20.00
256	☐	J1828	1,001.06	2,885.86	J54	15.68	36.89	20.00	2,624.22	27.24
257	☐	J1830	1,000.41	2,855.29	J54	16.20	36.89	20.00	2,623.57	26.51
258	☐	J1834	1,004.44	2,766.66	J54	18.25	36.94	20.00	2,656.35	22.95
259	☐	J1836	1,016.68	2,691.18	J54	19.65	36.94	20.00	2,668.58	20.65
260	☐	J1838	1,007.77	3,013.77	J54	14.22	36.95	20.00	2,664.58	29.30
261	☐	J1840	1,003.89	2,843.72	J54	16.97	36.94	20.00	2,655.58	24.86
262	☐	J1842	1,000.33	5,371.52	J2632	15.07	88.53	20.00	5,224.47	25.25
263	☐	J1844	1,001.77	4,712.33	J2446	-4.63	29.84	20.00	3,878.38	55.80
264	☐	J1850	1,001.42	4,107.09	J1848	6.48	79.60	20.00	3,851.42	33.47
265	☐	J1852	1,007.51	1,844.07	J1654	9.54	56.18	20.00	1,705.38	33.09
266	☐	J1866	1,011.01	2,071.57	J1866	20.00	48.67	20.00	2,071.57	20.00
267	☐	J1934	1,010.36	2,019.97	J1934	20.00	57.16	20.00	2,019.97	20.08
268	☐	J1936	1,004.07	4,397.89	J1936	20.00	67.61	20.00	4,397.89	20.02
269	☐	J1938	1,002.26	4,833.31	J1938	20.00	67.97	20.00	4,833.25	20.09
270	☐	J1940	1,000.67	4,984.51	J1940	20.00	66.78	20.00	4,984.52	20.00
271	☐	J1942	1,001.81	5,917.92	J1942	20.00	66.06	20.00	3,066.75	50.45
272	☐	J1944	1,002.22	4,133.01	J1552	-1.64	34.84	20.00	2,743.35	45.01
273	☐	J1946	1,006.29	3,885.78	J1552	12.53	35.09	20.00	3,235.04	32.03
274	☐	J1954	1,001.18	2,848.58	J54	16.35	36.89	20.00	2,625.48	26.05
275	☐	J1956	1,003.50	2,182.11	J1956	20.00	51.17	20.00	2,182.11	20.01
276	☐	J1958	1,000.00	2,825.50	J54	15.84	36.77	20.00	2,575.88	27.82
277	☐	J1968	1,002.14	2,539.37	J1968	20.00	47.27	20.00	2,539.37	20.04
278	☐	J1970	1,004.13	3,188.87	J54	11.18	36.96	20.00	2,669.87	34.13
279	☐	J1974	1,002.87	1,477.83	J1974	20.00	34.63	20.00	1,477.83	20.04
280	☐	J1976	1,003.74	4,952.70	J1976	20.00	69.52	20.00	4,952.70	20.00

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
281	☐	J1978	1,000.59	4,824.22	J1978	20.00	72.23	20.00	4,824.22	20.00
282	☐	J1980	1,020.37	2,651.30	J1980	20.00	64.20	20.00	2,651.28	20.09
283	☐	J1986	1,001.46	3,147.07	J2266	12.89	55.54	20.00	2,884.43	27.11
284	☐	J1990	1,000.57	2,472.36	J2266	14.22	52.49	20.00	2,301.79	25.78
285	☐	J1992	1,001.28	2,256.15	J2266	15.11	51.06	20.00	2,122.32	24.89
286	☐	J1996	1,001.47	2,592.62	J1998	17.83	48.96	20.00	2,513.25	22.20
287	☐	J1998	1,003.97	2,031.32	J1998	20.00	45.74	20.00	2,031.32	20.01
288	☐	J20	1,002.42	3,659.83	J20	20.00	77.65	20.00	3,659.83	20.00
289	☐	J2000	1,001.87	2,431.74	J2000	20.00	46.53	20.00	2,431.73	20.04
290	☐	J2006	1,003.87	1,487.33	J2006	20.00	35.97	20.00	1,487.32	19.98
291	☐	J2008	1,010.54	2,686.26	J54	19.30	36.91	20.00	2,641.81	21.12
292	☐	J2010	1,011.96	2,484.00	J2010	20.00	46.94	20.00	2,484.00	20.04
293	☐	J2020	1,000.00	926.80	J2020	20.00	16.18	20.00	926.80	20.00
294	☐	J2022	1,000.30	957.27	J2020	18.70	16.45	20.00	931.67	21.30
295	☐	J2024	1,006.73	876.74	J2024	20.00	12.08	20.00	876.75	20.00
296	☐	J2028	1,003.52	3,232.89	J2028	20.00	72.54	20.00	3,232.89	20.00
297	☐	J2030	1,000.43	4,437.98	J750	17.62	73.51	20.00	4,352.59	22.66
298	☐	J2032	1,003.24	4,007.73	J744	17.09	74.18	20.00	3,913.28	23.13
299	☐	J2034	1,001.55	4,186.31	J746	17.35	73.75	20.00	4,096.23	22.90
300	☐	J2036	1,000.10	3,989.71	J2036	20.00	80.88	20.00	3,989.71	20.04
301	☐	J2038	1,005.11	3,995.89	J746	18.27	73.40	20.00	3,938.40	21.82
302	☐	J2044	1,001.47	2,260.93	J2046	19.65	56.27	20.00	2,251.77	20.35
303	☐	J2046	1,001.79	2,212.73	J2046	20.00	55.92	20.00	2,212.73	19.99
304	☐	J2048	1,001.02	2,973.45	J2020	6.29	40.57	20.00	2,370.09	34.63
305	☐	J2050	1,000.00	3,779.83	J2050	20.00	96.80	20.00	3,779.83	20.07
306	☐	J2052	1,000.14	4,411.89	J2050	19.45	98.81	20.00	4,398.62	20.69
307	☐	J2054	1,001.97	1,943.46	J2056	14.62	39.05	20.00	1,774.01	25.37
308	☐	J2062	1,002.56	3,539.11	J54	5.68	37.05	20.00	2,720.30	43.04
309	☐	J2064	1,008.50	3,162.32	J54	12.84	37.05	20.00	2,726.24	33.90
310	☐	J2068	1,002.03	4,505.17	J2068	20.00	53.22	20.00	4,505.17	20.00
311	☐	J2070	1,001.57	5,259.23	J334	13.96	33.64	20.00	4,393.45	29.95
312	☐	J2072	1,001.28	5,562.02	J334	11.05	33.63	20.00	4,350.21	33.06
313	☐	J2074	1,004.52	4,068.48	J2074	20.00	53.76	20.00	4,068.48	20.00
314	☐	J2078	1,007.14	3,104.10	J2078	20.00	49.27	20.00	3,104.10	20.00
315	☐	J2082	1,006.92	991.19	J2138	15.94	15.43	20.00	858.77	31.74

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
316	☐	J2084	1,003.28	965.67	J2138	16.64	15.43	20.00	855.13	30.56
317	☐	J2090	1,019.49	3,758.90	J2140	4.43	43.29	20.00	2,887.08	50.41
318	☐	J2092	1,011.52	3,931.04	J2140	0.69	43.30	20.00	2,882.43	53.86
319	☐	J2094	1,009.73	3,642.45	J2140	6.74	43.30	20.00	2,880.65	46.87
320	☐	J2096	1,003.95	3,853.58	J2140	2.10	43.29	20.00	2,871.55	52.63
321	☐	J2098	1,000.00	3,270.15	J2140	10.28	42.89	20.00	2,730.00	44.77
322	☐	J2100	1,015.67	3,247.08	J2140	11.02	42.89	20.00	2,745.67	43.35
323	☐	J2114	1,009.22	2,577.03	J2398	15.44	54.10	20.00	2,431.74	24.65
324	☐	J2122	1,001.81	2,360.35	J2122	20.00	54.06	20.00	2,360.35	20.00
325	☐	J2124	1,002.83	2,526.86	J2122	14.77	54.10	20.00	2,366.94	25.89
326	☐	J2126	1,001.87	2,397.80	J2122	18.98	54.10	20.00	2,365.97	21.02
327	☐	J2128	1,006.35	2,738.97	J2398	11.40	54.33	20.00	2,466.08	28.60
328	☐	J2130	1,005.19	2,612.41	J2398	14.26	54.12	20.00	2,430.38	25.86
329	☐	J2134	1,000.00	2,940.87	J2134	20.00	30.38	20.00	2,940.87	20.00
330	☐	J2136	1,003.28	880.03	J2138	19.27	15.43	20.00	855.18	20.73
331	☐	J2138	1,000.00	830.09	J2138	20.00	14.55	20.00	830.09	20.00
332	☐	J2140	1,015.08	1,836.64	J2140	20.00	38.28	20.00	1,836.65	20.00
333	☐	J2142	1,012.35	2,803.81	J2140	-1.15	39.68	20.00	2,013.23	41.16
334	☐	J2144	1,009.60	2,520.74	J2140	4.53	39.23	20.00	1,946.48	35.47
335	☐	J2146	1,000.14	2,158.58	J2140	14.87	39.35	20.00	1,953.63	25.50
336	☐	J2148	1,007.30	2,138.78	J2140	15.57	39.35	20.00	1,960.79	24.93
337	☐	J2150	1,000.73	2,216.86	J2140	13.49	39.38	20.00	1,958.04	27.09
338	☐	J2152	1,000.33	2,235.16	J2140	12.99	39.38	20.00	1,957.65	27.72
339	☐	J2154	1,001.65	2,337.17	J2140	10.65	39.45	20.00	1,969.83	30.50
340	☐	J2156	1,000.49	2,305.03	J2140	11.49	39.45	20.00	1,968.67	29.86
341	☐	J2158	1,003.54	2,350.67	J2140	10.68	39.53	20.00	1,982.00	30.49
342	☐	J2160	1,001.75	2,235.87	J2140	13.67	39.53	20.00	1,980.21	27.84
343	☐	J2162	1,008.14	4,100.81	J2140	-1.23	43.38	20.00	2,936.71	50.00
344	☐	J2168	1,022.14	3,524.61	J2140	5.08	42.85	20.00	2,736.88	54.40
345	☐	J2172	1,029.75	3,654.23	J2140	2.12	42.83	20.00	2,737.44	59.19
346	☐	J2176	1,002.64	3,802.89	J2140	-2.44	42.79	20.00	2,697.03	64.81
347	☐	J2180	1,003.23	3,886.73	J2140	-4.72	42.76	20.00	2,690.26	66.88
348	☐	J2184	1,002.71	3,950.45	J2140	-6.53	42.75	20.00	2,683.62	68.21
349	☐	J2188	1,004.07	4,081.40	J2140	-10.73	42.68	20.00	2,662.31	67.59
350	☐	J2190	1,010.74	4,085.31	J2140	-10.86	42.66	20.00	2,664.09	66.18

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
351		J2198	1,002.24	3,023.45	J54	13.92	36.95	20.00	2,657.17	29.89
352		J22	1,003.11	5,316.04	J1424	5.89	53.10	20.00	4,392.12	38.88
353		J2200	1,003.66	2,497.31	J2200	20.00	58.24	20.00	2,497.31	20.02
354		J2202	1,003.03	2,069.93	J2202	20.00	50.55	20.00	2,069.93	20.01
355		J2204	1,000.00	2,770.59	J54	16.75	36.77	20.00	2,573.90	26.06
356		J2206	1,000.79	2,277.72	J2202	19.13	52.16	20.00	2,252.88	20.88
357		J2208	1,002.99	2,170.06	J2208	20.00	51.47	20.00	2,170.06	20.01
358		J2210	1,002.44	2,238.28	J2210	20.00	52.71	20.00	2,238.28	20.01
359		J2212	1,013.73	4,564.08	J1552	2.19	37.65	20.00	3,650.62	41.91
360		J2214	1,018.37	1,678.57	J2214	20.00	47.25	20.00	1,678.57	20.00
361		J2224	1,008.93	5,912.67	J2224	20.00	76.67	20.00	5,912.66	20.10
362		J2226	1,001.81	4,673.06	J2226	20.00	77.87	20.00	4,673.06	20.01
363		J2228	1,001.32	5,139.85	J2234	18.94	94.59	20.00	5,110.45	21.07
364		J2230	1,000.57	4,945.76	J2230	20.00	93.44	20.00	4,945.76	20.01
365		J2232	1,000.89	5,064.70	J2234	18.52	94.43	20.00	5,024.23	21.48
366		J2234	1,001.73	3,859.80	J2234	20.00	91.49	20.00	3,859.80	20.09
367		J2238	1,004.99	5,139.85	J2238	20.00	76.71	20.00	5,139.85	20.00
368		J2240	1,008.95	5,342.50	J2240	20.00	78.67	20.00	5,342.50	20.00
369		J2252	1,000.89	4,354.63	J2140	17.47	45.51	20.00	4,125.65	25.74
370		J2254	1,000.26	2,833.49	J2256	19.21	73.55	20.00	2,813.84	20.79
371		J2260	1,000.55	3,406.43	J2256	14.06	75.59	20.00	3,237.33	25.94
372		J2264	1,006.82	2,228.52	J2612	16.86	52.78	20.00	2,145.38	23.14
373		J2266	1,005.43	1,898.57	J2266	20.00	48.68	20.00	1,898.57	20.00
374		J2272	1,000.00	1,728.41	J2272	20.00	39.74	20.00	1,728.41	20.00
375		J2276	1,003.68	3,485.94	J2276	20.00	73.08	20.00	3,485.94	20.01
376		J2280	1,000.57	3,521.39	J2280	20.00	75.74	20.00	3,521.39	20.00
377		J2284	1,001.30	3,381.51	J2284	20.00	74.00	20.00	3,381.51	20.00
378		J2288	1,001.04	3,776.47	J2276	18.94	73.86	20.00	3,742.57	21.08
379		J2290	1,002.40	3,603.59	J2290	20.00	74.30	20.00	3,603.59	20.01
380		J2296	1,000.65	3,339.19	J2296	20.00	74.38	20.00	3,339.19	20.00
381		J2300	1,001.08	4,121.58	J2300	20.00	75.72	20.00	4,121.58	20.05
382		J2304	1,007.02	5,249.49	J2304	20.00	77.72	20.00	5,249.50	20.00
383		J2306	1,008.89	5,174.41	J2306	20.00	74.86	20.00	5,174.41	20.00
384		J2308	1,004.88	3,506.84	J2028	18.17	73.35	20.00	3,452.87	21.94
385		J2314	1,004.48	6,656.62	J334	16.69	34.11	20.00	6,093.51	27.15

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
386	☐	J2338	1,000.33	2,399.33	J2338	20.00	49.96	20.00	2,399.34	19.97
387	☐	J2340	1,001.00	3,255.49	J54	9.33	36.92	20.00	2,643.01	38.22
388	☐	J2344	1,002.56	2,979.38	J348	8.92	37.03	20.00	2,352.19	31.08
389	☐	J2346	1,002.34	1,725.20	J348	19.15	33.42	20.00	1,687.60	20.93
390	☐	J2348	1,001.67	4,220.21	J2476	19.34	53.09	20.00	4,177.23	20.66
391	☐	J2350	1,001.49	8,235.46	J334	7.83	34.69	20.00	6,750.77	34.43
392	☐	J2352	1,005.47	1,244.32	J2138	6.88	15.43	20.00	857.36	40.15
393	☐	J2354	1,005.33	5,821.54	J568	18.57	56.80	20.00	5,717.54	21.49
394	☐	J2356	1,002.93	8,327.38	J334	5.69	34.34	20.00	6,506.82	38.09
395	☐	J2358	1,001.30	6,028.98	J2358	20.00	62.87	20.00	6,028.98	20.00
396	☐	J2360	1,004.44	4,623.04	J2360	20.00	57.80	20.00	4,623.04	20.01
397	☐	J2362	1,001.85	4,508.03	J1424	-12.58	51.18	20.00	3,119.73	54.91
398	☐	J2364	1,000.49	3,635.86	J1552	6.56	34.82	20.00	2,726.03	37.00
399	☐	J2368	1,001.59	2,770.19	J54	16.15	36.69	20.00	2,542.09	25.12
400	☐	J2370	1,001.06	4,500.33	J642	18.66	74.61	20.00	4,444.84	21.34
401	☐	J2372	1,000.87	7,348.22	J334	13.83	34.16	20.00	6,307.78	33.00
402	☐	J2374	1,001.91	4,389.98	J2374	20.00	49.85	20.00	4,389.98	19.99
403	☐	J2376	1,001.06	4,941.81	J1576	19.01	86.23	20.00	4,911.74	21.04
404	☐	J2382	1,001.49	3,835.99	J2382	20.00	98.54	20.00	3,835.99	20.07
405	☐	J2392	1,003.09	2,258.00	J2266	15.11	51.06	20.00	2,124.13	24.89
406	☐	J2394	1,000.22	2,259.68	J2046	19.64	56.27	20.00	2,250.51	20.35
407	☐	J2396	1,000.00	3,270.17	J2140	10.28	42.89	20.00	2,730.00	44.77
408	☐	J2398	1,026.59	2,366.48	J2398	20.00	53.57	20.00	2,366.48	20.00
409	☐	J24	1,003.13	3,637.07	J24	20.00	76.77	20.00	3,637.08	20.00
410	☐	J2400	1,001.20	3,787.00	J2400	20.00	76.11	20.00	3,787.00	20.02
411	☐	J2402	1,006.88	977.53	J2138	16.38	15.43	20.00	858.73	28.93
412	☐	J2404	1,004.35	673.47	J2404	20.00	-13.42	20.00	673.47	20.00
413	☐	J2412	1,000.41	1,633.34	J2412	20.00	34.55	20.00	1,633.34	20.00
414	☐	J2414	1,003.83	2,297.67	J2414	20.00	59.54	20.00	2,297.67	19.99
415	☐	J2416	1,003.07	2,332.69	J2416	20.00	54.58	20.00	2,332.69	19.99
416	☐	J2418	1,000.49	4,586.68	J2140	-21.07	42.83	20.00	2,724.20	64.88
417	☐	J2420	1,002.30	3,972.92	J2140	-5.15	42.84	20.00	2,730.12	56.23
418	☐	J2422	1,000.20	4,967.40	J2140	-21.69	43.38	20.00	2,928.77	66.12
419	☐	J2424	1,000.53	5,093.06	J1576	16.56	86.31	20.00	4,989.71	23.53
420	☐	J2426	1,001.99	5,187.16	J1576	16.68	86.59	20.00	5,086.46	23.45

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
421		J2428	1,001.91	2,182.11	J322	19.34	48.60	20.00	2,161.85	20.63
422		J2430	1,001.16	2,716.15	J54	17.41	36.72	20.00	2,559.53	23.61
423		J2432	1,001.00	2,995.85	J2020	5.78	40.58	20.00	2,371.52	35.20
424		J2434	1,000.00	3,621.62	J1324	18.70	40.65	20.00	3,520.46	21.35
425		J2436	1,000.00	3,845.98	J1324	16.60	40.71	20.00	3,581.79	23.42
426		J2438	1,000.00	4,211.44	J1324	15.98	40.98	20.00	3,875.40	24.10
427		J2440	1,002.52	3,376.49	J1552	10.76	34.82	20.00	2,728.06	33.11
428		J2460	1,002.69	2,690.92	J2020	12.61	40.49	20.00	2,353.46	27.71
429		J2476	1,004.03	2,008.14	J2476	20.00	45.96	20.00	2,008.15	20.00
430		J2482	1,001.93	4,057.59	J2446	14.95	29.84	20.00	3,878.99	30.31
431		J2484	1,000.89	930.52	J2484	20.00	16.16	20.00	930.52	20.00
432		J2492	1,000.08	2,907.00	J54	14.58	36.80	20.00	2,585.79	30.36
433		J2512	1,000.00	2,696.35	J54	15.70	36.39	20.00	2,449.63	25.05
434		J2514	1,000.00	1,118.80	J50	16.97	21.61	20.00	1,042.61	23.03
435		J2516	1,000.00	2,697.19	J2516	20.00	50.22	20.00	2,697.19	19.97
436		J2522	1,000.00	477.27	J150	18.82	-42.06	20.00	462.70	21.21
437		J26	1,001.89	5,360.47	J2140	9.06	45.73	20.00	4,397.12	38.66
438		J260	1,001.32	4,325.46	J260	20.00	53.59	20.00	4,322.98	20.00
439		J2600	1,000.00	1,989.01	J2612	16.75	50.36	20.00	1,911.87	23.25
440		J2606	1,000.54	1,626.81	J2606	20.00	46.10	20.00	1,626.81	20.03
441		J2608	1,000.54	1,819.16	J2612	17.83	48.39	20.00	1,771.09	22.23
442		J2610	1,000.54	1,739.00	J2612	17.83	47.11	20.00	1,693.41	22.19
443		J2612	1,000.54	1,546.72	J2612	20.00	44.13	20.00	1,546.72	20.03
444		J2614	1,000.54	1,672.90	J2614	20.00	48.33	20.00	1,672.90	20.02
445		J2616	1,000.00	1,871.20	J2616	20.00	51.92	20.00	1,871.20	20.00
446		J2618	1,001.77	4,770.15	J2618	20.00	93.81	20.00	4,770.15	20.01
447		J262	1,002.77	3,055.64	J262	20.00	51.16	20.00	3,055.65	20.00
448		J2620	1,001.77	5,228.04	J2632	18.36	88.24	20.00	5,178.83	21.79
449		J2622	1,001.77	5,038.51	J2622	20.00	95.19	20.00	5,038.51	20.00
450		J2624	1,001.77	5,182.93	J2632	19.02	88.09	20.00	5,153.41	21.03
451		J2626	1,001.77	5,138.48	J2632	17.85	88.01	20.00	5,074.90	22.26
452		J2628	1,001.77	5,008.16	J2628	20.00	95.02	20.00	5,008.16	20.00
453		J2630	1,001.77	5,045.49	J2630	20.00	89.03	20.00	5,045.49	20.01
454		J2632	1,001.77	4,813.58	J2632	20.00	87.53	20.00	4,813.58	20.02
455		J2634	1,001.77	4,631.90	J2634	20.00	88.44	20.00	4,631.90	20.00

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
456		J2636	1,001.77	4,231.83	J2636	20.00	90.75	20.00	4,231.81	20.14
457		J2638	1,001.77	4,362.32	J2638	20.00	91.10	20.00	4,362.30	20.17
458		J264	1,001.49	3,398.73	J54	7.33	36.98	20.00	2,675.86	39.54
459		J2640	1,001.77	4,246.93	J2640	20.00	92.01	20.00	4,246.92	20.14
460		J2642	1,001.77	4,531.09	J2642	20.00	88.65	20.00	4,531.10	20.00
461		J2644	1,001.77	4,631.57	J2644	20.00	91.75	20.00	4,631.58	20.00
462		J2646	1,000.00	5,135.85	J2646	20.00	86.99	20.00	5,135.86	20.01
463		J266	1,002.05	3,662.60	J54	4.39	37.11	20.00	2,764.77	46.17
464		J268	1,008.24	4,610.68	J268	20.00	58.23	20.00	4,610.63	19.97
465		J274	1,000.90	3,253.81	J274	20.00	44.76	20.00	3,253.82	20.00
466		J276	1,004.41	2,006.18	J276	20.00	42.80	20.00	2,006.18	19.95
467		J28	1,002.77	4,661.50	J28	20.00	77.53	20.00	4,661.50	19.97
468		J282	1,001.57	2,313.66	J2056	13.83	41.70	20.00	2,086.54	26.15
469		J284	1,001.20	2,529.70	J292	17.04	42.58	20.00	2,397.32	23.33
470		J288	1,001.00	2,095.20	J288	20.00	45.91	20.00	2,095.20	19.95
471		J290	1,001.20	2,350.92	J306	18.89	44.16	20.00	2,306.62	21.11
472		J294	1,001.59	2,052.77	J292	15.40	39.51	20.00	1,893.08	24.54
473		J296	1,001.20	2,615.37	J296	20.00	44.05	20.00	2,615.37	20.03
474		J30	1,001.12	5,574.34	J1424	8.93	53.41	20.00	4,786.42	35.18
475		J302	1,000.45	2,799.60	J50	14.37	38.05	20.00	2,585.66	25.69
476		J306	1,000.00	1,705.93	J306	20.00	39.25	20.00	1,705.93	19.98
477		J312	1,002.20	1,022.66	J312	20.00	21.13	20.00	1,022.66	20.00
478		J314	1,001.67	1,194.23	J312	18.78	27.67	20.00	1,169.40	21.22
479		J316	1,006.35	2,919.66	J316	20.00	50.88	20.00	2,919.67	20.00
480		J32	1,000.90	5,373.76	J1424	18.55	53.78	20.00	5,244.15	22.36
481		J322	1,003.24	1,664.31	J322	20.00	42.90	20.00	1,664.31	19.98
482		J324	1,001.87	5,454.53	J334	11.25	33.59	20.00	4,270.09	32.85
483		J326	1,000.24	6,697.84	J334	9.20	33.90	20.00	5,197.27	35.70
484		J328	1,002.97	3,268.93	J2020	0.12	40.75	20.00	2,413.05	42.18
485		J330	1,002.03	1,655.46	J330	20.00	37.56	20.00	1,655.46	20.00
486		J332	1,001.53	1,714.13	J332	20.00	38.63	20.00	1,714.13	20.00
487		J336	1,002.54	1,528.20	J334	16.18	26.47	20.00	1,352.51	23.82
488		J340	1,006.19	3,309.06	J2020	3.72	41.29	20.00	2,553.97	40.61
489		J342	1,003.34	2,174.62	J348	14.50	35.04	20.00	1,913.99	26.02
490		J348	1,001.75	1,431.87	J348	20.00	30.58	20.00	1,431.87	20.00

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
491	☐	J352	1,002.22	1,521.47	J352	20.00	34.28	20.00	1,521.47	20.01
492	☐	J356	1,004.13	3,495.55	J334	9.48	32.17	20.00	2,564.34	33.23
493	☐	J360	1,001.46	2,058.94	J334	12.34	28.97	20.00	1,625.19	27.67
494	☐	J362	1,003.52	4,116.73	J334	10.94	32.88	20.00	3,127.35	33.00
495	☐	J370	1,001.97	2,068.15	J348	19.58	35.77	20.00	2,045.70	20.61
496	☐	J374	1,001.59	3,841.57	J374	20.00	55.70	20.00	3,837.81	20.00
497	☐	J376	1,003.21	3,983.03	J400	19.41	52.26	20.00	3,943.39	20.59
498	☐	J378	1,002.52	4,444.26	J408	17.62	55.87	20.00	4,300.03	22.43
499	☐	J384	1,001.65	4,353.04	J384	20.00	58.48	20.00	4,351.78	20.00
500	☐	J386	1,002.50	5,853.65	J386	20.00	63.73	20.00	5,853.66	20.00
501	☐	J388	1,000.71	4,254.50	J408	18.04	55.67	20.00	4,138.83	21.96
502	☐	J392	1,001.83	6,644.31	J334	9.10	33.88	20.00	5,137.07	35.82
503	☐	J394	1,002.26	4,477.39	J394	20.00	54.51	20.00	4,477.01	20.00
504	☐	J396	1,001.95	3,298.39	J396	20.00	55.66	20.00	3,298.40	20.00
505	☐	J398	1,003.17	3,179.57	J398	20.00	54.46	20.00	3,179.57	20.03
506	☐	J400	1,000.73	2,790.76	J400	20.00	49.79	20.00	2,790.76	20.00
507	☐	J406	1,000.22	2,898.79	J408	18.83	52.92	20.00	2,852.00	21.17
508	☐	J408	1,003.44	2,125.31	J408	20.00	48.92	20.00	2,125.31	20.00
509	☐	J410	1,001.26	3,787.51	J410	20.00	57.31	20.00	3,783.89	20.00
510	☐	J414	1,000.98	2,660.89	J414	20.00	53.39	20.00	2,660.90	20.00
511	☐	J42	1,001.22	3,422.08	J50	18.78	40.97	20.00	3,364.75	21.33
512	☐	J422	1,000.51	3,042.33	J408	19.04	53.42	20.00	3,001.64	20.96
513	☐	J430	1,005.72	3,947.67	J430	20.00	59.39	20.00	3,947.68	20.00
514	☐	J432	1,003.66	6,410.96	J432	20.00	65.19	20.00	6,410.96	20.00
515	☐	J436	1,002.14	6,663.91	J334	17.96	34.12	20.00	6,303.90	24.63
516	☐	J438	1,001.20	4,044.94	J438	20.00	56.48	20.00	4,028.81	20.00
517	☐	J440	1,000.75	5,812.51	J440	20.00	63.37	20.00	5,812.51	20.00
518	☐	J442	1,002.18	5,813.89	J442	20.00	63.18	20.00	5,813.89	20.00
519	☐	J444	1,001.85	6,668.74	J334	18.05	34.13	20.00	6,322.34	24.47
520	☐	J446	1,000.89	4,689.53	J454	19.48	63.61	20.00	4,663.26	20.58
521	☐	J448	1,001.63	4,772.00	J448	20.00	67.23	20.00	4,772.00	20.06
522	☐	J450	1,001.65	4,634.63	J454	18.14	63.46	20.00	4,543.27	21.89
523	☐	J454	1,004.48	2,401.14	J454	20.00	57.05	20.00	2,401.14	20.00
524	☐	J464	1,003.56	4,632.91	J464	20.00	68.48	20.00	4,632.91	20.05
525	☐	J468	1,002.73	8,493.83	J334	15.75	35.58	20.00	7,838.38	25.94

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
526	☐	J470	1,012.49	5,475.03	J2470	19.78	48.40	20.00	5,456.48	20.26
527	☐	J472	1,001.87	4,123.77	J1552	-1.95	34.82	20.00	2,727.41	44.96
528	☐	J476	1,004.52	992.87	J2138	15.81	15.43	20.00	856.42	24.89
529	☐	J48	1,011.13	4,949.43	J1096	16.50	31.26	20.00	4,359.17	26.74
530	☐	J482	1,004.48	1,134.50	J2138	10.95	15.43	20.00	856.33	37.63
531	☐	J484	1,002.60	1,228.43	J2138	7.38	15.43	20.00	854.44	40.05
532	☐	J486	1,005.43	1,104.61	J2138	12.05	15.43	20.00	857.28	35.86
533	☐	J496	1,004.05	6,406.93	J496	20.00	76.43	20.00	6,406.93	20.06
534	☐	J500	1,001.73	7,407.54	J334	16.31	34.34	20.00	6,738.89	29.14
535	☐	J504	1,001.87	7,650.09	J334	14.40	34.29	20.00	6,661.79	31.97
536	☐	J510	1,002.42	6,793.24	J334	19.77	34.33	20.00	6,749.90	20.68
537	☐	J512	1,002.08	8,158.51	J334	9.77	34.27	20.00	6,584.02	38.35
538	☐	J514	1,002.46	5,748.61	J514	20.00	66.54	20.00	5,748.61	20.08
539	☐	J516	1,005.88	3,025.02	J516	20.00	66.58	20.00	3,025.02	20.00
540	☐	J518	1,000.89	8,459.79	J334	6.34	34.26	20.00	6,540.20	41.88
541	☐	J52	1,000.96	1,953.47	J50	14.37	33.84	20.00	1,725.77	25.62
542	☐	J520	1,005.13	8,547.02	J334	1.79	34.15	20.00	6,201.81	43.43
543	☐	J522	1,005.23	8,521.25	J334	2.35	34.17	20.00	6,246.92	42.29
544	☐	J526	1,002.22	7,219.33	J334	10.86	34.06	20.00	5,816.78	34.99
545	☐	J528	1,002.60	6,689.25	J334	18.39	34.22	20.00	6,398.99	24.11
546	☐	J530	1,001.65	7,117.56	J334	16.20	34.23	20.00	6,447.82	28.52
547	☐	J532	1,005.15	3,502.46	J532	20.00	59.88	20.00	3,502.46	20.00
548	☐	J534	1,005.47	8,337.32	J334	4.88	34.21	20.00	6,356.36	39.91
549	☐	J536	1,005.51	3,380.02	J536	20.00	58.02	20.00	3,380.02	19.99
550	☐	J538	1,005.09	8,277.68	J334	5.61	34.27	20.00	6,428.60	38.69
551	☐	J540	1,005.37	5,160.34	J540	20.00	59.34	20.00	5,156.01	20.02
552	☐	J542	1,001.18	8,318.93	J334	5.75	34.34	20.00	6,505.07	38.04
553	☐	J544	1,003.40	8,466.07	J334	4.42	34.45	20.00	6,642.98	38.41
554	☐	J546	1,005.23	1,245.55	J546	20.00	32.36	20.00	1,245.55	20.00
555	☐	J548	1,004.21	1,630.37	J548	20.00	41.37	20.00	1,630.37	20.01
556	☐	J550	1,003.28	3,393.11	J550	20.00	52.19	20.00	3,393.12	20.00
557	☐	J554	1,005.58	3,084.65	J334	17.66	32.66	20.00	2,827.48	24.48
558	☐	J564	1,002.32	8,205.80	J334	7.95	34.67	20.00	6,740.12	34.27
559	☐	J568	1,005.49	1,915.39	J568	20.00	46.89	20.00	1,915.39	20.05
560	☐	J574	1,002.89	6,615.05	J574	20.00	64.45	20.00	6,615.05	20.00

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
561	☐	J578	1,000.20	6,031.01	J578	20.00	62.98	20.00	6,031.01	20.00
562	☐	J580	1,004.35	4,622.74	J580	20.00	57.80	20.00	4,622.75	20.01
563	☐	J586	1,002.20	7,057.83	J334	18.36	34.31	20.00	6,750.23	24.14
564	☐	J588	1,002.71	5,533.14	J588	20.00	64.24	20.00	5,533.15	20.06
565	☐	J592	1,001.99	8,097.58	J334	10.67	34.27	20.00	6,617.56	37.05
566	☐	J594	1,004.07	8,131.57	J334	7.85	34.22	20.00	6,370.50	39.82
567	☐	J598	1,004.86	4,379.30	J598	20.00	68.59	20.00	4,379.30	20.00
568	☐	J600	1,005.96	5,421.13	J600	20.00	66.79	20.00	5,421.13	20.05
569	☐	J602	1,005.21	7,085.54	J334	15.73	34.19	20.00	6,345.86	29.98
570	☐	J604	1,002.83	7,744.99	J334	10.63	34.15	20.00	6,261.06	36.70
571	☐	J606	1,011.64	7,303.42	J334	15.09	34.20	20.00	6,450.17	32.25
572	☐	J608	1,011.90	6,962.86	J334	17.12	34.18	20.00	6,448.14	27.43
573	☐	J610	1,005.74	6,690.46	J334	18.89	34.18	20.00	6,485.97	23.04
574	☐	J612	1,005.03	3,964.36	J612	20.00	62.46	20.00	3,964.37	20.00
575	☐	J614	1,001.40	7,205.38	J334	10.93	34.06	20.00	5,812.36	34.91
576	☐	J616	1,002.54	6,174.04	J616	20.00	62.58	20.00	6,174.04	20.00
577	☐	J620	1,002.67	6,036.38	J620	20.00	63.17	20.00	6,036.38	20.00
578	☐	J622	1,002.20	7,177.94	J334	14.86	34.16	20.00	6,301.75	31.29
579	☐	J624	1,002.58	6,974.72	J334	16.20	34.16	20.00	6,314.27	28.91
580	☐	J626	1,004.72	6,630.86	J334	18.93	34.22	20.00	6,434.38	23.27
581	☐	J628	1,004.88	7,474.06	J334	13.84	34.22	20.00	6,421.62	34.03
582	☐	J630	1,002.56	6,623.20	J334	18.51	34.19	20.00	6,355.40	24.06
583	☐	J632	1,002.69	6,393.65	J334	19.81	34.19	20.00	6,359.01	20.56
584	☐	J634	1,004.01	7,214.66	J334	15.34	34.22	20.00	6,406.25	31.58
585	☐	J640	1,000.53	4,604.55	J656	17.55	74.93	20.00	4,502.21	22.46
586	☐	J642	1,002.54	3,588.21	J642	20.00	72.86	20.00	3,588.21	20.00
587	☐	J644	1,001.34	7,137.33	J334	18.19	34.34	20.00	6,796.53	24.70
588	☐	J646	1,001.28	4,608.06	J646	20.00	70.79	20.00	4,608.07	19.99
589	☐	J648	1,007.77	3,671.30	J648	20.00	64.28	20.00	3,671.30	20.00
590	☐	J652	1,001.77	7,160.61	J334	17.79	34.32	20.00	6,751.10	25.73
591	☐	J654	1,000.98	4,603.92	J656	17.46	74.92	20.00	4,497.84	22.55
592	☐	J656	1,007.69	3,185.96	J656	20.00	71.73	20.00	3,185.96	20.00
593	☐	J662	1,002.99	4,531.97	J662	20.00	74.83	20.00	4,531.97	20.00
594	☐	J664	1,002.97	3,855.42	J664	20.00	72.40	20.00	3,855.42	20.00
595	☐	J666	1,001.34	3,194.57	J668	18.51	68.41	20.00	3,147.50	21.50

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
596	☐	J668	1,003.01	1,944.18	J668	20.00	59.05	20.00	1,944.18	20.07
597	☐	J670	1,001.46	7,412.70	J334	16.30	34.34	20.00	6,741.30	29.21
598	☐	J672	1,002.79	4,958.12	J672	20.00	73.39	20.00	4,955.37	19.99
599	☐	J674	1,004.64	5,896.30	J674	20.00	73.39	20.00	5,896.31	20.04
600	☐	J676	1,002.36	3,518.31	J676	20.00	79.48	20.00	3,518.31	20.00
601	☐	J678	1,002.97	3,687.67	J678	20.00	74.49	20.00	3,687.67	20.00
602	☐	J680	1,003.21	3,512.46	J680	20.00	76.14	20.00	3,512.47	20.00
603	☐	J682	1,000.92	4,288.28	J682	20.00	80.00	20.00	4,288.28	20.00
604	☐	J686	1,002.60	4,708.71	J686	20.00	77.85	20.00	4,708.71	19.98
605	☐	J688	1,002.05	3,327.18	J688	20.00	72.27	20.00	3,327.19	20.00
606	☐	J690	1,001.67	4,962.12	J1424	19.73	53.65	20.00	4,936.96	20.39
607	☐	J694	1,001.93	2,383.93	J694	20.00	64.94	20.00	2,383.93	20.00
608	☐	J696	1,001.32	2,931.38	J696	20.00	76.01	20.00	2,931.38	20.00
609	☐	J700	1,001.46	4,228.40	J700	20.00	79.61	20.00	4,228.40	20.00
610	☐	J702	1,001.40	2,322.47	J702	20.00	71.20	20.00	2,322.46	19.96
611	☐	J704	1,000.89	2,308.13	J704	20.00	71.83	20.00	2,308.13	19.97
612	☐	J708	1,001.63	2,558.77	J708	20.00	73.40	20.00	2,558.77	20.00
613	☐	J710	1,000.96	3,192.54	J710	20.00	75.12	20.00	3,192.54	20.00
614	☐	J712	1,001.71	2,545.25	J808	19.19	71.54	20.00	2,528.03	20.81
615	☐	J716	1,001.28	4,373.75	J750	19.35	73.52	20.00	4,350.14	20.81
616	☐	J722	1,002.28	3,180.77	J746	17.91	70.79	20.00	3,122.72	22.09
617	☐	J724	1,001.32	3,471.36	J746	17.77	71.89	20.00	3,404.66	22.24
618	☐	J726	1,006.84	4,473.02	J726	20.00	67.48	20.00	4,473.02	20.03
619	☐	J728	1,003.28	4,004.10	J2266	15.33	57.90	20.00	3,786.04	25.05
620	☐	J730	1,003.15	3,130.26	J730	20.00	65.50	20.00	3,129.31	20.00
621	☐	J734	1,000.71	3,569.64	J2266	12.80	56.77	20.00	3,273.21	27.20
622	☐	J738	1,003.19	2,781.63	J738	20.00	64.91	20.00	2,781.63	20.00
623	☐	J742	1,001.63	3,266.96	J742	20.00	71.39	20.00	3,266.96	20.00
624	☐	J744	1,001.63	3,190.29	J744	20.00	71.88	20.00	3,190.29	20.00
625	☐	J746	1,001.06	2,528.09	J746	20.00	67.33	20.00	2,528.10	20.00
626	☐	J748	1,001.75	3,005.26	J746	18.16	70.01	20.00	2,956.51	21.85
627	☐	J750	1,003.09	3,408.59	J750	20.00	71.19	20.00	3,408.59	20.01
628	☐	J752	1,000.20	3,854.95	J780	18.94	72.59	20.00	3,820.11	21.10
629	☐	J756	1,004.48	4,444.25	J756	20.00	72.89	20.00	4,444.25	20.05
630	☐	J758	1,001.32	4,231.21	J750	19.77	73.32	20.00	4,223.08	20.30

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
631	☐	J76	1,002.20	4,676.06	J76	20.00	68.43	20.00	4,676.06	20.06
632	☐	J770	1,001.65	4,214.50	J770	20.00	76.98	20.00	4,214.50	20.05
633	☐	J772	1,000.53	3,605.64	J794	19.30	75.86	20.00	3,584.84	20.71
634	☐	J774	1,001.83	3,967.42	J746	17.35	73.28	20.00	3,880.71	22.69
635	☐	J776	1,000.98	4,030.46	J750	18.80	72.81	20.00	3,989.40	21.26
636	☐	J78	1,005.13	5,455.27	J78	20.00	70.64	20.00	5,455.28	20.00
637	☐	J780	1,001.46	3,525.33	J780	20.00	71.76	20.00	3,525.33	20.01
638	☐	J782	1,000.31	3,815.87	J780	19.11	72.51	20.00	3,786.70	20.93
639	☐	J786	1,000.79	4,133.92	J786	20.00	75.65	20.00	4,133.92	20.05
640	☐	J788	1,000.24	4,153.95	J788	20.00	75.33	20.00	4,153.94	20.05
641	☐	J792	1,001.63	2,628.33	J792	20.00	72.89	20.00	2,628.33	20.00
642	☐	J794	1,000.89	2,756.95	J794	20.00	72.08	20.00	2,756.95	20.00
643	☐	J796	1,000.00	4,535.81	J1222	16.25	80.11	20.00	4,415.81	23.86
644	☐	J798	1,000.00	5,091.49	J798	20.00	109.37	20.00	5,091.49	20.01
645	☐	J80	1,007.47	3,815.70	J80	20.00	61.59	20.00	3,815.70	20.00
646	☐	J800	1,001.32	5,322.86	J1576	16.71	87.09	20.00	5,221.86	23.49
647	☐	J802	1,002.48	5,323.47	J1576	16.67	87.08	20.00	5,221.23	23.52
648	☐	J804	1,000.69	5,224.40	J2646	18.94	87.24	20.00	5,192.06	21.11
649	☐	J808	1,001.32	1,859.12	J808	20.00	62.90	20.00	1,859.12	20.00
650	☐	J810	1,001.22	2,334.41	J810	20.00	72.30	20.00	2,334.41	19.95
651	☐	J812	1,001.81	2,040.06	J812	20.00	68.81	20.00	2,040.06	20.07
652	☐	J814	1,001.47	5,143.11	J814	20.00	89.02	20.00	5,143.12	20.01
653	☐	J816	1,000.00	4,235.19	J816	20.00	100.04	20.00	4,235.18	20.11
654	☐	J818	1,001.24	2,565.35	J1424	9.64	47.52	20.00	2,225.52	31.34
655	☐	J82	1,000.69	3,923.72	J2266	12.52	57.52	20.00	3,592.13	27.48
656	☐	J820	1,001.75	2,556.34	J1424	9.59	47.46	20.00	2,216.51	31.31
657	☐	J822	1,001.30	2,674.32	J1424	8.13	47.85	20.00	2,278.07	33.00
658	☐	J824	1,001.30	2,634.99	J1424	8.82	47.76	20.00	2,263.34	32.34
659	☐	J830	1,002.54	5,297.09	J2140	-12.30	44.43	20.00	3,386.52	59.95
660	☐	J832	1,000.06	4,548.48	J2140	-25.68	42.52	20.00	2,610.28	66.97
661	☐	J834	1,001.55	3,110.16	J834	20.00	79.19	20.00	3,110.16	20.00
662	☐	J836	1,001.63	3,833.01	J2256	13.21	76.86	20.00	3,617.02	26.79
663	☐	J84	1,004.56	5,765.93	J84	20.00	82.13	20.00	5,765.93	20.00
664	☐	J842	1,001.36	4,299.58	J1424	18.89	52.99	20.00	4,223.82	22.35
665	☐	J844	1,023.48	1,469.88	J844	20.00	59.77	20.00	1,469.88	20.00

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
666	☐	J848	1,000.33	5,467.51	J1424	4.21	53.20	20.00	4,435.69	41.27
667	☐	J850	1,001.04	5,366.13	J2140	8.88	45.72	20.00	4,390.90	38.92
668	☐	J852	1,000.08	5,511.95	J1424	8.41	53.36	20.00	4,701.98	35.81
669	☐	J854	1,001.24	5,655.55	J2140	-8.29	45.05	20.00	3,767.17	56.49
670	☐	J856	1,002.85	4,685.92	J2140	17.22	45.73	20.00	4,415.96	27.18
671	☐	J858	1,001.47	4,372.69	J2140	16.98	45.56	20.00	4,102.70	26.99
672	☐	J86	1,004.17	7,939.82	J334	10.86	34.24	20.00	6,491.78	39.81
673	☐	J860	1,001.08	4,400.84	J2140	16.25	45.48	20.00	4,073.04	28.77
674	☐	J862	1,001.95	3,383.99	J862	20.00	79.02	20.00	3,383.99	20.00
675	☐	J864	1,029.83	4,112.57	J2140	18.97	45.32	20.00	4,021.45	22.48
676	☐	J866	1,001.44	4,728.20	J2140	7.12	45.00	20.00	3,754.51	42.19
677	☐	J868	1,001.20	5,270.78	J2140	9.80	45.71	20.00	4,366.04	37.94
678	☐	J870	1,000.28	5,114.52	J2140	11.27	45.66	20.00	4,330.65	36.16
679	☐	J872	1,001.97	4,462.17	J2140	16.68	45.54	20.00	4,160.13	27.25
680	☐	J874	1,002.85	2,432.12	J874	20.00	71.74	20.00	2,432.12	20.00
681	☐	J876	1,001.18	5,055.20	J2140	4.39	45.17	20.00	3,875.29	46.22
682	☐	J878	1,000.35	5,654.71	J2140	-8.29	45.05	20.00	3,766.26	56.49
683	☐	J880	1,001.83	5,284.68	J2140	9.27	45.66	20.00	4,341.18	40.95
684	☐	J882	1,002.60	5,169.35	J1424	9.82	53.28	20.00	4,485.15	35.60
685	☐	J884	1,001.18	4,835.93	J2140	8.64	45.23	20.00	3,923.25	41.39
686	☐	J886	1,001.12	4,622.23	J2140	12.62	45.32	20.00	3,996.95	35.96
687	☐	J888	1,002.06	4,501.01	J2140	14.74	45.40	20.00	4,044.88	32.13
688	☐	J890	1,000.85	5,184.11	J1424	9.43	53.26	20.00	4,472.42	35.91
689	☐	J892	1,001.26	5,629.27	J2140	-8.89	45.00	20.00	3,726.51	56.78
690	☐	J898	1,002.50	5,429.60	J2140	6.74	45.61	20.00	4,298.76	44.18
691	☐	J902	1,002.01	4,562.19	J1424	-13.86	51.19	20.00	3,124.46	55.54
692	☐	J904	1,001.77	4,394.38	J1424	-11.63	51.04	20.00	3,066.07	51.83
693	☐	J906	1,001.53	3,148.14	J1424	18.69	51.09	20.00	3,083.70	22.59
694	☐	J908	1,002.67	3,904.03	J1424	1.70	51.09	20.00	3,084.84	45.00
695	☐	J912	1,003.11	4,328.84	J1424	-9.44	51.06	20.00	3,077.02	53.08
696	☐	J914	1,001.91	4,795.59	J1424	-7.58	51.90	20.00	3,461.64	51.32
697	☐	J918	1,001.73	5,490.44	J1424	-6.56	52.73	20.00	4,003.62	50.44
698	☐	J92	1,001.83	7,144.11	J334	10.82	34.04	20.00	5,747.76	35.12
699	☐	J920	1,001.99	5,055.41	J1424	3.26	52.77	20.00	4,061.77	41.48
700	☐	J922	1,002.95	5,688.03	J1424	-3.12	53.05	20.00	4,292.69	47.35

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
701	☐	J924	1,001.12	5,509.42	J1424	7.26	53.31	20.00	4,634.96	36.99
702	☐	J926	1,000.22	5,568.52	J1424	2.25	53.19	20.00	4,429.42	42.98
703	☐	J928	1,001.71	4,431.28	J1424	1.72	51.97	20.00	3,497.95	42.91
704	☐	J930	1,001.81	4,255.09	J1424	7.47	52.11	20.00	3,580.63	37.65
705	☐	J932	1,001.42	4,372.64	J1424	-11.67	51.00	20.00	3,049.67	51.89
706	☐	J934	1,001.61	4,188.00	J1424	-12.91	50.55	20.00	2,892.65	52.91
707	☐	J936	1,001.22	3,003.76	J936	20.00	81.18	20.00	3,003.76	20.00
708	☐	J938	1,000.30	3,047.85	J936	19.82	81.40	20.00	3,043.42	20.18
709	☐	J94	1,001.79	6,804.96	J334	9.15	33.92	20.00	5,285.77	35.76
710	☐	J940	1,003.89	4,527.71	J1424	-11.76	51.26	20.00	3,155.14	55.70
711	☐	J942	1,006.47	4,614.83	J1424	-1.96	51.99	20.00	3,509.99	48.64
712	☐	J944	1,002.05	4,588.00	J1424	15.76	53.07	20.00	4,298.33	28.13
713	☐	J948	1,001.75	5,490.43	J1424	-6.56	52.73	20.00	4,003.64	50.44
714	☐	J956	1,001.26	5,526.85	J1424	3.11	53.19	20.00	4,433.75	42.29
715	☐	J958	1,002.30	4,442.45	J1424	4.30	52.16	20.00	3,605.10	42.07
716	☐	J96	1,002.14	6,623.28	J334	15.70	34.06	20.00	5,918.33	28.45
717	☐	J960	1,004.74	4,899.07	J1424	4.59	52.70	20.00	3,989.90	42.67
718	☐	J962	1,002.38	4,271.65	J1424	18.61	52.93	20.00	4,178.06	22.91
719	☐	J968	1,004.44	2,372.75	J840	19.28	78.43	20.00	2,360.12	20.72
720	☐	J972	1,001.77	3,905.85	J1424	1.83	51.10	20.00	3,090.36	46.02
721	☐	J974	1,000.35	3,989.21	J1424	-0.14	51.11	20.00	3,092.35	48.08
722	☐	J976	1,000.96	4,487.46	J1424	-10.98	51.25	20.00	3,146.62	55.32
723	☐	J978	1,001.47	4,318.35	J1424	-8.12	51.14	20.00	3,104.50	54.18
724	☐	J980	1,002.48	3,379.37	J1424	13.98	51.10	20.00	3,091.07	31.11
725	☐	J982	1,001.38	2,585.54	J1424	6.23	47.04	20.00	2,156.18	33.77
726	☐	J986	1,000.16	3,426.00	J1424	-2.87	49.46	20.00	2,587.88	42.87
727	☐	J988	1,000.98	3,018.24	J1424	-0.51	48.22	20.00	2,338.86	40.51
728	☐	J992	1,000.75	2,050.12	J1424	13.00	44.36	20.00	1,855.72	27.00
729	☐	J996	1,002.56	1,907.95	J1424	18.24	44.36	20.00	1,857.53	21.95
730	☐	J998	1,000.33	1,697.18	J1424	18.45	41.80	20.00	1,657.56	21.55

LEGEND:

- JUNCTION MEETS MDD + 1000 GPM FF REQUIREMENT
- JUNCTION DOES NOT MEET MDD + 1000 GPM FF REQUIREMENT
- INACTIVE JUNCTION
- ACTIVE PIPE
- INACTIVE PIPE

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DATE JUNE 2021

SCALE AS SHOWN

PROJECT 2020-016

City of Sequim

CLALLAM COUNTY WASHINGTON

FIGURE 5B: 2041 MAXIMUM DAY DEMAND + 1000 GPM FF WITH IMPROVEMENTS

CITY OF SEQUIM

WILSON ENGINEERING

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
1	☐	J100	1,004.46	3,205.40	J334	17.68	32.39	20.00	2,940.82	24.74
2	☐	J1000	1,001.67	1,681.95	J1000	20.00	42.93	20.00	1,681.95	20.04
3	☐	J1006	1,002.42	2,960.80	J1552	16.11	34.68	20.00	2,672.94	25.34
4	☐	J1008	1,022.50	4,438.53	J2464	8.51	28.81	20.00	3,743.13	35.47
5	☐	J1014	1,006.17	3,547.13	J1014	20.00	84.72	20.00	3,547.13	20.04
6	☐	J1016	1,003.70	4,530.98	J1016	20.00	94.31	20.00	4,530.99	20.00
7	☐	J1018	1,008.42	3,019.52	J1018	20.00	89.25	20.00	3,019.52	20.02
8	☐	J102	1,004.09	3,165.48	J334	7.01	31.02	20.00	2,196.19	33.65
9	☐	J1020	1,002.83	4,797.88	J2632	16.24	85.45	20.00	4,683.84	24.13
10	☐	J1022	1,000.00	4,263.97	J1022	20.00	94.95	20.00	4,263.96	20.13
11	☐	J1030	1,000.00	4,553.98	J1030	20.00	104.02	20.00	4,553.99	20.01
12	☐	J1044	1,000.53	3,051.69	J1044	20.00	57.08	20.00	3,051.69	20.00
13	☐	J1048	1,001.00	3,176.87	J54	17.76	37.24	20.00	3,013.21	23.01
14	☐	J1050	1,000.96	2,975.82	J1056	18.70	45.88	20.00	2,910.90	21.34
15	☐	J1052	1,002.54	3,110.39	J54	18.81	37.25	20.00	3,022.18	21.74
16	☐	J1054	1,005.72	2,850.46	J1054	20.00	46.41	20.00	2,850.46	20.03
17	☐	J1056	1,005.23	2,384.34	J1056	20.00	43.94	20.00	2,384.34	20.01
18	☐	J1058	1,001.28	2,750.00	J1056	19.13	45.27	20.00	2,709.38	20.89
19	☐	J106	1,003.15	2,498.50	J334	10.16	29.88	20.00	1,861.60	29.84
20	☐	J1064	1,000.20	3,541.66	J1324	19.50	40.55	20.00	3,502.31	20.52
21	☐	J1068	1,000.53	3,745.38	J1324	17.55	40.61	20.00	3,552.33	22.54
22	☐	J1074	1,000.00	1,573.63	J1074	20.00	37.04	20.00	1,573.63	19.97
23	☐	J1076	1,000.87	1,580.06	J1076	20.00	36.95	20.00	1,580.05	19.95
24	☐	J108	1,007.41	1,807.12	J2138	12.26	26.67	20.00	1,423.56	29.89
25	☐	J1080	1,001.40	3,806.73	J1974	18.96	46.20	20.00	3,735.98	21.09
26	☐	J1084	1,002.50	3,245.72	J1084	20.00	40.85	20.00	3,245.73	20.03
27	☐	J1086	1,000.20	3,417.92	J1086	20.00	43.09	20.00	3,417.92	20.03
28	☐	J1088	1,001.02	3,419.54	J1088	20.00	43.09	20.00	3,419.54	20.03
29	☐	J1090	1,002.42	3,281.06	J1090	20.00	43.08	20.00	3,281.06	20.03
30	☐	J1092	1,000.14	3,306.43	J1096	19.77	30.77	20.00	3,274.77	20.36
31	☐	J1094	1,002.26	3,075.17	J1094	20.00	37.38	20.00	3,075.17	20.02
32	☐	J1096	1,000.00	2,878.73	J1096	20.00	30.40	20.00	2,878.73	20.00
33	☐	J1098	1,000.00	2,644.80	J1098	20.00	30.94	20.00	2,644.80	20.02
34	☐	J1102	1,003.03	6,181.57	J334	10.03	33.42	20.00	4,785.90	34.51
35	☐	J1106	1,003.30	6,809.60	J334	16.60	33.75	20.00	6,184.89	27.95

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
36	☐	J1110	1,000.39	4,819.38	J642	18.67	75.43	20.00	4,762.38	21.33
37	☐	J1112	1,000.00	4,735.92	J1112	20.00	75.45	20.00	4,735.92	20.00
38	☐	J1114	1,000.00	4,735.93	J1114	20.00	75.45	20.00	4,735.93	20.00
39	☐	J1116	1,004.29	4,743.55	J1116	20.00	74.69	20.00	4,743.56	20.00
40	☐	J1118	1,000.96	4,477.77	J54	14.72	37.75	20.00	3,976.20	26.97
41	☐	J1120	1,010.66	2,154.66	J2020	19.55	39.83	20.00	2,135.47	20.42
42	☐	J1128	1,000.69	4,329.88	J1128	20.00	91.19	20.00	4,329.85	20.14
43	☐	J1130	1,000.90	4,139.99	J1130	20.00	91.90	20.00	4,139.99	20.08
44	☐	J1132	1,000.12	4,278.62	J1132	20.00	90.89	20.00	4,278.62	20.10
45	☐	J1134	1,000.18	4,234.53	J1134	20.00	90.99	20.00	4,234.52	20.10
46	☐	J1138	1,000.10	4,227.44	J1138	20.00	92.09	20.00	4,227.44	20.09
47	☐	J1140	1,001.16	4,239.41	J1140	20.00	93.14	20.00	4,239.40	20.09
48	☐	J1144	1,000.81	4,148.18	J1144	20.00	92.16	20.00	4,148.17	20.08
49	☐	J1146	1,000.57	4,221.52	J1146	20.00	92.96	20.00	4,221.51	20.09
50	☐	J1148	1,001.46	4,275.76	J1148	20.00	94.70	20.00	4,275.76	20.09
51	☐	J1150	1,000.63	4,209.14	J1150	20.00	93.41	20.00	4,209.14	20.09
52	☐	J1152	1,000.89	4,235.73	J1152	20.00	92.13	20.00	4,235.73	20.09
53	☐	J1154	1,000.85	4,173.09	J1154	20.00	92.85	20.00	4,173.09	20.08
54	☐	J1158	1,001.04	4,116.18	J1158	20.00	94.31	20.00	4,116.18	20.07
55	☐	J1160	1,000.94	4,334.50	J1160	20.00	95.62	20.00	4,334.48	20.11
56	☐	J1164	1,002.65	4,391.06	J1164	20.00	96.40	20.00	4,391.00	20.15
57	☐	J1166	1,000.63	4,262.33	J1166	20.00	94.85	20.00	4,262.32	20.09
58	☐	J1168	1,000.79	4,278.12	J1168	20.00	95.26	20.00	4,278.12	20.09
59	☐	J1170	1,002.40	3,115.90	J54	19.32	37.28	20.00	3,065.95	21.32
60	☐	J1172	1,002.03	2,910.04	J1172	20.00	53.23	20.00	2,910.04	20.00
61	☐	J1174	1,002.14	3,326.51	J54	16.04	37.27	20.00	3,041.95	26.05
62	☐	J1176	1,003.24	3,003.26	J1176	20.00	53.53	20.00	3,003.26	20.01
63	☐	J1178	1,003.62	2,903.14	J1178	20.00	56.91	20.00	2,903.14	20.01
64	☐	J118	1,015.22	1,346.32	J2402	19.83	37.39	20.00	1,343.42	20.17
65	☐	J1180	1,002.26	2,900.58	J1180	20.00	58.02	20.00	2,900.58	20.00
66	☐	J1182	1,001.04	2,928.71	J1182	20.00	58.88	20.00	2,928.71	20.00
67	☐	J1184	1,001.10	2,953.18	J1184	20.00	59.36	20.00	2,953.18	20.00
68	☐	J1186	1,001.26	2,974.97	J1186	20.00	59.44	20.00	2,974.97	20.00
69	☐	J1188	1,001.18	3,061.73	J1188	20.00	59.01	20.00	3,061.73	20.00
70	☐	J1190	1,001.55	3,013.73	J1190	20.00	59.96	20.00	3,013.73	20.00

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
71	☐	J1192	1,001.95	2,962.96	J1192	20.00	53.42	20.00	2,962.96	20.00
72	☐	J1194	1,001.04	2,863.56	J1194	20.00	53.07	20.00	2,863.56	20.01
73	☐	J120	1,002.73	8,455.87	J334	15.92	35.34	20.00	7,780.87	25.84
74	☐	J1200	1,000.81	6,438.83	J334	18.90	33.75	20.00	6,223.86	22.85
75	☐	J1204	1,000.79	6,858.98	J334	16.97	33.81	20.00	6,304.80	27.87
76	☐	J1210	1,000.35	3,526.00	J1222	17.70	75.90	20.00	3,462.22	22.33
77	☐	J1214	1,000.96	3,390.26	J1214	20.00	77.32	20.00	3,390.26	20.02
78	☐	J1216	1,000.83	3,605.60	J1222	16.42	76.06	20.00	3,505.75	23.60
79	☐	J1218	1,000.85	3,363.46	J1218	20.00	76.74	20.00	3,363.46	20.02
80	☐	J1220	1,000.31	3,390.73	J1222	19.31	75.57	20.00	3,371.99	20.71
81	☐	J1222	1,000.12	3,298.55	J1222	20.00	75.28	20.00	3,298.55	20.02
82	☐	J1224	1,002.60	4,884.92	J1228	19.53	63.72	20.00	4,860.95	20.51
83	☐	J1226	1,003.52	4,429.96	J1228	18.69	63.13	20.00	4,367.06	21.33
84	☐	J1228	1,009.38	3,330.34	J1228	20.00	61.03	20.00	3,330.34	20.00
85	☐	J1234	1,002.73	4,848.99	J1228	19.57	63.69	20.00	4,827.48	20.46
86	☐	J1244	1,000.85	3,352.03	J1250	14.22	50.73	20.00	3,095.71	26.19
87	☐	J1246	1,001.65	3,028.52	J1246	20.00	48.33	20.00	3,028.52	20.02
88	☐	J1248	1,003.72	3,196.04	J54	19.11	37.35	20.00	3,129.73	21.54
89	☐	J1250	1,001.97	2,797.88	J1250	20.00	49.81	20.00	2,797.88	20.01
90	☐	J1252	1,001.46	2,908.56	J1252	20.00	50.18	20.00	2,908.56	20.01
91	☐	J1254	1,003.80	2,950.73	J1254	20.00	50.31	20.00	2,950.73	20.01
92	☐	J1256	1,005.72	2,905.62	J1256	20.00	48.32	20.00	2,905.62	20.02
93	☐	J126	1,000.12	1,374.26	J2138	19.17	25.78	20.00	1,331.86	20.84
94	☐	J1262	1,011.35	3,193.05	J54	19.57	37.37	20.00	3,161.28	20.73
95	☐	J1266	1,005.62	4,580.70	J2374	13.58	49.90	20.00	1,837.42	55.71
96	☐	J1272	1,000.73	5,138.12	J1272	20.00	84.46	20.00	5,138.13	20.00
97	☐	J1276	1,002.67	4,980.62	J1276	20.00	84.74	20.00	4,980.62	20.01
98	☐	J128	1,000.31	1,638.26	J2138	15.06	26.40	20.00	1,389.94	25.52
99	☐	J1280	1,000.53	6,875.22	J2140	-12.87	47.16	20.00	4,895.82	56.19
100	☐	J1282	1,004.88	4,338.33	J1282	20.00	80.56	20.00	4,338.33	20.00
101	☐	J1284	1,000.73	6,896.64	J2140	-13.33	47.16	20.00	4,894.11	56.46
102	☐	J1286	1,002.60	6,951.94	J2140	-14.29	47.16	20.00	4,898.08	57.06
103	☐	J1292	1,005.15	6,113.02	J2140	-12.81	46.79	20.00	4,296.27	59.92
104	☐	J1298	1,001.85	6,122.77	J2140	-13.09	46.79	20.00	4,292.97	59.99
105	☐	J1300	1,004.13	6,061.61	J2140	-10.45	46.79	20.00	4,344.09	58.06

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
106	☐	J1306	1,009.03	6,555.50	J2140	-18.50	46.83	20.00	4,432.27	63.51
107	☐	J1310	1,002.60	6,579.71	J2140	-19.35	46.82	20.00	4,418.64	63.96
108	☐	J1316	1,000.57	6,530.61	J2140	0.86	47.33	20.00	5,230.55	46.67
109	☐	J1320	1,000.20	3,303.60	J1324	19.77	40.25	20.00	3,286.75	20.23
110	☐	J1322	1,000.53	3,281.01	J1324	18.64	40.09	20.00	3,183.20	21.36
111	☐	J1324	1,001.44	1,774.89	J1324	20.00	34.80	20.00	1,774.89	20.00
112	☐	J1326	1,000.31	1,687.04	J1326	20.00	34.50	20.00	1,687.04	20.00
113	☐	J1328	1,000.00	4,326.83	J1328	20.00	84.61	20.00	4,326.80	20.11
114	☐	J134	1,003.68	4,526.14	J54	14.38	37.75	20.00	3,989.26	27.42
115	☐	J1344	1,001.79	4,611.40	J238	17.47	47.84	20.00	4,415.48	22.72
116	☐	J1350	1,010.60	5,794.91	J2316	16.23	29.87	20.00	4,926.24	29.56
117	☐	J1352	1,002.30	4,942.75	J238	17.33	48.06	20.00	4,721.96	23.05
118	☐	J1354	1,004.86	4,372.69	J1644	17.10	46.01	20.00	4,278.74	22.85
119	☐	J1356	1,000.04	4,368.03	J1644	17.09	46.01	20.00	4,273.72	22.83
120	☐	J1358	1,009.22	4,332.09	J2464	0.70	28.78	20.00	3,409.85	39.30
121	☐	J1360	1,003.70	4,928.80	J2446	-13.20	29.84	20.00	3,900.41	67.35
122	☐	J1364	1,017.97	4,763.75	J1622	11.29	56.06	20.00	4,557.79	30.86
123	☐	J1366	1,004.68	4,676.95	J2446	-3.14	29.84	20.00	3,882.92	52.50
124	☐	J1368	1,001.02	4,782.23	J2446	-7.41	29.84	20.00	3,880.59	60.46
125	☐	J1370	1,000.10	3,766.10	J1222	16.68	76.59	20.00	3,669.55	23.36
126	☐	J1372	1,000.16	3,733.82	J1222	17.80	76.59	20.00	3,669.61	22.26
127	☐	J1374	1,000.12	3,586.46	J1552	6.49	34.68	20.00	2,670.64	37.08
128	☐	J1380	1,002.81	3,037.02	J1552	15.03	34.68	20.00	2,673.33	28.14
129	☐	J1390	1,000.24	4,808.72	J2446	-8.50	29.85	20.00	3,927.03	64.03
130	☐	J1392	1,000.57	3,808.42	J794	19.77	75.03	20.00	3,800.93	20.26
131	☐	J1394	1,001.04	3,797.04	J1394	20.00	74.89	20.00	3,797.04	20.02
132	☐	J1396	1,003.74	2,925.12	J1998	18.65	50.08	20.00	2,867.88	21.38
133	☐	J1402	1,001.81	3,236.95	J54	17.33	37.27	20.00	3,042.88	24.34
134	☐	J1404	1,001.36	3,143.79	J1998	17.45	50.60	20.00	3,031.60	22.62
135	☐	J1406	1,003.70	2,735.42	J1406	20.00	49.64	20.00	2,735.42	20.01
136	☐	J1416	1,000.83	4,060.55	J1424	-7.11	51.18	20.00	2,974.27	47.11
137	☐	J142	1,001.44	5,825.92	J2316	15.73	29.86	20.00	4,862.02	27.91
138	☐	J1424	1,000.33	1,610.14	J1424	20.00	41.19	20.00	1,610.14	20.03
139	☐	J1426	1,001.49	3,085.21	J2202	19.35	55.97	20.00	3,060.91	20.80
140	☐	J1436	1,000.26	2,854.86	J1442	19.13	64.02	20.00	2,830.40	20.87

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
141	☐	J1442	1,001.26	2,749.03	J1442	20.00	63.59	20.00	2,749.03	20.00
142	☐	J1448	1,000.37	2,633.25	J1448	20.00	59.68	20.00	2,633.25	20.00
143	☐	J1450	1,000.90	3,576.16	J54	13.85	37.35	20.00	3,130.55	32.23
144	☐	J1452	1,000.96	3,159.84	J54	19.60	37.35	20.00	3,130.61	20.97
145	☐	J1456	1,000.00	5,625.00	J1904	-12.82	41.63	20.00	3,901.56	56.63
146	☐	J1458	1,000.00	5,750.64	J1904	-15.02	41.66	20.00	3,923.86	58.64
147	☐	J146	1,004.07	2,610.06	J146	20.00	29.65	20.00	2,610.06	20.01
148	☐	J1460	1,003.19	5,609.51	J1904	-14.61	41.74	20.00	3,837.69	59.89
149	☐	J1462	1,003.68	5,405.71	J1904	-10.28	41.76	20.00	3,829.13	55.42
150	☐	J1464	1,003.58	5,158.64	J1904	-4.91	41.77	20.00	3,824.12	48.79
151	☐	J1466	1,013.92	5,188.28	J1904	-5.30	41.79	20.00	3,831.18	49.26
152	☐	J1468	1,001.18	5,075.37	J1904	-3.18	41.77	20.00	3,823.38	47.66
153	☐	J1470	1,001.73	5,016.91	J1904	-1.93	41.77	20.00	3,824.51	47.46
154	☐	J1472	1,001.32	5,013.93	J1904	-1.88	41.77	20.00	3,824.09	47.42
155	☐	J1474	1,004.46	4,538.72	J1904	7.66	41.77	20.00	3,828.30	38.84
156	☐	J1476	1,002.08	4,503.62	J1904	8.36	41.76	20.00	3,827.19	39.95
157	☐	J1478	1,001.83	4,753.67	J1904	3.45	41.76	20.00	3,827.44	47.63
158	☐	J148	1,001.85	1,647.38	J148	20.00	27.20	20.00	1,647.38	20.01
159	☐	J1480	1,001.61	5,292.28	J1904	-7.78	41.76	20.00	3,828.01	56.33
160	☐	J1482	1,000.87	4,826.11	J1904	1.98	41.76	20.00	3,825.99	46.14
161	☐	J1490	1,004.01	6,302.18	J1904	-12.48	41.91	20.00	4,442.19	60.67
162	☐	J1492	1,003.36	5,807.48	J1904	-15.13	41.68	20.00	3,967.37	59.18
163	☐	J1494	1,003.07	5,546.19	J1904	-13.34	41.75	20.00	3,831.59	58.93
164	☐	J1498	1,001.67	6,370.71	J2140	-18.80	46.79	20.00	4,280.61	63.44
165	☐	J150	1,010.89	2,361.69	J150	20.00	36.87	20.00	2,361.69	20.01
166	☐	J1500	1,008.65	5,361.16	J2140	-6.04	46.37	20.00	3,923.18	47.82
167	☐	J1502	1,003.11	5,550.74	J2140	-7.44	46.51	20.00	4,029.32	49.93
168	☐	J1504	1,004.56	5,188.35	J2140	1.52	46.60	20.00	4,101.26	43.35
169	☐	J1506	1,002.36	6,378.58	J2140	-17.22	46.90	20.00	4,347.85	62.82
170	☐	J1508	1,002.79	6,359.51	J2140	-17.95	46.83	20.00	4,301.36	63.03
171	☐	J1510	1,002.46	5,266.27	J2140	3.10	46.80	20.00	4,264.27	46.01
172	☐	J1512	1,001.26	5,507.43	J2140	-1.48	46.80	20.00	4,263.07	50.23
173	☐	J1514	1,000.00	4,626.95	J1904	4.28	41.41	20.00	3,725.87	39.37
174	☐	J1516	1,000.00	3,863.59	J1904	18.15	41.41	20.00	3,725.87	23.06
175	☐	J1518	1,002.93	4,388.49	J1904	6.24	41.18	20.00	3,567.84	38.51

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
176	☐	J152	1,007.47	2,121.09	J148	14.03	27.45	20.00	1,701.22	27.22
177	☐	J1520	1,001.40	3,683.69	J1532	14.73	54.49	20.00	3,451.07	25.67
178	☐	J1522	1,000.00	4,041.81	J1904	11.60	41.06	20.00	3,477.28	34.80
179	☐	J1524	1,000.00	3,721.99	J1904	16.47	41.06	20.00	3,477.28	27.51
180	☐	J1526	1,002.28	2,515.92	J1526	20.00	60.76	20.00	2,515.92	20.00
181	☐	J1528	1,001.24	3,315.59	J1532	16.87	53.83	20.00	3,186.97	23.28
182	☐	J1530	1,001.51	2,276.85	J1530	20.00	54.73	20.00	2,276.85	20.04
183	☐	J1532	1,003.76	3,033.94	J1532	20.00	53.37	20.00	3,033.93	20.00
184	☐	J1534	1,001.49	2,949.66	J1534	20.00	51.27	20.00	2,949.66	20.00
185	☐	J1536	1,002.14	2,893.95	J1536	20.00	48.67	20.00	2,893.95	20.00
186	☐	J1538	1,000.67	3,278.88	J1536	14.16	49.08	20.00	3,024.64	26.03
187	☐	J1540	1,000.55	3,756.66	J1904	13.21	40.77	20.00	3,314.85	30.48
188	☐	J1542	1,001.83	3,251.70	J1542	20.00	55.18	20.00	3,251.70	20.00
189	☐	J1546	1,002.05	6,404.69	J334	16.13	33.65	20.00	5,728.10	27.93
190	☐	J1550	1,001.40	3,462.71	J1550	20.00	55.21	20.00	3,462.72	20.00
191	☐	J1552	1,000.51	1,211.73	J1552	20.00	24.96	20.00	1,208.82	20.00
192	☐	J1554	1,001.04	1,456.09	J1552	15.96	26.47	20.00	1,299.13	24.04
193	☐	J1556	1,010.48	1,667.08	J1552	10.82	26.79	20.00	1,330.34	29.42
194	☐	J1558	1,000.59	1,691.02	J1552	9.83	26.81	20.00	1,321.79	30.37
195	☐	J1560	1,000.43	1,727.15	J1552	8.86	26.87	20.00	1,325.69	31.38
196	☐	J1562	1,000.85	1,993.82	J1552	2.27	27.54	20.00	1,374.24	37.74
197	☐	J1564	1,034.06	4,482.29	J1552	-16.44	34.56	20.00	2,599.17	56.44
198	☐	J1568	1,003.23	2,745.70	J1568	20.00	58.97	20.00	2,745.70	19.99
199	☐	J1570	1,000.57	3,798.73	J1904	11.77	40.70	20.00	3,274.08	31.62
200	☐	J1572	1,000.00	3,828.04	J1904	9.74	40.56	20.00	3,196.11	34.00
201	☐	J1574	1,002.60	4,214.71	J1576	18.36	82.96	20.00	4,166.64	21.79
202	☐	J1576	1,004.01	3,930.16	J1576	20.00	82.34	20.00	3,930.16	20.07
203	☐	J1578	1,002.16	3,841.25	J1578	20.00	82.85	20.00	3,841.25	20.07
204	☐	J1582	1,004.94	4,455.78	J1582	20.00	86.67	20.00	4,455.79	20.00
205	☐	J1584	1,000.22	4,552.18	J1576	15.95	83.57	20.00	4,430.80	24.09
206	☐	J1588	1,000.45	2,852.12	J1588	20.00	78.56	20.00	2,852.12	20.12
207	☐	J1590	1,001.22	2,895.67	J1590	20.00	78.66	20.00	2,895.67	20.12
208	☐	J1592	1,001.69	2,897.92	J1592	20.00	77.22	20.00	2,897.92	20.12
209	☐	J1594	1,000.83	2,668.88	J1594	20.00	72.88	20.00	2,668.88	20.11
210	☐	J1596	1,000.63	2,767.18	J1598	19.18	72.16	20.00	2,747.23	20.82

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
211	☐	J1598	1,000.30	2,696.12	J1598	20.00	71.83	20.00	2,696.12	20.00
212	☐	J1600	1,001.77	2,979.06	J1600	20.00	72.86	20.00	2,979.06	20.00
213	☐	J1602	1,000.59	4,127.41	J1324	18.27	41.03	20.00	3,974.80	21.93
214	☐	J1604	1,001.14	3,765.18	J1604	20.00	44.29	20.00	3,765.18	20.00
215	☐	J1608	1,002.14	3,647.36	J1608	20.00	43.60	20.00	3,647.37	20.00
216	☐	J1610	1,005.53	5,708.86	J1610	20.00	80.15	20.00	5,708.86	20.00
217	☐	J1612	1,000.67	3,942.70	J1612	20.00	79.57	20.00	3,942.70	20.00
218	☐	J1614	1,000.12	4,137.58	J2050	19.46	96.17	20.00	4,124.36	20.61
219	☐	J1616	1,003.26	3,568.21	J1616	20.00	95.65	20.00	3,568.21	20.03
220	☐	J1618	1,002.58	3,077.59	J1618	20.00	94.87	20.00	3,077.59	20.01
221	☐	J1620	1,006.75	3,287.16	J1618	19.57	96.12	20.00	3,278.86	20.45
222	☐	J1622	1,003.54	4,382.34	J2446	1.93	29.84	20.00	3,808.49	39.82
223	☐	J1624	1,006.75	1,688.90	J1624	20.00	48.50	20.00	1,688.90	20.00
224	☐	J1626	1,009.40	1,917.93	J1654	3.80	56.18	20.00	1,707.27	39.18
225	☐	J1632	1,002.73	3,650.97	J1632	20.00	90.32	20.00	3,650.97	20.00
226	☐	J1638	1,004.54	1,816.94	J1654	11.42	56.18	20.00	1,702.41	29.59
227	☐	J1644	1,006.43	2,278.86	J2464	2.80	23.12	20.00	1,273.01	37.19
228	☐	J1646	1,002.14	4,390.46	J2140	19.27	46.79	20.00	4,332.92	21.82
229	☐	J1648	1,002.32	4,333.05	J1794	18.60	87.34	20.00	4,289.01	21.39
230	☐	J1654	1,000.12	1,697.97	J1654	20.00	56.18	20.00	1,697.97	20.00
231	☐	J1656	1,002.95	1,693.33	J1656	20.00	56.08	20.00	1,693.33	20.00
232	☐	J1664	1,001.02	4,672.64	J2446	-3.12	29.84	20.00	3,883.24	56.66
233	☐	J1670	1,001.10	5,818.01	J2140	-5.89	46.79	20.00	4,330.70	54.93
234	☐	J1678	1,000.37	4,955.45	J1678	20.00	72.67	20.00	4,955.45	20.00
235	☐	J1680	1,002.56	4,820.59	J1680	20.00	72.32	20.00	4,820.59	20.00
236	☐	J1682	1,003.11	4,617.56	J1682	20.00	72.15	20.00	4,617.57	20.00
237	☐	J1686	1,004.90	4,189.35	J1084	18.77	41.78	20.00	4,080.17	21.47
238	☐	J1698	1,005.09	3,097.91	J1698	20.00	56.72	20.00	3,097.91	19.99
239	☐	J1700	1,001.34	3,457.63	J1702	17.51	55.24	20.00	3,347.53	22.48
240	☐	J1702	1,009.62	2,457.99	J1702	20.00	51.86	20.00	2,457.99	20.00
241	☐	J1704	1,001.83	4,557.65	J54	10.81	37.62	20.00	3,762.65	34.64
242	☐	J1706	1,008.75	3,181.98	J1706	20.00	59.43	20.00	3,181.98	20.00
243	☐	J1712	1,004.76	2,096.83	J1722	5.92	49.90	20.00	1,812.11	35.77
244	☐	J1714	1,002.75	2,227.33	J1722	-1.23	49.90	20.00	1,810.11	41.50
245	☐	J1716	1,001.40	2,227.61	J1722	-2.53	49.62	20.00	1,791.27	43.10

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
246	☐	J1718	1,001.14	2,233.00	J1722	-1.23	49.99	20.00	1,814.53	41.23
247	☐	J1720	1,001.20	2,032.12	J1722	7.52	49.47	20.00	1,781.72	32.68
248	☐	J1722	1,001.61	1,722.09	J1722	20.00	48.45	20.00	1,722.09	19.99
249	☐	J1724	1,002.26	1,872.23	J1722	15.25	49.33	20.00	1,773.99	24.74
250	☐	J1726	1,001.10	1,847.99	J1722	16.10	49.24	20.00	1,767.23	23.89
251	☐	J1728	1,001.79	1,898.41	J1722	13.92	49.33	20.00	1,773.34	26.18
252	☐	J1730	1,002.06	1,994.66	J1722	9.26	49.40	20.00	1,778.09	30.83
253	☐	J1734	1,005.39	2,408.76	J1722	10.03	54.26	20.00	2,165.45	29.96
254	☐	J1742	1,008.52	2,310.22	J1722	1.37	51.42	20.00	1,919.96	38.63
255	☐	J1746	1,001.57	2,272.82	J1722	-0.80	50.58	20.00	1,853.75	40.79
256	☐	J1750	1,000.73	1,903.18	J1722	13.62	49.33	20.00	1,772.28	26.60
257	☐	J1752	1,000.00	1,944.99	J1722	11.97	49.47	20.00	1,780.52	28.58
258	☐	J1754	1,031.11	3,145.79	J1754	20.00	40.73	20.00	3,145.79	20.00
259	☐	J1760	1,001.44	6,146.21	J2140	19.33	47.79	20.00	6,089.40	21.23
260	☐	J1762	1,001.18	3,389.69	J1762	20.00	78.97	20.00	3,389.70	20.00
261	☐	J1764	1,002.18	3,881.48	J1764	20.00	79.81	20.00	3,881.48	20.00
262	☐	J1768	1,000.67	6,754.30	J2140	-9.43	47.18	20.00	4,942.84	54.01
263	☐	J1774	1,003.99	6,360.64	J2140	7.66	47.43	20.00	5,464.90	39.50
264	☐	J1780	1,001.47	6,159.05	J1424	3.94	54.33	20.00	5,150.35	40.98
265	☐	J1782	1,000.43	5,164.85	J2140	8.67	46.78	20.00	4,436.36	38.12
266	☐	J1784	1,000.49	4,439.06	J2256	19.57	79.58	20.00	4,423.16	20.43
267	☐	J1786	1,008.12	6,587.44	J2140	-12.49	46.99	20.00	4,695.92	59.03
268	☐	J1788	1,004.07	4,524.56	J1788	20.00	87.73	20.00	4,524.52	20.00
269	☐	J1790	1,000.08	6,054.77	J2140	-10.61	46.79	20.00	4,330.85	58.28
270	☐	J1792	1,007.32	4,238.39	J1792	20.00	88.39	20.00	4,238.36	20.00
271	☐	J1794	1,002.20	4,143.98	J1794	20.00	87.01	20.00	4,143.95	20.00
272	☐	J1798	1,000.55	2,594.70	J1798	20.00	49.59	20.00	2,594.70	20.00
273	☐	J18	1,001.63	4,967.88	J1424	16.00	53.93	20.00	4,704.57	26.57
274	☐	J1800	1,000.94	1,502.38	J1800	20.00	38.80	20.00	1,502.38	20.00
275	☐	J1802	1,002.18	3,792.96	J1802	20.00	61.15	20.00	3,792.96	20.00
276	☐	J1804	1,001.42	3,536.16	J1806	19.03	77.52	20.00	3,509.56	20.99
277	☐	J1806	1,002.30	3,299.70	J1806	20.00	76.71	20.00	3,299.70	20.02
278	☐	J1808	1,005.23	3,861.54	J1808	20.00	72.30	20.00	3,861.54	20.02
279	☐	J1810	1,002.01	3,666.04	J1810	20.00	74.87	20.00	3,666.04	20.02
280	☐	J1812	1,002.91	3,817.36	J1812	20.00	74.55	20.00	3,817.37	20.02

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
281	☐	J1814	1,001.65	4,005.40	J1814	20.00	71.79	20.00	4,005.40	20.03
282	☐	J1816	1,001.30	3,623.15	J2276	19.42	72.02	20.00	3,604.81	20.60
283	☐	J1822	1,002.34	3,636.16	J2276	19.44	72.05	20.00	3,618.34	20.59
284	☐	J1826	1,000.39	4,698.86	J1826	20.00	65.72	20.00	4,698.84	20.09
285	☐	J1828	1,001.06	3,307.88	J1250	14.96	50.70	20.00	3,084.30	25.44
286	☐	J1830	1,000.41	3,262.85	J1250	15.98	50.70	20.00	3,083.65	24.45
287	☐	J1834	1,004.44	3,185.49	J54	19.69	37.37	20.00	3,162.89	20.56
288	☐	J1836	1,016.68	3,067.77	J1836	20.00	54.10	20.00	3,067.77	20.02
289	☐	J1838	1,007.77	3,496.80	J54	15.64	37.38	20.00	3,172.09	27.50
290	☐	J1840	1,003.89	3,299.10	J54	18.19	37.37	20.00	3,162.10	23.09
291	☐	J1842	1,000.33	4,826.73	J2632	15.19	85.45	20.00	4,681.35	25.13
292	☐	J1844	1,001.77	4,712.33	J2446	-4.63	29.84	20.00	3,880.87	55.79
293	☐	J1850	1,001.42	4,108.54	J1848	6.48	79.60	20.00	3,853.20	33.47
294	☐	J1852	1,007.51	1,844.07	J1654	9.54	56.18	20.00	1,705.38	33.09
295	☐	J1870	1,010.03	3,268.09	J1904	15.00	40.14	20.00	2,971.15	25.03
296	☐	J1872	1,001.91	2,534.81	J1904	4.36	35.39	20.00	1,916.32	37.13
297	☐	J1874	1,005.66	2,345.31	J1904	9.75	35.36	20.00	1,915.49	31.59
298	☐	J1878	1,021.24	2,095.29	J1904	16.52	35.36	20.00	1,931.08	25.98
299	☐	J1882	1,005.74	2,482.24	J1904	5.89	35.37	20.00	1,917.14	36.23
300	☐	J1884	1,032.53	1,990.06	J1904	19.04	35.37	20.00	1,943.93	21.91
301	☐	J1886	1,004.80	2,539.98	J1904	4.30	35.39	20.00	1,919.34	37.15
302	☐	J1890	1,012.86	2,453.59	J1904	7.01	35.39	20.00	1,927.28	35.11
303	☐	J1892	1,075.08	1,928.76	J1892	20.00	40.00	20.00	1,928.75	20.05
304	☐	J1894	1,003.13	2,051.93	J1904	17.42	35.47	20.00	1,928.23	22.58
305	☐	J1896	1,005.74	2,368.15	J1904	9.36	35.42	20.00	1,924.22	31.33
306	☐	J1898	1,005.25	1,693.16	J1898	20.00	36.19	20.00	1,693.16	20.00
307	☐	J1902	1,007.63	1,746.67	J1902	20.00	35.49	20.00	1,746.67	20.00
308	☐	J1904	1,003.82	1,889.92	J1904	20.00	35.20	20.00	1,889.93	20.00
309	☐	J1906	1,003.46	1,817.40	J1906	20.00	36.65	20.00	1,817.40	20.00
310	☐	J1908	1,007.83	1,775.11	J1908	20.00	41.79	20.00	1,775.11	20.04
311	☐	J1910	1,001.04	1,643.60	J1910	20.00	37.60	20.00	1,643.60	20.03
312	☐	J1912	1,003.95	1,827.04	J1910	19.33	39.40	20.00	1,804.58	20.71
313	☐	J1914	1,008.63	3,051.85	J1904	7.82	38.42	20.00	2,468.15	32.15
314	☐	J1920	1,014.12	2,259.95	J1920	20.00	39.60	20.00	2,259.95	20.02
315	☐	J1922	1,007.53	2,169.64	J1922	20.00	39.57	20.00	2,169.64	20.00

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
316	☐	J1924	1,017.03	3,229.56	J1754	19.35	40.84	20.00	3,187.39	20.65
317	☐	J1934	1,010.36	2,012.15	J1934	20.00	56.52	20.00	2,012.15	20.04
318	☐	J1936	1,004.07	4,203.53	J1936	20.00	66.48	20.00	4,203.53	20.01
319	☐	J1938	1,002.26	4,562.98	J1938	20.00	66.77	20.00	4,562.98	20.07
320	☐	J1940	1,000.67	4,689.38	J1940	20.00	65.58	20.00	4,689.35	20.09
321	☐	J1944	1,002.22	4,078.55	J1552	-1.62	34.70	20.00	2,687.80	45.00
322	☐	J1954	1,001.18	3,273.03	J1250	16.40	50.77	20.00	3,110.87	23.87
323	☐	J1956	1,003.50	2,363.70	J1956	20.00	52.30	20.00	2,363.70	20.00
324	☐	J1958	1,000.00	3,171.46	J2202	14.54	55.67	20.00	2,970.79	25.63
325	☐	J1968	1,002.14	2,916.86	J1968	20.00	48.37	20.00	2,916.86	20.01
326	☐	J1970	1,004.13	3,709.16	J54	12.72	37.38	20.00	3,179.70	32.45
327	☐	J1974	1,002.87	1,486.35	J1974	20.00	34.77	20.00	1,486.35	20.02
328	☐	J1976	1,003.74	5,119.81	J1976	20.00	69.70	20.00	5,119.81	20.01
329	☐	J1978	1,000.59	4,998.52	J1978	20.00	72.50	20.00	4,998.52	20.00
330	☐	J1980	1,020.37	5,734.12	J1980	20.00	70.80	20.00	5,734.12	20.00
331	☐	J1986	1,001.46	3,079.90	J2266	12.89	54.58	20.00	2,825.59	27.11
332	☐	J1990	1,000.57	2,438.10	J2266	14.22	51.53	20.00	2,268.42	25.84
333	☐	J1992	1,001.28	2,227.46	J2266	15.11	50.10	20.00	2,093.30	24.95
334	☐	J1996	1,001.47	2,941.86	J1998	17.83	50.03	20.00	2,850.68	22.17
335	☐	J1998	1,003.97	2,197.92	J1998	20.00	46.81	20.00	2,197.92	20.00
336	☐	J20	1,002.42	3,841.69	J20	20.00	78.50	20.00	3,841.69	20.00
337	☐	J2000	1,001.87	2,760.35	J2000	20.00	47.59	20.00	2,760.35	20.02
338	☐	J2006	1,003.87	1,557.41	J2006	20.00	37.05	20.00	1,557.42	20.00
339	☐	J2008	1,010.54	3,111.23	J2008	20.00	50.71	20.00	3,111.23	20.02
340	☐	J2010	1,011.96	2,830.58	J2010	20.00	48.05	20.00	2,830.59	20.02
341	☐	J2012	1,003.01	2,756.00	J1910	9.05	43.33	20.00	2,353.10	30.96
342	☐	J2014	1,002.46	2,737.12	J1910	9.58	43.33	20.00	2,352.55	30.69
343	☐	J2016	1,005.39	2,235.32	J2442	12.32	36.28	20.00	1,913.24	28.04
344	☐	J2020	1,000.00	2,057.19	J2020	20.00	39.42	20.00	2,057.19	20.00
345	☐	J2022	1,000.30	2,154.48	J2020	18.70	39.68	20.00	2,100.22	21.30
346	☐	J2024	1,006.73	2,390.63	J2024	20.00	42.60	20.00	2,390.63	20.01
347	☐	J2028	1,003.52	3,059.91	J2028	20.00	70.30	20.00	3,059.91	20.01
348	☐	J2030	1,000.43	4,105.39	J750	17.30	71.28	20.00	4,009.97	22.96
349	☐	J2032	1,003.24	3,751.91	J744	16.64	71.94	20.00	3,645.42	23.57
350	☐	J2034	1,001.55	3,903.25	J746	16.84	71.52	20.00	3,798.01	23.41

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
351	☐	J2036	1,000.10	3,734.78	J2036	20.00	78.62	20.00	3,734.78	20.02
352	☐	J2038	1,005.11	3,727.39	J746	18.05	71.17	20.00	3,664.19	22.02
353	☐	J2044	1,001.47	2,718.27	J2046	19.65	59.58	20.00	2,707.40	20.35
354	☐	J2046	1,001.79	2,642.58	J2046	20.00	59.24	20.00	2,642.58	19.99
355	☐	J2048	1,001.02	4,428.89	J54	12.99	37.64	20.00	3,803.78	30.75
356	☐	J2050	1,000.00	3,513.60	J2050	20.00	93.92	20.00	3,513.60	20.03
357	☐	J2052	1,000.14	4,055.55	J2050	19.45	95.92	20.00	4,042.38	20.61
358	☐	J2054	1,001.97	1,931.26	J2056	14.62	38.79	20.00	1,761.56	25.38
359	☐	J2062	1,002.56	4,158.04	J54	6.96	37.42	20.00	3,237.83	42.07
360	☐	J2064	1,008.50	3,601.88	J54	15.29	37.42	20.00	3,243.77	30.17
361	☐	J2068	1,002.03	4,478.63	J2068	20.00	52.73	20.00	4,478.64	19.99
362	☐	J2070	1,001.57	5,199.66	J334	13.75	33.25	20.00	4,351.47	30.10
363	☐	J2072	1,001.28	5,497.79	J334	10.90	33.23	20.00	4,309.98	33.14
364	☐	J2074	1,004.52	4,054.77	J2074	20.00	53.26	20.00	4,054.78	20.00
365	☐	J2078	1,007.14	3,097.47	J2078	20.00	48.79	20.00	3,097.47	20.00
366	☐	J2082	1,006.92	1,186.34	J2082	20.00	33.43	20.00	1,186.35	20.00
367	☐	J2084	1,003.28	1,137.87	J2084	20.00	31.09	20.00	1,137.87	20.00
368	☐	J2090	1,019.49	4,467.52	J2140	19.33	46.82	20.00	4,414.22	21.82
369	☐	J2092	1,011.52	4,750.58	J2140	15.04	46.82	20.00	4,407.91	31.06
370	☐	J2094	1,009.73	4,311.25	J2094	20.00	95.01	20.00	4,311.23	20.00
371	☐	J2096	1,003.95	4,634.17	J2140	16.82	46.82	20.00	4,398.69	27.71
372	☐	J2098	1,000.00	3,739.56	J2098	20.00	103.62	20.00	3,739.56	20.00
373	☐	J2100	1,015.67	3,702.71	J2100	20.00	103.30	20.00	3,702.71	20.00
374	☐	J2102	1,001.53	4,292.93	J2102	20.00	75.84	20.00	4,292.93	20.00
375	☐	J2106	1,000.47	3,240.57	J2106	20.00	36.70	20.00	3,240.57	20.03
376	☐	J2108	1,002.60	3,707.49	J2134	17.80	30.74	20.00	3,402.23	23.18
377	☐	J2110	1,002.44	3,645.61	J1096	18.16	30.85	20.00	3,392.48	22.68
378	☐	J2114	1,009.22	4,178.16	J2398	16.62	60.40	20.00	4,017.04	23.52
379	☐	J212	1,000.20	5,966.24	J2316	15.16	29.87	20.00	4,879.05	28.58
380	☐	J2122	1,001.81	3,751.14	J2122	20.00	60.37	20.00	3,751.14	20.00
381	☐	J2124	1,002.83	3,729.99	J2124	20.00	70.38	20.00	3,729.99	20.00
382	☐	J2126	1,001.87	3,808.33	J2122	19.15	60.40	20.00	3,770.00	20.86
383	☐	J2128	1,006.35	4,570.19	J2140	14.13	46.56	20.00	4,145.70	28.79
384	☐	J2130	1,005.19	4,232.17	J2122	15.35	60.83	20.00	4,013.93	24.79
385	☐	J2134	1,000.00	2,969.96	J2134	20.00	30.39	20.00	2,969.97	20.00

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
386	☐	J2136	1,003.28	1,367.99	J2138	19.27	25.73	20.00	1,330.95	20.73
387	☐	J2138	1,000.00	1,257.04	J2138	20.00	24.85	20.00	1,257.04	20.00
388	☐	J214	1,006.57	4,248.17	J214	20.00	58.28	20.00	4,248.17	20.01
389	☐	J2140	1,015.08	2,883.77	J2140	20.00	44.48	20.00	2,883.77	20.00
390	☐	J2142	1,012.35	4,751.89	J2140	-1.15	45.88	20.00	3,577.29	41.15
391	☐	J2144	1,009.60	4,146.81	J2140	4.53	45.43	20.00	3,306.16	35.45
392	☐	J2146	1,000.14	3,483.67	J2140	18.03	45.55	20.00	3,364.73	22.30
393	☐	J2148	1,007.30	3,372.21	J2148	20.00	52.50	20.00	3,372.21	20.00
394	☐	J2150	1,000.73	3,539.96	J2140	17.38	45.58	20.00	3,381.29	23.17
395	☐	J2152	1,000.33	3,538.81	J2140	17.39	45.58	20.00	3,380.90	23.24
396	☐	J2154	1,001.65	3,662.05	J2140	16.15	45.65	20.00	3,428.09	24.98
397	☐	J2156	1,000.49	3,551.18	J2140	17.98	45.65	20.00	3,426.93	22.77
398	☐	J2158	1,003.54	3,697.43	J2140	16.38	45.73	20.00	3,474.21	24.72
399	☐	J2160	1,001.75	3,345.65	J2160	20.00	57.85	20.00	3,345.65	20.00
400	☐	J2162	1,008.14	5,963.31	J2140	-8.78	46.74	20.00	4,326.54	53.79
401	☐	J2168	1,022.14	4,073.84	J2100	18.69	104.53	20.00	4,043.05	21.20
402	☐	J2172	1,029.75	4,250.82	J2100	17.55	104.97	20.00	4,191.23	22.40
403	☐	J2176	1,002.64	4,495.31	J2140	17.77	46.81	20.00	4,322.38	26.95
404	☐	J2180	1,003.23	4,627.28	J2140	15.58	46.81	20.00	4,320.87	32.18
405	☐	J2184	1,002.71	4,733.77	J2140	13.73	46.81	20.00	4,318.70	36.07
406	☐	J2188	1,004.07	5,046.90	J2140	8.14	46.81	20.00	4,314.57	44.44
407	☐	J2190	1,010.74	5,094.06	J2140	7.38	46.82	20.00	4,320.17	44.86
408	☐	J2198	1,002.24	3,501.71	J54	15.46	37.37	20.00	3,164.45	27.92
409	☐	J22	1,003.11	5,839.29	J1424	8.78	54.25	20.00	5,097.87	35.43
410	☐	J2200	1,003.66	2,741.51	J2200	20.00	59.42	20.00	2,741.51	20.00
411	☐	J2202	1,003.03	2,219.40	J2202	20.00	51.63	20.00	2,219.41	20.00
412	☐	J2204	1,000.00	3,112.50	J2202	15.23	55.55	20.00	2,938.53	24.77
413	☐	J2206	1,000.79	2,477.36	J2202	19.13	53.24	20.00	2,450.06	20.86
414	☐	J2208	1,002.99	2,344.15	J2208	20.00	52.55	20.00	2,344.15	20.00
415	☐	J2210	1,002.44	2,426.48	J2210	20.00	53.79	20.00	2,426.48	20.00
416	☐	J2212	1,013.73	4,535.10	J1552	1.74	37.24	20.00	3,640.93	42.53
417	☐	J2214	1,018.37	1,675.79	J2214	20.00	47.16	20.00	1,674.45	20.00
418	☐	J2224	1,008.93	5,736.54	J2224	20.00	75.88	20.00	5,736.54	20.03
419	☐	J2226	1,001.81	4,553.82	J2226	20.00	77.08	20.00	4,553.82	20.02
420	☐	J2228	1,001.32	4,647.29	J2234	18.90	91.69	20.00	4,616.50	21.10

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
421	☐	J2230	1,000.57	4,475.81	J2230	20.00	90.60	20.00	4,475.81	20.00
422	☐	J2232	1,000.89	4,585.01	J2234	18.52	91.53	20.00	4,544.14	21.48
423	☐	J2234	1,001.73	3,564.40	J2234	20.00	88.60	20.00	3,564.40	20.04
424	☐	J2238	1,004.99	4,778.60	J2238	20.00	75.41	20.00	4,778.60	20.11
425	☐	J2240	1,008.95	4,977.76	J2240	20.00	77.50	20.00	4,977.76	20.09
426	☐	J2252	1,000.89	5,709.37	J2252	20.00	80.52	20.00	5,709.37	20.00
427	☐	J2254	1,000.26	4,160.44	J2256	19.21	79.03	20.00	4,133.16	20.79
428	☐	J2260	1,000.55	5,750.43	J2140	-1.94	46.78	20.00	4,436.48	49.02
429	☐	J2264	1,006.82	2,200.79	J2612	16.86	51.82	20.00	2,117.44	23.19
430	☐	J2266	1,005.43	1,874.71	J2266	20.00	47.72	20.00	1,874.71	20.02
431	☐	J2272	1,000.00	1,842.32	J2272	20.00	40.80	20.00	1,842.33	20.00
432	☐	J2276	1,003.68	3,290.26	J2276	20.00	70.96	20.00	3,290.26	20.01
433	☐	J2280	1,000.57	3,328.98	J2280	20.00	73.62	20.00	3,328.99	20.01
434	☐	J2284	1,001.30	3,202.38	J2284	20.00	71.88	20.00	3,202.38	20.01
435	☐	J2288	1,001.04	3,546.07	J2276	18.91	71.74	20.00	3,512.36	21.10
436	☐	J2290	1,002.40	3,395.31	J2290	20.00	72.18	20.00	3,395.31	20.01
437	☐	J2296	1,000.65	3,166.47	J2296	20.00	72.25	20.00	3,166.47	20.01
438	☐	J230	1,001.81	4,278.80	J230	20.00	48.31	20.00	4,278.80	20.01
439	☐	J2300	1,001.08	3,834.92	J2300	20.00	73.54	20.00	3,834.92	20.03
440	☐	J2304	1,007.02	4,879.79	J2304	20.00	76.45	20.00	4,879.78	20.11
441	☐	J2306	1,008.89	4,801.28	J2306	20.00	73.53	20.00	4,801.28	20.00
442	☐	J2308	1,004.88	3,313.02	J2028	17.83	71.10	20.00	3,250.99	22.29
443	☐	J2314	1,004.48	6,614.72	J334	16.72	33.71	20.00	6,010.87	27.35
444	☐	J2318	1,000.35	4,308.02	J238	18.59	47.65	20.00	4,203.18	21.42
445	☐	J2330	1,009.24	5,811.81	J2316	16.06	29.87	20.00	4,910.22	27.29
446	☐	J2332	1,008.28	4,082.08	J220	19.81	55.29	20.00	4,071.24	20.20
447	☐	J2336	1,000.26	5,506.39	J2316	17.96	29.89	20.00	5,006.69	27.45
448	☐	J2338	1,000.33	2,384.34	J2338	20.00	49.71	20.00	2,384.32	20.06
449	☐	J2340	1,001.00	3,732.19	J54	11.82	37.36	20.00	3,147.83	35.31
450	☐	J2344	1,002.56	2,973.67	J348	8.92	36.58	20.00	2,347.34	31.08
451	☐	J2346	1,002.34	1,717.76	J348	19.13	32.96	20.00	1,679.48	20.95
452	☐	J2348	1,001.67	4,204.39	J2476	19.34	52.60	20.00	4,161.70	20.66
453	☐	J2350	1,001.49	8,233.29	J334	7.68	34.29	20.00	6,668.19	34.64
454	☐	J2352	1,005.47	1,850.15	J2138	11.26	26.67	20.00	1,421.62	35.94
455	☐	J2354	1,005.33	5,775.79	J334	19.16	33.65	20.00	5,624.81	22.00

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
456	☐	J2356	1,002.93	8,255.74	J334	5.34	33.95	20.00	6,380.55	38.41
457	☐	J2358	1,001.30	6,898.16	J334	19.86	34.28	20.00	6,873.61	20.45
458	☐	J236	1,000.24	4,312.23	J238	18.24	47.63	20.00	4,182.25	21.76
459	☐	J2360	1,004.44	4,782.05	J2360	20.00	57.73	20.00	4,782.05	20.01
460	☐	J2362	1,001.85	4,808.76	J1424	-12.05	52.20	20.00	3,393.55	54.54
461	☐	J2364	1,000.49	3,586.92	J1552	6.49	34.68	20.00	2,671.01	37.08
462	☐	J2368	1,001.59	3,272.09	J54	16.55	37.25	20.00	3,024.35	24.69
463	☐	J2370	1,001.06	4,820.12	J642	18.66	75.43	20.00	4,763.05	21.34
464	☐	J2372	1,000.87	7,299.08	J334	13.99	33.77	20.00	6,258.37	32.85
465	☐	J2374	1,001.91	4,360.05	J2464	2.16	28.81	20.00	3,484.65	38.44
466	☐	J2376	1,001.06	4,487.79	J1576	18.45	83.60	20.00	4,440.93	21.60
467	☐	J2378	1,001.12	6,415.60	J2316	13.15	29.87	20.00	4,916.00	34.56
468	☐	J238	1,002.79	2,399.41	J238	20.00	43.80	20.00	2,399.40	19.95
469	☐	J2382	1,001.49	3,566.49	J2382	20.00	95.65	20.00	3,566.49	20.03
470	☐	J2388	1,007.12	3,837.36	J1904	5.10	40.14	20.00	2,996.93	36.81
471	☐	J2390	1,002.71	2,404.86	J1920	19.00	40.18	20.00	2,361.70	21.00
472	☐	J2392	1,003.09	2,229.31	J2266	15.11	50.10	20.00	2,095.11	24.95
473	☐	J2394	1,000.22	2,717.04	J2046	19.64	59.58	20.00	2,706.14	20.35
474	☐	J2396	1,000.00	3,739.59	J2396	20.00	103.62	20.00	3,739.59	20.00
475	☐	J2398	1,026.59	3,741.67	J2398	20.00	59.88	20.00	3,741.67	20.00
476	☐	J24	1,003.13	3,828.83	J24	20.00	77.66	20.00	3,828.84	20.00
477	☐	J240	1,000.57	4,232.91	J244	18.02	61.16	20.00	4,135.81	21.98
478	☐	J2400	1,001.20	3,558.72	J2276	19.69	71.85	20.00	3,548.90	20.34
479	☐	J2402	1,006.88	1,214.89	J2402	20.00	32.57	20.00	1,214.89	20.00
480	☐	J2404	1,004.35	2,195.42	J148	12.71	27.43	20.00	1,693.13	31.98
481	☐	J2406	1,005.49	3,417.47	J1904	8.75	39.68	20.00	2,808.98	31.25
482	☐	J2412	1,000.41	1,626.60	J2412	20.00	34.09	20.00	1,626.60	20.00
483	☐	J2414	1,003.83	2,738.23	J2414	20.00	62.85	20.00	2,738.23	19.99
484	☐	J2416	1,003.07	2,890.27	J2416	20.00	57.90	20.00	2,890.27	19.99
485	☐	J2418	1,000.49	6,053.91	J2140	-10.62	46.79	20.00	4,330.09	58.27
486	☐	J242	1,001.55	3,541.48	J242	20.00	63.70	20.00	3,540.65	20.00
487	☐	J2420	1,002.30	4,956.20	J2140	10.23	46.79	20.00	4,333.07	38.00
488	☐	J2422	1,000.20	6,620.16	J2140	-20.04	46.83	20.00	4,424.57	64.42
489	☐	J2424	1,000.53	4,606.48	J1576	16.55	83.77	20.00	4,501.95	23.53
490	☐	J2426	1,001.99	4,680.88	J1576	16.70	83.99	20.00	4,579.54	23.43

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
491	☐	J2428	1,001.91	2,167.99	J322	19.34	48.29	20.00	2,147.38	20.66
492	☐	J2430	1,001.16	3,185.98	J54	18.10	37.27	20.00	3,047.12	22.74
493	☐	J2432	1,001.00	4,451.23	J54	12.67	37.64	20.00	3,800.37	31.27
494	☐	J2434	1,000.00	3,666.07	J1324	18.68	40.62	20.00	3,560.86	21.37
495	☐	J2436	1,000.00	3,885.83	J1324	16.61	40.68	20.00	3,617.40	23.41
496	☐	J2438	1,000.00	4,252.49	J1324	15.94	40.97	20.00	3,907.53	24.14
497	☐	J2440	1,002.52	3,332.52	J1552	10.60	34.68	20.00	2,673.04	33.30
498	☐	J2442	1,005.21	1,880.57	J2442	20.00	36.06	20.00	1,880.57	20.00
499	☐	J2460	1,002.69	4,149.82	J54	16.85	37.67	20.00	3,852.46	24.65
500	☐	J2476	1,004.03	2,005.44	J2476	20.00	45.46	20.00	2,005.44	20.00
501	☐	J2482	1,001.93	4,058.73	J2446	14.97	29.84	20.00	3,881.49	30.24
502	☐	J2484	1,000.89	2,189.12	J2484	20.00	41.20	20.00	2,189.12	20.00
503	☐	J2486	1,010.56	2,383.29	J1904	8.88	35.38	20.00	1,922.81	32.83
504	☐	J2492	1,000.08	3,257.91	J54	17.61	37.31	20.00	3,081.31	25.20
505	☐	J250	1,000.71	5,809.96	J2316	16.52	29.89	20.00	4,995.29	31.74
506	☐	J2512	1,000.00	3,250.45	J54	14.90	37.07	20.00	2,900.51	25.83
507	☐	J2514	1,000.00	1,115.91	J50	16.97	21.50	20.00	1,039.65	23.03
508	☐	J2516	1,000.00	2,682.13	J2516	20.00	50.00	20.00	2,682.14	20.00
509	☐	J2522	1,000.00	1,770.95	J2522	20.00	34.59	20.00	1,770.95	20.00
510	☐	J26	1,001.89	6,459.52	J2140	15.86	47.80	20.00	6,114.19	26.96
511	☐	J260	1,001.32	4,249.39	J260	20.00	53.25	20.00	4,249.39	20.06
512	☐	J2600	1,000.00	1,965.87	J2612	16.75	49.40	20.00	1,888.73	23.28
513	☐	J2606	1,000.54	1,609.45	J2606	20.00	45.14	20.00	1,609.45	20.02
514	☐	J2608	1,000.54	1,799.26	J2612	17.83	47.43	20.00	1,751.39	22.19
515	☐	J2610	1,000.54	1,721.02	J2612	17.83	46.15	20.00	1,675.25	22.18
516	☐	J2612	1,000.54	1,530.06	J2612	20.00	43.17	20.00	1,530.06	20.02
517	☐	J2614	1,000.54	1,655.95	J2614	20.00	47.37	20.00	1,655.95	20.02
518	☐	J2616	1,000.00	1,850.48	J2616	20.00	50.96	20.00	1,850.48	20.02
519	☐	J2618	1,001.77	4,331.25	J2618	20.00	90.90	20.00	4,331.21	20.14
520	☐	J262	1,002.77	3,029.51	J262	20.00	50.81	20.00	3,029.52	20.00
521	☐	J2620	1,001.77	4,718.08	J2632	17.53	85.38	20.00	4,643.35	22.67
522	☐	J2622	1,001.77	4,558.38	J2622	20.00	92.25	20.00	4,558.38	20.00
523	☐	J2624	1,001.77	4,673.51	J2632	18.43	85.37	20.00	4,625.66	21.64
524	☐	J2626	1,001.77	4,644.06	J2632	17.19	85.24	20.00	4,559.91	22.94
525	☐	J2628	1,001.77	4,537.91	J2642	19.24	86.79	20.00	4,515.72	20.80

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
526	☐	J2630	1,001.77	4,545.17	J2630	20.00	86.41	20.00	4,545.17	20.00
527	☐	J2632	1,001.77	4,342.83	J2632	20.00	84.80	20.00	4,342.83	20.00
528	☐	J2634	1,001.77	4,197.56	J2634	20.00	85.68	20.00	4,197.56	20.10
529	☐	J2636	1,001.77	3,876.90	J2636	20.00	87.98	20.00	3,876.90	20.06
530	☐	J2638	1,001.77	3,986.75	J2638	20.00	88.32	20.00	3,986.75	20.07
531	☐	J264	1,001.49	3,987.10	J54	8.63	37.39	20.00	3,186.84	38.46
532	☐	J2640	1,001.77	3,894.41	J2640	20.00	89.23	20.00	3,894.40	20.06
533	☐	J2642	1,001.77	4,115.20	J2642	20.00	85.87	20.00	4,115.19	20.09
534	☐	J2644	1,001.77	4,212.22	J2644	20.00	88.95	20.00	4,212.22	20.09
535	☐	J2646	1,000.00	4,614.87	J2646	20.00	84.50	20.00	4,614.88	20.00
536	☐	J266	1,002.05	4,317.54	J54	5.47	37.45	20.00	3,287.93	45.48
537	☐	J268	1,008.24	4,518.07	J268	20.00	57.84	20.00	4,518.07	19.98
538	☐	J274	1,000.90	3,355.09	J274	20.00	44.70	20.00	3,355.09	20.00
539	☐	J276	1,004.41	1,997.30	J276	20.00	42.64	20.00	1,997.30	19.97
540	☐	J28	1,002.77	5,131.51	J28	20.00	78.65	20.00	5,131.51	20.02
541	☐	J282	1,001.57	2,297.82	J2056	13.83	41.44	20.00	2,070.33	26.17
542	☐	J284	1,001.20	2,514.58	J292	17.03	42.44	20.00	2,381.87	23.32
543	☐	J288	1,001.00	2,085.00	J288	20.00	45.75	20.00	2,085.00	19.97
544	☐	J290	1,001.20	2,339.01	J306	18.89	43.97	20.00	2,294.64	21.06
545	☐	J294	1,001.59	2,042.35	J292	15.40	39.34	20.00	1,882.43	24.57
546	☐	J296	1,001.20	2,606.00	J296	20.00	43.91	20.00	2,606.00	20.02
547	☐	J30	1,001.12	6,214.15	J1424	11.98	54.61	20.00	5,665.26	31.27
548	☐	J302	1,000.45	2,844.71	J50	14.37	37.93	20.00	2,576.42	25.62
549	☐	J306	1,000.00	1,698.57	J306	20.00	39.07	20.00	1,698.57	19.98
550	☐	J312	1,002.20	1,017.88	J312	20.00	20.87	20.00	1,017.88	20.00
551	☐	J314	1,001.67	1,188.19	J312	18.78	27.41	20.00	1,163.34	21.22
552	☐	J316	1,006.35	2,902.18	J316	20.00	50.59	20.00	2,902.18	20.00
553	☐	J32	1,000.90	5,718.86	J32	20.00	77.37	20.00	5,718.86	20.03
554	☐	J322	1,003.24	1,652.46	J322	20.00	42.59	20.00	1,652.46	19.99
555	☐	J324	1,001.87	5,389.04	J334	11.10	33.20	20.00	4,232.93	32.89
556	☐	J326	1,000.24	6,662.08	J334	9.15	33.51	20.00	5,079.79	35.89
557	☐	J328	1,002.97	4,595.84	J54	9.75	37.60	20.00	3,725.12	36.94
558	☐	J330	1,002.03	1,649.70	J330	20.00	37.11	20.00	1,649.70	20.05
559	☐	J332	1,001.53	1,708.09	J332	20.00	38.18	20.00	1,708.09	20.05
560	☐	J336	1,002.54	1,513.17	J334	16.18	26.06	20.00	1,332.65	23.83

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
561	☐	J340	1,006.19	4,199.59	J54	13.01	37.54	20.00	3,609.91	33.37
562	☐	J342	1,003.34	2,171.57	J348	14.49	34.59	20.00	1,903.73	26.04
563	☐	J348	1,001.75	1,420.39	J348	20.00	30.13	20.00	1,420.39	20.00
564	☐	J352	1,002.22	1,515.74	J352	20.00	33.82	20.00	1,515.74	20.04
565	☐	J356	1,004.13	3,487.35	J334	9.47	31.77	20.00	2,557.03	33.24
566	☐	J360	1,001.46	2,049.65	J334	12.34	28.56	20.00	1,612.72	27.66
567	☐	J362	1,003.52	4,102.61	J334	10.89	32.49	20.00	3,114.73	33.03
568	☐	J370	1,001.97	2,063.47	J348	19.54	35.32	20.00	2,038.16	20.68
569	☐	J374	1,001.59	3,788.40	J374	20.00	55.24	20.00	3,788.40	19.93
570	☐	J376	1,003.21	3,919.17	J400	19.41	51.92	20.00	3,883.68	20.61
571	☐	J378	1,002.52	4,373.77	J408	17.59	55.29	20.00	4,231.41	22.46
572	☐	J384	1,001.65	4,282.61	J384	20.00	57.82	20.00	4,282.61	20.00
573	☐	J386	1,002.50	5,752.70	J386	20.00	63.10	20.00	5,752.70	20.04
574	☐	J388	1,000.71	4,189.11	J408	18.04	55.11	20.00	4,077.29	21.96
575	☐	J392	1,001.83	6,606.85	J334	9.04	33.49	20.00	5,025.31	36.05
576	☐	J394	1,002.26	4,392.34	J394	20.00	54.18	20.00	4,392.35	20.04
577	☐	J396	1,001.95	3,264.56	J396	20.00	55.13	20.00	3,264.56	19.94
578	☐	J398	1,003.17	3,147.33	J398	20.00	54.09	20.00	3,147.33	19.97
579	☐	J400	1,000.73	2,764.92	J400	20.00	49.46	20.00	2,764.92	20.04
580	☐	J406	1,000.22	2,875.61	J408	18.83	52.36	20.00	2,829.02	21.14
581	☐	J408	1,003.44	2,113.08	J408	20.00	48.36	20.00	2,113.08	20.01
582	☐	J410	1,001.26	3,736.56	J410	20.00	56.70	20.00	3,736.57	20.00
583	☐	J414	1,000.98	2,642.03	J414	20.00	52.84	20.00	2,642.03	19.99
584	☐	J42	1,001.22	3,551.69	J50	18.71	40.89	20.00	3,488.18	21.41
585	☐	J422	1,000.51	3,016.16	J408	19.04	52.86	20.00	2,975.68	20.93
586	☐	J430	1,005.72	3,863.13	J430	20.00	58.88	20.00	3,863.14	20.00
587	☐	J432	1,003.66	6,285.45	J432	20.00	64.46	20.00	6,285.45	20.06
588	☐	J436	1,002.14	6,580.09	J334	18.08	33.72	20.00	6,211.31	24.55
589	☐	J438	1,001.20	3,973.14	J438	20.00	55.96	20.00	3,973.14	20.00
590	☐	J440	1,000.75	5,711.83	J440	20.00	62.75	20.00	5,711.84	20.04
591	☐	J442	1,002.18	5,713.29	J442	20.00	62.57	20.00	5,713.29	20.04
592	☐	J444	1,001.85	6,583.72	J334	18.17	33.72	20.00	6,230.88	24.37
593	☐	J446	1,000.89	4,458.90	J454	19.46	62.49	20.00	4,431.81	20.58
594	☐	J448	1,001.63	4,495.47	J448	20.00	65.98	20.00	4,495.46	20.07
595	☐	J450	1,001.65	4,416.55	J454	18.14	62.34	20.00	4,325.67	21.87

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
596	☐	J454	1,004.48	2,360.03	J454	20.00	55.93	20.00	2,360.03	19.98
597	☐	J464	1,003.56	4,363.99	J464	20.00	67.15	20.00	4,363.99	20.02
598	☐	J468	1,002.73	8,500.19	J334	15.45	35.31	20.00	7,753.22	26.44
599	☐	J470	1,012.49	5,883.86	J2470	19.65	48.40	20.00	5,852.56	20.42
600	☐	J472	1,001.87	4,069.96	J1552	-1.93	34.68	20.00	2,672.39	44.95
601	☐	J476	1,004.52	1,655.70	J2138	14.72	26.38	20.00	1,391.81	25.83
602	☐	J478	1,003.50	2,973.70	J478	20.00	47.80	20.00	2,973.71	20.00
603	☐	J48	1,011.13	5,246.88	J54	11.42	38.11	20.00	4,348.63	29.47
604	☐	J480	1,001.08	2,767.99	J480	20.00	48.60	20.00	2,767.99	20.00
605	☐	J482	1,004.48	1,514.76	J2138	18.24	26.67	20.00	1,420.63	24.96
606	☐	J484	1,002.60	1,794.16	J2138	12.44	26.67	20.00	1,418.75	34.75
607	☐	J486	1,005.43	1,462.32	J2138	19.25	26.67	20.00	1,421.58	22.21
608	☐	J490	1,006.43	2,528.85	J490	20.00	49.31	20.00	2,528.86	20.00
609	☐	J492	1,003.26	1,971.76	J492	20.00	46.96	20.00	1,971.77	20.00
610	☐	J494	1,003.44	2,692.92	J494	20.00	48.49	20.00	2,692.92	20.00
611	☐	J496	1,004.05	6,463.04	J496	20.00	76.37	20.00	6,463.04	20.08
612	☐	J500	1,001.73	7,479.70	J334	14.47	34.05	20.00	6,629.24	32.41
613	☐	J504	1,001.87	7,693.38	J334	12.83	34.00	20.00	6,612.30	34.08
614	☐	J510	1,002.42	6,907.91	J334	18.36	34.04	20.00	6,641.36	24.31
615	☐	J512	1,002.08	8,093.98	J334	8.21	33.95	20.00	6,518.45	39.96
616	☐	J514	1,002.46	6,948.51	J334	18.73	34.13	20.00	6,738.99	23.20
617	☐	J516	1,005.88	3,195.97	J516	20.00	67.03	20.00	3,195.97	20.09
618	☐	J518	1,000.89	8,345.30	J334	4.89	33.94	20.00	6,472.30	43.24
619	☐	J52	1,000.96	1,947.48	J50	14.37	33.73	20.00	1,719.45	25.63
620	☐	J520	1,005.13	8,394.17	J334	1.49	33.76	20.00	6,125.55	43.62
621	☐	J522	1,005.23	8,373.48	J334	2.05	33.77	20.00	6,163.50	42.48
622	☐	J526	1,002.22	7,199.17	J334	10.77	33.67	20.00	5,715.35	35.29
623	☐	J528	1,002.60	6,703.57	J334	18.02	33.87	20.00	6,339.72	25.05
624	☐	J530	1,001.65	7,123.39	J334	15.79	33.89	20.00	6,391.65	29.31
625	☐	J532	1,005.15	3,502.35	J532	20.00	59.54	20.00	3,502.35	20.07
626	☐	J534	1,005.47	8,231.83	J334	4.63	33.82	20.00	6,266.57	40.13
627	☐	J536	1,005.51	3,383.02	J536	20.00	57.88	20.00	3,383.02	20.00
628	☐	J538	1,005.09	8,198.30	J334	5.40	33.87	20.00	6,327.97	38.93
629	☐	J540	1,005.37	5,302.20	J540	20.00	59.26	20.00	5,302.20	20.02
630	☐	J542	1,001.18	8,248.34	J334	5.41	33.95	20.00	6,378.80	38.36

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
631	☐	J544	1,003.40	8,403.85	J334	4.24	34.05	20.00	6,508.12	38.66
632	☐	J546	1,005.23	1,238.65	J546	20.00	31.98	20.00	1,238.65	20.00
633	☐	J548	1,004.21	1,623.03	J548	20.00	40.99	20.00	1,623.03	20.04
634	☐	J550	1,003.28	3,388.66	J550	20.00	51.83	20.00	3,388.66	20.00
635	☐	J554	1,005.58	3,080.21	J334	17.61	32.24	20.00	2,818.35	24.53
636	☐	J564	1,002.32	8,205.78	J334	7.81	34.28	20.00	6,657.01	34.52
637	☐	J568	1,005.49	1,911.62	J568	20.00	46.41	20.00	1,911.62	20.00
638	☐	J574	1,002.89	6,847.94	J334	19.38	34.16	20.00	6,744.05	21.55
639	☐	J578	1,000.20	6,924.96	J334	19.65	34.27	20.00	6,864.99	20.96
640	☐	J580	1,004.35	4,781.73	J580	20.00	57.73	20.00	4,781.74	20.01
641	☐	J586	1,002.20	7,205.30	J334	16.66	34.05	20.00	6,674.51	27.49
642	☐	J588	1,002.71	5,512.87	J588	20.00	63.85	20.00	5,512.87	20.02
643	☐	J592	1,001.99	8,053.87	J334	8.98	33.97	20.00	6,561.20	38.83
644	☐	J594	1,004.07	8,051.02	J334	7.18	33.86	20.00	6,313.31	40.48
645	☐	J598	1,004.86	4,342.04	J598	20.00	68.07	20.00	4,341.98	19.95
646	☐	J600	1,005.96	5,355.76	J600	20.00	66.25	20.00	5,355.76	20.02
647	☐	J602	1,005.21	7,079.91	J334	15.54	33.82	20.00	6,288.93	30.54
648	☐	J604	1,002.83	7,691.55	J334	10.62	33.76	20.00	6,203.90	36.77
649	☐	J606	1,011.64	7,211.13	J334	15.48	33.81	20.00	6,401.31	31.65
650	☐	J608	1,011.90	6,864.12	J334	17.55	33.78	20.00	6,402.59	26.62
651	☐	J610	1,005.74	6,580.62	J334	19.23	33.77	20.00	6,426.29	22.27
652	☐	J612	1,005.03	3,925.34	J612	20.00	61.87	20.00	3,925.35	20.01
653	☐	J614	1,001.40	7,185.03	J334	10.84	33.66	20.00	5,710.66	35.21
654	☐	J616	1,002.54	6,100.39	J616	20.00	62.02	20.00	6,100.39	20.04
655	☐	J620	1,002.67	5,958.85	J620	20.00	62.61	20.00	5,958.85	20.04
656	☐	J622	1,002.20	7,138.46	J334	15.00	33.77	20.00	6,250.45	31.24
657	☐	J624	1,002.58	6,930.74	J334	16.35	33.77	20.00	6,265.61	28.79
658	☐	J626	1,004.72	6,592.44	J334	18.88	33.84	20.00	6,382.71	23.45
659	☐	J628	1,004.88	7,453.34	J334	13.27	33.86	20.00	6,370.12	34.80
660	☐	J630	1,002.56	6,596.85	J334	18.48	33.81	20.00	6,305.16	24.35
661	☐	J632	1,002.69	6,360.97	J334	19.75	33.81	20.00	6,310.79	20.84
662	☐	J634	1,004.01	7,191.23	J334	15.14	33.84	20.00	6,352.24	32.11
663	☐	J640	1,000.53	5,014.52	J656	17.54	75.94	20.00	4,911.04	22.48
664	☐	J642	1,002.54	3,789.92	J642	20.00	73.68	20.00	3,789.93	20.00
665	☐	J644	1,001.34	7,439.10	J334	15.29	34.09	20.00	6,700.77	30.44

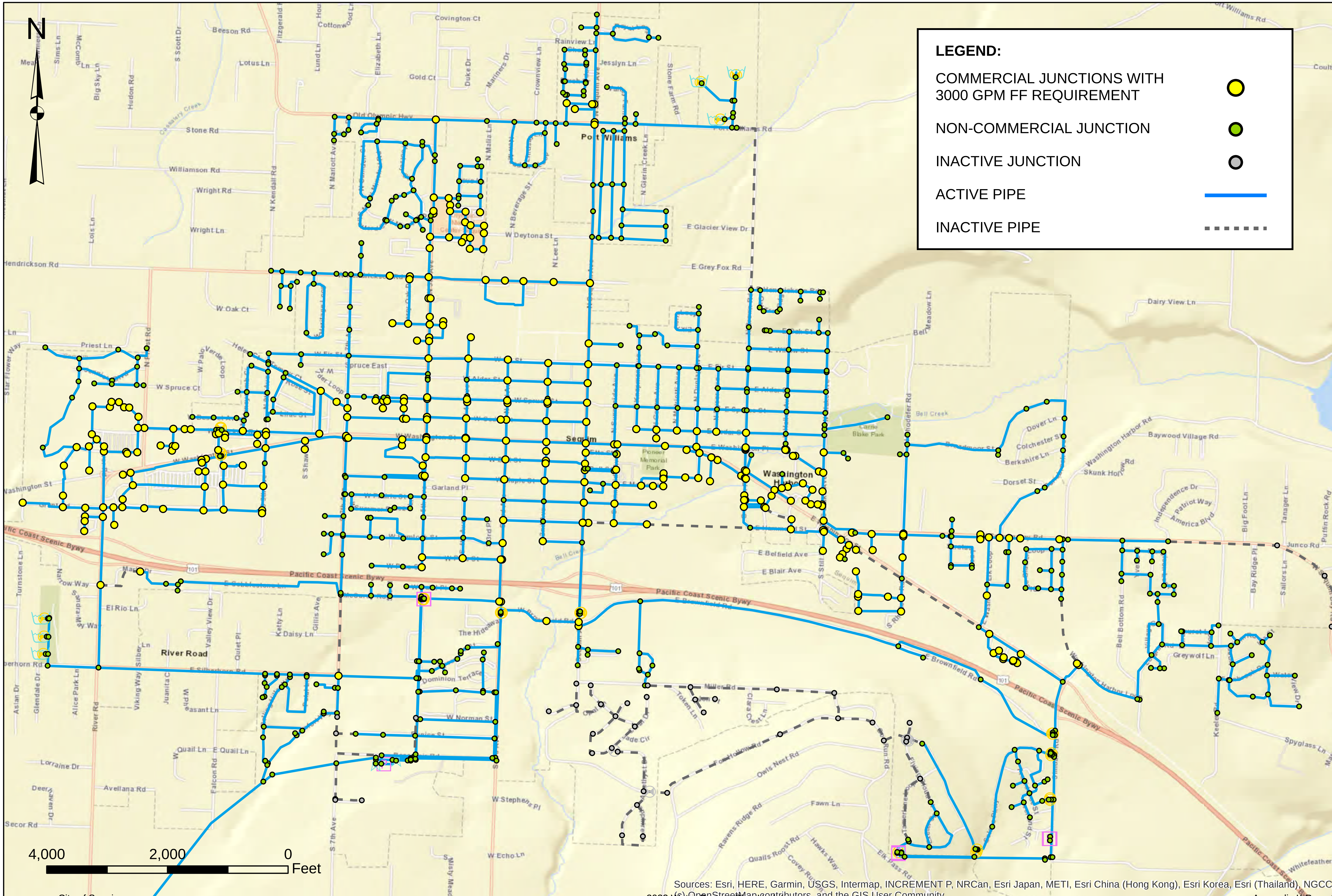
		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
666	☐	J646	1,001.28	4,751.23	J646	20.00	70.99	20.00	4,751.24	20.00
667	☐	J648	1,007.77	6,676.86	J648	20.00	67.24	20.00	6,676.87	20.00
668	☐	J652	1,001.77	7,279.89	J334	16.05	34.04	20.00	6,657.28	29.21
669	☐	J654	1,000.98	5,012.49	J656	17.46	75.93	20.00	4,905.49	22.56
670	☐	J656	1,007.69	3,365.47	J656	20.00	72.74	20.00	3,365.48	20.00
671	☐	J658	1,003.26	4,143.59	J658	20.00	76.48	20.00	4,143.60	19.99
672	☐	J660	1,001.42	4,289.94	J660	20.00	75.85	20.00	4,289.94	20.00
673	☐	J662	1,002.99	4,700.82	J662	20.00	75.34	20.00	4,700.82	20.00
674	☐	J664	1,002.97	3,935.94	J664	20.00	72.64	20.00	3,935.94	20.00
675	☐	J666	1,001.34	3,299.87	J668	18.51	69.02	20.00	3,252.23	21.49
676	☐	J668	1,003.01	1,976.25	J668	20.00	59.65	20.00	1,976.25	20.03
677	☐	J670	1,001.46	7,485.65	J334	14.44	34.06	20.00	6,630.25	32.52
678	☐	J672	1,002.79	5,138.05	J672	20.00	73.80	20.00	5,138.05	20.00
679	☐	J674	1,004.64	5,997.30	J674	20.00	73.36	20.00	5,997.31	20.06
680	☐	J676	1,002.36	3,661.40	J676	20.00	80.24	20.00	3,661.41	20.00
681	☐	J678	1,002.97	3,833.26	J678	20.00	75.15	20.00	3,833.27	20.00
682	☐	J680	1,003.21	3,614.90	J680	20.00	76.66	20.00	3,614.91	20.00
683	☐	J682	1,000.92	4,473.96	J682	20.00	80.64	20.00	4,473.96	20.00
684	☐	J686	1,002.60	4,987.01	J686	20.00	78.62	20.00	4,987.01	20.00
685	☐	J688	1,002.05	3,454.65	J688	20.00	72.96	20.00	3,454.65	20.00
686	☐	J690	1,001.67	5,297.58	J690	20.00	78.02	20.00	5,297.58	20.02
687	☐	J694	1,001.93	2,436.91	J694	20.00	65.55	20.00	2,436.92	20.00
688	☐	J696	1,001.32	2,995.24	J696	20.00	76.53	20.00	2,995.25	20.00
689	☐	J698	1,003.07	2,674.05	J698	20.00	73.05	20.00	2,674.05	20.11
690	☐	J700	1,001.46	4,401.41	J700	20.00	80.23	20.00	4,401.41	20.00
691	☐	J702	1,001.40	2,246.59	J702	20.00	69.04	20.00	2,246.58	20.00
692	☐	J704	1,000.89	2,234.27	J704	20.00	69.67	20.00	2,234.27	20.00
693	☐	J708	1,001.63	2,466.06	J708	20.00	71.24	20.00	2,466.06	20.00
694	☐	J710	1,000.96	3,037.60	J710	20.00	72.96	20.00	3,037.61	20.01
695	☐	J712	1,001.71	2,452.01	J808	19.19	69.38	20.00	2,434.95	20.81
696	☐	J716	1,001.28	4,050.40	J750	18.82	71.29	20.00	4,008.54	21.34
697	☐	J722	1,002.28	3,015.96	J746	17.91	68.55	20.00	2,959.62	22.10
698	☐	J724	1,001.32	3,269.30	J746	17.77	69.65	20.00	3,204.76	22.25
699	☐	J726	1,006.84	4,264.23	J726	20.00	66.36	20.00	4,264.23	20.01
700	☐	J728	1,003.28	3,868.82	J2266	15.28	56.90	20.00	3,651.68	25.07

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
701	☐	J730	1,003.15	3,062.51	J730	20.00	64.48	20.00	3,062.51	20.00
702	☐	J734	1,000.71	3,473.66	J2266	12.80	55.81	20.00	3,185.85	27.20
703	☐	J738	1,003.19	2,736.57	J738	20.00	63.90	20.00	2,736.57	20.00
704	☐	J742	1,001.63	3,085.90	J742	20.00	69.16	20.00	3,085.91	20.01
705	☐	J744	1,001.63	3,021.01	J744	20.00	69.64	20.00	3,021.01	20.01
706	☐	J746	1,001.06	2,425.74	J746	20.00	65.09	20.00	2,425.74	20.00
707	☐	J748	1,001.75	2,860.06	J746	18.16	67.77	20.00	2,812.48	21.85
708	☐	J750	1,003.09	3,206.42	J750	20.00	68.95	20.00	3,206.42	20.01
709	☐	J752	1,000.20	3,597.38	J780	18.86	70.37	20.00	3,560.88	21.17
710	☐	J756	1,004.48	4,132.70	J756	20.00	70.97	20.00	4,132.71	20.03
711	☐	J758	1,001.32	3,927.54	J750	19.41	71.10	20.00	3,906.93	20.64
712	☐	J76	1,002.20	4,394.99	J76	20.00	67.07	20.00	4,394.99	20.02
713	☐	J770	1,001.65	3,917.99	J770	20.00	74.78	20.00	3,917.99	20.03
714	☐	J772	1,000.53	3,400.64	J794	19.30	73.70	20.00	3,380.46	20.71
715	☐	J774	1,001.83	3,699.20	J746	17.35	71.04	20.00	3,614.40	22.67
716	☐	J776	1,000.98	3,747.96	J750	18.71	70.59	20.00	3,705.10	21.32
717	☐	J78	1,005.13	5,063.37	J78	20.00	69.24	20.00	5,063.37	20.00
718	☐	J780	1,001.46	3,307.62	J780	20.00	69.53	20.00	3,307.62	20.01
719	☐	J782	1,000.31	3,563.13	J780	19.03	70.28	20.00	3,532.22	21.00
720	☐	J786	1,000.79	3,845.35	J786	20.00	73.47	20.00	3,845.35	20.03
721	☐	J788	1,000.24	3,861.21	J788	20.00	73.16	20.00	3,861.21	20.03
722	☐	J792	1,001.63	2,528.43	J792	20.00	70.73	20.00	2,528.43	20.00
723	☐	J794	1,000.89	2,643.04	J794	20.00	69.92	20.00	2,643.04	20.00
724	☐	J796	1,000.00	4,181.30	J1222	16.25	77.65	20.00	4,062.79	23.81
725	☐	J798	1,000.00	4,538.53	J798	20.00	104.65	20.00	4,538.53	20.01
726	☐	J80	1,007.47	3,726.63	J80	20.00	60.86	20.00	3,726.63	20.00
727	☐	J800	1,001.32	4,787.47	J1576	16.77	84.31	20.00	4,687.13	23.43
728	☐	J802	1,002.48	4,789.78	J1576	16.70	84.31	20.00	4,687.17	23.49
729	☐	J804	1,000.69	4,699.37	J2646	18.70	84.59	20.00	4,659.22	21.35
730	☐	J808	1,001.32	1,812.67	J808	20.00	60.75	20.00	1,812.67	20.00
731	☐	J810	1,001.22	2,259.09	J810	20.00	70.15	20.00	2,259.08	20.00
732	☐	J812	1,001.81	1,984.60	J812	20.00	66.66	20.00	1,984.60	19.97
733	☐	J814	1,001.47	4,625.79	J814	20.00	86.41	20.00	4,625.79	20.00
734	☐	J816	1,000.00	3,909.19	J816	20.00	97.15	20.00	3,909.19	20.05
735	☐	J818	1,001.24	2,680.33	J1424	10.00	48.54	20.00	2,338.33	31.03

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
736	☐	J82	1,000.69	3,802.87	J2266	12.52	56.56	20.00	3,478.45	27.49
737	☐	J820	1,001.75	2,670.89	J1424	9.92	48.48	20.00	2,328.17	31.02
738	☐	J822	1,001.30	2,797.95	J1424	8.52	48.87	20.00	2,397.48	32.68
739	☐	J824	1,001.30	2,755.40	J1424	9.22	48.78	20.00	2,380.80	31.99
740	☐	J830	1,002.54	6,524.08	J2140	-8.89	47.08	20.00	4,787.81	55.97
741	☐	J832	1,000.06	6,253.49	J2140	-15.90	46.79	20.00	4,291.18	61.92
742	☐	J834	1,001.55	5,797.37	J2140	-6.02	46.67	20.00	4,292.06	51.71
743	☐	J836	1,001.63	5,839.69	J2140	-0.54	46.89	20.00	4,587.30	48.06
744	☐	J84	1,004.56	5,364.29	J84	20.00	80.85	20.00	5,364.29	20.12
745	☐	J842	1,001.36	4,658.49	J842	20.00	90.32	20.00	4,658.49	20.00
746	☐	J844	1,023.48	1,492.85	J844	20.00	61.07	20.00	1,492.85	20.01
747	☐	J848	1,000.33	6,101.30	J1424	6.47	54.40	20.00	5,232.33	38.41
748	☐	J850	1,001.04	6,457.46	J2140	15.76	47.80	20.00	6,104.56	27.13
749	☐	J852	1,000.08	6,139.40	J1424	11.22	54.54	20.00	5,540.21	32.22
750	☐	J854	1,001.24	6,982.53	J2140	-8.44	47.30	20.00	5,155.09	54.34
751	☐	J856	1,002.85	5,221.55	J856	20.00	89.17	20.00	5,221.55	20.01
752	☐	J858	1,001.47	5,127.87	J858	20.00	82.42	20.00	5,127.86	20.01
753	☐	J86	1,004.17	7,814.00	J334	11.12	33.86	20.00	6,429.17	39.34
754	☐	J860	1,001.08	5,151.93	J860	20.00	85.49	20.00	5,151.94	20.00
755	☐	J862	1,001.95	3,767.38	J862	20.00	81.03	20.00	3,767.38	20.00
756	☐	J864	1,029.83	6,474.98	J2140	15.51	47.74	20.00	6,103.85	27.44
757	☐	J866	1,001.44	6,163.99	J2140	6.64	47.32	20.00	5,230.11	39.74
758	☐	J868	1,001.20	6,318.85	J2140	17.20	47.79	20.00	6,084.26	24.89
759	☐	J870	1,000.28	6,240.19	J2140	18.20	47.79	20.00	6,088.24	23.24
760	☐	J872	1,001.97	5,752.16	J872	20.00	80.79	20.00	5,752.16	20.00
761	☐	J874	1,002.85	2,574.78	J874	20.00	73.50	20.00	2,574.77	20.06
762	☐	J876	1,001.18	6,060.90	J2140	9.87	47.38	20.00	5,329.16	36.64
763	☐	J878	1,000.35	6,981.75	J2140	-8.44	47.30	20.00	5,154.17	54.34
764	☐	J88	1,003.09	2,920.02	J88	20.00	65.01	20.00	2,919.48	20.00
765	☐	J880	1,001.83	6,018.03	J1424	13.10	54.69	20.00	5,556.72	30.90
766	☐	J882	1,002.60	5,780.32	J1424	12.88	54.46	20.00	5,294.76	31.20
767	☐	J884	1,001.18	5,747.98	J2140	15.51	47.41	20.00	5,408.94	28.29
768	☐	J886	1,001.12	5,440.80	J886	20.00	88.02	20.00	5,440.80	20.09
769	☐	J888	1,002.06	5,280.58	J888	20.00	87.57	20.00	5,280.58	20.08
770	☐	J890	1,000.85	5,795.56	J1424	12.41	54.44	20.00	5,280.09	31.70

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
771	☐	J892	1,001.26	6,982.19	J2140	-9.78	47.27	20.00	5,098.68	55.24
772	☐	J898	1,002.50	6,217.97	J1424	11.01	54.74	20.00	5,617.14	33.72
773	☐	J90	1,004.48	2,738.91	J90	20.00	64.95	20.00	2,738.43	20.00
774	☐	J902	1,002.01	4,870.91	J1424	-13.50	52.21	20.00	3,399.41	55.29
775	☐	J904	1,001.77	4,699.34	J1424	-11.56	52.06	20.00	3,327.28	51.79
776	☐	J906	1,001.53	3,279.77	J936	19.66	82.91	20.00	3,271.05	20.34
777	☐	J908	1,002.67	4,124.45	J1424	3.69	52.11	20.00	3,350.73	42.99
778	☐	J912	1,003.11	4,603.91	J1424	-8.54	52.09	20.00	3,341.11	52.42
779	☐	J914	1,001.91	5,158.25	J1424	-6.53	52.96	20.00	3,836.48	50.46
780	☐	J918	1,001.73	6,008.05	J1424	-5.75	53.83	20.00	4,568.72	49.58
781	☐	J92	1,001.83	7,121.21	J334	10.73	33.65	20.00	5,641.88	35.38
782	☐	J920	1,001.99	5,502.48	J1424	5.72	53.87	20.00	4,638.22	38.78
783	☐	J922	1,002.95	6,308.80	J1424	-2.14	54.20	20.00	4,989.64	46.14
784	☐	J924	1,001.12	6,136.05	J1424	9.77	54.49	20.00	5,447.76	33.87
785	☐	J926	1,000.22	6,216.67	J1424	4.12	54.38	20.00	5,214.28	40.71
786	☐	J928	1,001.71	4,763.79	J1424	3.49	53.02	20.00	3,882.37	41.19
787	☐	J930	1,001.81	4,562.30	J1424	9.93	53.17	20.00	3,992.33	34.71
788	☐	J932	1,001.42	4,674.25	J1424	-11.61	52.02	20.00	3,307.53	51.85
789	☐	J934	1,001.61	4,460.50	J1424	-12.91	51.58	20.00	3,119.03	52.91
790	☐	J936	1,001.22	3,121.76	J936	20.00	82.21	20.00	3,121.76	20.00
791	☐	J938	1,000.30	3,169.84	J936	19.82	82.43	20.00	3,165.32	20.18
792	☐	J94	1,001.79	6,772.89	J334	9.12	33.53	20.00	5,164.10	35.95
793	☐	J940	1,003.89	4,821.57	J1424	-10.86	52.28	20.00	3,436.88	55.05
794	☐	J942	1,006.47	4,941.59	J1424	0.02	53.05	20.00	3,897.17	46.68
795	☐	J944	1,002.05	5,008.26	J944	20.00	90.70	20.00	5,008.25	20.01
796	☐	J948	1,001.75	6,008.04	J1424	-5.75	53.83	20.00	4,568.74	49.58
797	☐	J956	1,001.26	6,167.84	J1424	5.15	54.39	20.00	5,223.73	39.75
798	☐	J958	1,002.30	4,764.86	J1424	6.77	53.22	20.00	4,026.47	39.22
799	☐	J96	1,002.14	6,566.30	J334	15.72	33.67	20.00	5,812.57	28.66
800	☐	J960	1,004.74	5,315.28	J1424	7.50	53.83	20.00	4,563.11	38.86
801	☐	J962	1,002.38	4,618.42	J962	20.00	90.32	20.00	4,618.42	20.00
802	☐	J968	1,004.44	2,465.93	J840	19.28	79.96	20.00	2,453.01	20.78
803	☐	J972	1,001.77	4,116.54	J1424	4.07	52.12	20.00	3,357.61	43.64
804	☐	J974	1,000.35	4,208.08	J1424	2.01	52.13	20.00	3,360.35	45.91
805	☐	J976	1,000.96	4,775.26	J1424	-9.98	52.27	20.00	3,427.00	54.58

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
806	☐	J978	1,001.47	4,576.90	J1424	-6.67	52.16	20.00	3,374.94	53.01
807	☐	J980	1,002.48	3,527.05	J1424	16.69	52.12	20.00	3,358.32	26.44
808	☐	J982	1,001.38	2,705.13	J1424	6.23	48.06	20.00	2,260.77	33.77
809	☐	J986	1,000.16	3,625.62	J1424	-2.87	50.48	20.00	2,759.77	42.87
810	☐	J988	1,000.98	3,170.23	J1424	-0.51	49.24	20.00	2,467.84	40.51
811	☐	J992	1,000.75	2,126.93	J1424	13.00	45.39	20.00	1,929.66	27.06
812	☐	J996	1,002.56	1,975.04	J1424	18.50	45.39	20.00	1,931.47	21.73
813	☐	J998	1,000.33	1,755.39	J1424	18.45	42.82	20.00	1,715.41	21.59



SHEET X OF X

DATE JUNE 2021

SCALE AS SHOWN

PROJECT 2020-016

City of Sequim

CLALLAM COUNTY WASHINGTON

FIGURE 6: 2041 MAXIMUM DAY DEMAND + 3000 GPM FF JUNCTIONS

CITY OF SEQUIM

WILSON ENGINEERING

LEGEND:

- JUNCTION MEETS MDD + 3000 GPM FF REQUIREMENT
- JUNCTION DOES NOT MEET MDD + 3000 GPM FF REQUIREMENT
- INACTIVE JUNCTION
- ACTIVE PIPE
- INACTIVE PIPE

4,000 2,000 0 Feet

City of Sequim

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

SHEET X OF X

DATE JUNE 2021 | SCALE AS SHOWN | PROJECT 2020-016

City of Sequim
CLALLAM COUNTY WASHINGTON

FIGURE 7A: 2041 MAXIMUM DAY DEMAND + 3000 GPM FF

CITY OF SEQUIM

WILSON ENGINEERING

2041 MDD+FF 3000 gpm Commercial Report

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
1	☐	J1044	3,000.53	2,705.81	J54	17.79	12.59	20.00	2,570.52	24.00
2	☐	J1048	3,001.00	2,685.71	J54	17.46	11.73	20.00	2,533.26	23.36
3	☐	J1050	3,000.96	2,563.84	J1056	18.70	7.48	20.00	2,508.62	21.30
4	☐	J1052	3,002.54	2,659.30	J54	18.04	11.85	20.00	2,540.63	22.76
5	☐	J1054	3,005.72	2,478.94	J1054	20.00	6.00	20.00	2,478.94	20.00
6	☐	J1056	3,005.23	2,147.30	J1056	20.00	-7.30	20.00	2,147.30	20.01
7	☐	J1058	3,001.28	2,410.41	J1056	19.13	2.80	20.00	2,375.28	20.87
8	☐	J106	3,003.15	2,502.52	J334	10.16	0.82	20.00	1,873.37	29.85
9	☐	J1102	3,003.03	6,231.56	J334	10.13	28.29	20.00	4,875.95	34.37
10	☐	J1106	3,003.30	6,836.80	J334	16.59	30.98	20.00	6,246.04	27.77
11	☐	J1110	3,000.39	4,499.60	J642	18.67	49.30	20.00	4,444.17	21.35
12	☐	J1112	3,000.00	4,460.98	J1112	20.00	49.61	20.00	4,460.96	19.99
13	☐	J1114	3,000.00	4,460.98	J1114	20.00	49.61	20.00	4,460.97	19.99
14	☐	J1116	3,004.29	4,517.41	J1116	20.00	49.92	20.00	4,517.39	20.00
15	☐	J1170	3,002.40	2,751.10	J54	17.04	12.57	20.00	2,571.08	25.20
16	☐	J1172	3,002.03	2,580.85	J54	19.79	12.48	20.00	2,567.63	20.40
17	☐	J1174	3,002.14	2,857.59	J54	14.86	12.20	20.00	2,555.63	27.46
18	☐	J1176	3,003.24	2,645.48	J54	18.58	12.24	20.00	2,558.56	22.43
19	☐	J1178	3,003.62	2,603.15	J54	19.38	12.37	20.00	2,564.71	21.23
20	☐	J1180	3,002.26	2,608.76	J54	19.31	12.44	20.00	2,566.14	21.40
21	☐	J1182	3,001.04	2,633.70	J54	18.90	12.46	20.00	2,565.67	22.22
22	☐	J1184	3,001.10	2,653.90	J54	18.59	12.48	20.00	2,566.70	22.84
23	☐	J1186	3,001.26	2,669.77	J54	18.34	12.50	20.00	2,567.73	23.29
24	☐	J1188	3,001.18	2,726.93	J54	17.42	12.55	20.00	2,569.33	24.84
25	☐	J1190	3,001.55	2,700.35	J54	17.85	12.52	20.00	2,568.58	24.22
26	☐	J1192	3,001.95	2,617.98	J54	19.14	12.41	20.00	2,564.67	21.52
27	☐	J1194	3,001.04	2,547.35	J1194	20.00	5.73	20.00	2,547.35	20.00
28	☐	J120	3,002.73	8,454.45	J334	16.23	34.15	20.00	7,866.37	25.36
29	☐	J1200	3,000.81	6,508.65	J334	18.80	31.05	20.00	6,293.00	23.00
30	☐	J1204	3,000.79	6,888.17	J334	16.97	31.21	20.00	6,354.27	27.68
31	☐	J1224	3,002.60	5,206.18	J1224	20.00	55.15	20.00	5,206.18	20.00
32	☐	J1226	3,003.52	4,712.68	J1228	18.69	47.59	20.00	4,649.72	21.36
33	☐	J1228	3,009.38	3,491.13	J1228	20.00	31.71	20.00	3,491.13	20.00
34	☐	J1234	3,002.73	5,167.31	J1234	20.00	54.85	20.00	5,167.32	20.00
35	☐	J1244	3,000.85	2,918.66	J54	15.13	13.67	20.00	2,625.04	28.08

2041 MDD+FF 3000 gpm Commercial Report

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
36	☐	J1246	3,001.65	2,609.19	J54	19.61	12.82	20.00	2,584.49	20.61
37	☐	J1248	3,003.72	2,772.71	J54	17.68	13.69	20.00	2,628.73	23.77
38	☐	J1250	3,001.97	2,474.84	J1250	20.00	4.28	20.00	2,474.85	20.00
39	☐	J1252	3,001.46	2,550.95	J1252	20.00	7.13	20.00	2,550.95	20.00
40	☐	J1254	3,003.80	2,580.47	J1254	20.00	8.09	20.00	2,580.47	20.00
41	☐	J1256	3,005.72	2,533.10	J1256	20.00	7.12	20.00	2,533.10	20.00
42	☐	J1262	3,011.35	2,754.66	J54	18.43	14.08	20.00	2,655.77	22.52
43	☐	J1268	3,010.68	3,918.49	J1754	6.62	22.72	20.00	3,177.39	33.77
44	☐	J1272	3,000.73	4,388.86	J2140	16.50	30.79	20.00	4,079.77	28.10
45	☐	J1276	3,002.67	4,030.52	J2140	16.65	28.31	20.00	3,755.75	27.95
46	☐	J1280	3,000.53	5,342.93	J2140	-6.57	27.14	20.00	3,616.63	54.08
47	☐	J1282	3,004.88	3,670.46	J2140	19.63	27.32	20.00	3,640.70	20.96
48	☐	J1284	3,000.73	5,392.51	J2140	-7.78	27.05	20.00	3,606.34	54.80
49	☐	J1286	3,002.60	5,483.46	J2140	-9.90	26.90	20.00	3,591.38	56.05
50	☐	J1292	3,005.15	4,481.68	J2140	-23.60	12.78	20.00	2,615.38	66.01
51	☐	J1298	3,001.85	4,481.35	J2140	-23.68	12.78	20.00	2,612.07	65.91
52	☐	J1306	3,009.03	4,936.94	J2140	-20.80	18.84	20.00	2,935.40	65.62
53	☐	J1310	3,002.60	4,914.22	J2140	-20.30	18.88	20.00	2,931.17	65.39
54	☐	J1316	3,000.57	5,366.77	J2140	-2.06	28.79	20.00	3,814.42	52.03
55	☐	J1392	3,000.57	4,077.53	J794	19.77	48.06	20.00	4,069.89	20.28
56	☐	J1394	3,001.04	4,063.95	J1394	20.00	47.88	20.00	4,063.95	20.04
57	☐	J1396	3,003.74	2,581.72	J1998	18.49	6.08	20.00	2,525.78	21.54
58	☐	J1402	3,001.81	2,803.09	J54	15.84	12.22	20.00	2,556.19	26.33
59	☐	J1404	3,001.36	2,740.90	J54	16.91	12.20	20.00	2,555.00	24.92
60	☐	J1406	3,003.70	2,433.86	J1406	20.00	2.47	20.00	2,433.86	20.00
61	☐	J1426	3,001.49	2,779.89	J54	16.77	12.83	20.00	2,584.00	26.68
62	☐	J1436	3,000.26	2,612.17	J54	19.53	12.83	20.00	2,582.76	21.14
63	☐	J1442	3,001.26	2,527.17	J1442	20.00	0.08	20.00	2,527.17	20.00
64	☐	J1448	3,000.37	2,421.95	J1448	20.00	-3.92	20.00	2,421.95	20.00
65	☐	J1450	3,000.90	3,146.68	J54	11.06	13.74	20.00	2,628.25	35.95
66	☐	J1452	3,000.96	2,843.25	J54	16.49	13.74	20.00	2,628.31	27.44
67	☐	J1490	3,004.01	4,488.42	J2140	-22.75	13.52	20.00	2,647.38	65.80
68	☐	J1492	3,003.36	4,136.08	J2140	-8.32	16.48	20.00	2,794.57	54.33
69	☐	J1498	3,001.67	4,536.75	J2140	-26.97	12.05	20.00	2,580.32	67.27
70	☐	J1500	3,008.65	3,381.47	J2140	-9.90	0.80	20.00	2,207.01	49.93

2041 MDD+FF 3000 gpm Commercial Report

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
71	☐	J1506	3,002.36	4,513.40	J2140	-25.19	12.64	20.00	2,606.42	66.56
72	☐	J1508	3,002.79	4,515.09	J2140	-25.48	12.50	20.00	2,601.04	66.58
73	☐	J1546	3,002.04	6,462.82	J334	16.17	30.30	20.00	5,837.46	27.67
74	☐	J1550	3,001.40	3,480.09	J1550	20.00	29.26	20.00	3,475.77	20.00
75	☐	J1610	3,005.53	4,236.14	J2140	18.36	30.73	20.00	4,087.87	23.76
76	☐	J1612	3,000.67	3,280.32	J1612	20.00	29.35	20.00	3,280.32	20.00
77	☐	J1678	3,000.37	4,778.49	J1678	20.00	51.53	20.00	4,778.46	20.00
78	☐	J1680	3,002.56	4,668.91	J1680	20.00	50.43	20.00	4,668.88	20.00
79	☐	J1682	3,003.11	4,466.86	J1682	20.00	48.29	20.00	4,466.84	20.00
80	☐	J1760	3,001.44	5,046.74	J2140	12.10	32.20	20.00	4,331.81	34.91
81	☐	J1762	3,001.18	2,930.51	J1762	20.00	17.17	20.00	2,930.52	20.00
82	☐	J1764	3,002.18	3,246.52	J1764	20.00	28.35	20.00	3,246.52	20.00
83	☐	J1768	3,000.67	5,250.53	J2140	-4.34	27.32	20.00	3,636.49	52.62
84	☐	J1774	3,003.99	5,386.80	J2140	1.77	30.13	20.00	4,003.10	49.04
85	☐	J1782	3,000.43	3,216.41	J2256	15.50	23.31	20.00	3,093.60	24.50
86	☐	J1784	3,000.49	2,922.79	J2256	19.57	16.53	20.00	2,911.72	20.43
87	☐	J1786	3,008.12	5,256.67	J2140	-17.49	22.75	20.00	3,207.09	63.32
88	☐	J1788	3,004.07	3,858.64	J2140	10.20	22.75	20.00	3,203.04	39.80
89	☐	J1802	3,002.18	3,607.95	J1802	20.00	33.71	20.00	3,607.92	20.00
90	☐	J1808	3,005.23	4,148.44	J1808	20.00	47.89	20.00	4,148.44	20.06
91	☐	J1810	3,002.01	3,908.77	J1810	20.00	45.15	20.00	3,908.77	20.02
92	☐	J1812	3,002.91	4,088.03	J1812	20.00	48.07	20.00	4,088.03	20.04
93	☐	J1814	3,001.65	4,317.72	J1814	20.00	50.02	20.00	4,317.71	20.09
94	☐	J1816	3,001.30	3,866.70	J2276	19.47	42.90	20.00	3,849.55	20.55
95	☐	J1822	3,002.34	3,876.92	J2276	19.64	43.18	20.00	3,865.14	20.39
96	☐	J1826	3,000.39	4,994.73	J1826	20.00	51.70	20.00	4,994.73	20.00
97	☐	J1828	3,001.06	2,885.86	J54	15.68	13.65	20.00	2,624.22	27.25
98	☐	J1830	3,000.41	2,855.29	J54	16.20	13.65	20.00	2,623.57	26.51
99	☐	J1834	3,004.44	2,766.66	J54	18.25	14.23	20.00	2,656.35	22.95
100	☐	J1836	3,016.68	2,691.18	J54	19.65	14.23	20.00	2,668.58	20.64
101	☐	J1838	3,007.77	3,013.77	J54	14.22	14.33	20.00	2,664.58	29.30
102	☐	J1840	3,003.89	2,843.72	J54	16.97	14.23	20.00	2,655.58	24.87
103	☐	J1866	3,011.01	2,071.57	J1866	20.00	-24.44	20.00	2,071.57	20.00
104	☐	J1934	3,010.36	2,019.97	J1934	20.00	-35.19	20.00	2,019.97	20.00
105	☐	J1936	3,004.07	4,397.89	J1936	20.00	46.39	20.00	4,397.89	19.97

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		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
106	☐	J1938	3,002.26	4,833.31	J1938	20.00	51.08	20.00	4,833.31	20.03
107	☐	J1940	3,000.67	4,984.51	J1940	20.00	51.52	20.00	4,984.51	20.00
108	☐	J1944	3,002.22	4,133.01	J1552	-1.64	16.54	20.00	2,743.34	45.01
109	☐	J1954	3,001.18	2,848.58	J54	16.35	13.67	20.00	2,625.48	26.05
110	☐	J1956	3,003.50	2,182.11	J1956	20.00	-13.90	20.00	2,182.11	20.00
111	☐	J1958	3,000.00	2,825.50	J54	15.84	12.70	20.00	2,575.88	27.83
112	☐	J1962	3,000.00	2,833.13	J54	15.72	12.72	20.00	2,577.05	28.07
113	☐	J1968	3,002.14	2,539.37	J1968	20.00	7.46	20.00	2,539.37	20.00
114	☐	J1976	3,003.74	4,952.70	J1976	20.00	51.18	20.00	4,952.70	20.00
115	☐	J1978	3,000.59	4,824.22	J1978	20.00	51.84	20.00	4,824.18	20.00
116	☐	J1980	3,020.37	2,651.30	J1980	20.00	5.67	20.00	2,651.30	20.00
117	☐	J1996	3,001.47	2,592.62	J1998	17.83	5.70	20.00	2,513.25	22.17
118	☐	J1998	3,003.97	2,031.32	J1998	20.00	-18.79	20.00	2,031.32	20.01
119	☐	J2000	3,001.87	2,431.74	J2000	20.00	3.65	20.00	2,431.74	20.00
120	☐	J2006	3,003.87	1,487.33	J2006	20.00	-65.07	20.00	1,487.33	20.01
121	☐	J2008	3,010.54	2,686.26	J54	19.30	13.81	20.00	2,641.82	21.13
122	☐	J2010	3,011.96	2,484.00	J2010	20.00	5.17	20.00	2,484.00	20.00
123	☐	J2024	3,006.73	876.74	J2024	20.00	-219.45	20.00	876.74	20.00
124	☐	J2062	3,002.56	3,539.11	J54	5.68	15.49	20.00	2,720.30	43.04
125	☐	J2064	3,008.50	3,162.32	J54	12.84	15.49	20.00	2,726.24	33.89
126	☐	J2068	3,002.03	4,505.17	J2068	20.00	38.25	20.00	4,505.17	19.98
127	☐	J2070	3,001.57	5,259.23	J334	13.96	26.98	20.00	4,393.43	29.97
128	☐	J2072	3,001.28	5,562.02	J334	11.05	26.85	20.00	4,350.23	33.07
129	☐	J2074	3,004.52	4,068.48	J2074	20.00	35.30	20.00	4,068.48	20.00
130	☐	J2114	3,009.22	2,577.03	J2398	15.44	0.65	20.00	2,431.74	24.65
131	☐	J2122	3,001.81	2,360.35	J2122	20.00	-2.63	20.00	2,360.35	20.01
132	☐	J2124	3,002.83	2,526.86	J2122	14.77	-2.35	20.00	2,366.94	25.90
133	☐	J2126	3,001.87	2,397.80	J2122	18.98	-2.35	20.00	2,365.97	21.03
134	☐	J2128	3,006.35	2,738.97	J2398	11.40	2.29	20.00	2,466.08	28.61
135	☐	J2130	3,005.19	2,612.41	J2398	14.26	0.77	20.00	2,430.38	25.87
136	☐	J2142	3,012.35	2,803.81	J2140	-1.15	-7.61	20.00	2,013.23	41.19
137	☐	J2144	3,009.60	2,520.74	J2140	4.53	-10.97	20.00	1,946.49	35.47
138	☐	J2146	3,000.14	2,158.58	J2140	14.87	-10.05	20.00	1,953.63	25.50
139	☐	J2148	3,007.30	2,138.78	J2140	15.57	-10.05	20.00	1,960.79	24.93
140	☐	J2150	3,000.73	2,216.86	J2140	13.49	-9.84	20.00	1,958.04	27.09

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		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
141	☐	J2152	3,000.33	2,235.16	J2140	12.99	-9.84	20.00	1,957.65	27.72
142	☐	J2154	3,001.65	2,337.17	J2140	10.65	-9.26	20.00	1,969.83	30.50
143	☐	J2156	3,000.49	2,305.03	J2140	11.49	-9.26	20.00	1,968.67	29.85
144	☐	J2158	3,003.54	2,350.67	J2140	10.68	-8.71	20.00	1,982.07	30.54
145	☐	J2160	3,001.75	2,235.87	J2140	13.67	-8.71	20.00	1,980.21	27.84
146	☐	J2162	3,008.14	4,100.81	J2140	-1.23	18.88	20.00	2,936.71	49.98
147	☐	J2198	3,002.24	3,023.45	J54	13.92	14.29	20.00	2,657.16	29.89
148	☐	J22	3,003.11	5,316.04	J1424	5.89	36.91	20.00	4,392.11	38.91
149	☐	J2200	3,003.66	2,497.31	J2200	20.00	0.39	20.00	2,497.31	20.00
150	☐	J2202	3,003.03	2,069.93	J2202	20.00	-22.12	20.00	2,069.93	20.01
151	☐	J2204	3,000.00	2,770.59	J54	16.75	12.66	20.00	2,573.90	26.07
152	☐	J2206	3,000.79	2,277.72	J2202	19.13	-9.79	20.00	2,252.88	20.87
153	☐	J2208	3,002.99	2,170.06	J2208	20.00	-15.09	20.00	2,170.06	20.00
154	☐	J2210	3,002.44	2,238.28	J2210	20.00	-11.39	20.00	2,238.28	20.00
155	☐	J2224	3,008.93	5,912.67	J2224	20.00	63.01	20.00	5,912.67	19.98
156	☐	J2228	3,001.32	5,139.85	J2234	18.94	75.57	20.00	5,110.45	21.10
157	☐	J2230	3,000.57	4,945.76	J2230	20.00	72.72	20.00	4,945.77	20.03
158	☐	J2232	3,000.88	5,064.70	J2234	18.52	74.39	20.00	5,024.23	21.51
159	☐	J2234	3,001.73	3,859.80	J2234	20.00	52.00	20.00	3,859.79	20.13
160	☐	J2238	3,004.99	5,139.85	J2238	20.00	60.94	20.00	5,139.85	20.00
161	☐	J2240	3,008.95	5,342.50	J2240	20.00	64.07	20.00	5,342.50	20.01
162	☐	J2248	3,001.40	1,509.43	J2248	20.00	-142.35	20.00	1,509.43	20.05
163	☐	J2250	3,000.41	2,962.07	J2250	20.00	18.55	20.00	2,962.07	20.00
164	☐	J2252	3,000.88	4,354.63	J2140	17.47	30.99	20.00	4,125.67	25.64
165	☐	J2254	3,000.26	2,833.49	J2256	19.21	12.32	20.00	2,813.84	20.79
166	☐	J2260	3,000.55	3,406.43	J2256	14.06	27.89	20.00	3,237.33	25.94
167	☐	J2272	3,000.00	1,728.41	J2272	20.00	-36.91	20.00	1,728.41	20.01
168	☐	J2276	3,003.68	3,485.94	J2276	20.00	34.87	20.00	3,485.94	20.00
169	☐	J2280	3,000.57	3,521.39	J2280	20.00	36.54	20.00	3,521.39	20.00
170	☐	J2284	3,001.30	3,381.51	J2284	20.00	32.49	20.00	3,381.51	20.00
171	☐	J2288	3,001.04	3,776.47	J2276	18.94	40.77	20.00	3,742.57	21.08
172	☐	J2290	3,002.40	3,603.59	J2290	20.00	37.98	20.00	3,603.59	20.00
173	☐	J2296	3,000.65	3,339.19	J2296	20.00	31.42	20.00	3,339.19	20.00
174	☐	J2300	3,001.08	4,121.58	J2300	20.00	48.20	20.00	4,121.58	20.06
175	☐	J2304	3,007.02	5,249.49	J2304	20.00	62.60	20.00	5,249.50	20.01

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		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
176	☐	J2306	3,008.89	5,174.41	J2306	20.00	59.89	20.00	5,174.41	20.01
177	☐	J2314	3,004.48	6,656.62	J334	16.69	30.73	20.00	6,093.50	27.17
178	☐	J2340	3,001.00	3,255.49	J54	9.33	14.03	20.00	2,643.01	38.22
179	☐	J2348	3,001.67	4,220.21	J2476	19.34	35.90	20.00	4,177.23	20.67
180	☐	J2350	3,001.49	8,235.46	J334	7.83	31.42	20.00	6,777.39	34.37
181	☐	J2354	3,005.33	5,821.54	J568	18.57	46.53	20.00	5,717.55	21.43
182	☐	J2356	3,002.93	8,327.38	J334	5.69	31.15	20.00	6,506.94	38.09
183	☐	J2358	3,001.30	6,028.98	J2358	20.00	54.12	20.00	6,028.98	20.00
184	☐	J2360	3,004.44	4,623.04	J2360	20.00	43.46	20.00	4,623.04	20.01
185	☐	J2368	3,001.59	2,770.19	J54	16.15	11.91	20.00	2,542.09	25.13
186	☐	J2370	3,001.06	4,500.33	J642	18.66	49.30	20.00	4,444.84	21.35
187	☐	J2372	3,000.87	7,348.22	J334	13.83	31.09	20.00	6,307.77	33.02
188	☐	J2398	3,026.59	2,366.48	J2398	20.00	-3.30	20.00	2,366.48	20.01
189	☐	J24	3,003.13	3,637.07	J24	20.00	38.17	20.00	3,637.08	20.00
190	☐	J2400	3,001.20	3,787.00	J2400	20.00	42.49	20.00	3,787.00	20.01
191	☐	J2422	3,000.20	4,967.40	J2140	-21.69	18.88	20.00	2,928.77	66.10
192	☐	J2430	3,001.16	2,716.15	J54	17.41	12.30	20.00	2,559.53	23.62
193	☐	J2476	3,004.03	2,008.14	J2476	20.00	-18.40	20.00	2,008.14	19.99
194	☐	J2492	3,000.08	2,907.00	J54	14.58	12.89	20.00	2,585.79	30.37
195	☐	J2512	3,000.00	2,696.35	J54	15.70	9.85	20.00	2,449.63	25.06
196	☐	J26	3,001.89	5,360.47	J2140	9.06	32.57	20.00	4,397.11	38.66
197	☐	J260	3,001.32	4,325.46	J260	20.00	37.59	20.00	4,322.98	20.01
198	☐	J262	3,002.77	3,055.64	J262	20.00	21.12	20.00	3,055.65	20.00
199	☐	J264	3,001.49	3,398.73	J54	7.33	14.67	20.00	2,675.86	39.54
200	☐	J266	3,002.04	3,662.60	J54	4.39	16.30	20.00	2,764.77	46.17
201	☐	J274	3,000.90	3,253.81	J274	20.00	26.05	20.00	3,253.81	20.03
202	☐	J276	3,004.40	2,006.18	J276	20.00	-15.60	20.00	2,006.18	19.99
203	☐	J28	3,002.77	4,661.50	J28	20.00	53.05	20.00	4,661.48	19.96
204	☐	J30	3,001.12	5,574.34	J1424	8.93	39.35	20.00	4,786.55	35.25
205	☐	J316	3,006.35	2,919.66	J316	20.00	18.03	20.00	2,919.67	20.00
206	☐	J32	3,000.90	5,373.76	J1424	18.55	41.81	20.00	5,244.16	22.46
207	☐	J326	3,000.24	6,697.84	J334	9.20	29.03	20.00	5,202.40	35.69
208	☐	J360	3,001.46	2,058.94	J334	12.34	-9.20	20.00	1,625.20	27.66
209	☐	J374	3,001.59	3,841.57	J374	20.00	34.16	20.00	3,837.81	20.00
210	☐	J376	3,003.21	3,983.03	J400	19.41	33.82	20.00	3,943.38	20.59

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		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
211	☐	J378	3,002.52	4,444.26	J408	17.62	38.53	20.00	4,300.03	22.43
212	☐	J388	3,000.71	4,254.50	J408	18.04	37.11	20.00	4,138.83	21.96
213	☐	J392	3,001.83	6,644.31	J334	9.10	28.90	20.00	5,137.07	35.82
214	☐	J400	3,000.73	2,790.76	J400	20.00	14.98	20.00	2,790.76	20.00
215	☐	J406	3,000.22	2,898.79	J408	18.83	16.25	20.00	2,852.00	21.17
216	☐	J408	3,003.44	2,125.31	J408	20.00	-14.22	20.00	2,125.31	20.00
217	☐	J414	3,000.98	2,660.89	J414	20.00	10.11	20.00	2,660.89	20.00
218	☐	J42	3,001.22	3,422.08	J50	18.78	27.22	20.00	3,364.72	21.38
219	☐	J422	3,000.51	3,042.33	J408	19.04	20.03	20.00	3,001.64	20.96
220	☐	J432	3,003.66	6,410.96	J432	20.00	55.79	20.00	6,410.97	20.00
221	☐	J436	3,002.14	6,663.91	J334	17.96	31.04	20.00	6,303.89	24.66
222	☐	J438	3,001.20	4,044.94	J438	20.00	36.48	20.00	4,028.81	20.00
223	☐	J444	3,001.85	6,668.74	J334	18.05	31.07	20.00	6,322.33	24.50
224	☐	J446	3,000.88	4,689.53	J454	19.48	46.57	20.00	4,663.26	20.51
225	☐	J448	3,001.63	4,772.00	J448	20.00	50.28	20.00	4,772.00	20.05
226	☐	J450	3,001.65	4,634.63	J454	18.14	45.39	20.00	4,543.27	21.82
227	☐	J454	3,004.48	2,401.14	J454	20.00	-3.39	20.00	2,401.14	20.00
228	☐	J464	3,003.56	4,632.91	J464	20.00	49.98	20.00	4,632.91	20.05
229	☐	J468	3,002.73	8,493.83	J334	15.75	34.13	20.00	7,838.38	25.94
230	☐	J472	3,001.87	4,123.77	J1552	-1.95	16.30	20.00	2,727.40	44.96
231	☐	J48	3,011.13	4,949.43	J1096	16.50	26.34	20.00	4,359.16	26.78
232	☐	J500	3,001.73	7,407.54	J334	16.31	31.78	20.00	6,738.89	29.14
233	☐	J504	3,001.87	7,650.09	J334	14.40	31.73	20.00	6,661.78	31.97
234	☐	J510	3,002.42	6,793.24	J334	19.77	31.79	20.00	6,749.90	20.68
235	☐	J512	3,002.08	8,158.51	J334	9.77	31.60	20.00	6,584.02	38.35
236	☐	J514	3,002.46	5,748.61	J514	20.00	54.30	20.00	5,748.62	20.00
237	☐	J516	3,005.88	3,025.02	J516	20.00	20.62	20.00	3,025.02	20.03
238	☐	J518	3,000.88	8,459.79	J334	6.34	31.54	20.00	6,540.19	41.88
239	☐	J520	3,005.13	8,547.02	J334	1.79	30.91	20.00	6,201.81	43.44
240	☐	J522	3,005.23	8,521.25	J334	2.35	30.94	20.00	6,246.91	42.31
241	☐	J526	3,002.22	7,219.33	J334	10.86	30.28	20.00	5,816.77	35.01
242	☐	J528	3,002.60	6,689.25	J334	18.39	31.29	20.00	6,398.98	24.12
243	☐	J530	3,001.65	7,117.56	J334	16.20	31.36	20.00	6,447.81	28.53
244	☐	J532	3,005.15	3,502.46	J532	20.00	30.79	20.00	3,502.46	20.00
245	☐	J534	3,005.47	8,337.32	J334	4.88	31.07	20.00	6,356.35	39.93

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
246	☐	J542	3,001.18	8,318.93	J334	5.75	31.15	20.00	6,505.19	38.04
247	☐	J544	3,003.40	8,466.07	J334	4.42	31.20	20.00	6,642.98	38.41
248	☐	J554	3,005.58	3,084.65	J334	17.66	18.40	20.00	2,827.48	24.45
249	☐	J564	3,002.32	8,205.80	J334	7.95	31.39	20.00	6,765.20	34.22
250	☐	J568	3,005.49	1,915.39	J568	20.00	-28.80	20.00	1,915.39	20.01
251	☐	J574	3,002.89	6,615.05	J574	20.00	56.32	20.00	6,615.01	20.00
252	☐	J578	3,000.20	6,031.01	J578	20.00	54.20	20.00	6,031.01	20.00
253	☐	J580	3,004.35	4,622.74	J580	20.00	43.46	20.00	4,622.75	20.01
254	☐	J586	3,002.20	7,057.83	J334	18.36	31.89	20.00	6,750.22	24.12
255	☐	J588	3,002.71	5,533.14	J588	20.00	51.39	20.00	5,533.15	20.00
256	☐	J592	3,001.99	8,097.58	J334	10.67	31.64	20.00	6,617.56	37.05
257	☐	J594	3,004.07	8,131.57	J334	7.85	31.23	20.00	6,370.49	39.83
258	☐	J598	3,004.86	4,379.30	J598	20.00	45.76	20.00	4,379.30	20.00
259	☐	J600	3,005.96	5,421.13	J600	20.00	52.43	20.00	5,421.13	20.00
260	☐	J602	3,005.21	7,085.54	J334	15.73	31.16	20.00	6,345.86	29.99
261	☐	J604	3,002.83	7,744.99	J334	10.63	31.00	20.00	6,261.06	36.72
262	☐	J606	3,011.64	7,303.42	J334	15.09	31.36	20.00	6,450.16	32.26
263	☐	J608	3,011.90	6,962.86	J334	17.12	31.33	20.00	6,448.13	27.44
264	☐	J610	3,005.74	6,690.46	J334	18.89	31.39	20.00	6,485.97	23.05
265	☐	J614	3,001.40	7,205.38	J334	10.93	30.27	20.00	5,812.35	34.93
266	☐	J616	3,002.54	6,174.04	J616	20.00	52.62	20.00	6,174.04	20.00
267	☐	J622	3,002.20	7,177.94	J334	14.86	31.08	20.00	6,301.74	31.31
268	☐	J626	3,004.72	6,630.86	J334	18.93	31.38	20.00	6,434.37	23.27
269	☐	J628	3,004.88	7,474.06	J334	13.84	31.31	20.00	6,421.61	34.04
270	☐	J630	3,002.56	6,623.20	J334	18.51	31.20	20.00	6,355.39	24.07
271	☐	J634	3,004.01	7,214.66	J334	15.34	31.30	20.00	6,406.25	31.59
272	☐	J640	3,000.53	4,604.55	J656	17.55	50.01	20.00	4,502.21	22.48
273	☐	J642	3,002.54	3,588.21	J642	20.00	35.96	20.00	3,588.21	20.00
274	☐	J644	3,001.34	7,137.33	J334	18.19	31.93	20.00	6,796.53	24.69
275	☐	J646	3,001.28	4,608.06	J646	20.00	49.15	20.00	4,608.03	20.00
276	☐	J648	3,007.77	3,671.30	J648	20.00	34.83	20.00	3,671.30	20.00
277	☐	J652	3,001.77	7,160.61	J334	17.79	31.82	20.00	6,751.09	25.72
278	☐	J654	3,000.98	4,603.92	J656	17.46	49.96	20.00	4,497.84	22.57
279	☐	J656	3,007.69	3,185.96	J656	20.00	25.76	20.00	3,185.96	20.00
280	☐	J666	3,001.34	3,194.57	J668	18.51	24.51	20.00	3,147.50	21.50

2041 MDD+FF 3000 gpm Commercial Report

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
281	☐	J668	3,003.01	1,944.18	J668	20.00	-46.93	20.00	1,944.18	20.01
282	☐	J670	3,001.46	7,412.70	J334	16.30	31.78	20.00	6,741.29	29.21
283	☐	J672	3,002.79	4,958.12	J672	20.00	53.44	20.00	4,955.33	20.00
284	☐	J688	3,002.04	3,327.18	J688	20.00	29.90	20.00	3,327.19	20.00
285	☐	J690	3,001.67	4,962.12	J1424	19.73	40.40	20.00	4,936.95	20.50
286	☐	J694	3,001.93	2,383.93	J694	20.00	-9.18	20.00	2,383.93	20.01
287	☐	J726	3,006.84	4,473.02	J726	20.00	47.21	20.00	4,473.02	19.98
288	☐	J756	3,004.48	4,444.25	J756	20.00	51.06	20.00	4,444.24	20.09
289	☐	J76	3,002.20	4,676.06	J76	20.00	50.43	20.00	4,676.06	20.07
290	☐	J770	3,001.65	4,214.50	J770	20.00	50.22	20.00	4,214.50	20.07
291	☐	J78	3,005.13	5,455.27	J78	20.00	58.33	20.00	5,455.28	20.00
292	☐	J786	3,000.79	4,133.92	J786	20.00	48.36	20.00	4,133.92	20.06
293	☐	J796	3,000.00	4,535.81	J1222	16.25	55.42	20.00	4,415.82	23.75
294	☐	J800	3,001.32	5,322.86	J1576	16.71	71.45	20.00	5,221.86	23.54
295	☐	J802	3,002.48	5,323.47	J1576	16.67	71.43	20.00	5,221.24	23.57
296	☐	J808	3,001.32	1,859.12	J808	20.00	-70.18	20.00	1,859.12	20.00
297	☐	J830	3,002.54	5,297.09	J2140	-12.30	24.87	20.00	3,386.52	59.92
298	☐	J832	3,000.06	4,548.48	J2140	-25.68	12.78	20.00	2,610.28	66.97
299	☐	J834	3,001.55	3,110.16	J834	20.00	24.13	20.00	3,110.16	20.00
300	☐	J836	3,001.63	3,833.01	J2256	13.21	37.55	20.00	3,617.02	26.79
301	☐	J84	3,004.56	5,765.93	J84	20.00	69.24	20.00	5,765.93	20.01
302	☐	J848	3,000.33	5,467.51	J1424	4.21	37.22	20.00	4,435.68	41.30
303	☐	J850	3,001.04	5,366.13	J2140	8.88	32.54	20.00	4,390.90	38.92
304	☐	J852	3,000.08	5,511.95	J1424	8.41	38.86	20.00	4,701.99	35.78
305	☐	J854	3,001.24	5,655.55	J2140	-8.29	28.42	20.00	3,767.17	56.48
306	☐	J856	3,002.85	4,685.92	J2140	17.22	32.65	20.00	4,415.95	27.19
307	☐	J858	3,001.47	4,372.69	J2140	16.98	30.90	20.00	4,102.72	26.90
308	☐	J86	3,004.17	7,939.82	J334	10.86	31.49	20.00	6,491.77	39.81
309	☐	J860	3,001.08	4,400.84	J2140	16.25	30.77	20.00	4,073.05	28.69
310	☐	J862	3,001.95	3,383.99	J862	20.00	32.68	20.00	3,383.99	20.00
311	☐	J866	3,001.44	4,728.20	J2140	7.12	28.31	20.00	3,754.51	42.18
312	☐	J868	3,001.20	5,270.78	J2140	9.80	32.40	20.00	4,366.04	37.94
313	☐	J870	3,000.28	5,114.52	J2140	11.27	32.20	20.00	4,330.65	36.16
314	☐	J872	3,001.97	4,462.17	J2140	16.68	31.19	20.00	4,160.13	27.25
315	☐	J876	3,001.18	5,055.20	J2140	4.39	29.25	20.00	3,875.29	46.23

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow
316	☐	J878	3,000.35	5,654.71	J2140	-8.29	28.42	20.00	3,766.26	56.48
317	☐	J880	3,001.83	5,284.68	J2140	9.27	32.26	20.00	4,341.18	40.95
318	☐	J882	3,002.60	5,169.35	J1424	9.82	37.55	20.00	4,485.15	35.64
319	☐	J884	3,001.18	4,835.93	J2140	8.64	29.61	20.00	3,923.25	41.40
320	☐	J886	3,001.12	4,622.23	J2140	12.62	30.15	20.00	3,996.97	35.88
321	☐	J888	3,002.06	4,501.01	J2140	14.74	30.49	20.00	4,044.89	32.05
322	☐	J890	3,000.85	5,184.11	J1424	9.43	37.48	20.00	4,472.41	35.95
323	☐	J892	3,001.26	5,629.27	J2140	-8.89	28.08	20.00	3,726.51	56.77
324	☐	J898	3,002.50	5,429.60	J2140	6.74	32.03	20.00	4,298.77	44.18
325	☐	J92	3,001.83	7,144.11	J334	10.82	30.15	20.00	5,747.76	35.09
326	☐	J924	3,001.12	5,509.42	J1424	7.26	38.47	20.00	4,634.97	36.95
327	☐	J926	3,000.22	5,568.52	J1424	2.25	37.18	20.00	4,429.41	43.02
328	☐	J94	3,001.79	6,804.96	J334	9.15	29.22	20.00	5,285.77	35.75
329	☐	J956	3,001.26	5,526.85	J1424	3.11	37.20	20.00	4,433.75	42.32
330	☐	J96	3,002.14	6,623.28	J334	15.70	30.44	20.00	5,918.32	28.47

LEGEND:

- JUNCTION MEETS MDD + 3000 GPM FF REQUIREMENT
- JUNCTION DOES NOT MEET MDD + 3000 GPM FF REQUIREMENT
- INACTIVE JUNCTION
- ACTIVE PIPE
- INACTIVE PIPE

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X	X

DATE	SCALE	PROJECT
JUNE 2021	AS SHOWN	2020-016

City of Sequim
WASHINGTON
CLALLAM COUNTY

FIGURE 7B: 2041 MAXIMUM DAY DEMAND + 3000 GPM FF WITH IMPROVEMENTS

CITY OF SEQUIM

WILSON ENGINEERING

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

2041 MDD+FF 3000 gpm Commercial w_Improvements Report

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
1	☐	J1044	3,000.53	3,051.69	J1044	20.00	21.34	20.00	3,051.69	19.96
2	☐	J1048	3,001.00	3,176.87	J54	17.76	20.14	20.00	3,011.33	22.99
3	☐	J1050	3,000.96	2,975.82	J1056	18.70	18.16	20.00	2,909.68	21.30
4	☐	J1052	3,002.54	3,110.39	J54	18.81	20.24	20.00	3,020.30	21.70
5	☐	J1054	3,005.72	2,850.46	J1054	20.00	16.67	20.00	2,849.32	20.00
6	☐	J1056	3,005.23	2,384.34	J1056	20.00	3.38	20.00	2,383.48	20.00
7	☐	J1058	3,001.28	2,750.00	J1056	19.13	13.48	20.00	2,708.31	20.87
8	☐	J106	3,003.15	2,498.50	J334	10.16	0.72	20.00	1,861.59	29.86
9	☐	J1102	3,003.03	6,181.57	J334	10.03	28.19	20.00	4,785.90	34.53
10	☐	J1106	3,003.30	6,809.60	J334	16.60	30.89	20.00	6,184.89	27.94
11	☐	J1110	3,000.39	4,819.38	J642	18.67	53.63	20.00	4,762.39	21.27
12	☐	J1112	3,000.00	4,735.92	J1112	20.00	53.44	20.00	4,735.92	19.94
13	☐	J1114	3,000.00	4,735.93	J1114	20.00	53.44	20.00	4,735.93	19.94
14	☐	J1116	3,004.29	4,743.55	J1116	20.00	53.07	20.00	4,743.56	19.95
15	☐	J1170	3,002.40	3,115.90	J54	19.32	20.80	20.00	3,064.01	21.33
16	☐	J1172	3,002.03	2,910.04	J1172	20.00	17.65	20.00	2,910.04	20.06
17	☐	J1174	3,002.14	3,326.51	J54	16.04	20.50	20.00	3,040.05	26.06
18	☐	J1176	3,003.24	3,003.26	J1176	20.00	19.98	20.00	3,002.25	20.00
19	☐	J1178	3,003.62	2,903.14	J1178	20.00	17.12	20.00	2,902.27	20.07
20	☐	J1180	3,002.26	2,900.58	J1180	20.00	17.02	20.00	2,900.58	20.07
21	☐	J1182	3,001.04	2,928.71	J1182	20.00	17.87	20.00	2,928.71	20.05
22	☐	J1184	3,001.10	2,953.18	J1184	20.00	18.59	20.00	2,953.18	20.03
23	☐	J1186	3,001.26	2,974.97	J1186	20.00	19.24	20.00	2,974.97	20.02
24	☐	J1188	3,001.18	3,061.73	J1188	20.00	21.66	20.00	3,061.73	19.96
25	☐	J1190	3,001.55	3,013.73	J1190	20.00	20.35	20.00	3,013.74	19.99
26	☐	J1192	3,001.95	2,962.96	J1192	20.00	19.03	20.00	2,962.96	20.03
27	☐	J1194	3,001.04	2,863.56	J1194	20.00	16.38	20.00	2,862.63	20.00
28	☐	J120	3,002.73	8,455.87	J334	15.92	33.72	20.00	7,780.90	25.88
29	☐	J1200	3,000.81	6,438.83	J334	18.90	30.93	20.00	6,223.85	22.85
30	☐	J1204	3,000.79	6,858.98	J334	16.97	31.08	20.00	6,304.79	27.82
31	☐	J1224	3,002.60	4,884.92	J1228	19.53	48.64	20.00	4,860.93	20.53
32	☐	J1226	3,003.52	4,429.96	J1228	18.69	44.04	20.00	4,367.06	21.31
33	☐	J1228	3,009.38	3,330.34	J1228	20.00	28.16	20.00	3,330.34	20.00
34	☐	J1234	3,002.73	4,848.99	J1228	19.57	48.36	20.00	4,827.47	20.48
35	☐	J1244	3,000.85	3,352.03	J1250	14.22	22.00	20.00	3,094.52	26.10

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
36	☐	J1246	3,001.65	3,028.52	J1246	20.00	20.53	20.00	3,027.30	19.98
37	☐	J1248	3,003.72	3,196.04	J54	19.11	21.56	20.00	3,127.73	21.56
38	☐	J1250	3,001.97	2,797.88	J1250	20.00	14.96	20.00	2,796.89	20.00
39	☐	J1252	3,001.46	2,908.56	J1252	20.00	17.81	20.00	2,907.50	20.06
40	☐	J1254	3,003.80	2,950.73	J1254	20.00	18.76	20.00	2,949.65	20.04
41	☐	J1256	3,005.72	2,905.62	J1256	20.00	17.78	20.00	2,904.51	20.00
42	☐	J1262	3,011.35	3,193.05	J54	19.57	21.84	20.00	3,159.25	20.74
43	☐	J1268	3,010.68	4,500.61	J1904	6.06	28.90	20.00	3,733.29	34.12
44	☐	J1272	3,000.73	5,138.12	J1272	20.00	62.60	20.00	5,138.09	20.00
45	☐	J1276	3,002.67	4,980.62	J1276	20.00	61.44	20.00	4,980.63	20.00
46	☐	J1280	3,000.53	6,875.22	J2140	-12.87	37.23	20.00	4,895.81	56.23
47	☐	J1282	3,004.88	4,338.33	J1282	20.00	51.83	20.00	4,338.33	19.96
48	☐	J1284	3,000.73	6,896.64	J2140	-13.33	37.22	20.00	4,894.10	56.49
49	☐	J1286	3,002.60	6,951.94	J2140	-14.29	37.23	20.00	4,898.06	57.09
50	☐	J1292	3,005.15	6,113.02	J2140	-12.81	34.51	20.00	4,296.27	59.92
51	☐	J1298	3,001.85	6,122.77	J2140	-13.09	34.51	20.00	4,292.96	59.99
52	☐	J1306	3,009.03	6,555.50	J2140	-18.50	35.12	20.00	4,432.27	63.51
53	☐	J1310	3,002.60	6,579.71	J2140	-19.35	35.07	20.00	4,418.64	63.96
54	☐	J1316	3,000.57	6,530.61	J2140	0.86	38.66	20.00	5,230.35	46.67
55	☐	J1392	3,000.57	3,808.42	J794	19.77	42.44	20.00	3,800.93	20.24
56	☐	J1394	3,001.04	3,797.04	J1394	20.00	42.29	20.00	3,797.04	20.01
57	☐	J1396	3,003.74	2,925.12	J1998	18.65	16.74	20.00	2,866.85	21.38
58	☐	J1402	3,001.81	3,236.95	J54	17.33	20.51	20.00	3,040.98	24.35
59	☐	J1404	3,001.36	3,143.79	J1998	17.45	20.64	20.00	3,030.46	22.59
60	☐	J1406	3,003.70	2,735.42	J1406	20.00	13.13	20.00	2,734.48	20.00
61	☐	J1426	3,001.49	3,085.21	J2202	19.35	21.48	20.00	3,059.92	20.74
62	☐	J1436	3,000.26	2,854.86	J1442	19.13	13.99	20.00	2,829.71	20.87
63	☐	J1442	3,001.26	2,749.03	J1442	20.00	10.74	20.00	2,749.04	20.00
64	☐	J1448	3,000.37	2,633.25	J1448	20.00	6.73	20.00	2,633.25	20.00
65	☐	J1450	3,000.90	3,576.16	J54	13.85	21.60	20.00	3,128.54	32.24
66	☐	J1452	3,000.96	3,159.84	J54	19.60	21.60	20.00	3,128.60	20.99
67	☐	J1490	3,004.01	6,302.18	J1904	-12.48	34.15	20.00	4,442.26	60.63
68	☐	J1492	3,003.36	5,807.48	J1904	-15.13	30.83	20.00	3,967.30	59.20
69	☐	J1498	3,001.67	6,370.71	J2140	-18.80	34.43	20.00	4,280.60	63.44
70	☐	J1500	3,008.65	5,361.16	J2140	-6.04	31.61	20.00	3,923.12	47.81

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
71	☐	J1506	3,002.36	6,378.58	J2140	-17.22	34.81	20.00	4,347.91	62.76
72	☐	J1508	3,002.79	6,359.51	J2140	-17.95	34.54	20.00	4,301.36	63.03
73	☐	J1546	3,002.04	6,404.69	J334	16.13	30.19	20.00	5,728.10	27.94
74	☐	J1550	3,001.40	3,462.71	J1550	20.00	29.04	20.00	3,462.71	20.00
75	☐	J1610	3,005.53	5,708.86	J1610	20.00	63.78	20.00	5,708.86	20.00
76	☐	J1612	3,000.67	3,942.70	J1612	20.00	45.26	20.00	3,942.70	20.00
77	☐	J1678	3,000.37	4,955.45	J1678	20.00	53.73	20.00	4,955.45	19.94
78	☐	J1680	3,002.56	4,820.59	J1680	20.00	52.43	20.00	4,820.59	19.95
79	☐	J1682	3,003.11	4,617.56	J1682	20.00	50.49	20.00	4,617.57	19.95
80	☐	J1760	3,001.44	6,146.21	J2140	19.33	41.39	20.00	6,089.40	21.23
81	☐	J1762	3,001.18	3,389.69	J1762	20.00	33.08	20.00	3,389.69	20.00
82	☐	J1764	3,002.18	3,881.48	J1764	20.00	44.27	20.00	3,881.48	20.00
83	☐	J1768	3,000.67	6,754.30	J2140	-9.43	37.45	20.00	4,942.81	54.05
84	☐	J1774	3,003.99	6,360.64	J2140	7.66	39.48	20.00	5,464.90	39.50
85	☐	J1782	3,000.43	5,164.85	J2140	8.67	34.93	20.00	4,436.36	38.09
86	☐	J1784	3,000.49	4,439.06	J2256	19.57	52.71	20.00	4,423.16	20.42
87	☐	J1786	3,008.12	6,587.44	J2140	-12.49	36.31	20.00	4,695.86	59.01
88	☐	J1788	3,004.07	4,524.56	J1788	20.00	58.41	20.00	4,524.56	19.99
89	☐	J1802	3,002.18	3,792.96	J1802	20.00	36.35	20.00	3,792.96	20.00
90	☐	J1808	3,005.23	3,861.54	J1808	20.00	42.35	20.00	3,861.54	20.01
91	☐	J1810	3,002.01	3,666.04	J1810	20.00	39.59	20.00	3,666.04	20.00
92	☐	J1812	3,002.91	3,817.36	J1812	20.00	42.50	20.00	3,817.37	20.01
93	☐	J1814	3,001.65	4,005.40	J1814	20.00	44.53	20.00	4,005.40	20.01
94	☐	J1816	3,001.30	3,623.15	J2276	19.42	37.35	20.00	3,604.81	20.58
95	☐	J1822	3,002.34	3,636.16	J2276	19.44	37.63	20.00	3,618.34	20.58
96	☐	J1826	3,000.39	4,698.86	J1826	20.00	48.45	20.00	4,698.86	19.99
97	☐	J1828	3,001.06	3,307.88	J1250	14.96	21.76	20.00	3,083.13	25.37
98	☐	J1830	3,000.41	3,262.85	J1250	15.98	21.76	20.00	3,082.48	24.38
99	☐	J1834	3,004.44	3,185.49	J54	19.69	21.94	20.00	3,160.85	20.57
100	☐	J1836	3,016.68	3,067.77	J1836	20.00	21.21	20.00	3,066.73	19.96
101	☐	J1838	3,007.77	3,496.80	J54	15.64	22.00	20.00	3,170.04	27.51
102	☐	J1840	3,003.89	3,299.10	J54	18.19	21.94	20.00	3,160.05	23.10
103	☐	J1866	3,011.01	2,139.53	J1866	20.00	-17.91	20.00	2,139.53	20.00
104	☐	J1934	3,010.36	2,012.15	J1934	20.00	-35.92	20.00	2,012.15	20.00
105	☐	J1936	3,004.07	4,203.53	J1936	20.00	43.80	20.00	4,203.53	19.99

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
106	☐	J1938	3,002.26	4,562.98	J1938	20.00	47.84	20.00	4,562.98	19.98
107	☐	J1940	3,000.67	4,689.38	J1940	20.00	48.28	20.00	4,689.38	19.99
108	☐	J1944	3,002.22	4,078.55	J1552	-1.62	15.77	20.00	2,687.79	44.99
109	☐	J1946	3,006.29	3,808.00	J1552	12.57	21.59	20.00	3,159.56	31.98
110	☐	J1954	3,001.18	3,273.03	J1250	16.40	22.30	20.00	3,109.68	23.86
111	☐	J1956	3,003.50	2,363.70	J1956	20.00	-3.19	20.00	2,363.07	20.00
112	☐	J1958	3,000.00	3,171.46	J2202	14.54	19.20	20.00	2,969.85	25.65
113	☐	J1962	3,000.00	3,178.60	J2202	14.86	19.67	20.00	2,987.24	25.39
114	☐	J1968	3,002.14	2,916.86	J1968	20.00	18.11	20.00	2,915.73	20.06
115	☐	J1976	3,003.74	5,119.81	J1976	20.00	53.01	20.00	5,119.81	19.93
116	☐	J1978	3,000.59	4,998.52	J1978	20.00	53.96	20.00	4,998.52	19.94
117	☐	J1980	3,020.37	5,734.12	J1980	20.00	57.10	20.00	5,734.12	20.00
118	☐	J1996	3,001.47	2,941.86	J1998	17.83	16.36	20.00	2,849.67	22.17
119	☐	J1998	3,003.97	2,197.92	J1998	20.00	-8.14	20.00	2,197.28	20.00
120	☐	J2000	3,001.87	2,760.35	J2000	20.00	14.32	20.00	2,759.32	20.00
121	☐	J2006	3,003.87	1,557.41	J2006	20.00	-54.42	20.00	1,557.02	20.01
122	☐	J2008	3,010.54	3,111.23	J2008	20.00	22.11	20.00	3,110.04	20.00
123	☐	J2010	3,011.96	2,830.58	J2010	20.00	15.83	20.00	2,829.52	20.00
124	☐	J2024	3,006.73	2,390.63	J2024	20.00	4.47	20.00	2,389.72	20.00
125	☐	J2062	3,002.56	4,158.04	J54	6.96	22.78	20.00	3,235.70	42.08
126	☐	J2064	3,008.50	3,601.88	J54	15.29	22.78	20.00	3,241.64	30.19
127	☐	J2068	3,002.03	4,478.63	J2068	20.00	38.12	20.00	4,478.62	20.00
128	☐	J2070	3,001.57	5,199.66	J334	13.75	26.88	20.00	4,351.47	30.13
129	☐	J2072	3,001.28	5,497.79	J334	10.90	26.75	20.00	4,309.98	33.17
130	☐	J2074	3,004.52	4,054.77	J2074	20.00	35.17	20.00	4,054.78	20.00
131	☐	J2114	3,009.22	4,178.16	J2398	16.62	38.38	20.00	4,017.04	23.51
132	☐	J2122	3,001.81	3,751.14	J2122	20.00	35.09	20.00	3,751.14	19.99
133	☐	J2124	3,002.83	3,729.99	J2124	20.00	38.41	20.00	3,729.99	20.00
134	☐	J2126	3,001.87	3,808.33	J2122	19.15	35.37	20.00	3,770.00	20.85
135	☐	J2128	3,006.35	4,570.19	J2140	14.13	33.18	20.00	4,145.70	28.78
136	☐	J2130	3,005.19	4,232.17	J2122	15.35	38.58	20.00	4,013.93	24.79
137	☐	J2142	3,012.35	4,751.89	J2140	-1.15	28.09	20.00	3,577.30	41.20
138	☐	J2144	3,009.60	4,146.81	J2140	4.53	24.73	20.00	3,306.19	35.51
139	☐	J2146	3,000.14	3,483.67	J2140	18.03	25.65	20.00	3,364.80	22.30
140	☐	J2148	3,007.30	3,372.21	J2148	20.00	27.14	20.00	3,372.22	20.05

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
141	☐	J2150	3,000.73	3,539.96	J2140	17.38	25.86	20.00	3,381.33	23.17
142	☐	J2152	3,000.33	3,538.81	J2140	17.39	25.86	20.00	3,380.94	23.23
143	☐	J2154	3,001.65	3,662.05	J2140	16.15	26.44	20.00	3,428.13	24.97
144	☐	J2156	3,000.49	3,551.18	J2140	17.98	26.44	20.00	3,426.97	22.77
145	☐	J2158	3,003.54	3,697.43	J2140	16.38	26.99	20.00	3,474.25	24.72
146	☐	J2160	3,001.75	3,345.65	J2160	20.00	27.89	20.00	3,345.65	20.06
147	☐	J2162	3,008.14	5,963.31	J2140	-8.78	34.46	20.00	4,326.54	53.79
148	☐	J2198	3,002.24	3,501.71	J54	15.46	21.98	20.00	3,162.40	27.93
149	☐	J22	3,003.11	5,839.29	J1424	8.78	42.24	20.00	5,097.87	35.42
150	☐	J2200	3,003.66	2,741.51	J2200	20.00	11.21	20.00	2,740.80	20.00
151	☐	J2202	3,003.03	2,219.40	J2202	20.00	-11.47	20.00	2,218.84	20.00
152	☐	J2204	3,000.00	3,112.50	J2202	15.23	18.33	20.00	2,937.60	24.81
153	☐	J2206	3,000.79	2,477.36	J2202	19.13	0.86	20.00	2,449.39	20.87
154	☐	J2208	3,002.99	2,344.15	J2208	20.00	-4.43	20.00	2,343.54	20.00
155	☐	J2210	3,002.44	2,426.48	J2210	20.00	-0.73	20.00	2,425.84	20.00
156	☐	J2224	3,008.93	5,736.54	J2224	20.00	61.59	20.00	5,736.54	19.98
157	☐	J2228	3,001.32	4,647.29	J2234	18.90	65.97	20.00	4,616.50	21.10
158	☐	J2230	3,000.57	4,475.81	J2230	20.00	63.18	20.00	4,475.82	20.00
159	☐	J2232	3,000.88	4,585.01	J2234	18.52	64.79	20.00	4,544.14	21.48
160	☐	J2234	3,001.73	3,564.40	J2234	20.00	42.40	20.00	3,564.40	20.02
161	☐	J2238	3,004.99	4,778.60	J2238	20.00	55.81	20.00	4,778.60	20.12
162	☐	J2240	3,008.95	4,977.76	J2240	20.00	58.78	20.00	4,977.76	20.00
163	☐	J2248	3,001.40	1,577.26	J2248	20.00	-127.98	20.00	1,577.26	20.00
164	☐	J2250	3,000.41	3,403.32	J2250	20.00	32.92	20.00	3,403.32	20.00
165	☐	J2252	3,000.88	5,709.37	J2252	20.00	64.07	20.00	5,709.37	20.00
166	☐	J2254	3,000.26	4,160.44	J2256	19.21	48.50	20.00	4,133.16	20.78
167	☐	J2260	3,000.55	5,750.43	J2140	-1.94	34.93	20.00	4,436.48	48.99
168	☐	J2272	3,000.00	1,842.32	J2272	20.00	-26.24	20.00	1,841.79	20.00
169	☐	J2276	3,003.68	3,290.26	J2276	20.00	29.32	20.00	3,290.26	19.98
170	☐	J2280	3,000.57	3,328.98	J2280	20.00	30.99	20.00	3,328.98	19.98
171	☐	J2284	3,001.30	3,202.38	J2284	20.00	26.94	20.00	3,202.38	20.00
172	☐	J2288	3,001.04	3,546.07	J2276	18.91	35.22	20.00	3,512.33	20.99
173	☐	J2290	3,002.40	3,395.31	J2290	20.00	32.44	20.00	3,395.30	19.95
174	☐	J2296	3,000.65	3,166.47	J2296	20.00	25.87	20.00	3,166.47	20.01
175	☐	J2300	3,001.08	3,834.92	J2300	20.00	42.52	20.00	3,834.92	20.01

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
176	☐	J2304	3,007.02	4,879.79	J2304	20.00	57.40	20.00	4,879.79	20.00
177	☐	J2306	3,008.89	4,801.28	J2306	20.00	54.83	20.00	4,801.28	20.00
178	☐	J2314	3,004.48	6,614.72	J334	16.72	30.63	20.00	6,010.86	27.35
179	☐	J2340	3,001.00	3,732.19	J54	11.82	21.80	20.00	3,145.80	35.33
180	☐	J2348	3,001.67	4,204.39	J2476	19.34	35.77	20.00	4,161.70	20.66
181	☐	J2350	3,001.49	8,233.29	J334	7.68	31.32	20.00	6,668.17	34.68
182	☐	J2354	3,005.33	5,775.79	J334	19.16	30.02	20.00	5,624.81	22.01
183	☐	J2356	3,002.93	8,255.74	J334	5.34	31.07	20.00	6,380.55	38.41
184	☐	J2358	3,001.30	6,898.16	J334	19.86	32.28	20.00	6,873.57	20.36
185	☐	J2360	3,004.44	4,782.05	J2360	20.00	44.36	20.00	4,782.05	20.01
186	☐	J2368	3,001.59	3,272.09	J54	16.55	20.28	20.00	3,022.47	24.64
187	☐	J2370	3,001.06	4,820.12	J642	18.66	53.63	20.00	4,763.05	21.28
188	☐	J2372	3,000.87	7,299.08	J334	13.99	30.98	20.00	6,258.36	32.84
189	☐	J2398	3,026.59	3,741.67	J2398	20.00	34.43	20.00	3,741.67	20.00
190	☐	J24	3,003.13	3,828.83	J24	20.00	42.48	20.00	3,828.83	20.00
191	☐	J2400	3,001.20	3,558.72	J2276	19.69	36.08	20.00	3,548.90	20.32
192	☐	J2422	3,000.20	6,620.16	J2140	-20.04	35.12	20.00	4,424.57	64.42
193	☐	J2430	3,001.16	3,185.98	J54	18.10	20.58	20.00	3,045.21	22.75
194	☐	J2476	3,004.03	2,005.44	J2476	20.00	-18.53	20.00	2,005.44	19.99
195	☐	J2492	3,000.08	3,257.91	J54	17.61	21.02	20.00	3,079.36	25.22
196	☐	J2512	3,000.00	3,250.45	J54	14.90	18.58	20.00	2,898.75	25.83
197	☐	J26	3,001.89	6,459.52	J2140	15.86	41.47	20.00	6,114.18	26.96
198	☐	J260	3,001.32	4,249.39	J260	20.00	36.92	20.00	4,249.39	20.00
199	☐	J262	3,002.77	3,029.51	J262	20.00	20.57	20.00	3,029.51	20.04
200	☐	J264	3,001.49	3,987.10	J54	8.63	22.24	20.00	3,184.77	38.47
201	☐	J266	3,002.04	4,317.54	J54	5.47	23.30	20.00	3,285.73	45.50
202	☐	J274	3,000.90	3,355.09	J274	20.00	28.08	20.00	3,355.08	20.03
203	☐	J276	3,004.40	1,997.30	J276	20.00	-15.67	20.00	1,997.30	20.00
204	☐	J28	3,002.77	5,131.51	J28	20.00	58.76	20.00	5,131.51	20.00
205	☐	J30	3,001.12	6,214.15	J1424	11.98	44.90	20.00	5,665.29	31.17
206	☐	J316	3,006.35	2,902.18	J316	20.00	17.63	20.00	2,902.19	20.00
207	☐	J32	3,000.90	5,718.86	J32	20.00	61.74	20.00	5,718.86	20.00
208	☐	J326	3,000.24	6,662.08	J334	9.15	28.93	20.00	5,079.74	35.89
209	☐	J360	3,001.46	2,049.65	J334	12.34	-9.30	20.00	1,612.71	27.67
210	☐	J374	3,001.59	3,788.40	J374	20.00	33.53	20.00	3,788.40	20.00

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
211	☐	J376	3,003.21	3,919.17	J400	19.41	33.16	20.00	3,883.68	20.59
212	☐	J378	3,002.52	4,373.77	J408	17.59	37.91	20.00	4,231.41	22.45
213	☐	J388	3,000.71	4,189.11	J408	18.04	36.49	20.00	4,077.29	21.96
214	☐	J392	3,001.83	6,606.85	J334	9.04	28.80	20.00	5,025.32	36.01
215	☐	J400	3,000.73	2,764.92	J400	20.00	14.32	20.00	2,764.92	20.00
216	☐	J406	3,000.22	2,875.61	J408	18.83	15.63	20.00	2,829.02	21.17
217	☐	J408	3,003.44	2,113.08	J408	20.00	-14.84	20.00	2,113.08	20.00
218	☐	J414	3,000.98	2,642.03	J414	20.00	9.50	20.00	2,642.03	20.00
219	☐	J42	3,001.22	3,551.69	J50	18.71	29.17	20.00	3,488.17	21.44
220	☐	J422	3,000.51	3,016.16	J408	19.04	19.41	20.00	2,975.68	20.93
221	☐	J432	3,003.66	6,285.45	J432	20.00	54.83	20.00	6,285.46	20.00
222	☐	J436	3,002.14	6,580.09	J334	18.08	30.88	20.00	6,211.31	24.55
223	☐	J438	3,001.20	3,973.14	J438	20.00	35.86	20.00	3,973.14	20.00
224	☐	J444	3,001.85	6,583.72	J334	18.17	30.91	20.00	6,230.88	24.37
225	☐	J446	3,000.88	4,458.90	J454	19.46	44.04	20.00	4,431.82	20.54
226	☐	J448	3,001.63	4,495.47	J448	20.00	46.82	20.00	4,495.47	19.99
227	☐	J450	3,001.65	4,416.55	J454	18.14	42.96	20.00	4,325.67	21.85
228	☐	J454	3,004.48	2,360.03	J454	20.00	-5.83	20.00	2,360.03	20.00
229	☐	J464	3,003.56	4,363.99	J464	20.00	46.21	20.00	4,363.99	20.00
230	☐	J468	3,002.73	8,500.19	J334	15.45	33.70	20.00	7,753.23	26.45
231	☐	J472	3,001.87	4,069.96	J1552	-1.93	15.52	20.00	2,672.39	44.95
232	☐	J48	3,011.13	5,246.88	J54	11.42	29.97	20.00	4,348.63	29.49
233	☐	J500	3,001.73	7,479.70	J334	14.47	31.71	20.00	6,629.23	32.51
234	☐	J504	3,001.87	7,693.38	J334	12.83	31.68	20.00	6,612.57	34.12
235	☐	J510	3,002.42	6,907.91	J334	18.36	31.76	20.00	6,641.36	24.37
236	☐	J512	3,002.08	8,093.98	J334	8.21	31.53	20.00	6,518.45	39.97
237	☐	J514	3,002.46	6,948.51	J334	18.73	32.02	20.00	6,738.99	23.20
238	☐	J516	3,005.88	3,195.97	J516	20.00	25.69	20.00	3,195.97	20.00
239	☐	J518	3,000.88	8,345.30	J334	4.89	31.45	20.00	6,472.30	43.24
240	☐	J520	3,005.13	8,394.17	J334	1.49	30.82	20.00	6,125.55	43.62
241	☐	J522	3,005.23	8,373.48	J334	2.05	30.85	20.00	6,163.50	42.49
242	☐	J526	3,002.22	7,199.17	J334	10.77	30.18	20.00	5,715.35	35.29
243	☐	J528	3,002.60	6,703.57	J334	18.02	31.20	20.00	6,339.72	25.06
244	☐	J530	3,001.65	7,123.39	J334	15.79	31.28	20.00	6,391.59	29.33
245	☐	J532	3,005.15	3,502.35	J532	20.00	30.79	20.00	3,502.35	20.00

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
246	☐	J534	3,005.47	8,231.83	J334	4.63	30.97	20.00	6,266.57	40.13
247	☐	J542	3,001.18	8,248.34	J334	5.41	31.07	20.00	6,378.79	38.36
248	☐	J544	3,003.40	8,403.85	J334	4.24	31.13	20.00	6,508.11	38.67
249	☐	J554	3,005.58	3,080.21	J334	17.61	18.31	20.00	2,818.35	24.53
250	☐	J564	3,002.32	8,205.78	J334	7.81	31.30	20.00	6,657.91	34.56
251	☐	J568	3,005.49	1,911.62	J568	20.00	-28.90	20.00	1,911.62	19.99
252	☐	J574	3,002.89	6,847.94	J334	19.38	32.03	20.00	6,743.96	21.55
253	☐	J578	3,000.20	6,924.96	J334	19.65	32.27	20.00	6,864.94	20.87
254	☐	J580	3,004.35	4,781.73	J580	20.00	44.36	20.00	4,781.74	20.01
255	☐	J586	3,002.20	7,205.30	J334	16.66	31.86	20.00	6,674.51	27.51
256	☐	J588	3,002.71	5,512.87	J588	20.00	51.42	20.00	5,512.87	20.00
257	☐	J592	3,001.99	8,053.87	J334	8.98	31.60	20.00	6,561.20	38.83
258	☐	J594	3,004.07	8,051.02	J334	7.18	31.14	20.00	6,313.30	40.43
259	☐	J598	3,004.86	4,342.04	J598	20.00	45.45	20.00	4,342.04	19.94
260	☐	J600	3,005.96	5,355.76	J600	20.00	52.13	20.00	5,355.75	20.00
261	☐	J602	3,005.21	7,079.91	J334	15.54	31.07	20.00	6,288.92	30.49
262	☐	J604	3,002.83	7,691.55	J334	10.62	30.92	20.00	6,203.90	36.76
263	☐	J606	3,011.64	7,211.13	J334	15.48	31.16	20.00	6,401.31	31.59
264	☐	J608	3,011.90	6,864.12	J334	17.55	31.14	20.00	6,402.59	26.58
265	☐	J610	3,005.74	6,580.62	J334	19.23	31.16	20.00	6,426.28	22.22
266	☐	J614	3,001.40	7,185.03	J334	10.84	30.18	20.00	5,710.66	35.21
267	☐	J616	3,002.54	6,100.39	J616	20.00	52.31	20.00	6,100.36	20.00
268	☐	J622	3,002.20	7,138.46	J334	15.00	30.97	20.00	6,250.45	31.22
269	☐	J626	3,004.72	6,592.44	J334	18.88	31.19	20.00	6,382.70	23.46
270	☐	J628	3,004.88	7,453.34	J334	13.27	31.21	20.00	6,370.12	34.86
271	☐	J630	3,002.56	6,596.85	J334	18.48	31.08	20.00	6,305.16	24.30
272	☐	J634	3,004.01	7,191.23	J334	15.14	31.17	20.00	6,352.23	32.03
273	☐	J640	3,000.53	5,014.52	J656	17.54	55.21	20.00	4,910.96	22.35
274	☐	J642	3,002.54	3,789.92	J642	20.00	40.30	20.00	3,789.92	20.00
275	☐	J644	3,001.34	7,439.10	J334	15.29	31.93	20.00	6,700.77	30.44
276	☐	J646	3,001.28	4,751.23	J646	20.00	51.06	20.00	4,751.24	19.95
277	☐	J648	3,007.77	6,676.86	J648	20.00	58.77	20.00	6,676.84	20.00
278	☐	J652	3,001.77	7,279.89	J334	16.05	31.81	20.00	6,657.28	29.22
279	☐	J654	3,000.98	5,012.49	J656	17.46	55.15	20.00	4,905.40	22.44
280	☐	J656	3,007.69	3,365.47	J656	20.00	30.95	20.00	3,365.47	20.00

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
281	☐	J666	3,001.34	3,299.87	J668	18.51	27.53	20.00	3,252.23	21.49
282	☐	J668	3,003.01	1,976.25	J668	20.00	-43.98	20.00	1,976.25	20.01
283	☐	J670	3,001.46	7,485.65	J334	14.44	31.71	20.00	6,630.24	32.61
284	☐	J672	3,002.79	5,138.05	J672	20.00	55.65	20.00	5,138.05	20.00
285	☐	J688	3,002.04	3,454.65	J688	20.00	33.31	20.00	3,454.65	20.00
286	☐	J690	3,001.67	5,297.58	J690	20.00	59.46	20.00	5,297.58	20.00
287	☐	J694	3,001.93	2,436.91	J694	20.00	-6.16	20.00	2,436.91	20.00
288	☐	J726	3,006.84	4,264.23	J726	20.00	44.45	20.00	4,264.23	19.99
289	☐	J756	3,004.48	4,132.70	J756	20.00	45.79	20.00	4,132.71	20.01
290	☐	J76	3,002.20	4,394.99	J76	20.00	46.56	20.00	4,394.99	20.00
291	☐	J770	3,001.65	3,917.99	J770	20.00	44.51	20.00	3,917.99	20.01
292	☐	J78	3,005.13	5,063.37	J78	20.00	53.94	20.00	5,063.37	20.09
293	☐	J786	3,000.79	3,845.35	J786	20.00	42.68	20.00	3,845.35	20.01
294	☐	J796	3,000.00	4,181.30	J1222	16.25	48.69	20.00	4,062.79	23.78
295	☐	J800	3,001.32	4,787.47	J1576	16.77	62.30	20.00	4,687.13	23.43
296	☐	J802	3,002.48	4,789.78	J1576	16.70	62.28	20.00	4,687.17	23.49
297	☐	J808	3,001.32	1,812.67	J808	20.00	-75.80	20.00	1,812.67	19.98
298	☐	J830	3,002.54	6,524.08	J2140	-8.89	36.73	20.00	4,787.67	55.94
299	☐	J832	3,000.06	6,253.49	J2140	-15.90	34.51	20.00	4,291.17	61.92
300	☐	J834	3,001.55	5,797.37	J2140	-6.02	34.12	20.00	4,292.06	51.69
301	☐	J836	3,001.63	5,839.69	J2140	-0.54	35.70	20.00	4,587.35	47.98
302	☐	J84	3,004.56	5,364.29	J84	20.00	64.14	20.00	5,364.30	20.00
303	☐	J848	3,000.33	6,101.30	J1424	6.47	43.00	20.00	5,232.33	38.36
304	☐	J850	3,001.04	6,457.46	J2140	15.76	41.45	20.00	6,104.56	27.13
305	☐	J852	3,000.08	6,139.40	J1424	11.22	44.39	20.00	5,540.21	32.14
306	☐	J854	3,001.24	6,982.53	J2140	-8.44	38.36	20.00	5,155.04	54.35
307	☐	J856	3,002.85	5,221.55	J856	20.00	66.32	20.00	5,221.55	20.00
308	☐	J858	3,001.47	5,127.87	J858	20.00	61.15	20.00	5,127.82	20.00
309	☐	J86	3,004.17	7,814.00	J334	11.12	31.25	20.00	6,428.96	39.39
310	☐	J860	3,001.08	5,151.93	J860	20.00	63.39	20.00	5,151.94	20.00
311	☐	J862	3,001.95	3,767.38	J862	20.00	42.55	20.00	3,767.38	20.00
312	☐	J866	3,001.44	6,163.99	J2140	6.64	38.67	20.00	5,229.91	39.75
313	☐	J868	3,001.20	6,318.85	J2140	17.20	41.40	20.00	6,084.26	24.89
314	☐	J870	3,000.28	6,240.19	J2140	18.20	41.39	20.00	6,088.24	23.23
315	☐	J872	3,001.97	5,752.16	J872	20.00	64.53	20.00	5,752.17	20.00

		ID	Total Demand (gpm)	Hydrant Available Flow (gpm)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (psi)	Critical Node Pressure at Fire Demand (psi)	Critical Pressure for Design Run (psi)	Hydrant Design Flow (gpm)	Hydrant Pressure at Design Flow (psi)
316	☐	J876	3,001.18	6,060.90	J2140	9.87	39.03	20.00	5,329.16	36.63
317	☐	J878	3,000.35	6,981.75	J2140	-8.44	38.36	20.00	5,154.12	54.35
318	☐	J880	3,001.83	6,018.03	J1424	13.10	44.57	20.00	5,556.71	30.94
319	☐	J882	3,002.60	5,780.32	J1424	12.88	43.30	20.00	5,294.76	31.14
320	☐	J884	3,001.18	5,747.98	J2140	15.51	39.31	20.00	5,408.93	28.29
321	☐	J886	3,001.12	5,440.80	J886	20.00	67.61	20.00	5,440.80	20.00
322	☐	J888	3,002.06	5,280.58	J888	20.00	65.89	20.00	5,280.57	20.01
323	☐	J890	3,000.85	5,795.56	J1424	12.41	43.24	20.00	5,280.09	31.64
324	☐	J892	3,001.26	6,982.19	J2140	-9.78	38.13	20.00	5,098.63	55.24
325	☐	J898	3,002.50	6,217.97	J1424	11.01	44.87	20.00	5,617.14	33.73
326	☐	J92	3,001.83	7,121.21	J334	10.73	30.06	20.00	5,641.88	35.38
327	☐	J924	3,001.12	6,136.05	J1424	9.77	43.98	20.00	5,447.76	33.80
328	☐	J926	3,000.22	6,216.67	J1424	4.12	42.91	20.00	5,214.28	40.67
329	☐	J94	3,001.79	6,772.89	J334	9.12	29.11	20.00	5,164.09	35.95
330	☐	J956	3,001.26	6,167.84	J1424	5.15	42.95	20.00	5,223.73	39.71
331	☐	J96	3,002.14	6,566.30	J334	15.72	30.32	20.00	5,812.57	28.66

APPENDIX L

DETAILED CIP PROJECT COST ESTIMATES

City of Sequim **7/13/2022**

Booster Station 1 Project
Preliminary Project Cost Estimate

Prepared by: **Brian Smith, PE, Wilson Engineering LLC**

Wilson Job No.: **2020-016**

Preliminary Cost Estimate - Closed zone booster station to provide fire and domestic flow and pressure to new 635 HGL pressure zone

Item Description	Quantity	Unit	2022 Unit Price	Construction Year 2022 Amount
CONSTRUCTION				
a. Mobilization	1	LS	$ 87,870	**$ 87,870**
b. Temporary Erosion and Sediment Control	1	LS	$ 8,700	**$ 8,700**
c. Booster Station Improvements				
Pre-packaged Booster Pump System, with Enclosure and Controls - Capable of providing at least 215 ft of head (after station headlosses) at 1457 gpm minimum with largest pump out of service	1	EA	$520,000	$ 520,000
Clearing and grubbing	1	LS	$ 10,000	$ 10,000
Site earthwork/grading	1	LS	$ 20,000	$ 20,000
Site piping	1	LS	$ 20,000	$ 20,000
New 3 phase electrical service	1	LS	$100,000	$ 100,000
Generator with automatic transfer switch	1	LS	$150,000	$ 150,000
Electrical connections, telemetry and system integration	1	LS	$ 50,000	$ 50,000
Subtotal				**$ 870,000**
SUMMARY				
Subtotal				$ 966,570
Contingencies	25%			$ 241,600
Sales Tax	8.8%			$ 106,319
Preliminary Estimated Construction Costs				**$ 1,315,000**
Permit Fees	2%			$ 26,000
DOH Project Report				$ 35,000
Topographic Survey	2%			$ 27,000
Geotechnical Investigation				$ 10,000
Engineering Design	10%			$ 131,500
Construction Phase Engineering/Inspection	10%			$ 131,500
Construction Phase Surveying	1%			$ 14,000
TOTAL PROJECT ESTIMATED COST				**$ 1,700,000**

Figure L-1

New Booster Pump Station at City-owned Reservoir Road site

PRV

Potential PRV(s)

Highest elevation served: approximately 539 ft

Potential PRV(s)

Black boundary = ultimate potential service area for new booster pump station (includes Emerald Highlands area [lower zone served through PRV]). Build-out ERUs ~1671

0 250 500 1,000 1,500 2,000 2,500 Feet

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

SHEET 1	OF 1	
DATE March 2022	SCALE AS SHOWN	PROJECT 2020-016

City of Sequim

WASHINGTON

CLALLAM COUNTY

POTENTIAL NEW PRESSURE ZONE FED BY BPS

APPROXIMATELY 1671 POTENTIAL PARCELS

WILSON ENGINEERING

City of Sequim **6/29/2022**

Source 4 Project
Preliminary Project Cost Estimate

Prepared by: **Brian Smith, PE, Wilson Engineering LLC**

Wilson Job No.: **2020-016**

Preliminary Cost Estimate - Add flow control valve in new vault for automatic and remote control of infiltration gallery flow rate

Item Description	Quantity	Unit	2022 Unit Price	Construction Year 2022 Amount
CONSTRUCTION				
a. Mobilization	1	LS	$ 11,312	**$ 11,312**
b. Temporary Erosion and Sediment Control	1	LS	$ 1,120	**$ 1,120**
c. Flow Control Valve Improvements				
6-inch globe valve, configured for Rate of Flow Control, with automatic control	1	EA	$ 10,000	$ 10,000
New vault for flow control valve, at Reservoir Road site	1	LS	$ 50,000	$ 50,000
6-inch gate valve for isolation of flow control valve	2	EA	$ 3,500	$ 7,000
Telemetry, SCADA programming	1	LS	$ 30,000	$ 30,000
Piping, fittings, disinfection, commissioning	1	LS	$ 15,000	$ 15,000
Subtotal				**$ 112,000**
SUMMARY				
Subtotal				$ 124,432
Contingencies	25%			$ 31,100
Sales Tax	8.8%			$ 13,687
Preliminary Estimated Construction Costs				**$ 170,000**
Permit Fees	2%			$ 3,000
DOH Project Report				$ 20,000
Topographic Survey	2%			$ 4,000
Engineering Design	10%			$ 17,000
Construction Phase Engineering/Inspection	10%			$ 17,000
Construction Phase Surveying	1%			$ 2,000
TOTAL PROJECT ESTIMATED COST				**$ 240,000**

City of Sequim **7/13/2022**

Distribution 21 Project
Preliminary Project Cost Estimate

Prepared by: **Brian Smith, PE, Wilson Engineering LLC**

Wilson Job No.: **2020-016**

Preliminary Cost Estimate - New piping to connect new booster station to Emerald Highlands and west

Item Description	Quantity	Unit	2022 Unit Price	Construction Year 2022 Amount
CONSTRUCTION				
a. Mobilization	1	LS	$ 181,346	**$ 181,346**
b. Temporary Erosion and Sediment Control	1	LS	$ 17,955	**$ 17,955**
c. Distribution System Improvements				
12-inch Water main, installed	4600	LF	$ 150	$ 690,000
Utility Bridge to cross Bell Creek, 8' wide by 240' long, installed	1	LS	$ 960,000	$ 960,000
12-inch gate valves	3	EA	$ 3,500	$ 10,500
HMA restoration	300	TON	$ 400	$ 120,000
Traffic control	1	LS	$ 15,000	$ 15,000
Subtotal				**$ 1,795,500**
SUMMARY				
Subtotal				$ 1,994,801
Contingencies	20%			$ 399,000
Sales Tax	8.8%			$ 210,654
Preliminary Estimated Construction Costs				**$ 2,605,000**
Permit Fees	1%			$ 26,000
Topographic Survey	2%			$ 53,000
Engineering Design	10%			$ 260,500
Construction Phase Engineering/Inspection	10%			$ 260,500
Construction Phase Surveying	1%			$ 27,000
TOTAL PROJECT ESTIMATED COST				**$ 3,240,000**

APPENDIX M

SEPA DOCUMENTATION

Contents:

- Checklist
- Determination (DNS)
- No Comments Received

ENVIRONMENTAL REVIEW PACKET AND CHECKLIST
PROJECTS SUBJECT TO DESIGN REVIEW

SEPA ENVIRONMENTAL CHECKLIST

Purpose of checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

***Instructions for applicants*:**

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Instructions for Lead Agencies:
Please adjust the format of this template as needed. Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

Use of checklist for nonproject proposals: [help]

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (part D). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in Part B - Environmental Elements –that do not contribute meaningfully to the analysis of the proposal.

A. Background [help]

1. Name of proposed project, if applicable: [help]

CITY OF SEQUIM 2022 WATER SYSTEM PLAN UPDATE, PRELIMINARY REVIEW DRAFT

2. Name of applicant: [help]

CITY OF SEQUIM

3. Address and phone number of applicant and contact person: [help]

SEQUIM PUBLIC WORKS
152 W CEDAR ST.
SEQUIM, WA 98382

CONTACT: ANN SOULE, 360-912-1635
PETE TJEMSLAND, 360-681-6607

4. Date checklist prepared: [help]

JULY 11, 2022

5. Agency requesting checklist: [help]

CITY OF SEQUIM

6. Proposed timing or schedule (including phasing, if applicable): [help]

PLAN APPROVAL PROCESS WILL EXTEND THROUGH 2022 AND POTENTIALLY INTO 2023

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain. [help]

WATER SYSTEM PLAN UPDATES ARE REQUIRED BY WA STATE DEPT. OF HEALTH EVERY TEN YEARS (DUE IN 2032)

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal. [help]

PERTINENT INFORMATION IS INCLUDED IN THE DRAFT PLAN DOCUMENT AND APPENDIX

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain. [help]

DOES NOT APPLY

10. List any government approvals or permits that will be needed for your proposal, if known. [help]

A. APPROVAL OF PRELIMINARY REVIEW DRAFT BY SEQUIM PLANNING COMMISSION AND CITY COUNCIL (expected July-August 2022)
B. CONDITIONAL APPROVAL BY WA STATE DEPARTMENT OF HEALTH, WHICH INCLUDES REVIEW AND CONCURRENCE BY WA STATE DEPARTMENT OF ECOLOGY (expected August-November 2022)
C. ADOPTION OF FINAL DRAFT BY SEQUIM CITY COUNCIL (expected December 2022)
D. FINAL APPROVAL BY WA STATE DEPARTMENT OF HEALTH (expected January 2023)

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.) [help]

A PRELIMINARY REVIEW DRAFT "WATER SYSTEM PLAN UPDATE" PROVIDES CURRENT DATA AND ANALYSES BY WHICH THE COMMUNITY AND AGENCIES CAN EVALUATE COMPLETENESS AND ADEQUACY FOR MAINTAINING THE CITY'S PERMITTED STATUS AS A MUNICIPAL WATER PURVEYOR. AN IMPORTANT ELEMENT OF THE PLAN IS THE CAPITAL IMPROVEMENT PROGRAM IN CHAPTER 8, WHICH LISTS THE CONSTRUCTION PROJECTS NEEDED.

INDIVIDUAL CAPITAL PROJECTS MAY OR MAY NOT NEED TO SUBMIT A SEPA CHECKLIST; NOTE THAT WATER LINES 12 INCHES OR LESS IN DIAMETER ARE CATEGORICALLY EXEMPT UNDER WAC 197-11-800.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist. [help]

CITY OF SEQUIM WATER SERVICE AREA INCLUDES CITY LIMITS EXCEPT THOSE AREAS SERVED BY PUD NO. 1 OF CLALLAM COUNTY OR PRIVATE WATER SYSTEMS. FIGURE 1-7 IN THE PLAN SHOWS THE WATER SERVICE AREA.

B. ENVIRONMENTAL ELEMENTS [help]

1. Earth [help]

a. General description of the site: [help]

DOES NOT APPLY

(check one): ☐ Flat, ☐ rolling, ☐ hilly, ☐ steep slopes, ☐ mountainous, ☐ other _____

b. What is the steepest slope on the site (approximate percent slope)? [help]

DOES NOT APPLY

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils. [help]

DOES NOT APPLY

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

DOES NOT APPLY

[help]

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill. [help]

DOES NOT APPLY

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe. [help]

DOES NOT APPLY

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)? [help]

DOES NOT APPLY

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any: [help]

DOES NOT APPLY

2. Air [help]

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known. [help]

DOES NOT APPLY

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe. [help]

DOES NOT APPLY

c. Proposed measures to reduce or control emissions or other impacts to air, if any: [help]

DOES NOT APPLY

3. Water [help]

a. Surface Water:

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

DOES NOT APPLY

[help]

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans. [help]

DOES NOT APPLY

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material. [help]

DOES NOT APPLY

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known. [help]

DOES NOT APPLY

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan. [help]

DOES NOT APPLY

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge. [help]

DOES NOT APPLY

b. Ground Water:

1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known. [help]

DOES NOT APPLY

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve. [help]

DOES NOT APPLY

c. Water runoff (including stormwater):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe. [help]

DOES NOT APPLY

2) Could waste materials enter ground or surface waters? If so, generally describe. [help]

DOES NOT APPLY

3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe. [help]

DOES NOT APPLY

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any: [help]

DOES NOT APPLY

4. Plants [help]

a. Check the types of vegetation found on the site: [help] DOES NOT APPLY

- ☐ deciduous tree: alder, maple, aspen, other
- ☐ evergreen tree: fir, cedar, pine, other
- ☐ shrubs
- ☐ grass
- ☐ pasture
- ☐ crop or grain
- ☐ Orchards, vineyards or other permanent crops.
- ☐ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
- ☐ water plants: water lily, eelgrass, milfoil, other
- ☐ other types of vegetation

b. What kind and amount of vegetation will be removed or altered? [help]

DOES NOT APPLY

c. List threatened and endangered species known to be on or near the site.

DOES NOT APPLY

[help]

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any: [help]

DOES NOT APPLY

e. List all noxious weeds and invasive species known to be on or near the site. [help]

DOES NOT APPLY

5. Animals [help]

a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site. [help]

Examples include:

birds: hawk, heron, eagle, songbirds, other:
mammals: deer, bear, elk, beaver, other:
fish: bass, salmon, trout, herring, shellfish, other _____

DOES NOT APPLY

b. List any threatened and endangered species known to be on or near the site. [help]

DOES NOT APPLY

c. Is the site part of a migration route? If so, explain. [help]

DOES NOT APPLY

d. Proposed measures to preserve or enhance wildlife, if any: [help]

DOES NOT APPLY

e. List any invasive animal species known to be on or near the site. [help]

DOES NOT APPLY

6. Energy and Natural Resources [help]

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc. [help]

DOES NOT APPLY

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe. [help]

DOES NOT APPLY

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any: [help]

DOES NOT APPLY

7. Environmental Health [help]

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe. [help]

DOES NOT APPLY

1) Describe any known or possible contamination at the site from present or past uses. [help]

DOES NOT APPLY

2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity. [help]

DOES NOT APPLY

3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project. [help]

DOES NOT APPLY

4) Describe special emergency services that might be required. [help]

DOES NOT APPLY

5) Proposed measures to reduce or control environmental health hazards, if any: [help]

DOES NOT APPLY

b. Noise [help]

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

DOES NOT APPLY [help]

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site. [help]

DOES NOT APPLY

3) Proposed measures to reduce or control noise impacts, if any: [help]

DOES NOT APPLY

8. Land and Shoreline Use [help]

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe. [help]

DOES NOT APPLY

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use? [help]

DOES NOT APPLY

1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how: [help]

DOES NOT APPLY

c. Describe any structures on the site. [help]

DOES NOT APPLY

d. Will any structures be demolished? If so, what? [help]

DOES NOT APPLY

e. What is the current zoning classification of the site? [help]

DOES NOT APPLY

f. What is the current comprehensive plan designation of the site?

DOES NOT APPLY [help]

g. If applicable, what is the current shoreline master program designation of the site? [help]

DOES NOT APPLY

h. Has any part of the site been classified as a critical area by the city or county? If so, specify. [help]

DOES NOT APPLY

i. Approximately how many people would reside or work in the completed project? [help]

DOES NOT APPLY

j. Approximately how many people would the completed project displace? [help]

DOES NOT APPLY

k. Proposed measures to avoid or reduce displacement impacts, if any: [help]

DOES NOT APPLY

L. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any: [help]

DOES NOT APPLY

m. Proposed measures to reduce or control impacts to agricultural and forest lands of long-term commercial significance, if any: [help]

DOES NOT APPLY

9. Housing [help]

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing. [help]

DOES NOT APPLY

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing. [help]

DOES NOT APPLY

c. Proposed measures to reduce or control housing impacts, if any:

DOES NOT APPLY [help]

10. Aesthetics [help]

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed? [help]

DOES NOT APPLY

b. What views in the immediate vicinity would be altered or obstructed? [help]

DOES NOT APPLY

c. Proposed measures to reduce or control aesthetic impacts, if any: [help]

DOES NOT APPLY

11. Light and Glare [help]

a. What type of light or glare will the proposal produce? What time of day would it mainly occur? [help]

DOES NOT APPLY

b. Could light or glare from the finished project be a safety hazard or interfere with views? [help]

DOES NOT APPLY

c. What existing off-site sources of light or glare may affect your proposal? [help]

DOES NOT APPLY

d. Proposed measures to reduce or control light and glare impacts, if any: [help]

DOES NOT APPLY

12. Recreation [help]

a. What designated and informal recreational opportunities are in the immediate vicinity? [help]

DOES NOT APPLY

b. Would the proposed project displace any existing recreational uses? If so, describe.

DOES NOT APPLY [help]

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any: [help]

DOES NOT APPLY

13. Historic and cultural preservation [help]

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers ? If so, specifically describe. [help]

DOES NOT APPLY

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources. [help]

DOES NOT APPLY

c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc. [help]

DOES NOT APPLY

d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required. [help]

DOES NOT APPLY

14. Transportation [help]

a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any. [help]

DOES NOT APPLY

b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop?

DOES NOT APPLY [help]

c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate? [help]

DOES NOT APPLY

d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private). [help]

DOES NOT APPLY

e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe. [help]

DOES NOT APPLY

f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates? [help]

DOES NOT APPLY

g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe. [help]

DOES NOT APPLY

h. Proposed measures to reduce or control transportation impacts, if any: [help]

DOES NOT APPLY

15. Public Services [help]

a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe. [help]

DOES NOT APPLY

b. Proposed measures to reduce or control direct impacts on public services, if any.

DOES NOT APPLY
[help]

16. Utilities [help]

a. Check the utilities currently available at the site: [help]
☐ electricity, ☐ natural gas, ☐ water, ☐ refuse service, ☐ telephone, ☐ sanitary sewer, ☐ septic system, ☐ other _____

DOES NOT APPLY

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed. [help]

DOES NOT APPLY

C. Signature [help]

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

I certify under penalty of perjury under the laws of the State of Washington that the foregoing is true and correct.

Signature: Ann Soule

Printed name: Ann Soule

Position and Agency/Organization Resource Manager, Sequim Public Works

Date and Place Submitted: July 14, 2022 in Sequim, WA

D. supplemental sheet for nonproject actions [help]

(**IT IS NOT NECESSARY** to use this sheet for project actions)

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment. When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

Of these potential impacts, implementation of the proposed Capital Improvement Program (CIP, Chapter 8) of the Water System Plan Update would be the most likely activity to result in impacts: primarily the production of noise from construction projects.

Proposed measures to avoid or reduce such increases are:

All proposed capital projects, when funded, will provide measures to mitigate environmental impacts. Projects will be constructed over the course of several years. Whenever detailed construction plans are generated, additional environmental review, if applicable, will be required.

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

Specific and cumulative proposed projects cited within the Water System Plan CIP could affect plants, animals, fish, or marine life in both positive and negative ways. Additional "phased review" of the projects cited in the plan could be required under WAC 197-11-060 (5).

Proposed measures to protect or conserve plants, animals, fish, or marine life are:

Tapping the deepest aquifers is one way implementation of the Plan is a benefit because it will lessen impacts to surface water supplies. Also, generally speaking, implementation of this Plan includes a continual effort to improve water use efficiency and water conservation system-wide, while maintaining an economically viable municipal water system.

3. How would the proposal be likely to deplete energy or natural resources?

Implementation of the Plan necessarily involves withdrawals of water from various sources in the Dungeness watershed, which is well known to be water-short in the critical season of late summer.

Proposed measures to protect or conserve energy and natural resources are:

In recognition of the need to use water efficiently and avoid wasting water or impacts to surface water and senior water rights, the Plan involves the following:

- Utilizing a variety of sources across the geography as well as among different aquifer depths
- Drilling a new deep well at the Silberhorn Wellfield
- Avoid using surface water as much as possible
- Implementing conservation measures according to new water use efficiency and conservation goals to be adopted in 2022
- Utilizing recycled water from the Water Reclamation Facility for the City's own consumptive uses (mostly irrigation)
- Using asset management to keep up with maintenance and replace/repair assets as soon as necessary to minimize leaks and avoid wasting of water
- Planning ahead both fiscally and operationally

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?

Implementation of the Plan necessarily involves withdrawals of water year-round.

Proposed measures to protect such resources or to avoid or reduce impacts are:

Minimizing the impact of water withdrawals is a goal of the Plan. Because groundwater in the Dungeness watershed is known to be hydraulically connected to surface water and the Dungeness River and nearby smaller streams are habitat for threatened salmon species, the City implements water resource management measures as listed above.

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

The proposed Plan is consistent with the City's 2015 Comprehensive Plan and prepares the municipal water system for a smooth expansion pursuant to growth projections.

Proposed measures to avoid or reduce shoreline and land use impacts are:

Potential impacts to land and shoreline uses that could result from capital projects implementing the CIP will be addressed during environmental review of individual projects.

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

Again, the proposed Plan is consistent with the City's 2015 Comprehensive Plan and prepares the municipal water system for a smooth expansion pursuant to growth projections.

Proposed measures to reduce or respond to such demand(s) are:

Implementation of the proposed Plan will be the City's response to increased demand on its utilities and additional service connections over time.

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

The proposed Plan is consistent with requirements of the Washington Department of Health for municipal water systems. All proposed projects cited in the Plan shall be required to conform to all local, state, and federal requirements for the protection of the environment (i.e. Washington Administrative Code (WAC) 246-290).

DATE CHECKLIST RECEIVED: _____ RECEIVED BY: _____

CITY OF
SEQUIM

152 West Cedar Street · Sequim, WA 98382
City Hall (360) 683-4139 · FAX (360) 681-3448
Public Works (360) 683-4908 · FAX (360) 681-0552

DETERMINATON OF NONSIGNIFICANCE (DNS) WAC 197-11-340
City of Sequim Proposed City Water System Plan Update

Project Reference: Proposed City of Sequim Water System Plan.

Description of proposal: A preliminary review draft "water system plan update" provides current data analyses by which the community and agencies can evaluate completeness and adequacy for maintaining the city's permitted status as a municipal water purveyor.

Proponent: City of Sequim

Location: Incorporated area of Sequim.

Consistency with applicable city of Sequim plans & regulations: The proposal has been reviewed for compliance with all applicable codes and standards, including the Growth Management Act (GMA), Sequim's Comprehensive Plan & Municipal Code and has been deemed to be consistent with all applicable plans, regulations, plans and State law.

Lead Agency: City of Sequim

SEPA Threshold Determination: The lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An environmental impact statement (EIS) is not required under RCW 43.21C.030(2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public on request.

This DNS is issued under WAC 197-11-340(2); the lead agency will not act on this proposal for 14 days from the date of publication below. Comments must be submitted by August 2, 2022.

Responsible Official: Steven Lachnicht
Address: City of Sequim, 152 W. Cedar Street, Sequim, WA 98382
Phone: 360-683-4908

Issuance Date: July 18, 2022 **Signature:** _____
Steven Lachnicht, Responsible Official

APPEALS: You may file an appeal of this determination with the director within 21 days after the date of the decision of the matter being appealed becomes final. A notice of appeal shall be delivered to the department by mail or personal delivery and must be received by 4:00 p.m. on the last business day of the appeal period, with the required appeal fee. You should be prepared to make specific factual objection. Contact the responsible official to read or ask about procedures for SEPA appeals.

APPENDIX N

FINANCIAL DATA

Contents:

- Fees
- General Facility Charge (GFC) Calculations
- Water Utility Rate Study
- 10-year Financial Plan

Chapter 13.72
INSTALLATION AND CONNECTION FEES

Sections:

13.72.010 Installation and connection fees.

13.72.020 Sewer general facility charges.

13.72.025 Water general facility charges.

13.72.030 Collection of fees.

13.72.010 Installation and connection fees.

A. From and after the effective date of the ordinance codified in this section, no person or firm shall connect to the city water distribution system or sewage disposal system without first paying to the city clerk the sum or sums set forth in this section and without having first obtained a permit from the city therefor.

B. For the purposes of this section, “developer installed services” shall be defined as services installed from the city main to the property line according to the city standards and including the developer’s purchase and placement of all materials, including meter, meter box, locking meter stop, piping, fittings and all related appurtenances, and including roadway replacement and sidewalk removal, if necessary.

C. Water. Service charges for connecting to any city water main is set forth in Chapter 3.68 SMC (Rates and Fees). (Ord. 2021-028 § 1(c) (Exh. C); Ord. 2020-013 § 1 (Exh. A); Ord. 93-012 § 2)

13.72.020 Sewer general facility charges.

From and after the effective date of the amending ordinance codified in this section, there shall be collected from each person, firm or corporation connecting to the sanitary sewer system of the city for property located within the city or within the urban growth area (UGA) the following charges (which shall be in addition to and supplemental to any other connection charges established in this chapter or in any other ordinances of the city). The GFC collected will be the charge in effect when a complete building permit application is filed. GFCs are not payable in advance.

A. For connection to the city sewage disposal system:

	Type of Connection	General Facilities Charge (per unit)
1.	Residential living unit	As established by resolution [one equivalent residential unit, ERU] (includes condominium units, mobile home park units and multifamily units under three-plex)
2.	Multifamily units (over two units)	[0.7 ERU per unit]
3.	Temporary residential units:	
a.	Motel and hotel rooms, seasonal overnight travel trailer parks and RV parks	[0.3 ERU per unit]
b.	Rest homes, nursing homes, assisted care facilities	[0.6 ERU per unit]
4.	Commercial and industrial units and other units:	

Based on the following meter size as determined by approved engineering recommendation according to current ANSI/AWWA standard C700. Increases due to fire sprinkler installation may be disregarded in the below calculations; provided, that the increased capacity cannot be used for other than fire sprinklers.

Meter Size (inches)	ERU
5/8	1
3/4	1.5
1	2.5
1-1/2	5
2	8

Meters sized greater than two inches or any use requiring an industrial pretreatment plan requires an approved engineering analysis of equivalent ERUs.

B. The city public works director’s decision as to anticipated sewer usage may be appealed to the hearing examiner upon written notice filed with the city clerk within 21 days of the director’s decision. This amendatory section and amended rates do not affect rates contracted to be collected pursuant to any latecomer agreement.

C. If a project for which a GFC has been paid does not connect to the city sewer system before the building permit expires, a new GFC will be charged based on the difference between the GFC paid and the new GFC in effect on the date when a new complete building permit application is filed. No refund shall be issued if the new GFC is lower than the paid GFC.

D. Extensions of service in Sequim’s corporate city limits and the urban growth area shall have a priority over extensions outside of Sequim’s urban growth area except in the case of risks to public health so certified by the Clallam County health director.

E. Connection to the City Sewage Disposal System for Service of Properties Lying Outside the Corporate Limits but Within the Sequim Urban Growth Area. The city council may, at its sole discretion, extend the city’s sewage disposal system to serve property lying outside the corporate city

limits but within the UGA. Such UGA extensions shall be made upon such terms and conditions as the council deems appropriate. Such terms and conditions shall, at a minimum, include the following:

1. Owners of the property to be served shall sign and return to the city for recording purposes a declaration of covenant and an irrevocable power of attorney to the city and a commitment to annex and a waiver of all objections to annexation at such time as the extension of the corporate boundaries to include the subject property becomes desirable by the city. Such agreement shall constitute a covenant running with the land to be served.

2. Owners will pay a monthly collection fee of not less than one and one-half times the fee charged to city residents. The council, at its discretion, may increase this amount in situations where the costs of providing service are extraordinary. Such monthly collection fees will be adjusted at such time as the property is actually annexed into the city.

3. The city shall reserve the right to disconnect service in the event the continued service would subject the city sewage disposal system to unreasonable damage, or unreasonable increased maintenance costs. The city shall reconnect after the risk of unreasonable damage and unreasonable increased maintenance costs no longer exists.

4. The city may require installation of or bonding or no-protest LIDs for streets, curbs, gutters and sidewalks and other terms as part of a preannexation agreement or other agreement with the city, which agreement shall be recorded as a covenant affecting all of the parcels of the owner receiving city services.

5. Owners shall also be bound by the applicable terms of any interlocal agreement between the city and Clallam County concerning land use and utilities in the Sequim urban growth area.

F. Latecomer Applicability. Owners of property connecting laterally to developer- established sewer trunk lines shall be subject to payment of latecomer fees as established by a recorded agreement between the city and the developer/installer.

G. General Facilities Charges for Extensions of City Sewage Service Outside City Limits. General facilities charges for connection to the city sewage disposal system to serve property located outside the corporate city limits for use for regionally significant residential units, commercial or industrial uses are established by the city council at the time of application for service. Where existing contracts, executed prior to the adoption of the Growth Management Act (Chapter 36.70A RCW), provided for sewage service to areas outside of Sequim's city limits, the general facility charges will be at least one and one-half times the general facility charge provided for inside the city limits or as specifically

provided by contract. Former SMC 13.72.020(F) (as referenced in some contracts and as existing in 1989) is intended to be modified and replaced by this subsection G.

H. Transfer of General Facilities Fees.

1. Persons or entities owning property for which sewer general facilities charges have previously been paid by the owner to the city may transfer the sewer development rights obtained by the general facilities payment to a different location under the following conditions:

a. The buildings which were served by the utilities provided pursuant to the general facilities payments are to be demolished or removed;

b. The general facility charge transfer shall be recorded in favor of the city in the county property records at the property owner's expense.

2. In the event structures are destroyed or demolished on any site, an additional general facilities charge for a replacement structure erected upon the same site, and for which the same number of general facilities charges would be levied as had been previously paid, shall not be required.

3. The amount of general facilities charges which may be transferred shall be calculated based upon the amount actually paid by the owner of the premises at the time of the initial payment of general facilities charges. The funds paid may be transferred and applied to the new location at their face value. If, from the time of the initial payment to the time of the requested transfer, general facilities charges have increased, the transferor shall pay the difference between the general facilities charges paid and general facilities charges which would be levied under the new rate structure.

4. The terms of this section relating to transfer of general facilities charges shall apply to sewer general facilities charges. (Ord. 2021-028 § 1(c) (Exh. C); Ord. 2020-013 § 1 (Exh. A); Ord. 2019-004 (Exh. B); Ord. 2015-017 § 1 (Att. A); Ord. 2013-005 § 1; Ord. 2008-003 § 2; Ord. 2007-001; Ord. 2005-029 § 2; Ord. 2004-002 Exh. A; Ord. 2002-015; Ord. 97-007 § 2)

13.72.025 Water general facility charges.

From and after the effective date of the amending ordinance codified in this section there shall be collected from each person, firm or corporation connecting to the water system of the city for property located within the city or within the urban growth area (UGA) the following charges (which shall be in addition to and supplemental to any other connection charges established in this chapter or in any other ordinances of the city). The GFC collected will be the charge in effect when a complete building

permit application is filed. GFCs are payable only upon filing a complete building permit application. GFCs are not payable in advance.

A. For connection to the city water distribution system:

	Type of Connection	General Facilities Charge (per unit)
1.	Residential living unit	As established by resolution [one equivalent residential unit, ERU] (includes condominium units, mobile home park units and multifamily units under three-plex)
2.	Multifamily units (over two units)	[0.7 ERU per unit]
3.	Temporary residential units:	
a.	Motel and hotel rooms, seasonal overnight travel trailer parks, and RV parks	[0.3 ERU per unit]
b.	Rest homes, nursing homes, assisted care facilities	[0.6 ERU per unit]
4.	Commercial and industrial units and other units:	

Based on the following meter size as determined by approved engineering recommendation according to current ANSI/AWWA standard C700. Increases due to fire sprinkler installation may be disregarded in the below calculations; provided, that the increased capacity cannot be used for other than fire sprinklers.

Meter Size (inches)	ERU
5/8	1
3/4	1.5
1	2.5
1-1/2	5
2	8

Meters sized greater than two inches or any use requiring an industrial pretreatment plan requires a city-approved engineering analysis of equivalent ERUs.

B. The city public works director’s decision as to anticipated water usage may be appealed to the hearing examiner upon written notice filed with the city clerk within 21 days of the director’s decision.

C. If a project for which a GFC has been paid does not connect to the city water system before the building permit expires, a new GFC will be charged based on the difference between the GFC paid and the new GFC in effect on the date when a new complete building permit application is filed. No refund shall be issued if the new GFC is lower than the paid GFC.

D. Extensions of service in Sequim’s corporate city limits and the urban growth area shall have a priority over extensions outside of Sequim’s urban growth area except in the case of risks to public health so certified by the Clallam County health director.

E. Connection to the City Water System for Service of Properties Lying Outside the Corporate Limits but Within the Sequim Urban Growth Area. The city council may, at its sole discretion, extend the city’s water system to serve property lying outside the corporate city limits but within the UGA. Such UGA extensions shall be made upon such terms and conditions as the council deems appropriate. Such terms and conditions shall, at a minimum, include the following:

1. Owners of the property to be served shall sign and return to the city for recording purposes a declaration of covenant and an irrevocable power of attorney to the city and a commitment to annex and a waiver of all objections to annexation at such time as the extension of the corporate boundaries to include the subject property becomes desirable by the city. Such agreement shall constitute a covenant running with the land to be served.

2. Owners shall pay a monthly collection fee of not less than one and one-half times the fee charged to city residents. The council, at its discretion, may increase this amount in situations where the costs of providing service are extraordinary. Such monthly collection fees shall be adjusted at such time as the property is actually annexed into the city.

3. The city shall reserve the right to disconnect service in the event the continued service would subject the city water system to unreasonable damage, or unreasonable increased maintenance costs. The city shall reconnect after the risk of unreasonable damage and unreasonable increased maintenance costs no longer exists.

4. The city may require installation of or bonding or no-protest LIDs for streets, curbs, gutters and sidewalks and other terms as part of a preannexation agreement or other agreement with the city, which agreement shall be recorded as a covenant affecting all of the parcels of the owner receiving city services.

5. Owners shall also be bound by the applicable terms of any interlocal agreement between the city and Clallam County concerning land use and utilities in the Sequim urban growth area.

F. Latecomer Applicability. Owners of property connecting laterally to developer-established water trunk lines shall be subject to payment of latecomer fees as established by a recorded agreement between the city and the developer/installer.

G. General facilities charges for extensions of city water service outside city limits and outside the Sequim urban growth area for use for regionally significant residential units, commercial or industrial uses shall be established by the city council at the time of application for service.

H. Transfer of Water General Facilities Fees.

1. Persons or entities owning property for which water general facilities charges have previously been paid by the owner to the city may transfer the water development rights obtained by the general facilities payment to a different location under the following conditions:

a. The buildings which were served by the utilities provided pursuant to the general facilities payments are to be demolished or removed;

b. The general facility charge transfer shall be recorded in favor of the city in the county property records at the property owner's expense.

2. In the event structures are destroyed or demolished on any site, an additional general facilities charge for a replacement structure erected upon the same site, and for which the same number of general facilities charges would be levied as had been previously paid, shall not be required.

3. The amount of general facilities charges which may be transferred shall be calculated based upon the amount actually paid by the owner of the premises at the time of the initial payment of general facilities charges. The funds paid may be transferred and applied to the new location at their face value. If, from the time of the initial payment to the time of the requested transfer, general facilities charges have increased, the transferor shall pay the difference between the general facilities charges paid and general facilities charges which would be levied under the new rate structure.

4. The terms of this section relating to transfer of general facilities charges shall apply to water general facilities charges. (Ord. 2020-013 § 1 (Exh. A); Ord. 2019-004 (Exh. B); Ord. 2015-017 § 1 (Att. A); Ord. 2013-005 § 1; Ord. 2007-001; Ord. 2005-029 § 2; Ord. 2004-002 Exh. A; Ord. 2002-015; Ord. 97-008 § 2)

13.72.030 Collection of fees.

The connection charges established in this chapter shall be collected at the time the request for connection is made or, if a building permit is to be issued, at the time the building permit is issued. (Ord. 2020-013 § 1 (Exh. A); Ord. 299 § 2, 1974)

The Sequim Municipal Code is current through Ordinance 2022-010, passed March 14, 2022.

Disclaimer: The city clerk's office has the official version of the Sequim Municipal Code. Users should contact the city clerk's office for ordinances passed subsequent to the ordinance cited above.

City Website: https://www.sequimwa.gov/
City Telephone: (360) 683-4139

Code Publishing Company

City of Sequim
Utility Rate Study: Water Utility
General Facility Charge Calculation

Existing Cost Basis			Notes
PLANT-IN-SERVICE			
Utility Capital Assets		$ 22,817,920	Fixed assets at original cost - Assets from 2007, and current asset data
less: Contributed Capital		-	Donated assets at original cost.
plus: Interest on Non-Contributed Plant		12,861,542	Interest on assets up to a maximum 10-year period (more specific than previous calculations)
plus: Construction-Work-in-Progress		-	
2019 Year-end Estimated Cash Balances	$ 5,388,179		Operating, capital and debt cash balances
less: Debt Principal Outstanding	(2,365,725)		
less: Net Debt Principal Outstanding		$ -	Debt principal outstanding, net of cash reserves
TOTAL EXISTING COST BASIS		**$ 35,679,461**	

Future Cost Basis		Notes
CAPITAL IMPROVEMENT PLAN (2020-2030)		All costs are in 2020 dollars and do not include a realization factor.
Total Citywide Projects	$ 23,992,982	De-escalated by 2.8% each year, uses full CIP. Admin charges are reduced in proportion to excluded costs.
less: Stormwater Capital Projects	(1,184,798)	Replacement % for Admin charges assumed to be equal to average for total CIP.
less: Vehicle Replacements	(661,701)	
less: Developer Contributions/Grants	(904,365)	Future grants/contributions - no Stormwater grants.
less: Provision for Future Asset Retirements	(873,003)	From the original CIP - de-escalated by 2.8% (does not include stormwater or vehicle R&R).
Growth-Related Share of Projects	**$ 20,369,116**	
TOTAL FUTURE COST BASIS	**$ 20,369,116**	
Adjustments for Buy-in plus Incremental Method:		For this method, instead of deducting estimated future asset retirements related to replacement projects, exclude the entire amount of replacement projects.
Provision for Future Retirements	$ 873,003	
Deduction of Replacement CIP	(4,352,283)	
TOTAL FUTURE COST BASIS	**$ 16,889,835**	

Customer Base		Notes
		Uses the ratios from chapter 13.72, and the customer data total units to get total current ERUs.
Existing Customers	5,110	For GFC calculation, ERUs are a hybrid; SFR/MF is per-unit and commercial is based on MCEs
Future Unreserved Capacity	1,699	Difference between total customer base and existing customers
TOTAL CAPACITY (in ERUs)	**6,809**	Table 2-12 projected ERUs states 7,915 ERUs for 2032 build out, existing ERUs are escalated to build out.

City of Sequim
Utility Rate Study: Water Utility
General Facility Charge Calculation

Resulting Charge				Notes
Average Integrated Method				
Charge Components	**Cost Basis**	**ERUs**	**Charge**	
Component for Existing Assets	$ 35,679,461	6,809	**$ 5,240**	
Component for Future Assets	$ 20,369,116	6,809	**$ 2,991**	
	$ 56,048,577		**$ 8,231**	
TOTAL GFC PER ERU			**$ 8,231**	
Existing GFC			$8,184	
Increase (%) - Calculated Above Existing GFC			0.6%	
Increase ($) - Calculated Above Existing GFC			$47	
Buy-in Plus Incremental Method				
Charge Components	**Cost Basis**	**ERUs**	**Charge**	
Component for Existing Assets	$ 35,679,461	6,809	**$ 5,240**	
Component for Future Assets	$ 16,889,835	1,699	**$ 9,940**	
	$ 52,569,297		**$ 15,180**	
TOTAL GFC PER ERU			**$ 15,180**	
Existing GFC			$8,184	
Increase (%) - Calculated Above Existing GFC			85.5%	
Increase ($) - Calculated Above Existing GFC			$6,996	

City of Sequim

Utility Rate Study: Water Utility

General Facility Charge Calculation

Previous Study Calculation		
Existing Facility Component		
Total Assets included in the GFC	$	35,679,461
Divided by Total Number of Existing ERUs		5,940
Existing Facility Component of the GFC ($/ERU)	$	6,007
Future Facility Components		
Total Planned Improvement Costs that Benefit All Customers	$	5,146,757
Divided by Total Number of All ERUs in 2032		7,915
	$	650
Total Planned Improvement Costs that Benefit Growth	$	22,117,014
Divided by Total Number of Growth in ERUs from 2020 to 2029		1,426
	$	15,507
Existing Facility Component of the GFC ($/ERU)	$	6,007
Future Facility Component of GFC benefit to all customers	$	650
Future Facility Component of GFC benefit to growth	$	15,507
	$	**22,164**

City of Sequim

COMPREHENSIVE WATER AND SEWER UTILITY RATE STUDY

April 2021

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April 23, 2021

Matthew Klontz, Interim Public Works Director
City of Sequim
152 W City Cedar Street
Sequim, WA 98382

Subject: Comprehensive Water and Sewer Utility Rate Study

Dear Mr. Klontz:

FCS GROUP is pleased to submit this report summarizing the results of the 2020 comprehensive water and sewer utility rate study. On July 27, 2020, we presented the revenue requirement forecast to the City Council. We presented the cost-of-service analysis, rate design alternatives, and an updated General Facility Charge (GFC) to the Council on September 28, 2020.

This report documents both parts of the study for future reference. We have separately provided to City staff a copy of the Excel models for the water and sewer rates and GFCs. We hope that the report and models together can assist the City in its efforts to maintain utility rates that are adequate, equitable, and supportive of the City's policy goals.

It has been a pleasure to work with you and other City staff on this effort. In particular, we appreciate the information and insights provided by Sarah VanAusdle.

Please let us know if you have any questions or need additional information. Gordon can be reached at (425) 516-7209.

Sincerely,

Gordon Wilson
Senior Program Manager

Tage Aaker
Project Manager

Amanda Levine
Analyst

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Section I. INTRODUCTION

I.A. BACKGROUND

In January 2020, the City of Sequim contracted with FCS GROUP to conduct a water and sewer rate study. The main purposes of this rate study are to develop a revenue requirement forecast for the City's water and sewer utilities for the 2020-2030 study period and to recommend a rate schedule for the 2021-2026 study period.

The major components of this study are as follows:

- **Water and sewer revenue requirement forecast.** Review the City's financial policies, develop a strategy for funding capital improvements, and develop an annual revenue requirement forecast.
- **Water and sewer cost-of-service analysis.** Analyze customer billing data, asset data, and system plans to determine the appropriate share of the cost burden that should be borne by different customer classes.
- **Prepare alternative rate designs.** Develop rate design options that address the City's policy interests while generating the targeted revenue requirement.
- **Review and update the General Facility Charges** (GFCs)**.** Analyze the asset inventory, classify the City's Capital Improvement Plan (CIP), determine applicable growth, review the existing GFC methodology, and calculate updated GFCs for each utility.
- **Jurisdictional surveys.** Conduct a survey of the current rates and GFCs of comparable water and sewer utilities.

On July 27, 2020, we presented the first part of the study—the revenue requirement forecast—to the City Council. The second part—the cost-of-service analysis, rate design alternatives, and updated GFC—was presented to the Council on September 28, 2020.

This report documents both parts of the study for future reference. The methodology, key factors, conclusions, and recommendations for each area of the study are described in subsequent sections of the report.

Section II of the report outlines the ratemaking methodology and fiscal policies assumed for both water and sewer utilities. Sections III, IV, and V focus on the water utility, describing first the revenue requirement forecast, then the cost-of-service allocation and rate design options. In Sections VI, VII, and VIII we address the same three ratemaking components for the sewer utility. Section IX describes the GFC update for both water and sewer. Comparative jurisdictional surveys are included in the revenue requirement and GFC sections. Section X summarizes our findings and recommendations.

Section II. Rate Study Methodology

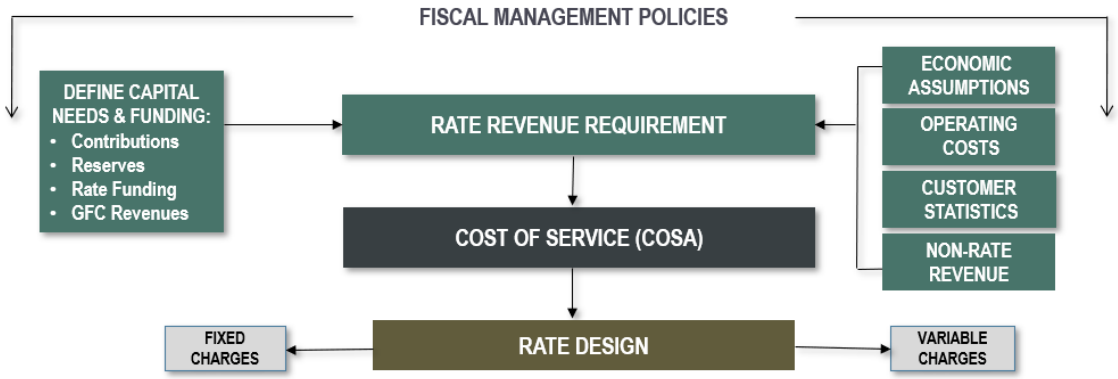
II.A. Overview of Ratemaking Methodology

This section applies to both the water and sewer utilities.

The development of user rates is based on principles that are generally accepted across the water and sewer industry. These principles are designed to generate rates that equitably recover costs from each class of customer, using a rate design that addresses the City's policy goals. Below are the primary steps in developing utility rates:

- **Revenue Requirement Forecast.** This forecast identifies the total revenue needed to fully fund the system on a stand-alone basis, considering operating and maintenance expenditures, capital funding needs, debt requirements, and fiscal policy objectives.
- **Cost-of-Service Analysis.** This analysis equitably distributes costs to customer classes based on their proportional demand and use of the system.
- **Rate Design Analysis.** This analysis includes the development of rates that generate sufficient revenue to meet the system forecast needs and also address City policy objectives such as water conservation, equity, simplicity, or responsiveness to low-income customers.

Exhibit 1: Overview of the Rate Study Process



II.B. Revenue Requirement

A revenue requirement analysis includes the following elements:

- **Fiscal Policy Review.** Identifies and evaluates the fiscal policies that serve as forecast parameters. The policies that affect the revenue requirement address cash reserves, rate-funded capital reinvestment, and debt. The fiscal policy review is described later in this section.
- **Capital Funding Strategy.** Defines a strategy for funding the City's capital improvement program, including an analysis of available resources from rate revenues, debt financing, and any special resources that may be available, such as grants, outside contributions, or general facility charges (GFCs). Identifies any debt needed to fund the capital improvement plan (CIP).
- **Operating Forecast.** Identifies future annual non-capital costs associated with the operation, maintenance, and administration of the system.

- **Annual Debt Service.** Incorporates any new or existing debt service into the utility forecast.
- **Sufficiency Testing.** Evaluates the sufficiency of existing rate revenues in meeting all financial obligations, including any coverage requirements associated with long-term debt.
- **Strategy Development.** Designs a forward-looking strategy for adjusting rates to fully fund all financial obligations over the projection period. The goal is usually a smooth pattern of rate changes over the forecast period.

II.B.1. Key Economic and Growth Assumptions

The operating and maintenance (O&M) expenditure forecast largely relies on the City's 2020 adopted budget for the Water Operating Fund (401) and the Sewer Operating Fund (402). The line items in the budget are then adjusted each year using one of the following factors:

- **General Cost Inflation** – assumed to be 2.5% per year, based on both the Washington State Economic & Revenue Forecast Council projection for the Consumer Price Index (CPI) as well as the recent historical performance of the Seattle-Tacoma-Bellevue CPI.
- **Construction Cost Inflation** – assumed to be 3.0% per year, based on the historical Engineering News-Record Construction Cost Index (20-City Average).
- **Labor Cost Inflation** – assumed to be 2.5% per year, based on recent historical performance of the Employment Cost Index (Wages and Salaries) and confirmed by City staff.
- **Benefit Cost Inflation** – assumed to be equal to labor cost inflation for the forecast period.
- **Taxes**
  - State Excise Taxes - Water: 5.029% of gross revenue for water sales; for non-rate revenue, the state Business & Occupations (B&O) tax rate is 1.75% of gross revenue.
  - State Excise Taxes – Sewer: The sewer utility is taxed on 3.852% of rate revenue related to sewer collection service and the 1.75% B&O rate for rate revenue related to treatment & transmission. The weighted average in Sequim is 1.771% of total rate revenue. Regional wastewater treatment revenue from Carlsborg and the Jamestown S'Klallam Tribe is exempt from the tax. The 1.75% B&O rate applies to GFCs and other non-rate revenue.
  - City Utility Tax: 8% of gross revenues for both water and sewer utilities.
- **Fund Earnings** – assumed to be 0.5% per year based on recent history of the Washington Local Government Investment Pool (LGIP).
- **Customer Growth** – assumed to be 0.5% per year for the water utility, and 3% in 2020 and 1% per year thereafter for the sewer utility. These assumptions were based on discussions with City staff at the time of analysis. Sewer is assumed to have a higher growth rate because of sewer-only customer growth outside of the City.

II.C. COST OF SERVICE

The purpose of a cost-of-service analysis is to provide a rational basis for distributing the cost of utility service to each class of customers in proportion to the demands they place on the system. For each class, its percentage of total cost can be compared with its percentage of total revenue. This provides a measure of how equitable the rates are and whether the relative rate burden should shift toward or away from any given group of customers.

Following are the key analytical steps in the cost of service analysis:

- **Functional Cost Allocation.** Apportions the annual revenue requirement to the following major functions of the water system.
  - » Customer (general customer costs),
  - » Base Demand (year-round average usage),
  - » Peak Demand (peak-season usage in relation to average annual usage), and
  - » Fire protection (fire-specific costs).

  Apportions the annual revenue requirement to the following major functions of the wastewater system:
  - » Customer (general customer costs),
  - » Flow (related to hydraulic volume of sewage conveyed and treated by the system),
  - » BOD (Bio-chemical Oxygen Demand), a measure of sewage strength related to the amount of cleaning required to safely discharge effluent from the City Water Reclamation Facility (WRF), and
  - » TSS (Total Suspended Solids), another measure of sewage strength related to extracting and disposing of biosolids from the wastewater flow.
- **Customer Class Designation.** Identifies the customer classes that will be evaluated as part of the study. Revised customer classes or class definitions may be considered. It is appropriate to group customers that exhibit similar usage characteristics and service requirements.
- **Cost Allocation to Customer Classes.** Allocates the costs from the functional cost allocation to different customer classes based on their unique demands for each service as reflected in system planning documents and customer billing data. The results identify recommended shifts in cost recovery by customer class, which informs the rate design evaluation.

II.D. RATE DESIGN EVALUATION

Rate design refers to how the bills are calculated. Every rate has a numerator and a denominator. The numerator is the total cost that must be recovered for the system to be able to fund its revenue requirement. The denominator is the *unit basis*, the measurement used to calculate an individual bill. Rate design has to do with the unit basis for the charges. Most rate designs consist of some combination of fixed and variable charges. Fixed charges often vary by meter size, which is an indicator of a particular customer's potential demand for water service and contribution to wastewater flow.

A primary consideration in rate design is that the rates are *equitable*—that is, they generate sufficient revenue in a manner that is reasonably commensurate with the cost of providing service to individual customers. At the same time, rate design is influenced by the City's other policy goals. There are several competing policy considerations when designing a rate structure. These include revenue stability, conservation incentives, or the protection of certain vulnerable customer classes (such as low-income customers). State law gives utilities wide discretion in determining rate classes and designing rates, as long as the rates are not arbitrary and capricious.

During the rate study, the City's existing rate design was reviewed, and alternatives were presented to the Council for consideration. This report describes the options recommended by FCS GROUP.

II.E. FISCAL POLICY REVIEW

A utility financial forecast requires several types of fiscal policies to serve as forecast parameters. These policies include the level of cash reserves, the level of debt, and the amount of rate-funded capital reinvestment. Those policies are discussed here for both water and sewer utilities. Cash reserves are considered separately for operating, capital, and debt service purposes.

II.E.1. Operating Reserve

An operating reserve is designed to provide a liquidity cushion; it protects the utility from the risk of short-term variation in the timing of revenue collection or payment of expenses. The most common operating reserve target is between 60 days to 90 days of operating expenses for water utilities and 45 days to 60 days for sewer utilities. This equates to 16%-25% of annual expenses for water and 12%-16% for sewer.

In a typical financial forecast, the operating reserve target is based on the December 31 balance, with the balance expected to vary during the year. In the forecast, in any year in which year-end operating reserves exceed the policy maximum number of days of O&M expenses, the excess cash is "swept" into the capital reserve to help pay for capital projects.

Current City policy calls for both the Water Unrestricted Fund and the Sewer Unrestricted Fund to maintain a fund balance of between 3 months and 5 months of operating expenditures (25%-42%). In addition, City policy also outlines an Economic Uncertainty Reserve and a Future Liabilities Reserve, each adding 1%-3% of ongoing revenues to the operating reserves.

Recommended Policy: Because the City's current operating reserve policies are more conservative than what we typically see in the industry, we are recommending a more conservative operating reserve policy than what we would typically recommend. In this case, we recommend that the City maintain an operating fund balance of 3-5 months (25%-42%) for each utility. However, we do not think it is necessary to have separate Economic Uncertainty and Future Liabilities reserves.

In the water utility, this equates to a range of $456,000-$760,000 based on 2020 budgeted expenditures of $1.8 million. In the sewer utility, this equates to a range of $966,000-$1.6 million based on 2020 budgeted expenditures of $3.9 million. These targets are met in each year of the 2020-2030 forecast.

II.E.2. Capital Reserve

The capital reserve consists of cash that has been set aside for capital purposes, often in a separate fund. Resources include general facility charges from new development, grants, and debt proceeds, along with current rate revenue committed to capital reinvestment.

In general, there are two primary capital funding strategies: debt and cash financing (pay-as-you-go). Cash financing consists of saving up in advance of a given capital need, which means that the capital reserve fund balance is a tool for cash financing of foreseeable future capital projects. For that reason, we can expect that the capital reserve balance will fluctuate throughout the forecast horizon.

However, there is a target minimum capital reserve balance that is the lowest level allowed in the forecast. This minimum capital reserve serves as a contingency for the capital program. It provides a source of emergency funding for cost overruns on planned capital projects, unexpected asset failures

or other unanticipated capital needs such as providing matching funds for grant awards. There are a variety of typical benchmarks that may be used to set a minimum capital balance in a forecast:

- A percentage (commonly 1–2%) of the original cost of fixed assets.
- A rolling multi-year average of capital improvement program (CIP) costs.
- An amount deemed sufficient to fund replacement of a critical piece of infrastructure.

Current City policy targets a reserve of a minimum of 2.5 years and a maximum of 6 years of scheduled CIP expenditures. In our opinion, the target minimum is overly conservative, implying that capital spending could continue without reduction for two-and-a-half years even if all capital funding sources were eliminated. This target minimum leaves large amounts of cash available but unused for planned capital projects; the target in 2020 is a minimum of $3.3 million for water and $5.2 million for sewer. Furthermore, as the CIP is expected to grow, the amount held back from planned spending would increase to even higher levels.

Since the capital fund balance serves as both a risk reserve and a capital funding tool, there is also no need to specify a maximum capital fund balance. “Pay as you go” capital funding requires saving in advance for foreseeable capital costs, and the right amount of savings depends not on a certain dollar threshold but on the amount of “pay as you go” capital spending forecast over the planning horizon.

Recommended Policy: We recommend maintaining a minimum capital fund balance equal to 25% of the City’s annual forecasted CIP. (A common minimum capital reserve is 1% of the cost of fixed assets. The suggested “25% of CIP” threshold is equivalent to about 1% of fixed assets for sewer and 1.8% of fixed assets for water.) Based on the current CIP, the recommended minimum in 2020 is about $450,000 for both water and sewer utilities. This gives the City enough of a financial cushion to respond to bad news without locking up large amounts of otherwise usable capital funds. This would be the forecast minimum; most years the capital fund balance will be much higher than the minimum, just to achieve the planned level of debt vs. pay-as-you-go capital spending.

II.E.3. Debt Reserve

A debt reserve is most often required as a condition of bond issuance, though some loan programs also require a reserve. The reserve protects creditors from the risk of borrower default. It is most often linked to either average annual debt service or maximum annual debt service.

Recommended Policy: The policy should simply be to comply with the terms specified in the debt contracts.

II.E.4. Debt Service Coverage

Debt service coverage is typically a requirement associated with revenue bonds and some state loans, and it is an important benchmark to measure the riskiness of the water and sewer utility’s capital funding plans. Coverage is most easily understood as a factor applied to annual debt service. In such a case, if the City issues revenue bonds, the utility agrees to collect enough revenue to meet operating expenses and not only pay debt service but to collect an additional 25% above bonded debt service. The extra revenue is a “cushion” that makes bondholders more confident that debt service will be paid on time.

In actual borrowing, bonds can be "cross-pledged"—meaning that both water and sewer revenues are pledged (if needed) to pay each other's debt service. Cross-pledging the revenue debt can be a way to achieve a more favorable debt service coverage. However, for ratemaking purposes, the two utilities should each comply with its policies on a stand-alone basis, so the debt service coverage calculation is tested against the revenues of each revenue independently.

Recommended Policy: While 1.25 is a common contractual minimum coverage for revenue bonds, a higher coverage is a sign of financial strength and leads to more favorable interest rates. We recommend a planned minimum debt service coverage of 2.00 for revenue bonds alone and 1.5 for total debt (including State loans). Both utilities easily comply with this standard. For the water utility, the lowest debt service coverage in the forecast period (through 2030) is 6.52 for bonded debt and 5.1 for total debt. The sewer utility has been even more conservative in its level of debt; the lowest forecast coverage is 13.5 for bonded debt and 3.8 for total debt.

II.E.5. Rate Funded System Reinvestment

Rate funded system reinvestment is the funding of infrastructure replacement needs through a planned annual commitment of current rate revenue. Together with "sweeping" any excess operating fund balance into the capital funds, this policy ensures that the City is not too reliant on debt as a way of funding capital investment—particularly for the most foreseeable capital projects.

Without a formal asset management plan, the most common approach to system reinvestment funding is to set the annual funding target as some percentage of original cost depreciation expense.

Because of cost inflation over time, funding system reinvestment based on original cost depreciation will not fully meet future replacement needs, especially for mature systems that are just beginning to address those needs. Capital costs increase over time with inflation, so replacement cost will naturally be higher than the original cost. However, original cost depreciation is a simple benchmark to calculate, and it can be translated into a goal for annual rate funding of capital projects.

This study bases the system reinvestment target on estimated original cost depreciation from the City's record of fixed assets. For the water utility, this target is about $370,000 in 2020, and it increases to $750,000 by the end of the forecast in 2030. For the sewer utility, this target is about $800,000 in 2020, increasing to $1,300,000 by 2030. In addition to the planned system reinvestment, any cash flow over and above the 150-day maximum operating reserve is considered available for capital projects.

Recommended Policy: Target an annual rate funded system investment amount equal to 100% of the City's original cost depreciation in both the water and sewer utility. This policy is achieved in each year of the water forecast. In the sewer forecast, to moderate rate increases, the forecast gradually increases the planned system reinvestment assumption each year until it reaches 100% of depreciation in the year 2030.

Exhibit 2: Summary of Recommended Fiscal Policies

Policy	Recommended Target
Operating Reserve	90 to 150 days of O&M in both Water and Sewer utility (equates to $456,000-$760,000 for Water and $966,000-$1.6 million for Sewer)
Capital Reserve	25% of annual average CIP ($450,000 in both the water and sewer utility)
Debt Service Coverage	If debt is issued, an internal policy target of at least 2.0 for bonded debt service coverage and 1.5 for total debt service coverage, with each utility considered independently
Rate-Funded Capital Reinvestment	Target annual rate-funded capital of 100% of original cost depreciation (water utility equates to $370,000 in 2020, and sewer utility equates to $800,000 in 2020.)

Section III. WATER REVENUE REQUIREMENT

This section presents the results of the revenue requirement forecast for the water utility. The recommended increases in the overall revenue requirement are summarized in **Exhibit 3**.

Exhibit 3: Summary Results of Water Revenue Requirement Forecast

Summary of Rate Adjustments	2021	2022	2023	2024	2025	2026
Annual Rate Adjustments	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%

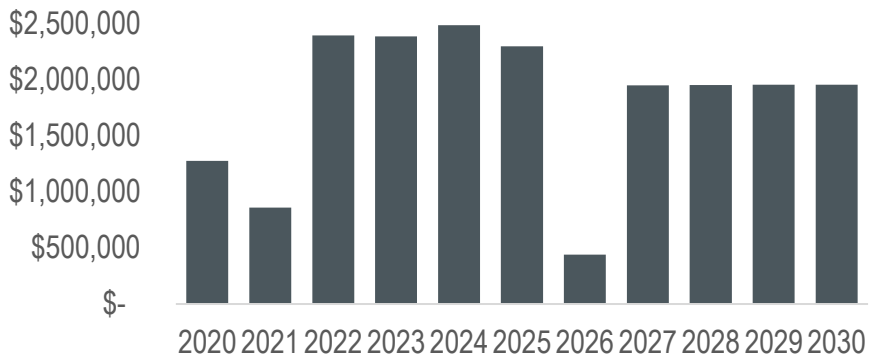
The revenue requirement analysis has two parts. The *capital funding strategy* describes how planned capital improvements will be paid for, including the amount of borrowing needed. The *annual forecast* contains a year-by-year projection of future ongoing costs (including debt service that results from the capital funding strategy) and the rate revenue needed to fund those costs.

III.A. CAPITAL FUNDING STRATEGY

III.A.1. Capital Expenditure Forecast

The 2020-30 CIP provided by the City showed estimated costs by project, by year, in escalated dollars. Water capital projects in the CIP total $28.5 million. However, based on discussions with the staff about the level of capital projects that can realistically be executed, we assumed a capital completion factor of 70%. After applying this factor, the total 11-year CIP is about $20 million, an average of $1.8 million/year. Year-by-year assumed capital expenditures are shown in **Exhibit 4**.

Exhibit 4: Water CIP Forecast (Escalated Dollars, after 70% Completion Factor)



Major water capital projects include:

- WTR-027CU – Main Replacement (Bell St Alley 2nd-3rd) – $1.12 million in 2020-2030.
- WTR-032CU – West Prairie from S. Sequim to S. 5th – $1.26 million in 2022-2024.
- WTR-047CU – Happy Valley Reservoir – $3.29 million in 2027-2030.
- WTR-064RR – Ranney Well Water Line Replacement – $1.82 million in 2023 and 2025.

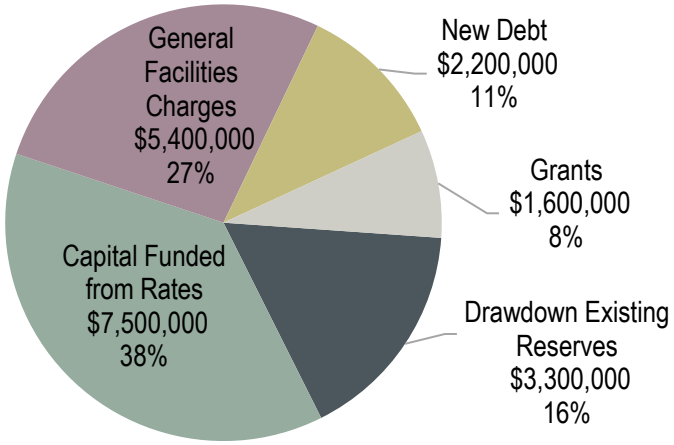
III.A.2. Capital Funding Sources

Capital funding sources include GFC revenue, remaining State Revolving Fund (SRF) loan proceeds (including reimbursement for Stormwater Bell Creek), the drawdown of current cash reserves, annual rate-funded system reinvestment, and excess annual cash flow above the operating reserve target.

Capital needs not funded by other sources are assumed to be financed by revenue bonds. In this capital funding strategy, $2.2 million in bond proceeds are needed—$1 million in 2025 and $1.2 million in 2028. This represents 11% of the $20 million total 11-year CIP.

Exhibit 5 summarizes the planned capital funding sources.

Exhibit 5: Summary of Water Capital Funding Sources



III.B. ANNUAL FORECAST

The purpose of the annual forecast is to determine whether existing rates are sufficient to recover system costs for the 2020-2030 planning period. The 2020 budget was the baseline year for this forecast. Following are some of the key assumptions in the annual forecast.

III.B.1. Fund Balances

Exhibit 6 shows that the total water fund balances were about $5.0 million at the beginning of 2020. Of this total, just over $4.0 million consists of capital reserves.

Exhibit 6: Water Fund Balances

Description	Beginning 2020 Cash Balances
Operating Reserve	$852,000
Capital Reserve	$4,005,000
Debt Reserve	$114,000
Total Beginning Cash January 1, 2020	**$4,971,000**

III.B.2. Operating Revenue and Expenses

- **Water Sales.** This revenue line is projected based on 2019 actuals, with the adopted 4% rate increase for 2020 and 0.50% growth.
- **Non-Rate Revenue.** Non-rate revenue consists of late fees, hydrant rental deposits, and meter installations. The forecast is based on 2020 budget figures.
- **Operating and Maintenance (O&M) Expenses.** Notable O&M expenses include wages & salaries for employees and administration interfund service charges. The O&M cost escalation assumptions are discussed in the previous section.

III.B.3. Debt Service

- **Existing Debt Service.** The utility currently has one outstanding revenue bond (that it shares with the sewer utility) reaching maturity in 2034. In addition to revenue bonds the utility also has two State Revolving Fund loans with repayment occurring between 2020 and 2035. Total existing debt service payments range from $198,000 per year in 2020 to $73,000 per year in 2035.
- **New Debt Service.** The repayment schedules for the two planned bond issues assume a twenty-year term with an interest rate of 3.5% and 1.0% issuance costs. New debt service is about $76,000 per year beginning in 2025 and another $92,000 per year beginning in 2028.

III.B.4. Rate-Funded System Reinvestment

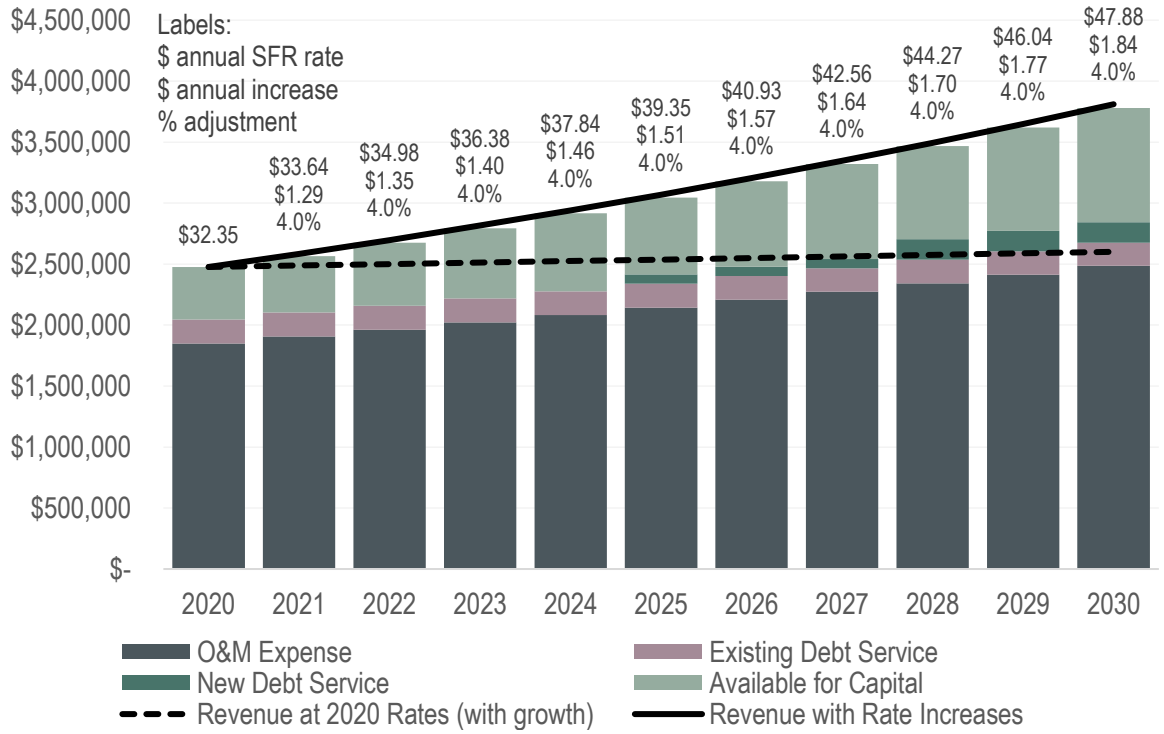
In the 2020-2030 forecast, the water utility averages $670,000 per year of rate-funded capital, compared with an average of $557,000 of depreciation.

III.C. REVENUE REQUIREMENT RESULTS

Exhibit 7 shows the revenue requirement through 2030. The chart details are as follows:

- Dashed line: Revenue at existing rates.
  - » Rate revenue is expected to be roughly $2.5 million in 2020 and is expected to increase 0.50% per year with customer growth, before future rate adjustments. This line also includes non-rate revenues. The City's revenue at 2020 rates gradually becomes inadequate over time.
- Solid line: Revenues with 4%/year rate increases.
  - » As the costs associated with the capital program are incorporated into the forecast, rate revenue must increase, both to pay debt service on new debt and to continue allowing the utility to cash-fund most capital projects. Rate revenues are expected to grow to just over $3.7 million per year by 2030.
- Dark blue bar: Operating and maintenance expenses.
- Pink bar: Existing debt service – one revenue bond and two SRF loans.
- Dark Green bar: New debt service, assuming $1 million in debt proceeds in 2025 and $1.2 million in 2028.
- Light Green bar: Available for capital.
  - » This amount increases gradually after 2021 as revenues increase with rate increases. By 2030, about $940,000 per year would be available for capital projects.

Exhibit 7: Annual Water Revenue Requirement Forecast 2020-2030



The annual forecast shows a deficiency in rate revenue without rate increases. Annual increases of 4% are needed to fully cover all costs and meet policy reserves.

Exhibit 8 shows that after the 4% annual rate increases are assumed, forecasted operating reserves from 2020-2030 stay within the policy parameters of 90-150 days of O&M expenses.

Exhibit 8: Water Operating Reserve Forecast

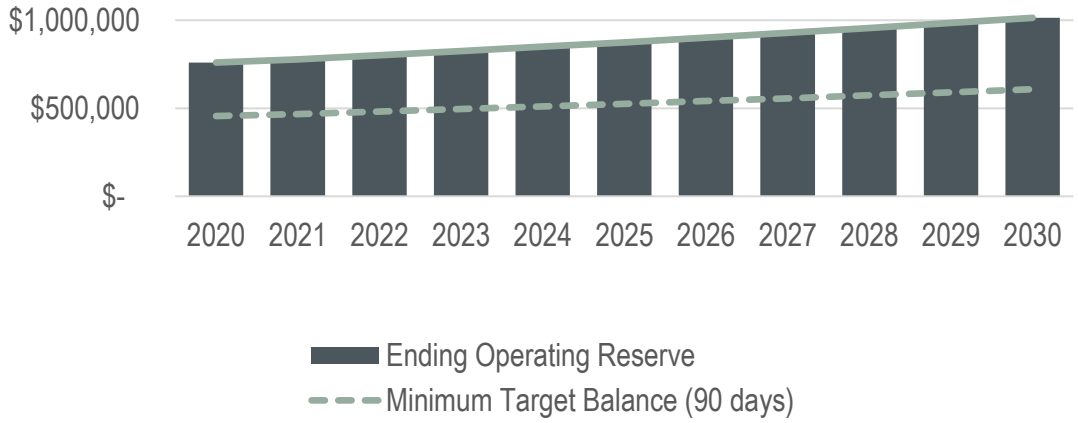
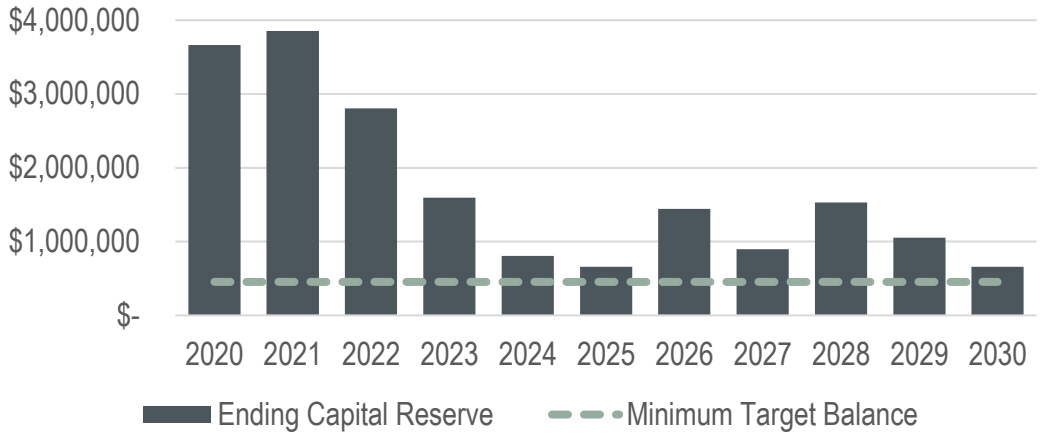


Exhibit 9 shows the projected level of capital reserves in the 2020-2030 forecast. Excess capital reserves are drawn down through 2024, which allows the water utility to avoid borrowing during that period. Beginning in 2025 and again in 2028, capital projects are funded by a mixture of borrowing, current rate revenue, and GFCs. From 2025 through 2030, the level of capital reserves is stable, and it stays above the minimum policy reserve target.

Exhibit 9: Water Capital Reserve Forecast

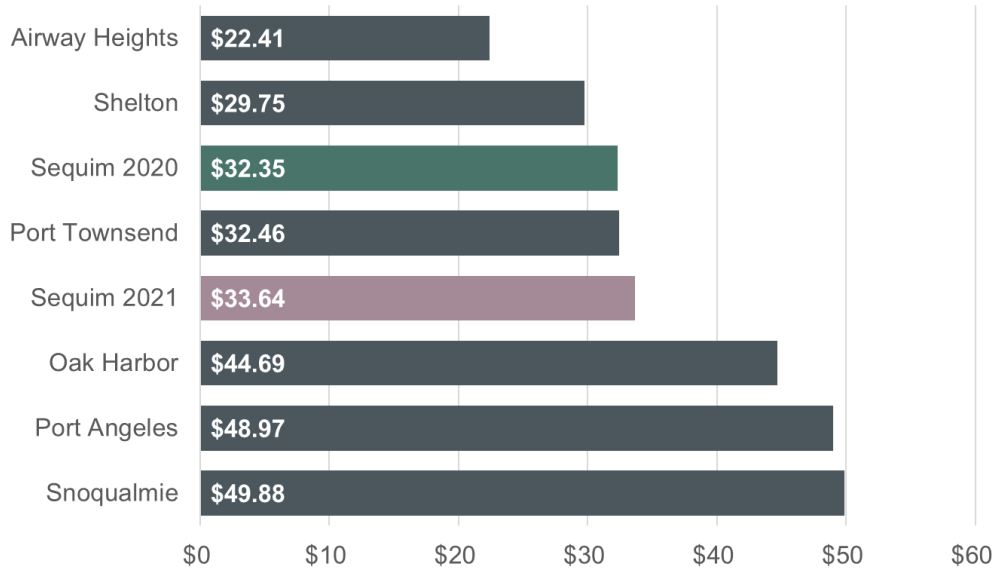


III.D. WATER RATE SURVEY

Exhibit 10 shows how Sequim water rates for Single Family customers compare to those of other utilities. Later in this report we will show a similar comparison for sewer rates and for water and sewer GFCs. We used the same list of jurisdictions to compare the rates and GFCs for both water and sewer utilities. City staff selected comparator utilities that are either nearby or similar in size and other characteristics. This comparison assumes 530 cf/month of water usage, which is the average for Sequim Single Family customers. To be consistent with the comparison shown in our July 2020 presentation to the Council, this chart assumes across-the-board rate increases for 2021.

Sequim water rates fall in the middle of this comparison group, both before and after considering the recommended 4.0% increase in the 2021 revenue requirement.

Exhibit 10: Survey of Single Family Monthly Water Bills (630 cf/mo)



Section IV. Water Cost of Service Analysis

A cost-of-service analysis assesses rate equity by comparing cost recovery with the unique demands that each customer class places on the system. There are three main steps to allocate the revenue requirement to customer classes: 1) allocate utility costs by function, 2) develop allocation factors for customer classes, and 3) allocate costs to customer classes. The share of costs attributable to each customer class can be compared with its share of revenue. This comparison gives an indication of the degree to which rates for each class should increase or decrease relative to that of other classes.

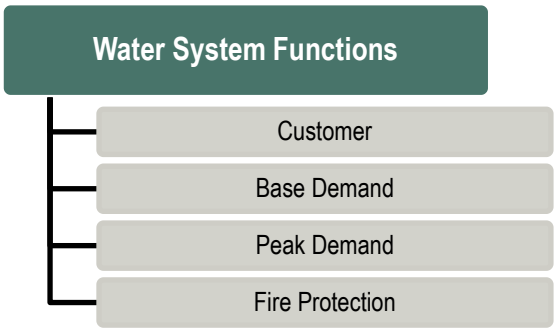
IV.A. FUNCTIONAL ALLOCATION – ASSETS

The functional allocation is a two-step process: first assign *system assets* to the functions of water service, using engineering criteria and industry standard practice with respect to cost causation. Then use the resulting percentage allocations to help allocate the *annual revenue requirement*.

The primary functions of water service are the following:

- **Customer.** These are costs associated with serving individual water customers, such as administrative, billing, and customer service costs. These costs are generally uniform by customer regardless of their meter size or demand placed on the water system.
- **Meters and Services.** These costs are associated with the installation, maintenance, and repairs of meters and service lines.
- **Base Demand.** These costs relate to average service provided on demand and are correlated with year-round water consumption.
- **Peak Demand.** These costs relate to providing additional capacity to meet incremental water demand during peak demand periods. For Sequim, the peak season is defined as June-September. Peak demand is measured as peak-month average usage in relation to year-round average usage.
- **Fire Protection.** Associated with the ability of the system to provide adequate capacity and water flow corresponding to minimum fire safety standards required to serve its customer demographic. These are mostly incremental costs related to providing storage, distribution capacity, and hydrants for fire protection.

Exhibit 11: Major Functions of Service - Water



The assignment of the major asset classes to functions are guided by the following principles:

- **Supply & Treatment Assets** are allocated 45% to base demand and 55% to peak demand. According to Table 2-4 of the June 2013 Water System Plan prepared by Gray & Osborne, the ratio of Maximum Day Demand to Average Day Demand for the City water system is 2.20. This "peaking factor" guides the allocations between base and peak demand, using the "base-extra capacity method" outlined in the *Manual M1: Principles of Water Rates, Fees and Charges* published by the American Water Works Association (AWWA). Base demand represents the year-round average, which is 1.0 ÷ 2.2 = 45% of the total demand. The peak demand allocation is the extra capacity required due to system peaking; it is calculated as the difference between total demand and base demand, or 55%.
- **Transmission & Distribution Assets** are first assigned to the fire protection function based on the cost of the pipe oversizing needed to meet fire flow requirements. Remaining costs are allocated to base and peak demand using the same percentages as supply and treatment assets.
- **Pumping Assets** are allocated in the same manner as transmission & distribution assets.
- **Storage Assets** are allocated based on the storage analysis in the Water System Plan, which categorizes storage requirements as operating storage (OS), equalizing storage (ES), standby storage (SB), fire suppression storage (FSS), dead storage and excess storage. Standby and fire suppression storage are nested together—that is, the combined SB/FSS requirement is the higher of the two rather than the sum of the two. To separate them, we reduced both SB and FSS in proportion to their share of the total when considered as stand-alone requirements. After this adjustment, FSS is assigned 100% to the Fire Protection function; ES is assigned 100% to peak demand; and SB is allocated between Base and Peak using the peaking factor discussed above.

  The other storage types are allocated in the same way we would allocate overhead costs—by spreading them proportionately to the "direct service" functions of ES, SB, and FSS. Operating storage (storage needed to allow the pumps to rest) is a function of the configuration of the reservoirs and size of the pumps, and dead storage is a function of the elevation of the reservoir. Both are only indirectly related to system demand. Similarly, we spread proportionately the storage surplus or deficit—the difference between actual storage built and total storage requirements. The costs refer to actual storage built, but the purposes—the reasons those costs are incurred—are defined by the requirements. Any difference between the two cannot be attributed to a particular "direct service" category, so it is allocated as an overhead amount.
- **Hydrant Assets** are allocated 100% to fire.

The historical asset data was limited in its specificity. It did not contain any assets that could be attributed to the customer function. With most utilities, the customer function is a very small share of total assets—sometimes a share of the office space is booked as a utility asset, but not always—and with the Sequim water system, no customer-related assets are shown in the historical asset data.

The result of the asset allocation is 32% to base demand, 38% to peak demand, and 30% to the fire protection function. These percentages are referred to as the "plant in service" allocation, and they are used to allocate the capital-related line items in the annual revenue requirement.

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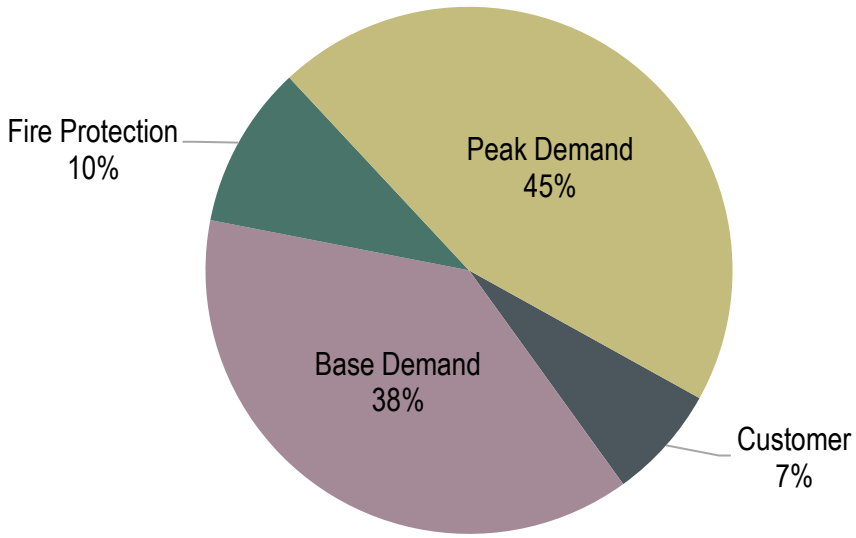
IV.B. FUNCTIONAL ALLOCATION – ANNUAL COSTS

The next step is to allocate each 2021 budget line item to the functional categories. The following summarizes the key assumptions for the allocation of annual costs.

- **Water Administration Costs –** About $43,000 per year in administrative supplies and services are assumed to be related to customer service and are assigned to the customer function.
- **Water Interfund Service Charge** – An estimated 10% of this charge is assumed to be related to customer billing and is assigned to the customer function. The remainder is allocated in proportion to all other annual costs.
- **Water Transmission & Distribution –** About $900,000 of annual costs associated with transmission and distribution (T&D) system maintenance (including salaries, benefits, materials, and services) are allocated based on the T&D asset percentages previously developed: 40% to base demand, 49% to peak demand and 11% to fire protection.
- **Utility-Related Line Items** – A group of budget line items totaling $80,000 per year are labeled as "utility" line items. They consist of administrative expenditures, including salaries, benefits, and family medical leave. These costs are allocated in proportion to all other annual costs.
- **Stormwater Transfer** – This line item is also allocated in proportion to all other annual costs.
- **Taxes –** This is allocated in proportion to all other expenses.
- **Debt Service and Rate-Funded Capital Reinvestment –** This is allocated as plant in service – 32% to base demand, 38% to peak demand, and 30% to fire protection.
- **Non-Rate Revenue/Cash Flow Adjustments –** Non-rate revenues (such as interest earnings, late fees, hydrant rentals and water meter installation fees) are allocated in proportion to all other annual costs.

The results of the functional allocation are shown in **Exhibit 12**. Most of the cost is allocated to either base or peak demand, but about 7% is allocated to the customer function and about 10% to the fire protection function.

Exhibit 12: Functional Cost Allocation - Water



IV.C. CUSTOMER CLASS DISTINCTIONS

In this cost of service analysis, we focused on four main customer classes: Single Family Residential (which includes the Standby class), Multi-Family, Commercial (which includes the Irrigation class) and Hotel/Motel/RV. Single Family Residential includes duplexes; Multi-Family is defined as three or more units per meter.

IV.D. ALLOCATION FACTORS

Once the customer classes were defined, the functional costs from **Exhibit 12** were allocated to the customer classes based on the demand each class places on the system. To complete this step, we developed allocation metrics focused on customer characteristics, such as the number of accounts, annual and peak-month consumption levels, and fire flow requirements. These allocation factors are intended to equitably allocate total costs to those benefitting from the service. For this study, functional costs were allocated to customer classes based on the following metrics:

- **Customer Costs.** Single Family (which includes duplexes) and Multi-Family base charges are based on the number of dwelling units. Other accounts assume one unit per account.
- **Base Demand.** Base Demand costs are allocated to customer classes based on total billed volume.
- **Peak Demand.** Peak Demand costs are allocated based on the peak billed volume for each class, as measured in the 2019 customer billing data. Utilities differ in their definition of "peak season." The Sequim water system has a 4-month peak season, defined as June through September.
- **Fire Protection.** Fire Protection costs are allocated based on the fire flow gallons per minute (GPM) and duration requirements identified for each customer class in Chapter 3 of the 2013 WSP. Single Family Residential customers require 1,000 GPM for a duration of one hour; most other classes require 3,000 GPM for a duration of 3 hours. There are no fire flow requirements for the irrigation class.

IV.E. COST OF SERVICE RESULTS

Exhibit 13 compares each customer group's 2021 cost-of-service allocation ("COSA") with its share of the 2021 revenue assuming across-the-board ("ATB") 4% rate increases. The rightmost column in this table shows us the relative percentage shift in rate burden that should take place to best match the cost of serving these four broad customer classes. The 0% total change shown on the bottom row indicates that this shift would be revenue-neutral across all the classes.

Exhibit 13: Comparison of 2021 Water Revenue with Across-the-Board Increases to Cost-of-Service Allocation

Class	2021 Revenue with ATB Increases	2021 COSA	$ Difference	% Difference
Single Family	$ 1,091,095	$ 981,403	$ (109,692)	-10.1%
Multi-Family	607,697	475,976	(131,721)	-21.7%
Commercial	678,558	951,034	272,476	40.2%
Hotel/Motel/RV	127,939	96,876	(31,063)	-24.3%
Total	**$ 2,505,289**	**$ 2,505,289**	**$ (0.00)**	**0.00%**

Exhibit 14 compares the 2021 cost-of-service allocation with the 2021 revenue assuming no rate increase from 2020. The figures in the rightmost column indicate the percentage changes from 2020 rates that would be needed to *both* achieve the projected revenue requirement *and* shift the rate burden among customer classes. The 4% total change shown on the bottom row indicates that an increase in the overall revenue requirement is part of the change for each customer class.

Exhibit 14: Comparison of 2021 Water Revenue under 2020 Rates to Cost-of-Service Allocation

Class	2021 Revenue with 2020 Rates	2021 COSA	$ Difference	% Difference
Single Family	$ 1,049,130	$ 981,403	$ (67,727)	-6.5%
Multi-Family	584,324	475,976	(108,348)	-18.5%
Commercial	652,460	951,034	298,574	45.8%
Hotel/Motel/RV	123,018	96,876	(26,142)	-21.3%
Total	**$ 2,408,931**	**$ 2,505,289**	**$ 96,357**	**4.00%**

The specific percentages in these tables have been updated somewhat from the versions shown to the Council in September 2020, but the basic finding is the same: to reflect the cost of serving each class, Single Family Residential, Multi-Family and Hotel/Motel/RV should be paying relatively less and Commercial customers should be paying more.

It should be noted that any cost-of-service analysis is a snapshot in time, based on a variety of assumptions that are not exact measures of the relative burden on the system. It is a common practice to assume a margin of error of 10%, within which a cost-of-service adjustment is a judgment call. In these results, however, only the Single Family class is within 10% of its cost of service, and the other classes vary by more than 10%. If the City is considering changes to its rate design (which will be discussed in the next section), the effect of those changes should be to decrease the relative rate burden of Single Family Residential, Multi-Family and Hotel/Motel/RV customers, and increase the rate burden for Commercial customers.

Section V. WATER RATE DESIGN

V.A. EXISTING RATE STRUCTURE

As shown in **Exhibit 15**, current water rates are comprised of a fixed monthly charge that varies by meter size and class, and a tiered usage charge per cubic foot (cf) that varies by class.

Exhibit 15: 2020 Monthly Water Rates

2020 Monthly Water Rates - Inside-City Customers			
Base Charge ($/month)		**Usage Rates ($/cubic feet)**	
Single Family Residential (per unit)	$27.31	Single Family/Multi-family	
Multi-Family Residential (per unit)	$25.93	Block 1 (<=600 cf/mo/unit)	$0.00950
Hotel/Motel/RV (per unit)	$20.47	Block 2 (601-1600 cf/mo/unit)	$0.02777
		Block 3 (>1600 cf/mo/unit)	$0.03509
Commercial (per meter)			
5/8" x 3/4"	$27.31	Commercial and Hotel/Motel/RV	
1"	$45.59	Block 1 (<=600 cf/mo/unit)	$0.00950
1.5"	$90.92	Block 2 (>600 cf/mo/unit)	$0.02777
2"	$145.55	Commercial	
3"	$272.98	Uniform Usage Rate	*N/A*

Notes: Single family includes duplex. Multi-family is defined as 3 or more units per meter.
Commercial includes Public Authority and Irrigation.
Outside-City customers are charged 1.5 times the rates applicable to inside-City customers

The usage charges are designed with conservation blocks. The Single Family Residential and the Multi-Family classes have three blocks. The first tier is up to 600 cf/month/unit, a second tier is for usage between 601 and 1,600 cf/month/unit, and there is a third tier for usage above 1,600 cf/month/unit. The Commercial and Hotel/Motel/RV classes also have block rates but with only two tiers, one for usage up to 600 cf/month per account and the second for usage above 600 cf/month per account.

There is a reduced rate program through which qualifying low-income customers pay 50% of the fixed charge. Customers who live outside the City are charged a rate multiplier of 1.5 times.

V.B. POLICY GOALS OF WATER RATE DESIGN CHANGES

The underlying goals of the suggested changes to the water rate design are:

- Improved equity, both within and among customer classes.
- Improved efficiency for staff and simplicity for customers.
- Responsiveness to the needs of low-income customers.

V.C. RECOMMENDED CHANGES TO WATER RATE DESIGN

There are four recommended changes to the water rate design.

- Eliminate tiers for Commercial usage charges.
  - » Why? Improved equity within the group of Commercial customers. Commercial customers are so unlike each other that a usage tier does not imply anything about their water conservation practices. For example, a grocery store that uses more than 600 cf per month is not necessarily using an inordinately high amount of water; it is just being a grocery store. A grocery store will naturally use more water than an accountant's office. Block rates make sense for residential customers (especially Single Family), who are similar to each other and exhibit seasonal peaking. Block rates do not make as much sense for Commercial customers.
  - » A uniform usage rate for Commercial customers would also be more efficient to administer.
  - » In addition, eliminating the lower usage tier would have the effect of increasing cost recovery from the Commercial class, which fits the findings of the cost-of-service analysis.
- Re-calibrate Multi-Family and Hotel/Motel/RV base charges to match their annual usage in relation to Single Family.
  - » Why? Improved equity between customer classes. We analyzed year-round average monthly water usage per unit for the Single Family, Multi-Family, and Hotel/Motel/RV classes. To be in proportion with their unit water consumption, the Multi-Family base charge per unit should be reduced from 95% to 86% of the Single Family charge. The Hotel/Motel/RV base charge per unit should be reduced from 75% to 60% of the Single Family charge.
  - » Lowering the revenue from Multi-Family and Hotel/Motel/RV classes fits the findings of the cost-of-service analysis.
- Correct the application of American Water Works Association (AWWA) meter capacity ratios to Commercial base rates.
  - » Why? Improved equity, both within the Commercial class and among classes.
  - » The City uses meter size multiples published by the AWWA to scale up the base charges for Commercial customers.
  - » Currently the larger meters are charged as though 3/4" were the smallest meter size, when in reality a 5/8" x 3/4" meter is the smallest meter size (and the one used by most Single Family residential customers). For instance, a 1" meter is now charged 1.67 times the rate of the basic meter, whereas the AWWA meter ratios would call for a multiple of 2.5 times.
  - » As a result, larger meters are paying less in relation to the basic meter than they should. We recommend that the Commercial base charge be scaled up in relation to 5/8" x 3/4" meters.
- Expand eligibility for the low-income discount program to match Clallam PUD, for which income thresholds are higher and there is no asset test.
  - » Why? Improved simplicity for customers and efficiency for City staff. If someone is eligible for PUD discounted rates, they would automatically be eligible for City discounted rates.
  - » This change also responds to economic conditions—support for low-income people in the community is increasingly important as utility rates go up. Based on the number of Clallam PUD low-income electricity customers who live within the City, we estimate that this change would allow the City to support 250 low-income households compared to about 50 today.

- Currently the City has an asset test—the maximum for 2019 was $150,000 excluding the value of the customer's primary residence. An asset test is unusual among low-income discount programs for utilities in Washington, because it requires more complex documentation than just an income test. Because of the documentation burden, even customers who might be eligible choose not to apply. The asset test also adds to the administrative complexity for staff.
- We estimate that this change would add about 1.8% to the average bill of non-low-income Single Family customers.

V.D. IMPACT ON WATER RATES

Exhibit 16 shows the effect of all four of these rate design changes on the water rates. In this table, the blue shading draws attention to what the changes are, and the yellow shading shows the percentage change to each type of rate, including the effect of the 4% across-the-board rate increase. For example, blue shading near the top of the table shows that the Multi-Family residential base rate would go from 95% to 86% of the Single Family base rate. The yellow shading shows that this change results in an 8.75% reduction in the Multi-Family base rate compared with the 2020 adopted rate.

For Commercial usage rates, eliminating Block 1 means that all usage would be billed at a rate that is similar to the current Block 2 rate—a uniform $0.02500/cf instead of $0.00988/cf for Block 1 and $0.02888/cf for Block 2. Large Commercial customers would be more affected by the change to the base charge; small Commercial customers would be more affected by the change to the usage charge.

Exhibit 16: Impact of Rate Design Changes on Water Rates

Inside-City Water Rates	2020 Adopted		2021 with Across-the- Board Changes			2021 with Rate Design Changes		
Base Charge ($/month)	% of SFR	Rate	% of SFR	Rate	% Change	% of SFR	Rate	% Change
Single Family Residential (per unit)	100%	$27.31	100%	$28.40	4.00%	100%	$27.50	0.69%
Multi-Family Residential (per unit)	95%	$25.93	95%	$26.96	4.00%	86%	$23.66	-8.75%
Hotel/Motel/RV (per unit)	75%	$20.47	75%	$21.29	4.00%	60%	$16.50	-19.38%
Commercial (per meter)	Meter Multiple		Meter Multiple			Meter Multiple		
5/8" x 3/4"	1.00	$27.31	1.00	$28.40	4.00%	1.00	$27.50	0.69%
1"	1.67	$45.59	1.67	$47.42	4.00%	2.50	$68.75	50.79%
1.5"	3.33	$90.92	3.33	$94.55	4.00%	5.00	$137.50	51.24%
2"	5.33	$145.55	5.33	$151.37	4.00%	8.00	$220.00	51.15%
3"	10.00	$272.98	10.00	$283.90	4.00%	16.00	$440.00	61.18%
Usage Rates ($/cubic feet)		Rate		Rate	% Change		Rate	% Change
Single Family/Multi-family							*Includes Hotel/Motel/RV with MF*	
Block 1 (<=600 cf/mo/unit)		$0.00950		$0.00988	4.00%		$0.01073	13.00%
Block 2 (601-1600 cf/mo/unit)		$0.02777		$0.02888	4.00%		$0.03138	13.00%
Block 3 (>1600 cf/mo/unit)		$0.03509		$0.03649	4.00%		$0.03965	13.00%
Commercial and Hotel/Motel/RV								
Block 1 (<=600 cf/mo/unit)		$0.00950		$0.00988	4.00%		N/A	163.29%
Block 2 (>600 cf/mo/unit)		$0.02777		$0.02888	4.00%		N/A	-9.97%
Commercial								
Uniform Usage Rate		N/A		N/A			$0.02500	
Outside City Multiplier		1.50		1.50			1.50	
Eligible Low-Income Customers		50		50			250	

V.E. IMPACT ON SAMPLE WATER CUSTOMER BILLS

With so many types of rate changes, how can we gauge the impact of the whole package? The best way to assess the overall impact is to define a group of *sample customers* and then calculate their bills with and without the rate design changes.

Exhibit 17 shows sample monthly charges for a group of customers with an assumed set of characteristics. The sample customers represent the average Sequim customer of a given class. For instance, the year-round average monthly water usage of Single Family customers is 530 cf/month. (And 1,060 cf/month is twice the average, showing the impact on high-usage customers). The average Multi-Family account has 29 units, and the average Hotel/Motel/RV customer has 40 units. The average Commercial account with a 5/8" x 3/4" meter uses 670 cf/month, and the average Commercial account with a 2" meter uses 5,480 cf/month.

Exhibit 17: Monthly Charges to Sample Water Customers

Sample Customer Impacts - Monthly Charges	2020 Rates	2021 Rates with Across-the-Board Changes	2021 Rates with Rate Design Changes
Single Family (not low-income, 530 cf/month usage)	$32.34	$33.64	$33.19
Percent Change		4.0%	2.6%
Dollar Change		$1.29	$0.84
Single Family (not low-income, 1,060 cf/month usage)	$45.78	$47.61	$48.37
Percent Change		4.0%	5.7%
Dollar Change		$1.83	$2.59
Multi-family (29 units, 460 cf/month/unit usage)	$873.72	$908.67	$824.66
Percent Change		4.0%	-5.6%
Dollar Change		$34.95	($49.06)
Hotel/Motel/RV (40 units, 255 cf/month/unit usage)	$916.92	$953.59	$770.60
Percent Change		4.0%	-16.0%
Dollar Change		$36.68	($146.32)
Small Commercial (5/8" x 3/4" meter, 670/month usage)	$34.95	$36.35	$44.25
Percent Change		4.0%	26.6%
Dollar Change		$1.40	$9.30
Large Commercial (2" meter, 5,480 cf/month usage)	$286.75	$298.22	$357.00
Percent Change		4.0%	24.5%
Dollar Change		$11.47	$70.25

This table shows the impact that the package of rate design changes has on these sample customers. For single-family customers, the resulting rate increases would be *less than* 4% for average users and *greater than* 4% for above-average users. For Multi-Family and Hotel/Motel/RV customers, 2021 rates would decrease (by 5.7% and 16%, respectively) instead of increasing by 4%. The biggest adverse impact of the rate design changes is on Commercial customers. Small customers would see a 26.6% increase (instead of a 4% increase), mainly due to eliminating the lowest tier of usage charges. For large Commercial customers, the 24.5% increase results mainly from applying corrected meter ratios.

V.F. IMPACT ON WATER COST-OF-SERVICE COMPARISON

How does this package of rate design changes affect the cost-of-service analysis? **Exhibit 18** addresses this question. For each group, the *direction* of the shift matches what the cost-of-service analysis called for, even if the magnitude goes only partway toward the cost of serving each class.

We saw earlier that Commercial rate revenue would need to rise by 40.2% for it to approximate the cost of serving Commercial customers more closely. After the recommended package of rate design changes, Commercial rate revenue would still need to rise, but only 25.2%. For Single Family, Multi-Family, and Hotel/Motel/RV customers, the direction called for was the opposite—rates needed to decrease in relative terms to reflect the cost of serving those groups. After the package of rate design changes, all three groups would still be paying a higher percentage of revenue than warranted, but the difference would have narrowed, particularly for Multi-Family and Hotel/Motel/RV customers.

Exhibit 18: Impact of Rate Design Changes on Water Cost-of-Service Comparison

Impact of Rate Design Changes on Water Cost-of-Service Allocation (COSA) Comparison					
		Across-the-Board Increases		After Rate Design Changes	
Customer Class	2021 Cost of Service	2021 Revenue	% Change Needed to Match COSA	2021 Revenue	% Change Needed to Match COSA
Single Family	$ 981,403	$ 1,091,095	-10.1%	$ 1,087,567	-9.8%
Multi-Family	475,976	607,697	-21.7%	554,238	-14.1%
Commercial	951,034	678,558	40.2%	759,389	25.2%
Hotel/Motel/RV	96,876	127,939	-24.3%	104,095	-6.9%
Total	$ 2,505,289	$ 2,505,289		$ 2,505,289	

As we mentioned in our discussion of the cost-of-service analysis, these percentages are very approximate and can change from one year to another. It is common to assume that a variance within 10% is acceptable. In this case, if the rate design package is implemented, there will have already been a heavy impact on Commercial customers, and both Single Family and Hotel/Motel/RV customers will be within 10% of the target percentage. This is a positive step toward greater equity among customer classes, and we do not suggest further rate adjustments.

V.G. RECOMMENDED WATER RATE SCHEDULE

Exhibit 19 shows what the 2020-2026 rate table would look like if these rate design changes were made. After implementation of the rate design changes and rate shifts in 2021, the exhibit assumes 4% across-the-board rate increases in 2022 and moving forward.

Exhibit 19: Proposed Monthly Water Rates

Inside-City Water Rates with Rate Design Changes	2020 Rates	2021	2022	2023	2024	2025	2026
Base Charge ($/month)							
Single Family Residential (per unit)	$27.31	$27.50	$28.60	$29.74	$30.93	$32.17	$33.46
Multi-Family Residential (per unit)	$25.93	$23.66	$24.60	$25.59	$26.61	$27.68	$28.78
Hotel/Motel/RV (per unit)	$20.47	$16.50	$17.16	$17.85	$18.56	$19.30	$20.07
Commercial (per meter)							
5/8" x 3/4"	$27.31	$27.50	$28.60	$29.74	$30.93	$32.17	$33.46
1"	$45.59	$68.75	$71.50	$74.36	$77.33	$80.43	$83.64
1.5"	$90.92	$137.50	$143.00	$148.72	$154.67	$160.86	$167.29
2"	$145.55	$220.00	$228.80	$237.95	$247.47	$257.37	$267.66
3"	$272.98	$440.00	$457.60	$475.90	$494.94	$514.74	$535.33
Usage Rates ($/cubic feet)							
Single Family/Multi-family							
Block 1 (<=600 cf/mo/unit)	$0.00950	$0.01073	$0.01116	$0.01160	$0.01207	$0.01255	$0.01305
Block 2 (601-1600 cf/mo/unit)	$0.02777	$0.03138	$0.03263	$0.03394	$0.03530	$0.03671	$0.03818
Block 3 (>1600 cf/mo/unit)	$0.03509	$0.03965	$0.04124	$0.04289	$0.04460	$0.04639	$0.04824
Commercial and Hotel/Motel/RV							
Block 1 (<=600 cf/mo/unit)	$0.00950	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Block 2 (>600 cf/mo/unit)	$0.02777	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Commercial							
Uniform Usage Rate	*N/A*	$0.02500	$0.02600	$0.02704	$0.02812	$0.02925	$0.03042

Note: Single family includes duplex. Multi-family is 3+ units per meter. Commercial includes Public Authority & Irrigation.

Note: Outside-City customers will be charged 1.5 times the rates applicable to inside-City customers

Section VI. Sewer Revenue Requirement

This section presents the revenue requirement forecast for the sewer utility. Recommended increases in the overall revenue requirement are summarized in **Exhibit 20**.

Exhibit 20: Summary Results of Sewer Revenue Requirement Forecast

Summary of Rate Adjustments	2021	2022	2023	2024	2025	2026
Annual Rate Adjustments	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%

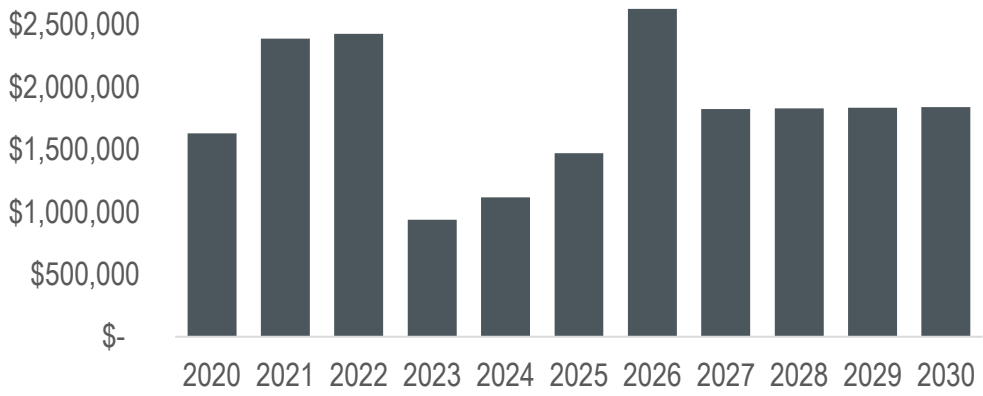
Like the water forecast, the sewer revenue requirement forecast is a two-step process. The *capital funding strategy* describes how planned capital improvements will be paid for, while the *annual forecast* contains the year-by-year projection of future ongoing costs and revenues.

VI.A. CAPITAL FUNDING STRATEGY

VI.A.1. Capital Expenditure Forecast

The 2020-30 Sewer CIP costs were provided by project, by year, and are in escalated dollars. **Exhibit 21** shows the planned annual capital spending. Cost escalation is included in these figures, and the 70% completion factor is applied. The average CIP per year is $1.8 million, and the total CIP during the forecast is $20 million. The fact that it is the same size as the water CIP is coincidental.

Exhibit 21: Sewer CIP Forecast (Escalated Dollars, after 70% Completion Factor)



Major sewer projects include:

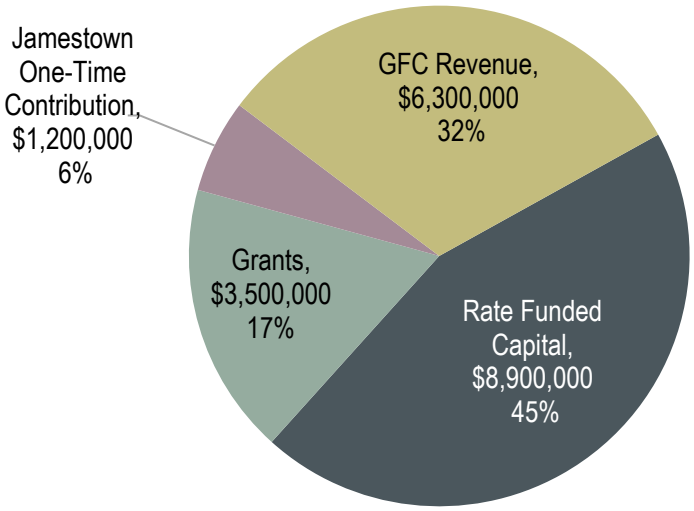
- SRR-014CU - East Fir Street Sewer Replacement – $2.2 million in 2027-2030.
- SRR-024CU - Reclaimed Water Network Expansion – $3.4 million in 2027-2030.
- SRR-034CU - Class A Biosolids Handling & Distribution Center – $2.5 million in 2024-2026.
- SRR-035CU - Aerobics Digester Capacity Upgrades – $2.1 million in 2020 and 2022.

VI.A.2. Capital Funding Sources

Capital funding sources for 2020-2030 include GFC revenue, remaining State Revolving Fund (SRF) loan proceeds (including reimbursement for Stormwater Bell Creek), grants or forgivable loans for the Doe Run and West Fir projects, a one-time capacity charge from the Jamestown S'Klallam Tribe, the drawdown of current cash reserves, annual cash-funded system reinvestment, and excess cash flow above the operating reserve target. No borrowing is forecast for the study period.

Exhibit 22 summarizes the planned capital funding sources.

Exhibit 22: Summary of Sewer Capital Funding Sources



VI.B. ANNUAL FORECAST

The purpose of the annual forecast is to determine whether existing rates are sufficient to recover system costs for the 2020-2030 planning period. The 2020 budget was the baseline year for this forecast. Following are some of the key assumptions in the annual forecast.

VI.B.1. Fund Balances

Exhibit 23 shows that the total sewer fund balances were about $7.0 million at the beginning of 2020. Of this total, just over $5.0 million consists of capital reserves.

Exhibit 23: Water Fund Cash Balances

Description	Beginning 2020 Cash Balances
Operating Reserve	$1,833,000
Capital Reserve	$5,024,000
Debt Reserve	$114,000
Total Beginning Cash January 1, 2020	**$6,971,000**

VI.B.2. Operating Revenue

- **Sewer Sales.** This is based on 2019 actuals, assuming 3% growth in 2020, 1%/year thereafter.
- **Non-Rate Revenue.** Non-rate revenue consists of reinspection fees, sewer sale late fees, city services, and space rentals (based on budget provided by the City).
- **Wholesale Customers.** The City of Sequim also provides wastewater treatment to wholesale customers–the Carlsborg system and the Jamestown S'Klallam Tribe. These customers pay a fixed pipe charge and volume-related treatment charge. The City also provides sewer maintenance service to those two systems plus the Sekiu/Clallam Bay system, for which they pay maintenance charges. In 2020, wholesale revenue accounts for 5% of the total City sewer revenue. This percentage moves up to 11% by the end of the forecast in 2030.

VI.B.3. Debt Service

Existing Debt Service. The sewer utility currently has one outstanding revenue bond (shared with the water utility) reaching maturity in 2034. In addition, there are three State Revolving Fund loans with repayment occurring by 2029 and one PWTF loan to be repaid in 2027. Total existing debt service payments range from $377,000 in 2020 to $3,000 by 2039.

New Debt Service. No new sewer debt issues are forecast during the study period.

VI.B.4. Rate-Funded System Reinvestment

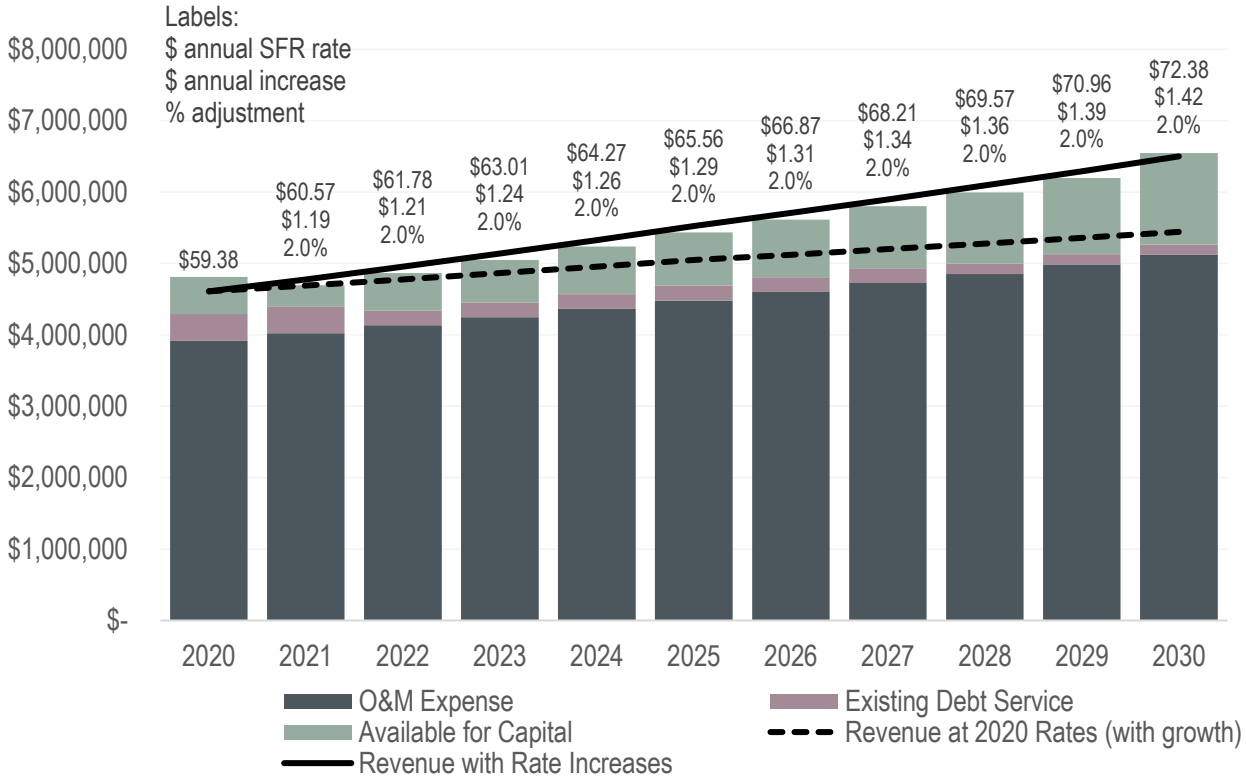
From 2020-2030, the sewer utility averages $760,000 of rate-funded capital per year, compared with an average of $1,053,000 of depreciation. The forecast level of rate-funded capital grows from 34% of depreciation in 2021 to 100% of depreciation in 2030.

VI.C. REVENUE REQUIREMENT RESULTS

Exhibit 24 graphically represents the revenue requirement forecast through 2030. The chart uses the same symbols and colors that we saw for the water revenue requirement.

- Dashed line: Revenue at existing rates plus customer growth.
  - » Rate revenue is about $4.6 million in 2020 and increases 1.0% per year with customer growth, before future rate adjustments. This gradually becomes inadequate over time.
- Solid line: Revenues with 2%/year rate increases.
  - » Rate revenues are expected to grow to just under $6.5 million per year by 2030.
- Dark blue bar: Operating and maintenance expense (O&M).
  - » Operating expenses are based on the adopted 2020 budget and increase with inflation.
- Pink bar: Existing debt service, with one revenue bond, three SRF loans, and one PWTF loan. There is no new debt service in the sewer revenue requirement forecast.
- Light Green bar: Available for capital.
  - » This amount increases gradually after 2021 as revenues increase with rate increases. By 2030, $1.6 million per year would be available for capital projects.

Exhibit 24: Annual Sewer Revenue Requirement Forecast 2020-2030



The annual forecast shows a deficiency in rate revenue without rate increases. Annual increases of 2% are needed to fully cover all costs and meet policy reserves.

Exhibit 25 shows that after the 2% annual rate increases are assumed, forecasted operating reserves from 2020-2030 stay within the policy parameters of 90-150 days of O&M expenses.

Exhibit 25: Sewer Operating Reserve Forecast

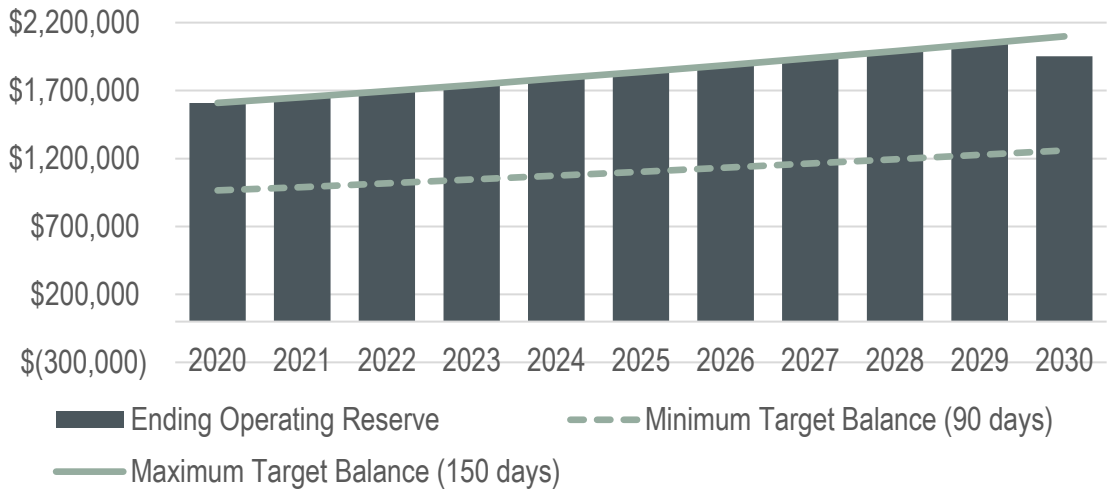
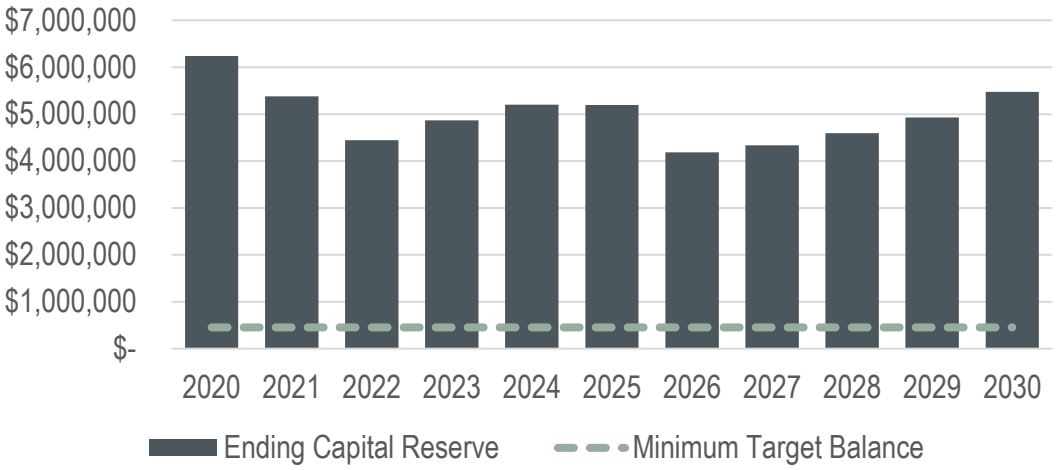


Exhibit 26 shows that in the 2020-2030 forecast, the level of capital reserves is stable. This confirms that the recommended 2% annual rate increases lead to sustainable capital funding without new debt.

The projected capital fund balance during this period stays well above the minimum balance of about $450,000 (25% of the average CIP).

Exhibit 26: Sewer Capital Reserve Forecast

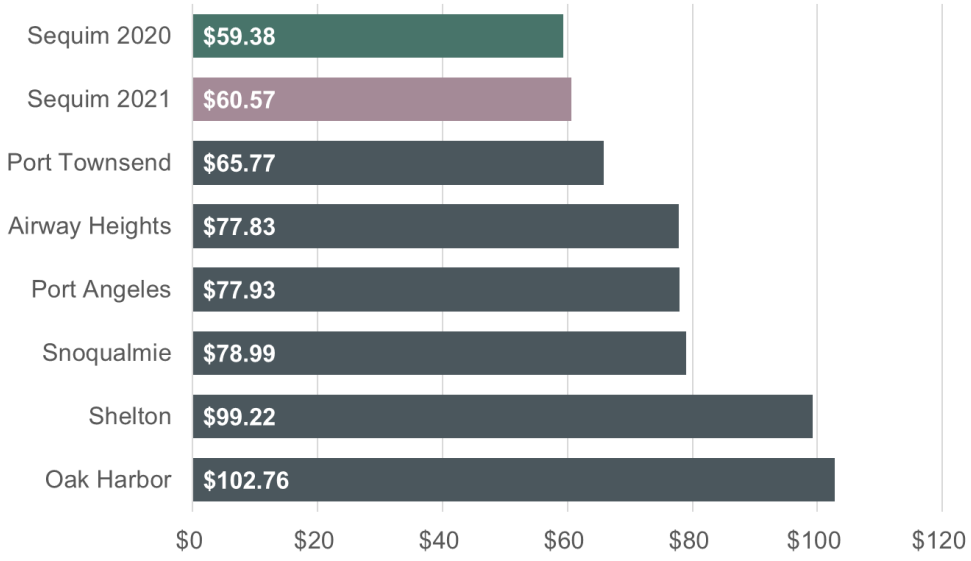


VI.D. SEWER RATE SURVEY

Exhibit 27 shows how Sequim sewer rates for Single Family customers compare to those of other utilities. This comparison is drawn from the same list of similar jurisdictions used for water rates and water and sewer GFC. Again, to be consistent with the comparison shown in our July 2020 presentation to the Council, this chart assumes across-the-board rate increases for 2021, before any changes to rate design. This comparison assumes 530 cf/month of water usage, which is in the lower usage tier for Sequim Single Family customers.

Sequim sewer rates are currently at the bottom of this comparison group, and they continue to be lower than the other sewer rates after considering the recommended 2% increase in the 2021 revenue requirement.

Exhibit 27: Survey of Single Family Monthly Sewer Bills



Section VII. Sewer Cost of Service Analysis

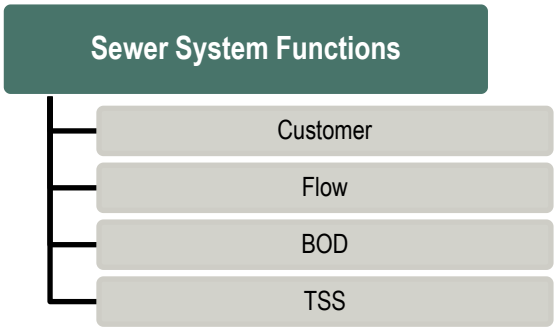
The sewer cost-of-service analysis mirrors the analysis performed for the water utility. Following is a description of the three main steps to allocate the sewer revenue requirement to customer classes equitably: 1) allocating utility costs by function, 2) developing allocation factors for customer classes, and 3) allocating costs to customer classes.

VII.A. Functional Allocation – Assets

Again, we first assign *system assets* to the functions of sewer service and then use the resulting percentage allocations to help allocate the *annual revenue requirement*. The primary functions of sewer service are the following:

- **Customer Costs.** These are costs associated with providing service to customers regardless of sewer contribution, such as billing and office support.
- **Sewer Flow Costs.** These costs are related to actual and estimated sewer volume processed within the system in a year.
- **Sewage Strength Costs.** These costs reflect strength of sewage processed. Strength is tracked by two measurements – biochemical oxygen demand (BOD) and total suspended solids (TSS). BOD is the parameter used to characterize the organic strength of sewage, while TSS measures the amount of particles suspended in water that will be filtered out and disposed of as biosolids.

Exhibit 28: Major Functions of Service - Sewer



Again, the City's historical asset data is limited in its specificity. There are three major classes of sewer system assets: pumping, treatment, and collection system assets. The assignment of the major asset classes to functions are guided by the following principles:

- **Pumping Assets** include the Doe Run and Port Williams lift stations. They must be sized to handle peak flow requirements to reliably convey wastewater to the City Water Reclamation Facility (WRF). Pumping assets are assigned 100% to the flow function.
- **Treatment Assets** consist of the WRF. Using a common engineering rule-of-thumb standard, we allocated 40% of treatment assets to flow, 30% to BOD and 30% to TSS.
- **Collection System Assets** are allocated 80% to flow and 20% to customer, assuming that customer laterals, cleanouts, and the physical connections are common to all customers.

The result of the asset allocation is 7% to the customer function, 55% to flow, 19% to BOD, and 19% to TSS. These percentages are referred to as the "plant in service" allocation, and they are used to allocate capital-related items in the annual revenue requirement.

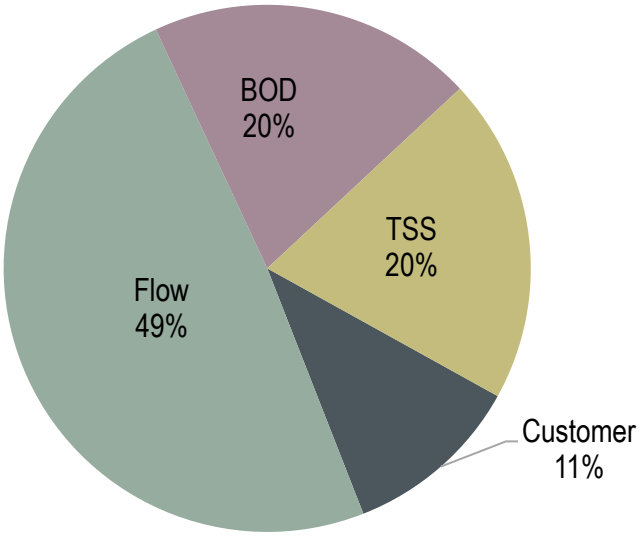
VII.B. FUNCTIONAL ALLOCATION – ANNUAL COSTS

The following summarizes the key allocation assumptions for annual costs:

- **Sewer Administration Costs –** Except for Billing Supplies (which is assigned to the customer function), administrative line items are allocated in proportion to all other expenses. These line items include materials and supplies, small tools, professional services, communication, office repair & maintenance, miscellaneous service fees and intergovernmental professional services.
- **Sewer Line Operations –** Salaries, benefits, equipment, and pump station utilities are allocated as the collection system, which splits the allocation 20% to customer and 80% to flow.
- **WRF Operations –** Salaries, benefits, maintenance and WRF capital expenditures are allocated as treatment assets: 40% to flow, 30% to BOD and 30% to TSS.
- **Transfers** – The transfers from the sewer operating fund to stormwater operations and to special funds is allocated in proportion to all other expenses.
- **Taxes –** Allocated in proportion to all other expenses.
- **Debt Service and Rate-Fund Capital Reinvestment –** This is allocated as plant in service – 6.8% to customer, 54.9% to flow, 19.1% to BOD and 19.1% to TSS.
- **Wholesale Revenue –** Wholesale revenue is broken out between treatment charges (allocated as treatment assets) and pipe maintenance revenue (allocated 100% to flow).
- **Other Non-Rate Revenue** – Other non-rate revenues include interest earnings, inspection fees, late fees, space rental, and wholesale revenue are allocated 100% in proportion to all other annual costs.

The results of the functional allocation are shown in **Exhibit 29**. Nearly half of the cost is allocated to flow, while 11% is allocated to the customer function and 20% each to BOD and TSS.

Exhibit 29: Functional Cost Allocation - Sewer



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VII.C. CUSTOMER CLASSES

In the cost of service analysis, we focused on four main customer classes: Single Family Residential (including Standby and Sewer-only customers), Multi-Family, Commercial and Hotel/Motel/RV.

VII.D. ALLOCATION FACTORS

Once the customer classes were defined, the functional costs from **Exhibit 29** were allocated to the customer classes based on the demand each class places on the system. For this study, functional costs were allocated to customer classes based on the following allocation metrics:

- **Customer Costs.** These costs were allocated based on the number of customer accounts.
- **Flow.** These costs were allocated based on non-peak billed volume. The wastewater generated by individual customers (and customer classes) is not directly metered, so it must be inferred from by metered water usage. Metered water usage peaks in the summer because of irrigation, which does not enter the sewer system. Therefore, the closest approximation of how much wastewater enters the sewer system from individual customers is the winter average metered water usage.
- **BOD and TSS.** These types of costs are both allocated based on non-peak billed volume. The rate model has the capability to adjust this metric for different BOD and/or TSS concentrations assumed for each customer class. However, the City does not currently have a pretreatment program and therefore a maximum domestic-strength BOD or TSS concentration has not been defined. There is likewise no customer class for high-strength Commercial customers such as restaurants. The December 2013 General Sewer Plan prepared by Gray & Osborne states that the City's average concentration is 293 mg/L for both BOD and TSS (pp. 2-20 and 2-21), but it does not contain any data differentiating domestic from Commercial loadings or concentration. Lacking a reasonable basis for an assumption, this cost-of-service analysis does not differentiate the customer classes by wastewater strength.

VII.E. COST OF SERVICE RESULTS

Exhibit 30 compares each customer group's 2021 cost-of-service allocation ("COSA") with its share of the 2021 revenue assuming across-the-board ("ATB") 2% rate increases. The rightmost column in this table shows us the relative percentage shift in rate burden that should take place to best match the cost of serving these four broad customer classes. The 0% total change shown on the bottom row indicates that this shift would be revenue-neutral across all the classes.

Exhibit 30: Comparison of 2021 Sewer Revenue with Across-the-Board Increases to Cost-of-Service Allocation

Class	2021 Revenue with ATB Increases	2021 COSA	$ Difference	% Difference
Single Family	$ 2,244,049	$ 2,312,752	$ 68,703	3.1%
Multi-Family	1,120,761	1,021,337	(99,424)	-8.9%
Commercial	870,008	975,737	105,729	12.2%
Hotel/Motel/RV	268,765	193,756	(75,008)	-27.9%
Total	**$ 4,503,583**	**$ 4,503,583**	**$ (0)**	**0.00%**

Exhibit 31 compares the 2021 cost-of-service allocation with the 2021 revenue assuming no rate increase from 2020. The figures in the rightmost column indicate the percentage changes from 2020 rates that would be needed to *both* achieve the projected revenue requirement *and* shift the rate burden among customer classes. The 2% total change shown on the bottom row indicates that an increase in the overall revenue requirement is part of the change for each customer class.

Exhibit 31: Comparison of 2021 Sewer Revenue with 2020 Rates to Cost-of-Service Allocation

Class	2021 Revenue with 2020 Rates	2021 COSA Amended Revenue	$ Difference	% Difference
Single Family	$ 2,200,048	$ 2,312,752	$ 112,704	5.1%
Multi-Family	1,098,785	1,021,337	(77,448)	-7.0%
Commercial	852,949	975,737	122,788	14.4%
Hotel/Motel/RV	263,495	193,756	(69,739)	-26.5%
Total	**$ 4,415,277**	**$ 4,503,583**	**$ 88,306**	**2.00%**

The specific percentages in these tables have been updated somewhat from the versions shown to the Council in September 2020, but the basic finding is the same: to reflect the cost of serving each class, Multi-Family and Hotel/Motel/RV should be paying relatively less for sewer service and Commercial and Single Family customers should be paying more.

Once again, any cost-of-service analysis is a snapshot in time, based on a variety of assumptions that are not exact measures of the relative burden on the system. It is a common practice to assume a margin of error of 10%, within which a cost-of-service adjustment is a judgment call. In these results, Single Family revenue is within 5% of its cost of service and Multi-Family is within 10%. However, Commercial and Hotel/Motel/RV vary by more than 10%. If the City is considering changes to its rate design (which will be discussed in the next section), the main emphasis of those changes should be on adjusting Commercial rates up and Hotel/Motel/RV rates down, since those are the classes that are more than 10% off the COSA target.

Section VIII. SEWER RATE DESIGN

VIII.A. EXISTING RATES

As shown in **Exhibit 32**, the existing sewer rate design mostly consists of a fixed monthly charge. For Single Family Residential, the fixed monthly charge falls into one of two tiers based on winter average usage. For the Multi-Family and Hotel/Motel/RV classes, the fixed charge is scaled up by the number of units; for the Commercial class, the fixed charge is scaled up by meter size. For the Commercial and Hotel/Motel/RV classes, there is also a usage charge for volume above 600 cf/month.

As with water, the sewer utility has a reduced rate program through which qualifying low-income customers pay 50% of the fixed charge. Unless superseded by a specific contract, the City imposes a 2.0 rate multiplier on outside-City sewer customers.

Exhibit 32: Existing Monthly Sewer Rates

2020 Monthly Sewer Rates - Inside-City Customers			
Base Charge ($/month)		**Base Charge ($/month)**	
Single Family Residential (per unit):		Commercial (per meter)	$62.88
Winter Avg Usage =<600 cf/mo	$59.38	5/8" x 3/4"	$78.41
Winter Avg Usage >600 cf/mo	$68.90	1"	$156.35
Sewer Only	$62.69	2"	$469.52
Multi-Family Residential (per unit)	$56.41	3"	
Hotel/Motel/RV (per unit)	$44.53		
		Usage Rates	
		Per cubic foot above 600 cf/mo:	
		Hotel/Motel/RV	$0.06208
		Commercial	$0.06208

Notes: Single family includes duplex. Multi-family is defined as 3 or more units per meter. Commercial includes Public Authority and Irrigation. Under otherwise specified in separate agreement, outside-City customers are charged 2.0 times the rates applicable to inside-City customers.

VIII.B. POLICY GOALS OF SEWER RATE DESIGN CHANGES

The underlying goals of the potential rate design changes are the same for sewer as for water:

- Improved equity, both within and among customer classes.
- Improved efficiency for staff and simplicity for customers.
- Responsiveness to the needs of low-income customers.

VIII.C. RECOMMENDED CHANGES TO SEWER RATE DESIGN

There are five recommended changes to the sewer rate design.

- Standardize the outside-City multiplier at 1.5 for all sewer customers.
  - » Why? Improved equity within sewer customers and between water and sewer.
  - » Currently the multiplier for water is a consistent 1.5. For sewer it varies, because contracts with specific neighborhoods supersede the general City policy.
  - » As a result, most outside-City sewer customers do not pay the 2.0 multiplier. **Exhibit 33** shows how many outside-City sewer customers are charged which multiplier.

Exhibit 33: Rate Multipliers for Outside-City Sewer Accounts

Rate Multipliers for Outside-City Sewer Accounts		
Currently at 1.5	234	80%
Currently at 1.6	29	10%
Currently at 2.0	31	11%
Total Outside-City Accounts	294	100%

  - » Because so few customers pay the 2.0 multiplier, the cost of standardizing it at 1.5 is relatively small. And because the cost-of-service analysis calls for increasing Commercial sewer rates, we suggest increasing the Commercial usage rate to offset revenue loss.
- Set Hotel/Motel/RV base charges to reflect winter average usage in relation to Single Family.
  - » Why? Improved equity between customer classes.
  - » We analyzed the average monthly water usage per unit of Multi-Family and Hotel/Motel/RV customers during the non-peak months of October through May. For the Multi-Family class, winter average usage per unit is about 98% of Single Family usage; we recommend that the current 95% factor remain. However, for the Hotel/Motel/RV class, the base charge should be reduced from 75% to 60% of the Single Family base charge.
  - » Reducing revenue from Hotel/Motel/RV is also consistent with the cost-of-service analysis.
- Eliminate the Hotel/Motel/RV usage charge.
  - » Why? Improved equity.
  - » There is more than one way to scale up the charges to larger customers—charge per unit, charge by meter size, or charge for excess usage above a certain threshold. Currently, Multi-Family sewer charges are scaled up by applying them to each dwelling unit. Commercial buildings do not have units, so a charge for excess usage (>600 cf/month) is the primary way to scale up the bill for larger businesses.
  - » However, hotels, motels, and RV spaces are currently scaled up with two methods, giving them twice the impact. The base charge applies per unit, and they also pay the excess usage charge for water consumption above 600 cf/month.
  - » We suggest eliminating the usage charge for Hotels/Motels/RVs, offset by a higher usage rate for the Commercial class.
  - » This fits the cost-of-service analysis and treats Hotel/Motel/RVs just like Multi-Family.
- Combine the two tiers of the Single Family sewer charge into a single uniform rate.
  - » Why? Simplicity and efficiency.

- » It would be simpler for customers to understand, especially those whose usage falls near the tier boundary (600 cf/mo winter average). With the current structure, they could be charged the lower rate one year and then—with just a small increase in winter usage—find themselves charged the higher rate the following year.
- » It would be more efficient for staff. The billing system does not automatically calculate the tiers; staff must do a manual calculation each year.
- » Creating a uniform rate would mean a one-time added increase of about 1.1%, or $0.67 per month, to the rates of people who use less than 600 cf/month (84% of all customers).

- Expand Low-Income Discount eligibility to match Clallam PUD, for which income thresholds are higher and there is no asset test.
  - » This is the same proposal as for the water utility, for the same reasons. For sewer, it adds about 1.8% ($1.06/month) to the average non-low-income Single Family bill.

VIII.D. IMPACT ON SEWER RATES

Exhibit 34 shows the effect of these rate design changes on sewer rates. Again, the blue shading draws attention to what the changes are, while the yellow shading shows the percentage change to each type of rate, including the effect of the 2% across-the-board rate increase. For example, blue shading near the top of the table shows that Single Family customers would go from a two-tiered fixed charge to a uniform fixed charge per month. For those using less than 600 cf/month the rate would go from $59.38 in 2020 to $62.29 per month in 2021, a 4.9% increase instead of a 2% across-the-board increase. (Of this 4.9% increase, 1.1% is due to merging the two rate tiers, and 1.8% is attributable to the expanded low-income program.)

Exhibit 34: Impact of Rate Design Changes on Sewer Rates

Inside-City Sewer Rates	2020 Adopted		2021 with Across-the- Board Changes			2021 Rate Design Changes - Uniform Single Family Rate		
Base Charge ($/month)	% of SFR Tier 1	Rate	% of SFR Tier 1	Rate	Pct. Change	% of SFR Uniform	Rate	Pct. Change
Single Family Residential (per unit):								
Winter Avg Usage =<600 cf/mo	100%	$59.38	100%	$60.57	2.00%	N/A	N/A	4.90%
Winter Avg Usage >600 cf/mo	116%	$68.90	116%	$70.28	2.00%	N/A	N/A	-9.59%
Uniform Rate	N/A	N/A	N/A	N/A		100%	$62.29	
Sewer Only	106%	$62.69	106%	$63.94	2.00%	100%	$62.29	-0.64%
Multi-Family Residential (per unit)	95%	$56.41	95%	$57.54	2.00%	95%	$59.18	4.90%
Hotel/Motel/RV (per unit)	75%	$44.53	75%	$45.42	2.00%	65%	$40.49	-9.07%
Commercial (per meter)	Meter Multiple		Meter Multiple			Meter Multiple		
5/8" x 3/4"	1.00	$62.88	1.00	$64.14	2.00%	1.00	$65.96	4.90%
1"	1.25	$78.41	1.25	$79.98	2.00%	1.25	$82.25	4.90%
1.5"	2.49	$156.35	2.49	$159.48	2.00%	2.49	$164.02	4.90%
2"	3.98	$250.25	3.98	$255.26	2.00%	3.98	$262.52	4.90%
3"	7.47	$469.52	7.47	$478.91	2.00%	7.47	$492.54	4.90%
Usage Rates								
Per cubic foot above 600 cf/mo:								
Hotel/Motel/RV		$0.06208		$0.06332	2.00%		N/A	N/A
Commercial		$0.06208		$0.06332	2.00%		$0.07683	23.76%
Outside-City Multiplier		2.00		2.00			1.50	
Eligible Low-Income Customers		50		50			250	

VIII.E. IMPACT ON SAMPLE SEWER CUSTOMER BILLS

Exhibit 35 shows monthly sewer charges for the same group of sample customers previously described for the water utility.

Exhibit 35: Monthly Charges to Sample Sewer Customers

Sample Customer Impacts - Monthly Charges	2020 Rates	2021 Rates with Across-the-Board Changes	2021 Rate Design Changes with Uniform SF Rate
Single Family (not low-income, <600 cf/month usage)	$59.38	$60.57	$62.29
Percent Change		2.0%	4.9%
Dollar Change		$1.19	$2.91
Multi-family (460 cf/month/unit usage)	$1,626.89	$1,659.43	$1,706.65
Percent Change		2.0%	4.9%
Dollar Change		$32.54	$79.76
Hotel/Motel/RV (255 cf/month/unit usage)	$1,783.88	$1,819.56	$1,622.01
Percent Change		2.0%	-9.1%
Dollar Change		$35.68	($161.87)
Small Commercial (5/8" x 3/4" meter, 670 cf/month usage)	$67.23	$68.57	$71.34
Percent Change		2.0%	6.1%
Dollar Change		$1.34	$4.12
Large Commercial (2" meter, 5,480 cf/month usage)	$553.20	$564.26	$637.47
Percent Change		2.0%	15.2%
Dollar Change		$11.06	$84.26

As we saw in the previous exhibit, the increase would be 4.9% instead of 2% for Single Family customers who are not low-income and whose winter average usage places them in the lower rate tier. Because we kept the equivalence factor at 95% for Multi-Family customers, the impact for our sample Multi-Family structure would be the same in percentage terms as the impact for Single Family. However, Hotel/Motel/RV customers would see reduced sewer rates because their equivalence factor would go from 75% to 65% of the Single Family rate and their usage rate would be eliminated. The largest adverse impact is on large Commercial customers, for whom the main part of the monthly bill comes from usage charges on volumes over 600 cf/month. In this sample customer profile, the large Commercial customer's sewer bill increases by 15.2%. In contrast, the sample small Commercial customer does not pay much in the way of usage charges; its increase of 6.1% is most attributable to the increase in fixed charges for Commercial customers.

VIII.F. IMPACT ON SEWER COST-OF-SERVICE COMPARISON

We saw earlier that before making any shift in the relative rate burden, the rate revenue from both Single Family and Multi-Family customers were within 10% of the level implied by the cost of service. We considered those variances close enough, so the main goal in our rate design changes was to increase the share borne by Commercial customers and decrease the share borne by Hotel/Motel/RV customers. The cost-of-service analysis would justify a 12.2% increase in revenue generated by Commercial rates and a 27.9% decrease in revenue generated by Hotel/Motel/RV.

For Hotel/Motel/RV customers, eliminating the usage charge and reducing the Single Family equivalence factor from 75% to 65% both have the effect of reducing the relative rate burden. For Commercial customers, we were able to adjust the usage rate so that Commercial revenue would match the COSA percentage.

Exhibit 36 shows how the package of sewer rate design changes affects the cost-of-service analysis.

Exhibit 36: Impact of Rate Design Changes on Sewer Cost-of-Service Comparison

Impact of Rate Design Changes on Sewer Cost-of-Service Allocation (COSA) Comparison					
		Across-the-Board Increases		After Rate Design Changes	
Customer Class	2021 Cost of Service	2021 Revenue	% Change Needed to Match COSA	2021 Revenue	% Change Needed to Match COSA
Single Family	$ 2,312,752	$ 2,244,049	3.1%	$ 2,157,650	7.2%
Multi-Family	1,021,337	1,120,761	-8.9%	1,152,656	-11.4%
Commercial	975,737	870,008	12.2%	968,389	0.8%
Hotel/Motel/RV	193,756	268,765	-27.9%	224,887	-13.8%
Total	$ 4,503,583	$ 4,503,583		$ 4,503,583	

For the Hotel/Motel/RV class, the rate design changes reduce the variance between the revenue share and the cost-of-service share from 27.9% to 13.8%, which is a substantial step in the direction of equity. By adjusting the usage rate, we were able to mostly eliminate the variance for Commercial.

Single Family and Multi-Family moved a few percentage points in the wrong direction, and Multi-Family now exceeds the 10% margin of error. However, outside of the Commercial class, the sewer rate design is dominated by fixed charges, and the relationship between the fixed charges for Single Family, Multi-Family, and Hotel/Motel/RV should be tied to their winter average water usage. As a result, we do not have a lot of flexibility in adjusting the cost-of-service percentages for any class except Commercial. For that reason, we consider the above percentages to be an acceptable outcome.

VIII.G. RECOMMENDED SEWER RATE SCHEDULE

Exhibit 37 shows what the 2020-2026 rate table would look like if these changes were made. The table assumes a 2% across-the-board rate increase in 2022 moving forward.

Exhibit 37: Recommended Monthly Sewer Rates

Inside-City Sewer Rates with 2021 Rate Design Changes	2020 Rates	2021	2022	2023	2024	2025	2026
Base Charge ($/month)							
Single Family Residential (per unit):							
Winter Avg Usage =<600 cf/mo	$59.38	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Winter Avg Usage >600 cf/mo	$68.90	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Uniform Rate	*N/A*	$62.29	$63.54	$64.81	$66.10	$67.43	$68.77
Sewer Only	$62.69	$62.29	$63.54	$64.81	$66.10	$67.43	$68.77
Multi-Family Residential (per unit)	$56.41	$59.18	$60.36	$61.57	$62.80	$64.05	$65.33
Hotel/Motel/RV (per unit)	$44.53	$40.49	$41.30	$42.13	$42.97	$43.83	$44.70
Commercial (per meter)							
5/8" x 3/4"	$62.88	$65.96	$67.28	$68.63	$70.00	$71.40	$72.83
1"	$78.41	$82.25	$83.90	$85.58	$87.29	$89.03	$90.82
1.5"	$156.35	$164.02	$167.30	$170.64	$174.05	$177.54	$181.09
2"	$250.25	$262.52	$267.77	$273.12	$278.59	$284.16	$289.84
3"	$469.52	$492.54	$502.39	$512.44	$522.69	$533.14	$543.80
Usage Rates							
Per cubic foot above 600 cf/mo:							
Hotel/Motel/RV	$0.06208	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Commercial	$0.06208	$0.07683	$0.07837	$0.07994	$0.08154	$0.08317	$0.08483

Note: Single family includes duplex. Multi-family is 3+ units per meter. Commercial includes Public Authority & Irrigation.
Outside-City customers will be charged 1.5 times the rates applicable to inside-City customers

VIII.H. COMBINED WATER/SEWER BILL IMPACT

Exhibit 38 shows the bill impact of both the across-the-board adjustments and the rate design changes for a sample single family customer that is not low-income and uses 530 cf/month.

Exhibit 38: Combined Water/Sewer Bill Impact – Single Family Sample Customer

Sample Customer: Single Family, not Low-Income, Usage 530 cf/month	2020 Rates	2021 Rates with Across-the-Board Changes	2021 Rate Design Changes with Uniform SF Rate
Water	$32.34	$33.64	$33.19
Percent Change		4.0%	2.6%
Dollar Change		$1.29	$0.84
Sewer	$59.38	$60.57	$62.29
Percent Change		2.0%	4.9%
Dollar Change		$1.19	$2.91
Combined Water & Sewer	$91.72	$94.20	$95.48
Percent Change		2.7%	4.1%
Dollar Change		$2.48	$3.76

The combined impact would be 2.71% in 2021 if rates are increased across-the-board. It the rate design changes are implemented, this sample customer would see a one-time increase of $4.09%. In future years the combined increase would be closer to 2.7%, the same as the combined across-the-board percentage in 2021. In general, the sewer bill is nearly twice as large as the average water bill, and sewer is increasing by 2%/year instead of 4%/year.

Exhibit 39 shows the combined impact of water and sewer rate for a large commercial customer that has a 2” meter and uses 5,480 cf/month of water.

Exhibit 39: Combined Water/Sewer Bill Impact – Large Commercial Sample Customer

Sample Customer: Commercial, 2" meter, Average Usage 5,480 cf/month	2020 Rates	2021 Rates with Across-the-Board Changes	2021 Rate Design Changes with Uniform SF Rate
Water	$286.75	$298.22	$357.00
Percent Change		4.0%	24.5%
Dollar Change		$11.47	$70.25
Sewer	$553.20	$564.26	$637.47
Percent Change		2.0%	15.2%
Dollar Change		$11.06	$84.26
Combined Water & Sewer	$839.95	$862.49	$994.47
Percent Change		2.7%	18.4%
Dollar Change		$22.53	$154.51

In 2021, the combined impact would be 2.7% with across-the-board increases and 18.4% assuming the rate design changes, which are intended to increase the commercial share of the total cost of service. In future years, the combined impact would be closer to 2.7%, the same as the across-the-board option for 2021.

Section IX. GENERAL FACILITY CHARGE

IX.A. INTRODUCTION TO GENERAL FACILITY CHARGES

As part of the rate study, the City requested an update to its general facility charges (GFCs). GFCs are designed to recover from new development a proportionate share of the cost of capital facilities. GFCs are one-time charges, not ongoing rates. They are payable at the time a structure is newly connected to the water or sewer system or a structure is redeveloped to a higher level of demand. GFCs serve two primary purposes:

- to provide equity between existing and new customers; and
- to provide a source of funding for system capital costs.

GFC revenue may only be used for capital expenditures. They are intended to recover the cost of system facilities, not property-specific assets such as water meters.

IX.A.1. Legal Basis

For cities, GFCs are authorized by Section 35.92.025 of the Revised Code of Washington (RCW).

> Cities and towns are authorized to charge property owners seeking to connect to the water or sewerage system of the city or town as a condition to granting the right to so connect, in addition to the cost of such connection, such reasonable connection charge as the legislative body of the city or town shall determine proper in order that such property owners shall bear their equitable share of the cost of such system.

"Equitable share" is the key language in that section. RCW 35.92.025 is silent about the specific methodology for a GFC. However, the statute governing water and sewer districts (RCW 57.08.005 (11)) does provide further methodological guidance. While Chapter 57 strictly applies only to special districts, we use it to inform our GFC methodology for cities and counties as well.

IX.A.2. General Methodology

The general methodology for a GFC is to divide applicable capital costs (the numerator) by the applicable customer base (the denominator).

IX.A.3. Cost Basis (Numerator)

The *cost basis* includes the cost of both existing assets and future planned capital improvements.

- **The cost of the existing system** includes the original cost of existing assets plus construction work in progress. Assets are excluded if they had outside funding such as grants, developer donations, or cost sharing from other agencies. Depreciation is not deducted; instead, the focus is on the cost actually borne by the utility ratepayers. As authorized in the statute, interest on the asset cost is added for up to 10 years, using interest rates prevailing at the time of construction. We also subtract outstanding debt principal, net of cash balances (but not less than zero).
- **The cost of future improvements** includes projects in the City's Capital Improvement Plan (CIP). Future capital costs are expressed in current dollars, not inflated dollars. Included in their

entirety are projects needed to expand system capacity, meet regulatory requirements, or add new functionality. If a CIP project is for repair and replacement, a deduction is made for the future retirement of the asset being replaced. This is to avoid double-counting the same asset in the GFC calculation.

IX.A.4. Units (Denominator)

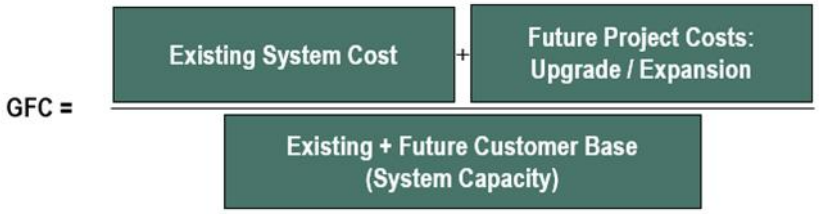
The unit of measurement for the customer base (the denominator) may be equivalent residential units (ERUs), meter capacity equivalents (MCEs), or a similar metric. The choice of units in the GFC calculation depends on how it is administered. In Sequim, both water and sewer GFCs are administered with equivalence factors outlined in the Sequim Municipal Code, Chapter 13.72. Each type of residential development has a specified ERU value per unit. For commercial development, the number of ERUs is based on the meter size.

The total denominator includes the number of ERUs that can be served by existing system capacity, plus the growth in capacity made possible by future capital projects.

IX.A.5. GFC Calculation

In Washington, there is more than one method that can be used to construct a defensible GFC. Here we use the *average integrated method*, which provides stability over time and equity between new and existing customers. It is a simple calculation. As shown in **Exhibit 40**, the GFC is the total cost (existing plus future assets) divided by the total ERUs—existing capacity plus growth allowed by future capital investment. The GFC represents the average unit cost of capacity.

Exhibit 40: GFC Average Integrated Methodology



The calculated charges represent the maximum allowable charge. The City may legally choose to implement a charge less than the maximum.

The following narrative describes how the general GFC methodology is applied to the City of Sequim water and sewer systems.

IX.B. WATER GENERAL FACILITY CHARGE

IX.B.1. Existing Cost Basis - Water

The existing cost portion of the calculation is intended to recognize the current ratepayers' net investment in the original cost of system assets. The calculation includes the following elements:

- ***Utility Capital Assets:*** The City's historical cost data is limited, and we derived our cost estimate from four sources. The 2007 GFC update contained estimated costs for assets placed in service prior to 2007. The 2014 GFC update contained estimates for assets added between 2007 and 2014. The City provided historical cost data for assets added since 2014. In addition, the City

provided a current pipe inventory so we could replicate the 2007 pipe analysis with more complete information about the size and lineal feet of feet of water pipe.

- ***Less: Contributed Assets*** – The total original cost should be reduced by the amount of funding from grants, developers or property owners, or intergovernmental cost sharing. Prior year revenue from GFCs or similar capacity charges are not deducted. The City does not have records of any outside funding for the water system. However, to account for the possibility of developer-funded water line extensions, we assumed that 50% of the pipe 8 inches or smaller was originally funded by developers. This assumption was made in the 2007 GFC update, and we decided it is still a reasonable assumption, lacking other data about capital contributions. Based on this assumption and the various sources of historical cost data, we estimate that the water utility assets had an original cost net of capital contributions of $22.8 million.
- ***Plus: Interest on Non-Contributed Plant in Service*** – RCW 35.92.025 allows GFCs to include interest for up to 10 years of an asset's life, at the rate applicable at the time of construction (but not to exceed 10% in any year). The total accumulated interest over the ten years cannot exceed the cost of the asset. Conceptually, this interest provision attempts to account for opportunity costs that the City's customers incurred by supporting investments in infrastructure rather than having it available for investment or other uses. Using historical Bond Buyer Index data, we calculated interest on the system-funded water assets at $12.9 million.
- ***Plus*: *Construction Work-in-Progress*** – The costs of construction work in progress can be added to the existing cost basis to recognize investments that the City has made in capital projects that are currently underway but not yet complete. The City did not identify any construction work-in-progress for the water system.
- ***Less: Debt Principal Outstanding*** – We subtract outstanding debt principal, net of cash balances (but not less than zero). The rationale is that outstanding debt principal represents assets acquired but not yet paid for by the ratepayers, so newly connecting property owners will be paying a share of that debt principal through their monthly rates after they join the system. However, cash balances represent money that *has* already been collected from current ratepayers—money that offsets the cost of future debt principal payments. In the case of the water system, cash reserves exceed outstanding debt principal, so there is no net debt principal deduction.

After these adjustments, the existing cost basis will be spread across the total future capacity of the system (existing and future planned capacity), since all existing infrastructure will continue to benefit all customers. As shown in **Exhibit 41**, the existing cost basis for the water system is $35.7 million.

Exhibit 41: Water GFC Existing Cost Basis

Existing Cost Basis		
PLANT-IN-SERVICE		
Utility Capital Assets Net of Capital Contributions		$ 22,817,920
plus: Interest on Non-Contributed Plant		12,861,542
plus: Construction-Work-in-Progress		-
2019 Year-end Estimated Cash Balances	$ 4,971,660	
less: Debt Principal Outstanding	(2,430,725)	
less: Net Debt Principal Outstanding		$ -
TOTAL EXISTING COST BASIS		**$ 35,679,461**

IX.B.2. Future Cost Basis - Water

The future cost basis portion of the general facility charge is intended to recover a share of the costs associated with planned future capital projects. Future facilities planned for construction can be included in the connection charge if they are included in an adopted capital improvement plan, provided that they are not planned to be funded by grants, developers, or outside agencies. There are two main types of capital projects, described below.

- ***Upgrade/Expansion Projects*** – Upgrade/expansion projects generally involve upgrades to meet current regulatory requirements or serve additional customers.
- ***Repair and Replacement (R&R) Projects*** – These are projects related to the repair or replacement of existing infrastructure. To avoid including the value of these projects twice—in the existing cost basis and in the future cost basis—we calculate a deduction for future asset retirements. The City staff estimated the proportion of each project that is R&R rather than upgrade or expansion. Using the estimated replacement cost, the year of planned construction, the expected useful life of each type of asset, and historical inflation index data, we estimate the original cost of the replaced assets and then deduct that amount from the future cost basis. This deduction reduces the future cost basis for the water system by about $819,000.

The City's 2020 through 2030 capital plan identifies $23.7 million in capital project costs in current dollars. This total represents the full CIP, without the 70% completion factor assumed for the revenue requirement forecast. In addition to excluding contributed capital, we also deducted stormwater projects and vehicle replacements. **Exhibit 42** summarizes the future cost basis.

Exhibit 42: Water GFC Future Cost Basis

Future Cost Basis		
CAPITAL IMPROVEMENT PLAN (2020-2030)		
Total Citywide Projects	$	23,723,051
less: Stormwater Capital Projects		(1,452,122)
less: Vehicle Replacements		(230,062)
less: Developer Contributions/Grants		(1,176,595)
less: Provision for Future Asset Retirements		(819,178)
TOTAL FUTURE COST BASIS	**$**	**20,045,094**

IX.B.3. Customer Base - Water

The next step in calculating the GFC is to determine the number of users the system is designed to support after completion of the CIP. The denominator is measured in equivalent residential units (ERUs).

(Note that an "ERU" in the GFC part of this study can have a separate meaning from an "ERU" in the rate part of this study. That is because at the point when a GFC transaction occurs—when a builder comes to the development services counter and the GFC is charged—the building has not been built yet, and no one knows how much actual water it will use. The GFC definition of an ERU must therefore be based on indicators that are knowable at the point of development, and those might be different from how a utility chooses to design its rates.)

In the Water System Plan, a system capacity analysis provides an estimate of buildout capacity in both ERUs and population. However, the ERU calculation in the System Plan is based on an assumed volume of water per ERU (163 gallons per day per unit). When applying the GFC to a particular development, the staff calculates it using equivalence factors that are specified in the Sequim Municipal Code. These equivalence factors are separate from 163 gpd per unit.

So instead of relying directly on the Water System Plan, we calculated the actual total number of ERUs in 2019 using the equivalence factors specified in the Sequim Municipal Code. Then we used the percentage increases in the System Plan to forecast the number of ERUs in future years.

Exhibit 43 shows the estimate of actual 2019 ERUs using the Municipal Code definitions.

Exhibit 43: 2019 Actual ERUs for Water GFC Calculation

Type of Connection	Equivalence Factor (Municipal Code)	Number of Units (2019 Customer Data)	ERUs
Residential Living Units:			
Single Family Units	1.00	2,396	2,396
Multi-Family Units	0.70	1,546	1,082
Motel/Hotel/RV	0.30	435	130
Commercial and Industrial Units:			
5/8" meter	1.00	-	-
3/4" meter	1.50	285	427
1" meter	2.50	73	182
1-1/2" meter	5.00	48	238
2" meter	8.00	55	441
3" meter	16.00	6	94
Total Water ERUs in 2019			4,990

When the 4,990 ERUs in 2019 are projected to buildout in 2032 using the same percentage increases in the Water System Plan, the result is an estimate of 6,809 ERUs in 2032.

Therefore, the total capacity (in ERUs) of the customer base at the end of the System Plan planning period is 6,809 ERUs. This is the GFC denominator. Existing 2020 customers represent 5,110 ERUs of that capacity (the 2019 ERU figure plus one year of estimated customer growth). The future unreserved capacity is the difference between the two, or 1,669 ERUs.

IX.B.4. General Facility Charge Calculation - Water

To calculate the GFC, the sum of the existing and future cost basis is divided by the total existing and future capacity of the system. This is shown in **Exhibit 44.**

Exhibit 44: General Facility Charge Calculation - Water

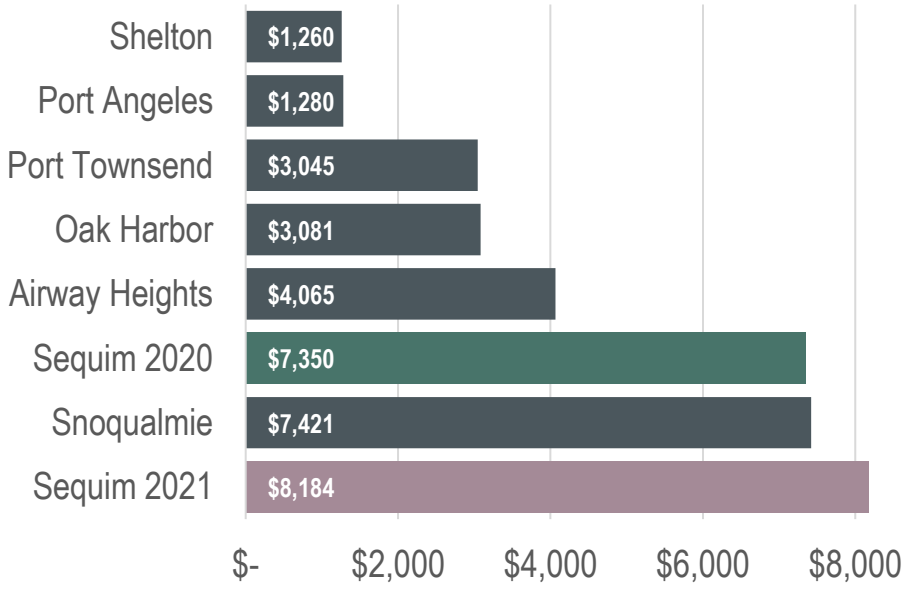
General Facility Charge Calculation - Water			
Average Integrated Method			
Charge Components	**Cost Basis**	**ERUs**	**Charge**
Component for Existing Assets	$ 35,679,461	6,809	**$ 5,240**
Component for Future Assets	$ 20,045,094	6,809	**$ 2,944**
	$ 55,724,556		**$ 8,184**
TOTAL GFC PER ERU			**$ 8,184**
Existing GFC			$7,350
Increase/(Decrease (%) - Calculated from Existing GFC			11.3%
Increase/(Decrease) ($) - Calculated from Existing GFC			$834

The resulting calculated GFC is $8,184 per ERU. The previous GFC is $7,350, so this is an $834 increase. The City may choose to implement a charge at any level up to the calculated charge. However, choosing a lower GFC would reduce the amount of GFC revenue available for capital projects, which means that ratepayers would have to pay a greater share of capital costs.

IX.B.5. Comparative Survey – Water GFCs

The following chart shows how the Sequim water GFC compares with those of other utilities—the same group of comparators we used for the revenue requirement forecast. Note that GFCs are typically not revisited annually, so some of the lower charges might simply be out of date. That said, the updated GFC would place the Sequim GFC higher than the comparable utilities.

Exhibit 45: Sequim Water GFCs Compared to Similar Utilities



IX.C. SEWER GENERAL FACILITY CHARGE

IX.C.1. Existing Cost Basis - Sewer

The components of the existing cost basis are the same for the sewer GFC as for the water GFC.

- ***Utility Capital Assets Net of Contributed Capital:*** Because of limited historical cost data, we relied on the same data sources for Sewer as for Water, and we assumed that 50% of the sewer pipe 8 inches or smaller was contributed capital. For the sewer system, we also deducted capital cost-sharing from wholesale customers. Prior year revenue from GFCs or similar capacity charges are not deducted. Total sewer capital assets net of contributed capital is $39.8 million.
- ***Plus: Interest on Non-Contributed Plant in Service*** – The interest on non-contributed sewer assets is calculated to be $22.1 million.
- ***Plus*: *Construction Work-in-Progress*** – The City did not identify any construction work-in-progress for the sewer system.
- ***Less: Debt Principal Outstanding*** – As with the water system, sewer cash reserves exceed outstanding debt, so there is no deduction for net debt principal.

As shown in **Exhibit 46**, the existing cost basis for the sewer system is $61.9 million.

Exhibit 46: Sewer GFC Existing Cost Basis

Existing Cost Basis		
PLANT-IN-SERVICE		
Utility Capital Assets Net of Capital Contributions		$ 39,756,804
plus: Interest on Non-Contributed Plant		22,131,092
plus: Construction-Work-in-Progress		-
2019 Year-end Estimated Cash Balances	$ 6,971,024	
less: Debt Principal Outstanding	(2,584,577)	
less: Net Debt Principal Outstanding		$ -
TOTAL EXISTING COST BASIS		**$ 61,887,896**

IX.C.2. Future Cost Basis - Sewer

The City's 2020-2030 sewer capital plan identifies $22.9 million (current dollars) in capital project costs. This total uses the full CIP (without the 70% completion factor), but there are deductions for stormwater capital, vehicle replacement, and estimated funding from grants, developers, and wholesale cost-sharing payments. The deduction for future retirement of replaced sewer assets is about $1.1 million. **Exhibit 47** shows that the sewer future cost basis is $14.8 million.

Exhibit 47: Sewer GFC Future Cost Basis

Future Cost Basis	
CAPITAL IMPROVEMENT PLAN (2020-2030)	
Total Citywide Projects	$ 22,915,462
less: Stormwater Capital Projects	(2,818,825)
less: Vehicle Replacements less than $50,000	(244,345)
less: Developer Contributions/Grants	(3,970,177)
less: Provision for Repair & Replacement	(1,076,911)
TOTAL FUTURE COST BASIS	**$ 14,805,205**

IX.C.3. Customer Base - Sewer

The next step in calculating the sewer GFC is to determine the number of users the system is designed to support after completion of the CIP. There are three steps:

- **Convert WRF rated capacity to unreserved ERUs.** The WRF rated capacity is 1.67 MGD. Carlsborg and Jamestown S'Klallam have capacity reservations of 5.68% and 6.29%, respectively, so the City has unreserved capacity of 1.47 MGD. Using the General Sewer Plan definition of an ERU (110 gpd/ERU), the plant has unreserved capacity of 13,365 ERUs.
- **Use customer data to measure actual 2019 ERUs. Exhibit 48** shows how customer data was used to estimate actual 2019 ERUs, using the definitions in the Sequim Municipal Code.

Exhibit 48: 2019 Actual ERUs for Sewer GFC Calculation

Type of Connection	Equivalence Factor (Municipal Code)	Number of Units (2019 Customer Data)	ERUs
Residential Living Unit:			
Single Family	1.00	2,758	2,758
Multi-Family Units	0.70	1,560	1,092
Motel/Hotel/RV	0.30	443	133
Commercial and Industrial Units:			
5/8"	1.00	0	0
3/4"	1.50	228	342
1"	2.50	61	152
1-1/2"	5.00	30	150
2"	8.00	34	271
3"	16.00	5	80
Total Sewer ERUs in 2019			4,978

The General Sewer Plan (GSP) shows 6,547 ERUs in 2019, while the customer data shows 4,978 ERUs in 2019. In other words, ERUs from the customer data are 76% of ERUs from the GSP. In calculating the GFC, we must use ERUs from customer data and the Sequim Municipal Code.

- **Use the ratio between the two kinds of ERUs to convert WRF capacity into the type of ERU that can be used to calculate the GFC**. To express system capacity in customer data ERUs, apply the 76% conversion factor to the 13,365 ERUs from the first step. The result is a total of 10,161 ERUs for the purpose of calculating the GFC.

Therefore, the total capacity of the plant is 10,161 ERUs. This is the denominator for the sewer GFC. Existing customers are 5,136 ERUs (the 2019 ERU figure plus one year of estimated customer growth), and future unreserved capacity is the difference between the two (5,025 ERUs).

IX.C.4. General Facility Charge Calculation - Sewer

To calculate the GFC, the sum of the existing and future cost basis is divided by the total existing and future capacity of the system. This is shown in **Exhibit 49.**

Exhibit 49: General Facility Charge Calculation - Sewer

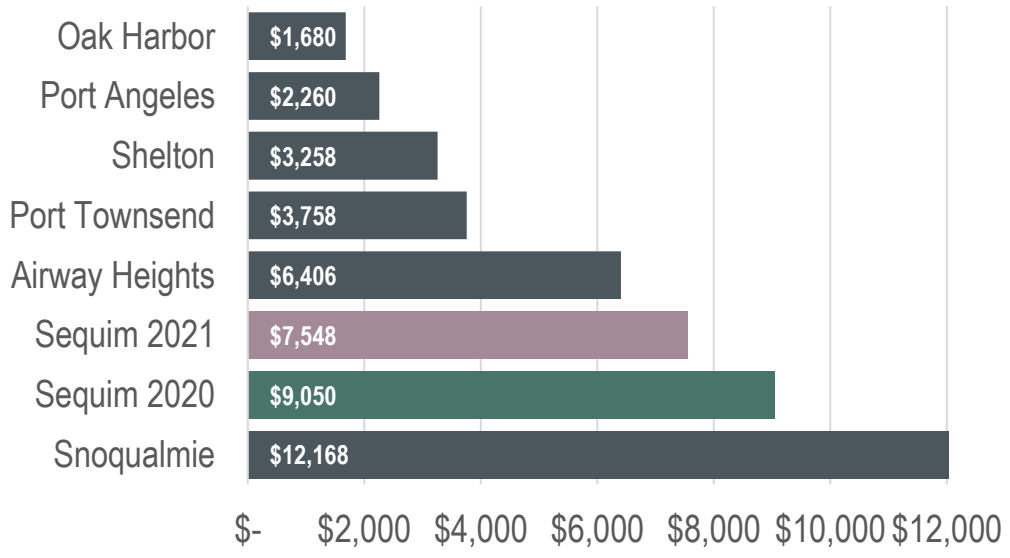
General Facility Charge Calculation - Sewer			
Average Integrated Method			
Charge Components	**Cost Basis**	**Customers**	**Charge**
Component for Existing Assets	$ 61,887,896	10,161	**$ 6,091**
Component for Future Assets	$ 14,805,205	10,161	**$ 1,457**
	$ 76,693,101		**$ 7,548**
TOTAL GFC PER ERU			**$ 7,548**
Existing GFC			$9,050
Increase/(Decrease (%) - Calculated from Existing GFC			-16.6%
Increase/(Decrease) ($) - Calculated from Existing GFC			($1,502)

The resulting calculated GFC is $7,548 per ERU. This is $1,502 decrease from the previous GFC, $9,050. The City may choose to implement a charge at any level up to the calculated charge, but we recommend adopting the full $7,548. It is a fair allocation of the cost of capacity between existing and new customers, and any capital costs not funded by a GFC must be paid for by ratepayers.

IX.C.5. Comparative Survey – Sewer GFCs

The following chart compares the Sequim sewer GFC with that of other utilities. Again, GFCs are not typically updated annually, which weakens the comparison. It shows that even with a decrease, the Sequim sewer GFC would be higher than that of all the other utilities except Snoqualmie.

Exhibit 50: Sequim Sewer GFCs Compared to Similar Utilities



IX.D. COMBINED WATER AND SEWER GFCS

Exhibit 51 shows the combined water and sewer GFCs per equivalent residential unit, comparing the existing with the recommended levels.

Exhibit 51: Combined GFCs – Water and Sewer

Combined Water/Sewer GFCs				
	Existing	Revised	$% Change	% Change
Water GFC	$7,350	$8,184	$834	11%
Sewer GFC	$9,050	$7,548	($1,502)	-17%
Total	$16,400	$15,732	($668)	-4%

While the water GFC is increasing, the sewer SDC is decreasing. As a result, the combined water and sewer GFCs would be decreasing by $668, or 4%.

Section X. SUMMARY

Following is a summary of the findings and recommendations that we presented to the City Council.

- To fund operating and capital costs through 2026, the overall rate revenue should increase by 4% per year for the water utility and 2% per year for the sewer utility.
  - » Regardless of whether the City adopts the rate design changes or opts for across-the-board rate adjustments, there needs to be enough money to run the utility. For that reason, the most important part of the study is the revenue requirement forecast and the overall rate increases.
  - » We pointed out to the Council that delaying needed rate increases is usually a bad idea. For example, delaying a 4% water rate increase in 2021 would mean needing to raise the 2022 water rates by 8.2%. A two-year break from the needed increases means an increase of 12.5% to catch up to the level of revenue needed to operate the utility and re-invest in capital infrastructure.
  - » A smooth pattern of increases is less disruptive to customers and the community. Most customers prefer gradual changes over intermittent rate spikes.
  - » Sequim is fortunate to have strong cash balances that can be drawn down if needed, as well as regional wholesale partners who help bear the burden of capital investment in the WRF. That is why the projected rate increases can be as moderate as they are.
- The forecast includes borrowing for the water CIP, with $1 million of debt proceeds in 2025 and $1.2 million in 2028. There is no borrowing forecast for the sewer utility.
- Based on our analysis of the cost of service and specific issues in the current rate structure, we recommend rate design changes that have the effect of increasing revenue from Commercial and decreasing revenue from Multi-Family and Hotel/Motel/RV.
  - » For Water, we recommend that the City:
    - » Eliminate the tiers in Commercial usage charges.
    - » Update the Multi-Family and Hotel/Motel/RV base charges to reflect their annual usage in relation to Single Family Residential.
    - » Correct the application of AWWA meter ratios for Commercial base charges.
  - » For Sewer, we recommend that the City:
    - » Create a uniform outside-City multiplier of 1.5.
    - » Update the Hotel/Motel/RV base charges to reflect winter average usage in relation to Single Family Residential.
    - » Eliminate the Hotel/Motel/RV usage charge.
    - » Combine the two tiers of the Single Family sewer charge into a uniform rate.
  - » For both Water and Sewer, we recommend expanding the Low-Income Discount program to match that of Clallam PUD.
- We recommend that the GFCs be updated to $8,184/ERU for water and $7,548/ERU for sewer.

City of Sequim
Utility Rate Study: Water Utility
Summary

Revenue Requirement	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
		0.4%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	
Revenues											
Rate Revenues Under Existing Rates	$ 2,524,234	$ 2,536,855	$ 2,549,539	$ 2,562,287	$ 2,575,099	$ 2,587,974	$ 2,600,914	$ 2,613,919	$ 2,626,988	$ 2,640,123	$ 2,653,324
Non-Rate Revenues	48,277	45,356	45,488	45,587	45,687	45,791	46,280	46,351	45,832	45,074	43,624
Total Revenues	**$ 2,572,511**	**$ 2,582,211**	**$ 2,595,028**	**$ 2,607,874**	**$ 2,620,786**	**$ 2,633,765**	**$ 2,647,194**	**$ 2,660,269**	**$ 2,672,820**	**$ 2,685,197**	**$ 2,696,948**
Expenses											
Cash Operating Expenses	$ 1,762,750	$ 1,827,312	$ 1,868,516	$ 1,910,784	$ 1,954,145	$ 1,998,628	$ 2,044,264	$ 2,091,084	$ 2,139,120	$ 2,188,404	$ 2,238,971
Existing Debt Service	200,271	199,447	199,199	198,875	198,476	197,252	195,928	197,004	195,480	193,756	194,432
New Debt Service	-	-	-	-	-	76,509	76,509	76,509	168,321	168,321	168,321
System Reinvestment Funding	293,410	366,001	471,573	503,263	543,543	561,645	601,657	737,438	805,567	872,605	924,206
Additions Required to Meet Reserves	-	-	-	-	-	-	-	-	-	-	-
Total Expenses	**$ 2,256,431**	**$ 2,392,761**	**$ 2,539,288**	**$ 2,612,921**	**$ 2,696,164**	**$ 2,834,034**	**$ 2,918,358**	**$ 3,102,036**	**$ 3,308,488**	**$ 3,423,086**	**$ 3,525,930**
Net Surplus (Deficiency)	$ 316,080	$ 189,450	$ 55,740	$ (5,048)	$ (75,378)	$ (200,269)	$ (271,165)	$ (441,767)	$ (635,667)	$ (737,889)	$ (828,982)
Additions to Meet Coverage	-	-	-	-	-	-	-	-	-	-	-
Total Surplus (Deficiency)	**$ 316,080**	**$ 189,450**	**$ 55,740**	**$ (5,048)**	**$ (75,378)**	**$ (200,269)**	**$ (271,165)**	**$ (441,767)**	**$ (635,667)**	**$ (737,889)**	**$ (828,982)**
Annual Rate Increase		**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**
Cumulative Rate Increase		**2.00%**	**4.04%**	**6.12%**	**8.24%**	**10.41%**	**12.62%**	**14.87%**	**17.17%**	**19.51%**	**21.90%**
Revenues After Rate Increases	$ 2,524,234	$ 2,587,592	$ 2,652,541	$ 2,719,120	$ 2,787,370	$ 2,857,332	$ 2,929,052	$ 3,002,571	$ 3,077,935	$ 3,155,191	$ 3,234,387
Additional Taxes from Rate Increase	-	6,611	13,420	20,434	27,657	35,095	42,753	50,637	58,754	67,108	75,707
Net Cash Flow After Rate Increase	**$ 316,080**	**$ 233,576**	**$ 145,321**	**$ 131,351**	**$ 109,236**	**$ 33,994**	**$ 14,220**	**$ (103,752)**	**$ (243,474)**	**$ (289,929)**	**$ (323,626)**
Coverage After Rate Increase: Bonded Debt	13.89	13.00	13.10	13.21	13.30	8.18	8.33	8.22	5.67	5.76	5.80
Coverage After Rate Increase: Total Debt	8.07	7.58	7.67	7.78	7.87	5.78	5.89	5.85	4.45	4.53	4.57
Sample Residential Bill (5/8" Meter, x 5.3 ccf)	$32.35	$32.99	$33.65	$34.32	$35.01	$35.71	$36.43	$37.15	$37.90	$38.66	$39.43
Annual Increase ($)		$0.65	$0.66	$0.67	$0.69	$0.70	$0.71	$0.73	$0.74	$0.76	$0.77
Net Cash Flow Check	-	-	-	-	-	-	-	-	-	-	-

Fund Balance	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Operating Reserve											
Beginning Balance	$ 1,308,776	$ 724,418	$ 750,950	$ 770,600	$ 790,769	$ 811,471	$ 832,720	$ 846,940	$ 743,188	$ 499,714	$ 209,785
plus: Net Cash Flow after Rate Increase	316,080	233,576	145,321	131,351	109,236	33,994	14,220	(103,752)	(243,474)	(289,929)	(323,626)
less: Transfer of Surplus to Capital Fund	(900,438)	(207,044)	(125,671)	(111,182)	(88,535)	(12,745)	-	-	-	-	-
Ending Balance	**$ 724,418**	**$ 750,950**	**$ 770,600**	**$ 790,769**	**$ 811,471**	**$ 832,720**	**$ 846,940**	**$ 743,188**	**$ 499,714**	**$ 209,785**	**$ (113,841)**
Actual Days of O&M	*150 days*	*150 days*	*150 days*	*150 days*	*150 days*	*150 days*	*149 days*	*127 days*	*83 days*	*34 days*	*-18 days*
Minimum Balance Requirement	*$ 434,651*	*$ 450,570*	*$ 462,360*	*$ 474,461*	*$ 486,882*	*$ 499,632*	*$ 512,719*	*$ 526,152*	*$ 539,940*	*$ 554,094*	*$ 568,622*
Maximum Balance Requirement	*$ 724,418*	*$ 750,950*	*$ 770,600*	*$ 790,769*	*$ 811,471*	*$ 832,720*	*$ 854,531*	*$ 876,919*	*$ 899,900*	*$ 923,490*	*$ 947,704*
Capital Reserve											
Beginning Balance	$ 3,924,286	$ 4,984,126	$ 4,728,211	$ 4,792,453	$ 4,084,197	$ 4,476,152	$ 5,016,380	$ (867,973)	$ (3,241,583)	$ (4,277,523)	$ (5,187,073)
plus: System Reinvestment Funding	293,410	366,001	471,573	503,263	543,543	561,645	601,657	737,438	805,567	872,605	924,206
plus: Transfers from Operating Fund	900,438	207,044	125,671	111,182	88,535	12,745	-	-	-	-	-
plus: Capital Grants / Other Resources	-	-	-	-	-	-	-	152,966	152,966	445,466	152,966
plus: GFC Revenue	600,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000
plus: Revenue Bond Proceeds	-	-	-	-	-	1,000,000	-	-	1,200,000	-	-
plus: Other Loans 1 Proceeds	-	-	-	-	-	-	-	-	-	-	-
plus: Other Loans 2 Proceeds	-	-	-	-	-	-	-	-	-	-	-
plus: Other Loans 3 Proceeds	-	-	-	-	-	-	-	-	-	-	-
plus: Interest Earnings	19,621	24,921	23,641	23,962	20,421	22,381	25,082	-	-	-	-
Total Funding Sources	**$ 5,737,756**	**$ 6,082,092**	**$ 5,849,096**	**$ 5,930,860**	**$ 5,236,695**	**$ 6,572,923**	**$ 6,143,119**	**$ 522,431**	**$ (583,050)**	**$ (2,459,451)**	**$ (3,609,901)**
less: Capital Expenditures	(753,629)	(1,353,881)	(1,056,643)	(1,846,663)	(760,543)	(1,556,543)	(7,011,092)	(3,764,014)	(3,694,473)	(2,727,621)	(2,699,097)
Ending Capital Fund Balance	**$ 4,984,126**	**$ 4,728,211**	**$ 4,792,453**	**$ 4,084,197**	**$ 4,476,152**	**$ 5,016,380**	**$ (867,973)**	**$ (3,241,583)**	**$ (4,277,523)**	**$ (5,187,073)**	**$ (6,308,998)**
Minimum Target Balance	*$ 618,732*	*$ 618,732*	*$ 618,732*	*$ 618,732*	*$ 618,732*	*$ 618,732*	*$ 618,732*	*$ 618,732*	*$ 618,732*	*$ 618,732*	*$ 618,732*
Combined Beginning Balance	**$ 5,233,062**	**$ 5,708,544**	**$ 5,479,161**	**$ 5,563,053**	**$ 4,874,966**	**$ 5,287,623**	**$ 5,849,100**	**$ (21,033)**	**$ (2,498,395)**	**$ (3,777,809)**	**$ (4,977,288)**
Combined Ending Balance	**$ 5,708,544**	**$ 5,479,161**	**$ 5,563,053**	**$ 4,874,966**	**$ 5,287,623**	**$ 5,849,100**	**$ (21,033)**	**$ (2,498,395)**	**$ (3,777,809)**	**$ (4,977,288)**	**$ (6,422,839)**
Ending Total Days of Operating Expenditures	*1,182 days*	*1,091 days*	*1,079 days*	*921 days*	*974 days*	*1,050 days*	*-4 days*	*-426 days*	*-627 days*	*-805 days*	*-1,013 days*
Combined Minimum Target Balance	*1,053,382*	*1,069,302*	*1,081,092*	*1,093,193*	*1,105,614*	*1,118,364*	*1,131,450*	*1,144,883*	*1,158,672*	*1,172,826*	*1,187,354*

City of Sequim

Utility Rate Study: Water Utility

Assumptions

Economic & Financial Factors	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Escalation Rates											
General Cost Inflation	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%
Construction Cost Inflation	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%
Labor Cost Inflation	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%
Benefit Cost Inflation	7.00%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%
Labor + Benefits	3.85%	2.80%	2.80%	2.80%	2.80%	2.80%	2.80%	2.80%	2.80%	2.80%	2.80%
Revenue Growth Before Increases	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%
[Extra]	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
No Escalation	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Investment Interest	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%
Tax Rates											
State Excise	5.029%	5.029%	5.029%	5.029%	5.029%	5.029%	5.029%	5.029%	5.029%	5.029%	5.029%
State B&O	1.75%	1.75%	1.75%	1.75%	1.75%	1.75%	1.75%	1.75%	1.75%	1.75%	1.75%
City Utility	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%
State Excise & City Utility	13.03%	13.03%	13.03%	13.03%	13.03%	13.03%	13.03%	13.03%	13.03%	13.03%	13.03%
B&O & City Utility Tax	9.75%	9.75%	9.75%	9.75%	9.75%	9.75%	9.75%	9.75%	9.75%	9.75%	9.75%
No Tax	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Adjustments to Operating or Capital Spending		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Operating Budget Realization Factor	(100% is default)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
CIP Completion Factor	(100% is default)	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%

Fund Balance & Financial Policy Assumptions		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Beginning Fund Balances												
Operating Reserve		$ 1,308,776										
Capital Reserve		3,924,286										
Debt Reserve		155,117										
Total Reserves		$ 5,388,179										
Total Operating and Capital Cash Test: Days of O&M		150 days	150 days	150 days	150 days	150 days	150 days	150 days	150 days	150 days	150 days	150 days
(Informational only--does not drive rate increases)												
Operating Balance: Minimum & Maximum Target												
Min. Fund Balance Target (days of O&M expense)		90 days	90 days	90 days	90 days	90 days	90 days	90 days	90 days	90 days	90 days	90 days
Max. Fund Balance (days of O&M expense)		150 days	150 days	150 days	150 days	150 days	150 days	150 days	150 days	150 days	150 days	150 days
Capital Balance: Minimum Target												
Select Minimum Capital Fund Option →	2	User Input										
1 % of Plant Assets (Original Cost)	$ 22,817,920	$ 235,715	$ 249,254	$ 259,821	$ 278,287	$ 285,893	$ 301,458	$ 371,569	$ 409,209	$ 446,154	$ 473,430	$ 500,421
% of Total (between 1%-2%)		1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
2 User Input	25%	$ 618,732	$ 618,732	$ 618,732	$ 618,732	$ 618,732	$ 618,732	$ 618,732	$ 618,732	$ 618,732	$ 618,732	$ 618,732
System Reinvestment Funding												
Select Annual Funding Option →	1	Original Cost Depreciation										
Target Amounts												
1 Original Cost Depreciation		$ 366,762	$ 406,668	$ 471,573	$ 503,263	$ 543,543	$ 561,645	$ 601,657	$ 737,438	$ 805,567	$ 872,605	$ 924,206
2 Estimated Replacement Cost Depreciation		$ 745,520	$ 785,426	$ 850,331	$ 882,021	$ 922,301	$ 940,403	$ 980,415	$ 1,116,196	$ 1,184,325	$ 1,251,363	$ 1,302,964
3 Manual User Input		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
4 No Rate Funded Capital		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Percent Toggle of Selected Funding Target		80%	90%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Funding Target Assumed in Model		$ 293,410	$ 366,001	$ 471,573	$ 503,263	$ 543,543	$ 561,645	$ 601,657	$ 737,438	$ 805,567	$ 872,605	$ 924,206
Actual Result w/ Transfers (compared to Annual Depreciation)		326%	141%	127%	122%	116%	102%	100%	100%	100%	100%	100%

Capital Financing Assumptions		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
General Facility Charges												
Select Revenue Option →	2	Manual Input										
1 Calculated		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Actual Charge	2020 Customer	$8,184	$8,184	$8,184	$8,184	$8,184	$8,184	$8,184	$8,184	$8,184	$8,184	$8,184
Existing Customer Base	-		-	-	-	-	-	-	-	-	-	-
Incremental Customer Base		-	-	-	-	-	-	-	-	-	-	-
Annual Revenue												
2 Manual Input		$ 600,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000
Other Funding Sources (Uses)	**Capital Grants / Other Resources**											
Grants												
SMR-001CU - Dungeness Off-Stream Reservoir Stormwater Improvements		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
SMR-003RR - 7th Ave and Washington Upgrade		-	-	-	-	-	-	-	-	-	-	-
SMR-009RR - Bell Creek Culvert Under Blake Ave, Park Entrance, and Rhodefer Rd		-	-	-	-	-	-	-	-	-	-	-
SMR-011RR - Retrofit Discharge to Bell Creek on North Brown		-	-	-	-	-	-	-	-	-	-	-
Developer Contributions												
SMR-007RR - Bell Creek Culvert Upgrade at Washington St		-	-	-	-	-	-	-	-	-	-	-
WTR-008NC - Reservoir Road and 7th Avenue Water Main		-	-	-	-	-	-	-	-	-	-	-
WTR-013NC - West Sequim Bay Water Main		-	-	-	-	-	-	-	152,966	152,966	152,966	152,966
WTR-017CU - Brown Road Water Main from East Fir Street to East Washington Stree		-	-	-	-	-	-	-	-	-	292,500	-
Stormwater Bell Creek - Reimbursement			-	-	-	-	-	-	-	-	-	-
[Extra]		-	-	-	-	-	-	-	-	-	-	-
[Extra]		-	-	-	-	-	-	-	-	-	-	-
Total		**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 152,966**	**$ 152,966**	**$ 445,466**	**$ 152,966**
Total (less Stormwater Grants)		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 152,966	$ 152,966	$ 445,466	$ 152,966
Revenue Bonds	*Level total payments*											
Term (years)		20 years	20 years	20 years	20 years	20 years	20 years	20 years	20 years	20 years	20 years	20 years
Interest Only Payments (years)		0 years	0 years	0 years	0 years	0 years	0 years	0 years	0 years	0 years	0 years	0 years
Interest Cost		3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%
Issuance Cost		1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Legal Minimum or Policy Coverage	**1.50**	*Higher than Sequim's required coverage of 1.25.*										
Use Reserves to Pay for Last Payment?	**Yes**	("Yes" is default)										
Include / Exclude GFCs in Coverage?	**Include**											

City of Sequim

Utility Rate Study: Water Utility

Ending Cash Balances 2019

Water Funds: Ending Cash Balance Allocations			% Allocation				$ Allocation			
Fund Number	Fund Description	Balance as of end 2020	Debt Fund	Capital Fund	Operating Fund	Exclude	Debt Fund	Capital Fund	Operating Fund	Exclude
401-000	Water Unrestricted / Operations	$ 1,308,776	0%	0%	100%	0%	$ -	$ -	$ 1,308,776	$ -
401-004	Refundable Water Deposits	$ -	0%	0%	0%	100%	-	-	-	-
411-411	Water Restricted - GFCs	$ 2,700,006	-1.52%	102%	0%	0%		2,741,123	-	-
411-413	Water R - Replacement Reserve	$ 1,183,163	0%	100%	0%	0%	-	1,183,163	-	-
411-419	Water R - Bond Redemption	$ 155,117	100%	0%	0%	0%	155,117	-	-	-
Total		$ 5,347,062					$ 155,117	$ 3,924,286	$ 1,308,776	$ -

City of Sequim
Utility Rate Study: Water Utility
Operating Revenue and Expenditure Forecast

Operating Expenses		Escalation	Actuals 2020	Budget 2021	2022	2023	2024	2025	2026	2027	2028
Account #	**Taxes**										
401-000-534-50-53-00	Water TransIntergovExcise (Excise & B&O Tax)	**[Calculated]**	$ 106,010	$ 114,995	$ 126,707	$ 127,296	$ 127,887	$ 128,481	$ 129,079	$ 129,679	$ 130,282
401-000-534-10-54-00	Water AdminUtilityBO (City Utility 8%)	**[Calculated]**	192,720	173,000	187,199	188,135	189,076	190,021	190,971	191,926	192,886
Water Unrestricted											
401-000-534-10-31-00	Water Admin Supplies	General Cost Inflation	$ 1,064	$ 1,100	$ 1,128	$ 1,156	$ 1,185	$ 1,214	$ 1,245	$ 1,276	$ 1,308
401-000-534-10-35-00	Water Admin Small Tools	General Cost Inflation	2,507	250	256	263	269	276	283	290	297
401-000-534-10-41-00	Water AdminProfServices	General Cost Inflation	341	5,001	5,126	5,254	5,386	5,520	5,658	5,800	5,945
401-000-534-10-42-00	Water AdminCommunication	General Cost Inflation	13,151	13,200	13,530	13,868	14,215	14,570	14,935	15,308	15,691
401-000-534-10-48-00	Water AdminRepairMaint	General Cost Inflation	1,433	3,900	3,998	4,097	4,200	4,305	4,412	4,523	4,636
401-000-534-10-49-00	Water AdminMisc Services Fees	General Cost Inflation	10,439	10,135	10,388	10,648	10,914	11,187	11,467	11,753	12,047
401-000-534-10-51-00	Water AdminIntergovProfServ	General Cost Inflation	7,040	9,650	9,891	10,139	10,392	10,652	10,918	11,191	11,471
401-000-534-10-91-00	Water AdminInterfundServChg	General Cost Inflation	507,025	535,922	549,320	563,053	577,129	591,558	606,347	621,505	637,043
401-000-534-50-11-00	Water TransSalaries Wages	Labor Cost Inflation	354,696	305,171	312,800	320,620	328,636	336,852	345,273	353,905	362,752
401-000-534-50-12-00	Water TransOvertime Wages	Labor Cost Inflation	24,182	5,797	5,942	6,090	6,243	6,399	6,559	6,723	6,891
401-000-534-50-13-00	Water TransCall Wages	Labor Cost Inflation	18,207	4,638	4,754	4,873	4,995	5,119	5,247	5,379	5,513
401-000-534-50-21-00	Water TransL&I Insurance	Benefit Cost Inflation	16,272	13,082	13,540	14,014	14,504	15,012	15,537	16,081	16,644
401-000-534-50-22-00	Water TransFICA/Medicare	Benefit Cost Inflation	29,314	25,767	26,669	27,602	28,568	29,568	30,603	31,674	32,783
401-000-534-50-23-00	Water TransRetirementPERS	Benefit Cost Inflation	50,063	30,726	31,801	32,914	34,066	35,259	36,493	37,770	39,092
401-000-534-50-25-00	Water TransMed/Dent/Vision	Benefit Cost Inflation	92,996	85,536	88,530	91,628	94,835	98,155	101,590	105,146	108,826
401-000-534-50-29-00	Water Trans Fam&Med Leave	Benefit Cost Inflation	974	464	480	497	514	532	551	570	590
401-000-534-50-31-00	Water Trans Supplies/Chemicals	General Cost Inflation	26,096	45,992	47,142	48,320	49,528	50,767	52,036	53,337	54,670
401-000-534-50-35-00	Water TransSmToolsEquip	General Cost Inflation	63,939	73,500	75,338	77,221	79,151	81,130	83,159	85,237	87,368
401-000-534-50-41-00	Water TransProfServices	General Cost Inflation	115,823	83,945	86,044	88,195	90,400	92,660	94,976	97,350	99,784
401-000-534-50-43-00	Water Trans TravelMeals	General Cost Inflation	1,804	2,500	2,563	2,627	2,692	2,760	2,829	2,899	2,972
401-000-534-50-47-00	Water WellsUtilityServices	General Cost Inflation	75,223	67,118	68,796	70,516	72,279	74,086	75,938	77,836	79,782
401-000-534-50-48-00	Water TransRepair Maintenance	General Cost Inflation	17,220	10,001	10,251	10,507	10,770	11,039	11,315	11,598	11,888
401-000-534-50-49-00	Water TransMisc Services/ Fees	General Cost Inflation	17,446	10,692	10,959	11,233	11,514	11,802	12,097	12,399	12,709
401-000-534-50-51-00	Water Intergovernmental	General Cost Inflation	2,720	-	-	-	-	-	-	-	-
401-000-538-10-11-00	UtilitiesSalaries Wages	Labor Cost Inflation	28,632	28,943	29,667	30,408	31,168	31,948	32,746	33,565	34,404
401-000-538-10-21-00	UtilitiesL&I Insurance	Benefit Cost Inflation	902	844	874	904	936	969	1,002	1,037	1,074
401-000-538-10-22-00	UtilitiesFICAMedicare	Benefit Cost Inflation	2,133	1,794	1,857	1,922	1,989	2,059	2,131	2,205	2,282
401-000-538-10-23-00	UtilitiesRetirementPERS	Benefit Cost Inflation	3,691	3,387	3,506	3,628	3,755	3,887	4,023	4,163	4,309
401-000-538-10-25-00	UtilitiesInsuranceMed/Dent/V	Benefit Cost Inflation	5,924	6,134	6,349	6,571	6,801	7,039	7,285	7,540	7,804
401-000-538-10-29-00	Utilities Fam&Med Leave	Benefit Cost Inflation	42	42	43	45	47	48	50	52	53
401-000-589-00-00-00	NonExpenditure	General Cost Inflation	-	-	-	-	-	-	-	-	-
401-000-597-38-00-00	TrnfrtoStmWtrOps	General Cost Inflation	52,800	52,800	54,120	55,473	56,860	58,281	59,738	61,232	62,763
401-000-597-99-09-00	Trnfr to Special Fund Nonop	General Cost Inflation	5,000	5,000	5,125	5,253	5,384	5,519	5,657	5,798	5,943
411-411-538-10-11-00	Utilities Salaries Wages	Labor Cost Inflation	21,088	21,309	21,842	22,388	22,947	23,521	24,109	24,712	25,330
411-411-538-10-21-00	Utilities L&I Insurance	Benefit Cost Inflation	657	640	662	686	710	734	760	787	814
411-411-538-10-22-00	Utilities FICAMedicare	Benefit Cost Inflation	1,522	1,630	1,687	1,746	1,807	1,870	1,936	2,004	2,074
411-411-538-10-23-00	Utilities RetirementPERS	Benefit Cost Inflation	2,719	2,184	2,260	2,340	2,421	2,506	2,594	2,685	2,779
411-411-538-10-25-00	Utilities InsuranceMed/Dent/Vision	Benefit Cost Inflation	5,729	5,930	6,138	6,352	6,575	6,805	7,043	7,289	7,545
411-411-538-10-29-00	Utilities Fam&Med Leave (WR)	Benefit Cost Inflation	31	31	32	33	34	36	37	38	39
[Extra]	[Extra]	General Cost Inflation	-	-	-	-	-	-	-	-	-
TOTAL CASH OPERATING EXPENSES BEFORE REALIZATION FACTOR			$ 1,879,576	$ 1,762,750	$ 1,827,312	$ 1,868,516	$ 1,910,784	$ 1,954,145	$ 1,998,628	$ 2,044,264	$ 2,091,084
REALIZATION FACTOR IMPACT (Excluding Taxes)			n/a	-	-	-	-	-	-	-	-
TOTAL CASH OPERATING EXPENSES			**$ 1,879,576**	**$ 1,762,750**	**$ 1,827,312**	**$ 1,868,516**	**$ 1,910,784**	**$ 1,954,145**	**$ 1,998,628**	**$ 2,044,264**	**$ 2,091,084**

City of Sequim
Utility Rate Study: Water Utility
Operating Revenue and Expenditure Forecast

				Actuals	*Budget*							
Operating Revenues		**Taxation**	**Escalation**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**
Account #	**Rate Revenues**											
401-000-343-40-19-00	Water SalesFlatRatesstandby	State Excise & City Utility	Revenue Growth Before Increases	$ 8,712	$ 11,866	$ 11,925	$ 11,985	$ 12,045	$ 12,105	$ 12,166	$ 12,226	$ 12,288
401-000-343-40-21-00	Water SalesMeteredResident	State Excise & City Utility	Revenue Growth Before Increases	1,648,934	$ 1,714,546	1,723,119	1,731,734	1,740,393	1,749,095	1,757,840	1,766,630	1,775,463
401-000-343-40-22-00	Water SalesMeteredCommercial	State Excise & City Utility	Revenue Growth Before Increases	594,068	$ 601,937	604,947	607,971	611,011	614,066	617,137	620,222	623,323
401-000-343-40-40-00	Water SalesPublic/Fed/City	No Tax	Revenue Growth Before Increases	108,244	$ 195,885	196,864	197,849	198,838	199,832	200,831	201,835	202,845
[Extra]	[Extra]	No Tax	No Escalation	-	-	-	-	-	-	-	-	-
[Extra]	[Extra]	No Tax	No Escalation	-	-	-	-	-	-	-	-	-
	Total Rate Revenue			**$ 2,359,957**	**$ 2,524,234**	**$ 2,536,855**	**$ 2,549,539**	**$ 2,562,287**	**$ 2,575,099**	**$ 2,587,974**	**$ 2,600,914**	**$ 2,613,919**
					6.96%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%
	Non-Rate Revenues											
401-000-343-40-18-00	Water SalesLate Fees	State B&O	No Escalation	$ 2,767	$ 14,000	14,000	14,000	14,000	14,000	14,000	14,000	14,000
401-000-389-00-10-00	HydrantRentalDeposit	State B&O	No Escalation	-	1,958	1,958	1,958	1,958	1,958	1,958	1,958	1,958
401-000-379-00-34-00	Water MeterInstallGFCs	No Tax	No Escalation	27,307	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000
[Extra]	[Extra]	No Tax	No Escalation	-	-	-	-	-	-	-	-	-
	Total Non-Rate Revenues			**$ 30,074**	**$ 40,958**	**$ 40,958**	**$ 40,958**	**$ 40,958**	**$ 40,958**	**$ 40,958**	**$ 40,958**	**$ 40,958**
					36.19%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
TOTAL OPERATING REVENUES				**$ 2,390,031**	**$ 2,565,192**	**$ 2,577,813**	**$ 2,590,497**	**$ 2,603,245**	**$ 2,616,057**	**$ 2,628,932**	**$ 2,641,872**	**$ 2,654,877**

City of Sequim
Utility Rate Study: Water Utility
Existing Debt

Existing Debt Service - Summary	Total	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Annual Debt Payments																					
Revenue Bonds	**$ 1,643,350**	$ 116,300	$ 116,200	$ 116,675	$ 117,075	$ 117,400	$ 116,900	$ 116,300	$ 118,100	$ 117,300	$ 116,300	$ 117,700	$ 116,500	$ 117,600	$ 118,600	$ 4,400	$ -	$ -	$ -	$ -	$ -
PWTF Loans	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SRF Loans	1,256,675	83,971	83,247	82,524	81,800	81,076	80,352	79,628	78,904	78,180	77,456	76,732	76,009	75,285	74,561	73,837	73,113	-	-	-	-
Total Debt Payments	2,900,025	**200,271**	**199,447**	**199,199**	**198,875**	**198,476**	**197,252**	**195,928**	**197,004**	**195,480**	**193,756**	**194,432**	**192,509**	**192,885**	**193,161**	**78,237**	**73,113**	**-**	**-**	**-**	**-**

Existing Debt Service - Revenue Bonds		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Water and Sewer Revenue Bond 2014																					
Annual Interest Payment	**$ 435,850**	$ 48,800	$ 46,200	$ 44,175	$ 42,075	$ 39,900	$ 36,900	$ 33,800	$ 30,600	$ 27,300	$ 23,800	$ 20,200	$ 16,500	$ 12,600	$ 8,600	$ 4,400	$ -	$ -	$ -	$ -	$ -
Annual Principal Payment	**$ 1,207,500**	67,500	70,000	72,500	75,000	77,500	80,000	82,500	87,500	90,000	92,500	97,500	100,000	105,000	110,000	-	-	-	-	-	-
Total Annual Payment	**$ 1,643,350**	$ 116,300	$ 116,200	$ 116,675	$ 117,075	$ 117,400	$ 116,900	$ 116,300	$ 118,100	$ 117,300	$ 116,300	$ 117,700	$ 116,500	$ 117,600	$ 118,600	$ 4,400	$ -	$ -	$ -	$ -	$ -
Use of Debt Reserve for Debt Service		-	-	-	-	-	-	-	-	-	-	-	-	-	-	4,400	-	-	-	-	-
TOTAL REVENUE BONDS																					
Annual Interest Payment	**$ 435,850**	$ 48,800	$ 46,200	$ 44,175	$ 42,075	$ 39,900	$ 36,900	$ 33,800	$ 30,600	$ 27,300	$ 23,800	$ 20,200	$ 16,500	$ 12,600	$ 8,600	$ 4,400	$ -	$ -	$ -	$ -	$ -
Annual Principal Payment	**$ 1,207,500**	67,500	70,000	72,500	75,000	77,500	80,000	82,500	87,500	90,000	92,500	97,500	100,000	105,000	110,000	-	-	-	-	-	-
Total Annual Payment	**$ 1,643,350**	$ 116,300	$ 116,200	$ 116,675	$ 117,075	$ 117,400	$ 116,900	$ 116,300	$ 118,100	$ 117,300	$ 116,300	$ 117,700	$ 116,500	$ 117,600	$ 118,600	$ 4,400	$ -	$ -	$ -	$ -	$ -
Use of Debt Reserve for Debt Service		-	-	-	-	-	-	-	-	-	-	-	-	-	-	4,400	-	-	-	-	-
Annual Debt Reserve Target on Existing Revenue Bonds		118,600	118,600	118,600	118,600	118,600	118,600	118,600	118,600	118,600	118,600	118,600	118,600	118,600	118,600	-	-	-	-	-	-

Existing Debt Service - SRF Loans		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Drinking Water SRF - 5th & McCurdy Water Pump Station - 028																					
Annual Interest Payment	**$ 54,765**	$ 6,443	$ 6,040	$ 5,638	$ 5,235	$ 4,832	$ 4,430	$ 4,027	$ 3,624	$ 3,222	$ 2,819	$ 2,416	$ 2,013	$ 1,611	$ 1,208	$ 805	$ 403	$ -	$ -	$ -	$ -
Annual Principal Payment	**644,299**	40,269	40,269	40,269	40,269	40,269	40,269	40,269	40,269	40,269	40,269	40,269	40,269	40,269	40,269	40,269	40,269	-	-	-	-
Total Annual Payment	**$ 699,065**	$ 46,712	$ 46,309	$ 45,906	$ 45,504	$ 45,101	$ 44,698	$ 44,296	$ 43,893	$ 43,490	$ 43,088	$ 42,685	$ 42,282	$ 41,879	$ 41,477	$ 41,074	$ 40,671	$ -	$ -	$ -	$ -
Drinking Water SRF - Sunnyside Water Main - 036																					
Annual Interest Payment	**$ 43,684**	$ 5,139	$ 4,818	$ 4,497	$ 4,176	$ 3,854	$ 3,533	$ 3,212	$ 2,891	$ 2,570	$ 2,248	$ 1,927	$ 1,606	$ 1,285	$ 964	$ 642	$ 321	$ -	$ -	$ -	$ -
Annual Principal Payment	**513,926**	32,120	32,120	32,120	32,120	32,120	32,120	32,120	32,120	32,120	32,120	32,120	32,120	32,120	32,120	32,120	32,120	-	-	-	-
Total Annual Payment	**$ 557,610**	$ 37,260	$ 36,938	$ 36,617	$ 36,296	$ 35,975	$ 35,654	$ 35,332	$ 35,011	$ 34,690	$ 34,369	$ 34,048	$ 33,726	$ 33,405	$ 33,084	$ 32,763	$ 32,442	$ -	$ -	$ -	$ -
TOTAL OTHER LOANS																					
Annual Interest Payment	**$ 98,449**	$ 11,582	$ 10,858	$ 10,134	$ 9,411	$ 8,687	$ 7,963	$ 7,239	$ 6,515	$ 5,791	$ 5,067	$ 4,343	$ 3,619	$ 2,896	$ 2,172	$ 1,448	$ 724	$ -	$ -	$ -	$ -
Annual Principal Payment	**1,158,225**	72,389	72,389	72,389	72,389	72,389	72,389	72,389	72,389	72,389	72,389	72,389	72,389	72,389	72,389	72,389	72,389	-	-	-	-
Total Annual Payment	**$ 1,256,675**	$ 83,971	$ 83,247	$ 82,524	$ 81,800	$ 81,076	$ 80,352	$ 79,628	$ 78,904	$ 78,180	$ 77,456	$ 76,732	$ 76,009	$ 75,285	$ 74,561	$ 73,837	$ 73,113	$ -	$ -	$ -	$ -

City of Sequim
Utility Rate Study: Water Utility
Capital Improvement Program

18%	5,146,757	Benefit all customers
82%	23,021,379	New CIP related to growth
	28,168,136	total without storm or vehicles

2031 **Project Costs in Year**

Description	Escalated Total	Escalated Capital Cost as Provided by Client										
		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Shared Projects - City Facilities	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
CFL-012NC - City Shop Upgrade and Expansion	300,000	-	25,000	25,000	125,000	125,000	-	-	-	-	-	-
CFL-013NC - Fuel Station at City Shop Property	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
Shared Projects - Parks	-	-	-	-	-	-	-	-	-	-	-	-
PRK-013RR - Guy Cole Parking Lot Overlay and Drainage Improvements	90,000	-	-	-	-	-	-	90,000	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
Shared Projects - Sewer	-	-	-	-	-	-	-	-	-	-	-	-
SRR-025CU - WRF Reclaimed Water Pumping Facility Improvements	245,561	-	-	-	-	-	-	-	61,390	61,390	61,390	61,390
	-	-	-	-	-	-	-	-	-	-	-	-
Stormwater	-	-	-	-	-	-	-	-	-	-	-	-
SMR-001CU - Happy Valley Stormwater Diversion	134,375	-	19,500	61,500	53,375	-	-	-	-	-	-	-
SMR-002RR - South 3rd Ave Drainage Improvements	52,000	-	-	-	-	-	-	-	52,000	-	-	-
SMR-003RR - 7th Ave and Washington Upgrade	62,000	-	-	-	-	-	-	-	-	31,000	31,000	-
SMR-004RR - Miller Road Abatement - City Limit to Emerald Highland Pond	100,000	-	-	-	-	-	-	100,000	-	-	-	-
SMR-007RR - Bell Creek Culvert Upgrade at Washington St	600,000	-	-	-	-	-	-	-	300,000	300,000	-	-
SMR-008RR - Seal Street Drainage Improvements	-	-	-	-	-	-	-	-	-	-	-	-
SMR-009RR - Bell Creek Culvert Under Blake Ave, Park Entrance, and Rhodefer Rd	50,000	-	-	-	-	-	50,000	-	-	-	-	-
SMR-011RR - Retrofit Discharge to Bell Creek on North Brown	91,000	-	-	91,000	-	-	-	-	-	-	-	-
SMR-077ER - Street Sweeper Replacement	120,000	120,000	-	-	-	-	-	-	-	-	-	-
SMR-078ER - Vac truck Replacement	185,500	-	185,500	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
Shared Projects - Streets	-	-	-	-	-	-	-	-	-	-	-	-
STR-014CU - Etta Street Active Alleyway	-	-	-	-	-	-	-	-	-	-	-	-
STR-041RR - City-wide Pavement Rehabilitation	420,000	95,000	85,000	75,000	65,000	55,000	45,000	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
Water	-	-	-	-	-	-	-	-	-	-	-	-
WTR-004CU - Simdars Road Booster Station	540,000	-	-	-	-	-	-	540,000	-	-	-	-
WTR-006CU - Brown Road Water Main - Pt Williams to East Fir	1,100,000	-	-	-	-	-	250,000	850,000	-	-	-	-
WTR-007CU - 5th Avenue Water Main	230,000	-	-	-	-	-	-	230,000	-	-	-	-
WTR-008NC - Reservoir Road and 7th Avenue Water Main	700,000	-	-	-	-	-	-	-	700,000	-	-	-
WTR-009CU - Norman Street and Eunice Street Water Main	584,828	-	-	-	-	-	-	-	146,207	146,207	146,207	146,207
WTR-013NC - West Sequim Bay Water Main	1,359,700	-	-	-	-	-	-	-	339,925	339,925	339,925	339,925
WTR-015CU - West Fir Street Transmission Main Replacement	-	-	-	-	-	-	-	-	-	-	-	-
WTR-016CU - East Fir Street Water Main	1,046,750	-	-	-	-	-	-	-	261,688	261,688	261,688	261,688
WTR-017CU - Brown Road Water Main from East Fir Street to East Washington Street	650,000	-	-	-	-	-	-	-	-	650,000	-	-
WTR-019CU - East Etta Street Water Main	230,000	-	30,000	200,000	-	-	-	-	-	-	-	-
WTR-023NC - Pressure Relief Valve	110,000	-	-	-	-	-	-	110,000	-	-	-	-
WTR-024NC - Craftsman Court PRV Station	67,222	-	-	-	-	-	-	-	16,806	16,806	16,806	16,806
WTR-026NC - Washington Harbor Road Water Main - No. 2	467,706	-	-	-	-	-	-	-	116,927	116,927	116,927	116,927
WTR-027CU - AC/Galv Iron Main Replacement (Bell St Alley 2nd to 3rd)	1,600,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	50,000	50,000	50,000	50,000
WTR-031NC - West Washington Street Isolation Valves	120,000	-	-	-	-	-	-	120,000	-	-	-	-
WTR-032CU - West Prairie from S Sequim to S 5th	1,820,000	-	-	-	-	-	-	1,820,000	-	-	-	-
WTR-034PL - SCADA Upgrade Report	-	-	-	-	-	-	-	-	-	-	-	-
WTR-036CU - Fixed Base Automatic Meter Reading System	634,534	-	-	-	-	-	-	-	158,634	158,634	158,634	158,634
WTR-039NC - Port Williams Well No.4	900,000	-	-	-	-	100,000	800,000	-	-	-	-	-
WTR-040CU - New Deep Well at Silberhorn	1,050,000	-	50,000	150,000	850,000	-	-	-	-	-	-	-
WTR-044CU - Infiltration Gallery Improvements	851,026	-	-	-	-	-	-	-	212,757	212,757	212,757	212,757
WTR-047CU - Happy Valley Reservoir	4,697,449	-	-	-	-	-	-	-	1,174,362	1,174,362	1,174,362	1,174,362
WTR-062PL - Utility Rate Study - Water AND Sewer	-	-	-	-	-	-	-	-	-	-	-	-
WTR-064RR - Ranney Well Water Line Replacement	2,564,000	-	-	-	-	-	-	2,564,000	-	-	-	-
WTR-065NC - Water line under new Guy Cole parking lot	150,000	-	-	-	-	-	-	150,000	-	-	-	-
WTR-066NC - Blake Ave Extension to Rhodefer Rd	150,000	-	-	-	-	150,000	-	-	-	-	-	-
WTR-071NC - New SCADA Installation	497,000	22,000	25,000	50,000	400,000	-	-	-	-	-	-	-
WTR-060PL - Water System Plan	100,000	25,000	75,000	-	-	-	-	-	-	-	-	-
WTR-085RR - Paint 1.7MG Reservoir	250,000	-	250,000	-	-	-	-	-	-	-	-	-
WTR-079ER - Replacement of WR-18 Chevy 3500 Pickup	58,000	-	-	-	-	-	58,000	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
Carryover Projects	-	-	-	-	-	-	-	-	-	-	-	-
Infiltration Gallery Generator	-	-	-	-	-	-	-	-	-	-	-	-
Administration Charges to the Capital Funds - eligible portion	4,584,360	177,366	258,712	222,008	328,473	188,088	295,492	1,016,102	591,544	585,276	460,996	460,302
Small Non-CIP Items in Water Reserve	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
Scheduled Fleet Replacement	-	-	-	-	-	-	-	-	-	-	-	-
PW-34 Cadet Mower Tank 60	4,000	4,000	-	-	-	-	-	-	-	-	-	-
New - CAT Skidsteer	24,000	24,000	-	-	-	-	-	-	-	-	-	-
SH-22 Chevrolet 2500 blue lift gate	11,600	-	11,600	-	-	-	-	-	-	-	-	-
WR-18 Chevrolet 3500	-	-	-	-	-	-	-	-	-	-	-	-
SH-21 Case 580 SE Backhoe	25,000	-	-	25,000	-	-	-	-	-	-	-	-
New - Man Lift	18,000	-	-	18,000	-	-	-	-	-	-	-	-
SW-15 Elgin Crosswind- Street Sweeper	170,000	170,000	-	-	-	-	-	-	-	-	-	-
SH-03 Ryan Ford F-150 eff. 3/2019 prev. PD-03 Lisa	8,540	-	-	8,540	-	-	-	-	-	-	-	-

City of Sequim
Utility Rate Study: Water Utility
Capital Improvement Program

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82%	23,021,379	New CIP related to growth
	28,168,136	total without storm or vehicles

2031 **Project Costs in Year**

Description	Escalated Total	Escalated Capital Cost as Provided by Client										
		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
SW-16 Vac Con Louisville OLD Vac Truck	**265,000**	-	265,000	-	-	-	-	-	-	-	-	-
New 10 YD Dump (placeholder)	**30,000**	-	-	-	30,000	-	-	-	-	-	-	-
New 5 YD Dump (placeholder)	**24,000**	-	24,000	-	-	-	-	-	-	-	-	-
SH-09 IH 4700/DT 408 Bucket Truck	**26,960**	-	-	-	-	26,960	-	-	-	-	-	-
SH-32 Ford F-600 (Melon Truck)	**12,000**	-	-	-	-	-	12,000	-	-	-	-	-
ST-48 Ford F-350 (green flat bed)	**13,000**	-	-	-	-	-	13,000	-	-	-	-	-
ST-13 Dodge1500	**6,000**	-	-	-	-	-	6,000	-	-	-	-	-
WR-02 Chevrolet 2500	**48,000**	-	-	48,000	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
Total Capital Projects Before Completion Factor	**30,249,111**	837,366	1,504,312	1,174,048	2,051,848	845,048	1,729,492	7,790,102	4,182,238	4,104,970	3,030,690	2,998,996
Completion Factor Impact	**(3,024,911)**	(83,737)	(150,431)	(117,405)	(205,185)	(84,505)	(172,949)	(779,010)	(418,224)	(410,497)	(303,069)	(299,900)
Total Capital Projects	**$ 27,224,200**	**$ 753,629**	**$ 1,353,881**	**$ 1,056,643**	**$ 1,846,663**	**$ 760,543**	**$ 1,556,543**	**$ 7,011,092**	**$ 3,764,014**	**$ 3,694,473**	**$ 2,727,621**	**$ 2,699,097**

City of Sequim
Utility Rate Study: Water Utility
Capital Funding

Check O.K.

Capital Project Summary	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
TOTAL CAPITAL EXPENDITURES	**$ 753,629**	**$ 1,353,881**	**$ 1,056,643**	**$ 1,846,663**	**$ 760,543**	**$ 1,556,543**	**$ 7,011,092**	**$ 3,764,014**	**$ 3,694,473**	**$ 2,727,621**	**$ 2,699,097**

Capital Financing Plan	Available Same Year?	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Capital Grants / Other Resources		-	-	-	-	-	-	-	152,966	152,966	445,466	152,966
Balance/Remained to be Funded		**$ 753,629**	**$ 1,353,881**	**$ 1,056,643**	**$ 1,846,663**	**$ 760,543**	**$ 1,556,543**	**$ 7,011,092**	**$ 3,611,048**	**$ 3,541,507**	**$ 2,282,155**	**$ 2,546,130**
OTHER FUNDING SOURCES		*(Note: Operating transfers in year N are always assumed to be available in year N + 1.)*										
Beginning Fund Balances		$ 3,924,286	$ 4,984,126	$ 4,728,211	$ 4,792,453	$ 4,084,197	$ 4,476,152	$ 5,016,380	$ (867,973)	$ (3,241,583)	$ (4,277,523)	$ (5,187,073)
System Reinvestment Funding	Yes	293,410	366,001	471,573	503,263	543,543	561,645	601,657	737,438	805,567	872,605	924,206
GFC Revenue Towards Capital	Yes	600,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000
Interest Earnings	Yes	19,621	24,921	23,641	23,962	20,421	22,381	25,082	-	-	-	-
Minimum Capital Balance?	Yes	(618,732)	(618,732)	(618,732)	(618,732)	(618,732)	(618,732)	(618,732)	(618,732)	(618,732)	(618,732)	(618,732)
Other Loans 1 Proceeds		-	-	-	-	-	-	-	-	-	-	-
Other Loans 2 Proceeds		-	-	-	-	-	-	-	-	-	-	-
Other Loans 3 Proceeds		-	-	-	-	-	-	-	-	-	-	-
Revenue Bond Proceeds		-	-	-	-	-	1,000,000	-	-	1,200,000	-	-
TOTAL CAPITAL RESOURCES		**$ 4,218,585**	**$ 5,256,316**	**$ 5,104,693**	**$ 5,200,946**	**$ 4,529,429**	**$ 5,941,446**	**$ 5,524,387**	**$ (249,267)**	**$ (1,354,748)**	**$ (3,523,650)**	**$ (4,381,599)**
Info: Working Capital Contingency Deficit		-	-	-	-	-	-	*(1,486,705)*	*(3,860,315)*	*(4,896,254)*	*(5,805,805)*	*(6,927,729)*

New Debt Computations	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
REVENUE BONDS											
Amount to Fund	$ -	$ -	$ -	$ -	$ -	$ 1,000,000	$ -	$ -	$ 1,200,000	$ -	$ -
Issuance Costs	-	-	-	-	-	10,874	-	-	13,049	-	-
Reserve Required	-	-	-	-	-	76,509	-	-	91,811	-	-
Amount of Debt Issue	$ -	$ -	$ -	$ -	$ -	$ 1,087,383	$ -	$ -	$ 1,304,860	$ -	$ -
Other Loans 1											
Amount to Fund	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Issuance Costs	-	-	-	-	-	-	-	-	-	-	-
Amount of Debt Issue	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Other Loans 2											
Amount to Fund	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Issuance Costs	-	-	-	-	-	-	-	-	-	-	-
Amount of Debt Issue	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Other Loans 3											
Amount to Fund	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Debt Service Summary	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
EXISTING DEBT SERVICE											
Annual Interest Payments	$ 60,382	$ 57,058	$ 54,309	$ 51,486	$ 48,587	$ 44,863	$ 41,039	$ 37,115	$ 33,091	$ 28,867	$ 24,543
Annual Principal Payments	139,889	142,389	144,889	147,389	149,889	152,389	154,889	159,889	162,389	164,889	169,889
Total Debt Service Payments	$ 200,271	$ 199,447	$ 199,199	$ 198,875	$ 198,476	$ 197,252	$ 195,928	$ 197,004	$ 195,480	$ 193,756	$ 194,432
Revenue Bond Payments Only	116,300	116,200	116,675	117,075	117,400	116,900	116,300	118,100	117,300	116,300	117,700
NEW DEBT SERVICE											
Annual Interest Payments	$ -	$ -	$ -	$ -	$ -	$ 38,058	$ 36,713	$ 35,320	$ 79,548	$ 76,441	$ 73,225
Annual Principal Payments	-	-	-	-	-	38,451	39,797	41,190	88,773	91,880	95,095
Total Debt Service Payments	$ -	$ -	$ -	$ -	$ -	$ 76,509	$ 76,509	$ 76,509	$ 168,321	$ 168,321	$ 168,321
Revenue Bond Payments Only	-	-	-	-	-	76,509	76,509	76,509	168,321	168,321	168,321
TOTAL DEBT SERVICE PAYMENTS	**$ 200,271**	**$ 199,447**	**$ 199,199**	**$ 198,875**	**$ 198,476**	**$ 273,761**	**$ 272,437**	**$ 273,514**	**$ 363,801**	**$ 362,077**	**$ 362,753**
Total Interest Payments	60,382	57,058	54,309	51,486	48,587	82,921	77,752	72,435	112,639	105,308	97,769
Total Principal Payments	139,889	142,389	144,889	147,389	149,889	190,840	194,686	201,079	251,162	256,769	264,985
Total Revenue Bond Payments Only	116,300	116,200	116,675	117,075	117,400	193,409	192,809	194,609	285,621	284,621	286,021
Use of Debt Reserve for Debt Service	-	-	-	-	-	-	-	-	-	-	-

City of Sequim
Utility Rate Study: Water Utility
Capital Funding

Check O.K.

Debt Amortization: Revenue Bonds	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	##
Debt Assumptions: Revenue Bonds												
Term (years)	20 years	20 years	20 years	20 years	20 years	20 years	20 years	20 years	20 years	20 years	20 years	
Interest Only Payments (years)	0 years	0 years	0 years	0 years	0 years	0 years	0 years	0 years	0 years	0 years	0 years	
Interest Cost	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	
Issuance Cost	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	
Revenue Bonds Total												
Interest Payments	$ -	$ -	$ -	$ -	$ -	$ 38,058	$ 36,713	$ 35,320	$ 79,548	$ 76,441	$ 73,225	
Principal Payments	-	-	-	-	-	38,451	39,797	41,190	88,773	91,880	95,095	
Total	$ -	$ -	$ -	$ -	$ -	$ 76,509	$ 76,509	$ 76,509	$ 168,321	$ 168,321	$ 168,321	
Use of Debt Reserve for Debt Service	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	

Debt Amortization : Other Loans 1	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	##
Debt Assumptions : Other Loans 1												
Term (years)	20 years	20 years	20 years	20 years	20 years	20 years	20 years	20 years	20 years	20 years	20 years	
Interest Only Payments (years)	0 years	0 years	0 years	0 years	0 years	0 years	0 years	0 years	0 years	0 years	0 years	
Interest Cost	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	
Issuance Cost	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	
Other Loans 1 Total												
Interest Payments	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Principal Payments	-	-	-	-	-	-	-	-	-	-	-	
Total	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	

Debt Amortization : Other Loans 2	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	##
Debt Assumptions : Other Loans 2												
Term (years)	20 years	20 years	20 years	20 years	20 years	20 years	20 years	20 years	20 years	20 years	20 years	
Interest Only Payments (years)	0 years	0 years	0 years	0 years	0 years	0 years	0 years	0 years	0 years	0 years	0 years	
Interest Cost	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	
Issuance Cost	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	
Other Loans 2 Total												
Interest Payments	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Principal Payments	-	-	-	-	-	-	-	-	-	-	-	
Total	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	

Debt Amortization : Other Loans 3	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	##
Debt Assumptions : Other Loans 3												
Term (years)	20 years	20 years	20 years	20 years	20 years	20 years	20 years	20 years	20 years	20 years	20 years	
Interest Only Payments (years)	0 years	0 years	0 years	0 years	0 years	0 years	0 years	0 years	0 years	0 years	0 years	
Interest Cost	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	
Other Loans 3 Total												
Interest Payments	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Principal Payments	-	-	-	-	-	-	-	-	-	-	-	
Total	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	

City of Sequim
Utility Rate Study: Water Utility
Revenue Requirement Tests

Cash Flow Test	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
REVENUES											
Rate Revenue	$ 2,524,234	$ 2,536,855	$ 2,549,539	$ 2,562,287	$ 2,575,099	$ 2,587,974	$ 2,600,914	$ 2,613,919	$ 2,626,988	$ 2,640,123	$ 2,653,324
Other Non-Rate Revenue	40,958	40,958	40,958	40,958	40,958	40,958	40,958	40,958	40,958	40,958	40,958
Interest Earnings: Operating & Debt Reserve Funds	7,319	4,398	4,530	4,629	4,729	4,833	5,322	5,393	4,874	4,116	2,666
Total Revenue	$ 2,572,511	$ 2,582,211	$ 2,595,028	$ 2,607,874	$ 2,620,786	$ 2,633,765	$ 2,647,194	$ 2,660,269	$ 2,672,820	$ 2,685,197	$ 2,696,948
EXPENSES											
Cash Operating Expenses	$ 1,762,750	$ 1,827,312	$ 1,868,516	$ 1,910,784	$ 1,954,145	$ 1,998,628	$ 2,044,264	$ 2,091,084	$ 2,139,120	$ 2,188,404	$ 2,238,971
Existing Debt Service	200,271	199,447	199,199	198,875	198,476	197,252	195,928	197,004	195,480	193,756	194,432
New Debt Service	-	-	-	-	-	76,509	76,509	76,509	168,321	168,321	168,321
System Reinvestment Funding	293,410	366,001	471,573	503,263	543,543	561,645	601,657	737,438	805,567	872,605	924,206
Additions Required to Meet Min. Operating Reserve	-	-	-	-	-	-	-	-	-	-	-
Total Expenses	$ 2,256,431	$ 2,392,761	$ 2,539,288	$ 2,612,921	$ 2,696,164	$ 2,834,034	$ 2,918,358	$ 3,102,036	$ 3,308,488	$ 3,423,086	$ 3,525,930
NET CASH FLOW (DEFICIENCY)	**$ 316,080**	**$ 189,450**	**$ 55,740**	**$ (5,048)**	**$ (75,378)**	**$ (200,269)**	**$ (271,165)**	**$ (441,767)**	**$ (635,667)**	**$ (737,889)**	**$ (828,982)**

Coverage Test - with GFCs	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
ALLOWABLE REVENUES											
Rate Revenue	$ 2,524,234	$ 2,536,855	$ 2,549,539	$ 2,562,287	$ 2,575,099	$ 2,587,974	$ 2,600,914	$ 2,613,919	$ 2,626,988	$ 2,640,123	$ 2,653,324
Other Revenue	40,958	40,958	40,958	40,958	40,958	40,958	40,958	40,958	40,958	40,958	40,958
GFC Revenue	600,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000
Interest Earnings - All Funds	26,941	29,318	28,171	28,591	25,150	27,214	30,404	5,393	4,874	4,116	2,666
Total Revenue	$ 3,192,133	$ 3,107,131	$ 3,118,669	$ 3,131,836	$ 3,141,207	$ 3,156,146	$ 3,172,276	$ 3,160,269	$ 3,172,820	$ 3,185,197	$ 3,196,948
EXPENSES Include City Utility Tax?											
Cash Operating Expenses No	$ 1,576,482	$ 1,640,113	$ 1,680,381	$ 1,721,708	$ 1,764,124	$ 1,807,657	$ 1,852,338	$ 1,898,198	$ 1,945,269	$ 1,993,585	$ 2,043,178
Revenue Bond Debt Service	116,300	116,200	116,675	117,075	117,400	193,409	192,809	194,609	285,621	284,621	286,021
Revenue Bond Coverage Requirement at 1.5	58,150	58,100	58,338	58,538	58,700	96,705	96,405	97,305	142,810	142,310	143,010
Total Expenses	$ 1,750,932	$ 1,814,413	$ 1,855,394	$ 1,897,321	$ 1,940,224	$ 2,097,771	$ 2,141,552	$ 2,190,112	$ 2,373,701	$ 2,420,516	$ 2,472,209
Coverage	13.89	12.62	12.33	12.04	11.73	6.97	6.85	6.49	4.30	4.19	4.03
COVERAGE SURPLUS (DEFICIENCY)	**$ 1,441,201**	**$ 1,292,718**	**$ 1,263,275**	**$ 1,234,515**	**$ 1,200,983**	**$ 1,058,375**	**$ 1,030,723**	**$ 970,157**	**$ 799,120**	**$ 764,681**	**$ 724,739**

Maximum Revenue Deficiency	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Sufficiency Test Driving the Deficiency	*None*	*None*	*None*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*
Maximum Revenue Deficiency (Surplus)	$ (316,080)	$ (189,450)	$ (55,740)	$ 5,048	$ 75,378	$ 200,269	$ 271,165	$ 441,767	$ 635,667	$ 737,889	$ 828,982
plus: Additional Tax Expense	(47,352)	(28,381)	(8,350)	756	11,292	30,002	40,623	66,180	95,228	110,542	124,189
less: Incremental Revenue From Prior Rate Increases	-	-	(50,991)	(103,516)	(157,617)	(213,332)	(270,705)	(329,778)	(390,595)	(453,202)	(517,644)
Net Revenue Deficiency (Surplus)	**$ (363,432)**	**$ (217,831)**	**$ (115,081)**	**$ (97,712)**	**$ (70,947)**	**$ 16,939**	**$ 41,082**	**$ 178,169**	**$ 340,300**	**$ 395,230**	**$ 435,527**

City of Sequim
Utility Rate Study: Water Utility
Revenue Requirement Tests

Rate Increases	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Rate Revenue @ Existing Rates	$ 2,524,234	$ 2,536,855	$ 2,549,539	$ 2,562,287	$ 2,575,099	$ 2,587,974	$ 2,600,914	$ 2,613,919	$ 2,626,988	$ 2,640,123	$ 2,653,324
Revenues from Prior Rate Increases	-	-	50,991	103,516	157,617	213,332	270,705	329,778	390,595	453,202	517,644
Rate Revenue Before Rate Increase (incl. previous increases)	2,524,234	2,536,855	2,600,530	2,665,804	2,732,715	2,801,306	2,871,619	2,943,697	3,017,584	3,093,325	3,170,967
Required Annual Rate Increase	0.00%	0.00%	0.00%	0.00%	0.00%	0.60%	1.43%	6.05%	11.28%	12.78%	13.73%
Number of Months New Rates Will Be In Effect	12	12	12	12	12	12	12	12	12	12	12
Info: % Increase to Generate Required Revenue	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.60%*	*1.43%*	*6.05%*	*11.28%*	*12.78%*	*13.73%*
Policy Induced Rate Increases	0.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
ANNUAL RATE INCREASE	**0.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**
CUMULATIVE RATE INCREASE	**0.00%**	**2.00%**	**4.04%**	**6.12%**	**8.24%**	**10.41%**	**12.62%**	**14.87%**	**17.17%**	**19.51%**	**21.90%**

Impacts of Rate Increases	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Sufficiency Test Driving the Deficiency	*None*	*None*	*None*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*	*Cash*
Rate Revenues After Rate Increase	$ 2,524,234	$ 2,587,592	$ 2,652,541	$ 2,719,120	$ 2,787,370	$ 2,857,332	$ 2,929,052	$ 3,002,571	$ 3,077,935	$ 3,155,191	$ 3,234,387
Full Year Rate Revenues After Rate Increase	2,524,234	2,587,592	2,652,541	2,719,120	2,787,370	2,857,332	2,929,052	3,002,571	3,077,935	3,155,191	3,234,387
Partial Year Adjustment	-	-	-	-	-	-	-	-	-	-	-
Additional Taxes Due to Rate Increases	-	6,611	13,420	20,434	27,657	35,095	42,753	50,637	58,754	67,108	75,707
Net Cash Flow After Rate Increase	**$ 316,080**	**$ 233,576**	**$ 145,321**	**$ 131,351**	**$ 109,236**	**$ 33,994**	**$ 14,220**	**$ (103,752)**	**$ (243,474)**	**$ (289,929)**	**$ (323,626)**
Coverage After Rate Increase: Bonded Debt	**13.89**	**13.00**	**13.10**	**13.21**	**13.30**	**8.18**	**8.33**	**8.22**	**5.67**	**5.76**	**5.80**
Coverage After Rate Increase: Total Debt	**8.07**	**7.58**	**7.67**	**7.78**	**7.87**	**5.78**	**5.89**	**5.85**	**4.45**	**4.53**	**4.57**

Debt Financing Assumptions	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Net Revenue Bond Proceeds: Automatic Calculation	$ -	$ -	$ -	$ -	$ -	$ 1,000,000	$ -	$ -	$ 1,200,000	$ -	$ -
Net Revenue Bond Proceeds: Override*	$ -	$ -	$ -	$ -	$ -	$ 1,000,000	$ -	$ -	$ 1,200,000	$ -	$ -
Other Loans 1 Proceeds											
Other Loans 2 Proceeds											
Other Loans 3 Proceeds											

**Model will automatically calculate revenue bond debt if 'Revenue Bond Proceeds: Override' is blank. A zero does not equal a "blank."*

Fund Balance Impacts	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Ending Fund Balance: Operating Reserve	**$ 724,418**	**$ 750,950**	**$ 770,600**	**$ 790,769**	**$ 811,471**	**$ 832,720**	**$ 846,940**	**$ 743,188**	**$ 499,714**	**$ 209,785**	**$ (113,841)**
Actual Days of Operations & Maintenance	150 days	150 days	150 days	150 days	150 days	150 days	149 days	127 days	83 days	34 days	-18 days
Minimum Target: Operating Reserve	434,651	450,570	462,360	474,461	486,882	499,632	512,719	526,152	539,940	554,094	568,622
Minimum Target: Operating Reserve (in Days of O&M)	90 days	90 days	90 days	90 days	90 days	90 days	90 days	90 days	90 days	90 days	90 days
Ending Fund Balance: Capital Reserve	**$ 4,984,126**	**$ 4,728,211**	**$ 4,792,453**	**$ 4,084,197**	**$ 4,476,152**	**$ 5,016,380**	**$ (867,973)**	**$ (3,241,583)**	**$ (4,277,523)**	**$ (5,187,073)**	**$ (6,308,998)**
Minimum Target: Capital Reserve	618,732	618,732	618,732	618,732	618,732	618,732	618,732	618,732	618,732	618,732	618,732
Total Ending Operating and Capital Cash (days of O&M)	**1,182 days**	**1,091 days**	**1,079 days**	**921 days**	**974 days**	**1,050 days**	**-4 days**	**-426 days**	**-627 days**	**-805 days**	**-1,013 days**

City of Sequim

Utility Rate Study: Water Utility

Fund Activity

$ 1,193,848	*$ 573,045*	*$ 597,245*	*$ 614,445*	*$ 632,077*	*$ 574,390*	*$ 601,657*	*$ 737,438*	*$ 805,567*	*$ 872,605*	*$ 924,206*
326%	*141%*	*127%*	*122%*	*116%*	*102%*	*100%*	*100%*	*100%*	*100%*	*100%*

Funds	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
OPERATING RESERVE											
Beginning Balance	$ 1,308,776	$ 724,418	$ 750,950	$ 770,600	$ 790,769	$ 811,471	$ 832,720	$ 846,940	$ 743,188	$ 499,714	$ 209,785
plus: Net Cash Flow after Rate Increase	316,080	233,576	145,321	131,351	109,236	33,994	14,220	(103,752)	(243,474)	(289,929)	(323,626)
less: Transfer of Surplus to Capital Fund	(900,438)	(207,044)	(125,671)	(111,182)	(88,535)	(12,745)	-	-	-	-	-
Ending Balance	**$ 724,418**	**$ 750,950**	**$ 770,600**	**$ 790,769**	**$ 811,471**	**$ 832,720**	**$ 846,940**	**$ 743,188**	**$ 499,714**	**$ 209,785**	**$ (113,841)**
Minimum Target Balance: 90 days	*$ 434,651*	*$ 450,570*	*$ 462,360*	*$ 474,461*	*$ 486,882*	*$ 499,632*	*$ 512,719*	*$ 526,152*	*$ 539,940*	*$ 554,094*	*$ 568,622*
Maximum Target Balance: 150 days	*$ 724,418*	*$ 750,950*	*$ 770,600*	*$ 790,769*	*$ 811,471*	*$ 832,720*	*$ 854,531*	*$ 876,919*	*$ 899,900*	*$ 923,490*	*$ 947,704*
Actual Days of Cash Achieved	*150 days*	*150 days*	*150 days*	*150 days*	*150 days*	*150 days*	*149 days*	*127 days*	*83 days*	*34 days*	*-18 days*
CAPITAL RESERVE											
Beginning Balance	$ 3,924,286	$ 4,984,126	$ 4,728,211	$ 4,792,453	$ 4,084,197	$ 4,476,152	$ 5,016,380	$ (867,973)	$ (3,241,583)	$ (4,277,523)	$ (5,187,073)
plus: System Reinvestment Funding	293,410	366,001	471,573	503,263	543,543	561,645	601,657	737,438	805,567	872,605	924,206
plus: Transfers from Operating Fund	900,438	207,044	125,671	111,182	88,535	12,745	-	-	-	-	-
plus: Capital Grants / Other Resources	-	-	-	-	-	-	-	152,966	152,966	445,466	152,966
plus: GFC Revenue	600,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000
plus: Revenue Bond Proceeds	-	-	-	-	-	1,000,000	-	-	1,200,000	-	-
plus: Other Loans 1 Proceeds	-	-	-	-	-	-	-	-	-	-	-
plus: Other Loans 2 Proceeds	-	-	-	-	-	-	-	-	-	-	-
plus: Other Loans 3 Proceeds	-	-	-	-	-	-	-	-	-	-	-
plus: Interest Earnings	19,621	24,921	23,641	23,962	20,421	22,381	25,082	-	-	-	-
Total Funding Sources	**$ 5,737,756**	**$ 6,082,092**	**$ 5,849,096**	**$ 5,930,860**	**$ 5,236,695**	**$ 6,572,923**	**$ 6,143,119**	**$ 522,431**	**$ (583,050)**	**$ (2,459,451)**	**$ (3,609,901)**
less: Capital Expenditures	(753,629)	(1,353,881)	(1,056,643)	(1,846,663)	(760,543)	(1,556,543)	(7,011,092)	(3,764,014)	(3,694,473)	(2,727,621)	(2,699,097)
Ending Capital Fund Balance	**$ 4,984,126**	**$ 4,728,211**	**$ 4,792,453**	**$ 4,084,197**	**$ 4,476,152**	**$ 5,016,380**	**$ (867,973)**	**$ (3,241,583)**	**$ (4,277,523)**	**$ (5,187,073)**	**$ (6,308,998)**
Minimum Target Balance	*$ 618,732*	*$ 618,732*	*$ 618,732*	*$ 618,732*	*$ 618,732*	*$ 618,732*	*$ 618,732*	*$ 618,732*	*$ 618,732*	*$ 618,732*	*$ 618,732*
DEBT RESERVE											
Beginning Balance	$ 155,117	$ 155,117	$ 155,117	$ 155,117	$ 155,117	$ 155,117	$ 231,626	$ 231,626	$ 231,626	$ 323,438	$ 323,438
plus: Reserve Funding from New Debt	-	-	-	-	-	76,509	-	-	91,811	-	-
less: Use of Reserves for Debt Service	-	-	-	-	-	-	-	-	-	-	-
Ending Balance	**$ 155,117**	**$ 155,117**	**$ 155,117**	**$ 155,117**	**$ 155,117**	**$ 231,626**	**$ 231,626**	**$ 231,626**	**$ 323,438**	**$ 323,438**	**$ 323,438**
Minimum Target Balance	*$ 118,600*	*$ 118,600*	*$ 118,600*	*$ 118,600*	*$ 118,600*	*$ 195,109*	*$ 195,109*	*$ 195,109*	*$ 286,921*	*$ 286,921*	*$ 286,921*
SUMMARY											
Combined Beginning Balance	$ 5,388,179	$ 5,863,661	$ 5,634,278	$ 5,718,170	$ 5,030,083	$ 5,442,740	$ 6,080,727	$ 210,593	$ (2,266,768)	$ (3,454,371)	$ (4,653,850)
Plus: Inflows	$ 2,129,550	$ 1,331,542	$ 1,266,206	$ 1,269,758	$ 1,261,735	$ 2,207,274	$ 1,140,958	$ 1,286,653	$ 2,506,870	$ 1,528,142	$ 1,253,546
Less: Outflows	$ (1,654,068)	$ (1,560,925)	$ (1,182,314)	$ (1,957,845)	$ (849,078)	$ (1,569,288)	$ (7,011,092)	$ (3,764,014)	$ (3,694,473)	$ (2,727,621)	$ (2,699,097)
Combined Ending Balance	**$ 5,863,661**	**$ 5,634,278**	**$ 5,718,170**	**$ 5,030,083**	**$ 5,442,740**	**$ 6,080,727**	**$ 210,593**	**$ (2,266,768)**	**$ (3,454,371)**	**$ (4,653,850)**	**$ (6,099,401)**
Net Change in Reserves	*$ 475,482*	*$ (229,383)*	*$ 83,892*	*$ (688,087)*	*$ 412,657*	*$ 637,987*	*$ (5,870,134)*	*$ (2,477,361)*	*$ (1,187,603)*	*$ (1,199,479)*	*$ (1,445,551)*
TOTAL AVAILABLE CASH TEST: DAYS OF O&M											
Operating & Capital Ending Balance	$ 5,708,544	$ 5,479,161	$ 5,563,053	$ 4,874,966	$ 5,287,623	$ 5,849,100	**$ (21,033)**	**$ (2,498,395)**	**$ (3,777,809)**	**$ (4,977,288)**	**$ (6,422,839)**
Ending Total Days of O&M	1,182 days	1,091 days	1,079 days	921 days	974 days	1,050 days	-4 days	-426 days	-627 days	-805 days	-1,013 days
Target: 150 Days of O&M	*$ 724,418*	*$ 753,667*	*$ 773,398*	*$ 793,651*	*$ 814,439*	*$ 835,777*	*$ 857,678*	*$ 880,160*	*$ 903,236*	*$ 926,923*	*$ 951,238*

City of Sequim
Utility Rate Study: Water Utility
Water Rate Schedule

Note: "Across-the-Board" (ATB) means that all rates increase by the same percentage (both fixed and volume charges).
SMC: 13.84.030
Outside City = 1.5x base rates and volume rates

Across-the-Board Rate Schedule	Previous 2018	Previous 2019	Existing 2020	ATB 2021	ATB 2022	ATB 2023	ATB 2024	ATB 2025	ATB 2026	ATB 2027	ATB 2028	ATB 2029	ATB 2030
Annual System-Wide Rate Increase				**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**	**2.00%**
Monthly Fixed Charges													
Single Family Residential (per unit)	$24.77	$26.26	$27.31	$27.31	$27.86	$28.41	$28.98	$29.56	$30.15	$30.76	$31.37	$32.00	$32.64
Multi-Family Residential (per unit)	$23.52	$24.93	$25.93	$26.45	$26.98	$27.52	$28.07	$28.63	$29.20	$29.79	$30.38	$30.99	$31.61
Hotel and Motel (per unit)	$18.57	$19.68	$20.47	$20.88	$21.30	$21.72	$22.16	$22.60	$23.05	$23.51	$23.98	$24.46	$24.95
Commercial and Public Authority and Irrigation													
5/8" and 3/4"	$24.77	$26.26	$27.31	$27.86	$28.41	$28.98	$29.56	$30.15	$30.76	$31.37	$32.00	$32.64	$33.29
1"	$41.36	$43.48	$45.22	$46.12	$47.05	$47.99	$48.95	$49.93	$50.93	$51.94	$52.98	$54.04	$55.12
1-1/2"	$82.47	$87.42	$90.92	$92.74	$94.59	$96.49	$98.41	$100.38	$102.39	$104.44	$106.53	$108.66	$110.83
2"	$132.03	$139.95	$145.55	$148.46	$151.43	$154.46	$157.55	$160.70	$163.91	$167.19	$170.54	$173.95	$177.42
3"	$247.62	$262.48	$272.98	$278.44	$284.01	$289.69	$295.48	$301.39	$307.42	$313.57	$319.84	$326.24	$332.76
Volume Charge													
Single and Multi-Family Residential													
Usage up to 600 cf	$0.00861	$0.00913	$0.00950	$0.00969	$0.00988	$0.01008	$0.01028	$0.01049	$0.01070	$0.01091	$0.01113	$0.01135	$0.01158
Over 600 cf and up to 1,600 cf	$0.02547	$0.02670	$0.02777	$0.02833	$0.02889	$0.02947	$0.03006	$0.03066	$0.03127	$0.03190	$0.03254	$0.03319	$0.03385
Over 1,600 cf	$0.03183	$0.03374	$0.03509	$0.03579	$0.03651	$0.03724	$0.03798	$0.03874	$0.03952	$0.04031	$0.04111	$0.04194	$0.04277
Commercial, Public Authority, Motel/Hotel & Irrigation													
Usage up to 600 cf	$0.00861	$0.00913	$0.00950	$0.00969	$0.00988	$0.01008	$0.01028	$0.01049	$0.01070	$0.01091	$0.01113	$0.01135	$0.01158
Over 600 cf	$0.02547	$0.02670	$0.02777	$0.02833	$0.02889	$0.02947	$0.03006	$0.03066	$0.03127	$0.03190	$0.03254	$0.03319	$0.03385

Percent Increase									
2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
6.02%	4.00%	0.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
5.99%	4.01%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
5.98%	4.01%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
6.02%	4.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
5.13%	4.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
6.00%	4.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
6.00%	4.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
6.00%	4.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
6.04%	4.05%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
4.83%	4.01%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
6.00%	4.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
6.04%	4.05%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
4.83%	4.01%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%

City of Sequim

Utility Rate Study: Water Utility

Assets

Replacement Cost Year: 2020

Assumption - everything listed was paid for by the City

Asset Number	Asset Category	Asset Description	Purchase Date	Original Cost	% Contributed by Grants / Donations	Original Cost less Contributions	Useful Life (years)	Annual Original Cost Depreciation	Function	ENR Multiplier	Replacement Cost	Replacement Cost Depreciation			
F-1 and F-2 Fixed Asset and CWIP										0.00	$ -	$ -	1900	3.25%	$ -
		2014 AC/Galv Water Line replace Proj.	1/1/2014	$ 855,000	0%	$ 855,000	75	$ 11,400	Transmission & Distribution	1.18	$ 1,013,099	$ 13,508	2014	4.23%	$ 217,127
		3rd & Sycamore Connection	1/1/2016	$ 40,000	0%	$ 40,000	75	$ 533	Transmission & Distribution	1.12	$ 44,956	$ 599	2016	3.25%	$ 5,197
		CB Park Waterline Extension	1/1/2017	$ 94,000	0%	$ 94,000	75	$ 1,253	Transmission & Distribution	1.08	$ 101,732	$ 1,356	2017	3.67%	$ 10,339
		Sunnyside water line upgrade	1/1/2018	$ 736,000	0%	$ 736,000	75	$ 9,813	Transmission & Distribution	1.05	$ 773,122	$ 10,308	2018	3.96%	$ 58,251
		Reservoir Vent	1/1/2019	$ 60,000	0%	$ 60,000	30	$ 2,000	Storage	1.03	$ 61,800	$ 2,060	2019	0.00%	$ -
		Port Williams Pump	1/1/2019	$ 88,000	0%	$ 88,000	10	$ 8,800	Pumping	1.03	$ 90,640	$ 9,064	2019	0.00%	$ -
		5th McCurdy Booster Station	1/1/2019	$ 672,000	0%	$ 672,000	25	$ 26,880	Pumping	1.03	$ 692,160	$ 27,686	2019	0.00%	$ -
						$ -									
Prior to 2007: "2007 Study: Chapter 1 GFCs"															
Percentage of Pipes Installed by Decade (updated)		0%	1/1/1930	$ -	0%	$ -	75	$ -	Transmission & Distribution	57.24	$ -	$ -	1930	4.13%	$ -
		0%	1/1/1940	$ -	0%	$ -	75	$ -	Transmission & Distribution	48.02	$ -	$ -	1940	2.56%	$ -
		1%	1/1/1950	$ 9,895	0%	$ 9,895	75	$ 132	Transmission & Distribution	22.78	$ 171,466	$ 2,286	1950	1.92%	$ 1,898
		6%	1/1/1960	$ 146,234	0%	$ 146,234	75	$ 1,950	Transmission & Distribution	14.10	$ 1,671,793	$ 22,291	1960	3.52%	$ 51,401
		11%	1/1/1970	$ 623,709	0%	$ 623,709	75	$ 8,316	Transmission & Distribution	8.41	$ 3,257,853	$ 43,438	1970	6.33%	$ 394,652
		12%	1/1/1980	$ 1,334,171	0%	$ 1,334,171	75	$ 17,789	Transmission & Distribution	3.59	$ 3,686,518	$ 49,154	1980	8.59%	$ 1,146,609
		19%	1/1/1990	$ 2,773,514	0%	$ 2,773,514	75	$ 36,980	Transmission & Distribution	2.46	$ 5,786,976	$ 77,160	1990	7.27%	$ 2,017,500
		44%	1/1/2000	$ 8,565,849	0%	$ 8,565,849	75	$ 114,211	Transmission & Distribution	1.87	$ 13,245,745	$ 176,610	2000	5.71%	$ 4,890,386
		8%	1/2/2010	$ 2,279,535	0%	$ 2,279,535	75	$ 30,394	Transmission & Distribution	1.32	$ 2,571,989	$ 34,293	2010	4.29%	$ 978,680
	PRV	5th Ave & McCurdy	1/1/1996	$ 26,988	0%	$ 26,988	50	$ 540	Transmission & Distribution	2.07	$ 55,779	$ 1,116	1996	5.76%	$ 15,538
	PRV	3rd Ave	1/1/1998	$ 30,583	0%	$ 30,583	50	$ 612	Transmission & Distribution	1.96	$ 60,024	$ 1,201	1998	5.09%	$ 15,569
	PRV	River Road	1/1/1999	$ 31,540	0%	$ 31,540	50	$ 631	Transmission & Distribution	1.92	$ 60,482	$ 1,210	1999	5.43%	$ 17,118
	PRV	Brackett Road	1/1/2000	$ 32,642	0%	$ 32,642	50	$ 653	Transmission & Distribution	1.87	$ 60,968	$ 1,219	2000	5.71%	$ 18,636
	PRV	Washington Street	1/1/2000	$ 32,642	0%	$ 32,642	50	$ 653	Transmission & Distribution	1.87	$ 60,968	$ 1,219	2000	5.71%	$ 18,636
	Hydrants	Hydrants (3)	1/1/1970	$ 160,185	0%	$ 160,185	50	$ 3,204	Hydrants	8.41	$ 1,347,809	$ 26,957	1970	6.33%	$ 101,357
	Booster Pump Stations	Reservoir Site	1/1/1973	$ 65,955	0%	$ 65,955	25	$ 2,638	Pumping	6.13	$ 404,426	$ 16,177	1973	5.19%	$ 34,225
	Booster Pump Stations	5th Ave & McCurdy	1/1/1995	$ 209,382	0%	$ 209,382	25	$ 8,375	Pumping	2.12	$ 444,692	$ 17,788	1995	5.95%	$ 124,652
	Reservoirs	Reservoir Rd	1/1/1983	$ 430,372	0%	$ 430,372	50	$ 8,608	Storage	2.86	$ 1,229,920	$ 24,599	1983	9.51%	$ 409,104
	Reservoirs	Reservoir Rd (W)	1/1/1973	$ 105,089	0%	$ 105,089	50	$ 2,102	Storage	6.13	$ 644,389	$ 12,888	1973	5.19%	$ 54,532
	Reservoirs	Reservoir Rd (E)	1/1/1995	$ 1,136,052	0%	$ 1,136,052	50	$ 22,722	Storage	2.12	$ 2,412,784	$ 48,257	1995	5.95%	$ 676,330
	Source of Supply	Infiltration Gallery Collector Well	1/1/1953	$ 2,367	0%	$ 2,367	50	$ 47	Supply/Treatment	18.50	$ 43,796	$ 876	1953	2.74%	$ 647
	Source of Supply	24-in Concrete Trans Pipe	1/1/1953	$ 12,338	0%	$ 12,338	50	$ 247	Supply/Treatment	18.50	$ 228,289	$ 4,566	1953	2.74%	$ 3,374
	Source of Supply	Siberhorn Well Field #1	1/1/1983	$ 358,589	0%	$ 358,589	50	$ 7,172	Supply/Treatment	2.86	$ 1,024,778	$ 20,496	1983	9.51%	$ 340,869
	Source of Supply	Siberhorn Well Field #2	1/1/1983	$ 358,589	0%	$ 358,589	50	$ 7,172	Supply/Treatment	2.86	$ 1,024,778	$ 20,496	1983	9.51%	$ 340,869
	Source of Supply	Siberhorn Well Field #3	1/1/1975	$ 180,747	0%	$ 180,747	50	$ 3,615	Supply/Treatment	5.25	$ 949,481	$ 18,990	1975	7.05%	$ 127,442
	Source of Supply	Port Williams Well Field #1	1/1/1995	$ 459,440	0%	$ 459,440	50	$ 9,189	Supply/Treatment	2.12	$ 975,774	$ 19,516	1995	5.95%	$ 273,520
	Source of Supply	Port Williams Well Field #2	1/1/1998	$ 529,369	0%	$ 529,369	50	$ 10,588	Supply/Treatment	1.96	$ 1,038,978	$ 20,780	1998	5.09%	$ 269,493
	Treatment	Siberhorn Treatment System	1/1/1991	$ 119,284	0%	$ 119,284	50	$ 2,386	Supply/Treatment	2.40	$ 286,668	$ 5,734	1991	6.92%	$ 82,545
	Treatment	Infiltration Gallery System	1/1/1991	$ 119,284	0%	$ 119,284	50	$ 2,386	Supply/Treatment	2.40	$ 286,668	$ 5,734	1991	6.92%	$ 82,545
	Treatment	Port Williams Treatment System	1/1/1995	$ 138,577	0%	$ 138,577	50	$ 2,772	Supply/Treatment	2.12	$ 294,314	$ 5,887	1995	5.95%	$ 82,500
						$ -				0.00	$ -	$ -	1900	3.25%	$ -
						$ -				0.00	$ -	$ -	1900	3.25%	$ -
Totals Used in Model				**$ 22,817,920**		**$ 22,817,920**		**$ 366,762**			**$ 46,105,616**	**$ 745,520**			**$ 12,861,542**

APPENDIX O

PLAN APPROVAL AND CORRESPONDENCE

Contents:

- City response letter addressing DOH comments on Draft Water System Plan dated July 2022
- City Council resolution approving Final Water System Plan dated September 2023
- City Council resolution adopting Water Conservation and Efficiency Goals
- Letters requesting review addressed to adjacent water purveyors
- Comments received
    1. Planning Commission (8/2/2022)
    2. Jamestown S'Klallam Tribe (8/9/2022)
    3. Clallam PUD (8/26/2022)
    4. Lee Water System (9/15/2022)
    5. WA Dept of Health (6/9/2023) incorporating WA Dept of Ecology comments from 12/5/2022
- Legal Notice of public hearing on Water System Plan
- City responses to comments received

August 25, 2023

Deborah Johnson, Regional Planner
Candida Granillo-Dodds, P.E., Regional Engineer
Department of Health, Office of Drinking Water SWRO
PO Box 47823
Olympia, WA 98504-7823

RE: Sequim City of Water System, ID #77620Y, Clallam County
Water System Plan Update, ODW Project #22-0905

Dear Deborah and Candida:

Below for your review are the City of Sequim's responses to the comments in the letter received from your office dated June 9, 2023 regarding the subject submittal. To provide context we have repeated the comment with the response immediately following. This letter, minus attachments, is also included in Appendix O.

Please note that we have attached change pages for each of the modifications described in this letter to make it clear what modifications have been made from the original Water System Plan submittal. We have also attached a clean version of the fully updated body of the Water System Plan (with Appendices) with all updates incorporated.

CHAPTER 1 – WATER SYSTEM DESCRIPTION

1. 1.3.2. Climate and geography, p. 3. For the stormwater managed aquifer recharge project, please see our fact sheet and contact us for further guidance as the project develops: Aquifer Storage and Recovery Projects and Drinking Water Wells. This does not need to be addressed in the WSP, but please keep us up to date.

Response:
Thank you, but we were not able to find the referenced DOH fact sheet with an internet search – could you please send it directly?

CHAPTER 3 – SYSTEM ANALYSIS

2. 3.4.1.3. Source water quality analysis, p. 58. Copper – 1.3 mg/L is an Action Level, not MCL.

Response:
That has been corrected in the revised Water System Plan.

3. 3.6.1. Source of supply, p. 75. If the City wishes to eventually enter into a satellite management role, its draft SMA plan (noted in several other places throughout the document as being appended to the 2014 WSP) will need to be updated and approved at that time. It was not reviewed nor is proposed for approval as a part of the current WSP update.

Response:
Yes, it is understood that the draft SMA plan will need to be updated and approved in the future if the City decides to pursue becoming a SMA.

WILSON ENGINEERING, LLC | 805 Dupont Street, Suite 7, Bellingham, WA 98225 | **T** (360) 733-6100 **F** (360) 647-9061 | www.wilsonengineering.com

CHAPTER 4 – WATER USE EFFICIENCY PROGRAM AND WATER RESOURCE ANALYSIS

4. 4.2. Data collection & demand forecasting, Table 4-1, p. 78. If the production meters are not calibrated, please explain how you will identify when they are not working properly.

Response:
The production meters have a OPTICHECK service tool that can be used for on-site verification of flowmeter. The City will utilize this tool periodically and if flowmeter readings vary from expected values. This edit is reflected in the revised Water System Plan.

5. 4.5.2.2. Supplemental measures (use reclaimed water), p. 87. Are any of these sites dual-plumbed reclaimed water use sites? Do they conduct shutdown cross-connection tests? If so, at what frequency?

Response:
Sites that are dual-plumbed reclaimed water use sites conduct annual shutdown cross-connection tests. This edit is reflected in the revised Water System Plan.

6. 4.6.2.3. Silberhorn wellfield, Figure 4-1, p. 89. Is it possible to separate the water level from when the pumps are running and when they are not to observe trends more clearly?

Response:
There are some records of whether the water level measurements were taken while pumps were running or not, but those records are not comprehensive. We are of the opinion that Figure 4-1 sufficiently depicts the data to demonstrate that long-term trends show water level and aquifer stability from 2009 to present day, demonstrating that the withdrawals are sustainable.

CHAPTER 5 – SOURCE WATER PROTECTION

7. 5.4.3.1. Introduction (wellhead protection areas), p. 99. The bullet beginning “three primary zones” is inaccurate; WAC 246-290-135(3)(c)(2) includes a 6-month time of travel too, which is shown in the mapped WHPAs in Fig. 5-3 so this appears to be just a text error. No buffer zone is required.

Response:
Thank you, the text in the revised Water System Plan has been updated to reflect this input.

8. 5.11. Source water protection management plan, Figure 5.1, p. 112. The watershed drainage area ends at the county border in the figure, but the drainage area should extend into Jefferson County.

Response:
Figure 5.1 has been updated in the revised Water System Plan.

CHAPTER 6 – OPERATION AND MAINTENACE PROGRAM

9. 6.1. Water operations staff certifications, p. 115. Please update staff information if turnover has occurred since this was drafted.

Response:
Table 6-1 has been updated to reflect water operations staff certifications as of 8/7/2023 in the revised Water System Plan.

10. 6.4.1. Reservoirs, p. 117. How often does an operator inspect the top of the reservoirs to look at vent screens, hatches, and other penetrations in the tops of the reservoirs?

Response:
Once per year. This edit is reflected in the revised Water System Plan.

11. 6.4.4. Unidirectional flushing, p. 118. Please describe the flushing frequency.

Response:
The City plans to complete a full distribution system flush approximately once every 5 years. This edit is reflected in the revised Water System Plan.

12. 6.5. Operation and maintenance projects, Project M-5, p. 121. Please provide more details on this project. If the missing information is needed to accurately track backflow device testing and ensure they are tested annually, it should be a higher priority with more resources assigned to it.

Response:
See updates to the details in the revised Water System Plan.

13. 6.6.1.9. Water main breaks, p. 126. We recommend following the guidance in our publication, 331- 583 Water Main Break Response Protocol for Chlorinated Systems.

Response:
Thank you, we have incorporated and referenced this guidance in the revised Water System Plan.

APPENDICES

14. Appendix A. It appears the local government consistency form was submitted to the Clallam Co. hydrogeologist. Typically, for a city-owned system this form would be reviewed and signed by city planning staff responsible for comprehensive (GMA) planning in that jurisdiction. Please ask your Community Development Department to complete the third column and sign the form, then replace the unsigned version with the signed document.

Response:
The Principal Planner for Clallam County completed and signed the local government consistency form on January 19, 2023. It is included in the updated Appendix A.

15. Appendix B. Please review and update, if needed, WFI forms.

Response:
Updated WFI form is included in the updated Appendix B.

16. Appendix C. Is a signed version available of the 1998 city/county interlocal/SERP agreement?

Response:
Yes, the signed version is now included in the updated Appendix C.

17. Appendix D. The Huffman system is now a Group A and is believed to currently have 18 connections. We did not check each listed system for currency, but you may want to.

Response:
We have updated the information in Appendix D on the Huffman system and other known updates.

18. (General) Please number the pages, add to WSP table of contents, and create a single integrated document.

Response:
This has been completed in the revised Water System Plan.

WA DEPARTMENT OF ECOLOGY Comments (included in DOH comment letter)

Re Water Rights Assessment

Ecology Comment:

- The WRSA specifies an **annual quantity** for Surface Water Right Certificate 1316 for the Dungeness River. This right did not specify an annual quantity and cannot be assumed to be valued at an amount that represents continuous pumping at 1.4 cubic feet per second (specified as 1,014 ac-ft/yr). The WRSA should show the annual quantity as "unspecified".
- Ecology views the **annual quantity** under Surface Water Right Certificate 1316 for the Dungeness River and Ground Water Right Certificate 2102-A for the infiltration trench as non-additive and limited to a combined total of 1,160 ac-ft/yr.
- The **annual quantity** under Permit G2-29239 for the Port Williams Well Field was issued in 1997 as entirely ***non-additive*** to the City's existing rights.

City Response:
The City recognizes that there is disagreement with Ecology about the annual quantity of its River water right certificate (Cert 1316) and about the annual quantity of its Port Williams water right permit (Permit G2-29239). The City respectfully submits that the disagreement between Ecology and the City on quantification of the extent and validity of the water rights does not need to be resolved in this Water System Plan review process. The City has demonstrated its ability to ensure water availability as growth occurs, as required for Plan approval by DOH.

Ecology Comment:

- The water rights for the Dungeness River and infiltration gallery are certificated rights issued prior to full perfection and assumed to be "in good standing" under RCW 90.03.330(3). Although inchoate quantities are available for development, these rights are not necessarily valid at face-

value quantities. Because Ecology is only able to tentatively assess the extent and validity of water rights represented by certificates, the actual value of the City's water right portfolio cannot be confirmed except through a Superior Court adjudication.

City Response:
Comment noted.

Ecology Comment:

- The 1997 water right permit for the Port Williams Well Field was issued as a non-additive right, consistent with the laws, regulations, and policies in effect at that time. Consequently, Ecology concludes that the total **annual quantity** authorized for diversion/withdrawal under all of City of Sequim water rights combined can be no more than 2,864 ac-ft/yr. The claimed total of 4,714 ac-ft/yr should not be relied on for planning purposes.
- Ecology agrees that the City's **instantaneous** water rights are adequate to meet the projected 20-year demand. The Water System Plan indicates that 1,535.6 ac-ft/yr is required to meet the 10-year projected **annual quantity** demand and 2,063.7 ac-ft/yr is needed to satisfy the 20-year demand. The City has adequate water rights for the 10-year planning horizon and may have adequate rights for the 20-year planning horizon.

City Response:
Like the draft Plan and WRSA, the final Plan shows that the City has adequate instantaneous water rights to accommodate growth <u>through</u> the end of the 20-year plan period, and adequate annual water rights to accommodate growth as well; however, <u>at the end of</u> the 20-year period its River water rights may need to be utilized to meet the projected annual need.

Re Source Production Issues

Ecology Comment:

- The Water System Plan indicates that production capacity may be increased through additional wells at the existing well fields, development of a new deep groundwater source under pending Water Right Application G2-30721, and construction of a new surface water treatment facility to directly utilize the Dungeness River. Although Section 3.4.1.2 of the Plan suggests that surface water use would be developed only when necessary to meet source reliability needs, improve system resiliency, and serve long-term growth in the service area, the WRSA appears to indicate otherwise.

City Response:
The Plan indicates in various places that the City intends to avoid the need for a future surface water treatment plant by focusing additional water supply development on deep wells at existing wellfields. The WRSA shows conceptually that the City currently has adequate water rights when its surface water right is exercised; however, the City has a water right application (G2-30721) on file and a new deep well planned at the Silberhorn wellfield. Exactly how the City will utilize its water rights portfolio in 20 years will be addressed in subsequent Water System Plan Updates.

Ecology Comment:

- The WRSA shows that by 2041, the City expects to divert 364.3 ac-ft/yr of surface water under Certificate 1316, nearly double the current production from both the infiltration gallery under Certificate 2102 and the Silberhorn Wellfield, and actually decrease production at the Port Williams Wellfield below the current level. This shows a disproportionate reliance on surface water and shallow groundwater under Certificates Nos. 1316 and 2102 as these two sources would account for approximately 64% of the expected 20-year production total. This outcome would not be consistent with the requirement under Permit G2-29239 to gradually eliminate the use of surface water from the Dungeness River except for emergency/back-up supply purposes.

City Response:
See updated WRSA with a revised ratio of groundwater production to surface water production that addresses this concern.

Ecology Comment:

- The Capital Improvements Plan shows that construction of the proposed surface water treatment facility is not scheduled until 2040 and would occur near the end of the 20-year planning horizon. To the extent that groundwater is available for sustainable development, the City is encouraged to prioritize development of sources at the Port Williams and Silberhorn Well Fields while actively pursuing a new groundwater right under pending Application No. G2-30721.

City Response:
The suggested actions are under advisement.

Ecology Comment:

- Regarding the potential for fully developing quantities under the Port Williams Well Field permit and the history of monitoring results being reported to Ecology, Section 3.4.1.2 states: "*At this time no guidance has been given to the City in regards to the ability to develop Port Williams to the full permitted water right."* The City is encouraged to contact Ecology to discuss its strategy for source prioritization and further development of this well field, and any concerns it may have regarding long-term groundwater level declines and potential impacts to senior right holders.

City Response:
The suggested actions are under advisement.

Re Future Interties

Ecology Comment:

- Section 1.6.3 of the Water System Plan discusses the potential for serving wholesale water through future interconnections with adjacent water systems. If these systems are located outside of the City and UGA service area, applications for changes of water rights will be required under RCW 90.03.383.

- An intertie with the Resort and Marina Water System will not require water right change applications if the intertie will deliver water only one way to this system. Because the current primary well (Well AHM612) for the Resort and Marina system is not authorized to serve as a primary source under existing water rights, the City is encouraged to interconnect with and/or acquire this water system as soon as possible. This is especially important if new development is occurring in the portion of the City occupied by the Resort and Marina system service area.

City Response:
Comments noted. The City is considering whether to acquire the existing Resort & Marina System, which may include water rights.

Re Water Use Efficiency Program

Ecology Comment:

- The Water System Plan shows that the City has substantially reduced water usage through conservation and expanded use of reclaimed water. Distribution system leakage is less than 10%, demonstrating reasonably efficient use. The 2022 water use efficiency goal seeks to further reduce water use and distribution system leakage.

City Response:
Comment noted.

Ecology Comment:

- The City is required under RCW 90.03.386(3)(c) to describe "the projected effects of delaying the use of existing inchoate rights over the next six years through the addition of further cost-effective water conservation measures before it may divert or withdraw further amounts of its inchoate right for beneficial use". The Plan shows that the projected water use efficiency savings over the next 20 years would amount to approximately 150,194 gallons per day, or 168.2 ac-ft/yr. These savings would substantially delay the need to divert/withdraw additional water, particularly from sources that have a greater effect on area streams.

City Response:
The City continues to look for ways to increase its water efficiency, however, the City does not agree that these savings would "substantially delay" our need to withdraw additional water. The City continues to have concerns for adequate supply for its long-term growth, which is why the City is working on its deep well project.

Ecology Comment:

- The Plan indicates that the City's intends to use reclaimed water for aquifer recharge projects, increase the amount of water used to augment flows in Bell Creek, and potentially augment flows in Gierin Creek in the future. We value the City's efforts and contributions to the health of the greater Dungeness River watershed.

City Response:
Comment noted – thank you.

Re Watershed Plan Consistency

Ecology Comment:

- The City of Sequim service area is located primarily in the Elwha-Dungeness Water Resource Inventory Area (WRIA 18) and all of the City's water sources are in Dungeness portion of WRIA 18. A Watershed Management Plan was adopted for WRIA 18 in May 2005, and an instream flow rule for the Dungeness portion of WRIA 18, Chapter 173-518 WAC, became effective on January 2, 2013. The part of the service area in WRIA 17 is not covered under the WRIA 17 Watershed Plan or instream flow rule (Chapter 173-517 WAC).
- Although the City's water rights are not affected by the East WRIA 18 instream flow rule, Chapter 3 of the Watershed Plan includes the following recommendations specific to the City of Sequim:
    1. Pumping from the Dungeness River Ranney system during low flow periods should be reduced to the minimum flow needed to maintain that source as an emergency backup, in accordance with the City's water right and Department of Health regulations and permits.
    2. The City should continue to incorporate findings from East WRIA 18 water resources studies into long-term planning strategies for water resources, based on best available science.

City Response:
Comment noted. The City's standard operations at the Infiltration Gallery (a.k.a. Ranney system) involve tracking River flow and reducing production during extreme low flows. (Note that the Gallery's flow is generally adjusted between 350gpm and 718 gpm, which is 0.78cfs to 1.6 cfs.) The City relies on the latest hydrologic science and engineering in its water system planning and water supply development projects.

Ecology Comment:

- The Plan's proposal to directly use surface water for non-emergency use and increase pumping at the infiltration trench as reflected in the WRSA is inconsistent with the recommendations and goals of the WRIA 18 Watershed Plan. The City of Sequim's Water System Plan is otherwise "not inconsistent" with the watershed plan adopted under Chapter 90.82 RCW and comprehensive watershed plan adopted under RCW 90.54.040(1) for East WRIA 18.

City Response:
*The City's updated Water Right Self-Assessment (WRSA) form in Appendix H addresses some of Ecology's concerns. DOH's Water System Plan Guidebook states that Ecology's approval is required for municipal purveyors that are "expanding their water rights <u>place of use</u>… the **new area…** must not be inconsistent with the watershed plan…." The City is not expanding the place of use of its water rights; therefore it is not inconsistent.*

Ecology Comment:

- Ecology is committed to working with the City to ensure its success in obtaining a new water right under Application G2-30721. A timely decision would reduce or eliminate the need for the City to rely on surface water and shallow groundwater sources to meet the long-term needs of the City and UGA. We encourage the City to contact our office to discuss the new application and any outstanding issues regarding the use of water under the City's existing water rights.

City Response:
The suggested actions are under advisement.

In the time between submission of the draft WSP and now, the City team recognized the need for additional modifications to the WSP that are not addressed in any of the above comments/responses. Those additional modifications are explained here:

1. Chapter 1, Section 1.7: we made clarifying edits to the second paragraph of this section regarding the Clallam County SERP – see revised Water System Plan.

2. Chapter 8, Section 8.2.7, Item 19: There was a typo in the title of this project name. It has been corrected from South 2nd Avenue to South 5th Avenue in the revised Water System Plan.

3. Appendix H: Water Rights Self-Assessment form, new water right application G2-30721 amounts were recently updated to 1,000 gpm and 2,000 ac-ft/yr.

4. Appendix O: Now contains all comments received on the draft Water System Plan and the City's responses, including a copy of this letter.

5. Wellhead protection letters, Appendix P: Added addresses/parcel numbers to which letters were sent.

Please feel free to contact us with any questions or comments.

Very truly yours,

WILSON ENGINEERING, LLC

Brian M. Smith

Brian Smith, P.E. (bsmith@wilsonengineering.com)

And

City of Sequim

A.P. Tjemsland

Pete Tjemsland, Utilities Manager (ptjem@sequimwa.gov)

Enclosures:

- Water System Plan modified pages with tracked changes
- Water System Plan with changes accepted and Appendices

RESOLUTION NO. R2022-012

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF SEQUIM, WASHINGTON, APPROVING THE CITY'S DRAFT WATER SYSTEM PLAN UPDATE FOR SUBMITTAL TO WASHINGTON STATE DEPARTMENT OF HEALTH FOR REVIEW

WHEREAS, pursuant to the requirements of Revised Code of Washington (RCW) 70A.100.050 (Development of water system plans for critical water supply service areas), and Washington Administrative Code (WAC) 246-290 regulating Group A Public Water Supplies, the City of Sequim has prepared a Draft Water System Plan Update to the current Plan adopted in 2014 as an element of the City's Comprehensive Plan; and

WHEREAS, the City of Sequim Planning Commission held a public hearing at its meeting on August 2, 2022 and unanimously approved forwarding said Draft Plan to City Council for its approval; and

WHEREAS, WAC 246-290-100 (8) requires that a Draft Plan be approved by the municipal water system's governing body before it is submitted to the Washington State Department of Health, Office of Drinking Water for its review;

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF SEQUIM, WASHINGTON, HEREBY RESOLVES AS FOLLOWS:

Section 1. Draft Plan Approved for Submittal. The Draft Water System Plan Update dated July 14, 2022, which is incorporated herein by this reference as if fully set forth, is approved for submittal to the Washington State Department of Health Office of Drinking Water for that agency's review.

APPROVED by the Council and approved by the Mayor of the City of Sequim this 8th day of August 2022.

Tom Ferrell, Mayor

Attest:

Haylie Clement, City Clerk

Approved as to Form:

Kristina Nelson-Gross, City Attorney

Note that this page will be replaced by City Council resolution adopting the final WSP September 2023

RESOLUTION NO. R2022-011

A RESOLUTION OF THE CITY COUNCIL OF CITY OF SEQUIM, WASHINGTON, ADOPTING WATER CONSERVATION & EFFICIENCY GOALS FOR THE 2022 WATER SYSTEM MASTER PLAN UPDATE

WHEREAS, pursuant to the requirements of WAC 246-290-830 (Water use efficiency goal setting), water use efficiency goals for municipal water systems must be set in a public forum that provides opportunity for consumers and the public to participate and comment; and

WHEREAS, WAC 246-290-830 provides requirements for the goals and for the public forum including public notice requirements – all of which have been met; and

WHEREAS, Sequim City Council held a public hearing regarding new water conservation and efficiency goals on August 8, 2022, and considered all comments received.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF SEQUIM, WASHINGTON, HEREBY RESOLVES AS FOLLOWS:

Section 1. Goals Adopted. The "Water Conservation & Efficiency Goals for the City of Sequim's 2022 Water System Master Plan Update", a copy of which is attached hereto as Exhibit A and incorporated herein by this reference as if fully set forth, is hereby adopted.

APPROVED by the Council and approved by the Mayor of the City of Sequim this 8th day of August 2022.

Tom Ferrell, Mayor

Attest:

Haylie Clement, City Clerk

Approved as to Form:

Kristina Nelson-Gross, City Attorney

Proposed Water Conservation/Efficiency Goals for the 2022 Water System Master Plan Update

1. WATER CONSERVATION GOALS

Previous goals and how well they were met:

- As a demand-side goal set in the ***2014 Water System Plan***, the City set out to reduce the ERU (equivalent residential unit, the total usage divided by # residences) value of 160 gpd/unit by 10% over 10 years. The City's primary tactic for reaching this goal was the additional use of Class A reclaimed water from its Water Reclamation Facility to replace irrigation use of potable water.
    - In 2021, the usage per ERU was **146 gpd/ unit, or a 9% reduction over 10 years**. Notably, usage per ERU was more than 10% lower in 2018 and 2019 but increased slightly in 2020 and 2021, potentially due to more residents spending more time in their homes because of the COVID-19 pandemic.
    - Estimated water savings due to decreasing usage per ERU was approximately 260 million gallons over 9 years.
- As a supply-side goal set in the ***2014 Water System Plan***, the City would reduce DSL (distribution system leakage) to the DOH threshold of 10% over the subsequent 6 years. This would be an average reduction of 1% DSL per year.
    - DSL went from **13.7% for 2014 to 9.1% for 2021**, which achieved the goal of reducing DSL below the DOH standard of 10%.
    - The estimated amount of water that was saved by decreasing DSL compared to the 2010 DSL is approximately 90 million gallons.

Proposed goals with the 2022 Plan Update:

- As a demand-side goal, the City will attempt to continue reducing the ERU value by 5 percent over the next 10 years.
    - The City's approach to reaching this goal is through conservation education and continually increasing use of reclaimed water.
- As a supply-side goal, the City will continue to reduce DSL by 3% over the next 10 years.
    - This will be by continuing to fix leaks and replacing AC and Galvanized pipe.

2. WATER USE EFFICIENCY (WUE) MEASURES

The ***2014 Water System Plan*** listed the following "WUE Measures" the City would implement:

> Implement Source Meters, Service Meters and Meter Calibration (Mandatory Implementation)

- Standard procedure.

> Implement Program Promotion and Customer Education (Mandatory Implementation)

- Utility bills are mailed monthly and include information on historical water use, and ways to save water and energy.
- The City also provides information on conservation on their website and at City Hall.
- In the annual Water Quality report, water conservation tips are also provided including simple ways that customers can reduce their daily water consumption.

> Implement a Water Loss Control Action Plan to Control Leakage (Mandatory Implementation if DSL >10 percent)

- In 2013-14, the City's 3-year rolling average DSL was **14.9 percent**, not meeting the 10% DOH maximum. As such, the City implemented a Water Loss Control Action Plan (WLCAP) to remain in compliance which included the following actions:
  - Assess data accuracy, and
  - Assess data collection methods and errors.

> Evaluate Conservation Pricing (Mandatory Evaluation, Supplementary Implementation)

- The City has an inclined block water rate structure to incentivize water use efficiency.

> Bills Showing Consumption History (Supplementary Implementation)

- Standard procedure.

> Evaluate Reclaimed Water (Mandatory Evaluation, Supplementary Implementation)

- The City pumps Class A reclaimed water into the City for reuse, primarily for the City Shop (including in the water truck), the Reuse Demonstration Site at Carrie Blake Park, and augmentation of Bell Creek stream flows.

> Notifying Customers About Leaks on Their Property (Supplementary Implementation)

- Standard procedure.

All the above WUE measures were and continue to be implemented. Proposed new, expanded or enhanced WUE measures with the 2022 Plan Update include:

> Implement Program Promotion and Customer Education at least once per year

- Monthly utility bills are either paper or electronic; any bill can now be paid online.
- Bills include information on the customer's historical water use and ways to save water and energy. The City also provides information on water conservation in most monthly newsletters that accompany bills, on its website, and in flyers at City Hall. In the annual Water Quality report, water conservation tips are provided including simple ways that customers can reduce their daily water consumption.
- When the Dungeness watershed is experiencing state-declared drought (three out of the past seven summers), additional water-saving outreach is conducted:

- A new flyer, "About the Drought," was used in 2015, 2019, and 2020 and is available when needed in the future. A webpage on Drought was developed first in 2015 and is now available anytime: https://www.sequimwa.gov/856/Water-Conservation-Drought
- Tips on conserving are included in the City's monthly newsletter, on its website, and emailed out to list-serve subscribers.
- Also note that the City's monthly newsletter is reprinted in the Sequim Gazette.

> Evaluate Distribution System Leakage (DSL)

- The City currently performs annual leak detection surveys as a part of system O&M. Leaks are repaired whenever found and the City budgets annually for both leak detection and leak repair. The City's storage tanks are in good condition and are inspected regularly. Meters are calibrated and replaced as necessary depending on size. The City is currently undertaking a number of CIP projects to replace water mains which includes $200,000 per year for the replacement of asbestos cement (AC) water mains since they can be brittle and prone to leakage. Water theft is not considered to be a significant source of DSL at this time.
- The City's current 3-year rolling average DSL for 2019-2021 is **9.1 percent**, which meets the DOH standard of 10% maximum DSL and avoids the requirement for a Water Loss Control Action Plan (WLCAP).

> Conservation Pricing

- The City's current inclined block water rate structure was adopted by Ordinance 2021-028.
- In summary, the City's base charge does not include any water usage. For residential customers, monthly usage rates are $0.00950 per cubic foot (cf) for the first 600 cf, $0.02777 for 601-1,600 cf, and $0.03509 for 1,601 or more cf. Irrigation, Commercial, and public agency customers have the same rate structure up to 1,600 cf, but do not pay a higher rate for more usage.

> Use Reclaimed Water

- In 2021, the City used 32.6% of its reuse water for projects around the City, which averaged approximately 221,000 gpd. This is up from 20% and 120,000 gpd in 2006. Reclaimed water was mainly used by the Water Reclamation Facility (WRF), the Water Reuse Demonstration Site at Carrie Blake Park, and for other projects by the City (dust control, vehicle washing, etc.).
- Future projects for reclaimed water use are discussed in the City's *2008 Engineering Report* and include various aquifer recharge projects, additional storage, additional augmentation of Bell Creek, and possible augmentation of Gierin Creek.

Summary: The WUE regulations require systems of our size (2,500-9,999 connections) to implement all mandatory and at least six supplementary WUE measures. By DOH counting, the City implements 12 supplementary measures, more than exceeding the minimum requirement.

3. PROJECTION OF WATER SAVED

Water use per ERU has been decreasing, and the goals listed above aim to continue that trend. Within the next ten years the City's conservation program is projected to reduce the average day demand by approximately 100,000 gallons and reduce the maximum day demand by approximately 270,000 gallons. The City will evaluate its progress against its WUE goals when the WUE Plan is updated and new goals are set.

The City may consider additional incentives to reduce water use, such as rebate programs for showerhead or faucet replacements, or toilet/urinal retrofits. The City would perform a quantitative evaluation, including the marginal cost of water, to assess the cost-effectiveness prior to implementing a rebate program.

4. ADDITIONAL INFORMATION

For further information and reference, water use efficiency is discussed in several places in the 2022 Water System Plan Update. In particular, refer to the following sources:

- Water supply characteristics information: see Chapters 1, 2, and 3
- Water demand forecasts information: see Chapter 3
- Water use efficiency and resource analysis: see Chapter 4
- Annual WUE reports and links to the 2022 Draft Plan Update: https://www.sequimwa.gov/356/Water

CITY OF SEQUIM

PUBLIC WORKS
152 W. Cedar Street, Sequim, WA 98382
PH (360) 683-4908 FAX (360) 681-0552

August 18, 2022

Battelle NW Marine Lab
Chris Dissing, Water System Manager
1529 W. Sequim Bay Rd.
Sequim WA 98382

SUBJ: **Draft 2022 Water System Plan Update, City of Sequim**

To all Managers of Public Water Systems adjacent to City of Sequim:

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Later this month the City will submit the Plan to WA Dept. of Health (DOH) for its 90-day review. In addition, in accordance with WAC 246-290-100(7), the City is transmitting the plan to Clallam County and all adjacent water purveyors to assess consistency with ongoing and adopted planning efforts.

The City has prepared this Water System Comprehensive Plan update in accordance with WAC 246-290-100.

If you have any questions or comments, please do not hesitate to contact Brian Smith with Wilson Engineering at 360-733-6100 or bsmith@wilsonengineering.com, or me at 360-912-1635 or asoule@sequimwa.gov.

We would greatly appreciate it if you could provide any written comments to us within sixty days via email or regular mail. Thank you.

Best regards,

Ann Soule
Ann Soule, LHG
Sequim Public Works

Brian Smith
Brian Smith, P.E.
Wilson Engineering, L.L.C.

c: Pete Tjemsland, Sequim Utilities Manager

CITY OF SEQUIM

PUBLIC WORKS
152 W. Cedar Street, Sequim, WA 98382
PH (360) 683-4908 FAX (360) 681-0552

August 18, 2022

Baywood Village Mobile Home Park
Dale Metzger, Water System Manager
PO Box 92
Sequim WA 98382

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Sequim Public Works

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Wilson Engineering, L.L.C.

c: Pete Tjemsland, Sequim Utilities Manager

CITY OF SEQUIM

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August 18, 2022

Deytona
Lonnie Jacobson, Water System Manager
200 Home Ln.
Port Angeles WA 98362

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CITY OF SEQUIM

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152 W. Cedar Street, Sequim, WA 98382
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August 18, 2022

Evergreen Clallam County PUD 1
Tom Martin, Water System Manager
PO Box 1000
Carlsborg WA 98324

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CITY OF SEQUIM

PUBLIC WORKS
152 W. Cedar Street, Sequim, WA 98382
PH (360) 683-4908 FAX (360) 681-0552

August 18, 2022

Flauras Acres Property Owner
Dale Metzger, Water System Manager
PO Box 92
Sequim WA 98382

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Sequim Public Works

Brian Smith
Brian Smith, P.E.
Wilson Engineering, L.L.C.

c: Pete Tjemsland, Sequim Utilities Manager

CITY OF SEQUIM

PUBLIC WORKS
152 W. Cedar Street, Sequim, WA 98382
PH (360) 683-4908 FAX (360) 681-0552

August 18, 2022

Foxfire Lane Water
Bill Wood, Water System Manager
PO Box 2163
Sequim WA 98382

SUBJ: **Draft 2022 Water System Plan Update, City of Sequim**

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c: Pete Tjemsland, Sequim Utilities Manager

CITY OF SEQUIM

PUBLIC WORKS
152 W. Cedar Street, Sequim, WA 98382
PH (360) 683-4908 FAX (360) 681-0552

August 18, 2022

Happy Valley Estates
William Benedict, Water System Manager
63 Morgan Dr.
Sequim WA 98382-7771

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We would greatly appreciate it if you could provide any written comments to us within sixty days via email or regular mail. Thank you.

Best regards,

Ann Soule
Ann Soule, LHG
Sequim Public Works

Brian Smith
Brian Smith, P.E.
Wilson Engineering, L.L.C.

c: Pete Tjemsland, Sequim Utilities Manager

CITY OF SEQUIM

PUBLIC WORKS
152 W. Cedar Street, Sequim, WA 98382
PH (360) 683-4908 FAX (360) 681-0552

August 18, 2022

Huffman
Kevin Odegard, Water System Manager
PO Box 123
Port Orchard, WA 98366

SUBJ: **Draft 2022 Water System Plan Update, City of Sequim**

To all Managers of Public Water Systems adjacent to City of Sequim:

The City's 2022 Water System Plan Update is ready for review by interested parties by browsing to the City's webpage: https://www.sequimwa.gov/356/Water

Later this month the City will submit the Plan to WA Dept. of Health (DOH) for its 90-day review. In addition, in accordance with WAC 246-290-100(7), the City is transmitting the plan to Clallam County and all adjacent water purveyors to assess consistency with ongoing and adopted planning efforts.

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PUBLIC WORKS
152 W. Cedar Street, Sequim, WA 98382
PH (360) 683-4908 FAX (360) 681-0552

August 18, 2022

Lee
Shawn ODell, Water System Manager
PO Box 336
Gig Harbor, WA 98335

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c: Pete Tjemsland, Sequim Utilities Manager

CITY OF SEQUIM

PUBLIC WORKS
152 W. Cedar Street, Sequim, WA 98382
PH (360) 683-4908 FAX (360) 681-0552

August 18, 2022

Palo Verde
Dale Metzger, Water System Manager
PO Box 92
Sequim WA 98382

SUBJ: **Draft 2022 Water System Plan Update, City of Sequim**

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Ann Soule, LHG
Sequim Public Works

Brian Smith
Brian Smith, P.E.
Wilson Engineering, L.L.C.

c: Pete Tjemsland, Sequim Utilities Manager

CITY OF SEQUIM

PUBLIC WORKS
152 W. Cedar Street, Sequim, WA 98382
PH (360) 683-4908 FAX (360) 681-0552

August 18, 2022

Resort and Marina
Dale Metzger, Water System Manager
PO Box 92
Sequim WA 98382

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Best regards,

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Ann Soule, LHG
Sequim Public Works

Brian Smith
Brian Smith, P.E.
Wilson Engineering, L.L.C.

c: Pete Tjemsland, Sequim Utilities Manager

CITY OF SEQUIM

PUBLIC WORKS
152 W. Cedar Street, Sequim, WA 98382
PH (360) 683-4908 FAX (360) 681-0552

August 18, 2022

Sequim Elks 2642
Charlie Johnson, Water System Manager
143 Port Williams Rd.
Sequim WA 98382

SUBJ: **Draft 2022 Water System Plan Update, City of Sequim**

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Best regards,

Ann Soule
Ann Soule, LHG
Sequim Public Works

Brian Smith
Brian Smith, P.E.
Wilson Engineering, L.L.C.

c: Pete Tjemsland, Sequim Utilities Manager

CITY OF SEQUIM

PUBLIC WORKS
152 W. Cedar Street, Sequim, WA 98382
PH (360) 683-4908 FAX (360) 681-0552

August 18, 2022

Sun Meadows
Dale Metzger, Water System Manager
PO Box 92
Sequim WA 98382

SUBJ: **Draft 2022 Water System Plan Update, City of Sequim**

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Sequim Public Works

Brian Smith
Brian Smith, P.E.
Wilson Engineering, L.L.C.

c: Pete Tjemsland, Sequim Utilities Manager

CITY OF SEQUIM

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152 W. Cedar Street, Sequim, WA 98382
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August 18, 2022

Sunland Water District
Water System Manager
5762 Woodcock Rd.
Sequim WA 98382

SUBJ: **Draft 2022 Water System Plan Update, City of Sequim**

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Ann Soule, LHG
Sequim Public Works

Brian Smith
Brian Smith, P.E.
Wilson Engineering, L.L.C.

c: Pete Tjemsland, Sequim Utilities Manager

CITY OF SEQUIM

PUBLIC WORKS
152 W. Cedar Street, Sequim, WA 98382
PH (360) 683-4908 FAX (360) 681-0552

August 18, 2022

Trowbridge Court Condo Association
Kevin Odegard, Water System Manager
PO Box 123
Port Orchard, WA 98366

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Best regards,

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Ann Soule, LHG
Sequim Public Works

Brian Smith
Brian Smith, P.E.
Wilson Engineering, L.L.C.

c: Pete Tjemsland, Sequim Utilities Manager

CITY OF SEQUIM

PUBLIC WORKS
152 W. Cedar Street, Sequim, WA 98382
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August 18, 2022

Vistas Inc.
Dale Metzger, Water System Manager
PO Box 92
Sequim WA 98382

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Sequim Public Works

Brian Smith
Brian Smith, P.E.
Wilson Engineering, L.L.C.

c: Pete Tjemsland, Sequim Utilities Manager

CITY OF SEQUIM

PUBLIC WORKS
152 W. Cedar Street, Sequim, WA 98382
PH (360) 683-4908 FAX (360) 681-0552

August 18, 2022

West Sequim Bay Inc.
Dale Metzger, Water System Manager
PO Box 92
Sequim WA 98382

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Sequim Public Works

Brian Smith
Brian Smith, P.E.
Wilson Engineering, L.L.C.

c: Pete Tjemsland, Sequim Utilities Manager

CITY OF SEQUIM
PLANNING COMMISSION MINUTES – DRAFT
PUBLIC MEETING
CIVIC CENTER – COUNCIL CHAMBERS
AUGUST 2, 2022

E X C E R P T for Water System Plan Approval Record

1. CALL TO ORDER

Present: Karen Mahalick, Jeff Carter, Dan Butler, Eileen Cummings, Alex Fane, Julianne Coonts
Absent: Elizabeth Hall
Excused: None

3. NEW BUSINESS

a. Public Works Water System Plan– Public Hearing

Ann Soule, Public Works Resource Manager, addressed questions from the PC meeting held 7/19/2022 – two staff members from Wilson Engineering, Brian Smith and Melanie Mankamyer, were in attendance via Zoom for support.

Commissioner Fane had asked if the average demand for 2021 was 146 gallons/day close to the volume of the rate step increase? Answer is yes, the rate step happens at 600 cubic feet per month which is right around 150 gallons per day, which is industry standard for a typical household. Gallons/day is standard for DOH and in engineering; cubic feet per month is for some reason the standard unit used in utility billing.

The second question was: Is the City monitoring to be aware of potential long-term changes in aquifer supplies? Yes. Information gained from the City's monthly monitoring of well water levels is utilized in managing pumping across seasons and/or years.

Will the new deep well at Silberhorn improve City water quality? Water from deeper aquifers almost always has lower nitrate concentrations than from shallower aquifers, so a new deep well will dilute nitrates coming from that wellfield (through mixing). However, staff wanted to clarify that nitrates are not currently trending upward and are not close to the level that triggers more frequent sampling.

How many days of supply are available in the event of a power failure? The City standard is to have 1 MDD (max daily demand) volume available (approx. 2 ADD), so this is what is available without using a backup generator. The City currently has surplus storage capacity to serve future growth, so currently there is more than 1 MDD available. With the aid of a generator that are installed and functional, the City can

operate the system as normal during a power failure for at least multiple days, with the limiting factor being fuel storage/ability to refill fuel.

How do the average annual costs of water system operations and capital projects compare to the revenue generated from an average 350M gallons per year?

- From typical annual operating and capital expenditures, the City's costs total around $0.007 per gallon.
- At 600 cubic feet per month (close to the average used per ERU), the revenue totals around $0.0073 per gallon. All excess is transferred to the water enterprise capital fund.
- Wilson Engineering indicates that a typical ballpark cost for municipal water in Washington State is 1.5 cents per gallon.

Commissioner Fane mentioned that link for the preliminary draft (pdf) of the water system plan did not contain any appendices, to which staff replied they would look into; both are on the City website.

Commissioner Fane brought up that main distribution pipelines are not predominately in the earthquake liquification zones, but so much of downtown is in a liquification area, it seemed like that was minimized in the plan. Wanted any comment/response from staff. Ann deferred his question to Brian, and was told that it would be looked into. *[Post Script: This is a good point and PW staff are discussing ways to address it with Wilson Engineering, in the Plan chapter 1 and/or the CIP.]*

Commissioner Fane brought up the average water rate, in comparing Sequim to Port Angeles and Port Townsend, the average cost does not include what we see on our bills, which is the rate for sewer. Pages he referenced were comparing water costs, not sewer, was not a factor in that study but it appears on our water bills. In the comparison w/ Port Angeles and Port Townsend, what do their bills show? Sarah VanAusdle, Public Works Director, asked for clarification about what specifically he was asking for. Commissioner Fane referenced the Water System Plan created by staff and Wilson Engineering, and noted that it was comparing the cost of water in Sequim to Port Angeles and Port Townsend. Concerned about the fact that the cost of sewer was not factored in, but it shows up on the bill. Brian Smith says that the numbers came from the Sequim rate study from 2021 (from FCS, not Wilson Engineering) and shows a breakdown of cost water from Sequim, Port Angeles, Port Townsend, and other comparable utilities. Everything in that plan was looking at water, not sewer, or wastewater…everything in the water system plan focuses on water, not the other services. Sarah VanAusdle, Public Works Director, mentioned that one of the things they do during the annual budget process is compare to Port Angeles, Port Townsend, and the PUD water services. Commissioner Fane still expressed concern over the water bill, explaining that there are other fees, and thats what the average Sequim citizen will be looking at. He asked if there has been a study done where we could correlate the sewer cost to water usage instead of the high base rate per household? PW Director explained historical base rates, explained that the second tier was eliminated last year and only went with the lower one, and mentioned that sewer prices have not increased in several years.

Ann Soule returned to report that there were no comments received as of 4pm regarding the SEPA comment period. She also thanked Travis Simmons for advertising this public hearing with the proper notice.

Commissioner Coonts asked a final question if there was a reason why the cubic foot measurement was listed instead of gallons, and mentioned that if people saw it in gallons, they may understand it better. Ann said that it's typical for bills to be set up that way, but that doesn't mean that our bills couldn't have a note to explain it better. *[Post Script: PW staff are looking into this with the billing dept, and noted that our billing software will change in the coming year so a change to gallons could be considered then.]*

Kaye Gagnon, works with Disaster Airlift Response Team for Clallam County (DART) suggested one thing going forward, next line of thinking, having a plan for the fuel supply for the generators or alternate forms of making potable water. *[Post Script: There are various ways staff can deal with water supply in emergency situations and several are described in the Plan, chapter 6.]*

Brian Grad via zoom - curious why there is no plan for incorporating water storage under tanks or cisterns. Pete Tjemsland, Utilities Manager, clarified that we do keep storage, we have 3 million gallons in our city.

MOTION to forward the 2022 Water System Plan Update preliminary review draft to City Council for approval; moved Karen Mahalick by seconded by Eileen Cummings.
YES: Karen Mahalick, Jeff Carter, Dan Butler, Eileen Cummings, Alex Fane, Julianne Coonts
NO: None
ABSTAIN: None
The vote Passed.

JAMESTOWN S'KLALLAM TRIBE
1033 Old Blyn Highway, Sequim, WA 98382 360/683-1109 FAX 360/681-4643

August 9, 2022

Travis Simmons
City of Sequim
Department of Community Development
Assistant Planner
(360)681-3438
tsimmons@sequimwa.gov

Re: 2022 Water System Plan Update – Preliminary Review Draft

The Jamestown S'Klallam Tribe ("Tribe") respectfully submits this comment letter regarding the City of Sequim's 2022 Water System Plan Update - Preliminary Review Draft. This comprehensive look at the water system and needs of the City of Sequim highlights the value of our natural resources and the need for a healthy environment to protect this valuable and limited resource.

The Tribe urges the City of Sequim, while planning for future growth in the city, to consider ways to reduce the water supply infrastructure within the channel migration zone of the Dungeness River. The Dungeness River is prone to rapid channel migration during storm events. Climate change is expected to bring more frequent and more severe storm events. The Tribe is actively working to remove infrastructure from within the floodplain and channel migration zone to restore both habitat and healthy river function.

The Tribe also has questions regarding the potential for future surface water withdrawal from the Dungeness, including where a surface water treatment facility would be built. River water withdrawal and development in the floodplain and channel migration zone can have negative impacts on endangered salmon and orcas. Please invest in water reuse, water conservation, and, policies and incentives to wisely use our precious water resources.

We appreciate the opportunity to comment on this plan update and look forward to continuing to work with the City of Sequim in protecting our environment and limited resources for the benefit of all.

Sissi P. Bruch

Sissi P. Bruch, PhD
Environmental Planning Biologist
Jamestown S'Klallam Tribe
1033 Old Blyn Highway
Sequim, WA 98382
(360) 461-3006

From:	Bowen Kendrick x459
To:	Ann Soule
Cc:	"bsmith@wilsonengineering.com"; Tom Martin x449; Sean Worthington x240
Subject:	Preliminary Comments on the Draft 2022 Water System Plan Update, City of Sequim
Date:	Thursday, August 25, 2022 6:02:07 PM

EXTERNAL SENDER: This email originated outside the organization. Do not click links or open attachments unless you verify the sender and know the content is safe.

Ann,

The District received your notification regarding the City's Draft WSP on 8/22/22. After initial review I have some preliminary comments to forward which I hope will lead to further discussions between the City and the District.

First, Section 1.6 of the Draft WSP covers the City's water service boundaries. A significant change to the City's retail water service area is proposed via this WSP, specifically in the southern region of the City limits. This new retail water service area overlaps with the retail water service area which the District has historically maintained. As pointed out in the Draft WSP, the City and District entered into an Interlocal Water Service Area Boundary Agreement in 1995 and, in the interest of our rate paying customers, took steps that would eliminate and avoid the creation of duplicate water system facilities. The District has concerns that the proposed expansion of the City's retail service area could lead to the creation of duplicate water system facilities that would be uneconomical and contrary to the public interest.

Second, it is noted that the City plans to install a new closed-loop booster pump station to serve the expanded portions of the City's retail service area including the existing Emerald Highlands Development. The installation of this new booster station along with associated distribution mains is required for the City to meet the four threshold factors identified in RCW 43.20.260. The District currently provides water service to Emerald Highlands leveraging its capability to provide excellent water service and fire flow reliability from its gravity storage reservoirs on Raven's Ridge and Stampede Dr. in addition to the redundant sources of supply at Loma Vista and Holgerson Wells. The District can also utilize it's existing infrastructure to provide excellent water service and fire flow reliability to the portions of the proposed retail service area expansion which are outside of Emerald Highlands.

It is generally accepted that gravity storage is a more reliable source of fire flow protection than a closed loop booster pump station. Section 8.3.1 of the Washington State Department of Health Water System Design Manual states:

'*In general, you should be cautious using a closed booster pump station if fire flow is required because a closed booster pump station is less reliable than gravity storage.*'

In addition to concerns related to the creation of duplicate water system facilities, the District has concerns that the proposed means of serving the City's expanded retail water service area will not provide the same level of safety and reliability that could be achieved with the existing storage facilities of the Evergreen Water System.

Lastly, the City of Sequim is taking steps to expand its retail water service area without first coordinating and reaching agreement with the District on the proposed revisions. This is in conflict with the legislature's declarations contained in RCW 54.48 and the 1995 Interlocal Water Service Area Boundary Agreement between the City and the District. Section 1.2 of the Agreement states:

'As areas are annexed into the City during the term of this Agreement, the service area boundary shall be reviewed by representatives of each party hereto, and appropriate adjustments made to Exhibit "A".

Since 1995, the City limits shown in 'Exhibit A' have expanded significantly in the southern portion of the Sequim UGA, specifically within the SW ¼ of the SW ¼ of T30 R 3W and the SE ½ of the SE ¼ of T30 R 4W. According to the City's Annexation Map, much of this area was annexed in 1996, one year following the execution of the Water Service Area Boundary Agreement. It is assumed that in 1996, per Section 1.2 of the Agreement, discussions between the City and the District took place in order to agree upon appropriate adjustments to the City and District's respective service area boundaries. Continuing this tradition of interlocal cooperation is in the best interests of our rate-paying customers. As such, the City and District need to meet to discuss and delineate appropriate adjustments to their respective service area boundaries prior to the finalization of the City's proposed retail service area revision.

As stated before, it is my hope that these comments will lead to further discussion and coordination between the City and the District. I forward these comments with respect and look forward to working with you on this issue.

Best regards,

Bowen Kendrick
Water/Wastewater Superintendent
PUD 1 of Clallam County
O:360-565-3459
C:360-461-1724

WILSON ENGINEERING

Brian Smith <bsmith@wilsonengineering.com>

City of Sequim Draft WSP Comments

Puccinelli, John <jpuccinelli@calwater.com> Thu, Sep 15, 2022 at 1:58 PM
To: "bsmith@wilsonengineering.com" <bsmith@wilsonengineering.com>
Cc: "asoule@sequimwa.gov" <asoule@sequimwa.gov>, "O'Dell, Shawn" <sodell@wawater.com>

Hi Brian,

Comments related to the draft WSP:

1. Washington Water Service owns and operates Lee Water System. Please remove reference to the Lee Water Company, which no longer exists. Updates to page 50 of Appendices:

    a. The Lee Water System is owned and operated by Washington Water Service and located outside of the City's UGA northwest of the City. Source for the water system is provided by three wells with a combined capacity of approximately 130 gpm. Auxiliary power is provided for one well in the event of a commercial power outage. The system is not chlorinated. Storage consists of an 22,000-gallon concrete reservoir, and the distribution system consists of 6-inch and 4-inch asbestos-cement and 2-inch PVC pipe. There are fire hydrants on the system, but are not rated for fire flow. The water system is approved to serve a total of 86 ERUs, and consists entirely of single-family residential development. All sources and connections are metered. The Lee Water Systems does not anticipate any growth due to lack of developable property in the vicinity.

2. Regional Water Purveyors: add Sunshine Acres, DOH ID 862506, approved connections 492, source capacity 330 gpm, storage capacity 260,000 gallons

3. Requesting the Future Service Area shown in orange on Figure 1-7 be routed to exclude Lee Water System.

4. On Figure 1-7, Lee WS serves **Clallam Parcel: 033018220060**

John Puccinelli, P.E.
Engineering Manager
Washington Water Service
4531 Intelco Loop SE, Suite 3
Lacey, WA 98503
D: 360-810-8341
C: 253-320-1631

Quality. Service. Value.

wawater.com

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STATE OF WASHINGTON
DEPARTMENT OF HEALTH
SOUTHWEST DRINKING WATER REGIONAL OPERATIONS
111 Israel Road Southeast • PO Box 47823 • Olympia, Washington 98504-7823
Tel: (360) 236-3030 • Fax: (360) 236-3029 • TDD/TTY 711

June 9, 2023

Ann Soule
City of Sequim
152 West Cedar Street
Sequim, Washington 98382

Subject: Sequim City of Water System, ID #77620Y, Pacific County
Water System Plan Update, ODW Project #22-0905

Dear Ms. Soule:

Thank you for submitting the draft City of Sequim Water System Plan (WSP) update, received by the Office of Drinking Water (ODW) on August 26, 2022. The following comments must be addressed before ODW can approve the WSP:

CHAPTER 1 – WATER SYSTEM DESCRIPTION

1. 1.3.2. Climate and geography, p. 3. For the stormwater managed aquifer recharge project, please see our fact sheet and contact us for further guidance as the project develops: Aquifer Storage and Recovery Projects and Drinking Water Wells. This does not need to be addressed in the WSP, but please keep us up to date.

CHAPTER 3 – SYSTEM ANALYSIS

2. 3.4.1.3. Source water quality analysis, p. 58. Copper – 1.3 mg/L is an Action Level, not MCL.

3. 3.6.1. Source of supply, p. 75. If the City wishes to eventually enter into a satellite management role, its draft SMA plan (noted in several other places throughout the document as being appended to the 2014 WSP) will need to be updated and approved at that time. It was not reviewed nor is proposed for approval as a part of the current WSP update.

CHAPTER 4 – WATER USE EFFICIENCY PROGRAM AND WATER RESOURCE ANALYSIS

4. 4.2. Data collection & demand forecasting, Table 4-1, p. 78. If the production meters are not calibrated, please explain how you will identify when they are not working properly.

5. 4.5.2.2. Supplemental measures (use reclaimed water), p. 87. Are any of these sites dual-plumbed reclaimed water use sites? Do they conduct shutdown cross-connection tests? If so, at what frequency?

6. 4.6.2.3. Silberhorn wellfield, Figure 4-1, p. 89. Is it possible to separate the water level from when the pumps are running and when they are not to observe trends more clearly?

CHAPTER 5 – SOURCE WATER PROTECTION

7. 5.4.3.1. Introduction (wellhead protection areas), p. 99. The bullet beginning "three primary zones" is inaccurate; WAC 246-290-135(3)(c)(2) includes a 6-month time of travel too, which is shown in the mapped WHPAs in Fig. 5-3 so this appears to be just a text error. No buffer zone is required.

8. 5.11. Source water protection management plan, Figure 5.1, p. 112. The watershed drainage area ends at the county border in the figure, but the drainage area should extend into Jefferson County.

CHAPTER 6 – OPERATION AND MAINTENACE PROGRAM

9. 6.1. Water operations staff certifications, p. 115. Please update staff information if turnover has occurred since this was drafted.

10. 6.4.1. Reservoirs, p. 117. How often does an operator inspect the top of the reservoirs to look at vent screens, hatches, and other penetrations in the tops of the reservoirs?

11. 6.4.4. Unidirectional flushing, p. 118. Please describe the flushing frequency.

12. 6.5. Operation and maintenance projects, Project M-5, p. 121. Please provide more details on this project. If the missing information is needed to accurately track backflow device testing and ensure they are tested annually, it should be a higher priority with more resources assigned to it.

13. 6.6.1.9. Water main breaks, p. 126. We recommend following the guidance in our publication, 331-583 Water Main Break Response Protocol for Chlorinated Systems.

APPENDICES

14. Appendix A. It appears the local government consistency form was submitted to the Clallam Co. hydrogeologist. Typically, for a city-owned system this form would be reviewed and signed by city planning staff responsible for comprehensive (GMA) planning in that jurisdiction. Please ask your Community Development Department to complete the third column and sign the form, then replace the unsigned version with the signed document.

15. Appendix B. Please review and update, if needed, WFI forms.

16. Appendix C. Is a signed version available of the 1998 city/county interlocal/SERP agreement?

17. Appendix D. The Huffman system is now a Group A and is believed to currently have 18 connections. We did not check each listed system for currency, but you may want to.

18. (General) Please number the pages, add to WSP table of contents, and create a single integrated document.

DEPARTMENT OF ECOLOGY

Washington State Department of Ecology has provided the following comments:

Water Rights Assessment

The Water Right Self Assessment (WRSA) form in Appendix H accurately lists all water rights and associated change authorizations held by the City of Sequim (the City).

Ecology agrees that the total instantaneous authorization is 4,296 gallons per minute. However, the City asserts that the annual quantity authorized under each of these water rights was issued for primary supply and is additive for a total of 4,714 acre-feet per year (ac-ft/yr) from all sources combined. Ecology does not agree with this annual quantity assessment.

- The WRSA specifies an annual quantity for Surface Water Right Certificate 1316 for the Dungeness River. This right did not specify an annual quantity and cannot be assumed to be valued at an amount that represents continuous pumping at 1.4 cubic feet per second (specified as 1,014 ac-ft/yr). The WRSA should show the annual quantity as "unspecified."
- Ecology views the annual quantity under Surface Water Right Certificate 1316 for the Dungeness River and Ground Water Right Certificate 2102-A for the infiltration trench as non-additive and limited to a combined total of 1,160 ac-ft/yr.
- The annual quantity under Permit G2-29239 for the Port Williams Well Field was issued in 1997 as entirely ***non-additive*** to the City's existing rights.
- Appendix H of the Water System Plan includes a document explaining the City's water right assessment. This document acknowledges the difference in perspective that Ecology communicated in writing in 2020 when the City requested a review of its water rights portfolio.
- The following points summarize Ecology's position on the City's water rights:

  ➢The water rights for the Dungeness River and infiltration gallery are certificated rights issued prior to full perfection and assumed to be "in good standing" under RCW 90.03.330(3). Although inchoate quantities are available for development, these rights are not necessarily valid at face-value quantities. Because Ecology is only able to tentatively assess the extent and validity of water rights represented by certificates, the actual value of the City's water right portfolio cannot be confirmed except through a Superior Court adjudication.

  ➢The 1997 water right permit for the Port Williams Well Field was issued as a non-additive right, consistent with the laws, regulations, and policies in effect at that time. Consequently, Ecology concludes that the total annual quantity authorized for diversion/ withdrawal under all of City of Sequim water rights combined can be no more than 2,864 ac-ft/yr. The claimed total of 4,714 ac-ft/yr should not be relied on for planning purposes.
- Ecology agrees that the City's instantaneous water rights are adequate to meet the projected 20-year demand. The Water System Plan indicates that 1,535.6 ac-ft/yr is required to meet the 10-year projected annual quantity demand and 2,063.7 ac-ft/yr is needed to satisfy the 20-year demand. The City has adequate water rights for the 10-year planning horizon and may have adequate rights for the 20-year planning horizon.

Source Production Issues

The Water System Plan indicates that production capacity may be increased through additional wells at the existing well fields, development of a new deep groundwater source under pending Water Right Application G2-30721, and construction of a new surface water treatment facility to directly utilize the Dungeness River. Although Section 3.4.1.2 of the Plan suggests that surface water use would be developed only when necessary to meet source reliability needs, improve system resiliency, and serve long-term growth in the service area, the WRSA appears to indicate otherwise.

The WRSA shows that by 2041, the City expects to divert 364.3 ac-ft/yr of surface water under Certificate 1316, nearly double the current production from both the infiltration gallery under Certificate 2102 and the Silberhorn Wellfield, and actually decrease production at the Port Williams Wellfield below the current level. This shows a disproportionate reliance on surface water and shallow groundwater under Certificates Nos. 1316 and 2102 as these two sources would account for approximately 64% of the expected 20-year production total. This outcome would not be consistent with the requirement under Permit G2-29239 to gradually eliminate the use of surface water from the Dungeness River except for emergency/back-up supply purposes.

The Capital Improvements Plan shows that construction of the proposed surface water treatment facility is not scheduled until 2040 and would occur near the end of the 20-year planning horizon. To the extent that groundwater is available for sustainable development, the City is encouraged to prioritize development of sources at the Port Williams and Silberhorn Well Fields while actively pursuing a new groundwater right under pending Application No. G2-30721.

Regarding the potential for fully developing quantities under the Port Williams Well Field permit and the history of monitoring results being reported to Ecology, Section 3.4.1.2 states: "*At this time no guidance has been given to the City in regards to the ability to develop Port Williams to the full permitted water right."* The City is encouraged to contact Ecology to discuss its strategy for source prioritization and further development of this well field, and any concerns it may have regarding long-term groundwater level declines and potential impacts to senior right holders.

Future Interties

Section 1.6.3 of the Water System Plan discusses the potential for serving wholesale water through future interconnections with adjacent water systems. If these systems are located outside of the City and UGA service area, applications for changes of water rights will be required under RCW 90.03.383.

An intertie with the Resort and Marina Water System will not require water right change applications if the intertie will deliver water only one way to this system. Because the current primary well (Well AHM612) for the Resort and Marina system is not authorized to serve as a primary source under existing water rights, the City is encouraged to interconnect with and/or acquire this water system as soon as possible. This is especially important if new development is occurring in the portion of the City occupied by the Resort and Marina system service area.

Water Use Efficiency Program

The Water System Plan shows that the City has substantially reduced water usage through conservation and expanded use of reclaimed water. Distribution system leakage is less than 10%, demonstrating reasonably efficient use. The 2022 water use efficiency goal seeks to further reduce water use and distribution system leakage.

The City is required under RCW 90.03.386(3)(c) to describe "the projected effects of delaying the use of existing inchoate rights over the next six years through the addition of further cost-effective water conservation measures before it may divert or withdraw further amounts of its inchoate right for beneficial use." The Plan shows that the projected water use efficiency savings over the next 20 years would amount to approximately 150,194 gallons per day, or 168.2 ac-ft/yr. These savings would

substantially delay the need to divert/withdraw additional water, particularly from sources that have a greater effect on area streams.

The Plan indicates that the City's intends to use reclaimed water for aquifer recharge projects, increase the amount of water used to augment flows in Bell Creek, and potentially augment flows in Gierin Creek in the future. We value the City's efforts and contributions to the health of the greater Dungeness River watershed.

Watershed Plan Consistency
The City of Sequim service area is located primarily in the Elwha-Dungeness Water Resource Inventory Area (WRIA 18) and all of the City's water sources are in Dungeness portion of WRIA 18. A Watershed Management Plan was adopted for WRIA 18 in May 2005, and an instream flow rule for the Dungeness portion of WRIA 18, Chapter 173-518 WAC, became effective on January 2, 2013. The part of the service area in WRIA 17 is not covered under the WRIA 17 Watershed Plan or instream flow rule (Chapter 173-517 WAC).

Although the City's water rights are not affected by the East WRIA 18 instream flow rule, Chapter 3 of the Watershed Plan includes the following recommendations specific to the City of Sequim:

1. Pumping from the Dungeness River Ranney system during low flow periods should be reduced to the minimum flow needed to maintain that source as an emergency backup, in accordance with the City's water right and Department of Health regulations and permits.

2. The City should continue to incorporate findings from East WRIA 18 water resources studies into long-term planning strategies for water resources, based on best available science.

The Plan's proposal to directly use surface water for non-emergency use and increase pumping at the infiltration trench as reflected in the WRSA is inconsistent with the recommendations and goals of the WRIA 18 Watershed Plan. The City of Sequim's Water System Plan is otherwise "not inconsistent" with the watershed plan adopted under Chapter 90.82 RCW and comprehensive watershed plan adopted under RCW 90.54.040(1) for East WRIA 18.

Ecology is committed to working with the City to ensure its success in obtaining a new water right under Application G2-30721. A timely decision would reduce or eliminate the need for the City to rely on surface water and shallow groundwater sources to meet the long-term needs of the City and UGA. We encourage the City to contact our office to discuss the new application and any outstanding issues regarding the use of water under the City's existing water rights.

The Department's review of your WSP and design does not confer or guarantee any right to a specific quantity of water. Our review is based on your representation of available water quantity. If the Washington Department of Ecology, a local planning agency, or other authority responsible for determining water rights and water system adequacy determines that you have use of less water than you represent, the number of approved connections may be reduced commensurate with the actual amount of water and your legal right to use it.

CLOSING

Please submit a copy of the revised .pdf in its entirety to the box.com folder you originally submitted to. If you don't have a box.com folder with us, please contact our admin team at swro.admin@doh.wa.gov prior to submittal so that one can be set up to drop your revised WSP and respond to all comments. To expedite our review, please provide a summary of your response to comments and a complete WSP that is bookmarked and hyperlinked.

Regulations establishing a schedule for fees for review of planning, engineering, and construction documents have been adopted (WAC 246-290-990). Please note that we have included an invoice for $3,705.00 for the review of the water system plan. This fee covers our cost for review of the initial submittal, plus the review of one revised document. Please remit your complete payment within thirty days of the date of this letter. If paying by check or money order, mail to: DOH, Revenue Section, P.O. Box 1099, Olympia, WA 98507-1099. Or if you prefer, you can now pay online—follow the instructions at *Online Payment Guide* 331-688.(PDF).

If you have any questions, please contact Deborah Johnson at 253-433-3054 or by e-mail at deborah.johnson@doh.wa.gov, or Candida Granillo-Dodds at 564-669-3170 or by e-mail at candida.granillo-dodds@doh.wa.gov.

Sincerely,





Deborah Johnson
Regional Planner, Office of Drinking Water

Candida Granillo-Dodds, PE
Regional Engineer, Office of Drinking Water

Enclosures

cc: Brian Smith, Wilson Engineering
Benjamin Majors, Clallam Co. Environmental Health
Mike Gallagher, Ecology

Peninsula Daily News

Affidavit of Publication

State of Washington }
County of Clallam/Jefferson } ss

Michael Gates being first duly sworn, upon oath deposes and says: that he/she is the legal representative of the Peninsula Daily News a daily newspaper. The said newspaper is a legal newspaper by order of the superior court in the county in which it is published and is now and has been for more than six months prior to the date of the first publication of the Notice hereinafter referred to, published in the English language continually as a daily newspaper in Clallam/Jefferson County, Washington and is and always has been printed in whole or part in the Peninsula Daily News and is of general circulation in said County, and is a legal newspaper, in accordance with the Chapter 99 of the Laws of 1921, as amended by Chapter 213, Laws of 1941, and approved as a legal newspaper by order of the Superior Court of Clallam/Jefferson County, State of Washington, by order dated June 16, 1941, and that the annexed is a true copy of PDN959746 WATER SYSTEM PLAN as it was published in the regular and entire issue of said paper and not as a supplement form thereof for a period of 1 issue(s), such publication commencing on 07/29/2022 and ending on 07/29/2022 and that said newspaper was regularly distributed to its subscribers during all of said period.

The amount of the fee for such publication is $39.50.

Linda Phillips
Notary Public
State of Washington
My Appointment Expires 8/29/2025
Commission Number 4417

Subscribed and sworn before me on this 29th day of July, 2022.

Notary Public in and for the State of Washington.

CITY OF SEQUIM/LEGAL | 48203016
HAYLIE CLEMENT

CITY OF SEQUIM
NOTICE OF PUBLIC HEARING WATER
SYSTEM PLAN PRELIMINARY REVIEW DRAFT

Notice is hereby given that the City Council of the City of Sequim will hold a public hearing on the Water System Plan Preliminary Review Draft, at a meeting Monday, August 8, 2022, starting at 6 p.m. at 152 W. Cedar St., Sequim. Any person may appear and be heard. Interested persons may hear and participate in this meeting online at https://sequimwa-gov.zoom.us/j/83397723647. People may also join by calling (253) 215-8782 and using ID# 833 9772 3647. Written public comment can be sent to clerk@sequimwa.gov and will be distributed to the Council prior to the meeting. Any persons needing special accommodation for attendance should contact the Sequim City Clerk. A copy of the draft plan shall be furnished to any person who requests it. Requests may submitted on www.sequimwa.gov, by sending an email to clerk@sequimwa.gov, calling (360) 681-3428 or by regular mail to the Sequim City Clerk, Sequim Civic Center, 152 W. Cedar St., Sequim, WA 98382.
PDN.: July 29, 2022
Legal No. 959746

City of Sequim Responses to Comments Received

on the Draft Water System Plan dated July 2022

1. Planning Commission

Responses to comments from Planning Commissioners and public during public review in July and August 2022:

- See above in Appendix O for minutes from the 8/2/2022 meeting of the Planning Commission in which all questions were addressed.

2. Jamestown S'Klallam Tribe

Responses to letter from Sissi P. Bruch, Environmental Planning Biologist, dated 8/9/2022:

- Comments are received and noted.
- As described in Chapter 8, project number S-3, the anticipated location for a new facility, if needed in the future, would be the City's Reservoir Road property, well out of the floodplain and channel migration zone. Existing facilities will need to be maintained with due respect to potential future flooding.
- As described in Chapter 4, the City continues to invest in water reuse, water conservation, and policies and incentives to conserve water.

3. PUD No. 1 of Clallam County

Responses to email from Bowen Kendrick, Water/Wastewater Superintendent, dated 8/25/2022:

- It is the City's general policy that the City should serve customers within city limits and UGA; this is reflected in the ILA between the City and PUD from 1995. Of note, the city limits have expanded through annexations a few times since the 1995 ILA.
- The City intends to maintain the retail service area as defined in the Draft WSP (to coincide with city limits and UGA) and continue to plan for constructing infrastructure to serve existing and proposed development within its retail service area.
- The City-adopted CIP includes projects supporting the service area defined in the WSP. (E.g., a new closed-loop booster pump station to serve the southern portion of the City's retail service area that is too high in elevation to be served by existing pressure zones)
- The City has sufficient storage, source, and water right capacity to serve all existing and proposed development within City limits and UGA.* The City is concerned that PUD does not have sufficient storage, source, backup generator, and/or water right capacity to serve all the existing and proposed development within City Limits that they have expressed a desire to serve. (*The general annual growth rate was applied, showing that the capacity is sufficient to serve anticipated growth for 20 years.)

- The City agrees that a new or updated ILA is long overdue. Unfortunately, if any negotiations transpired between the City and PUD between 1995 and present, they were not documented.
- When City staff met with PUD staff in November 2022 to discuss PUD's preliminary comments on the WSP dated August 2022, it was agreed that the PUD would provide a proposal or requests for specific updates to the existing ILA. No correspondence on this topic has been received.
- Discussions and a field trip regarding Legacy Ridge involving both City and PUD staff in early 2023 did not directly address disagreements in service area boundaries.
    - Background: The Legacy Ridge development application indicates PUD to be the water provider; both PUD and the City understand that conditions of approval involve meeting City design standards and that all water piping installed within City limits is owned by the City. The status of the Legacy Ridge development is not known.
- The City maintains that coordination with the PUD should be occurring on a regular basis.

4. Lee Water System (owned by Washington Water Service)

Responses to email from John Puccinelli, Engineering Manager, dated 9/15/2022:

- The recommended updates regarding the Lee Water System in item 1 of the email have been incorporated into the revised Water System Plan (Chapter 1 and Appendix D)
- The recommended updates regarding the Sunshine Acres water system in item 2 of the email have been incorporated into the revised Water System Plan (Appendix D)
- Item 3 of the email requested the Future Service Area be adjusted to exclude the Lee Water System. The City considered this request but intends to leave the Future Service Area unchanged. The City has no plans to annex this area, but leaving the Future Service Area unchanged would allow future consolidation, if mutually agreed upon by both parties, without requiring the City to amend its Water System Plan.
- Item 4 of the email noted a modification to the service area of the Lee Water System. This modification is noted, but the City is not responsible for maintaining service area boundaries for adjacent purveyors. The boundaries shown on Figure 1-7 are for information only and were provided by Clallam County, so the Lee Water System may request this change with Clallam County if desired.

5. WA Department of Health, Office of Drinking Water

The City's responses to official comments from Deborah Johnson, Regional Planner, and Candida Granillo-Dodds, Regional Engineer, dated 6/9/2023, which incorporate verbatim comments from WA Department of Ecology's Marie Peter, SWRO Water Resources Program, dated 12/5/2022:

- See response letter, attached in Appendix O.

APPENDIX P

SOURCE WATER PROTECTION LETTER TEMPLATES

Contents:

- Template for letters to landowners and operators of potential contaminant sites
    - Address/parcel info for owners of on-site septic systems
    - Address/parcel info for owners of toxic cleanup and UST sites
    - Address info for landowners upstream of infiltration gallery
- Template for notifications to state and local agencies
- Template for local area first responders

CITY OF SEQUIM

PUBLIC WORKS
152 W. Cedar Street, Sequim, WA 98382
PH (360) 683-4908 FAX (360) 681-0552

August ____, 2022

Dear Business or Property Owner:

The City of Sequim has a Wellhead Protection Program in conjunction with its Municipal Water System which serves over 8,000 residents and dozens of businesses. These programs, as required by the Federal Safe Drinking Water Act and administered by the Washington State Department of Health, are intended to help protect our public drinking water supply from potential contamination. Wellhead Protection first involves mapping "Zones of Contribution" (ZOCs) where pollution entering the environment could affect water quality at public water system sources, such as wellheads.

The reason for this letter is because the second stage includes a land use inventory that documents existing and potential sources of contamination within ZOCs – and notifying affected businesses and property owners such as yourself. FYI, a map delineating the ZOCs is available by browsing to the City's Water System Plan webpage, at https://www.sequimwa.gov/356/Water, or through the City's Public Works Department.

As you know, contamination can come from a variety of sources, including, but not limited to:

- dumping of motor oil, gasoline, antifreeze, or other spent solvents or chemicals on the ground or directly to storm drains;
- leaking underground or above-ground storage tanks or containers;
- overuse or improper use of pesticides or other agricultural chemicals;
- accidental spills of chemicals or other toxic/hazardous materials; and
- improper use of septic systems for disposal of hazardous materials.

We have notified the agency that regulates your type of business that you are in one of our City's ZOCs. If you need technical assistance, please contact them about managing your specific business in a way that will best prevent contamination.

Because everyone plays a role in protecting water quality, local residents and businesses throughout the City are also being asked to do their part. Thank you for your stewardship of Sequim's excellent water.

Sincerely,

Pete Tjemsland
Utilities Manager, Sequim Public Works

MAILING ADDRESS						SEQUIM ADDRESS						PARCEL NUMBER	PROPERTY ID
250 DEYTONA ST			SEQUIM	WA	98382	250 W	DEYTONA ST	NULL	SEQUIM	98382		033018500090	19957
521 E GLACIER VIEW DR	NULL	NULL	SEQUIM	WA	0	521 E	GLACIER VIEW DR	NULL	SEQUIM	98382		033017349120	19412
914 N BEVERAGE ST	NULL	NULL	SEQUIM	WA	98382	914 N	BEVERAGE ST	NULL	SEQUIM	98382		033018419020	19837
910 N BEVERAGE ST			SEQUIM	WA	98382	910 N	BEVERAGE ST	NULL	SEQUIM	98382		033018419010	19836
P O BOX 3787	NULL	NULL	SEQUIM	WA	98382	730 E	GREY FOX RD	NULL	SEQUIM	98382		033017349230	19423
521 W HEMLOCK ST	NULL	NULL	SEQUIM	WA	0	521 W	HEMLOCK ST	NULL	SEQUIM	98382		033019349020	21080
891 BEVERAGE ST			SEQUIM	WA	98382	891 N	BEVERAGE ST	NULL	SEQUIM	98382		033018439170	82040
32 CROWNVIEW LN	NULL	NULL	SEQUIM	WA	0	9937 NULL	OLD OLYMPIC HWY	NULL	SEQUIM	98382		033018610400	20200
P O BOX 4041	NULL	NULL	SEQUIM	WA	98382	171 NULL	STONE FARM RD	NULL	SEQUIM	98382		033017510050	19468
850 N BEVERAGE ST	NULL	NULL	SEQUIM	WA	0	850 N	BEVERAGE ST	NULL	SEQUIM	98382		033018449000	19938
31 JERSEY LN	NULL	NULL	SEQUIM	WA	98382	31 NULL	JERSEY LN	NULL	SEQUIM	98382		033017510070	19470
PO BOX 748	NULL	NULL	CARLSBORG	WA	98324	100 W	DEYTONA ST	NULL	SEQUIM	98382		033018500000	19948
170 W DEYTONA ST			SEQUIM	WA	98682	170 W	DEYTONA ST	NULL	SEQUIM	98382		033018500040	19952
144 IOKA ROAD			SEQUIM	WA	98382	144 NULL	IOKA RD	NULL	SEQUIM	98382		033017229060	19313
61 STACY CT	NULL	NULL	SEQUIM	WA	98382	61 NULL	STACEY CT	NULL	SEQUIM	98382		033017510120	19475
760 N BEVERAGE ST	NULL	NULL	SEQUIM	WA	0	760 N	BEVERAGE ST	NULL	SEQUIM	98382		033018440010	19922
252 SENZ RD	NULL	NULL	SEQUIM	WA	0	663 N	BROWN RD	NULL	SEQUIM	98382		033020210030	22094
32 CROWNVIEW LN	NULL	NULL	SEQUIM	WA	0	63 NULL	CROWNVIEW LN	NULL	SEQUIM	98382		033018610410	20202
51 VALLEY FARM CT	NULL	NULL	SEQUIM	WA	98382	51 NULL	VALLEY FARM CT	NULL	SEQUIM	98382		033017520160	19494
570 EAST GLACIER VIEW DR	NULL	NULL	SEQUIM	WA	98382	570 E	GLACIER VIEW DR	NULL	SEQUIM	98382		033017349080	19407
370 W DEYTONA STREET	NULL	NULL	SEQUIM	WA	98382	370 W	DEYTONA ST	NULL	SEQUIM	98382		033018500150	19963
131 VALLEY FARM CT	NULL	NULL	SEQUIM	WA	98382	131 NULL	VALLEY FARM CT	NULL	SEQUIM	98382		033017520050	19483
10083 OLD OLYMPIC HWY	NULL	NULL	SEQUIM	WA	98382	10083 NULL	OLD OLYMPIC HWY	NULL	SEQUIM	98382		033018149300	19652
95 CROWNVIEW LN	NULL	NULL	SEQUIM	WA	0	71 NULL	CROWNVIEW LN	-73	SEQUIM	98382		033018149170	19639
123 HARLEMAN DR	NULL	NULL	SEQUIM	WA	98382	983 N	SEQUIM AVE	NULL	SEQUIM	98382		033018739010	20523
122 KANE LN	NULL	NULL	SEQUIM	WA	98382	52 NULL	CROWNVIEW LN	NULL	SEQUIM	98382		033018610430	20204
160 E HENDRICKSON RD	NULL	NULL	SEQUIM	WA	0	160 E	HENDRICKSON RD	NULL	SEQUIM	98382		033017330100	19378
970 N GIERIN CREEK LN	NULL	NULL	SEQUIM	WA	98382	970 NULL	GIERIN CREEK LN	NULL	SEQUIM	98382		033017329050	19370
31 STACY CT	NULL	NULL	SEQUIM	WA	98382	31 NULL	STACEY CT	NULL	SEQUIM	98382		033017510110	19474
270 W DEYTONA	NULL	NULL	SEQUIM	WA	98382	291 W	DEYTONA ST	NULL	SEQUIM	98382		033018500200	19968
C/O LAMBROS ROGERS	PO BOX 2998	NULL	PORT ANGELES	WA	98362	230 NULL	PORT WILLIAMS RD	NULL	SEQUIM	98382		033017320020	19360
32 CROWNVIEW LN	NULL	NULL	SEQUIM	WA	0	21 NULL	ANCHOR COVE LN	NULL	SEQUIM	98382		033018610370	20196
741 N LEE LN			SEQUIM	WA	98382	741 NULL	LEE LN	NULL	SEQUIM	98382		033018449060	19943
310 S SHAW LN	NULL	NULL	SEQUIM	WA	0	310 S	SHAW LN	NULL	SEQUIM	98382		033019320070	21025
PO BOX 2082			KINGSTON	WA	98346	974 NULL	SEQUIM DUNGENESS	NULL	SEQUIM	98382		033017330010	80937
1040 SEQUIM DUNGENESS WAY	NULL	NULL	SEQUIM	WA	98382	1060 NULL	SEQUIM DUNGENESS WY	NULL	SEQUIM	98382		033017520170	19495
160 VALLEY FARM CT	NULL	NULL	SEQUIM	WA	98382	160 NULL	VALLEY FARM CT	NULL	SEQUIM	98382		033017520010	19479
355 DUNGENESS MEADOWS	NULL	NULL	SEQUIM	WA	98382	1050 N	MALIA LN	NULL	SEQUIM	98382		033018429020	19883
SUITE 104-191	1400 W WASHINGTON ST		SEQUIM	WA	98382	975 NULL	SEQUIM DUNGENESS WY	NULL	SEQUIM	98382		033018730050	20522
290 W DEYTONA ST			SEQUIM	WA	98382	290 W	DEYTONA ST	NULL	SEQUIM	98382		033018500110	19959
60 STONE FARM RD	NULL	NULL	SEQUIM	WA	98382	60 NULL	STONE FARM RD	NULL	SEQUIM	98382		033017510140	19477
PO BOX 2997			SEQUIM	WA	98382	124 NULL	CROWNVIEW LN	NULL	SEQUIM	98382		033018149150	19637
640 N SEQUIM AVE	NULL	NULL	SEQUIM	WA	0	640 N	SEQUIM AVE	NULL	SEQUIM	98382		033020220025	22127
33 JESSLYN LANE	NULL	NULL	SEQUIM	WA	98382	33 E	JESSLYN LN	NULL	SEQUIM	98382		033017239010	19333
4317 NE THURSTON WAY #220			VANCOUVER	WA	98662	9732 NULL	OLD OLYMPIC HWY	NULL	SEQUIM	98382		033018429050	19886
122 W HENDRICKSON RD	NULL	NULL	SEQUIM	WA	98382	122 W	Hendrickson	NULL	Sequim	98382		033018440100	19932
1050 N GIERIN CREEK LN	NULL	NULL	SEQUIM	WA	98382	1050 NULL	GIERIN CREEK LN	NULL	SEQUIM	98382		033017329020	19367
2522 171ST AVE E	NULL	NULL	LAKE TAPPS	WA	0	9941 NULL	OLD OLYMPIC HWY	NULL	SEQUIM	98382		033018610020	20190
1033 OLD BLYN HWY	NULL	NULL	SEQUIM	WA	0	9971 NULL	OLD OLYMPIC HWY	NULL	SEQUIM	98382		033018610010	20188
151 W DEYTONA ST	NULL	NULL	SEQUIM	WA	98382	151 W	DEYTONA ST	NULL	SEQUIM	98382		033018500270	19975
920 N GIERIN CREEK LN			SEQUIM	WA	0	920 N	GIERIN CREEK LN	NULL	SEQUIM	98382		033017329060	19371
171 W DEYTONA	NULL	NULL	SEQUIM	WA	98382	171 W	DEYTONA ST	NULL	SEQUIM	98382		033018500260	19974
612 E GLACIER VIEW DRIVE	NULL	NULL	SEQUIM	WA	98382	612 E	GLACIER VIEW DR	NULL	SEQUIM	98382		033017349090	19408
P O BOX 21866	NULL	NULL	SEATTLE	WA	98111	933 N	BROWN RD	NULL	SEQUIM	98382		033017310080	19350
38 CALLE LOYOLA	NULL	NULL	SAN CLEMENTE	CA	92673	991 N	SEQUIM AVE	NULL	SEQUIM	98382		033018419250	19866
101 GARDEN LN	NULL	NULL	SEQUIM	WA	98382	310 W	DEYTONA ST	NULL	SEQUIM	98382		033018500120	19960
763 N BEVERAGE ST	NULL	NULL	SEQUIM	WA	98382	763 N	BEVERAGE ST	NULL	SEQUIM	98382		033018439010	19903
601 5TH AVE	NULL	NULL	FORKS	WA	98331	271 W	DEYTONA ST	NULL	SEQUIM	98382		033018500210	19969
110 DEYTONA ST	NULL	NULL	SEQUIM	WA	98382	110 W	DEYTONA ST	NULL	SEQUIM	98382		033018500010	19949
351 W DEYTONA	NULL	NULL	SEQUIM	WA	98382	351 W	DEYTONA ST	NULL	SEQUIM	98382		033018500170	19965
PO BOX 1955	NULL	NULL	SEQUIM	WA	0	750 N	SEQUIM AVE	NULL	SEQUIM	98382		033017330140	19381
33166 WESTLONG ST	NULL	NULL	LAKE ELSINORE	CA	0	22 NULL	ANCHOR COVE LN	NULL	SEQUIM	98382		033018610040	20194
420 E GREY FOX RD	NULL	NULL	SEQUIM	WA	98382	420 E	GREY FOX RD	NULL	SEQUIM	98382		033017349150	19415
32 CROWNVIEW LN	NULL	NULL	SEQUIM	WA	0	31 NULL	CROWNVIEW LN	NULL	SEQUIM	98382		033018610420	20225
421 E GLACIER VIEW DR	NULL	NULL	SEQUIM	WA	0	421 E	GLACIER VIEW DR	NULL	SEQUIM	98382		033017349140	19414
1033 OLD BLYN HWY	NULL	NULL	SEQUIM	WA	0	41 NULL	ANCHOR COVE LN		SEQUIM	98382		033018610390	20220
201 STONE FARM ROAD	NULL	NULL	SEQUIM	WA	98382	201 NULL	STONE FARM RD	NULL	SEQUIM	98382		033017510060	19469
10053 OLD OLYMPIC HWY	NULL	NULL	SEQUIM	WA	0	10053 NULL	OLD OLYMPIC HWY	NULL	SEQUIM	98382		033018149050	19627
883 N BEVERAGE ST	NULL	NULL	SEQUIM	WA	98382	883 N	BEVERAGE ST	NULL	SEQUIM	98382		033018439160	82039
980 N OLIVER LN			SEQUIM	WA	98382	980 N	OLIVER LN	NULL	SEQUIM	98382		033018730030	20518
100 JESSLYN LN	NULL	NULL	SEQUIM	WA	0	100 NULL	JESSLYN LN	NULL	SEQUIM	98382		033017239070	19339
PO BOX 928	NULL	NULL	CHINO VALLEY	AZ	86323	550 N	SEQUIM AVE	NULL	SEQUIM	98382		033020229110	22159
471 E GREY FOX ROAD	NULL	NULL	SEQUIM	WA	0	471 E	GREY FOX RD	NULL	SEQUIM	98382-3170		033017349020	19401
172 CROWNVIEW LANE	NULL	NULL	SEQUIM	WA	98382	172 NULL	CROWNVIEW LN	NULL	SEQUIM	98382		033018149140	19636
PO BOX 1916	NULL	NULL	SEQUIM	WA	0	925 N	SEQUIM AVE	NULL	SEQUIM	98382		033018410100	19833
350 W DEYTONA ST	NULL	NULL	SEQUIM	WA	98382	350 W	DEYTONA ST	NULL	SEQUIM	98382		033018500140	19962
1031 N GIERIN CREEK LN	NULL	NULL	SEQUIM	WA	0	1031 NULL	GIERIN CREEK LN	NULL	SEQUIM	98382		033017329030	19368
383 RIVERVIEW DR			SEQUIM	WA	98382	220 W	DEYTONA ST	NULL	SEQUIM	98382		033018500070	19955
1915 TOWNE RD	NULL	NULL	SEQUIM	WA	98382	876 N	BEVERAGE ST	NULL	SEQUIM	98382		033018449020	19940
980 N MALIA LN	NULL	NULL	SEQUIM	WA	98362	980 N	MALIA LN	NULL	SEQUIM	98382		033018429040	19885
574 WASHINGTON HARBOR	NULL	NULL	SEQUIM	WA	0	131 W	DEYTONA ST	NULL	SEQUIM	98382		033018500280	19976
950 N BEVERAGE ST	NULL	NULL	SEQUIM	WA	0	950 N	BEVERAGE ST	NULL	SEQUIM	98382		033018419030	19838
120 VALLEY FARM COURT	NULL	NULL	SEQUIM	WA	98382	120 NULL	VALLEY FARM CT	NULL	SEQUIM	98382		033017520070	19485
MICHAEL & LYDIA STANHOPE	12 JESSLYN LN	NULL	SEQUIM	WA	98382	12 NULL	JESSLYN LN	NULL	SEQUIM	98382		033017239050	19337
PO BOX 1117	NULL	NULL	SEQUIM	WA	0	741 N	SEQUIM AVE	NULL	SEQUIM	98382		033018440060	19927
95 CROWNVIEW LN	NULL	NULL	SEQUIM	WA	0	95 NULL	CROWNVIEW LN	NULL	SEQUIM	98382		033018149160	19638
231 W DEYTONA ST	NULL	NULL	SEQUIM	WA	98382	231 W	DEYTONA ST	NULL	SEQUIM	98382		033018500230	19971
630 S 5TH AVE	NULL	NULL	SEQUIM	WA	0	630 S	FIFTH AVE	NULL	SEQUIM	98382		033019349030	21081
PO BOX 928	NULL	NULL	CHINO VALLEY	AZ	86323	560 N	SEQUIM AVE	NULL	SEQUIM	98382		033020229100	22158
140 E HENDRICKSON RD	NULL	NULL	SEQUIM	WA	0	140 E	HENDRICKSON RD	NULL	SEQUIM	98382		033017330120	19380
32 CROWNVIEW LN	NULL	NULL	SEQUIM	WA	0	40 NULL	ANCHOR COVE LN	NULL	SEQUIM	98382		033018610030	20192
143 PORT WILLIAMS RD	NULL	NULL	SEQUIM	WA	0	143 NULL	PORT WILLIAMS RD	NULL	SEQUIM	98382		033017230050	19327
574 WASHINGTON HARBOR RD	NULL	NULL	SEQUIM	WA	98382	130 W	DEYTONA ST	NULL	SEQUIM	98382		033018500020	19950
761 LEE LN			SEQUIM	WA	98382	761 NULL	LEE LN	NULL	SEQUIM	98382		033018449050	19942
234 W HAMMOND ST			SEQUIM	WA	98382	-51 NULL	MARINERS DR		SEQUIM	98382		033018630070	20255
373 SCHMUCK RD	NULL	NULL	SEQUIM	WA	98382	343 NULL	PORT WILLIAMS RD	NULL	SEQUIM	98382		033017210225	85243
655 CLARK RD	NULL	NULL	SEQUIM	WA	98382	980 N	BEVERAGE ST	NULL	SEQUIM	98382		033018419040	19839
122 JESSLYN LN	NULL	NULL	SEQUIM	WA	98382	122 NULL	JESSLYN LN	NULL	SEQUIM	98382		033017239100	19342

PO BOX 924	NULL	NULL	SEQUIM	WA	98382	230	W	DEYTONA ST	NULL	SEQUIM	98382	033018500080	19956
1020 N OLIVER LN			SEQUIM	WA	98382	1020	N	OLIVER LN	NULL	SEQUIM	98382	033018739040	20526
20 STONE FARM RD	NULL	NULL	SEQUIM	WA	98382	20	NULL	STONE FARM RD	NULL	SEQUIM	98382	033017510150	83124
51 STONE FARM RD			SEQUIM	WA	98383	51	NULL	STONE FARM RD	NULL	SEQUIM	98382	033017510020	19465
100 VALLEY FARM CT			SEQUIM	WA	98382	100	NULL	VALLEY FARM CT	NULL	SEQUIM	98382	033017520080	19486
211 W DEYTONA ST	NULL	NULL	SEQUIM	WA	98382	211	W	DEYTONA ST	NULL	SEQUIM	98382	033018500250	19973
906 PARRISH RD			SEQUIM	WA	98382	673	N	DUNLAP AVE	NULL	SEQUIM	98382	033020219030	22111
9690 OLD OLYMPIC HWY			SEQUIM	WA	98382	680	N	FIFTH AVE	NULL	SEQUIM	98382	033019120025	20811
311 W TURNHERE RD	NULL	NULL	SEQUIM	WA	98382	311	W	TURNHERE RD	NULL	SEQUIM	98382	033018439020	19904
142 JESSLYN LANE	NULL	NULL	SEQUIM	WA	98382	142	NULL	JESSLYN LN	NULL	SEQUIM	98382	033017239090	19341
90 CROWNVIEW LN	NULL	NULL	SEQUIM	WA	0	90	NULL	CROWNVIEW LN	NULL	SEQUIM	98382	033018149060	19628
912 E SPRUCE ST			SEQUIM	WA	98382	190	W	DEYTONA ST	NULL	SEQUIM	98382	033018500050	19953
601 W HENDRICKSON RD			SEQUIM	WA	98382	601	W	HENDRICKSON RD	NULL	SEQUIM	98382	033019219040	20889
843 SHERBURNE RD			SEQUIM	WA	98382	511	E	WASHINGTON ST	NULL	SEQUIM	98382	033020319000	22209
913 N BROWN RD			SEQUIM	WA	98382	913	N	BROWN RD	NULL	SEQUIM	98382	033017310100	19352
PO BOX 6			SEQUIM	WA	98382	480	E	GREY FOX RD	NULL	SEQUIM	98382	033017349160	19416
383 RIVERVIEW DR			SEQUIM	WA	98382	210	W	DEYTONA ST	NULL	SEQUIM	98382	033018500060	19954
970 N GIERIN CREEK LN	NULL	NULL	SEQUIM	WA	0	981	NULL	GIERIN CREEK LN	NULL	SEQUIM	98382	033017329040	19369
570 E GREY FOX RD	NULL	NULL	SEQUIM	WA	98382	570	E	GREY FOX RD	NULL	SEQUIM	98382	033017349180	19418
470 E GLACIER VIEW DR			SEQUIM	WA	98382	470	E	GLACIER VIEW DR	NULL	SEQUIM	98382	033017349060	19405
121 W BELL ST	NULL	NULL	SEQUIM	WA	98382	330	W	DEYTONA ST	NULL	SEQUIM	98382	033018500130	19961
150 VALLEY FARM CT			SEQUIM	WA	98382	150	NULL	VALLEY FARM CT	NULL	SEQUIM	98382	033017520020	19480
750 E GREY FOX RD			SEQUIM	WA	98382	750	E	GREY FOX RD	NULL	SEQUIM	98382	033017349220	19422
351 W TURNHERE RD	NULL	NULL	SEQUIM	WA	98382	351	W	TURNHERE RD	NULL	SEQUIM	98382	033018439030	19905
718 N 5TH AVE	NULL	NULL	SEQUIM	WA	0	718	N	FIFTH AVE	NULL	SEQUIM	98382	033018439100	19916
872 N BEVERAGE ST	NULL	NULL	SEQUIM	WA	98382	872	N	BEVERAGE ST	NULL	SEQUIM	98382	033018449030	19941
571 GREY FOX ROAD	NULL	NULL	SEQUIM	WA	98382	571	E	GREY FOX RD	NULL	SEQUIM	98382	033017349040	19403
1010 N MALIA LN	NULL	NULL	SEQUIM	WA	0	1010	N	MALIA LN	NULL	SEQUIM	98382	033018429030	19884
685 N BROWN RD			SEQUIM	WA	98382	685	NULL	BROWN RD	NULL	SEQUIM	98382	033020210180	22107
526 N WEST AVE #137			ARLINGTON	WA	98223	344	E	HENDRICKSON RD	NULL	SEQUIM	98382	033017339020	19386
6111 CHABLIS LANE	NULL	NULL	PENSACOLA	FL	32504	221	W	DEYTONA ST	NULL	SEQUIM	98382	033018500240	19972
6677 FILLMORE ST			CHINO	CA	91710	9785	NULL	OLD OLYMPIC HWY	NULL	SEQUIM	98382	033018680400	20450
574 WASHINGTON HARBOR RD	NULL	NULL	SEQUIM	WA	98382	150	W	DEYTONA ST	NULL	SEQUIM	98382	033018500030	19951
101 VALLEY FARM COURT	NULL	NULL	SEQUIM	WA	98382	101	NULL	VALLEY FARM CT	NULL	SEQUIM	98382	033017520040	19482
130 PORT WILLIAMS RD	NULL	NULL	SEQUIM	WA	0	130	NULL	PORT WILLIAMS RD	NULL	SEQUIM	98382	033017329000	19365
50 JERSEY LN	NULL	NULL	SEQUIM	WA	0	50	NULL	JERSEY LN	NULL	SEQUIM	98382	033017510100	19473
313 P ST	NULL	NULL	PORT TOWNSEND	WA	98368	760	N	SEQUIM AVE	#09	SEQUIM	98382	033017500000	19440
220 E HENDRICKSON			SEQUIM	WA	98382	220	E	HENDRICKSON RD	NULL	SEQUIM	98382	033017330110	19379
80 VALLEY FARM COURT	NULL	NULL	SEQUIM	WA	98382	80	NULL	VALLEY FARM CT	NULL	SEQUIM	98382	033017520100	19488
615C W HENDRICKSON RD	NULL	NULL	SEQUIM	WA	0	615	W	HENDRICKSON RD	NULL	SEQUIM	98382	033019219020	20887
1400 W WASHINGTON ST STE 104	PMB 136		SEQUIM	WA	98382	151	NULL	VALLEY FARM CT	NULL	SEQUIM	98382	033017520060	19484
90 VALLEY FARM CT	NULL	NULL	SEQUIM	WA	98382	90	NULL	VALLEY FARM CT	NULL	SEQUIM	98382	033017520090	19487
251 W DEYTONA ST	NULL	NULL	SEQUIM	WA	0	251	W	DEYTONA ST	NULL	SEQUIM	98382	033018500220	19970
PO BOX 583	NULL	NULL	SEQUIM	WA	0	688	N	SEQUIM AVE	NULL	SEQUIM	98382	033020220035	22129
CITY MANAGER	152 WEST CEDAR ST	NULL	SEQUIM	WA	0		E	WASHINGTON ST	NULL	SEQUIM	98382	033020322130	22223
899 HENDRICKSON RD	NULL	NULL	SEQUIM	WA	98382	899	W	HENDRICKSON RD	NULL	SEQUIM	98382	033019229080	20925
275 S 7TH AVE	NULL	NULL	SEQUIM	WA	0	311	S	SEVENTH AVE	NULL	SEQUIM	98382	033019320050	21019
420 E GLACIER VIEW DR	NULL	NULL	SEQUIM	WA	98382	420	E	GLACIER VIEW DR	NULL	SEQUIM	98382	033017349050	19404
612 E GLACIER VIEW DRIVE	NULL	NULL	SEQUIM	WA	98382	873	N	BROWN RD	NULL	SEQUIM	98382	033017349105	19410
PO BOX 2243	NULL	NULL	SEQUIM	WA	98382	111	W	DEYTONA ST	NULL	SEQUIM	98382	033018500300	19977
P O BOX 2048	NULL	NULL	SEQUIM	WA	98382	885	N	BEVERAGE ST	NULL	SEQUIM	98382	033018439040	19906
10 JERSEY LN	NULL	NULL	SEQUIM	WA	98382	10	NULL	JERSEY LN	NULL	SEQUIM	98382	033017510090	19472
425 E WASHINGTON ST STE 8	NULL	NULL	SEQUIM	WA	98382	425	E	WASHINGTON ST	NULL	SEQUIM	98382	033020310060	22200
PO BOX 1117	NULL	NULL	SEQUIM	WA	0	760	NULL	LEE LN	NULL	SEQUIM	98382	033018449080	19945
PO BOX 264	NULL	NULL	SEQUIM	WA	98382	931	NULL	GIERIN CREEK LN	NULL	SEQUIM	98382	033017329070	19372
PO BOX 2833	NULL	NULL	SEQUIM	WA	98382	471	E	GLACIER VIEW DR	NULL	SEQUIM	98382	033017349130	19413
520 E GREY FOX RD			SEQUIM	WA	98382	520	E	GREY FOX RD	NULL	SEQUIM	98382	033017349170	19417
350 W TURNHERE RD			SEQUIM	WA	98382	350	W	TURNHERE RD	NULL	SEQUIM	98382	033018439000	19902
PO BOX 1887	NULL	NULL	SEQUIM	WA	98382	571	E	GLACIER VIEW DR	NULL	SEQUIM	98382	033017349110	19411
P O BOX 727	NULL	NULL	PORT ANGELES	WA	98362	1080	N	MALIA LN	NULL	SEQUIM	98382	033018429010	19882
1352 W SEQUIM BAY RD	NULL	NULL	SEQUIM	WA	0	703	N	SEQUIM AVE	NULL	SEQUIM	98382	033018440090	19930
146 IOKA RD	NULL	NULL	SEQUIM	WA	0	146	NULL	IOKA RD	NULL	SEQUIM	98382	033017229050	19312
1323 SEQUIM DUNGENESS WAY	NULL	NULL	SEQUIM	WA	98382	1323	NULL	SEQUIM DUNGENESS WY	NULL	SEQUIM	98382	033018110150	19552
32 CROWNVIEW LN	NULL	NULL	SEQUIM	WA	0	10013	NULL	OLD OLYMPIC HWY	NULL	SEQUIM	98382	033018149180	19640
131 STONE FARM ROAD	NULL	NULL	SEQUIM	WA	98382	131	NULL	STONE FARM RD	NULL	SEQUIM	98382	033017510040	19467
280 GOLF COURSE RD	NULL	NULL	PORT ANGELES	WA	0	753	E	GLACIER VIEW DR	NULL	SEQUIM	98382	033017349190	19419
9690 OLD OLYMPIC HWY			SEQUIM	WA	98382	9690	NULL	OLD OLYMPIC HWY	NULL	SEQUIM	98382	033018420050	19873
93 LAKE DAWN RD			PORT ANGELES	WA	98362	152	W	HENDRICKSON RD	8-Jan	SEQUIM	98382	033018440080	19929
371 DEYTONA ST	NULL	NULL	SEQUIM	WA	98382	371	W	DEYTONA ST	NULL	SEQUIM	98382	033018500160	19964
464 SOUTHHILL BLVD			DALY CITY	CA	94014	52	NULL	JESSLYN LN	NULL	SEQUIM	98382	033017239060	19338
3021 RIDGE RD STE A57	NULL	NULL	ROCKWALL	TX	75032	444	S	NINTH AVE	NULL	SEQUIM	98382	033019320125	21034
621 WEST HEMLOCK STREET	NULL	NULL	SEQUIM	WA	0	621	W	HEMLOCK ST	NULL	SEQUIM	98382	033019349070	21087
630 E GREY FOX RD	NULL	NULL	SEQUIM	WA	0	630	E	GREY FOX RD	NULL	SEQUIM	98382	033017349250	19425
781 N BEVERAGE ST	NULL	NULL	SEQUIM	WA	0	781	N	BEVERAGE ST	NULL	SEQUIM	98382	033018500190	19967
182 CROWNVIEW LN			SEQUIM	WA	98382	182	NULL	CROWNVIEW LN	NULL	SEQUIM	98382	033018149130	19635
PO BOX 515			SEQUIM	WA	98382	21	NULL	STONE FARM RD	NULL	SEQUIM	98382	033017510010	19464
245 NICKI LN			SEQUIM	WA	98382	315	NULL	S SEVENTH AVE	NULL	SEQUIM	98382	033019320015	84145
PO BOX 1867			SEQUIM	WA	98382	133	NULL	JESSLYN LN	NULL	SEQUIM	98382	033017530000	19498
PO BOX 583	NULL	NULL	SEQUIM	WA	0	686	N	SEQUIM AVE	NULL	SEQUIM	98382	033020220045	22131
331 W DEYTONA ST			SEQUIM	WA	98382	331	W	DEYTONA ST	NULL	SEQUIM	98382	033018500180	19966
30611 NW 71ST AVE	NULL	NULL	RIDGEFIELD	WA	98642	NULL	NULL	PUFFIN PL	NULL	SEQUIM	98382	033018610000	20187
C/O BOB YANKIS	9619 208TH AVE NE	NULL	REDMOND	WA	98053	151	NULL	CROWNVIEW LN	NULL	SEQUIM	98382	033018700000	20488
PO BOX 1767	NULL	NULL	SEQUIM	WA	0	520	E	GLACIER VIEW DR	NULL	SEQUIM	98382	033017349070	19406
PO BOX 1801			SEQUIM	WA	98382	360	E	HENDRICKSON RD	-362	SEQUIM	98382	033017339030	19387
33 STARES LN			SEQUIM	WA	98382	93	NULL	JESSLYN LN	NULL	SEQUIM	98382	033017239030	19335
1080 N GIERIN CREEK LN	NULL	NULL	SEQUIM	WA	0	1080	NULL	GIERIN CREEK LN	NULL	SEQUIM	98382	033017329010	19366
PO BOX 2830	NULL	NULL	SEQUIM	WA	98382	715	E	GREY FOX RD	NULL	SEQUIM	98382	033017340300	19397
270 DEYTONA SW	NULL	NULL	SEQUIM	WA	98382	270	W	DEYTONA ST	NULL	SEQUIM	98382	033018500100	19958
621 PORT WILLIAMS RD	NULL	NULL	SEQUIM	WA	98382	621	NULL	PORT WILLIAMS RD	NULL	SEQUIM	98382	033017130000	19270
130 VALLEY FARM CT	NULL	NULL	SEQUIM	WA	98382	130	NULL	VALLEY FARM CT	NULL	SEQUIM	98382	033017520030	19481
887 N BEVERAGE ST	NULL	NULL	SEQUIM	WA	98382	887	N	BEVERAGE ST	NULL	SEQUIM	98382	033018439060	19910
91 STONE FARM RD	NULL	NULL	SEQUIM	WA	98382	91	NULL	STONE FARM RD	NULL	SEQUIM	98382	033017510030	19466
7721 S MT ANGELES RD			PORT ANGELES	WA	98362	31	NULL	ANCHOR COVE LN	NULL	SEQUIM	98382	033018610380	20198
PO BOX 4076	NULL	NULL	SEQUIM	WA	0	603	E	GLACIER VIEW DR	NULL	SEQUIM	98382	033017349210	19421
43 JERSEY LANE			SEQUIM	WA	98382	43	NULL	JERSEY LN	NULL	SEQUIM	98382	033017510080	19471
878 N BEVERAGE ST	NULL	NULL	SEQUIM	WA	0	878	N	BEVERAGE ST	NULL	SEQUIM	98382	033018449010	19939
689 N BROWN RD	NULL	NULL	SEQUIM	WA	98382	689	N	BROWN RD	NULL	SEQUIM	98382	033020210170	22103
971 N BEVERAGE ST	NULL	NULL	SEQUIM	WA	98382	971	N	BEVERAGE ST	NULL	SEQUIM	98382	033018419050	19840
PO BOX 84			SUQUAMISH	WA	98392	781	NULL	SEQUIM DUNGENESS WY	NULL	SEQUIM	98382	033018500310	19978
C/O [illegible]	[illegible] KINGSMILL LN	NULL	NEW ORLEANS	LA	[illegible]	[illegible]	[illegible]	[illegible] OLYMPIC HWY	NULL	SEQUIM	[illegible]	[illegible]	20516

611 E GLACIER VIEW DR			SEQUIM	WA	98382	611	E	GLACIER VIEW DR	NULL	SEQUIM	98382	033017349200	19420
471 W PRAIRIE ST	NULL	NULL	SEQUIM	WA	0	111	NULL	CROWNVIEW LN		SEQUIM	98382	033018149030	19625
412 GREY HAWK LN	NULL	NULL	SEQUIM	WA	98382	412	NULL	GREY HAWK LN	NULL	SEQUIM	98382	043035440400	43663
71 BREEZY PT PL	NULL	NULL	SPRING	TX	77381	251	NULL	LORRAINE DR	NULL	SEQUIM	98382	043025320250	41984
1704 LONG SHADOW LN	NULL	NULL	GEORGETOWN	TX	0	21	NULL	TURNSTONE LN	NULL	SEQUIM	98382	043025220325	41851
3111 4TH STREET #17	NULL	NULL	SANTA MONICA	CA	90405	134	NULL	DEERHAVEN DR	NULL	SEQUIM	98382	043025319110	41971
353 CLOVER LN			SEQUIM	WA	0	353	NULL	CLOVER LN	NULL	SEQUIM	98382	043035410250	43608
171 SECOR RD	NULL	NULL	SEQUIM	WA	98382	171	NULL	SECOR RD	NULL	SEQUIM	98382	043025349010	42060
262 LORRAINE DR	NULL	NULL	SEQUIM	WA	98382	262	NULL	LORRAINE DR	NULL	SEQUIM	98382	043025319050	41966
PO BOX 448	NULL	NULL	SEQUIM	WA	0	183	NULL	ASLAN DR	NULL	SEQUIM	98382	043025249070	41930
41 SHILOH LANE	NULL	NULL	SEQUIM	WA	98382	110	NULL	ALICE PRK LN	NULL	SEQUIM	98382	043025249010	41923
2782 TOKELAND ROAD	NULL	NULL	TOKELAND	WA	98590	101	W	SILBERHORN RD	NULL	SEQUIM	98382	043025240275	41918
2304 S LONGWOOD AVE	NULL	NULL	LOS ANGELES	CA	90016	191	W	SILBERHORN RD	NULL	SEQUIM	98382	043025249020	41925
PO BOX 2145			SEQUIM	WA	98382	193	NULL	ASLAN DR	NULL	SEQUIM	98382	043025249080	41931
PO BOX 981			CARLSBORG	WA	0	81	NULL	GLENDALE DR	NULL	SEQUIM	98382	043025249120	41937
325 E WASHINGTON ST	PMB223	NULL	SEQUIM	WA	98382	153	NULL	DEERHAVEN DR	NULL	SEQUIM	98382	043025319120	41972
263 W SILBERHORN RD	NULL	NULL	SEQUIM	WA	0	263	W	SILBERHORN RD	-271	SEQUIM	98382	043025230010	41879
PO BOX 3083	NULL	NULL	SEQUIM	WA	0	223	NULL	LORRAINE DR	NULL	SEQUIM	98382	043025319140	41974
223 SECOR RD	NULL	NULL	SEQUIM	WA	98382	223	NULL	SECOR RD	NULL	SEQUIM	98382	043025340200	42051
PO BOX 2484	NULL	NULL	SEQUIM	WA	98382	101	NULL	WALLACE WY	NULL	SEQUIM	98382	043025339230	42039
212 SECOR RD			SEQUIM	WA	98382	212	NULL	SECOR RD	NULL	SEQUIM	98382	043025310475	41961
101 LORRAINE DR	NULL	NULL	SEQUIM	WA	0	101	NULL	LORRAINE DR	NULL	SEQUIM	98382	043025510045	42149
141 SECOR RD	NULL	NULL	SEQUIM	WA	98382	141	NULL	SECOR RD	NULL	SEQUIM	98382	043025349000	42059
221 ASLAN DR	NULL	NULL	SEQUIM	WA	0	221	NULL	ASLAN DR	NULL	SEQUIM	98382	043025249090	41934
1235 EVANS RD	NULL	NULL	SEQUIM	WA	98382	NULL	NULL	GLENDALE DR	NULL	SEQUIM	98382	043025249160	41941
11 GLENDALE DR			SEQUIM	WA	98382	11		GLENDALE DR	NULL	SEQUIM	98382	043025249100	41935
53 ASLAN DRIVE			SEQUIM	WA	98382	53	NULL	ASLAN DR	NULL	SEQUIM	98382	043025249030	41926
160 LORRAINE DR			SEQUIM	WA	98382	160	NULL	LORRAINE DR	NULL	SEQUIM	98382	043025319090	41969
92 ALICE PARK LN	NULL	NULL	SEQUIM	WA	0	92	NULL	ALICE PRK LN	NULL	SEQUIM	98382	043025249000	41922
93 DEERHAVEN DR	NULL	NULL	SEQUIM	WA	0	93	NULL	DEERHAVEN DR	NULL	SEQUIM	98382	043025310275	41954
162 ALICE PARK LANE	NULL	NULL	SEQUIM	WA	98382	162	NULL	ALICE PRK LN	NULL	SEQUIM	98382	043025249015	41924
120 WALLACE WAY			SEQUIM	WA	98382	120	NULL	WALLACE WY	NULL	SEQUIM	98382	043025339200	42036
3620 HUNGRY JUNCTION RD	NULL	NULL	ELLENSBURG	WA	98926	192	NULL	SECOR RD	NULL	SEQUIM	98382	043025310430	41958
202 LORRAINE DR	NULL	NULL	SEQUIM	WA	0	202	NULL	LORRAINE DR	NULL	SEQUIM	98382	043025319040	41965
364 CLOVER LN			SEQUIM	WA	98382	364	NULL	CLOVER LN	NULL	SEQUIM	98382	043035410170	43600
120 TURNSTONE LN			SEQUIM	WA	98382	120	NULL	TURNSTONE LN	NULL	SEQUIM	98382	043025210230	41822
PO BOX 3626			SEQUIM	WA	98382	203	NULL	LORRAINE DR	NULL	SEQUIM	98382	043025319150	41975
PO BOX 3787			SEQUIM	WA	98382	45	NULL	WALLACE WY	NULL	SEQUIM	98382	043025339220	42038
PO BOX 1780			SEQUIM	WA	98382	1364	NULL	RIVER RD	NULL	SEQUIM	98382	043025349100	85216
1012 RIVER RD	NULL	NULL	SEQUIM	WA	0	1012	NULL	RIVER RD	NULL	SEQUIM	98382	043025310150	41949
375 COMMUNITY LN	NULL	NULL	SEQUIM	WA	0	232	NULL	SECOR RD	NULL	SEQUIM	98382	043025310500	41962
101 GLENDALE DR	NULL	NULL	SEQUIM	WA	98382	103	NULL	GLENDALE DR		SEQUIM	98382	043025249130	41938
150 TURNSTONE LN	NULL	NULL	SEQUIM	WA	0	150	NULL	TURNSTONE LN	NULL	SEQUIM	98382	043025210200	41818
180 STONE RD			SEQUIM	WA	98382	131	W	SILBERHORN RD	NULL	SEQUIM	98382	043025249110	41936
35952 FIRESTONE CT	NULL	NULL	NEWARK	CA	94560	140	NULL	LORRAINE DR	NULL	SEQUIM	98382	043025319100	41970
PO BOX 3522	NULL	NULL	SEQUIM	WA	0	245	NULL	SECOR RD	NULL	SEQUIM	98382	043025340150	42050
143 ASLAN DR	NULL	NULL	SEQUIM	WA	0	143	NULL	ASLAN DR	NULL	SEQUIM	98382	043025249060	41929
143 SECOR RD	NULL	NULL	SEQUIM	WA	0	143	NULL	SECOR RD	NULL	SEQUIM	98382	043025349020	42061
249 SECOR RD			SEQUIM	WA	98382	249	NULL	SECOR RD	NULL	SEQUIM	98382	043025349090	42069
231 RIVER RUN RD	NULL	NULL	SEQUIM	WA	98382	231	NULL	RIVER RUN RD	-233	SEQUIM	98362-8266	043035440200	43659
PO BOX 3787			SEQUIM	WA	98382	255	NULL	SECOR RD	#NAME?	SEQUIM	98382	043025339210	42037
3610 101ST ST	NULL	NULL	VANCOUVER	WA	98686	262	NULL	SECOR RD	NULL	SEQUIM	98382	043025320125	41981
PO BOX 3501	NULL	NULL	SEQUIM	WA	0	261	NULL	LORRAINE DR	NULL	SEQUIM	98382	043025329050	41997
145 SECOR RD	NULL	NULL	SEQUIM	WA	98382	145	NULL	SECOR RD	NULL	SEQUIM	98382	043025349030	42062
79 ROAD LESS TRAVELED WAY	NULL	NULL	SEQUIM	WA	98382	79	NULL	ROAD LESS TRAVELED	NULL	SEQUIM	98382	043035140500	43449
153 GLENDALE DR	NULL	NULL	SEQUIM	WA	98382	153	NULL	GLENDALE DR	NULL	SEQUIM	98382	043025249150	41940
C/O DEBBIE MCGREGOR	126 W GOFORTH RD	NULL	SEQUIM	WA	0	305	W	SILBERHORN RD	NULL	SEQUIM	98382	043025230000	41878
172 SECOR RD	NULL	NULL	SEQUIM	WA	0	172	NULL	SECOR RD	NULL	SEQUIM	98382	043025310435	41959
142 SECOR RD			SEQUIM	WA	98382	142	NULL	SECOR RD	NULL	SEQUIM	98382	043025310450	41960
500 N WESTBERRY BLVD	UNIT 307	NULL	MADERA	CA	93637	153	NULL	LORRAINE DR	NULL	SEQUIM	98382	043025319080	41968
203 GLENDALE DR	NULL	NULL	SEQUIM	WA	98382	203	NULL	GLENDALE DR	NULL	SEQUIM	98382	043025249170	41942
191 SECOR RD	NULL	NULL	SEQUIM	WA	0	191	NULL	SECOR RD	NULL	SEQUIM	98382	043025340125	42049
143 GLENDALE DR			SEQUIM	WA	98382	143	NULL	GLENDALE DR	NULL	SEQUIM	98382	043025249140	41939
73 SECOR RD	NULL	NULL	SEQUIM	WA	0	73	NULL	SECOR RD	-93	SEQUIM	98382	043025340050	42044
302 SECOR RD			SEQUIM	WA	98382	302	NULL	SECOR RD	NULL	SEQUIM	98382	043025320150	41983
247 SECOR RD	NULL	NULL	SEQUIM	WA	98382	247	NULL	SECOR RD	NULL	SEQUIM	98382	043025349080	42068
172 ALICE PARK LN	NULL	NULL	SEQUIM	WA	98382	172	NULL	ALICE PRK LN	NULL	SEQUIM	98382	043025240250	41917
73 ASLAN DR	NULL	NULL	SEQUIM	WA	0	73	NULL	ASLAN DR	NULL	SEQUIM	98382	043025249040	41927
111 LORRAINE DR	NULL	NULL	SEQUIM	WA	98382	111	NULL	LORRAINE DR	NULL	SEQUIM	98382	043025319070	41967
94 SECOR ROAD			SEQUIM	WA	98382	94	NULL	SECOR RD	NULL	SEQUIM	98382	043025319020	41964
71 DEERHAVEN DR	NULL	NULL	SEQUIM	WA	98382	71	NULL	DEERHAVEN DR	NULL	SEQUIM	98382	043025310300	41955
PO BOX 3575	NULL	NULL	SEQUIM	WA	98382	222 & 224	W	SILBERHORN RD		SEQUIM	98382	043025210250	41823
100 LORRAINE DR	NULL	NULL	SEQUIM	WA	0	100	NULL	LORRAINE DR	NULL	SEQUIM	98382	043025510030	42148
CITY MANAGER	152 WEST CEDAR ST	NULL	SEQUIM	WA	0	124	NULL	SILBERHORN RD	NULL	SEQUIM	98382	043025210150	41817
133 JESSLYN LN #4	NULL	NULL	SEQUIM	WA	98382	133	NULL	JESSLYN LN	NULL	SEQUIM	98382	033017530000	19501
1400 W WASHINGTON ST SUITE 104	PMB 311	NULL	SEQUIM	WA	98382	42	NULL	ANCHOR COVE LN	NULL	SEQUIM	98382	033018610030	20193
2664 DESERT BREEZE WAY	NULL	NULL	PALM SPRINGS	CA	92264	760	N	SEQUIM AVE	#12	SEQUIM	98382	033017500000	19443
PO BOX 46	NULL	NULL	SEQUIM	WA	0	387	E	WASHINGTON ST	NULL	SEQUIM	98382	033020322130	22224
133 JESSLYN LN APT 2	NULL	NULL	SEQUIM	WA	0	133	NULL	JESSLYN LN	NULL	SEQUIM	98382	033017530000	19499
33166 WESTLONG ST	NULL	NULL	LAKE ELSINORE	CA	0	20	NULL	ANCHOR COVE LN	NULL	SEQUIM	98382	033018610040	20195
PO BOX 1595	NULL	NULL	SEQUIM	WA	0	62	NULL	WINDSOR CT	NULL	SEQUIM	98382	033018700000	20500
32 CROWNVIEW LN	NULL	NULL	SEQUIM	WA	0	9935	NULL	OLD OLYMPIC HWY	NULL	SEQUIM	98382	033018610400	20201
PO BOX 1595	NULL	NULL	SEQUIM	WA	0	13	NULL	WINDSOR CT	NULL	SEQUIM	98382	033018700000	20497
PO BOX 1595	NULL	NULL	SEQUIM	WA	0	33	NULL	WINDSOR CT	NULL	SEQUIM	98382	033018700000	20499
32 CROWNVIEW LN	NULL	NULL	SEQUIM	WA	0	23	NULL	ANCHOR COVE LN	NULL	SEQUIM	98382	033018610370	20197
133 JESSLYN LANE #7			SEQUIM	WA	98382	133	NULL	JESSLYN LN	NULL	SEQUIM	98382	033017530000	19504
172 LAMAR LN	NULL	NULL	SEQUIM	WA	98382	153	NULL	CROWNVIEW LN	NULL	SEQUIM	98382	033018700000	20489
32 CROWNVIEW LN	NULL	NULL	SEQUIM	WA	0	51	NULL	CROWNVIEW LN	NULL	SEQUIM	98382	033018610410	20203
133 JESSLYN LN UNIT 6			SEQUIM	WA	98382	133	NULL	JESSLYN LN	NULL	SEQUIM	98382	033017530000	19503
2664 DESERT BREEZE WAY	NULL	NULL	PALM SPRINGS	CA	92264	760	N	SEQUIM AVE	#01	SEQUIM	98382	033017500000	19448
PO BOX 1089			CARLSBORG	WA	98324	760	N	SEQUIM AVE	#4	SEQUIM	98382	033017500000	19451
16735 ARMSTEAD ST	NULL	NULL	GRANADA HILLS	CA	0	20	NULL	HAMPTON CT	NULL	SEQUIM	98382	033018700000	20495
585 WASANKARI RD	NULL	NULL	PORT ANGELES	WA	0	760	N	SEQUIM AVE	#11	SEQUIM	98382	033017500000	19442
PO BOX 1595	NULL	NULL	SEQUIM	WA	0	52	NULL	HAMPTON CT	NULL	SEQUIM	98382	033018700000	20492
PO BOX 1595	NULL	NULL	SEQUIM	WA	0	20	NULL	WINDSOR CT	NULL	SEQUIM	98382	033018700000	20503
PO BOX 1595	NULL	NULL	SEQUIM	WA	0	22	NULL	WINDSOR CT	NULL	SEQUIM	98382	033018700000	20502
2664 DESERT BREEZE WAY	NULL	NULL	PALM SPRINGS	CA	92262	760	N	SEQUIM AVE	#05	SEQUIM	98382	033017500000	19444
PO BOX 1595	NULL	NULL	SEQUIM	WA	0	31	NULL	WINDSOR CT	NULL	SEQUIM	98382	033018700000	20498
1033 OLD BLYN HWY	NULL	NULL	SEQUIM	WA	0	9981	NULL	OLD OLYMPIC HWY	NULL	SEQUIM	98382	033018610010	20189
PO BOX 1595	NULL	NULL	SEQUIM	WA	0	30	NULL	HAMPTON CT	NULL	SEQUIM	98382	033018700000	20493

2664 DESERT BREEZE WAY	NULL		NULL	PALM SPRINGS	CA	92264		760	N	SEQUIM AVE	#02	SEQUIM	98382	033017500000	19449
2664 DESERT BREEZE WAY	NULL		NULL	PALM SPRINGS	CA	92262		760	N	SEQUIM AVE	#08	SEQUIM	98382	033017500000	19447
150 AMETHYST DR				SEQUIM	WA	98382		760	N	SEQUIM AVE	#03	SEQUIM	98382	033017500000	19450
7721 S MT ANGELES RD				PORT ANGELES	WA	98362		33	NULL	ANCHOR COVE LN	NULL	SEQUIM	98382	033018610380	20199
PO BOX 100	NULL		NULL	SEQUIM	WA	98382		21	NULL	HAMPTON CT	NULL	SEQUIM	98382	033018700000	20490
PO BOX 1595	NULL		NULL	SEQUIM	WA	0		60	NULL	WINDSOR CT	NULL	SEQUIM	98382	033018700000	20501
2777 ALLEN PKWY STE 950	NULL		NULL	HOUSTON	TX	77019		760	N	SEQUIM AVE	#10	SEQUIM	98382	033017500000	19441
133 JESSLYN LN #3				SEQUIM	WA	98382		133	NULL	JESSLYN LN	NULL	SEQUIM	98382	033017530000	19500
PO BOX 3741				SEQUIM	WA	98382		133	NULL	JESSLYN LN	NULL	SEQUIM	98382	033017530000	19502
590 CHELSAMISH DR				SEQUIM	WA	98382		760	N	SEQUIM AVE	#07	SEQUIM	98382	033017500000	19446
252 SENZ RD	NULL		NULL	SEQUIM	WA	0			NULL	BROWN RD	NULL	SEQUIM	98382	033020210030	22095
158 SUNSET PLACE	NULL		NULL	SEQUIM	WA	0		760	N	SEQUIM AVE	#06	SEQUIM	98382	033017500000	19445
2522 171ST AVE E	NULL		NULL	LAKE TAPPS	WA	0		9951	NULL	OLD OLYMPIC HWY	NULL	SEQUIM	98382	033018610020	20191
50 CROWNVIEW LANE	NULL		NULL	SEQUIM	WA	98382		50	NULL	CROWNVIEW LN	NULL	SEQUIM	98382	033018610430	20205
PO BOX 1595	NULL		NULL	SEQUIM	WA	0		11	NULL	WINDSOR CT	NULL	SEQUIM	98382	033018700000	20496
PO BOX 100	NULL		NULL	SEQUIM	WA	98382		23	NULL	HAMPTON CT	NULL	SEQUIM	98382	033018700000	20491
22 HAMPTON CT	NULL		NULL	SEQUIM	WA	98382		22	NULL	HAMPTON CT	NULL	SEQUIM	98382	033018700000	20494

Owner	Address	City	Site Name:	FACILITY SITE ID	Site Status / Active Tag
	651 E WASHINGTON ST	SEQUIM, WA 98382		FACILITY SITE ID 3344	Cleanup Started
	1033 OLD BLYN HWY	SEQUIM, WA 98382		FACILITY SITE ID 14122	No Further Action
	486 RIVER RD	SEQUIM, WA 98382		FACILITY SITE ID 40388	Awaiting Cleanup
	169 RIVER RD	SEQUIM, WA 98382		FACILITY SITE ID 75535	Awaiting Cleanup
	1284 W WASHINGTON ST	SEQUIM, WA 98382		FACILITY SITE ID 2102527	No Further Action
	990 E WASHINGTON AVE	SEQUIM, WA 98382		FACILITY SITE ID 2250694	A5215
	1529 W SEQUIM BAY RD	SEQUIM, WA 98382		FACILITY SITE ID 4736831	No Further Action
	1453 W WASHINGTON ST	SEQUIM, WA 98382		FACILITY SITE ID 7573197	Awaiting Cleanup
	933 W WASHINGTON ST	SEQUIM, WA 98382		FACILITY SITE ID 9748955	A5347
	1350 E WASHINGTON ST	SEQUIM, WA 98382		FACILITY SITE ID 9943161	No Further Action
	152 W CEDAR ST	SEQUIM, WA 98382		FACILITY SITE ID 14962917	No Further Action
	503 N SEQUIM AVE	SEQUIM, WA 98382		FACILITY SITE ID 23784348	No Further Action
	1453 W WASHINGTON ST	SEQUIM, WA 98382		FACILITY SITE ID 25785716	No Further Action
	194 W WASHINGTON ST	SEQUIM, WA 98382		FACILITY SITE ID 28654424	No Further Action
	822 E WASHINGTON ST	SEQUIM, WA 98382		FACILITY SITE ID 29844397	A1030
	PO Box 3588	Seattle, WA 98104		FACILITY SITE ID 33652163	No Further Action
	144 W BELL ST	SEQUIM, WA 98382		FACILITY SITE ID 43189149	A0906
	194 W WASHINGTON ST	SEQUIM, WA 98382		FACILITY SITE ID 58777919	A4150
	2577 W SEQUIM BAY RD	SEQUIM, WA 98382		FACILITY SITE ID 77943722	A4298
	680 W WASHINGTON	SEQUIM, WA 98382		FACILITY SITE ID 83634739	A8619
	808 W WASHINGTON ST	SEQUIM, WA 98382		FACILITY SITE ID 85773984	No Further Action
	216 E WASHINGTON ST	SEQUIM, WA 98382		FACILITY SITE ID 89728125	No Further Action

City of Sequim Infiltration Gallery Watershed Property Owner List

Owner	Address	Phone	Contact
Department of Natural Resources	411 Tillicum Lane, Forks, WA 98331-9271	(360) 374-2800	Sue Trettevik, Olympic Regional Manager
US Forest Service	1835 Black Lake Boulevard SW, Olympia, WA 98512	(360) 956-2402	Reta Laford, Olympic National Forest Supervisor
Department of Fish & Wildlife	48 Devonshire Road, Montesano, WA 98563		
Green Crow Timber	727 East 8th Street, Port Angeles, WA 98362	(360) 452-3325	Thomas Swanson, Vice President & Area Manager
Peninsula Long Rifles Inc.	PO Box 958, Port Angeles, WA 98362	(360) 452-6755	Deb Rupp, Secretary
Albert Haller Foundation	PO Box 2739, Sequim, WA 98382	(360) 683-1119	
Cedar Lane Trust			
Manke Family Resources	826 Fairmount Ave, Shelton, WA 98584	(360) 432-0160	
JLCG LLC Timber Co			
RD Merril Co	813 East 8th Street, Port Angeles, WA 98362	(360) 452-2367	
CDR Ranch Inc.	PO Box 1298, Sequim, WA 98382	(360) 683-4644	

CITY OF SEQUIM

PUBLIC WORKS
152 W. Cedar Street, Sequim, WA 98382
PH (360) 683-4908 FAX (360) 681-0552

August 23, 2022

SUBJ: Wellhead Protection informational letter for Regulatory Agencies, from City of Sequim, WA

To: Regulatory Agency Staff for Toxics, UST/LUST,

We are writing to let you know that businesses or facilities you regulate are in our public water system wellhead protection Zones of Contribution (ZOCs). We expect that this information will be used by your agency to:

- Help prioritize local and state pollution control outreach efforts.
- Provide incentives for risk reduction by the identified potential contaminant sources.
- Support local land-use planning decisions.

The Sequim municipal water system serves more than 8,000 residents and dozens of businesses. The map found at https://www.sequimwa.gov/356/Water shows the 6-month and 1-, 5- and 10-year time-of-travel ZOCs.

Below is the list of properties specific to your area of expertise, which we obtained from your databases. These facilities, their facility identification numbers, and their operational status are listed below.

[insert list for 2022]

City of Sequim has mailed or will soon mail letters of notification to these properties in August 2022.

Because everyone plays a role in protecting water quality, all local residents and businesses in the City are being asked to do their part. Thank you for your stewardship of Sequim's excellent water.

If you have any questions regarding this information, please contact me at ptjem@sequimwa.gov

Sincerely,

Pete Tjemsland
Utilities Manager, Sequim Public Works

CITY OF SEQUIM

PUBLIC WORKS
152 W. Cedar Street, Sequim, WA 98382
PH (360) 683-4908 FAX (360) 681-0552

August __, 2022

SUBJ: Wellhead Protection informational letter for First Responders, City of Sequim, WA

To: First Responder Agencies in the Dungeness Watershed

As you know, the City of Sequim has a wellhead protection program in accordance with Washington State Department of Health (DOH) and the Washington state Department of Ecology (Ecology) regulations. As part of this program, we have mapped "Zones of Contribution" (ZOCs) in which environmental contamination has the potential to cause significant damage to our sources of drinking water. This notification is in accordance with DOH regulations as specified in WAC 246-290-135.

We are notifying your agency of this fact as your personnel would be among the first responders in the event of an accidental spill of contaminants within our ZOCs.

The maps linked from our Water System Plan webpage at https://www.sequimwa.gov/356/Water show the 6-month, 1-year, 5-year, and 10-year time of travel boundaries of the WHPA for the Silberhorn and Port Williams Well systems and the area of influence for the Infiltration Gallery. A contaminant spill within these areas poses a significant risk to the City's drinking water system. It is, therefore, of the utmost importance that reasonable spill response measures are taken in the event of an accidental spill to protect our drinking water supplies. Please take any and all precautions or steps necessary to ensure that the District would be able to responds to an accidental spill within this area promptly and effectively.

Because everyone plays a role in protecting water quality, local residents and businesses throughout the City are also being asked to do their part. Thank you for your stewardship of Sequim's excellent water.

If you have any questions regarding this information, please contact me at ptjem@sequimwa.gov

Sincerely,

Pete Tjemsland
Utilities Manager, Sequim Public Works