Comprehensive Water System Plan

CITY OF FORKS
forkswashington.org

City of Forks

Clallam County, Washington

Prepared By:

GIBBS & OLSON
CIVIL ENGINEERS • LAND SURVEYORS

March 2024

Gibbs & Olson Project No. 0788.0181

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24635

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TABLE OF CONTENTS

CHAPTER 1 WATER SYSTEM DESCRIPTION

CHAPTER 2 BASIC PLANNING DATA

CHAPTER 3 WATER SYSTEM ANALYSIS

CHAPTER 4 WATER USE EFFICIENCY PROGRAM

CHAPTER 6 OPERATION & MAINTENANCE PROGRAM

CHAPTER 7 DISTRIBUTION FACILITIES DESIGN & CONSTRUCTION STANDARDS

CHAPTER 8 CAPITAL IMPROVEMENT PROGRAM

CHAPTER 9 FINANCIAL PROGRAM

TABLES

FIGURES

Chapter 1

WATER SYSTEM DESCRIPTION

CHAPTER 1

WATER SYSTEM DESCRIPTION

OBJECTIVE

The objective of this chapter is to present background information for the City of Forks (the City) Comprehensive Water System Plan (Plan). The Plan will assess the current and future capabilities of the City Water System (System). System capabilities will be evaluated relative to statutory requirements in Chapter 246-290-100 WAC and Chapter 246-293-250 WAC and the Washington State Department of Health (DOH) Water System Design Manual (Design Manual). The Plan will recommend any needed improvements to allow the System to provide water service throughout the planning period in compliance with projected demands, regulatory requirements, and expectations of the City's customers, Mayor and Council.

This chapter presents information on the following:

- Ownership and management of the system
- System background data
- The existing system facilities inventory
- Related planning documents
- Retail Service Area and Service Area
- Service area agreements and policies
- Conditions of service

OWNERSHIP AND MANAGEMENT

SYSTEM NAME

The name of the water system on the (DOH) data system is *Forks Municipal Water Department,* and the Public Water System ID (PWSID) Number is 26000E.

TYPE OF OWNERSHIP

The City System is a municipal water system owned and operated by the Incorporated City of Forks, Washington. The system is registered as a Group A water system with the DOH.

MANAGEMENT STRUCTURE AND DECISION-MAKING PROCEDURES

The water system is managed by the Public Works Director who supervises the Water Lead Worker, other City staff, and part-time workers. The Public Works Director reports to the Mayor who has overall administrative authority for City functions. The mayor in turn reports to the City Council, which is responsible for program overview and policy decision-making. At the writing of this plan the Mayor, Council members, and staff are as follows:

Mayor	Tim Fletcher
Council Member	Hickory Grant
Council Member	Jeff Gingell
Council Member	Joe Soha
Council Member	Clint Wood
Council Member	Nettie Grant
City Clerk Treasurer	Caryn DePew
Attorney/Planner	Rod Fleck
Public Works Director	Paul Hampton

WATER FACILITIES INVENTORY FORM

A copy of the City's Water Facilities Inventory (WFI) form, dated November 23, 2020, is included in Appendix A.

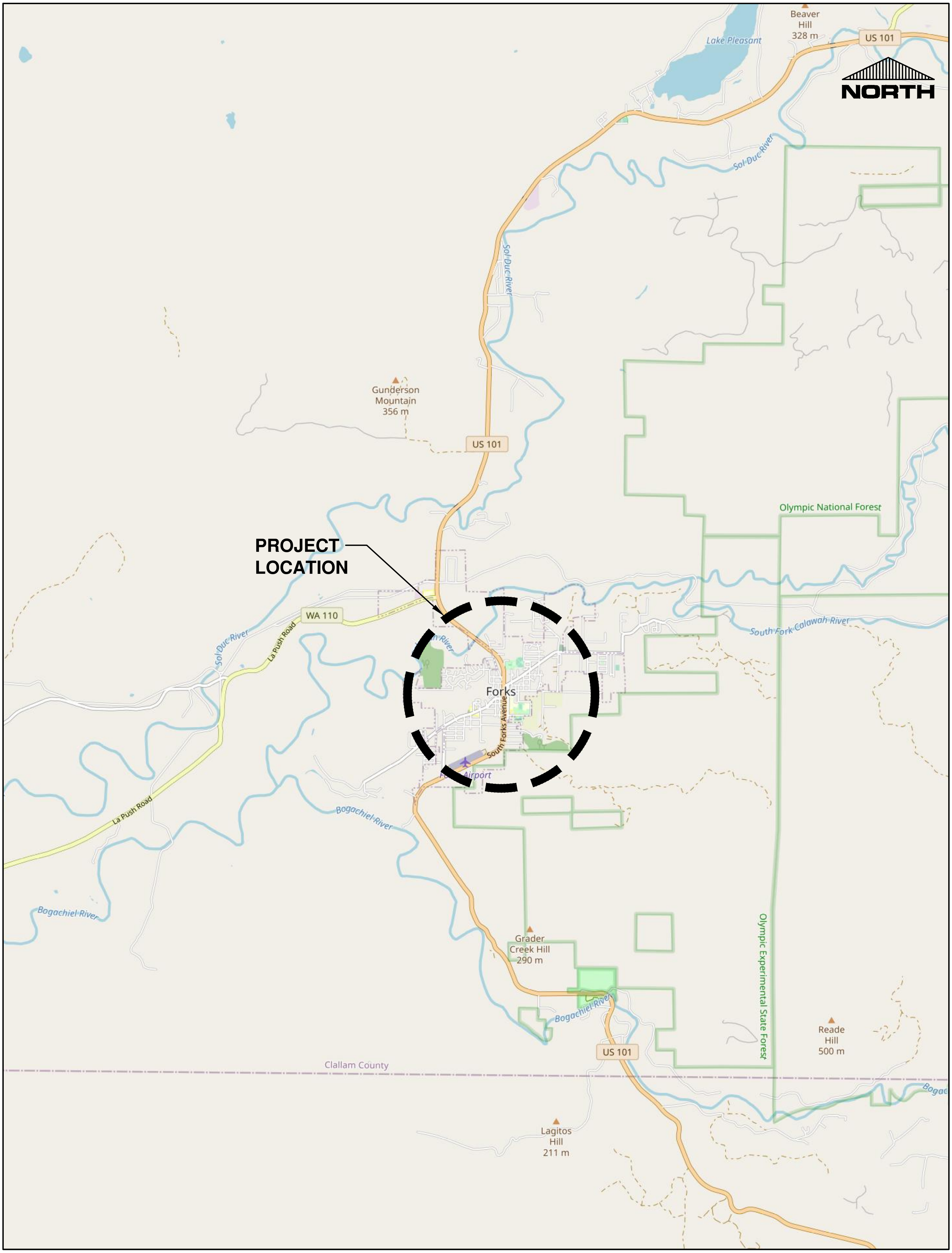
The WFI indicates 1,345 full-time single-family residential connections, 34 apartment buildings, condos, duplexes, barracks or dorms, 521 full-time residential units in apartments, condos, duplexes, or dorms, and 213 non-residential connections, for a total of 2,079 service connections, with a full-time residential population of 4,350. Transient population is indicated as 500 to 1,250 persons per month and the system is indicated as accessible to transient public every day of every month. The WFI also indicates that there are 50 to 100 students, daycare children, and employees present each month. The estimated transient population would include anyone who stopped at a service station or restaurant or otherwise used or potentially could have used the City's water facilities. The WFI form is based off November 2020 data and does not reflect design data during the years 2018 to 2021 used in later chapters.

SYSTEM BACKGROUND

Forks Water System is located on the western side of the Olympic Peninsula in Washington State at the western foot of the Olympic Mountains near the confluence of the Bogachiel River with the Calawah River and the Sol Duc River, which then becomes the Quillayute River. The location of the City of Forks is shown on the vicinity map on Figure 1-1. The following section provides basic system background.

HISTORY OF SYSTEM DEVELOPMENT AND GROWTH

Prior to 1953, the Town of Forks was supplied by surface water from Elk Creek, which drains into the Calawah River northeast of town. The present water system for the City of Forks was created in 1953 with the drilling of Well Number 1, construction of a 150,000-gallon storage tank and the completion of a piping system to serve the town site.



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City of Forks
Water System Plan
Vicinity Map
Figure 1-1

DRAWING: T:\PROJECTS\0788 MISC ENG PROJECT\0181 JACKSON CIVIL ENG FORKS WTR SYS PLAN\FIGURES & EXHIBITS\FIG 1-1 VICINITY MAP.DWG, LAYOUT TAB: FIGURE 1-1, PLOT DATE: 10/30/2020 2:17:18 PM, DRAWING SAVE DATE: 10/29/2020 1:43:37 PM, PLOTTED BY: KROGERS
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The system serves the incorporated City as well as the unincorporated portions of the County immediately adjacent to the City. Approximately 40 percent of the residential service connections are outside of the incorporated City limits.

As the population increased, the City drilled four additional production wells, and constructed two additional storage tanks totaling 1,750,000 gallons. The City has also added new pipelines to serve new subdivisions and an industrial park situated north of the City limits near the Sol Duc River. Table 1-1 contains a brief summary of the development history of the City of Forks:

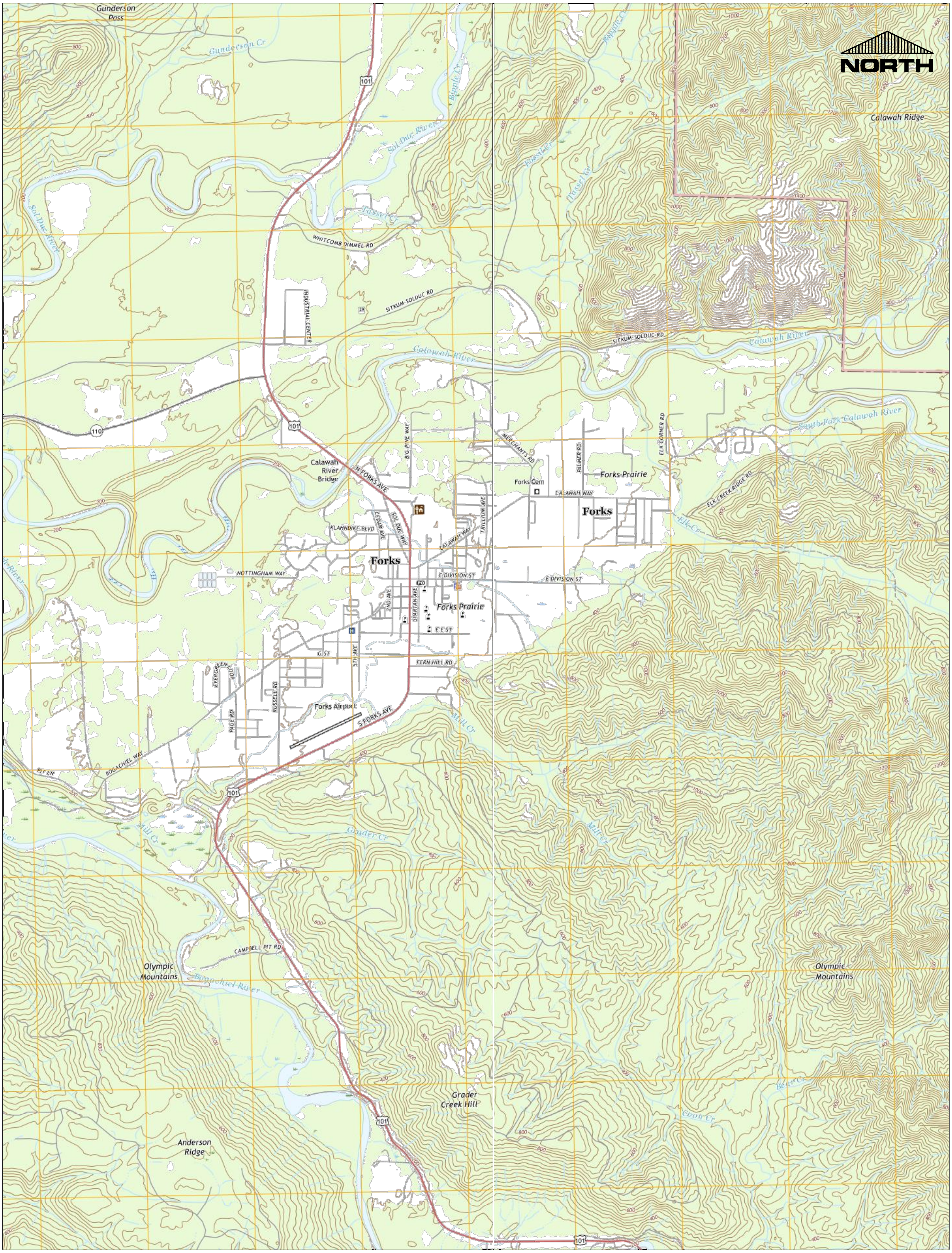
TABLE 1-1

Significant Events in the History of the City of Forks Water System

Date	Event
Pre 1953	City served by surface water from Elk Creek
1940s	Original gas chlorination system installed
1940s	Original fluoridation system installed
1953	Drill Well Number 1
1953	Drill Well Number 2
1954	Construct 150,000-gallon Reservoir No. 1
1961	Drill Well Number 3
1967	Drill Well Number 4
1969	Construct 750,000-gallon Reservoir No. 2
1979	Drill Well Number 5
1979	Construct 1,000,000-gallon Reservoir No. 3
1989	KCM Water System Plan
1999	Liquid sodium hypochlorite system was installed
1999	Polaris Engineering & Surveying, Inc., Water System Plan
2003	Gray & Osborne, Inc., Rate Study
2007	Gray & Osborne, Inc., Water System Plan
2020	Drill Well Number 6

GEOGRAPHY

The Forks Prairie is relatively flat (slopes usually less than 1 percent) with elevations ranging from 100 to 400 feet, with the lower elevations and steep slopes primarily occurring along the banks of the Calawah and Bogachiel Rivers to the north, south and west, and the higher elevations located in adjacent Olympic foothills to the east. A map showing the topography of the City and surrounding area is shown on Figure 1-2. The surrounding foothills with elevations of up to 1,000 feet envelope the City except to the west. Currently, there are residences served by the City located in these foothills overlooking the Forks Prairie with more growth anticipated in the future.



DRAWING: T:\PROJECTS\0788 MISC ENG PROJECT\0181 JACKSON CIVIL ENG FORKS WTR SYS PLAN\FIGURES & EXHIBITS\FIG 1-2 TOPOGRAPHY MAP.DWG, LAYOUT TAB: FIGURE 1-2, PLOT DATE: 10/30/2020 2:17:28 PM, DRAWING SAVE DATE: 10/30/2020 2:10:28 PM, PLOTTED BY: KROGERS
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City of Forks
Water System Plan
Topography Map
Figure 1-2

The Forks Prairie had its origin many thousands of years ago as a result of glacial action. It is typical of the many western Washington prairies that exist in areas dominated by forests. The Prairie is underlain with a gravelly substrate that has very high permeability. Because of the relatively flat nature and gravelly substrate (glacial outwash) minimal foundation and settling problems can be expected. Due to the flat topography, lower areas of the Prairie are susceptible to winter flooding. The City of Forks and Clallam County have taken an active role in preventing flooding by requiring on-site water retention for new development and implementing flood control ordinances.

ADJACENT PURVEYORS

There are no organized water systems adjacent to the Forks Water System. Properties in the unincorporated County are served by individual wells. The closest public water system is operated by Washington State Parks at Bogachiel State Park (DOH Water System ID# SP090W), which is located approximately 5 miles south along US Highway 101.

CODES AND ORDINANCES

The City of Forks adopted the Forks Municipal Code, which consists of the ordinances of the City that have ongoing effect and that have not expired according to their own terms. This code may be amended by reference to code section without the necessity of referring to the underlying ordinance. The Forks Municipal Code is available at http://www.codepublishing.com/WA/Forks/. Title 13 of the Forks Municipal Code includes all Public Services. The specific section of code that refers to the water system within that Title is Chapter 13.20 through Chapter 13.40. Table 1-2 lists the applicable sections within Title 13. Appendix B includes the sections of Forks Municipal Code listed in Table 1-2.

Basic service standards are established by the appropriate Washington Administrative Code (WAC). Minimum service pressures are 30 psi for normal operating conditions and no less than 20 psi for fire service conditions. Minimum fire flows for buildings are established by the International Fire Code. The residential fire standard is 1,000 gpm for a 30-minute duration. Major structures within the City have been rated by the Washington Surveying and Rating Bureau. The maximum building fire requirement is 3,500 gpm for a 180-minute duration.

TABLE 1-2

Title 13 – Public Services Forks Municipal Code

Section Number	Section Description
13.20	Water Department
13.25	Water Restrictions
13.30	Water Rates and Charges

13.35	Sale of Bulk Water
13.40	Cross-Connection and Backflow Control devices

WATER RIGHTS

Water rights Certificates and Reports of Examination were reviewed to determine the current status of the City of Forks water rights. The status of water rights is summarized in Table 1-3. The total water rights available for the system are 1,390 gpm instantaneous withdrawal rate (Q_i) and 950 acre-feet per year (ac-ft/yr) annual withdrawal rate (Q_a). The City of Forks has no water rights applications pending. The City of Forks Water rights Certificates and Water Rights Self-Assessment Form are included in Appendix C.

TABLE 1-3

Summary of Water Rights

Water Right Number Certificate No.	Points of Withdrawal	Q_i, gpm	Installed Capacity (gpm)	Q_a, ac-ft/y	Priority Date
02108 G2*03542 C	Wells No. 1 and No. 2	500	475	504 Primary	2/13/54
G2*05930 C 04120	Well No. 3	290	300 (1)	464 Supplemental (2)	6/2/61
G2-24829 C	Wells No. 4 No. 5, and No. 6	600	1,130 (3)	950 Primary/ Supplemental (4)	3/15/78
TOTAL		**1,390**	**1,905**	**950**	

(1) The pump installed in Well 3 is capable of producing up to 300 gpm, depending on aquifer conditions and system pressure at the well site, but is normally throttled to produce around 250 gpm and does not normally produce greater than 290 gpm. If the circumstances permit (low system pressure and high aquifer level) then in an emergency situation, this well could produce up to 300 gpm.

(2) The annual quantity on Certificate No. 4120-A is entirely supplemental to Certificate 2108-A.

(3) The City only runs one well, Well 4, Well 5, or Well 6 at a time. Wells 4, 5, and 6 have capacities of 300 gpm, 480 gpm, and 350 gpm, respectively. Therefore, while the installed capacity is 1,130 gpm, the maximum the City uses at any time under this water right is 480 gpm.

(4) Certificate No. G2-24829 C does not explicitly state the primary and supplemental annual quantities. The certificate states that the annual limit is 950 ac-ft/yr, and in the provisions of the certificate it is stated that the total annual quantity authorized under this filing, Certificate 2108 and Certificate 4120 shall be limited to 950 ac-ft/yr. This provision implies that Certificate No. G2-24829 C is for 446 ac-ft/yr primary Q_a, and 504 ac-ft/yr supplemental Q_a from Certificate 2108-A G2*03542 C.

INVENTORY OF EXISTING FACILITIES

The existing system is all within one pressure zone, which is controlled by the overflow elevation of Reservoir No. 3. The system has six production wells operating as two independent well fields, approximately 25 miles of distribution piping and three storage tanks with a combined volume of 1.925 million gallons.

The following sections describe in more detail the existing system facilities listed above and provide a foundation for further system evaluation. A map of the City water distribution system is shown on Figure 1-3, with the location of major system components indicated.

CONNECTIONS BY CUSTOMER CLASS

Customer classes are defined in Chapter 13.30 of the Forks Municipal Code. Customer classes include 3/4-inch, 1-inch, 1-1/2-inch, 2-inch, 3-inch, 4-inch, and 6-inch rates. Water rates for those served within the City limits are different from those outside the City limits. In addition, there is a charge for trailer parks, apartment houses, and motels renting units as apartments, without individual meters.

The City billing records indicate that as of 2021 there are 2,043 active service meters. The City of Forks serves 10 trailer courts, which all have a master meter for billing and water usage.

There are 212 commercial connections including City of Forks municipal facilities which include the cemetery, the baseball park, the visitor center and the dog pound, among others all of which are now metered. Table 1-4 summarizes the number of average water connections for 2021.

TABLE 1-4

Average 2021 Active Water Service Connections by Customer Class

Class Number	Residential/Commercial/ Other	Inside/Outside of City Limits	Average Number of Connections
Class 1	Residential	Inside	1,308
Class 2	Residential	Outside	502
Class 3	Commercial	Inside	198
Class 4	Commercial	Outside	14
Class 5	Not Billed/Municipal	Inside	5
Class 6	Not Billed/Non-municipal (1)	Inside	16
Total			2,043

(1) The City maintains several services that are not billed but non-municipal, however the water use is accounted for.

SOURCE FACILITIES

The system has six wells in two well fields located within City limits. Wells S01, S02, and S03 are incorporated into a single wellfield (S06) and Wells S04, S05 and 6 make up the second wellfield (S07). Well 6 was installed in 2020 and has not yet been given a Source Number in the most recent DOH Water Facilities Inventory Form. Well 6 was drilled as a replacement well for the City's original drought relief well, the Campbell Pit Well, which failed to meet the requirements of DOH and Department of Ecology (DOE). The oldest of these wells has been operating over 68 years. Since the replacement of the old iron well screens and cleaning of the Well Nos. 1 and 2 in the late 1980s, few problems have been experienced with the wells. The current specific capacities of the wells have remained relatively unchanged since the time of their construction or replacement of well screens. During the last couple of years, Well No. 1 has been experiencing a sulfur odor and is not used. The City is investigating ways to eliminate the sulfur odor. Table 1-5 summarizes known data about the City's wells. The sum of the individual capacities is 1,905 gpm.

Wells 1, 2, and 3 are controlled by floats located in the City's one-million-gallon (MG) reservoir, see the Storage Facilities section below. A signal is transmitted via telephone line. Wells 4 and 5 are controlled by pressure sensors installed on the tank. A level signal is transmitted by a radio transmission unit (RTU). The pressure sensor for water level indication and radio communication system was built in 2009. Wells are operated somewhat differently in dry and wet seasons. In the dry season, when the water table is down, the flow rate of the wells is dialed down by throttling the downstream valves. First, the flow rate of Well 5 is decreased, and then the Well 3 flow rate is decreased to minimize the cone of depression and avoid source quality problems. Staff monitors water levels in all sources weekly since 2019.

The City has one diesel trailer-mounted emergency generator that is shared by the water and wastewater utilities.

TABLE 1-5

Well Data

Data	Well No. 1	Well No. 2	Well No. 3	Well No. 4	Well No. 5	Well No. 6
Source Number	S01	S02	S03	S04	S05	N/A
Ecology Tag No.	AHM638	AHM642	AHM639	AHM640	AHM641	BJE749
Year Drilled	1953	1953	1961	1967	1997	2020
Depth drilled, ft bgs (1)	178	161	114	132	130	152

Open Interval, feet bgs (1)	126-136	109-113	102-109	118-128	117-128	105-115, 124-139
Well Casing Diameter, in	10	10	10	10	10	8
Opening Type (2)	SS 25 slot (3ft), SS 30 slot (7ft)	SS 100 slot (5ft), SS 50 slot (1ft)	Iron 100 slot	SS 125 slot	SS 125 slot	SS 60 slot
Static Water Level, feet bgs (1)	-	85.5	82.7	90.0	-	93.0
Tested capacity per well log	370 gpm for 8 hrs	347 gpm for 3 hrs	500 gpm for 3.5 hrs	120 gpm for 3 hrs	-	344 gpm for 72 hrs
Drawdown at well test rate, ft	-	3	6.63	3	-	6.12
Specific capacity, gpm per ft drawdown	12	93	76	26	-	56.21
Pump Installed	Submersible	Berkeley	Jacuzzi	Turbine	Jacuzzi	US Motors
Current operating capacity, gpm	210	265	300 (3)	300 (4)	480 (4)	350 (5)
Use	Permanent	Permanent	Permanent	Permanent	Permanent	Drought Relief
Treatment	Chlorination	Chlorination	Chlorination	Chlorination	Chlorination	Chlorination

(1) bgs = below ground surface

(2) SS = stainless steel; slot refers to opening size in thousands of an inch, for example 60 slot = 0.060-inch opening

(3) The pump installed in Well 3 is capable of producing up to 300 gpm, depending on aquifer conditions and system pressure at the well site, but is normally throttled to produce around 250 gpm and does not normally produce greater than 290 gpm. If the circumstances permit (low system pressure and high aquifer level) then, in an emergency, this well could produce up to 300 gpm.

(4) The City only runs either Well 4 or Well 5 at a time.

(5) Well 6 is a drought relief well and will only be run when Well 5 has to be turned off due to low water levels.

TREATMENT AND DISINFECTION FACILITIES

The treatment process provided for the City's wells is disinfection. Fluoridation was discontinued on May 15, 2020. Disinfection is provided as a protection against bacterial growth in the distribution system. There is no history of coliform contamination of the wells and the wells are all rated as low susceptibility, so there is no disinfectant contact time requirement associated with this disinfection operation. The disinfection systems use a sodium hypochlorite solution, which is applied by metering pumps. The feed solution consists of one part 12.5 percent sodium hypochlorite solution and one part water, for a resulting 6.25 percent feed solution. The metering pumps have been adjusted by experience to provide a distribution system residual of approximately 0.2 mg/L. Each of the city's two wellfields is fitted with a pump house with chlorine feed units.

BOOSTER STATION FACILITIES

Because of the relatively flat topography of the Forks Prairie, all distribution occurs within a single pressure zone. The City does not own or operate any booster pump stations as part of its System.

TRANSMISSION AND DISTRIBUTION SYSTEM FACILITIES

The System has approximately 25 miles of water main ranging in diameters from 4 to 12 inches. Over 80 percent of the pipe is asbestos cement (A/C) and over 31 percent of the pipe is 4-inch diameter. The summary of pipe types and diameters is included in Table 1-6. A complete map of the water distribution system is included on Figure 1-3.

TABLE 1-6

Water Main Inventory

Pipe Material	Pipe Diameter (inches)					Total, ft	Percent of Total
	12"	10"	8"	6"	4"		
Asbestos Cement (AC), ft	0	13,360	29,640	26,400	36,640	**106,040**	**80.5%**
Ductile Iron (DI), ft	0	0	0	0	800	**800**	**0.6%**
PVC, ft	14,000	0	6,080	1,100	3,680	**24,860**	**18.9%**
Total, ft	**14,000**	**13,360**	**35,720**	**27,500**	**41,120**	**131,700**	**100.0%**
Percent of Total	**10.6%**	**10.1%**	**27.1%**	**20.9%**	**31.2%**	**100.0%**	

An analysis of the distribution system was performed by KCM as part of the 1989 Water Comprehensive Plan. Pressures within the majority of the System were found to be adequate, however pressure deficiencies in portions of the System were noted in that report. The CIP recommended in the 1989 Plan was designed to upgrade smaller lines and provide a reinforced looping system to eliminate the pressure deficiencies. The City has installed several miles of new water main through 2000. Table 1-7 lists improvements from capital improvements identified in the 2007 Water System Plan and the status of these improvements.

DRAWING: T:\PROJECTS\0788 MISC ENG PROJECT\0181 JACKSON CIVIL ENG FORKS WTR SYS PLAN\FIGURES & EXHIBITS\FIG 1–3 DISTRICT WATER SYSTEM FACILITIES.DWG, LAYOUT TAB: FIGURE 1–3, PLOT DATE: 2/28/2024 2:32:12 PM, DRAWING SAVE DATE: 4/7/2022 3:22:40 PM, PLOTTED BY: GMICKELSEN
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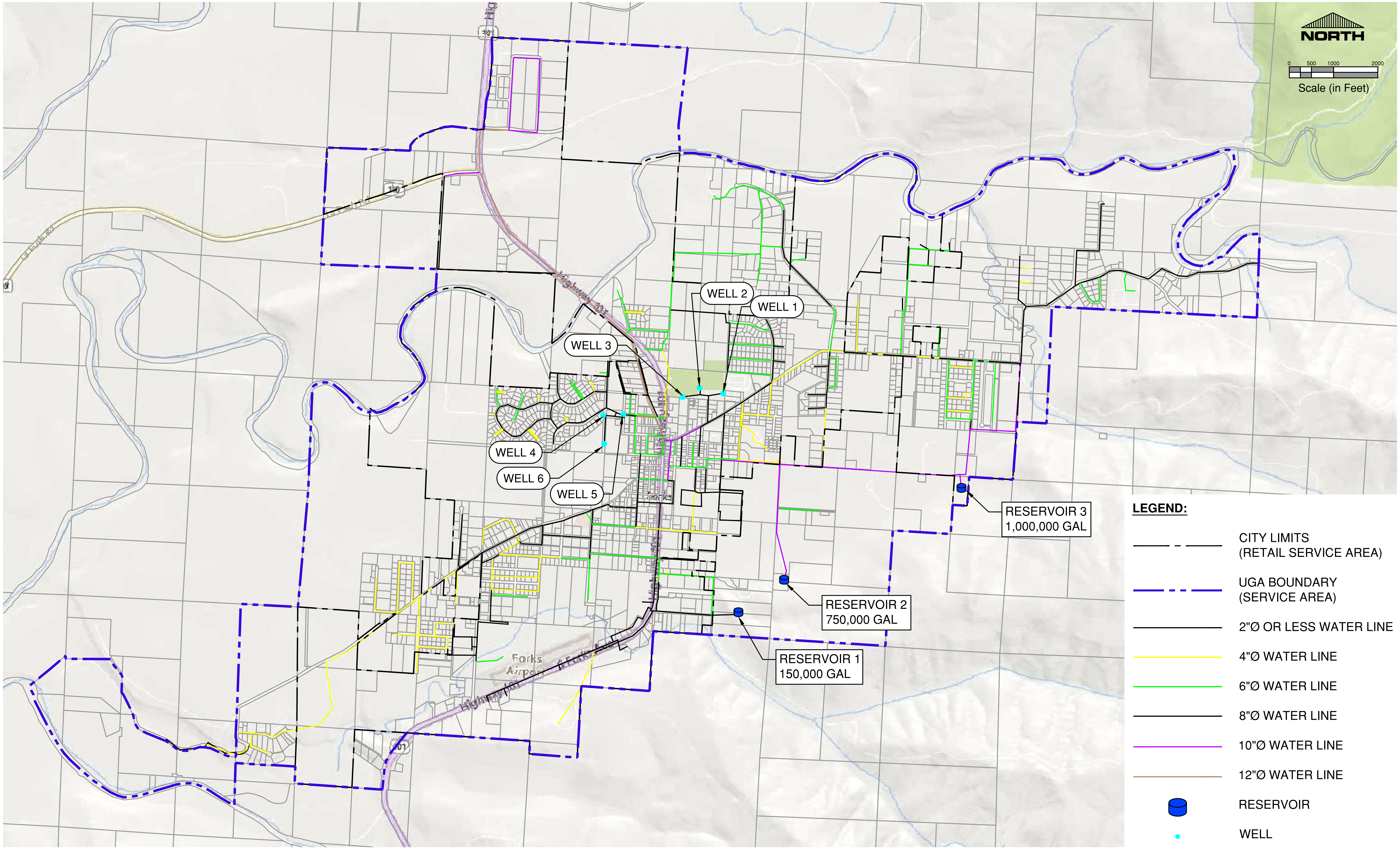

LEGEND:

— - —	CITY LIMITS (RETAIL SERVICE AREA)
— - —	UGA BOUNDARY (SERVICE AREA)
—	2"Ø OR LESS WATER LINE
—	4"Ø WATER LINE
—	6"Ø WATER LINE
—	8"Ø WATER LINE
—	10"Ø WATER LINE
—	12"Ø WATER LINE
●	RESERVOIR
•	WELL

City of Forks
Water System Plan
District Water System Facilities Map
Figure 1-3

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TABLE 1-7

Projects Completed Since 2024

No. (1)	Project Title	Description	Financing Source (2)	Status
D-1	North of City Yard	1,530 LF 8-in PVC, Big Pine Way to Thomas St and Pine Ave Connection	C	Complete
D-2	Connect Merchant to Palmer Road	5,590 LF 8-in PVC, Merchant Rd to Palmer Rd	C	Not Complete
D-3	Forks Avenue South	2,680 LF 8-in PVC, S Forks Ave to Russell Rd Connection	C	Not Complete
D-4	Eddy Avenue to Bogachiel Way	1,690 LF from Eddy Avenue to Bogachiel Way	D	Not Complete
D-5	Bogachiel Way	2,830 LF 8-in PVC, Bogachiel Way Improvement	D	Not Complete
D-6	"E" Street to Fernhill Road	2,240 LF on "E" Street SE to Fernhill Road	D	Not Complete
D-7	5th Avenue SW to Forks Avenue South	900 LF from Fifth Avenue SW to Forks Avenue South	C	Not Complete
D-8	"K" Street SW	2,250 LF, 6-inch along "K" Street SW	C	Complete
D-9	West End of Bogachiel Way	3,220 LF on west end of Bogachiel Way	D	Not Complete
D-10	Eighth Avenue NE	840 LF on Eighth Avenue NE	D	Not Complete
D-11	Between Palmer Rd and Calawah Way	2,250 LF between Palmer Road and Calawah Way	D	Not Complete
D-12	King Richard's Way to Robin Hood Loop	3,020 LF connecting southwest quarter of Section 5 to King Richard's Way	D	Not Complete
D-13	LaPush Road connect to Hwy 101	4,720 LF 8-in PVC, LaPush Rd to Hwy 101 Connection	D	Complete
LD-1	Leak Detection	Leak Detection and Repair	C	Ongoing
S-1	Well 1 Replacement	Replace Well 1 if Necessary	C	Not Complete
ST-1	New 1.0 MG Reservoir	Add 1.0 MG of storage for Industrial Park	D	Not Complete
ST-2	Recoat Reservoirs Nos. 2 and 3	Inspect, strip, clean, and recoat interior and exterior of Reservoirs No.2 and 3	C	Complete
ST-3	Reservoir Seismic Upgrades	Add seismic upgrades to both reservoirs at time of recoating	C	Not Complete
T-1	Update Telemetry	Motor Control Upgrades	C	Complete

No. [(1)]	**Project Title**	**Description**	**Financing Source** [(2)]	**Status**
T-2	Update Telemetry	Update Telemetry System	C	Complete
WSP	Update WSP	Water System Plan Update	C	Not Complete

(1) D for distribution system improvements, LD for leak detection, S for source facilities improvements, ST for storage system improvements, and T for telemetry improvements

(2) C for City and D for developer

Most of the capital improvements that were not completed were dependent on developers and did not have a planning year included in the 2007 WSP. Numbers D-7 and D-8 were not completed because of lack of funding. In addition to Table 1-7, the following water improvements were also completed:

- 721 LF 6-in PVC, Fern Hill Rd / Hwy 101 Replacement
- 748 LF 6-in PVC, K Street Extension as a part of D-8
- 704 LF 6-in PVC, Palmer Rd Extension

METERING FACILITIES

All water service customers are metered at the point of delivery and the City has master meters at each well field. Individual service meters include direct read meters with all new development receiving radio read meters. There are approximately 325 radio read meters in the system which include both new services and meters that are difficult to direct read due to their location.

STORAGE FACILITIES

The City owns and operates three water reservoirs: Reservoir No. 1 is a 0.15 MG welded steel tank constructed 1954; Reservoir No. 2 is a 0.75 MG welded steel tank constructed in 1969; and Reservoir No. 3 is a 1.0 MG welded steel tank constructed in 1979. Reservoir No. 1 has overall dimensions of 30 feet in diameter by 31 feet tall, Reservoir No. 2 has overall dimensions of 65 feet in diameter by 32 feet tall, and Reservoir No. 3 has overall dimensions of 65.2 feet in diameter by 42 feet tall. Reservoir No. 1 has an overflow elevation set at 467 feet. The overflow elevation of Reservoirs Nos. 2 and 3 is set at elevation 469 feet. The float switches for the wells are set to allow for a 4-foot drop in the tanks between pump cycles.

TELEMETRY FACILITIES

The wells are controlled by a telemetry system linking the 1.0 MG storage tank to the pump control houses. Well pumps are automatically called on after a reservoir tank drawdown of 4 feet. The telemetry system was upgraded over a 2-year period beginning in 2015. Both pump houses received motor control upgrades followed by upgrades to the telemetry system. Upgrades to telemetry included changing from the use of discrete signal communication to a digital signal using programmable controllers with signals sent via radio.

SYSTEM INTERTIES

There are no large public or private water systems located in the vicinity of the City of Forks. There is no potential for an intertie because there are no adjacent water systems.

ASSET INVENTORY

The following section compares the City's assets to typical related assets and Table 1-8 shows the City's asset inventory with approximate replacement costs. For a complete description of each asset, refer to the individual sections.

Wells have a typical lifespan of 30 to 50 years and submersible pumps have a typical lifespan of 15 years. Based on typical lifespans, Wells S01 through S04 are due for replacement and are scheduled to be replaced upon failure. Well S05 is due for replacement in the year 2029. Well 6 including the pump is new and has its full lifespan. All other submersible pumps are due for replacement and are scheduled to be replaced upon failure.

Based on several sources, asbestos cement pipe has a typical life expectancy of 70 years and both ductile iron and PVC pipe have a typical life expectancy of 100 years. Based on typical lifespans, AC pipe installed in downtown Forks in the year 1953 is due to last until the year 2023 and AC pipe installed in the industrial are and outlying subdivisions in the years 1961 to 1979 is due to last until the years 2031 to 2049. Water pipe is scheduled to be replaced with PVC upon failure.

With proper maintenance, welded steel tanks have a typical life expectancy of 100 years. Based on typical life expectancies, Reservoir No. 1 will last until 2054 (with proper maintenance), Reservoir No. 2 will last until 2069, and Reservoir No. 3 will last until 2079. Because the life expectancy is longer than the planning period of this WSP, there is no schedule for replacement. The remaining life of Reservoir 1 is shown as 0 years in Table 1-8 because the City does not plan to maintain Reservoir 1 and plans to decommission Reservoir 1 when the next inspection no longer meets DOH requirements.

TABLE 1-8

Asset Inventory

Asset	Year Installed	Condition	Remaining Life, years	Replacement Cost
Well 1	1953	Adequate	0	$100,000
Well 2	1953	Adequate	0	$100,000
Well 3	1961	Adequate	0	$100,000

Well 4	1967	Adequate	0	$100,000
Well 5	1979	Good	7	$100,000
Well 6	2020	Excellent	20+	$100,000
Distribution System (1)	Varies	Varies	Varies	$40,000,000
Reservoir 1 (2)	1954	Poor	0	$500,000
Reservoir 2	1969	Excellent	20+	$2,500,000
Reservoir 3	1979	Excellent	20+	$3,000,000

(1) Assumes $300 per foot for 131,700 ft.

(2) Reservoir 1 will be decommissioned when the next inspection no longer meets DOH requirements. The replacement cost should not be considered in any totals.

RELATED PLANNING DOCUMENTS

Other planning documents related to the City Plan are summarized below.

GMA RELATED PLANS, POLICIES, AND DEVELOPMENT REGULATIONS

Pursuant to the GMA, Clallam County and its cities worked together to adopt *Countywide Planning Policies*. These policies address issues such as urban growth, affordable housing, economic development, and public facilities to achieve consistency between County and City Comprehensive Plans.

The Water System Plan is consistent with the Land Use Element of the City of Forks Growth Management Plan and the Clallam County Comprehensive Plan: City of Forks Urban Growth Area, both which were developed in accordance with Section 36.70A.070 of the Growth Management Act (GMA) to address land uses for the City and the adjacent Urban Growth Area (UGA).

The Land Use Element of the City of Forks Growth Management Plan represents the community’s policy plan for growth over the next 20 years. It describes how the goals in the other plan elements will be implemented through land use policies and regulations and is a key element in implementing the comprehensive plan.

The Land Use Element was developed in accordance with the county-wide planning policies and has been integrated with all other planning elements to ensure consistency throughout the comprehensive plan. The Land Use Element specifically considers the general distribution and location of land uses, the appropriate intensity and density of land uses given current development trends, the protection of the quality and quantity of water supply, the provision of public services, and stormwater runoff.

Copies of the water system plan have been submitted to the Clallam County Department of Community Development, Planning Division and the City of Forks Legal & Planning Department for review and signed Local Government Consistency Determination Form’s (DOH Publication 331-568) are included in Appendix E.

COORDINATED WATER SYSTEM PLANS

There is no coordinated water system plan affecting the City of Forks.

ADJACENT PURVEYOR WATER SYSTEM PLANS

There are no adjacent purveyors required to submit water system plans.

WASTEWATER FACILITY PLANS

The City operates a wastewater system. The last General Sewer/Wastewater Facility Plan was completed in February 2016.

STORMWATER COMPREHENSIVE PLANS

The City does not have a stormwater system and does not have a Stormwater Comprehensive Plan. The City of Forks has adopted a Comprehensive Flood Management Plan that will help to address site specific problems associated with stormwater runoff.

WATERSHED PLANNING – WRIA 20, SOLEDUCK – HOH

Planning began in this watershed as a multi-WRIA (Watershed Resources Inventory Area) process in conjunction with WRIA 19. After Phase 1 organizing, the process split into two parallel efforts, with separate Planning Units working in each watershed. The US Bureau of Reclamation conducted some of the Phase 2 work and a consultant team has begun work to complete Phase 2, level 1 assessment and develop the Phase 3 plan.

RETAIL SERVICE AREA CHARACTERISTICS

Historically, Clallam County and the City of Forks were dominated by the timber industry. As the timber industry has subsided in the area, the economic base for Forks has declined.

RETAIL SERVICE AREA

A City’s Retail Service Area is the specific area where the supplier has a duty to provide service to new service connections as set forth in RCW 43.20.260. The Retail Service Area for the City System is shown in Figure 1-3, along with the City’s corporate limits. Because of the generally flat topography of the Forks Prairie, all distribution occurs within a single pressure zone. A portion of the Retail Service Area between the Calawah and Sol Duc Rivers is served by a single water main and there is no production source or storage tank north of the Calawah River.

ZONING AND LAND USE

The City and County zoning within the service area is shown on Figure 1-4.

SERVICE AREA CHARACTERISTICS

A City's Service Area is the specific area a water system currently serves and areas where future water service is planned. This area is designated by the Forks Urban Growth Area boundary (FUGA). The City and the county have coordinated their activities in identifying the FUGA and in the development of interim management policies for the area within the FUGA but outside of the current City limits. The City and county have also agreed to formulate annexation policies for City annexations. This process was conducted according to the county-wide planning policies and the contract governing the Clallam County Regional Planning Commission.

The FUGA boundary was developed based on environmental constraints, the concentrations of existing development, the existing infrastructure and services, the need for flexibility in location of new development and the location of designated commercial forest lands.

The City of Forks Service Area and FUGA are shown on Figure 1-3. There are no adjacent water purveyors to the City.

FUTURE LAND USE

Future land use is guided by current zoning. There are no currently known plans to change the existing zoning and there are no known large-scale developments currently planned.

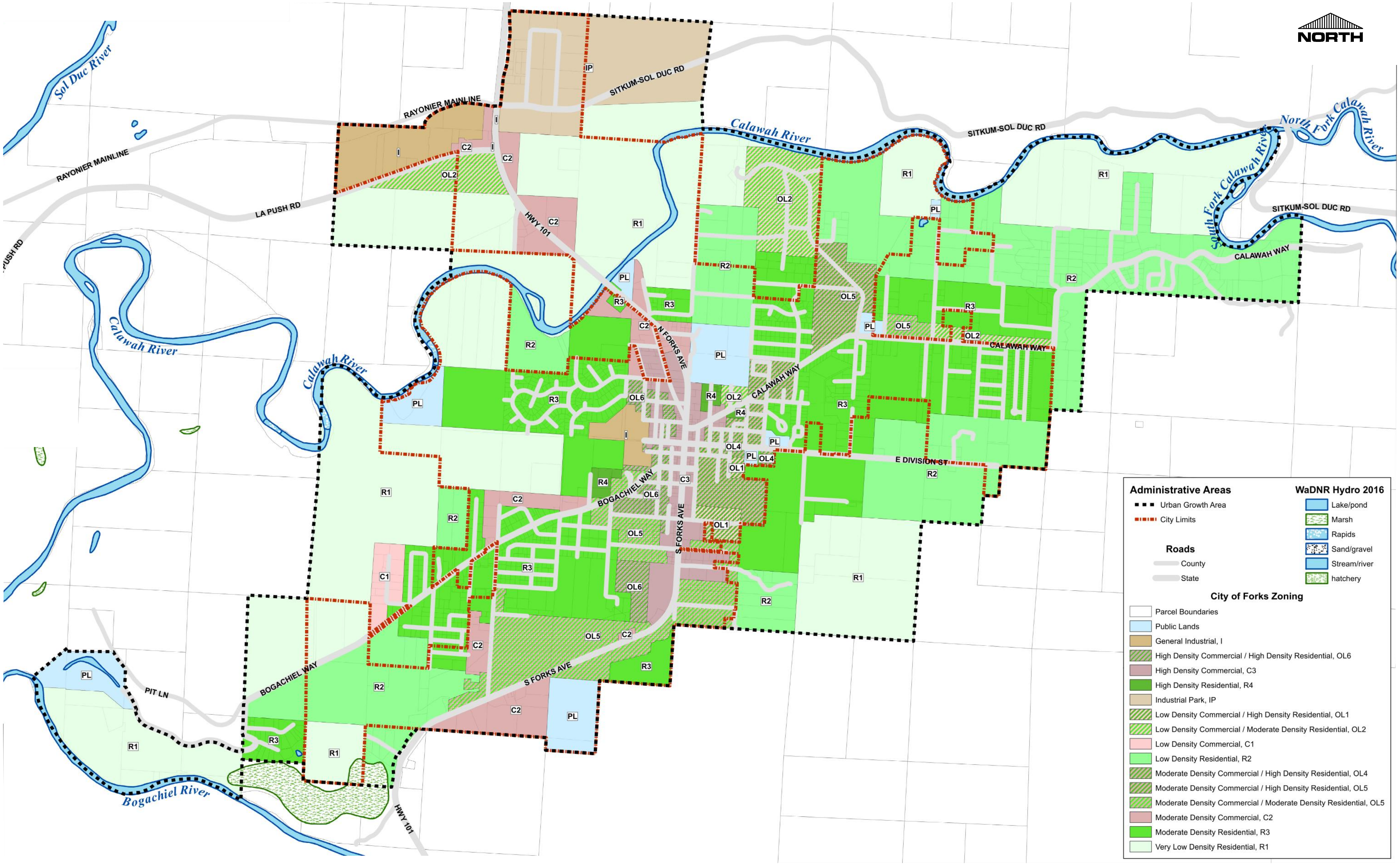
SERVICE AREA AGREEMENTS

There are no other organized water systems in the immediate vicinity of the City of Forks. No service area agreements are in force at this time.

The water comprehensive plan for Clallam County PUD has cited the possibility of trucking water from Forks to Seiku in the event of a failure of the PUD well. An agreement with the PUD is being pursued allowing cross-trucking of water in the event of a production emergency. There is no formal agreement between the City and the PUD regarding emergency trucking of water.

SERVICE AREA POLICIES

Service area policies reflect the requirements of the Forks City Code as well as operating policies of the water utility. The policy also reflects State and Federal drinking water requirements.



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City of Forks
Water System Plan
District Zoning Map
Figure 1-4

DRAWING: T:\PROJECTS\0788 MISC ENG PROJECT\0181 JACKSON CIVIL ENG FORKS WTR SYS PLAN\FIGURES & EXHIBITS\FIG 1-4 DISTRICT ZONING MAP.DWG, LAYOUT TAB: FIGURE 1-4, PLOT DATE: 11/12/2020 1:18:59 PM, DRAWING SAVE DATE: 11/12/2020 12:30:58 PM, PLOTTED BY: KROGERS
PLOT DEVICE: GIBBS & OLSON - DWG TO PDF.PC3, PLOT SYLE TABLE: GIBBS-OLSON STANDARD COLOR WITH BLACK.CTB, PAPER SIZE: GIBBS & OLSON - FIGURE B SIZE (LANDSCAPE - 17.00 X 11.00 INCHES)

WHOLESALING/WHEELING WATER

The City does not allow the wholesaling of water.

ANNEXATIONS

Approximately 25 percent of the current customer base is from properties outside of the incorporated City limits. There is no requirement for annexation as a requirement for water service.

DIRECT CONNECTION AND SATELLITE/REMOTE SYSTEMS

Service to new areas is provided by direct connection through the extension of water mains.

The City of Forks also owns and operates the Quillayute Airport (UIL) that is associated with a Group B (ID#02289) water system currently providing water to one automated weather balloon launch system and another NOAA facility that is sometimes utilized by staff or contractors. While the City is developing an FAA funded Airport Master Plan that identifies future improvements and expansion of utilities at UIL, it is premature at this point to address such future speculative endeavors until such time as a need arises. The current plan for sewage treatment is to utilize commercially approved on-site septic systems for any improvements to the hangar at UIL. Such improvements will require replacement of the existing failing water pipes constructed in the 1940s. These improvements are identified in the Airport Master Plan. If in the next ten years, the replacement of water pipes at UIL is also accompanied by increased use and/or development, the City will engage DOH SW Drinking Water Region to determine if an amendment to the City's Water System Plan is needed with particular attention to a change in the UIL water system to a Group A system.

DESIGN PERFORMANCE STANDARDS

All future water system extensions and all improvements to the existing water system must meet minimum DOH regulations and standards as outlined in the Design Manual, as well as applicable local fire flow standards. Detailed developer extension standards are included in Appendix B.

LATECOMER AGREEMENTS

The City will administer latecomer agreements for developers of water main extensions. Developers are required to enter into a contract with the City and identify an area of benefit for the latecomer agreement. The City charges a minor fee for administering the latecomer agreement which is added to the late-comer fee paid by persons connecting to the affected waterline.

OVERSIZING

The water utility has no written policy concerning oversizing waterlines. Where oversizing of developer constructed waterlines is in the best interest of the water utility, the utility will consider funding the additional cost of larger lines and appurtenances.

CROSS-CONNECTION CONTROL PROGRAM

Section 13.40 of the Forks Municipal Code contains all of the requirements for the Cross-Connection program and backflow prevention devices. The City has a certified cross connection control specialist on staff.

SYSTEM EXTENSIONS

The water utility has prepared a priority list of capital improvement projects for water line extensions. Extensions not on the priority list will be at the developer's expense. Extensions will be constructed to the City standard specifications (see Appendix B).

CONDITIONS OF SERVICE

DUTY TO SERVE AND PURVEYOR RESPONSIBILITIES

The system will provide service for residential, commercial, industrial or other uses as authorized under the City Code subject to the availability of water and the number of approved connections permitted on the Water Facilities Inventory as approved by the DOH.

A municipal water supplier has a duty to provide retail water service to all new service connections within its retail service area if:

1. There is sufficient capacity to serve the water in a safe and reliable manner as determined by the department;
2. It is consistent with the requirements of local plans and regulations and, for water service by the water utility of a city or town, with the utility service extension ordinances of the city or town;
3. There is sufficient water rights to provide water service; and
4. It can be available in a timely and reasonable manner. The City has defined all potential customers within its service area boundaries (identical to the UGA boundary) as timely and reasonable.

The City agrees to provide a safe and reliable supply of potable water meeting all state and federal requirements, provide timely notification if a contamination event occurs, enforce cross-connection control requirements, and operate and maintain water system facilities to maximize the life and reliability of facilities.

CUSTOMER RESPONSIBILITIES

The customer shall provide space for and exercise proper care to protect the system's property on their premises. This shall include meters, meter pit, meter boxes, fittings, pipes and other facilities installed by and remaining the property of the system. In the event of loss or damage to the system's property because of the customer's negligence or abuse, the customer will be required to pay the cost of repairs or replacement.

CONNECTION FEE SCHEDULE

The connection fee schedule is included in various resolutions. Table 1-9 summarizes connection fees.

TABLE 1-9

Connection Fee Schedule

Meter Size	Within City Limits	Outside City Limits
3/4"	$1,182.46	$1,345.34

METER AND MATERIAL SPECIFICATIONS

The Meter and Material Specifications are included in the Standards and Specifications for the City of Forks.

CONSENT AGREEMENTS FOR INSPECTION, MAINTENANCE AND REPAIR THAT DISRUPT SERVICE

The application for water service contains a consent agreement relating to line disruption, on-site inspection of facilities and other items which affect the use and benefit of the water. For specifics, see the water application form in Appendix D and Ordinance 353 (Chapter 13.20.020 Application for Service) in Appendix B.

CROSS CONNECTION CONTROL REQUIREMENTS

Applications for water service are screened to determine whether cross-connection control devices are required as a condition of service. The cross-connection control ordinance is in Chapter 13.40 of the Forks Municipal Code. The water utility requires cross-connection control devices for specific uses, and staff is trained to monitor and inspect backflow assembly device installations.

LATECOMER PAY BACK

Latecomers connecting to waterlines constructed under a latecomer agreement with the water utility will be required to pay all latecomer fees to the water utility at the time of hookup. The water utility distributes the latecomer fees in accordance with the latecomer agreement.

DEVELOPER EXTENSIONS REQUIREMENTS, DESIGN STANDARDS, FINANCIAL RESPONSIBILITY, P.E. DESIGN REQUIRED

Developers are responsible for designing water main extensions in accordance with the City's design standards. Plans are to be prepared by the developer's licensed professional engineer (P.E.) and reviewed and approved by the City or City's Engineer as a condition of final plat approval. The Developer is responsible for securing all necessary easements and rights of way for extension of facilities. Construction is completed by the developer and inspected by the City or City's Engineer. All improvements belong to the developer until accepted by the City. See Standard Construction Specifications in Appendix B.

COMPLAINTS

POLICY FOR DEALING WITH COMPLAINTS

Complaints are forwarded to the Water Superintendent for investigation. The Water Superintendent or designated subordinate makes contact with the complainant, when necessary, investigates the complaint, resolves the complaint when possible, or recommends a solution to the Water Superintendent. The Water Superintendent is responsible for resolving the complaint, contacting the complainant regarding the resolution of the complaint, and recording the resolution of the complaint in the complaint log.

COMPLAINT RECORD KEEPING

Telephone complaints are logged by City staff and forwarded to the Water Superintendent. The telephone logs are maintained in the business office. Written complaints are received by the Water Superintendent. The Water Superintendent maintains a complaint and resolution file. There has been no water related complaints from 2018 to current.

Chapter 2

BASIC PLANNING DATA

CHAPTER 2

BASIC PLANNING DATA

OBJECTIVE

The objective of this chapter is to present basic planning data and water demand forecasts needed to assess the current and future capabilities of the water system to provide service. This chapter will provide existing and projected population, service connections, and water use data, and will develop the water demand associated with the planning element known as an equivalent residential unit (ERU). This chapter also includes projected land use and water demands for 10- and 20-year planning periods.

The water use data and water demand forecasts found in this chapter comprise two of the three elements required for the development of a conservation program. The third required element is implementation of the conservation program and its component parts, which is addressed in Chapter 4.

CURRENT SYSTEM DEMANDS

In this section current system demands are examined in terms of production per capita and sales per connection by customer class for the City of Forks. This information is later used to project future water system demands and evaluate water use efficiency.

CURRENT CITY POPULATION

The analysis of local population and demographic trends is important for a broad understanding of the community and to anticipate future needs.

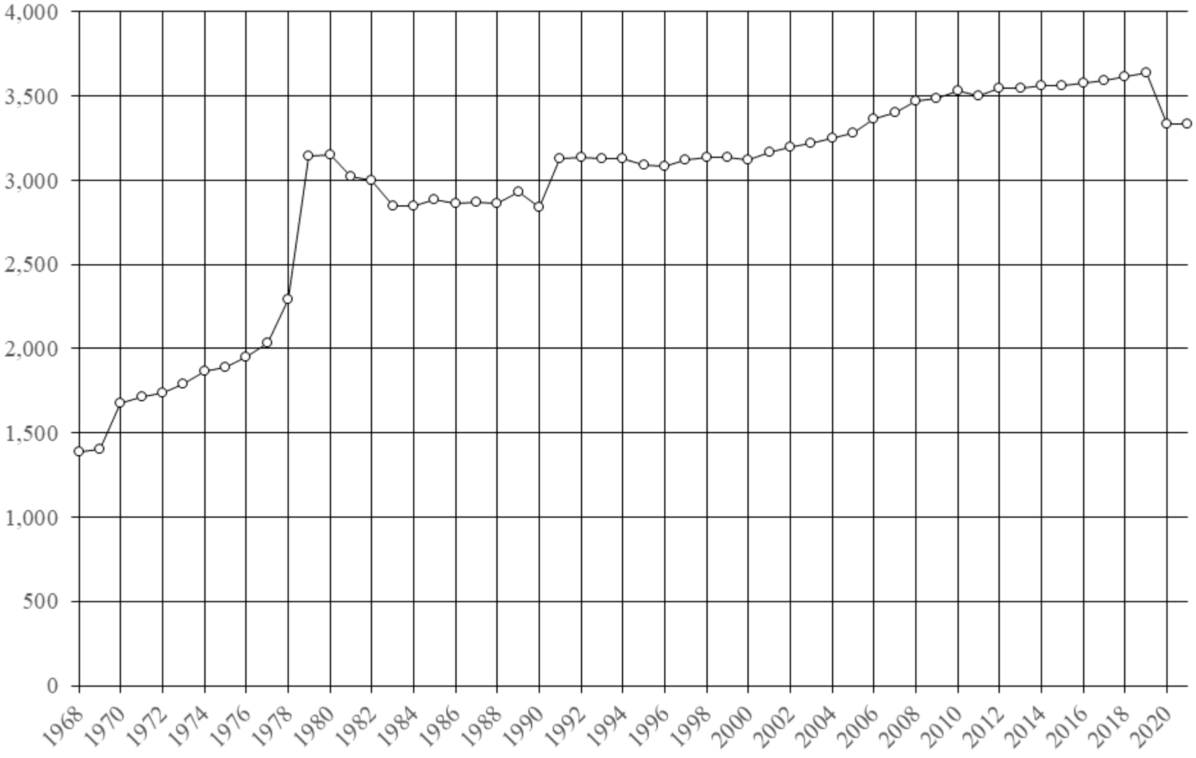
The total population within the city limits of Forks was determined to be 3,635 by the 2019 Estimate. Intercensal population data from 1968 to 2010 and postcensal data from 2011 to 2021 is available in the Office of Financial Management (OFM), *Population Estimates for the State, Counties, Cities, and Towns: April 1, 1960, to present.*

Figure 2-1 shows the historic population by year since 1968. There was rapid growth prior to 1980 then a population decrease due to a decline in the timber industry. In 1991 there was a modest increase in population with creation of the industrial park and the Olympic Natural Resource Center (ONRC). Since 1991, the population in Forks has remained constant. The changes in population in Forks are primarily tied to the timber industry. Annexations also account for increases in population. During 1960–1970 annexations increased population by 364, 1974–1980 annexations increased population by 978, and in years 1984–1990 the population increased by 478 through annexations.

The City of Forks also serves residents outside the City limits. The number of residents outside City limits was derived from the ratio of the known residential water meters (1,315) and population (3,335) within City limits, and the known residential water meters outside City limits (503) in 2021. By dividing the population within City limits by the number of meters within City limits equates to 2.536 persons per meter. Multiplying 2.536 persons per meter by 503 residential meters outside city limits equals 1,276 people. The estimated residential population served by the City of Forks water system is 3,335 (inside City limits) and 1,276 (outside City limits) for a total estimated served population of 4,611.

FIGURE 2-1

Historic Population within the City Limits of the City of Forks



TOTAL SERVICE CONNECTIONS

The City of Forks water system has four customer classes (city residential, outside city residential, city commercial, and outside city commercial). Year-end water connections and estimated year-end population are shown in Table 2-1.

TABLE 2-1

Year End Connections and Estimated Population

Year	Total Meters Served (1)	Inside City Residential Units Served	Outside City Residential Units Served	Inside City Commercial Units Served	Outside City Commercial Units Served	Estimated Service Area Residential Population
2021	2,022	1,308	502	198	14	4,611

(1) An additional 21 meters are read but not billed. These include the City's source and municipal use meters.

WATER PRODUCTION

Water production history is examined in the following sections and a per capita water production rate is determined.

Production History

Annual water production is summarized in Table 2-2, and monthly water production records since 2018 are shown in Figure 2-2. Water production remained mostly steady as seen both in Table 2-2 and in Figure 2-2.

TABLE 2-2

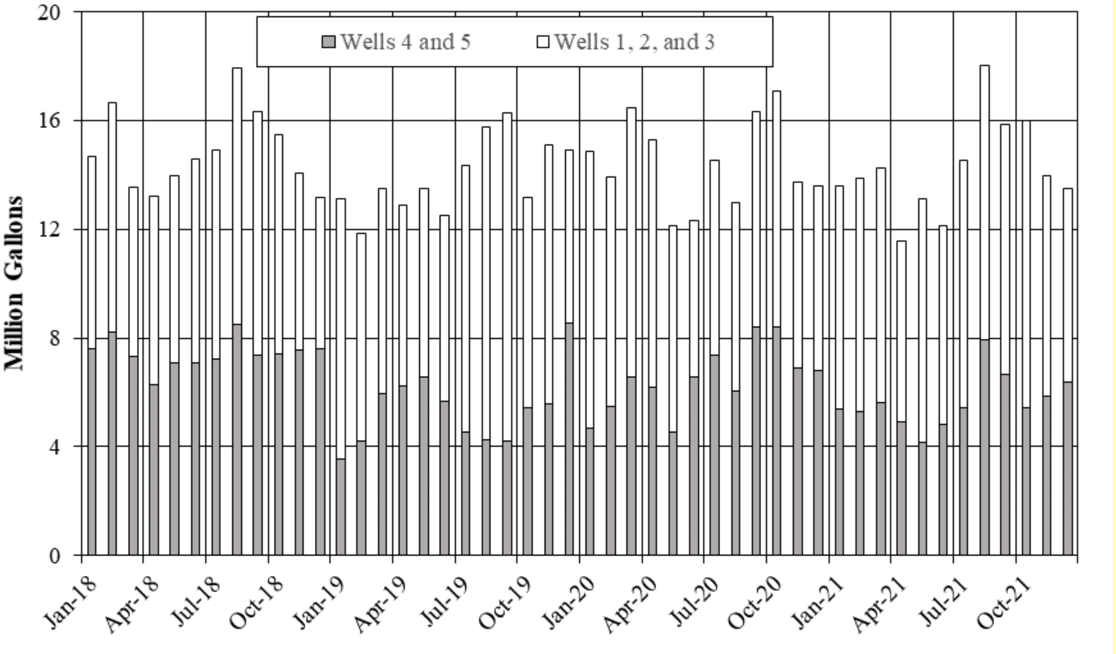
Annual Water Production Records

Year	Production, Wells 1, 2, and 3		Production, Wells 4 and 5		Total Production	
	MG	ac-ft	MG	ac-ft	MG	ac-ft
2018	89.2	273.7	89.3	274.1	178.5	547.8
2019	102.2	313.6	64.7	198.6	166.9	512.2
2020	95.3	292.4	78.0	239.3	173.3	531.7
2021	102.4	314.2	68.0	208.5	170.4	522.7
Average	97.3	289.5	75.0	230.1	172.3	528.6

(1) Well 6 does not have any production because it is for drought relief only.

FIGURE 2-2

Monthly Water Production Records



Per Capita Water Use

Monthly and annual per capita water use is determined by dividing the monthly and annual water production by the estimated annual populations. Table 2-3 shows annual average per-capita water production, and Figure 2-3 shows monthly per capita water production including a trend line. Note that since this data is based on water production, it includes water used for non-residential purposes, water leakage, and other unaccounted-for water.

Water production mostly held steadily between 2018 through 2021 with slightly below average production in the first half of the year 2019. Table 2-3 shows the calculated average daily per capita water production. The average per capita water production is 98 gallons per capita per day (gpcd). For purposes of planning future water demands, an average day per capita water demand of 98 gallons per capita per day (gpcd) will be used.

TABLE 2-3

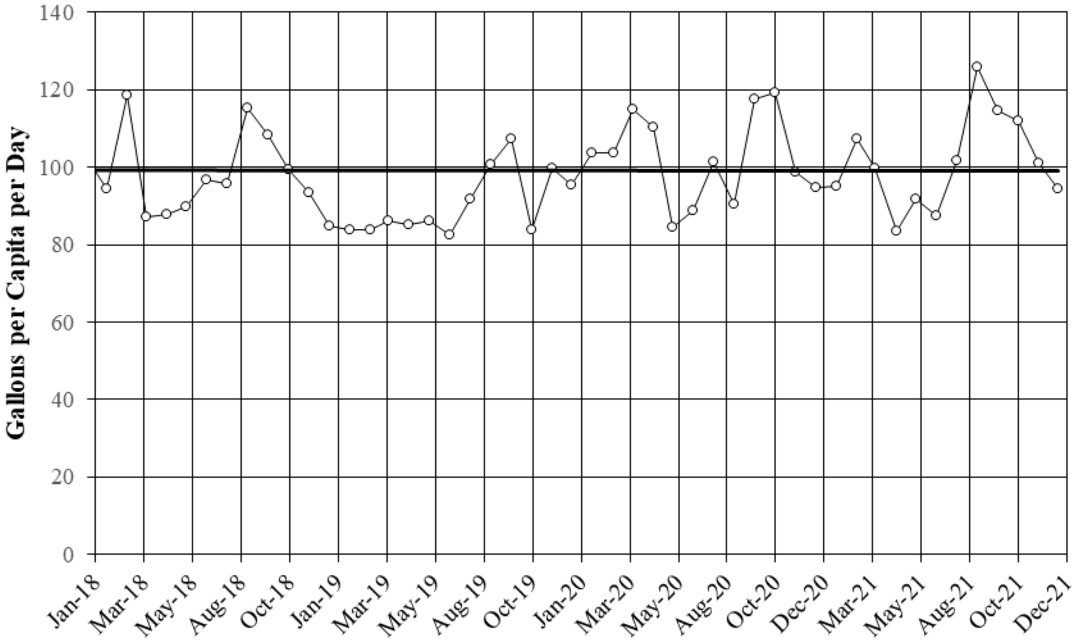
Average Annual Per Capita Water Production

Year	Production, MG(1)	Population (estimated)	Per Capita Water Production, gpcd
2018	178.5	5,018	97
2019	166.9	5,049	91
2020	173.3	4,626	102
2021	170.4	4,611	101
Average			98

(1) This data is based on water production and includes water used for non-residential purposes, water leakage and other unaccounted-for water.

FIGURE 2-3

Monthly Per Capita Water Production



Maximum Day Production

Daily production records were reviewed for June, July, and August of 2018 through 2021. Maximum day water production for the periods examined are summarized in Table 2-4.

TABLE 2-4

Maximum Day to Average Day Factor

Date	Maximum Day Production (gpd)	Annual Average Day Production (gpd)	Factor
July 18, 2018	691,300	488,767	1.41
August 14, 2019	818,580	457,275	1.79
July 7, 2020	739,421	473,378	1.56
July 8, 2021	884,130	466,711	1.89
Maximum			1.89

The maximum days were determined by visual examination of the monthly data sheets. Average day for 2018 through 2021 is the total production from Table 2-2 divided by a year. The maximum day to average day factor was determined by dividing the maximum day by the annual average day. The highest recorded daily water production during these 4 years was on July 8, 2021 at 884,130 gallons, a peak factor of 1.89. The next highest recorded daily production occurred on August 14, 2019 and was 818,580 gallons with a peak factor of 1.79.

The maximum day demand to average day demand peaking factor of 1.89 will be used to estimate maximum day demands. The estimated maximum day per capita water production is 185 gallons per capita per day (98 gpcd x 1.89). Note that this per capita water demand does not necessarily represent the actual water use by each individual but represents overall system production divided by the estimated number of individual users. Non-residential use and unaccounted-for water is included in this usage factor. For the Forks Water System, it is assumed that overall water use will remain approximately proportional to population; therefore, water use per capita is a useful predictor of future water needs. Table 2-5 summarizes per-capita water demand statistics.

TABLE 2-5

Summary of Per Capita Water Demand Statistics

Demand Factor	Value
Average Day Demand, gpcd (1)	98
Maximum Day Demand, gpcd (1)	185
Maximum Day to Average Day Factor	1.89

(1) Demand figures in Table 2-5 are based on water production records and include all water uses and unaccounted-for water.

WATER CONSUMPTION HISTORY

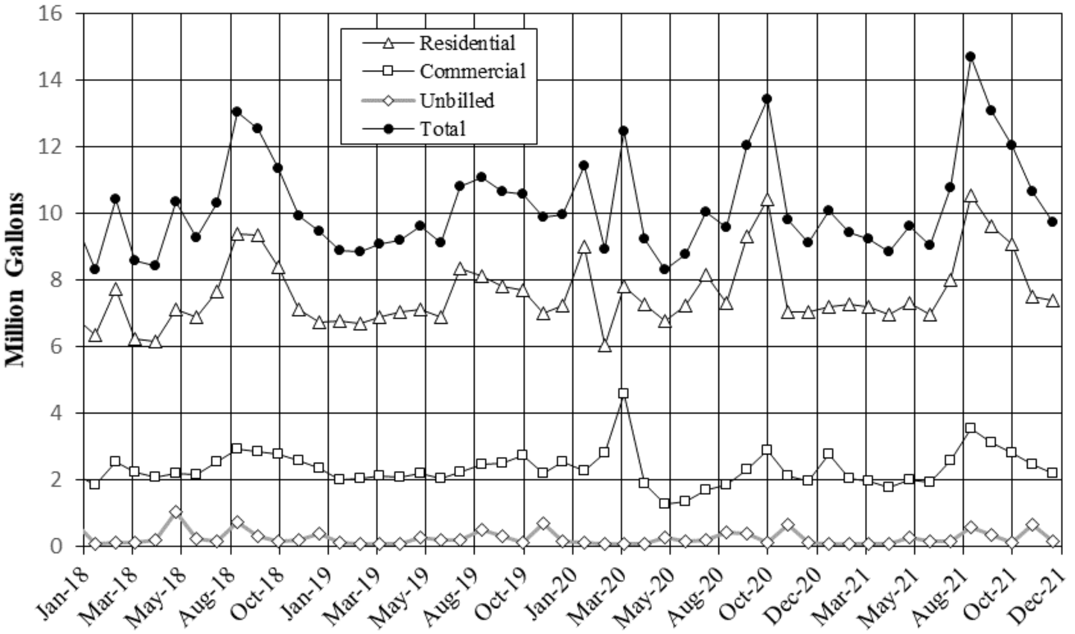
The City reads water meters and bills water customers each month.

Water Consumption by Customer Class

Water sales data was obtained for total water sales for the period January 2018 through December 2021, a period of 4 years. Water sales are divided into residential and commercial classes. Water accounts metered by the City, but not billed are also recorded. These accounts are typically customers who have granted water related easements and have been given free water in perpetuity in exchange for the easements. Other water uses such as construction water use and hydrant flushing have been tracked and are included in the total. The number of residents and commercial accounts slightly increased throughout the time period. Figure 2-4 shows monthly residential, commercial, unbilled, and total water sales.

FIGURE 2-4

Monthly Residential, Non-Residential and Total Water Sales



Average annual water sales by customer class are shown in Table 2-6.

TABLE 2-6

Annual Water Sales by Customer Class

Year	Residential Sales, MG	Commercial Sales, MG	Total Sales, MG (1)	Percent Residential	Percent Commercial
2018	89.1	29.1	118.2	75.4%	24.6%
2019	87.6	27.2	114.8	76.3%	23.7%
2020	93.3	26.9	120.2	77.6%	22.4%
2021	95.0	29.2	124.2	76.5%	23.5%
Average	91.3	28.1	119.4	76.4%	23.6%

(1) Does not include non-sale water.

Residential uses include the billing categories of inside and outside City limit residential. Non-residential uses include the billing categories of inside and outside City limit commercial. Not included in Table 2-6 are non-sale municipal uses. Table 2-7 shows average annual water sales per residential unit and per non-residential unit for years 2018 through 2021.

TABLE 2-7

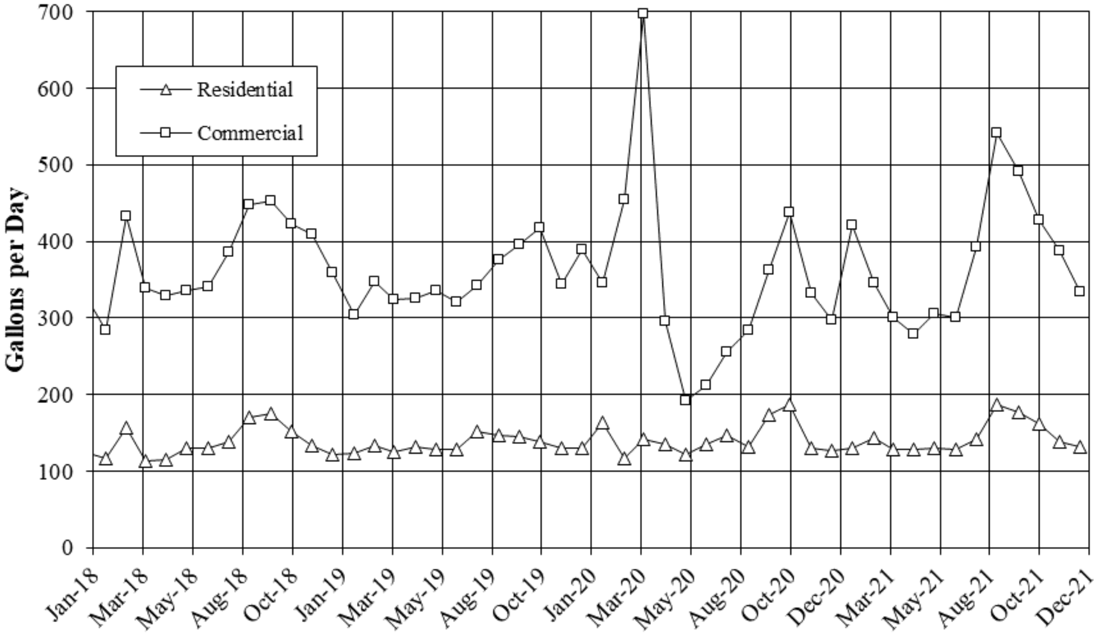
Average Annual Water Sales per Unit

Year	Average Day Residential Sales, gal	Residential Units	Residential Sales per Unit, gpd	Average Day Commercial Sales, gal	Commercial Units	Commercial Sales per Unit, gpd
2018	243,994	1,772	138	79,662	211	378
2019	239,879	1,783	135	74,651	212	352
2020	254,984	1,789	143	73,552	212	347
2021	260,331	1,810	144	80,128	212	378
Average	249,797	1,788	140	76,998	212	364

Figure 2-5 shows monthly residential water sales per connection.

FIGURE 2-5

Monthly Average Daily Water Sales per Connection



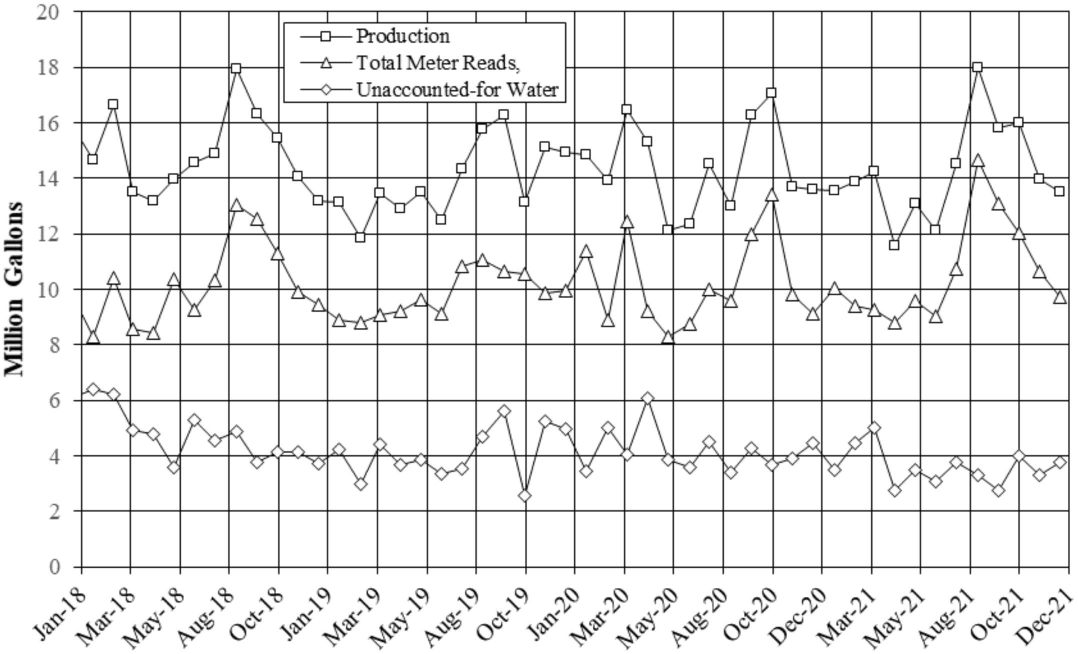
Lost and Unaccounted for Water

Lost and unaccounted-for water consists of the difference between water produced and water sold or otherwise accounted-for. Unaccounted-for water generally consists of a total of several things, including leakage, unauthorized consumption, water main flushing, firefighting, street sweeping, construction, water main breaks, under-reading service meters, and sales to water haulers not accounted-for in the water sales records. Monthly water production, water sales, and unaccounted-for water is shown on Figure 2-6.

As can be seen, monthly variability in lost and unaccounted-for water is fairly high. For systems that collect water sales data monthly for all customers, the month-to-month unaccounted-for water tends to be quite variable. This variability may be due to filling and drawing of reservoirs, timing of the reading of water service meter relative to water source meters, as well as actual monthly variability of water losses and unaccounted-for water uses. In general, if unaccounted-for water tends to increase and decrease with water sales then this indicates that water service meters are reading low. If unaccounted-for water stays relatively constant, or varies independently of water sales, then this would tend to indicate that unaccounted-for water represents leakage or unmetered water use.

FIGURE 2-6

Monthly Water Production, Sales and Unaccounted-for Water

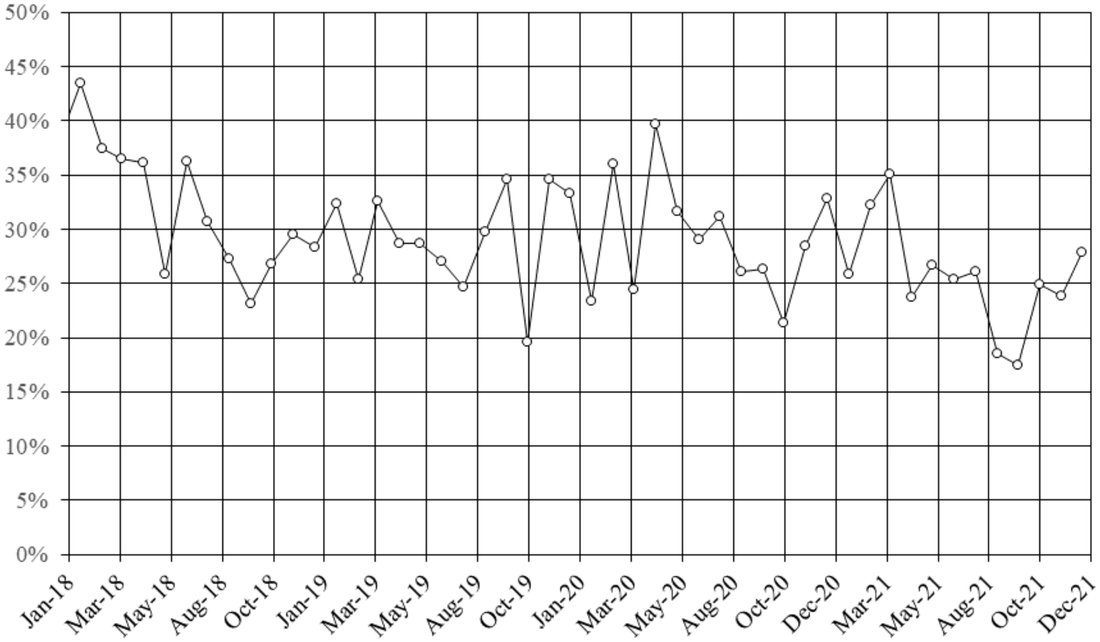


Monthly percent unaccounted-for water is shown in Figure 2-7. Monthly percent unaccounted-for water varies from a low of 17% in September 2021 to a high of 44% in January 2018 and has been slightly decreasing over the four-year analysis period. Amendments to the Drinking Water Regulations collectively known as the "Water Use Efficiency Rule," effective January 22, 2007, establish a 3-year average unaccounted-for water goal of 10 percent or less. The water use efficiency rule is discussed in greater detail in Chapter 4 of this Plan.

Percent unaccounted-for water is calculated as a percent of water production. If water loss rate were to stay constant, then as water sales increased, the percent of unaccounted-for water would decrease, and as water sales decreased, the percent of unaccounted-for water would increase. If the percentage of unaccounted-for water were to increase during high use times and decrease during low use times this could represent under-reading service meters or increased unaccounted-for or unauthorized water use that coincides with increased overall water use. Figure 2-6 shows little to no correlation between water sales and unaccounted for water. This probably represents a combination of low reading water meters, leaks, breaks, and legitimate but unaccounted-for or under-accounted-for water use, and possibly unauthorized water use.

FIGURE 2-7

Monthly Percent Unaccounted-for Water



Due to monthly data variability, annual unaccounted-for water is considered a better evaluation of overall water use efficiency. Annual water production, total annual water sales, and annual unaccounted-for water are shown in Table 2-8. The annual unbilled water category is higher than shown in Figure 2-6 because some of this data was only tracked annually and not monthly. The data shows annual lost and unaccounted-for water averaged at 26%. For comparison, the 2007 Water Comprehensive Plan noted that unaccounted-for water loss averaged 24%. The current 3-year average rate of 26% unaccounted-for water exceeds the Water Use Efficiency Rule goal of 10%. The Water Use Efficiency Rule requires specific actions of water utilities that have a 3-year average lost and unaccounted-for water greater than 10%. Chapter 4 describes the requirements of the Water Use Efficiency Rule and the City’s plans to reduce lost and unaccounted-for water.

The City has transitioned to master meters for all trailer parks in March 2020. This transition has encouraged park owners to repair leaking water lines on their properties. The reduction in lost and unaccounted for water in 2021 may in part be due to these repairs.

TABLE 2-8

Annual Water Production, Sales and Unaccounted-for Water

Year	Annual Water Production, MG	Annual Water Sales, MG	Annual Unbilled Water, MG	Annual Total Accounted-for, MG	Annual Unaccounted-for Water, MG	Percent Unaccounted-for Water
2019	166.9	114.8	4.9	119.7	47.2	28%
2020	173.3	120.2	9.3	129.5	43.8	25%
2021	170.4	124.2	3.8	128.0	42.4	25%
					Average	26%

EQUIVALENT RESIDENTIAL UNITS (ERUS)

Use of Equivalent Residential Units (ERUs) is a way to express water use by non-residential customers as an equivalent number of residential customers. The value of an ERU for a given system is calculated by dividing the volume of water utilized in the residential customer classes by the number of residential units served. This number defines the average day residential water use, or one ERU. Table 2-7 shows the average daily water usage per residential connection as 140 gpd. For planning purposes, **one ERU will be estimated as 140 gpd**. For comparison, the 2007 Water Comprehensive Plan estimated an ERU was equivalent to 212 gpd. This decrease shows customers are generally using less water and is likely in part due to previous water conservation efforts.

The volume of water used by non-residential commercial customer classes can be divided by the average single-family residential water use to determine the number of equivalent residential units utilized by the other customer classes. It should be noted that the number of ERUs represented by non-residential users will change from year to year because commercial users do not use the same amount of water every year. It should also be noted that the definition of an ERU will change from year to year because residential users also do not use the same amount of water every year. Since the definition of an ERU is the average residential water use over a data period, the total residential water use in any given year will not necessarily match the total number of residential connections multiplied by the water use per ERU. Therefore, the ERU estimates should not be used as exact predictors of water use in any given year, but rather as an estimate of the capacity of the water system to support additional water users. The numbers of ERUs for residential water use, non-residential water use and unaccounted for water are shown in Table 2-9.

It can be seen that in 2021 there was a total of 2,043 water meters, which was equivalent to 3,612 residential units (ERUs). Of these meters, 1,810 ERUs are attributed to residences, 212 meters (572 ERUs) to commercial accounts, and 21 meters (55 ERUs) to non-sale meters. There are also 846 ERUs of unaccounted for water.

TABLE 2-9

Equivalent Residential Units for 2021

Customer Class	Average Daily Water Use, gpd	Meters	ERUs
Residential (1)	260,331	1,810	1,810
Commercial (2)	80,128	212	572
Unbilled (2)(3)	7,760	21	55
Subtotals	348,219	2,043	2,437
Unaccounted-for (2)	118,492	0	846
Totals	466,711	2,043	3,283

(1) All residential meters are 1 ERU each regardless of usage for any given year.

(2) Commercial, Non-sales, and Unaccounted-for ERUs are determined by dividing the average day water sales by 140 gpd per ERU.

(3) The Unbilled Customer Class includes other non-metered, tracked water use such as construction water use and hydrant flushing.

Maximum Day Demand per ERU

As discussed above under the heading, *Maximum Day Demand* and shown in Table 2-5, the estimated average day to maximum day ratio for the City is 1.89. With an average day demand per ERU of 140 gpd, the **maximum day demand is estimated at 265 gpd per ERU.**

Peak Hour Demand

Peak Hour Demand (PHD) is a value that applies to the system as a whole, not to any individual service, and is estimated using Equation 3-1 from the Water System Design Manual:

$$PHD = (ERU_{MDD}/1440)[(C)(N) + F] + 18$$

Where

PHD = Peak Hour Demand, gallons per minute
C = Coefficient from Water System Design Manual Table 3-1
N = Number of ERUs served
F = Factor from Water System Design Manual Table 3-1
ERU_{MDD} = Maximum Day Demand per connection, gallons per day

For a system with more than 500 ERUs, C and F are: 1.6 and 225, respectively. As derived above, MDD for the City water system is 265 gpd. Inserting these numbers into the above equation yields the following:

$$PHD = (265/1440)[(1.6)(N) + 225] + 18$$

This equation simplifies to the following:

$$PHD = 0.29N + 59$$

Using 2,437 current metered ERUs from Table 2-9, the estimated peak hour demand for metered sales in 2021 is 766 gpm. The estimated peak hour demand for the 3,283 metered plus unaccounted-for water ERUs would be 1,011 gpm. The above formula will be used to estimate projected peak hour demands.

FUTURE SYSTEM DEMANDS

To project future City water demands it will be assumed that water use will be proportional to population. Historic water use factors developed above will be applied to projected populations to estimate future water demands.

PROJECTED LAND USE

The majority of the service area is reserved for residential use with the largest classification being single family residential. Smaller areas are zoned multifamily residential, commercial, and industrial. Areas outside of the service area are largely forested and utilized for timber production and occasional farms. There are no anticipated major changes in land use in the future.

FUTURE POPULATION

From Figure 2-1 it can be seen that the population within City limits has remained constant over the last 14 years. The Washington State Office of Financial Management (OFM) provides low, medium and high series growth projections for counties in Washington State. The OFM low, medium, and high series 10-year (2031) growth rate projections for Clallam County are -3.3, 4.9, and 9.0 percent, respectively.

OFM currently projects to the year 2040. For this Water System Plan, the year 2041 was projected with the 2039 to 2040 OFM growth rate. The corresponding low, medium, and high series 20-year (2041) growth rate projections for Clallam County are -7.3, 7.6, and 15.8 percent, respectively.

For planning purposes, it is more conservative to over-predict than to under-predict growth. Therefore, for facilities planning purposes, a growth rate within the City's service area will be projected based on the OFM high series rate of 9.0 percent for 10-year and 15.8 percent for 20-year. At these growth rates, the population served by the City will be as shown in Table 2-10.

TABLE 2-10

Projected City Service Area Population

Year	Population
2021	4,611
2031	5,026
2041	5,340

PROJECTED NON-RESIDENTIAL WATER NEEDS

By using historic per capita water production, historic non-residential water usage and unaccounted-for water are taken into account. Since there are no known plans for large-scale changes in land use, it is estimated that non-residential water use will increase in proportion to population. If residential use, non-residential use or unaccounted-for water are reduced in the future, then use of historic per-capita water demand may over-predict future water demands. However, it is preferable to over-predict than to under-predict future water demands so that adequate resources can be assured. Therefore, future water use will be estimated based on projected growth rates and historic water production records.

FUTURE DEVELOPMENT

There is an industrial park that has been platted; however, most of the site is still undeveloped and vacant. It is not known what types of businesses will lease space in the industrial park; therefore, future water demands are unknown. Since there are no large-scale developments planned at this time it is estimated that future development will progress in a manner similar to development in the recent past.

FUTURE EQUIVALENT RESIDENTIAL UNITS

It is anticipated that the value of an ERU will change as the system grows. With promotion of water conservation, the water usage represented by an ERU may go down, but for projection of water system needs it is prudent not to assume that it will. To predict future ERUs, water demands will be projected forward based on projected growth and historic usage rates and the projected demand will be divided by the current usage rate per ERU to project the number of future ERUs represented by the projected demands.

PROJECTED NON-REVENUE WATER DEMANDS

Non-revenue water demands are available for the year 2021. This data will be used to project (or estimate) future non-revenue water demands. Non-revenue water includes all of the City’s municipal water uses, unbilled water for uses such as construction use and hydrant flushing, and Distribution System Leakage. It will be assumed that future non-revenue water demands will remain approximately the same as current non-revenue water demands and will increase proportionately to population.

WATER RATES AND RATE IMPACTS ON WATER DEMAND

The City passed a water rate ordinance in 2009 which calls for annual adjustments in utility rates per the consumer price index.

If the City's water rate structure is adjusted in the future, that adjustment may have an impact on water usage. The most likely impact of future rate adjustments would be to promote water conservation. If water customers use water in a more conservative manner than historic water use, then the water usage rate represented by an ERU would decline and the number of ERUs represented by a given water usage rate would increase. Water usage should be reevaluated periodically to adjust the value of an ERU.

FUTURE WATER DEMAND FOR 10- AND 20-YEAR HORIZONS

Projected Average Day, Maximum Day and Peak Hour Demands

Based on historic water use rates and projected population growth rates, estimated future City water demands are shown in Table 2-11. Peak Hour Demand in Table 2-11 is estimated based on the Peak Hour Demand formula developed previously and applied to the total ERUs for the Water System. Table 2-12 shows estimated future City water demands with implemented water conservation efforts as discussed in Chapter 4.

TABLE 2-11

Projected Water Demands without Conservation

Year	Population (1)	Average Day Demand, gpd (2)	Maximum Day Demand, gpd (3)	Peak Hour Demand, gpm (4)	ERUs (5)
2021	4,611	466,849	884,130	1,011	3,283
2031	5,026	492,548	929,810	1,079	3,518
2041	5,340	523,320	987,900	1,143	3,738

(1) Population is from Table 2-10.

(2) Average Day Demand is based on projected population times 98 gpcd from Table 2-5.

(3) Maximum Day Demand is based on projected population times 185 gpcd from Table 2-5.

(4) Peak Hour Demand is based on the formula developed previously under the heading *Peak Hour Demand*, and the ERUs shown in this table.

(5) ERUs are determined by dividing projected average day demand by 140 gpd per ERU, as described under the heading above, Equivalent Residential Units (ERUs). Note that projected ERUs in Table 2-11 will not correlate well with ERUs estimated in Table 2-9 because projected ERUs in Table 2-11 are based on average usage over a 3-year data period projected forward at growth rates established in the Future Population Section, whereas ERUs in Table 2-9 are based on 2021 data only.

TABLE 2-12

Projected Water Demands with Conservation

Year	Population (1)	Average Day Demand, gpd (2)	Maximum Day Demand, gpd	Peak Hour Demand, gpm	ERUs
2021	4,611	466,849	884,130	1,011	3,283
2031	5,026	392,028	740,933	871	2,800
2041	5,340	416,520	787,223	922	2,975

(1) Population is from Table 2-10.

(2) Average Day Demand is based on projected population times 78 gpcd which is the 2018 to 2021 per capita water use assuming 10% DSL instead of the actual DSL. As shown in Chapter 4, the goal is to reduce DSL to 10% by the year 2026.

(3) Maximum Day Demand is Average Day Demand multiplied by an ADD to MDD factor of 1.89 from Table 2-5.

(4) Peak Hour Demand is based on the formula developed previously under the heading *Peak Hour Demand*, and the ERUs shown in this table.

(5) ERUs are determined by dividing projected average day demand by 140 gpd per ERU, as described under the heading above, Equivalent Residential Units (ERUs). Note that projected ERUs in Table 2-12 will not correlate well with ERUs estimated in Table 2-9 because projected ERUs in Table 2-12 are based on average usage over a 3-year data period projected forward at growth rates established in the Future Population Section, whereas ERUs in Table 2-9 are based on 2021 data only.

Projected Annual Water Demand

Annual water demands are calculated directly from the average day demand in Table 2-11 and expressed in acre-feet per year (ac-ft/yr) in Table 2-13 for easy comparison to water right limitations.

TABLE 2-13

Projected Annual Water Demands

Year	Annual Demand, MG	Annual Demand, ac-ft/yr (1)
2021	170.40	523
2031	179.78	552
2041	191.01	586

(1) One acre-foot (ac-ft) of water it the amount of water required to cover 1 acre to a depth of 1 foot. One ac ft is approximately 325,851 gallons.

Chapter 3

WATER SYSTEM ANALYSIS

CHAPTER 3

WATER SYSTEM ANALYSIS

OBJECTIVE

The objective of this chapter is to determine if system improvements are necessary to meet water quality standards and to meet projected demands.

SYSTEM DESIGN STANDARDS

The Standards for planning and design for the City of Forks water system are based on commonly accepted standards including the following:

WAC 246-290, Group A Public Water Systems, Washington State Board of Health (March 19, 2019).
This is the primary drinking water regulation used by DOH. It sets basic standards to assess capacity, water quality, and system reliability.

Water System Design Manual, Washington State Department of Health (June, 2020) DOH Publication 331-123.
These standards serve as guidance for the preparation of plans and specifications for Group A public water systems in compliance with WAC 246-290.

Recommended Standards for Water Works, A Committee Report of the Great Lakes - Upper Mississippi River Board of State Public Health and Environmental Manager (2012).
Commonly known as the Ten States Standards, this document formalizes the design standards recommended by a water supply committee representing ten Midwestern and upper Great Lake States and the Province of Ontario. The report presents recommendations for both design and construction standards; however, the construction standards are somewhat general in nature with minor emphasis on materials specifications. Since surface water treatment is quite common in the Midwest and Upper Great Lakes, the Committee report tends to concentrate on water treatment plant design and operation.

Standard Specifications for Road, Bridge and Municipal Construction, Washington State Department of Transportation, American Public Works Association (2022).
These standards include detailed specifications for materials and workmanship of a wide variety of public works projects, including installation of public water supply facilities.

City of Forks Standard Specifications for Water Main Construction.
These standards include detailed specifications for materials and workmanship for installation water main extensions, including piping installation details, thrust blocking, inline valves, fire hydrants, air release valves, service connections of various types,

sample stations, blow offs, and pavement restoration applicable to developer extensions. A copy of these standards is contained in Appendix B.

WATER QUALITY STANDARDS

The Forks Municipal Water Department is a public water supply system regulated by the Washington State Department of Health Drinking Water Regulations, WAC 246-290, the latest edition of which is dated November 17, 2021, as well as sections of Code of Federal Regulations (CFR) Title 40, Parts 141 and 143, adopted by reference in WAC 246-290. The City is only supplied by groundwater; therefore, only groundwater supply regulations apply.

SYSTEM CAPACITY STANDARDS

The City uses the DOH Water System Design Manual as a guide for establishing water system capacity standards. Table 3-1 lists the recommended standards from the DOH Manual and the Forks Municipal Water Department’s policies with regards to each standard for general facility design.

TABLE 3-1

General Facilities Requirements

Standard	DOH Water System Design Manual (June 2020)	Forks Municipal Water System Standard
Average Day and Maximum Day Demand	Average day demand should be determined from previous metered water production and consumption data. Maximum day demand should be calculated using maximum day production data.	Average day demand per ERU is **140 gpd**. The maximum day to average day factor is 1.89, and the maximum day demand per ERU is **265 gpd**.
Peak Hour Demand	Peak hour demand is determined using the following equation: PHD = (MDD/1440)((C)(N) + F) + 18 C = Coefficient from DOH Water System Design Manual Table 3-1 N = Number of connections, ERUs F = Factor from DOH Water System Design Manual Table 3-1	Peak hour demand is determined by applying the DOH Water System Design Manual Formula where MDD = 265, C=1.6 and F = 225, which simplifies to the equation: **PHD = 0.29 x N + 59**
Minimum System Pressure	The system should be designed to maintain a minimum of 30 psi in the distribution system under PHD and 20 psi under fire flow conditions during MDD.	The System will meet or exceed the DOH required minimums.
Maximum System Pressure	Regulations do not address maximum system pressure. The Water System Design Manual, Section 6.2.7, recommends that pressures should be limited to 80 psi.	A maximum pressure of 100 psi will be used as a guide for future development and water system improvement projects. Connections with pressure in excess of 100 psi will be advised to install pressure-reducing valves.
Minimum Pipe Sizes	The diameter of a transmission line shall be determined by hydraulic analysis. The minimum size pipeline designed to provide fireflow shall not be less than 6-inches in diameter.	Same as DOH Water System Design Manual, Chapter 6.
Valve Spacing	Sufficient valving should be placed to keep a minimum number of customers out of service when water is turned off for maintenance or repair. Spacing of distribution system isolation valves should be 800 feet or less.	Valves every 800 feet, three gate valves at every tee and four at every cross unless otherwise directed by the system. Valves on each end of an easement or at each end of a water main in an easement.
Source Reliability	Meet MDD with 20 hours of pumping.	Meet MDD with 18 hours of pumping.

STORAGE STANDARDS

The DOH Water System Design Manual identifies the following components of reservoir storage volume identified in the figure below:

- Operational Storage (OS)
- Equalizing Storage (ES)
- Standby Storage (SS)
- Fire Suppression Storage (FSS)
- Dead Storage (DS)

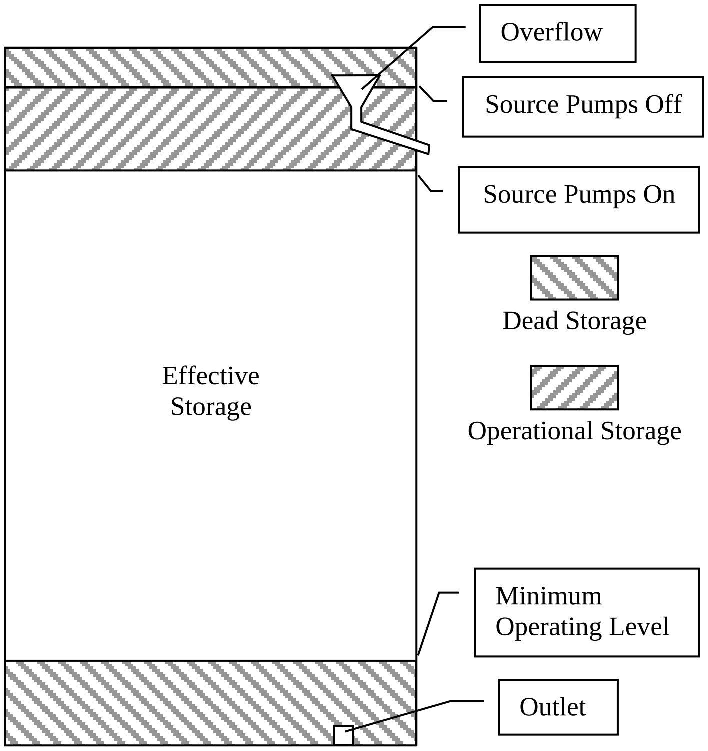


Table 3-2, copied from the Water System Design Manual, Table 7-1, provides equations and methods to calculate or determine each volume component. A reservoir's effective storage volume is the nominal volume less operational storage and dead storage. This volume must be large enough to accommodate the requirements for equalizing storage, standby storage and fire suppression storage.

Operational storage is the amount of water that flows in and out of a reservoir during normal system control cycling. Reservoirs typically operate with a maximum water level at which all source pumps are turned off, and a minimum level at which all source pumps are turned on. The amount of water that flows into and out of the reservoir between these two levels depends upon the operational control levels and the dimensions of the system's reservoirs. Operational storage should be sufficient to avoid source of supply pump cycling (starts/stops per hour) in excess of the pump motor manufacturer's recommendation.

Equalizing storage is the amount of water needed to meet peak system demand for a period of time that the system demand exceeds the system source capacity. The DOH Water System Design Manual recommends that this volume be estimated as PHD minus source capacity for 150 minutes, but not less than zero. The equalizing volume of a storage tank must be located at an elevation that provides a minimum service pressure of 30 psi to all customers served by the reservoir.

Standby Storage is water held in reserve for emergency situations, such as temporary loss of a water source. The DOH Water System Design Manual recommends that this volume equal the MDD for the pressure zone, but not less than 200 gallons per ERU. This value can be adjusted based on several factors identified in Section 7.1.1.3 of the Water System Design Manual.

Fire Suppression Storage is the maximum fire flow standard times the maximum fire flow duration standard for the water system. Fire flow storage may be nested within standby storage if allowed by the local fire protection authority.

Nested Storage," pursuant to WAC 246-290-010, means one component of storage is contained within the component of another. WAC 246-290-235 states, "Standby and fire suppression storage volumes may be nested with the larger of the two volumes being the minimum available, provided the local fire protection authority does not require them to be additive." Therefore, the Effective Storage Requirement will be either the sum of equalizing, standby and fire suppression, if "nesting" of standby and fire suppression storage is *not* allowed, or it will be the sum of equalizing storage plus the greater of standby or fire suppression storage if nesting of standby and fire storage *is* allowed. The local fire protection authority, Clallam County Fire District #1, allows nesting of standby and fire suppression storage; a letter signed by the Fire District Chief is included in Appendix E.

Dead storage is the volume at the bottom of the reservoir that cannot be used because it is either physically too low to provide sufficient service pressure at one or more connection in the distribution system or cannot be withdrawn from the reservoir at the required rates while maintaining the minimum required system pressure or other required operating parameter. The amount of dead storage existing in a system depends on storage system dimensions, elevations, pumping systems, outlet design, and possibly other requirements such as disinfectant contact time. Since fire flow storage is the first component above dead storage, the dead storage volume typically must be at an elevation such that a minimum of 20 psi (approximately 46 feet) distribution system pressure is maintained at the highest connection in the zone supplied by the reservoir when the water level in the reservoir reaches the bottom of the fire flow storage.

TABLE 3-2

Storage Standards

	High Level Alarm. Overflow above **pump off** elevation.
Pump(s) Off Pump(s) On	**Operational Storage (OS) Component** Not part of ES Not applicable for continuous pumping systems. Minimum OS volume for pump protection can be conservatively calculated as the pump supply capacity (in gpm) times 2.5 minutes. OS = Operational storage component (gallons).
Maintain 30 psi (required)	**Equalizing Storage (ES) Component** For call-on-demand: **ES = (PHD - Q_S)(150 min.),** but in no case less than zero. ES = Equalizing storage component (gallons). PHD = Peak hourly demand (gpm). Q_S = Total of all permanent and seasonal sources (gpm). See WSDM Section 7.1.1.2 for sizing criteria for continuous pumping operations.
Low Level	**Fire Suppression Storage (FSS) Component**

Alarm Maintain 20 psi (required)	For Single Sources: **FSS = (FF)(t_m)** FSS = Fire suppression storage component (gallons). FF = Needed fire flow rate, expressed in gpm as specified by fire authority or the Coordination Act, whichever is greater. t_m = Duration of FF rate, expressed in minutes as specified by fire authority.
Maintain 20 psi (recommended)	**Standby Storage (SB) Component** SB = (N)(SB_i)(T_d) SB = Total standby storage component, or its equivalent, in gallons. N = Number of ERUs based on the ERU_{MDD} value SB_i = Locally adopted unit SB volume in gallons per day per ERU (number of ERUs based on the ERU_{MDD} value) T_d = Number of days selected to meet water system-determined standard of reliability We recommend a minimum SB volume of at least 200 gal per ERU.
	Dead Storage (DS)
	Portion of a gravity reservoir that does not provide required minimum pressure.

(1) Copied from Table 7-1 in the 2019 Water System Design Manual

FIRE FLOW STANDARDS

The Uniform Fire Code sets minimum building standards based on fire flows available but does not specifically set fire flow standards for water systems. WAC 246-293-601, et seq., sets state minimum fire flow standards for water systems with 1,000 or more service connections or located within a critical water supply service area. The Forks Municipal Water System currently has more than 1,000 service connections; therefore, this regulation, at a minimum, applies to the City. The City of Forks has adopted the International Fire Code as part of the City Building Code. A copy of the City's Building Code Chapter 15.05 is included in Appendix B. Applicable fire suppression requirements are shown in Table 3-3. Appendix E contains a letter signed by the Clallam County Fire District #1 Chief approving these standards.

TABLE 3-3

Fire Flow Standards

Land Use Designation	Minimum Fire Flow Requirement (1)	Maximum Hydrant Spacing, feet (1)
Residential	1,000 gpm for 60 minutes	500
Commercial and Multifamily	1,500 gpm for 120 minutes	500
Maximum In City	3,500 gpm for 180 minutes	350
Industrial Park	3,000 gpm for 180 minutes	400

(1) Based on Uniform Fire Code Standards.

WATER QUALITY ANALYSIS

The following sections evaluate the record of water quality for the City. Water quality analysis is divided into the categories of Source Water Quality, Delivered Water Quality, Water Quality Reporting, and Water Quality Complaints. Water quality standards that apply to the water distribution system, including coliform, lead and copper, disinfectant byproducts, and asbestos are discussed under the heading of Delivered Water Quality. A review of water quality monitoring requirements relative to water quality monitoring completed is included under the heading Water Quality Reporting, and a review of water quality problems and complaints is included under the heading Water Quality Complaints. Appendix F includes a summary of the City of Forks water quality monitoring schedule and most recent sampling results for VOC, SOC, IOC, Asbestos, Bacteriological, and D/DBP.

SOURCE WATER QUALITY

As described in Chapter 1, The City has six wells in two wellfields located within City limits. The treatment process provided for the City's wells is disinfection (chlorination). Chlorination is discussed under the heading Delivered Water Quality.

Inorganic Chemical and Physical Water Quality

The City of Forks has been granted a 9 year waiver for inorganic chemicals (IOCs) sampling. The City most recently sampled for inorganic chemical and physical (IOC) water quality on July 12, 2017 for both Sourced S06 and S07 and monitoring results are summarized in Table 3-4 and provided in Appendix F. The Maximum Contaminant Level (MCL) for all inorganic chemical and physical water quality parameters for which there are MCLs are listed in the right-hand column. In all cases the detected chemicals and physical parameters are consistent and below the MCL. The next sample is scheduled to be collected in July of 2026.

TABLE 3-4

Inorganic Chemical Sampling Results

Location	**S-06, Wellfield**	**S-07, Wellfield**	**MCL**
Sample Date	**7/12/17**	**7/12/17**	
Primary Contaminants			
Arsenic	<0.001	<0.001	0.01
Barium	<0.1	<0.1	2
Cadmium	<0.001	<0.001	0.005
Chromium	<0.007	<0.007	0.1
Mercury	<0.0002	<0.0002	0.002
Selenium	<0.002	<0.002	0.05
Beryllium	<0.0003	<0.0003	0.004
Nickel	<0.005	<0.005	0.1
Antimony	<0.003	<0.003	0.006
Thallium	<0.001	<0.001	0.002
Cyanide	<0.05	<0.05	0.2
Fluoride (4)	1.06	0.71	4
Nitrite-N	<0.1	<0.1	1
Nitrate-N	0.64	0.67	10
Total Nitrite/Nitrate	0.64	0.67	10
Secondary Contaminants			
Iron	<0.1	<0.1	0.3
Manganese	<0.01	<0.01	0.05
Silver	<0.1	<0.1	0.1
Chloride	3.14	3.38	250
Sulfate	<50	<50	250
Zinc	<0.2	<0.2	5
Sodium	5.83	5.37	None
Hardness, Total (as $CaCO_3$)	54.3	71.2	None
Conductivity (mmho/cm)	97.4	116.0	700
Turbidity (NTU)	0.20	0.25	None
Color (color units)	<15	<15	15
Lead	0.002	<0.001	None (5)
Copper	<0.02	<0.02	None (5)

(1) All results in mg/L unless otherwise noted.
(2) A < sign indicates the sample was not detected at the State Reporting Limit
(3) NA indicates "Not Analyzed."
(4) The City no longer fluoridates as of May 15, 2020 which occurred after these sampling results.
(5) The standards for Lead and Copper are distribution system action levels based on 90th percentile distribution sample values.

Nitrate

The City takes additional Nitrate samples annually for both sources. Table 3-5 summarizes the most recent nitrate monitoring results and the Report of Analysis is included in Appendix F. The results for nitrates are below the MCL. The next sample date is currently being scheduled.

TABLE 3-5

Nitrite and Nitrate Monitoring Results

Location	**S06, Wellfield (S01, S02, S03)**	**S07, Wellfield (S04, S05)**	**MCL**
Sample Date	**4/7/2021**	**4/7/2021**	
Nitrate (mg/L)	0.78	0.77	10
Sample Date	**4/5/2022**	**4/5/2022**	
Nitrate (mg/L)	0.762	0.704	

Radionuclides

The City of Forks is required to sample for radionuclides including gross alpha and Radium 228 at a standard 6-year frequency for both sources. A radionuclide test report from Wellfield S06 dated September 12, 2016, reported both gross alpha and gross beta as not detected. A radionuclide test report from Wellfield S07 dated May 14, 2020, reported both gross alpha and Radium 228 as not detected. The next test is for Source 06 and is scheduled to be taken in September 2022.

Volatile and Synthetic Organic Chemical Water Quality

Laboratory reports for volatile organic chemicals (VOCs) and synthetic organic chemicals (SOCs) have been reviewed and divided into source water samples and distribution system samples. Source VOC samples were collected on September 12, 2016, from Source S06 and on August 25, 2021, for Source S07. No VOCs were detected in either of these samples. The City has been granted a 6 year waiver for VOC sampling for both sources. The next VOC sample due is scheduled for September 2022 for Source S06 and is currently being scheduled for Source S07.

Source SOC samples are divided into three categories: herbicides; pesticides; and soil fumigants. Herbicide samples were collected last on September 11, 2013 from Source S06 and on April 5, 2022 from Source S07. Pesticide samples were collected last on August 1, 2006 from Source S06 and on August 15, 2001 from Source S07. SOCs were below the MCL for all samples. According to the “Water Quality Monitoring Report for the Year 2021” issued by DOH, SOC sampling for Dioxin, Endothal, Glyphosphate, Diquat, and insecticides have a complete State Waiver. Herbicide sampling requires two samples to be taken at the standard 3-year frequency for both sources. The next herbicide samples due are scheduled in September of 2022 for Source 06 and is currently being scheduled for Source 07 (because a sample was recently collected on April 5, 2022). Pesticides and soil fumigants sampling are on waivers through December 2022.

DELIVERED WATER QUALITY

Delivered water quality applies to a number of water quality monitoring requirements of the water distribution system. Monitoring of delivered water quality is necessary because some water quality parameters have been demonstrated to change in the distribution system, or even in the plumbing of buildings. Chlorine residual decays in the distribution system, coliform bacteria can grow or can be introduced into the distribution system, disinfectant byproducts can develop in the distribution system, asbestos can be released into the distribution system from asbestos-concrete pipes, and water that is excessively corrosive dissolves lead and copper from building plumbing. For these reasons, distribution system or delivered water quality monitoring is required. The following sections summarize delivered water quality monitoring by the City.

Revised Total Coliform Rule

The Revised Total Coliform Rule (RTCR) identifies provisions for monitoring for total coliform as an indicator of bacteriological quality. Under the rule, water systems must develop a monitoring plan that identifies a prescribed number of monitoring locations based on population. If a sample tests positive for the presence of total coliform, RTCR outlines resampling procedures and public notification triggers. The City is required to take five distribution system coliform samples per month. Appendix F includes the City of Forks Coliform Monitoring Plan including a map showing locations of coliform monitoring. The City has taken all required samples and has not had coliform violations in the past 4 years.

Disinfectant Byproduct Monitoring

Disinfectant byproduct (DBP) monitoring requirements include Total Trihalomethanes (TTHM) and Haloacetic Acids (five) (HAA5). WAC 246-290-300(7)(b)(ii)(A) requires monitoring in accordance with 40 CFR 141.132(b)(1)(i). WAC 246-290-300(7)(b)(ii)(B) allows reduced monitoring with DOH approval in accordance with 40 CFR 141.132(b)(1)(ii). 40 CFR 141.132(b)(1)(i) requires 1 sample per year per chemically disinfected groundwater source for systems serving fewer than 10,000 persons. Multiple wells drawing from the same aquifer may be treated as one groundwater source for determining monitoring requirements under this rule. 40 CFR 141.132(b)(1)(ii) allows reduction of monitoring frequency to one sample per three years per chemically disinfected groundwater source if the average annual TTHM is less than 40 µg/L and the average annual HAA5 is less than 30 µg/L. Samples are required to be taken at a point of maximum residence time in the water distribution system.

The Stage 2 DBP Rule revised residual disinfectant concentrations and maximum contaminant levels for disinfection byproducts. The Stage 2 rule requires that each individual sample location meet the running annual average MCL, and that one sample location represent the point of maximum retention time in the water system. Under the Stage 1 rule, systems were able to average all sample locations in order to meet the MCL. The final rule for Stage 2 compliance states the system must meet 80 µg/L and 60 µg/L as the Locational Running Annual Averages (LRAAs) for TTHMs and HAA5s respectively. Compliance is based on LRAA at a majority of new monitoring sites, which will include high TTHM locations, high HAA5 locations, and existing Stage 1 locations. The high TTHM and HAA5 locations were determined by conducting an Initial Distribution System Evaluation (IDSE). The final rule also requires population-based monitoring for all systems. DOH requires the City to collect one sample per year for each TTHM and HAA5 based on the City's population and the source water type (groundwater).

Samples are collected at the point of maximum residence time at two sample stations: one at the northeast corner of the system at 2980 Calawah Way and the other at the southwest corner of the system at 2802 Bogachiel Way. The City's TTHM and HAA5 testing procedures and locations are included in Appendix F. On August 25, 2021, one sample was collected at each location and sent to Eurofins Eaton Analytical in Monrovia, California for analysis. HAA5 and TTHM were not detected at 2980 Calawah Way. 1.11 µg/L of TTHM was detected and HAA5 was not detected at 2802 Bogachiel Way. The next sample is scheduled to be collected in August 2022.

Asbestos

The City of Forks samples for asbestos at the standard 9-year frequency. A water sample taken on April 16, 2019, from a sample station at 11 Elk Loop Drive was analyzed for asbestos fibers. Asbestos fibers are measured as million fibers per liter greater than 10 micrometers in length (MFL>10 µm). The report indicates <0.121 MFL>10 µm fibers per liter. The MCL is 7 MFL>10 µm. The next sample is due to be taken in April 2028.

Lead and Copper Monitoring

Lead and copper monitoring is to determine if lead or copper are leaching out of customer service lines at a rate that is a health concern. The rule is that if 90 percent of the representative samples do not exceed the action levels for lead or copper, then the system is in compliance and no further action is required. The action level for lead is 0.015 mg/L and the action level for copper is 1.3 mg/L. The latest round of lead and copper sampling was completed in August 2021, which consisted of 20 samples. The highest level of lead was 0.0023 mg/L and the 90th percentile of lead was 0.0015 mg/L; the highest level of copper was 0.716 mg/L and the 90th percentile copper was 0.619 mg/L. In the 2021 samples, neither lead nor copper exceeded the action level. The City is on the standard sampling schedule of one round of samples every 3 years and the next sample is scheduled to be taken in August 2024. Table 3-6 summarizes the City's lead and copper monitoring results in 2018.

TABLE 3-6

Lead and Copper Monitoring Results 2021

Parameter	Highest Concentration (mg/L)	90th Percentile (mg/L)	Action Level (mg/L)
Lead	0.0023	0.0015	0.015
Copper	0.716	0.619	1.3

WATER QUALITY REPORTING

General water quality monitoring requirements are summarized in Appendix F. The City has one reduced monitoring frequency, which affect the monitoring requirements. Table 3-7 summarizes the City's monitoring requirements as shown on the Water Quality Monitoring Report for the Year 2021.

TABLE 3-7

Source Monitoring Requirements and Waivers for 2021

Monitoring Parameter	Sampling Requirement	Sampling Location
Coliform	5 per month	Distribution System
Nitrate	1 per year	S06, S07
IOC	1 every 3-years	S06, S07
VOC	1 every 3-years	S06, S07
Asbestos	1 sample every 9-years	Distribution System
Lead and Copper	1 set of 20 every 3-years	Distribution System
Herbicides, SOC 515.2	2 every 3 years	S06, S07
General Pesticides, SOC 525.2	2 every 3 years	S06, S07
Soil Fumigants	2 every 3 years	S06, S07
Total Trihalomethanes (THM)	Reduced: 1 per year	Distribution System
Halo-Acetic Acids (HAA5)	Reduced: 1 per year	Distribution System
Gross Alpha	1 sample every 6 years	S06, S07
Radium 228	1 sample every 6 years	S06, S07

WATER QUALITY COMPLAINTS

The City handles water quality complaints pursuant to their policy as described in Chapter 1. Water quality complaints are typically regarding "dirty" water. In response, the water operator will generally check the validity of the complaint by an on-site investigation, and flush water mains if appropriate. The City's routine water main flushing program generally keeps water quality complaints to a minimum. There have been no water quality complaints from the year 2018 to current.

SYSTEM DESCRIPTION AND ANALYSIS

The following sections evaluate the existing water system facilities in terms of their capacities, physical conditions, and performance capabilities. Facilities are evaluated relative to existing and projected requirements based on growth and demand projections from Chapter 2.

SOURCES

As described in Chapter 1, the System has six wells in two wellfields located within the City limits. The sources have been briefly described in Chapter 1. The wellfield designated S06 includes Well Nos. 1, 2, and 3 and is located east of Highway 101 and north of Calawah Way in the City's public works compound. Wellfield S07 includes S04, S05, and drought relief Well 6 and is located west of Highway 101 and north of Division Street. The system of wells draws from a confined aquifer lying directly below the City. The following sections discuss the adequacy of the existing sources and source related facilities.

General Description and Condition

Source S-01, Well No. 1

Well Nos. 1 and 2 are the City's oldest wells, drilled in 1953 and located in the northeast part of the City of Forks north of Calawah Way. When this well was first drilled it was predicted that a properly screened and developed well would deliver a minimum of 125 gpm. It currently produces approximately 210 gpm with the installed pump. The water-bearing sand and gravel formation terminates at 136 feet. No other water was encountered when drilling to the well bottom at 178 feet. Shale bedrock was encountered at 171 feet. The original iron well screen was replaced with a stainless-steel screen in 1968 due to a production decline from marked incrustation inside the screen. Well No. 1 originally had a specific capacity of 10 gpm per foot drawdown. After reconditioning the well with a new stainless-steel screen and redevelopment, the capacity was increased to 12 gpm per foot of drawdown. In 2000, Well No. 1 was refitted with a submersible well pump. About that time the well began experiencing a perceptible hydrogen sulfide odor. The well is presently not in production due to this problem. The City is investigating ways to eliminate the sulfur odor.

Source S-02, Well No. 2

Well No. 2, located 500 feet west of Well No. 1, struck water at 97 feet in the sand and gravel that were dry above that depth. The water-bearing sand and gravel continued to a depth of 112 feet. Drilling continued in hardpan from 113 to 157 feet where sandstone bedrock was penetrated 4 feet for a total well depth of 161 feet. The initial pump test indicated the formation would produce a minimum of 150 gpm year-round. It currently produces approximately 265 gpm with the installed pump. The well screen for Well No. 2 was replaced at the same time as the screen for Well No. 1. Well No. 2 originally had a specific capacity of 61 gpm per foot drawdown. After reconditioning the well with a new stainless-steel screen and redevelopment, the capacity was increased to 93 gpm per foot of drawdown.

Source S-03, Well No. 3

Well No. 3, located approximately 350 feet west of Well No. 2 was drilled in 1961 to increase the summer supply of water. Water was first encountered 86 feet below ground surface; however, quantities were limited. The water bearing formation below 102 feet was relatively loose, coarse sand and small gravel and correlated closely with Well No. 2. At 109 feet the water bearing zone changed to material similar to that which occurred above 86 feet. This formation was penetrated 5 feet to a depth of 114 feet, the overall well depth. The well currently has the capacity to produce 300 gpm with the installed pump.

Source S-04, Well No. 4

Well No. 4, located approximately 575 feet west of Highway 101 and 375 feet north of Division Street was drilled in 1967. Several thin lenses of water bearing gravel and sand were encountered but with no capacity for a production well. Drilling continued down through 6 feet of sandy and gravelly clay and at 116 feet the bit broke through this clay layer where water was encountered. The well was bottomed out at 132 feet. The well currently has the capacity to produce 300 gpm with the installed pump.

Source S-05, Well No. 5

Well No. 5 is located approximately 300 feet from Well No. 4 and was drilled in 1997. The well depth is 130 feet. The well currently has the capacity to produce 480 gpm with the installed pump.

Well No. 6

Well No. 6 is located approximately 650 feet south of Well No. 4 was drilled in 2020 to a depth of 152 feet below ground surface. The well is a drought relief/emergency well and has a capacity of 350 gpm.

Combined Capacity

The existing wells have a combined withdrawal capacity of 1,905 gallons per minute. The total output, however, is limited by water rights to 1,390 gpm. Aquifer water levels and well pumping rates are monitored on a periodic basis and the results noted on a Water Well Level Report to prevent over-pumping from portions of the aquifer. The frequency of monitoring well levels is increased as the water table lowers during late summer. Historically, well levels are lowest in October prior to winter rains.

Water Rights

The City of Forks water rights are summarized in Table 1-3. The water rights for Well Nos. 1 and 2 are included in the same permit. The existing pumping capacity of these wells is 475 gpm and the permitted withdrawal is 500 gpm. The water right for Well No. 3 is permitted for 300 gpm of instantaneous withdrawal and the existing pumping capacity is 290 gpm. The water rights for Well Nos. 4, 5, and 6 are included in the same permit. The existing pumping capacity of these wells is 1,130 gpm and the permitted withdrawal is 600 gpm.

Installed source capacity, instantaneous capacity, and annual withdrawal capacity are summarized in Table 1-3.

Source Capacity Analysis

The source capacity of the City is compared to projected water system demands in this section using a limiting factor analysis. Two analyses are performed. The first analysis compares ADD to the limiting factor of well capacity or annual water rights and the second analysis compares MDD to the limiting factor of well capacity or instantaneous water rights.

Average Day Demand Analysis

Wells Number 1 and 2 have a combined capacity of 475 gpm (575 acre-feet/year at 18 hours of pumping per day) which is compared against an annual water right of 504 acre-feet/year. The limiting factor for Sources 01 and 02 is the annual water right of 504 acre-feet/year. Well Number 3 has a capacity of 300 gpm (363 acre-feet/year at 18 hours of pumping per day) which is compared to an annual water right of 290 acre-feet/year. The limiting factor for Source 03 is the annual water right of 290 acre-feet/year. Wells Number 4, 5, and 6 have a combined capacity of 1,130 gpm (1,367 acre-feet/year at 18 hours of pumping per day) which is compared to an annual water right of 950 acre-feet/year. The limiting factor for Source 07 and the total limiting factor is the annual water right of 950 acre-feet/year. See Table 1-3, Note 4 for an explanation of annual water rights.

Projected average day demand from Table 2-11 is compared to current water rights in Table 3-8. From Table 3-8, the City of Forks has adequate water rights to meet projected demands for the 20-year planning horizon.

TABLE 3-8

Projected Water Demands and Source Capacity

Year	Annual Capacity (ac-ft/yr)	Projected ADD (ac-ft/yr)	Surplus (Deficit) (ac-ft/yr)
2021	950	523	427
2031	950	552	698
2041	950	586	364

Maximum Day Demand Analysis

The existing wells have a combined withdrawal capacity of 1,905 gpm, which is 515 gpm higher than the available water right limit. Well Number 1 is not currently in production and Well Number 6 is specified as a drought relief well. In practice, the other wells are throttled to keep the withdrawal rate at or less than the water right limit.

Wells 1 and 2 have a combined capacity of 475 gpm which is compared against an instantaneous water right of 500 gpm. The limiting factor for Sources 01 and 02 is the combined well capacity of 475 gpm. Well 3 has a capacity of 300 gpm which is compared against an instantaneous water right of 290 gpm. The limiting factor for Source 03 is the instantaneous water right of 290 gpm. Wells 4, 5, and 6 have a combined capacity of 1,130 gpm which is compared against an instantaneous water right of 600 gpm. The limiting factor for Source 07 is the instantaneous water right of 600 gpm. The total capacity of the system to meet MDD is 1,365 gpm.

Projected withdrawal rate requirements are compared to the limiting factor in Table 3-9. Projected Recommended Source Capacity is the capacity required to meet Maximum Day Demand, developed in Chapter 2 Table 2-11, in 18 hours per day of production. From Table 3-9 the City of Forks has adequate capacity to meet projected demands for the 20-year planning horizon. If growth and water usage develop as predicted, the City will have 450 gpm of surplus instantaneous capacity available by the year 2041.

TABLE 3-9

Projected Water Demands and Source Capacity

Year	Instantaneous Capacity (gpm)	Recommended Source Capacity (gpm) (1)	Surplus/(Deficit) (gpm)
2021	1,365	819	546
2031	1,365	861	504
2041	1,365	915	450

(1) Recommended source capacity is the minimum source capacity necessary to meet projected Maximum Day Demand, from Table 2-11, in 18 hours of pumping.

WATER TREATMENT

Chlorination

Source water is treated with liquid sodium hypochlorite, which is injected with pulse feed metering pumps. The metering pumps are controlled to operate in conjunction with the well pumps using a 4 to 20 milliamperes signal from the main water meter. The City’s two wellfields are each fitted with a pump house and chlorine feed units. Water from Wells S01, S02, and S03 is chlorinated at Control House No. 1 and water from Wells S04, S05 and Well 6 is chlorinated at Control House No. 2. At Control House No.1, a hypochlorite solution (12.5 percent) is diluted to a ratio of 1 part chlorine to 1 parts water and at Control House No. 2 the ratio is 1 part chlorine to 1 part water.

Fluoridation

Fluoridation for the City of Forks water system has been discontinued as of May 2020.

STORAGE

The existing system has three welded steel tanks: Reservoir No. 1 is a 0.15-million-gallon tank; Reservoir No. 2 is a 0.75-million-gallon tank; and Reservoir No. 3 is a 1-million-gallon tank.

General Condition

The condition of the tanks was examined by AquaTech, Inc. in 1994. Of note was the condition of Reservoir No. 1, the interior of which was found to have extensive blister corrosion. The 1,000,000- and 750,000-gallon reservoirs have been re-coated on the interior and exterior as of 2019.

The City plans to decommission the 150,000-gallon reservoir (Reservoir No. 1) when it fails the next inspection and no longer meets DOH requirements. For this reason, Reservoir 1 is excluded from the 10- and 20-year storage calculations.

Storage Capacity Analysis

Existing Storage

Reservoirs No. 2 and No. 3 have matching overflow elevations, but have different wall heights and, therefore, different base elevations. The overflow elevation for Reservoir No. 1 is 2 feet lower than the other two reservoirs. Details regarding dimensions and capacities of the three reservoirs are presented in Table 3-10.

TABLE 3-10

Reservoir Dimensions and Capacities

Parameter	Reservoir No. 1	Reservoir No. 2	Reservoir No. 3
Diameter, feet	30.0	63.0	65.2
Gallons per foot of water depth	5,287	23,317	24,974
Wall Height, feet	31	34	42
Gross Capacity, gallons	163,897	792,778	1,048,908
Total Gross Volume, gallons			
Top of Wall Elevation	469	471	471
Overflow Elevation, feet	467	469	469
Well-Off Elevation, feet	466	466	466
Well-On Elevation, feet	465	465	465
Minimum Operating Level, feet	440	439	431
Outlet Elevation, feet	439	438	430
Base Elevation, feet	438	437	429

Operational Storage

The operational storage is 53,578 gallons or 48,291 gallons excluding Reservoir 1 based on a pump off to pump on elevation difference of 1-foot as shown in Table 3-10. These volumes are large enough to prevent excessive pump cycling.

Equalizing Storage

The Water System Design Manual recommends that equalizing storage be calculated using the following equation, but in no case should it be less than zero:

$$ES \quad = \quad (PHD - Q_S) \text{ x } 150 \text{ minutes}$$

Where

ES = Equalizing storage component, gallons
PHD = Peak hourly demand, gpm
Q_S = Total source of supply capacity, excluding emergency sources, gpm

Peak Hour Demand is taken from Table 2-11. Q_S is the combined source capacity of 1,365 gpm as limited by the instantaneous water rights, see the Maximum Day Demand Analysis section and Table 3-9. Recommended equalizing storage capacities based on the DOH Water System Design Manual are shown in Table 3-11 and all are zero as the projected peak hourly demand through 2041 never exceeds the source capacity of 1,365 gpm.

Standby Storage

The Water System Design Manual recommends that standby storage be calculated using the greater of the following two equations:

$$SB = (N)(SB_i)(T_d)$$

Or

$$SB = 200 \text{ gallons} \times N$$

Where

SB = Total standby storage component, gallons
N = Number of ERUs based on the ERU_{MDD} value.
SB_i = Locally adopted unit SB volume in gallons per day per ERU (number of ERUs based on the ERU_{MDD} value).
T_d = Number of days selected to meet water system-determined standard of reliability.

This Water System Plan adopts the Water System Design Manual's recommended T_d of 1 day. The recommended standby storage capacities for the City, according to the above formulas, are summarized in Table 3-11. Values for N times SB_i are from Table 2-11.

Fire Suppression Storage

The City's maximum fire flow standard is 3,500 gpm for 3 hours. The fire suppression storage for this fire flow standard is 630,000 gallons and is shown in Table 3-11.

Dead Storage

The highest elevation gravity supplied customer is at elevation 391.2 feet. Using a conversion factor of 2.31 ft/psi, an elevation of 437.4 feet is required to maintain a pressure of 20 psi and an elevation of 460.5 feet is required to maintain a pressure of 30 psi. Reservoir 3 has a base elevation lower than 437.4 feet; therefore, the difference is dead storage. The dead storage volume calculates to be 209,782 gallons.

Total Recommended Storage

The recommended storage capacities, existing storage, and storage surplus or deficit are summarized in Table 3-11. Table 3-11 shows that the City has adequate storage to meet the recommendations of the DOH Water System Design Manual throughout the 20-year planning horizon.

The City is pursuing adding storage to provide fire flow to the industrial park north of the Calawah River. Currently, water service is provided through a single 12-inch main extending northerly on Highway 101 from the City to the industrial park. Hydraulic analyses conducted in 1999 calculated the maximum flow rate that can be achieved at the industrial park is 2,150 gpm (there have been several new projects since the 1999 hydraulic analysis and a new flowrate should be modeled after the current hydraulic model is calibrated – see the Hydraulic Model Calibration section below). This limited flow rate restricts certain types of construction, building sizes, and building uses within the industrial park. In order to provide a fire flow of 3,000 gpm with sufficient residual pressures would require additional storage facilities north of the Calawah River or by providing a looped distribution system to the industrial park. Looping the distribution system is not a feasible option with the existing distribution system configuration.

TABLE 3-11

Storage Capacity Analysis

	Year		
	2021	**2031**	**2041**
Projected ERUs and Demand (1)			
Equivalent Residential Units (ERU's)	3,283	3,518	3,738
Average Day Demand (gpd)	466,849	492,548	523,320
Maximum Day Demand (gpd)	884,130	929,810	987,900
Available Source (gpd) (2)			
Total Available Source (gpd)	1,965,600	1,965,600	1,965,600
Required Storage Calculations (gal)			
Operational Storage (OS) (3)	53,578	48,291	48,291
Equalizing Storage (ES)	0	0	0
Standby Storage (SS)	884,130	929,810	987,900
Fire Suppression Storage (FSS) (4)	630,000	630,000	630,000
Required Storage			
Greater than 30 psi at highest meter (5)	53,578	48,291	48,291
Greater than 20 psi at highest meter (6)	937,708	978,101	1,036,191
Existing Storage Greater Than 30 psi (gal) (7)			
Reservoir No. 1	29,079	0	0
Reservoir No. 2	128,244	128,244	128,244
Reservoir No. 3	137,357	137,357	137,357
Total Existing Storage at 30 psi	294,680	265,601	265,601
Storage Surplus/(Deficiency) at 30 psi (gal)	**241,102**	**217,310**	**217,310**

Existing Storage Greater Than 20 psi (gal) (7)			
Reservoir No. 1	151,208	0	0
Reservoir No. 2	666,866	666,866	666,866
Reservoir No. 3	714,256	714,256	714,256
Total Existing Storage at 20 psi	1,532,330	1,381,122	1,381,122
Storage Surplus/(Deficiency) at 20 psi (gal)	**594,622**	**403,021**	**344,931**

(1) From Table 2-11

(2) Instantaneous capacity of 1,365 gpm in gpd, see Table 3-9.

(3) Operational storage is based on a 1-foot operating range. Reservoir 1 is assumed to be decommissioned before 2031.

(4) Fireflow storage is nested in standby storage, see the Storage Standards section.

(5) The total required storage above 30 psi is equal to the sum of OS and ES.

(6) The total required storage above 20 psi is equal to the sum of OS, ES, and the greater of SS or FSS.

(7) The storage volume available in existing reservoirs at 20 and 30 psi is based on the elevation of the highest customer (391.2 feet) as discussed above in the Dead Storage section. Reservoir 1 is assumed to be decommissioned before 2031.

TELEMETRY SYSTEM

Currently, the telemetry system utilizes a digital signal using programmable controllers for communication between the 1.0 MG Reservoir and the well pump control houses. Beginning in 2006, upgrades to the telemetry system were implemented which includes both pump houses receiving motor control upgrades and upgrading the telemetry system from discrete signals via telephone lines to the current digital signals. The City has switched from telephone communication to radio as of 2014.

DISTRIBUTION SYSTEM

The water distribution system includes all the piping distributing water from the source and storage facilities to the water customers. The following sections evaluate the general condition and the hydraulic capacity of the water distribution system.

General Description and Condition

The City water distribution system is described in general terms in Chapter 1 under the heading "Transmission and Distribution System Characteristics." The water distribution system has water transmission and distribution mains of various ages, materials, and sizes. While the system has not had a history of frequent water main leaks or failures it can be seen from Table 2-8 that the system has a relatively high average percentage (26%) of lost and unaccounted-for water. Lost and unaccounted-for water does not necessarily represent distribution system leakage, since low reading service meters, undocumented water usage, water theft and other factors are also involved, but it is an indicator that there may be excessive distribution system leakage. This will be discussed further in Chapter 4, Conservation Program.

Life expectancy of distribution mains for planning purposes is approximately 50 years. In a progressive distribution main replacement program, the water system would replace 1/50th of its system's mains annually once the system has attained an age of 50 years. The City will consider budgeting for this type of distribution main replacement program.

Hydraulic Capacity Analysis

The development of a computer hydraulic model, which can accurately and realistically simulate the performance of a water system in response to a variety of conditions and scenarios, has become an increasingly important element in the planning, design, and analysis of municipal water systems. The Washington State Department of Health's WAC 246-290 requires hydraulic modeling as a component of water system plans.

Hydraulic Modeling Software

The City's water system was analyzed using KYPIPE 2022 hydraulic modeling software. The KYPIPE model is configured with a graphical user interface. All water system elements, including pipes, pumps, and reservoirs are assigned a unique graphical representation within the model. Each element is assigned a number of attributes specific to its function in the actual water system. Typical element attributes include spatial coordinates, elevations, water demand, pipe lengths and diameters, and critical water levels for reservoirs. With attributes of each system element as the model input, the KYPIPE software produces the model output in the form of flows and pressures throughout the simulated water system.

Hydraulic Model Development

Prior to the calibration of the hydraulic model, the basic layout of the water system was recreated within the model. The lengths, diameters, and connection points of system piping were assigned using the City's map from the 2007 WSP. Piping projects that have been completed since the 2007 WSP (see Chapter 1 Transmission and Distribution Facilities and Table 1-7) were then added to the model. Elevations in the model were assigned using topographic data from Google Earth.

The water system is supplied by the City's storage reservoirs, see the Storage section of this chapter. Demands developed in Chapter 2 were evenly distributed throughout the system.

Hydraulic Model Calibration

A critical step in the development of a hydraulic model, prior to using it as a tool to analyze system performance, is calibration. Calibration consists of measuring pressure and flows in the field and comparing them with the same pressures and flows simulated in the model. A total of 5 hydrants were tested by City personnel in 2018 and 7 hydrant tests again in 2021, for a total of 12 hydrant tests to attempt to calibrate the water system model in a steady state scenario. A summary of these tests is presented in Table 3-12. The test locations were selected to evenly cover the water system including locations which maximize the friction loss by placing the test locations as far from the reservoirs as possible.

For the hydrant tests, a pressure gage was placed on a monitoring hydrant and pressure was measured under normal operating (where no hydrant was flowing) or "static" conditions. Once the pressure was recorded, a second testing hydrant was opened and the flow at this hydrant was measured using a pitot gage. While the testing hydrant was open, the pressure was observed and recorded at the monitoring hydrant once gage readings stabilized. The system operations or boundary conditions were recorded during the time the hydrant tests were conducted. Boundary conditions include reservoir levels and pump status and are presented in Table 3-12.

TABLE 3-12

Hydrant Test Information

Test No.	Test Date	Reservoir Levels (ft) (1)	Pump Status	Location
1	Jan 11, 2018	463.4	off	Russell Rd & Mill Creek Rd
2	Jan 11, 2018	464.3	off	US-101 & Sitkum-Solduc Rd
3	Jan 11, 2018	463.3	off	East A St & Blackberry Ave S
4	Jan 11, 2018	463.5	off	Merchants Rd & Hemlock View Ln
5	Jan 11, 2018	463.8	off	Elk Creek Ridge Rd & Elk Loop Dr
6	Mar 8, 2021	466.2	off	Russell Rd & Mill Creek Rd
7	Mar 8, 2021	466.4	off	US-101 & Sitkum-Solduc Rd
8	Mar 8, 2021	466.9	off	Sitkum-Solduc Rd & Industrial Center
9	Mar 9, 2021	466.6	off	East A St & Blackberry Ave S
10	Mar 9, 2021	467.2	off	Merchants Rd & Hemlock View Ln
11	Mar 9, 2021	467.4	off	Elk Creek Ridge Rd & Elk Loop Dr
12	Mar 9, 2021	466.1	off	US-101 & Johnson Rd

(1) Only Reservoir 2 was measured, and all reservoirs were assumed to be at the same elevation with the exception that Reservoir 1 is limited to its overflow elevation of 467.0.

Setting the boundary conditions for each hydrant test within the model, static pressures and residual pressures at the measured hydrant flow rate were generated. The total system demands were set as either the 2018 or 2021 Average Day Demand from Chapter 2. Model output was generated at points in the model equivalent to the locations of the hydrant tests. Model output for static pressures was generated by running the model at a steady state scenario. Model output for residual pressures was generated at each hydrant test location by placing an added demand equal to the measured hydrant flow rate and recording the resulting pressure.

The residual system pressures and pipe flow rates determined in the hydraulic analysis are highly dependent on the friction loss characteristics established for each pipe. The friction losses occurring in lengths of pipe and various valves are accounted for in the hydraulic model through the Hazen-Williams Coefficients (C factor). C factors were initially set at typical values between 125 and 140 depending on pipe material. Hydraulic calibration typically involves adjusting C factors until modeled pressure drops (difference between static pressure and residual pressure) are within five psi of field measured pressure drops. The friction factors for the pipe also compensate for system losses through valves and pipe fittings.

Table 3-13 shows the comparison between hydraulically modeled conditions and field hydrant tests before attempts at calibrating the hydraulic model were performed.

TABLE 3-13

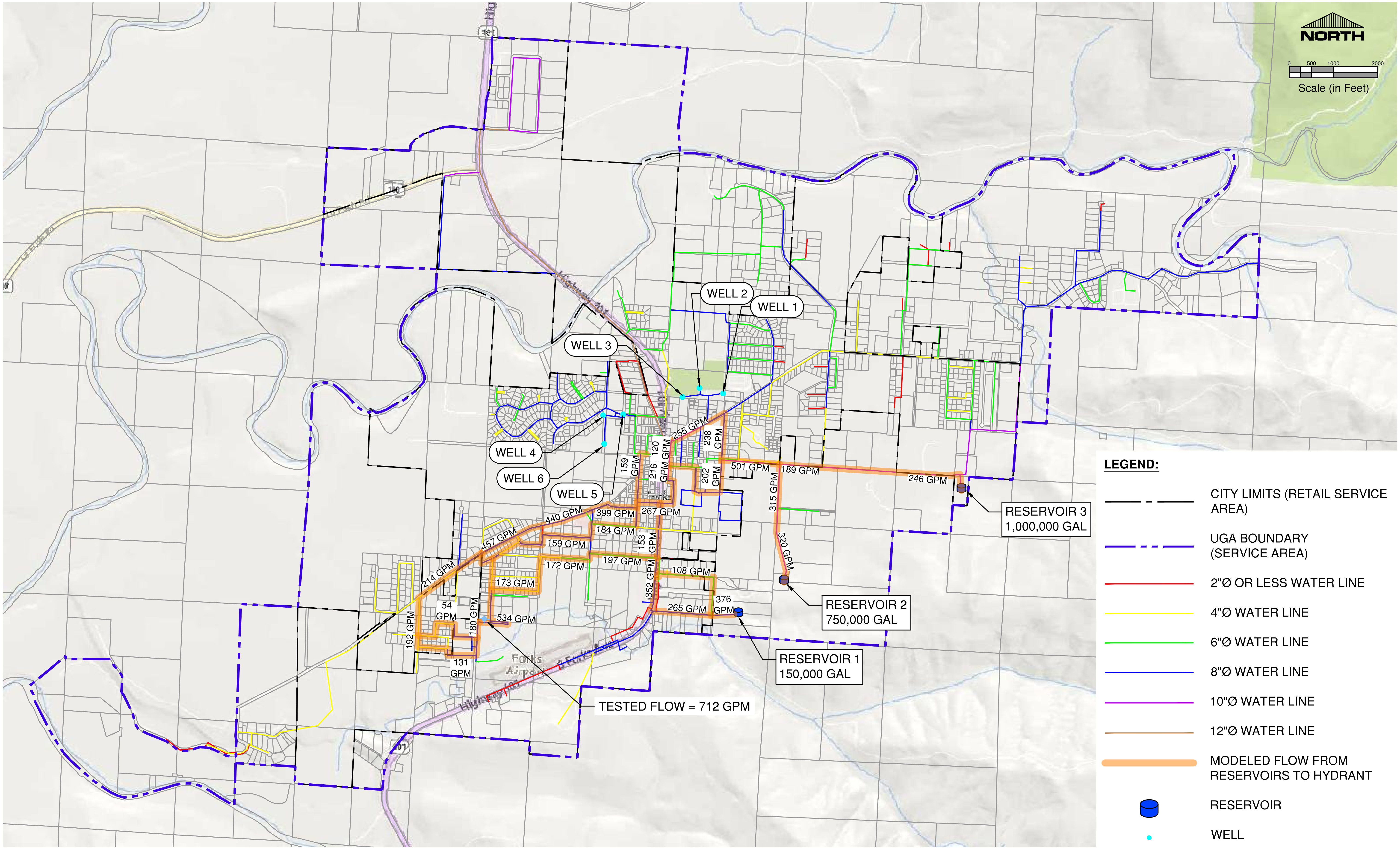
Hydraulic Model to Field Test Comparison

Test No.	Flow (gpm)	Field Test Pressures (psi)			Model Pressures (psi)			Difference between Field Tests and Model Pressures (psi) (1)	
		Static	Residual	Drop	Static	Residual	Drop	Static	Drop
1	605	82	21	61	80.6	73.5	7.1	1.4	53.9
2	1,138	71	48	23	69.5	57.9	11.6	1.5	11.4
3	1,113	65	59	6	67.2	60.7	6.5	2.7	0.5
4	712	68	34	34	65.1	50.2	14.9	2.9	19.1
5	805	46	32	14	45.4	24.6	20.8	0.6	6.8
6	712	83	22	61	82.2	73.2	9.0	0.8	52.0
7	1,175	72	56	16	72.5	59.5	13.0	0.5	3.0
8	1,138	70	52	18	70.6	57.7	12.9	0.6	5.1
9	993	68	59	9	68.6	66.3	2.3	0.6	6.7
10	750	64	21	43	62.1	46.1	16.0	1.9	27.0
11	839	47	31	16	48.9	27.0	21.9	1.9	5.9
12	919	70	60	10	69.2	62.6	6.6	0.8	3.4

(1) The absolute differences between field tests and model results are presented (no negatives are shown).

As can be seen in Table 3-13, the difference between field measured and hydraulically modeled static pressure are within 3 psi which indicates node elevations and reservoir levels are reasonably accurate. The comparison between hydraulically modeled and field-tested pressure drops is highly variable. Test Number 2 taken in 2018 with a difference in pressure drop of 11.4 psi was revised in 2021 and the revised Test Number 7 yielded a reasonable pressure drop of 3.0 psi. Test Numbers 1 and 6 occur at the same location on different dates and Test Numbers 4 and 10 occur at the same location at different dates. These field tests measured a pressure drop at the monitoring hydrant which is significantly higher than the hydraulically modeled indicating there may be field conditions blocking or restricting flow from the reservoirs to the hydrants.

Throughout 2021, Gibbs & Olson worked with City staff to investigate potential flow blockages or restrictions. There were no conditions discovered to explain the assumed flow blockages or restrictions. Therefore, at this time, the City’s hydraulic model is not calibrated. Chapter 8 includes a Capital Improvement Project to further investigate the water system and to achieve a hydraulic model that meets DOH’s calibration criteria. This project is budgeted for in the financial plan in Chapter 9. Figures 3-1 and 3-2 show modeled flows from the reservoirs to the tested fire hydrant for Fire Hydrant Test Numbers 6 and 10, respectively.



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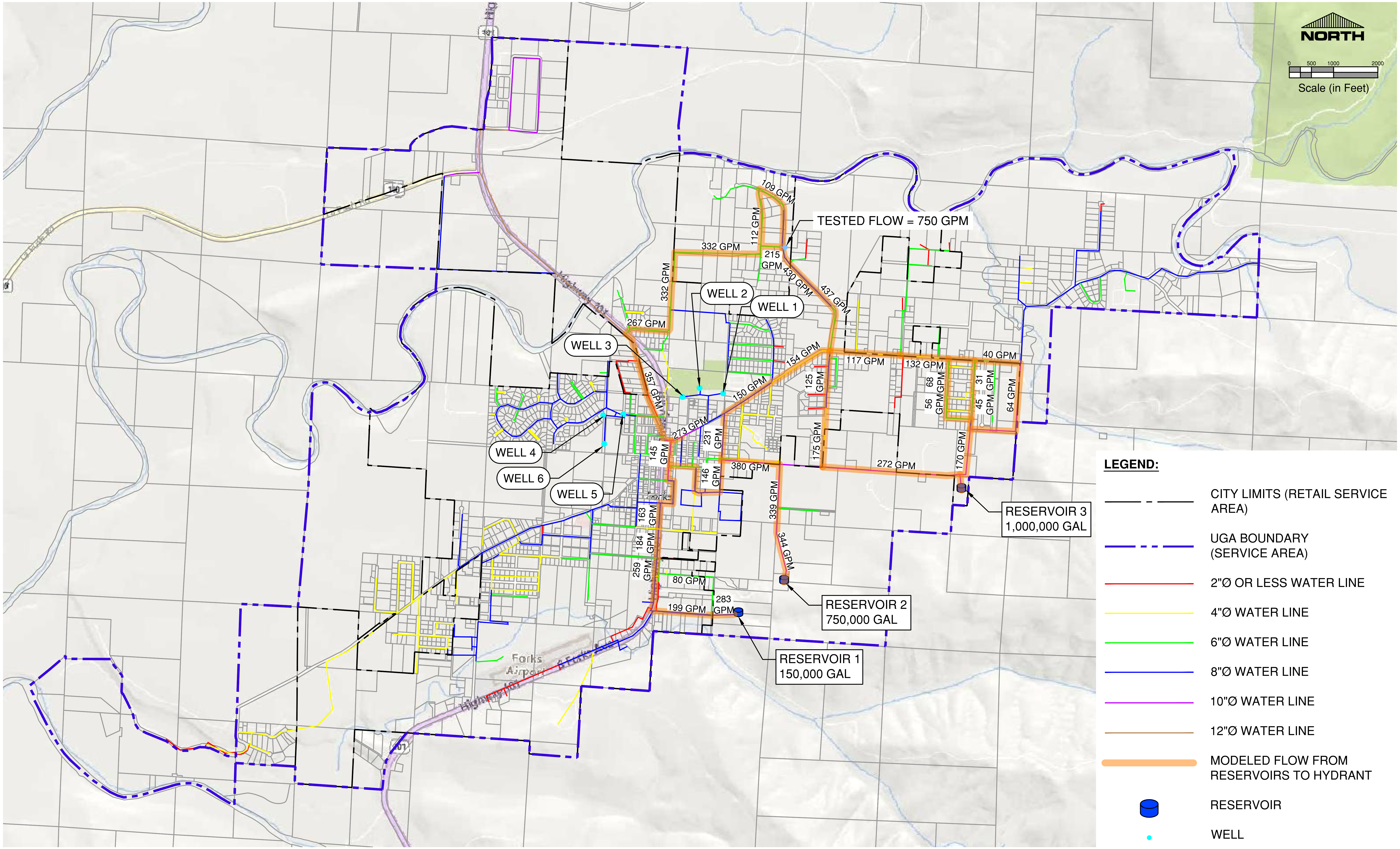
City of Forks
Water System Plan
Fire Hydrant Test Number 6
Figure 3-1



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City of Forks
Water System Plan
Fire Hydrant Test Number 10
Figure 3-2

WATER SYSTEM CAPACITY LIMITS

There are several factors that could limit water system capacity, including source capacity, storage capacity, annual water rights and instantaneous water rights capacity. From Table 3-9 it can be seen that the existing installed source pumping capacity exceeds the recommended capacity to meet estimated maximum day demand within 18 hours of pumping through the year 2041. To calculate the ERU limit based on source capacity, the estimated maximum day water demand per ERU is divided into the existing installed source capacity. From Table 3-1 the maximum day demand is 265 gpd per ERU. Therefore, the source capacity limit to ERUs is calculated as follows:

$$\text{Source Capacity Connections Limit} = \frac{\text{1,905 gpm x 1,080 min/day}}{\text{265 gpd per ERU}} = \text{7,764 ERUs}$$

Similarly, the instantaneous water rights limit can be calculated as follows:

$$\begin{array}{r}\text{Instantaneous Water Rights}\\ \text{Connections Limit}\end{array} = \frac{\text{1,390 gpm x 1,080 min/day}}{\text{265 gpd per ERU}} = \text{5,665 ERUs}$$

The annual water rights limit from Table 1-3 is 950 AF/Y and the Average Day Demand per ERU from Table 3-1 is 140 gpd. The limit on ERUs due to the annual water right limit is calculated as follows:

$$\begin{array}{r}\text{Annual Water Rights}\\ \text{Connections Limit}\end{array} = \frac{\text{950 AF/Y x 325,829 gal/AF}}{\text{365 days/year x 140 gpd per ERU}} = \text{6,057 ERUs}$$

The limit on ERU’s due to storage capacity is calculated by setting the surplus/(deficit) storage to 0 gallons and determining the resulting standby and equalizing storage. These storage component volumes can then be used to calculate an ERU value. Using the MDD and PHD formula developed in Chapter 2 and the storage calculations in Table 3-2, the storage capacity limits the system to 4,955 ERU’s.

The water system capacity limits discussed above are summarized in Table 3-14. The most limiting factor is the storage capacity, which limits the system to 4,955 ERU’s or an additional 1,672 ERU’s. With additional storage capacity, the system could expand to the annual water right limit of 5,665 ERUs, or an additional 2,382 ERUs. With additional annual water rights, the system could expand to the instantaneous water right limit of 6,057 ERUs, or an additional 2,774 ERUs. With additional instantaneous water rights, the system could expand to the installed source capacity limit of 6,057 ERUs, or an additional 4,481 ERUs. Note from Table 2-9 that the existing 3,283 ERUs includes 846 ERUs that represent lost and unaccounted-for water. Additional available ERU capacity can also be obtained by reducing lost and unaccounted-for water. Also, by reducing the consumption of residential users, the value of an ERU could be reduced, thus increasing the number of ERUs supportable by existing facilities. See Appendix C for the Water Rights Self-Assessment listing annual and instantaneous Water Rights.

TABLE 3-14

Water System Capacity Limits

Limiting Factor	System Capacity (ERUs)	Existing Demand (ERUs)	Available ERUs
Storage Capacity	4,955	3,283	1,672
Annual Water Rights	6,057	3,283	2,774
Instantaneous Water Rights	5,665	3,283	2,382
Installed Source Capacity	7,764	3,283	4,481

SUMMARY OF SYSTEM DEFICIENCIES

From the foregoing discussions, the following are the identified water system deficiencies. No attempt is made here to prioritize the deficiencies. Improvements to correct identified system deficiencies will be prioritized in Chapter 8, Capital Improvements.

SOURCE DEFICIENCIES

Well No. 1 will be examined to determine the source of the sulfur odor. Once the source has been determined a solution to remedy the problem will be investigated. The well will be reconditioned if blending is determined not to be an option. In the event that the problems with this well cannot be solved, it may be necessary to replace this well with a new well.

WATER TREATMENT DEFICIENCIES

No water treatment deficiencies have been identified.

WATER STORAGE DEFICIENCIES

No water storage capacities deficiencies have been identified with the exception of fire flow storage in the area of the industrial park north of the Calawah River. Reservoir No. 1 has extensive blister corrosion and the City plans to eliminate this reservoir when it fails the next inspection and no longer meets DOH requirements. In 2019, Reservoirs 2 and 3 were resurfaced inside and outside. Each of the two reservoirs are planned to be evaluated for seismic improvements. If the reservoirs are found to be in need of seismic retrofitting, the time to proceed with the modifications would be the next time of stripping and painting, provided funding can be obtained.

TELEMETRY DEFICIENCIES

No telemetry deficiencies have been identified.

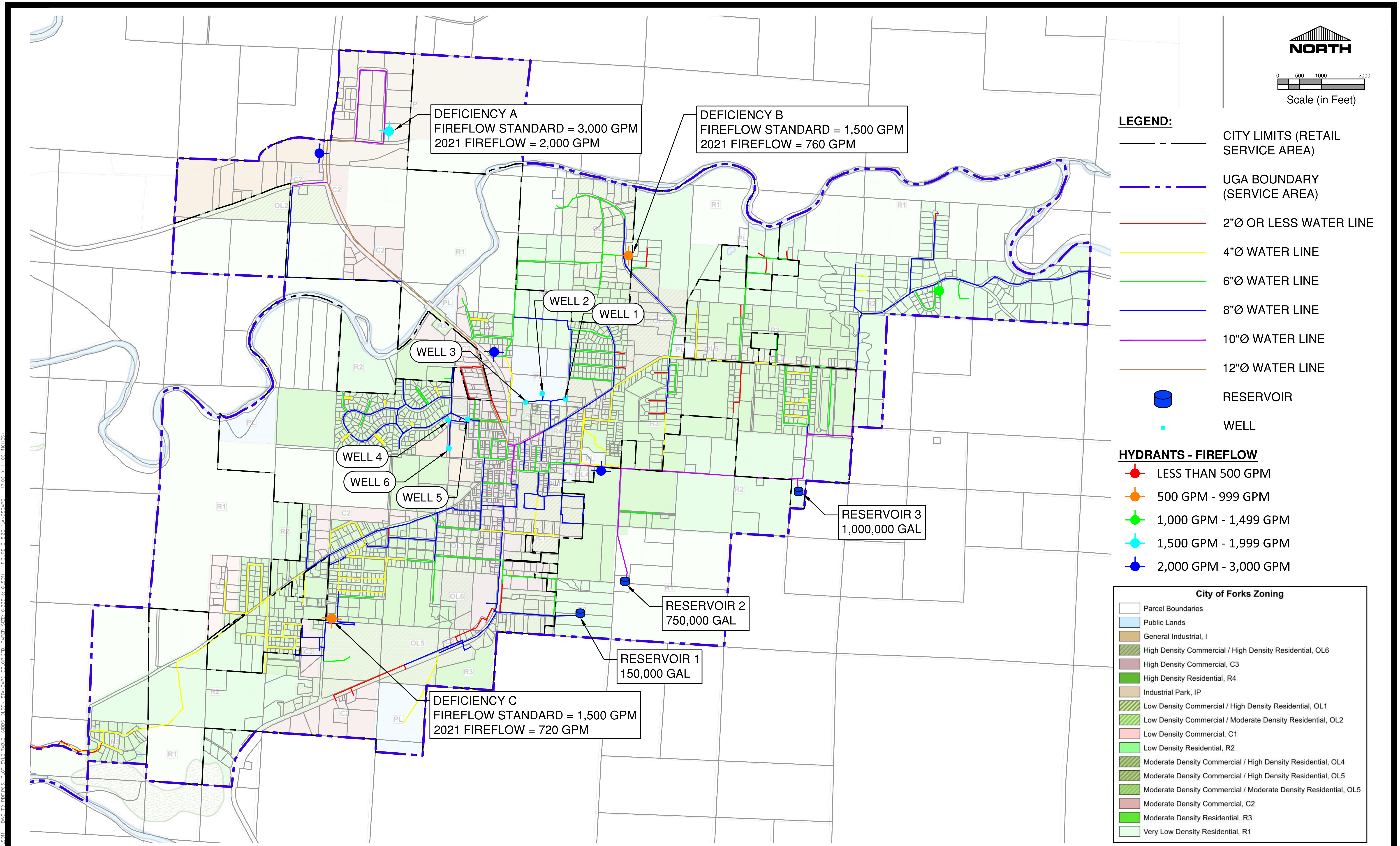
WATER DISTRIBUTION SYSTEM DEFICIENCIES

Due to the water model not being calibrated, a comprehensive list of water distribution system deficiencies cannot be fully identified. Investigation of the existing water system and subsequent calibration of the water system hydraulic model to identify deficiencies should be a priority.

In addition, based on fireflow testing not meeting Fire Flow Standards identified in Table 3-3 at average reservoir levels, several water system deficiencies have been identified and are presented in Figure 3-3.

Finally, since lost and unaccounted-for water has averaged 26 percent over the period from 2019 through 2021, reduction in the amount of lost and unaccounted-for water is necessary. Reduction of lost and unaccounted-for water will reduce the number of ERUs created by this loss as well as reduce pumping costs. Reduction of lost and unaccounted-for water is a high priority. Annual leak detection, leak repair, and routine service meter replacement are significant elements required to reduce unaccounted-for water.

Currently, water mains are replaced as breakage problems occur and individual service meters are replaced when they fail. Failures are often determined by comparing the current water bill to the previous month's bill. If the meter readings are substantially higher or lower than the previous month and water usage has not significantly changed, the City will check the meter and watch for obvious signs of leakage. If the problem persists and no leakage is found, then the meter is replaced. On average the City installs 35 meters per year. In general, 25 of those are replacement meters and 10 are new services.



DEFICIENCY A
FIREFLOW STANDARD = 3,000 GPM
2021 FIREFLOW = 2,000 GPM

DEFICIENCY B
FIREFLOW STANDARD = 1,500 GPM
2021 FIREFLOW = 760 GPM

DEFICIENCY C
FIREFLOW STANDARD = 1,500 GPM
2021 FIREFLOW = 720 GPM

RESERVOIR 1
150,000 GAL

RESERVOIR 2
750,000 GAL

RESERVOIR 3
1,000,000 GAL

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City of Forks
Water System Plan
2021 Fireflows
Figure 3-3

DRAWING: T:\PROJECTS\0788 MISC ENG PROJECT\0181 JACKSON CIVIL ENG FORKS WTR SYS PLAN\FIGURES & EXHIBITS\FIG 3-3 2021 FIREFLOWS.DWG, LAYOUT TAB: FIGURE 3-3, PLOT DATE: 2/29/2024 11:19:51 AM, DRAWING SAVE DATE: 2/28/2024 2:48:19 PM, PLOTTED BY: GMICKELSEN
PLOT DEVICE: GIBBS & OLSON - DWG TO PDF.PC3, PLOT SYLE TABLE: GIBBS-OLSON STANDARD COLOR.CTB, PAPER SIZE: GIBBS & OLSON - FIGURE B SIZE (LANDSCAPE - 17.00 X 11.00 INCHES)

Chapter 4

WATER USE EFFICIENCY PROGRAM

CHAPTER 4

WATER USE EFFICIENCY PROGRAM

OBJECTIVE

The objectives of this chapter are to assess the development and implementation of the City Conservation Program to promote efficient water use, in accordance with the Conservation Planning Requirements published jointly by Ecology and DOH. This Chapter will also evaluate water reuse opportunities in accordance with Chapter 90.46 RCW and the interim guidance from the Washington State Department of Health (DOH) developed in response to the municipal water law (House Bill 1338).

The City has adequate water rights and source capacity to serve growth projected for the 20-year planning horizon. The City's Water Use Efficiency Program is designed to promote efficient water use among its customers so as to reduce overall water usage.

WATER USE EFFICIENCY PLANNING REQUIREMENTS

The Washington Legislature passed the Water Use Efficiency Act of 1989 (43.20.230 RCW), which directs DOH to develop procedures and guidelines relating to water use efficiency. In response to this mandate, Ecology, the Washington Water Utilities Council, and DOH jointly published a document titled *Conservation Planning Requirements* (1994). This document provides guidelines and requirements regarding the development and implementation of conservation programs for public water systems.

In addition, the Municipal Water Supply-Efficiency Requirements Act, Chapter 5, Laws of 2003 (Municipal Water Law), amended Chapter 90.46 RCW to require additional conservation measures. Among other things, the Municipal Water Law directed DOH to develop the Water Use Efficiency Rule (WUE Rule) which was adopted January 22, 2007.

DOH then published a guidance document, titled *Water Use Efficiency Guidebook* (WUE Guidebook) originally dated July 2007, revised January 2011, and again in January 2017 (DOH Publication #331-375). The *Water Use Efficiency Guidebook* supersedes and replaces the 1994 *Conservation Planning Requirements*: therefore, the WUE Rule and WUE Guidebook now provide all the currently effective water use efficiency planning requirements. The WUE Guidebook is intended to provide guidance and clarification on the requirements of the WUE Rule, and not to establish any additional requirements.

Water Use Efficiency Programs developed in compliance with the WUE Rule and Guidebook are required by DOH and 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. The

City's Water Use Efficiency Program documents actions and planning efforts that the City has taken relating to the implementation of water use efficiency measures.

WATER USE EFFICIENCY RULE

The WUE Rule consists of a series of amendments to existing sections and addition of new sections to WAC 246-290, the Group A Public Water System Regulations, and sets additional requirements for public water purveyors. The WUE Rule is comprised of four sections:

1. Planning requirements
2. Metering requirements
3. Distribution leakage standard
4. Goal setting and performance reporting requirements

The requirements of the WUE Rule are discussed in the following sections. This section also includes the City's Water Loss Control Action Plan.

PLANNING REQUIREMENTS

The Planning Requirements of the WUE Rule include the following:

1. Estimation of the amount of water saved through implementation of the system's WUE program over the past 6 years.
2. Description of the water system's WUE goals.
3. Selection of WUE measures.
4. For each WUE measure selected, either:
    a. Include a plan to implement the measure, or
    b. Evaluate selected water use efficiency measures to show that they are not cost effective.

These WUE Rule planning requirements are addressed in the following sections.

WATER USE EFFICIENCY GOALS

The WUE Guidebook requires public water providers to set goals through a public process at least every 6 years. The public process must be set in a public forum that provides opportunity for consumers and the public to participate and comment on the water use efficiency goals.

Previous Goals

The WUE Goal adopted by the City of Forks identified in their 2007 Water System Plan was to reduce the daily production per capita of 136 gallons per capita day (gpcd) by 1% for ten years. This results in a daily production goal of 121.8 gpcd by the year 2016 and maintained through the year 2025. As shown in Table 4-1, the City of Forks has more than achieved their previous WUE goal over the past 6 years; it is estimated demand side WUE efficiency measures have saved an average of 180,188 gpd and a total of 460.7 MG over the past 6 years.

TABLE 4-1

Previous Water Savings

Year	Estimated Service Area Residential Population (1)	Per Capita Water Production (gpcd)			Savings	
		Projected (2)	Goal (2)	Actual (3)	gpd	MG
2015	4,927	136	123.0	100.9	172,938	63.1
2016	4,947	136	121.8	98.9	183,534	67.2
2017	4,972	136	121.8	102.7	165,568	60.4
2018	5,018	136	121.8	97.4	193,695	70.7
2019	5,049	136	121.8	90.6	229,225	83.7
2020	4,626	136	121.8	102.4	155,434	56.9
2021	4,611	136	121.8	101.1	160,924	58.7

(1) Estimated service area residential population is calculated via the method used in Chapter 2, Current City Population.

(2) Projected and goal per capita water production are copied from the 2007 Water System Plan.

(3) Actual per capita water production is from Table 2-3.

Current Goals

The most recent published WUE goal adopted by the City of Forks was set in a public forum held on 11/09/2015. Another public forum was due to be held in 2021 but was cancelled due to the Covid pandemic and the City is planning to reschedule.

Goals set in the 2015 public forum primarily focused on reducing DSL. Some of the measures that have been taken to reduce DSL include:

- Auditing water loss calculation to correctly identify authorized consumption meters and meters used for testing
- Establishing a meter maintenance program, testing meters, and replacing faulty meters
- Eliminating other leaks such as fire hydrants
- Transitioning mobile home parks to master meters.

As shown in Table 4-2, these measures have reduced DSL by an estimated 194,900 gpd in the year 2021 and a total of 262.4 MG over the past 6 years.

TABLE 4-2

Current Water Savings

Year	Percent Unaccounted-for Water		Production (MG)		Savings	
	without goals (1)	actual (2)	without goals (3)	actual (4)	gpd	MG (5)
2015	47%	47%	182.9	182.9	0	0.0
2016	47%	46%	185.4	180.5	13,388	4.9
2017	47%	41%	207.3	187.4	54,521	19.9
2018	47%	32%	230.1	178.5	141,370	51.6
2019	47%	29%	223.1	166.9	153,973	56.2
2020	47%	25%	231.9	173.3	160,109	58.6
2021	47%	25%	241.6	170.4	195,068	71.2

(1) The value from the year 2015 is assumed to remain unchanged if no efforts were made to reduce unaccounted-for water.

(2) From Table 2-8.

(3) The total quantity of water that would need to be produced to match that years accounted for water at the percent unaccounted-for water from the year 2015. This is an unreal value used for estimating water savings.

(4) From Table 2-2

(5) Production without goals minus actual production.

Additional measures that were adopted in the 2015 public forum include education to customers when they open an account and flyers for existing water accounts and a public drought workshop. Water Use Efficiency Annual Performance Reports are included in Appendix A.

WATER USE EFFICIENCY MEASURES

Required Measures for All Systems

The conservation measures listed in this section are required for all public water systems regardless of size. This section also discusses how the City is fully implementing these measures.

Source Meter Installation

The installation of flow meters on each source of supply is required for all water systems to measure the amount of water entering the distribution system. The City has a master meter at each wellfield. These meters were installed in the early 1990s. Meters are tested, maintained, repaired, and replaced as needed to maintain accuracy of source metering.

Service Meter Installation

The installation of flow meters on each consumer service connection and interties is required to measure the amount of water delivered to customers. The City is fully metered and charges customers based on metered water usage. The City requires meter installation on all new direct service connections.

Meter Calibration

Meters must be selected, installed, operated, calibrated, and maintained following generally accepted industry standards and information from the manufacturer. The City has pursued a water meter testing and replacement program and will continue this program to assure meter accuracy. The City is also pursuing an automatic read metering system. All new and difficult to read services currently have radio read meters installed, and the long-term goal is to have the entire system on automated meter reading.

Customer Education

Program promotion includes publicizing the need for water conservation through distribution of DOH brochures, bill inserts, and requiring efficient plumbing fixtures in new development.

The City promotes water conservation through incorporation of Department of Health water conservation brochures into their annual water reports. The City's building code requires compliance with all applicable regulations, including current building code and current plumbing code requirements including use of water-efficient fixtures.

Water Loss Control Action Plan (WLCAP)

The Water Use Efficiency Rule, adopted in January 2007, amends the drinking water regulations, including, in part, the following new section, WAC 246-290-820 (4):

> (e) If the average distribution system leakage calculated under subsection (2) of this section is between ten and nineteen percent of total water produced and purchased, the water loss control action plan must include an assessment of data collection and audit conditions.
>
> (f) If the average distribution system leakage calculated under subsection (2) of this section is between twenty and twenty-nine percent of total water produced and purchased, the water loss control action plan must include elements listed under (e) of this subsection and implementation of field activities such as actively repairing leaks or maintaining meters.
>
> (g) If the average distribution system leakage calculated under subsection (2) of this section is at thirty percent or above the total water produced and purchased, the water loss control action plan must include elements listed under (e) and (f) of this subsection and include implementation of control

methods to reduce leakage within six months of determining standard exceedance.

The City's average unaccounted-for water, as shown in Table 2-8, has averaged 26 percent over the data period. The City, therefore, falls under item (f) above, and is required to assess data collection and to implement leak detection and repair, and meter maintenance. The City purchased a sonic leak detection device in 2003 which the City uses to find and repair leaks within the City system. The City will assure that all water use, with the exception of emergency fire department use, is metered. The City will assure that all water used for water main flushing is accounted-for. The City will regularly test service meters for accuracy and replace inaccurate service meters.

In addition, the City has transitioned to master meters for all trailer parks in March 2020. This transition has encouraged park owners to repair leaking water lines on their properties. The reduction in lost and unaccounted for water in 2021 may in part be due to these repairs. Continued repairs will likely contribute to a reduction in leaking water as well. As shown in Table 4-2, the City's unaccounted for water has dropped from 47% to 25% over the past 6 years.

The City expects unaccounted for water to continue to decrease with continued efforts identified in this WLCAP and the goal is to achieve the distribution system leakage standard of 10% or less unaccounted-for water by the year 2026. This goal, as shown in Table 4-3, is achievable because it uses the percent decrease of average unaccounted for water from the previous 6 years of approximately 3.5%.

TABLE 4-3

Percent Unaccounted-for Water Goal

Year	Percent Unaccounted-for Water Goal
2021 (current)	25.0%
2022	21.5%
2023	18.0%
2024	14.5%
2025	11.0%
2026	10.0%

Recommended Measures

Though water conservation programs can vary depending on location and need, the City must determine the measures that are most appropriate and cost-effective to implement within their own service area. Proven and successful conservation measures include water surveys, education programs, technological advancements of home appliances and plumbing fixtures, and installation of indoor and outdoor water-saving devices.

The WUE Rule requires a total number of recommended water conservation measures which are based on the number of service connections served by the City, that must be evaluated for potential implementation. Based on the City having 2,022 service connection in 2021, the City must evaluate and/or implement 5 additional WUE measures per Table 5-1 of the WUE Guidebook.

The WUE Guidebook suggests that the selection and implementation of WUE measures should be determined by the cost of a measure in relation to the value of the water conserved, and other benefits. Also, selected measures must support the City's goal which is currently to reduce lost and unaccounted-for water to ten percent or below by the year 2026. The level of implementation for the City is noted in each section.

Purveyor Assistance

Purveyor assistance includes aiding wholesale customers in developing and implementing a conservation program that is consistent with their needs. The City has no wholesale customers; therefore, this measure is not applicable to the City.

Bills Reflecting Consumption History

Bills showing consumption history provide information to the customer and to the purveyor regarding water use trends. The customer can observe the difference in water consumption during the same period for both the current and previous year. The City implements this measure by using Vision water-billing software that shows customer water use history.

Water Conservation Kits

Water conservation kits containing easily installed water-saving devices can be distributed to customers. These kits can include such items as shower flow restrictors, toilet-tank-water displacement devices, leak detection tablets, informational brochures, and other materials. The City will consider obtaining and distributing water conservation kits in the future in consideration of the status of actual water use at the time compared to water conservation goals.

Landscape Management

Water use management of large irrigation operations for agriculture, nurseries, and landscaping can increase the irrigation efficiency of these operations. Moisture sensors, flow timers, low volume sprinklers, drip irrigation, weather monitoring, low water demand landscaping, and other practices can be encouraged by the water utility.

The City promotes the use of water efficient irrigation systems and implements this WUE measure by distributing Water Conservation Guideline 7: Irrigation and Landscaping (DOH Pub. #331-120-7) to large irrigation customers.

Conservation Pricing

Another means of promoting customer water demand efficiency is through water rates that can provide an economic incentive to conserve water. The current City water rates are included in Chapter 13.30 of the Forks Municipal Code included in Appendix B and summarized in Chapter 9. The City water rates include a base rate plus a unit price for water usage. All meter sizes (inside and outside the City) have a base rate for a base amount of water per month. In addition, all meter sizes include an overage rate for all water use in excess of the base amount. All rates are for water use per month. Because additional water usage results in a higher water bill, this structure promotes water conservation.

Reclaimed Water

The City uses reclaimed water for groundwater recharge as discussed in the below section.

Target Water Savings Projections

Estimated water savings from previous and current goals are shown in Tables 4-1 and 4-2. The City is due for a new set of goals and water savings projections to be established through public forum.

Regional Conservation Programs

The City is not involved in a regional water supply.

WATER USE DATA REPORTING

A summary of the City's water use data collection required by the WUE Rule is presented in Table 4-4.

TABLE 4-4

Summary of Water Use Data Collection Requirements

Required Data Type[(1)]	Unit of Measure	Collection Frequency	Comments
Water Production	Gallons	Daily	Production data is recorded at the wells daily.
Maximum Day Production	Gallons	Monthly	Maximum day is determined monthly from source of supply meter readings.
Water Sold	Gallons	Billing Period	Total sold by customer class for each billing period (City billing periods are monthly).
Accounted-for Water	Gallons	Billing Period	The sum of metered water sales, known unmetered water use (e.g., filling a 5,000-gallon water truck), and estimated unmetered water use (e.g., main flushing).
Unaccounted-for Water	Gallons	Billing Period	The difference between monthly Water Production and monthly Accounted-for Water.
Percent Unaccounted-for Water	Percent of Production	Billing Period	DSL divided by Water Production times 100 percent. Calculate for each billing period, for each year and for a 3-year running average.

SOURCE OF SUPPLY ANALYSIS

OPTIMIZING USE OF CURRENT SUPPLIES

By promoting water conservation and water use efficiency, and by reducing unaccounted-for water the City will optimize the use of current water supplies.

ENHANCED CONSERVATION MEASURES

As technology for water leak detection and repair advances and as more water-efficient building fixtures and appliances become more standard, water conservation will be enhanced by implementation of standard building codes and replacement of aging fixtures and appliances with newer, more water-efficient units.

WATER RIGHT CHANGES

No water rights changes are anticipated in this water plan.

INTERTIES

The City does not have any interties with other water systems.

ARTIFICIAL RECHARGE

At this time there are no plans for any kind of artificial recharge of the aquifers in the Forks area. The City has not had any problems with their groundwater supply and there is no reason at this time to consider an artificial recharge program.

WATER RESERVATIONS

The City does not have any water rights reservations.

EVALUATION OF WATER RECLAMATION OPPORTUNITIES

In 2003, Chapter 90.46 of the Revised Code of Washington (RCW) was amended to require public water systems serving 1,000 or more connections to evaluate opportunities for reclaimed water when completing water system plans.

This evaluation has five elements:

1. Discussion of water reclamation and reuse requirements in Washington State
2. Identification of potential reclaimed water users
3. Estimates of potable water savings if reclaimed water were available
4. Financial feasibility of implementing reclaimed water projects
5. Recommendations for implementing a reclaimed water program

WATER RECLAMATION AND REUSE REQUIREMENTS IN WASHINGTON STATE

"Reclaimed water" is defined in RCW 90.46.010 as "effluent derived in any part from sewage from a wastewater treatment system that has been adequately and reliably treated, so that as a result of that treatment, it is suitable for a beneficial use or a controlled use that would not otherwise occur and is no longer considered wastewater."

In the State of Washington, any type of direct beneficial reuse of municipal wastewater is defined as water reuse or reclamation. *The Departments of Health and Ecology have issued Water Reuse and Reclamation Standards jointly*. This discussion is based on the current standards dated September 1997, which are adopted by reference in RCW Chapter 90.46, Reclaimed Water Use.

Washington State reuse standards are based on similar standards used throughout the United States. Washington's reuse standards for municipal wastewater can be grouped into four categories:

- Treatment Standards
- Permitted Uses of Reclaimed Water

- Use Area Requirements
- Operational and Reliability Requirements

Washington’s reuse treatment standards call for *continuous* compliance, meaning that the treatment standard must be met on a constant basis, or the treated water cannot be used as reclaimed water.

Treatment Standards

The State of Washington’s standards for municipal wastewater reuse have four classifications based on the type of treatment provided. The classifications are summarized below in Table 4-5.

TABLE 4-5

State of Washington Reclaimed Water Treatment Standards

Reuse Class	**Continuously Oxidized (1)**	**Continuously Coagulated (2)**	**Continuously Filtered (3)**	**Disinfection (Total Coliform Density) (4)**	
				7-Day Median Value	**Single Sample**
A	Yes	Yes	Yes	≤2.2/100 ml	23/100 ml
B	Yes	No	No	≤2.2/100 m1	23/100 ml
C	Yes	No	No	≤23/100 ml	240/100 ml
D	Yes	No	No	≤240/100 ml	no standard

(1) Oxidized wastewater is defined as wastewater in which organic matter has been stabilized such that the biochemical oxygen demand (BOD) does not exceed 30 mg/L and the total suspended solids (TSS) do not exceed 30 mg/L (monthly average basis), is non-putrescible (does not have a foul smell) and contains dissolved oxygen.

(2) Coagulated wastewater is defined as an oxidized wastewater in which colloidal and finely divided suspended matter have been destabilized and agglomerated prior to filtration by the addition of chemicals or an equally effective method.

(3) Filtered wastewater is defined as an oxidized, coagulated wastewater that has been passed through natural undisturbed soils or filter media, such as sand or anthracite, so that the turbidity as determined by an approved laboratory method does not exceed an average operating turbidity of 2 nephelometric turbidity units (NTU), determined monthly, and does not exceed 5 NTU at any time.

(4) Disinfection is a process which destroys pathogenic organisms by physical, chemical or biological means. The disinfection standards use coliform density as the measure of pathogen destruction. DOH recommends that a chlorine residual of 0.5 mg/L be maintained during conveyance from the reclamation plant to the use area to avoid biological growth in the pipeline and sprinkler heads.

Permitted Uses of Reclaimed Municipal Wastewater

Allowable water reuse methods within the State of Washington are presented in Table 4-6. Most of the allowable reuse methods provide limited opportunity for reuse due to the relatively small quantities and seasonal nature of the reuse demand.

Two reuse methods that offer the potential for 100 percent reuse on a year-round basis are groundwater recharge and stream flow augmentation. A more detailed discussion of groundwater recharge and stream flow augmentation is provided after Table 4-6.

TABLE 4-6

Allowable Uses of Reclaimed Water

Use	**Class of Reclaimed Water Allowed**			
	Class A	**Class B**	**Class C**	**Class D**
Irrigation of Non-Food Crops				
Trees and fodder, fiber, and seed crops	YES	YES	YES	YES
Sod, ornamental plants for commercial use, pasture to which milking cows or goats have access	YES	YES	YES	NO
Irrigation of Food Crops				
Spray Irrigation:				
All food crops	YES	NO	NO	NO
Food crops which undergo physical or chemical processing sufficient to destroy all pathogenic agents	YES	YES	YES	YES
Surface Irrigation:				
Food crops where there is no reclaimed water contact with edible portion of crop	YES	YES	NO	NO
Root crops	YES	NO	NO	NO
Orchards and vineyards	YES	YES	YES	YES
Food crops which undergo physical or chemical processing sufficient to destroy all pathogenic agents	YES	YES	YES	YES
Landscape Irrigation				
Restricted access areas (e.g., cemeteries, freeway landscaping)	YES	YES	YES	NO
Open access areas (e.g., golf courses, parks, playgrounds, etc.)	YES	NO	NO	NO
Impoundments				
Landscape impoundments	YES	YES	YES	NO
Restricted recreational impoundments	YES	YES	NO	NO
Non-restricted recreational impoundments	YES	NO	NO	NO
Fish Hatchery Basins	YES	YES	NO	NO
Decorative Fountains	YES	NO	NO	NO
Flushing of Sanitary Sewers	YES	YES	YES	YES

TABLE 4-6 – (continued)

Allowable Uses of Reclaimed Water

Use	Class of Reclaimed Water Allowed			
	Class A	**Class B**	**Class C**	**Class D**
Street Cleaning				
Street sweeping, brush dampening	YES	YES	YES	NO
Street washing, spray	YES	NO	NO	NO
Washing of Corporation Yards, Lots, and Sidewalks	YES	YES	NO	NO
Dust Control (Dampening Unpaved Roads, Other Surfaces)	YES	YES	YES	NO
Dampening of Soil for Compaction (Construction, Landfills, etc)	YES	YES	YES	NO
Water Jetting for Consolidation of Backfill Around Pipelines				
Pipelines for reclaimed water, sewage, storm drainage, gas, electrical	YES	YES	YES	NO
Firefighting and Protection				
Dumping from aircraft	YES	YES	YES	NO
Hydrants or sprinkler systems in buildings	YES	NO	NO	NO
Toilet and Urinal Flushing	YES	NO	NO	NO
Ship Ballast	YES	YES	YES	NO
Washing Aggregate and Making Concrete	YES	YES	YES	NO
Industrial Boiler Feed	YES	YES	YES	NO
Industrial Cooling				
Aerosols or other mist not created	YES	YES	YES	NO
Aerosols or other mist created (e.g., cooling towers, spraying)	YES	NO	NO	NO
Industrial Process				
With exposure of workers	YES	NO	NO	NO
Without exposure of workers	YES	YES	YES	NO

Groundwater Recharge

Groundwater recharge with reclaimed water is permitted under the water reuse standards. Three categories of groundwater recharge are covered in the water reuse standards:

1. Direct injection to a drinking water aquifer,
2. Direct injection to a non-drinking water aquifer, and
3. Surface percolation.

Direct Injection to a Drinking Water Aquifer

Direct injection of reclaimed water to a drinking water aquifer must meet the water quality standards for primary contaminants (except nitrate), secondary contaminants, radionuclides and carcinogens contained in Table 1 of WAC 173-200, as well as maximum contaminant levels (MCLs) contained in the State Drinking Water Standards, WAC 246-290.

Additionally, for direct injection to a drinking water aquifer, pre-injection treatment must include the following:

1. Reverse osmosis treatment
2. Turbidity $\leq$ 0.1 NTU (average) and $\leq$ 0.5 NTU (maximum)
3. Total organic carbon levels $\leq$ 1.0 mg/L
4. Total nitrogen $\leq$ 10 mg/L as N

Direct Injection to a Non-Drinking Water Aquifer

Direct injection of reclaimed water to a non-drinking water aquifer must meet Class A reclaimed water treatment standards as well as the following additional criteria:

1. $BOD_5 \leq 5$ mg/L
2. TSS $\leq$ 5 mg/L
3. Any additional criteria deemed necessary by DOH or Ecology

Surface Percolation

Groundwater recharge using surface percolation requires at least Class A reclaimed water unless a lesser level is allowed under a pilot project status by DOH and Ecology. In addition to secondary treatment to provide oxidized wastewater, the process must include a "step to reduce nitrogen prior to final discharge to groundwater."

Stream Flow Augmentation

For small streams where fish habitat has been degraded due to low instream flows, stream flow augmentation is an option allowed under the water reuse regulations and standards.

This reuse method requires an NPDES permit and adherence to the Surface Water Quality Standards (WAC 173-201A). However, the key difference between stream flow augmentation and surface water disposal is that a determination of beneficial use has been established based on a need to increase flows to the stream. To make this determination requires concurrence from the Washington State Department of Fish and Wildlife that the need exists for additional instream flows.

The City of Forks has three larger creeks; Grader Creek, Mill Creek and Elk Creek, and two major rivers; the Calawah River and the Bogachiel River within or adjacent to its Urban Growth Area (UGA). The creeks feed into one of the two rivers, which then combines to form the Quillalute River and flows directly into the Pacific Ocean. The City of Forks wastewater treatment plant (WWTP) effluent flows by gravity to infiltration basins where it seeps into the ground.

Other Uses

The water reuse standards allow for other uses that are not discussed in detail in this chapter. However, the general basis for the reuse criteria is that when unlimited public access to the reclaimed water is involved (as is the case for the reuse scenarios that might apply for the City of Forks) the criteria will require Class A reclaimed water. Essentially, for a water reclamation project to have the flexibility to allow for relatively unrestricted use, the reclaimed water should meet the Class A reuse standard.

Use Area Requirements

The water reuse standards establish criteria for siting and identifying water reclamation projects and their facilities. Water reclamation storage facilities, valves, and piping must be clearly color-coded and labeled and no cross connections between potable water and reclaimed waterlines are allowed. The potable water system manager must have an approved cross-connection control program pursuant to WAC 246-290-490.

Maximum attainable separation between reclaimed waterlines and potable waterlines must be achieved. A minimum horizontal separation of 10 feet is required for buried lines, but when crossing is necessary, a minimum 18-inch vertical separation is required, and the potable waterline must be above the reclaimed waterline.

Reclaimed water may be used to flush toilets in condominiums and apartment complexes as long as residents do not have access to plumbing systems for repairs or modifications.

Another key requirement for a water reclamation project is setback distance. Table 4-6 summarizes setback requirements for water reclamation facilities. In general, setback distances are minimized with higher levels of treatment and reliability. Class A reclaimed water requires no buffer between irrigated areas and public use areas.

TABLE 4-7

Setback Distances for Reclaimed Water in the State of Washington

Reclaimed Water Use/Facility	Distance (Feet)			
	Class A	Class B	Class C	Class D
Minimum Distance to Potable Water Well:				
Spray or Surface Irrigation	50	50	100	300
Unlined Storage Pond or Impoundment	500	500	500	1,000
Lined Storage Pond or Impoundment	100	100	100	200
Pipeline	50	100	100	300
Minimum Distance from Irrigation Areas to Public Areas	0	50	50	100

Operational and Reliability Requirements

Under the reuse standards, there are a number of operational and reliability requirements for a water reclamation plant. Several key requirements are summarized below.

- Minimum Class III Operator.
- Critical equipment and process failures must be signaled by an alarm.
- Emergency storage and disposal facilities in the event of equipment failure or the intermittent production of effluent that does not meet the reclaimed water standards.
- Operating records provided to DOH as well as Department of Ecology.
- No bypass of untreated or partially treated water.
- Either a standby power supply or long-term disposal or storage facilities for untreated wastewater.

POTENTIAL RECLAIMED WATER USERS

Inventory of Large Water System Users

Table 2-6 shows that commercial water use accounts for approximately 24 percent of overall use for the last 4 years. The average water use per commercial connection in 2021 was approximately 378 gallons per day.

Parks and Recreational Areas

The City of Forks has four parks, civic and recreation areas with irrigable property. Irrigable property is defined as areas with managed landscapes having grass, flowers or shrubs. However, none of the parks or other municipal facilities is irrigated. In 2019, the total for all municipal water use was 211,000 gallons, which included parks, cemetery, visitor center, dog pound, and City Hall.

Sewer Jetting

The City of Forks wastewater collection system could utilize reclaimed water to jet sewer wastewater collection piping and for other operational uses at the wastewater treatment plant.

CURRENT AND FUTURE WASTEWATER FLOWS

Much of the City of Forks is not sewered. The sewer system serves only the commercial core of the City, and outlying residential areas are on individual waste disposal systems. Therefore, the wastewater flow is much lower than the water supply system capacity. The City's Wastewater Treatment Facility (WWTF) has a design capacity of 230,000 gallons per day. The City's estimated current and projected influent flows to the WWTF have been calculated based on available monthly sewer flow records. Projected flows have been estimated at the growth rates established in Chapter 2. These estimated sewer flow rates are presented in Table 4-8. Note that this growth rate projection may overestimate future sewer flow rates because, as stated above, the sewer system serves only the commercial core area of Forks. The flows of the sewer system would be expected to increase at the growth rate of the commercial core, which may not be the same as the growth rate of the City as a whole.

TABLE 4-8

Projected WWTF Flows for the City of Forks

All Flows in mgd	2021	2031	2041
Average Flow	0.110	0.120	0.127
Maximum Month Flow	0.160	0.174	0.185
Minimum Month Flow	0.090	0.098	0.104

In addition to the water quality of the reclaimed water, the diurnal and seasonal variations in flow will be a major consideration in the design of reuse facilities. These issues will be considered further in the water reuse feasibility analysis.

WATER REUSE FEASIBILITY ANALYSIS

Groundwater Recharge

Groundwater recharge by direct injection would potentially be the most expensive reuse option because it would require upgrading the wastewater treatment plant to include Class A treatment plus reverse osmosis treatment and TOC removal. However, groundwater recharge by surface percolation involves a lesser degree of treatment.

The City of Forks is currently recharging groundwater through the use of infiltration basins at the WWTP. The basins provide additional filtration to groundwater that may benefit instream flows.

Because of the significant costs, technical challenges and limited benefits that might be derived from a reuse strategy involving groundwater recharge, direct injection is not considered a feasible option by the City.

Stream Flow Augmentation

There are currently two cities in the State of Washington that augment stream flows with reclaimed water. These cases are discussed below.

City of Sequim – The City of Sequim treats all of its municipal wastewater to Class "A" standards and conveys the reclaimed water into the City for various uses, including augmenting stream flows in Bell Creek. The City worked with the Washington State Department of Fish and Wildlife (WSDF&W) to develop an operating strategy that includes a continuous 0.1 cfs flow of reclaimed water into Bell Creek. WSDF&W determined that stream flow augmentation could only be beneficial with a constant flow, absent any diurnal or seasonal variations. The City of Sequim limits the flows to 0.1 cfs, approximately 15 percent of current and 10 percent of future projected reclaimed water production rates. The City has made commitment to other uses that preclude committing any future flow increases to stream flow augmentation.

City of Medical Lake – The City of Medical Lake releases Class "A" reclaimed water to East Medical Lake. This arrangement required review and approval from the WSDF&W. Reclaimed water releases are tied to target lake levels. Excess reclaimed water that cannot be released into the lake is discharged to a nearby stream (Deep Creek).

Based on the Washington State Department of Ecology's Water Quality Assessment 303(d) list for non-pollutant impaired streams, there are no streams in the vicinity of Forks that would benefit from stream flow augmentation. The key with any stream flow augmentation project is establishing benefit to habitat. Generally speaking, the rivers and streams in the vicinity of Forks are not subject to unnatural low stream flows. These watercourses are fed from snowmelt and rain from the nearby Olympic Mountains located in Olympic National Park. Due to the geography and marine climate, Forks is located in a region that receives more precipitation than any other in the continental United States, measuring precipitation in feet rather than inches. From the City of Forks, rivers and streams flow west through largely private timberland before entering the Pacific Ocean, 14 miles to the west.

Stream flow augmentation is not considered a feasible option for the City.

Irrigation

Since all of the City’s municipal facilities account for less than 300,000 gallons annually for all uses, the cost of supplying reclaimed water for a proportion of that amount, no matter how large, is not a cost-effective option for water reuse.

Components of Water Reuse System

If there was substantial demand for reuse within the City of Forks, the City could potentially supply those users with non-potable water. For the foreseeable future, the City can meet its water conservation goals without investing in such a significant project. Additionally, there appears to be no environmental pressures for the City to discontinue infiltrating its effluent at the treatment plant. Therefore, this preliminary analysis indicates that the costs significantly outweigh potential benefits for developing the capability of water reuse. The City may give further consideration to water reuse at a later date.

WATER SUPPLY CHARACTERISTICS

The WUE Guidebook indicates that a Water Use Efficiency Program should include a description of the water system source characteristics. The source characteristics for the City of Forks water system are thoroughly described in Chapters 1 and 3 of this Water System Plan.

Chapter 5

WELLHEAD PROTECTION

CHAPTER 5

WELLHEAD PROTECTION

The City of Forks has previously developed a Wellhead Protection Program separate from this plan. The program was prepared for Clallam County and the WRIA 20 Planning Unit by Golder Associates. Excerpts of the report, *Multi-Purpose Storage Assessment Water Resources Inventory Area 20* (June 2005) and its accompanying appendix, *Contaminant Study City of Forks and Vicinity* (May 2005) (Golder Report) are included in Appendix G.

For this Water System Plan, the report was reviewed and updated as necessary as discussed in the following section. The time of travel zones were revised due to the addition of Well 6. 6-month, 1-year, 5-year, and 10-year time of travel boundaries were determined using the Calculated Fixed Radius method and are shown in Figure 5-1.

The contaminant inventory developed in 2005 was reviewed and updated. The following summarizes the findings:

- Twelve facilities were found to be listed on EPA's Resource Conservation and Recovery Act (RCRA) Info database; however, all of them are currently inactive and none of these inactive facilities are located within the time of travel zones on Figures 4-23 through 4-25 in Appendix G.

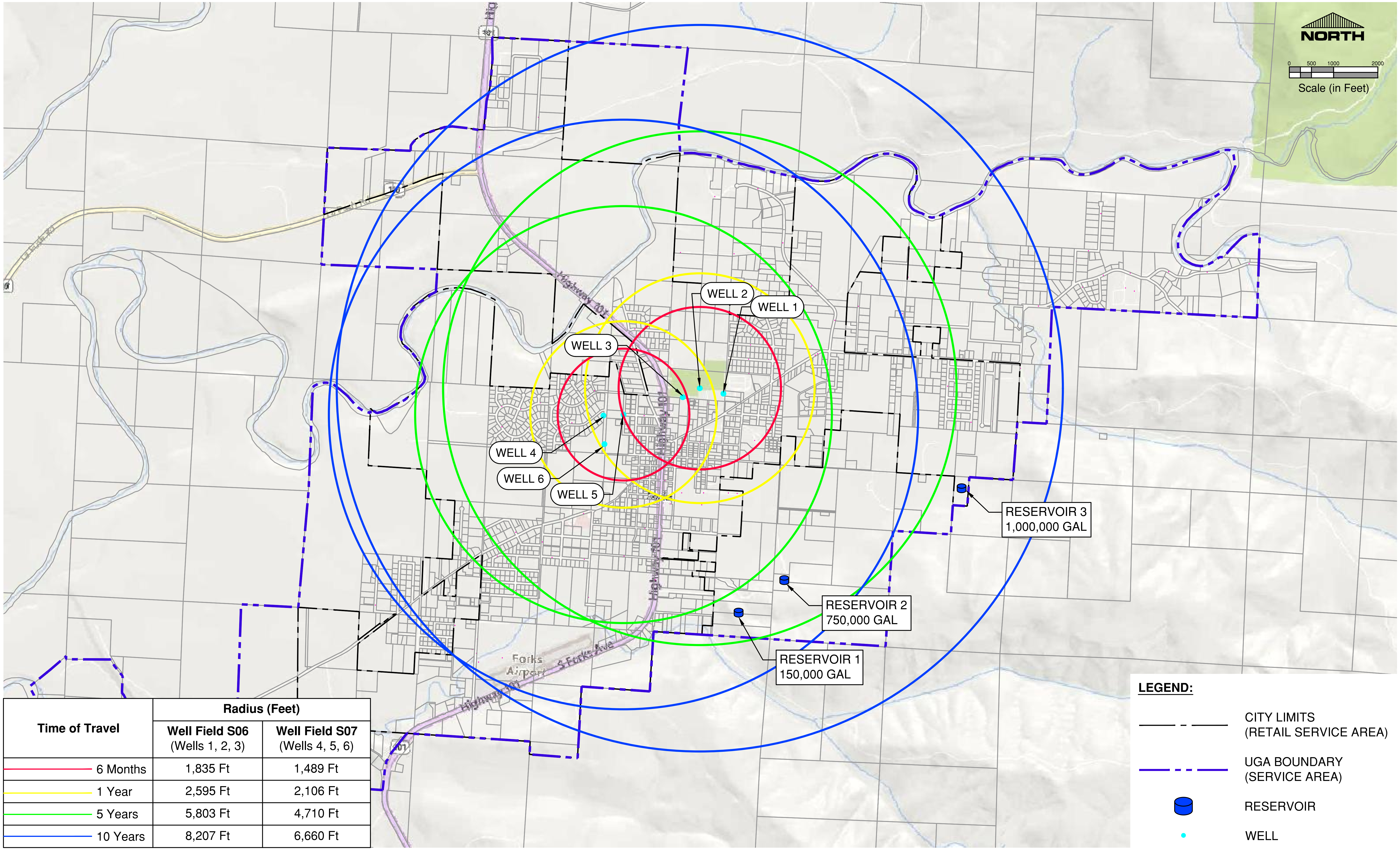
- Five leaking underground storage tank (LUST) sites were identified within Forks and its vicinity. Of these five sites, four were listed as cleanup complete, and one was listed as cleanup started. This site, the Chevron Station 9-1923 is outside of the time of travel zones. Two additional underground storage tanks (UST) sites were also identified. USTs are regulated under RCRA, and the data is stored in Ecology's LUST and Regulated UST database. The LUST and UST list and maps are included in Appendix G.

- The Facility Registry Service (FRS) is a centrally managed database that identifies facilities either subject to environmental regulations or of environmental interest. Over 100 sites were identified in Forks and its vicinity. Additional information can be obtained on EPA's FRS website.

- The Golder Report stated that of all the sites previously identified in 2005, only one site should be considered for further assessment, which is the Washington State Department of Natural Resources Headquarters facility located between the well clusters. The LUST database indicates this site has been cleaned up and some of the UST's have been removed and no further action is needed.

The City has sent letters to all business and landowners identified on the contaminant inventory within the time of travel zones and all emergency responders. The letter states their property or business is within the Wellhead Protection area, includes a map of the Wellhead Protection area, and states that the activities of their business may be a potential source for groundwater contamination. The letter includes a website address to Clallam County Hazardous Waste. A copy of this letter, a list of businesses, property owners, and emergency responders the letter has been sent to, and signatures from the businesses, property owners, and emergency responders showing the letter has been received are included in Appendix E.

A Contingency Plan, titled Water Shortage Response Plan, is included in Appendix I which details alternate sources of water in the event of groundwater contamination of all wells.



Time of Travel	Radius (Feet)	
	Well Field S06 (Wells 1, 2, 3)	Well Field S07 (Wells 4, 5, 6)
6 Months	1,835 Ft	1,489 Ft
1 Year	2,595 Ft	2,106 Ft
5 Years	5,803 Ft	4,710 Ft
10 Years	8,207 Ft	6,660 Ft

LEGEND:

CITY LIMITS (RETAIL SERVICE AREA)

UGA BOUNDARY (SERVICE AREA)

RESERVOIR

● WELL

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City of Forks
Water System Plan
Time Of Travel Map
Figure 5-1

Chapter 6

OPERATION AND MAINTENANCE PROGRAM

CHAPTER 6

OPERATION & MAINTENANCE PROGRAM

INTRODUCTION

The objective of this chapter is to provide an evaluation of the City's operation and maintenance (O&M) program and its ability to assure satisfactory management of the water system operations in accordance with WAC 246-290. The City's Operation and Maintenance Manual and specific component related documentation are maintained by the City for use by operations personnel. Information presented in the complete O&M manual is considered sensitive information and is not intended for general distribution to the public.

The O&M Program includes the following elements:

- Water System Management and Personnel
- Operator Certification
- System Operation and Control
- Comprehensive Monitoring Plan
- Preventive Maintenance Program
- Emergency Response Program
- Safety Procedures
- Cross-Connection Control Program
- Customer Complaint Response Program
- Recordkeeping and Reporting
- O&M Improvements

WATER SYSTEM MANAGEMENT AND PERSONNEL

The City's water system is managed and operated by City staff. Mr. Paul Hampton is the Public Works Director and Mr. Nick Dias is the Water Superintendent. Financial records are maintained by the Deputy Clerk, Mrs. Ginger Simmons.

OPERATOR CERTIFICATION

Department of Health (DOH) requires all Group A water systems to have at least one certified Water Distribution Manager (WDM) under WAC 246-292-050. The WDM must further be certified at a level equal to or higher than the water system's classification rating as described in Table 6-1 and in accordance with WAC 246-292-040.

TABLE 6-1

TABLE 6-2Water System Group Classification

Classification	Population Served
Group 1	Less than 1,500
Group 2	1,501 to 15,000
Group 3	15,501 to 50,000
Group 4	Greater than 50,000

The City serves greater than 1,500 people and therefore is required to have a WDM Level II (WDM II). Additionally, the City is required to develop a Cross Connection Control (CCC) Program and must ensure that a Cross Connection Specialist (CCS) is responsible for overseeing the program and for periodic inspections of premises for cross-connections. Finally, the City must ensure that a Backflow Assembly Tester (BAT) is responsible for inspecting, testing, and monitoring backflow prevention assemblies in accordance with WAC 246-290-490. The City can perform these tests or can allow the customers to have their device tested by an approved BAT. Table 6-2 provides a list of the maintenance personnel, positions and certifications.

TABLE 6-3

City of Forks Water System Personnel Certifications

Staff	Position	Certifications(1)
Paul Hampton	Public Works Director	WDM II, CCS, WWTPO II, CDL, CBI
Dan Wahlgren	Wastewater Plant Operator	WDM II, WWTPO III, WWCO I, CDL
Steven Gaydeski	Utilities Worker	WDM II, WWTPO II, CDL
Mike Hirsch	Utilities Worker, Building Inspector	RBI
Nick Dias	Utilities Worker Lead	WDM II, CDL
Ryan Oberfranc	Utilities Worker	CDL
Brett Pederson	Utilities Worker	CDL
Joseph Cowles	Community Service Crew Supervisor	WDM I

(1) WDM is short for Water Distribution Manager, Levels I, II, or III; CDL is short for Commercial Driver's License; CBI is short for Commercial Building Inspector; RBI is short for Residential Building Inspector; WWTPO is short for Wastewater Treatment Plant Operator, Levels I, II, or III; WWCO is short for Wastewater Collections, Levels I, II, or III; CCS is short for Cross Connection Supervisor.

PROFESSIONAL GROWTH REQUIREMENTS

In order to promote and maintain expertise for the various grades of operator certification, Washington State requires all certified operators meet professional growth requirements by completing no less than three continuing education units (CEUs) every 3 years. Programs sponsored by both Washington Environmental Training Resource Center (WETRC) and the American Water Works Association (AWWA) Pacific Northwest Subsection are the most popular sources of CEUs for certified operators in Washington State. The professional growth requirement may also be met by advancement by examination or certification in a different classification.

The Public Works Director maintains the status of staff CEUs. Resources to obtain training are provided by the City as necessary to maintain these credits.

SYSTEM OPERATION AND CONTROL

The City staff is responsible for the daily operations of its wells, storage facilities, and distribution system. Under normal operating conditions all well pumps are online, all storage reservoirs are online, and all distribution valves are open. The descriptions of major water system components are discussed in Chapter 1 and the locations are shown in Figure 1-3.

WELLS

The well pumps are controlled by an alternator system that allows more than one well pump to switch on depending on the signal sent from the tank. Previously, the well pumps were switched on by hand in response to low water levels in the reservoir. This method can still be employed if there is a failure in the telemetry system.

Normally, all pump switches are set to AUTO. Individual pump switches can be set to the OFF position while taking soundings for drawdown levels. Individual pumps can also be switched to HAND if it is necessary to test an individual pump. The Operator normally watches the manifold pressure gage when switching pumps to ensure the manifold pressure is stable in order to prevent starting a pump against a water hammer. No other special consideration or precautions are required. Pump water meters are read on a daily basis. Monthly drawdown readings are taken and compared to historic drawdown levels. If drawdown is excessive, pump discharge valves are adjusted to keep drawdown within the prescribed pumping rates.

STORAGE

There are no special conditions for the operation of the reservoirs. The reservoirs function separately from one another and up to two tanks can be removed from the system without affecting normal distribution system pressures. Tanks may be taken offline by closing the intake valves. Normally, the reservoirs are inspected every 5 years.

DISTRIBUTION

The City’s distribution system consists of approximately 25 miles of gravity fed pipe, varying in size from 4 to 12 inches in diameter.

Most of the downtown area is serviced by looped mains. The isolation of one main in this area will not have a major impact on regular service. Water mains to the outlying areas are not looped. Closing down lines in these areas effectively shuts down service for the term of the line closure. Closure of some the looped lines within the system will also affect system pressures during periods of fire flow. This is especially important for the lines that service the industrial park.

The distribution system is passive and requires no special procedure for operation. Individual service meters are read monthly. Gate valves and fire hydrants are exercised on a yearly schedule. The City purchased a sonic leak detection unit in 2003, which is used to test portions of the distribution system on an ongoing basis.

WATER QUALITY MONITORING

The City receives an annual statement from DOH that indicates what water quality tests are required and when they are required. The monitoring requirements for 2021 are provided in Appendix H. An analysis of the City’s most current water quality test results can be found in Chapter 3. The City is also required to publish a Consumer Confidence Report (CCR) every year to provide customers with water quality data and to explain to its customers any deficiencies the water system may have. A copy of the most recent CCR can be found in Appendix H.

PREVENTIVE MAINTENANCE

The most cost-effective method for maintaining a water system is to provide a planned preventive maintenance program. A planned preventive maintenance program can provide the optimum level of maintenance activities for the least total maintenance cost. Typical tasks that are performed on a daily, monthly, or yearly basis are listed below in Table 6-3.

TABLE 6-4

Preventive Maintenance Tasks

Preventive Maintenance Tasks and Frequency	
Daily • Respond to customer inquiries. • On-call 24 hours per day. • Respond to service requests. • Monitor chlorine residuals. • Monitor for leaks in the system. • Visit well sites to record meter readings and aquifer level and ensure proper operation of disinfection facility and wells. • Monitor water level in the reservoir.	**Yearly** • Inspect all City-owned backflow prevention devices. • Flush distribution system and repair leaks. • Inspect wellhead protection area for contaminant sources. • Inspect and exercise hydrants and valves.
Monthly • Collect routine coliform samples. • Inspect reservoir hatches, vents, and screens.	**Every 5 Years** • Clean reservoir (as needed).
	Every 10 Years • Re-coat reservoir (as needed).

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. Written documentation of reservoir maintenance should be completed with each inspection and repair, and a copy of the report retained on file.

The 1,000,000- and 750,000-gallon reservoirs have been re-coated on the interior and exterior as of 2019. As mentioned in Chapter 3, the 150,000-gallon reservoir will be decommissioned upon the next failed inspection.

WELLS

Routine maintenance for the wells includes keeping records of water meter readings, discharge pressures, sounding of static and pumping water levels in each well, and keeping the well facilities clean. Water quality samples are taken at each well as required by DOH. Summaries of the total annual production of each wellfield, as well as peak daily production are maintained.

DISTRIBUTION SYSTEM VALVE MAINTENANCE

Good preventive maintenance dictates that all valves be exercised regularly. An important aspect of distribution system valve maintenance and record keeping is to ensure that distribution valves are completely open. A partially closed valve can reduce peak day operation and fire flow. The City currently exercises valves in the system as time permits. The City does keep records of valve maintenance.

HYDRANT MAINTENANCE

Hydrants should be inspected regularly and repaired if necessary. It is important to maintain good records of hydrant maintenance. The City flushes and inspects fire hydrants annually. The following recommended procedure for testing fire hydrants has been adapted from the American Water Works Association (AWWA) (1989).

- Check appearance of hydrants for visible damage or leaks. Check for residue stains on the hydrant.
- Remove an outlet nozzle cap and sound for leakage.
- Check for presence of water or ice in the hydrant body with a plumb bob.
- Replace the outlet nozzle cap. Open the hydrant a few turns and allow air to vent. Tighten cap.
- Open the hydrant fully.
- Check for leakage at flanges and around outlet nozzles, packing, and seals.
- Partially close the hydrant so the drains open and water flows through under pressure for about 10 seconds, flushing the drain outlets.
- Close the hydrant completely.
- Remove an outlet nozzle cap and attach a fire hose or some other deflector.
- Open the hydrant and flush.
- Close the hydrant and check for operation of the drain valve.
- Check the main valve for leakage.
- Remove all outlet nozzle caps, clean and lubricate threads.

- Check chains and cable for free action.

- Replace caps and tighten.

- Check lubrication of operating nut threads.

- Locate and exercise auxiliary valve. Leave open.

DISTRIBUTION SYSTEM FLUSHING

Distribution system flushing is conducted on a regular basis to help reduce stagnant water in the distribution system that could contribute to water quality problems. This task is combined with the hydrant maintenance.

METERS

Accurate water metering is an essential financial and conservation-oriented component of water system infrastructure. A substantial amount of revenue may be lost through inaccurate metering of residential and commercial accounts. The importance of accurate source meter readings cannot be overestimated. Without accurate source meter readings, the City cannot determine well pump performance, well output, or lost and unaccounted-for water volumes or accurately bill its customers.

The City has replaced service meters as necessary but will implement a service meter calibration and replacement program as part of its capital facilities plan.

INVENTORY OF MATERIALS

The City maintains repair supplies including the appurtenances needed to make emergency repairs. At a minimum the materials on hand include the materials necessary to repair leaks for every size and type of pipe in the distribution system. Additional repair materials can be purchased in the closest cities of Port Angeles and Aberdeen/Hoquiam if necessary. It is recommended to have the following materials in the City’s inventory:

- Ductile iron, and PVC replacement pipes in various sizes ranging from 1-inch to 12-inch
- Repair clamps and transitions couplers to connect replacement pipe
- Water main valves in various sizes ranging from 1-inch to 12-inch
- Materials for 12 service taps including meters
- Trench box, backhoe, and dump truck ready
- 20 yards of bedding and backfill
- 10 yards of crushed rock

- Concrete mix for thrust blocks
- Chlorine for disinfection
- Poly service pipe and corp stops

EMERGENCY RESPONSE PROGRAM

As required by WAC 246-290, the City is required to have Emergency Response Plans which address general procedures for routine or major emergencies within the Regional Water System. Water utilities have the responsibility to provide an adequate and reliable quantity and quality of water at all times. To meet this requirement, utilities must reduce or eliminate the effects of natural disasters, accidents, and intentional acts. Although it is not possible to anticipate all potential disasters affecting the City's water system, formulating procedures to manage and remedy common emergencies is appropriate. The major components of this Program include an Emergency Contact List, Vulnerability Assessment, Contingency Plan, and Inventory of Materials and Equipment.

WATER SYSTEM PERSONNEL EMERGENCY CONTACT LIST

Table 6-4 provides phone numbers for emergency contacts including response agencies, governments, and material suppliers.

TABLE 6-5

Water System Emergency Phone List

Agency/Group/Business	Contact	Phone Number
Fire/Police Emergency	--	911
Clallam County Fire District No. 1	Bill Paul, Fire Chief	(360) 775-5679
Forks Police Department	Mike Rowley, Police Chief	work: (360) 640-1730 home: (360) 374-9011
Forks Jail	After-Hours Emergency	(360) 374-2223
Clallam County Sheriff	--	(360) 452-7836
Washington State Patrol	Port Angeles Detachment	(360) 417-1738
Water System Equipment and Supplies	Ferguson	(360) 681-8417
Home Depot Plus (chlorine)	Ike Hull	(360) 460-8760
Clallam County Health Division	Coliform Testing	(360) 374-3121
Spectra Laboratories	Inorganic chemical testing (VOC/SOC testing)	(360) 779-5141
Washington State Testing Laboratory	Inorganic chemical testing	(206) 361-2898
Washington State Department of Health Office of Drinking Water	SW Regional Office	main (360) 236-3030 alternate (360) 236-3034
Washington State Department of Health	After-Hours Emergency	(877) 481-4901
Washington State Department of Emergency Management	24-Hour Emergencies	(800) 258-5990 (800) 424-8802
Washington State Department of Ecology	Emergencies	(360) 407-6300
Clallam County	Emergency Management	(360) 417-2283
Statewide One-Call	Utility Locates	(800) 424-5555 811
City of Forks Water Operations Manager	Paul Hampton	(360) 374-5412
City of Forks Public Works	Public Works Director	(360) 374-5412 ext. 242
Jackson Civil	Devin Jackson	(360) 723-0381

SYSTEM VULNERABILITY

It is important to estimate the degree in which system facilities may be vulnerable to various types of emergencies to identify system weakness. The following sections provide information regarding which facilities would be vulnerable to various types of emergency events and recommended actions that City staff could take to help mitigate the situation. System vulnerability for the Water System is due to several conditions such as natural and man-made disasters, mechanical failure, power outages and vandalism.

Natural disasters include high water and flooding, severe earthquake, and severe snowstorm.

On the other hand, water system reliably is enhanced by having a diversity of sources and interties with other water systems or providing redundant infrastructure whenever practical. The vulnerability or reliability of the major components of the water system is presented.

Wells

Forks' water supplies are solely from groundwater sources. All wells are less than 200' deep in a prolific aquifer located near Highway 101. Responsible management of the water system requires the Water System to implement a Wellhead Protection Program. As outlined in Chapter 5, the City of Forks has developed a Wellhead Protection Program separate from this Water System Plan.

The wells are susceptible to aquifer contamination, vandalism, mechanical failure, and power outages. Aquifer contamination can be from many potential sources. The most obvious are accidents on Highway 101 or nearby gas stations. Mechanical failure is not as much a concern because of multiple wells available for the Water System. All wells in Wellfield S06 are equipped with generator hookups and manual transfer switches, and a 200kW backup generator so auxiliary power can be provided in the event of an extended power outage. The generator is in a covered location and has sufficient fuel to run for an extended period of time. In the storage analysis (Chapter 3), it is shown that the system can meet maximum day demand in the event that the wells are disabled by providing standby storage without needing additional water from the wells. If such condition occurred while the reservoir water level was low, the system has auxiliary power supply to Wells S01, S02, and S03 to meet demands.

One measure to help assure that water supply will continue to be available when needed is to monitor water levels in water wells, both during use and while not in use. Decline in water level while the well is not in use would signal a change in the groundwater conditions in the area. Change in water level while the well is in use, if there is no change in level while the well is not in use, would indicate problems developing with individual wells. Corrosion or encrustation of well screens or casing slots, siltation of the strata near the well, and other circumstances can greatly reduce the productivity of wells. Many times, these problems are correctable, but it is better to find these problems early rather than discover these problems in an emergency situation. The City routinely monitors well levels, particularly during the dry summer season and records levels in a logbook for future reference.

Reservoirs

The system has three finished water storage tanks, 1.0 MG, 0.75 MG, and 0.15 MG in size. Isolation or loss of one of the larger tanks will strain the system, but not prevent its operation. Loss of the 0.15 MG reservoir will not significantly affect system performance.

Vulnerability concerns for a reservoir center around the potential for damage to the structure or contamination. The storage reservoirs are located out or nearly out of city limits, on dead-end gravel roads, in areas with a low potential for vandalism. Vandalism cannot be totally prevented, but it can be deterred. Therefore, ensure all hatch covers and other protection equipment are in good operating condition and repair or replace when not operable. Vent screens on the reservoirs are checked annually and repaired as needed to prevent birds or other wildlife from entering the reservoir.

Distribution System

The distribution system vulnerability is due to breaks in the piping network, which can cause extensive loss of water thereby depleting storage, potentially cause flooding, loss of service, and contamination of the water system. To minimize pipe breaks, construction standards regarding pipe bedding and materials and followed. The City's design and construction standards are documented in Chapter 7. The City implements routine valve exercising program and maintains records of valve maintenance.

Interties

Interties are often inexpensive ways to enhance the reliability of all water systems involved. However, due to the City's proximity to other water systems, an intertie is not a practical or cost-effective method of increasing water system reliability for the City of Forks.

EMERGENCY PROCEDURES AND RELATED CONTINGENCY PLAN

Line Breaks

Line breaks are common in any water system and have increased frequency of occurrence as the system ages. Breaks in Regional Water System lines or City distribution mains should be reported to the City of Forks Public Works staff. If the incident occurs after hours, the on-call City personnel should be notified by contacting the City cell phone or the general City emergency number. The City should have sufficient materials in its inventory to address line breaks emergencies as identified in the Inventory of Materials section above and an up-to-date drawing identifying the locations of all isolation valves.

DOH requests that they be notified any time a water main break results in loss of service to ten or more customers, or results in system depressurization.

Contamination of Water Supply

Bacterial contamination of the water supply can result from such items as main breaks, backflow events, unauthorized entry into the reservoir, damaged or unprotected openings, or pollution from an isolated source. Table 6-5 provides the appropriate action that will be taken in the event of the contamination of the water supply.

TABLE 6-6

Water System Contamination Response Actions

Distribution System Contamination
• Perform chemical and free chlorine residual analysis at various locations within the system, including the reservoirs and at system extremities.
• Disinfect distribution lines as dictated by the nature of the contamination.
Reservoir Contamination
• Isolate reservoir from system.
• Inspect vent screens, hatches, and piping to identify source of contamination.
• Re-sample to confirm contamination. Take multiple samples at different locations in reservoir, if possible.
• Check distribution system for presence of contamination.
• If reservoir water is contaminated and therefore considered unsuitable for consumption, drain and clean reservoir.
• Disinfect reservoir if bacteriological standards are exceeded. Follow AWWA Standards. A 50 ppm chlorine solution in the reservoir can be obtained by adding 97 gallons of 5.25 percent chlorine bleach per 100,000 gallons of storage.
Communications
• Provide public notice as needed for water conservation. • Post boil water advisory and notify DOH if there is a possibility water quality has been compromised.

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. A positive test result is mainly 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 coliform, 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. Under these circumstances, a boil water order would be warranted. A suggested boil water notice is included in Appendix

I. WAC 246-290-320(2) details the specific procedures for water utilities to follow in the event that coliform bacteria are detected in the system.

VOC/SOC and Inorganic Chemical/Physical Characteristics Detection Procedures

In the event of a volatile organic chemical or synthetic organic chemical event, WAC 246-290-320(6) requires follow-up monitoring to be conducted in accordance with the following:

a) For VOCs, 40 CFR 141.24 (f)(11) through (15), and (22)
b) For SOCs, 40 CFR 141.24(b), (c) and (h)(7) through (11) and (20).

Power Failure

Various types of weather can cause a loss of power. These weather conditions include wind, lightning, freezing rain, or snowstorm. Additionally, power can be lost through traffic accidents.

In the event of a power outage, public works staff will first check reservoir levels visually. The possible length of the power outage will be estimated, and customers will be notified of the emergency and water conservation will be requested through radio, television, newspaper and/or police loudspeaker.

The City has a 200 kW portable generator that can be utilized to power Wellfield S06, which includes Wells S01, S02, and S03.

Severe Earthquake

A severe earthquake can result in distribution system breaks and structural damage to the wells and reservoirs. A severe earthquake could also result in loss of electrical power. Table 6-6 provides procedures to follow in the event of a severe earthquake.

TABLE 6-7

Severe Earthquake Response Actions

System Component	Proposed Actions
Reservoir	• Observe structure for visual signs of structural damage • If structural damage is apparent, drain reservoir and inspect the interior, exterior and roof of the tank • If leakage is suspected, isolate reservoir and monitor water level
Distribution Lines	• Close valves to isolate breaks • Check reservoir level
Wells	• Inspect wells and treatment for operation

	• Inspect well seals to prevent contamination from entering the wellhead • Inspect for alignment of pump column and casing
Communications	• Provide public notice as needed for water conservation • Post boil water advisory and notify DOH if there is a possibility water quality has been compromised

Cold Weather Conditions/Severe Snowstorm

Extended cold weather conditions could cause freezing problems at shallow service connections, valve vaults without an insulating earth cover, reservoirs, and water supply and treatment facilities. Heavy snowfall may impede employees from reaching a problem area. Water supply should not be interrupted because flowing water is used to prevent freezing. Table 6-7 addresses the possible emergency events and response actions that will be taken in the event of a severe snowstorm.

TABLE 6-8

Severe Freezing/Snowstorm Response Actions

System Component	Proposed Actions
Reservoir	• Clear snow from roads and walkways
Distribution Lines	• Contact Clallam County Public Works, Roads Division, to expedite plowing to any problem area • Have chains and snow gear ready for maintenance equipment and vehicles • Maintain mapping of valve locations to locate valves as needed • Frozen lines can be wrapped with heat tape
Wells	• Clear snow from well access roads • Inspect wells and treatment for operation • Install space heater at wells as necessary

High Water and Flooding

Heavy snowmelt and/or rains can cause the water levels to rise and reach a flood level. Table 6-8 addresses the major system components and corresponding response actions that will be taken in the event of high water or flooding. If portions of the City system became significantly inundated, the areas could be valved off to prevent contamination. Affected customers and the local fire department should be notified to any shut down. Chlorine residuals should be checked throughout the distribution system.

TABLE 6-9

High Water/Flooding Emergency Response Actions

System Component	Proposed Actions
Reservoir	• No action should be required as reservoir is above flood level
Distribution Lines	• Test for coliform bacteria • Prepare to valve off any washed out or damaged waterlines
Wells	• Inspect wells and treatment for operation • Test for coliform bacteria • Monitor wells and remove from service if floodwaters reach air vents
Communication	• Provide public notice as needed for water conservation • Post boil water advisory and notify DOH if there is a possibility water quality has been compromised

Fire

The amount of available fire flow is discussed in Chapter 3, System Analysis. The storage reservoirs and sources can provide fire flow requirements within the water service area. In addition to the direct effects that are listed below, the high flow velocities during a fire may cause scouring of the pipes. This will create dirty water in the distribution system and generate customer complaints which will trigger additional flushing. Table 6-9 presents the emergency response for a fire scenario.

TABLE 6-10

Fire Emergency Response Actions

System Component	Proposed Actions
Reservoir	• Draw down will occur in the reservoirs with increased demand • Monitor reservoir levels
Distribution Lines	• Low pressure may occur in the extremities of the system depending on extent of fire incident • Monitor system and adjust sources if applicable
Wells	• Monitor wells for proper operation

Vandalism/Terrorism/Bioterrorism

According to the U.S. Environmental Protection Agency (EPA), "the threat of public harm from an attack on the Nation's water supply is small." However, it is important to be prepared for it is as a utility would prepare for any other potential emergency situation.

Many potential terrorist attacks would resemble other emergencies in effect. They may cause infrastructure damage like an earthquake or fire, or may contaminate the water as would happen in an accidental spill or main break.

Private and government agencies are working to help prevent and respond to terrorist attacks. The groups which will be useful to the City for updating information and strategies are:

- Environmental Protection Agency
- Centers for Disease Control and Prevention
- Department of Defense
- Federal Emergency Management Agency
- American Water Works Association
- Association of Metropolitan Water Agencies

The City has several security measures in place. The reservoirs are covered and have locked hatches, and the wells are housed in locked structures. Operators or maintenance staff should report any suspicious persons or findings to the local police department.

If an emergency occurs which may be an act of terrorism, the local police department should be notified immediately.

WATER SHORTAGE RESPONSE PLANNING

The City's water utility has discussed planning in case of water shortage. With the current system of reliability, the City's contingency planning to meet short-term water shortages is adequate. A Water Shortage Response Plan is included in Appendix I.

CROSS-CONNECTION CONTROL PROGRAM

The City's cross-connection and backflow control was established in 2006 via Ordinance 543 and can be found in Chapter 13.40 of the Forks Municipal Code, see Appendix B. The City has personnel certified to implement the cross-connection control program.

PRIORITY SERVICE LIST

There are three categories of business establishments that may pose a hazard to the water system. Category one services pose the highest degree of hazard and include the following facilities:

- Printers
- Medical laboratories
- Chemical companies
- Radiator shops
- Battery, fertilizer, and paint manufacturers
- Pest control businesses
- Janitorial companies

Category two services are considered less hazardous and include the following:

- Doctor, dentist, and veterinarians' offices
- Blood banks
- Drug rehabilitation centers
- Car washes
- Photo laboratories
- Commercial laundries
- Nursing homes and hospitals

The least hazardous service category includes the following types of businesses:

- Food processing facilities
- Dairy establishments
- Beverage and candy manufacturers
- Massage and health spas
- Motels and schools with pool, spa, or sauna facilities

NEW AND EXISTING CROSS-CONNECTION DEVICES

The City currently has approximately 25 cross-connection control devices located within the water system. They are grouped in three major locations. The Forks Hospital has ten within its premises, which are tested annually. The Olympic National Resource Center (ONRC) – University of Washington has eight backflow prevention devices. The City of Forks has a total of seven devices, which are tested annually. New and existing cross-connection devices will be catalogued and checked initially by the Cross-Connection Control Specialist. It is the responsibility of the customer to ensure proper testing of the devices on an annual basis thereafter. Backflow prevention devices are required on all new cross connections. A condition for new services will be an evaluation by the cross-connection control certified City staff to determine what type of backflow device is needed.

CROSS-CONNECTION CONTROL PROGRAM RECORD KEEPING

A critical program element of a cross-connection control program is the maintenance of accurate records. The City has an existing database with a list of cross-connection devices within the water system. The City is currently working on implementing cross connection control software that will track an updated list of backflow assemblies within the distribution system.

PROGRAM SCHEDULING AND PERSONNEL REQUIREMENTS

The inventory and inspection status is maintained by the City. Inspection and testing of the cross-connection control devices is done by independent private inspectors and paid for by the service customer.

CUSTOMER COMPLAINT RESPONSE

The City rarely receives complaints about water service, but when complaints are received, they are taken seriously. Complaints are logged in at City Hall and a water system operator is sent to investigate the complaint. Depending on the findings of the complaint investigator, appropriate actions are taken to resolve the complaint. If a customer feels that their complaint is not being addressed properly, all customers of the water system have access to the City Council at regularly scheduled meetings to be heard regarding their complaints.

Chapter 7

DISTRIBUTION FACILITIES DESIGN & CONSTRUCTION STANDARDS

CHAPTER 7

DISTRIBUTION FACILITIES DESIGN & CONSTRUCTION STANDARDS

OBJECTIVE

The objective of this chapter is to document the City's design and construction standards to allow the City to obtain DOH approval to utilize the alternative review process for construction of new and replaced water distribution facilities. Through this process, a purveyor needs no further approval from DOH for distribution project reports, construction documents, or installation of distribution mains, pipe linings, and tank coatings.

This chapter includes the following elements:

- System Standards, Policies and Procedures
- Project Review Procedures
- Policies and Requirements for Outside Parties
- Design Standards
- Construction Standards
- Construction Inspection Procedures

The City's Technical Specifications and Standard Details are located in Appendix B.

SYSTEM STANDARDS, POLICIES, AND PROCEDURES

The City has developed the Technical Specifications and Standard Details to govern any improvements within the public right-of-way and/or public easements, all improvements required within the proposed right-of-way of new subdivisions and for all improvements intended for maintenance by the City.

PROJECT REVIEW PROCEDURES

PERMIT APPLICATION

All applications for line extension shall be submitted in writing to the City at least 90 days in advance of the proposed commencement date of construction. No construction will be authorized until such time as the City has approved the construction drawings. Each line extension application shall be accompanied by:

- A plot plan showing the location of all lots and details relating to the proposed construction. Written proof of right-of-way and/or easement dedications shall be submitted with the plot plan unless waived by the City.

- Construction drawings showing locations, sizes, and types of all mains, valves, hydrants, and fittings and exact distances from property lines, typical sections, topography, and profiles (where required for plan interpretation) and miscellaneous typical details.

- An estimate of the cost of construction.

- A completed environmental checklist, when required by the City, on a form provided by the City.

- An agreement by the applicant to pay the City's cost and fees incurred in the course of reviewing and processing the line extension application, enforcing obligations of the line extension applicant and otherwise incurred as a result of the line extension application.

- Latecomer agreement proposal (if applicable).

APPLICATION REVIEW

Each application for a line extension shall be reviewed initially to ascertain whether the proposed line extension application is complete. Complete applications shall be reviewed by the City Utilities Superintendent and the City Legal Counsel in order to determine whether the proposed project will meet City construction standards and will not impair the City's ability to provide full water service to its other customers and by the City's SEPA official, who shall determine if the proposed project complies with the City's SEPA guidelines.

Applications will then be forwarded to the City Council with recommendations. The Council will then consider the recommendations, make the necessary environmental determinations and either order the issuance of the applicant's line extension permit or reject the application. The issuance of a line extension permit may be made contingent upon any reasonable conditions.

APPROVAL OF PLANS

Proposed extensions of utility lines shall be constructed and installed in accordance with plans prepared by a licensed civil engineer and such plans must be approved by the City Engineer. All such extensions must be installed in accordance with the requirements of the City Engineer. Construction and all other matters shall be approved by the City prior to construction.

POLICIES AND REQUIREMENTS FOR OUTSIDE PARTIES

EXTENSIONS – WHERE TO BE CONSTRUCTED

All extensions to the existing water mains, Water Service Connections and Customer Service Lines not located upon the premises to be served shall be constructed only upon public street or alleys or parcels where the City has recorded easements for such utility purposes. Proof that the applicant has secured required easements shall be delivered to the City prior to commencing construction.

PERFORMANCE BOND

The developer shall furnish to the City a surety bond in a form, and with a surety license to do business as a surety by the State of Washington and approved by the City and in an amount acceptable to the City, which bond shall guarantee the faithful performance of the work on the line extension, payment of all individuals or entities, including state and municipal entities and agencies, who are empowered to create a lien upon the line extension for nonpayment of obligations to those individuals or entities and the replacement of all defective material and workmanship within 1 year after acceptance of the line extension by the City. In some cases, a 2-year bond may be required because of County rules on road restoration.

AGREEMENT

The developer shall sign an agreement, on a form issued by the City, to indemnify, defend and hold harmless the City from any and all liability for damages arising from acts done during or in the preparation for construction of the line extension.

PROOF OF INSURANCE

The developer shall submit proof of the applicant’s comprehensive general and automobile liability and property damage insurance, before commencing work, in limits of $5,000,000 bodily injury including death, and $1,000,000 property damage protecting against all claims for personal injury or collapse or explosion damage, arising during or in preparation for construction of line extension.

COSTS AND INSPECTION DEPOSIT

Persons obtaining extensions of City water mains shall pay the City’s engineering costs incurred in reviewing the plans, consultations regarding the City’s requirement, inspection of the work and administration of the extension of the utility system. An inspection and engineering fee deposit shall be paid to the City at the time application for the extension is made. The deposit shall be as calculated by the City Utility Superintendent.

Before the City will accept the completed extension, the applicant shall pay all City costs that exceed the engineering and inspection fee deposit, and if the City's actual costs are less than the deposit, the differences shall be refunded to the applicant.

LINE EXTENSION CONSTRUCTION

Upon receipt of the City's line extension permit, the applicant may commence construction of the proposed line extension. In addition to being subject to any conditions placed upon the line extension permit, construction of the line extension shall be subject to the following conditions:

- The applicant shall be responsible for paying all costs of the line extension.

- The applicant shall procure and pay for all permits, licenses, easements, environmental notices, reports, impact statements and for the review thereof, shoreline permits, railroad and highway crossing permits and other permits or exemptions necessary for construction of the line extension.

- All taps of a line to an existing City main shall be made by City crews or under direct supervision of the City personnel, with material supplied by the owner, contractor or the City. Payment must be made in advance for this work and for any material required, if done by the City, unless prior financial arrangements have been made with the City.

- All trenches shall be inspected for proper bedding and pipe installation prior to back filling. No exceptions will be allowed.

- A hydrostatic test shall be made by the applicant under the supervision of the City.

- The City will obtain water samples after the line has been sanitized by the contractor and send them to an appropriate health department agency for testing.

- The procedures and acceptance criteria used for sanitizing the line, pressure testing the line and water testing shall conform to state and City standards.

EXTENSION TO BE COMPLETED WITHIN 1 YEAR

The extension shall be complete and offered for acceptance within 1 year of the date for approval of the application. If the extension is not completed and offered for acceptance within 1 year from the date of approval, the applicant's rights shall cease and they shall make new or amended application and pay the additional administrative, legal, engineering, and inspection costs.

CITY COSTS TO BE BORNE BY DEVELOPER

Any costs reasonably incurred by the City for legal services, accounting services and other services incident to the receipt, study and approval or rejection of this application shall be borne by the developer, and the developer agrees to pay such costs within 30 days of billing by the City. If legal proceedings are instituted to enforce any provision of this agreement, the applicant will pay a reasonable attorney's fee to the City.

DESIGN STANDARDS (PERFORMANCE STANDARDS AND SIZING CRITERIA)

The City has adopted the *Standard Specifications for Road, Bridge, and Municipal Construction* by the Washington State Department of Transportation and the American Public Works Association as a standard specification and modified it as required to meet City requirements. This section is a summary of the standards used by the City for its water system. Also presented in the City's Standard Drawings and Specifications are standard detail drawing for components such as hydrants, valves, and pipe installations located in Appendix B.

WATER MAINS

Water mains shall be sized to provide adequate domestic and fire flows at the required residual pressure. Fire flow minimum requirements are ultimately determined by the Forks Fire Department and may be modified based upon an approved fire sprinkler plan for the development.

The City shall be consulted as to the size of the water main. In general, the minimum size main, which will be allowed to serve the development is 6-inch diameter, unless otherwise approved. Larger size mains are required in specific areas outlined in the Water System Plan. Nothing shall preclude the City from requiring the installation of a larger sized main in areas not addressed in the Plan, if the City determines that a larger size is needed to meet fire protection requirements or for future service.

Dead-end mains shall not be permitted unless specifically approved, and the distribution system to a development shall be interconnected so that pressures throughout the system will tend to become equalized under varying rates and locations of demand. If a dead-end main is approved by the City, the main shall be extended to the farthest boundary of the development and a valved 2-inch diameter minimum blowoff shall be provided. It is not the intent to set arbitrary standards with regard to pipe sizes and layout; therefore, in special situations where it can be shown that domestic supply requirements and fire protection requirements can be met at existing and anticipated future pressures, the City will consider each design on its individual merits.

For commercial, multifamily, and industrial applications the minimum main size shall be an 8-inch diameter loop and 12-inch diameter dead ends are as required based on fire flow demands.

SERVICE SIZING

Service sizing is based on peak flow rate:

- Single-Family Residential – 2.0 gpm/service
- Multifamily Residential – 1.0 gpm/service
- Commercial: by facility – Generally low impact
- Industrial: by facility – Generally low impact unless water used in an industrial process
- Irrigation: by system capacity – Significant users schedule for off-peak usage of water

FIRE FLOW

Fire flow depends on land use category, see Table 3-3.

SYSTEM PRESSURES

See Table 3-1.

CONTRUCTION STANDARDS (MATERIALS AND METHODS)

Specifications and standard drawings for water main extensions were prepared by the City in 1993 and reviewed in 2006. Approval of the standard specifications was given by letter from the State Department of Health on November 2, 1993. Copies of the Standard Specifications and the DOH letter are included in Appendix B.

CONSTRUCTION CERTIFICATION AND FOLLOW-UP PROCEDURES

ACCEPTANCE OF LINE EXTENSION

Upon certification of completion of the line extension construction by the City engineer, the applicant shall convey and transfer to the City on forms approved by the City including but not limited to warranty bill of sale, the line extension and all easements, permits and rights necessary to run, operate and maintain the line extension.

The line extension shall not be accepted by the City until:

- Receipts of all material used, labor utilized, and the cost thereof are provided the City along with receipts indicating the payment of those costs.
- "As-built" drawings are provided to the City.
- The posting of surety for maintenance for a term of 1 year.

Upon acceptance of the line extension, the City will assume ownership of the line extension and the responsibility for its operation and maintenance.

Chapter 8

CAPITAL IMPROVEMENT PROGRAM

CHAPTER 8

CAPITAL IMPROVEMENT PROGRAM

OBJECTIVE

The objective of this chapter is to present the City of Forks Capital Improvement Program, which is composed of projects identified in the previous chapters. These improvements are assessed and prioritized for implementation over 10- and 20-year planning periods. The Improvement Program has been developed in conjunction with the financial capabilities and recommendations presented in Chapter 9, Financial Program.

This chapter includes capital improvement projects for source of supply, storage, distribution and other identified capital and non-capital improvements. The chapter provides an assessment of alternatives where necessary, identifies the preferred alternative for each project, and recommends a schedule for the improvements developed in conjunction with Chapter 9.

IDENTIFICATION OF SYSTEM IMPROVEMENTS

Water system deficiencies identified in previous chapters are summarized in the following sections, together with evaluations of alternatives where necessary and planning level cost opinions. Details of planning level cost opinions are included in Appendix J.

CAPITAL IMPROVEMENTS

SOURCE IMPROVEMENTS

S-1: Well 1 Replacement

As discussed in Chapter 3, Well 1 has exhibited sulfide odors that limit the viability of this source. If attempts to rehabilitate this well fail, it may be necessary to drill a new well to replace Well 1. For planning purposes, it will be estimated that the City will replace Well 1. Assumptions are the replacement well could be constructed within 50 feet of Well 1 and the replacement well would be equipped with a pitless unit and run with electrical power supply and controls rerouted from the existing Well 1 pump house, and connected to the system through the existing Well 1 piping.

The planning level base construction cost from the 2007 Water System Plan was projected per Engineering News Record (ENR) Seattle's Construction Cost Index (CCI) to the June 2022 value. Then, 8.6% sales tax, a 20% construction contingency, and 30% engineering, permitting, and administrative costs were added for a total year 2022 cost of $178,000.

WATER STORAGE IMPROVEMENTS

ST-1: 1,000,000 Gallon Reservoir

This project involves the construction of an estimated 1,000,000-gallon reservoir north of the Calawah River to increase residual pressures and address fireflow deficiencies in the Industrial Park identified in Chapter 3. The planned location is adjacent to the Industrial Park with the necessary elevation and lot size to install a storage reservoir sufficient to supply fire flows of 3,000 gpm. Construction of a reservoir at this location is contingent upon future tenant requirements at the Industrial Park. Presently, the City does not have a tenant with these water demand requirements, but there have been discussions with developers that would have a need for higher fire flows.

Assessment of Alternatives

An alternative to constructing a new reservoir to address fireflow deficiencies is to provide looping within the existing distribution system. The existing distribution system configuration rules out the construction of additional looping of lines of sufficient diameter to make this an attractive option; therefore, this option is considered not feasible.

Planning Level Cost Opinion

The planning level base construction cost from the 2007 Water System Plan was projected per ENR Seattle's Construction Cost Index (CCI) to the June 2022 value. Then 8.6% sales tax, a 20% construction contingency, and 30% engineering, permitting, and administrative costs were added for a total year 2022 cost of $2,500,000.

This cost opinion was also verified using a reservoir cost curve comparing total gallons to total project cost for similar reservoir projects in western Washington.

Improvement Schedule

The 2007 Water System Plan planned to construct this reservoir within the six-year planning period; however, as discussed in Chapter 1, this project was not completed. This project is planned to be developer financed; therefore, the schedule will depend on the development of the industrial park.

ST-2: Seismic Upgrades to Reservoir Nos. 2 and 3

Seismic upgrades are likely necessary to Reservoirs 2 and 3 to meet current seismic standards. The planning level base construction cost from the 2007 Water System Plan was projected per ENR Seattle's CCI to the June 2022 value. Then 8.6% sales tax, a 20% construction contingency, and 30% engineering, permitting, and administrative costs were added for a total year 2022 cost of $250,000.

WATER DISTRIBUTION SYSTEM IMPROVEMENTS

Known distribution system deficiencies were identified in Chapter 3. Water distribution system improvements are a combination of incomplete projects carried over from the previous water system plan to achieve infrastructure buildout, projects to address known deficiencies, a project to achieve a calibrated hydraulic model, and an annual pipe replacement project to replace pipes in the distribution system that are past the expected lifespan. Many of the distribution projects loop water mains while expanding infrastructure. All distribution system improvements will meet fire flow requirements. Following are the recommended distribution system improvements:

D-1: Annual Pipe Replacement

As mentioned in Chapter 3, a progressive distribution main replacement program would plan to replace 1/50th of water system distribution mains annually once they have reached a lifespan of 50 years. As of the year 2022, the water system has approximately 100,750 feet of pipe installed over 50 years ago and 22,200 feet of pipe that would reach a lifespan of 50 years in the year 2039.

At $350 per linear foot of pipe, the annual replacement program should initially budget for $705,000 dollars per year (100,750 feet x 1/50 x $350) and be re-assessed in 2031 or during the next Water System Plan.

D-2: Hydraulic Model Calibration

This project involves investigation of the existing water system to discover why field fire hydrant testing, as described in Chapter 3, drops residual pressures much lower than the same test input into the hydraulic model. Investigation should begin by verifying all valves along the flow paths identified in Figures 3-1 and 3-2 are open. $80,000 is budgeted for this project which includes investigation, monies for potential waterline repairs, calibration of the hydraulic model, and amending this Water System Plan with calibration results.

D-3: Merchant to Palmer Rd

Install an estimated 5,590 feet of 8-inch water main connecting Merchant Road with Palmer Road. This main would extend northerly from Merchant Road in the northwest quarter of Section 3 then easterly to the intercept to the existing main on Palmer Road and Project D-11. The project will include an additional 8-inch loop as can be seen in Figure 8-1. The 2007 Water System Plan estimated the cost for this improvement to be $639,100. The updated opinion of cost for this improvement is $1,504,000.

D-4 Forks Avenue South

Install an estimated 2,680 feet of 8-inch water main on Forks Avenue South. This main would extend along the southern boundary of the Forks Airport from the existing main on Russell Road to existing main at the intersection of Gun Club Road and Forks Avenue South, thereby creating a system loop. The 2007 Water System Plan estimated the cost for this improvement at $471,500. The updated opinion of cost for this improvement is $1,045,000.

D-5: Mark Rd (Eddy Ave) to Bogachiel Way

Installation of an estimated 1,690 linear feet of 8-inch water main from Mark Rd (Eddy Ave) west to the intercept with the water main on Bogachiel Way. Two short stubs will be added to connect to water mains to the north on Page Road and another on Eddy Ave. The 2007 Water System Plan estimated the cost for this improvement at $218,800. The updated opinion of cost for this improvement is $585,000.

D-6 Bogachiel Way

Install an estimated 2,830 feet of 8-inch water main on Bogachiel Way between Russell Road and 5th Avenue SW. The 2007 Water System Plan estimated the cost for this improvement at $521,500. The updated opinion of cost for this improvement is $1,390,000.

D-7: East E St to Fernhill Rd

Installation of an estimated 2,240 feet of 8-inch water main from East “E” Street east to 4th Avenue SE then south to the intercept with the water main on Fernhill Road. The 2007 Water Plan estimated the cost for this improvement at $332,500. The updated opinion of cost for this improvement is $889,000.

D-8: 5th Ave SW to Forks Ave South

Install an estimated 900 feet of 8-inch water main from the 6-inch main on 5th Avenue SW to the intercept with the main that is perpendicular to Forks Avenue South. The 2007 Water System Plan estimated the cost for these improvements at $156,100. The updated opinion of cost for this improvement is $387,000.

D-9: West End of Bogachiel Way

Install an estimated 3,220 feet of 8-inch water main from the west end of Bogachiel Way and connect and loop to small subdivision at the southwest corner of the water system. The 2007 Water Plan estimated the cost for this improvement at $550,400. The updated opinion of cost for this improvement is $1,210,000.

D-10: Trillium Ave to Big Burn Pl

Installation of an estimated 840 feet of 8-inch water main from the northern terminus of Trillium Ave, north, to the dead-end water main in Big Burn Pl. The 2007 Water System Plan estimated the cost for this improvement at $102,600. The updated opinion of cost for this improvement is $273,000.

D-11: Palmer Road to Elk Corner Rd

Installation of an estimated 1,550 feet of 8-inch water main along an easement running east-west bisecting the northeast quarter of Section 3 from the 6-inch dead end water main in Palmer Rd to the 8-inch dead end water main in Elk Corner Rd. This water main will include a crossing of Elk Creek. The 2007 Water System Plan estimated the cost for this improvement at $262,400; however, this estimate included approximately 700 linear feet of water main which has already been installed in Palmer Rd. The updated opinion of cost for this improvement is $445,000.

D-12: King Richard's Way Extension

Installation of an estimated 3,020 feet of 8-inch water main along the eastern and northern boundaries of the southeastern quarter-quarter of Section 5, which connects to the water system via King Richard's Way to Robin Hood Loop. The 2007 Water System Plan estimated the cost for this improvement at $377,300. The updated opinion of cost for this improvement is $829,000.

NON-CAPITAL IMPROVEMENTS

There are system needs identified in earlier chapters of this plan that are not capital facilities improvements; however, still need to be included in the financial plan to meet regulatory requirements for water conservation. These improvements are summarized below.

LD -1 Leak Detection and Repair Program

The City will pursue a regular leak detection and repair program as a part of the WLCAP described in Chapter 4. In addition, the City will continue to improve on record keeping of unmetered water uses. The City will pursue a water meter calibration and replacement program and will budget $20,000 annually for leak detection and repair. It should be noted that leak detection is performed on a routine basis by City staff using City owned leak detection equipment; therefore, it is not shown as a separate budget item in the City's capital improvement budget. As leaks are discovered, they are repaired at whatever cost it takes to repair them, regardless of the amount set aside in the budget for this work. This cost generally comes from the City's operations budget, not from the capital improvements budget. Nevertheless, by placing a specific amount in the City's planning budget for leak detection and repair, it is anticipated that additional attention will be focused on this matter.

Lead Service Line Inventory

Per EPA's Lead and Copper Rule Revisions, that went into effect in December 2021, all Group A community water systems are required to submit a lead service line inventory by October 2024. The City is using EPA's Service Line Inventory Template to inventory lines when they are exposed for leaks or other work and anticipates completing the inventory by October 2024. This work is performed on a routine basis by City staff; therefore, it is included in the Operations and Maintenance budget and not shown as a separate budget item in the Capital Improvement Program.

CAPITAL IMPROVEMENT SCHEDULE

Capital improvements identified above are shown in Figure 8-1. An overall capital improvement schedule is summarized in Table 8-1. The total estimated cost of all recommended capital improvements is $22,688,000. An estimated $19,260,000 is for distribution system improvements of which $4,231,000 is anticipated to be developer funded, $929,000 is proposed to be funded by the City, and the remaining cost of $14,100,000 comes from CIP D-1 which budgets for $705,000 annually. Water storage improvements are estimated to cost $2,750,000 of which $2,500,000 is developer funded and $250,000 is funded by the City. The remaining $678,000 is for leak detection, source improvements, and updating the Water System Plan in 10 years and is to be funded by the City.

TABLE 8-1

Capital Improvement Schedule

No.	Project Title	Type of Improvement	Description	Cost	Financing Source [(1)]	Year [(2)]
D-1	Annual Pipe Replacement	Distribution	Replace approximately 2,000 linear feet of pipe annually	$705,000	Unknown	Annual
D-2	Hydraulic Model Calibration	Distribution	Calibrate hydraulic model, model distribution system deficiencies, and amend WSP.	$80,000	Loan, Reserves, Rates	2023
D-3	Merchant Rd to Palmer Rd	Distribution	5,590 lf of 8-inch PVC	$1,504,000	Loan, Reserves, Rates	2031+
D-4	Forks Ave S	Distribution	2,680 lf of 8-inch PVC	$1,045,000	Loan, Reserves, Rates	2031+
D-5	Mark Rd (Eddy Ave) to Bogachiel Way	Distribution	1,690 lf of 8-inch PVC	$585,000	Developer Financed	-
D-6	Bogachiel Way	Distribution	2,830 lf of 8-inch PVC	$1,390,000	Developer Financed	-
D-7	East E St to Fernhill Rd	Distribution	2,240 lf of 8-inch PVC	$889,000	Developer Financed	-
D-8	5th Ave SW to K St	Distribution	2,320 lf of 8-inch PVC	$849,000	Loan, Reserves, Rates	2026
D-9	West End of Bogachiel Way	Distribution	3,220 lf of 8-inch PVC	$1,210,000	Developer Financed	-
D-10	Trillium Ave to Big Burn Pl	Distribution	840 lf of 8-inch PVC	$273,000	Developer Financed	-
D-11	Palmer Rd to Elk Corner Rd	Distribution	1,350 lf of 8-inch PVC and 200 lf of 8-inch HDPE	$445,000	Developer Financed	-
D-12	King Richard’s Way Extension	Distribution	3,020 lf of 8-inch PVC	$829,000	Developer Financed	-
LD-1	Leak Detection	Leak Detect	Leak detection and repair	$20,000	Loan, Reserves, Rates	Annual

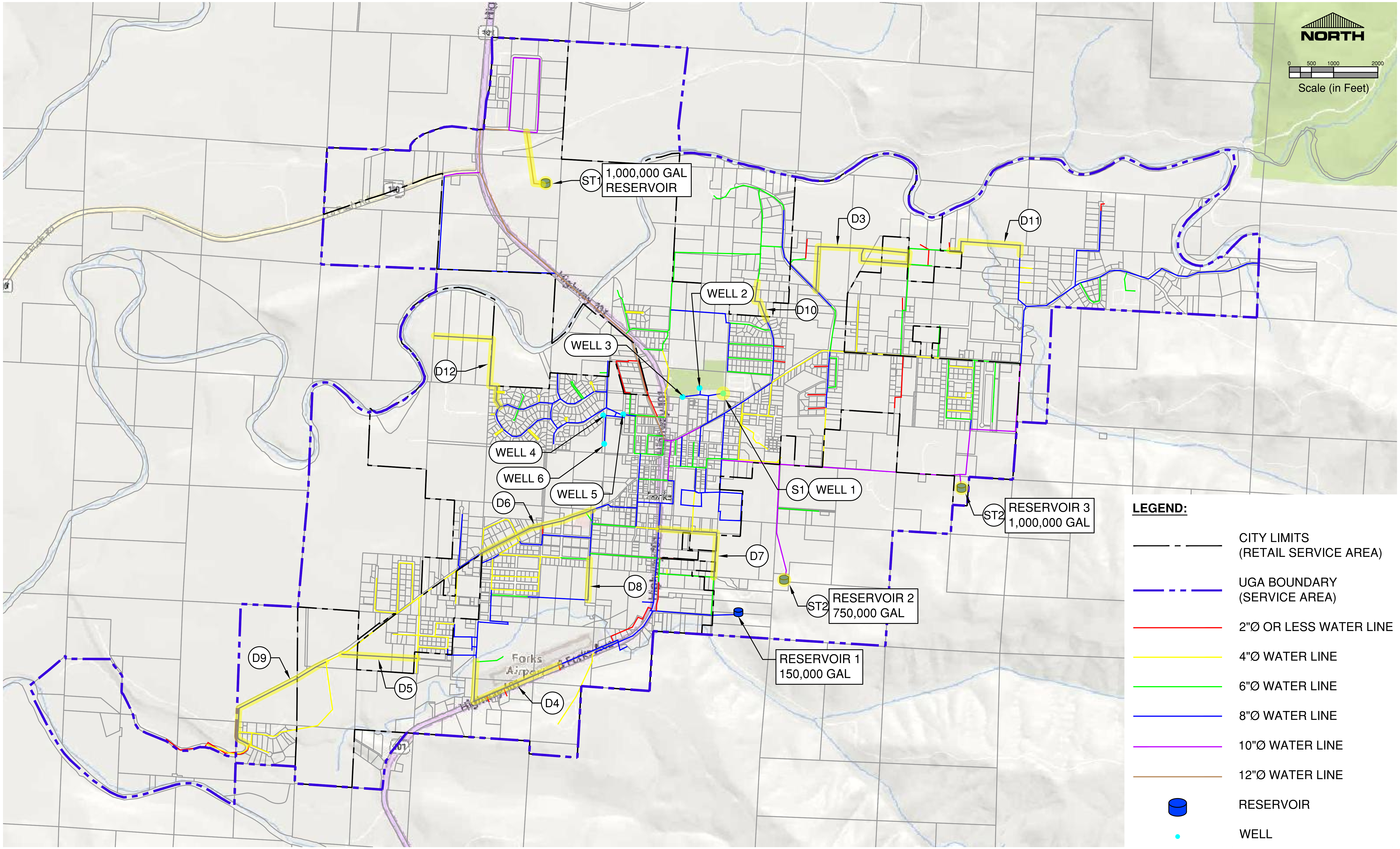
TABLE 8-1 – (continued)

Capital Improvement Schedule

No.	Project Title	Type of Improvement	Description	Cost	Financing Source (1)	Year (2)
S-1	Well 1 Replacement	Source	Replace Well 1 if necessary	$178,000	Loan, Reserves, Rates	2041
ST-1	New 1.0 MG Reservoir	Storage	Add 1.0 MG of storage for Industrial Park	$2,500,000	Developer Financed	-
ST-2	Reservoir Seismic Upgrades	Storage	Seismic upgrades to Reservoirs 2 and 3	$250,000	Loan, Reserves, Rates	2029
WSP	Update WSP	WSP	Water System Plan Update	$100,000	Loan, Reserves, Rates	2031
			Total Capital Improvements	$26,627,000		

(1) Financing is anticipated to be completed by a combination of reserves, loans and rate increases necessary to make debt service on loans while retaining adequate reserves for emergencies.

(2) Years are specified for City-financed projects. The City has no control over the timing of developer-financed projects.



City of Forks
Water System Plan
Capital Improvement Project Map
Figure 8-1

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DRAWING: T:\PROJECTS\0788 MISC ENG PROJECT\0181 JACKSON CIVIL ENG FORKS WTR SYS PLAN\FIGURES & EXHIBITS\FIG 8-1 CAPITAL IMPROVEMENT PROJECTS MAP.DWG, LAYOUT TAB: FIGURE 8-1, PLOT DATE: 2/28/2024 2:48:28 PM, DRAWING SAVE DATE: 2/28/2024 2:31:10 PM, PLOTTED BY: GMICKELSEN
PLOT DEVICE: GIBBS & OLSON - DWG TO PDF.PC3, PLOT SYLE TABLE: GIBBS-OLSON STANDARD COLOR.CTB, PAPER SIZE: GIBBS & OLSON - FIGURE B SIZE (LANDSCAPE - 17.00 X 11.00 INCHES)

Chapter 9

FINANCIAL PROGRAM

CHAPTER 9

FINANCIAL PROGRAM

OBJECTIVE

The objective of this chapter is to analyze the City's total costs of providing water service, review the current rate structure to ensure that the current or proposed adjusted rates are adequate to cover the costs of operation and maintenance, and ascertain the City's financial capability to implement the 10-year Capital Improvement Plan outlined in Chapter 8.

PAST AND PRESENT FINANCIAL STATUS

This section reviews historic revenues and expenses, recent rate changes and current City of Forks rates.

WATER RATES

In 2019, the City passed Ordinance 643 establishing a meter rate structure as shown in Appendix B. Ordinance 643 contained a provision to increase rates annually in January by a percentage equal to the annual percentage increase indicated in the Consumer Price Index All Urban Consumers (CPI-U for the Seattle-Tacoma-Bellevue area) All Items Category, as indicated for the June-to-June period of the previous year. The 2021 water rates are summarized in Table 9-1, below and included in Appendix K.

TABLE 9-1

2021 Water Rates

Basic rate for 400 cubic feet or less:		
Meter Size	**Inside City**	**Outside City**
Low-Income	$19.49	$29.27
3/4 inch	$26.02	$39.04
1 inch	$65.06	$97.64
1-1/2 inch	$119.25	$178.92
2 inch	$208.17	$312.26
3 inch	$273.24	$409.85
4 inch	$329.58	$494.39
6 inch	$390.30	$585.50
Additional rate per 100 cubic feet for 400 cubic feet up to 1,000 cubic feet:		
Low Income	$2.15	$3.19
Standard	$2.86	$4.25
Additional rate per 100 cubic feet for over 1,000 cubic feet:		
Low Income	$1.63	$2.44
Standard	$2.19	$3.26

In addition to the water rates, the City charges a 6 percent tax that is imposed on in-City customers only. Revenues from this tax are used in the City general fund. The City also charges a meter installation charge, which is $1,182.46 for installations within the corporate limits of the City and $1,345.34 for installations outside the City. Both inside and outside the City installation rates are for meters that are up to ¾ inches in size.

The City also charges an additional fee for trailer parks, apartment houses, and motels renting units as apartments, without individual meters, of $5.87 per unit for apartment or trailer over and above the regular bill.

HISTORIC REVENUES AND EXPENSES

Historic revenues are summarized in Table 9-2. Revenues from rates, meters, and miscellaneous includes revenues from water meter rates, water meter connection fees, and all other uncategorized revenue. Although the uncategorized revenue can be variable, the majority is assumed to come from meter rates and connection fees. In general, this category increased by 2.8% annually. In 2020, Rates, Meters, and Miscellaneous Revenue dropped by 8.4%. From Figure 2-1 in Chapter 2, population also dropped by approximately 8.4% in 2020. In 2019, a $1.7 million bond anticipation note was issued by the United States Department of Agriculture (USDA) to fund The Reservoirs 2 and 3 recoating capital improvement project and several other smaller projects. The bond anticipation note was retired or paid off in 2020 with the issued 40-year bond at a 2.25% annual interest rate in the amount of $1.8 million.

TABLE 9-2

Summary of Historical Water Fund Revenues ($1,000)

Description	2015	2016	2017	2018	2019	2020	2021
Rates, Meters, and Misc.	$876	$894	$931	$950	$1,048	$961	$1,059
Bonds					$1,680	$1,830	
Grants						$381	
Insurance Proceeds				$63			$4
Fixed Asset Sold		$27					
Total Revenues	**$876**	**$921**	**$931**	**$1,013**	**$2,728**	**$3,171**	**$1,062**

Historic Expenses are summarized in Table 9-3. Salaries, Benefits, and Miscellaneous includes all other uncategorized expenses. In 2019, a bond anticipation note was used to fund a $1.5 million reservoirs recoating capital improvement project and several other smaller projects and in 2020 the bond anticipation note was retired or paid off with the bond. The 2020 Projects expenses include the construction of Well 6.

TABLE 9-3

Summary of Historical Water Fund Expenses ($1,000)

Description	2015	2016	2017	2018	2019	2020	2021
Salaries, Benefits, and Misc.	$709	$719	$753	$816	$810	$861	$930
Operations & Maintenance				$32		$39	$274
Projects				$287	$1,586	$2,336	$30
Comprehensive Plan				$10	$18	$41	$8
Bond Payments					$30	$58	$69.6
Total Expenses	**$709**	**$719**	**$753**	**$1,145**	**$2,443**	**$3,335**	**$1,312**

Based on the revenues and expenses in Tables 9-2 and 9-3, the Forks Water Utility cash flow is summarized in Table 9-4. The net revenue has not been consistent and has decreased in years with high project expenses or high operations and maintenance expenses. The balance increased from the years 2015 to 2018 and decreased in 2021 with a net revenue decrease of $250,000.

TABLE 9-4

Summary of Historical Forks Water Fund Cash Flow ($1,000)

Description	2015	2016	2017	2018	2019	2020	2021
Beginning Fund Balance	$457	$624	$826	$1,003	$871	$1,156	$992
Total Revenues	$876	$921	$931	$1,013	$2,728	$3,171	$1,062
Total Expenses	$709	$719	$753	$1,145	$2,443	$3,335	$1,312
Net Revenue	$167	$201	$178	($132)	$285	($164)	($249)
Ending Fund Balance	$624	$826	$1,003	$871	$1,156	$992	$743

PROJECTED CASH FLOWS

Table 9-5 shows projected revenues. Future revenues depend on several factors including the actual city growth rate and the rate increases which follow the CPI-U as described above. The Rates, Meters, and Miscellaneous Revenue was projected at an annual percentage rate of 5.94% in 2022, 9.10% in 2023 and between 3.36% and 3.48% thereafter. These percentages are developed from a combination of the population growth rate used in Chapter 2: Future Population of this Water System Plan and the past years average CPI-U for the Seattle-Tacoma-Bellevue area All Items Category. The year 2022 annual percentage rate of 5.94% is derived from the 2020 to 2021 CPI-U inflation rate and the year 2023 annual percentage rate of 9.10% is derived from the 2021 to 2022 CPI-U inflation rate. These percentage rates are consistent as the average Rates, Meters, and Miscellaneous Revenue percentage increase from 2015 to 2021 is 3.40%. Projected revenues do not include grants or fixed asset sales because whether or not the City sells assets or secures grants is unknown.

Table 9-6 shows projected expenses without capital improvement project expenses. Projected capital improvement expenses will be considered later in this chapter and are not included in this projection. Salaries, Benefits, and Miscellaneous expenses are projected to increase annually by 4.34% starting from the City’s projected 2022 budget. 4.34% is the average percent increase for the years 2015 to 2021. The City’s 2022 water fund budget is included in Appendix K.

The Operations and Maintenance budget is projected to increase by an annual inflation rate of 3.05% starting from the City’s 2022 budget. An annual percentage increase between 0.96% and 0.68% is also applied to the Operations and Maintenance budget to reflect additional costs associated with system growth – see Chapter 2: Future Population. The City provided the bond amortization schedule as shown in the Bond Payments Expense category. The Bond Payments expense category consists of payments towards the 40-year bond at a 2.25% annual interest rate in the amount of $1.8 million.

Table 9-7 shows projected cash flow. The net income is shown to decrease starting in 2023 but remain positive and therefore the balance is shown to increase to $1.2 million in the year 2031.

TABLE 9-5

Projected Revenues ($1,000)

Description	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Rates, Meters, and Misc. Percent Increase	5.94%	9.56%	3.48%	3.47%	3.41%	3.44%	3.43%	3.42%	3.42%	3.36%
Rates, Meters, and Misc.	$1,122	$1,229	$1,272	$1,316	$1,361	$1,408	$1,456	$1,506	$1,557	$1,610
Total	$1,122	$1,229	$1,272	$1,316	$1,361	$1,408	$1,456	$1,506	$1,557	$1,610

TABLE 9-6

Projected Expenses without Capital Improvements ($1,000)

Description	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Salaries, Benefits, and Misc. (1)	$889	$928	$968	$1,010	$1,054	$1,100	$1,148	$1,197	$1,249	$1,304
Operations & Maintenance (2)	$151	$157	$163	$170	$177	$183	$191	$198	$206	$214
Bond Payments	$69.6	$69.6	$69.6	$69.6	$69.6	$69.6	$69.6	$69.6	$69.6	$69.6
Total	$1,110	$1,155	$1,201	$1,250	$1,300	$1,353	$1,408	$1,465	$1,525	$1,587

(1) Salary, Benefits, and Miscellaneous is projected to increase by an annual rate of 4.34% starting from the City's 2022 budget.

(2) Operations and Maintenance is projected to increase by an annual inflation rate of 2.50% plus an annual system growth rate between 0.96% and 0.68% starting from the City's 2022 budget.

(3) Bond payments are from the City's amortization schedule.

TABLE 9-7

Projected Cash Flow without Capital Improvements ($1,000)

Description	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Beginning Balance (1)	$743	$755	$829	$900	$966	$1,026	$1,081	$1,129	$1,170	$1,202
Projected Revenues (2)	$1,122	$1,229	$1,272	$1,316	$1,361	$1,408	$1,456	$1,506	$1,557	$1,610
Projected Expenses (3)	$1,110	$1,155	$1,201	$1,250	$1,300	$1,353	$1,408	$1,465	$1,525	$1,587
Net Income	$12	$74	$71	$66	$61	$55	$48	$41	$32	$23
Ending Balance	$755	$829	$900	$966	$1,026	$1,081	$1,129	$1,170	$1,202	$1,225

(1) Beginning balance for 2022 is the ending balance from 2021 from Table 9-4.

(2) Projected Revenues are from Table 9-5.

(3) Projected Expenses are from Table 9-6.

FUNDING OPTIONS FOR CAPITAL IMPROVEMENTS

To estimate how much, if any, additional cash flow is required to fund the planned capital improvements it must first be estimated how improvements might be financed. The estimated $1,857,000 cost for the City funded Capital Improvement Projects represents $918 per connection if distributed evenly amongst the 2,022 metered connections, or $762 per ERU if distributed evenly amongst the estimated 2,437 ERUs served in 2021. These values give some perspective to the magnitude of the funding required. The cost per connection for recommended improvements is less than the meter connection charges of $1,182.46 per meter inside City limits and $1,345.34 outside City limits.

GRANT AND LOW INTEREST LOAN AVAILABILITY

There is currently very little in the way of grant funds available for water system improvements. Many grant funding programs have had their budgets reduced recently due to prioritization of these funds to other government priorities. The few grant funds that are available generally require either that the community served by the water system be designated as low to moderate income, that improvements would cause the water rates to exceed a maximum percentage of mean household income, and/or that the improvements be necessary to eliminate an existing public health threat. Given the current status of various grant programs, while it may be worth applying for grants, it is prudent that the City not rely on receiving any grant funds for the recommended improvements.

Funding is available for water system improvements through low interest loan programs. Drinking Water State Revolving Fund (DWSRF) and Public Works Trust Fund (PWTF) have low interest loans available for 0 to 2 percent annual interest rate and 20-year terms. DWSRF, by federal policy, does not fund distribution system improvements unless it can be shown that the distribution system improvements are to alleviate an existing public health problem. Distribution system improvements to meet fire flow standards have been specifically excluded from DWSRF funding. PWTF loans can be used to fund water distribution system improvements, but funds in these programs are limited and competition for these funds is generally high. Priorities are generally directed to the communities with the greatest financial need and to projects that address the greatest public health and safety threats. Other low interest loan programs are available, such as Community Economic Revitalization Board (CERB) loans and grants for projects that create jobs or improve the local economy. Further discussion of financing programs is included later in this chapter.

ESTIMATED FINANCING COSTS

While there is no guarantee that low interest loans can be obtained for the recommended water system improvements, it is reasonable to estimate that conventional loans will be available. To estimate annual debt service that would be necessary to finance the recommended capital improvements, it will be estimated that larger expense improvements will be financed at 6 percent for 20 years with conventional loans through private lenders. It will be assumed that reserves would be used as 10 percent matching share.

FINANCING PLAN

Table 9-8 presents a financing plan model for completing the planned City-financed water system improvements. Developer financed improvements are not included in this table because they are planned to be paid for by developers when the developers are ready to proceed with development. Improvements have been distributed over the 10-year planning period to allow for coordination with the City's funding capacity and to improve project manageability. Projects have been projected from the year 2022 base construction cost at 2.50% annual interest to the proposed construction year. All projects except hydraulic model calibration, annual leak detection, and the Water System Plan Update are projected to be funded with 10 percent from Capital Reserves and the remaining 90 percent financed at 6 percent annual interest rate over 20 years.

Overall, capital reserves are projected to decrease to $281,000 in 2031; however, they are maintained above the Financial Viability Criterion of 1/8 of annual operating expenses, through the 10-year planning period. To maintain a higher capital reserve, additional revenues would most likely come from increased rates, but may also come from lower rate financing or possibly from grant funds, if either of these is available at the time the City is ready to pursue the proposed improvements.

TABLE 9-8

Capital Improvement Financing Plan ($1,000)

Project No.	Year	Cost Estimate	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
D-2	2023	$80		$82								
D-5 (2)	2026	$849					$94	$73	$73	$73	$73	$73
LD-1	Annual	$20 (4)	$20	$20	$20	$20	$20	$20	$20	$20	$20	$20
ST-2 (2)	2029	$250								$30	$23	$23
WSP	2031	$100										$125
Totals			$20	$102	$20	$20	$114	$93	$93	$123	$117	$242
Beginning Balance			$743	$735	$707	$758	$804	$751	$712	$667	$584	$500
Net Revenue			$12	$74	$71	$66	$61	$55	$48	$41	$32	$23
Ending Balance			$735	$707	$758	$804	$751	$712	$667	$584	$500	$281
1/8 of Annual O&M Expense (3)			$139	$144	$150	$156	$163	$169	$176	$183	$191	$198

(1) Only City-financed projects are shown in this table. Developer-financed projects are not accounted for in the City's budget and are planned to be completed on the developer's schedule.

(2) Funding for all capital improvements (CIP D-5 and ST-2), except hydraulic model calibration, leak detection, and water system plan update, are estimated based on the City paying 10 percent of the project cost up front and financing the remainder of the project at 6 percent annual interest rate over a 20-year pay-off period.

(3) One-eighth of the projected total annual operating expense is shown here as a comparison to the Financial Viability Criterion for minimum allowable capital reserves.

(4) Annual cost

COMPARISON OF RATES

Table 9-9 summarizes water rates for typical single-family residential services for several communities in the general vicinity of or comparable to the City of Forks. The rates in Table 9-9 represent single-family residential usage only. Other rates differ from system to system but are roughly proportional to single-family residential rates. The City currently has average rates compared to all utilities shown. All other cities have adopted an annual rate increase schedule.

TABLE 9-9

Comparison of Water Rates with Nearby Water Utilities

Utility	Base Rate	Unit Rate Amount, cf	Unit Rate per 100 cf	Cost for 1,000 cf
Hoquiam (Outside) (1)	$67.80	0-1,200	$2.97	$97.50
Long Beach (Outside)	$58.87	>400	$6.17	$95.89
Port Angeles (Outside) (1)	$57.75	0-1,000	$2.96	$87.39
Hoquiam (Inside)	$45.20	0-1,200	$1.98	$65.00
Forks (Outside)	**$39.04**	**400-1,000**	**$4.25**	**$64.54**
Long Beach (Inside)	$39.23	>400	$4.12	$63.95
Aberdeen (Outside) (2)	$46.08	400-1,299	$2.55	$61.38
Port Angeles (Inside)	$38.50	0-1,000	$1.98	$58.26
Shelton (3)	$15.99	600-1,500	$4.01	$53.33
Forks (Inside)	**$26.02**	**400-1,000**	**$2.86**	**$51.52**
Westport (Outside) (5)	$36.60	501-4,000	$2.61	$49.65
Aberdeen (Inside)	$36.86	400-1,299	$2.04	$49.10
Westport (Inside) (4)	$19.75	501-4,000	$1.63	$27.90

(1) Port Angeles and Hoqiuam outside City limit rates are 150% of inside City limit rates.
(2) Aberdeen outside City limit rates are 25% higher than inside City limit rates
(3) Shelton's rates are $3.35 per 100 cf for the first 600 cf and $4.01 per 100 cf for over 600 up to 1,500 cf.
(4) Westport rates increased by 3% each year beginning from $17.55 in 2018.
(5) Westport outside City limit rates are 1.6 times inside City limits rates plus an additional $5.00 base fee.

FINANCIAL VIABILITY

According to the Department of Health, the financial health of a utility may be judged by employing the following four financial viability tests:

1. Revenues minus Expenses ≥ 0
2. Operating Cash Reserve ≥ 1/8 x Annual Operating Expenses
3. Emergency Reserves ≥ Cost of the Most Vulnerable Facility
4. Rates ≤ 2.0 percent of Median Household Income (MHI)

1. The first financial viability test is revenues minus expenses must be greater than or equal to zero. From Table 9-7 it can be seen that projected revenues for the City with the current rates will not exceed expenses through the ten year planning period with no capital improvements. Beginning in 2026 with the planned funding of Capital Improvement Project D-6, expenses are shown to exceed rates through the planning year 2031. The City can pursue several options including increasing rates or pursuing lower interest funding or grant money to fund CIP D-5 and ST-2 and maintain a positive net revenue.

2. The second financial viability test is that operating cash reserves must be greater than one-eight of annual operating expenses. Operating expenses do not include debt or capital improvement project costs. From Table 9-8, the City can implement the capital improvement program and remain above 1/8 of operating expenses throughout the planning period.

3. The third financial viability test requires the water utility to have an emergency reserve equal to the cost of replacing the system's most vulnerable facility. Since insurance covers the replacement of above ground facilities, the most vulnerable facility that the utility would have to fund would be repairing a major water main. From Table 9-4, the City currently has $743,000 in reserves. Table 9-8 projects that the utility will have $281,000 in reserves in 2031. The cost for a major water main repair is generally below $100,000. Therefore, the utility has the resources available to respond to replace the system's most vulnerable facility not covered by insurance.

4. The fourth financial viability test is that water utility rates should not exceed 2 percent of the Median Household Income (MHI) for the utility service area. According to *US Census Bureau, American Community Survey, 2016-2020 5-Year Estimate, Income and Benefits* for the City of Forks, WA, the estimated annual Median Household Income (MHI) for the City of Forks was $35,786 compared to Clallam County's $55,090. At 3.05 percent annual inflation rate, the current MHI for the City of Forks is estimated at $38,002. Two percent of the estimated current MHI is $63.34 per month. The City water rates are shown in Table 9-1. The average residential monthly bill inside and outside the City based on one ERU as defined in Chapter 2 is as follows:

Inside City limits: [$26.02 mo. meter charge + (140 gpd (569 cf/mo) – 400 cf/mo) x $2.86 / 100 cf] x 6% tax = $32.71

Outside City limits: $39.04 mo. Meter charge + (140 gpd (569 cf/mo) – 400 cf/mo) x $4.25 / 100 cf = $43.88

The average residential bill inside the City is 1.03% of the MHI and the average residential bill outside the City is 1.39% of the MHI. Both average rates are below 2% of the MHI.

CONCLUSIONS AND RECOMMENDATIONS

Based on review of the City's water utility finances and planned capital improvements, the current rate structure is sufficient to fund operations and planned capital improvements over the entire planning period. Higher expense projects are shown to be funded with conventional financing; however, low interest loans available from funding sources such as the Public Works Trust Fund or Drinking Water State Revolving Fund should be pursued at the time of construction. Availability of low-interest loans through Public Works Trust Fund or Drinking Water State Revolving Fund for distribution system improvements is not good. Projects that provide for public health protection always get the highest rating for these programs and there are rarely funds remaining for distribution improvement projects.

This Water System Plan does not propose any rate increases in addition to the annual increases already adopted; however, rate increases may need to be considered depending on the ability to secure low interest loans or grant funding to fund higher expense Capital Improvement Projects. Rate increases should be re-evaluated shortly after the construction of CIP D-5 and ST-2.

ALTERNATIVE CAPITAL IMPROVEMENT FUNDING SOURCES

This section describes alternative funding sources the City may pursue for implementing capital projects. The following are potential funding sources currently available for public water utility improvements. It is important to note that these sources rarely provide full project funding. As in the past, the City will need to supplement funds secured from these sources with other sources of revenue to ensure implementation of the recommended capital improvement projects occurs.

Availability and conditions on government grant and loan programs vary from program to program and from year to year. Current details on specific programs are best determined by either visiting the web site for each specific program or by meeting with a specific program's regional representative.

Grants:
Community Development Block Grant (CDBG)
Community Investment Fund (CIF)
US Economic Development Administration (US EDA)
US EPA State and Tribal Assistance Grant (STAG)
USDA Forest Service, Rural Assistance Program (USFS)
USDA Rural Development (RD)
American Rescue Plan Act (ARPA)

Loans:	Public Works Trust Fund (PWTF)
	Community Economic Revitalization Board (CERB)
	Drinking Water State Revolving Fund (DWSRF)
	USDA Rural Development (RD)
Bonds:	Revenue Bonds
	General Obligation Bonds
Other:	Utility Local Improvement Districts
	Infrastructure Assistance Coordinating Council

COMMUNITY DEVELOPMENT BLOCK GRANT (CDBG)

The Community Development Block Grant program is a competitive source of federal funding for a broad range of community development projects. A primary requirement of the CDBG program is that the project must principally benefit at least 70 percent of the low-to-moderate income residents of the project area.

COMMUNITY INVESTMENT FUND (CIF)

The Community Investment Fund partners with CDBG to fund projects that benefit at least 70 percent of low-to-moderate income residents. An applicant would first apply to the CDGB General Purpose program and meet the income limits of that program. At the discretion of the Public Work Board and if the applicant is turned down for the General Purpose program, an applicant may be asked to apply to the Community Investment Fund.

US ECONOMIC DEVELOPMENT ADMINISTRATION (US EDA) – WATER AND WASTEWATER

US EDA offers competitive grants for projects. Projects are selected locally by an economic development district and submitted to Congress for competitive selection among regions in the United States. Similar to CERB, applicants must have an industrial partner ready to proceed or a feasibility study that establishes realistic job creation.

US EPA STATE AND TRIBAL ASSISTANCE GRANT (STAG) – WATER AND WASTEWATER

Local jurisdictions within the state of Washington can apply to the State and Tribal Assistance Grant (STAG) program through the office of their local Congressional representative. The Congressional representative will work to add the project as a line item to the VA/HUD Appropriations Bill.

US FOREST SERVICE – WATER AND WASTEWATER

Forest Service grants are available through the Rural Community Assistance Program to assist rural communities that are dependent on natural resources. Project proposals must show a broad community benefit that result in greater ability to improve economically, socially, or environmentally. The project must have the potential for economic development and/or job creation/retention.

USDA RURAL DEVELOPMENT, RURAL UTILITY SERVICES (RUS) – WATER AND WASTEWATER

The RD Rural Utility Service administers water and wastewater loan and grant programs to improve the quality of life and promote economic development in rural areas. Rural Development has a loan program that, under certain conditions, includes a limited grant program. Eligible projects include the construction, expansion, extension or improvement of rural water, sanitary sewers, solid waste disposal, storm, and wastewater disposal facilities. A basic criterion for RD funding is an inability to obtain funds from other sources at reasonable terms. Eligible applicants include municipalities; counties; non-profit corporations, associations, or cooperatives; and federally recognized Indian tribes in rural areas with populations less than 10,000.

AMERICAN RESCUE PLAN ACT (ARPA)

The US Department of Treasury grants funds to counties who distribute funding throughout the county. Clallam County is the primary contact to secure potential ARPA funding.

PUBLIC WORKS TRUST FUND (PWTF)

The PWTF loan program is a Washington state loan program established by the Legislature to assist cities, towns, counties, and special districts with funding for different types of public works projects. The projects can include streets, roads, drainage systems, water systems, and sanitary sewer systems. The emphasis of allocating funds is based on replacement and/or repair of existing systems. No funds are allocated to install a new system or extend an existing system. Rather, funds are granted to rehabilitate or replace an existing system serving an existing population. Loans are issued at up to a two percent interest rate for a maximum term of 20 years.

COMMUNITY ECONOMIC REVITALIZATION BOARD (CERB)

The Community Economic Revitalization Board's prime mission is to partner with business and industry and local governments to maintain and create jobs. Established by the Legislature in 1982, CERB provides low-interest loans or, in unique circumstances, grants to help finance local public infrastructure necessary to develop or retain stable business and industrial activities. Projects eligible for funding include roads, domestic and industrial waters systems, sanitary and storm sewers, port facilities, and general purpose industrial buildings.

DRINKING WATER STATE REVOLVING FUND (DWSRF)

The Washington Department of Health (DOH) manages these funds. In August 1996 Congress reauthorized the Safe Drinking Water Act (SDWA) and appropriated funding for states to develop their Drinking Water State Revolving Fund (DWSRF) loan programs. Each state receives an annual federal allocation in the form of a Capitalization Grant. In Washington State, the DWSRF is jointly managed by the Department of Health (DOH) Division of Drinking Water and the Public Works Trust Fund Board (Board), along with its partner, the Department of Community, Trade and Economic Development.

DWSRF loans are available to all community public water systems, and non-profit, non-community water systems, except federally and state-owned systems. The loans may be used for drinking water treatment, pipe installation and replacement, source water protection, well construction and rehabilitation, storage, and other projects.

The average interest rate in 2020 was 1.3% and loan term can be for the life of the facility up to a 30-year maximum term (up to a 40-year maximum term for disadvantaged communities). In addition, eligible systems must demonstrate "adequate operational, technical, and financial capability to maintain compliance," have an approved water system plan (WSP) to ensure the applicant project is included in the WSP Capital Improvement Program and meet other eligibility criteria.

REVENUE BONDS – WATER AND WASTEWATER

The most common source of funds for construction of major utility improvements is the sale of revenue bonds. These are tax-free bonds issued by a city. The major source of funds for debt service on revenue bonds is from monthly water or sewer service charges. In order to qualify to sell revenue bonds marketable to investors, the bonds typically have contractual provisions for the city to meet debt coverage requirements. The city must show that its annual net operating income (gross income less operation and maintenance expenses) must be equal to or greater than a factor, typically 1.2 to 1.4 times the annual debt service on all par debt. If a coverage factor has not been specified it will be determined at the time of any future bond issues.

GENERAL OBLIGATION BONDS – WATER AND WASTEWATER

A city may by council action or special election issue general obligation bonds to finance almost any projects of general benefit to the city. The bonds are repaid by tax assessments levied against all privately-owned properties within the city. This includes vacant property that would not otherwise contribute to the cost of the specific improvements. This type of bond issue is usually reserved for municipal improvements that are of general benefit to the public, such as arterial streets, bridges, lighting, municipal buildings, firefighting equipment, parks, and water and wastewater facilities. General obligation bonds are the most attractive bonds to investors because they are backed by the municipality's full taxing authority and carry the lowest rate of interest of any type of bond that a city may issue.

Disadvantages of general obligation bonds include the following:

- Voter approval is often required. The city will incur the legal costs of drafting a ballot measure and pay for the cost of holding a special election. There is also the additional cost of investing staff time in public education of the need for the project, yet there is always uncertainty to the outcome of elections.

- There are legal, as well as practical limits on the amount of general obligation debt a city can issue. Financing capital improvements through general obligation debt reduces the ability of the city to issue additional general obligation debt, which is often the only source of outside financing for many general government facilities.

UTILITY LOCAL IMPROVEMENT DISTRICTS – WATER AND WASTEWATER

Another potential source of funds for improvements can be obtained through the formation of Utility Local Improvement Districts (ULIDs) involving a special assessment made against properties benefiting by the improvements. ULID bonds are further backed by a legal claim to the revenues generated by the utility, similar to revenue bonds.

Sewer system expansion is a frequent application of ULID financing. Typically, ULIDs are formed by the city at the written request (by petition) of the property owners within a specific section of the city's service area. Upon receipt of a sufficient number of signatures or petitions, and acceptance by the city council, the local improvement area is formed. Therefore, a sewer system is designed for that particular area in accordance with the city's sewer comprehensive plan. Each separate property in the ULID is assessed in accordance with the special benefits the property receives from the water or wastewater system improvements. A citywide ULID could form part of a financing package for large-scale capital projects such as sewer line extensions or replacements that benefit all residents in the service area. The assessment places a lien on the property that must be paid in full upon sale of the property. ULID participants have the option of paying their assessment immediately upon receipt, thereby reducing the portion of the costs financed by the ULID bonds.

The advantages of ULID financing, as opposed to rate financing, to the property owner include:

- The ability to avoid interest costs by early payment of assessments.

- If the ULID assessment is paid in installments, it may be eligible to be deducted from federal income taxes.

- Low-income senior citizens may be able to defer assessment payments until the property is sold.

- Some Community Block Grant funds are available to property owners with incomes near or below poverty level. Funds are available only to reduce assessments.

The major disadvantage to the ULID process is that it may be politically difficult to approve formation. The ULID process may be stopped if 40 percent of the property owners protest its formation. Also, there are significant legal and administrative costs associated with the ULID process, which increases total project costs by approximately 30 percent over other financing options.

Appendix A – WFI, WUEs

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Date Submitted: 6/30/2016

Water Use Efficiency
Annual Performance Report - 2015

WS Name: FORKS MUNICIPAL WATER DEPT

Water System ID# : 26000 WS County: CLALLAM

Report submitted by: *Paul Hampton*

Meter Installation Information:

Estimate the percentage of metered connections: *100%*

If not 100% metered – Did you submit a meter installation plan to DOH? No

Within your meter installation plan, what date did you commit to completing meter installation?

Current status of meter installation:

Production, Authorized Consumption, and Distribution System Leakage Information:

12-Month WUE Reporting Period *01/01/2015* To *12/31/2015*

Incomplete or missing data for the year? *No*

If yes, explain:

Total Water Produced & Purchased (TP) – Annual volume gallons	*170,572,072*	gallons	
Authorized Consumption (AC) – Annual Volume in gallons	*137,265,891*	gallons	
Distribution System Leakage – Annual Volume TP – AC	*33,306,181*	gallons	
Distribution System Leakage – DSL = [(TP – AC) / TP] x 100 %	*19.5 %*		
3-year annual average - %	*21.4 %*		*2011, 2014, 2015*

Goal-Setting Information:

Enter the date of most recent public forum to establish WUE goal: *11/09/2015*

Has goal been changed since last performance report? *No*

Note: Customer goal must be re-established every 6 years through a public process.

Customer WUE Goal (Demand Side):

Customer (Demand Side) Goal Progress:

Additional Information Regarding Supply and Demand Side WUE Efforts

We have audited our water loss calculation and have correctly identified authorized consumption meters and meters used for testing. We have replaced a bad meter to a mobile home park that was not registering correctly. We are planning to hire an outside contractor to test our system for leaks. We are setting a goal to have a meter maintenance program in place by the end of 2016.

Describe Progress in Reaching Goals:

- Estimate how much water you saved.
- Report progress toward meeting goals within your established timeframe.
- Identify any WUE measures you are currently implementing.
- If you established a goal to maintain a historic level (such as maintaining daily consumption at 65 gallons per person per day for the next two years) you must explain why you are unable to reduce water use below that level.

The following questions will help DOH better understand water usage, water resources management and drought response. The data will be used to provide technical assistance, not for regulatory purposes.

All questions are voluntary

Month	**Date of Measurement**	**Static Water Level (feet below measuring point)**	**Dynamic Water Level (feet below measuring point)**
January			
February			
March			
April			
May			
June			
July			
August			
September			
October			
November			
December			

Water level data:

Please provide the following information (if known) to help us better utilize the water level data.

Well tag Id number:

Well depth:

Water level accuracy (within 0.01 ft < 1 ft ~ 1 ft)

Completion type (e.g., cased open interval, cased open-ended, cased open-ended with perforations, etc…)

Location coordinates (latitude, longitude) and accuracy of the coordinates (< 1ft, ~1ft, >1000ft)

Water level parameter name (e.g. depth below measuring point, depth below top of casing, depth below ground surface)

Elevation of top of casing OR elevation of measuring point if different than top of casing (as specified in question 7)

Monthly/Seasonal Water Usage:

What was your maximum daily water demand for the previous year (in gallons per day)? ____________

Month	Volume of Water Produced in gallons
January	
February	
March	
April	
May	
June	
July	
August	
September	
October	
November	
December	

Water shortage response:

Did you activate any level of water shortage response plan the previous year?

☐ Yes ☐ No ☐ There was no need to

If you activated a water shortage response plan the previous year, what level did you activate? (Check all that apply)

☐ Advisory Conservation ☐ Voluntary Conservation

☐ Mandatory Conservation ☐ Rationing ☐ Other

What factors caused your water shortage the previous year?

☐ Drought ☐ Fire ☐ Landslides ☐ Earthquakes

☐ Flooding ☐ Water Supply Limitations ☐ Other

Do not mail, fax, or email this report to DOH

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Date Submitted: 7/18/2017

Water Use Efficiency
Annual Performance Report - 2016

WS Name: FORKS MUNICIPAL WATER DEPT Water System ID# : 26000 WS County: CLALLAM

Report submitted by: *Paul Hampton*

Meter Installation Information:

Estimate the percentage of metered connections: *100%*

If not fully metered - Current status of meter installation:

Production, Authorized Consumption, and Distribution System Leakage Information:

12-Month WUE Reporting Period: *01/01/2016* To *12/31/2016*

Incomplete or missing data for the year? *No*

If yes, explain:

Distribution System Leakage Summary:

Total Water Produced and Purchased (TP) – Annual Volume	*177,002,771*	gallons
Authorized Consumption (AC) – Annual Volume	*148,348,543*	gallons
Distribution System Leakage – Annual Volume TP – AC	*28,654,228*	gallons
Distribution System Leakage – Percent DSL = [(TP – AC) / TP] x 100	*16.2 %*	
3-year annual average	*21.7 %*	

Goal-Setting Information:

Date of Most Recent Public Forum: *11/09/2015* Has goal been changed since last performance report? *No*

Note: Customer goal must be re-established every 6 years through a public process

WUE Goals:

Customer Goal (Demand Side):

Describe Progress in Reaching Goals:

Customer (Demand Side) Goal Progress:

Additional Information Regarding Supply and Demand Side WUE Efforts

Include any other information that describes how you and your customers use water efficiently:

This year we have eliminated a leaking fire hydrant that was estimated at 5 gal per minute. We also have installed two new trailer court meters, which one was leaking. We have started to replace inaccurate meters this year and will continue with the efforts. We have also purchased new meter testing equipment to test for inaccurate meters. We will plan to budget for a contractor to come in for leak detection.

Do not mail, fax, or email this report to DOH

Washington State Department of
Health
Division of Environmental Health
Office of Drinking Water

Date Submitted: 6/29/2018

Water Use Efficiency
Annual Performance Report - 2017

WS Name: FORKS MUNICIPAL WATER DEPT Water System ID# : 26000 WS County: CLALLAM

Report submitted by: *Paul Hampton*

Meter Installation Information:

Estimate the percentage of metered connections: *100%*

If not fully metered - Current status of meter installation:

Production, Authorized Consumption, and Distribution System Leakage Information:

12-Month WUE Reporting Period: *01/01/2017* To *12/31/2017*

Incomplete or missing data for the year? *No*

If yes, explain:

Distribution System Leakage Summary:

Total Water Produced and Purchased (TP) – Annual Volume	*187,363,088* gallons
Authorized Consumption (AC) – Annual Volume	*132,511,629* gallons
Distribution System Leakage – Annual Volume TP – AC	*54,851,459* gallons
Distribution System Leakage – Percent DSL = [(TP – AC) / TP] x 100	*29.3 %*
3-year annual average	*21.7 %*

Goal-Setting Information:

Date of Most Recent Public Forum: *11/09/2015* Has goal been changed since last performance report? *No*

Note: Customer goal must be re-established every 6 years through a public process

WUE Goals:

Customer Goal (Demand Side):

Describe Progress in Reaching Goals:

Customer (Demand Side) Goal Progress:

Additional Information Regarding Supply and Demand Side WUE Efforts

Include any other information that describes how you and your customers use water efficiently:

Keep identifying leaks and fixing them. Testing and replacing old meters. Education to customers when they open an account and flyers for existing water accounts.

Do not mail, fax, or email this report to DOH

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Date Submitted: 6/24/2019

Water Use Efficiency
Annual Performance Report - 2018

WS Name: FORKS MUNICIPAL WATER DEPT   Water System ID# : 26000   WS County: CLALLAM

Report submitted by: *Paul Hampton*

Meter Installation Information:

Estimate the percentage of metered connections: *100%*

If not fully metered - Current status of meter installation:

Production, Authorized Consumption, and Distribution System Leakage Information:

12-Month WUE Reporting Period: *01/01/2018* To *12/31/2018*

Incomplete or missing data for the year? *No*

If yes, explain:

Distribution System Leakage Summary:

Total Water Produced and Purchased (TP) – Annual Volume	*178,446,309* gallons
Authorized Consumption (AC) – Annual Volume	*133,389,812* gallons
Distribution System Leakage – Annual Volume TP – AC	*45,056,497* gallons
Distribution System Leakage – Percent DSL = [(TP – AC) / TP] x 100	*25.2 %*
3-year annual average	*23.6 %*

Goal-Setting Information:

Date of Most Recent Public Forum: *11/09/2015* Has goal been changed since last performance report? *No*

Note: Customer goal must be re-established every 6 years through a public process

WUE Goals:

Customer Goal (Demand Side):

Describe Progress in Reaching Goals:

Customer (Demand Side) Goal Progress:

We are having a drought workshop 6/25/2019 that the public is invited to.

Additional Information Regarding Supply and Demand Side WUE Efforts

Include any other information that describes how you and your customers use water efficiently:

We are continually fixing leaks and we are in the planning stages of hiring a contractor to do leak detection. We are also issuing letters to the mobile home parks stating that the City will no longer be reading meters within the park. Due to the high water loss in trailer parks we anticipate that this will help reduce the City's water loss.

Do not mail, fax, or email this report to DOH

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Date Submitted: 6/10/2020

Water Use Efficiency
Annual Performance Report - 2019

WS Name: FORKS MUNICIPAL WATER DEPT Water System ID# : 26000 WS County: CLALLAM

Report submitted by: *Paul Hampton*

Meter Installation Information:

Estimate the percentage of metered connections: *100%*

If not fully metered - Current status of meter installation:

Production, Authorized Consumption, and Distribution System Leakage Information:

12-Month WUE Reporting Period: *01/01/2019* To *12/31/2019*

Incomplete or missing data for the year? *No*

If yes, explain:

Distribution System Leakage Summary:

Total Water Produced and Purchased (TP) – Annual Volume	*166,893,947*	gallons
Authorized Consumption (AC) – Annual Volume	*124,524,930*	gallons
Distribution System Leakage – Annual Volume TP – AC	*42,369,017*	gallons
Distribution System Leakage – Percent DSL = [(TP – AC) / TP] x 100	*25.4 %*	
3-year annual average	*26.6 %*	

Goal-Setting Information:

Date of Most Recent Public Forum: *11/09/2015* Has goal been changed since last performance report? *No*

Note: Customer goal must be re-established every 6 years through a public process

WUE Goals:

Customer Goal (Demand Side):

Describe Progress in Reaching Goals:

Customer (Demand Side) Goal Progress:

Additional Information Regarding Supply and Demand Side WUE Efforts

Include any other information that describes how you and your customers use water efficiently:

We continue to track and fix leaks. We have stopped reading meters in the mobile home parks and hope to see a change in 2020 water loss. We are identifying stuck meters once a quarter and are replacing aging meters.

Do not mail, fax, or email this report to DOH

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Date Submitted: 6/21/2021

Water Use Efficiency
Annual Performance Report - 2020

WS Name: FORKS MUNICIPAL WATER DEPT

Water System ID# : 26000 WS County: CLALLAM

Report submitted by: *Paul Hampton*

Meter Installation Information:

Estimate the percentage of metered connections: *100%*

If not 100% metered – Did you submit a meter installation plan to DOH? No

Within your meter installation plan, what date did you commit to completing meter installation?

Current status of meter installation:

Production, Authorized Consumption, and Distribution System Leakage Information:

12-Month WUE Reporting Period *01/01/2020* To *12/31/2020*

Incomplete or missing data for the year? *No*

If yes, explain:

Total Water Produced & Purchased (TP) – Annual volume gallons	*173,244,280*	gallons	
Authorized Consumption (AC) – Annual Volume in gallons	*133,309,996*	gallons	
Distribution System Leakage – Annual Volume TP – AC	*39,934,284*	gallons	
Distribution System Leakage – DSL = [(TP – AC) / TP] x 100 %	*23.1 %*		
3-year annual average - %	*24.6 %*		*2018, 2019, 2020*

Goal-Setting Information:

Enter the date of most recent public forum to establish WUE goal: *11/09/2015*

Has goal been changed since last performance report? *No*

Note: Customer goal must be re-established every 6 years through a public process.

Customer WUE Goal (Demand Side):

Customer (Demand Side) Goal Progress:

Additional Information Regarding Supply and Demand Side WUE Efforts

The City has budgeted over a 100,000 dollars to replace old meters including the source meters. Meter installation has already started as of June 2021. The City continues to identify leaks and stuck meters.

Describe Progress in Reaching Goals:

- Estimate how much water you saved.
- Report progress toward meeting goals within your established timeframe.
- Identify any WUE measures you are currently implementing.
- If you established a goal to maintain a historic level (such as maintaining daily consumption at 65 gallons per person per day for the next two years) you must explain why you are unable to reduce water use below that level.

The following questions will help DOH better understand water usage, water resources management and drought response. The data will be used to provide technical assistance, not for regulatory purposes.

All questions are voluntary

Month	Date of Measurement	Static Water Level (feet below measuring point)	Dynamic Water Level (feet below measuring point)
January	01/31/2020	68.8	
February	02/14/2020	62.8	
March	03/27/2020	84.4	
April	04/24/2020	87.5	
May	05/29/2020	90.5	
June	06/26/2020	91.8	
July	07/31/2020	93.9	
August	08/28/2020	95.2	
September	09/25/2020	96.0	
October	10/30/2020		
November	11/27/2020	85.1	
December	12/31/2020	81.5	

Water level data:

Please provide the following information (if known) to help us better utilize the water level data.

Well tag Id number:	AHM638
Well depth:	178.0
Water level accuracy (within 0.01 ft < 1 ft ~ 1 ft)	1ft
Completion type (e.g., cased open interval, cased open-ended, cased open-ended with perforations, etc…)	Open Interval
Location coordinates (latitude, longitude) and accuracy of the coordinates (< 1ft, ~1ft, >1000ft)	47.95436767 124.38044227
Water level parameter name (e.g. depth below measuring point, depth below top of casing, depth below ground surface)	depth below top of casing
Elevation of top of casing OR elevation of measuring point if different than top of casing (as specified in question 7)	300ft

Monthly/Seasonal Water Usage:

What was your maximum daily water demand for the previous year (in gallons per day)?

Month	Volume of Water Produced in gallons
January	14,867,996
February	13,918,784
March	16,781,432
April	15,304,080
May	12,131,064
June	12,335,268
July	14,554,860
August	12,983,036
September	16,298,920
October	17,079,832
November	13,716,824
December	13,582,184

Water shortage response:

Did you activate any level of water shortage response plan the previous year?

☐ Yes ☑ No ☐ There was no need to

If you activated a water shortage response plan the previous year, what level did you activate? (Check all that apply)

☐ Advisory Conservation ☐ Voluntary Conservation

☐ Mandatory Conservation ☐ Rationing ☐ Other

What factors caused your water shortage the previous year?

☐ Drought ☐ Fire ☐ Landslides ☐ Earthquakes

☐ Flooding ☐ Water Supply Limitations ☐ Other

Do not mail, fax, or email this report to DOH

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

WATER FACILITIES INVENTORY (WFI) FORM

Quarter: 1
Updated: 11/23/2020
Printed: 1/22/2021
WFI Printed For: On-Demand
Submission Reason: Treatment Update

ONE FORM PER SYSTEM

RETURN TO: Central Services - WFI, PO Box 47822, Olympia, WA, 98504-7822

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
26000 E	FORKS MUNICIPAL WATER DEPT	CLALLAM	A	Comm

6. PRIMARY CONTACT NAME & MAILING ADDRESS

CLYDE P. HAMPTON [SUPERINTENDENT]
500 E DIVISION ST
FORKS, WA 98331

STREET ADDRESS IF DIFFERENT FROM ABOVE

ATTN
ADDRESS
CITY STATE ZIP

7. OWNER NAME & MAILING ADDRESS

FORKS, CITY OF
CLYDE P. HAMPTON
500 E DIVISION ST
FORKS, WA 98331

SUPERINTENDENT

STREET ADDRESS IF DIFFERENT FROM ABOVE

ATTN
ADDRESS
CITY STATE ZIP

9. 24 HOUR PRIMARY CONTACT INFORMATION

Primary Contact Daytime Phone: (360) 374-5412
Primary Contact Mobile/Cell Phone: (360) 640-8363
Primary Contact Evening Phone: (xxx)-xxx-xxxx
Fax:
E-mail: xxxxxxxxxxxxxxxxxxxx

10. OWNER CONTACT INFORMATION

Owner Daytime Phone: (360) 374-5412 x242
Owner Mobile/Cell Phone: (360) 640-1535
Owner Evening Phone:
Fax:
E-mail: xxxxxxxxxxxxxxxxxxxx

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- ☒ 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
- ☒ Commercial / Business
- ☒ Day Care
- ☒ Food Service/Food Permit
- ☐ 1,000 or more person event for 2 or more days per year
- ☒ Hospital/Clinic
- ☒ Industrial
- ☒ Licensed Residential Facility
- ☒ Lodging
- ☒ Recreational / RV Park
- ☒ Residential
- ☒ School
- ☐ Temporary Farm Worker
- ☒ Other (church, fire station, etc.): ________________

13. WATER SYSTEM OWNERSHIP (mark only one)

- ☐ Association
- ☒ City / Town
- ☐ County
- ☐ Federal
- ☐ Investor
- ☐ Private
- ☐ Special District
- ☐ State

14. STORAGE CAPACITY (gallons)

1,900,000

- 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
26000 E	FORKS MUNICIPAL WATER DEPT	CLALLAM	A	Comm

15	16 SOURCE NAME	17 INTERTIE	18 SOURCE CATEGORY										19 USE			20	21 TREATMENT						22 DEPTH	23	24 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	WELL #1 AHM638 WW				X								X					X		X			126	210	SE SE	04	28N	13W
S02	WELL #2 AHM642 WW				X								X					X		X			109	265	SE SE	04	28N	13W
S03	WELL #3 AHM639 WW				X								X					X		X			102	300	SE SE	04	28N	13W
S04	WELL #4 AHM640 WW				X								X			Y		X		X			118	300	SW SE	04	28N	13W
S05	WELL #5 AHM641 WW				X								X			Y		X		X			117	480	SW SE	04	28N	13W
S06	WF (S01,2 & 3)			X									X					X					102	775	SE SE	04	28N	13W
S07	WF (S04 & 5)			X									X					X					117	780	SW SE	04	28N	13W

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
26000 E	FORKS MUNICIPAL WATER DEPT	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?)		1866	Unspecified
A. Full Time Single Family Residences (Occupied 180 days or more per year)	1345		
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	34		
B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year	521		
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.	213	213	
28. TOTAL SERVICE CONNECTIONS		2079	

29. FULL-TIME RESIDENTIAL POPULATION

A. How many residents are served by this system 180 or more days per year? 4350

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?	500	500	500	750	750	1000	1250	1250	1000	750	500	500
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?	100	100	100	100	100	100	50	50	100	100	100	100
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
	5	5	5	5	5	5	5	5	5	5	5	5

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**
26000	FORKS MUNICIPAL WATER DEPT

Total WFI Printed: 1

Washington State Department of
Health
Division of Environmental Health
Office of Drinking Water

Water Facilities Inventory (WFI)

Report Create Date: 1/22/2021

Water System Id(s): 26000

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 B – Municipal Code
and Standard Details

Chapter 13.20
WATER DEPARTMENT

Sections:

13.20.010 Definition of terms and duties of personnel.

(1) “City,” as used in this chapter, includes the mayor and the city council of the city of Forks and the municipal water department.

(2) “Water superintendent” means the official of the water department and such other personnel as the city council may authorize, appointed by the mayor to oversee the water department personnel and the operation and maintenance of the water system, making repairs of all kinds. Supervise construction of all extensions and additions and any construction work in connection with the present water system, and any new system that may be established. The superintendent shall, at

all times, be subject to the direction and authority of, and answerable only to, the mayor and shall hold such appointment during the pleasure of the mayor. The above personnel shall receive such salary as the city council may determine. (Ord. 246 § 3, 1982)

13.20.020 Application for service.

(1) The city shall require a connection fee of $25.00 at the time of application for water service.

(2) For each service applied for, or a transfer within the water system, there shall be a service charge of $15.00, payable at the time of application for service. An application must be made, in writing, on a standard form at the office of the water department. The application shall set forth: (a) signature of the applicant; (b) owner of the premises to be served; (c) location of premises; (d) address of party paying bills.

(3) An application is merely a written request for service and does not, in itself, bind the city to serve. The city reserves the right to serve water upon any premises, regardless of classification, through either metered or flat rate service. (Ord. 353 §§ 2, 3, 1993; Ord. 294 § 1, 1987; Ord. 246 § 4, 1982)

13.20.030 Contracts.

(1) Upon acceptance, the application shall be considered a contract in which the applicant agrees to abide by such rates, rules and regulations as may be adopted by the city, and to pay all bills promptly.

(2) When a customer’s requirements for water are unusual, or necessitate considerable special or reserve equipment or special consideration, the city may require a contract over and above general application contracts, for an extended period and may also require security satisfactory to the city to protect the city against loss and guarantee the performance of the provisions of said contract. The city reserves the right to make special contracts, the provisions and conditions of which may be different from or have exceptions to the regular published schedules. Such special contracts shall be in writing and signed by the proper customer and the city.

(3) Except for special contracts, which specify the length of time to which the contract rate shall be extended, all rates, rules and regulations are subject to change or modification by the city without notice. (Ord. 246 § 5, 1982)

13.20.040 Water charges.

(1) All water services charged are due and payable on the tenth day of each calendar month. Whenever any charge for furnishing water to any customer shall not be paid within 30 days after the same becomes due and payable, the city of Forks, upon prior notice, shall discontinue service of water to such customer and water shall not again be furnished to such customer until all outstanding obligations for water supplied to such customer shall have been paid in full. Whenever disconnection is made for nonpayment of bills, the city of Forks will charge $25.00 for the cost of

collection and reconnection.

(2) The word “notice,” as used above, shall mean sending a written notice by regular mail to the customer and/or posting the property supplied with water. If more than one residence is supplied by a meter, such as apartment houses or trailer parks, then the owner of the property as well as each tenant shall be notified by regular mail and/or posting the property and each living unit contained thereon. Notice shall be sent and/or posted for the benefit of a property owner no less than 15 days prior to the shutoff date. If the owner does not pay within five days of the effective date of notice, then each of any tenants upon the owner’s property shall be notified by regular mail and/or posting of that tenant’s living unit at least five days before the shutoff date and the property owner shall have to pay an additional $1.00 per tenant notified in addition to any amounts due for water service.

(3) If any customer disputes the amount of a bill the city shall provide that person with an opportunity to meet with a representative of the water department to resolve the dispute. If a meeting is requested by the customer pursuant to this section, then the customer’s water shall not be shutoff for nonpayment of a disputed bill for at least 10 days from the date of the meeting even if the shutoff is authorized at an earlier date pursuant to subsection (2) of this section.

(4) At the time specified by a customer that he expects to vacate the premises where service is supplied, or that he desires service to be discontinued, the meter will be read, turned off and a bill rendered, which is payable immediately. If the homeowner desires the water to be left on, a bill will be rendered to owner for minimum monthly charges.

(5) If, at the customer’s request, the water is turned on and off, or vice versa, more than once in a meter reading month, a minimum charge of $10.00 will be made for the labor involved.

(6) Each customer vacating any premises supplied with water service by the city will be responsible for all water supplied to the premises until the city shall have notice of such removal.

(7) Any landowner who has apartments on his property which consist of three or more units, obtaining service from one meter, shall be charged a surcharge of $2.00 per unit in addition to the minimum and meter charges, occupied or not.

(8) Any landowner who has mobile homes and/or trailers on his or her property consisting of three or more mobile homes and/or trailers placed at locations where they are capable of obtaining service from one meter shall be considered a trailer park or court and shall be charged a surcharge of $2.00 per mobile home or trailer in addition to the minimum and meter charges, whether or not such mobile homes and/or trailers are currently occupied. (Ord. 353 §§ 4, 5, 1993; Ord. 335 § 1, 1991; Ord. 294 § 2, 1987; Ord. 246 § 6, 1982)

13.20.045 Billing adjustments.

Pursuant to a policy approved by the city council, and subject to modification from time to time by the council, the director of public works, acting as the water superintendent, shall be authorized to approve or deny the adjustment of water billings when a request has been made by a customer following that customer’s repair of an outdoor water line that had been leaking. Further, pursuant to such a policy referenced herein, the director of public works may make only one billing adjustment during any five-year period when the requested adjustment is related to a repaired, substantially costly water leak occurring within a building associated with the customer water account for that building and/or parcel. (Ord. 578 § 1, 2010; Ord. 568 § 1, 2009)

13.20.050 Consent for private connections.

(1) It shall be a violation of these rules and regulations for any person or persons to attach to or detach from any water main or service pipe, or water connections through which water is supplied by the city of Forks. No person supplied with water from the city mains will be entitled to use it for any other purpose than stated in their original application, or supply in any way other persons, or premises, or to interfere in any manner with any pipe or connection without first making written application to the city.

(2) It shall be a violation of these rules and regulations for any person to use or tamper with any valve, curbstop, etc., which is the property of the city for the purpose of turning water on or off, without the express consent of the city. The city shall hold any person responsible for the cost of repairing any damage to any of the city’s property caused by such usage or tampering. The city requires every property owner to install his own valve in his own pipe for the control of service to his premises.

(3) It shall be a violation of these rules and regulations for any person, or persons to cut, alter, change, remove, disconnect or connect with or in any manner interfere, meddle or tamper with any fire hydrant owned or used by the city; provided, that the provisions of this section shall not apply to the city of Forks fire department, and/or street department. Other departments of the city may be allowed to connect to said fire hydrants, but before doing so must obtain consent from the water superintendent and must use a spanner or regulation wrench in connection therewith. (Ord. 246 § 7, 1982)

13.20.060 Responsibility and service preference.

(1) The city shall not be liable for any loss or damage of any nature whatsoever caused by any defect in the customer’s line, plumbing or equipment, and the city may, without notice, discontinue service to any customer when a defective condition of plumbing or equipment upon the premises of the customer results, or is likely to result, in interference with proper service or is likely to cause contamination of the water. The city does not assume the duty of inspecting the customer’s lines, plumbing or equipment, and shall not be responsible therefor, and will not be liable for failure of customer to receive service on account of defective plumbing or apparatus on the customer’s premises.

(2) Should any meter fail to register correctly, or if a leak should be detected, the city may adjust the billing accordingly. Such adjustment shall be estimated by the city from a corresponding period.

In the case of a leak, an adjustment will be made when the leak is detected. The city, however, will adjust only once for a leak and it is the property owners' responsibility to fix the leak, as the city will adjust only one billing.

(3) The city will not permit any physical connection between a private water supply and the city's distribution system or supply line.

(4) The city will exercise reasonable diligence and care to furnish and deliver a continuous and sufficient supply of water to the customer avoiding any shortage or interruption of delivery of the same. However, the city will not be liable for high or low pressure conditions, interruption or shortage or insufficiency of supply, or any loss or damage occasioned thereby. The city, whenever it shall find it necessary to make repairs or improvements to its system, shall have the right to suspend, temporarily, the delivery of water, but in all such cases, if possible, a reasonable notice will be given to customers, and repairs and improvements will be completed as rapidly as possible.

(5) The use of water upon the premises of the customer is at the risk of the customer, and the responsibility of the city shall cease 12 inches inside the customer's side of the meter.

(6) In case of shortage of supply, the city reserves the right to give preference in the manner of furnishing service for the best interest of public convenience and necessity. (Ord. 246 § 8, 1982)

13.20.070 Transfer of service.
Owners of rental properties may file a "continuous service agreement" with the water department office, requesting that water service be transferred directly into the owner's name, upon the water department receiving a removal notice under FMC 13.20.040 from a tenant. Automatic transfers will still be subject to the $15.00 service fee under FMC 13.20.020. Rental properties not covered by a "continuous service agreement" will be treated as any other property where a service removal has been filed and will be subject to the $25.00 connection fee under FMC 13.20.020, along with the $15.00 service fee under FMC 13.20.020. (Ord. 353 § 6, 1993)

13.20.080 New services.
All new water services will be required to purchase a water meter. Additional cost for labor and material will be required if the water main line does not border the resident's property. (Ord. 381 § 5, 1994)

13.20.090 Discontinued water services.
If a service has been discontinued for any reason and the city of Forks cannot determine that a service has been at that location it will be considered a new service and all fees will apply. If the city of Forks can verify that a service was at that location then it will re-establish that service. The city of Forks will determine if a service existed by locating a meter box in the ground or having any record of an account for that location (meter book page or someone who may have signed for that location). The property owner will be responsible for protecting any unused services. If an unused

service has been covered up the owner will be responsible for any costs incurred to re-establish this service. (Ord. 381 § 6, 1994)

13.20.100 Considered regular customer when.

Customers applying for water service after a meter reading day during any month will be considered a regular customer and will be billed on the first day of the second following month for water consumption and minimums. (Ord. 353 § 7, 1993)

13.20.110 Deposits.

Customer water deposits held by the city of Forks as of the effective date of the ordinance codified in this section shall be credited to the customer’s account unless the customer has had a disconnection for nonpayment of bills in the last six months. (Ord. 353 § 8, 1993)

13.20.120 Water main extension contracts.

In accordance with the Laws of the State of Washington of 1959, Chapter 261 and subsequent amendments (RCW 35.91.010 through 35.91.050), the city may from time to time, as it deems necessary and advisable, contract with owners of real estate for the construction of water mains, hydrants or appurtenances, hereinafter called “water facilities,” within the corporate limits of the city or within 10 miles of the corporate limits connecting with the public water system to serve the area in which real estate of such owners is located, and to provide for a period of not to exceed 15 years from the reimbursement of such owners and their assigns by any owner of real estate who did not contribute to the original cost of such water facilities, and who subsequently tap on to or use the same of the fair pro rata share of the cost of construction of said water facilities, including not only those directly connected thereto, but also users connected to laterals or branches connected thereto, subject to such reasonable rules and regulations as the city may provide or contract, notwithstanding the provisions of any other law. The provisions of such contract shall not be effective as to any owner of real estate not a party thereto unless such contract shall have been recorded in the office of the county auditor for Clallam County prior to the time such owner taps into or connects to said water facilities.

That in connection with the terms of the contract and the law enforcement thereof all of the terms of Chapter 261, Laws of 1959, as hereafter amended, shall apply. (Ord. 246 § 9, 1982)

13.20.130 Meters.

(1) After September 1, 1953, all premises or customers served by the city shall be metered. All meters will be owned, installed and maintained by the city, unless otherwise provided in special contracts and/or writing.

(2) Where a meter is used to measure the total water used, as in apartment houses, residential courts, water districts, etc., the city will not furnish or read auxiliary or submeters used for the customer’s convenience.

(3) The city will keep an accurate account of its meter reading books, which shall be offered at all times, places and courts as prima facia evidence of the use of water service by the customer, and shall be the basis on which all bills are calculated.

(4) The city will, upon request, test any customer’s meter, and where circumstances require, adjust for wrong charges. When a customer requests a meter test, a deposit of $10.00 to cover the cost of testing will be required of the customer. The amount deposited will be returned to the customer if the meter is found to overregister more than two percent under conditions of normal operation. The customer will have the right to require the test to be conducted in the presence of an expert or other representative appointed by him.

(5) All meters will be tested before installation and no meter will be placed in service or allowed to remain in service which is known to have a registration error in excess of two percent under normal conditions.

(6) Meters will be read monthly and bills rendered, based on total consumption.

(7) When making charges, all meters serving a customer’s premises will be considered separately and the readings will not be combined or split, except where the city, for operating necessity, elects to install two or more meters at a central location. These readings will be combined in making charges.

(8) Only one residence or business will be served by a meter.

(9) The location of the meter or meters must be a place satisfactory to the city before service will be supplied. Ordinarily meters will be installed outside of buildings and between the property line and curb. Where meters are at present or may be installed within a building, the city will not be held responsible for damage for seepage through the wall, nor from leaking meter, pipe or fittings.

(10) No rent or other charge shall be made by the customer against the city for placing or maintaining meters upon customer’s premises.

(11) If a meter under-registers due to tampering or piping or in any other way causing under registering, service may be discontinued and will not be reconnected until restitution has been made for the loss of revenue, and satisfactory assurance given that there will be no more tampering.

(12) Meter readings are to be averaged during any period when it is impossible or impracticable to read meters on regular reading date. (Ord. 626 § 1, 2016; Ord. 353 § 9, 1993; Ord. 246 § 10, 1982)

13.20.140 Authority – Violation, penalty.

(1) The city shall have authority to decide any questions which may arise and are not fully covered by any of the provisions of this chapter, and all decisions shall be final. The right is reserved by the

city to amend or add to these rules and regulations as experience shows necessity or expediency.

(2) Any person violating any of the provisions of this chapter of the city shall be prosecuted as a misdemeanor and upon conviction thereof shall be punishable by a fine not to exceed $500.00 or imprisonment, or both. (Ord. 246 § 11, 1982)

13.20.150 Tax addition schedule.

The amount of the total of any or all revenue, or other form of tax imposed by any federal or state taxing body upon the city, may be apportioned among the various different classes of service furnished therein, and shall constitute an additional charge to any amounts billed to any customer under any rate schedule or special contract covered by ordinances covering the city. (Ord. 246 § 12, 1982)

Chapter 13.25
WATER RESTRICTIONS

Sections:

13.25.010 Declaration.

The city water superintendent is empowered, from time to time and as circumstances require, to declare the existence of a water emergency when, in the judgment of such water superintendent, the water supply available to the city of Forks is insufficient to continue to allow unrestricted use of such water. (Ord. 279 § 1, 1985)

13.25.020 Restrictions.

Upon declaring such an emergency, the city water superintendent may restrict or prohibit the use of water by any and all parties served by the city of Forks water system for any and/or all outdoor uses, including but not limited to irrigation, lawn and garden sprinkling, vehicle washing, swimming pool use, or any other outdoor use of water. (Ord. 279 § 2, 1985)

13.25.030 Notice of restrictions.

Any such declaration of a water emergency and imposition of use restrictions shall be effective immediately upon publication in the following manner:

(1) The notice required by this section shall be publicly posted at the Forks City Hall, the United States Post Office in Forks, Washington, and at least three other places in the city of Forks. The emergency use regulations so posted shall be in effect from the time of posting, but, in order to remain in effect, the notice shall be published in the first issue of the city’s official newspaper, published after such date of posting.

(2) The form of such notice shall be substantially as follows:

> Emergency water restrictions. The Forks City Water Superintendent has determined that a shortage exists in the Forks city water supply and that a water emergency exists. As a result, the following emergency water use restrictions are in effect, and are applicable to all users of the Forks city water system, whether within or without the City, as specified below:

> (description of restrictions)
>
> Violation of the above use restrictions by any person is a misdemeanor and the violator is subject to a fine.

(Ord. 279 § 3, 1985)

13.25.040 Violation – Penalty.
(1) Any person who violates any water use restriction imposed under this chapter shall be guilty of a misdemeanor and shall be punished by a fine not to exceed $500.00.

(2) Any person receiving water service from the city of Forks water utility who fails to prevent use in violation of such restrictions of water supplied to such person shall be guilty of a misdemeanor and shall be punished by a fine not to exceed $500.00. (Ord. 279 § 4, 1985)

13.25.050 Abrogation by council.
Any water emergency and/or water use restriction declared and/or imposed by the city water superintendent under this chapter may be abrogated by a resolution of the Forks city council. (Ord. 279 § 5, 1985)

Chapter 13.30
WATER RATES AND CHARGES

Sections:

13.30.010 Meter rates.

(1) The following schedule of meter rates shall be the basic rate for 400 cubic feet or less of water used by the consumer:

Meter Size	Inside City Rate	Outside City Rate
3/4"	$21.56	$32.35
1"	$53.92	$80.91
1-1/2"	$98.83	$148.27
2"	$172.53	$258.79
3"	$226.45	$339.68
4"	$273.16	$409.75
6"	$323.48	$485.25

(2) The above listed rates are the basic rates for 400 cubic feet or less of water used, and the city shall charge the following amount of water used in excess of 400 cubic feet and up to and including 1,000 cubic feet per month as follows:

Inside City Rate	Outside City Rate
$2.36 per each 100 cubic feet	$3.52 per each 100 cubic feet

For every 100 cubic feet of water used over 1,000 cubic feet, the city shall charge the following:

Inside City Rate	Outside City Rate
$1.81 per each 100 cubic feet	$2.70 per each 100 cubic feet

(Ord. 597 § 2, 2012; Ord. 566 § 2, 2009; Ord. 515 § 2, 2004; Ord. 470 § 2, 2000; Ord. 461 § 2, 1999; Ord. 381 § 2, 1994; Ord. 225 § 2, 1980)

13.30.020 Trailer parks and apartments.

Trailer parks, apartment houses, and motels renting units as apartments, without individual meters, will be charged in addition to the minimum and meter charges the sum of $4.88 per unit for each apartment, trailer, and/or unit over and above the regular bill. (Ord. 597 § 3, 2012; Ord. 566 § 3, 2009; Ord. 515 § 3, 2004; Ord. 470 § 2, 2000; Ord. 461 § 3, 1999; Ord. 381 § 4, 1994)

13.30.030 Connection charges.

(1) Service charges for meter installation shall be $980.00, up to a three-quarter-inch meter, for installation within the corporate limits of the city of Forks.

(2) Service charges for meter installation shall be $1,115, up to a three-quarter-inch meter, for installation outside the corporate limits of the city of Forks. (Ord. 597 § 4, 2012; Ord. 566 § 5, 2009; Ord. 381 § 3, 1994; Ord. 225 § 3, 1980)

13.30.040 Low income assistance program.

(1) Purpose. This section is designed to relieve low income senior citizens and/or disabled citizens from the effect of the city’s water service charges as permitted by RCW 35.92.020(5) and Article 8, Section 7 of the State Constitution.

(2) Water Rate Charges for the Low Income Assistance Program.

(a) Eligibility. Low income senior citizens’ water rates are available to individuals that meet the following conditions:

(i) The water rates account shall be in the name of the individual owner or renter certifying eligibility for low income senior citizen rates; and

(ii) That individual shall be or exceed 62 years of age at the time of filing; or

(iii) That individual is disabled, and able to provide proof of the disability from another governmental agency, as:

(A) Defined in RCW 74.18.020(4) (blindness), RCW 71A.10.020(2) (developmentally disabled), or RCW 71.05.020(1) mentally ill; or

(B) Determined by the Social Security Administration; or

(C) Determined by the Department of Veterans Administration and said individual had received an honorable or general discharge from military service.

(iv) Income eligibility shall be determined by utilizing the individual’s certified gross income and comparing that to the poverty guidelines updated periodically in the Federal Register by the U.S. Department of Health and Human Services under the authority of 42 U.S.C. 9902(2). Any individual certifying in their application to have income levels at or below the amounts found within those guidelines for a similar-sized household as the applicant's shall be determined to have met the income criteria required for participation in this city program;

(v) Is the sole occupant or head of household.

(b) Only one domestic water charge reduction will be given for each applicant and for each property served.

(c) Service shall be for single-family residential purposes only, through a three-quarter-inch line.

(d) Rates. Those that are approved for participation in this specific program shall be charged 75 percent for water services provided by the city with this discount rate being applied to any current and/or future water services rate structure approved by the city council in accordance with the city's laws, regulations and/or procedures.

(e) Application. Individuals must apply at Forks City Hall annually. The application will require information on age of the applicant, with copies of documents proving the qualifying basis for inclusion of the applicant into the low income assistance program, and household income must be notarized.

(f) Determination of eligibility shall be made by the city clerk/treasurer based upon information given in the annual application of the low income senior citizen.

(g) Period of Validity of the Application. Upon approval of the application, the household will receive the reduced rate beginning the first day of the month following the date of the application through December 31st of the year in which the application is made. Renewal shall be effective from January 1st of the renewal application's year so long as the renewal application is made by January 31st of the renewal year.

(h) Appeals. Where a difference of opinion exists regarding eligibility under this section the city council shall make the final determination upon written notice of appeal to the city council by the applicant.

(i) False Representation. Any person making a false representation in order to secure reduced water rates pursuant to this section shall be guilty of a misdemeanor.

(3) Upon publication of such guidelines, usually in February of any given calendar year or shortly thereafter, the city shall utilize the new guidelines for the determination of household eligibility for

this program. City administrative staff shall be empowered to comport their review to such guidelines upon their publication in the Federal Register. Further, city administrative staff may modify and alter the notarized application in a manner that reflects the utilization of these poverty guidelines, as well as in any manner as to comport with other applicable state and federal laws. (Ord. 565 § 1, 2009; Ord. 552 §§ 1 – 3, 2007; Ord. 228 §§ 1, 2, 1980; Ord. 225 § 5, 1980)

13.30.050 Annual rate increase.

The rates listed in FMC 13.10.010, 13.30.010, 13.30.020 and 13.30.030 shall be increased annually in January by a percentage equal to the annual percentage increase indicated in the Consumer Price Index All Urban Consumers (CPI-U for the Seattle-Tacoma Bellevue area) All Items Category, as indicated for the June to June period of the previous year. (Ord. 566 § 6, 2009)

Chapter 13.35
SALE OF BULK WATER

Sections:

13.35.010 Application.

This chapter shall apply do the sale of water by the city in bulk quantities (more than 400 CF) to entities not on the existing water system and who intend to export the water out of the region associated with the city’s water system. The chapter shall not be applicable to demands for water for fire fighting purposes. (Ord. 477 § 1, 2001)

13.35.020 Mayor authorized to negotiate contracts.

The mayor, in working with city staff, shall have the authority to negotiate contracts for the sale of bulk water with prospective purchasers, brokers, agencies or entities (purchasers) pursuant to the terms of this chapter. Said contracts, if in compliance with this chapter, shall be deemed to be approved by the council and will not require review and individual approval of the council. (Ord. 477 § 2, 2001)

13.35.030 Base rate for bulk water.

In negotiating contracts, the mayor shall ensure that at a minimum the rate charged to the bulk water purchasers shall be four times the established rate for noncity users. The basis for this rate is that the bulk purchaser has not born any of the expenses over the last five decades of the city’s existence that are associated with the acquisition, maintenance, upgrade and repair of the city’s water system. (Ord. 477 § 3, 2001)

13.35.040 Fees.

In addition to the base rate, the following fees shall be applied to the purchasers of bulk water:

(1) Contract and Negotiations Fee. Each purchaser shall pay a one-time contract development and negotiations fee of at least $500.00 and no more than $1,000.

(2) Load Fee. Purchasers shall be charged a load fee of at least $0.02 per gallon and no more than

$0.07 per gallon to cover the costs associated with city crews having to schedule and load vehicles and/or containers with water.

(3) Treatment and Certification Fee. If purchasers are acquiring treated water, purchasers shall be charged a treatment and certification fee of not less than $0.04 a gallon and not more than $0.10 a gallon to cover the costs associated with the operation of the treatment plant The city utilities superintendent shall be authorized to issue a certificate indicating at the tire of loading the water had been treated in compliance with applicable state and federal regulations. (Ord. 477 § 4, 2001)

13.35.050 Taxes.

All sales of bulk water shall be subject to the established city utilities tax schedule. (Ord. 477 § 5, 2001)

13.35.060 Rights of city protected and reserved.

Rights of city shall be protected and reserved. Any contracts with purchasers of bulk water shall ensure that:

(1) The city has the right to end any such contracts if it is deemed by the mayor and/or the utilities superintendent that:

(a) The continuation of the contract would be detrimental to the health and welfare of the citizens of the city of Forks; or

(b) The continuation of the contract would not be in the best interest of the city as viewed and determined by the city's representatives noted herein.

(2) Purchasers shall indemnify and hold harmless, pursuant to language used in the regular course of business by the city, of any and all causes of action, real or imagined, that are not the direct intentional act of the city, its employees, and/or agents. (Ord. 477 § 6, 2001)

13.35.070 Violation – Penalty.

Any city water customer who utilizes their water connection in a manner as to sell, gift or transfer water to an individual, organization, corporation, agency or subdivision thereof, or institution or subdivision thereof, for the purpose of using the water outside of the geographic coverage of the city's water system shall be deemed to have violated this chapter. The penalty for violation of this chapter shall be the payment of a civil penalty of not less than $500.00 and not more than $1,000 and also be responsible for restitution equal to treble the amount of the value (rate plus fees) of the water removed from the city's system. (Ord. 477 § 7, 2001)

Chapter 13.40
CROSS-CONNECTION AND BACKFLOW CONTROL DEVICES

Sections:

13.40.010 Purpose.

The purpose of this chapter is to protect the health of the water consumers of the Forks city water system and the potability of the water in the distribution system, and to implement the Washington Department of Health’s requirements as found in Chapter 246-90 WAC; the applicable chapter of the Uniform Plumbing Code (see WAC 51-56-003); and the current edition of Accepted Procedure and Practice in Cross Connection Control Manual – Pacific Northwest Section. Inspection and regulation of all actual (direct) and potential (indirect) cross-connections between potable and nonpotable systems is required in order to minimize the danger of contamination and pollution of the potable drinking water. Controlling and preventing cross-connections is accomplished by either removing the cross-connection or installing an approved backflow preventer to protect the potable water system, at the expense of the property owner where the cross-connection occurs. (Ord. 543 § 1, 2006)

13.40.015 Application.

The city of Forks is required to either eliminate or control all cross-connections throughout its service area. Therefore, anyone wanting or using water from the city of Forks is required to comply with this chapter, and with the regulations referenced in FMC 13.40.010. The owner of property in which a cross-connection occurs is fully responsible for all damages incurred. (Ord. 543 § 1, 2006)

13.40.020 Definitions.

(1) "Air gap (AG)" means a physical vertical separation through the free atmosphere measured from the end of the lowest portion of the potable water system and the beginning of the flood level rim of the receiving vessel, tank, plumbing fixture or other apparatus. This physical separation must be at least two times the inside diameter of the potable water pipe and in no case less than one inch.

(2) "Auxiliary supply" means any water source or system other than the city of Forks public potable

water system, which may be available to or in the building, or on the premises.

(3) "Backflow" means the flow, other than in the intended direction of flow, of any liquids, gasses or substances into the public potable water system.

(4) "Back pressure" means backflow caused by a pump, elevated piping, elevated tank, boiler or other means which could create pressure greater than supply pressure.

(5) "Back siphonage" means backflow due to a negative or sub-atmospheric pressure condition in the water system.

(6) "Backflow preventer" means a state-approved backflow prevention device which prevents the backflow of water or other liquids into the potable water system.

(7) "Contamination" means a physical or toxic hazard which could be detrimental to health.

(8) "Cross-connection" means a point in the piping system where the potable water is connected, or the possibility exists of being connected, directly to a source of contamination, pollution, or other nonpotable substance.

(9) "Double check valve assembly (DCVA)" means a state-approved backflow preventer consisting of two independently acting check valves, either spring-loaded or internally weighted, installed as a unit between two tightly closing shutoff valves and having suitable connections for testing.

(10) "Pollution" means a hazard which could cause aesthetic problems or have a detrimental effect on the quality of water in the potable system.

(11) "Potable water" means water which is safe for human consumption, as determined by the public health authority having jurisdiction.

(12) "Pressure vacuum breaker assembly (PVBA)" means a state-approved backflow preventer consisting of a spring-loaded check valve and an independently acting air inlet valve installed as a unit between two tightly closing shutoff valves and having suitable connections for testing.

(13) "Reduced pressure backflow assembly (RPBA)" means a state-approved backflow preventer consisting of two independently acting spring-loaded check valves, separated by a spring-loaded differential pressure relief valve, all of which is installed as a unit and has suitable connections for testing. (Ord. 543 § 1, 2006)

13.40.025 Hazards and requirements for backflow preventers.

Approved backflow preventers shall be installed at the service connection of, or within, the following facilities, and any others found by the public works director to pose a risk of backflow, under the direction of the public works director, commensurate with the degree of hazard as determined by the public works director:

(1) Premises having an auxiliary water supply.

(2) Premises having internal cross-connections or intricate plumbing arrangements which make it impractical to ascertain whether or not a cross-connection exists.

(3) Premises where entry is restricted so that inspections for cross-connections cannot be made.

(4) Premises having a history of repeated cross-connections.

(5) Premises on which any substance is handled under pressure and/or piped so as to pose a risk of entry into the public potable water system.

(6) Process waters or cooling towers.

(7) Toxic or hazardous chemicals.

(8) Hospitals, mortuaries, clinics.

(9) Laboratories.

(10) Sewage treatment plants and lift stations.

(11) Food and beverage processing plants.

(12) Chemical plants.

(13) Petroleum processing plants or storage tanks.

(14) Car washes.

(15) Fire sprinkler systems.

(16) Irrigation systems. (Ord. 543 § 1, 2006)

13.40.030 Backflow preventer installation requirements.
State-approved backflow preventers required by this chapter shall be installed under the direction of the utility superintendent per the city of Forks standards. The backflow preventers must never be subjected to flooding, corrosive fumes, damage or freezing and shall be installed as follows:

(1) AG – a vertical physical separation below the end of the potable water system of not less than one inch or two times the inside diameter of the potable pipe, whichever is greater, measured from the flood level rim of the receiving vessel, tank fixture or plumbing apparatus.

(2) RPBA – 12 inches plus diameter of the backflow preventer from the finished grade or floor to the bottom of the backflow preventer and not more than five feet without an approved working platform.

(3) DCVA – 12 inches from the finished grade or floor to the bottom of the backflow preventer and not more than five feet without an approved working platform.

(4) PVBA – 12 inches above all downstream piping and sprinkler heads and not more than five feet without an approved working platform. (Ord. 543 § 1, 2006)

13.40.040 Annual inspection and testing requirements.

All RPBAs, DCVAs and PVBAs must be tested at least annually and all air gaps installed in lieu of a backflow preventer shall be inspected at least annually. Test/inspection reports shall be returned to the city of Forks utility superintendent within 30 days after receipt of the yearly test notification. Tests and inspections may be required on a more frequent basis at the discretion of the utility superintendent. (Ord. 543 § 1, 2006)

13.40.050 Termination of water service.

Failure of the customer to cooperate in the installation, maintenance, repair, inspection and testing of backflow preventers and/or air gap separations required under this chapter shall be grounds for immediate termination of water service to the premises. (Ord. 543 § 1, 2006)

Appendix C – Water Rights

Water Right Self-Assessment Form for Water System Plans

331-372 • 1/13/2017

All water right permits, claims, and certificates must be evaluated in a water right self-assessment for all sources used to supply the water system. The self-assessment compares the parameters and other limitations of existing water rights against current and forecasted water production, as described in your water system plan, to determine whether the rights are adequate to serve your system's current and future water needs.

You must account for all sources of supply and total quantities of water withdrawn from the source. If you purchase water from another purveyor through a non-emergency intertie, you must complete the INTERTIES section of the self-assessment.

A Note on Exempt Wells

If you're seeking DOH approval of a new Group A or Group B water system using an exempt well, you must complete the self-assessment, although certain fields will not apply. Talk to your DOH regional planner about using the Water Right Self-Assessment form for a Small Water System Management Program instead of this version.

Local governments must ensure that an adequate potable water supply is available from the exempt well before issuing a building permit. Before developing a permit exempt well, check with your local authorities on their criteria for establishing an adequate potable water supply for your planned public water system.

Water Right Parameters

Below is a brief description of the parameters associated with a typical water right. For the self-assessment, you only need to describe the last two bulleted items if they apply to your water rights.

Source Type – this refers to whether the source is surface water, groundwater or a spring.
Source Location – this refers to the location of points of groundwater withdrawal or surface water diversion for each right.
Purpose of Use – this refers to the type of use, such as municipal water supply, community domestic, industrial or agricultural purposes.
Place of Use – this describes where water can be put to beneficial use under the right. Under the 2003 Municipal Water Law, RCW 90.03.386, the place of use for a water right held for municipal water supply purposes may be the system's service area as identified in an approved water system plan or small water system management program. See Ecology Policy 2030 for information on how Ecology administers the Municipal Water Law.

Period of Use – this refers to time-of-year limitations in which the water right may be put to use. If any water right has a time-of-year limitation, please include this information in the INTERRUPTIBLE WATER RIGHTS section.

Provisions or Limiting Conditions – this refers to any provisions or conditions placed on the water right. If a water right has a limiting condition or other provision, such as a collection and reporting requirement, other than a time-of year limitation, include this information in the ADDITIONAL COMMENTS section at the bottom of the self-assessment and in the water system plan narrative.

See Ecology Policy 1040 for more information on water right terminology. If you have questions about your water rights, please contact the Ecology regional office in your area.

Completing the Water Right Self-Assessment Form

The self-assessment is a Word document to allow users to make changes or to expand the document. You may use another format, if preferred, as long as all required information is included. Below is a description of all fields and how to complete them. This form is divided into four different sections. Each section is described in the headings below.

See the column identifiers (A, B, C, etc) at the bottom of each column for guidance in completing the necessary calculations.

Water Right Permit, Certificate, or Claim Number: This number is assigned by Ecology when a permit application is filed. It’s listed at the top of the permit or certificate. For water right claims, this is the registration number stamped in the lower left hand corner of the claim form.

WFI Source #: Identify the individual sources (e.g. well #1, well #2) as defined on the DOH Water Facilities Inventory form. If a water right is associated with multiple sources, list all sources in the same row in this column. If a source is associated with multiple water rights, identify each water right on a separate row.

If you have any source(s) that is not currently being used (categorized as standby, back-up, or emergency), and the source has an associated water right that is not listed in column #1, please include the source and water right information in the ADDITIONAL COMMENTS section. This will identify that the source is still intended for a beneficial use under RCW 90.03.015(4). See Ecology Policy 1040.

EXISTING WATER RIGHTS SECTION *(olive green color, top section)*

This section refers to existing water rights. It does not include any water right applications that have been submitted to Ecology.

Primary Qi (Instantaneous Quantity): This is also known as instantaneous flow rate. It’s the amount of water allowed to be taken under the right from the source during a period of peak operation. For surface water, this is generally expressed in terms of cubic feet per second (cfs). For groundwater, this is generally expressed in terms of gallons per minute (gpm). One cfs equals 448.8 gpm. Please indicate the units of measurement you are using for each source. If there are situations where the flow rate will be limited (e.g. limitations established on the source when other sources are utilized), please note them in the ADDITIONAL COMMENTS section in the form and in the WSP narrative.

Non-Additive Qi: This term was formally known as "supplemental." Your water rights may use the old terminology. See Ecology Policy 1040 for more information. Not all water rights have non-additive quantities. If a water right has non-additive Qi quantities, include the non-additive quantity in this field. This is generally listed in the "quantity, type of use, period of use" section on both permits and certificates. *Non-additive quantities should not be included in the primary Qi totals.*

Primary Qa (Annual Quantity): This is the amount of water that can be taken from the source under the right on an annual basis. It's usually expressed in terms of acre-feet. An acre-foot is the amount of water necessary to submerge an acre of land to a depth of one foot. One acre-foot equals 43,560 cubic feet or 325,851 gallons of water.

Non-Additive Qa: This term was formerly known as "supplemental." Your water rights may use the old terminology. See Ecology Policy 1040 for more information. Not all water rights have non-additive quantities. If a water right has non-additive Qa quantities, include the non-additive quantity in this field. This is generally listed in the "quantity, type of use, period of use" section on both permits and certificates. *Non-additive quantities should not be included in the primary Qa totals.*

CURRENT SOURCE PRODUCTION SECTION *(light green color, top section)*

This section refers to how much water is withdrawn from the source under each water right for the most recent full calendar year. You will need to determine any excess or deficiency for each water right after calculating how much water was withdrawn compared to how much water is allowed under each water right. If demand has decreased over past years, you may wish to include historic maximum production information in the ADDITIONAL COMMENTS section. This will provide a more complete picture of the use of your water rights.

Use the water use data and demand projections from your water system plan to define current and projected water needs. You can determine if you'll need additional water rights based on the comparison of existing water rights, current water production, and projected 10- and 20-year needs.

Total Qi (Instantaneous Quantity): This refers to the total maximum instantaneous flow rate withdrawn from the source under each water right during the most recent calendar year. For surface water, this is expressed in terms of cubic feet per second (cfs). For groundwater, this is expressed in terms of gallons per minute (gpm). One cfs equals 448.8 gpm.

Current Excess or Deficiency (Qi): Please calculate the excess or deficiency for each water right after comparing the total amount withdrawn against each water right. Please use parentheses for deficient amounts.

Total Qa (Annual Quantity): This refers to the total volume of water withdrawn from each source under each water right during the most recent calendar year. It's usually expressed in acre-feet.

Current Excess or Deficiency (Qa): Please calculate the excess or deficiency for each water right after comparing the total amount withdrawn against each water right. Please use parentheses for deficient amounts.

10-YEAR FORECASTED SOURCE PRODUCTION SECTION *(light blue color, top section)*

This section refers to how much water you project to withdraw from each source in ten years as determined in your water system plan. Please complete this section in the same manner (using the same units of measurement) as the current source production section using your 10-year forecasted amounts.

20-YEAR FORECASTED SOURCE PRODUCTION SECTION *(darker blue color, top section)*

This section refers to how much water you project to withdraw from each source in twenty years as determined in your water system plan. Please complete this section in the same manner (using the same units of measurement) as the current source production section using your 20-year forecasted amounts. If you are unable to provide 20-year forecasts for each source, you may choose to include the combined 20-year total at the bottom.

PENDING WATER RIGHTS SECTION *(second section of form)*

Please complete this section for any water right applications that have been submitted to Ecology. Please include the application number, whether it's a new or a change application, the date submitted, and the total quantities requested.

INTERTIES SECTION *(third section of form)*

This section must be completed by purveyors who purchase any amount of wholesale water. If your system sells water to another public water system, include the quantity sold in the CURRENT SOURCE PRODUCTION section.

Purchasers of wholesale water must account for all water obtained through the intertie for non-emergency supply purposes. This is to ensure that all sources of supply are considered when evaluating whether new water rights are needed within 20 years.

Please identify the maximum quantity of water, expressed in the same manner as the above sections, allowed under each intertie contract. If there are limiting conditions or temporary agreements that effect the long-term use of the intertie, you must account for such limiting conditions when evaluating the current and forecasted water supply needs in your water system plan.

Finally, purchasers of wholesale water are responsible for ensuring that the underlying water right (held by the purveyor selling water) are adequate for such use. You should confirm that the selling system has accounted for the wholesale area in their water system plan to ensure that the water right authorizes the distribution of water through the intertie.

INTERRUPTIBLE WATER RIGHTS SECTION *(bottom section of form)*

This section refers to water rights that have an annual time-of-year interruption. Please complete this section for any water right listed in the above fields that has a time-of-year interruption. Please include the water right number, describe the limitation, and the time period of interruption. Purveyors with interruptible rights should develop a water shortage response plan as part of their water system plan to describe how demand will be met during periods of interruption through aggressive demand-side conservation, fixing leaks or other means.

ADDITIONAL COMMENTS SECTION *(bottom section of form)*

If the system has any source that is not currently being used on a regular basis (such a source may be categorized as stand-by, back-up, emergency), you should identify the source in this section if the source has an associated water right that is not listed in the above sections. The purpose is to identify that such water rights are still intended for a future beneficial use as required under RCW 90.03.015(4). See Page 2, Item 9 (b) in ECY Policy 2030. For these water rights, please briefly describe the future intended use of the source and when you expect to utilize the water right. This does not refer to sources categorized as seasonal sources.

You should also include any other comments in this section that will explain aspects of your water right portfolio that are not identified above.

Water Right Self-Assessment Form for Water System Plan

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

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
1. Certificate # 02108 G2*03542 C	S01 and S02	500 GPM		504 Acre-Feet/Year		475 GPM	25 GPM	192 Acre-Feet/Year	312 Acre-Feet/Year	475 GPM	25 GPM	169 Acre-Feet/Year	335 Acre-Feet/Year	475 GPM	25 GPM	180 Acre-Feet/Year	324 Acre-Feet/Year
2. Certificate # G2*05930 C 04120	S03	290 GPM			464 Acre-Feet/Year	300 GPM	(10 GPM) [3]	122 Acre-Feet/Year	342 Acre-Feet/Year	300 GPM	(10 GPM) [3]	107 Acre-Feet/Year	357 Acre-Feet/Year	300 GPM	(10 GPM) [3]	113 Acre-Feet/Year	351 Acre-Feet/Year
3. Certificate # G2-24829 C	S04, S05, and Well 6 [1]	600 GPM		950 Acre-Feet/Year		1,130 GPM	(530 GPM) [3]	209 Acre-Feet/Year	741 Acre/-Feet/Year	1,130 GPM	(530 GPM) [3]	276 Acre-Feet/Year	674 Acre-Feet/Year	1,130 GPM	(530 GPM) [3]	293 Acre-Feet/Year	657 Acre-Feet/Year
	TOTALS =	1,390 GPM		950 Acre-Feet/Year [2]		1,390 GPM	(515 GPM) [3]	523 Acre-Feet/Year	427 Acre-Feet/Year [4]	1,390 GPM	(515 GPM) [3]	552 Acre-Feet/Year	398 Acre-Feet/Year [4]	1,390 GPM	(515 GPM) [3]	586 Acre-Feet/Year	364 Acre-Feet/Year [4]
Column Identifiers for Calculations:		A		B		C	=A-C	D	=B-D	E	= A-E	F	=B-F	G	=A-G	H	=B-H

PENDING WATER RIGHT APPLICATIONS: Identify any water right applications that have been submitted to Ecology.

Application Number	**New or Change Application?**	**Date Submitted**	**Quantities Requested**			
			Primary Qi	**Non-Additive Qi**	**Primary Qa**	**Non-Additive Qa**

INTERTIES: Systems receiving wholesale water complete this section. Wholesaling systems must include water sold through intertie in the current and forecasted source production columns above.

Name of Wholesaling System Providing Water	**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
1.															
2															
3															
TOTALS =															
Column Identifiers for Calculations:	A	B		C	=A-C	D	=B-D	E	=A-E	F	=B-F	G	=A-G	H	=B-H

INTERRUPTIBLE WATER RIGHTS: Identify limitations on any water rights listed above that are interruptible.

Water Right #	**Conditions of Interruption**	**Time Period of Interruption**
1		
2		
3		

ADDITIONAL COMMENTS:

[1] Well 6 was drilled as a replacement well which was constructed and tested under Water Right Certificate Number G2-24829 C in 2020 and has not yet been given a Source Number in the most recent DOH Water Facilities Inventory Form dated November 23, 2020.

[2] The total annual quantity authorized under Ground Water Certificate Numbers 02108 G2*03542 C, G2*05930 C 04120, and G2-24829 C shall be limited to 950 Acre-Feet/Year.

[3] Installed capacities under Water Right Certificate Numbers G2*05930 C 04120 and G2-24829 C exceed existing water rights, but pumps are run within existing water rights.

[4] The annual total excess capacity is less than the sums of annual excess capacity above due to the supplemental relationships between water rights.

2108

S. F. No. 7361—3-53—3M. 34100.

CERTIFICATE RECORD NO. 5 PAGE NO. 2108-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 FORKS, 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*~~ two (2) wells

located within the SW¼ of SE¼ of Sec. 4, Twp. 28 N., Rge. 13 W.W.M.

for the purpose of municipal supply

under and subject to provisions contained in Ground Water Permit No. 3427 *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* 2108-A*; that the right hereby confirmed dates from* February 11, 1954*; 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* 500 gallons per minute; 504 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 Forks, Clallam County, Washington.

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 G Walker

State Supervisor of Water Resources.

ENGINEERING DATA
O.K. RHR

2108

Ground Water Permit No...............................

CERTIFICATE OF GROUND WATER RIGHT

Recorded in the office of the State Supervisor of Water Resources, Olympia, Washington, in Book No. .... *of Ground Water Right Certificates, on page* ....,

on the .... *day of* ....,

195..........

STATE OF WASHINGTON, } *ss.*
County of ....

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

S. F. No. 7361—5-60—3M. 62306.

CERTIFICATE RECORD NO. 9 PAGE NO. 4120-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 FORKS, 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* well

located within SW¼SE¼

Sec. 4 *, Twp.* 28 *N., R.* 13 W. *W. M.,*

for the purpose of municipal supply

under and subject to provisions contained in Ground Water Permit No. 5589 *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* 9 *at page* 4120-A *; that the right hereby confirmed dates from* May 2, 1961 *; 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* 290 gallons per minute; 464 acre-feet per year for municipal supply.

Special provisions required by the Supervisor of Water Resources: This certificate is issued as a supplemental right to Ground Water Certificate No.2108-A. The total withdrawal shall not exceed 464 acre-feet per year less any amount withdrawn under above certificate.

A description of the lands to which such ground water right is appurtenant:

Town of Forks, Clallam County, Washington.

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 22d *day of* January *, 19*62.

M G Walker
State Supervisor of Water Resources.

GINEERING DATA

K Sh

Ground Water Permit No...............................

CERTIFICATE OF GROUND WATER RIGHT

Recorded in the office of the State Supervisor of Water Resources, Olympia, Washington, in Book No...............................*of Ground Water Right Certificates, on page*....................., *on the*....................*day of*..............................

19..........

STATE OF WASHINGTON, } *ss.*
County of..

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, WASH., 1960

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

CERTIFICATE OF WATER RIGHT

☐ 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
March 15, 1978	G 2-24829	G 2-24829 P	G 2-24829 C

NAME
TOWN OF FORKS

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
P.O. Box 1998	Forks	Washington	98331

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.

PUBLIC WATER TO BE APPROPRIATED

SOURCE
2 wells

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	600	950

QUANTITY, TYPE OF USE, PERIOD OF USE
950 acre-feet per year municipal supply continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION—WITHDRAWAL
Well #4 - 495 feet south and 1315 feet west

Well #5 - 380 feet south and 1060 feet west BOTH from the North Quarter corner of

Section 9.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
NE¼NW¼	9	28	13 W	20	Clallam

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by the Town of Forks.

(SEE REVERSE SIDE)

PROVISIONS

The access port shall be maintained at all times on the well (s).

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.)

The total annual quantity authorized under this filing, Ground Water Certificate Nos. 2108 and 4120 shall be limited to 950 acre-feet.

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 RCW 90.03.380, 90.03.390, and 90.44.020.

This certificate of water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180.

Given under my hand and the seal of this office at Olympia *Washington, this* 21 *day of* September *, 19* 81

DONALD W. MOOS, Director
Department of Ecology

by B Cameron
for E.W. Asselstine, Regional Manager

ENGINEERING DATA
OK 9/14/81 WB

FOR COUNTY USE ONLY

Appendix D –Applications

City of Forks
Application for Water Service

I agree to pay for water service promptly at the following address as regulated in the ordinance of the City of Forks and abide by all rules and regulations of the Water Department as provided by said ordinances. This contract is terminated when customer vacates the following mentioned premises, provided previous notice shall have been received by the Forks Water Department and provided, further, that all bills for service hereunder at the time of vacation shall have been paid in full. It is a violation of the current rules and regulations for any person or persons to attach or detach from any water main or service pipe, or water connections through which water is supplied by the City of Forks. No person supplied with water from the City mains will be entitled to use it for any other purpose than stated in the original application or supply in any way other persons or premises, or to interfere in any manner with any pipe or connection without first making written application to the City of Forks.

____/ ___________________

Signature **Date**

Requested Service Start Date (weekday only) ____

I, the above signed, do hereby make application for water service at:

____ **Employer** __________________________

Property Address

____ _____________________________

Property Owner **Property Owner Phone**

_________________________________ _______________________________________

Person to whom bill is sent **Mailing Address**

Applicant Phone Number ____

____

(For office use only)

<u>OPENING ACCOUNT</u> ACCOUNT NUMBER ______________________

METER NUMBER _____________________

CONNECTION FEE $ _____________ RECEIPT # ___________ DATE _______________

SERVICE CHARGE $ _____________ PAID _____________ BILLED _______________

METER READING _____________________

Revised 4/17/2018

APPLICATION FOR NEW WATER CONNECTION

500 E Division Street, Forks, WA 98331
360-374-5412 forkswashington.org info@forkswashington.org

Fee: $ ______________ Date paid: ______________ Receipt: #______________

OWNER INFORMATION

Project address: ____

Tax parcel number (12-digit geographic ID; *application will not be approved w/out this number**): ______________________

Owner: ______________________________ Phone: ______________________

Mailing address: ______________________________ E-mail: ______________________

CONTRACTOR INFORMATION

Name: ______________________________ License #: ______________________

Mailing address: ______________________________ Expiration date: ______________________

Phone: ______________________ E-mail: ______________________________

REQUIREMENTS/INSPECTIONS

1. The City shall be responsible for connection of the meter to the water main.
2. The owner shall install the service line from the meter to the building.
3. The minimum nominal service line size is ¾” iron-pipe size that supports a minimum water pressure of 200 psi.
4. Approved service line materials: 1. PVC 2. Polyethylene (poly) 3. Copper 4. PEX
5. Install service line with a minimum cover of 18” (depth of 18”).
6. Any work involving a street or sidewalk may require additional documentation and approval. Any such work must be completed by a contractor licensed and bonded with the State of Washington.
7. Any variation from these instructions requires written approval from a City inspector.

Inspections			
Prior to backfill	**Date**	**Inspector**	**Approved/not improved**
Pipe layout and integrity; as-built completion			☐ Approved ☐ Not approved
Potential for cross connection			☐ Approved ☐ Not approved
Backflow prevention device installed			☐ Approved ☐ Not approved
Restoration of street/sidewalk			☐ Approved ☐ Not approved

FOR OFFICIAL USE ONLY

Meter #	Meter size	Tap required? ☐ Yes ☐ No	Type of water main	Water main size

Type of service ☐ Single-family residential ☐ Multi-family residential ☐ Commercial ☐ Industrial

I have read and completed the application and know it to be true and correct. I am authorized to apply for this service and understand that it is my responsibility to determine which permits are required and to obtain those permits prior to beginning work. I understand that additional information may be required when determined necessary by the building official. *The City of Forks does not maintain tax parcel number information. If you do not have this number, you can look it up by using the Property Search link on the Home page of the Clallam County website (www.clallam.net).

Date Print name Signature (☐ Owner ☐ Contractor ☐ Representative)

WATER CONNECTION PROPOSAL

In the space below, draw a sketch indicating the complete course of the water service showing lot boundaries, buildings, connection(s) to buildings, driveway(s), streets, location of sewer lines, and other obvious landmarks on the site from which dimensions can be drawn. A plot plan drawn to scale may be submitted in lieu of a sketch. Clearly mark all applicable dimensions.

AS-BUILT WILL BE REQUIRED AT TIME OF INSPECTION

Submitted by (owner/contractor): ___________________________________ Date: _________ Verified by (City inspector): ________

Appendix E – Correspondence

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Local Government Consistency Determination Form

Water System Name: Forks Municipal Water Department PWS ID: 26000E

Planning/Engineering Document Title: Water System Plan Plan Date: August 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.

	For use by water system	**For use by local government**
Local Government Consistency Statement	**Identify the page(s) in submittal**	**Yes or Not Applicable**
a) The water system service area is consistent with the adopted land use and zoning within the service area.	1-17 to 1-21	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.	2-14 to 2-15	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.	1-21	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.	1-18 to 1-21	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.	1-15 to 1-17	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
Signature

9-5-23
Date

Donella Clark Principal Planner Clallam Co
Printed Name, Title, & Jurisdiction

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Local Government Consistency Determination Form

Water System Name: Forks Municipal Water Department PWS ID: 26000E

Planning/Engineering Document Title: Water System Plan Plan Date: August 2022

Local Government with Jurisdiction Conducting Review: City of Forks – Planning Department

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.

	For use by water system	For use by local government
Local Government Consistency Statement	**Identify the page(s) in submittal**	**Yes or Not Applicable**
a) The water system service area is consistent with the adopted land use and zoning within the service area.	1-17 to 1-21	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.	2-14 to 2-15	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.	1-21	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.	1-18 to 1-21	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.	1-15 to 1-17	Yes

*Consultant used a more aggressive growth analysis as a precautionary water plan.

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.

Signature

1 Sep 23
Date

William R. Fleck City Attorney/Plng, Forks
Printed Name, Title, & Jurisdiction

GIBBS & OLSON
CIVIL ENGINEERS • LAND SURVEYORS

May 20, 2022

District Fire Chief
Clallam County Fire District #1
11 Spartan Ave
Forks, WA 98331

RE: Fire Flow and Fire Suppression Storage Standards

Please sign below indicating Clallam County Fire District #1 approves the following standards applicable to the City of Forks, WA.

Effective Storage Requirement

If Nesting Is Not Allowed by Local Fire Authority	**If Nesting Is Allowed by Local Fire Authority**	**Standard Applicable to the City of Forks**
The sum of: Equalizing Storage, plus Standby Storage, plus Fire Suppression Storage	The sum of: Equalizing Storage, plus The Greater of Standby Storage, or Fire Suppression Storage	The City of Forks standard is for nested standby and fire storage.

Fire Flow Standards

Land Use Designation	**Minimum Fire Flow Requirement (1)**	**Maximum Hydrant Spacing, feet (1)**
Residential	1,000 gpm for 60 minutes	500
Commercial and Multifamily	1,500 gpm for 120 minutes	500
Maximum In City	3,500 gpm for 180 minutes	350
Industrial Park	3,000 gpm for 180 minutes	400

(1) Based on Uniform Fire Code Standards.

Signature____________________ **Date** 6/13/22
District Chief

Sincerely,

Mike Marshall, PE

File: 0788.0193

P:\0788 Misc. Eng Proj\0181 JacksonCivilEng_Forks_WtrSysPlan\Corr-Mtgs\Fire Confirmation Letter.docx

SEPA Rules - WAC 197-11-970
Determination of Non-Significance (DNS)

Forks Water System Plan Update

Description of proposal: This Water System Plan (WSP) update is prepared for the City of Forks to fulfill the requirements of Washington Administrative Code (WAC) 246-290-100 and WAC 246-293-250, and WAC 246-295 and the Washington State Department of Health (DOH) Water System Design Manual (Design Manual). The City of Forks operates a municipal water system consisting of five production wells, approximately 25 miles of distribution piping, and three storage tanks servicing approximately 1,785 connections.

Location of proposal:

The City of Forks' municipal water system provides services through the City and the Forks Urban Growth Area. Both are located in the SW portion of Clallam County and are generally within Sections 32-33 T 29 N, R 13 W and 8-10, 16-18 T 28 N, R 13 W, W.M., Clallam County, Washington State.

Proposed Project: The City of Forks operates a municipal water system that is required by state law to undertake water system planning and adopt updates to its state approved Water System Plan (WSP). The proposed Water System Plan (WSP) update was prepared for the City of Forks to fulfill the requirements of Washington Administrative Code (WAC) 246-290-100 and WAC 246-293-250, and WAC 246-295 and the Washington State Department of Health (DOH) Water System Design Manual (Design Manual). The WSP update reviewed the planning service area in order to recommend any needed improvements to allow the System to provide water service throughout the twenty-year planning period. Proposed improvements would be in compliance with projected demands, regulatory requirements, and expectations of the City's customers, Mayor and Council. While the plan recommends projects, any project would require its own permit review to include compliance with SEPA where appropriate. Also, the adopted plan will be utilized by the City to pursue state and federal funding that may reduce costs to the customers of the water system.

Staff Contact Person:
Paul Hampton
Public Works Director
(360)374-5412

Prior SEPA Documents: None for these proposed WSP update.

Mitigation required: NONE.

Lead Agency
Rod Fleck, City Attorney/Planner
City Planning Department, City of Forks
500 East Division
Forks, Washington 98331

The Lead Agency had determined that the above items would not have a probable significant adverse impact on the environment if the mitigation noted above is completed. An environmental impact statement (EIS) is not required under RCW 43.21C.030(2). This decision was made after review of a complete environmental checklist and other information on file with the lead agency and upon the following findings. This information is available to the public on request.

This DNS is issued under 197-11-340 (2); the lead agency will not act on this proposal for a period of 14 days from the date of issuance to allow for review and comments from the general public.

Comments must be submitted to the City Planner at:

Rod Fleck, City Attorney/Planner
Forks City Hall
500 East Division
Forks, Washington 98331

Comments will be accepted up to Noon, 8 December 2023. The City will review said comments together to determine the impact upon the stated MDNS. Submittal of comments is not the same as a written appeal of this determination.

You may appeal this determination no later than Noon, 8 December 2023, by filing a written appeal with the City Clerk of Forks at 500 East Division, Forks, Washington 98331. You should be prepared to make specific factual objections based upon the action being considered and the SEPA Checklist completed in association with this project. Contact Rod Fleck at 360/374-5412, ext. 245 to read or ask about the procedures for appeals.

Date: 22 November 2023
William R. Fleck
Attorney/Planner

CITY OF FORKS

500 E. Division St. • Forks, Washington 98331-8618

(360) 374-5412 • Fax: (360) 374-9430 • TTY: (360) 374-2696
forkswashington.org

Wellhead Protection Area Letter List

Business/Property Owner	Name of Recipient Print Name	Signature
Department of Natural Resources	Kim Pearson	Kim Pearson
Clallam County PUD	Rebecca Lausche	Rebecca Lausch
Forks Mobile Home Park	Robert Cotton	
CenturyLink	Tim Haag	Tim Haag
Quillayute Valley School District	Hazel Rose	

500 E. Division St. • Forks, Washington 98331-8618
(360) 374-5412 • Fax: (360) 374-9430 • TTY: (360) 374-2696
forkswashington.org

Date

Business/Property Owner
Address
City, ST Zip

RE: City of Forks Water System – Wellhead Protection Areas

Dear Business/Property Owner:

The purpose of this letter is to ask for your cooperation in ensuring safe drinking water for the City of Forks Water System by protecting our groundwater from contamination. To protect the drinking water supply for the customers of the Forks Water System, a wellhead protection program has been developed as required by State law. As part of the wellhead protection program, the area overlying the short-term and long-term recharge zone of our drinking water supplies has been mapped (see attached). This is called our wellhead protection area.

A Wellhead Protection Area (WHPA) is the area of land surrounding a municipal well, which contributes water to the well. Within the WHPA, protective measures are implemented to safeguard the underlying groundwater supply from potential contaminant sources. A municipal well taps into the water-bearing unit (or aquifer) found below the ground surface and draws groundwater from this unit for the municipal water supply system. Since this water must be distributed to our communities as clean and safe drinking water, it is important that the source aquifers are protected from contamination.

We have conducted an inventory to potential sources of groundwater contamination within the area. The location of your property/business within our wellhead protection area means that your activities have the potential to affect our customer's drinking water supply. The following is a list of common sources of contamination threatening water quality at municipal wells: Storage Tanks, Septic Systems, Uncontrolled Hazardous Waste, Landfills, Chemicals, Road Salts, fertilizers, Pesticides, and RV Gray Water.

You can contact Clallam County at the following link: https://www.clallam.net/hhs/EnvironmentalHealth/hwaste.html to request technical assistance to help manage your business in a way that will best prevent groundwater contamination.

Sincerely,

Leaking Underground Storage Tank List

Site Name	CleanupSiteId	FacilitySiteId	Site Status	Site Rank	Address	City	Zip Code	County	Region	Responsible Section	Latitude	Longitude
CHEVRON STATION 9-1923	7879	11187551	Cleanup Started		222 FORKS AVE	FORKS	98331	Clallam	Southwest	Southwest	47.94874532	-124.385793
DNR Olympic Region HQ	9193	43696488	No Further Action		MP 3 Hoh Mainline	FORKS	98331	Clallam	Southwest	Southwest	47.95704462	-124.3837338
Forks Warehouse	11328	98747635	No Further Action		441 W E ST	FORKS	98331	Clallam	Southwest	Southwest	47.946417	-124.389844
PACIFIC TELECOM INC	11145	94392924	No Further Action		CALAWAH WAY CENTRAL OFFICE	FORKS	98331	Clallam	Southwest	Southwest	47.95128	-124.38447
QUILLAYUTE VALLEY SCHOOL DIST	6075	43367461	No Further Action		521 N FORKS AVE	FORKS	98331	Clallam	Southwest	Southwest	47.95722	-124.38729

Underground Storage Tank List

Site Name	CleanupSiteId	FacilitySiteId	Site Status	Site Rank	Address	City	Zip Code	County	Region	Responsible Section	Latitude	Longitude
CHEVRON STATION 9-1923	7879	11187551	Cleanup Started		222 FORKS AVE	FORKS	98331	Clallam	Southwest	Southwest	47.94874532	-124.385793
✓ DNR Olympic Region HQ	9193	43696488	No Further Action		MP 3 Hoh Mainline	FORKS	98331	Clallam	Southwest	Southwest	47.95704462	-124.3837338
Forks Sand & Gravel Inc	12622	7773181	No Further Action		112 2ND AVE	FORKS	98331	Clallam	Southwest	Southwest	47.949793	-124.387567
✓ Forks Warehouse	11328	98747635	No Further Action		441 W E ST	FORKS	98331	Clallam	Southwest	Southwest	47.946417	-124.389844
✓ PACIFIC TELECOM INC	11145	94392924	No Further Action		CALAWAH WAY CENTRAL OFFICE	FORKS	98331	Clallam	Southwest	Southwest	47.95128	-124.38447
✓ QUILLAYUTE VALLEY SCHOOL DIST	6075	43367461	No Further Action		521 N FORKS AVE	FORKS	98331	Clallam	Southwest	Southwest	47.95722	-124.38729
✓ WA WSU FORKS MOBILE HOME PARI	2143	20127	No Further Action		671 CALAWAH WAY	FORKS	98331	Clallam	Southwest	Southwest	47.954663	-124.377779

CITY OF FORKS

500 E. Division St. • Forks, Washington 98331-8618

(360) 374-5412 • Fax: (360) 374-9430 • TTY: (360) 374-2696
forkswashington.org

Date: 1/18/2024

Joe Soha
PO Box 2001
Forks WA 98331

RE: City of Forks Water System – Wellhead Protection Areas

Dear Business/Property Owner:

The purpose of this letter is to ask for your cooperation in ensuring safe drinking water for the City of Forks Water System by protecting our groundwater from contamination. To protect the drinking water supply for the customers of the Forks Water System, a wellhead protection program has been developed as required by State law. As part of the wellhead protection program, the area overlying the short-term and long-term recharge zone of our drinking water supplies has been mapped (see attached). This is called our wellhead protection area.

A Wellhead Protection Area (WHPA) is the area of land surrounding a municipal well, which contributes water to the well. Within the WHPA, protective measures are implemented to safeguard the underlying groundwater supply from potential contaminant sources. A municipal well taps into the water-bearing unit (or aquifer) found below the ground surface and draws groundwater from this unit for the municipal water supply system. Since this water must be distributed to our communities as clean and safe drinking water, it is important that the source aquifers are protected from contamination.

We have conducted an inventory to potential sources of groundwater contamination within the area. The location of your property/business within our wellhead protection area means that your activities have the potential to affect our customer's drinking water supply. The following is a list of common sources of contamination threatening water quality at municipal wells: Storage Tanks, Septic Systems, Uncontrolled Hazardous Waste, Landfills, Chemicals, Road Salts, fertilizers, Pesticides, and RV Gray Water.

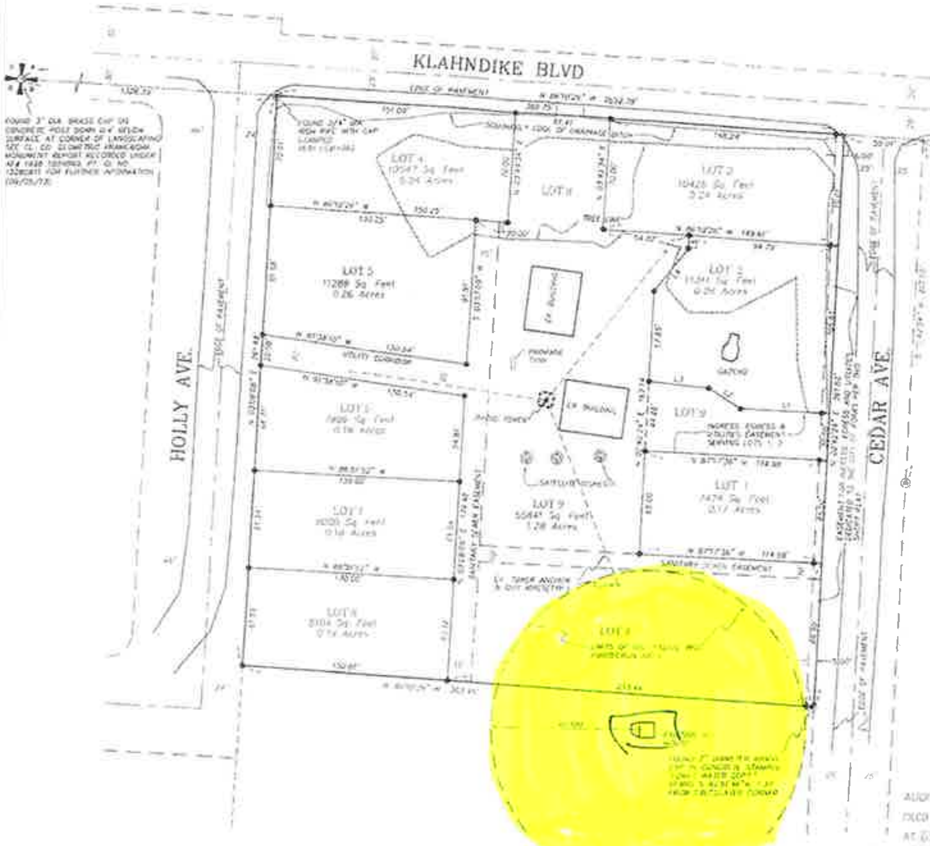
You can contact Clallam County at the following link: https://www.clallam.net/hhs/EnvironmentalHealth/hwaste.html to request technical assistance to help manage your business in a way that will best prevent groundwater contamination.

Sincerely,

Paul Hampton Public Works Director

SHORT SUBDIVISION

A PORTION OF THE NE 1/4 OF THE NW 1/4 OF SECTION 9,
T. 28 N., R. 13 W., W.M.
CITY OF FORKS, CLALLAM COUNTY, WASHINGTON
PREPARED FOR
FORKS BROADCASTING, INC.



FOUND 3" DIA. BRASS CAP IN CONCRETE POST DOWN 0.4' BELOW SURFACE AT CORNER OF LANDSCAPING. SEE CL. CO. GEODETIC FRAMEWORK MONUMENT REPORT RECORDED UNDER AF# 1998 1009396 PT. ID. NO. 13280811 FOR FURTHER INFORMATION (06/05/13)

FOUND 3" DIA. BRASS CAP IN CONCRETE. SEE CL. CO. GEODETIC FRAMEWORK MONUMENT REPORT RECORDED UNDER AF# 1998 1009396 PT. ID. NO. 13280821 FOR FURTHER INFORMATION (06/05/13)

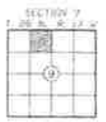
SURVEYOR'S NARRATIVE:

SEE CLALLAM COUNTY GEODETIC FRAMEWORK SURVEY RECORDED IN VOLUME 39 OF SURVEYS, PAGE 74, UNDER AF# [illegible], RECORDS OF CLALLAM COUNTY, WASHINGTON FOR SECTION SUBDIVISION INFORMATION. THIS SURVEY WAS USED TO POSITION THE NORTH AND WEST LINES OF THIS PARCEL. THE SOUTH BOUNDARY WAS ESTABLISHED BASED ON THE PLAT OF CAMPBELL'S ADDITION USING THE METES AND BOUNDS DISTANCE CALL ON THE WEST BOUNDARY OF BLOCK 4 AND THE BEARING CALL ON THE SOUTH LINE PARALLEL TO THE NORTH LINE OF THE SECTION. THE LOCATION OF CEDAR STREET ON THE EAST BOUNDARY WAS ESTABLISHED BASED ON THE PREVIOUS SURVEY RECORDED IN VOL. 46 OF SURVEYS, PAGE 53 RECORDED BY DAN KOUSBAUGH, PLS. THIS SURVEY DEPICTS THE LOCATION OF CEDAR STREET BASED ON FOUND ORIGINAL CORNERS FOR THE PLAT OF CAMPBELL'S ADDITION. THE FOUND KOUSBAUGH CORNERS FIT THE CALCULATED POSITIONS VERY WELL.

LEGEND:

- ● = SET 1/2" [illegible] REBAR WITH PLASTIC CAP STAMPED "PLS 26071"
- ⊙ = FOUND 5/8" [illegible] REBAR STAMPED "KOUSBAUGH [illegible]" UNLESS OTHERWISE NOTED

LINE TABLE		
LINE	BEARING	DISTANCE
L1	N 87°17'26" W	56.61
L2	N 17°52'11" W	28.92
L3	N 82°58'35" W	32.70
L4	N 38°23'34" E	24.75
L5	N 27°43'56" E	8.52



SCALE: 1" = 40'

SURVEYOR'S CERTIFICATE:
THIS MAP CORRECTLY REPRESENTS A SURVEY MADE BY ME OR UNDER MY DIRECTION IN CONFORMANCE WITH THE CITY OF FORKS MUNICIPAL CODE, TITLE 16, AND THE REQUIREMENTS OF THE WASHINGTON STATE SURVEY RECORDING ACT, TITLE 58 RCW, AT THE REQUEST OF FORKS BROADCASTING, INC. IN SEPTEMBER, 2012.

Bradley R. Lymangrover 5/20/14
BRADLEY R. LYMANGROVER, PLS 26071 DATE

AUDITOR'S CERTIFICATE:
FILED FOR RECORD THIS 2nd DAY OF June, 2014
AT 1:52PM IN VOLUME 34 OF SHORT PLATS, AT PAGE 95
AT THE REQUEST OF B.R. LYMANGROVER LAND SURVEYING

Lorna Elliott - Deputy
COUNTY AUDITOR
AUDITOR'S FILE NUMBER 2014-1308647

B.R. Lymangrover
Land Surveying
[illegible]
PORT ANGELES, WA [illegible]
PHONE: (360) [illegible]

SHEET 1 OF 2
DATE: 02/25/14 JOB# [illegible]

VOL 34 PG 95

Appendix F – Water Quality Schedule and Reporting

eurofins | Eaton Analytical

750 Royal Oaks Drive, Suite 100, Monrovia, CA 91016 / Tel: 626-386-1100 / Lab ID No. - C838

Herbicides

Report of Analysis

Date Collected: 04/05/22

System Group Type: (circle one) [✓ A] B Other

Water System ID Number: 26000E

System Name: Forks Municipal water

Lab Number / Sample Number: 094-90075

County: Clallam

Sample Location:
S07 - Control House 2 190 Cedar Ave

Source Number(s): (list all sources if blended or composited)
S07

Sample Purpose: (check appropriate box)
- ☒ RC- Routine/Compliance (satisfies monitoring requirements)
- ☐ C - Confirmation (confirmation of chemical result)*
- ☐ I - Investigative (does not satisfy monitoring requirements)
- ☐ O - Other (specify - does not satisfy monitoring requirements)

Date Received: 04/08/22
Date Analyzed: 04/13/22, 04/29/22
Date Reported: 05/10/22
COMMENTS: EEA Folder:997976 Spectra# 216675-01

Sample Composition: (check appropriate box)
- ☐ S - Single Source
- ☒ B - Blended (list source numbers in "Source Numbers" field)
- ☐ C - Composite (list source numbers in "Source Numbers" field)
- ☐ D - Distribution Sample

Sample Type: (check one)
- ☒ Pre-treatment/Untreated (Raw)
- ☐ Post-treatment (Finished)
- ☐ Unknown or Other

Sample Collected by: (name) Nick Dias
Phone Number: ______________________

Send Report to:
Washington State DOH
Office of Drinking Water/Data Entry
P.O. Box 47822
Olympia, WA 98504-7822

Bill to: (client name)
Spectra Laboratories
26276 Twelve Trees Lane
Poulsbo, WA 98370

ANALYTICAL RESULTS

DOH #	ANALYTE	DATA QUALIFIER	RESULTS	SDRL	TRIGGER	MCL	UNITS	EXCEEDS MCL? (X if Yes)	METHOD/ INITIALS
0137	Dalapon		ND	1	1	200	ug/L		EPA 515.4/JB5V
0037	2,4-D		ND	0.1	0.1	70	ug/L		EPA 515.4/JB5V
0038	2,4,5-TP (Silvex)		ND	0.2	0.2	50	ug/L		EPA 515.4/JB5V
0134	Pentachlorophenol		ND	0.04	0.04	1	ug/L		EPA 515.4/JB5V
0139	Dinoseb		ND	0.2	0.2	7	ug/L		EPA 515.4/JB5V
0140	Picloram		ND	0.1	0.1	500	ug/L		EPA 515.4/JB5V
0138	Dicamba		ND	0.2	0.2	--	ug/L		EPA 515.4/JB5V
0135	2,4-DB		ND	1	1	--	ug/L		EPA 515.4/JB5V
0136	2,4,5-T		ND	0.4	0.4	--	ug/L		EPA 515.4/JB5V
0220	Bentazon		ND	0.5	0.5	--	ug/L		EPA 515.4/JB5V
0221	Dichlorprop		ND	0.5	0.5	--	ug/L		EPA 515.4/JB5V
0223	Acifluorfen		ND	2	2	--	ug/L		EPA 515.4/JB5V
0225	DCPA (Acid Metabolites)		ND	0.1	0.1	--	ug/L		EPA 515.4/JB5V
0226	3,5-Dichlorobenzoic acid		ND	.05	.05	--	ug/L		EPA 515.4/JB5V

Qualifier Definitions

Bacteriological Sampling Schedule

BIWEEKLY SAMPLING ROTATION SCHEDULE

	MONTH 1	MONTH 2	MONTH 3
First Monday	A-1 A-2 A-3	A-4 A-5 A-6	A-7 A-8 A-9
Third Thursday	B-1 B-2 B-3	B-4 B-5 B-6	B-7 B-8 B-9

(This cycle repeats after the third month.)

Repeat sample sites are available up stream and down stream of all routine sampling sites.

All water storage tanks can be sampled as necessary.

All sources can be sampled directly as necessary.

Regulations require six routine samples per month.

Rotation schedule

Month	First Monday	Third Thursday	Month	First Monday	Third Thursday
January	A1,A2,A3,	/B1,B2,B3	July	A1,A2,A3,	/B1,B2,B3
February	A4,A5,A6,	/B4,B5,B6	August	A4,A5,A6,	/B4,B5,B6
March	A7,A8,A9,	/B7,B8,B9	September	A7,A8,A9,	/B7,B8,B9
April	A1,A2,A3,	/B1,B2,B3	October	A1,A2,A3,	/B1,B2,B3
May	A4,A5,A6,	/B4,B5,B6	November	A4,A5,A6,	/B4,B5,B6
June	A7,A8,A9,	/B7,B8,B9	December	A7,A8,A9,	/B7,B8,B9

SAMPLING INFORMATION

SITE # A-1

Type	Meter #	Location
Routine	3-476-6	Information center
Repeat	3-476-6	Information Center
Repeat	3-477	Vacant lot
Repeat	3-476-1	Animal Shelter

SITE # A-2

Type	Meter #	Location
Routine	4-58	Pay and Save
Repeat	4-58	Pay and Save
Repeat	4-60	Library
Repeat	4-56	Congrinational Church

SITE # A-3

Type	Meter #	Location
Routine	1-309	Exon Station
Repeat	1-309	Exon Station
Repeat	1-308	Chevron Station
Repeat	1-321	Caboose Restaurant

SITE # A-4

Type	Meter #	Location
Routine	1-328	D.N.R.
Repeat	1-328	D.N.R.
Repeat	1-321-1	Tillicum Park
Repeat	1-325-1	Doug Allen

SITE # A-5

Type	Meter #	Location
Routine	67-128	Swanson's Truck Shop
Repeat	67-128	Swanson's Truck Shop
Repeat	1-336	Addleman's Truck Shop
Repeat	67-134	Patty Lovelady res.

SAMPLING INFORMATION

SITE # A-6

Type	Meter #	Location
Routine	19-54	Aldergrove Laundermat
Repeat	19-54	Aldergrove Laundermat
Repeat	1-21	Tod Horton
Repeat	1-16	Duplexes

SITE # A-7

Type	Meter #	Location
Routine	1-165-1	Newton's Mill
Repeat	1-165-1	Newton's Mill
Repeat	1-163-2	Cemitary
Repeat	6-74	Ken Craig

SITE # A-8

Type	Meter #	Location
Routine	1-231	CenturyTel warehouse
Repeat	1-231	CenturyTel warehouse
Repeat	6-66	Steve Hobi
Repeat	1-233	Joanne Palmer

SITE # A-9

Type	Meter #	Location
Routine	6-13	Forks Rec. Center
Repeat	6-13	Forks Rec. Center
Repeat	6-1	Oxbow Laundry Room
Repeat	4-113	City Hall

SITE # B-1

Type	Meter #	Location
Routine	2-88	B&P Auto Repair
Repeat	2-88	B&P Auto Repair
Repeat	2-92	True Value
Repeat	2-83	Leona McDonald

SAMPLING INFORMATION

SITE # B-2

Type	Meter #	Location
Routine	2-70-1	Control House #2
Repeat	2-70-1	Control House #2
Repeat	2-70	Radio Station
Repeat	2-60	David Haight

SITE # B-3

Type	Meter #	Location
Routine	2-47	Shell Station
Repeat	2-47	Shell Station
Repeat	2-100	Sully's Restaurant
Repeat	2-46	Nazarene Church

SITE # B-4

Type	Meter #	Location
Routine	3-39	Almar Building
Repeat	3-39	Almar Building
Repeat	3-33	Chalet Deli
Repeat	3-20	Doug Steward

SITE # B-5

Type	Meter #	Location
Routine	3-90	Penninsula College
Repeat	3-90	Penninsula College
Repeat	3-89	Pacific Inn
Repeat	3-96	Forks Forum

SITE # B-6

Type	Meter #	Location
Routine	3-242-2	Dahlgren's Shop
Repeat	3-242-2	Dahlgren's Shop
Repeat	3-240	Stella Thrall
Repeat	88-14	Bill Peterson

SAMPLING INFORMATION

SITE # B-7

Type	Meter #	Location
Routine	3-300	Wilder Trucking
Repeat	3-300	Wilder Trucking
Repeat	63-8	McCoy Mill
Repeat	3-411	Dave Conway

SITE # B-8

Type	Meter #	Location
Routine	3-143-1	Hospital
Repeat	3-143-1	Hospital
Repeat	3-142-1	D.S.H.S. Building
Repeat	3-144	Catholic Church

SITE # B-9

Type	Meter #	Location
Routine	3-458-1	Gilmore Tire
Repeat	3-458-1	Gilmore Tire
Repeat	3-464	Graphic Arts
Repeat	3-457	Ron Ward

ROTATION SCHEDULE

MONTH			
JANUARY	A1,A2,A3/B1,B2,B3	JULY	A1,A2,A3/B1,B2,B3
FEBURARY	A4,A5,A6/B4,B5,B6	AUGUST	A4,A5,A6/B4,B5,B6
MARCH	A7,A8,A9/B7,B8,B9	SEPTEMBER	A7,A8,A9/B7,B8,B9
APRIL	A1,A2,A3/B1,B2,B3	OCTOBER	A1,A2,A3/B1,B2,B3
MAY	A4,A5,A6/B4,B5,B6	NOVEMBER	A4,A5,A6/B4,B5,B6
JUNE	A7,A8,A9/B7,B8,B9	DECEMBER	A7,A8,A9/B7,B8,B9

BIWEEKLY SAMPLING ROTATION SCHEDULE

	MONTH 1	MONTH 2	MONTH 3
WEEK 2	A-1 A-2 A-3	A-4 A-5 A-6	A-7 A-8 A-9
WEEK 4	B-1 B-2 B-3	B-4 B-5 B-6	B-7 B-8 B-9

(THIS CYCLE REPEATS AFTER THE THIRD MONTH)

REPEAT SAMPLE SITES ARE AVAILABLE UPSTREAM AND DOWN STREAM OF ALL REPEAT SAMPLE SITES.

ALL WATER STORAGE TANKS CAN BE SAMPLED AS NECESSARY.

ALL SOURCES CAN BE SAMPLED DIRECTLY AS NECESSARY.

SAMPLING INFORMATION

NUMBER OF ROUTINE SAMPLES REQUIRED BY REGULATION - SIX PER MONTH

	TYPE	SITE #	METER #	LOCATION
	ROUTINE	A-1	3-476-6	INFORMATION CENTER
SAMPLE	REPEAT		3-476-6	INFORMATION CENTER
SITE	REPEAT		3-477	VACANT LOT
GROUP	REPEAT		3-476-1	DOG POUND

	TYPE	SITE #	METER #	LOCATION
	ROUTINE	A-2	4-58	PAY & SAVE
SAMPLE	REPEAT		4-58	PAY & SAVE
SITE	REPEAT		4-60	LIBRARY
GROUP	REPEAT		4-56	CHURCH

	TYPE	SITE #	METER #	LOCATION
	ROUTINE	A-3	5-10	VAGABOND REST.
SAMPLE	REPEAT		5-10	VAGABOND REST.
SITE	REPEAT		5-9	JODYS
GROUP	REPEAT		5-19	P.T.I. OFFICE

ADDITIONAL SAMPLING INFORMATION

WATER SYSTEM NAME - FORKS MUNICIPAL WATER

	TYPE	SITE #	METER #	LOCATION
	ROUTINE	A-4	1-328	D.N.R.
SAMPLE	REPEAT		1-328	D.N.R.
SITE	REPEAT		1-321-1	TILLICUM PARK
GROUP	REPEAT		1-325-1	DOUG ALLEN

	TYPE	SITE #	METER #	LOCATION
	ROUTINE	A-5	67-128	SWANSON TRK. SHOP
SAMPLE	REPEAT		67-128	SWANSON TRK. SHOP
SITE	REPEAT		1-336	ADDLEMAN TRK. SHOP
GROUP	REPEAT		67-134	PATTY PROFIT

	TYPE	SITE #	METER #	LOCATION
	ROUTINE	A-6	19-54	ALDERGROVE LNDRY MAT
SAMPLE	REPEAT		19-54	ALDERGROVE LNDRY MAT
SITE	REPEAT		1-21	TOD HORTON
GROUP	REPEAT		1-16	DUPLEXES

	TYPE	SITE #	METER #	LOCATION
	ROUTINE	A-7	1-165-1	NEWTONS MILL
SAMPLE	REPEAT		1-165-1	NEWTONS MILL
SITE	REPEAT		1-163-2	CEMETARY
GROUP	REPEAT		6-74	KEN CRAIG

	TYPE	SITE #	METER #	LOCATION
	ROUTINE	A-8	1-231	P.T.I. WAREHOUSE
SAMPLE	REPEAT		1-231	P.T.I. WAREHOUSE
SITE	REPEAT		6-66	STEVE HOBI
GROUP	REPEAT		1-233	JOANN PALMER

	TYPE	SITE #	METER #	LOCATION
	ROUTINE	A-9	6-13	FORKS REC. CENTER
SAMPLE	REPEAT		6-63	FORKS REC. CENTER
SITE	REPEAT		6-1	OXBOW LNDRY RM.
GROUP	REPEAT		4-113	CITY HALL

ADDITIONAL SAMPLING INFORMATION

WATER SYSTEM NAME - FORKS MUNICIPAL WATER

	TYPE	SITE #	METER #	LOCATION
	ROUTINE	B-1	2-88	EDWARDS LOGGING
SAMPLE SITE GROUP	REPEAT		2-88	EDWARDS LOGGING
	REPEAT		2-92	TRUE VALUE
	REPEAT		2-83	LEONA MCDONALD

	TYPE	SITE #	METER #	LOCATION
	ROUTINE	B-2		CONTROL HOUSE #2
SAMPLE SITE GROUP	REPEAT			CONTROL HOUSE #2
	REPEAT		2-70	RADIO STATION
	REPEAT		2-60	DAVID HAIGHT

	TYPE	SITE #	METER #	LOCATION
	ROUTINE	B-3	2-47	SHELL STATION
SAMPLE SITE GROUP	REPEAT		2-47	SHELL STATION
	REPEAT		2-100	SULLYS DRIVEIN
	REPEAT		2-46	NAZARENE CHURCH

	TYPE	SITE #	METER #	LOCATION
	ROUTINE	B-4	3-39	ALMAR BILDING
SAMPLE SITE GROUP	REPEAT		3-39	ALMAR BUILDING
	REPEAT		3-33	CHALET DELI.
	REPEAT		3-20	DOUG STEWARD

	TYPE	SITE #	METER #	LOCATION
	ROUTINE	B-5	3-90	B & P AUTO
SAMPLE SITE GROUP	REPEAT		3-90	B & P AUTO
	REPEAT		3-89	PACIFIC INN
	REPEAT		3-96	FORKS FORM

	TYPE	SITE #	METER #	LOCATION
	ROUTINE	B-6	3-242-2	DAHLGRENS
SAMPLE SITE GROUP	REPEAT		3-242-2	DAHLGRENS
	REPEAT		3-240-2	STELLA THRALL
	REPEAT		88-14	BILL PETERSON

ADDITIONAL SAMPLING INFORMATION

WATER SYSTEM NAME - FORKS MUNICIPAL WATER

	TYPE	SITE #	METER #	LOCATION
	ROURINE	B-7	3-301	HOH GROWN
SAMPLE	REPEAT		3-301	HOH GROWN
SITE	REPEAT		63-8	McCOY MILL
GROUP	REPEAT		3-411	DAVE CONWAY

	TYPE	SITE #	METER #	LOCATION
	ROUTINE	B-8	3-143-1	HOSPITAL
SAMPLE	REPEAT		3-143-1	HOSPITAL
SITE	REPEAT		3-142-1	D.S.H.S.
GROUP	REPEAT		3-144	CATHOLIC CHURCH

	TYPE	SITE #	METER #	LOCATION
	ROUTINE	B-9	3-458-1	EARLY TIRE
SAMPLE	REPEAT		3-458-1	EARLY TIRE
SITE	REPEAT		3-464	GRAPHIC ARTS
GROUP	REPEAT		3-457	RON WARD

Clallam County Health and Human Services Environmental Health Laboratory
Physical Location: County Courthouse 223 E. 4th Street, Room 130
Mailing Address: 111 E. 3rd, Port Angeles, WA 98362
(360) 417-2334

Report of Analysis – **Nitrate Test**

Date Collected: 3/17/2020	**Group: A**
Time Collected: 11:32:00 AM	**System Name: Forks Municpal**
System ID number: 26000	County: Clallam
Lab Sample number: 092-03754	Source number: S06
Sample Location: control house #~~2~~ 1	Date Received: 3/17/2020
Sample Purpose: Routine/Compliance	Date Analyzed: 3/18/2020
Sample Composition: Blended	Date Reported: 3/20/2020
Collected By: Joe Gaydeski	Sample Type: Untreated
Phone Number: 360-640-3633	Receipt #: bill to same
Send Report to: City of Forks 500 E. Division Forks, WA 98331	Lab comments:

DOH test#	Analyte tested	**RESULTS**	Units	SRL	Trigger	MCL	MCL Exceeded? (check only if yes)	Method	Analyst
0020	Nitrate-N	**0.73**	mg/L	0.5	5.0	10.0		SM4500-NO3 D	*smw*

In general, results less than 5.0 are satisfactory. Results between 5 & 10 may require more frequent monitoring. Results greater than 10 require treatment.

ND: In the results column, indicate this compound was analyzed and **Not Detected** at a level greater than or equal to the SRL.

SRL (State Reporting Level): The minimum reporting level established by the Washington State Department of Health (DOH)

Trigger: DOH drinking water response level. Systems with compounds detected at concentrations in excess of this level may be required to take additional samples or monitor more frequently.

MCL: Maximum Contaminant Level: Drinking water that exceeds the MCL may be a health risk. Public water systems that exceed the MCL, please contact your regional DOH office to determine follow-up action.

Clallam County Health and Human Services Environmental Health Laboratory
Physical Location: County Courthouse 223 E. 4th Street, Room 130
Mailing Address: 111 E. 3rd, Port Angeles, WA 98362
(360) 417-2334

Report of Analysis – **Nitrate Test**

Date Collected: 3/17/2020	**Group: A**
Time Collected: 11:53:00 AM	**System Name: Forks Municpal**
System ID number: 26000	County: Clallam
Lab Sample number: 092-03753	Source number: S07
Sample Location: control house # 2	Date Received: 3/17/2020
Sample Purpose: Routine/Compliance	Date Analyzed: 3/18/2020
Sample Composition: Blended	Date Reported: 3/20/2020
Collected By: Joe Gaydeski	Sample Type: Untreated
Phone Number: 360-640-3633	Receipt #: bill to same
Send Report to: City of Forks 500 E. Division Forks, WA 98331	Lab comments:

DOH test#	Analyte tested	**RESULTS**	Units	SRL	Trigger	MCL	MCL Exceeded? (check only if yes)	Method	Analyst
0020	Nitrate-N	**0.55**	mg/L	0.5	5.0	10.0		SM4500-NO3 D	*smw*

In general, results less than 5.0 are satisfactory. Results between 5 & 10 may require more frequent monitoring. Results greater than 10 require treatment.

ND: In the results column, indicate this compound was analyzed and **Not Detected** at a level greater than or equal to the SRL.
SRL (State Reporting Level): The minimum reporting level established by the Washington State Department of Health (DOH)
Trigger: DOH drinking water response level. Systems with compounds detected at concentrations in excess of this level may be required to take additional samples or monitor more frequently.
MCL: Maximum Contaminant Level: Drinking water that exceeds the MCL may be a health risk. Public water systems that exceed the MCL, please contact your regional DOH office to determine follow-up action.

Coliform Monitoring Plan for: City of Forks

A. System Information

Plan Date: 3/1/2022

Water System Name Forks Municipal Water Department	**County** Clallam	**System I.D. Number** 26000E
Name of Plan Preparer Gerald Mickelsen, EIT	**Position** Consultant	**Daytime Phone** **360-425-0991**

Sources: DOH Source Number, Source Name, Well Depth, Pumping Capacity	S01: Well No.1; 178 ft deep; 210 gpm pump capacity S02: Well No. 2; 161 ft deep; 265 gpm pump capacity S03: Well No. 3; 114 ft deep; 300 gpm pump capacity S04: Well No. 4; 130 ft deep; 300 gpm pump capacity S05: Well No. 5; 132 ft deep; 480 gpm pump capacity Well 6 (1): 152 ft deep; 350 gpm pump capacity S06: Well Numbers 1, 2, and 3 S07: Well Numbers 4, 5, and 6 (1) Well 6 has not yet been assigned a DOH Source Number
Storage: List and Describe	Reservoir 1: 1 MG welded steel tank Reservoir 2: 0.75 MG welded steel tank Reservoir 3: 0.15 MG welded steel tank
Treatment: Source Number & Process	S06 and S07: Disinfection
Pressure Zones: Number and name	One main pressure zone.
Population by Pressure Zone	4,611 service population.

Number of Routine Samples Required Monthly by Regulation:	5
Number of Sample Sites Needed to Represent the Distribution System:	6
***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 Clallam County Health and Human Services	**Office Phone 360-374-3121** **After Hours Phone** - -
Address 140 C Street Forks, WA 98331	**Cell Phone** - - **Email** EnviroHealth@co.clallam.wa.us
Hours of Operation Tues, Thurs, and Fri, 8:30 am to 12:00 pm and 1:00 pm to 4:30 pm	
Contact Name ______	
Emergency Laboratory Name ______	**Office Phone** - - **After Hours Phone** - -
Address ______	**Cell Phone** - - **Email** ______
Hours of Operation ______	
Contact Name ______	

C. Wholesaling of Groundwater

	Yes	No
We are a consecutive system and purchase groundwater from another water system.	☐	☒
We sell groundwater to other public water systems.	☐	☒

D. Routine, Repeat, and Triggered Source Sample Locations

Location/Address for **Routine Sample Sites**	Location/Address for **Repeat Sample Sites**	Groundwater Sources for **Triggered Sample Sites***
A1. Visitor Information Center 1411 S Forks Ave	**1-1. Visitor Information Center** 1411 S Forks Ave	**S01 – S07**
	1-2. Vacant Lot	**S01 – S07**
	1-3. Animal Shelter 1510 S Forks Ave	**S01 – S07**
A2. Pay and Save 314 S Forks Ave	**2-1. Pay and Save** 314 S Forks Ave	**S01 – S07**
	2-2. Library 171 S Forks Ave	**S01 – S07**
	2-3. First Congregational Church 280 Spartan Ave	**S01 – S07**
A3. Mobil Gas Station 171 N Forks Ave	**3-1. Mobil Gas Station** 171 N Forks Ave	**S01 – S07**
	3-2. Chevron Gas Station 490 N Forks Ave	**S01 – S07**
	3-3. Caboose Restaurant	**S01 – S07**
A4. Department of Natural Resources 411 Tillicum Ln	**4-1. Department of Natural Resources** 411 Tillicum Ln	**S01 – S07**
	4-2. Tillicum Park Tillicum Ln	**S01 – S07**
	4-3. Doug Allen Residence	**S01 – S07**
A5. Swanson's Repair 600 Woodpecker Ln	**5-1. Swanson's Repair** 600 Woodpecker Ln	**S01 – S07**
	5-2. Addleman's Truck Shop	**S01 – S07**
	5-3. Patty Lovelady Residence	**S01 – S07**

A6. Aldergrove Laundromat 1750 Calawah Way	**6-1. Aldergrove Laundromat** 1750 Calawah Way	**S01 – S07**
	6-2. Tod Horton Residence	**S01 – S07**
	6-3. Duplexes	**S01 – S07**
A7. Newton's Mill 1017 Calawah Way	**7-1. Newton's Mill** 1017 Calawah Way	**S01 – S07**
	7-2. Cemetery Calawah Way	**S01 – S07**
	7-3. Ken Craig Residence	**S01 – S07**
A8. CenturyLink Warehouse 751 Calawah Way	**8-1 CenturyLink Warehouse** 751 Calawah Way	**S01 – S07**
	7-2. Steve Hobi Residence	**S01 – S07**
	7-3. Joanna Palmer Residence	**S01 – S07**
A9. Forks Athletic and Aquatic Center 91 Maple Ave	**9-1. Forks Athletic and Aquatic Club** 91 Maple Ave	**S01 – S07**
	9-2. Oxbow Laundry Room	**S01 – S07**
	7-3. City Hall 500 E Division St	**S01 – S07**
B1. B&P Auto Repair 430 Sol Duc Way	**1-1. B&P Auto Repair** 430 Sol Duc Way	**S01 – S07**
	1-2. True Value 10 S Forks Ave	**S01 – S07**
	1-3. Leona McDonald Residence	**S01 – S07**

B2. Control House #2 260 Cedar Ave	**2-1. Control House #2** 260 Cedar Ave	**S01 – S07**
	2-2. Radio Station 260 Cedar Ave	**S01 – S07**
	2-3. David Haight Residence	**S01 – S07**
B3. Shell Gas Station 170 N Forks Ave	**3-1. Shell Gas Station** 170 N Forks Ave	**S01 – S07**
	3-2. Sully’s Burgers Restaurant 220 N Forks Ave	**S01 – S07**
	3-3. Church of Nazarene 170 Sol Duc Way	**S01 – S07**
B4. Almar Building 150-190 S Forks Ave	**4-1. Almar Building** 150-190 S Forks Ave	**S01 – S07**
	4-2. Chalet Deli	**S01 – S07**
	4-3. Doug Steward Residence	**S01 – S07**
B5. Peninsula College 481 S Forks Ave	**5-1. Peninsula College** 481 S Forks Ave	**S01 – S07**
	5-2. Pacific Inn 352 S Forks Ave	**S01 – S07**
	5-3. Forks Forum 490 S Forks Ave	**S01 – S07**
B6. Dahlgren Logging Co Shop 1666 Bogachiel Way	**6-1. Dahlgren Logging Co Shop** 1666 Bogachiel Way	**S01 – S07**
	6-2. Stella Thrall Residence	**S01 – S07**
	6-3. Bill Peterson Residence	**S01 – S07**

B7. Wilder Trucking Russell Rd	**7-1. Wilder Trucking** Russell Rd	**S01 – S07**
	7-2. McCoy Mill	**S01 – S07**
	7-3. Dave Conway Residence	**S01 – S07**
B8. Hospital 530 Bogachiel Way	**8-1. Hospital** 530 Bogachiel Way	**S01 – S07**
	8-2. Social and Health Services Department 421 5th Ave	**S01 – S07**
	8-3. St. Anne Catholic Church 511 5th Ave	**S01 – S07**
B9. Gilmore Tire S Forks Ave	**9-1. Gilmore Tire** S Forks Ave	**S01 – S07**
	9-2. Graphic Arts	**S01 – S07**
	9-3. Ron Ward Residence	**S01 – S07**

*** When you collect the repeats, you must sample every groundwater source that was in use when the original routine sample was collected.**

Important Notes for Sample Collector:

A locations are sampled on the first Monday of each month. B locations are sampled on the third Thursday of each month.

Repeat sample sites are available: (1) at the same tap as the original unsatisfactory sample; (2) within 5 upstream connections of the routine sampling site; and (3) within 5 downstream connections of the routine sampling sites.

All water storage tanks can be sampled as necessary.

All sources can be sampled directly as necessary.

E. Reduced Triggered Source Monitoring Justification (add sheets as needed):

F. Routine Sample Rotation Schedule

Month	Routine Site(s)	Month	Routine Site(s)
January	A1-A3, B1-B3	July	A1-A3, B1-B3
February	A4-A6, B4-B6	August	A4-A6, B4-B6
March	A7-A9, B7-B9	September	A7-A9, B7-B9
April	A1-A3, B1-B3	October	A1-A3, B1-B3
May	A4-A6, B4-B6	November	A4-A6, B4-B6
June	A7-A9, B7-B9	December	A7-A9, B7-B9

G. Level 1 and Level 2 Assessment Contact Information

Name Paul Hampton	**Office Phone** 360-374-5412 ext 242 **After Hours Phone** - -
Address 500 E Division St.	**Email** Paul@forkswashington.org
Name	**Office Phone** - - **After Hours Phone** - -
Address	**Email**

H. *E. coli*-Present Sample 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.	☐	☐	☐	☐
We document all water main breaks, construction & repair activities, and low pressure and outage incidents.	☒	☐	☐	☐
We can easily access and review documentation on water main breaks, construction & repair activities, and low pressure and outage incidents.	☐	☐	☐	☐
Our Cross-Connection Control Program is up-to-date.	☒	☐	☐	☐
We test all cross-connection control devices annually as required, with easy access to the proper documentation.	☒	☐	☐	☐
We routinely inspect all treatment facilities for proper operation.	☒	☐	☐	☐
We identified one or more qualified individuals who are able to conduct a Level 2 assessment of our water system.	☐	☐	☐	☐
We have procedures in place for disinfecting and flushing the water system if it becomes necessary.	☐	☐	☐	☐
We can activate an emergency intertie with an adjacent water system in an emergency.	☐	☒	☐	☐
We have a map of our service area boundaries.	☒	☐	☐	☐
We have consumers who may not have access to bottled or boiled water.	☐	☒	☐	☐
There is a sufficient supply of bottled water immediately available to our customers who are unable to boil their water.	☐	☒	☐	☐
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.	☐	☐	☐	☐
We have messages prepared and translated into different languages to ensure our consumers will understand them.	☐	☒	☐	☐
We have the capacity to print and distribute the required number of notices in a short time period.	☐	☐	☐	☐
Policy Direction	**Yes**	**No**	**N/A**	**To Do List**
We have discussed the issue of *E. coli*-present sample results with our policy makers.	☐	☐	☒	☐
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.	☐	☐	☒	☐

(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.	☐	☐	☐	☐
We have a list of all of our customers' addresses.	☐	☐	☐	☐
We have a list of customer telephone numbers or access to a Reverse 9-1-1 system.	☒	☐	☐	☐
We have a list of customer email addresses.	☐	☐	☐	☐
We encourage our customers to remain in contact with us using social media.	☐	☒	☐	☐
We have an active website we can quickly update to include important messages.	☒	☐	☐	☐
Our customers drive by a single location where we could post an advisory and expect everyone to see it.	☒	☐	☐	☐
We need a news release to supplement our public notification process.	☐	☐	☐	☐

Distribution System *E. coli* Response Plan

If we have *E. coli* in our distribution system we will immediately:

1. Call DOH.
2. Collect repeat and triggered source samples per Part D. Collect additional investigative samples as necessary.
3. Inspect our water system facilities for proper operation.
4. Interview staff to determine whether anything unusual was happening in the water system service area, especially since the previous month's sample(s).
5. Review new construction activities, water main breaks, and pressure outages that may have occurred during the previous month.
6. Review Cross-Connection Control Program status.
7. Discuss with DOH whether to issue a Health Advisory based on the findings of steps 3-6.

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.	☒	☐	☐	☐
We address any significant deficiencies identified during a sanitary survey.	☒	☐	☐	☐
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.	☐	☒	☐	☐
We routinely inspect our well site(s).	☒	☐	☐	☐
We have a good raw water sample tap installed at each source.	☒	☐	☐	☐
After we complete work on a source, we disinfect the source, flush, and collect an investigative sample.	☒	☐	☐	☐
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.	☐	☐	☐	☐
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.	☐	☐	☐	☐
We have prepared templates and a communications plan that will help us quickly distribute our messages.	☒	☐	☐	☐

E. coli-Present Triggered Source Sample Response Checklist – Both Sources S06 and S07

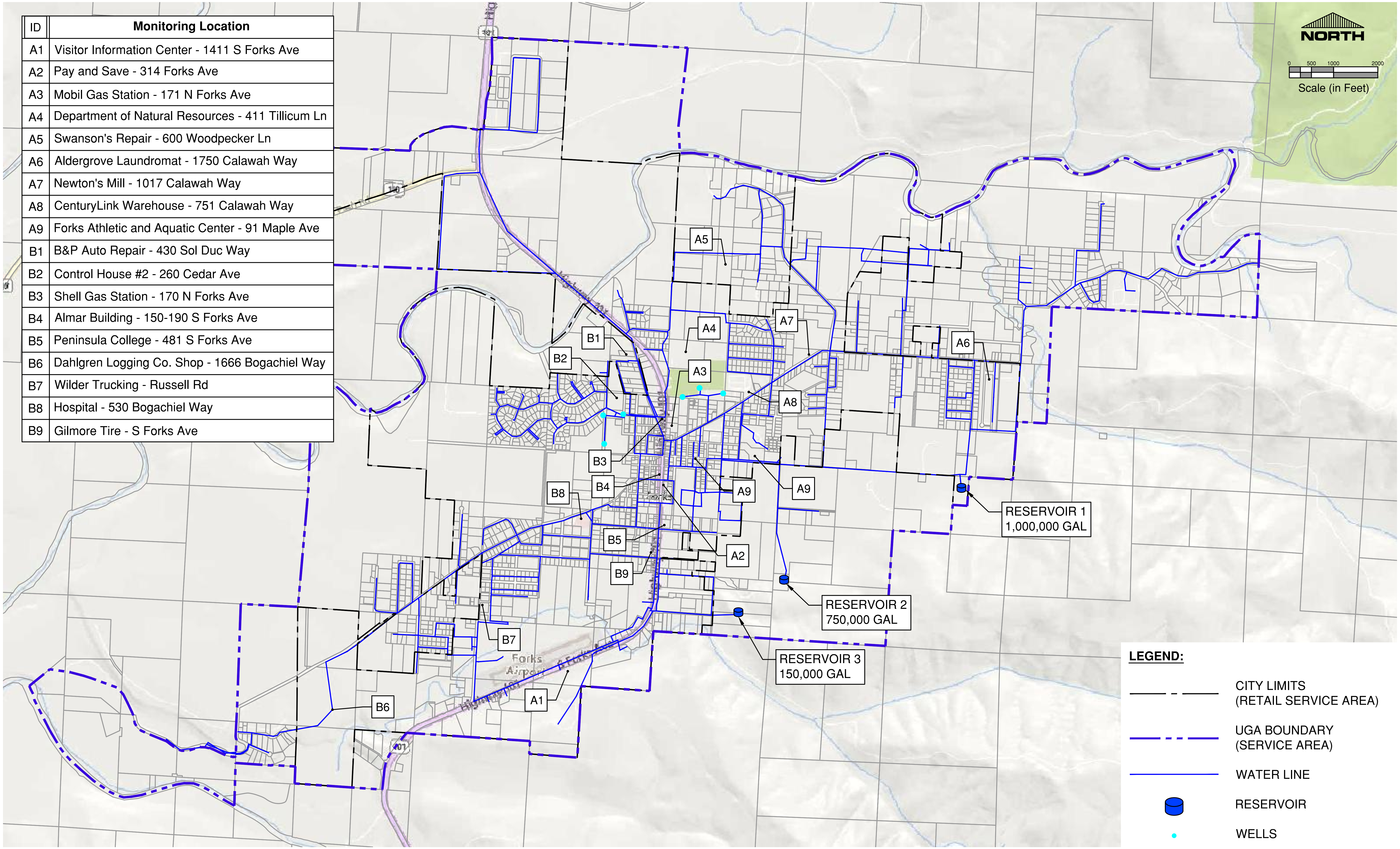
Alternate Sources	**Yes**	**No**	**N/A**	**To Do List**
We can stop using this source and still provide reliable water service to our customers.	☒	☐	☐	☐
We have an emergency intertie with a neighboring water system that we can use until corrective action is complete (perhaps for several months).	☐	☒	☐	☐
We can provide bottled water to all or part of the distribution system for an indefinite period.	☐	☒	☐	☐
We can quickly replace our existing source of supply with a more protected new source.	☐	☐	☐	☐
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? 0.2 mg/L	☒	☐	☐	☐
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.	☐	☐	☐	☐
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.	☐	☐	☐	☐
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.	☐	☐	☐	☐

E. coli-Present Triggered Source Sample Response Plan – Source S01 – S07

If we have *E. coli* in Sources 01, 02, 03, 04 , 05, 06, or 07 water we will immediately:

1. Call DOH.
2. Take repeat samples
3. Issue boil water advisory
4. Inform local media of boil water advisory

I. System Map



ID	Monitoring Location
A1	Visitor Information Center - 1411 S Forks Ave
A2	Pay and Save - 314 Forks Ave
A3	Mobil Gas Station - 171 N Forks Ave
A4	Department of Natural Resources - 411 Tillicum Ln
A5	Swanson's Repair - 600 Woodpecker Ln
A6	Aldergrove Laundromat - 1750 Calawah Way
A7	Newton's Mill - 1017 Calawah Way
A8	CenturyLink Warehouse - 751 Calawah Way
A9	Forks Athletic and Aquatic Center - 91 Maple Ave
B1	B&P Auto Repair - 430 Sol Duc Way
B2	Control House #2 - 260 Cedar Ave
B3	Shell Gas Station - 170 N Forks Ave
B4	Almar Building - 150-190 S Forks Ave
B5	Peninsula College - 481 S Forks Ave
B6	Dahlgren Logging Co. Shop - 1666 Bogachiel Way
B7	Wilder Trucking - Russell Rd
B8	Hospital - 530 Bogachiel Way
B9	Gilmore Tire - S Forks Ave

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City of Forks
Water System Plan
Coliform Monitoring Plan
System Map

DRAWING: T:\PROJECTS\0788 MISC ENG PROJECT\0181 JACKSON CIVIL ENG FORKS WTR SYS PLAN\FIGURES & EXHIBITS\APOPENDIX F - COLIFORM MONITORING PLAN MAP.DWG, LAYOUT TAB: SYSTEM MAP, PLOT DATE: 3/4/2022 4:19:22 PM, DRAWING SAVE DATE: 3/4/2022 3:32:32 PM, PLOTTED BY: GMICKELSEN
PLOT DEVICE: GIBBS & OLSON - DWG TO PDF.PC3, PLOT SYLE TABLE: GIBBS-OLSON STANDARD COLOR WITH BLACK.CTB, PAPER SIZE: GIBBS & OLSON - FIGURE B SIZE (LANDSCAPE - 17.00 X 11.00 INCHES)

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
SOUTHWEST DRINKING WATER REGIONAL OPERATIONS
P.O. Box 47823 Olympia, Washington 98504-7823
TDD Relay 1-800-833-6388

SANITARY SURVEY REPORT

Sanitary surveys are the Office of Drinking Water's (ODW) way to inspect public water systems through a field visit. We are also able to offer technical assistance to help improve system operations and ensure public health is protected.

This report documents the findings for the following water system.

December 14, 2020

Paul Hampton
City of Forks
500 East Division Street
Forks, Washington 98331

Forks Municipal Water Department
ID #26000E

County:	Clallam
System Type:	Community
Operating Permit Color:	Green
Surveyor:	Jocelyne Gray Virtual
Water System Attendees:	Paul Hampton
Inspection Date:	December 1, 2020

Thank you for submitting documentation for the virtual survey on November 12, 2020, with additional documentation sent December 1, 2020.

Significant Deficiencies and Findings are assigned a due date. If you are not able to complete the work by the assigned date, you MUST submit a Corrective Action Plan describing how and when you will complete the work. Failure to respond by the date below will result in further compliance actions in accordance with WAC 246-290-050.

As you correct the items, send me documentation that demonstrates the items have been completed as directed. Include the system name, ID number, item #, and the date the deficiencies were corrected. You can send them to me by e-mail at jocelyne.gray@doh.wa.gov or by mail at PO Box 47823, Olympia, Washington 98504-7823.

SIGNIFICANT DEFICIENCIES* - BY JANUARY 21, 2020

1. Well vents must be downturned to prevent contamination entering the well, see DOH Publication #331-232.

SIGNIFICANT FINDINGS** - NONE FOUND

OBSERVATIONS

2. Submit as-built project report for disinfection systems, see WAC 246-290-110, -120, and -250. Submit by e-mail to swro.admin@doh.wa.gov.

3. Ensure all premise isolation backflow assemblies are tested every twelve months by a certified backflow assembly tester (BAT), see WAC 246-290-490. ODW expects purveyors to have 100 percent of all premise isolation assemblies be tested.
4. Reservoir 3 needs to be recoated to prevent it from rusting through. If the tank is to be kept online, have the interior inspected and cleaned, see WAC 246-290-235.

RECOMMENDATIONS

5. It is recommended the raw water sample taps be located inside to protect them from contamination.
6. Develop a schematic of the disinfection systems and post in each control building.
7. Tanks should be inspected and cleaned every five to seven years. Develop a schedule for inspecting and cleaning each reservoir.
8. Distribution valves should be exercised annually to ensure they function when needed.
9. Submit a current Coliform Monitoring Plan to charese.gainor@doh.wa.gov.
10. Submit a lead and copper monitoring plan that includes justification for each sample location based on the EPA tier criteria: https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-111.pdf.
11. The City of Forks Municipal Water (City) should hold a public forum for the water use efficiency goals during the public meeting for the adoption of the water system plan. The customer goal needs to be listed on the Water Use Efficiency (WUE) report.
12. In the Consumer Confidence Report, lead results should be converted to parts per billion (AL – 15 ppb) so “Your Water” results should be 1 – 3 ppb and 90th Percentile should be 3.

SYSTEM INFORMATION

The full time residential population served by the Forks Municipal Water Department is about 4,350. The limiting factor for the water system capacity is storage. As of the most recent WSP from 2007, the system is approved for an “unspecified” number of connections with a maximum limit of 3,932 equivalent residential units (ERUs). As reported on the Water Facilities Inventory (WFI) form, the system currently serves a total of 1981 connections, including 1345 single-family residences, 183 multi-family residential units, and 213 non-residential connections. The WSP update was due in 2013 and was scheduled to be submitted in 2020.

The system is fed entirely by groundwater, including five groundwater wells occupying two wellfields. The system is served by one single pressure zone that has three storage reservoirs. There are no booster pump stations.

Despite the system’s apparent excess in physical capacity, severe droughts have limited capacity in late summer and early fall, making it difficult for the system to satisfy peak demands. Forks is prone to summer drought; there have been three state declared droughts in the Forks area since 2015. During a declared drought, the system imposes mandatory restrictions on its customers. The system has identified additional, deeper groundwater sources that could improve capacity during future droughts. A deeper emergency well has been drilled and will be going through the source approval process.

SECTION 1: SOURCE

This system has two wellfields located within city limits. S06 consists of Wells 1, 2, and 3, while S07 consists of Wells 4 and 5. The total pumping capacity for all wells, as listed on the WFI, is about 1,555 gallons per minute (gpm). Wells 1, 2, and 3 are located within the City's central facility. Well 1 has a submersible pump, while the other wells have turbine pumps. The wells range in depth from 102 feet to 126 feet.

Wells 1, 2, and 3 are controlled by floats located in a one million gallon (MG) reservoir. A signal is transmitted via telephone line. Wells 4 and 5 are controlled by pressure sensors installed on the tank. A level signal is transmitted by a radio transmission unit (RTU). The pressure sensor for water level indication and radio communication system was built in 2009. Wells are operated somewhat differently in dry and wet seasons. In the dry season, when the water table is down, the flow rate of the wells is dialed down by throttling the downstream valves. First, the flow rate of Well 5 is decreased, and then the Well 3 flow rate is decreased to minimize the cone of depression and avoid source quality problems. Staff monitors water levels in all sources weekly since 2019.

The City has one diesel trailer-mounted emergency generator that is shared by the water and wastewater utilities.

Source ID #	**Name**	**Description**	**Ecology Tag #**	**Listed on WFI Yes No**	**Approved by ODW Yes No**
S01	Well #1	210 GPM, Submersible Pump	AHM638	☒ ☐	☐ ☐
S02	Well #2	265 GPM, Turbine Pump	AHM642	☒ ☐	☐ ☐
S03	Well #3	300 GPM, Turbine Pump	AHM639	☒ ☐	☐ ☐
S04	Well #4	300 GPM, Turbine Pump	AHM640	☒ ☐	☐ ☐
S05	Well #5	480 GPM, Turbine Pump	AHM641	☒ ☐	☐ ☐
S06	WF (S01, 02, & 03)	775 GPM, Total Capacity		☒ ☐	☐ ☐
S07	WF (S04 & 05)	780 GPM, Total Capacity		☒ ☐	☐ ☐

If the sources were approved, they were approved prior to 1993.

WELLHEAD	**Source ID #01**		**Source ID #02**		**Source ID #03**		**Source ID #04**		**Source ID #05**	
	Yes	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
System has well log	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐
*Wellcap sealed	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐
*Openings sealed	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐
*Vent screened	☒	☐	☐	☒	☐	☒	☐	☒	☐	☒
Terminates 6" above grade	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐
*Protected from flooding	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐
Source meter	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐
**Raw water sample tap	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐
Check valve	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐
**Protected from unauthorized access	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐
Structure in good condition	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐

WELLHEAD	**Source ID #01**	**Source ID #02**	**Source ID #03**	**Source ID #04**	**Source ID #05**
	Yes No	**Yes No**	**Yes No**	**Yes No**	**Yes No**
Sanitary control area free of contaminants (*If no, is there an approved mitigation plan for the contaminant identified)	☒ ☐	☒ ☐	☒ ☐	☒ ☐	☒ ☐
**Protected from physical damage	☒ ☐	☒ ☐	☒ ☐	☒ ☐	☒ ☐
Frequency of routine site visit	2x/week	2x/week	2x/week	2x/week	2x/week
Frequency of source meter reading	Daily	Daily	Daily	Daily	Daily

Well vents must be downturned, see DOH Publication #331-232.

The raw water tap for S06 wellfield is located outside of the Control 1 building. The raw water tap for S07 wellfield is a yard hydrant located outside the Control 2 building. It is recommended the raw water sample taps be located inside to protect them from contamination.

The building for Well 4 was rebuilt this year.

WELL PUMP EQUIPMENT	**Source ID #01**	**Source ID #02**	**Source ID #03**	**Source ID #04**	**Source ID #05**
	Yes No	**Yes No**	**Yes No**	**Yes No**	**Yes No**
*Functional and reliable pump and pump controls	☒ ☐	☒ ☐	☒ ☐	☒ ☐	☒ ☐
*Pump control valve or vacuum relief valve with a protected air gap at discharge	☒ ☐	☒ ☐	☒ ☐	☒ ☐	☒ ☐
Generator available	☒ ☐	☒ ☐	☒ ☐	☒ ☐	☒ ☐
Generator has automatic startup	☐ ☒	☐ ☒	☐ ☒	☐ ☒	☐ ☒
Generator fuel source	Diesel	Diesel	Diesel	Diesel	Diesel

EMERGENCY SOURCES

An emergency well was drilled in 2020 to a depth deeper than Wells 4 and 5. The well is to be used when Well 5 has to be turned off due to low water levels.

ID #	**Name**	**Description**	**Ecology Tag #**	**Listed on WFI Yes No***	**Disconnected Yes No***	**Inspected Yes No***	**Approved by ODW Yes No**
S09	Well X	Near Wellfield S07		☐ ☒	☒ ☐	☐ ☒	☐ ☒

SECTION 2: DISINFECTION

Sodium hypochlorite is fed at each wellfield. The system purchases 12.5 percent product and dilutes it one gallon of sodium hypochlorite to three gallons of water within the solution tank. The system targets a distribution system free chlorine residual concentration of 0.2 milligrams per liter (mg/L).

#	Site or Location	Treatment type and Chemical Used	Listed on WFI Yes No	CT Provided Yes No	Approved by ODW Yes No
1	Wellfield S06	Disinfection/Sodium Hypochlorite	☒ ☐	☐ ☒	☐ ☒
2	Wellfield S07	Disinfection/Sodium Hypochlorite	☒ ☐	☐ ☒	☐ ☒

Submit an as-built project report for the disinfection systems by e-mail to swro.admin@doh.wa.gov.

CHEMICAL TREATMENT	1	2
	Yes No	**Yes No**
Operated & maintained properly	☒ ☐	☒ ☐
*RPBA or air gap between the chemical tank and fill waterline	☒ ☐	☒ ☐
**Post treatment sample tap	☒ ☐	☒ ☐
Redundant equipment available	☒ ☐	☒ ☐
Schematic of treatment facilities available	☐ ☒	☐ ☒
Adequate chlorine residual test kit available	☒ ☐	☒ ☐
Test kit calibrated and maintained properly	☒ ☐	☒ ☐
Chemical feed proportional to flow	☒ ☐	☒ ☐
**Approved chemicals used	☐ ☐	☐ ☐

Develop a schematic of the disinfection systems and post in each control building.

HYPOCHLORITE ADDITION	1	2
	Yes No	**Yes No**
Hypochlorite concentration %	12.5	12.5
Feed solution concentration	3%	3%
Hypochlorite solution located in separate room	☒ ☐	☒ ☐

DISINFECTION COMPLIANCE	1	2
	Yes No	**Yes No**
Disinfection required	☐ ☒	☐ ☒
CT required	☐ ☒	☐ ☒
Monthly report submitted	☒ ☐	☒ ☐
Residuals maintained in distribution system	☒ ☐	☒ ☐
Daily residuals recorded	☒ ☐	☒ ☐

SECTION 3: OTHER TREATMENTS

The system has fluoridated for dental health purposes since the 1950s. ODW supports fluoridation of public water systems to improve dental health. On October 26, 2020, the city council voted to stop adding fluoride to the drinking water. The mayor authorized turning off the treatment on May 15, 2020, due to equipment failure. Public notice was provided in the Consumer Confidence Report published June 2020.

It was verified during this survey the fluoride equipment was disconnected and removed.

Update the WFI indicating fluoridation is no longer provided.

SECTION 4: DISTRIBUTION SYSTEM

The distribution system has approximately 25 miles of water main ranging in diameter from 4 to 12 inches. Over 80 percent of the pipe is asbestos cement and 19 percent is PVC. Less than 1 percent is ductile iron.

The system last submitted a WUE Report in 2020. The distribution system leakage (DSL) was estimated to be 26.6 percent. The system has an active leak detection program. Based on October 2020 records, leakage decreased to 23.6 percent. In 2020, the City approved master metering the mobile home parks and that will change the water leakage as the City will no longer read the meters on the individual mobile homes.

The system implemented a CCC program in 1999.

FEATURES	Yes No
Service area and facility map	☒ ☐
Minimum pressure requirements met	☒ ☐
Service meters (reading frequency monthly)	☒ ☐
Leak detection program	☒ ☐
Water system leakage (%)	26.6%
Adequate valving for flushing and pipe repair	☒ ☐
Blow-offs on dead ends	☒ ☐
Routine flushing (frequency annual)	☒ ☐
Routine valve exercise (frequency #)	☐ ☒

Distribution valves should be exercised annually to ensure they function when needed.

CROSS CONNECTION CONTROL (Community Systems)	Yes No
System has enabling authority	☒ ☐
Ongoing hazard inspections	☒ ☐
High hazards identified	☒ ☐
High hazards protected	☒ ☐
Annual testing	☐ ☒
System has installation standards	☒ ☐
CCS on staff or under contract	☒ ☐
Cross connections observed have been eliminated	☒ ☐

Paul Hampton is the certified Cross Control Specialist (CCS). The City is working to update cross connection control ordinances to provide improved enforcement authority.

The City is currently working on implementing cross connection control software that will track an updated list of backflow assemblies within the distribution system.

SECTION 5: FINISHED WATER STORAGE

The system has three welded steel tanks for finished water storage with a total effective storage of 1.5 MG. The 2007 WSP recommended cleaning, painting, and seismic upgrades to Reservoirs #1 and #2. The WSP also recommended removal of Reservoir #3 due to excessive interior corrosion and construction of a new 1.0 MG reservoir north of the Calawah River to increase pressure and fire flows to the Industrial Park. The City has budgeted an assessment for reservoir cleaning, recoating, and seismic upgrades in the 2016 and 2017 budget. The City is also planning to add telemetry upgrades in this timeframe, which will include a SCADA system.

Reservoir	Reservoir Name	Description	Year Built	Total Volume (Gal)
1	Reservoir 1	50-Foot High Welded Steel Tank	1954	1,049,000
2	Reservoir 2	Welded Steel Tank	1969	793,000
3	Reservoir 3	25-Foot High Welded Steel Tank	1969	164,000

TOP OF RESERVOIR	Res #1		Res #2		Res #3	
	Yes	No	Yes	No	Yes	No
**Hatch: Locked	☒	☐	☒	☐	☒	☐
*Hatch: Watertight seal or gasket	☒	☐	☒	☐	☒	☐
Hatch: Over-lapping cover	☒	☐	☒	☐	☒	☐
*Screened air vent	☒	☐	☒	☐	☒	☐
*Openings sealed/protected	☒	☐	☒	☐	☒	☐

FEATURES	Res #1		Res #2		Res #3	
	Yes	No	Yes	No	Yes	No
Separate inlet/outlet	☐	☒	☐	☒	☐	☒
Protected drain outlet	☒	☐	☒	☐	☒	☐
*Protected overflow outlet	☒	☐	☒	☐	☒	☐
*Overflow line discharges into a sanitary sewer with an air gap	NA		NA		NA	
Operational water level gauge	☒	☐	☒	☐	☐	☒
Bypass piping or isolation possibility	☒	☐	☒	☐	☒	☐
**Protected from unauthorized entry	☒	☐	☒	☐	☒	☐
Low level alarms	☒	☐	☒	☐	☐	☒
Sample tap at outlet	☒	☐	☒	☐	☒	☐

MAINTENANCE	Res #1	Res #2	Res #3
	Yes No	Yes No	Yes No
Frequency of structural and coating inspection	Infrequent	Infrequent	Infrequent
Frequency of cleaning	Infrequent	Infrequent	Infrequent
Frequency of appurtenance inspection	Monthly	Monthly	Monthly
Frequency of routine site visit	Monthly	Monthly	Monthly
**Structure in good condition	☒ ☐	☒ ☐	☒ ☐
Clear of excessive vegetation	☒ ☐	☒ ☐	☒ ☐

Reservoirs 1 and 2 were recoated on the exterior, and telemetry was installed in 2019.

Reservoir 3 needs to be coated to prevent it from rusting through. If the tank is to be refurbished, have the interior inspected and cleaned.

Tanks should be inspected and cleaned every five to seven years. Develop a schedule for inspecting and cleaning each reservoir.

SECTION 6: PRESSURE TANKS

There are no pressure tanks on this system.

SECTION 7: BOOSTER PUMPS AND FACILITIES

There are no booster pump stations on this system.

SECTION 8: WATER QUALITY MONITORING AND REPORTING

Refer to the Water Quality Monitoring Schedule for your monitoring requirements and status. If you have any questions on source monitoring, please contact Sophia Petro at (360) 236-3046.

CHEMICAL	
Sample Point	**Description**
1	Control Building 1 Yard Hydrant (S06)
2	Control Building 2 Sink Faucet (S07)

CHEMICAL	Sample Point 1	Sample Point 2
	Yes No	Yes No
Monitoring adequate	☒ ☐	☒ ☐
ODW WQ data reviewed	☒ ☐	☒ ☐
Sample collection sites correct	☒ ☐	☒ ☐
System has prior: ☐ Nitrate results above 5 mg/L		

CHEMICAL	**Sample Point 1**		**Sample Point 2**	
	Yes	**No**	**Yes**	**No**
☐ Nitrite results above 0.5 mg/L				
☐ Primary MCL				
☐ Secondary MCL exceedance(s)				
☐ Organic detections				
☐ Other Enter Other				

COLIFORM	**Yes**	**No**
Monitoring adequate	☒	☐
Monitoring plan adequate	☐	☒
Monitoring plan followed	☐	☒
# of Treatment Technique Triggers (TTT)	0	
# of Treatment Technique Violations (TTV)	0	
# of Coliform Monitoring Violations	0	
# of *E. coli* MCL Violations	0	

Submit a current Coliform Monitoring Plan to charese.gainor@doh.wa.gov.

LEAD & COPPER	**Yes**	**No**
Monitoring adequate	☒	☐
Monitoring plan adequate	☐	☒
Monitoring plan followed	☒	☐
Results below action level	☒	☐

Submit a lead and copper monitoring plan to me that includes justification for each sample location based on the EPA tier criteria: https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-111.pdf.

DISINFECTION BYPRODUCTS	**Yes**	**No**
Monitoring adequate	☒	☐
Monitoring plan adequate	☒	☐
Monitoring plan followed	☒	☐
Results satisfactory	☒	☐

SECTION 9: SYSTEM MANAGEMENT AND OPERATIONS

The City of Forks was incorporated in 1945 and is currently a code city with a strong mayor. There are five council members and the mayor, all elected positions. Council meetings are held twice a month on the second and fourth Mondays. The water department is managed by the Public Works Department. Paul Hampton is the Public Works Director.

PROJECT/PLANNING	Yes No
System approved	☒ ☐
Current WSP	☐ ☒
Year WSP approved	2007
Emergency response plan	☒ ☐

The system is working on an updated WSP with plans to submit the document in 2020. The emergency response plan needs to meet EPA AWIA requirements. For more information about the federal requirements, visit https://www.epa.gov/waterresilience/americas-water-infrastructure-act-risk-assessments-and-emergency-response-plans. The emergency response plan must include a water shortage plan that addresses more than just droughts.

REPORTING	Yes No	N/A
WFI reviewed and updated with purveyor	☒ ☐	---
Consumer confidence report (Community only)	☒ ☐	☐
Water use efficiency report (Municipal Water Suppliers)	☒ ☐	☐
Cross connection control annual report (> 1000 conn)	☒ ☐	☐

Thank you for submitting an updated WFI.

The City should hold a public forum for the water use efficiency goals during the public meeting for the adoption of the water system plan. The customer goal needs to be listed on the WUE report.

Lead results are converted to parts per billion (AL – 15 ppb) so “Your Water” results should be 1 – 3 ppb and 90th Percentile should be 3.

OPERATOR CERTIFICATION

This system is required to have one Water Distribution Manager 2 (WDM2) certified operator. Paul Hampton satisfies this requirement. There are two backup operators with their WDM2 and one with his WDM1.

If you have any questions or this information is inaccurate, please contact Operator Certification at (800) 525-2536.

Name of Operator	Certification Number	Certifications	Mandatory Operator
Joseph Gaydeski	014135	WDM2	☐
Clyde (Paul) Hampton	014022	WDM2, CCS	☒
Danny Wahlgren	004518	WDM2	
Steven Gaydeski	015197	WDM1	

WDS-Water Distribution Specialist; WDM-Water Distribution Manager; WTPO-Water Treatment Plant Operator, BTO-Basic Treatment Operator; CCS-Cross Connection Specialist; BAT-Backflow Assembly Tester

OPERATIONS	Yes No
Operational records maintained	☒ ☐
Complaints followed up	☒ ☐
Complaints documented	☒ ☐
# of complaints recorded at ODW (since last survey)	0
Operation and maintenance program	☒ ☐
Current survey has significant deficiencies identified	☒ ☐
Previous survey deficiencies/findings corrected, if no list below	☒ ☐

The one complaint received by ODW in 2020 was not recorded. A customer complained about the location of his water meter and the City was aware of the situation. The City has relocated the meter to the satisfaction of the customer.

CLOSING

Photos for this survey were provided by the purveyor.

Your system has significant deficiencies identified in this current survey. You can qualify for the reduced frequency under WAC 246-290-416 of once every 5 years, if all the identified significant deficiencies are addressed by the due date in this report.

Regulations establishing a schedule of fees, including fees for sanitary surveys, were adopted March 18, 2012 (WAC 246-290-990). The amount due is $306. An itemized worksheet is enclosed with the invoice.

If you have any questions, please contact me at (360) 236-3034 or by e-mail at jocelyne gray@doh.wa.gov.

Sincerely,

Jocelyne Gray

Jocelyne Gray
Office of Drinking Water, Regional Engineer

Enclosures

cc: Rod Fleck, City of Forks
Clallam County Health & Humans Services
Emily Firman, Arcora Foundation

SANITARY SURVEY FEE WORKSHEET

Department of Health
Office of Drinking Water
Sanitary Survey Time Tracking

System Name Forks Municipal Water Department PWS ID # 26000E
County Clallam County
Surveyor Jocelyne Gray Date: 12/01/20

System over 10,000 Connections? NO

	Quantity		Cost
Department of Health Paid Costs	**Hours/Miles**		
Survey program RO Coordination	1	$ 102	$ 102.00
Survey Program Administrative Support	1	$ 102	$ 102.00
Travel expenses (Mileage)	0	(# Miles) x ($.58/Mile)	$ -
Technical Assistance	0	$ 102	$ -
Travel Time <10,000	0	102	$ -
Total Department of Health Costs to Perform All Surveys			$ 204.00
Water System Paid Costs	**Hours**		
Scheduling, research, prep	1	$ 102	$ 102.00
Survey Field Work	0	$ 102	$ -
Survey documentation – preparation of survey report to the purveyor	2	$ 102	$ 204.00
Additional Water System Paid Costs for systems serving 10,000 or more connections			
	Hours		
	0	$ -	$ -

NOTES: Virtual survey. All photos provided by purveyor.

Total Cost of Survey	$ 510.00
Costs Covered by DOH	$ 204.00
Invoice amount due (Less than 10,000 Connections)	**$ 306.00**

STATE OF WASHINGTON
Department of Health
OFFICE OF DRINKING WATER
SANITARY SURVEY INSPECTION

INVOICE

FORKS, CITY OF
FORKS MUNICIPAL WATER DEPT
500 E DIVISION ST
FORKS, WA 98331

WS ID:	26000
Invoice No:	45049
Invoice Date:	12/14/2020
Due Date:	01/28/2021

WS NAME: FORKS MUNICIPAL WATER DEPT SURVEY DATE: 12/01/2020

DESCRIPTION	**QTY**	**COST**	**AMOUNT**
Scheduling, Research, Prep	1.00	x $102.00	$102.00
Survey Field Work	0.00	x $102.00	$0.00
Survey Documentation	2.00	x $102.00	$204.00
		Total Amount Due	**$306.00**

1. **Make checks payable to Department of Health, Federal ID #91-1444603.**
2. For billing questions, please contact Southwest Drinking Water Regional Operations at (360) 236-3030.
3. This invoice is issued in accordance with WAC 246-290-990(3)(c)(iii).
4. For persons with disabilities, this document is available on request in other formats. To submit a request, please call 711 Washington Relay Service.

Please return the bottom portion of this invoice with your check.

Invoice Number: 45049
INVOICE AMOUNT: $306.00

Invoice Date: 12/14/2020
Invoice Due Date: 01/28/2021

WS Name: FORKS MUNICIPAL WATER DEPT

WS ID: 26000

Reference: SANITARY SURVEY INSPECTION PERFORMED ON 12/01/2020

Please remit to:
ACCOUNTS RECEIVABLE
SANITARY SURVEY PROGRAM
DEPARTMENT OF HEALTH
PO BOX 1099
OLYMPIA, WA 98507-1099

6DWA10597240700 SS00026000X01282100030600

SPECTRA Laboratories - Kitsap

...Where experience matters

1786 SE Mile Hill Dr.
Port Orchard, WA 98366
(360) 443-7845

LCR TEST PANEL

Distribution System - Report of Analyses

Lead and Copper Analyses (LCR)		System Group Type:	A
System ID No:	26000E	System Name:	Forks Municipal Water
Source Number(s):	S93	County:	Clallam
		Date Received:	9/1/2021
Sample Purpose:	Routine Compliance	Date Reported:	9/14/2021

Send Report to:

Spectra Laboratories-Kitsap, Poulsbo
26276 Twelve Trees Ln #C
Poulsbo, WA 98370
Attn: Angela Kaelin

Bill to:

Spectra Laboratories-Kitsap, Poulsbo
26276 Twelve Trees Ln #C
Poulsbo, WA 98370
Attn: Angela Kaelin

EPA REGULATED and or STATE REGULATED OR REQUIRED

(DOH #) Analyte	(0009) Lead	(0023) Copper
State Reporting Level (SDRL)	0.001	0.02
Regulatory Action Level	0.015	1.3
Method	EPA 200.8	EPA 200.8

State Lab Number	Sample Number	Date Collected	Location Collected	Lead (mg/L)	Pb Qual	Copper (mg/L)	Cu Qual	Analyst	Date Analyzed
225	89401	08/26/2021	1120 Bogachiel Way	ND	---	0.032	---	SK	09/09/2021
225	89402	08/26/2021	1476 Merchants Rd	ND	---	0.247	---	SK	09/09/2021
225	89403	08/26/2021	2333 Calawah Way	ND	---	0.025	---	SK	09/09/2021
225	89404	08/26/2021	250 Sawyer Way	0.0023	---	0.113	---	SK	09/09/2021
225	89405	08/26/2021	1201 Palmer Rd	ND	---	0.038	---	SK	09/09/2021
225	89406	08/26/2021	1360 Merchants Rd	ND	---	0.060	---	SK	09/09/2021
225	89407	08/26/2021	450 Spruce Dr	0.0016	---	0.573	---	SK	09/09/2021
225	89408	08/26/2021	771 Chuckhole	ND	---	0.187	---	SK	09/09/2021
225	89409	08/26/2021	181 E. Division	ND	---	0.020	---	SK	09/09/2021
225	89410	08/26/2021	510 Prairie Dr	ND	---	0.153	---	SK	09/09/2021
225	89411	08/26/2021	272 Elk Corner	ND	---	0.024	---	SK	09/09/2021
225	89412	08/26/2021	361 2nd Ave	ND	---	0.118	---	SK	09/09/2021
225	89413	08/26/2021	911 K St	ND	---	0.064	---	SK	09/09/2021
225	89414	08/26/2021	530 Collins St	0.0015	---	0.683	---	SK	09/10/2021

225	89415	08/26/2021	960 Robinhood Loop	0.0013	---	0.619	---	SK	09/10/2021
225	89416	08/26/2021	301 Evergreen Loop	ND	---	0.307	---	SK	09/10/2021
225	89417	08/26/2021	580 Spruce Dr	ND	---	0.716	---	SK	09/10/2021
225	89418	08/26/2021	841 H St	ND	---	0.193	---	SK	09/10/2021
225	89419	08/26/2021	930 Division	ND	---	0.094	---	SK	09/10/2021
225	89420	08/26/2021	410 Evergreen Loop	ND	---	0.544	---	SK	09/10/2021

90th

NOTES:

***Confirmation**	Include the original lab number, sample number, and collection date of original sample in either lab or sampler comments section.
SDRL:	(State Detection Reporting Level) The minimum reporting level established by the department.
Action Level:	The concentration of the 90th percentile of all distribution samples collected during the monitoring period that, if exceeded, signals the system is in violation.
NA:	(Not Analyzed) In the results column, indicates this compound was not included in the current analysis.
ND:	(Not Detected) In the results column, indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.
< (0.00x):	The compound was not detected in the sample at or above the concentration indicated (usually the lab method reporting limit).
mg/L:	milligrams per liter or parts per million.

Lab Qualifiers Comments:

Approved By Jessica A Donaldson

Jessica Donaldson
Laboratory Manager

SPECTRA Laboratories - Kitsap
...Where experience matters

Spectra Labs - Kitsap, LLC (Poulsbo)
26276 Twelve Trees Ln NW Ste. C
Poulsbo, WA 98370
Phone: (360) 779-5141
www.spectra-lab.com

Spectra Labs - Kitsap, LLC (Poulsbo) received samples from City of Forks on Tuesday, August 31, 2021 at 12:21 pm. Unless otherwise noted, all samples were received in good condition and were tested in accordance with the laboratory's quality control procedures. A summary of the samples received are outlined below.

Sample No.	Description	Location	Sampled
211520-01	Forks Municipal Water	1120 Bogachiel Way	08/26/2021 10:03
211520-02	Forks Municipal Water	1476 Merchants Rd	08/26/2021 5:00
211520-03	Forks Municipal Water	2333 Calawah Way	08/26/2021 5:30
211520-04	Forks Municipal Water	250 Sawyer Way	08/26/2021 6:05
211520-05	Forks Municipal Water	1201 Palmer Rd	08/26/2021 6:45
211520-06	Forks Municipal Water	1360 Merchants Rd	08/26/2021 8:30
211520-07	Forks Municipal Water	450 Spruce Dr	08/26/2021 3:05
211520-08	Forks Municipal Water	771 Chuckhole	08/26/2021 8:00
211520-09	Forks Municipal Water	181 E. Dvision	08/26/2021 12:45
211520-10	Forks Municipal Water	510 Prarie Dr	08/26/2021 6:30
211520-11	Forks Municipal Water	272 Elk Corner	08/26/2021 3:00
211520-12	Forks Municipal Water	361 2nd Ave	08/26/2021 4:15
211520-13	Forks Municipal Water	911 K St	08/26/2021 5:30
211520-14	Forks Municipal Water	530 Collins St	08/26/2021 5:30
211520-15	Forks Municipal Water	960 Robinhood Loop	08/26/2021 6:00
211520-16	Forks Municipal Water	301 Evergreen Loop	08/26/2021 7:30
211520-17	Forks Municipal Water	580 Spruce Dr	08/26/2021 7:45
211520-18	Forks Municipal Water	841 H St	08/26/2021 7:50
211520-19	Forks Municipal Water	930 Division	08/26/2021 8:00
211520-20	Forks Municipal Water	410 Evergreen Loop	08/26/2021 9:36

This report package contains laboratory sample results and any attachments listed below. If you have any questions please call (360) 779-5141 or email us at www.spectra-lab.com.

SPECTRA Laboratories – Kitsap, LLC

DRINKING WATER SAMPLE INFORMATION (WSI) FOR LEAD AND COPPER ANALYSIS

See Sampling Instructions on back of this page

1. System ID No: 26000E

2. System Name: Forks Municipal Water

3. Sampled By: Joe Gaydeski

Phone #: (360) 640-3633

4. DOH Source: S93 (Distribution Samples)

5. Group (Circle one): [✓ A] B Private

6. County: (circle one)
Kitsap [✓ Clallam] Jefferson
Mason Pierce Thurston
Island King Grays Harbor
Other:

7. Sample Purpose:
☑ Routine Compliance
☐ Other, Investigative

8. Composition:
☑ Distribution
☐ Single Source
☑ ~~Blended~~ Jb

9. Sample Type:
☐ Untreated (raw)
☑ Treated
☐ Unknown

10. Is this a Consecutive System? (circle) Yes [✓ No] (Receive finished water from a wholesale system?)

11. Send Report To:
City of Forks
500 E. Division
Forks, WA 98331

12. Phone No.: 360-374-5412 xt: 5

13. Fax No.:

14. Email: joeg@forkswashington.org

Sample Location or Address	Date Collected	Time	Lab Number
1. 1120 Bogachiel way	8/26/21	10:03 AM	211520-01
2. 1476 Merchants Rd	8/27/21	5:00 AM	02
3. 2333 Calawah Way	8/27/21	5:30 AM	03
4. 250 Sawyer way	8/27/21	6:05 AM	04
5. 1201 Palmer Rd	8/27/21	6:45 AM	05
6. 1360 Merchants Rd	8/27/21	8:30 AM	06
7. 450 Spruce Dr	8/28/21	3:05 AM	07
8. 771 Chuckhole	8/28/21	8:00 AM	08
9. 181 E. Division	8/30/21	12:45 PM	09
10. 510 Prairie Dr	8/31/21	6:30 AM	10

Sample Relinquished By:	Joe Gaydeski	**Date /Time:** 8/31/21 12:40 PM	**Condition on Receipt:**
Sample Received By:	RR	**Date /Time:** 8/31/21 1240	**Temperature On Receipt:**

26276 Twelve Trees Lane, Suite C ▲ Poulsbo, WA 98370 ▲ (360) 779-5141 ▲ Fax: (360) 779-5150
www.spectra-lab.com

S:\Administrative\Forms and Templates\Templates\Sample Management\Current WSI Forms\Pb & Cu IOC Form Rev 3.1 051517.doc
Revision date 051517

SPECTRA Laboratories – Kitsap, LLC

DRINKING WATER SAMPLE INFORMATION (WSI) FOR LEAD AND COPPER ANALYSIS

See Sampling Instructions on back of this page

1. System ID No: 26000E

2. System Name: Forks Municipal Water

3. Sampled By: Joe Gaydeski

Phone #: 360-640-3633

4. DOH Source: S93 (Distribution Samples)

5. Group (Circle one): [✓ A] B Private

6. County: (circle one)
Kitsap [✓ Clallam] Jefferson
Mason Pierce Thurston
Island King Grays Harbor
Other:

7. Sample Purpose:
☑ Routine Compliance
☐ Other, Investigative

8. Composition:
☑ Distribution
☐ Single Source
~~☑ Blended~~ JG

9. Sample Type:
☐ Untreated (raw)
☑ Treated
☐ Unknown

10. Is this a Consecutive System? (circle) Yes [✓ No] (Receive finished water from a wholesale system?)

11. Send Report To:
City of Forks
500 E. Division
Forks WA 98331

12. Phone No.: 360-374-5412 xt: 5

13. Fax No.:

14. Email: joeg@forkswashington.org

Sample Location or Address	Date Collected	Time	Lab Number
1. 272 Elk Corner	8/26/21	3:00 AM	211520-11
2. 361 2nd Ave	8/26/21	4:15 AM	12
3. 911 K St	8/26/21	5:30 AM	13
4. 530 Collins St	8/26/21	5:30 AM	14
5. 960 Robinhood Loop	8/26/21	6:00 AM	15
6. 301 Evergreen Loop	8/26/21	7:30 AM	16
7. 580 Spruce Dr	8/26/21	7:45 AM	17
8. 841 H St	8/26/21	7:50 AM	18
9. 930 Danielson	8/26/21	8:00 AM	19
10. 410 Evergreen Loop	8/26/21	9:36 AM	20

Sample Relinquished By:	Joe Gaydeski	**Date /Time:** 8/31/21 12:40PM	**Condition on Receipt:**
Sample Received By:	RP	**Date /Time:** 8/31/21 1240	**Temperature On Receipt:**

WATER
MANAGEMENT
LABORATORIES INC.

1515 80th St. E.
Tacoma, WA 98404
(253) 531-3121

TOTAL TRIHALOMETHANE (TTHM) SAMPLING
BY METHOD 524.2

This kit contains 3 vials (two clear, one amber) in a foam holder. The amber vial is filled with pure laboratory water used as a FIELD BLANK. This vial should travel with you to the sampling site. **DO NOT OPEN THE FIELD BLANK**, this is for quality control.

1. Samples must be collected in duplicate (both clear vials must be filled).
2. Take the sample at the end of the distribution system.
3. **Do not rinse the sampling vials**. They contain the preservatives Ascorbic Acid and Sodium Thiosulfate. The preservatives are not hazardous but please use caution to avoid splashing.
4. If sampling from a tap or faucet, turn it on and let it run for 10 minutes to allow the water temperature to stabilize. Turn flow down to a thin, steady stream. Fill the two clear vials completely. Fill the cap with water then close. There should be no air bubbles or large headspace in the vials.
5. If sampling a pond, stream, or lake, dip a clean 1 quart glass bottle 6 to 12 inches below the surface, then fill the vials completely with no air bubbles or large headspace.
6. Shake the vials until all the preservatives are dissolved.

Sample must be kept at 4°C during storage and shipment. Any sample older than 7 days, that has an expired Field Blank, large air bubbles, or that is not received cold will be rejected.

1515 80th St E * Tacoma, WA 98404
(253) 531-3121

Updated: 11-12
1986 * PROPERTY OF WATER MANAGEMENT LABORATORIES, INC.

b:\Trihalomethane

WATER
MANAGEMENT
LABORATORIES INC.

1515 80th St. E.
Tacoma, WA 98404
(253) 531-3121

HALOACETIC ACID (HAA) SAMPLING
BY METHOD 552.2

This kit contains 3 amber vials in a foam holder. One vial is filled with pure laboratory water as a FIELD BLANK. This vial should travel with you to the sampling site. **DO NOT OPEN THE FIELD BLANK**, this is for quality control.

1. Samples must be collected in duplicate (both amber vials must be filled).

2. Take the sample at the end of the distribution system.

3. **Do not rinse the sampling vials**. They contain the preservative Ammonium Chloride. The preservative is not hazardous but please use caution to avoid splashing.

4. If sampling from a tap or faucet, turn it on and let it run for 10 minutes to allow the water temperature to stabilize. Turn flow down to a thin, steady stream. Fill the two clear vials completely. Fill the cap with water then close. There should be no air bubbles or large headspace in the vials.

5. If sampling a pond, stream, or lake, dip a clean 1 quart glass bottle 6 to 12 inches below the surface, then fill the vials completely with no air bubbles or large headspace.

6. Shake the vials until all the preservative is dissolved.

Sample must be kept at 4°C during storage and shipment. Any sample older than 7 days, that has an expired Field Blank, large air bubbles, or that is not received cold will be rejected.

1515 80th St E * Tacoma, WA 98404
(253) 531-3121

Updated: 11-12
1986 * PROPERTY OF WATER MANAGEMENT LABORATORIES, INC.

b:\Haloaceitc Acid

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
OFFICE OF DRINKING WATER
NewMarket Industrial Campus, Bldg. 3 • PO Box 47822 • Olympia, Washington 98504-7822
Tel: (360) 236-3100 • FAX: (360) 236-2252 • TDD Relay Service: 1-800-833-6388

June 8, 2005

DAVE ZELLAR
CITY OF FORKS
500 E DIVISION ST
FORKS WA 98331

Dear DAVE ZELLAR:

Re: FORKS MUNICIPAL WATER DEPT, ID# 26000, CLALLAM County
Reduced Monitoring Schedule for Disinfection Byproducts

We are pleased to let you know that laboratory results for your system's Total Trihalomethane (TTHM) and Haloacetic Acid (HAA5) samples may qualify you for a reduced monitoring schedule for TTHM and HAA5 under the Disinfection Byproducts (DBP) Stage I Rule. Your results have met the following conditions which are required to qualify for reduced monitoring.

- The average of all TTHM samples taken in 2004, or result of a single sample if only one was taken, must be 20 µg/L (micrograms per liter) or less.
- The average of all HAA5 samples taken in 2004, or result of a single sample if only one was taken, must be 15 µg/L or less.

In addition to meeting the sample results conditions, you need to confirm that your system also meets the following conditions. Please review, check the box for verification, and keep this letter for reference.

☐ The correct number of samples must have been taken. This includes one TTHM and one HAA5 sample for each chlorination or ozonation treatment plant identified in your DBP monitoring plan.

☐ Each DBP sample must have been taken during the month of warmest water temperature from a location in your distribution system representing the maximum residence time (MRT). The MRT is the longest time it takes for water to go from the point where it is treated to where the last consumer uses it.

Disinfection Byproducts Monitoring Plan

System Name Forks Municipal Water
PWSID# 26000E
Date 12/29/03
Completed by Ivan Cowles

Type and Population of System GW only <10,000

Monitoring requirements are additive; for example a system using ozone and chlorine, or chlorine with conventional filtration must meet the monitoring requirements for both.

Treatment Provided

Chlorine (gas, hypochlorite, etc) or Chloramines

Identify the number of "Treatment Plants" serving your system

A "Treatment Plant" or "TP" may be:

- A single surface water source
- A single well source
- A combination of multiple, individual sources (if all of the water is blended prior to distribution)

2

Enter Description of Treatment Plant Below

TP1	Wellfield S06 (wells SO1,SO2,SO3) located at 300 Lupine Ave. Sodium Hypochlorite and Sodium Fluoride added.
TP2	Wellfield S07 (wells SO4,SO5) located at 190 Cedar Ave. Sodium Hypochlorite and Sodium Fluoride added.

Disinfectant Monitoring

Required:

Chlorine residuals must be measured at the same time and place as routine or repeat coliform samples
MRDL for chlorine and chloramines = 4.0 mg/l as Cl2

Compliance

Compliance is based on the running annual average (RAA) of 12 consecutive months
DOH will determine compliance for chlorine MRDL
Daily residual measurements will / will not be included in the compliance calculations (circle one)

Byproduct Monitoring

Required:

TTHM & HAA5 - 1 sample per treatment plant per year during month of warmest water temperature
[one sample should be collected at MRT and the other average residence time (ART)]
TTHM MCL = 0.080 mg/l, HAA5 MCL = 0.060 mg/l

Compliance

Must go to quarterly monitoring if annual sample exceeds MCL for either TTHM or HAA5
Compliance is then based on the Running Annual Average (RAA) of quarterly results or averages
DOH will determine compliance for TTHM & HAA5 based on data submitted by the lab

Specify sampling location(s) for: 2802

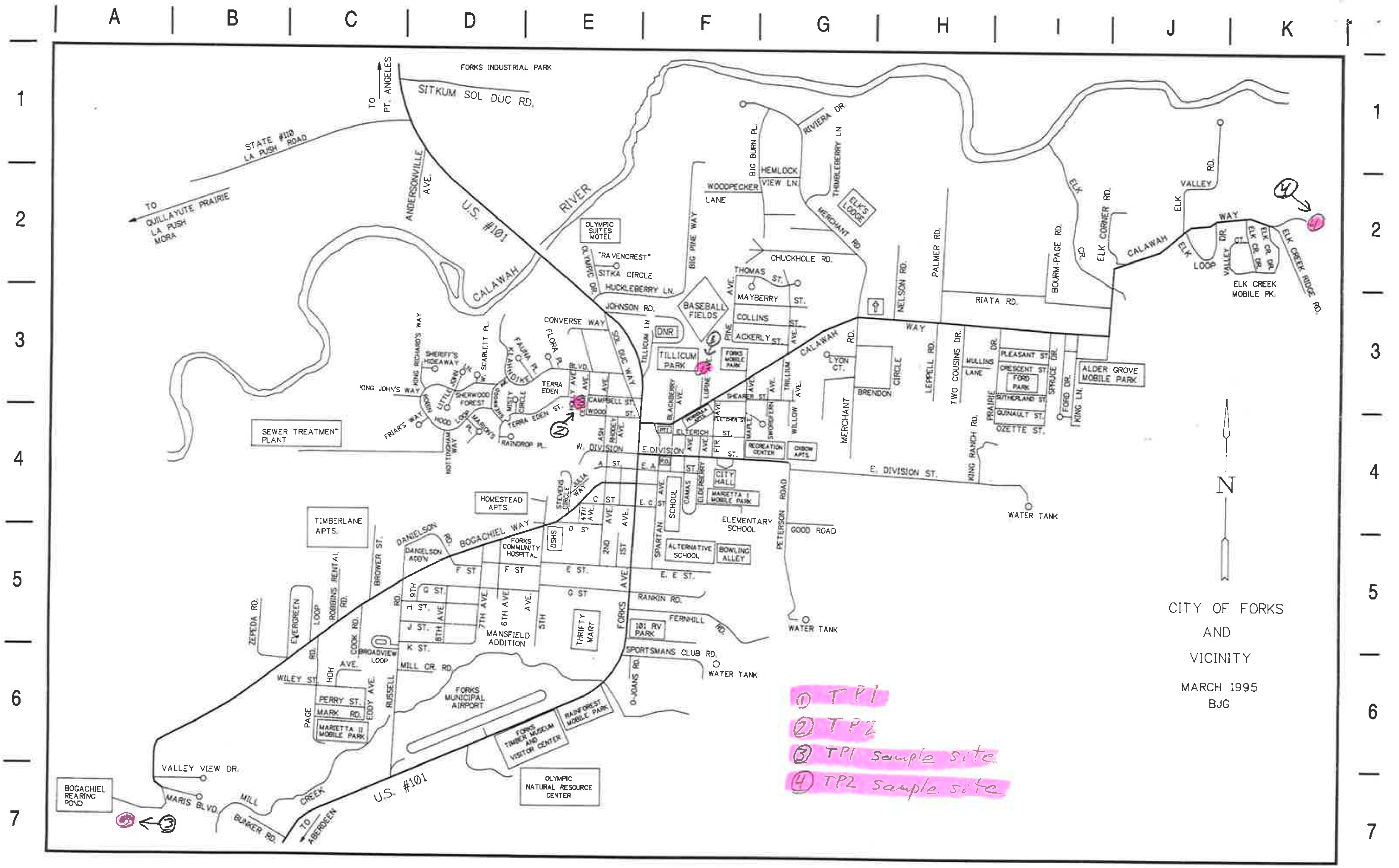
TTHM & HAA5	Enter Sampling Locations	Enter sampling schedule
TP1 (MRT)	outside tap at 2802 Bogachiel Way	August
TP2 (MRT)	Sampling tap about 200' east of 2980 Calawah Way	August

No information needed here

Attach a distribution map with sample locations

Reduced Monitoring

To qualify for reduced monitoring the following criteria must be met (and State must approve)
TTHM RAA </= 0.040 mg/l AND HAA5 RAA </= 0.030 mg/l for two consecutive years
OR
TTHM RAA </= 0.020 mg/l AND HAA5 RAA </= 0.015 mg/l for one year
Monitoring may then be reduced to 1 sample per treatment plant per 3-year cycle



CITY OF FORKS
AND
VICINITY

MARCH 1995
BJG

① TP1
② TP2
③ TP1 sample site
④ TP2 sample site

Washington State Department of Health
Environmental Public Health
Office of Drinking Water

Water Quality Monitoring Schedule

System: FORKS MUNICIPAL WATER DEPT
Contact: Clyde P Hampton

PWS ID: 26000 E
Group: A - Comm

Region: SOUTHWEST
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	4466	4475	4474	4483	4440	4440	4483	4474	4467	4466	4466	4468
Number of Routine Samples Required	5	5	5	5	5	5	5	5	5	5	5	5

- 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	20	Jan 2022 - Dec 2024	standard - 3 year	08/26/2021	Aug 2024
Asbestos	1	Jan 2020 - Dec 2028	standard - 9 year	04/16/2019	Apr 2028
Total Trihalomethane (THM)	1	Jan 2022 - Dec 2022	reduced - 1 year	08/25/2021	***Aug 2022***
Halo-Acetic Acids (HAA5)	1	Jan 2022 - Dec 2022	reduced - 1 year	08/25/2021	***Aug 2022***

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 S06 WF (S01,2 & 3) 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	04/07/2021	~~Apr 2022~~
Complete Inorganic (IOC)	1	Jan 2020 - Dec 2028	waiver - 9 year	07/12/2017	Jul 2026
Volatile Organics (VOC)	1	Jan 2020 - Dec 2025	waiver - 6 year	09/12/2016	Sep 2022
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	09/11/2013	Sep 2022
Pesticides	0	Jan 2020 - Dec 2022	waiver - 3 year	08/01/2006	
Soil Fumigants	0	Jan 2020 - Dec 2022	waiver - 3 year		
Gross Alpha	1	Jan 2020 - Dec 2025	standard - 6 year	09/12/2016	Sep 2022
Radium 228	1	Jan 2020 - Dec 2025	standard - 6 year	09/12/2016	Sep 2022

Source S07 WF (S04 & 5) 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	04/07/2021	~~Apr 2022~~
Complete Inorganic (IOC)	1	Jan 2020 - Dec 2028	waiver - 9 year	07/12/2017	Jul 2026
Volatile Organics (VOC)	1	Jan 2020 - Dec 2025	waiver - 6 year	08/25/2021	
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	04/03/2013	~~Apr 2022~~
Pesticides	0	Jan 2020 - Dec 2022	waiver - 3 year	08/15/2001	
Soil Fumigants	0	Jan 2020 - Dec 2022	waiver - 3 year		
Gross Alpha	1	Jan 2020 - Dec 2025	standard - 6 year	05/14/2020	
Radium 228	1	Jan 2020 - Dec 2025	standard - 6 year	05/14/2020	

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.

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.

Appendix G – Wellhead Protection Program

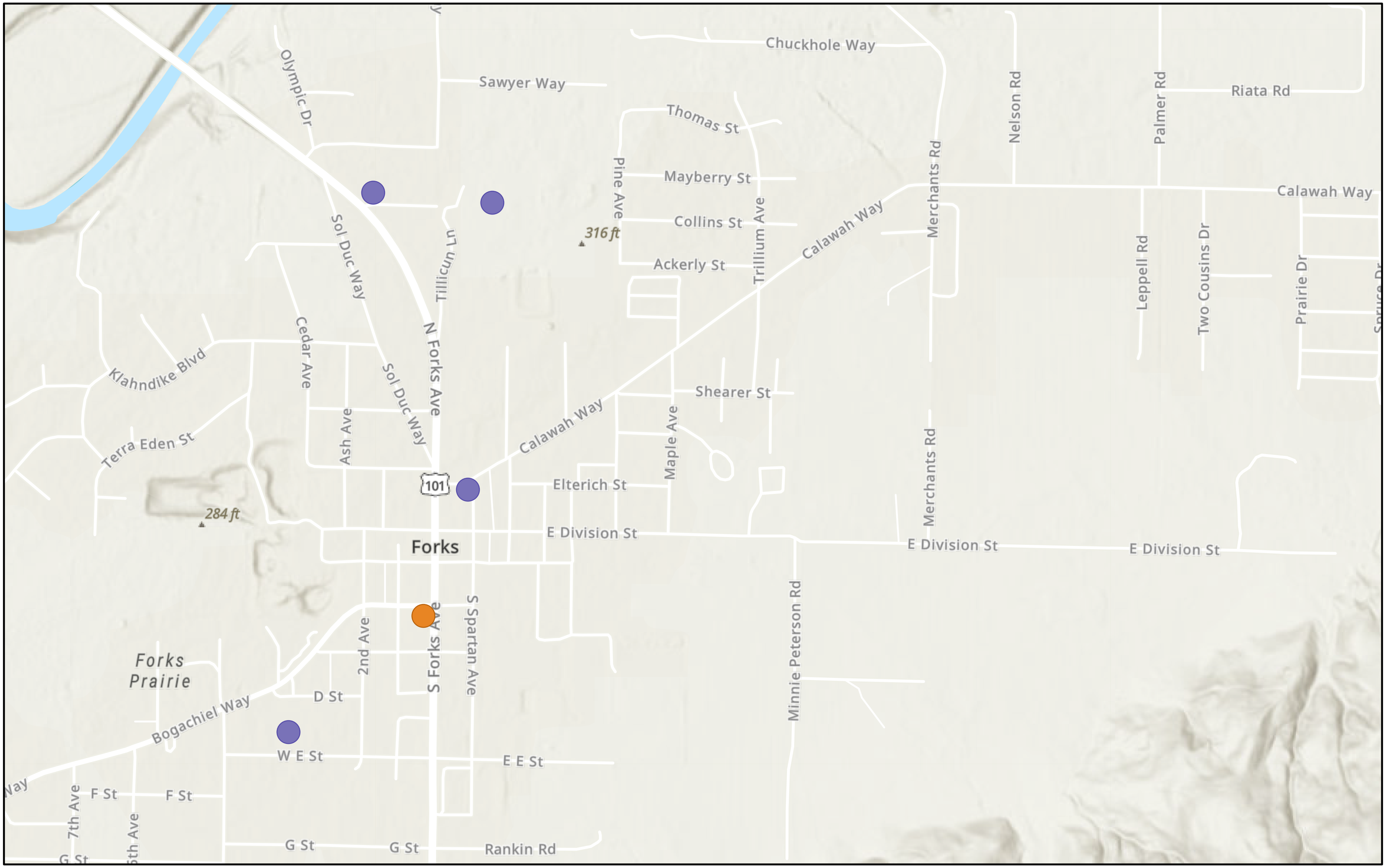
Leaking Underground Storage Tank List

Site Name	CleanupSiteId	FacilitySiteId	Site Status	Site Rank	Address	City	Zip Code	County	Region	Responsible Section	Latitude	Longitude
CHEVRON STATION 9-1923	7879	11187551	Cleanup Started		222 FORKS AVE	FORKS	98331	Clallam	Southwest	Southwest	47.94874532	-124.385793
DNR Olympic Region HQ	9193	43696488	No Further Action		MP 3 Hoh Mainline	FORKS	98331	Clallam	Southwest	Southwest	47.95704462	-124.3837338
Forks Warehouse	11328	98747635	No Further Action		441 W E ST	FORKS	98331	Clallam	Southwest	Southwest	47.946417	-124.389844
PACIFIC TELECOM INC	11145	94392924	No Further Action		CALAWAH WAY CENTRAL OFFICE	FORKS	98331	Clallam	Southwest	Southwest	47.95128	-124.38447
QUILLAYUTE VALLEY SCHOOL DIST	6075	43367461	No Further Action		521 N FORKS AVE	FORKS	98331	Clallam	Southwest	Southwest	47.95722	-124.38729

Underground Storage Tank List

Site Name	CleanupSiteId	FacilitySiteId	Site Status	Site Rank	Address	City	Zip Code	County	Region	Responsible Section	Latitude	Longitude
CHEVRON STATION 9-1923	7879	11187551	Cleanup Started		222 FORKS AVE	FORKS	98331	Clallam	Southwest	Southwest	47.94874532	-124.385793
DNR Olympic Region HQ	9193	43696488	No Further Action		MP 3 Hoh Mainline	FORKS	98331	Clallam	Southwest	Southwest	47.95704462	-124.3837338
Forks Sand & Gravel Inc	12622	7773181	No Further Action		112 2ND AVE	FORKS	98331	Clallam	Southwest	Southwest	47.949793	-124.387567
Forks Warehouse	11328	98747635	No Further Action		441 W E ST	FORKS	98331	Clallam	Southwest	Southwest	47.946417	-124.389844
PACIFIC TELECOM INC	11145	94392924	No Further Action		CALAWAH WAY CENTRAL OFFICE	FORKS	98331	Clallam	Southwest	Southwest	47.95128	-124.38447
QUILLAYUTE VALLEY SCHOOL DIST	6075	43367461	No Further Action		521 N FORKS AVE	FORKS	98331	Clallam	Southwest	Southwest	47.95722	-124.38729
WA WSU FORKS MOBILE HOME PARI	2143	20127	No Further Action		671 CALAWAH WAY	FORKS	98331	Clallam	Southwest	Southwest	47.954663	-124.377779

LUST Map



7/8/2022

Cleanup Site Status

● Cleanup complete

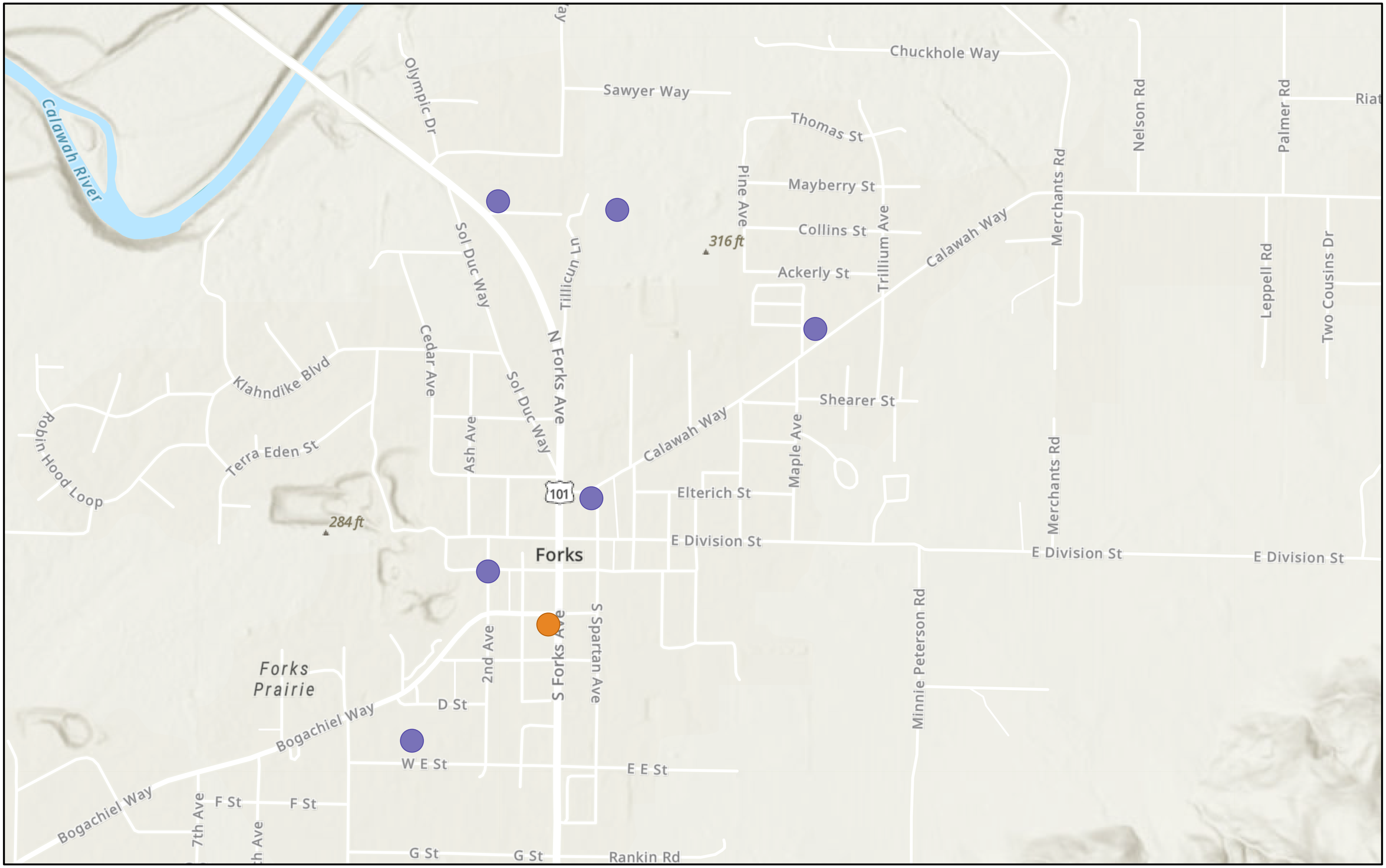
● Cleanup started

1:18,056

0	0.1	0.2	0.4 mi
0	0.15	0.3	0.6 km

Esri, NASA, NGA, USGS, FEMA, Esri Community Maps Contributors, WA State Parks GIS, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc,

UST Map



7/8/2022

Cleanup Site Status

● Cleanup complete

● Cleanup started

1:18,056

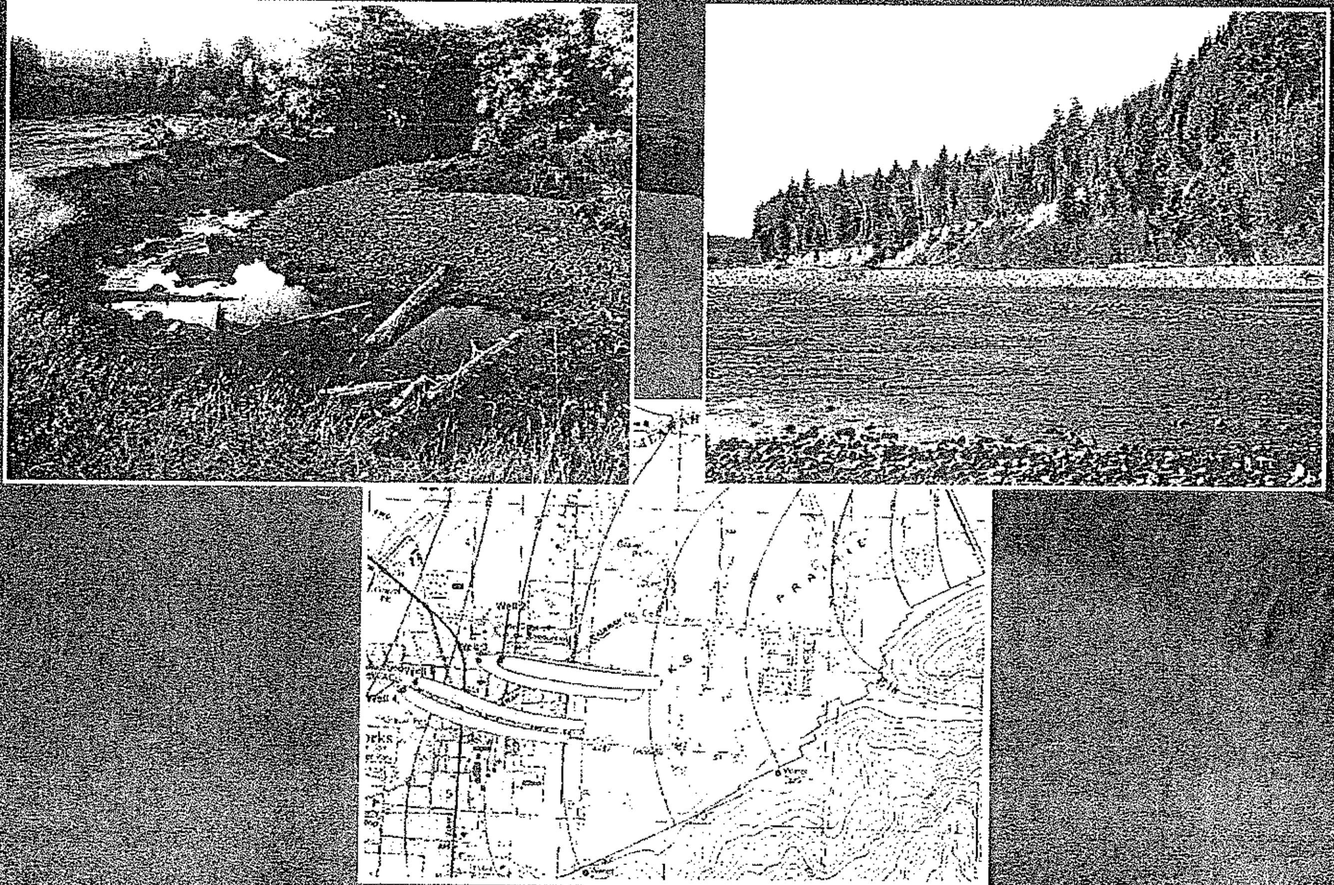
0 0.1 0.2 0.4 mi

0 0.15 0.3 0.6 km

Esri, NASA, NGA, USGS, FEMA, Esri Community Maps Contributors, WA State Parks GIS, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc,

Prepared for Clallam County
and the WRIA 20 Planning Unit

Multi-Purpose Storage Assessment
Water Resources Inventory Area 20



1801002210cv027.indd DATE 06/30/05

June 30, 2005

Golder Associates

4.0 CITY OF FORKS MUNICIPAL WATER SUPPLY

The City of Forks (City) is located in western Clallam County, near the confluence of the Sol Duc, Calawah and Bogachiel Rivers on the Olympic Peninsula of western Washington (Figures 1-1 and 4-1). Forks is the largest community in WRIA 20 with a water service population of approximately 5,000, including the incorporated city limits and surrounding unincorporated area. The City serves water to over half of the population of the watershed with groundwater from their municipal water supply.

Information on the City's water system was reviewed as a component of the WRIA 20 Storage Assessment in order to assist the City in providing a safe and reliable source of drinking water. The information contained in this chapter will help in the planning of the City's municipal water supply needs, which is one objective of the watershed planning.

4.1 Hydrogeology

Groundwater in the Forks Prairie area is mainly found in glacial sediments, therefore understanding the glacial geology of the region is important for determining many factors, including groundwater recharge, discharge and movement, as well as any hydraulic connection between groundwater and surface water. The extent of glaciation is important to the hydrogeology of an area because the presence of till (deposited at the base of a glacier) often results in confining units which can control the recharge and flow of water in an aquifer. There are reports that the ice may have been up to 2,000 feet thick in the Quillayute-Forks area (Booth and Goldstein, 1994).

4.1.1 Glacial Deposition

Two main types of glaciers are alpine (valley) and continental (ice sheet). Alpine glaciers are bodies of ice originating in mountainous areas and flowing downvalley to their terminus. A typical alpine glacier might cover several square miles and reach thicknesses of several hundred feet. Ice sheets are much larger, covering hundreds to thousands of square miles with ice thickness up to thousands of feet. While alpine glaciers are usually restricted to alpine valleys, ice sheets are thick enough to move over existing terrain.

The continental glacier which flowed into the western United States during the last ice age is called the Cordilleran Ice Sheet. The Cordilleran Ice Sheet advanced from Canada into western Washington between 1 million years ago and retreated approximately 12,000 years ago. The Puget Lobe of the ice sheet occupied Puget Sound between the Cascade Range and Olympic Mountains. West of the Puget Sound, the Cordilleran Ice Sheet advanced into the Straight of Juan de Fuca, along the northern edge of the Olympic Mountains, wrapping slightly southward around the western tip of the Olympic Peninsula to near the present-day location of the City of Forks. Geologic mapping indicates the north and west sides of the Olympic Peninsula are covered with a blanket of glacial deposits derived from the last major advance of the Cordilleran Ice Sheet (Tabor and Cady, 1978).

In addition to the continental glaciers, smaller alpine glaciers also strongly influenced this region of WRIA 20. Today the Olympic Mountains harbor 266 active alpine glaciers. Most are cirque glaciers, but several small valley glaciers extend beyond the cirques (Spicer, 1986). Despite the relatively small size of most of the alpine glaciers in the Olympic Mountains today, the sedimentary record of many valleys of the Peninsula indicate a history of much more extensive glacial activity. Geologic mapping indicates that some valleys in the western Olympics repeatedly hosted large Pleistocene valley glaciers, whereas other valleys had only limited glacial activity in their headwaters, or glaciers were absent altogether (Montgomery, 2002). Glaciation, sea level fluctuation and tectonic deformation were the main governing forces in the Quaternary history of Olympic Peninsula, but glaciogenic deposition has exerted the dominant influence on geomorphic and stratigraphic evolution of the river valleys (Thackray, 1996). In the western Olympic Peninsula, for instance glaciated valleys are thought to have had between two and four times as much rock mass removed from them as fluvial valleys (Montgomery 2002).

The hydrogeology of the Forks Prairie area is complicated by fact that there were numerous glacial advances into the western Olympic Peninsula. The glacial record of the western Olympic Peninsula is unique because it records a time of limited alpine ice extent during the last maximum extent of continental glaciers. The Queets and Hoh river valleys contain morphologic and stratigraphic evidence of at least six ice advances during the last (Wisconsin) glacial cycle (Thackray, 2001). It has been assumed that mountain glaciers fluctuate synchronously with continental ice sheets. However, the glacial sediment record indicates that the maximum advance of the alpine glaciers of the Olympic Peninsula preceded the maximum advance of the Cordilleran Ice Sheet by as much as 8,000 years (Thackray 2001). The smaller mass of alpine glaciers typically allows more rapid response to short-lived regional climatic fluctuations than continental ice sheets. However this has been difficult to document because many mountain glacier records in the western United States are incomplete due to a lack of datable material, poor stratigraphic exposure and/or erosion or concealment as a result of the extensive advances during the last glacial maximum (Thackray, 2001). Alpine glaciation in the Olympic Mountains appears to have been driven mainly by moisture supply from the Pacific Ocean and not necessarily by periods of coldest temperatures. Moisture supply to the Olympic mountains during the last glacial maximum was hindered by changes in regional weather patterns (e.g., a southern shift in the winter jet stream) thought to have been caused by the presence of the Cordilleran Ice Sheet (Thackray, 2001). The apparent differences in the timing of alpine and continental glacier fluctuations may also be the result of the contrasting preservation of sedimentological record.

We speculate that alpine glaciation in the Calawah River basin may not have been as extensive as other areas in the western Olympics (e.g., Queets and Hoh) because the elevation in the catchment is generally below 4,000 feet. The topography of the South Fork of the Calawah River and the Sitkum River do not indicate the strong "U-shaped" topography typically present in glaciated valleys. The North Fork of the Calawah River may have had a much stronger influence.

4.1.2 Post-Glacial Processes and Contemporary Hydrogeology

This section includes discussion of the post-glacial processes that formed today's landscape, along with a relatively detailed discussion of groundwater flow in the Quillayute Prairie area. More detailed discussion of groundwater flow in the Forks area is contained within the section in which groundwater flow and wellhead protection areas are modeled.

According to the "hardpan" (as till is often referred to by well drillers) indicated in well logs for the City's wells, the continental ice sheet advanced into the Forks Prairie area (likely from the north along the present-day location of Highway 101). Till likely blanketed the entire area from Forks Prairie to Quillayute Prairie and locations further south and west. Water from the ancestral Calawah, Sol Duc and Bogachiel Rivers likely eroded and reworked the material deposited by the glacier, and may have deposited the sand and gravel unit in which the City's wells are completed. In the process of reworking the sediments deposited by the ice sheet, water draining from the Calawah River and other drainage basins likely eroded the till plain from its former position of occupying the valley into its current configuration (Figure 4-2).

Field visits were conducted to confirm previously mapped lithologies (Appendix 4-A). One cross section was developed along the east-west axis of the Quillayute System (Figure 4-3), along with three north-south cross sections (Figures 4-4 through 4-6).

The Quillayute Prairie is home to a few dozen residences and the Quillayute State Airport. The Airport was constructed in the early 1940s and used as a military airbase during World War II. While the military installation was active, it had a population of approximately 2,000 and was supplied with water from three wells. The Airport is now owned and operated by the City of Forks.

The Quillayute Prairie is a gently sloping terrace located between the Dickey and Sol Duc Rivers (Figures 4-4 and 4-5). The Prairie is comprised of till (compacted, poorly sorted clay, silt, sand, gravel and cobbles) which is over 80 to 100 feet thick, according to well logs for wells completed in the area and conditions observed in the field (Appendix 4-A). The southern edge of the prairie is abruptly truncated and forms a bluff overlooking the broad floodplain of the Sol Duc River.

The Quillayute Prairie is likely a remnant of the larger till layer, which was eroded by the Sol Duc and Dickey Rivers that left an "island" forming the prairie. The linear, northeast-southwest trending ridge located between the Calawah River and Quillayute Road (north of Forks; mapped as undifferentiated drift in Figure 4-1) is also capped by till (Figures 4-6). This linear hill is also likely a remnant of a continuous till sheet that was eroded leaving this island of till.

Using geologic and topographic maps and limited water level data, a conceptual model of groundwater flow was developed for the Quillayute Prairie area. Water levels were measured in several wells using an electronic water level sounder. Wellhead elevations were recorded with a handheld GPS unit. (The accuracy of GPS unit varied between ±18 and 23 feet and may produce inexact groundwater elevations). Groundwater elevations on Quillayute Prairie likely approximate topography and there appears to be a main groundwater divide along the axis of the prairie that might be coincident with the "east-west" runway of the Airport. Groundwater flow beneath the Airport is likely to the north and south off either side of the Prairie from this divide. Wetlands near Quillayute Road (SE ¼ SW ¼ Sec. 13, T 28 N, R 15 W) may be coincidental with groundwater discharge. On the north side of Quillayute Prairie, the small tributary streams of the Dickey River are incised into the Prairie and to which groundwater is draining (Secs. 7 & 13, T 28 N, R 15 W).

Most domestic wells on the Prairie are drilled to depths between 100 and 130 feet and are completed in a sand and gravel layer. The sand and gravel layer supplying water to domestic wells on Quillayute Prairie is likely a separate water bearing layer than the Quileute wells completed in the Three Rivers area (Figure 4-4 and 4-5). Well logs for wells completed in the Three Rivers areas indicate the presence of a clayey sand and gravel unit in the upper 20 to 30 feet of the borings. This unit is likely stratigraphically lower than the sand and gravel unit in which the wells on Quillayute Prairie are completed. Additionally, the water level in the wells on Quillayute Prairie are between 60 and 70 feet higher than the wells completed in the Three Rivers area. According to the conceptual model (Figure 4-2), wells in the Quillayute Prairie area tap older alluvium and outwash, whereas the Quileute wells tap younger alluvium. Hydraulic connection between wells on Quillayute Prairie and the Three Rivers area may be limited, if present at all. In addition to lack of a clear connecting unit between the areas, the Sol Duc River likely acts as a groundwater divide between the two locations.

4.2 Water Supply System

The municipal water system for the City of Forks is presented in this section. A review of water rights and use is first described, followed by a description of the sources of water, water quality considerations and finally conventional infrastructure storage.

4.2.1 Municipal Water Rights and Water Use

The City has three active groundwater rights. The City holds 1,100 gallons per minute (gpm) and 950 acre-feet/year in primary rights for Wells 1, 2, 4 and 5 (Table 4-1). The City's 1999 Comprehensive Water System Plan indicated a total water rights of 1,430 gpm and 950 acre-feet/year (Polaris, 1999). A review of the City's water right files indicated that some of the rights are supplemental (Table 4-1), however the designations are not clearly stated in the water rights files. Despite repeated mention in the water rights files of the portions of the total Qa (annual quantity) being supplemental, there is not an explicit mention regarding the amount of primary Qi (instantaneous quantity). It is assumed that 500 gpm under GWC 2108-A and 600 gpm under G2-24829C are primary, for a total primary Qi of 1,100 gpm. The relative size of these quantities is consistent with municipal water use patterns where the value for Qi (in gpm) is higher than the value for Qa (in acre-feet/year) calculated if the well were pumped continuously. In order to meet peak water demand, municipalities typically must pump at rates higher than those calculated for average Qa use.

In 2004, the City pumped approximately 655 acre-feet of water. Assuming a service population of 5,000, the average per capita water use is 119 gallons per day per person (gpcpd). This per capita use value is slightly higher than values reported for Clallam County by the USGS, where values of 100 gpcpd was reported for domestic use and 103 gpcpd was reported for all uses including domestic, irrigation and industrial uses (Lane, 2004). A full characterization of water use has not been conducted, and factors that may affect calculated per capita use patterns include industrial use.

Average monthly use is shown in Figure 4-7. The average monthly use from November to April is assumed to be representative of non-consumptive interior use and accounts for approximately 90% of the total water use. This water use is considered non-consumptive because it is returned to the groundwater through septic systems, including the treated effluent from the City of Forks wastewater treatment plant. The higher use from May to October is assumed to reflect exterior use (e.g., landscape irrigation). This use is considered to represent consumptive use due to evapotranspiration losses, although a portion of it may recharge to groundwater depending on irrigation patterns.

Total annual water use in 2004 has not changed significantly from 1999 (i.e., approximately 700 AF/yr). Therefore, annual and instantaneous water use projections from the 1999 Comprehensive Water System Plan are used and adjusted assuming no significant change between 1999 and 2005, and assuming future annual demand growth of 1% and 3% (Figures 4-8 and 4-9). This results in the need for additional water rights within the next few years as driven by the need to meet maximum daily demand estimates (e.g., instantaneous). This estimate is based on an assumed maximum daily demand peaking factor of 2.5 and an associated maximum average daily demand of slightly less than 1,100 gpm (Polaris, 1999). This factor may be conservatively large, given that the actual maximum installed pumping capacity is approximately 880 gpm. Conservative estimates are standard in water system planning to provide a safety margin. The City currently records water use on analog spiral chart recorders, which makes review of the data labor intensive. Replacement with digital recorders, as is planned in the near future, will facilitate data analysis.

The schedule for new water rights may be deferred if growth is slower than projected (as occurred between 1999 and 2005), or accelerated if demand increases above projected rates (e.g., new industrial demand develops). Given the rate that new water right applications are processed, it is recommended that the City submit applications for new water rights and pursue the processing of such applications.

4.2.2 Water Supply Sources

The City's water supply system relies exclusively on groundwater supplied by five wells ranging in capacity from approximately 140 gallons per minute (gpm) to 560 gpm. All of the City wells are completed in a sand and gravel aquifer. Bedrock was encountered during drilling of Wells 1 and 2, at 191 and 157 feet below ground surface (bgs) respectively. The City's wells are older (26 to 52 years) but have had very few problems during their operation. There are problems reported with low seasonal (summer) water levels and limited available drawdown. Butterfly valves were installed on the discharge line of several of the City's wells in the late 1990's in order to control drawdown in the wells during pumping. Therefore operation of the wells is not optimized with respect to their associated water rights.

City of Forks Municipal Water Supply Well Details

Well No.	Township, Range, Section and ¼-¼ Section	Screened Interval (ft bgs)	Current Pumping Capacity (gpm; valved back to control drawdown)	Associated Water Right	
				Qi (gpm)	Qa (AF/yr)
1	28/13-4 SW SE	125-135	(not used)	500	504
2	28/13-4 SW SE	110-115	180		
3	28/13-4 SW SE	101-109	140	290*	464
4	28/13-9 NE NW	118-128	350	600	446**
5	28/13-9 NE NW	117-128	560		
			Total:	**1,100**	**950**

* Supplemental to Wells 1 & 2.

** This right also has an additional 504 AF/yr volume that is supplemental to Wells 1 & 2, for a total Qa of 950 AF/yr.

The City has been considering installation of a new water supply well to replace the lost capacity of Well 1, to be able to fully exercise existing water rights, and to diversify the water sources supplying the City. Diversification of water supply sources also increases system reliability and redundancy. Because the existing wells do not fully exercise the existing water rights, a new well could be permitted as additional points of withdrawal under existing water rights. Well siting considerations are discussed later in this chapter.

4.2.3 Water Quality

The Washington State Department of Health (WDOH) water quality database (current as of November 2004 was queried to determine if the City's water system has documented any water quality problems. The quality of the City's water appears to be excellent and there are no concerns with the City's water quality, except:

- In 1985, there were several exceedances of iron and manganese (these are aesthetic concerns, not health concerns);

- In the late 1980s there were several detections of disinfection byproducts in the source water; and,
- Well 1 has experienced hydrogen sulfide concentrations in recent years and is currently not being pumped.

There have been anecdotal reports of saline water in isolated wells of the Forks Prairie area. This area is located too distant from the Pacific Ocean to have any reasonable concern related to saline intrusion. Such reports, along with the hydrogen sulfide in Well 1, is most likely related to deep-seated groundwater flow discharging from bedrock to the unconsolidated sand and gravel aquifers.

4.2.4 Existing and Future System Storage

The City has three above-ground storage tanks with nominal capacities of one million gallons, 750,000 gallons and 150,000 gallons. The 150,000 gallon tank is currently not in use and is being considered for replacement by a larger tank (e.g. one million gallons). The actual working storage capacity is approximately 1.55 million gallons (e.g., due to dead storage), which provides for 2.5 days of storage assuming at the current average daily demand of 0.6 MGD, based on assumptions in Polaris (1999). Although not explicitly stated in the Comprehensive Water System Plan, it is assumed that Polaris (1999) accounted for dead storage in the reservoirs.

Total annual water use in 2004 has not changed significantly from 1999. Therefore, current and projected future storage needs are taken from the 1999 Comprehensive Water System Plan and adjusted assuming no significant change between 1999 and 2005, and assuming future annual demand growth of 1% and 3% (Figure 4-10). The DOH Water System Design Manual has specific requirements and guidelines for storage, as summarized:

- Dead storage – storage needed to provide minimum water pressures; that is, the volume of water (in any reservoir) which is less than approximately 70 feet (30 pounds per square inch [psi]) above the highest service in that pressure zone.
- Standby storage – storage for reliability purposes (e.g., if one or more sources is out of service for a short time); required volume is calculated as follows:

  2 x average day demand minus daily supply capacity of all sources except the largest (but recommended not less than 200 gallons per day per Equivalent Residential Unit (ERU; an ERU is a unit of measure used to equate non-residential water usage to single family residences. For example, if a system has sufficient capacity to serve 100 Equivalent Residential units (ERUs), then it can serve 100 single family houses. Similarly the same system could serve 80 single family residences and one (or more) commercial services that has a water use equivalent to 20 ERUs. For example a school might be expected to use the same amount of water as 20 single family residences. Therefore, this school represents 20 ERUs.)

- Peak flow storage – storage to supply peak demands in excess of supply capacity. Required volume is calculated as follows:

  (Peak hour demand minus capacity of all sources) x 150 minutes

In some cases, peak flow and standby storage, the largest two components, are combined due to economic necessity on the assumption that the likelihood of a source outage and a major fire occurring on the same day is small. DOH requires the fire marshal to formally approve combining these two storages. Ten State Standards indicate only that storage is adequate to meet domestic and fire flow demands (Great Lakes - Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, 2003).

Based on Polaris (1999), the City of Forks will need new storage by the year 2012 at the earliest (i.e., assuming a 3% demand growth rate). New storage may be deferred significantly into the future based on lower historical annual growth rates (e.g., 1% or less).

4.3 Well Tests

Limited aquifer testing was conducted by Golder staff on May 24 and 25, 2005. The field visits performed by Golder staff are detailed in Appendix 4-A. In order to determine the specific capacity of the wells, each of the City wells was pumped for 30 minutes and the drawdown at the end of this time was measured. Well 5 was pumped for 1 hour in order to determine if there was an impact to the water level in other City wells as a result of pumping in Well 5. There was no drawdown observed in Wells 1, 2 or 3 as a result of pumping in Wells 4 or 5.

City of Forks Wells Specific Capacities

Well	**Pumping Rate** (gpm)	**30-Minute Specific Capacity** (gpm/ft)	**Comments**
1	-	-	Well was not tested. Used as observation well only. (2003-2004 data indicate a specific capacity of ~36 gpm/ft)
2	180	67	
3	140	89	
4	352	30	
5 *	565	-	Water level could not be sounded past 96 feet due to blockage in well.

Following the specific capacity tests, Well 3 was pumped at 140 gpm for approximately 18 hours and the water levels monitored in the other City wells in order to determine aquifer parameters (e.g., transmissivity and storativity; Figures 4-11 through 4-13). Analysis of the Well 3 aquifer test data indicated a leaky aquifer. This is likely the result of recharge being induced from layers above the screened sand and gravel layer. The pumping test analysis indicates that the sand and gravel aquifer unit is highly transmissive, which resulted in a shallow cone of drawdown. The data do not indicate that any hydraulic boundaries (e.g., low permeable or recharge boundaries) were encountered during pumping. The fact that no boundaries were encountered during the constant discharge test of Well 3 is consistent with the very shallow cone of depression observed, where approximately 1.9 feet of drawdown was observed in Well 3 and no drawdown was observed in Wells 5, located 1,600 feet away (Figure 4-14).

The constant rate pumping test data were analyzed using the commercial program *Aqtesolv for Windows* (version 2.12; Duffield, 1998). *Aqtesolv* is an interactive solver which enables the user to readily apply different analytical solutions to derive the key aquifer parameters, and has both manual and automatic curve matching functionality.

For the analysis, the applicability of the Theis confined aquifer method (1935), and the two leaky aquifer methods of Hantush (1955, 1960) were evaluated. The potential for aquifer boundaries to influence the test data were evaluated using both confined and leaky solutions.

The analysis using the Theis method resulted in reasonably good curve fits, with very high transmissivities (in the range of 28,000 to 42,000 ft^2/day). However, such a condition would yield an average hydraulic conductivity of between 1,100 and 1,700 ft/day (based on a saturated thickness of 25 feet). These results are not consistent with the lithologic description of the aquifer material, which are expected to have a lower conductivity.

One cause for the higher than expected transmissivity using the Theis method is the possibility that the overlying sediments contain and can release sufficient water when the well is pumped to effectively reduce the drawdown in the actual aquifer. This is often referred to as a leaky aquifer condition. The Hantush methods are, in essence, variations on the Theis approach, but account for the storage effect of the overlying formation. The two Hantush methods differ in that whereas one solution assumes that the piezometric level in the aquitard remains constant during pumping, the other assumes that drawdown occurs. Comparing the two approached for the test data, we decided that the latter was more appropriate, with the following results:

Assumed Aquifer Parameters

	Distance from pumped well (feet)	**Transmissivity** (ft^2/day)	**Hydraulic conductivity*** (ft/day)	**Storativity**	**β-value****
Well 1	780	9,000	360	0.005	1.25
Well 2	330	11,700	470	0.01	0.5
Well 3	0	11,800	470	-	0.1

* Based on a saturated thickness (b) of 25 feet

** For Hantush (1960), β-values were assumed based on a K':S' factor of between 2 and 2.5 (assuming b' = 50 feet).

Figures 4-11 through 4-13 show the final analytical curve matches for the field data. Following the brief well tests conducted in the City's wells, the pressure transducer used to measure water levels remained in Well 1 to record water level data between May 24 and June 2, 2005. The water level data were then compared to barometric pressure, precipitation and river stage in the Calawah River. Barometric pressure and precipitation data were measured at the Quillayute State Airport (www.ncdc.noaa.gov/oa/ncdc.html). River stage data for the Calawah was obtained from the USGS for a gage near the Highway 101 bridge in Forks (http://waterdata.usgs.gov/wa/nwis/uv?12043000).

There does not appear to be a strong and direct correlation between water level in Well 1 and barometric pressure (Figure 4-15). Such a correlation would indicate a confined aquifer. The pumping test indicated a leaky response, which is consistent with the absence of a discernible correlation of groundwater levels to fluctuations in barometric pressure. The relationship between groundwater levels on one hand, and stream stage and precipitation on the other hand is less clear (Figures 4-16 and 4-17). Groundwater levels dropped significantly over the period monitored. The water level in Well 1 are presumed to show a response to precipitation. Between May 13 and 23, approximately 4.5 inches of rain was recorded at the Quillayute State Airport (Figure 4-16). Between May 24 and May 30, not more than a trace of rain was recorded at the Quillayute State Airport and the water level in Well 1 declined approximately 0.5 feet. Unfortunately, water level data from Well 1 are not available before May 24, and therefore the aquifer's response to precipitation cannot be fully determined. However, it appears that the water level declines when precipitation is not recharging groundwater. The effect of Well 2 pumping is clearly seen on the water level in Well 1 (Figure 4-15). It is assumed that the drop in water level is related to environmental conditions (e.g., precipitation) and not to pumping of Well 2 because the dropping trend does not stabilize between the pumping cycles of Well 2.

The water level in Well 1 does not show a strong and direct correlation to stage in the Calawah River. between May 24 and June 2, 2005, the water level in Well 1 declined approximately 0.75 feet (Figure 4-17). During this same period, the Calawah River stage declined approximately 1.5 feet. There is insufficient data at this time to determine the exact hydraulic relationship between the Calawah River and the aquifer beneath Forks Prairie, but it appears that the aquifer does respond directly to changes in river stage. Instead both river stage and aquifer water level decline when precipitation is not occurring in the area.

4.4 Wellhead Protection

A Wellhead Protection Program consists of delineating capture zones of wells, conducting an inventory of possible contaminant sites in the general area, preparing a qualitative assessment of the potential impact of these to the water supply, and implementing appropriate ordinances for the adequate protection of drinking water supplies. In this report, a three dimensional steady state groundwater model is presented that simulates captures zones of the drinking water wells of the City of Forks, and a contaminant inventory was commissioned. (The contaminant inventory, Appendix 4-B, and is provided under separate cover to the City of Forks.)

4.4.1 Forks Prairie Groundwater Model

A numerical groundwater flow model of the area to assist with the wellhead protection evaluation. The model uses the USGS code *MODFLOW* to simulate groundwater flow in the alluvial and glacial outwash sediments. *MODFLOW* uses a finite-difference method to solve the complex groundwater flow equation in three dimensions. The particle tracking code *MODPATH* was used with the flow model to simulate the capture potential of the City's wells.

4.4.1.1 Model Construction

The numerical model was based on the current conceptual understanding of the hydrologic and hydrogeologic system. The main components of the system are:

- Aquifer properties;
- Surface water bodies;
- Recharge; and,
- Pumping.

Model Domain and Grid

The model grid consists of cells varying in size from 50 foot square (in the general vicinity of the wells) to 200 foot square at the model's perimeter (Figure 4-18). This grid system allows the model to predict flows, gradients and velocities with sufficient accuracy in the immediate wellfield areas. The aquifer system was divided into two discrete layers - an upper layer (representing the overlying, partially saturated material) and a lower layer (representing the true aquifer).

The top of the model was established as coinciding with land surface; Golder developed this surface from USGS DEM files (30-meter resolution) which were interpolated to the final model grid. The base of the model was set to coincide with the top of the bedrock, which for this project was assumed to be relatively impermeable.

Aquifer and Aquitard Properties

The model base was assumed to slope generally east to west at roughly the same gradient as the land surface (Figures 4-19 and 4-20). The depth also increases from the north and south edges to the center of the model. The hydraulic properties assigned to the aquifer and overlying aquitard based on the results of the aquifer testing performed in May 2005 (see Section 4-3). These parameter values were varied during model construction and calibration

- Upper layer: $K_h = 20$ ft/day; $K_v = 10$ ft/day
- Lower layer: $K_h = 350$ ft/day; $b = 25$ feet

For the purpose of performing transport runs for capture zone assessment, uniform effective porosities of 0.15 and 0.2 we assigned to layers 1 and 2, respectively. At this stage, the model was established to be used in steady-state mode; therefore, no specific storage parameters were assigned for these layers.

Recharge

Annual precipitation in the valley is typically over 100 inches. A uniform recharge rate of 54 inches per year (0.0123 ft/day) was applied to the top of the model to represent recharge derived from precipitation and run-off that enters the subsurface at the valley edges.

Subsurface Flow

As the model boundaries do not coincide with the true aquifer limits at the up and down-gradient extents, we used the Constant Head function in MODFLOW to allow groundwater to enter and exit. These boundaries were located at sufficient distances from the wellfield area that future pumping would not cause a significant change in the fluxes across these boundaries.

Surface Water

The Calawah River flows east to west through the valley, and includes a meandering reach just west of the wellfields. The river is suspected to receive considerable discharge from the aquifer system in the area. Although only one USGS river gage exists in the region, the baseflow component to the river flow is likely in the order of 50 cfs. Therefore, the river was considered to be a major sink for the groundwater in the model.

The river was incorporated into the model using the head-dependent *RIVER* module. The river stage (which remains unchanged in response to applied stresses) was set at the approximate land elevation based on the USGS topographic maps and DEM data. The river bed for each cell was assumed to be 5 feet below the stage level, and a river bed conductance value of 25 sq. ft/day per linear foot of river reach was assumed to be reasonable to represent the hydraulic effects of the relatively granular surficial soils.

Towards the southwest model boundary, the Fork Prairie terminates topographically; this feature is marked by a line of springs which discharge groundwater at an unknown rate. We represented this in the model using a line of *DRAIN* cells that allow water to flow out of the upper layer.

The net discharge from the river and springs in the calibrated model were 56 cfs and 6 cfs, respectively.

Pumping

The average pumping rates assigned the wells were equal to the average annual water right limits (assuming continuous, year-round pumping) distributed among the wells: 156 gpm (for Wells 2 & 3) and 138 gpm (for Wells 4 & 5). Well 1 is inactive and was not included in the model. For the baseline condition, we set pumping for these wells equal to zero; this was done because the best field-measured water levels for these wells were measured with all wells non-pumping. All pumping fluxes were assigned to model layer 2.

4.4.1.2 Model Results 4-21

Figure 4-2 shows the modeled baseline flow field in the aquifer (layer 2). Although groundwater is generally from the east to west through the valley, the piezometric contour pattern indicates the major sink effect of the river. The average potentiometric gradient in the wellfield vicinity is about 0.007.

Figure 4-21 also shows the calibration results for the target wells. The box-plots indicate the difference between the model-calculated and the field observed water levels. These residuals are between 0.2 and 3.5 feet at the wellfield wells, which is generally acceptable for a model of this magnitude. The calibration for the two, upgradient private wells are less close. However, some uncertainty exists regarding the reliability of the measured water level elevations.

The model was run to steady-state with the wellfield wells pumping at their average annual water right rates; Figure 4-22 shows the resulting groundwater flow field for the main aquifer. The piezometric contours differ from those for the calibration baseline set in the vicinity of the wells, but the difference is fairly minor. The maximum water level difference between the two conditions is about 2.5 feet. The actual drawdown in the wells will be greater than this because of the well inefficiency effects and the fact that the modeling method averages the water level in the cell containing the well across the cell width (50 feet).

Golder then used *MODPATH* to determine the time-based capture zones for the wells under the new flow field conditions. Figures 4-23 through 4-25 show these capture zones for 6 months, one year and 5 years, respectively. The capture zones have a distinctly long and narrow shape, which is typical for well pumping from a relatively highly transmissive aquifer at low rates.

The 10-year time-of-travel zone was not determined because it extended beyond the model boundary. The model did not extend further east because of lack of information on the aquifer thickness and properties, and recharge areas including points of connection with streams.

Some of the water intercepted by the wells will be derived locally from the overlying (aquitard) sediments. The model is unable to determine the relative contribution from each layer.

4.4.2 Contaminant Inventory

Golder contracted Environmental Data Resources, Inc. (EDR) to produce a contaminant inventory of the Forks area. This report uses available environmental databases and the data have not been verified. The Contaminant Inventory was centered on Section 13 of Township 28N, Range 13W, and has a coverage radius of three miles. The survey was dated May 15, 2005, and included in Appendix 4-B of this report.

Database Findings

The following summarizes the findings:

- Six facilities were found to be listed on the EPA's RCRAInfo database. This database includes sites that are known to generate, transport, store, treat and/or dispose of hazardous materials.
- One State Hazardous Waste (or priority) Site was identified. This designation indicates that the site has planned remedial action using state funds and potentially responsible parties.
- The report identified the presence of three (3) leaking underground storage tank (LUST) sites in the coverage area, and a further ten (10) underground storage tank (UST) sites in the survey area. USTs are regulated under RCRA, and the data are stored in Ecology's LUST and UST Site/Tank Reports.
- Two sites were identified as having entered into the Voluntary Cleanup Program (VCP), or as having some level of remedial action.
- The FINDS (Facility Index System) contains 21 sites in the survey area. This database lists sites which have activities that only could pose a risk to the environment, and provides sources for additional information.
- One mine site, listed in the Mines Master Index File, exists in the survey area.
- Two sites were found under the ICR list; these sites have undergone remedial action outside the regulatory oversight programs. (Both sites were also listed in the LUST and UST databases). Two sites were also listed in the Brownfields database, both of which were also in the UST list.

*Note - many of the sites were listed in more than one of the databases covered by the survey.

Potential Impact to Wellfield

The hazardous substances reported for all listed sites are petroleum products – gasoline, diesel and oil. These products contain chemical constituents (such as benzene) that are known to be detrimental to the environment and human health if released. Some of these chemicals are relatively mobile in the subsurface, and are readily dissolved in groundwater. Several of the listed sites are located upgradient from the City's wells.

Only one site should be considered for further assessment; this is the WADNR Headquarters facility. The WADNR facility is located between the well clusters, and also operated USTs which appear to have released gasoline products to the soil. The LUST database indicates that this site was cleaned up and some of the USTs have been removed.

None of the remaining sites have known chemical releases. If future releases do occur, the chemicals would need to travel vertically through as much as 75 feet of unsaturated zone before encountering the water table. The migration rate is difficult to estimate without field testing. Although upper soils are heterogeneous with lithologies ranging in texture from clay to sand, the infiltration rate is expected to be relatively high. During the migration, these chemicals typically degrade to less toxic products, thereby reducing their threat.

4.5 Future Well Siting

The most limiting factors in siting a new well are anticipated to be the existence of an aquifer at a particular site (versus encountering bedrock), and available drawdown (e.g., the water level in the well). Consideration should also be given to future zoning implications for wellhead protection purposes.

Bedrock irregularities may pose difficulty in siting wells. The marine sedimentary and igneous rocks that comprise the bedrock in the Forks area generally cannot support productive water wells (Golder, 2005). Depth to bedrock is a critical factor in siting future wells. If bedrock is encountered at a shallow depth, there may been insufficient drawdown to allow a municipal well to be installed. Cross-sections in hydrogeologic report contained in the most recent Comprehensive Water System Plan (Polaris, 1999) are highly speculative. A smooth U-shaped bedrock valley is unlikely given the degree of topographic relief present in the bedrock foothills adjacent to the valleys. The subsurface bedrock could have significant topographic relief.

Hydrogeologic cross-sections of the Quillayute Prairie/Three Rivers/Forks Prairie area were prepared using well logs on file with the Washington State Department of Ecology (Ecology). In addition to information provided by well logs, the Washington Department of Natural Resources (WDNR) 1:100,000 surficial geology was used to determine the location of geologic units (e.g., alluvium, till, outwash, bedrock etc). The hydrogeologic cross-sections indicate a basal gravel unit above the bedrock (Figures 4-3 through 4-6). Existing well logs on file at Ecology for wells installed north of the Calawah River indicate that bedrock is likely shallow in the area (40 to 100 feet). Department of Ecology's well log database indicates that at least four dry wells were installed north of City:

Dry Wells on North Side of Calawah River

Well Location (T/R-S ¼/¼)	Total Depth of Borehole (ft bgs)	Material Encountered
29/13-29 SW/SE	225	Shale
29/13-32	138	Shale
29/13-32 NE/NE	50	Clay
29/13-32 SW/SE	104	Shale

Our assessment is that there is more risk drilling a well north of the City. Therefore, we recommend well sites be considered near the middle of the Forks prairie, not too far from the location of Calawah Way. Moving north or south from the center of the prairie may encounter a shallower depth of aquifer material above the bedrock, thus limiting available drawdown. Areas east of town in T 28 N, R 13 W may be possible locations:

- SW Sec 3
- NW ¼ of the NW ¼ of Sec 10
- NE ¼ of the NE ¼, and the SE ¼ of the NE ¼ of Sec 9

The cost of a geophysical survey should be investigated for siting a new well to increase the probability of successfully installing a productive well. Potential methods include: time domain/seismic refraction to find depth to bedrock, resistivity to locate gravel layers.

The high transmissivity of the aquifer suggests that interference between wells should not be a major consideration in well siting. Figure 4-14 predicts drawdown interference from a well pumping 140 gpm on the order of half a foot at a distance of 100 feet.

4.6 Conclusions and General Recommendations

Installing a new well will diversify the existing array of municipal water supply wells and improve system redundancy and reliability. It will also allow the City to more fully exercise existing water rights. Such a well could be permitted with water rights by adding it as an additional point of withdrawal to existing water rights.

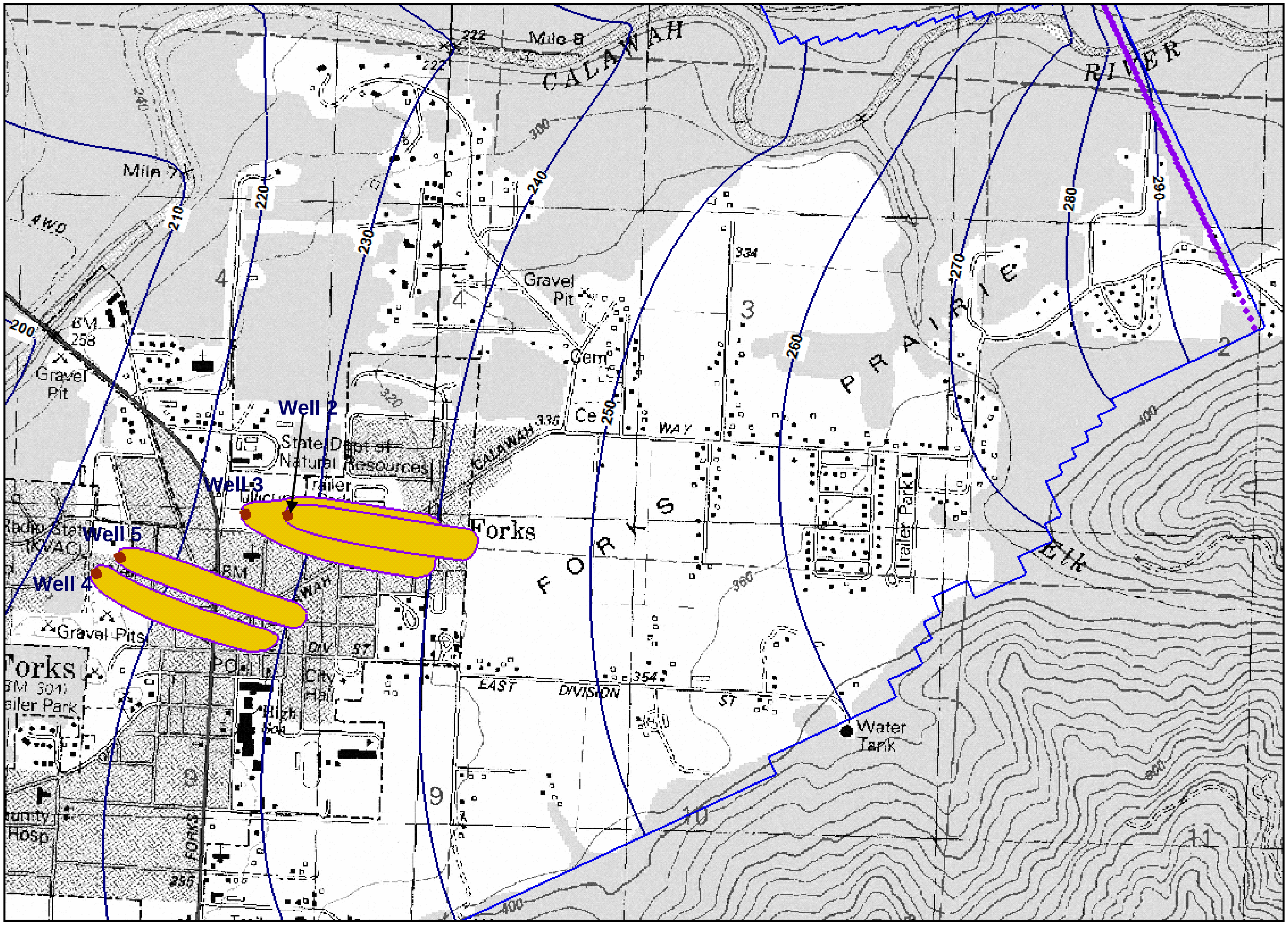
Current demand estimates (Polaris, 1999) indicates that new water rights will be needed in the near future (e.g., within five years). These estimates may be conservative, and new water rights may not be needed for an extended period of time, depending on water demand growth rates (e.g., new industrial demand). Applications should be submitted now for future water rights.

In order to prevent contamination of groundwater north of the river, it is recommended that the Grafstrom well in the Forks Industrial Park be abandoned in accordance with WAC 173-160-381. If other unused wells are identified within the City's service area, they should be properly abandoned as well.

The current operation of the wells consists of pumps whose flow is maintained significantly below their designed rates by valves. This is expected to create an unnecessary energy bill. Simple energy cost auditing may indicate significant cost savings through the purpose of appropriately sized submersible pumps.

Given the age of the wells, a video inspection should be conducted on any of the City wells in which pumps are pulled for maintenance. A video inspection of Well 2 from 2004 indicated that the screen was in fairly good shape. However, there appeared to be staining around a casing joint, perhaps indicating that one of the welds might be compromised. Unfortunately the camera could only recorded downhole views (not sideways) and no depth information was provided on the video in order to determine the depth of the casing joint.

Before groundwater development occurs at the Quillayute Airport, a hydrogeologic investigation should be conducted. In order to do this, a close working relationship with the citizens living near the airport should be established to facilitate access to private wells. This work could be conducted in conjunction with the Army Corps of Engineers, who are currently conducting contamination cleanup efforts in the area. A hydrogeologic investigation of this area would entail gathering well logs, collecting water level measurements, collecting samples for water quality analysis, perhaps limited pumping tests could be conducted on existing wells.



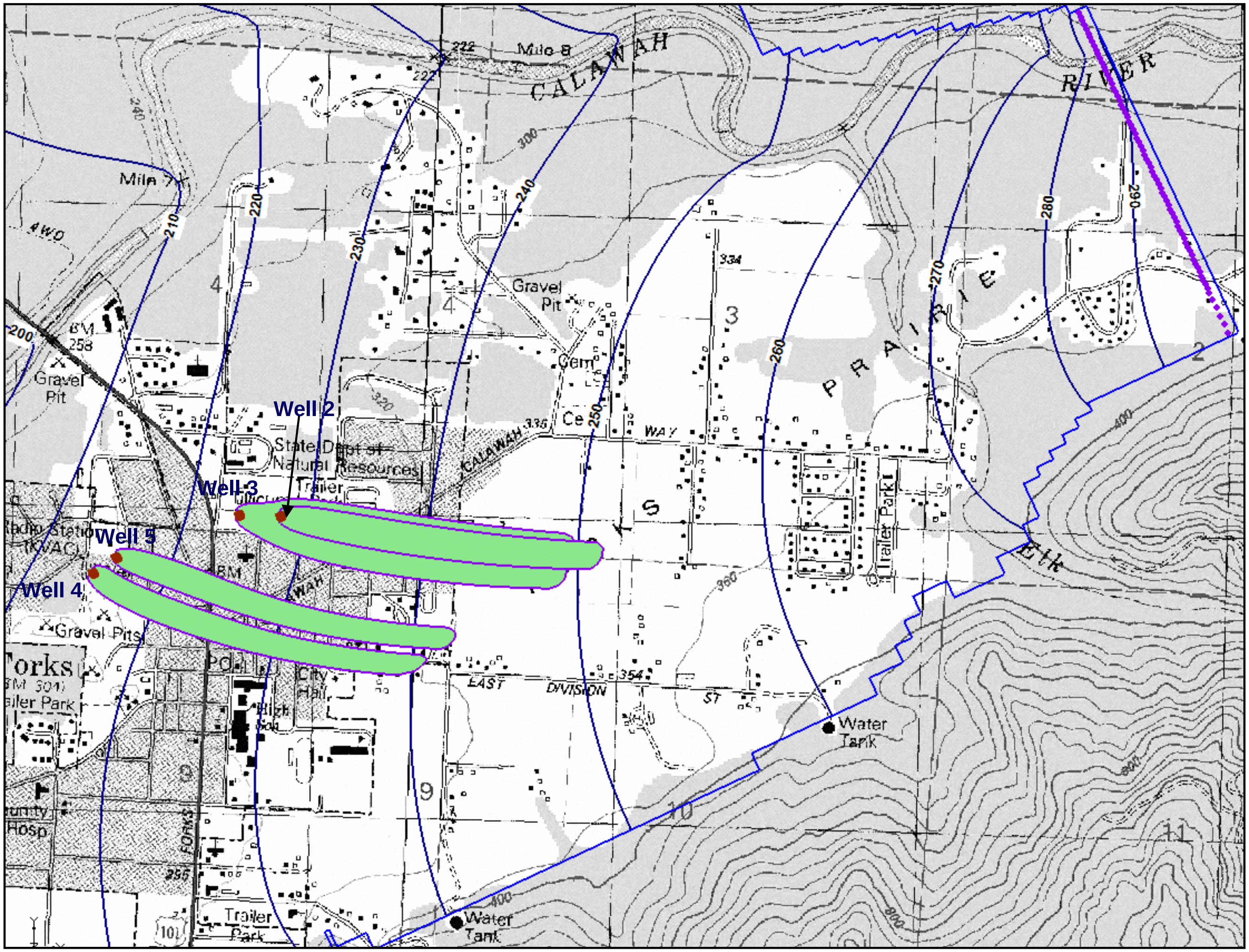
Golder Associates

TITLE

Predicted Capture Zones – 6 months

WRIA 20 – City of Forks

DRAWN	SDT	DATE	6-8-05	PROJECT No.	043-1130
CHECKED		SCALE	na	DWG No.	na
REVIEWED		FILE No.	Figs.ppt	FIGURE No.	4-23



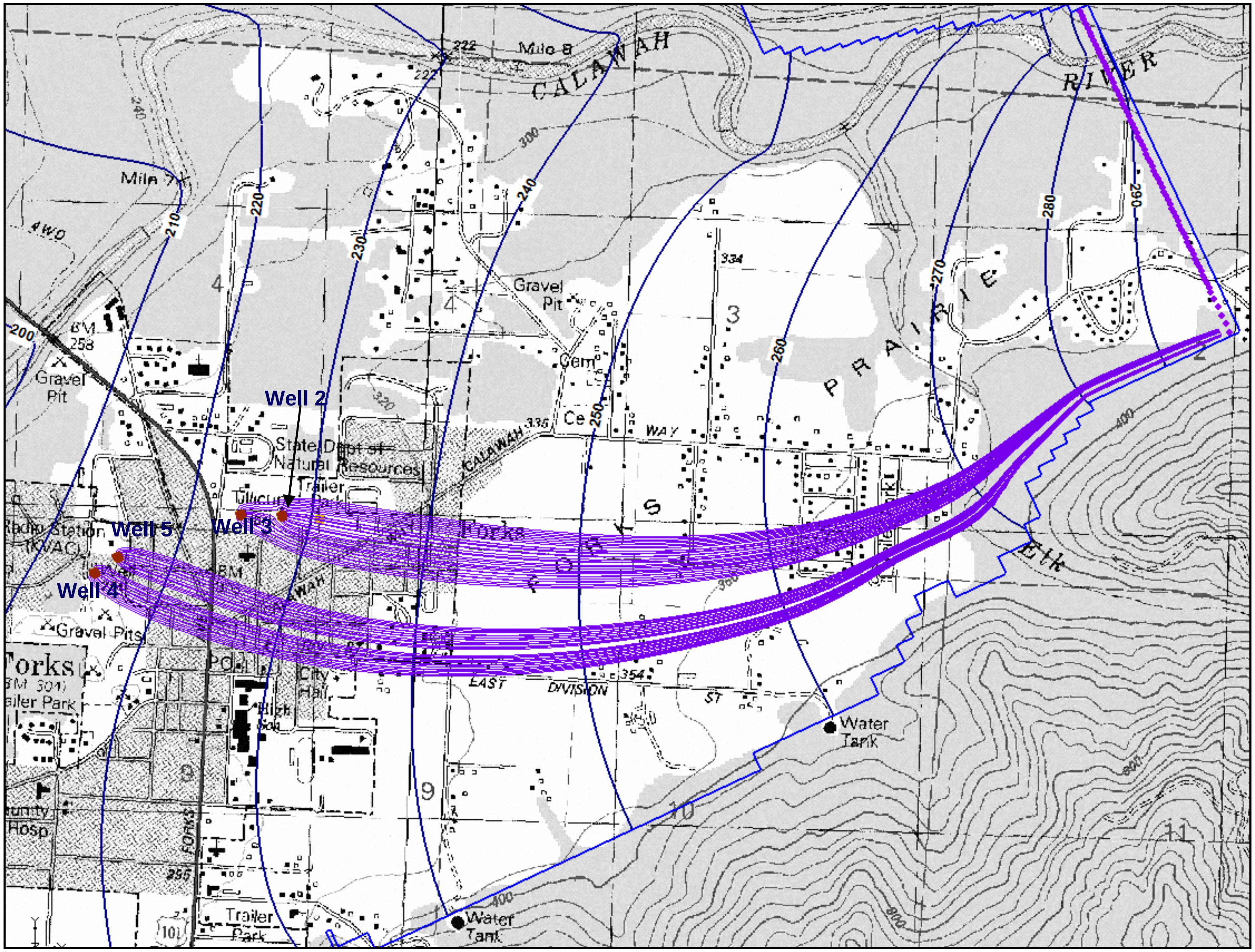
Golder Associates

WRIA 20 – City of Forks

TITLE

Predicted Capture Zones – 1 year

DRAWN	SDT	DATE	6-8-05	PROJECT No.	043-1130
CHECKED		SCALE	na	DWG No.	na
REVIEWED		FILE No.	Figs.ppt	FIGURE No.	4-24



Golder Associates

WRIA 20 – City of Forks

TITLE

Predicted Capture Zones – 5 years

DRAWN	SDT	DATE	6-8-05	PROJECT No.	043-1130
CHECKED		SCALE	na	DWG No.	na
REVIEWED		FILE No.	Figs.ppt	FIGURE No.	4-25

Appendix H – CCR

Forks Municipal Water
City of Forks
2019
Report to Consumers on Water Quality
PWS ID #26000E

Dear Customer:
We are pleased to present a summary of the quality of the water provided to you during the year 2019. The Safe Drinking Water Act (SDWA) requires that utilities issue an annual "Consumer Confidence" report to customers in addition to the other notices that may be required by law. This report details where our water comes from, what it contains, and the risks our water testing and treatment are designed to prevent. Forks Municipal Water is committed to providing you with a safe and reliable supply of water. Informed consumers are our best allies in maintaining safe drinking water.

The bottom line: Does Forks City water meet all federal and state regulations for drinking water? Absolutely.

We encourage public interest and participation in our community's decisions affecting drinking water. Regular city council meetings occur on the second and fourth Mondays of each month, at City Hall at 7:30 p.m. The public is welcome.

Find out more about Forks Municipal Water at www.forkswashington.com.

Overview
In 2019 Forks Municipal Water distributed just over 171.2-million gallons of water to the Forks area.

Water conservation: It is important to conserve water when possible. In 2017, 2018, and 2019 we implemented voluntary water restrictions, but 2015 and 2016 water restrictions were mandatory.

Call Before You Dig: It is very important to call 811 before you dig. We have had water mains broken by construction equipment in past years when people forgot, or chose not, to call 811 to have utility lines located. Those water-main breaks resulted in a considerable amount of water storage loss.

Cross connections: A cross connection is an actual or potential link between the potable water supply and a source of contamination (sewage, chemicals, gas, or any non-potable water). The most common cross connections around the house are caused by garden hoses. If a water main is broken, it can result in a phenomenon known as backsiphonage. Backsiphonage occurs when a partial vacuum is created in a piping system and causes flow in the opposite direction of normal flow. If a property owner has a hose hooked up to a potable water source and the opposite open end is submerged in a contaminant (chemicals, pond, pool, hot tub, fertilizer or soap sprayer, etc.), that contaminant could be siphoned back into the water system if a water main is broken. There have been many cases of the public becoming ill due to cross connections. Commercial properties often have backflow preventers installed and regularly inspected. If you are concerned about a possible cross connection, please contact the City.

Water leak repair: We understand that emergencies occur, but it is always best to have the City turn off water at the meter for leak repairs. Turning off water incorrectly may cause damage to the meter, valve, or pipes. Property owners or residents can protect themselves from any liability or costly repairs associated with such damage by having the City turn off the water for them. The Water Department can be reached at 360-374-5412, ext. 238 during normal business hours (8:00 a.m. to 5:00 p.m. M–F). For after-hours emergencies call 360-374-2223, ext. 4.

Water main installation: Water mains are replaced or added throughout the year due to age and City growth. Please use caution around construction zones. One of our goals is always to limit the impact of such work on home and business owners as much as possible, but unforeseen circumstances do occur. Please feel free to contact the Water Department with any concerns. We will do our best to address them in a timely manner.

Water tank rehabilitation: In 2018 the City of Forks received a USDA loan for water tank rehabilitation. The work began in November 2018 and was completed in September 2019. The 1,000,000- and 750,000-gallon tanks were resurfaced and new telemetry was installed on the 750,000-gallon tank. Telemetry tells the pumps to turn on when the water level in the tank drops to a specified level.

2019 projects: In 2019 several projects were completed and started. The City has repaired water leaks responsible for 1,801,422 gallons of lost water. The Fern Hill Road/Main Street water main was completed. This project consisted of replacing 800 feet of 1½" galvanized water line with new 6" C900 water line. Well house 4 was also rebuilt after being damaged by a fallen tree. The City also received a drought-relief grant from the Department of Ecology to add an emergency well to our system and to purchase a new water trailer with tanks that will be used to deliver water in bulk to smaller water systems in emergency conditions. The work on the new emergency well began in December.

Our water comes from five wells—well #1 AHM638 WW (S01), well #2 AHM642 WW (S02), well #3 AHM639 WW (S03), well #4 AHM640 WW (S04), well #5 AHM641 WW (S05; Wells 1, 2, and 3 make up Wellfield S06 while Wells 4 and 5 make up Wellfield S07— that are located from the Forks water compound at 300 Lupine Ave. to the radio station at 190 Cedar Ave. The susceptibility rating for our wells is classified as moderate by the Washington State Department of Health (DOH). Our water passes all state health standards for potable water as it is pumped from the ground. To ensure that it stays clean and safe, we add a very small amount of chlorine to kill any bacteria that may have entered the system accidentally, such as when a water main breaks or a backflow incident occurs. Chlorinated systems are required to maintain just a trace of chlorine throughout the distribution system. We try to maintain a minimum of .2 parts per million (ppm), which is comparable to one inch in 80 miles or one minute in ten years. In addition, we take at least six routine water samples per month and have them tested by an accredited lab for contamination by microbes such as E. coli and other coliforms. According to lab tests performed in February 2018, the water we pump from the ground has .05 mg/L of naturally occurring fluoride. Until May 15, 2020, we also added very small amounts of fluoride. The Washington State Department of Health states in **WAC 246-290-460, "**Where fluoridation is practiced, the optimal fluoride concentration is 0.7 mg/L." The City's objective has been a fluoride level between .5 and .7 mg/L. We tested the fluoride level in the water every day at two different locations, and sent two water samples to an accredited lab each month to ensure compliance with all federal and state fluoride regulations. The City of Forks, under the approval of the Mayor, discontinued fluoride treatment on May 15, 2020. The system is getting harder to maintain due to age and inconsistent distribution. We will re-evaluate at a later date to determine whether the City will treat the public water supply with fluoride in the future. Additional testing includes annual tests for nitrate contamination. Once every three years we test for over 60 volatile organic chemicals (VOCs), including styrene, butylbenzene, and trihalomethanes such as chloroform, as well as 45 synthetic organic chemicals including naphthalene, pyrene, and PCBs. We further have our water tested for a minimum of 24 inorganic chemicals such as nickel, iron, and sodium once every nine years.

In 2019 Forks Municipal Water tested the drinking water for the following at two separate and isolated locations: nitrates, VOCs, inorganic chemicals, and disinfection by-products. All tests performed passed with good results.

The Washington State Department of Health reduced the monitoring requirements for inorganic (IOC), volatile organics (VOC), and synthetic organics (SOC) because all sources are not at risk of contamination. The last samples taken for IOC were 2017, VOC were 2015 and 2016, 2013 for herbicides (SOC), and 2001 and 2006 for pesticides (SOC). The state also granted waiver for soil fumigants, dioxin, endothall, glyphosate, diquat, and insecticides.

An important question about water—Is water that meets federal drinking water standards absolutely safe?

Safety is relative not absolute. For example, an aspirin or two may help a headache, but taking an entire bottle at once could result in death. So, is aspirin safe? When setting drinking water standards, federal regulatory agencies use the concept of **reasonable risk**, not no risk. Completely risk-free water would cost too much. Therefore, the answer to the original question must be no, drinking water is not *absolutely* safe. However, the likelihood of becoming sick from drinking water that meets federal standards is typically as low as one chance in a million.

One difficulty the U.S. Environmental Protection Agency (EPA) has when trying to determine reasonable risk relates to the concept known as **susceptible population.** Not all people who drink water are the same in terms of health. Some people are more susceptible to illnesses than others. For example, only babies three months old or younger are affected by nitrates in drinking water, so for that contaminant babies are considered a susceptible population. They are more likely to become ill from high nitrate levels in their drinking water. The standard for nitrates, therefore, was selected to protect these infants. It is not always easy to identify populations susceptible to various contaminants. The elderly, those undergoing cancer treatment, babies, and those who are HIV positive, for example, are often considered susceptible populations. Federal regulatory agencies must balance the risks to all these groups with the cost of water treatment to arrive at standards that protect as many people as possible and can be afforded. This policy is commonly described as "the greatest good for the greatest number".

REQUEST

Please do not plant trees or large shrubs over water mains or near water meters. We have had numerous water-main breaks caused by tree roots. These repairs are costly and time consuming, and often result in damage to lawns and other landscaping.

Distribution Water Quality

Contaminant	Violation Yes/No	Ranges of levels detected in 2019	Unit measurement	MCLG	MCL	Typical source
Total coliform bacteria	No	There were no coliforms present in the 73 samples taken in 2019	Present/ Absent	0	Zero	Naturally present in the environment
E. coli	No	There was no *E. coli* detected in the 73 samples taken in 2019	Present/ Absent	0	Zero	Human and animal fecal waste
Total trihalomethanes (chloroform, bromodichloromethane, dibromochloromethane, bromoform)	No	3.1	ppb	NA	Total sum of 80	Typical by-products of chlorine disinfection of drinking water
Fluoride Residual	No	0.52–0.82	ppm		4	Naturally occurring or added
Chlorine Residual	No	SO6 .11–.48 SO7 .05–1.75	ppm	MRDLG 4	MRDL 4	Water additive used to control microbes

Source Water Quality

Contaminant	Violation Yes/No	Your water	Unit measurement	MCLG	MCL	Typical source
Nitrate – S06	No	0.69	ppm	10	10	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Nitrate – S07	No	0.73	ppm	10	10	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits

The tables above show results of water quality testing for 2019.

Lead and Copper

Contaminant	Violation Yes/No	Your Water	Unit Measurement	AL	90th Percentile	Samples > AL	Typical Source
Lead	No	.001–.003	ppm	15	.003	0 out of 20	Corrosion of household plumbing systems; erosion of natural deposits
Copper	No	.02–.74	ppm	1.3	.74	0 out of 20	Corrosion of household plumbing systems; erosion of natural deposits

The table above shows results of water quality testing in the distribution for 2018.

Key to terms used in the table and throughout this document

Maximum contaminant level (MCL): The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as possible using the best available treatment technology.

Maximum contaminant level goal (MCLG): 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.

Minimum detection level (MDL): The minimum level of a contaminant at or above which the testing laboratory must report detection.

Maximum residual disinfectant level (MRDL): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that the addition of disinfectant is necessary to control microbial contaminants.

Maximum residual disinfectant level goal (MRDLG): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

AL: Action level

MFL: Million fibers per liter

ppm: parts per million

ppb: parts per billion

SDRL: State Department of Health minimum reporting level

Additional required health information

SWAP map data language

Source Water Assessment Program (SWAP) data has been compiled for all community PWSs in Washington. SWAP data for our 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.

To ensure that tap water is safe to drink, the EPA prescribes limits on the amount of certain contaminants that may be contained in water provided by public water systems. Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water. Drinking water, including bottled water, may be reasonably 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 Environmental Protection Agency Safe Drinking Water Hotline (800-426-4791). Sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it filters out naturally occurring minerals and radioactive material, and may pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

(A) Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

(B) Inorganic contaminants, such as salts and metals, which can be naturally occurring or result from urban storm runoff, industrial or domestic wastewater discharge, oil and gas production, mining, or farming.

(C) Pesticides and herbicides, which may come from a variety of sources, such as agricultural applications, storm water runoff, and residential uses.

(D) Organic chemical contaminants, including synthetic and volatile organics, which are by-products of industrial processes and petroleum production, and may also be released by gas stations, or come from urban storm water runoff and septic systems.

(E) Radioactive contaminants, which can be naturally occurring or the result of oil and gas production and mining activities. In order to ensure that tap water is safe to drink, the EPA prescribes regulations that limit the amount of certain contaminants that may be contained in water provided by public water systems. FDA regulations establish limits for contaminants in bottled water which must meet the same protections for public health.

Some people may be more vulnerable to contaminants in their drinking water than is the general population. Immuno-compromised persons such as those with cancer undergoing chemotherapy, those who have undergone organ transplants, those with HIV/AIDS or other immune system disorders, as well as some elderly people and infants can be at particular risk from infections. These people should seek advice about their drinking water from their health care providers. EPA and Centers for Disease Control (CDC) guidelines on appropriate ways of reducing the risk of infection by Cryptosporidium are available from the Safe Drinking Water Hotline (800-426-4791). This report was prepared by Forks Municipal Water. For more information, call Forks Municipal Water at (360) 374-5412. Learn more about the Forks Municipal Water system at www.forkswashington.com.

Office of Drinking Water Lead Statement

In Washington State, lead in drinking water comes primarily from materials and components used in household plumbing. The longer water sits 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, flush water through any water tap that has not been used for six hours or more until the water is noticeably colder before using for drinking or cooking. The flushed water can be used to water plants, wash dishes, and 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 the EPA’s Safe Drinking Water Hotline (800-426-4791) or online at http://www.epa.gov/safewater/lead.

Este informe contiene informacion muy importante. Traduscalo o hable con alguien que lo entienda bien.

Appendix I – Water Shortage Response Plan

Water Shortage Response Plan

Forks

Prepared By:

GIBBS & OLSON
CIVIL ENGINEERS • LAND SURVEYORS

July 2019
Revised October 2023
Gibbs & Olson Project No. 0078.0181

Forks Water Shortage Response Plan

Table of Contents

Water Shortage Response Plan
for
Forks

Introduction

Introduction

DOH guidance document *Water Shortage Response Plans* (DOH PUB 331-316) was used to prepare this Water Shortage Response Plan (WSRP) for Forks. The goal of the WSRP is to maintain essential public health and safety services and minimize adverse impacts affecting the lifestyles of Forks' water customers. The WSRP outlines Fork's short-term water shortage response activities to minimize the impacts of events that can be weather-related water shortages, natural or human-caused disasters, or other water system operating emergencies. The objective of the WSRP is to establish procedures for managing water supply and demand in times of shortage. The WSRP identifies the range of demand reduction actions that are available and defines the mechanism(s) by which decisions will be made during a shortage event. Since each situation has unique characteristics, the WSRP cannot address all of the possible scenarios, or all of the supply and demand management actions that are appropriate to a given situation. For this reason, the WSRP is intended as a framework of actions that will be tailored to meet the specific needs of a shortage situation.

Background

Forks' water supplies are solely from groundwater sources. There are six wells in two well fields within city limits. All wells are less than 200' deep in a prolific aquifer. Water from all wells is treated with chlorine for disinfection.

Combined well production is 1,905 gpm and 2021 maximum day demand (MDD) is 614 gpm. Due to Forks' water supply solely deriving from groundwater, the water system is not highly vulnerable to short-term drought conditions. Summer drought conditions are a normal part of our annual weather cycle, and measures to meet annual summer demand are addressed in the City's Water System Plan.

This WSRP establishes procedures intended for use during unexpected periods of water shortage. There are several scenarios that could result in such a shortage and impair the ability of the City's water supplies to meet demand.

Drought conditions resulting in less than average fall/winter precipitation may decrease recharge to local aquifers. Impacts from this scenario may not be immediately evident due to lag times between drought conditions, recharge and groundwater withdrawal. Impacts may become evident in shallow aquifers 6 months to 1 year following below-average rainfall, and would likely be evident following a 1-2 year period of below-average precipitation.

Unusually warm and dry weather sustained over the summer months also holds the potential to impact water supplies if our usual period of peak demand extends in duration. Effects of from this scenario would be immediate.

Events such as natural disasters including earthquakes, flooding, snow and windstorms that result in power failures can result in water shortage situations lasting a longer period of time than a routine water main break. The same is true for human caused emergencies such as hazardous material spill, chlorine solution leak or an act of vandalism. Such emergencies can result in a critical water component to be out of service for an extended period of time resulting in a curtailment of water production.

Problem Assessment

There are no known issues that would affect Forks' ability to meet system demands.

Demand Analysis

The MDD is 614 gpm or 884,130 gpd.

Supply Analysis

Forks has six wells that produce 1,955 gpm or 2,743,200 gpd.

Demand and Supply Comparison Summary

During the peak demand period, the system now is able to produce 2,743,200 gpd which is more than double the MDD of 884,130 gpd. The supply is therefore adequate. There is also 1,900,000 gallons of storage available.

Options for Dealing with a Water Shortage

Water Resource Policies

Forks is governed by many federal, state and local laws, regulations, policies and plans that form the legal context within which the public water system operates. Those dealing with water resource policies include, at a minimum: water rights (chapter 173-152 WAC), water code (chapter 90.03 RCW), groundwater (chapter 90.44 RCW), Group A water systems (chapter 246-290 WAC), water use efficiency (RCW 90.03.386(3), watershed planning (chapter 90.82 RCW), Forks' ordinances and policies for service.

Water Shortage Response Team

When a potential water shortage is identified, the public water system would assemble a Water Shortage Response (WSR) Team to consider whether the WSRP should be implemented. The team would be comprised of the following staff though additional staff would be brought in, as needed:

- Public Works Director
- Mayor
- City Council

The WSR Team would consider the following water supply factors:

- Total supply availability.
- Groundwater rights status for that particular year.
- Operational condition of all sources, storage tanks, and other facilities.
- The rate of decline in groundwater levels compared with the normal operating levels.
- Amount of time required to implement a supply-enhancement measure.
- Weather conditions as derived from short- and long-term weather forecasts and modeling by the National Weather Service.

The WSR Team would then consider the following water demand factors:

- Current trends and seasonal forecasts for the system's daily water demands.
- The estimated margin of safety provided by the demand reduction compared with the level of risk assumed if no action is taken.
- Amount of time required to implement a water use reduction measure.
- Magnitude of expected savings provided by a water use reduction measure.

Other factors the WSR Team would consider include:

- The value of lost water sales revenue compared with the increased margin of supply reliability.
- Consultation with Council members, state resource agencies, the County, and interested organizations.
- Required time lags to institute measures.
- Ultimate cost to Forks customers, both residential and commercial.
- Equity in demand reduction between customer classes.
- Current events.
- Environmental benefits.

Stages of a Water Shortage

The four stages of phased responses are implemented in an effort to manage water demand when supplies become limited. Stages will be implemented progressively, if conditions allow or as needed depending on the situation. Each stage includes a variety of communications, internal operations, supply side actions and demand management strategies, as appropriate. Below is a summary of those stages.

Stage 1. Advisory

In this stage, customers would be informed as early as meaningful data is available, that water supply and demand conditions may result in a less than normal supply of water. If the supply and demand situation foreseen at the Advisory Stage develops, then the Utility would move to the Voluntary Stage.

Stage 2. Voluntary Reductions

This is the first step in reducing water consumption during a potential or actual water shortage. At this stage, voluntary cooperation and support of customers is requested to meet water use reduction goals.

Stage 3. Mandatory Restrictions

If voluntary measures do not provide the necessary reduction in water use, then mandatory activities would be implemented.

Stage 4. Emergency Curtailment

This stage would only be used when extraordinary levels of reduction are required to ensure demand does not exceed supply and public health and safety are not compromised.

Demand Reduction Options

Table 1, on the next page, provides a brief description of possible demand reduction options the Utility could possibly use based on the water shortage stage and an estimate (percentage) of water savings associated with it.

Table 1. Demand Reduction Options

Action	Stage and Consumption Reduction Goal Percentage				Comments
	Advisory	Voluntary	Mandatory	Emergency	
Communications	**1 – 5 %**	**5 – 10 %**	**10 – 20 %**	**20 – 30 %**	
Media coordination.	X	X	X	X	
Develop and implement public outreach and education plan.	X	X	X	X	
Coordination with resource agencies and local jurisdictions.	X	X	X	X	
Coordination with largest water users.	X	X	X	X	
Notify irrigation customers of potential shut down procedures.			X	X	
Forks	**1 – 5 %**	**5 – 10 %**	**10 – 20 %**	**20 – 30 %**	
WSR Team coordination and planning.	X	X	X	X	
Reduce all maintenance and operations water uses to essential levels.		X	X	X	
Assess water main flushing activities.	X	X	X	X	
Increase water quality monitoring actions as necessary.					
Finalize water use restrictions, exemptions, and enforcement procedures and penalties.			X	X	Subject to Council approval.
Apply surcharges and penalties.			X	X	
Initiate "Water watcher" patrols.			X	X	
Declare water emergency.				X	Subject to Council approval.
Customers	**1 – 5 %**	**5 – 10 %**	**10 – 20 %**	**20 – 30 %**	
Initiate residential indoor water use recommendations	X	X	X	X	
Initiate residential outdoor water use recommendations/tip (non-landscape)	X	X	X	X	

Initiate residential landscape water use recommendations/tips.	X	X	X	X	
Initiate commercial water use recommendations/tips.	X	X	X	X	
Initiate commercial landscape water use recommendations/tips.	X	X	X	X	
Contact water waste customers to cease waste.			X	X	
Initiate time of day watering restrictions (i.e., prohibited from 6 a.m. to 10 p.m.).			X	X	
Initiate day(s) of week lawn watering restrictions.			X	X	
Prohibit all lawn/turf watering, including new installations.			X	X	Possible exemptions for ballfields / playfields for safety purposes. All lawn watering banned prior to moving to Emergency Stage.
Prohibit all garden/ornamental landscape watering				X	
Initiate ornamental fountain operation restrictions		X	X	X	Prohibited at Mandatory and Emergency Stages.
Initiate car washing restrictions.		X	X	X	Request at Voluntary Stage, restrictions as necessary.
Initiate construction site water use restrictions				X	Water use prohibited. Exemptions as necessary to meet air quality regulations.
Restrict outdoor use by customers with special medical needs				X	Special medical needs like home dialysis are exempt from any emergency surcharge or restrictions, provided they notify Forks of

					such a need.
Initiate sidewalk, deck and driveway washing restrictions.			X	X	Except as necessary for public health or safety.
Initiate building pressure washing restrictions.			X	X	Limited at Mandatory Stage, prohibited at Emergency Stage.
Restrict filling of swimming pools			X	X	Prohibited at Emergency Stage for both private and public pools.
Penalties	**1 – 5 %**	**5 – 10 %**	**10 – 20 %**	**20 – 30 %**	
None	X	X			
Issue warnings, make site visit, collect shut off and reconnection fee			X		
Institute rate changes to further encourage conservation			X	X	Requires Council approval.
Impose surcharges			X	X	Requires Council approval.

Triggering Criteria

Individual triggers for implementing the WSRP include both environmental (i.e., temperature, rainfall, instream flow, snowpack, climatologic data, etc.) or infrastructure. **Tables 2 –5** provide details each stage as it relates to the objectives, triggers, actions, and communications.

Advisory Stage

There are a variety of conditions that may cause concern about water availability and signal a potential water shortage. Responses to triggering an Advisory Stage are shown in **Table 2**. A public message that might be drafted could be: "*The potential exists for lower than normal water supply. Customers may be asked to reduce consumption unless conditions return to normal. Please use water wisely. We will keep you informed.*" The Advisory Stage may be discontinued when water supply conditions return to a normal situation.

Voluntary Stage

As information further confirms the need to step up the surveillance of conditions contributing to both environmental and or infrastructure concerns about meeting water needs, **Table 3** provides responses that could occur during the Voluntary Stage. A public message that might be drafted would be: "We are relying on the support and cooperation of **all** water users to reduce consumption and stretch the available water supply. Water use needs to be reduced by ten percent, approximately 25 gallons per household per day.

Customers are responsible for determining how they will meet that goal. Water waste is not allowed. If everyone cooperates, more stringent restrictions may be avoided. In addition to meeting essential water needs of customers, the needs of fish habitat and other environmental concerns is a priority." **Appendix B** lists water use reductions actions customers can do.

Mandatory Stage

At this point if voluntary actions do not result in needed demand reductions, Forks will implement more aggressive actions and will limit or prohibit certain uses of water by customers. **Table 4** provides response that could occur during the Mandatory Stage. A public message that might be drafted would be: "We are imposing mandatory restrictions to reduce demand because the voluntary approach is not resulting in necessary water use reductions. We are continuing to rely on the support and cooperation of our customers to reduce water use.

However, we need the certainty and predictability of restricting certain water uses. This way, we can ensure that an adequate supply of water is available for public health and safety throughout this shortage."

Emergency Stage

At this stage, Forks would recognize that a critical water situation exists. Without additional significant curtailment actions, a shortage of water for public health and safety would be imminent.

This stage is characterized by two basic approaches. First, increasingly stringent water use restrictions would be established and enforced. Secondly, significant rate surcharges would be used to encourage customer compliance. While a rate surcharge may be implemented in either the Voluntary or Mandatory stages, a surcharge is a key component to the success of this stage, and any previous surcharge may be increased if appropriate. A public message that might be drafted would be: "A water supply emergency exists. Severe restrictions on water use are necessary to maintain adequate water supplies essential for basic public health and safety. The public's continued cooperation is requested. Restrictions will be strenuously enforced."

TABLE 2. ADVISORY STAGE OBJECTIVES, TRIGGERS, OPERATING ACTIONS AND COMMUNICATIONS

Objectives	Triggers	Actions	Communications
1. Prepare Forks staff, relevant agencies, and water users for a potential water shortage, thereby allowing all parties adequate time for planning and coordination. 2. Undertake supply management actions that forestall or minimize the need for more stringent demand or supply management actions later on.	1. River and stream levels that are historically low in August/September (when levels are at their annual lowest). Staff would begin monitoring precipitation and analyzing all available data. If stream levels do not come up to historical levels, we would declare an Advisory Stage in June. 2. River and stream levels that are significantly below historical normals for the current time of year and data indicates that expected demands may not be met if this trend worsens or continues. 3. Lower than normal winter precipitation or snow pack.	1. Convene Forks' Water Shortage Response Team to evaluate conditions, determine actions, and assign tasks. 2. Intensify communication with all Forks staff so they can communicate our message clearly to concerned customers. 3. Intensify data collection actions for well pumping records, tank level records, monitoring river and stream levels and weather conditions. 4. Assess water quality in the distribution system to target areas that may experience degradation with reduced consumption. 5. Develop a list of critical water uses and users. 6. Initiate planning and preparation for Voluntary Stage actions, including an assessment of potential staffing impacts, training needs, and communications strategies.	1. Brief Council members. 2. Consult with and provide status reports to state resource agencies, interest groups, and Native American Tribes. Specific entities include Jefferson County, State Departments of Health and Enterprise Services, interested environmental and community organizations, and large commercial customers. 3. Develop a status report for customers/businesses with special interests. 4. Develop and distribute public outreach and education materials explaining the drought response stages and expected ranges of actions through a variety of communication channels (i.e., print and radio media, TCTV, Forks website, direct mail, etc.). Post updated status reports on Forks' website and through other communication channels. Prepare information for customers, including developers, who may be planning new landscaping.

TABLE 3. VOLUNTARY STAGE OBJECTIVES, TRIGGERS, OPERATING ACTIONS AND COMMUNICATIONS

Objectives	Triggers	Actions	Communications
1. Inform Forks water customers of a water shortage and the need to reduce water use and eliminate water waste. 2. Reduce water use to meet consumption goals through voluntary customer actions. 3. Forestall or minimize the need for more stringent demand or supply management actions. 4. Minimize the disruption to customers while meeting consumption goals. 5. Maintain the highest water quality standards throughout the shortage.	1. River and stream levels continue to be low. 2. Rainfall and snowpack is significantly less than normal by April 1. 3. The summer is predicted to be hot and dry. 4. Water use demand projections indicate a systematic response to reducing demand is required.	1. Continue Advisory Stage actions. 2. WSR Team to prepare weekly reports for distribution to staff and local media on supply conditions and consumption levels. 3. WSR Team will consider the current and projected supply conditions and seasonal demand and set consumption goals that may be revised as necessary. 4. Reduce all operating system water uses to essential levels. 5. Increase water quality monitoring actions as necessary. 6. WSR Team will evaluate whether target consumption levels and supply conditions warrant a rate surcharge to reinforce voluntary actions and/or to recover revenue losses. The WSR Team would make recommendations to the Mayor for recommendation to the full Council. 7. Implement staffing reassignments as needed and plan staffing changes that may be needed for the Mandatory Stage, including staff to enforce mandatory restrictions. **8.** Contact the Forks Fire Department to inform them of the situation and request implementation of action listed in **Appendix D.**	1. WSR Team would establish systematic communications with the City Council, including the suggested nature and scope of the voluntary measures and strategies. 2. **Appendix A** contains a list of public agencies, large customers and business groups who should be provided status reports on the situation. Specific entities include Jefferson County, State Departments of Health, State and Enterprise Services, interested environmental and community organizations, and large commercial customers. Post updated status reports on the Forks website. 3. Develop and implement a comprehensive public awareness and education campaign with the goal of keeping customers informed about supply and demand conditions. This campaign will recommend customer actions to significantly reduce demand, reinforce desired customer actions, and remind customers that if goals are not achieved, mandatory restrictions may be necessary.

TABLE 3. VOLUNTARY STAGE OBJECTIVES, TRIGGERS, OPERATING ACTIONS AND COMMUNICATIONS - CONTINUE

Objectives	Triggers	Actions	Communications
			4. Promote consumption goals for typical households and a percentage reduction goal for commercial customers. 5. Prepare a current list of commercial car washes in the area that recycle water. 6. Contact Forks largest water users and request a percentage reduction. Contact public agencies to inform them of conditions and request their cooperation. 7. Identify customers with large irrigation accounts and promote the use of daily weather information, such as rainfall and reduced evapotranspiration (ET) rates to minimize irrigation use. Provide current ET rates on Forks' website. 8. Provide water quality information in public information so that if flushing is necessary, the public understands that it is essential for water quality maintenance. 9. Initiate remaining planning and preparation for the Mandatory Stage. 10. Establish regular communication with staff that has regular contact with the public, such as Utility Billing representatives, meter readers, and Water Operations staff. Keep them up to date on conditions, goals, and City Council's actions so they can provide accurate information to our customers.

TABLE 4. MANDATORY STAGE OBJECTIVES, TRIGGERS, OPERATING ACTIONS AND COMMUNICATIONS

Objectives	Triggers	Actions	Communications
1. Achieve targeted consumption reduction goals by restricting defined water uses. 2. Ensure that an adequate water supply will be available during the duration of the water shortage to protect public health and safety and to provide sufficient in-stream flows for fish habitat. 3. Minimize the disruption to customers' lives and businesses while meeting target consumption goals. 4. Promote equity among customers by establishing clear restrictions that affect all customers.	1. The current water supply would not be able to meet demand projections. 2. Measures implemented in the Voluntary Stage are not adequately reducing demand. 3. The time available to implement measures to reduce water use is not sufficient to allow education of customers required for voluntary compliance. 4. It is evident the level of water use reduction required would not be achieved through voluntary compliance.	1. Continue actions from Advisory and Voluntary Stages, as appropriate. 2. The WSR Team would develop a list of recommended water use restrictions and exemptions from restrictions. 3. The WSR Team would finalize and implement a process for receiving, recording, and responding to reported violations of restrictions. 4. The WSR Team would make recommendations to move to the Mandatory Stage and adopt mandatory restrictions, emergency surcharges, and fees to the City Council for adoption. The WSR Team would recommend the nature, scope, and timing of restrictions. 5. **Appendix C** provides an enforcement checklist the WSR Team would finalize and implement procedures and assess fines where mandatory restrictions are not followed. The WSR Team would review and process all requests for exemptions from mandatory requirements. 6. Initiate planning and preparation for the Emergency Stage.	1. WSR Team will provide periodic reports to the City Council, including the suggested nature and scope of the mandatory restrictions, implementation strategies, and customer response data. 2. Consult with and provide status reports to state resource agencies, interest groups, and Native American Tribes (**Appendix A** includes a list of appropriate contacts). Specific entities include the Forks School District, Jefferson County, Washington Department of Fish and Wildlife, Washington Department of Natural Resources, interested environmental and community organizations, and large commercial customers. Post updated status reports on the Forks website. 3. Through a media campaign and direct mail communicate: • Scope and nature of mandatory restrictions. • Reasons for imposing the restrictions. • Consumption goals and ways in which to achieve those goals.

TABLE 4. MANDATORY STAGE OBJECTIVES, TRIGGERS, OPERATING ACTIONS AND COMMUNICATIONS - CONTINUED

Objectives	Triggers	Actions	Communications
			• Additional restrictions that may be imposed if water use reduction goals are not achieved. • Enforcement mechanisms and fines. • Rate surcharges. • Projections for how long restrictions will be in place. 4. In communicating mandatory restrictions to the public, a clear distinction will be made between lawn/turf watering and watering gardens and ornamental plantings. The type and amount of watering will be clearly defined. 5. Any exemptions from water use restrictions will be clearly identified. 6. Contact irrigation customers and inform them that Forks may shut down their irrigation meters in the event of an immediate water shortage situation. 7. Provide area landscape management and property management companies with water use restriction information. 8. Restrict hydrant usage to essential purposes, including recall of hydrant meters previously issued. This should include contacting each registered hydrant user. Require the use of best management practices (BMPs) to reduce water use, meet operational needs, and provide for dust control.

Objectives	Triggers	Actions	Communications
			9. Post updated status reports on the Forks' website. 10. Continue and enhance communication actions from the Advisory and Voluntary Stages 11. **No exemptions will be allowed for watering new lawn installations**. 12. Evaluate resources and plans for moving into the Emergency Stage. As appropriate, begin preparatory measures.

TABLE 5. EMERGENCY STAGE OBJECTIVES, TRIGGERS, OPERATING ACTIONS AND COMMUNICATIONS

Objectives	Triggers	Actions	Communications
1. Ensure throughout the water shortage, an adequate water supply exists to protect public health and safety. 2. Sharply reduce water demand. 3. Restrict certain defined water uses in order to meet consumption goals.	1. Measures to reduce water use implemented in the Voluntary and Mandatory Stages have not adequately reduced demand. 2. The time available to implement measures to reduce water use is not sufficient to allow education of customers required for voluntary or mandatory compliance.	1. The WSR Team would define the water shortage as an emergency and, through the Mayor, would implement procedures for the full Council to formally declare a Water Shortage Emergency. 2. The WSR Team would develop a list of water use restrictions, prohibitions, exemptions, and surcharge rates for recommendation to the Council for consideration through the Mayor. 3. The WSR Team would increase the frequency of reports to the Mayor and the full Council. Reports would provide detail on the implementation of the Emergency Stage and customer response data. 4. The WSR Team would establish water use reduction goals. Consumption goals may be set in a variety of ways. Determining factors include equity among customers and the utility billing software in use. Single-family residential goals may be set as a standard per house allotment or as a percentage reduction from the previous year's consumption. Consumption goals may be below customers' average winter month use. Commercial, institutional, and multifamily residential customers may be asked to reduce water use by a set percentage of their average consumption during the previous year.	1. Define the problem to the public as an emergency, and institute formal procedures to declare a water emergency. 2. Inform customers of the rate surcharge and how it will affect them. Provide information on an appeal process. 3. Define and communicate exemptions for medical facilities and other public health situations. 4. Consult with and provide status reports to state resource agencies, interest groups and Native American Tribes. Specific entities include the Forks School District, Jefferson County, Washington Departments of Health, Enterprise Services, Fish and Wildlife, and Natural Resources; interested environmental and community organizations and large commercial customers. Post updated status reports on Forks' website.

TABLE 5. EMERGENCY STAGE OBJECTIVES, TRIGGERS, OPERATING ACTIONS AND COMMUNICATIONS - CONTINUED

Objectives	Triggers	Actions	Communications
		5. Adjust or modify utility billing systems to implement any approved surcharges and penalties. 6. Increase enforcement actions in accordance with the applicable ordinances approved by the full Council. 7. Provide training for personnel and deploy additional "Water Watcher" patrols. 8. Water Shortage Response Team to increase meeting frequency to daily status briefings to review the current situation and determine which actions are working and those that need to be improved. Focus on messages that are easy to communicate, implement, and have the potential to sharply reduce demand.	5. Through a media campaign and direct mail communicate to Forks customers the: • Scope and nature of rationing and curtailments, • Reasons for imposing the curtailments, • Water use reduction goals, • Enforcement mechanisms and fines, • Projections for how long curtailments will be in place, and • Rate surcharges. 6. Clearly identify any exemptions from the water use curtailment. 7. Inform customers about possible pressure reductions and problems this may cause. 8. Provide area landscape firms with water use curtailment information. 9. Post updated status reports on the Forks website. 10. Continue and enhance communication actions from the Advisory, Voluntary, and Mandatory Stages.

Alternative Water Sources

The City's 6 wells are located within two wellfields. If one wellfield was subject to a contamination event, the other wellfield could supply the City until the contamination is cleaned up and the wells returned to service. The complete loss of both wellfields is unlikely; however, in the event that the City loses enough source capacity such that, even with water use restriction's, reservoir capacity continues to decline, emergency sources of supply could be needed.

Emergency Water Supplies

If the City obtains potable water by transporting from another source, DOH has issued guidelines for water system utilities that deliver potable water to the public during emergencies. This guidance is included in Appendix G and is found at the following website and is summarized below:

https://doh.wa.gov/sites/default/files/legacy/Documents/Pubs/331-063.pdf

General

- DOH recommends that someone with water treatment expertise be responsible for the operation and management of trucked potable water.
- The City should contact the regional office of the DOH Division of Drinking Water or the local health department to discuss current requirements and approve the proposed operation.

Truck Container

- The truck container must be contaminant-free and capable of being maintained so that water contamination is prevented.
- If a truck container has been previously used only for potable water and has been protected from possible contamination, it may be used without disinfection and testing for bacteria.
- Truck containers that cannot pass the initial testing criteria after disinfection (i.e., absence of coliforms) shall not be used.
- Trucks previously used for substances other than potable water will be evaluated on an individual basis. Consult with DOH before using trucks that may have previously carried toxic or other non-potable liquids.
- All truck containers must be filled or emptied through an air gap or approved double-check valve assembly, in accordance with WAC 246-290-490.

Initial Truck Disinfection

- The tank and all hoses, pumps, and other equipment used in handling water should be disinfected by filling with water containing at least 50-60 parts per million (ppm) of chlorine and then held in the tank for at least 24 hours.
- One gallon of liquid bleach is required in every 1,000 gallons of water to produce 50-60 ppm. Bleach should be 5.25-6 percent hypochlorite with no additives. Bleach should be added in proportion to the water as the tank is being filled, e.g. add approximately one-half gallon of bleach with each 500 gallons of water.
- The chlorine solution must be flushed from the tank after 24 hours.
- Once the tank is emptied, refill it with the water to be transported, and test for coliform bacteria. If coliforms are present, repeat the process. If the tank cannot be disinfected to eliminate coliforms, it must not be used.
- Water to be transported by tank trucks should contain a free chlorine residual of about one part per million (1 ppm or 1 mg/L) at the beginning of the haul.

Source of Water

- The source for emergency trucked water must come from an approved public water supply, unless otherwise approved by DOH.
- Every precaution should be taken to ensure that the water remains potable once it is collected and transported.

Receiving Tank

- The water system's receiving tanks must be inspected to assure that water quality issues will not occur during filling and later distribution to consumers.
- Receiving tanks must be cleaned and disinfected using the same procedures identified for the truck containers (see "Initial Truck Disinfection" guidelines).
- The receiving tanks must be kept secure and protected from contamination throughout the emergency response.
- The customer's receiving tank must be filled through an air gap or an approved double-check valve assembly in accordance with WAC 246-290-490.

Documentation and Record-Keeping

- The receiving water system is responsible for documenting and keeping proper records of the emergency trucked water operation.
- Records should be retained for at least six months for review upon request by health agencies, haulers, or the supplying water system.

As noted, the City of Forks has six wells within two wellfields that provide a groundwater source of water. Trucking water would only be used during an extreme catastrophic event. The City works closely with the Quileute Tribe and it is assumed the City would seek a mutual aid agreement from the Quieute Tribe for trucking water in the event of an extreme catastrophic event. It is anticipated that 3,000-gallon water tanker trucks would be used to transfer water to the City. Assuming two trucks were utilized and could fill at the Quileute Tribe, travel to Forks, discharge water and return to the Quileute Tribe in a roundtrip time of 2 hours, each truck could make 12 trips in 24 hours. With two trucks that would be 24 trips at 3,000 gallons or approximately 72,000 gallons per day. This is approximately 15% of the average day demand. It is more likely that if trucking water became necessary the trucks would be used to fill customer water bottles at a central location in the City.

Plan Implementation

In order to properly implement this Plan, the City Council must adopt the key policies within it and inform the customers of new requirements including possible rate structure changes and tiered rate increases along with financial penalties for not complying with mandatory water use restrictions.

Appendix F contains health advisory templates to be used in the event of a water outage or severe shortage.

Emergency Declaration

In the event that this Plan must be implemented due to a water shortage, that action constitutes an “Emergency” as defined by the departments of Health and Ecology.

Appendix A

Water Shortage Response Contact List

WATER SHORTAGE RESPONSE CONTACT LIST

A working list of contacts for easy reference should be developed and regularly updated by staff. In the event of a water shortage caused by a drought, the following will be contacted directly. They will be apprised of the situation, and their support and cooperation in reducing demand will be requested.

Other Public Agencies

- Jefferson County
- Forks School District
- State Department of General Administration
- State Department of Ecology
- State Department of Health

Large Customers

Staff will develop a contact list based on previous two year's water consumption

Landscape Interests

- WSU/Lewis County Cooperative Extension
- Local nurseries
- Local landscape contractors
- The Irrigation Association
- Washington Association of Landscape Professionals
- Washington State Nursery and Landscape Association

Business Groups

- Jefferson County Chamber of Commerce
- Master Builders Association
- Rotary Clubs of Jefferson County

Appendix B

Voluntary Customer Water Use Reductions

VOLUNTARY CUSTOMER WATER USE REDUCTIONS

Residential Indoor

- Flush the toilet less often. Each flush uses 1.6 to 7 gallons of water, depending upon the age of the toilet.
- Dishwashers should be run only when there are full loads of dishes. Each load uses 8 to 13 gallons of water, less than by hand washing.
- Wash only full loads of laundry. Each load uses 15 to 40 gallons of water. High-Efficiency washing machines use approximately 30 percent less water than standard models.
- Keep a pitcher of cold drinking water in the refrigerator rather than running the faucet until the water gets cold.
- Take shorter showers. Each minute of showering time uses 2.0 to 5 gallons of water. Try to limit showering time to five minutes.
- Avoid letting the faucet run while shaving, brushing teeth, or washing vegetables.
- While waiting for hot water, use a container to catch wasted tap water for use on plants.

Residential Outdoors

- Wash cars less often. Instead of using a hose, consider a commercial car wash that recycles water.
- Always use a shutoff nozzle when using a hose. Be sure there are no leaks in any hose fittings.

Commercial and Residential Landscape

- Water lawns and gardens only early in the morning or late in the evening to reduce water loss from evaporation.
- Consider letting established lawns go dormant until the shortage is over. Homes that normally water lawns will save from 25 to 50 percent by not watering them.
- Do not water lawns when it is raining. If you have an automatic irrigation system, learn how to change the program that controls your system in order to cut back on irrigation time. Turn off automated irrigation system clocks during rainy spells. Install a rain sensor on automatic irrigation systems that will override the system during rainfall.
- Eliminate outdoor water play, such as running through a sprinkler, plastic water slides, and wading/swimming pools that requires frequent refilling.
- Eliminate all hosing of sidewalks, driveways, and decks. Use a broom instead.
- Water established plants only when necessary, testing the soil moisture levels in the root zone with your fingers. Two to four inches of mulch in your planting beds will help retain moisture.
- Create tree wells around trees to minimize runoff when watering.

Commercial

- Set goals for reduced water use and inform managers and employees. Give businesses ideas for limiting water use and ask them for their ideas.
- Repair all leaks and dripping faucets. Ensure that constantly running toilets are repaired. Urge employees to report leaks.
- Reduce or eliminate routine vehicle cleaning during the shortage. Use a local commercial car wash facility that recycles water.
- Ensure that all hoses are fitted with shutoff nozzles.
- Eliminate all hosing of walkways, parking lots, and loading docks. If washing paved areas is

necessary for public health and safety, pressure washers use substantially less water.

- Postpone routine building washing until after the shortage.
- Post signs informing customers of the nature of the water shortage and ask for cooperation in reducing water use.
- Turn off all non-recirculating fountains. On windy days, when there is significant water loss, turn off all fountains.
- Ask restaurants to deliver water only on request.
- Accelerate restroom upgrades by replacing older toilets with low-flow (1.6-gallon-per-flush) or high-efficiency (1.0 to 1.3 gallon per flush) models.

Appendix C

Mandatory Restrictions

Enforcement Procedural Checklist

________ Determine fines and/or surcharges to be imposed for mandatory restriction infractions, including whether or not there will be "one fine for all infractions" or whether certain selected water use reduction actions would command a higher fine than others.

________ Determine the number of warnings before fines or surcharges apply.

________ Establish a database for tracking violations.

________ Print self-duplicating "Notice of Violation" forms: one copy for location where violation occurred and one to record violation with billing. Print violations and fines on the Notice of Violation.

________ Assign and train staff with customer service and communication experience to "Water Watch".

________ Establish a procedure for "Water Watchers" to record warnings and penalties on customer accounts.

________ Establish a "hotline" for customers to report violations. To help avoid frivolous complaints, recorded message should note that only complains with name and address of complainant will be pursued.

________ Provide all field and customer service staff members with fact sheets and question and answer sheets. Provide briefings on restrictions and enforcement procedures. Train field staff to tag obvious violations.

Appendix D

Forks Fire Department Shortage Response

Forks Fire Department Shortage Response

The Fire Department uses water in a variety of ways. These uses include:

- Fire flow pressure testing
- Vehicle washing
- Washing of drill pad
- Training (evolution/wet training)
- Irrigation

The following explains how these water uses might be affected during the four stages of drought response.

Advisory Stage

At this stage, we would be communicating a possible water supply shortage to our customers. It may make sense to schedule any line flushing or wet training for earlier in the season in case restrictions are in place.

Voluntary Stage

In this stage, we would be asking our water customers to reduce their water use by a certain amount (generally about 5-10 percent). The Fire Department may change their water use at this stage in the following ways:

- Vehicle washing: Currently, several of the vehicles washed or at least rinsed daily. Washing is more frequent during the wet season, when vehicles are muddy. During this stage, vehicles would only be washed if they have mud on them but could continue to be rinsed each evening.
- Drill pad washing: The pad is now washed twice during the summer. If the voluntary stage occurs during summer months, a sweeper from the Public Works Department would be brought in to sweep the pad instead of washing it.
- Fire flow testing: Testing could still occur at this stage.
- Training: Scheduled training could still occur at this stage. However, the need for the training should be weighed carefully against the water use.
- Irrigation: Irrigation of landscape should be slightly reduced at this stage.

Mandatory Stage

At this stage, we would acknowledge a serious water supply shortage. Water use restriction would be enforced with fines. The Fire Department may alter their water use in the following way at this stage:

- Vehicle washing: As in the Voluntary Stage, vehicles would only be washed or rinsed if there is mud on them.
- Drill pad washing: As in the Voluntary Stage, the sweeper would be used instead of water.
- Fire flow testing: Testing should be postponed during this stage.

- Training: Scheduled training should not occur at this stage. If this stage continues for more than one month, limited training exercises would resume.
- Irrigation: Irrigation of landscape should be reduced at this stage.

Emergency Stage

At this stage, the utility would be faced with a critical water supply shortage. The goal would be to provide enough water to provide for our customers' health and safety during the duration of the emergency. No outdoor irrigation would be allowed for any of our customers. At this stage, the Fire Department would need to change their water uses in the following ways:

- Vehicle washing: Vehicles would only be washed if there is mud on them. No rinsing could occur. Vehicles that can fit in commercial washes must be washed only at facilities that recycle water.
- Drill pad washing: As in the Voluntary Stage, the sweeper would be used instead of water.
- Fire flow testing: Testing may not occur during this stage.
- Training: Scheduled training may not occur at this stage.
- Irrigation: Irrigation of landscape may not occur at this stage.

Appendix E

Forks Parks Department Alternative Irrigation Plan

Forks Parks Department Alternative Irrigation Plan

This plan will provide for reductions in irrigation water usage that meet thresholds provided for each of the stages of the Water Shortage Response Plan. The plan reduces water use at City owned parks, streetscapes and other facilities by shifting irrigation schedules and prioritizing City facilities based on the age of landscaping, watering needs and public use.

In Stage 2, the Voluntary Stage, water use consumed through non-exempt meters will be reduced by 5-10%. Stage 3, the Mandatory Stage, provides for water use reduction of 10-20%. In Stage 4, the Emergency Stage provides for water use reduction of 20-30%, which may also be required for ballfields/playfields.

Appendix F

Health Advisory Templates

DRINKING WATER WARNING

The Forks Water System, ID#26000E, located in Jefferson County may be contaminated because of a water outage and loss of pressure in the water system.

DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST. Bring all water to a rolling boil for one minute, and let it cool before using. Boiled or purchased bottled water should be used for drinking, making ice, brushing teeth, washing dishes, and food preparation until *further notice*. Boiling kills bacteria and other organisms in the water.

When a loss of pressure occurs, it is possible that contamination from the environment or from human or animal waste may be drawn into the water system. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems. <u>These symptoms are not only caused by organisms in drinking water</u>. If you experience any of these symptoms and they persist, you may want to seek medical advice. People at increased risk should seek advice about drinking water from their health care provider.

What happened?

The following is being done to correct the problem:

We have consulted with the Washington State Department of Health about this incident. We will notify you when you no longer need to boil the water. We anticipate resolving the problem by ______________________.

For more information, please contact ______________________ at (   )______-__________ or at
(owner or operator) (phone number)
____ (address).

Please share this notice with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distribution copies by hand or mail.

This notice is sent to you by ____________________ Water System on ___/___/____

::

Drinking Water Warning:
BOIL WATER – RESTRICT WATER USE

The Forks Water System, ID#26000E, located in Jefferson County is having difficulty maintaining water pressure within the distribution system because of the reason(s) checked below:

- ☐ The well and/or booster pumps have failed.
- ☐ There is a major leak or break in the distribution system.
- ☐ The source is failing (i.e. declining water table/low stream flow).
- ☐ The system was without power for a significant period of time and our tank water levels are low.
- ☐ Hot weather has created a demand greater than the system facilities can satisfy.
- ☐ Other:

The situation is being addressed and we will notify you when it is resolved. In the meantime, please follow all of the steps indicated below:

- ☐ Conserve Water by:
  - ☐ Water outside before 10 AM or after 7 PM, and avoid doing laundry or taking showers between 5 PM and 7 PM.
  - ☐ Limit outside watering to every other day and no watering on Mondays.
  - ☐ Curtail all use of water outside except spot watering of plants in critical need.
- ☐ Bring water to a rolling boil for one minute. Boiled water should be used for drinking, making ice, food preparation, washing dishes, and brushing teeth
- ☐ Other:

The state Drinking Water Regulations require that the water system be designed and operated to maintain 30 pounds of water pressure throughout the distribution system under normal circumstances. When a loss of pressure occurs, it is possible for contamination from the environment, such as human or animal waste, to be drawn into the water system. Microbes in these wastes can cause diarrhea, cramps, nausea, headaches, or other symptoms of illness. This may pose a special health risk for infants, young children, the elderly, and people with severely compromised immune systems. <u>Please note that these symptoms may also be the result of events totally unrelated to drinking water</u>. If you experience any of these symptoms and they persist, you may want to seek medical advice. People at increased risk should seek advice about disease causing organisms in drinking water from their health care provider.

What happened?

The following is being done to correct the problem:

We will be keeping you informed of our progress and it may be necessary to conduct a community meeting to discuss whether additional facilities will be required to correct the problem. For more information, please contact ________________________ at ( )______-__________.
(owner or operator) (phone number)

Please share this notice with all the other people who use this water system, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distribution copies by hand or mail.

Water Outages

Water outages may allow contaminants to enter the pipes.
The water, when it returns, may be temporarily unsafe to drink.

DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST.

Knowing the following information can help.

Before a water outage

- Store one gallon of water per person per day.
- Store at least a three-day supply of water per person.
- Collect the water from a safe supply.
- Thoroughly washed plastic containers such as soft drink bottles are best. You can also purchase food-grade plastic buckets or drums.
- If you are storing water in buckets or drums, put a couple of drops of chlorine bleach (unscented) into each bucket or drum.
- Seal water containers tightly, label with date, and store in a cool, dark place.
- Replace water every six months.
- Never reuse a container that contained toxic materials such as pesticides, solvents, chemicals, oil or antifreeze.

During a water outage

- Remove any garden hoses from taps or spigots.
- Listen to your hot water heater for gurgling or boiling noises. If it is making noise, turn it off until water service is restored.
- If water service is out, but you still have water in your pipes: Boiled or purchased bottled water should be used for drinking, making ice, brushing teeth, washing dishes and food preparation until further notice.
- Conserve water and try to prevent your taps from running dry.

After a water outage

- Until you hear from your water provider that they have sampled the water and it is safe to drink:
- **DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST.**
- Boiled or purchased bottled water should be used for drinking, making ice, brushing teeth, washing dishes and food preparation until further notice.
- Let water boil for one minute and allow it to cool before using it.
- If you are experiencing illness symptoms, it is recommended that you see your health care provider.

In the event of a water outage, call [Phone#], even if the power is out. After hours, follow the voice mail instructions and someone will be paged. We will make every effort to keep you informed, however, in the event of a region-wide event, we may not be able to return all calls.

[Contact Info]

Appendix G

Truck Transportation

Disinfecting trucked water

All trucked water must maintain a free chlorine residual of at least 0.5 ppm to the point of delivery. To accomplish this, the hauler must add ½ cup of 8.25 percent hypochlorite bleach to each 1,000 gallons of water that does not have a free chlorine residual. The bleach must be unscented and without additives. Add the bleach in proportion to the quantity of water at the beginning of each haul during filling to ensure uniform distribution.

For more information

If you have questions, call our nearest regional office:

Eastern Region:	Spokane Valley 509-329-2100
Northwest Region:	Kent 253-395-6750
Southwest Region:	Tumwater 360-236-3030

Office of Drinking Water publications are online at https://fortress.wa.gov/doh/eh/dw/publications/publications.cfm

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HEALTHIER WASHINGTON

For people with disabilities, this document is available on request in other formats. To submit a request, please call 1-800-525-0127 (TDD/TTY call 711).

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Truck Transportation

Emergency water supply for public use

January 2017

DOH 331-063
Revised

Public water systems that receive potable water for the public during emergencies must follow drinking water standards (WAC 246-290-451(2)).

The Washington State Department of Health doesn't allow trucked water as a long-term source of drinking water. We do recognize that it may be the only option as a temporary source in response to some emergencies.

Before a water system can receive potable water for the public during an emergency, it must receive permission from one of the following:

- Our nearest regional office
- The local health officer or designee
- The state emergency management agency
- The local emergency management agency

To protect public health, water systems thinking about receiving trucked water must consider the following:

- The source and quality of the water
- Personnel
- Documentation
- Recordkeeping
- The truck container, including disinfection and condition
- The receiving container

Source and quality of water

Trucked emergency water must come from an approved Group A public water system operating in compliance with WAC 246-290. If there is no other option, and there is a formal written agreement between the receiving water system and the state or local health department, hauled water may be from an unapproved source.

The water system must prove to the health agency that the intended unapproved source is safe to use when treated to the minimal levels described in “Disinfecting trucked water,” on page 7.

The water system must confirm that the:

- Truck hauler is familiar with proper handling procedures at the supply source and during transport.
- Delivered trucked water contains a free chlorine residual of at least 0.5 ppm.

The water system must reject the water if it believes the hauler failed to take the steps necessary to ensure the water remains potable.

Personnel

The water system must have the certified operator coordinate the receiving process, collect documentation, and keep records. These procedures must be in the water system’s emergency response program (WAC 246-290-415(2)(d)).

Documentation

The water system must document and keep proper records of the trucked water operation. This includes the:

- Hauler's name and contact information
- Amount of water delivered per trip
- Chlorine test results
- Name of the approved water source or water system
- Date and time of delivery

Recordkeeping

The water system should keep the following records for at least one year after the emergency water hauling operation ends.

- Documents to show proper disinfection of the water for each trip.
- Confirmation of initial tanker disinfection method and follow-up coliform monitoring results.
- The free chlorine residual in the container at the start of the haul.
- The free chlorine residual of the water at point of delivery.
- Any conditions observed about the receiving tank.

Records must be available on request for review by health agencies, haulers, or the supplying water system.

Containers designed and used only for potable water service

Properly designed and maintained truck containers dedicated to hauling only potable water may be used without initial tanker cleaning, disinfection, and testing for bacteria.

The truck container must be contaminant-free and maintained to prevent potential water contamination.

The hauler must fill and empty all truck containers through an air gap or other approved method. All containers must be completely enclosed and tightly sealed with lockable lids or hatches. Containers open to the atmosphere during hauling cannot be used.

Truck container

Truck containers used for hauling petroleum products, surfactants, or other non-food grade products may not be used for hauling potable water.

Trucks used for hauling food-grade products other than potable water must be evaluated on an individual basis. At minimum, a truck container used to haul a food-grade product other than potable water must be disinfected as directed in "Initial tanker disinfection," right.

Initial testing must show absence of coliform bacteria before using the truck to haul water. We may require additional water quality analysis depending on a truck's prior use.

After emergency hauling begins and safety measures are in place to prevent contamination, any health authority can require repeat testing at any time. An extended water-hauling emergency warrants additional water quality monitoring, including chlorine residuals.

Initial tanker disinfection

Truck containers used to transport food-grade products other than potable water must be cleaned and disinfected before potable water hauling operations begin.

1 Rinse and flush all water-hauling containers, hoses, truck-mounted pumps, and other equipment until they are free of rust, sediment, and other matter.

2 Use water with chlorine levels of at least 50 parts per million (ppm) to completely fill the tank, pumps, hoses, and other hauling equipment that will contact potable water. About ¾ gallon of liquid bleach is required in every 1,000 gallons of water to produce 50 ppm. To accomplish this, bleach must be 8.25 percent hypochlorite with no scent, cleaning enhancer, or other additives. Add the bleach to the water while filling the tank to ensure uniform distribution.

All surfaces that will contact potable water must be disinfected with the chlorine solution for at least 4 hours.

All equipment used to collect, transport, and deliver drinking water must be designed to handle potable water and endure disinfection.

3 After 4 hours, flush the chlorine solution from the tank and all pieces of equipment. Do not discharge directly into a stream because the chlorine in the water can kill fish and plants. To dechlorinate the water, treat it with citric acid or thiosulfate before discharging it.

4 When the tank, hoses, pipes, and pumps are empty, refill them with potable water and test for coliform bacteria. If coliform are present, repeat the disinfection steps. If coliform is still present after a second attempt to disinfect, the tanker cannot be used to haul potable water.

Handling

All hoses and other handling equipment used in the operation must always be stored off the ground. Hoses must be capped at each end when not in use.

All surfaces that contact potable water, including fill-point equipment, containers, caps, valves, filters, fittings, and other plumbing attachments, must be inspected regularly and disinfected or replaced as needed.

Receiving container

Inspect the water system's receiving tanks to confirm water quality during filling and later distribution to consumers. Clean and disinfect receiving tanks using the disinfection steps in "Initial tanker disinfection," at left.

Secure and protect the receiving tanks from contamination throughout the emergency response process. Keep written records of any comments about the receiving tanks.

The water system must inspect each water delivery for appearance or odor problems, check the chlorine residual, and fill water through an air gap or other approved method.

Appendix J – Cost Estimates

City of Forks Water System Plan
Planning Level Opinion of Probable Cost
Distribution System Improvement D-3
Merchant Rd to Palmer Rd

Item No.	Item Description	Quantity	Units	Unit Cost	Amount
1	Mobilization	1	LS	$80,000	$80,000
2	Project Temporary Traffic Control	1	LS	$5,000	$5,000
3	Clearing and Grubbing	1	LS	$25,000	$25,000
4	Hydroseeding	3,000	SY	$15	$45,000
5	Bank Run Gravel for Trench Backfill	2,000	TON	$50	$100,000
6	Crushed Surfacing Top Course (CSTC)	200	TON	$50	$10,000
7	Asphalt Treated Base	20	TON	$120	$2,400
8	HMA for Pavement Repair Cl. 1/2" PG 58-22	30	TON	$200	$6,000
9	Foundation Material	160	TON	$70	$11,200
10	Shoring	1	LS	$20,000	$20,000
11	Construction Surveying	1	LS	$16,000	$16,000
12	C900 PVC Pipe for Water Main 8 In. Diam.	5,590	LF	$80	$447,200
13	Connect to Existing Water Main	5	EA	$3,000	$15,000
14	Gate Valve 6-inch	3	EA	$1,000	$3,000
15	Gate Valve 8-inch	11	EA	$2,000	$22,000
16	Water Service, 1-inch Diameter	3	EA	$3,000	$9,000
17	Fire Hydrant Assembly	9	EA	$7,000	$63,000
18	Erosion Control Measures	1	LS	$8,000	$8,000
				Subtotal	$888,000
				Sales Tax @ 8.6%	$76,000
				Contingency @ 20%	$193,000
				Engineering, Permitting, and Administrative Costs @ 30%	$347,000
				Total Estimated Project Cost	$1,504,000

Notes and Assumptions

- June 2022 - ENR Seattle Construction Cost Index - 14,661.19
- Sales Tax, Contingency, Engineering, Permitting, and Administrative Costs are rounded to the nearest $1,000
- Total Estimated Project Cost is rounded to the nearest $1,000
- Land acquisitions or easements are not included
- Quantities are based on City of Forks Standard Drawings and WSDOT Standard Plans and Specifications where applicable
- Mobilization is 10% of road and water bid items rounded to the nearest $5,000
- Foundation Material is 0.027 tons per linear foot of water main rounded to the nearest 10 tons
- Shoring is $3.50 per linear foot of water main rounded to the nearest $1,000
- Construction Surveying is 2% of road and water bid items rounded to the nearest $1,000
- Erosion Control Measures are 1% of road and water bid items rounded to the nearest $1,000
- Gate valves are spaced at one every 1,000 linear feet, three at tees, and four at crosses
- Fire Hydrants are spaced per Table 3-3

City of Forks Water System Plan
Planning Level Opinion of Probable Cost
Distribution System Improvement D-4
Forks Avenue South

GIBBS & OLSON
CIVIL ENGINEERS • LAND SURVEYORS

Item No.	Item Description	Quantity	Units	Unit Cost	Amount
1	Mobilization	1	LS	$50,000	$50,000
2	Project Temporary Traffic Control	1	LS	$70,000	$70,000
3	Hydroseeding	500	SY	$15	$7,500
4	Bank Run Gravel for Trench Backfill	1,200	TON	$50	$60,000
5	Asphalt Treated Base	210	TON	$120	$25,200
6	HMA for Pavement Repair Cl. 1/2" PG 58-22	280	TON	$200	$56,000
7	Foundation Material	80	TON	$70	$5,600
8	Shoring	1	LS	$10,000	$10,000
9	Construction Surveying	1	LS	$10,000	$10,000
10	C900 PVC Pipe for Water Main 8 In. Diam.	2,680	LF	$80	$214,400
11	Connect to Existing Water Main	6	EA	$3,000	$18,000
12	Gate Valve 6-inch	1	EA	$1,000	$1,000
13	Gate Valve 8-inch	5	EA	$2,000	$10,000
14	Water Service, 1-inch Diameter	6	EA	$3,000	$18,000
15	Fire Hydrant Assembly	8	EA	$7,000	$56,000
16	Erosion Control Measures	1	LS	$5,000	$5,000
				Subtotal	$617,000
				Sales Tax @ 8.6%	$53,000
				Contingency @ 20%	$134,000
				Engineering, Permitting, and Administrative Costs @ 30%	$241,000
				Total Estimated Project Cost	$1,045,000

Notes and Assumptions

- June 2022 - ENR Seattle Construction Cost Index - 14,661.19
- Sales Tax, Contingency, Engineering, Permitting, and Administrative Costs are rounded to the nearest $1,000
- Total Estimated Project Cost is rounded to the nearest $1,000
- Land acquisitions or easements are not included
- Quantities are based on City of Forks Standard Drawings and WSDOT Standard Plans and Specifications where applicable
- Mobilization is 10% of road and water bid items rounded to the nearest $5,000
- Project Temporary Traffic Control is 15% of road and water bid items rounded to the nearest $5,000
- Foundation Material is 0.027 tons per linear foot of water main rounded to the nearest 10 tons
- Shoring is $3.50 per linear foot of water main rounded to the nearest $1,000
- Construction Surveying is 2% of road and water bid items rounded to the nearest $1,000
- Erosion Control Measures are 1% of road and water bid items rounded to the nearest $1,000
- Gate valves are spaced at one every 1,000 linear feet, three at tees, and four at crosses
- Fire Hydrants are spaced per Table 3-3

City of Forks Water System Plan
Planning Level Opinion of Probable Cost
Distribution System Improvement D-5
Mark Rd (Eddy Ave) to Bogachiel Way

Item No.	Item Description	Quantity	Units	Unit Cost	Amount
1	Mobilization	1	LS	$25,000	$25,000
2	Project Temporary Traffic Control	1	LS	$50,000	$50,000
3	Hydroseeding	1,100	SY	$15	$16,500
4	Bank Run Gravel for Trench Backfill	800	TON	$50	$40,000
5	Foundation Material	50	TON	$70	$3,500
6	Shoring	1	LS	$6,000	$6,000
7	Construction Surveying	1	LS	$6,000	$6,000
8	C900 PVC Pipe for Water Main 8 In. Diam.	1,690	LF	$80	$135,200
9	Connect to Existing Water Main	4	EA	$3,000	$12,000
10	Gate Valve 8-inch	7	EA	$2,000	$14,000
11	Water Service, 1-inch Diameter	2	EA	$3,000	$6,000
12	Fire Hydrant Assembly	4	EA	$7,000	$28,000
13	Erosion Control Measures	1	LS	$3,000	$3,000
				Subtotal	$345,000
				Sales Tax @ 8.6%	$30,000
				Contingency @ 20%	$75,000
				Engineering, Permitting, and Administrative Costs @ 30%	$135,000
				Total Estimated Project Cost	$585,000

Notes and Assumptions

- June 2022 - ENR Seattle Construction Cost Index - 14,661.19
- Sales Tax, Contingency, Engineering, Permitting, and Administrative Costs are rounded to the nearest $1,000
- Total Estimated Project Cost is rounded to the nearest $1,000
- Land acquisitions or easements are not included
- Quantities are based on City of Forks Standard Drawings and WSDOT Standard Plans and Specifications where applicable
- Mobilization is 10% of road and water bid items rounded to the nearest $5,000
- Project Temporary Traffic Control is 15% of road and water bid items rounded to the nearest $5,000
- Foundation Material is 0.027 tons per linear foot of water main rounded to the nearest 10 tons
- Shoring is $3.50 per linear foot of water main rounded to the nearest $1,000
- Construction Surveying is 2% of road and water bid items rounded to the nearest $1,000
- Erosion Control Measures are 1% of road and water bid items rounded to the nearest $1,000
- Gate valves are spaced at one every 1,000 linear feet and three at tees
- Fire Hydrants are spaced per Table 3-3

City of Forks Water System Plan

Planning Level Opinion of Probable Cost

Distribution System Improvement D-6

Bogachiel Way

GIBBS & OLSON
CIVIL ENGINEERS • LAND SURVEYORS

Item No.	Item Description	Quantity	Units	Unit Cost	Amount
1	Mobilization	1	LS	$60,000	$60,000
2	Project Temporary Traffic Control	1	LS	$125,000	$125,000
3	Hydroseeding	300	SY	$15	$4,500
4	Bank Run Gravel for Trench Backfill	1,200	TON	$50	$60,000
5	Asphalt Treated Base	220	TON	$120	$26,400
6	HMA for Pavement Repair Cl. 1/2" PG 58-22	300	TON	$200	$60,000
7	Foundation Material	80	TON	$70	$5,600
8	Shoring	1	LS	$10,000	$10,000
9	Construction Surveying	1	LS	$13,000	$13,000
10	C900 PVC Pipe for Water Main 8 In. Diam.	2,830	LF	$80	$226,400
11	Connect to Existing Water Main	8	EA	$3,000	$24,000
12	Gate Valve 6-inch	2	EA	$1,000	$2,000
13	Gate Valve 8-inch	15	EA	$2,000	$30,000
14	Water Service, 1-inch Diameter	29	EA	$3,000	$87,000
15	Water Service, 2-inch Diameter	5	EA	$6,000	$30,000
16	Fire Hydrant Assembly	7	EA	$7,000	$49,000
17	Erosion Control Measures	1	LS	$7,000	$7,000
				Subtotal	$820,000
				Sales Tax @ 8.6%	$71,000
				Contingency @ 20%	$178,000
				Engineering, Permitting, and Administrative Costs @ 30%	$321,000
				Total Estimated Project Cost	$1,390,000

Notes and Assumptions

- June 2022 - ENR Seattle Construction Cost Index - 14,661.19
- Sales Tax, Contingency, Engineering, Permitting, and Administrative Costs are rounded to the nearest $1,000
- Total Estimated Project Cost is rounded to the nearest $1,000
- Land acquisitions or easements are not included
- Quantities are based on City of Forks Standard Drawings and WSDOT Standard Plans and Specifications where applicable
- Mobilization is 10% of road and water bid items rounded to the nearest $5,000
- Project Temporary Traffic Control is 20% of road and water bid items rounded to the nearest $5,000
- Foundation Material is 0.027 tons per linear foot of water main rounded to the nearest 10 tons
- Shoring is $3.50 per linear foot of water main rounded to the nearest $1,000
- Construction Surveying is 2% of road and water bid items rounded to the nearest $1,000
- Erosion Control Measures are 1% of road and water bid items rounded to the nearest $1,000
- Gate valves are spaced at one every 1,000 linear feet, three at tees, and four at crosses
- Fire Hydrants are spaced per Table 3-3

City of Forks Water System Plan
Planning Level Opinion of Probable Cost
Distribution System Improvement D-7
East E St to Fernhill Rd

GIBBS & OLSON
CIVIL ENGINEERS • LAND SURVEYORS

Item No.	Item Description	Quantity	Units	Unit Cost	Amount
1	Mobilization	1	LS	$40,000	$40,000
2	Project Temporary Traffic Control	1	LS	$60,000	$60,000
3	Hydroseeding	900	SY	$15	$13,500
4	Bank Run Gravel for Trench Backfill	1,000	TON	$50	$50,000
5	Asphalt Treated Base	100	TON	$120	$12,000
6	HMA for Pavement Repair Cl. 1/2" PG 58-22	140	TON	$200	$28,000
7	Foundation Material	50	TON	$70	$3,500
8	Shoring	1	LS	$8,000	$8,000
9	Construction Surveying	1	LS	$9,000	$9,000
10	C900 PVC Pipe for Water Main 8 In. Diam.	2,240	LF	$80	$179,200
11	Connect to Existing Water Main	6	EA	$3,000	$18,000
12	Gate Valve 6-inch	2	EA	$1,000	$2,000
13	Gate Valve 8-inch	9	EA	$2,000	$18,000
14	Water Service, 1-inch Diameter	8	EA	$3,000	$24,000
15	Water Service, 2-inch Diameter	1	EA	$6,000	$6,000
16	Fire Hydrant Assembly	7	EA	$7,000	$49,000
17	Erosion Control Measures	1	LS	$5,000	$5,000
				Subtotal	$525,000
				Sales Tax @ 8.6%	$45,000
				Contingency @ 20%	$114,000
				Engineering, Permitting, and Administrative Costs @ 30%	$205,000
				Total Estimated Project Cost	$889,000

Notes and Assumptions

- June 2022 - ENR Seattle Construction Cost Index - 14,661.19
- Sales Tax, Contingency, Engineering, Permitting, and Administrative Costs are rounded to the nearest $1,000
- Total Estimated Project Cost is rounded to the nearest $1,000
- Land acquisitions or easements are not included
- Quantities are based on City of Forks Standard Drawings and WSDOT Standard Plans and Specifications where applicable
- Mobilization is 10% of road and water bid items rounded to the nearest $5,000
- Project Temporary Traffic Control is 15% of road and water bid items rounded to the nearest $5,000
- Foundation Material is 0.027 tons per linear foot of water main rounded to the nearest 10 tons
- Shoring is $3.50 per linear foot of water main rounded to the nearest $1,000
- Construction Surveying is 2% of road and water bid items rounded to the nearest $1,000
- Erosion Control Measures are 1% of road and water bid items rounded to the nearest $1,000
- Gate valves are spaced at one every 1,000 linear feet, three at tees, and four at crosses
- Fire Hydrants are spaced per Table 3-3

City of Forks Water System Plan
Planning Level Opinion of Probable Cost
Distribution System Improvement D-8
5th Ave SW to K St

GIBBS & OLSON
CIVIL ENGINEERS • LAND SURVEYORS

Item No.	Item Description	Quantity	Units	Unit Cost	Amount
1	Mobilization	1	LS	$40,000	$40,000
2	Project Temporary Traffic Control	1	LS	$60,000	$60,000
3	Hydroseeding	1,200	SY	$15	$18,000
4	Bank Run Gravel for Trench Backfill	1,100	TON	$50	$55,000
5	Asphalt Treated Base	90	TON	$120	$10,800
6	HMA for Pavement Repair Cl. 1/2" PG 58-22	120	TON	$200	$24,000
7	Foundation Material	70	TON	$70	$4,900
8	Shoring	1	LS	$9,000	$9,000
9	Construction Surveying	1	LS	$8,000	$8,000
10	C900 PVC Pipe for Water Main 8 In. Diam.	2,320	LF	$80	$185,600
11	Connect to Existing Water Main	3	EA	$3,000	$9,000
12	Gate Valve 6-inch	1	EA	$1,000	$1,000
13	Gate Valve 8-inch	4	EA	$2,000	$8,000
14	Water Service, 1-inch Diameter	5	EA	$3,000	$15,000
15	Fire Hydrant Assembly	7	EA	$7,000	$49,000
16	Erosion Control Measures	1	LS	$4,000	$4,000
				Subtotal	$501,000
				Sales Tax @ 8.6%	$43,000
				Contingency @ 20%	$109,000
				Engineering, Permitting, and Administrative Costs @ 30%	$196,000
				Total Estimated Project Cost	$849,000

Notes and Assumptions

- June 2022 - ENR Seattle Construction Cost Index - 14,661.19
- Sales Tax, Contingency, Engineering, Permitting, and Administrative Costs are rounded to the nearest $1,000
- Total Estimated Project Cost is rounded to the nearest $1,000
- Quantities are based on City of Forks Standard Drawings and WSDOT Standard Plans and Specifications where applicable
- Mobilization is 10% of road and water bid items rounded to the nearest $5,000
- Project Temporary Traffic Control is 15% of road and water bid items rounded to the nearest $5,000
- Foundation Material is 0.027 tons per linear foot of water main
- Shoring is $3.50 per linear foot of water main rounded to the nearest $1,000
- Construction Surveying is 2% of road and water bid items rounded to the nearest $1,000
- Erosion Control Measures is 1% of road and water bid items rounded to the nearest $1,000
- Gate valves are spaced at one every 1,000 linear feet and three at tees
- Fire Hydrants are spaced per Table 3-3

City of Forks Water System Plan
Planning Level Opinion of Probable Cost
Distribution System Improvement D-9
West End of Bogachiel Way

Item No.	Item Description	Quantity	Units	Unit Cost	Amount
1	Mobilization	1	LS	$55,000	$55,000
2	Project Temporary Traffic Control	1	LS	$85,000	$85,000
3	Hydroseeding	1,000	SY	$15	$15,000
4	Bank Run Gravel for Trench Backfill	1,400	TON	$50	$70,000
5	Asphalt Treated Base	250	TON	$120	$30,000
6	HMA for Pavement Repair Cl. 1/2" PG 58-22	340	TON	$200	$68,000
7	Foundation Material	90	TON	$70	$6,300
8	Shoring	1	LS	$12,000	$12,000
9	Construction Surveying	1	LS	$12,000	$12,000
10	C900 PVC Pipe for Water Main 8 In. Diam.	3,220	LF	$80	$257,600
11	Connect to Existing Water Main	4	EA	$3,000	$12,000
12	Gate Valve 8-inch	11	EA	$2,000	$22,000
13	Water Service, 1-inch Diameter	5	EA	$3,000	$15,000
14	Fire Hydrant Assembly	7	EA	$7,000	$49,000
15	Erosion Control Measures	1	LS	$6,000	$6,000
				Subtotal	$715,000
				Sales Tax @ 8.6%	$61,000
				Contingency @ 20%	$155,000
				Engineering, Permitting, and Administrative Costs @ 30%	$279,000
				Total Estimated Project Cost	$1,210,000

Notes and Assumptions

- June 2022 - ENR Seattle Construction Cost Index - 14,661.19
- Sales Tax, Contingency, Engineering, Permitting, and Administrative Costs are rounded to the nearest $1,000
- Total Estimated Project Cost is rounded to the nearest $1,000
- Quantities are based on City of Forks Standard Drawings and WSDOT Standard Plans and Specifications where applicable
- Mobilization is 10% of road and water bid items rounded to the nearest $5,000
- Project Temporary Traffic Control is 15% of road and water bid items rounded to the nearest $5,000
- Foundation Material is 0.027 tons per linear foot of water main
- Shoring is $3.50 per linear foot of water main rounded to the nearest $1,000
- Construction Surveying is 2% of road and water bid items rounded to the nearest $1,000
- Erosion Control Measures is 1% of road and water bid items rounded to the nearest $1,000
- Gate valves are spaced at one every 1,000 linear feet and three at tees
- Fire Hydrants are spaced per Table 3-3

City of Forks Water System Plan
Planning Level Opinion of Probable Cost
Distribution System Improvement D-10
Trillium Ave to Big Burn Pl

GIBBS & OLSON
CIVIL ENGINEERS • LAND SURVEYORS

Item No.	Item Description	Quantity	Units	Unit Cost	Amount
1	Mobilization	1	LS	$15,000	$15,000
2	Hydroseeding	600	SY	$15	$9,000
3	Bank Run Gravel for Trench Backfill	400	TON	$50	$20,000
4	Foundation Material	30	TON	$70	$2,100
5	Shoring	1	LS	$3,000	$3,000
6	Construction Surveying	1	LS	$3,000	$3,000
7	C900 PVC Pipe for Water Main 8 In. Diam.	840	LF	$80	$67,200
8	Connect to Existing Water Main	2	EA	$3,000	$6,000
9	Gate Valve 8-inch	1	EA	$2,000	$2,000
10	Water Service, 1-inch Diameter	6	EA	$3,000	$18,000
11	Fire Hydrant Assembly	2	EA	$7,000	$14,000
12	Erosion Control Measures	1	LS	$2,000	$2,000
				Subtotal	$161,000
				Sales Tax @ 8.6%	$14,000
				Contingency @ 20%	$35,000
				Engineering, Permitting, and Administrative Costs @ 30%	$63,000
				Total Estimated Project Cost	$273,000

Notes and Assumptions

- June 2022 - ENR Seattle Construction Cost Index - 14,661.19
- Sales Tax, Contingency, Engineering, Permitting, and Administrative Costs are rounded to the nearest $1,000
- Total Estimated Project Cost is rounded to the nearest $1,000
- Land acquisitions or easements are not included
- Quantities are based on City of Forks Standard Drawings and WSDOT Standard Plans and Specifications where applicable
- Mobilization is 10% of road and water bid items rounded to the nearest $5,000
- Project Temporary Traffic Control is not required
- Foundation Material is 0.027 tons per linear foot of water main
- Shoring is $3.50 per linear foot of water main rounded to the nearest $1,000
- Construction Surveying is 2% of road and water bid items rounded to the nearest $1,000
- Erosion Control Measures is 1% of road and water bid items rounded to the nearest $1,000
- Gate valves are spaced at one every 1,000 linear feet
- Fire Hydrants are spaced per Table 3-3

City of Forks Water System Plan
Planning Level Opinion of Probable Cost
Distribution System Improvement D-11
Palmer Rd to Elk Corner Rd

GIBBS & OLSON
CIVIL ENGINEERS • LAND SURVEYORS

Item No.	Item Description	Quantity	Units	Unit Cost	Amount
1	Mobilization	1	LS	$25,000	$25,000
2	Hydroseeding	900	SY	$15	$13,500
3	Bank Run Gravel for Trench Backfill	600	TON	$50	$30,000
4	Foundation Material	40	TON	$70	$2,800
5	Shoring	1	LS	$5,000	$5,000
6	Construction Surveying	1	LS	$5,000	$5,000
7	C900 PVC Pipe for Water Main 8 In. Diam.	1,350	LF	$80	$108,000
8	HDD HDPE Pipe for Water Main 8 In. Diam.	200	LF	$150	$30,000
9	Connect to Existing Water Main	2	EA	$3,000	$6,000
10	Gate Valve 8-inch	3	EA	$2,000	$6,000
11	Fire Hydrant Assembly	4	EA	$7,000	$28,000
12	Erosion Control Measures	1	LS	$3,000	$3,000
				Subtotal	$262,000
				Sales Tax @ 8.6%	$23,000
				Contingency @ 20%	$57,000
				Engineering, Permitting, and Administrative Costs @ 30%	$103,000
				Total Estimated Project Cost	$445,000

Notes and Assumptions

- June 2022 - ENR Seattle Construction Cost Index - 14,661.19
- Sales Tax, Contingency, Engineering, Permitting, and Administrative Costs are rounded to the nearest $1,000
- Total Estimated Project Cost is rounded to the nearest $1,000
- Quantities are based on City of Forks Standard Drawings and WSDOT Standard Plans and Specifications where applicable
- Mobilization is 10% of road and water bid items rounded to the nearest $5,000
- Project Temporary Traffic Control is not required
- Foundation Material is 0.027 tons per linear foot of water main
- Shoring is $3.50 per linear foot of water main rounded to the nearest $1,000
- Construction Surveying is 2% of road and water bid items rounded to the nearest $1,000
- Erosion Control Measures is 1% of road and water bid items rounded to the nearest $1,000
- 200 feet of Horizontal Directional Drilling for crossing Elk Creek
- Gate valves are spaced at one every 1,000 linear feet
- Fire Hydrants are spaced per Table 3-3

City of Forks Water System Plan
Planning Level Opinion of Probable Cost
Distribution System Improvement D-12
King Richard's Way Extension

GIBBS & OLSON
CIVIL ENGINEERS • LAND SURVEYORS

Item No.	Item Description	Quantity	Units	Unit Cost	Amount
1	Mobilization	1	LS	$45,000	$45,000
2	Hydroseeding	2,000	SY	$15	$30,000
3	Bank Run Gravel for Trench Backfill	1,400	TON	$50	$70,000
4	Foundation Material	90	TON	$70	$6,300
5	Shoring	1	LS	$11,000	$11,000
6	Construction Surveying	1	LS	$9,000	$9,000
7	C900 PVC Pipe for Water Main 8 In. Diam.	3,020	LF	$80	$241,600
8	Connect to Existing Water Main	1	EA	$3,000	$3,000
9	Gate Valve 8-inch	3	EA	$2,000	$6,000
10	Fire Hydrant Assembly	9	EA	$7,000	$63,000
11	Erosion Control Measures	1	LS	$5,000	$5,000
Subtotal					$490,000
Sales Tax @ 8.6%					$42,000
Contingency @ 20%					$106,000
Engineering, Permitting, and Administrative Costs @ 30%					$191,000
Total Estimated Project Cost					$829,000

Notes and Assumptions

- June 2022 - ENR Seattle Construction Cost Index - 14,661.19
- Sales Tax, Contingency, Engineering, Permitting, and Administrative Costs are rounded to the nearest $1,000
- Total Estimated Project Cost is rounded to the nearest $1,000
- Quantities are based on City of Forks Standard Drawings and WSDOT Standard Plans and Specifications where applicable
- Mobilization is 10% of road and water bid items rounded to the nearest $5,000
- Project Temporary Traffic Control is not required
- Foundation Material is 0.027 tons per linear foot of water main
- Shoring is $3.50 per linear foot of water main rounded to the nearest $1,000
- Construction Surveying is 2% of road and water bid items rounded to the nearest $1,000
- Erosion Control Measures is 1% of road and water bid items rounded to the nearest $1,000
- Gate valves are spaced at one every 1,000 linear feet
- Fire Hydrants are spaced per Table 3-3

Appendix K – Financial Program

CITY OF FORKS
WATER SERVICE RATES
EFFECTIVE JANUARY 1, 2021

Applied to February 1st Bills

Basic Rate for 400 cubic feet or less:		
Meter Size	Inside City Rate	Outside City Rate
3/4"	$26.02	$39.04
1"	$65.06	$97.64
1 1/2"	$119.25	$178.92
2"	$208.17	$312.26
3"	$273.24	$409.85
4"	$329.58	$494.39
6"	$390.30	$585.50

Low-Income Senior Rate	$19.49	$29.27
Low-Income Disabled Rate	$19.49	$29.27

Rate for over 400 cubic feet up to 1,000 cubic feet:			Low-Income	
	Inside City Rate	Outside City Rate	Inside City Rate	Outside City Rate
Per each 100 cubic feet	$2.86	$4.25	$2.15	$3.19

Rate for over 1,000 cubic feet:			Low-Income	
	Inside City Rate	Outside City Rate	Inside City Rate	Outside City Rate
Per each 100 cubic feet	$2.19	$3.26	$1.63	$2.44

	Per Unit
Meter rate for trailer parks/apts.	$5.87

Meter installation:		
Meter Size	Inside City Rate	Outside City Rate
3/4"	$1,182.46	$1,345.34

CPI-U 0.9% June 2020

Water Fund: Revenue

The majority of water fund revenues are derived from charges for service (water bills). The remaining revenue comes from interest earnings and meter installation charges.

BUDGET	2017	2018	2019	2020	2021	2022
Beginning Cash	$0	$0	$0	$0	$195,000	$0
Charges for Service	$895,000	$913,500	$1,000,000	$1,000,000	$970,000	$1,100,000
Misc. Revenue	$5,000	$6,500	$10,000	$10,000	$10,000	$10,000
Total	$900,000	$920,000	$1,010,000	$1,010,000	$1,175,000	$1,110,000

ACTUAL	2016	2017	2018	2019	2020	2021 '8 Month Actual+Est.
Beginning Fund Balance	$624,206	$825,563	$1,003,140	$891,236	$1,176,070	$1,012,421
Revenue	$920,850	$930,674	$1,012,680	$2,728,176	$3,171,064	$1,047,950
Expenses	-$719,493	-$753,097	-$1,124,584	-$2,443,342	-$3,334,713	-$1,336,296
Ending Fund Balance	$825,563	$1,003,140	$891,236	$1,176,070	$1,012,421	$724,075

2018 - New vehicle $32K, leave payout $21K, tank project $286K (USDA reimb. 1/2019), comp plan $15K

2019 - $1.470M tank project, $51.7K well project, $17K potable water project, $30K interim interest, $47K well house #4, $17.5K comp plan

2020 - $1,740K interim loan, $90K tank project, $510K well project, $41K comp plan, $39K generator, $58K USDA payments

2021 - $143 backhoe, $30K well project, $7.5K comp plan, $6K billing software, $100K meters, $69.6K USDA payments, $25K F550

Water Fund: Expense

Account Number	**400 000 000 514**
Description	**Financial & Administrative**
Revenue Source	**Water Fund** **Charges for Services**
Manager	**Paul Hampton** **Audrey Grafstrom**

Portions of Accounting Technician, Clerk/Treasurer, Utility Biller, Administrative Assistant Salaries & Benefits

2022 Budget:	
Salaries	$88,404
Benefits	$60,471
Supplies	$0
Charges	$0
Total	$148,875

Water Fund: Expense

Account Number Description	**400 000 000 515** **Legal Services**
Revenue Source	**Water Fund** **Charges for Services**
Manager	**Paul Hampton** **Rod Fleck**

1/3 Human Resources Dir. & 1/3 Attorney/Planner
Salaries & Benefits

2022 Budget:	
Salaries	$46,618
Benefits	$26,020
Supplies	$0
Charges	$0
Total	$72,638

Account Number Description	**400 000 000 534** **Water Operations**
Revenue Source	**Water Fund** **Charges for Services**
Manager	**Paul Hampton**

Janitor, PW Director & Crew Salaries & Benefits,
Supplies, Charges & Capital Expenses

2022 Budget:	
Salaries	$237,454
Benefits	$173,938
Supplies (includes $30K for meters)	$120,000
Professional Services	$37,000
Utilities	$40,850
Insurance	$50,556
All Other Charges	$127,979
Vehicle Leases	$31,110
Capital - USDA Loan Payments	$69,600
Total	$888,487

Grand Total Water Fund Expenditures	$1,110,000

CITY OF FORKS
WATER SERVICE RATES
EFFECTIVE JANUARY 1, 2024

Applied to February 1st Bills

Basic Rate for 400 cubic feet or less:		
Meter Size	Inside City Rate	Outside City Rate
3/4"	$31.62	$47.43
1"	$79.05	$118.63
1 1/2"	$144.89	$217.37
2"	$252.92	$379.38
3"	$331.98	$497.96
4"	$400.44	$600.68
6"	$474.22	$711.37

Low-Income Senior Rate	$23.68	$35.56
Low-Income Disabled Rate	$23.68	$35.56

Rate for over 400 cubic feet up to 1,000 cubic feet:			Low-Income	
	Inside City Rate	Outside City Rate	Inside City Rate	Outside City Rate
Per each 100 cubic feet	$3.49	$5.16	$2.61	$3.88

Rate for over 1,000 cubic feet:			Low-Income	
	Inside City Rate	Outside City Rate	Inside City Rate	Outside City Rate
Per each 100 cubic feet	$2.66	$3.96	$1.98	$2.96

	Per Unit
Meter rate for trailer parks/apts.	$7.13

Meter installation:		
Meter Size	Inside City Rate	Outside City Rate
3/4"	$1,436.69	$1,634.56

CPI-U 4.6% June 2023