2 | WATER SYSTEM DESCRIPTION

INTRODUCTION

This chapter describes the City of Woodland's (City) water service area and water service agreements and provides a thorough description of the water system and its individual components. The results of the evaluation and analyses of the existing water system are presented later in **Chapter 7**.

WATER SERVICE AREA

History

In 1845, Mr. Adolphus Le Lewes, a retired employee of the Hudson's Bay Company, established a land claim at the mouth of what is today known as the Lewis River. (The Lewis River is the namesake of Le Lewes, not Merriweather Lewis as is generally believed.) Prior to the City incorporating in 1906, there were several small communities in the area, including Pekin near the present-day Holland Bulb Farm, Kerns east of the City, Caples Landing west of the City on the Columbia River, and Martin's Landing north of the City. Before the development of a reliable road system, steamboats ran on the Lewis River. In 1913, when a bridge was built across the Lewis River, the road system began to transform the region into its current north/south corridor of commerce.

In the early 1900s, Mr. Bill Lawyer built and maintained the first electric service in the City. With electric service available, the residents of Woodland saw the need for a water system, having an abundance of flowing water right by their door. The City's first water system included wooden pipes that lasted many years. Since then, the water system has been expanded and upgraded to what is presently the City of Woodland. The City's current water system contains approximately 41 miles of water main consisting of the following materials: asbestos cement; steel; ductile iron; and polyvinyl chloride (PVC).

In 1999, the City completed construction of a surface water treatment plant (WTP). The primary purpose of the water treatment plant is to remove the high levels of iron that exist in the source water pumped from the horizontal Ranney collector well. The 1999 WTP had a design capacity of 2 million gallons per day (MGD) with a 1 MGD (700 gallons per minute (gpm)) capacity from each treatment train. In 2007, the treatment plant was expanded to 3 MGD by adding a third treatment train. Raw water is pumped to the WTP from the horizontal Ranney collector well located along the Lewis River.

The City has three existing reservoirs located at the City's WTP site. Reservoir No. 1 was constructed in 1912 and is no longer in use. Reservoir No. 2, a concrete reservoir with a capacity of 500,000 gallons, was constructed in 1962. It has an overflow elevation of 179 feet and a newer roof that was constructed in 2005. Reservoir No. 2 is cylindrical in shape from approximately 163 feet to the overflow elevation. From 163 feet to the reservoir's base, at approximately 156 feet, the reservoir is frustum-shaped. A 1.1 million gallon (MG) reservoir,

Reservoir No. 3, was constructed in 1990. It is a glass-lined bolted steel reservoir with an aluminum geodesic roof and an overflow elevation of 179 feet.

Existing Retail Water Service Area

The City is located along Interstate 5 in southern Cowlitz County, Washington, near the confluence of the Lewis and Columbia Rivers. The City boundaries encompass an area of approximately 4.25 square miles, as shown in **Figure 2-1**. The City's existing water distribution system extends from the southwestern shore of Horseshoe Lake, north to the north edge of Woodland High School, east along Dike Access Road to where Highway (Hwy) 503 meets the Lewis River, and south along the west edge of the Lewis River to Island Aire Drive just south of the top of Horseshoe Lake. The existing water distribution system is almost completely within the City limits, aside from some small areas in the northeast part of the distribution area, where the system extends to the Urban Growth Area as shown in **Figure 2-1**.

The City's water service area is defined in the *2016-2036 Woodland Comprehensive Plan* as "the entire corporate limits and Urban Growth Area (UGA)." The current UGA extends slightly outside of the City limits in several locations, mostly northeast of the City limits. The City is responsible for providing public water service, utility management, and water system development within this area. However, requests for new water service outside the City limits will not be granted until such property is annexed into the City limits. The City Council may grant exceptions in the event of public health emergencies.

Water Service Area

The City's water service area, as shown in **Figure 2-1**, includes all the area in the existing retail water service area as well as the wholesale water service area.

The City currently has municipal water rights issued by the Washington State Department of Ecology (Ecology) for a maximum instantaneous withdrawal of 2,800 gallons per minute (gpm) from its well near the Lewis River. The City's existing water rights can be used throughout the defined water service area per the 2003 Municipal Water Law. Though the City's water rights are granted to the City of Woodland, the City can use its water rights outside its corporate boundaries if the use is within the defined service area. **Figure 2-1** displays the system's service area and defined water right place of use.

Topography

Most of the City's water service area is relatively flat. Elevations near the freeway and river are about 25 feet elevation, and they slope gradually toward the north to about 40 feet . The ground elevation at the top of Scott Hill Road where the reservoirs are located is approximately 165 feet, but there are less than ten customers at elevations close enough to the reservoir to require private booster pumps.

The City will be completing construction in 2020 of a new booster pump station at the WTP site that will serve those high elevation customers that currently require individual booster pumps. The Scott Hill Booster Pump Station (BPS) will provide water service to a new closed zone (the

261 Pressure Zone) that includes these existing customers and the new Scott Hill Park and Sports Complex.

Geology

The City is located at the northern extent of the Portland Basin physiographic province. The Portland Basin is a structural depression that is part of the larger north-to-south trending Puget-Willamette Lowland, a tectonic forearc trough between the Coast Range forearc high to the west and the Cascade Range volcanic arc to the east.

The City is located near the confluence of the Columbia River and Lewis River and is situated on alluvial sediments east of the Columbia River and generally north and west of the Lewis River. The northeastern portion of the City is located at the base of the Lewis River valley, and the remainder of the City is located along the eastern edge of the Columbia River floodplain.

The Lewis River and Columbia River valleys in the City vicinity are bordered to the north and southeast by Tertiary-aged volcanic and sedimentary bedrock. The bedrock continues under the valley alluvium at depth. Well logs record alluvium to depths of up to several hundred feet in the City's vicinity.

The surface sediments underlying most of the City are composed of recent alluvium deposited by the Columbia River and Lewis River consisting of unconsolidated, poorly to well sorted, massive to laminated sand, silt, and gravel. Locally, alluvium includes fine-grained lacustrine, aeolian, and organic-rich marsh deposits.

Underlying and forming terraces along the edges of the recent alluvium are Pleistocene-age flood deposits originating from episodic glacial outburst floods from Glacial Lake Missoula and deposited by the Columbia River between 13,000 and 17,000 years ago. These sediments consist of unconsolidated silt and fine sand beds. A terrace north of the City center is capped with up to 90 feet of outburst flood deposits to an upper elevation of about 160 feet. Outburst flood deposits are mapped below recent alluvium beneath the City in some locations.

Underlying outburst flood deposits exposed along steep slopes of the northern terrace below about 60 feet elevation are Pleistocene alluvium consisting of unconsolidated sand and gravel derived from ancestral Mount St. Helens eruptions about 20,000 to 50,000 years ago. This unit is mapped below the outburst flood deposits and directly underlying recent alluvium beneath the City in some locations.

Landslides can occur where steep slopes exist in unconsolidated sediments. Landslides are mapped along the edges of the terrace north of the City center by the Washington State Department of Natural Resources (DNR).

In the vicinity of the City, depth to groundwater is generally shallow, measuring between 4 and 20 feet below ground surface. Shallow groundwater has the potential to necessitate dewatering during certain construction activities.

During an earthquake, unconsolidated alluvium is susceptible to liquefaction when saturated. Liquefaction susceptibility of surficial deposits generally has been identified by DNR. Alluvium deposits are identified as having a moderate to high liquefaction susceptibility.

According to the U.S. Geological Survey, a normal fault originating in bedrock is mapped to the southeast of the City and trending northwest toward the City center. The fault is not identified as an active fault by DNR.

INVENTORY OF EXISTING WATER FACILITIES

This section provides a detailed description of the existing water system and the current operation of the facilities. The analysis of the existing water facilities is presented in **Chapter 7**. Additional information on the City's existing water system facilities is included on the Washington State Department of Health (DOH) Water Facilities Inventory (WFI) form in **Appendix A** and the Sanitary Survey Report in **Appendix B**.

Pressure Zones

The City currently serves customers within an elevation range of approximately 10 feet near Woodland High School to approximately 160 feet near the Scott Hill Park and Sports Complex. The range of elevations requires that water pressure be increased or decreased to maintain pressures that are safe and sufficient to meet the system's flow requirements. The City achieves this by dividing the water system into two distinct pressure zones, as shown in **Figure 2-1**.

179 Zone

Pressures in the 179 Zone, which covers the majority of the water service area, are established by the surface water levels in Reservoirs No. 2 and No. 3, as illustrated in the hydraulic profile (**Figure 2-2**). Customers in this zone are located within an elevation range of approximately 10 feet to 70 feet.

261 Zone

The 261 Zone is located in the northern portion of the water system near the City's water treatment plant. The 261 Zone is a closed zone, with pressure maintained by the Scott Hill BPS. Customers in this zone are located within an elevation range of approximately 80 feet to 160 feet.

Supply Facilities

Introduction

Water in the City's system is supplied by a single source, the City owned and operated Ranney Collector Well (Ranney Well). A summary of the source is shown in **Table 2-1**. Additional information on the City's source of supply, water treatment, and water quality monitoring is presented in the following sections and in **Chapter 6**.

Table 2-1

Supply Facility Summary

Facility	Pressure Zone	Year Installed	Existing Capacity (gpm)	Pump Type	Pump Motor Size (hp)	Water Treatment
Ranney Collector Well	179 Zone	1968	2,100	(3) Vertical Turbine	(3) 100	Oxidation, Filtration, Fluoridation, Corrosion Control pH Adjustment, Disinfection

Water Supply

Ranney Collector Well

The City's Ranney Well is the sole source of supply for the City's water system. The Ranney Well is located at 1380 Lewis River Road along the west bank of the Lewis River and was constructed in 1968 and brought online in 1969. The Ranney Well supplies the distribution system via the WTP. As of 2007, the capacity of the Ranney Well ranged from 1,200 gpm to 1,400 gpm (2 MGD). Redevelopment and improvement of the Ranney Well laterals in 2014, as further described below, increased the overall capacity to at least 2,100 gpm (3 MGD) (refer to the 2014 *Ranney Well Improvement Project Redevelopment and New Lateral Installation Report* by Layne Ranney Collector Wells for estimation of yields from the well). When the City has recently pumped more than 2,100 gpm from the Ranney Well, it has resulted in a significant increase in raw water iron levels.

The Ranney Well consists of a caisson, laterals, and a pump station. The 13-foot-diameter caisson is 23 feet deep and buried in the riverbank. A total of 11 screened laterals extend radially out from near the bottom of the caisson at varying elevations, all within 7 feet above the caisson floor. Five of the laterals are closed and no longer in use. The six remaining laterals in use vary in length from 91 feet to 170 feet, and all but one extend east under the river. Three of the remaining laterals are 10¾ inches and were redeveloped in 2014. The other three are 12 inches and were installed in 2014 to increase capacity of the Ranney Well. Subsurface water is screened through the laterals and flows by gravity to the caisson where the pump intakes are submerged. In 2007, the City completed electrical improvements and replaced the previous pumps with three new 100 horsepower (hp) vertical turbine pumps with variable frequency drives (VFD). Each pump has an approximate capacity of 1,050 gpm at 303 feet of total dynamic head (TDH). Two pumps can be operated simultaneously, providing a pumping capacity of 2,100 gpm (3 MGD), with the third pump as a redundant backup. An emergency generator is installed at the Ranney Well.

Raw water is delivered from the pump station to the WTP through approximately 4,200 feet of 12-inch main. The raw water main was installed in 1999 when the WTP was constructed.

Water Treatment

Water Treatment Plant

The City's WTP is located at 130 Scott Hill Road and was put into service in 1999. The primary purposes of the WTP are to reduce turbidity, pathogens, and high levels of iron that exist in the source water pumped from the Ranney Well. The presence of iron in the source water indicates that the source is more typical of groundwater characteristics most of the time. However, turbidity breakthrough during extreme past events has been experienced. The WTP is available to operate 24 hours a day, 7 days a week, year round. The WTP originally was designed for a capacity of 1,400 gpm (2 MGD), with a 700 gpm capacity for each of the two filtration trains. In 2007, the capacity was expanded to 2,100 gpm (3 MGD) by adding a third filtration train.

Raw water is pumped to the WTP from the Ranney Well, which is located south of the plant along the west bank of the Lewis River. At the WTP, the raw water is pre-treated, filtered, and then further treated prior to being pumped to the City's distribution system. Pre-treatment includes pH adjustment and chlorine addition to oxidize iron that is present in the water. The other pre-treatment processes are polymer addition for primary coagulation, aluminum sulfate addition for secondary coagulation, and non-ionic polymer addition as a filter aid. The filtration system consists of three Microfloc® filtration units with upflow clarifiers to remove both turbidity and oxidized iron. Filtration is followed by chlorine addition for disinfection, fluoridation, and pH adjustment with soda ash for distribution system corrosion control. Finished water flows by gravity into a 169,000-gallon clear well. The clear well is baffled and designed to maintain a minimum of 155,000 gallons for adequate chlorine contact time to achieve the required Giardia and virus reductions through filtration and inactivation.

Pump Station Facilities

The City's water system has one booster pump station facility, the Scott Hill Booster Pump Station, which provides supply to the 261 Zone from the 179 Zone. A summary of the pumping facility's characteristics is shown in **Table 2-2**, and a detailed description follows.

Table 2-2

Booster Pump Station Facilities Summary

Pump Station	Suction Pressure Zone	Discharge Pressure Zone	Year Constructed	Existing Pumping Capacity (gpm)	Number of Pumps	Pump Type	Pump Motor Size (HP)	Generator [1]
Scott Hill BPS	179 Zone	261 Zone	2020	1,300	4	(4) single-stage end-suction centrifugal pumps	(3) 5 hp (1) 25 hp	Yes

1 = The Scott Hill BPS is located on the City's WTP site, which has a redundant power supply.

Scott Hill BPS

The Scott Hill BPS is located at the City's WTP site in a pump house near the maintenance shed. The construction of the BPS will be completed in 2020. The BPS supplies water from the 179 Zone to the 261 Zone. The BPS is equipped with three VFD-controlled single-stage end-suction centrifugal pumps with 5 hp motors, which provide a constant discharge pressure

of approximately 45 pounds per square inch (psi). The BPS also is equipped with an additional VFD-controlled single-stage end-suction pump with a 25 hp motor, which provides fire flow to the 261 Zone. The station has an existing pumping capacity of approximately 1,300 gpm. The new Scott Hill BPS was assumed to be online for the purposes of the existing system analyses contained in this WSP.

Storage Facilities

The City's water system has two active storage tanks, both located at the City's Water Treatment Plant site on Scott Hill Road. A summary of the storage facilities is shown in **Table 2-3**, and a detailed description of each facility follows.

Table 2-3

Storage Facilities Summary

Reservoir	Approximate Location	Pressure Zone	Year Constructed	Construction Type	Capacity (MG)	Diameter (feet)	Base Elev. (feet)	Overflow Elev. (feet)
Reservoir No. 2	Scott Hill Road	179 Zone	1962	Concrete	0.5	65	156	179
Reservoir No. 3	Scott Hill Road	179 Zone	2005	Steel	1.1	90	155	179

Reservoir No. 2

The 0.5 MG Reservoir No. 2 is located at the City's WTP site on Scott Hill Road, and provides water storage directly to the 179 Zone. The reservoir has a unique shape being a cylinder from 179 feet to approximately 163 feet, and then has the shape of an inverted frustum from 163 feet to 156 feet. The diameter of Reservoir No. 2 is reduced from 65 feet for the cylindrical portion to 33 feet by the bottom of the frustum. This means that the storage volume per foot of height varies between 156 feet and 163 feet.

Reservoir No. 2

Reservoir No. 2 is primarily filled by three pumps located in the WTP. A 16-inch-diameter PVC water main serves as the reservoir's outlet pipe.

Reservoir No. 3

The 1.1 MG Reservoir No. 3 also is located at the City's WTP site, approximately 67 feet away from Reservoir No. 2. The 89.5-foot-diameter, 23.8-foot-tall steel reservoir was constructed in 2005 and provides approximately 41,700 gallons of storage per foot of height for the 179 Zone.

Reservoir No. 3

A single 16-inch-diameter ductile iron water main serves as the reservoir's outlet pipe. Reservoir No. 3, much like Reservoir No. 2, is filled via the three pumps located in the WTP .

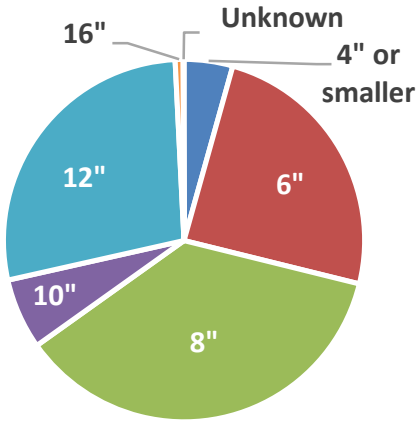
Distribution and Transmission System

The City's water service area contains approximately 41 miles of water main ranging in size from 2 to 16 inches. As shown in **Table 2-4**, most of the water main (approximately 61 percent) within the service area is 6- or 8-inch diameter, and an additional 28 percent of all water main is 12 inches in diameter or larger.

Table 2-4

Water Main Diameter Inventory

Diameter (Inches)	Length (Feet)	% of Total
4 or smaller	9,323	4.4%
6	52,413	24.5%
8	77,744	36.3%
10	13,541	6.3%
12	59,325	27.7%
16	1,523	0.7%
Unknown	163	0.1%
Total	**214,032**	**100%**

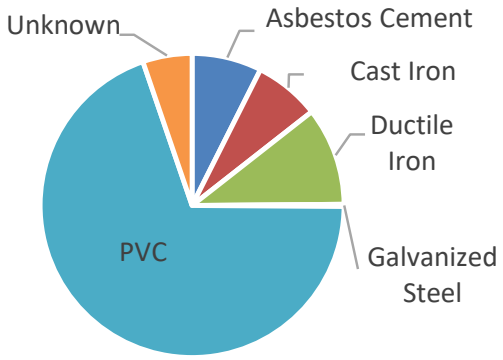


Water main in the City's system is generally constructed of asbestos cement, cast iron, ductile iron, galvanized steel, and PVC. Approximately 5.3 percent of the City's water main is constructed of unknown material. All new water main installations are required to use the water main material specified by the development plans in accordance with the City's development and construction standards. A detailed breakdown of the City's water main material inventory is shown in **Table 2-5**.

Table 2-5

Water Main Material Inventory

Material	Length (Feet)	% of Total
Asbestos Cement	15,895	7.4%
Cast Iron	14,985	7.0%
Ductile Iron	22,354	10.4%
Galvanized Steel	500	0.2%
PVC	149,059	69.6%
Unknown	11,239	5.3%
Total	**214,032**	**100%**



Master Meters

The City has one master meter located on Misty Court at the Bridge Road Intertie.

Water System Operation and Control

Water is collected at the City's Ranney Well, and the raw water is then pumped via a 12-inch transmission main to the City's WTP. The raw water is treated at the WTP for turbidity, pathogens, and high levels of iron. A Programmable Logic Controller (PLC) controls the start and stop levels in the City's two active reservoirs. Water is pumped into the reservoir when tank levels reach 16 feet, and the pumps are turned off when the water level in the reservoirs reach 22.7 feet. Water is then fed by gravity to the majority of the system in the 179 Pressure Zone. The smaller 261 Pressure Zone, which provides water service to a number of high service elevation customers near the WTP site and the Scott Hill Park and Sport Complex, is supplied by the newly constructed Scott Hill BPS. The BPS targets a discharge pressure of 45 psi, which translates to a hydraulic grade of 261 feet for the new pressure zone.

Telemetry and Supervisory Control System

Successful operation of any municipal water system requires gathering and using accurate water system information. A telemetry and supervisory control system gathers information and can efficiently control a system by automatically optimizing facility operations. A telemetry and supervisory control system also provides instant alarm notification to operations personnel in the event of equipment failure, operational problems, flood, fire, or other emergency situations.

Water System Interties

Water system interties are physical connections between two adjacent water systems. Interties are normally separated by a closed isolation valve or control valve. Emergency supply interties

provide water from one system to another during emergency situations only. An emergency situation may occur when a water system loses its main source of supply or a major transmission main and is unable to provide a sufficient quantity of water to its customers. Normal supply interties provide water from one system to another during non-emergency situations and typically are supplying water at all times.

The City's water system currently has one normal supply intertie with Clark Public Utilities (CPU) that is expected to be online by 2021. This normal supply intertie will supply potable water to the Bridge Road Water System, which is owned by CPU. The Bridge Road Water System currently has elevated levels of arsenic in its supply sources that must be mitigated.

A wholesale water agreement exists between the City and CPU to supply City water via an intertie to CPU's customers located in the Bridge Road Water System. A copy of this agreement is included in **Appendix C**.

The City currently has no plans for future interties with new parties.

WATER SERVICE AGREEMENTS

Clark Public Utilities Water Service Agreement

The Bridge Road Water System, which is owned by CPU, experiences high levels of arsenic from its existing groundwater well that must be mitigated. The City has agreed to provide potable water to the Bridge Road Water System via an intertie that has been installed on Misty Court. The agreement can be found in **Appendix C** of this Water System Plan.

SATELLITE SYSTEM MANAGEMENT

A Satellite System Management Agency (SSMA) is defined as a person or entity that is certified by DOH to own or operate more than one public water system without the necessity for a physical connection between such systems. SSMAs were created to stop the proliferation of small water systems, many of which could not meet federal and state water quality and water system planning regulations.

SSMAs can provide three different levels of service:

1. Ownership of the satellite system;
2. Operations and management of the satellite system; or
3. Contract services only.

The City is not currently an SSMA and does not presently intend to become one.

ADJACENT WATER SYSTEMS

Numerous small water systems are located in the vicinity of the City's retail water service area. The majority of these systems are small Group B, Non-Transient Non-Community Group A, or

Transient Non-Community Group A systems. Selected larger systems are described in greater detail in the sections that follow.

Bridge Road Water System

The Bridge Road Water System is located to the east of the City across the Lewis River. This water system serves a residential population of approximately 25 with 12 connections. Water historically has been supplied to the system by one groundwater well. In 2021 this water system will be supplied wholesale water by the City via an intertie located on Misty Court.

Clark Public Utilities

Clark Public Utilities serves a number of areas in Clark County and is a Group A community water system that serves a residential population of approximately 98,232 and a non-residential population of 12,433. CPU has approximately 35,141 connections. Water is supplied to this system by numerous groundwater wells and interties.

Peterson Farms

Peterson Farms is a small Group A community water system located 2 miles to the west of the City. This water system serves a residential population of approximately 95 and a non-residential population of 65, and has approximately 40 connections. Water is supplied to the system from two active groundwater wells.

Columbia Riverfront RV Park

Columbia Riverfront RV Park, located to the west of the City, operates a small Group A community water system with approximately 78 connections, a residential population of 48, and a non-residential population of 158. This water system is supplied by one active groundwater well.

Woodland MHC LLC

Woodland MHC LLC is a Group A community water system, located to the east of the City, that serves a residential population of 209 and has approximately 79 connections. Water is supplied to this system from four active groundwater wells.

Paradise Point State Park

Paradise Point State Park, located at 33914 NW Paradise Park Road in Ridgefield, Washington, has a non-residential population of approximately 1,113 and 25 connections. This water system is a transient non-community water system that is supplied water by two active groundwater wells.

Lewis River RV Park

Lewis River RV Park is a Group A community water system located next to the Lewis River approximately 4 miles upstream of the City. This water system serves a residential population of approximately 78 and a non-residential population of 269, and has approximately 26 connections. Water is supplied to this system via one active groundwater well.

Lewis River Golf Course

The Lewis River Golf Course is located at 3209 Old Lewis River Road. This Group A community water system serves a residential population of approximately 68, a non-residential population of approximately 232, and has 27 connections. This system is supplied by two active groundwater wells.

High Ridge

High Ridge is a small Group A water system located in Cowlitz County. This water system serves a residential population of approximately 25 and has 15 connections. Water is supplied to this system by five active groundwater wells.

Reservoir #2
0.5 MG
Base Elev: 156'
Overflow Elev: 179'

Scott Hill BPS
(1,300 gpm)

Reservoir #3
1.1 MG
Base Elev: 155'
Overflow Elev: 179'

Water Treatment Plant

Ranney Well Pump House
(2,100 gpm)

DIKE RD
DIKE ACCESS RD
BURKE RD S
ROBINSON RD
STENERSON RD
HERITAGE ST
HOWARD WAY
SCHURMAN WAY
CARA ST
PORT WAY
GUILD RD
N PEKIN RD
COTTONWOOD LN
VISTA DR
CAPLES RD
PEKIN RD N
GOERIG RD
BELMONT LOOP
OLD PACIFIC HWY
GREEN MOUNTAIN RD
SCOTT HILL RD
SCOTT AVE E
SCOTT AVE W
GOERIG ST
DOWN RIVER DR
MITCHELL AVE
COLUMBIA ST
BEECHWOOD ST
WASHINGTON ST
CC ST
CHERRY BLOSSOM LN
ATLANTIC AVE
PACIFIC AVE
PARK ST
HOFFMAN ST
DALE ST
2ND ST
5TH ST
BOZARTH AVE
PARK RD
LAKE AVE
PEKIN RD S
MARTY LP
MABLE LN
RASPBERRY LN
SANDALWOOD RD
B ST
A ST
PINEERTON DR
FOREST PARK RD
ROBINSON CREEK MDW
RUDY ROSS RD
CIMERRON
SALMON ST
BLACKTAIL LN
MERIWETHER LN
SPRUCE AVE
MAPLE ST
PINE ST
CEDAR AV
FIR ST
GUN CLUB RD
INSEL RD
HELLSHIRE DR
FOXTAIL CI
LEWIS RIVER RD/SR 503
LEWIS RIVER ROSS 503
WTP
P
W
5

Cowlitz County
Clark County

Legend

- Ranney Well
- Pump Station
- Reservoir
- Water Treatment Plant
- Transmission Main

Pressure Zones
- 261 Zone
- 179 Zone

Planning Boundaries
- City Limits
- Urban Growth Area
- Retail Water Service Area
- Water Service Area
- County Boundary Line
- Bridge Road Water System/Wholesale Water Service Area

Vicinity Map

Figure 2-1
Existing Water System
City of Woodland
Water System Plan

City of WOODLAND WASHINGTON

1 inch = 800 feet

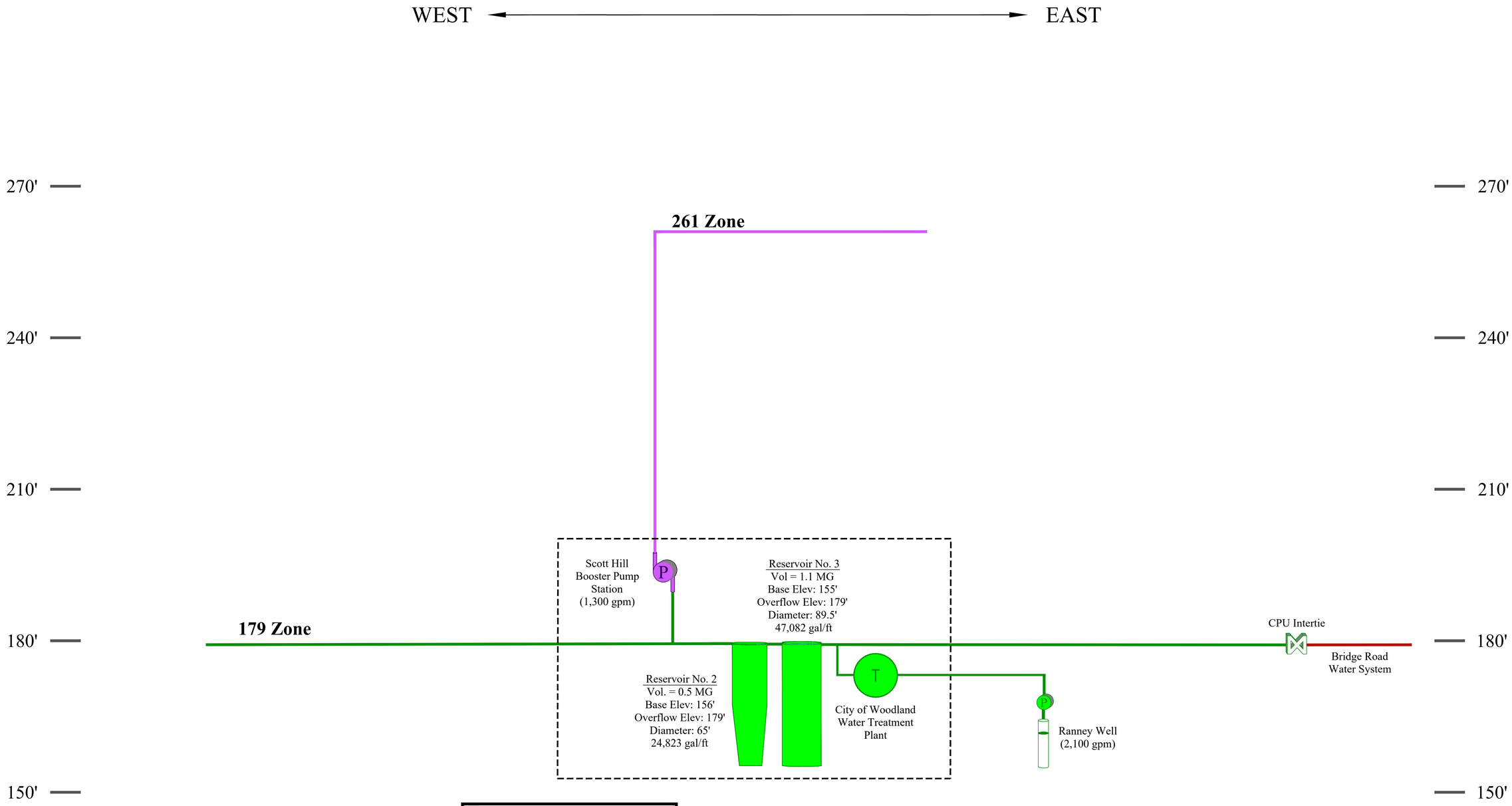
0 400 800 1,600 Feet

DRAWING IS FULL SCALE
WHEN BAR MEASURES 2"

RH2

NORTH

J:\DATA\WOOD\119-141\GIS\WSP-FIG_2-1_EX_WATER_SYST.MXD BY: DBRIGHT PLOT DATE: OCT 9, 2020 COORDINATE SYSTEM: NAD 1983 STATEPLANE WASHINGTON SOUTH FIPS 4602 FEET



Legend

- 179 Zone
- 261 Zone
- Bridge Road Water System
- Booster Pump Station
- Well Source
- Intertie
- Facilities at Same Site

Figure 2-2
Existing System Hydraulic Profile

City of Woodland
2020 Water System Plan

Date: September 28, 2020 Filename: J:\DATA\WOOD\119-141\CAD\WOOD WSP-HPX.DWG