

THURSTON
PUBLIC UTILITY DISTRICT

CEDAR RIDGE #617 WATER SYSTEM
COMPREHENSIVE WATER PLAN
PART B (INDIVIDUAL SYSTEM PLAN)

W.D.O.H. I.D. NO. 02938 6



December 2019

JWM&A Civil • Municipal • Geotechnical Engineering and Planning

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Water System Plan Submittal Form

This form must be completed and submitted along with the Water System Plan (WSP). It will expedite review and approval of your WSP. All water systems should contact their regional planner before developing any planning document for submittal.

<u>Cedar Ridge #617</u> 1. Water System Name	<u>029386</u> PWS ID# or Owner ID#	<u>Thurston PUD No 1</u> Water Systems Owner's Name
<u>Kim Gubbe</u> Contact Name for Utility	<u>(360)357-8783x125</u> Phone Number	<u>Director of Planning and Compliance</u> Title
<u>1230 Ruddell Rd SE</u> Contact Address	<u>Lacey</u> City	<u>WA 98503</u> State Zip
<u>Doug Eklund</u> 2. Project Engineer	<u>(360)352-9456</u> Phone Number	<u>Senior Project Engineer</u> Title
<u>1700 Cooper Point Rd SW, #B2</u> Project Engineer Address	<u>Olympia</u> City	<u>WA 98502</u> State Zip

3. Billing Contact Name (required if not the same as #1)	Billing Phone Number	Billing Fax Number
Billing Address	City	State Zip

4. How many services are presently connected to your system? 63
5. Is your system expanding (circle what applies: seeking to extend service area or increase number of approved connections)? Yes No
6. If the number of services is expected to increase, how many new connections are proposed in the next six years? 15
7. If your system is private-for-profit, is it regulated by the State Utilities and Transportation Commission? Yes No
8. Is the system located in a Critical Water Supply Service Area (i.e., have a Coordinated Water System Plan)? Yes No
9. Is your system a customer of a wholesale water system? Yes No
10. Will your system be pursuing additional water rights from the Department of Ecology in the next 20 years? Yes No
11. Is your system proposing a new intertie? Yes No
12. Do you have projects currently under review by us? Yes No
13. Are you requesting distribution main project report and construction document submittal exception and if so, does the WSP contain standard construction specifications for distribution mains? Yes No
14. The water system is responsible for sending a copy of the WSP to adjacent utilities for review or a letter notifying them that a copy of the WSP is available for their review and where the review copy is located. Has this been completed? Yes No
15. The purveyor is responsible for sending a copy of the WSP to all local governments within the service area (county and city planning departments, etc.). Has this been completed? Yes No
16. Are you proposing a change in the place of use of your water right? Yes No
17. What is the last year of the plan approval period (the year the shortest WSP projection is made)? 2029

If answer to questions 7, 8, 11, 14 and/or 15 is "yes," list who you sent the WSP to: Thurston County Community Planning and Economic Development (CPED) Department.

Is this plan: an Initial Submittal a Revised Submittal

Please enclose the following number of copies of the WSP:
3 copies for Northwest and Southwest Regional Offices OR 2 copies for Eastern Regional Office (We will send one copy to Ecology)
1 additional copy if you answered "yes" to question 7. 3 Total copies attached

Please return completed form to the Office of Drinking Water regional office checked below.

- Northwest Drinking Water Operations
Department of Health
20425 72nd Avenue South, Suite 310
Kent, WA 98032-2358
253-395-6750
- Southwest Drinking Water Operations
Department of Health
PO Box 47823
Olympia, WA 98504-7823
360-236-3030
- Eastern Drinking Water Operations
Department of Health
16201 East Indiana Avenue Suite 1500
Spokane Valley, WA 99216
509-329-2100

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).

PUBLIC UTILITY DISTRICT No. 1 of THURSTON COUNTY

COMPREHENSIVE WATER SYSTEM PLAN

PART B (INDIVIDUAL SYSTEM PLANS)

**CEDAR RIDGE #617 WATER SYSTEM
(ID # 02938 6)**

June 2019

Engineer's Certification:

I hereby certify that the Comprehensive Water System Plan for:

Part B for Cedar Ridge #617 Water System for Public Utility District No. 1 of
Thurston County

Was prepared by me or by someone under my direct supervision and meets or
exceeds the minimum requirements for such plans as defined under WAC 246
290 100.



Douglas H. M. Eklund, P. E.



Cedar Ridge Estates #617 Water System Plan
Part B Individual System Plan

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Chapter 1 DESCRIPTION OF WATER SYSTEM

1A. History of Water System

This water system was originally constructed beginning in or around 1992 by Mr. Jerry Cate to serve domestic supply and single family residential lots within the original authorized place use, within the north half of Section 25, Township 17 North, Range 2 West, W.M. lying westerly of Sheldon Road and the north half of the east half of the east half of Section 26 Township 17 North, Range 2 West, W.M., This the authorized place of use included the Plat of Cedar Ridge Estates and the approximate 80 acres to the east. The combined original contemplated service acres was approximately 400 acres, and the water system was developed and sized to serve this service area. A significant portion of the service area was platted into 64 lots, of which 64 of the lots are developed and are currently served by the water system. The PUD assumed operation of the water system under a satellite management agency agreement as of May 1, 2016. The PUD took over ownership of the water system effective April 1, 2017.

1B. Geography

Average annual rainfall in the service area is approximately 50 inches. The highest elevation service in the existing service area is at elevation 386 at the easterly end of 104th Lane SE. The wellsite elevation is at approximately 238 feet at the one of the lowest areas in the service area. The existing service area terrain ranges from relatively level at the wellsite to rolling to steep slopes in the northerly portion.

1C. Adjacent/Neighboring Purveyors

1. Cedarwood South Union Estates (WSDOH ID # 00253 3) serves areas lying west of the west line of the Cedar Ridge existing service area.
 - a. Group A Community, 44 connections, approved to serve 50 connections
 - b. Contact: Washington Water Service
6800 Meridian Rd SE
Olympia, WA 98513
phone (360) 491- 3760
2. There are a number of parcels lying southerly of the Plat of Cedar Ridge Estates which are occupied by single family residences apparently served by exempt wells. Some of these parcels are large enough to be subdivided into 5 acre parcels (in accordance with Thurston County Zoning requirements).

1D. Inventory of Existing Water System Facilities

- Facilities Inventory and Description

General

The well pumps through a cation exchange water softener system (for manganese and iron removal) to a storage reservoir. A hypochlorinator system injects sodium hypochlorite solution into the storage reservoir fill line immediately after the water softener system. A booster pump station adjacent to the storage reservoir pumps from the reservoir to the distribution system. The booster pump station is equipped with 4 booster pumps. The two lead booster pumps are equipped with variable speed drives operating in constant pressure mode, 120 psi. The two lag booster pumps are controlled by pressure switches and operate when the lead booster pumps cannot maintain the set pressure. The distribution system consists of un-looped waterlines following the platted roads. Waterlines include 6-inch, 4-inch, 3-inch and 2.5-inch diameter pvc lines. All services are metered. Lower elevation services are equipped with individual service pressure reducing valves.

Well 1 (S01)- 75 gpm metered, 132 ft to open interval, SE/4 of NW/4 Section 25, Township 17 North, Range 2 W, W.M. The well pump was worn and failing and replaced in 2018 with a new well pump. The new well pump is capable of pumping 75 gpm to the reservoir.

Reservoir-26ft. diameter x 20ft wall height, 75,500 gallons, reinforced concrete.

Booster Pump Station

1. 2 – 3 hp Grundfos CR4-80U
2. 2 – 5 hp Grundfos CR8-60U
3. 4 – 119 gallon bladder tanks
4. Automatic standby generator (propane fueled).

Distribution System

1. 6,030 LF 6 inch PVC watermain,
2. 1,125 LF 4 inch PVC watermain,
3. 2,150 LF 3 inch PVC watermain
4. 2.920 LF 2.5 inch PVC dead-end water main.
5. 63 service meters.

- Map of Facilities- A map of the existing facilities is included in the appendix titled "Water System Map".

1E. Related Plans

- Thurston County zoning allows development of single family residences within the existing service area. Currently, the developed lots within the service area are developed with single family residences.
- The Thurston County Comprehensive Plan notes that Thurston County has been among the fastest growing counties in the state since the 1960s. During the 1990s, the County grew at an annual rate of 2.5 percent, adding over 46,000 new residents between 1990 and 2000. The 2003 population was approximately 214,800. Projections show over 330,000 people will live the county in the year 2025, an increase of 35 percent. Chapter 2-Land Use of the Comprehensive Plan describes population growth trends in the urban and rural areas of the county. Comprehensive Plan at 1-10.
- The Thurston County Comprehensive Plan further provides that in order to meet the capacity for expected development in rural areas, water rights and public infrastructure must be available. Comprehensive Plan at 2-7.

1F. Retail Service Area and Characteristics

Characteristics

- Location- The Retail Service Area lies within Plat of Cedar Ridge Estates in the north ½ of Section 25, Township 17 North, Range 2 West, W.M. lying west of Sheldon Rd and north of McCorkle Rd. and the East ½ of the East ½ of the North ½ of Section 26, Township 17 North, Range 2 West, W.M.
- Roads - All roads within the Plat of Cedar Ridge Estates are located on private easements for roadways owned and maintained by the Cedar Ridge Homeowners Association. Adjacent roads are principally county roadways.
- Sewer Service - There are no public or private community sewer systems within the Retail Service Area. Sewer service is provided by private on-site disposal systems.
- Topography/Climate- Elevations in the Retail Service Area in Section 25 range between 234 feet above MSL near the south property line at the wellsite, and 420 feet at midway between Myra Lane and Jana Lane. The ground surface is undulating with slopes that range up to 10%. Elevations in the Cedar Ridge Estates Plat Section 26 range between 384 feet above MSL near the midpoint of the west line of the plat and 214 feet near the northwest corner of the of the plat. Climate for this area produces wet mild winters and dry summers. Annual rainfall amounts to approximately 48 to 52 inches with the majority of the rain occurring between October and March, outside of the growing season. Dry summer months can often average less than 1" of rainfall. Average annual air temperatures are about 50 degrees with the average frost free period typically lasting from 165 to 200 days.
- Development- Currently, 64 of the 64 platted lots within the original service area are developed. There are no multi-family or duplex dwelling within the Service Area, nor are there any commercial or institutional uses within the Service Area.
- Service Area Map- The Service Area for the Cedar Ridge Water System is shown on the service area map.

1G. Service Area and Characteristics

- Service Area - The Service Area lies in that portion of the south ½ of Section 25, Township 17 North, Range 2 West, W.M. west lying northerly of McCorkle Rd SE. The Service Area consists of 5 acre and larger parcels some of which are developed as single family residences served by single family wells. Some of the larger parcels could be subdivided into multiple 5-acre single family residential parcels.
- Water Systems -There are some permit exempt single family residential wells in the Service Area, however there are no Group A or Group B water systems within the Service Area.
- Sewer Service - There are no public or private community sewer systems within the Service Area.
- Topography/Climate-Ground Elevations the portion of the Service Area lying in Section 26 range between 384 feet above MSL near the midpoint of the west line of the Service area and 214 feet near the northwest corner of the Service Area. The ground surface is undulating with slopes that range up to 10%. Ground elevations in the Service Area range between 420 feet and 204 feet above MSL. The highest elevation service connection is at elevation 384.
- Development- The Service Area is currently zoned Rural Residential/Resource 1 dwelling unit per 5 acres.
- Service Area Map- The Service Area is shown on the service area map.

1H. Service Area Agreements

There are no formal service area agreements for the Cedar Ridge Water System. The Cedar Ridge Water System will not provide service outside its service area, unless on a temporary basis and in agreement with the primary purveyor for that service area and only upon obtaining approval from the Department of Health.

1I. Duty to Serve

- A. The Cedar Ridge #617 Water System has sufficient physical capacity to serve water in a safe and reasonable manner.
- B. Service requests for single family residential connections are consistent with adopted plans and development regulations.
- C. The Cedar Ridge #617 Water System has sufficient water rights to provide service as noted in Chapter 2 of this water system plan.
- D. The Cedar Ridge #617 Water System can provide water service in the Service Area immediately upon approval, completion and acceptance of construction of distribution system extensions as noted in Chapter 3 of this water system plan and upon receipt of service applications and payment of fees. Where extensions of the distribution system are required to provide service, the extensions of the distribution system will be designed and constructed by the project proponent.

Chapter 2 Basic Planning Data and Water Demand Forecasting.

Three years of source and service meter records are available for this water system. Analysis of Average Day Demand is based on analysis of the 36 months of meter records, beginning on September 23, 2016. Analysis of the Maximum Day Demand is based on analysis of the most recent 24 month meter records since the first 12 months records reflect the customers' consumption without experience of the impact of Thurston PUD water rates during high demand periods. The most recent 24 months meter records show declining Maximum Month Average Days Demand, apparently due to use of the Thurston PUD water rates. During the most recent 24 months the Maximum Month Average Day Demand was 506 gpd/ERU in July 2018. Applying a 1.7 peak factor to 506 gpd/ERU indicates that the Maximum Day Demand (MDD) is 860 gpd/ERU. Analysis of the 36 months of meter records indicates that the Average Day Demand (ADD) is 249 gpd/ERU. Distribution System Leakage (DSL) is based on the highest, and most recent, 12 months meter records show DSL 4,362,424 gallons per year (45.8% of source production) expressed as average daily DSL is 11,952 gpd, or 48 ERU ($11,952 \text{ gpd} / 249 \text{ gpd/ERU} = 48 \text{ ERU}$) on ADD basis or 14.3 ERU ($11,952 \text{ gpd} / 860 \text{ gpd/ERU} = 14.3 \text{ ERU}$) on MDD basis.

Thurston PUD has investigated the cause of the DSL. This water system has experienced manganese and iron concentrations significantly over the MCL's (especially manganese). The system is chlorinated and until earlier this year (2019) did not have a treatment system for manganese and iron removal system. The system was had been frequency flushed to try to clear oxidized iron and manganese from the distribution system. The volumes of flushing water were not recorded. Further, flushing the distribution system was not able to flush the service lines or the service meters. It is likely that the service meters under record due to deposits of oxidized manganese and iron in the meters. Thurston PUD is soon to replace all service meters in the water system and is always looking for evidence of water leaks. Very recently the manganese and iron removal system was put into service and the amount of flushing water should will decrease as the need to blow-off the distribution system decreases..

2A. Current Population and Number of Services

Residential Population-The residential population of the area serviced by the Cedar Ridge Water System is estimated at the rate of 2.5 capita per single family residence. For the 64 Single Family Residential connections the population served is estimated at 160 capita.

2B. Projected Land Use, Future Population, and Water Demand Forecasting

Projected Land Use- Projected land use for this area is single family residences. Current zoning requires that new single family residential lots have minimum area of 5 acres. The Retail Service Area includes the Cedar Ridge Estates plat and the North ½ of the East ½ of the East ½ of Section 26, Township 17 North, Range 2 West, W.M. The Service Area includes that portion of the South 1/2 of Section 25, Township 17 North, Range 2 West,

W.M., lying northerly of McCorkle Rd.

There are 64 single family residential connections within the Plat of Cedar Ridge Estates in the Retail Service Area. This represents full build out of the Cedar Ridge Estates plat. The portion of the Retail Service Area in the East ½ of the East ½ of the North ½ of Section 26 at full build-out would serve 16 single family residential connections.

It is projected that the number of new connections in the Retail Service area will increase according to the Washington State Office of Financial Management Thurston County Population Growth Projections (high series). Based on the existing 64 connections and the high series population projections, it is projected that the water system will serve 80 single family residential connections (200 capita) in 2028 and 90 single family residential connections in 2038 (225 capita).

This indicates the water system may serve up to 10 single family residential connections in the portion of the service area lying in the portion of the south half of Section 25, Township 17 North, Range 2 West, W.M., northerly of McCorckle Rd.

Please see the Demand Summary on the next page.

<u>Demand Summary</u>						
<u>Current</u>						
	ADD	249	gpd/ERU			
	MDD	860	gpd/ERU			
		Connections	N _{ADD}	N _{MDD}		
Single Family		64	64	64		
DSL		N/A	48	14.3		
Total		64	112	78.3		
Annual Demand =		31.2	Ac. Ft.	PHD =	150	gpm
<u>10 Year</u>						
	ADD	249	gpd/ERU			
	MDD	860	gpd/ERU			
		Connections	N _{ADD}	N _{MDD}		
Single Family		80	80	80		
DSL		N/A	48	14.3		
Total		80	128	94.3		
Annual Demand =		35.7	Ac. Ft.	PHD =	174	gpm
<u>20 Year</u>						
	ADD	249	gpd/ERU			
	MDD	860	gpd/ERU			
		Connections	N _{ADD}	N _{MDD}		
Single Family		90	90	90		
DSL		N/A	48	14.3		
Total		90	138	104.3		
Annual Demand		38.5	Ac.Ft	PHD =	187	gpm

2C. Fire Suppression Flow and Fire Suppression Storage

The Cedar Ridge #617 water distribution system is not required to provide fire suppression flow. The storage reservoir is not required to provide fire suppression storage. The Cedar Ridge #617 Water System service area is served by East Olympia Fire District 6. Several contact were made with East Olympia Fire Department 6 to obtain written confirmation the Fire Suppression Flow and Fire Suppression Storage required. Chief Nelson was sent an email on December 3, 2019 with a Service Area Map and Memo of Understanding for Chief Nelson to initial and return or to ask for revisions prior to initial and return. Map Chief Nelson noted that the Cedar Ridge Water System serves single family residences on 5 acre minimum lots and that in response to a fire, the District responds with 4 pumper trucks and 3 fire tender (water tanker) trucks. If additional water is required tender trucks are used to relay water Chief Nelson noted that he was may be unwilling to provide documentation of the Fire Flow and Fire Suppression Storage requirement, but would response verbally if requested by a Washington State Department of Health Water System Plan reviewer. The phone number for the East Olympia Fire District 6 is (360) 491-5533. Chief Nelson did respond with an email where he declined to provide an initialed memo of understanding. but made a brief discussion of the manner in which Fire District 6 responds to fires without the use of fire hydrants with fire flow. A copy of the email sent to him and his email in response is attached on the following pages.

Chapter3 SYSTEM ANALYSIS

3A. Water System Design Standards

Design standards for the expansion improvements will be in accordance with the standards listed in the "Water System Design Manual" (WDOH December 2009). As noted in Chapter 2, MDD is 860 gallons/day per ERU and ADD is 249 gallons/day per ERU. Peak Hourly Demand is currently calculated at 150 gpm according to Equation 5-3 of the Water System Design Manual for the existing 64 single family residential connections and 14.3 ERU of DSL on MDD basis. Equalizing and Standby Storage requirements are in accordance Chapter 9 of the Water System Design Manual. In accordance with the requirements of Thurston County Fire Protection District 6, East Olympia Fire Department, this water system does not provide fire flow. The water system is equipped with a draft fire hydrant located adjacent to the storage reservoir.

During at Peak Hour Demand condition, the minimum system pressure at the services will be 30 psi or greater.

3B. Water Quality Analysis

The source water is treated for iron and manganese removal. The source water is chlorinated. No other water treatment is required.

3C. System Description and Analysis

DESCRIPTION

As noted in the previous water system plan, the water system currently consists of a well located on a single parcel of land which also is the location for a ground level stand pipe type storage reservoir and a booster pump station which includes a cation exchange water softener for manganese and iron removal and hypochlorinator on the reservoir fill line. The well is automatically controlled by float switches in the storage reservoir. Water is withdrawn from the storage reservoir to the booster pump station and pumped to the distribution system. The distribution system consists of non-looped watermains and operates as a single pressure zone.

The well is equipped with a Franklin Model 90 FA3S4, (3 HP) submersible well pump capable of pumping 75 gpm at 107 ft. TDH, as noted in the Project Report for Iron and Manganese Treatment.

The storage reservoir is a reinforced concrete standpipe type reservoir with the reservoir footing at elevation 239 feet above sea level, approximately 1 foot higher than the ground elevation at the wellsite. The reservoir is located approximately 10

feet southerly of the well. The storage reservoir is 26 feet in diameter with 20 ft wall height. The overflow elevation is 258.5 feet, 19.5 feet above the bottom of the reservoir. This allows for 0.5 feet for overflow freeboard, 0.5 foot for operating storage height, and 1 foot of dead storage in the bottom of the reservoir, the reservoir provides 17.5 feet of live storage for equalizing and standby storage, or 69,499 gallons.

The booster pump station is provided with 4 booster pumps. There are two Grundfos CR8-60U (vertical turbine multi-stage) 5 hp booster pumps equipped with variable speed drives set to maintain 125 psi discharge pressure and two Grundfos CR4-80U (vertical turbine multi-stage) 3 hp booster pumps set to operate at fixed speed in lag to the 5 hp booster pumps. Currently the 2-5 hp pumps are set to operate as lead and lag 1. The 5 hp pumps alternate operation. The 2-3 hp pumps are set to operate together as lag 2. The booster pump station is equipped with 4-119 gallon bladder tanks. The booster pump discharge curves show that the 3 hp booster pumps are each rated at 30 gpm at 192 ft. T.D.H. and that the 5 hp pumps are each rated at 62 gpm at 192 ft. T.D.H.

Water services at lower elevations are equipped with service pressure reducing valves on the customer side of the side of the water meters to prevent over-pressurization.

The distribution system is shown on the plan titled "Service Area Map" and in the hydraulic model in the appendix "EPANet Analysis".

The system is served by two water rights G2-28422P and G2-28442P. These water rights allow for a total pumping rate of 300 gpm and an annual withdrawal of 40 acre-feet. Analysis of the water rights is provided in with the water right self-assessment form in the "Water Rights and Self-Assessment" appendix.

ANALYSIS

Analysis of the well pump shows that it is capable of pumping 75 gpm through the proposed treatment system to the reservoir, when the reservoir is full, as noted in the water treatment project report.

The booster pump station and distribution system is analyzed using EPANet 2.0 software.

The booster pump station and the distribution system is analyzed using EPANet 2.0 software. The EPANet model was used to evaluate three scenarios, Scenario 1 – current conditions serving 64 single family residential connections. Scenario 2 – conditions when the system serves 16 single family residential connections in the area lying west of the plat of Cedar Ridge Estates in addition to the current 64 single family residential connections, and Scenario 3 – conditions when the system serves up to 10 single family residential connections in the area lying southerly of the plat of Cedar Ridge Estates in addition to the 64 connections and the 16 connections noted above. The hydraulic

model Scenarios all include the demand exerted by the current 14.3 ERU on MDD basis of distribution system leakage except as noted.

The hydraulic analysis for Scenario 1 demonstrates the existing 4 booster pumps are not capable of maintaining 35 psi minimum pressure throughout the distribution system during peak hour demand for the 64 ERU of single family residential connections and the 48 ERU of distribution system leakage. Either the distribution system leakage must be reduced to 10% or less of the total source production and one of the two 3 hp booster pumps must be replaced with a 5 hp booster pump (matching the existing 5 hp boosters) in order to meet peak hour demand with one the largest booster pumps out of service or without reducing distribution system leakage to 10%, both of the 3 hp booster pumps must be removed and be replaced with 5 hp booster pumps (matching the existing 5 hp booster pumps) and an additional 5 hp booster pump needs to be added the booster pump station so that it can meet peak hour demand with one of the pumps out of service.

The hydraulic model for Scenario 2 demonstrates that with the 16 single family residential connections added to the existing 64 single family residential connection sand with DSL at 48 ERU, the two existing 3hp booster pumps would need to be removed and replaced with two 5 hp booster pumps as noted above, and additionally two more 5 hp booster pumps would have to be installed in the booster pump station in parallel with the other booster pumps (total six 5 hp booster pumps). This would allow the booster pump station to meet peak hour demand, 216 gpm, with one of the 5 hp booster pumps out of service.

The hydraulic model for Scenario 3 demonstrates that with the 10 single family residential connections (lying southerly of the Cedar Ridge Estates plat) added to the existing 64 single family residential connections and the 16 single family residential connections (total 0- single family residential connections and with DSL at 48 ERU operation (total) six 5 hp booster pumps operating in parallel would be required (to meet PHD 228 gpm with system pressures in excess of 35 psi with one of the booster pumps out of service. If DSL could be reduced to 10% of source, peak hour demand would be 181 gpm and the peak hour demand could be met with five 5 hp booster pumps (operating in parallel) with 1 pump out of service while maintaining system pressures greater than 35 psi.

3D. System Description and Analysis

Distribution system leakage is very high, approximately 45.8% of source production. The apparent DSL exerts a significant demand of the water rights, source capacity, treatment capacity, storage capacity, and booster pump capacity. The existing service meters are suspect of being worn and under recording. The source meter has recently been replaced in a configuration in conformance with the manufacturer's recommendations. Thurston PUD is committed to replace all the service meters in 2020 and this should help reduce DSL significantly. It is possible that the high DSL is due to

some actual distribution system leakage:

1. If the greatest portion of distribution system leakage is due to under-recording service meters and with replacement of the service metered DSL drops to 10% and the volume of source water does not decrease, the average day demand would increase:

With ADD = 249 gpd/ERU, with 64 ERU of single family residences and 48 ERU of DSL, average day demand = $249 \times (64 + 48) = 27,888$ gallons/day. If DSL was equal to 10% to total production, it would be 2,789 gallons/day and ADD would be $(27888 - 2,789)/64 = 392$ gpd/ERU.

ADD = 392 gpd/ERU for this water system is likely high, but it is not totally out of reason

2. Before the iron and manganese treatment system was put into service the distribution system was frequently blown down in an attempt to improve water quality and the blow-off volumes were not recorded. Now that the treatment system is operational the volume of blow off water needs to be measured and recorded.
3. Thurston PUD recently found and repaired a significant distribution system leak. Surveillance for leaks and leak repairs need to continue.

This water system plan is not allowed to base future projections of assumed reductions of DSL. As DSL is reduced, a Water System Plan amendment may be necessary.

3E. Limiting Factors

Source Capacity (Annual Average) is limited to 40 Acre-Ft. per Water Rights G2-28422P.

The well pump can operate up to 173,775 minutes per year within the annual limit (Q_A) of the water rights. Using Water System Design Manual (December 2009) equation 6-3 to determine ERU (N) based on Annual Average Demand, N is 143.4 ERU.

$$40 \text{ Acre-Ft/Yr} \times 43,560 \text{ Ft}^2/\text{Ac} \times 7.48 \text{ Gallon/Ft}^3 = 13,033,152 \text{ gallon/year}$$

$$N = \frac{V_a}{365 * ADD} = \frac{75 \text{ gpm} \times 173,775 \text{ min}}{365 * 249} = 143.4 \text{ ERU}$$

Average Demand Day (ADD) is 249 gpd/ERU.

V_a is the annual volume of water, in gallons per year from all sources, excluding emergency sources (if any), for the water system. At the 20 year projection, the system will serve 138 ERU (90 ERU Single Family Residential & 48 ERU DSL).

It is important to reduce DSL.

Source Capacity (Peak Day) is based upon operating the well pump up to 1,200 minutes/day. With maximum day demand (MDD) = 860 gpd/ERU and installed well pump capacity 75 gpm, the system can serve up to 104.7 ERU.

Using Water System Design Manual (2009) equation 6-4, to determine N based on Maximum Day Demand (MDD) demonstrates that the well is capable of serving up to 94.2 ERU, N = 94.2 ERU. is where MDD = 860 gpd/ERU.

$$N = \frac{V_d}{MDD} = \frac{75 \text{ gpm} * 1,200 \text{ min/day}}{860 \text{ gpd/ERU}} = 94.2 \text{ ERU}$$

Total “Capacity Related Storage” based on

storage, N_{CRS} = 108 ERU, based on the storage volume available for equalizing and standby storage.

Capacity Related Storage (CRS) is 69,499 gallons as noted on the reservoir diagram in the appendices. Equation 6-8 from the 2009 Water System Design Manual cannot be used with two separate N values for DSL, N_{ADD} and N_{MDD}. For this analysis, N_{ADD} for DSL will be used as noted in Chapter 2, N_{MDD} will not be used. DSL expressed as 8.3 gpm will be used and will be deducted from Q_s for this analysis. As noted in Chapter 2, DSL = 11,952 gallons/day,

$$DSL = 11,952 \text{ gpd}/1440 \text{ min./day} = 8.3 \text{ gpm}$$

$$N_{CRS} = \frac{CRS + 150[(Q_s - 8.3 \text{ gpm}) - \{(MDD/1440) \times F\}] - 2700}{[150(MDD/1440) \times C] + (SB_i \times t_d)}$$

$$N_{CRS} = 103.5 \text{ ERU}$$

where:

$$CRS = 69,499 \text{ gallons}$$

$$Q_s = 75 \text{ gpm}$$

$$MDD = 860 \text{ gpd/ERU}$$

$$F = 75$$

$$C = 2$$

$$SB_i = 249 \text{ gallon/day}$$

$$t_d = 2 \text{ days}$$

N_{CRS} = 103.5 ERU indicates that the existing reservoir is over connected since at the current time, the system has 64 ERU in single family residential connections and 48 ERU as DSL for a total of 112 ERU. Thurston PUD will not construct a new reservoir nor will it increase source capacity or redundancy with a new well or by installing two pumps in the existing well. Thurston PUD will work diligently to reduce DSL to 10% or less of the total source production.

Capacity based on Treatment

The capacity of the water treatment system matches the 75 gpm pumping capacity of the well. The proposed treatment system will match the Source Capacity based on maximum day demand, 110 ERU.

Distribution system, The hydraulic model indicates that the existing distribution system is adequate to serve at least 138 ERU consisting of 90 ERU for single family residential connections and 48 ERU of distribution system leakage.

<i>Water System Component</i>	<i>N</i>
Average Annual Source	143.4
Maximum Day Source	104.7
Total Capacity Related Storage	103.5
Treatment	94.2
Distribution System, booster pumps	62
Distribution System	138

3E. RECOMMENDED IMPROVEMENTS

1. The water system has a high percentage of DSL. It is recommended that the existing service meters be replaced to help address the high percentage of DSL. Thurston PUD is scheduled to replace the service meters in 2020. Also to address DSL, it is recommended that the volumes of all flushing water be metered or estimated and recorded and that Thurston PUD's efforts to locate and repair leaks continue.
2. The existing 2 - 3 hp booster pumps are undersized and are unable to maintain 30 psi minimum system pressure during peak hour demand when one of the 5 hp booster pumps is out of service, during existing peak hour demand 150 gpm. It is recommended that the two existing 3 hp booster pumps be removed and replaced with 5 hp booster pumps with variable speed, constant pressure drives (which match the head/discharge curve of the existing 5 hp booster pumps). With 4 - 5 hp booster pumps in service, one of the pumps can be out of service and the system pressures will remain above 30 psi during peak hour demand.
3. When a request is received to serve the 16 connections lying west of the plat of Cedar Ridge Estates or the 10 connections lying south of the Retail Service Area, the booster pump station needs to be modified with the addition of 1 – 5 hp booster pump, matching the head/discharge curve of the existing 5 hp booster pumps for a total of 5 – 5 hp booster pumps all operating in parallel. The additional 5 hp booster pump needs to be equipped with a variable speed drive to match the pressure setting of the existing 5 hp booster pumps. With 5 booster pumps all operating in parallel, the booster pumps can maintain system pressure in excess of 30 psi throughout the distribution system while serving 90 single family residential connections during peak hour demand (187 gpm), with one of the booster pumps out of service. When DSL is reduced to 10% or less of the total source production the issues of booster pump sizing will need to be revisited.

4. The existing distribution system is adequately sized to serve the projected 16 single family residential connections in the Retail Service Area lying West of the Cedar Ridge Estates Plat and the 10 single family residential connections in the Service Area lying southerly of the Cedar Ridge Estates Plat.

The highest ground elevation in the area for the 16 connections is at elevation 372 feet which is lower than the highest elevation existing service, elevation 384 ft. A water line extension from the west end of the existing 4 inch water line along 105th Lane SE will be required to serve the 16 connections. This water line extension will be constructed using 4 inch pipe. With the booster pump improvements noted above the system pressure during Peak Hour Demand will be at least 50 psi at elevation 364 at the west end of the existing 4 line along 105th Ln. during Peak Hour Demand, with 1 of the 5 hp booster pumps out of service. This will provide sufficient hydraulic grade line along the 4 inch extension to maintain system pressures in excess of 30 psi during Peak Hour Demand.

A water line extension from the south end of the existing 3 inch line along Wilmer Lane will be required to serve the 10 connections lying south of the plat of Cedar Ridge Estates. The highest elevation in this area is at elevation 300 ft, approximately 6 ft, lower than the ground elevation at the south end of the existing 3 inch line along Wilmer Lane. Elevation 300 is considerably lower than the elevation of the highest existing service, elevation 384 ft. During Peak Hour Demand, water pressure at the south end of the existing 3 inch line at elevation 306 feet will be greater than 73 psi. This will provide sufficient hydraulic grade line along the 3 inch extension to maintain system pressures in excess of 30 psi during Peak Hour Demand.

At this time the layout of the water lines and the lots to be served in both locations is unknown. When the water line extensions are proposed, approval of either project reports or water system plan amendments will be required prior to construction as determined by the Department of Health.

CHAPTER FOUR (Water Use Efficiency and Water Rights)

4A. Water Use Efficiency

The Cedar Ridge #617 Water System is required to develop and manage a water use efficiency program per WAC 246-290-100. It is anticipated that water use efficiency will become more and more important in years to come given the limited nature of the groundwater resource for the western side of Washington State. Water Use Efficiency Goals for Thurston PUD Water Systems were adopted May 26, 2015 by the Thurston PUD Board of Commissioners subsequent to advertised, open public hearings. The demand side water conservation goal established for all Group A water systems, “Reduce and/or maintain the average annual Equivalent Residential Unit (ERU) water usage for all accounts, per Group A system, to a value of 250 gallons per day (gpd) through 2021”. As noted in Chapter 2, based on the most recent 3 years water meter records, the average demand day is 247 gpd/ERU. The Cedar Ridge Water System is in compliance with the demand side goal.

4B. Water Rights

The water system operates under two active water rights G2-28422P and Second Amended G2-28424P, and a single well, Well 1. The system apparently operated with G2-28422 and Well 1 while G2-28424 (application) was filed and G2-28424 Report of Examination was prepared pending construction of an additional well. An additional well was subsequently constructed and was determined to have an insufficient amount of water to put the well into service.

Table 4-1 summarizes water rights as recorded with the Washington State Department of Ecology. A Water Rights Self-Assessment Form and copies of the water rights are included in the Water Rights Appendix.

Table 4-1. Summary of Water Rights

Water Right Number	Points of Withdrawal	Instantaneous Withdrawal (gpm)	Annual Rate AF/Y	Priority Date	Status
G2-28422P	Well #1	100	40	03/11/92	Active
G2-28424P	Well #1	200 (additive)	40 (non-additive)	03/11/92	Active

4C. Metering Program

All service connections are metered. All new service connections will be equipped with service meters prior to providing water service.

4D. Water Use Efficiency

The Water Use Efficiency Program is included in the appendix titled, “Water Use Efficiency Program”.

Chapter 5 SYSTEM MONITORING REQUIREMENTS

5A. SYSTEM MONITORING REQUIREMENTS

The following pages consist of:

- * Water Quality Monitoring Schedule
- * Coliform Monitoring Plan
- * Lead and Copper Sampling Plan
- * Disinfection By-Products Sampling Plan



Water Quality Monitoring Schedule

System: CEDAR RIDGE #617
Contact: Kimberly S Gubbe
SMA ID: 147

PWS ID: 02938 6
Group: A - Comm
SMA Name: PUD No 1 of Thurston County

Region: SOUTHWEST
County: THURSTON

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

	May 2019	Jun 2019	Jul 2019	Aug 2019	Sep 2019	Oct 2019	Nov 2019	Dec 2019	Jan 2020	Feb 2020	Mar 2020	Apr 2020
Coliform Monitoring Population	186	186	186	186	186	186	186	186	186	186	186	186
Number of Routine Samples Required	1	1	1	1	1	1	1	1	1	1	1	1

- 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

<u>Test Panel/Analyte</u>	<u># Samples Required</u>	<u>Compliance Period</u>	<u>Frequency</u>	<u>Last Sample Date</u>	<u>Next Sample Due</u>
Lead and Copper	5	Jan 2019 - Dec 2021	standard - 3 year	06/19/2018	Jun 2021
Asbestos	0	Jan 2011 - Dec 2019	waiver - 9 year		
Total Trihalomethane (THM)	1	Jan 2018 - Dec 2020	standard - 3 year	08/08/2017	Aug 2020
Halo-Acetic Acids (HAA5)	1	Jan 2018 - Dec 2020	standard - 3 year	08/08/2017	Aug 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.

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.

<i>Source S01</i>	<i>WELL #1</i>	<i>Well</i>	<i>Use - Permanent</i>	<i>Susceptibility - Low</i>		
<u>Test Panel/Analyte</u>	<u># Samples Required</u>	<u>Compliance Period</u>	<u>Frequency</u>	<u>Last Sample Date</u>	<u>Next Sample Due</u>	
Nitrate	1	Jan 2019 - Dec 2019	standard - 1 year	10/15/2018	Oct 2019	
Complete Inorganic (IOC)	1	Jan 2011 - Dec 2019	waiver - 9 year	10/17/2016		
Manganese	1	Jan 2017 - Dec 2019	standard - 3 year	10/17/2016	Oct 2019	
Volatile Organics (VOC)	1	Jan 2014 - Dec 2019	waiver - 6 year	10/15/2018		
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	10/15/2018		
Pesticides	0	Jan 2017 - Dec 2019	waiver - 3 year	10/21/2009		
Soil Fumigants	0	Jan 2017 - Dec 2019	waiver - 3 year	10/19/2000		
Gross Alpha	1	Jan 2014 - Dec 2019	standard - 6 year	07/15/2015		
Radium 228	1	Jan 2014 - Dec 2019	standard - 6 year	07/15/2015		



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):	07/01/2019
Submit CCR certification form to ODW (Community systems only):	10/01/2019
Submit Water Use Efficiency report online to ODW and to customers (Community and other municipal water systems only):	07/01/2019
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) 236-3046 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.

COLIFORM MONITORING PLAN (CMP)

Cedar Ridge #617

Source – Chlorinated and Filtered

System Information

Plan Date: 12/2019

Water System Name Cedar Ridge #617	County Thurston	System I.D. Number 029386
Name of Plan Preparer Kim Gubbe Thurston PUD	Position DPC	Daytime Phone # (360) 357-8783 ext. 125
Source:	S01 Well #1 135' 75 GPM	
Storage:	80,000	
Treatment:	Chlorination, Iron and Manganese Removal	
Pressure Zones:	One	
Population	186	
Number of Routine Samples Required Monthly by Regulation: 1 (One)		Number of Sample Sites Needed to Represent the Distribution System: 3 (Three)

Routine Sample Rotation Schedule

Month	Routine Site(s)	Month	Routine Site(s)
January	#1	July	#1
February	#2	August	#2
March	#3	September	#3
April	#1	October	#1
May	#2	November	#2
June	#3	December	#3

Level 1 and Level 2 Assessment Contact Information

Name Kim Gubbe	Office Phone: 360-357-8783 ext. 125 After Hours Phone: 360-688-0827
Address 1230 Ruddell Road SE, Lacey WA 98503	Email kgubbe@thurstonpud.org
Name Jim Campbell	Office Phone: 360-357-8783 ext. 120 After Hours Phone: 360-790-2662
Address 1230 Ruddell Road SE, Lacey WA 98503	Email jcampbell@thurstonpud.org

Routine, Repeat, and Triggered Source Sample Locations

Location/Address for <u>Routine</u> Sample Sites	Location/Address for <u>Repeat & Triggered Source</u> Sample Sites
X1.10333 Nyla	1-1. Sample Site #1
	1-2. 10321 Nyla
	1-3. 10543 Nyla
	*GWR -S01 – Well #1 before treatment
X2. 2141 107th	2-1. Sample Site #2
	2-2. 10543 Nyla
	2-3. 1512 105th Ln
	*GWR -S01 – Well #1 before treatment
X2. 10438 Stardust	3-1. Sample Site #3
	3-2. 1512 105th Ln
	3-3. 10328 Stardust
	*GWR -S01 – Well #1 before treatment

*You should mark the lab slip for the source sample “Ground Water Rule GWR” in type of sample and request an analysis for E coli count. **You must sample every groundwater source, before treatment, that was in use when the original routine sample was collected.***

Important notes for sample collector:

- Collect samples early in the month and early in the week.
- Check the sample sit/ tap before filling the bottle to make sure there is no reason to invalidate the sample result.
- Do not samples in week when key staff are on vacation or a holiday as it may create schedule conflicts.
- If a sample site is no longer a good sample site, substitute an acceptable site in the same area. If the site issues persist, choose a new permanent site and update CMP accordingly.

Laboratory Information

Laboratory Name Water Management Laboratories Inc.	Office Phone # (253) 531-3121
Address 1515 80 th St. E. Tacoma, WA 98404	After Hours # (253) 841-0732
Hours of Operation Monday – Friday: 8 a.m.- 5 p.m. Saturday: 9 a.m. – 12 p.m.	
Contact Name No specific contact	

E. coli-Present Sample Response

<p style="text-align: center;">Distribution System <i>E. coli</i> and <i>E. coli</i> Present Triggered Source Sample Response Plan</p>

<p>If we have <i>E. coli</i> in our distribution system, we will immediately:</p>
--

- | |
|--|
| <ol style="list-style-type: none">1. Call DOH.2. See attached plan: <i>What To Do When We Get A Positive Fecal Or E.Coli Sample</i> |
|--|

What To Do When We Get A Positive Fecal Or E-Coli Sample.

1. Call the agency that governs that system immediately of receiving the results.
Group A's Thurston, Lewis, Grays – SW Drinking Water, 360-236-3045 or 360-236-3030.
2. Work with agency, we could put the customers on boil water now or wait until the next tests come back. I usually put them on boil water now. Distribute door hangers at this time with a copy of the E. coli MCL attached.
K:\FORMS\Mandatory Language Forms\Acute Coliform MCL
K:\FORMS\Mandatory Language Forms\Boil Water Advisory Door Hanger
3. Fax form and door hanger to agency after it has been hand delivered to the customers.
4. Take the repeat samples within 24 hours and run a 24 hour test on them.
Group A's four samples – follow the Coliform Monitoring Plan. If more than 1 well was in operations then a raw sample from each will need to be taken, plus the four repeats (which should include one well).
5. Access the system; try to find where the contamination is coming from. Are there any bad tanks, what does the well head look like, what activity is going on around the well.
6. Call lab in 24 hours from time sample was taken if fax has not been received yet. Confirm that samples were good or bad.
7. If samples are negative take another round of samples, immediately. Run another 24-hour test. If next round is also negative lift the boil water notice.
8. If one of the samples comes back positive and we haven't found the problem, then we should start continuous temporary chlorination of the system and notify the customers by door hanger of the chlorination. If the system is permanently chlorinated take chlorine residual throughout the water system to determine if chlorinated water is at the desired residual and if not, try to determine the cause of why there maybe no residual. Then flush the system to get the chlorine throughout with monitoring to make sure that chlorine residual is consistent throughout the water system.
9. Once the chlorine is throughout the system then we need to take two rounds of repeat samples under normal operating conditions (i.e., normal chlorine residual, if any, or zero residual if system is not normally not disinfected) to lift the boil water.

***E. coli*-Present Sample Response**

Distribution System <i>E. coli</i> and <i>E. coli</i> Present Triggered Source Sample Response Plan
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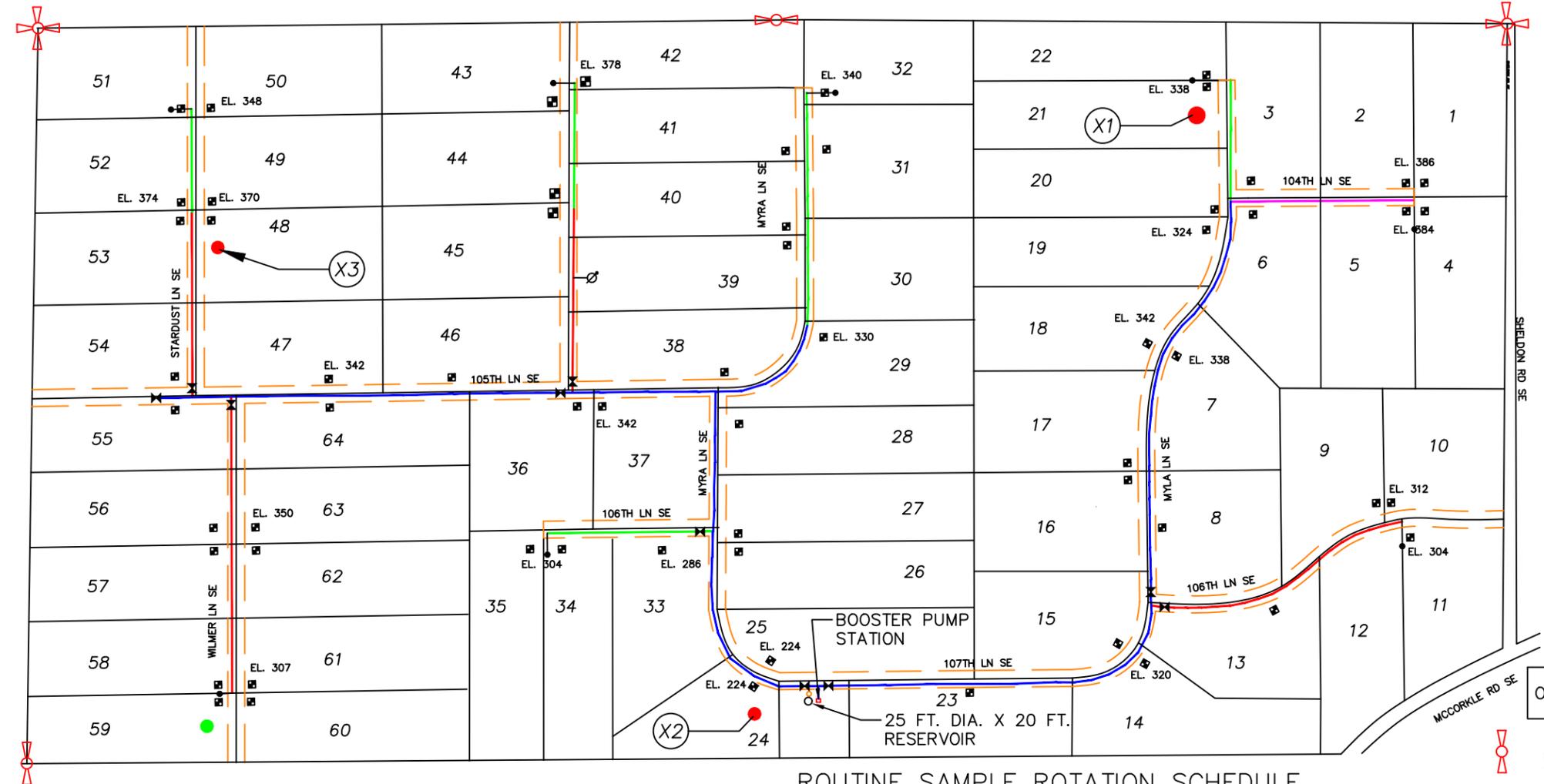
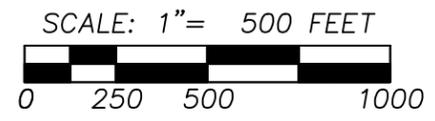
If we have *E. coli* in our distribution system, we will immediately:

1. Call DOH.
2. See attached plan : *What To Do When We Get A Positive Fecal Or E.Coli Sample*

What To Do When We Get A Positive Fecal Or E-Coli Sample.

1. Call the agency that governs that system immediately of receiving the results.
Group A's Thurston, Lewis, Grays – SW Drinking Water, 360-236-3044.
2. Work with agency, we could put the customers on boil water now or wait until the next tests come back. I usually put them on boil water now. Distribute door hangers at this time with a copy of the Acute mcl attached.
K:\FORMS\Mandatory Language Forms\Acute Coliform MCL
K:\FORMS\Mandatory Language Forms\Boil Water Advisory Door Hanger
3. Fax form and door hanger to agency after it has been hand delivered to the customers.
4. Take the repeat samples within 24 hours and run a 24 hour test on them.
Group A's four samples – follow the Coliform Monitoring Plan. If more than 1 well was in operations then a raw sample from each will need to be taken, plus the four repeats (which should include one well).
5. Access the system; try to find where the contamination is coming from. Are there any bad tanks, what does the well head look like, what activity is going on around the well.
6. Call lab in 24 hours from time sample was taken if fax has not been received yet. Confirm that samples were good or bad.
7. If samples are negative take another round of samples, immediately. Run another 24 hour test. If next round are also negative lift the boil water notice.
8. If one of the samples comes back positive and we haven't found the problem then we should start continuous temporary chlorination of the system and notify the customers by door hanger of the chlorination.
9. Once the chlorine is throughout the system then we need to take two rounds of repeat samples to lift notice

NORTH HALF OF SECTION 25, T 17 N, R 02 W, W.M.
THURSTON COUNTY



DISINFECTION BYPRODUCT (DBP)
MONITORING SAMPLE LOCATION

OUTSIDE TAP AT 10717 WILMER LN SE

COLIFORM MONITORING SAMPLE LOCATIONS

ROUTINE SAMPLE ROTATION SCHEDULE

WATER SYSTEM NAME	COUNTY	SYSTEM ID NUMBER
CEDAR RIDGE ESTATES #617	THURSTON	02938 6

LEGEND

- ROAD AND UTILITY EASEMENT
- 2 IN. PVC
- 3 IN. PVC
- 4 IN. PVC
- 6 IN. PVC
- SERVICE WATER METER
- COLIFORM MONITORING SAMPLE SITE
- DBP MONITORING SAMPLE SITE
- BLOW OFF
- GATE VALVE

MONTH	ROUTINE SITE
JANUARY	X1
FEBRUARY	X2
MARCH	X3
APRIL	X1
MAY	X2
JUNE	X3
JULY	X1
AUGUST	X2, DBP SAMPLE SITE
SEPTEMBER	X3
OCTOBER	X1
NOVEMBER	X2
DECEMBER	X3

LOCATION/ADDRESS FOR ROUTINE SAMPLE SITES	LOCATION/ADDRESS FOR REPEAT & TRIGGERED SOURCE SAMPLE SITES
X1. 10333 NYLA	1-1. SAMPLE SITE #1 1-2. 2141 107TH 1-3. 10438 STARDUST *GWR - S01 - WELL #1
X2. 2141 107TH	2-1. SAMPLE SITE #2 2-2. 10333 NYLA 2-3. 10438 STARDUST *GWR - S01 - WELL #1
X3. 10438 STARDUST	3-1. SAMPLE SITE #2 3-2. 10438 STARDUST 3-3. 2141 107TH *GWR - S01 - WELL #1

Z:\2017 Projects\17132 Thurston PUD Cedar Ridge WSP\WMA Drawings\CURRENT\17132 SERVICE MAP TIME OF TRAVEL.dwg, 6/3/2019 9:35:18 AM

NO	DATE	BY	APPR	REVISIONS

JWMA Civil and Municipal Engineering and Planning
Jerome W. Morrissette & Associates Inc., P.S.
 1700 Cooper Pt. Road S.W. #B-2, Olympia, Wa. 98502-1110 Ph 360.352.9456 Fx 360.352.9990

DESIGNED BY	06/03/2019	DATE
MH	06/03/2019	DATE
C.A.D.D. BY	06/03/2019	DATE
DE	06/03/2019	DATE
CHECKED BY	06/03/2019	DATE

**THURSTON PUBLIC
UTILITY DISTRICT 1**

**CEDAR RIDGE WATER SYSTEM
COLIFORM AND DISINFECTION BYPRODUCTS
MONITORING MAP**

17132 SHT 1 OF 1

Cedar Ridge Lead and Copper Monitoring Plan

	Id	Year Home was Built	Type of Pipe	Service Address	Date of Report	COPPER AL 1.3	LEAD AL 0.015
CEDAR RIDGE	02938 6	2001	pvc	10640 MYRA LANE SE, OLYMPIA	6/22/2018	0.106	0.0014
CEDAR RIDGE	02938 6	1991	pvc	10503 NYLA LANE SE, OLYMPIA	6/22/2018	0.196	<0.001
CEDAR RIDGE	02938 6	1998	copper	2526 104TH LANE SE, OLYMPIA	6/22/2018	0.156	<0.001
CEDAR RIDGE	02938 6	1998	pex	2415 104TH LANE SE, OLYMPIA	6/22/2018	0.033	<0.001
CEDAR RIDGE	02938 6	1993	copper & pvc	10415 STARDUST LANE SE, OLYMPIA	6/22/2018	0.064	<0.001

Disinfection Byproducts Monitoring Plan

Cedar Ridge - 617

ID #02938

Groundwater

Population: 186

Treatment Provided:

Hypo-chlorination for bacteria

Number of Treatment Plants (TP): 1

TP1 S01 well 1 treatment located inside pumphouse, permanent use

Disinfectant Monitoring

Required: Chlorine residuals must be measured at the same time and place as routine or repeat coliform samples. MRDL (maximum residual disinfectant level) for chlorine and chloramines = 4.0 mg/l.

Compliance: Compliance is based on the RAA (running annual average) of 12 consecutive months. DOH will determine compliance for chlorine MRDL. Daily residual measurements **will not** be included in the compliance calculations.

Byproduct Monitoring

Required: TTHM & HAA5 – 1 sample per treatment plant per year during month of warmest water temperature, collected at MRT (maximum residence time). TTHM MCL = 0.080 mg/l or 80 ppb, HAA5 MCL = 0.060 mg/l or 60 ppb

Compliance: Must go to quarterly monitoring if annual sample exceeds MCL for either TTHM or HAA5. Compliance is then based on the RAA of quarterly results or averages DOH will determine compliance for TTHM & HAA5 based on data submitted by the lab.

Sample Location:

MRT = **Outside tap at 10717 Wilmer**

Sample will be taken in the month of August when water should be the warmest.

Reduced Monitoring

To qualify for reduced monitoring the following criteria must be met (and State must approve) TTHM RAA \leq 0.04mg/l and HAA5 RAA \leq 0.03 mg/l for two consecutive years.

OR

TTHM RAA \leq 0.020 mg/l and HAA5 RAA \leq 0.015 mg/l for one year, monitoring may then be reduced to 1 sample per 3 year cycle.

System has qualified for reduced monitoring with results in August 2017 of Total HAA5 – 6.9 ppb and Total TTHM – 10.1 ppb next sampling to be performed in August 2020.

Completed by: Kim Gubbe, DPC updated May 31, 2019

Chapter 6 WELLHEAD PROTECTION

The wellhead protection discussed in this section addresses the sole source, well 1. The Wellhead Protection Plan is included in the appendices.

6A. POTENTIAL IMPACT AREAS

1. Susceptibility Analysis - See Ground Water Susceptibility Assessment form following the Wellhead Protection Plan.
2. Protective Covenants – See appendix titled, “Protective Covenants”

6B. CONTINGENCY PLAN

The contingency plan for the Cedar Ridge # 617 Water System is noted in Section 1.12 of Appendix E Thurston PUD Emergency Response Plan included in the currently approved Thurston County Public Utility District Water System Plan Part A – Umbrella. .

6C. NOTIFICATIONS

All the property owners within with well head protection area have been notified of the well head protection boundaries. These notifications will include all owners/operators of potential contaminant sources. It should be noted that many of the potential contamination sources are existing residences or potential residential development in currently undeveloped areas within the well head protection area.

Chapter 7 IMPROVEMENT PROGRAM

7A. Introduction

This chapter presents the Capital Improvement Plan (CIP) for the ten and twenty-year planning periods. Recommended water system improvements and associated costs, along with scheduling information is presented in the following section according to the Asset Management Plan, growth of the system and recommendations identified in earlier chapters of the plan.

In the future, other projects may arise which are not identified as part of the CIP. Such projects may be deemed necessary for ensuring water quality, preserving emergency water supply or addressing unforeseen problems with the water system. The PUD has collected a Capital Surcharge that should cover all cost of replacements and anything unforeseen projects or the PUD will seek funding through Public Works or Department of Health.

The PUD retains the flexibility to reschedule proposed projects and to expand or reduce the scope of proposed projects, as best determined by the PUD when new information becomes available for evaluation. Each capital improvement should also be reevaluated to consider the most recent planning efforts, as the proposed completion date for the project approaches.

7B. Asset Management Plan

The PUD uses an Asset Management Plan (see appendix) to guide the replacement of current assets. Each asset is being tracked using last replacement date, estimated life cycle, estimated replacement date and estimated replacement costs. Capital Improvement Fee is being collected from all PUD connections to fund the replacement of current assets.

7C. 10 Year Improvements

Mainline Extension for lots to the west. All costs will be paid by developer.

Booster Pump Replacement – Booster pumps have been graded as, in good condition, in 2019 and will be replaced upon failure due to the redundancy of 4 booster pumps. Plus, O & M has extended the life of the booster pumps. Costs will be paid for with the PUD Capital Improvement Fund, as needed.

Source Meter Replacement – Scheduled for 2021 and will be paid for with the PUD Capital Improvement Fund.

Pressure Tank Replacement – Pressure tanks have been graded as, in good condition, in 2019 and will be replaced upon failure. Tanks maintenance is completed on an annual basis with visual inspections throughout the year and has an estimated life cycle of 10 years. Costs will be paid for with the PUD Capital Improvement Fund, as needed.

Service Meter Replacement – Scheduled for replacement in early 2020. Meters have already been purchased with Capital Improvements Fund and installation will be completed by the end of January 2020.

Chlorine Pump Replacement - PUD performs maintenance on chlorine pumps on a regular basis and has an estimated life cycle of 8 years. Once pump is deemed in poor condition it is replaced. The chlorine pump is scheduled to be replaced in 2021 and will be paid for with PUD Capital Improvement Funds.

Electrical Upgrade – will be assess in 2026 to determine if system needs to be upgraded. PUD Capital Improvement Funds will be used for upgrades.

PUD staff will perform all replacements above except for mainline extension and electrical upgrades.

7D. 20 Year Improvements

Well Pump Replacement – Well pump was last replaced in 2018 and has an estimated life cycle of 13 years. Well pump is scheduled for replacement in 2031 and PUD Capital Improvement Funds will pay for replacement when needed.

Generator Replacement – Generator was installed in 2012 and has an estimated life cycle of 25 years. The generator is scheduled for replacement in 2037 and PUD Capital Improvement Funds will pay for replacement when needed. Bi-annual maintenance is performed on generators.

Treatment Replacement - Treatment was installed in 2019 and has an estimated life cycle of 25 years. The treatment is scheduled for replacement in 2040 and PUD Capital Improvement Funds will pay for replacement when needed. Monthly samples will be taken to make sure that treatment is working properly, if sampling determines that treatment needs to be replace it will be completed at that time.

PUD staff will perform all replacements above except for generator replacement.

Chapter 8 FINANCIAL PROGRAM

8A. System Financing

The Cedar Ridge water system is just one of 275 water systems that Thurston PUD owns and operates over a 6 county area. A PUD wide Financial Program was prepared and approved in the PUD's Water System Plan Part A, section 6. The PUD adopts an annual budget and rates by the first Monday in October for the following year.

8B. Costs of Improvements

In 2015 the PUD implemented a Capital Improvement Fee to pay for replacement of existing assets. It is anticipated that the cost of any necessary replacements or improvements will be funded through this reserve account. Where general funds or reserves are not adequate to provide the needed capital, the capital improvement funding is obtained through Community Development Loan/Grant programs, Public Works Trust Fund (PWTF), Drinking Water State Revolving Fund (DWSRF), Rural Development Loans/Grants, or other sources available to Thurston PUD.

8C. Financial Viability Worksheet

Thurston PUD does not budget for the operational expense on a system by system basis. A PUD wide Financial Program was prepared and approved in the PUD's Water System Plan Part A, section 6.

8D. Asset Management Plan

See appendix for Capital Asset Management Plan. Capital Asset Management Plan costs and funding are addressed in Thurston PUD's Water System Plan Part A, section 6.

Chapter 9 VULNERABILITY ASSESSMENT

The system components for this water system are all, to some greater or lesser degree, vulnerable to damage from various causes. Power outage, fire, fallen trees, earthquake, or other items can cause lengthy interruption of service. The vulnerability assessment presented here accounts for its current configuration with water supplied by well 1 and well 2 operating under level control the existing reservoir. In the future the system configuration will change with the construction of wells to replace the intertie booster pump stations and with the construction of a new storage reservoir. When the design of those projects is complete, the vulnerability assessment should be updated accordingly. The Thurston PUD Water System Plan Part A – Umbrella includes an Emergency Response Program in Appendix E which includes:

- Emergency Contact Lists
- Priority Service Customer List
- DOH and Public Notification Procedures
- Response Procedures Tailored of Various Emergency Situations
- Contingency Plans

In case of power outage, fire, fallen trees, earthquake, or other such occurrence, the following actions may be taken to restore the system to service while permanent repairs are made. The specific action taken will depend on the conditions that exist when the problem occurs. In all cases advise customers to conserve water until the problem is corrected.

Booster Pump Failure

1. There is one booster pump station. The booster pump station is equipped with 4 booster pumps. In the event of failure of one pump, the pump must be replaced or repaired as soon as possible.

Booster Pumps - loss of electrical power

1. The booster pump station is equipped with an automatic transfer switch and propane emergency generator.

Reservoir – loss of use of reservoir

1. The system is equipped with one storage reservoir. If the reservoir must be removed from service, the customers must be notified to conserve water, cease all outdoor water use and valves be set to pressurize the system solely with the well pump.

Distribution System

1. For failures and leaks in the distribution system isolate the leaking portion by closing valves as soon as the leak is located and shut off services in the isolated leaking portions and repair the line. Use standard repair materials. If the cause of the leak is identified, try to correct the deficiency to that the leak will not re-occur. Follow accepted practice in repairing leaks, and disinfect and flush the system in accordance with Department of Health requirements. Advise customers to flush lines and if necessary to clean aerators and faucets.

Appendices

Water Rights Self-Assessment

Water Rights

Well Protective Covenant

EPANet Analysis

Iron and Manganese Water Treatment Plans

Details Meter Records

Water Use Efficiency Program

Water Loss Control Action Plan

Wellhead Protection Plan

Asset Management Plan

System Map

Service Area Map

Water Rights Self Assessment

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 # <small>*If water right is interruptible, identify limitation in yellow section below</small>	WFI Source # <small>If a source has multiple water rights, list each water right on separate line</small>	Existing Water Rights <small>Qi= Instantaneous Flow Rate Allowed (GPM or CFS) Qa= Annual Volume Allowed (Acre-Feet/Year) This includes wholesale water sold</small>				Current Source Production – Most Recent Calendar Year <small>Qi = Max Instantaneous Flow Rate Withdrawn (GPM or CFS) Qa = Annual Volume Withdrawn (Acre-Feet/Year) This includes wholesale water sold</small>				10-Year Forecasted Source Production (determined from WSP) <small>This includes wholesale water sold</small>				20-Year Forecasted Source Production (determined from WSP) <small>This includes wholesale water sold</small>			
		Primary Qi <small>Maximum Rate Allowed</small>	Non-Additive Qi <small>Maximum Rate Allowed</small>	Primary Qa <small>Maximum Volume Allowed</small>	Non-Additive Qa <small>Maximum Volume Allowed</small>	Total Qi <small>Maximum Instantaneous Flow Rate Withdrawn</small>	Current Excess or (Deficiency) Qi	Total Qa <small>Maximum Annual Volume Withdrawn</small>	Current Excess or (Deficiency) Qa	Total Qi <small>Maximum Instantaneous Flow Rate in 10 Years</small>	10-Year Forecasted Excess or (Deficiency) Qi	Total Qa <small>Maximum Annual Volume in 10 Years</small>	10-Year Forecasted Excess or (Deficiency) Qa	Total Qi <small>Maximum Instantaneous Flow Rate in 20 Years</small>	20-Year Forecasted Excess or (Deficiency) Qi	Total Qa <small>Maximum Annual Volume in 20 Years</small>	20-Year Forecasted Excess or (Deficiency) Qa
1 G2-28422P	S01	100		40		75	+25	23.9	16.1	85	+15	24.0	16.0	85	+15	27.7	12.3
2 G2-28442P	S01	200			40		+200				+200						
3																	
4																	
5																	
6																	
TOTALS =		300		40		75	+225	23.9	16.1	85	+215	24.0	16.0	85	+15	27.7	12.3

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

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

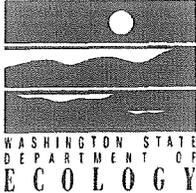
INTERTIES: Systems receiving wholesale water complete this section. Wholesaling systems must include water sold through intertie in the current and forecasted source production columns above.															
Name of Wholesaling System Providing Water	Quantities Allowed In Contract		Expiration Date of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

Water Rights



**APPLICATION FOR PERMIT
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON**

SURFACE WATER GROUND WATER

\$10.00 MINIMUM STATUTORY EXAMINATION FEE REQUIRED WITH APPLICATION

(GRAY BOXES FOR OFFICE USE ONLY)

APPLICATION NO. <u>228523</u>	WRIA <u>33</u>	COUNTY <u>Thurston</u>	PRIORITY DATE <u>3/11/92</u>	TIME <u>3:59</u>	ACCEPTED <u>2/</u>
-------------------------------	----------------	------------------------	------------------------------	------------------	--------------------

APPLICANT'S NAME - PLEASE PRINT
1/0 Jerry Cate (High Tech Farms Corporation)
Cedar Ridge Estates Well #2

Bus. Tel. 845-7122
 Home Tel. _____
 Other Tel. _____

ADDRESS (STREET) 3221 Shaw Rd E (CITY) Puyallup (STATE) wa (ZIP CODE) 99404

DATE & PLACE OF INCORPORATION IF APPLICANT IS A CORPORATION
Wash Sp. 1986

1. SOURCE OF SUPPLY

IF SURFACE WATER	IF GROUND WATER
SOURCE (NAME OF STREAM, LAKE, SPRING, ETC.) (IF UNNAMED, SO STATE) <u>as required by SBPA and find that it is: <input type="checkbox"/> not an "action"</u>	SOURCE (WELL, TUNNEL, INFILTRATION TRENCH, ETC.) <u>Well</u>
TRIBUTARY <input checked="" type="checkbox"/> Categorical exempt.	SIZE AND DEPTH <u>6" 142'</u>

2. USE

USE TO WHICH WATER IS TO BE APPLIED (DOMESTIC SUPPLY, IRRIGATION, MINING, MANUFACTURING, ETC.)

Community Domestic

ENTER QUANTITY OF WATER REQUESTED USING UNITS OF: CUBIC FEET PER SECOND (CFS) OR GALLONS PER MINUTE (GPM) ACRE FEET PER YEAR

_____ OR 100 _____

TIMES DURING YEAR WATER WILL BE REQUIRED

Year Round as needed

IF IRRIGATION, NUMBER OF ACRES	IF DOMESTIC USE, NUMBER OF UNITS BY TYPE, E.G. 1-HOME, 1-MOBILE HOME, 2-CAMPSITES, ETC. <u>69 lots</u>	IF MUNICIPAL USE, ESTIMATED POPULATION 20 YEARS FROM TODAY
DATE PROJECT WAS OR WILL BE STARTED <u>10-7-91</u>	DATE PROJECT WAS OR WILL BE COMPLETED <u>10-93</u>	

3. LOCATION OF POINT OF DIVERSION/WITHDRAWAL

3A. IF IN PLATTED PROPERTY

LOT <u>24</u>	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION) <u>Cedar Ridge Estates</u>	SECTION <u>25</u>	TOWN <u>17N</u>	RANGE <u>2W</u>	ALSO, PLEASE ENCLOSE A COPY OF THE PLAT AND MARK THE POINT(S) OF WITHDRAWAL OR DIVERSION
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3B. IF NOT IN PLATTED PROPERTY

ON ACCOMPANYING SECTION MAPS, ACCURATELY MARK AND IDENTIFY EACH POINT OF DIVERSION, SHOW NORTH-SOUTH AND EAST-WEST DISTANCES FROM NEAREST SECTION CORNER OR PROPERTY CORNER

ALSO, ENTER BELOW THE DISTANCES FROM THE NEAREST SECTION OR PROPERTY CORNER TO THE DIVERSION OR WITHDRAWAL.

200 FEET NORTH - 800 FEET EAST of the center of Sec 17

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) <u>SW 1/4 NE 1/4</u>	SECTION <u>25</u>	TOWNSHIP N. <u>17</u>	RANGE (E. OR W.) W.M. <u>2W</u>	COUNTY <u>Thurston</u>
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4. DO YOU OWN THE LAND ON WHICH THIS SOURCE IS LOCATED. IF NOT, INSERT NAME & ADDRESS OF OWNER

yes

5. LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

ATTACH A COPY OF THE LEGAL DESCRIPTION OF THE PROPERTY (ON WHICH THE WATER WILL BE USED) TAKEN FROM A REAL ESTATE CONTRACT, PROPERTY DEED OR TITLE INSURANCE POLICY, OR, COPY CAREFULLY IN THE SPACE BELOW.

N 1/2 of the Sec 25, Twp 17 N. R. 2 W and
N 1/2 of the E 1/2 of the E 1/2 of Sec 24,
Thurston Co, St of Wa

HR
file'd
DSHS

WHAT IS YOUR INTEREST IN THE PROPERTY ON WHICH THE WATER IS TO BE USED (PROPERTY OWNER, LESSEE, CONTRACT PURCHASER, ETC.)
Property Owner

ARE THERE ANY EXISTING WATER RIGHTS RELATED TO THE LAND ON WHICH THE WATER IS TO BE USED (INCLUDING WATER PROVIDED BY IRRIGATION DISTRICTS OR DITCH COMPANIES.) YES NO

IF YES, FROM WHAT SOURCE (i.e. SURFACE OR GROUND WATER) AND UNDER WHAT AUTHORITY

6. DESCRIPTION OF SYSTEM PROPOSED OR INSTALLED

(FOR EXAMPLE: SIZE OF PUMP, CAPACITY OF PUMP, PUMP MOTOR HORSE POWER, PIPE DIAMETER, NUMBER OF SPRINKLERS, ETC.)
 The well will be equipped with a 3 HP Beckwith submersible pump with a rated capacity of 77 GPM at 80' W.P.H. It will pump into a 50,000 gal storage tank. From the storage tank we will use 2 - 1/2" H.P. 2 - 1/2" H.P. PVC pipe to supply 137 GPM of water to a 6" distribution main at 115 to 135 PSI.

REMARKS

7.

8. COMPLETE THIS SECTION ONLY IF THIS APPLICATION INCLUDES IRRIGATION AS A USE

IN ORDER TO IMPLEMENT THE PROVISIONS OF INITIATIVE MEASURE NUMBER 59, THE FAMILY FARM WATER ACT WHICH WAS PASSED BY THE VOTERS ON NOVEMBER 3, 1977, WE MUST ASK THE FOLLOWING QUESTIONS:

DOES THE TOTAL NUMBER OF ACRES IN WHICH YOU HAVE CONTROLLING INTEREST IN THE STATE OF WASHINGTON EXCEED 2000 ACRES FOR THE FOLLOWING THREE CATEGORIES:

- 1. LANDS THAT ARE BEING IRRIGATED UNDER WATER RIGHTS ACQUIRED AFTER DECEMBER 8, 1977. YES NO
- 2. LANDS THAT MAY BE IRRIGATED UNDER APPLICATIONS NOW ON FILE WITH THE DEPARTMENT OF ECOLOGY. YES NO
- 3. LANDS THAT MAY BE IRRIGATED UNDER THIS APPLICATION. YES NO

IF 10 ACRE-FEET OR MORE OF WATER IS TO BE STORED AND/OR IF THE WATER DEPTH WILL BE 10 FEET OR MORE AT THE DEEPEST POINT, A STORAGE PERMIT MUST BE FILED IN ADDITION TO THIS PERMIT. THESE FORMS CAN BE SECURED, TOGETHER WITH INSTRUCTIONS, FROM THE DEPARTMENT OF ECOLOGY.

SIGNATURES

J. W. Gale, Sr.
 APPLICANT'S SIGNATURE

High Tech Farms Corporation
 LEGAL LANDOWNER'S NAME
 (PLEASE PRINT)

J. W. Gale, Sr.
 LEGAL LANDOWNER'S SIGNATURE (OWNER OF PROPERTY DESCRIBED IN ITEM NUMBER 5)

3221 Shaw E. Puyallup, WA 98374
 LEGAL LANDOWNER'S ADDRESS

FOR OFFICE USE ONLY

STATE OF WASHINGTON }
 DEPARTMENT OF ECOLOGY } ss.

This is to certify that I have examined this application together with the accompanying maps and data, and am returning it for correction or completion as follows:

In order to retain its priority date, this application must be returned to the Department of Ecology, with corrections, on or before 19.....

Witness my hand this day of, 19.....

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

PERMIT

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

Surface Water (issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

Ground Water (issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE March 11, 1992	APPLICATION NUMBER G2-28422	PERMIT NUMBER G2-28422 P	CERTIFICATE NUMBER
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NAME Jerry Cate (High Tech Farms Corp.)			
ADDRESS (STREET) 3221 Shaw Road East	(CITY) Puyallup	(STATE) Washington	(ZIP CODE) 98374-1560

The applicant is, pursuant to the Report of Examination which has been accepted by the applicant, hereby granted a permit to appropriate the following described public waters of the State of Washington, subject to existing rights and to the limitations and provisions set out herein.

PUBLIC WATERS TO BE APPROPRIATED

SOURCE Well No. 2 (Cedar Ridge Estates)
TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 100	MAXIMUM ACRE-FEET PER YEAR 40
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QUANTITY, TYPE OF USE, PERIOD OF USE 40 acre-feet per year	Multiple domestic supply	Year-round, as needed
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LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL
200 feet north and 200 feet east of the center of Section 25.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) SW $\frac{1}{4}$ NE $\frac{1}{4}$	SECTION 25	TOWNSHIP N. 17	RANGE, (E. OR W.) W.M. 2W	W.R.L.A. 23	COUNTY Thurston
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RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF FLAT OR ADDITION)
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LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

The north half of Section 25, T. 17 N., R. 2 W.W.M., and the north half of the east half of the east half of Section 26, T. 17 N., R. 2 W.W.M., Thurston County, Washington.

DESCRIPTION OF PROPOSED WORKS

6" x 142' drilled well. Equipped with a 3 horsepower submersible pump discharging 100 gpm.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE: Started	COMPLETE PROJECT BY THIS DATE: June 1, 1995 01	WATER PUT TO FULL USE BY THIS DATE: June 1, 1996 00
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PROVISIONS

Installation and maintenance of an access port as described in WAC 173-160-355 is required. An air line and gauge may be installed in addition to the access port.

An approved metering device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through -040. Meter readings shall be recorded at least monthly.

The Water Resources Act of 1971 specifies certain criteria regarding utilization and management of the waters of the state in the best public interest. Use of water may be subject to regulation at certain times, based on the necessity to maintain water quantities sufficient for preservation of the natural environment.

Flowing wells shall be constructed and equipped with valves to ensure that the flow of water can be completely stopped when not in use. Likewise, the well shall be continuously maintained to prevent the waste of water through leaky casings, pipes, fittings, valves, or pumps -- either above or below land surface.

The Permittee is advised that notice of proof of appropriation of water (under which the final certificate of water right is issued) should not be filed until the permanent diversion facilities have been installed, and the system is currently in use. This includes installation of a mainline system capable of delivering the recommended quantity of water to an existing or proposed distribution system within the area to be served.

This permit is subject to the implementation of the minimum requirements established in the Interim Guidelines for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology and Conservation Programs, July 1990.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the states water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this permit, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or fail to give notice to the Department of Ecology on forms provided by that Department documenting such compliance.

Given under my hand and the seal of this office at Olympia, Washington,

this 2 day of September, 19 92.

Chuck Clarke, Director
Department of Ecology

ENGINEERING DATA
OK gfb

by Gale Blomston

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

REPORT OF EXAMINATION
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

- Surface Water (issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)
- Ground Water (issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE March 11, 1992	APPLICATION NUMBER G2-28422	PERMIT NUMBER	CERTIFICATE NUMBER
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NAME
Jerry Cate (High Tech Farms Corp.)

ADDRESS (STREET) 3221 Shaw Road East	(CITY) Puyallup	(STATE) Washington	(ZIP CODE) 98374-1560
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PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Well No. 2 (Cedar Ridge Estates)

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 100	MAXIMUM ACRE-FEET PER YEAR 40
QUANTITY, TYPE OF USE, PERIOD OF USE 40 acre-feet per year	Multiple domestic supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL
200 feet north and 200 feet east of the center of Section 25.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) SW $\frac{1}{4}$ NE $\frac{1}{4}$	SECTION 25	TOWNSHIP N. 17	RANGE, (E. OR W.) W.M. 2W	W.R.L.A. 23	COUNTY Thurston
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RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)
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LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

The north half of Section 25, T. 17 N., R. 2 W.W.M., and the north half of the east half of the east half of Section 26, T. 17 N., R. 2 W.W.M., Thurston County, Washington.

DESCRIPTION OF PROPOSED WORKS

6" x 142' drilled well. Equipped with a 3 horsepower submersible pump discharging 100 gpm.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	June 1, 1995	June 1, 1996 <i>02 03</i>

REPORT

BACKGROUND:

Under the provisions of Chapters 90.03 and 90.44 Revised Code of Washington (RCW), Jerry Cate c/o High Tech Farms of Puyallup, Washington filed an application to withdraw ground water from Well No. 2. The amount requested is 100 gallons per minute for the purpose of Multiple domestic supply. The application was accepted for processing, assigned Application No. G2-28422, and given a priority date of March 11, 1992.

The legal notice of the applicant's proposed withdrawal was duly published in the Tenino Independent of Tenino, Washington on April 8 and 15, 1992. No objections were received as a result of the public notice.

I recommend issuance of a permit, based on the following report.

INVESTIGATIONS:

On May 26, 1992, I conducted a field investigation in the company of Bill Larson, the engineer for this project. Mr. Larson showed me the well site and the proposed community development area. Other investigations included a review of area water well reports, existing water rights, claims, and an evaluation of information submitted with the application.

As a result of these investigations, the following is reported.

This project site, known as Cedar Ridge Estates, is located approximately five miles south of Tumwater off of McCorkle Road. The surrounding land use is comprised of single family homes and small farms.

The proposed development of Cedar Ridge Estates is situated within a 400 acre area, with each lot being approximately 5 acres in size. A total of 80 lots are planned. The main roads have been roughed in; the lots, which are all timbered, will remain untouched for each owner's discretion regarding clearing.

The main well for this development is Well No. 2 located on lot 24 on the south end of the Cedar Ridge Estates. This well is 6" X 142 feet in depth, equipped with a 5 inch diameter screen from 132' to 142'. The four hour pump test conducted by S-K Pumps & Drilling Co., showed a yield of 89 gpm with 50 feet of draw down. The well is located at the base of the rolling hills of this development. The static water level was + 3 feet above the casing at the completion of drilling indicating artesian pressure.

The well will be equipped with a 3 horsepower submersible pump discharging 100 gpm to a 60,000 gallon concrete storage tank. From the storage tank two 3 horsepower and two 5 horsepower booster pumps will supply water to a 6 inch distribution main line. Plans are to develop this property in three phases, with completion of the entire service system by June of 1995.

DISCUSSION:

Department of Ecology records show that within a half mile radius of this site, nine wells have been constructed, one of which was drilled for this proposed development, but only produced 3 gpm. These wells range in depth from 39 to 280 feet, and completed in fractured basalt with some gravel and sand.

No ground water rights have been issued within the same half mile radius. There is an unnamed tributary to Pitman Lake, that runs south through the applicant's property. Approximately ¼ mile south of this development a surface water certificate was issued that appears to be using water from the same unnamed tributary. The certificate authorizes the use of .1 cfs, 5 acre-feet per year for single domestic supply, stock watering and irrigation. Five claims have been registered within Section 25.

Report Continued

Two other ground water applications have been filed by the applicant for this development. Application No. G2-28424 requests a withdrawal of 200 gpm for a second supply source for this system from Well No. 3.

Application No. G2-28425 requests a withdrawal of 3 gpm, from Well No. 1 drilled for this development. Located at the northeast end of this development, this well will be connected to the main line system.

If any other new well is anticipated for this development, other than the three mentioned in this report, the applicant shall apply under a separate application and obtain authorization from this office prior to drilling it (Chapter 90.44.050 RCW, enclosed).

Based on water use requirements, well spacing for this area, the completed well depth, and the material encountered in the construction of this well, interference to existing wells and other rights is unlikely. However, the applicant is reminded of the responsibility towards existing right in this area, and advised that regulation of the withdrawal and pumping rate may be required if existing rights injuriously affected.

WATER REQUIREMENTS:

The water use requirements for a multiple domestic supply of this type should not exceed a daily average of 450 gallons per day per service. For 80 services this amounts to 40 acre-feet per year.

CONCLUSIONS:

In accordance with Chapters 90.03 and 90.44 RCW, I find there is water available for appropriation from the source in question, that the appropriation as recommended is a beneficial use, and will not impair existing rights or be detrimental to public welfare.

RECOMMENDATIONS:

I recommend approval of this application and issuance of a permit to allow appropriation of 100 gallons per minute from Well No. 2 for multiple domestic supply. The period of use shall be year round as needed. The total annual withdrawal shall not exceed 40 acre-feet per year.

Approval shall be subject to the following provisions.

The water appropriated under this application will be used for public water supply. The State Board of Health rules require public water supply owners to obtain written approval from the Office of Water Supply, Department of Health, Mail Stop LD-11, Building 3, Olympia, Washington 98504, prior to any new construction or alterations of a public water supply system.

Installation and maintenance of an access port as described in WAC 173-160-355 is required. An air line and gauge may be installed in addition to the access port.

An approved metering device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through -040 (installation, operation, and maintenance requirements are attached). Meter readings shall be recorded at least monthly.

The Water Resources Act of 1971 specifies certain criteria regarding utilization and management of the water of the State in the best public interest. Favorable consideration of this application has been based on sufficient waters available, at least during portions of the year. However, it is pointed out to the applicant that this use of water may be subject to regulation at certain times, based on the necessity to maintain water quantities sufficient for preservation² of the natural environment.

Flowing wells shall be constructed and equipped with valves to ensure that the flow of water can be completely stopped when not in use. Likewise, the well shall be continuously maintained to prevent the waste of water through leaky casings, pipes, fittings, valves, or pumps – either above or below land surface.

The applicant is advised that notice of proof of appropriation of water (under which the final certificate of water right is issued) should not be filed until the permanent diversion facilities have been installed, and the system is currently in use. This includes installation of a mainline system capable of delivering the recommended quantity of water to an existing or proposed distribution system within the area to be served.

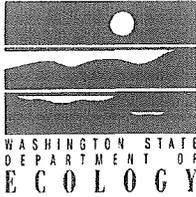
Report Continued

This permit is subject to the implementation of the minimum requirements established in the Interim Guidelines for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology and Conservation Programs, July 1990, (which is attached).

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the states water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this permit, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

REPORTED BY: Vivian Woodard Date: July 20, 1992

The statutory permit fee for this application is \$20.00.



APPLICATION FOR PERMIT

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

SURFACE WATER GROUND WATER

\$10.00 MINIMUM STATUTORY EXAMINATION FEE REQUIRED WITH APPLICATION

(GRAY BOXES FOR OFFICE USE ONLY)

APPLICATION NO <i>228423</i>	W.R.T.A. <i>23</i>	COUNTY <i>Thurston</i>	PRIORITY DATE <i>3/11/92</i>	TIME <i>3:59</i>	ACCEPTED <i>[initials]</i>
APPLICANT'S NAME - PLEASE PRINT <i>JERRY Cate, Pres High Tech Farms Corporation, Cedar Ridge Estates Well #3</i>			Bus. Tel. <i>845-7122</i>	Home Tel.	Other Tel.
ADDRESS (STREET) <i>3221 Shaw Rd E</i>	(CITY) <i>Puyallup</i>	(STATE) <i>Wg</i>	(ZIP CODE) <i>98374</i>		
DATE & PLACE OF INCORPORATION IF APPLICANT IS A CORPORATION <i>Wash St - 1986</i>					
1. SOURCE OF SUPPLY					
IF SURFACE WATER SOURCE (NAME OF STREAM, LAKE, SPRING, ETC.) (IF UNNAMED, SO STATE <i>as required by SCA and</i> <i>it is: <input type="checkbox"/> not an "action".</i>			IF GROUND WATER SOURCE (WELL, TUNNEL, INFILTRATION TRENCH, ETC.) <i>well</i> SIZE AND DEPTH <i>8" 150'</i>		
TRIBUTARY <i>3/11/92</i>			<input type="checkbox"/> categorically exempt.		
2. USE					
USE TO WHICH WATER IS TO BE APPLIED (DOMESTIC SUPPLY, IRRIGATION, MINING, MANUFACTURING, ETC.) <i>Domestic Community</i>					
ENTER QUANTITY OF WATER REQUESTED USING UNITS OF: CUBIC FEET PER SECOND (CFS) OR GALLONS PER MINUTE (GPM) ACRE FEET PER YEAR		<i>200</i>			
TIMES DURING YEAR WATER WILL BE REQUIRED <i>Year Round as needed</i>					
IF IRRIGATION, NUMBER OF ACRES		IF DOMESTIC USE, NUMBER OF UNITS BY TYPE, E.G. 1-HOME, 1-MOBILE HOME, 2-CAMPSITES, ETC. <i>64 lots</i>		IF MUNICIPAL USE, ESTIMATED POPULATION 20 YEARS FROM TODAY	
DATE PROJECT WAS OR WILL BE STARTED <i>Sept - 92</i>		DATE PROJECT WAS OR WILL BE COMPLETED <i>10 - 93</i>			
3. LOCATION OF POINT OF DIVERSION/WITHDRAWAL					
3A. IF IN PLATTED PROPERTY					
LOT <i>20</i>	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION) <i>Cedar Ridge Estates</i>	SECTION <i>25</i>	TOWN <i>17N</i>	RANGE <i>2W</i>
ALSO, PLEASE ENCLOSE A COPY OF THE PLAT AND MARK THE POINT(S) OF WITHDRAWAL OR DIVERSION					
3B. IF NOT IN PLATTED PROPERTY					
ON ACCOMPANYING SECTION MAPS, ACCURATELY MARK AND IDENTIFY EACH POINT OF DIVERSION, SHOW NORTH-SOUTH AND EAST-WEST DISTANCES FROM NEAREST SECTION CORNER OR PROPERTY CORNER					
ALSO, ENTER BELOW THE DISTANCES FROM THE NEAREST SECTION OR PROPERTY CORNER TO THE DIVERSION OR WITHDRAWAL. <i>1050 FEET NORTH & 300 FEET EAST OF THE CORNER OF SEC 25</i>					
LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) <i>5 1/4 NE 1/4</i>		SECTION <i>25</i>	TOWNSHIP N. <i>17</i>	RANGE (E. OR W.) W.M. <i>2W</i>	COUNTY <i>Thurston</i>
4. DO YOU OWN THE LAND ON WHICH THIS SOURCE IS LOCATED. IF NOT, INSERT NAME & ADDRESS OF OWNER <i>Yes</i>					
5. LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED					
ATTACH A COPY OF THE LEGAL DESCRIPTION OF THE PROPERTY (ON WHICH THE WATER WILL BE USED) TAKEN FROM A REAL ESTATE CONTRACT, PROPERTY DEED OR TITLE INSURANCE POLICY, OR, COPY CAREFULLY IN THE SPACE BELOW.					
<i>1/2 of Sec 25, Twn 17N, Rn 2W. and 1/4 of the E 1/2 of the E 1/2 of Sec 26, Twn 17N, Rn 2W. of the W. 1/2 in Thurston Co. State of Wa.</i>					
<i>HG Field DSHS</i>					

WHAT IS YOUR INTEREST IN THE PROPERTY ON WHICH THE WATER IS TO BE USED (PROPERTY OWNER, LESSEE, CONTRACT PURCHASER, ETC.)
Property owner

ARE THERE ANY EXISTING WATER RIGHTS RELATED TO THE LAND ON WHICH THE WATER IS TO BE USED (INCLUDING WATER PROVIDED BY IRRIGATION DISTRICTS OR DITCH COMPANIES.) YES NO

IF YES, FROM WHAT SOURCE (i.e. SURFACE OR GROUND WATER) AND UNDER WHAT AUTHORITY

6. DESCRIPTION OF SYSTEM PROPOSED OR INSTALLED

(FOR EXAMPLE: SIZE OF PUMP, CAPACITY OF PUMP, PUMP MOTOR HORSE POWER, PIPE DIAMETER, NUMBER OF SPRINKLERS, ETC.)
The plan for well #3 is to install two 3 HP pumps in the 3" casing to supply water to the 10,000 gal storage tank as a second supply source for the present system and for future demand as required.

7. REMARKS

8. COMPLETE THIS SECTION ONLY IF THIS APPLICATION INCLUDES IRRIGATION AS A USE

IN ORDER TO IMPLEMENT THE PROVISIONS OF INITIATIVE MEASURE NUMBER 59, THE FAMILY FARM WATER ACT WHICH WAS PASSED BY THE VOTERS ON NOVEMBER 3, 1977, WE MUST ASK THE FOLLOWING QUESTIONS:

DOES THE TOTAL NUMBER OF ACRES IN WHICH YOU HAVE CONTROLLING INTEREST IN THE STATE OF WASHINGTON EXCEED 2000 ACRES FOR THE FOLLOWING THREE CATEGORIES:

- 1. LANDS THAT ARE BEING IRRIGATED UNDER WATER RIGHTS ACQUIRED AFTER DECEMBER 8, 1977. YES NO
- 2. LANDS THAT MAY BE IRRIGATED UNDER APPLICATIONS NOW ON FILE WITH THE DEPARTMENT OF ECOLOGY. YES NO
- 3. LANDS THAT MAY BE IRRIGATED UNDER THIS APPLICATION. YES NO

IF 10 ACRE-FEET OR MORE OF WATER IS TO BE STORED AND/OR IF THE WATER DEPTH WILL BE 10 FEET OR MORE AT THE DEEPEST POINT, A STORAGE PERMIT MUST BE FILED IN ADDITION TO THIS PERMIT. THESE FORMS CAN BE SECURED, TOGETHER WITH INSTRUCTIONS, FROM THE DEPARTMENT OF ECOLOGY.

SIGNATURES

J. W. Coakley, Pres.
APPLICANT'S SIGNATURE

High Tech Farms Corporation
LEGAL LANDOWNERS NAME (PLEASE PRINT)

J. W. Coakley, Pres.
LEGAL LANDOWNER'S SIGNATURE (OWNER OF PROPERTY DESCRIBED IN ITEM NUMBER 5)

3221 Shaw E. Puyallup, WA. 98374
LEGAL LANDOWNER'S ADDRESS

FOR OFFICE USE ONLY

STATE OF WASHINGTON }
 DEPARTMENT OF ECOLOGY } ss.

This is to certify that I have examined this application together with the accompanying maps and data, and am returning it for correction or completion as follows:

In order to retain its priority date, this application must be returned to the Department of Ecology, with corrections, on or before, 19.....

Witness my hand this day of, 19.....

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

PERMIT

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

Surface Water (issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

Ground Water (issued in accordance with the provisions of Chapter 233, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE March 11, 1992	APPLICATION NUMBER G2-28424	PERMIT NUMBER G2-28424 P	CERTIFICATE NUMBER
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NAME Jerry Cate (High Tech Farms Corp.)			
ADDRESS (STREET) 3221 Shaw Road East	(CITY) Puyallup	(STATE) Washington	(ZIP CODE) 98374-1560

The applicant is, pursuant to the Report of Examination which has been accepted by the applicant, hereby granted a permit to appropriate the following described public waters of the State of Washington, subject to existing rights and to the limitations and provisions set out herein.

PUBLIC WATERS TO BE APPROPRIATED

SOURCE Well No. 3 (Cedar Ridge Estates)
TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 200	MAXIMUM ACRE-FEET PER YEAR 40 (supplemental)
QUANTITY, TYPE OF USE, PERIOD OF USE 40 acre-feet per year (supplemental)	Multiple domestic supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL
650 feet north and 300 feet east of the center of Section 25.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) SW $\frac{1}{4}$ NE $\frac{1}{4}$	SECTION 25	TOWNSHIP N. 17	RANGE, (E. OR W.) W.M. 2W	W.R.I.A. 23	COUNTY Thurston
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RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)
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LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

The north half of Section 25, T. 17 N., R. 2 W.W.M., and north half of the east half of the east half of Section 26, T. 17 N. R. 2 W.W.M., Thurston County, Washington.

DESCRIPTION OF PROPOSED WORKS

Proposed 8" x 150' drilled well. To be equipped with a 3 horsepower submersible pump discharging 200 gpm to a 60,000 gallon concrete reservoir.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE: June 1, 1993 / 2001	COMPLETE PROJECT BY THIS DATE: June 1, 1995 / 02	WATER PUT TO FULL USE BY THIS DATE: June 1, 1996 / 03
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PROVISIONS

"The authorized withdrawal rate (gpm) may be reduced at the time of issuance of a final water right certificate, to reflect the actual tested production of this well."

Installation and maintenance of an access port as described in WAC 173-160-355 is required. An air line and gauge may be installed in addition to the access port.

An approved metering device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through -040. Meter readings shall be recorded at least monthly.

All water wells constructed within the State shall meet the minimum standards for well construction and maintenance as provided under RCW 18.104, Washington Water Well Construction Act of 1972, and Chapter 173-160 WAC, Minimum Standards for Construction and Maintenance of Wells.

A completed well report of the well shall be submitted by the driller to the Department of Ecology within 30 days of completing this well. All pump test data for this well shall be submitted to the Department as it is obtained.

In accordance with WAC 173-160-205, wells shall not be located within certain minimum distances of potential sources of contamination. These minimum distances shall comply with local health regulations, as appropriate. In general, wells shall be located at least 100 feet from a sewer, septic tank, privy, or other source of contamination. Wells shall not be located within 1,000 feet of a solid waste landfill.

The Permittee is advised that notice of proof of appropriation of water (under which the final certificate of water right is issued) should not be filed until the permanent diversion facilities have been installed, and the system is currently in use. This includes installation of a mainline system capable of delivering the recommended quantity of water to an existing or proposed distribution system within the area to be served.

This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or fail to give notice to the Department of Ecology on forms provided by that Department documenting such compliance.

Given under my hand and the seal of this office at Olympia, Washington,

this 25th day of November, 19 92.

Fred Olson, Acting Director
Department of Ecology

ENGINEERING DATA
OK gb

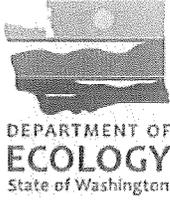
by Jane Blomquist



This permit is subject to the implementation of the minimum requirements established in the Interim Guidelines for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology and Conservation Programs, July 1990.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the states water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this permit, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

The Water Resources Act of 1971 specifies certain criteria regarding utilization and management of the waters of the state in the best public interest. Use of water may be subject to regulation at certain times, based on the necessity to maintain water quantities sufficient for preservation of the natural environment.



File NR G2-28424
WR Doc ID 2221621

State of Washington
AMENDED
WATER RIGHT PERMIT

PRIORITY DATE
3/11/1992

WATER RIGHT NUMBER
G2-28424

MAILING ADDRESS
CEDAR RIDGE ESTATES WATER ASSOCIATION
PO BOX 7236
OLYMPIA WA 98507

SITE ADDRESS (IF DIFFERENT)

Quantity Authorized for Withdrawal or Diversion

WITHDRAWAL OR DIVERSION RATE	UNITS	ANNUAL QUANTITY (AF/YR)
200	GPM	40

Purpose

PURPOSE	WITHDRAWAL OR DIVERSION RATE		UNITS	ANNUAL QUANTITY (AF/YR)		PERIOD OF USE (mm/dd)
	ADDITIVE	NON-ADDITIVE		ADDITIVE	NON-ADDITIVE	
Municipal	200		GPM	40		01/01 - 12/31

REMARKS: This permit is being amended to correct the location of the point of withdrawal.

ADDITIVE	IRRIGATED ACRES		PUBLIC WATER SYSTEM INFORMATION	
	NON-ADDITIVE		WATER SYSTEM ID	CONNECTIONS
			029386	

Source Location

COUNTY	WATERBODY	TRIBUTARY TO	WATER RESOURCE INVENTORY AREA
THURSTON	GROUNDWATER	N/A	23-UPPER CHEHALIS

SOURCE FACILITY/DEVICE	PARCEL	WELL TAG	TWP	RNG	SEC	QQ Q	LATITUDE	LONGITUDE
WELL 1	1272513100	AKY189	17N	02W	25	SW NE	46.9315	-122.8757

Datum: NAD83/WGS84

Place of Use

LEGAL DESCRIPTION OF AUTHORIZED PLACE OF USE

The place of use (POU) of this water right is the service area described in the most recent Water System Plan/Small Water System Management Program approved by the Washington State Department of Health, so long as the water system is and remains in compliance with the criteria in RCW 90.03.386(2). RCW 90.03.386 may have the effect of revising the place of use of this water right.

Proposed Works

6 inches in diameter x 142 feet deep. Screened from 132 to 142 feet below ground surface.

Development Schedule

BEGIN PROJECT	COMPLETE PROJECT	PUT WATER TO FULL USE
Started	Completed	June 1, 2021

Measurement of Water Use

How often must water use be measured?	Monthly
How often must water use data be reported to Ecology?	Upon Request by Ecology
What volume should be reported?	Total Annual Volume
What rate should be reported?	Annual Peak Rate of Withdrawal (gpm or cfs)

Provisions

Wells, Well Logs and Well Construction Standards

All wells constructed in the state shall meet the construction requirements of WAC 173-160 titled "Minimum Standards for the Construction and Maintenance of Wells" and RCW 18.104 titled "Water Well Construction". Any well which is unusable, abandoned, or whose use has been permanently discontinued, or which is in such disrepair that its continued use is impractical or is an environmental, safety or public health hazard shall be decommissioned.

All wells shall be tagged with a Department of Ecology unique well identification number. If you have an existing well and it does not have a tag, please contact the well-drilling coordinator at the regional Department of Ecology office issuing this decision. This tag shall remain attached to the well. If you are required to submit water measuring reports, reference this tag number.

Installation and maintenance of an access port as described in WAC 173-160- 291(3) is required.

Measurements, Monitoring, Metering and Reporting

An approved measuring device must be installed and maintained for each of the sources identified by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", WAC 173-173, which describes the requirements for data accuracy, device installation and operation, and information reporting. It also allows a water user to petition the Department of Ecology for modifications to some of the requirements.

Department of Health Requirements

Prior to any new construction or alterations of a public water supply system, the State Board of Health rules require public water supply owners to obtain written approval from the Office of Drinking Water of the Washington State Department of Health. Please contact the Office of Drinking Water at Southwest Drinking Water Operations, 243 Israel Road S.E., PO Box 47823, Tumwater, WA 98504-7823, (360) 236-3030.

Water Use Efficiency

The water right holder is required to maintain efficient water delivery systems and use of up-to-date water conservation practices consistent with RCW 90.03.005.

Proof of Appropriation

The water right holder shall file the notice of Proof of Appropriation of water (under which the certificate of water right is issued) when the permanent distribution system has been constructed and the quantity of water required by the project has been put to full beneficial use. The certificate will reflect the extent of the project perfected within the limitations of the permit. Elements of a proof inspection may include, as appropriate, the source(s), system instantaneous capacity, beneficial use(s), annual quantity, place of use, and satisfaction of provisions.

Schedule and Inspections

Department of Ecology personnel, upon presentation of proper credentials, shall have access at reasonable times, to the project location, and to inspect at reasonable times, records of water use, wells, diversions, measuring devices and associated distribution systems for compliance with water law.

This Permit Subject to Cancellation

This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or to give notice to the Department of Ecology on forms provided by the Department documenting such compliance.

Given under my hand and the seal of this office at Olympia, Washington this 23rd day of September 2016.

Department of Ecology

OK ML

by Michael J. Gallagher
Michael J. Gallagher
Section Manager

Date: October 3, 2016

Teresa Hanson:

The following is in response to your October 3, 2016 request for delivery information on your Certified Mail™ item number 9171999991703693296186. The delivery record shows that this item was delivered on September 26, 2016 at 11:32 am in OLYMPIA, WA 98501. The scanned image of the recipient information is provided below.

Signature of Recipient :



Address of Recipient :

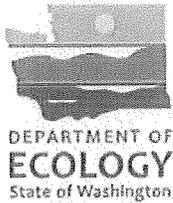
606 COLUMBIA
#212

Thank you for selecting the Postal Service for your mailing needs.

If you require additional assistance, please contact your local Post Office or postal representative.

Sincerely,
United States Postal Service

Re: 6228422 & 6228424



File NR G2-28424
WR Doc ID 2221621

State of Washington
SECOND AMENDED
WATER RIGHT PERMIT

PRIORITY DATE
3/11/1992

WATER RIGHT NUMBER
G2-28424

MAILING ADDRESS
CEDAR RIDGE ESTATES WATER ASSOCIATION
PO BOX 7236
OLYMPIA WA 98507

SITE ADDRESS (IF DIFFERENT)

Quantity Authorized for Withdrawal or Diversion

WITHDRAWAL OR DIVERSION RATE	UNITS	ANNUAL QUANTITY (AF/YR)
200	GPM	30.47

Purpose

PURPOSE	WITHDRAWAL OR DIVERSION RATE		ANNUAL QUANTITY (AF/YR)		PERIOD OF USE (mm/dd)
	ADDITIVE	NON-ADDITIVE	ADDITIVE	NON-ADDITIVE	
Municipal	200			30.47	01/01 - 12/31

REMARKS: This permit is being amended to correct the location of the point of withdrawal specified in the original permit, and to correct errors regarding the annual quantity and the service area in the first amended permit.

ADDITIVE	IRRIGATED ACRES		PUBLIC WATER SYSTEM INFORMATION	
	NON-ADDITIVE		WATER SYSTEM ID	CONNECTIONS
			029386	

Source Location

COUNTY	WATERBODY	TRIBUTARY TO				WATER RESOURCE INVENTORY AREA		
THURSTON	GROUNDWATER	N/A				23-UPPER CHEHALIS		
SOURCE FACILITY/DEVICE	PARCEL	WELL TAG	TWP	RNG	SEC	QQ Q	LATITUDE	LONGITUDE
WELL 1	1272513100	AKY189	17N	02W	25	SW NE	46.9315	-122.8757

Datum: NAD83/WGS84

Place of Use

LEGAL DESCRIPTION OF AUTHORIZED PLACE OF USE

The place of use (POU) of this water right is the area served by the Cedar Ridge Estates Water Association in the Cedar Ridge Estates Large Lot Subdivision in the North 1/2 of Section 25, in T. 17 N., R. 02 W. In the event that a water system plan for the Cedar Ridge Estates Water Association is

approved by Washington Department of Health, the place of use of this water right may be subject to change in accordance with RCW 90.03.386(2).

Proposed Works

6 inches in diameter x 142 feet deep. Screened from 132 to 142 feet below ground surface.

Development Schedule

BEGIN PROJECT	COMPLETE PROJECT	PUT WATER TO FULL USE
Started	Completed	June 1, 2021

Measurement of Water Use

How often must water use be measured?	Monthly
How often must water use data be reported to Ecology?	Upon Request by Ecology
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All wells shall be tagged with a Department of Ecology unique well identification number. If you have an existing well and it does not have a tag, please contact the well-drilling coordinator at the regional Department of Ecology office issuing this decision. This tag shall remain attached to the well. If you are required to submit water measuring reports, reference this tag number.

Installation and maintenance of an access port as described in WAC 173-160- 291(3) is required.

Measurements, Monitoring, Metering and Reporting

An approved measuring device must be installed and maintained for each of the sources identified by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", WAC 173-173, which describes the requirements for data accuracy, device installation and operation, and information reporting. It also allows a water user to petition the Department of Ecology for modifications to some of the requirements.

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Water Use Efficiency

The water right holder is required to maintain efficient water delivery systems and use of up-to-date water conservation practices consistent with RCW 90.03.005.

Proof of Appropriation

The water right holder shall file the notice of Proof of Appropriation of water (under which the certificate of water right is issued) when the permanent distribution system has been constructed and the quantity of water required by the project has been put to full beneficial use. The certificate will reflect the extent of the project perfected within the limitations of the permit. Elements of a proof inspection may include, as appropriate, the source(s), system instantaneous capacity, beneficial use(s), annual quantity, place of use, and satisfaction of provisions.

Schedule and Inspections

Department of Ecology personnel, upon presentation of proper credentials, shall have access at reasonable times, to the project location, and to inspect at reasonable times, records of water use, wells, diversions, measuring devices and associated distribution systems for compliance with water law.

This Permit Subject to Cancellation

This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or to give notice to the Department of Ecology on forms provided by the Department documenting such compliance.

Given under my hand and the seal of this office at Olympia, Washington this 25th day of October, 2016.

Department of Ecology

OK TH

by Michael J. Gallagher
Michael J. Gallagher
Section Manager

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

REPORT OF EXAMINATION
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

- Surface Water** (issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)
- Ground Water** (issued in accordance with the provisions of Chapter 203, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE March 11, 1992	APPLICATION NUMBER G2-28424	PERMIT NUMBER	CERTIFICATE NUMBER
---------------------------------	--------------------------------	---------------	--------------------

NAME Jerry Cate (High Tech Farms Corp.)			
ADDRESS (STREET) 3221 Shaw Road East	CITY Puyallup	STATE Washington	ZIP CODE 98374-1560

PUBLIC WATERS TO BE APPROPRIATED

SOURCE Well No. 3 (Cedar Ridge Estates)		
TRIBUTARY OF (IF SURFACE WATERS)		
MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 200	MAXIMUM ACRE-FEET PER YEAR 40 (supplemental)
QUANTITY, TYPE OF USE, PERIOD OF USE 40 acre-feet per year (supplemental)	Multiple domestic supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL
650 feet north and 300 feet east of the center of Section 25.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) SW $\frac{1}{4}$ NE $\frac{1}{4}$	SECTION 25	TOWNSHIP N. 17	RANGE, (E. OR W.) W.M. 2W	W.R.L.A. 23	COUNTY Thurston
--	---------------	-------------------	------------------------------	----------------	--------------------

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)
-----	-------	------------------------------------

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

The north half of Section 25, T. 17 N., R. 2 W.W.M., and north half of the east half of the east half of Section 26, T. 17 N. R. 2 W.W.M., Thurston County, Washington.

DESCRIPTION OF PROPOSED WORKS

Proposed 8" x 150' drilled well. To be equipped with a 3 horsepower submersible pump discharging 200 gpm to a 60,000 gallon concrete reservoir.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE: June 1, 1993	COMPLETE PROJECT BY THIS DATE: June 1, 1995	WATER PUT TO FULL USE BY THIS DATE: June 1, 1996
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REPORT

BACKGROUND:

Under the provisions of Chapters 90.03 and 90.44 Revised Code of Washington (RCW), Jerry Cate c/o High Tech Farms of Puyallup, Washington filed an application to withdrawal ground water from Well No. 3. The amount requested is 200 gallons per minute for the purpose of multiple domestic supply. The application was accepted for processing, assigned Application No. G2-28424, and given a priority date of March 11, 1992.

The legal notice of the applicant's proposed withdrawal was duly published in the Tenino Independent of Tenino, Washington on April 8 and 15, 1992. No objections were received as a result of the public notice.

I recommend issuance of a permit based on the following report.

INVESTIGATIONS:

On May 26, 1992, I conducted a field investigation in the company of Bill Larson, the engineer for this project. Mr. Larson showed me the proposed well site for Well No. 3 and the proposed development area. Other investigations included a review of area water well reports, existing water rights, claims, and an evaluation of information submitted with the application.

As a result of these investigations, the following is reported.

This project site, known as Cedar Ridge Estates, is located approximately five miles south of Tumwater off of McCorkle Road. The surrounding land use is comprised of single family homes and small farms.

The proposed development of Cedar Ridge Estates is situated within a 400 acre area, with each lot being approximately 5 acres in size. A total of 80 lots are planned. The main roads have been roughed in, wells No. 1 and 2 have been completed and have been applied for under G2-28425 and G2-28422 respectively. The lots which are all timbered, will remain untouched for each owner's discretion regarding clearing.

The main well for this development is Well No. 2 (G2-28422), and is located on lot 24 on the south end of Cedar Ridge Estates. Proposed Well No. 3, under this application, will be located approximately 200 to 300 feet north of Well No. 2. The anticipated dimensions are an eight inch casing to 150 feet, which will be equipped with two 3 horsepower submersible pumps discharging 200 gpm combined.

This third well will discharge to the 60,000 gallon concrete reservoir located by the main well, and will be used as a second supply source. From the reservoir storage tank two 3 horsepower and two 5 horsepower booster pumps will supply water to a 6 inch distribution main line. Plans are to develop this property in three phases, with completion of the water sources and service system by June of 1995.

DISCUSSIONS:

Department of Ecology records show that within a half mile radius of this site, nine wells have been constructed, two of which were drilled for this development (Well 1 and 2). The other seven wells in this area range in depth from 39 to 280 feet, are completed in fractured basalt with some gravel and sand.

No ground water rights have been issued within the same half mile radius. There is an unnamed tributary to Pitman Lake that runs south through the applicants property. Approximately ¼ mile south of this development a surface water certificate was issued that appears to be using water from the same unnamed tributary. The certificate authorizes the use of .1 cfs, 5 acre-feet per year for single domestic supply, stock watering and irrigation. Five claims have been registered within Section 25.

Report Continued

Two other ground water applications have been filed by the applicant for this development. Application No. G2-28422 (Well No. 2), has been recommended for issuance of a permit to allow withdrawal of 100 gpm; 40 acre-feet per year for multiple domestic supply for the planned 80 lots. Application No. G2-28425 (Well No. 1) requests a withdrawal of 3 gpm, is intended to augment supply to the north area of this development and will be connected to the main line system.

If any other new well is anticipated for this development, other than the three mentioned in this report, the applicant shall apply under a separate application and obtain authorization from this office prior to drilling it.

Based on water use requirements, and well spacing for this area, interference to other existing wells or existing rights is unlikely. However, the applicant is reminded of the responsibility towards existing rights in this area, and advised that regulation of the withdrawal and pumping rate may be required if existing rights are injuriously affected.

WATER REQUIREMENTS:

The water requirements for a multiple domestic supply of this type should not exceed a daily average of 450 gallons per day per service. For 80 homes this amounts to 40 acre-feet per year, and will be supplemental to existing rights.

CONCLUSIONS:

In accordance with Chapters 90.03 and 90.44 RCW, I find there is water available for appropriation from the source in question, that the appropriation as recommended is a beneficial use, and will not impair existing rights or be detrimental to public welfare.

RECOMMENDATIONS:

I recommend issuance of a permit to allow appropriation of 200 gallons per minute from Well No. 3 for multiple domestic supply. The period of use shall be year round as needed. The total annual withdrawal shall not exceed 40 acre-feet per year under all rights for this system.

Approval shall be subject to the following provisions.

"The authorized withdrawal rate (gpm) may be reduced at the time of issuance of a final water right certificate, to reflect the actual tested production of this well."

The water appropriated under this application will be used for public water supply. The State Board of Health rules require public water supply owners to obtain written approval from the Office of Water Supply, Department of Health, Mail Stop LD-11, Building 3, Olympia, Washington 98504, prior to any new construction or alterations of a public water supply system.

Installation and maintenance of an access port as described in WAC 173-160-355 is required. An air line and gauge may be installed in addition to the access port.

An approved metering device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through -040 (installation, operation, and maintenance requirements are attached). Meter readings shall be recorded at least monthly.

All water wells constructed within the State shall meet the minimum standards for well construction and maintenance as provided under RCW 18.104, Washington Water Well Construction Act of 1972, and Chapter 173-160 WAC, Minimum Standards for Construction and Maintenance of Wells.

A completed well report of the well shall be submitted by the driller to the Department of Ecology within 30 days of completing this well. All pump test data for this well shall be submitted to the Department as it is obtained.

The Water Resources Act of 1971 specifies certain criteria regarding utilization and management of the water of the State in the best public interest. Favorable consideration of this application has been based on sufficient waters available, at least during portions of the year. However, it is pointed out to the applicant that this use of water may be subject to regulation at certain times, based on the necessity to maintain water quantities sufficient for preservation of the natural environment.

Report Continued

In accordance with WAC 173-160-205, wells shall not be located within certain minimum distances of potential sources of contamination. These minimum distances shall comply with local health regulations, as appropriate. In general, wells shall be located at least 100 feet from a sewer, septic tank, privy, or other source of contamination. Wells shall not be located within 1,000 feet of a solid waste landfill.

The applicant is advised that notice of proof of appropriation of water (under which the final certificate of water right is issued) should not be filed until the permanent diversion facilities have been installed, and the system is currently in use. This includes installation of a mainline system capable of delivering the recommended quantity of water to an existing or proposed distribution system within the area to be served.

This permit is subject to the implementation of the minimum requirements established in the Interim Guidelines for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology and Conservation Programs, July 1990, (which is attached).

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the states water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this permit, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

REPORTED BY: Viola Winkler Date: July 20, 1992

The statutory permit fee for this application is \$20.00.

Well Protective Covenant

Well Protective Covenant

The Well Protective Covenant is noted on page 2 of the Cedar Ridge Estates Road Maintenance Association Road Maintenance Declaration and Agreement. All lot owners in Cedar Ridge Estates Large Lot Subdivision 0547 participate in the Road Maintenance Declaration and Agreement, including the lot owners within 100 feet of the well and any future wells. A copy of the Cedar Ridge Estates Road Maintenance Association Road Maintenance Declaration and Agreement, as recorded under Thurston County Auditor's File No. 9312030131, is provided on the following 6 pages.

existent prior to such use. All expenses for this repair will be borne by such individuals.

VI

ASSESSMENT, COLLECTION AND ENFORCEMENT

A). Assessment. From time to time, but not less frequently than once each calendar year, the Board will assess each tax parcel an amount established by the Board. The initial assessment is hereby set at \$100. per annum. If the cost of a project approved by the Board exceeds the funds on hand, the Board will assess the excess on a prorata basis in the same manner as annual contributions are assessed. All assessments will be binding on all members and property owners and if unpaid, become a lien on the land against which assessed.

B). Collection of Assessments. The Association will give written notice to each of the property owners in the Association of the amount of the assessment. Said assessments must be paid within thirty (30) days from the receipt of the notice of assessment. If the assessment is not paid within thirty (30) days from receipt of the notice, unless other payment arrangements have been made with the Board, the assessment will constitute a lien on the property of the delinquent owners, which lien may be enforced and foreclosed in the manner provided by law with respect to the lien of a mortgage. In the event foreclosure of the lien is necessary, the property owner will also be obligated to pay, in addition to the amount of the lien plus interest at the statutory rate, all costs and expenses incident to the enforcement of the lien, including reasonable attorney's fees. Members hereby designate the Association as their agent to bring a representative action required to collect from non-members. A statement signed by any two officers of the Association to the effect there are unpaid assessments as to any particular parcel will be binding on the Association. The Association may file a Notice of Lien with the Thurston County Auditor referencing this agreement and the amount(s) due.

C). Enforcement. It is agreed and understood that any assessments against the property which may become delinquent, together with interest calculated at the maximum legal rate from the date of assessment, and together with all costs of collection including reasonable attorney's fees, shall be a charge upon the property, a continuing lien thereon, and the personal obligation of the property owner or of such successor or successors in interest to the property owner as may then have any possessory interest in the lot. The Association and its successors or assigns, or any person or persons holding an easement to use the roads, may maintain and prosecute to judgement an action to collect

the assessment, together with such interest and costs, and to foreclose the lien. No person will be relieved of liability for an assessment by reason of non-use of the easement.

THURSTON COUNTY
OLYMPIA, WA
12/03/93 1:34 PM
REQUEST OF: CATE, JER
Sam S. Reed, AUDITOR
BY: VAL, DEPUTY
\$12.00 RMA

VII

BENEFIT OF COVENANT

The right and obligations set forth herein shall inure to and be binding upon the heirs, successors, or assigns of the parties hereto and will constitute a covenant running with the parcels of real estate affected hereby. High Tech Farms reserves the right to use any road or extensions thereof and utilities in perpetuity.

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VIII

DOCUMENT FOR OWNERS

Each new owner must sign the enclosed Exhibit "B" to become an owner and participant in Cedar Ridge.

Dated Dec 3, 1993



High Tech Farms Corporation
By J. W. Cate (President)
By J. W. Cate (Secretary)

STATE OF WASHINGTON
COUNTY OF Thurston
On this day personally appeared before me

to me known to be the individual described in and who executed the within and foregoing instrument, and acknowledged that signed the same as free and voluntary act and deed, for the uses and purposes therein mentioned.

GIVEN under my hand and official seal this day of 1993

Notary Public in and for the State of Washington, residing at

STATE OF WASHINGTON
COUNTY OF Thurston
On this 32 day of December 1993 before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared J. W. Cate

to me known to be the President and Secretary, respectively, of High Tech Farms Corporation the corporation that executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that he is authorized to execute the said instrument and that the seal affixed is the corporate seal of said corporation.

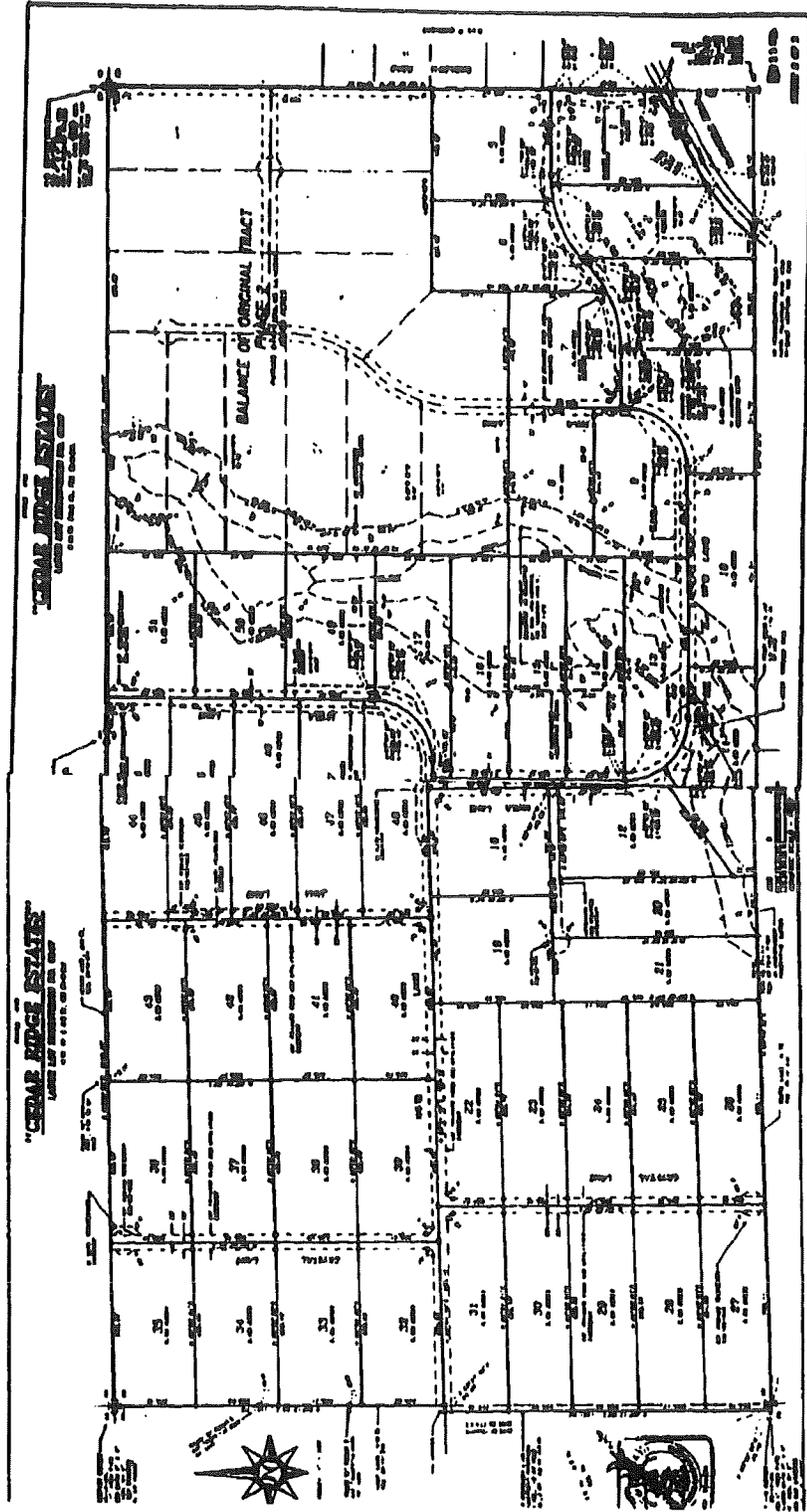
Witness my hand and official seal hereto affixed the day and year first above written.

Notary Public in and for the State of Washington, residing at

Exhibit "A"

N. 1/2 Sec 25 T2N 17 N. R. 2. W. W. M.

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POOR QUALITY
FOR MICROFILMING

Exhibit "B"

To be signed by all new owners upon transfer of ownership.

IN WITNESS WHEREOF, we as purchasers in a Project serviced by roads maintained by the Cedar Ridge Estates Road Maintenance Association Inc. hereby agree to become a participant within that Association and abide by all rules, regulations and agreements of that Association including paying the road assessment to maintain the roads. By signing our names to this document, we become a participant in that group.

PURCHASER

SELLER

PURCHASER

SELLER

Dated this _____ day of _____

STATE OF WASHINGTON)

) ss

COUNTY of Thurston)

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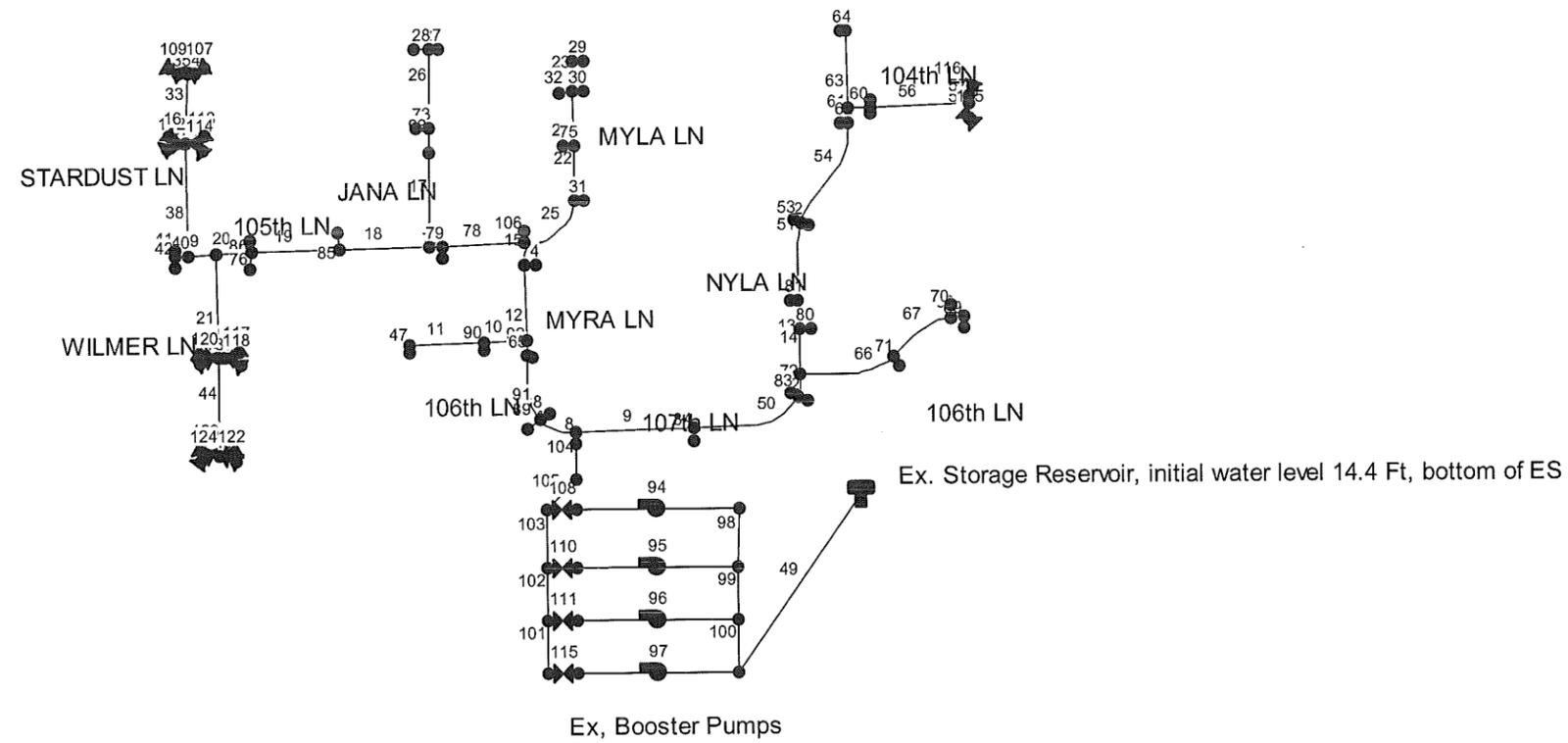
File No: 9312030131

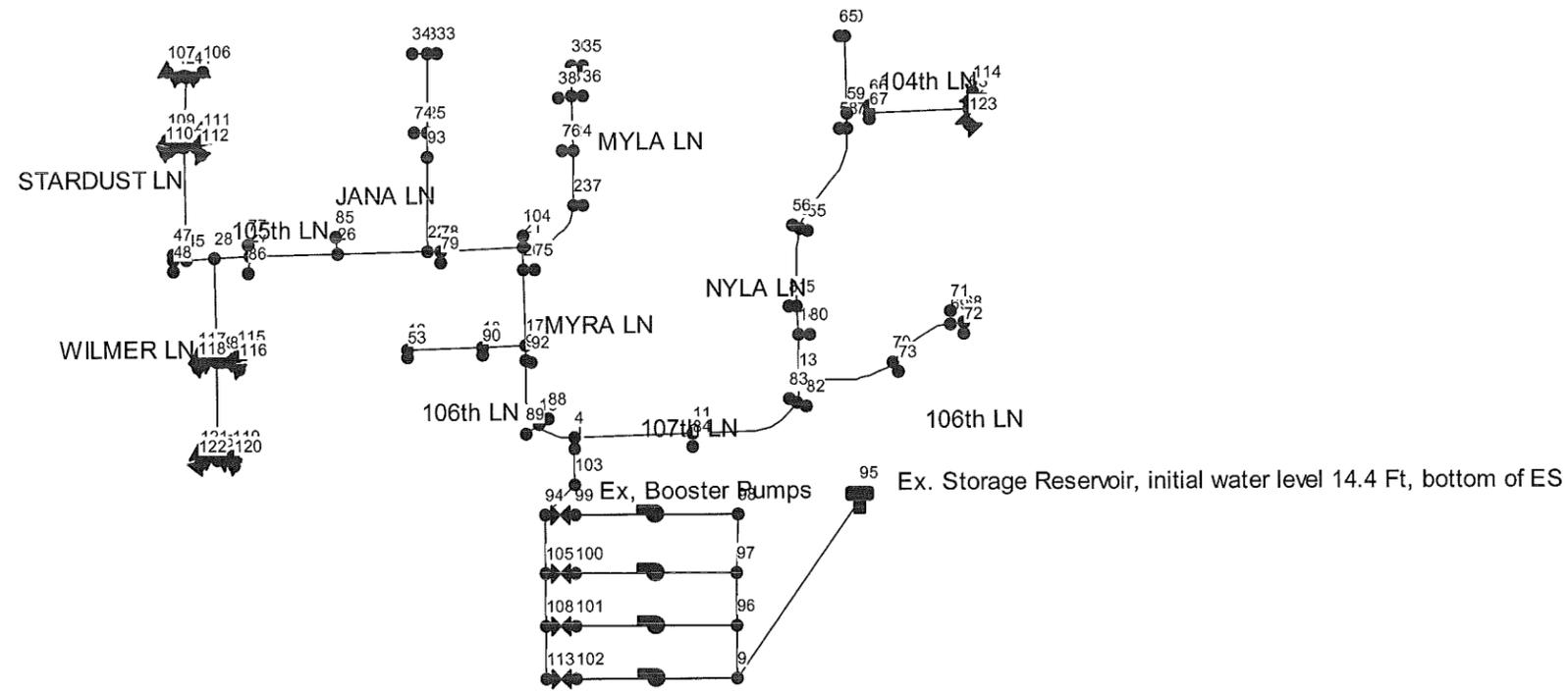
On this day, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared to me known to be the individual(s) described in and who executed the foregoing instrument and acknowledged that they signed the same as their free and voluntary act and deed, for the uses and purposes therein mentioned.

GIVEN under my hand and official seal this _____ day of _____ 19____.

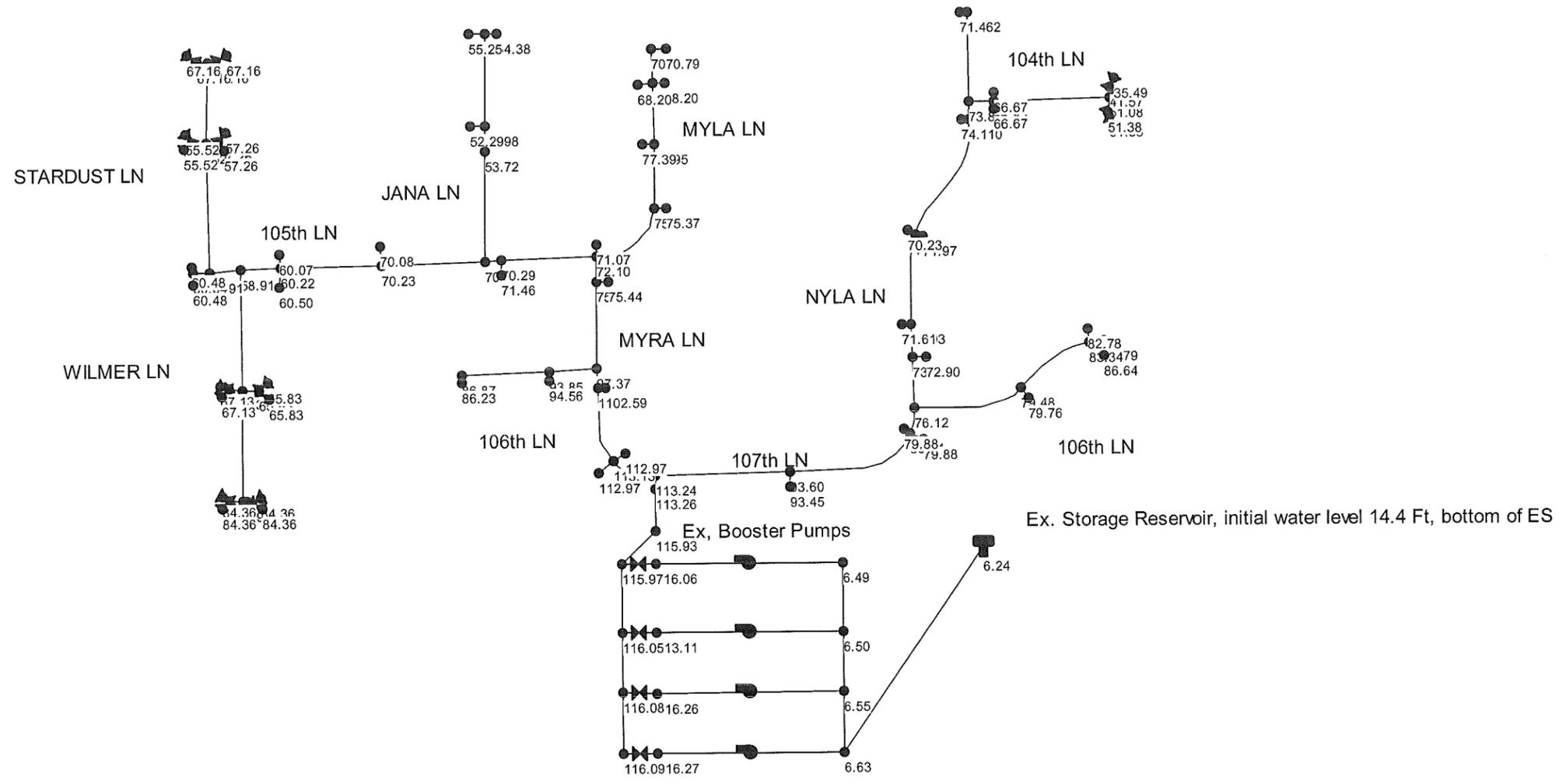
Notary Public in and for the
State of Washington, residing
at _____
My appointment expires: _____

EPANet Analysis

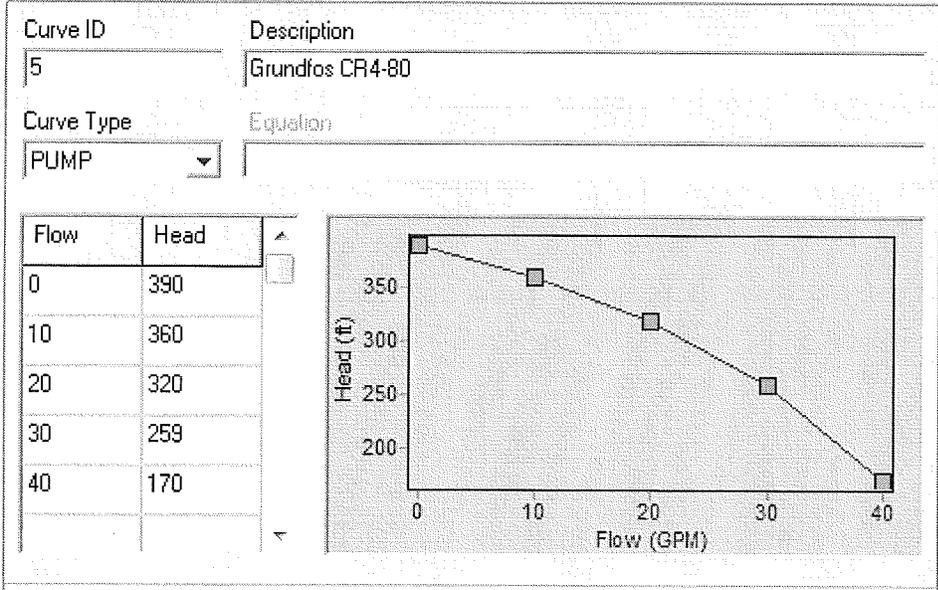
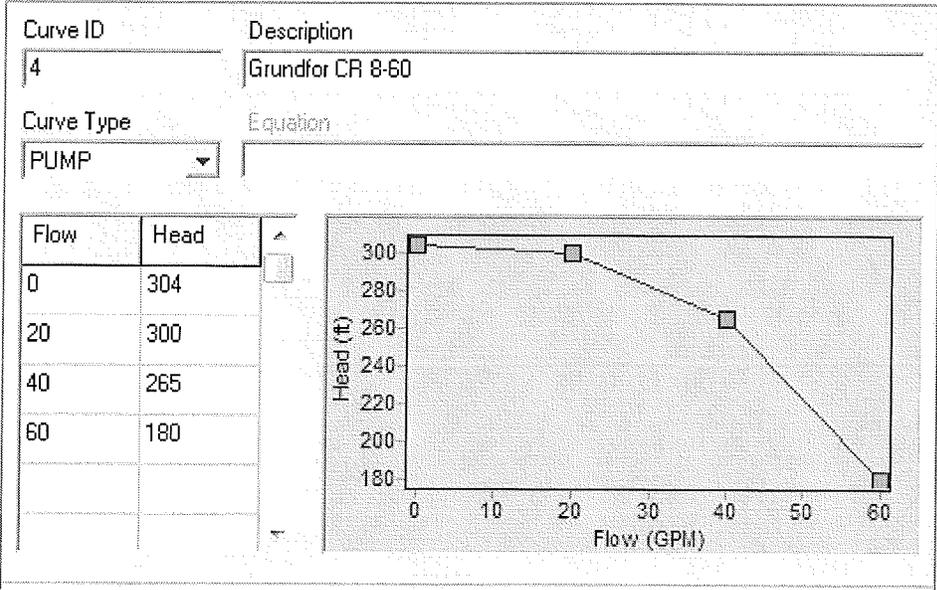


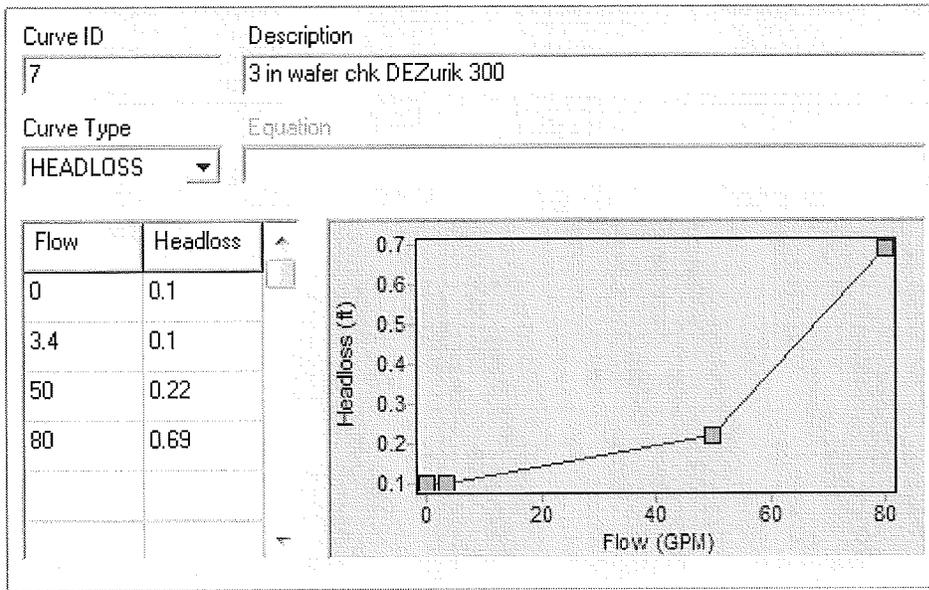
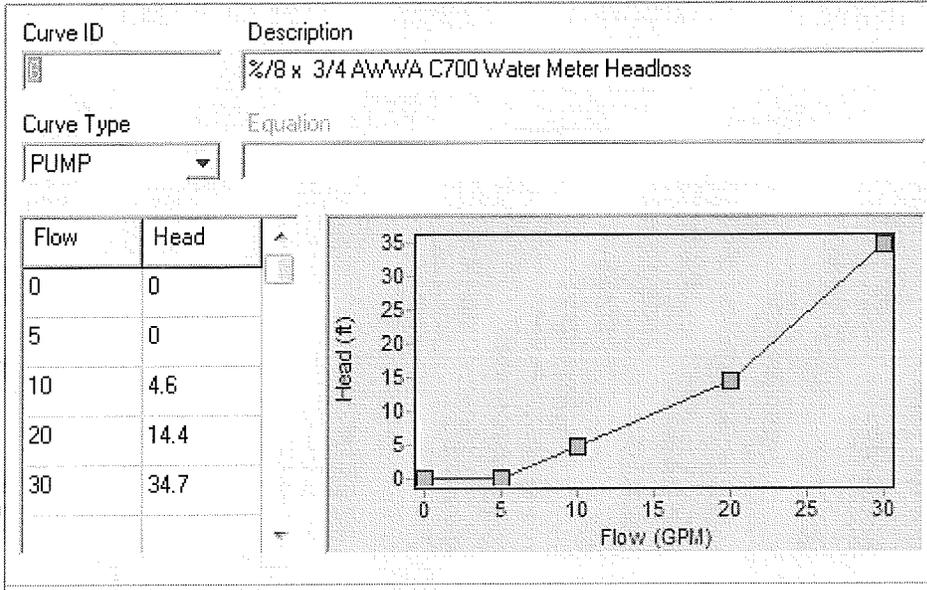


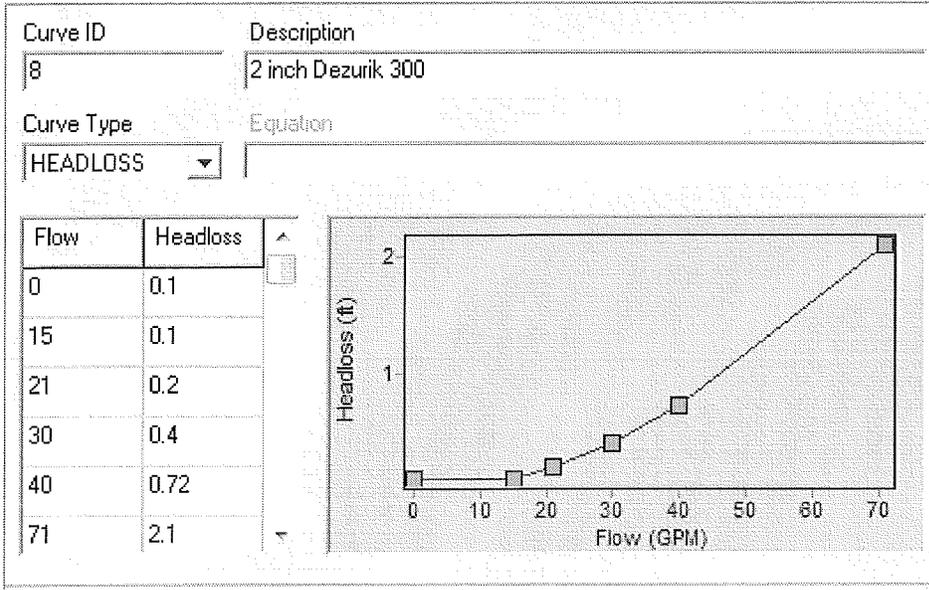
Existing System, Node ID's



Existing System, System Pressures at 147 gpm demand







Network Table - Nodes

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 9	238	0.00	253.30	6.63
Junc 1	244	0.00	505.40	113.26
Junc 4	244	0.00	505.35	113.24
Junc 11	289	0.00	505.02	93.60
Junc 12	320	0.00	504.72	80.04
Junc 13	329	0.00	504.67	76.12
Junc 14	336	0.00	504.59	73.05
Junc 15	336	0.00	504.55	73.03
Junc 16	244	0.00	505.09	113.13
Junc 17	280	0.00	504.73	97.37
Junc 18	288	0.00	504.59	93.85
Junc 19	304	0.00	504.49	86.87
Junc 20	330	0.00	504.46	75.59
Junc 21	338	0.00	504.39	72.10
Junc 22	342	0.00	504.20	70.28
Junc 23	330	0.00	504.30	75.52
Junc 24	324	0.00	503.89	77.95
Junc 25	384	0.00	503.96	51.98
Junc 26	342	0.00	504.08	70.23
Junc 27	365	0.00	503.98	60.22
Junc 28	368	0.00	503.95	58.91
Junc 29	349	0.00	503.21	66.82
Junc 30	340	0.00	503.73	70.94
Junc 31	346	0.00	503.74	68.35
Junc 32	380	0.00	503.86	53.67

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 33	378	2.12	503.50	54.38
Junc 34	376	2.12	503.50	55.25
Junc 35	340	2.12	503.37	70.79
Junc 36	346	2.12	503.39	68.20
Junc 37	330	2.12	503.94	75.37
Junc 39	348	0.00	503.35	67.31
Junc 40	372	0.00	503.43	56.95
Junc 41	348	0.00	502.99	67.16
Junc 42	348	0.00	502.99	67.16
Junc 43	370	0.00	502.14	57.26
Junc 44	374	0.00	502.14	55.52
Junc 45	368	0.00	503.95	58.91
Junc 46	364	0.00	503.95	60.64
Junc 47	364	2.12	503.59	60.48
Junc 48	364	2.12	503.59	60.48
Junc 49	347	0.00	501.92	67.13
Junc 50	306	0.00	502.98	85.35
Junc 51	307	0.00	501.69	84.36
Junc 52	309	0.00	501.69	83.49
Junc 53	304	4.25	503.01	86.23
Junc 54	338	0.00	504.45	72.12
Junc 55	338	2.12	504.09	71.97
Junc 56	342	2.12	504.09	70.23
Junc 57	334	0.00	504.33	73.80
Junc 58	332	4.25	503.04	74.11
Junc 59	334	0.00	504.32	73.80

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 60	338	0.00	504.21	72.02
Junc 61	350	0.00	504.21	66.82
Junc 62	386	0.00	503.87	51.08
Junc 63	386	0.00	481.94	41.57
Junc 64	384	4.25	502.59	51.38
Junc 65	338	4.25	502.92	71.46
Junc 66	350	2.12	503.86	66.67
Junc 67	350	2.12	503.86	66.67
Junc 68	304	0.00	504.31	86.79
Junc 69	312	0.00	504.34	83.34
Junc 70	321	0.00	504.42	79.48
Junc 71	312	4.25	503.05	82.78
Junc 72	304	2.12	503.95	86.64
Junc 73	320	2.12	504.07	79.76
Junc 74	382	4.25	502.67	52.29
Junc 75	330	2.12	504.11	75.44
Junc 78	342	0.00	504.21	70.29
Junc 79	338	4.25	502.93	71.46
Junc 80	336	2.12	504.24	72.90
Junc 81	338	4.25	503.26	71.61
Junc 82	320	2.12	504.36	79.88
Junc 83	320	2.12	504.36	79.88
Junc 84	289	2.12	504.66	93.45
Junc 85	342	2.12	503.73	70.08
Junc 86	364	2.12	503.63	60.50
Junc 87	350	0.00	501.92	65.83

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
June 88	244	2.12	504.73	112.97
June 89	244	2.12	504.73	112.97
June 90	286	2.12	504.23	94.56
June 91	270	0.00	504.76	101.72
June 92	268	4.25	504.76	102.59
June 93	380	0.00	503.97	53.72
June 96	238	0.00	253.11	6.55
June 97	238	0.00	253.01	6.50
June 98	238	0.00	252.98	6.49
June 99	238	0.00	505.86	116.06
June 100	245	0.00	506.04	113.11
June 101	238	0.00	506.32	116.26
June 102	238	0.00	506.34	116.27
June 103	238	0.00	505.55	115.93
June 104	340	2.12	504.03	71.07
June 106	348	2.12	502.99	67.16
June 107	348	2.12	502.99	67.16
June 109	374	2.12	502.14	55.52
June 110	374	2.12	502.14	55.52
June 111	370	2.12	502.14	57.26
June 112	370	2.12	502.14	57.26
June 115	350	2.12	501.92	65.83
June 116	350	2.12	501.92	65.83
June 117	347	2.12	501.92	67.13
June 118	347	2.12	501.92	67.13
June 119	307	2.12	501.69	84.36

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 120	307	2.12	501.69	84.36
Junc 121	307	2.12	501.69	84.36
Junc 122	307	2.12	501.69	84.36
Junc 38	346	2.12	503.39	68.20
Junc 76	324	4.25	502.61	77.39
Junc 77	365	2.12	503.63	60.07
Junc 94	238	0.00	505.65	115.97
Junc 105	238	0.00	505.83	116.05
Junc 108	238	0.00	505.90	116.08
Junc 113	238	0.00	505.92	116.09
Junc 114	386	19.62	467.91	35.49
Junc 123	384	0.00	502.59	51.38
Tank 95	239	-146.99	253.40	6.24

Network Table - Links

Link ID	Length ft	Diameter in	Roughness	Flow GPM
Pipe 8	20	6	120	146.99
Pipe 9	660	6	120	62.07
Pipe 10	258	2.5	120	6.37
Pipe 11	414	2.5	120	4.25
Pipe 12	420	6	120	-70.06
Pipe 13	156	6	120	-45.09
Pipe 14	246	6	120	-47.22
Pipe 15	130	6	120	-67.93
Pipe 17	600	3	120	-8.49
Pipe 18	500	6	120	40.34
Pipe 19	480	6	120	38.21
Pipe 20	190	6	120	33.97
Pipe 21	560	3	120	16.99
Pipe 22	300	2.5	120	-10.61
Pipe 23	170	2.5	120	-2.12
Pipe 24	290	2.5	120	-6.37
Pipe 25	450	4	120	-12.74
Pipe 26	420	2.5	120	-4.25
Pipe 27	60	1	120	-2.12
Pipe 28	60	1	120	2.12
Pipe 29	60	1	120	-2.12
Pipe 30	60	1	120	-2.12
Pipe 31	60	1	120	-2.12
Pipe 33	330	2.5	120	-4.25
Pipe 34	60	1	120	-2.12

Link ID	Length ft	Diameter in	Roughness	Flow GPM
Pipe 35	60	1	120	2.12
Pipe 36	60	1	120	-4.25
Pipe 37	60	1	120	4.25
Pipe 38	660	3	120	-12.74
Pipe 39	155	6	120	16.98
Pipe 40	80	6	120	4.25
Pipe 41	60	1	120	-2.12
Pipe 42	60	1	120	2.12
Pipe 43	60	1	120	-4.25
Pipe 44	630	3	120	8.49
Pipe 45	60	1	120	-4.25
Pipe 46	60	1	120	4.25
Pipe 47	69	1	120	-4.25
Pipe 48	210	6	100	84.91
Pipe 50	650	6	120	59.95
Pipe 51	450	6	120	40.85
Pipe 52	60	1	120	-2.12
Pipe 53	60	1	120	2.12
Pipe 54	610	6	120	-36.60
Pipe 55	60	1	120	4.25
Pipe 56	550	4	120	-23.87
Pipe 57	60	1	120	-19.62
Pipe 58	60	1	120	-2.12
Pipe 59	60	1	120	2.12
Pipe 60	125	4	120	-28.11
Pipe 61	100	6	120	-32.36

Link ID	Length ft	Diameter in	Roughness	Flow GPM
Pipe 62	60	1	120	4.25
Pipe 63	420	2.5	120	-4.25
Pipe 64	60	1	120	-4.25
Pipe 66	660	3	120	-8.49
Pipe 67	400	3	120	-6.37
Pipe 68	1000	3	120	-2.12
Pipe 69	60	1	120	-2.12
Pipe 70	60	1	120	4.25
Pipe 71	60	1	120	-2.12
Pipe 72	120	6	120	-55.71
Pipe 73	60	1	120	-4.25
Pipe 74	60	1	120	-2.12
Pipe 77	60	1	120	-4.25
Pipe 78	460	6	120	53.07
Pipe 79	60	6	120	48.83
Pipe 80	60	1	120	-2.12
Pipe 81	60	1	120	-4.25
Pipe 82	60	1	120	-2.12
Pipe 83	60	1	120	2.12
Pipe 84	60	1	120	-2.12
Pipe 85	60	1	120	-2.12
Pipe 86	60	1	120	-2.12
Pipe 87	60	1	120	-4.25
Pipe 88	60	1	120	-2.12
Pipe 89	60	1	120	2.12
Pipe 90	60	1	120	2.12

Link ID	Length ft	Diameter in	Roughness	Flow GPM
Pipe 91	400	6	120	80.67
Pipe 92	50	6	120	-76.42
Pipe 65	1000	12	100	-4.25
Pipe 93	40	3	120	8.49
Pipe 49	40	6	120	146.99
Pipe 98	4	3	120	-42.85
Pipe 99	4	3	120	-85.67
Pipe 100	4	3	120	-116.32
Pipe 101	4	3	110	30.67
Pipe 102	4	3	110	61.32
Pipe 103	4	3	110	104.14
Pipe 104	60	6	120	146.99
Pipe 106	60	1	120	2.12
Pipe 32	60	1	120	2.12
Pipe 75	60	1	120	4.25
Pipe 76	60	1	120	-2.12
Pipe 105	6	4	120	-146.99
Pump 94	#N/A	#N/A	#N/A	42.85
Pump 95	#N/A	#N/A	#N/A	42.82
Pump 96	#N/A	#N/A	#N/A	30.65
Pump 97	#N/A	#N/A	#N/A	30.67
Valve 107	#N/A	.625	#N/A	2.12
Valve 109	#N/A	.625	#N/A	2.12
Valve 112	#N/A	.625	#N/A	2.12
Valve 113	#N/A	.625	#N/A	2.12
Valve 114	#N/A	.645	#N/A	2.12

Link ID	Length ft	Diameter in	Roughness	Flow GPM
Valve 117	#N/A	.625	#N/A	2.12
Valve 118	#N/A	.625	#N/A	2.12
Valve 119	#N/A	.625	#N/A	2.12
Valve 120	#N/A	.625	#N/A	2.12
Valve 121	#N/A	.625	#N/A	2.12
Valve 122	#N/A	.625	#N/A	2.12
Valve 123	#N/A	.625	#N/A	2.12
Valve 124	#N/A	.625	#N/A	2.12
Valve 16	#N/A	0.625	#N/A	2.12
Valve 108	#N/A	3	#N/A	42.85
Valve 110	#N/A	3	#N/A	42.82
Valve 111	#N/A	1.25	#N/A	30.65
Valve 115	#N/A	1.25	#N/A	30.67
Valve 116	#N/A	0.625	#N/A	19.62
Valve 125	#N/A	0.625	#N/A	4.25

Network Table - Links

Link ID	Velocity fps	Status
Pipe 8	1.67	Open
Pipe 9	0.70	Open
Pipe 10	0.42	Open
Pipe 11	0.28	Open
Pipe 12	0.79	Open
Pipe 13	0.51	Open
Pipe 14	0.54	Open
Pipe 15	0.77	Open
Pipe 17	0.39	Open
Pipe 18	0.46	Open
Pipe 19	0.43	Open
Pipe 20	0.39	Open
Pipe 21	0.77	Open
Pipe 22	0.69	Open
Pipe 23	0.14	Open
Pipe 24	0.42	Open
Pipe 25	0.33	Open
Pipe 26	0.28	Open
Pipe 27	0.87	Open
Pipe 28	0.87	Open
Pipe 29	0.87	Open
Pipe 30	0.87	Open
Pipe 31	0.87	Open
Pipe 33	0.28	Open
Pipe 34	0.87	Open

Link ID	Velocity fps	Status
Pipe 35	0.87	Open
Pipe 36	1.73	Open
Pipe 37	1.73	Open
Pipe 38	0.58	Open
Pipe 39	0.19	Open
Pipe 40	0.05	Open
Pipe 41	0.87	Open
Pipe 42	0.87	Open
Pipe 43	1.73	Open
Pipe 44	0.39	Open
Pipe 45	1.73	Open
Pipe 46	1.73	Open
Pipe 47	1.73	Open
Pipe 48	0.96	Open
Pipe 50	0.68	Open
Pipe 51	0.46	Open
Pipe 52	0.87	Open
Pipe 53	0.87	Open
Pipe 54	0.42	Open
Pipe 55	1.73	Open
Pipe 56	0.61	Open
Pipe 57	8.01	Open
Pipe 58	0.87	Open
Pipe 59	0.87	Open
Pipe 60	0.72	Open
Pipe 61	0.37	Open

Link ID	Velocity fps	Status
Pipe 62	1.73	Open
Pipe 63	0.28	Open
Pipe 64	1.73	Open
Pipe 66	0.39	Open
Pipe 67	0.29	Open
Pipe 68	0.10	Open
Pipe 69	0.87	Open
Pipe 70	1.73	Open
Pipe 71	0.87	Open
Pipe 72	0.63	Open
Pipe 73	1.73	Open
Pipe 74	0.87	Open
Pipe 77	1.73	Open
Pipe 78	0.60	Open
Pipe 79	0.55	Open
Pipe 80	0.87	Open
Pipe 81	1.73	Open
Pipe 82	0.87	Open
Pipe 83	0.87	Open
Pipe 84	0.87	Open
Pipe 85	0.87	Open
Pipe 86	0.87	Open
Pipe 87	1.73	Open
Pipe 88	0.87	Open
Pipe 89	0.87	Open
Pipe 90	0.87	Open

Link ID	Velocity fps	Status
Pipe 91	0.92	Open
Pipe 92	0.87	Open
Pipe 65	0.01	Open
Pipe 93	0.39	Open
Pipe 49	1.67	Open
Pipe 98	1.95	Open
Pipe 99	3.89	Open
Pipe 100	5.28	Open
Pipe 101	1.39	Open
Pipe 102	2.78	Open
Pipe 103	4.73	Open
Pipe 104	1.67	Open
Pipe 106	0.87	Open
Pipe 32	0.87	Open
Pipe 75	1.73	Open
Pipe 76	0.87	Open
Pipe 105	3.75	Open
Pump 94	0.00	Open
Pump 95	0.00	Open
Pump 96	0.00	Open
Pump 97	0.00	Open
Valve 107	2.22	Open
Valve 109	2.22	Open
Valve 112	2.22	Open
Valve 113	2.22	Open
Valve 114	2.08	Open

Link ID	Velocity fps	Status
Valve 117	2.22	Open
Valve 118	2.22	Open
Valve 119	2.22	Open
Valve 120	2.22	Open
Valve 121	2.22	Open
Valve 122	2.22	Open
Valve 123	2.22	Open
Valve 124	2.22	Open
Valve 16	2.22	Open
Valve 108	1.95	Open
Valve 110	1.94	Open
Valve 111	8.01	Open
Valve 115	8.02	Open
Valve 116	20.52	Open
Valve 125	4.44	Open

Iron and Manganese Water Treatment Plans

SECTION 25 TOWNSHIP 17 NORTH RANGE 02 WEST, W.M.
THURSTON COUNTY

GENERAL NOTES

1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE 2018 STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION BY THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION, WASHINGTON STATE DEPARTMENT OF HEALTH REGULATIONS, AND AMERICAN WATER WORKS ASSOCIATION STANDARDS AND THE MANUFACTURERS' RECOMMENDATIONS.
2. ALL ELECTRICAL WORK AND MATERIALS SHALL COMPLY WITH THE NATIONAL ELECTRICAL CODE AND WAC 246-46B (ELECTRICAL SAFETY STANDARDS), PUGET SOUND ENERGY REQUIREMENTS, AND THE MANUFACTURERS' SPECIFICATIONS AND REQUIREMENTS AND ALL LOCAL CODES AND REGULATIONS. CONDUCTORS AND GROUNDING PER WAC 246-46B REQUIREMENTS. FURNISH AND INSTALL JUNCTION BOXES AS REQUIRED FOR ALL CIRCUITS. ALL JUNCTION BOXES, FIXTURES, AND CONDUITS SHALL BE SURFACE MOUNTED ON THE BUILDING INTERIOR.
3. UNDERGROUND WATER LINE PIPE SHALL BE IRON PIPE SIZE CLASS 200 PVC CONFORMING TO ASTM D2241 WITH JOINTS MEETING THE STANDARD OR ASTM D3139 USING RESTRAINED RUBBER GASKETS MEETING THE REQUIREMENTS OF ASTM F477.
4. UNDERGROUND WATERMAIN VALVES SHALL BE NON-RISING STEM RESILIENT WEDGE GATE VALVES WITH ENDS FOR IRON PIPE SIZE PVC PIPE, AMERICAN FLOW CONTROL OR APPROVED EQUAL. VALVES SHALL BE EQUIPPED WITH 2 INCH SQUARE OPERATING NUT AND CAST IRON TWO PIECE VALVE BOX WITH BASE. VALVE BOXES SHALL BE COAL TAR EPOXY PAINTED BY THE MANUFACTURER. VALVE BOX COVERS SHALL HAVE THE WORD "WATER" CAST INTO THE COVER. VALVES SHALL BE EQUIPPED WITH THRUST BLOCKING TO RESTRAIN THE VALVES BOTH FROM WATER LINE THRUST AND TORQUE APPLIED TO THE VALVE THROUGH THE OPERATING NUT.
5. ALL UNDERGROUND PIPE SHALL BE INSTALLED WITH CONTINUOUS PLASTIC MARKING TAPE, BLUE, WITH THE WORD "WATER" IMPRINTED ON IT, INSTALLED 12 TO 18 INCHES UNDER THE FINAL GROUND SURFACE. ALL UNDERGROUND PIPE SHALL BE INSTALLED WITH CONTINUOUS 14 GAUGE BLUE THIN TONING WIRE TAPPED TO THE TOP OF THE PIPE AND LEAD UP INSIDE THE BUILDING AND INSIDE ALL VALVE BOXES.
6. FLUSH, DISINFECT AND OBTAIN SATISFACTORY BACTERIOLOGICAL SAMPLES FROM THE TERMINAL END OR NEW WATERLINE/POINT OF CONNECTION TO EXISTING WATER LINES AND FROM SAMPLE TAPS INSIDE THE BUILDING AS NOTED.
7. ALL INTERIOR WATER LINES SHALL BE SUPPORTED FROM THE FLOOR OR WALLS OF THE BUILDING WITH FABRICATED PIPE HANGERS AND SUPPORTS IN ACCORDANCE WITH PLUMBING CODE REQUIREMENTS. PROVIDE UNIONS OR FLANGED JOINTS AS NECESSARY SO THAT SYSTEM COMPONENTS CAN BE READILY REMOVED AND REPLACED. MANUALLY OPERATED VALVES SHALL BE NO-LEAD BRASS NSF LISTED GATE VALVES. SAMPLE TAPS SHALL BE POLLARD WATER TAPING AND WITH 2 INCH NO HARD WATER BYPASS VALVE AND WITH TWO CLACK V3069 1 INCH MOTORIZED ALTERNATING VALVES. THE NO HARD WATER BYPASS VALVES AND THE ALTERNATING VALVES SHALL OPERATE AUTOMATICALLY.
8. INSTALL ALL EQUIPMENT IN ACCORDANCE WITH THE MANUFACTURERS' RECOMMENDATIONS.
9. ALL PIPE INTERIOR TO THE BUILDING SHALL BE STANDARD WEIGHT GALVANIZED STEEL PIPE WITH 150 LB MALLEABLE IRON GALVANIZED BANDED FITTINGS OR SHALL BE SCHEDULE 80 PVC WITH SOLVENT WELD FITTINGS.
10. CALL UNDERGROUND LOCATE AT 1 (800) 424-5555 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.

WATER TREATMENT SYSTEM

THE WATER TREATMENT SYSTEM SHALL CONSIST OF 6 MASTER WATER CONDITIONING CORP. MP-MAC-BOT CATION EXCHANGE WATER SOFTENERS OPERATING IN PARALLEL WITH INTERLOCKED CONTROL VALVES. THE WATER SOFTENERS SHALL OPERATE TO REMOVE IRON AND MANGANESE FROM WATER SUPPLIED BY THE EXISTING WELL AND TO STORE THE TREATED WATER IN THE EXISTING WATER STORAGE RESERVOIR. EACH MP-MAC-BOT SHALL BE EQUIPPED WITH A MINERAL TANK WITH DISTRIBUTOR AND WITH 2 CUBIC FEET OF ALDEX C-800 CATION EXCHANGE MEDIA, WITH A BRINE TANK WITH A MASTER WATER CONDITIONING CORP. 454 SHUTOFF VALVE ASSEMBLY WITH A MASTER WATER CONDITIONING CORP. 1 INCH MP-MFC CONTROL VALVE, A CLACK V7030 1 INCH NO HARD WATER BYPASS VALVE AND WITH TWO CLACK V3069 1 INCH MOTORIZED ALTERNATING VALVES. THE NO HARD WATER BYPASS VALVES AND THE ALTERNATING VALVES SHALL OPERATE AUTOMATICALLY.

CONDUCT A FULL SCALE PILOT TEST OF THE INSTALLED WATER TREATMENT SYSTEM.

PILOT TEST PROTOCOL

THE FULL SCALE PILOT TEST WILL BE CONDUCTED TO SAMPLE RAW WATER AND TREATED WATER QUALITY PERIODICALLY UNTIL THE SYSTEM HAS COMPLETED AT LEAST THREE REGENERATION CYCLES WITH THE TREATED WATER IRON AND MANGANESE LEVELS AT 1/4 OR LESS OF THE MAXIMUM CONTAMINANT LEVELS FOR IRON AND MANGANESE. AT THE AVERAGE ANNUAL RATE OF WATER DEMAND AND WITH THE CURRENT NUMBER OF CUSTOMERS, IT IS EXPECTED THAT 3 REGENERATION CYCLES WILL BE ACHIEVED IN APPROXIMATELY 5 DAYS. THE ACTUAL TIME PERIOD FOR 3 REGENERATION CYCLES DEPENDS ON THE ACTUAL WATER DEMAND AT THE TIME SINCE REGENERATION IS TRIGGERED BASED ON METERED WATER DEMAND.

FULL SCALE REGENERATION CYCLES TIME AND FLOW RATES ARE SET BASED ON THE RECOMMENDATIONS OF THE EQUIPMENT MANUFACTURER, MASTER WATER CONDITIONING CORPORATION. THE FULL SCALE PILOT TEST WILL VERIFY THAT THE REGENERATION CYCLES TIMES AND FLOW RATES ARE ADEQUATE TO PRODUCE TREATED WATER WITH IRON AND MANGANESE LEVELS CONTINUOUSLY BELOW THE SECONDARY MAXIMUM CONTAMINANT LEVELS.

THE FULL SCALE PILOT TEST WILL DOCUMENT THE QUALITY OF THE RAW WATER SUPPLIED TO THE FULL SCALE PILOT TEST EQUIPMENT DURING THE PILOT TEST. SAMPLE RAW AND TREATED WATER THREE TIMES DAILY DURING THE FULL SCALE PILOT TEST. IRON AND MANGANESE CONCENTRATIONS WILL BE ROUTINELY FIELD MEASURED USING THURSTON PUD TEST EQUIPMENT. AT A MAXIMUM INTERVAL OF 3 DAYS AND BEFORE THE REGENERATION CYCLE OCCURS, COLLECT ONE EACH RAW AND TREATED WATER SAMPLES FOR TESTING AT A CERTIFIED WATER TESTING LAB FOR MANGANESE CONCENTRATIONS. RECORD SOURCE METER READINGS DAILY WHEN THE SAMPLES ARE COLLECTED.

FIELD MEASURE RAW AND TREATED WATER PH ONCE DAILY DURING THE PILOT TEST. FIELD MEASURE RAW AND TREATED WATER FERROUS IRON ONCE EVERY THIRD DAY DURING THE PILOT TEST.

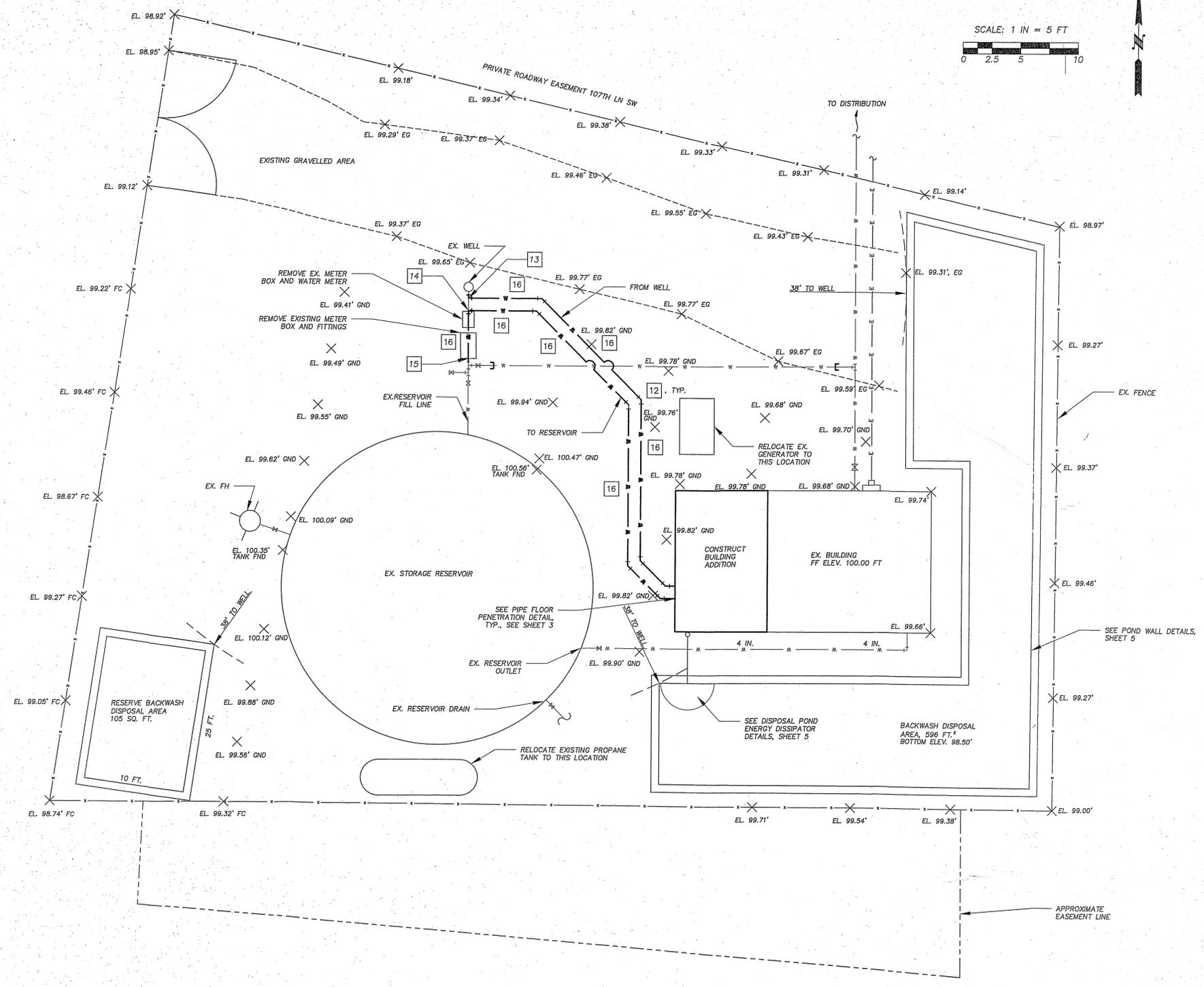
COLLECT SAMPLES AND OBTAIN TESTING LABORATORY RESULTS FOR HARDNESS, ALKALINITY, AND TOTAL ORGANIC CARBON FOR RAW AND TREATED WATER ONCE EVERY THIRD DAY DURING THE PILOT TEST.

FIELD MEASURE SAMPLES COLLECTED FROM THE RECYCLE TANK FOR IRON AND MANGANESE FOLLOWING EACH REGENERATION.

RECORD REGENERATION CYCLE LENGTHS AND FLOW RATES DURING THE PILOT TEST. IF ADJUSTMENTS ARE MADE TO ANY OF THE CYCLE LENGTHS OR FLOW RATES RECORD THE CHANGES, RECORD THE TIME AND DATE AND SOURCE METER READING WHEN THE ADJUSTMENTS (IF ANY) ARE MADE.

CALL BEFORE YOU DIG.

THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT 1-800-424-5555 A MINIMUM OF 48 HOURS PRIOR TO ANY CONSTRUCTION.



SHEET INDEX

- 1 - SITE PLAN
- 2 - BUILDING INTERIOR LAYOUT
- 3 - BUILDING INTERIOR DETAILS
- 4 - RECYCLE TANK DETAILS
- 5 - BACKWASH DISPOSAL DETAILS
- 6 - WATER TREATMENT PROCESS DIAGRAM
- 7 - BUILDING DETAILS
- 8 - EROSION CONTROL

LEGEND

- EXISTING FENCE
- W — CONSTRUCT UNDERGROUND WATERLINE
- W — EXISTING UNDERGROUND WATERLINE
- E — EXISTING UNDERGROUND ELECTRIC SERVICE
- × INDICATES EX. GROUND ELEVATIONS

NOTES

- 12 4 IN. 45° BEND (MJ), 2-MJ RESTRAINING GLAND, TRANSITION GASKETS
- 13 4 IN. 90° BEND (MJ) FIELD LOK GASKETS
4 IN. MJ PLUG TAPPED 2 IN. (NPT)
2 IN. NO LEAD BRONZE NIPPLE (NPT)
- 14 4 IN. 90° BEND (MJ), 2-MJ RESTRAINING GLAND, TRANSITION GASKETS
- 15 CONNECT TO EXISTING TEE, ADAPTERS AS REQUIRED
- 16 4 IN. CLASS 200 IPS PVC ASTM D2241

NO	DATE	BY	APPR	REVISIONS

JWMA Civil and Municipal Engineering and Planning
Jerome W. Morrissette & Associates Inc., P.S.
 1700 Cooper Pt. Road S.W. #B-2, Olympia, Wa. 98502-1110 Ph 360.352.9456 Fx 360.352.9990

Approved By _____
 DESIGNED BY 02/26/2019 DATE
 MH 02/26/2019 DATE
 C.A.D.D. BY DATE
 DE 02/26/2019 DATE
 CHECKED BY DATE
 02/27/2019 DATE PLOTTED

THURSTON COUNTY PUD 1

CEDAR RIDGE WATER TREATMENT SITE PLAN
 18108 SHT 1 OF 8

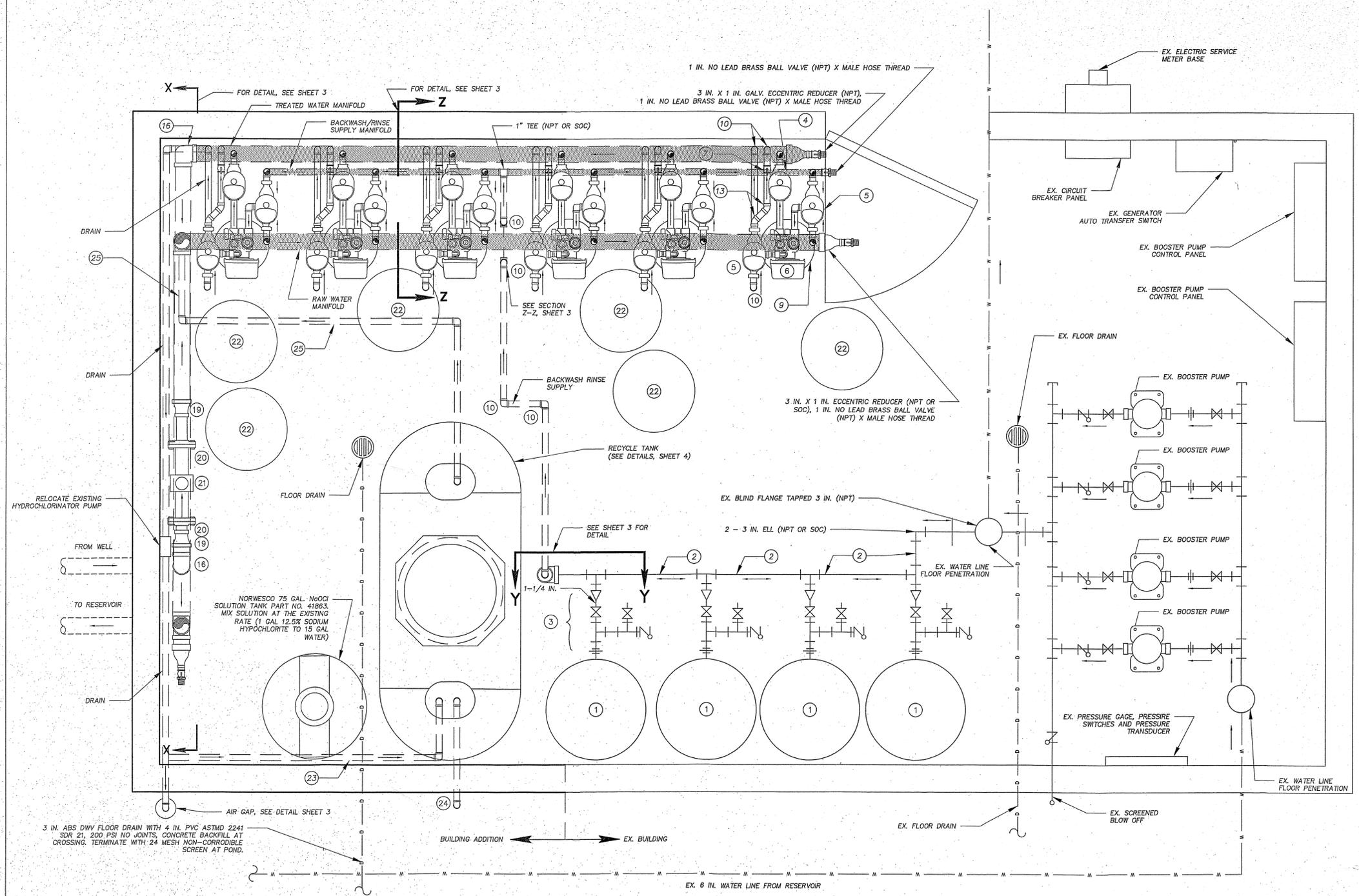


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TPN: 12725131100

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2/28/2019 9:06:50 AM Thurston PUD Cedar Ridge Water Treatment\JWMA Drawings\18108 Thurston PUD Cedar Ridge Water Treatment.dwg, 2/28/2019 9:06:50 AM



- NOTES**
- 1 EX. 119 GAL. BLADDER TANK, UNION, AND PRESSURE RELIEF VALVE. RELOCATE AS SHOWN
 - 2 3 IN. GALV. SCH40 STEEL OR SCH80 PVC PIPE
 - 3 REINSTALL EXISTING 1-1/4 IN. UNION, ASME PRESSURE RELIEF VALVE, DRAIN VALVE, AND BALL VALVE. FITTINGS AS REQUIRED.
 - 4 1 IN. NO HARD WATER BYPASS VALVE WITH CLACK FITTINGS AS REQUIRED
 - 5 1 IN. MOTORIZED ALTERNATING VALVE WITH CLACK FITTINGS AS REQUIRED
 - 6 1 IN. CLACK CONTROL VALVE WSI
 - 7 1 IN. BALL VALVE
 - 8 1/2 IN. CHROME SMOOTH SNOOT SAMPLE TAP
 - 9 ION EXCHANGE FILTER TANKS
 - 10 1 IN. 90° ELL (NPT)
 - 11 1 IN. TEE (NPT)
 - 12 1 IN. UNION
 - 13 1 IN. 45° ELL (NPT)
 - 14 1 IN. FLOWMATIC 80DI CHECK VALVE
 - 15 1" TEE (NPT), 1" X 1/2" BUSHING
 - 16 GALV. 3 IN. 90° ELL (NPT)
 - 17 3 IN. BALL VALVE
 - 18 3" X 3" X 1" TEE (NPT)
 - 19 3" X 2" REDUCER
 - 20 2 IN. BRONZE METER FLANGE
 - 21 2 IN. MASTER METER MULTIJET WATER METER FLANGED, GALLON REGISTER
 - 22 BRINE TANK
 - 23 RECYCLE TANK FILL
 - 24 RECYCLE TANK VENT
 - 25 FROM RECYCLE TANK



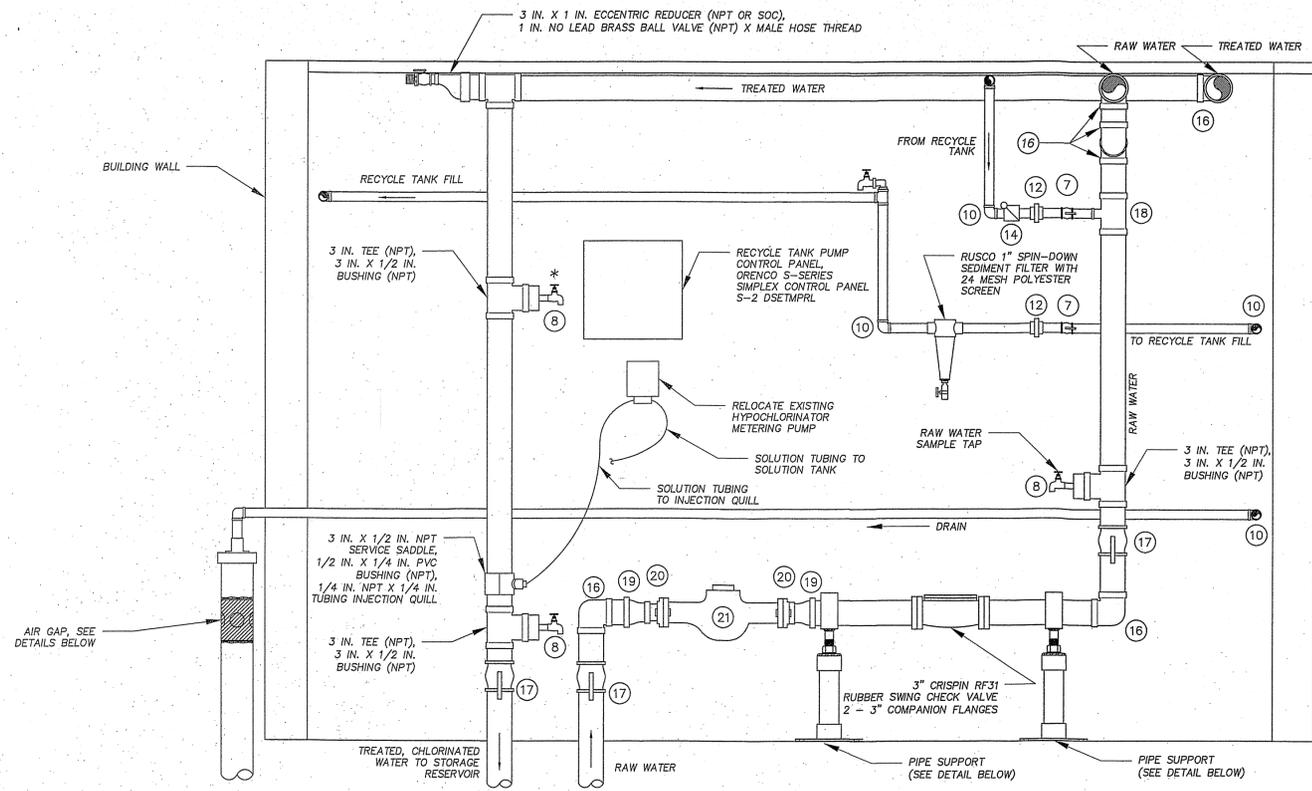
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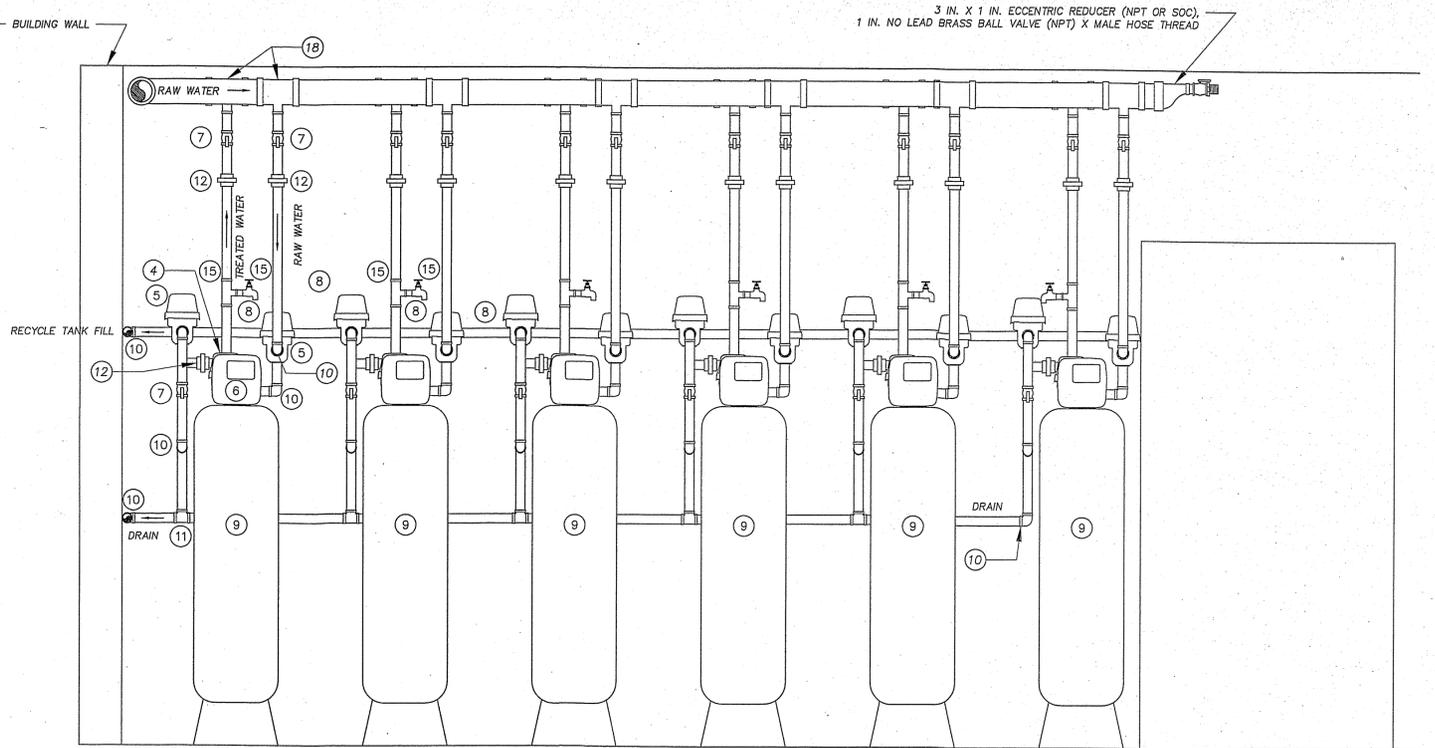
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 DE CHECKED BY 02/27/2019 DATE
 DATE PLOTTED 02/28/2019

THURSTON COUNTY PUD

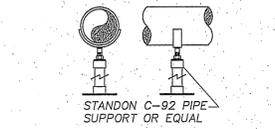
CEDAR RIDGE WATER TREATMENT BUILDING INTERIOR LAYOUT



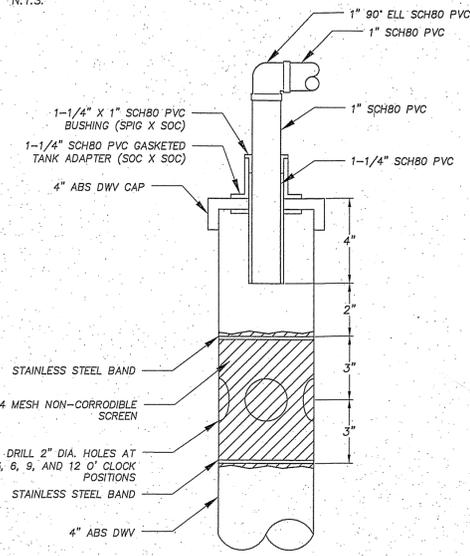
X-X: WEST WALL ELEVATION
N.T.S.



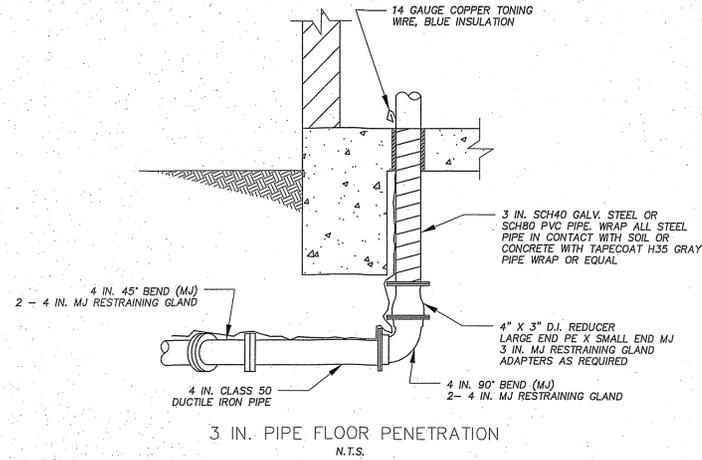
NORTH WALL ELEVATION AT ION EXCHANGE TANKS
N.T.S.



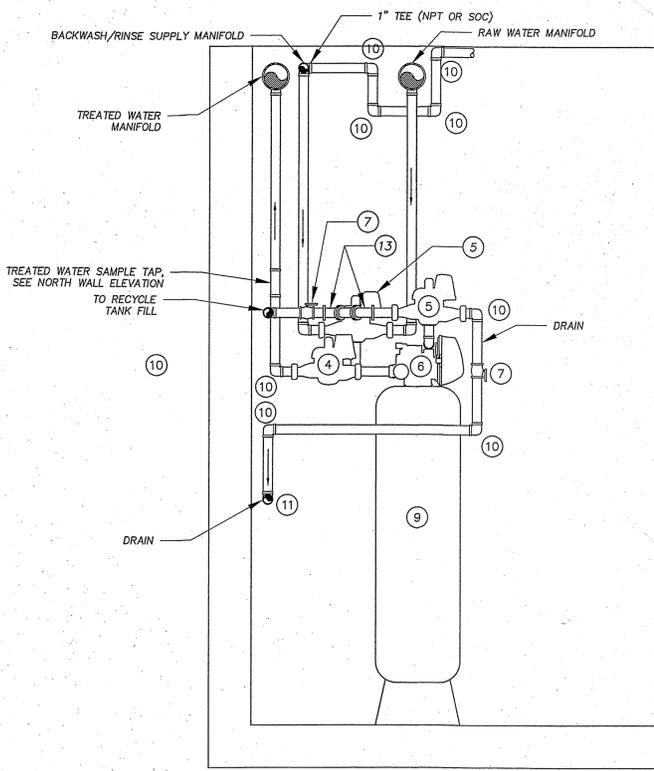
PIPE SADDLE SUPPORT DETAIL
N.T.S.



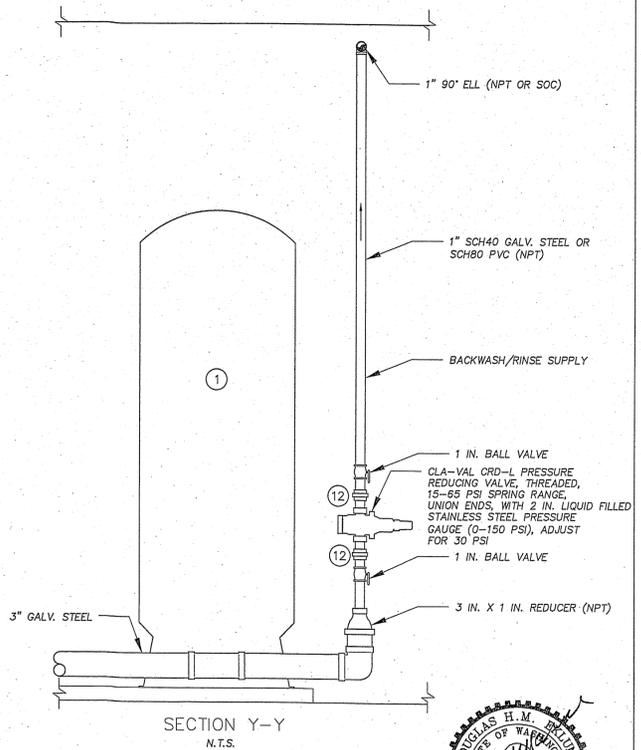
AIR GAP DETAIL
N.T.S.



3 IN. PIPE FLOOR PENETRATION
N.T.S.



SECTION Z-Z
N.T.S.



SECTION Y-Y
N.T.S.



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 1700 Cooper Pt. Road S.W. #B-2, Olympia, Wa. 98502-1110 Ph 360.352.9456 Fx 360.352.9990

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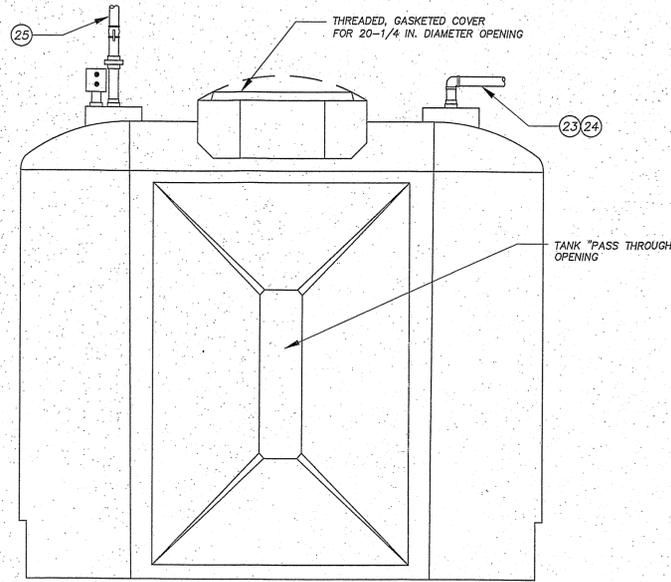
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THURSTON COUNTY PUD 1

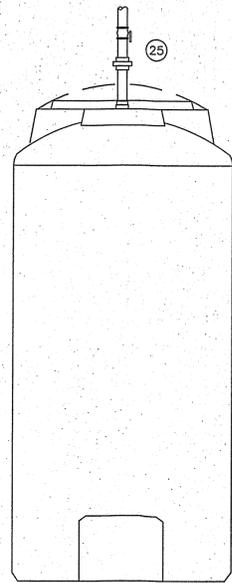
CEDAR RIDGE WATER TREATMENT BUILDING INTERIOR DETAILS

18108

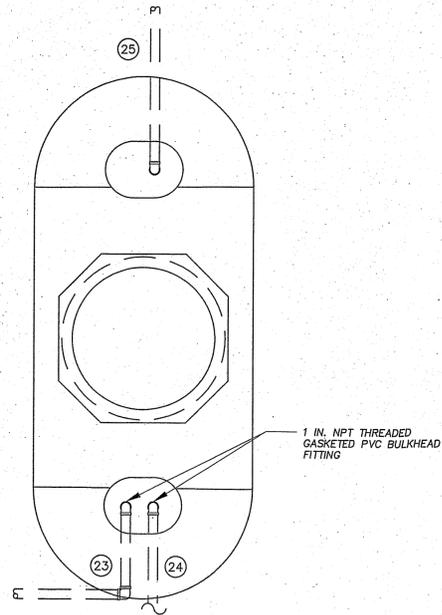
SHT 3 OF 8



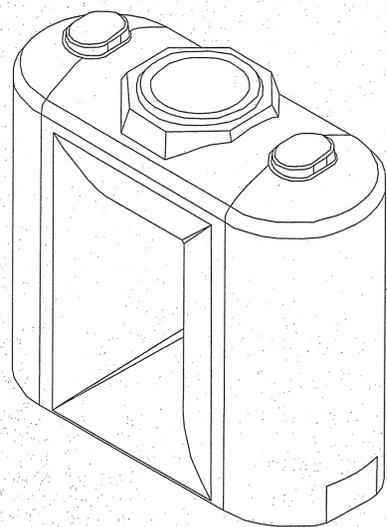
RECYCLE TANK SIDE ELEVATION
N.T.S.



RECYCLE TANK FRONT ELEVATION
N.T.S.

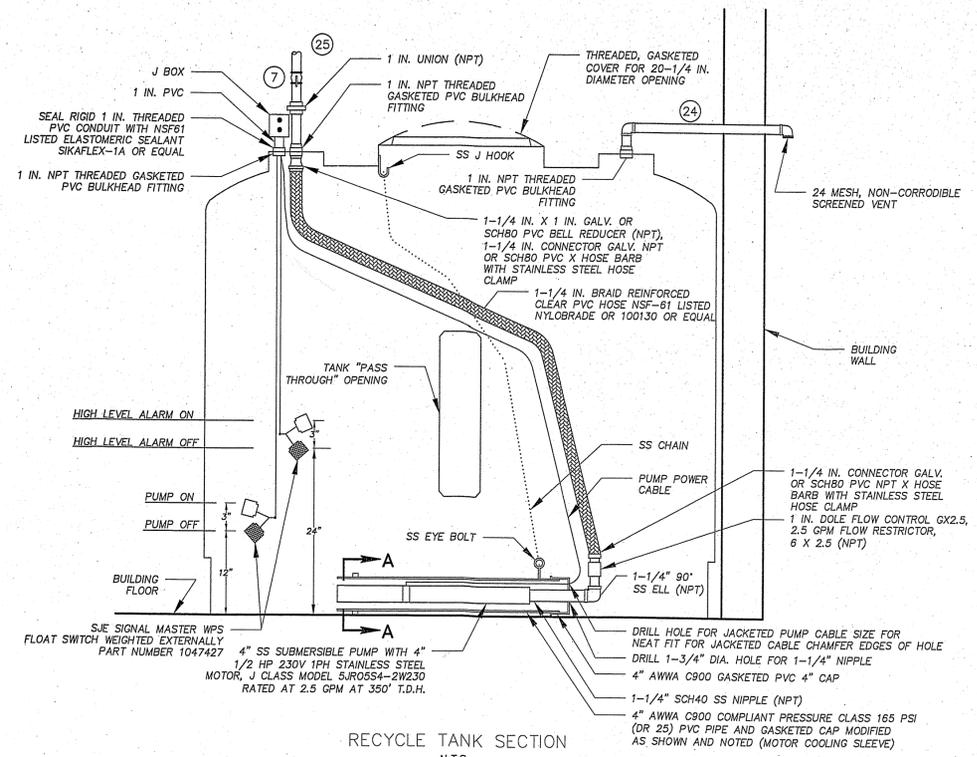


RECYCLE TANK PLAN VIEW
N.T.S.

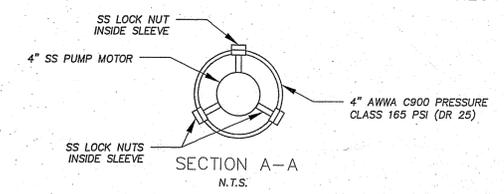


RECYCLE TANK ISOMETRIC VIEW
N.T.S.

NORWESCO 500 GALLON FREESTANDING TANK,
WASHOUGAL, WA; SPECIALTY TANKS/FREESTANDING,
PART NO. 43616 WITH NSF61 LABEL



RECYCLE TANK SECTION
N.T.S.



SECTION A-A
N.T.S.



NO	DATE	BY	APPR	REVISIONS

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Jerome W. Morrissette & Associates Inc., P.S.
 1700 Cooper Pt. Road S.W. #B-2, Olympia, Wa. 98502-1110 Ph 360.352.9456 Fx 360.352.9990

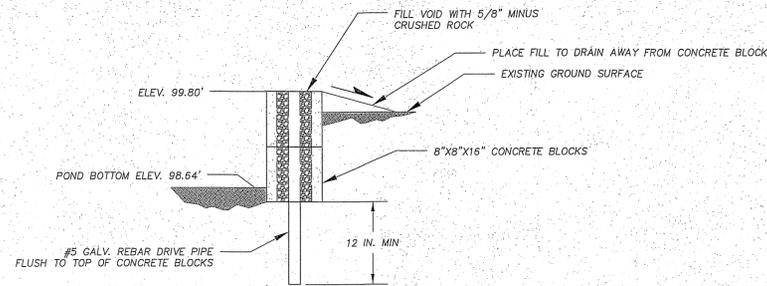
Approved By

DESIGNED BY 02/27/2019 DATE
 C.A.D.D. BY 02/27/2019 DATE
 CHECKED BY 02/27/2019 DATE
 DATE PLOTTED

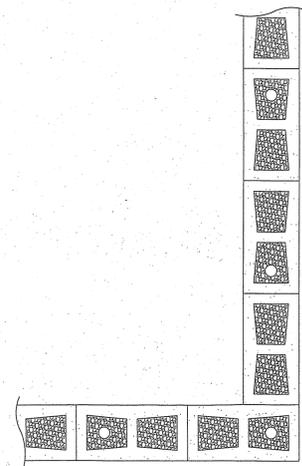
THURSTON
 COUNTY PUD 1

CEDAR RIDGE WATER TREATMENT
 RECYCLE TANK DETAILS
 18108 SHT 4 OF 8

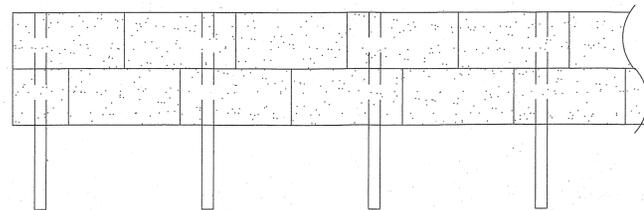
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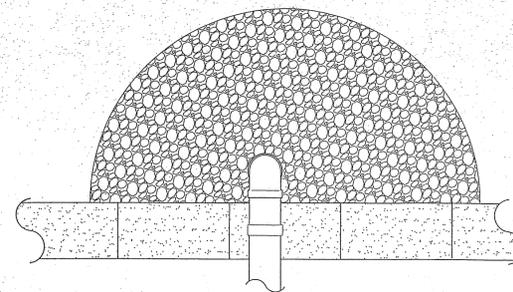
POND WALL TYPICAL SECTION
N.T.S.



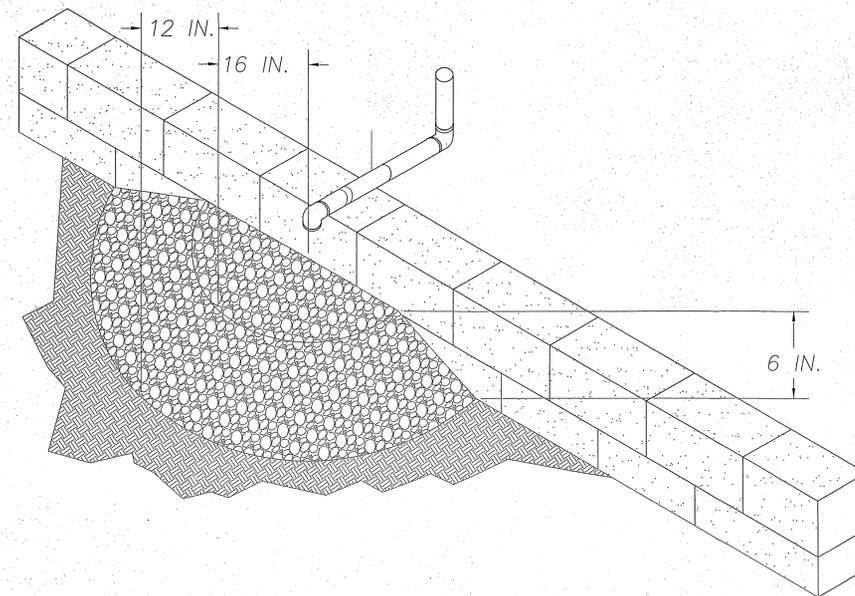
POND WALL TYPICAL PLAN VIEW
N.T.S.



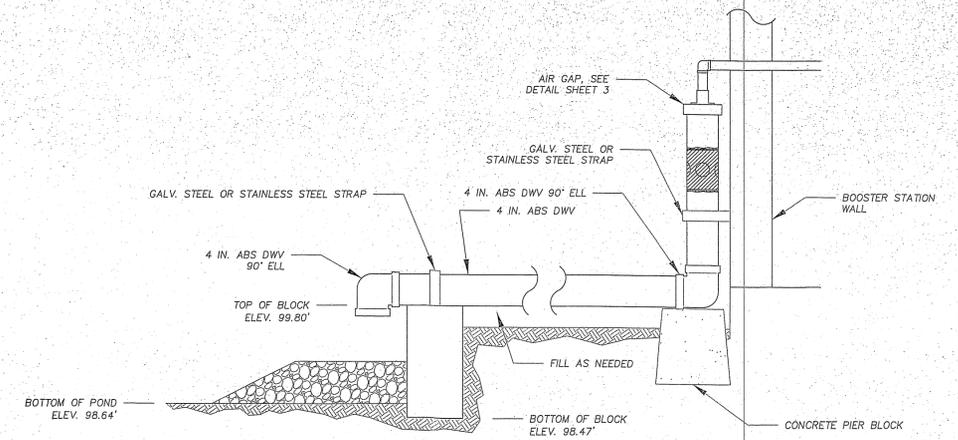
POND WALL TYPICAL ELEVATION
N.T.S.



DISPOSAL POND ENERGY DISSIPATOR PLAN VIEW
N.T.S.



DISPOSAL POND ENERGY DISSIPATOR ISOMETRIC VIEW
N.T.S.



DISPOSAL POND ENERGY DISSIPATOR DETAIL
N.T.S.



NO	DATE	BY	APPR	REVISIONS

JWMA Civil and Municipal Engineering and Planning
Jerome W. Morrissette & Associates Inc., P.S.
 1700 Cooper Pt. Road S.W. #B-2, Olympia, Wa. 98502-1110 Ph 360.352.9456 Fx 360.352.9990

Approved By

DESIGNED BY 01/16/2019 DATE
 C.A.D. BY 01/16/2019 DATE
 DE 01/16/2019 DATE
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 DATE PLOTTED

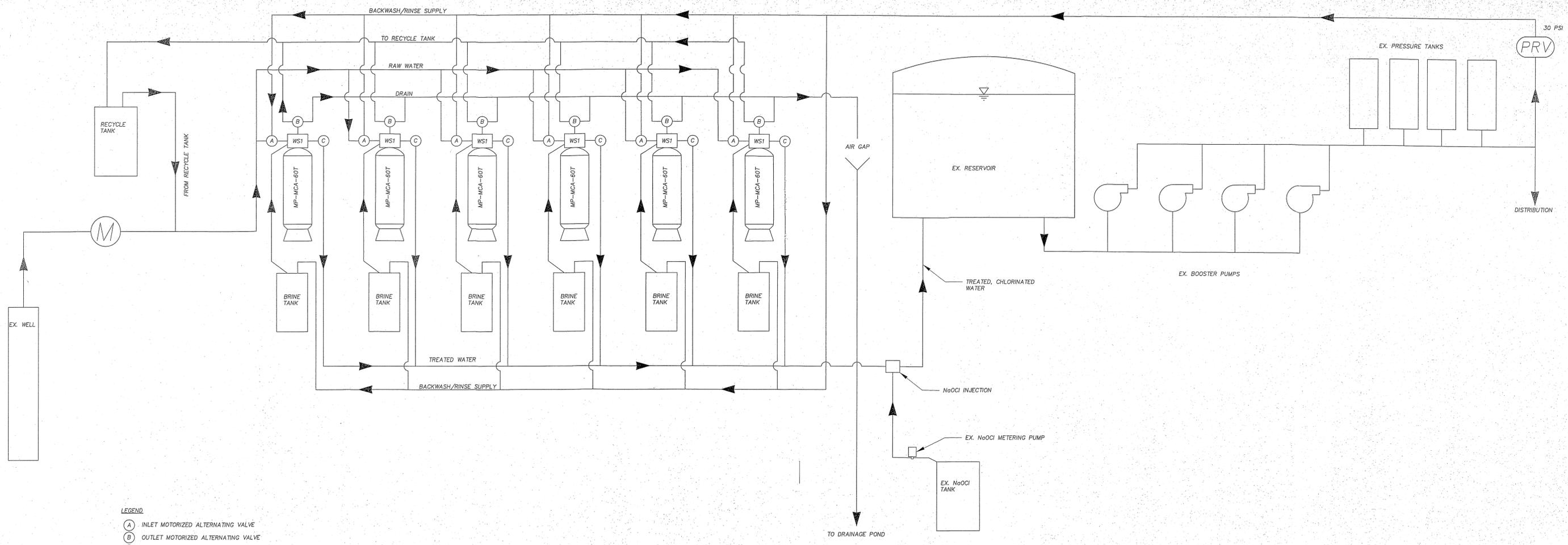
THURSTON COUNTY
 PUD 1

CEDAR RIDGE WATER TREATMENT
 BACKWASH DISPOSAL DETAILS

18108

SHT 5 OF 8

Z:\2018 projects\18108 Thurston PUD Cedar Ridge Water Treatment\WMA Drawings\on Exchange\18108 Thurston PUD Cedar Ridge Water Treatment.dwg, 1/16/2019 1:41:15 PM



LEGEND
 (A) INLET MOTORIZED ALTERNATING VALVE
 (B) OUTLET MOTORIZED ALTERNATING VALVE
 (C) NO HARD WATER BYPASS VALVE

NO	DATE	BY	APPR	REVISIONS

JWMA Civil and Municipal Engineering and Planning
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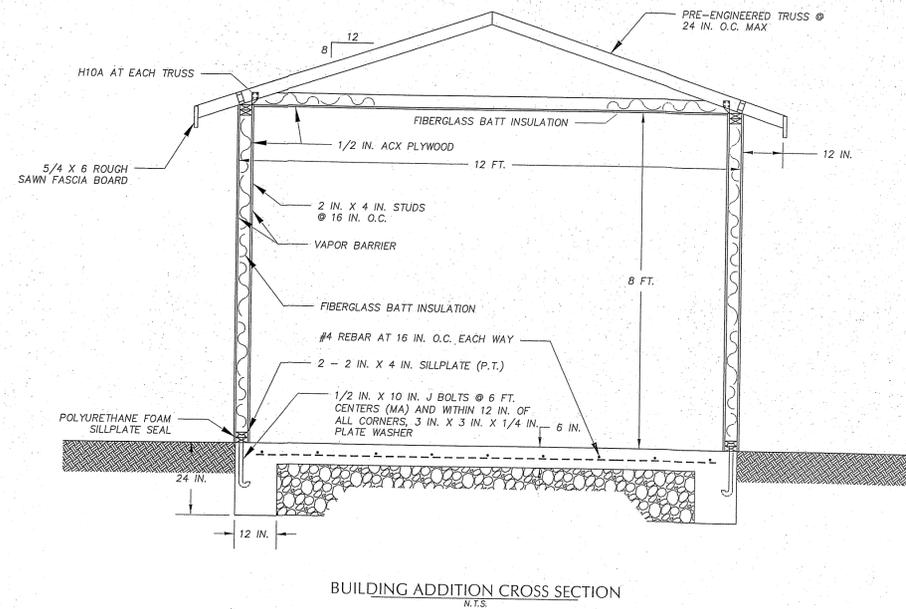
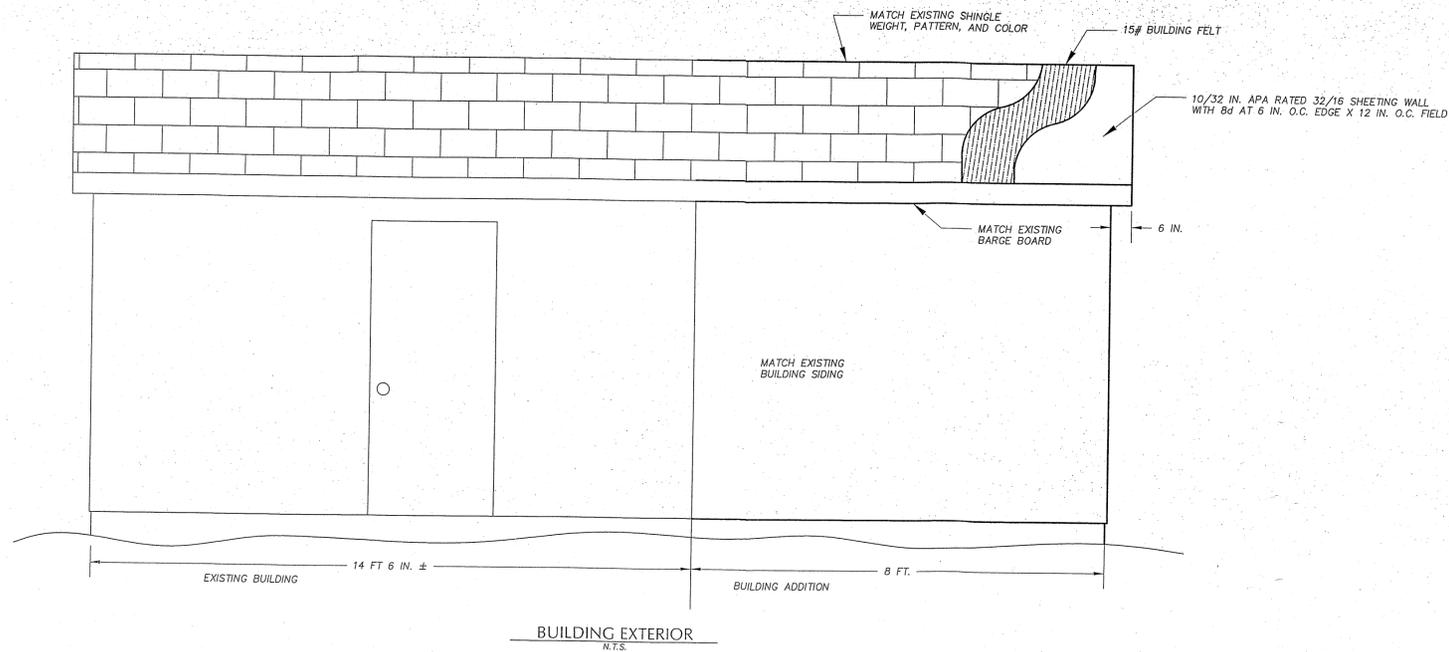
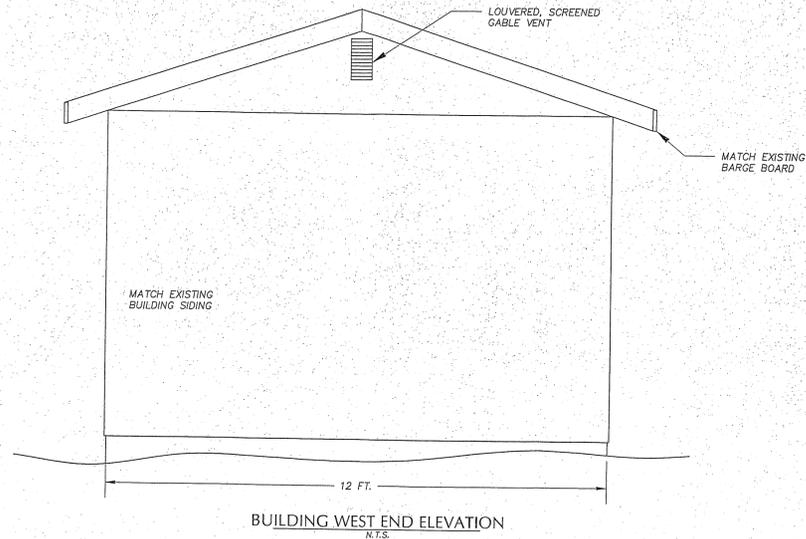
Approved By _____

DE DESIGNED BY 01/16/2019 DATE
 MH C.A.D.D. BY 01/16/2019 DATE
 DE CHECKED BY 01/16/2019 DATE
 DATE PLOTTED

THURSTON COUNTY PUD 1

CEDAR RIDGE WATER TREATMENT TREATMENT PROCESS DIAGRAM
 18108 SHT 6 OF 8





NO	DATE	BY	APPR	REVISIONS

JWM&A Civil • Municipal • Geotechnical • Land Surveying
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 1700 Cooper Pt. Road S.W. #B-2, Olympia, Wa. 98502-1110 Ph 360.352.9456 Fx 360.352.9990

Approved By _____

DE DESIGNED BY 01/14/2019 DATE
 MH C.A.D. BY 01/14/2019 DATE
 DE CHECKED BY 01/14/2019 DATE

THURSTON PUD

CEDAR RIDGE WATER TREATMENT
 BUILDING DETAILS

18108

SHEET 7 OF 8

SECTION 33, TOWNSHIP 17 NORTH, RANGE 2 EAST

EROSION/SEDIMENTATION CONTROL NOTES:

- ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE THURSTON COUNTY DRAINAGE DESIGN AND EROSION CONTROL MANUAL, OTHER COUNTY STANDARDS AND THE MOST CURRENT COPY OF THE STATE OF WASHINGTON STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION (WSDOT/APWA) IN THAT ORDER.
- TEMPORARY EROSION/WATER POLLUTION MEASURES SHALL BE REQUIRED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND THE DRAINAGE DESIGN AND EROSION CONTROL MANUAL.
- EXPOSED SOILS SHALL NOT BE LEFT EXPOSED AND UNWORKED FOR MORE THAN 2 DAYS BETWEEN (OCTOBER 1 - APRIL 30) OR 7 DAYS BETWEEN (MAY 1 - SEPT. 30).
- ALL EROSION CONTROL AND STORMWATER FACILITIES SHALL BE REGULARLY INSPECTED AND MAINTAINED BY THE CONTRACTOR DURING THE CONSTRUCTION PHASE OF THE DEVELOPMENT PROJECT.
- ASSURE THAT WASHOUT OF CONCRETE TRUCKS, CONCRETE WASHING AND CURING WATERS, WASTE STREAMS GENERATED FROM CONCRETE GRINDING AND SAWING, EXPOSED AGGREGATE PROCESSES, DEWATERING CONCRETE VAULTS, CONCRETE PUMPING AND MIXER WASHOUT IS PERFORMED OFFSITE OR IN DESIGNATED CONCRETE WASHOUT AREAS ONLY. DO NOT WASH OUT CONCRETE TRUCKS ONTO THE GROUND, OR INTO STORM DRAINS, OPEN DITCHES, STREETS, OR STREAMS. DO NOT DUMP EXCESS CONCRETE ON SITE, EXCEPT IN DESIGNATED CONCRETE WASHOUT AREAS. REFER TO THE DRAINAGE DESIGN AND EROSION CONTROL MANUAL OR STORMWATER MANAGEMENT MANUAL FOR WESTERN WASHINGTON FOR BMP'S. CONCRETE SPILLAGE OR CONCRETE DISCHARGE TO STORMWATER FACILITIES IS AN ILLICIT DISCHARGE.
- SAWCUTTING, CORING, GRINDING, ROUGHENING, HYDRO-DEMOLITION SLURRY AND CUTTINGS SHALL BE VACUUMED DURING CUTTING AND SURFACING OPERATIONS. REFER TO THE DRAINAGE DESIGN AND EROSION CONTROL MANUAL OR STORMWATER MANAGEMENT MANUAL FOR WESTERN WASHINGTON FOR BMP'S. SLURRY, SPILLAGE OR DISCHARGE TO STORMWATER FACILITIES IS AN ILLICIT DISCHARGE.
- APPLICANT SHALL COMPLY WITH ALL OTHER PERMITS AND OTHER REQUIREMENTS OF THE GOVERNING AUTHORITY OR AGENCY.
- WASHINGTON LAW REQUIRES THAT THE RULES ADOPTED BY WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION BE FOLLOWED. THOSE RULES ARE SET FORTH IN RCW 19.122 AND REQUIRES ANYONE PERFORMING ANY TYPE OF DIGGING TO CALL AT LEAST TWO BUSINESS DAYS BEFORE DIGGING. DIAL 811 OR 1-800-424-5555 OR VISIT WWW.CALLBEFOREYOUDIG.ORG
- ALL SURVEYING AND STAKING SHALL BE PERFORMED BY AN ENGINEERING OR SURVEYING FIRM CAPABLE OF PERFORMING SUCH WORK. THE ENGINEER OR SURVEYOR DIRECTING SUCH WORK SHALL BE LICENSED BY THE STATE OF WASHINGTON.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE SAFEGUARDS, SAFETY DEVICES, PROTECTIVE EQUIPMENT, FLAGGERS, AND ANY OTHER NEEDED ACTIONS TO PROTECT THE LIFE, HEALTH, AND SAFETY OF THE PUBLIC, AND TO PROTECT PROPERTY IN CONNECTION WITH THE PERFORMANCE OF WORK. ANY WORK WITHIN THE TRAVELED RIGHT-OF-WAY THAT MAY INTERRUPT NORMAL TRAFFIC FLOW SHALL REQUIRE AT LEAST ONE FLAGGER FOR EACH LANE OF TRAFFIC AFFECTED. ALL SECTIONS OF THE CURRENT WSDOT STANDARD SPECIFICATIONS FOR TRAFFIC CONTROL OR MUTCD SHALL APPLY.
- IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN STREET USE AND OTHER RELATED OR REQUIRED PERMITS PRIOR TO ANY CONSTRUCTION ACTIVITY IN THE COUNTY RIGHT-OF-WAY. IT SHALL ALSO BE THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN ALL REQUIRED PERMITS PRIOR TO ANY CONSTRUCTION.
- THE PROJECT ENGINEER SHALL INSPECT DRAINAGE AND EROSION CONTROL FACILITIES PERIODICALLY DURING CONSTRUCTION. THE PROJECT ENGINEER SHALL PROVIDE, AT A MINIMUM, INSPECTION CERTIFICATION FOR THE DRAINAGE AND EROSION CONTROL FACILITIES FOLLOWING ANY STORM EVENT WITH PRECIPITATION EQUAL TO OR EXCEEDING 2 INCHES IN A 24-HOUR PERIOD. FAILURE TO SUBMIT CERTIFICATION TO THE COUNTY WITHIN 24 HOURS FOLLOWING SUCH AN EVENT MAY RESULT IN A STOP WORK ORDER BEING PLACED ON THE PROJECT.
- ALL DISTURBED AREAS SHALL BE SEEDED AND MULCHED OR SIMILARLY STABILIZED TO THE SATISFACTION OF THE CITY. FOR SITES WHERE GRASS HAS BEEN PLANTED THROUGH HYDROSEEDING, THE PERFORMANCE BOND WILL NOT BE RELEASED UNTIL THE GRASS HAS BEEN THOROUGHLY ESTABLISHED (90% ESTABLISHMENT), UNLESS OTHERWISE APPROVED BY THE COUNTY.
- THE "APPLICANT" SHALL BE DEFINED AS MEANING THE CONTRACTOR.

TABLE 9.3 GUIDE TO MULCH MATERIALS, RATES, AND USES

MULCH MATERIAL	QUALITY STANDARDS	APPLICATION RATES		DEPTH OF APPLICATION	REMARKS
		PER 1000 SQ FT	PER ACRE		
GRAVEL, CRUSHED STONE, OR SLAG	WASHED 3/4 TO 1 1/2" INCH	9 C.Y.		3 IN.	GOOD FOR SHORT SLOPE AND AROUND WOODY PLANTS, AND ORNAMENTS. USE WHERE SUBJECT TO FOOT TRAFFIC
HAY OR STRAW	AIR DRY, FREE FROM WEED SEED AND COARSE MATERIAL	75 TO 100 POUNDS (APPROX. 2 IN THICK)	1.5 TO 2.5 TONS 90 TO 120 BALES	MIN 2 IN	USE WHERE NEEDED FOR MORE THAN 3 MOS. SUBJECT TO BLOWING-KEEP MOIST OR TIED DOWN
WOOD FIBER CELLULOSE (PARTLY DIGESTED WOOD FIBERS)	NO GROWTH ORGANISM INHIBITING DIGESTED FACTORS	20 TO 30 POUNDS	1000 TO 1500 POUNDS		WHEN USED ON CRITICAL AREAS, DOUBLE APPLICATION RATE. HYDROMULCHER, NO TIE-DOWN REQUIRED.

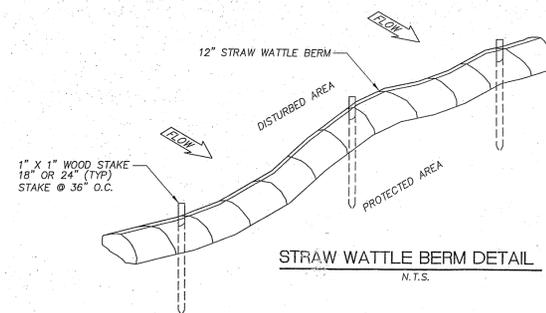


TABLE 9.4
SEED MIXTURE FOR EROSION CONTROL

NAME	PROPORTIONS BY WEIGHT	PERCENT PURITY	PERCENT GERMINATION
REDTOP (ARGROSTIS ALBA)	10 PERCENT	92	90
ANNUAL RYE (LOLIUM)	40 PERCENT	98	90
CHEWING FESCUE (FESTUCA RUBRA COMMUTATA) (JAMESTOWN, BANNER, SHADOW, OR KOKET)	40 PERCENT	97	80
WHITE DUTCH CLOVER (TRIFOLIUM REPENS) (MULTIFLORUM)	10 PERCENT	96	90

CALL BEFORE YOU DIG:
THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT 1-800-424-5555 A MINIMUM OF 48 HOURS PRIOR TO ANY CONSTRUCTION.

NO	DATE	BY	APPR	REVISIONS

JWMS&A Civil and Municipal Engineering and Planning
Jerome W. Morrisette & Associates Inc., P.S.
 1700 Cooper Pt. Road S.W. #B-2, Olympia, Wa. 98502-1110 Ph 360.352.9456 Fx 360.352.9990

Approved By _____

DESIGNED BY	DE	01/14/2019
DATE		
C.A.D.D. BY	MH	01/14/2019
DATE		
CHECKED BY	DE	01/14/2019
DATE		
DATE PLOTTED		01/16/19

THURSTON COUNTY
PUD 1

CEDAR RIDGE WATER TREATMENT
EROSION CONTROL

18108

SHT 8 OF 8



1-21-2019

Detailed Meter Records

System #	Name	Group	# of active water svcs	BILL DATE	MONTHLY SOLD GALLONS	BLOW OFF / TREATMENT GALLONS	MONTHLY PUMPED GALLONS	LOSS IN GAL (TP-AC)	GPM Leak Loss (LOSS GALLONS/4 3200)	MONTHLY DSL % (TP-(AC)/TP)	MONTHLY GAL PER DAY PER CONN ((SOLD/Act Svcs)/30)	YTD (AC) SOLD + BLOW OFF GALLONS	YTD (TP) PUMPED GALLONS	YTD DSL % ((TP-AC)/TP)	YTD Gallons Per Day Per Conn	ytd gpm leak loss (tp-ac)/52560 0	% of WR Used
617	Cedar Ridge	A	63	9/23/2016 -12/24/2016	920,436	0	1,167,096	246,660	5.71	21%	162						
617	Cedar Ridge	A	63	March-17	901,063	0	1,095,296	194,233	4.50	18%	477	901,063	1,095,296	18%	477		3.0%
617	Cedar Ridge	A	63	April-17	194,270	0	269,698	75,428	1.75	28%	103	1,095,333	1,364,994	20%	290		6.0%
617	Cedar Ridge	A	63	May-17	212,192	0	294,599	82,407	1.91	28%	112	1,307,525	1,659,593	21%	231		8.5%
617	Cedar Ridge	A	63	June-17	419,897	0	661,897	242,000	5.60	37%	222	1,727,422	2,321,490	26%	228		11.4%
617	Cedar Ridge	A	63	July-17	1,249,062	0	1,759,602	510,540	11.82	29%	661	2,976,484	4,081,092	27%	315		14.3%
617	Cedar Ridge	A	63	August-17	481,801	0	762,997	281,196	6.51	37%	255	3,458,285	4,844,089	29%	305		18.4%
617	Cedar Ridge	A	63	September-17	1,053,318	0	1,449,698	396,380	9.18	27%	557	4,511,603	6,293,787	28%	341		25.2%
617	Cedar Ridge	A	63	October-17	198,508	0	289,603	91,095	2.11	31%	105	4,710,111	6,583,390	28%	312		34.9%
617	Cedar Ridge	A	63	November-17	312,447	0	492,902	180,455	4.18	37%	165	5,022,558	7,076,292	29%	295		43.9%
617	Cedar Ridge	A	63	December-17	308,280	0	485,900	177,620	4.11	37%	163	5,330,838	7,562,192	30%	282		47.8%
617	Cedar Ridge	A	63	January-18	303,538	0	482,699	179,161	4.15	37%	161	303,538	482,699	37%	161		3.0%
617	Cedar Ridge	A	63	February-18	289,319	0	482,101	192,782	4.46	40%	153	592,857	964,800	39%	157		6.0%
617	Cedar Ridge	A	63	March-18	262,900	0	397,599	134,700	3.12	34%	139	855,757	1,362,400	37%	151		8.5%
617	Cedar Ridge	A	63	April-18	321,236	0	469,400	148,164	3.43	32%	170	1,176,993	1,831,800	36%	156		11.4%
617	Cedar Ridge	A	63	May-18	298,183	0	466,797	168,614	3.90	36%	158	1,475,176	2,298,597	36%	156		14.3%
617	Cedar Ridge	A	63	June-18	645,255	0	659,601	14,347	0.33	2%	341	2,120,430	2,958,198	28%	187		18.4%
617	Cedar Ridge	A	63	July-18	859,445	0	1,083,298	223,854	5.18	21%	455	2,979,875	4,041,496	26%	225		25.2%
617	Cedar Ridge	A	63	August-18	957,246	0	1,558,697	601,452	13.92	39%	506	3,937,120	5,600,194	30%	260		34.9%
617	Cedar Ridge	A	63	September-18	893,366	0	1,455,900	562,533	13.02	39%	473	4,830,487	7,056,093	32%	284		43.9%
617	Cedar Ridge	A	63	October-18	271,606	0	622,403	350,797	8.12	56%	144	5,102,093	7,678,497	34%	270		47.8%
617	Cedar Ridge	A	63	November-18	299,903	0	676,798	376,895	8.72	56%	159	5,401,996	8,355,295	35%	260		52.0%
617	Cedar Ridge	A	63	December-18	266,647	22,200	668,099	379,252	8.78	57%	141	5,690,843	9,023,393	37%	247	6.34	56.2%
617	Cedar Ridge	A	63	January-19	305,887		676,100	370,213	8.57	55%	157	305,887	676,100	55%	157		3.4%
617	Cedar Ridge	A	63	February-19	256,489		431,700	175,211	4.06	41%	145	562,376	1,107,800	49%	151		4.5%
617	Cedar Ridge	A	63	March-19	291,002		496,800	205,798	4.76	41%	149	853,378	1,604,600	47%	151		5.8%
617	Cedar Ridge	A	63	April-19	256,497		485,200	228,703	5.29	47%	136	1,109,875	2,089,800	47%	147		7.3%
617	Cedar Ridge	A	63	May-19	313,786		545,900	232,114	5.37	43%	161	1,423,661	2,635,700	46%	150		8.9%
617	Cedar Ridge	A	63	June-19	559,010		928,400	369,390	8.55	40%	296	1,982,671	3,564,100	44%	174		10.5%
617	Cedar Ridge	A	63	July-19	688,384		1,199,981	511,597	11.84	43%	352	2,671,055	4,764,081	44%	200		10.5%
617	Cedar Ridge	A	63	August-19	733,579		1,333,500	599,921	13.89	45%	376	3,404,634	6,097,581	44%	222		10.5%
617	Cedar Ridge	A	63	September-19				0	0.00	#DIV/0!	0	3,404,634	6,097,581	44%	198		10.5%
617	Cedar Ridge	A	63	October-19				0	0.00	#DIV/0!	0	3,404,634	6,097,581	44%	178		10.5%
617	Cedar Ridge	A	63	November-19				0	0.00	#DIV/0!	0	3,404,634	6,097,581	44%	162		0.6%
617	Cedar Ridge	A	63	December-19				0	0.00	#DIV/0!	0	3,404,634	6,097,581	44%	148	5.12	

Water Use Efficiency Program

Water Use Efficiency Program

The plan has four primary components.

1. **Customer Usage:** The District publishes a newsletter twice a year. Each newsletter contains a section on water conservation.
2. **Customer Side Leakage:** The District tracks customer usage through the billing system and alerts customers to apparent leaks. The District provides, free of charge, one hour of assistance in locating customer side leaks.
3. **Leak Detection and Repair:** The District conducts ongoing leak detection activities and is continually physically monitoring the system for evidence of leakage. Found leaks are repaired as soon as possible, usually within 24 hours.
4. **Water Rates:** The District rates are tiered to encourage water conservation.

The above four components have been implemented. Costs are included in the District's normal operating budget. On the occasions on which water mains have been day-lighted it is observed that the pipes are in good condition. The majority of water loss is anticipated to be the result of unrecorded distribution system flushing. The system has manganese concentrations above the MCL and is chlorinated. As a result the distribution system develops deposits of manganese. The distribution system is flushed frequently to improve water quality. The system will install a treatment system to address the manganese problem. This should greatly reduce the amount of distribution system flushing and reduce volume of unaccounted for water. The water system has conducted leak detection surveys and has found that there is little evidence of distribution system leakage.

Water Loss Control Action Plan

Water Loss Control Action Plan

Through the Water Use Efficiency Rule Washington State has implemented a program in which one of the objectives is to reduce unaccounted for water usage for each water system to 10% or less. Cedar Ridge was purchased by the PUD in 2016 and it was fully meter before that purchase.

The PUD has been actively taking steps to help reduce the DSL, such as repairing leaks when they are found. In April of 2019 the PUD used acoustic leak detection to help find leaks in this water system and no major leaks were found.

The PUD believes that the high level of manganese in the raw water is the cause of the leak loss for two reasons:

1. The PUD flushes the system at least quarterly and that water has not been recorded.
2. Clogging meters causing them to not read all the water going through them.

Currently the PUD is installing new treatment to remove the manganese. Once that treatment has been installed the current flushing schedule will not be needed and all water flushed in the future will be recorded. We also plan on replacing the meters once the treated water has stabilized in the system and this should be completed by the end of 2019.

If completing the two steps above do not bring the DSL below the 10% or above 3 gallons per minute, the PUD is committed to finding, repairing and meeting the established DSL standard.

Future steps:

- Replace all service meters by the end of 2019 – cost \$6,400 budgeted in PUD's current CIP
- Continue with acoustic leak detection – cost labor only
- Repair leaks as found – cost varies and is budgeted in current O&M budget
- Measure all backwash water and water used to flush distribution system. – cost labor only.

Wellhead Protection Plan

Cedar Ridge #617 Water System

Wellhead Protection Plan

September 2018

Developed by:

Kim Gubbe, Operations Manager, Thurston PUD
Doug Eklund, PE, JWM&A

In cooperation with:



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I. Introduction

I-1. Background

Congress enacted the Safe Drinking Water Act (SDWA) in 1974 with the goal of providing safe drinking water to all users of public water supplies. The SDWA gave the U.S. Environmental Protection Agency (EPA) the authority to develop a uniform national drinking water program, and to establish national standards for known or suspected drinking water contaminants. The 1986 SDWA amendments authorized two new provisions for groundwater protection. One of these was the Wellhead Protection (WHP) program. The SDWA allows each state to design its own WHP program in order to maximize program effectiveness at the local level. Each state's WHP activities are designed to protect land areas surrounding public water supply wells in order to prevent groundwater contamination.

The State of Washington requires that all Group A water systems (those serving fifteen or more connections or twenty-five or more people) develop WHP plans, as stated in the Washington Administrative Code (WAC 246-290). The Washington Department of Health (DOH) has established requirements, guidelines and materials to aid water systems in the development of their WHP plans. In order to help systems comply with WHP requirements, Evergreen Rural Water of Washington provides on-site assistance to small water systems. This assistance is provided at no cost to water systems through funding provided by the DOH and EPA.

I-2. Purpose

The purpose of WHP is to provide an organized approach to effectively protect drinking water supplies from contamination. The program seeks to identify and manage potential contaminant sources near public water supply wells in order to prevent future contamination. WHP safeguards the health of community residents and avoids negative financial impacts associated with contamination. The costs of contamination typically include the investigation of sites, installing treatment facilities, and/or locating new water sources, to name just a few. In fact, Washington State health officials have identified nearly twenty different direct and indirect costs associated with well contamination. To avoid these costs and ensure a safe, quality water supply, we need to protect groundwater at its source. WHP is a straightforward and cost effective method of accomplishing this goal.

I-3. Plan Overview

This WHP report includes the following elements:

- A completed susceptibility assessment.
- Identification of the WHP zones.
- An inventory of potential contaminant sources and land use activities.
- A discussion of the management strategy.
- Contingency and emergency response planning.
- Supporting information and documentation.

Upon completion of these elements, a Group A water system is expected to meet or exceed the requirements of Washington State's WHP program.

II. Hydrology

II-1. Location

Cedar Ridge Water System is located in Thurston County. The Cedar Ridge water system serves 62 connections at this time with a population of approximately 186 residents. The surrounding area is rural residential.

II-2. Well System

The Cedar Ridge water system maintains one ground water source, which is capable of producing good water. Water use for the system was metered at 7,562,198 gallons per year, in 2017. For details on the well construction refer to Well Logs.

II-3. Hydrogeology

Detailed hydrogeologic information is unavailable for the area. In most cases however, we can use three readily available indicators to predict groundwater flow: interactions between groundwater and surface water, land forms, and local geology.

S01, the Cedar Ridge well, withdraws water from a gravel layer between 132 ft. and 142 ft. below ground surface. The water bearing strata appears to be Q_{VR} , Vashon Recessional Outwash, underlain by till, as noted in Water Supply Bulletin No. 10, Geology and Ground-Water Resources of Thurston County, Washington Volume 1. Topography tends to suggest that groundwater movement may be generally southerly and westerly.

This water bearing strata is overlain with several confining layers with some limited water bearing layers between the confining layers. The well open interval extends from 132 ft to 142 ft below ground surface. The static water level of the water bearing strata in the open interval rises more than 20 ft. above the top of the uppermost confining layer (gray clay 49 ft. to 58 ft. below ground surface).

The use of fixed radius method for determining well susceptibility from surface contamination is appropriate for this water system considering that a detailed hydrogeologic analysis of the well is not available.

II-4. Aquifer Susceptibility

Susceptibility is determined by conditions that affect the movement of groundwater, and thus contaminants, from the land surface into an aquifer. Susceptibility is a qualitative measure of how quickly and easily contamination at the surface can reach the groundwater supply. Vulnerability is directly related to a source's Susceptibility and the proximity of potentially hazardous activities, such as the use or storage of chemicals.

Confining units are critical to susceptibility determinations. In general, a confining unit is any earth material that does not readily transmit water. Typically layers of clay or shale may act as confining units, depending upon their thickness and lateral extent. When confining layers are present, wells are less susceptible to contamination because the layers impede the movement of contaminants from the land surface into underlying aquifers.

Cedar Ridge water system has provided to DOH the Ground Water Contamination Susceptibility Assessment Survey Forms for its well. S01 received a LOW susceptibility rating from the State DOH. These ratings are based on several specific factors reported in the

Susceptibility Assessment Survey. These factors include well depth, well seal, and the presence of confining units. The presence or condition of these factors can diminish the possibility that contaminants originating at the land surface could potentially affect the wells.

Washington State also uses the Susceptibility Assessment to classify the overall vulnerability of active wells. Vulnerability is composed of two factors: the physical susceptibility (as noted above) along with each source's risk of exposure to contaminants. The risk of exposure to contaminants is determined by whether or not contaminants were used in the area, or detected in the water supply.

III. Identification of the Wellhead Protection Areas

III-1. Background

Aquifer recharge occurs through the infiltration of precipitation and surface water in areas where the aquifer lies at or near the soil surface, or where confining units are thin or absent, permitting further infiltration into the aquifer. Ideally, all land areas that contribute recharge to the aquifer would be targeted for protection efforts. Unfortunately, the identification of precise recharge areas for wells is a technical and time-consuming process. Further, they can include vast areas, making them difficult to manage. To remedy these problems, the WHP program focuses protection efforts near the wellhead.

III-2. Methods

Several different methods may be used to determine the WHP areas. The most straightforward method accepted by the state is a calculated fixed radius (CFR). This method is also part of the Susceptibility Assessment, which is used to grant monitoring waivers. The CFR is an excellent preliminary WHP delineation method because it is easily implemented and inexpensive. Unfortunately, the CFR can over-simplify groundwater flow conditions and may or may not be very accurate depending upon site-specific conditions. Therefore, other more complex delineation methods such as computer modeling and hydrogeologic mapping are encouraged, but not required for small systems.

Regardless of the method used, the state requires that the WHP areas include the sanitary control zone, along with the six month, one, five, and ten-year time of travel zones for groundwater. 'Time of travel' refers to the amount of time it would take for a particle of groundwater entering the aquifer at the boundary of the zone to reach the well after six months, one, five, or ten years of pumping.

III-3. Results

The CFR utilizes a volumetric flow equation to determine the WHPA radii:

$$r = \sqrt{Q t / \Pi n H}$$

Where:

Parameter	WHP Zone	S01		
r = calculated radius of protection zone (ft)	6 mo	271		
	1 year	383		
	5 year	855		
	10 year	1210		
Q = pumping rate of well per year (cuft/yr)		1,010,989		
t = time of travel (years)		0.5,1,5,10		
$\Pi = P_i$		3.14		
n = estimated porosity (if unknown - 0.22)		.22		
H = Open interval or length of well screen (ft) ** use 10 ft if open borehole or spring		10		

The wellhead protection zones .5, 1, 5, and 10 year times of travel are included as Figure 1. Once again, it is important to emphasize that the WHPA demonstrated here is a useful planning tool, but may not represent actual groundwater capture zones for the wells. A more conclusive WHPA delineation would, however, require more specific information and additional financial resources that may not be available. Furthermore, developing an awareness of the system's contamination potential is of higher priority at this time.

IV. Potential Contaminant Source Inventory

IV-1. Methods

A field survey was conducted of the WHP zones in order to inventory potential sources of contamination and identify land use activities, which may pose threats to groundwater quality (Table 1). The planning team conducted windshield and walk-through surveys to identify potential contaminant sources. The type and location of all potential contamination sources identified were recorded on base maps of the WHPA (Figure 1).

IV-2. Results

Other than residential septic systems, no potential sources of contamination could be identified within the Cedar Ridge WHP Area. Most of the residential septic systems receive their drinking water from the Cedar Ridge water system, making WHP management efforts straightforward.

The most direct pathway of contamination into an aquifer is through surface water seepage along well casings. Poorly sealed wells (both public and private) and wells with deteriorated (rusted and/or cracked) casings can allow surface water to migrate into pristine aquifers below. This is caused by inadequate well construction and pertains to both abandoned wells and wells currently in use.

Because of the quality of the Cedar Ridge source well, proper maintenance and periodic inspection should minimize this threat at the source well. The existence and location of abandoned wells is poorly documented, making this aspect of wellhead protection difficult to address. If any abandoned wells are located, DOE's Northwestern Regional Office will be contacted for information regarding proper closure options.

V. Management Strategy

V-1. Sanitary Control Area

Of primary concern are impacts from activities within the sanitary control area of the well. This area should already be tightly controlled to minimize direct contamination of the wells. This area should also be managed to reduce the possibility of surface flows reaching the wells and traveling down the casing.

The wells are located on private property. The well is secured safely inside a locked doghouse with a security fence around the property and is located adjacent to residential property.

V-2. Wellhead Protection Area

Because WHPA's typically include diverse land use areas, it is important citizens and businesses be informed that they can have a direct impact on the quality of groundwater. To accomplish this, a public education campaign is required to inform WHP Area residents and businesses of the sensitivity of their location above the drinking water supply.

Residents have been mailed a letter (Appendix C) informing them about the sensitivity of their location with regards to their groundwater supply. These letter included information regarding the safe disposal of hazardous chemicals, the proper use of septic systems.

VI. Contingency Planning

VI-1. Alternative Supply

A contingency plan is needed in the event that a contamination event or natural disaster results in the temporary or permanent loss of any or all of the wells. The contingency plan identifies the amount of water required to sustain the community on a daily basis and the alternative sources of supply for both short term and long term emergencies. This also includes a firm understanding of the costs and difficulties of siting and drilling a replacement well.

The Cedar Ridge water system maintains one source well (S01) and the system maintains 80,000 gallons storage capacity. In the event of a power outage, the system has a propane powered generator that will automatically power the water system. In the event of well failure or aquifer contamination the water system has no backup water supply, and would be faced with well replacement. The system is aware of the expense and difficulty involved with siting, constructing and bringing a new well online. Thurston PUD and the community are prepared to undertake this process in the event of aquifer contamination or complete well failure. For an alternative supply until well replacement could be facilitated, trucking water from a neighboring water system is the only possibility. Neighboring systems have been contacted and are capable of providing an emergency supply. The PUD has the ability to truck water to the system from a neighboring system for emergency use. The system will also contact the County Emergency Government Office for assistance.

VI-2. Emergency Response

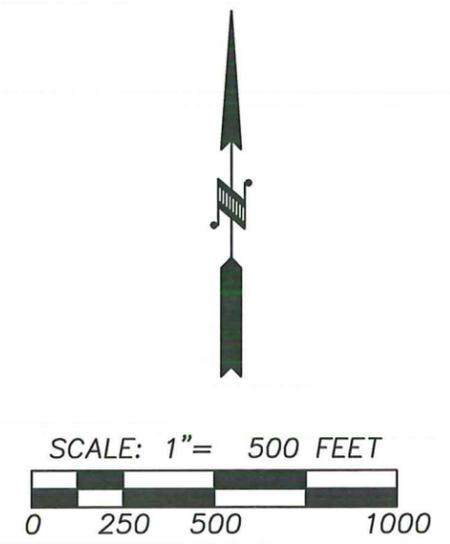
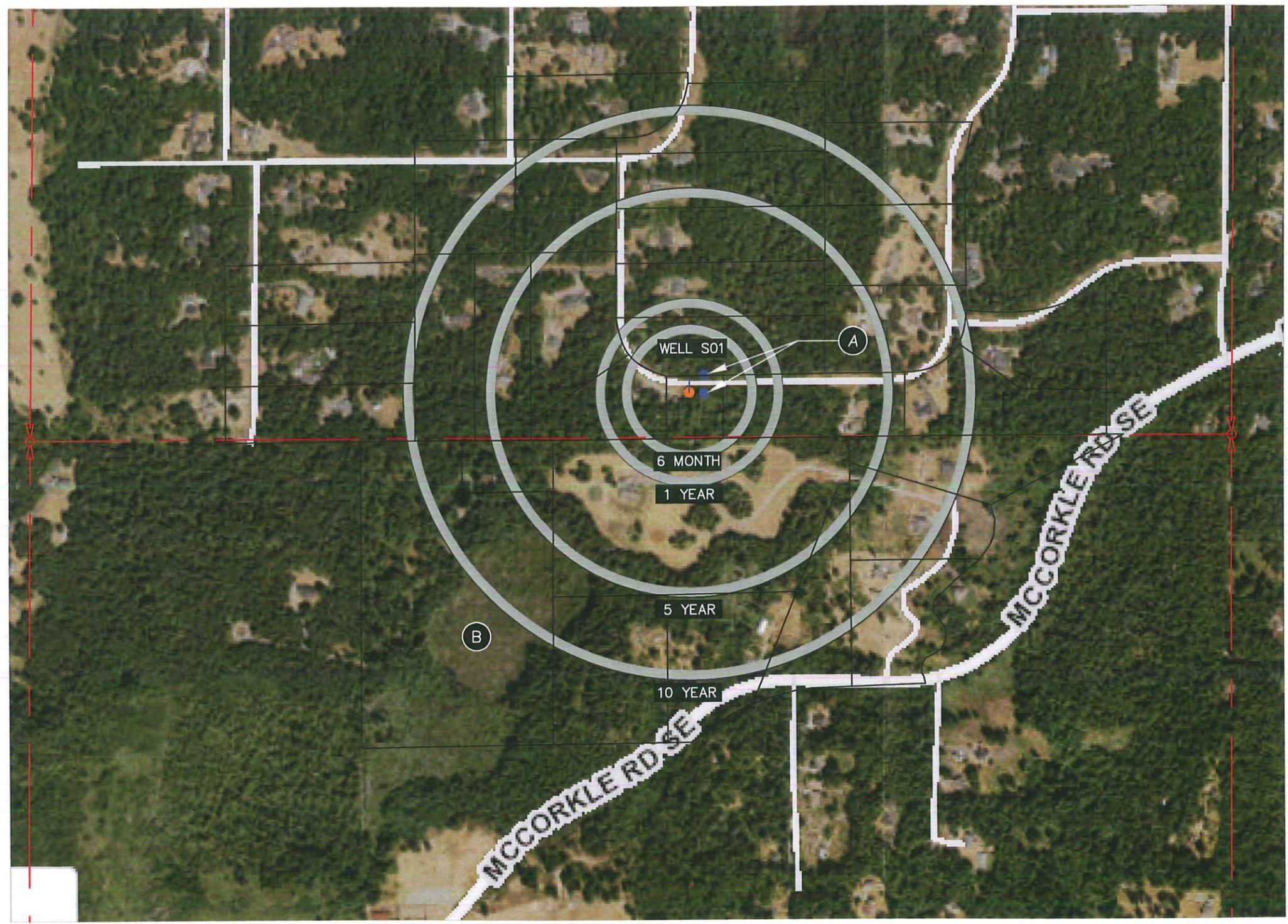
As with anywhere, a hazardous spill event is possible within the Cedar Ridge WHPA. An incident/spill response notice (Appendix C) has been sent to local emergency responders and planning agencies notifying them of the location of Cedar Ridge WHPA and the potential contaminant sources. After assessing the water system's vulnerability, these agencies will evaluate whether changes in hazardous spill, disaster response, and future planning procedures are needed to adequately protect the Cedar Ridge's water supply.

VII. Concluding Remarks

Cedar Ridge water system is in a good position to continue providing a safe and reliable drinking water supply. The community recognizes that the most effective way to protect their water supply is to prevent contamination. This plan serves the interests of Cedar Ridge residents by protecting their drinking water supply at minimal cost to consumers, while maintaining compliance with drinking water program regulations. With the continued dedication of the water operator and a heightened awareness of groundwater protection by residents and local businesses, Cedar Ridge is likely to have a clean, reliable water supply far into the future.

VIII. Figures

1. Wellhead Protection Area Map



TIME OF TRAVEL	
6 MONTH	274 FT.
1 YEAR	388 FT.
5 YEARS	868 FT.
10 YEARS	1228 FT.

$$r = \sqrt{\frac{Q \cdot t}{\pi \cdot n \cdot H}}$$

WHERE:
 Q= PUMPING RATE IN CF/YEAR
 Q= 1,042,568 CUBIC FEET
 t= TIME OF TRAVEL IN YEARS
 n= SOIL POROSITY (ASSUMED TO BE 0.22)
 H= THE SCREENED INTERVAL (10 FEET)
 π = PI = 3.1416
 r= RADIUS IN FEET

NOTES

- (A) SHALLOW SURFACE WATER PONDING APPROXIMATELY 150 FT EAST OF WELL
- (B) SHALLOW LAKE

FIGURE 1. WELL HEAD PROTECTION AREA MAP

NO	DATE	BY	APPR	REVISIONS

JWM&A Civil and Municipal Engineering and Planning
Jerome W. Morrissette & Associates Inc., P.S.
 1700 Cooper Pt. Road S.W. #B-2, Olympia, Wa. 98502-1110 Ph 360.352.9456 Fx 360.352.9990

DESIGNED BY 05/15/2019 DATE
 LH C.A.D.D. BY 05/15/2019 DATE
 DE CHECKED BY 05/15/2019 DATE

**THURSTON COUNTY
 PUD 1**

**CEDAR RIDGE WATER SYSTEM
 WELL TIME OF TRAVEL**

IX. Appendices

Appendix A: Well Reports

Appendix B: Ground Water Contamination Susceptibility Assessment

Water Facilities Inventory

Appendix C: Potential Contaminant Source List

Notification Letters

Appendix D: Resource Contacts

Appendix A:

Well Report

File Original and First Copy with
Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

100 GPM
Start Card No. 0110537

Water Right Permit No. _____

1) OWNER: Name JERRY CATE Address 3221 SHAW RD. E. PUYALLUP, WA. 9837

2) LOCATION OF WELL: County THURSTON NE 1/4 Sec. 25 T. 17 N., R. 2W W.M.

2a) STREET ADDRESS OF WELL (or nearest address) CORNER OF SHELDON & MCCORKLE RD.

3) PROPOSED USE: Domestic Industrial Municipal
 Irrigation Test Well Other
 DeWater

4) TYPE OF WORK: Owner's number of well (if more than one) 2
 Abandoned New well Method: Dup Bored
 Deepened Cable Driven
 Reconditioned Rotary Jolted

5) DIMENSIONS: Diameter of well 6 inches.
 Drilled 142 feet. Depth of completed well 142 ft.

6) CONSTRUCTION DETAILS:
 Casing installed: 6 " Diam. from 0 ft. to 132 ft.
 Welded Liner installed Diam. from _____ ft. to _____ ft.
 Threaded Diam. from _____ ft. to _____ ft.

Perforations: Yes No
 Type of perforator used _____
 SIZE of perforations _____ in. by _____ in.
 _____ perforations from _____ ft. to _____ ft.
 _____ perforations from _____ ft. to _____ ft.
 _____ perforations from _____ ft. to _____ ft.

Screens: Yes No
 Manufacturer's Name COOKS
 Type .035 Model No. _____
 Diam. 5 Slot size .035 from 132 ft. to 142 ft.
 Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel packed: Yes No Size of gravel _____
 Gravel placed from _____ ft. to _____ ft.

Surface seal: Yes No To what depth? 20 ft.
 Material used in seal bentonite
 Did any strata contain unusable water? Yes No
 Type of water? _____ Depth of strata _____
 Method of sealing strata off _____

7) PUMP: Manufacturer's Name _____
 Type: _____ H.P.

8) WATER LEVELS: Land surface elevation above mean sea level 10-92-99
 Static level _____ ft. below top of well Date _____
 Artesian pressure _____ lbs. per square inch Date _____
 Artesian water is controlled by _____ (Cap, valve, etc.)

9) WELL TESTS: Drawdown is amount water level is lowered below static level
 Was a pump test made? Yes No If yes, by whom? 4
 Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
recovery time 30 sec " " " " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)			
Time	Water Level	Time	Water Level

Date of test 65 23 1
 Bailor test _____ gal./min. with _____ ft. drawdown after _____ hrs.
 Artoat _____ gal./min. with stem set at _____ ft. for _____ hrs.
 Artesian flow _____ g.p.m. Date _____
 Temperature of water _____ Was a chemical analysis made? Yes No

10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
brown sand & gravel	0'	18'
brown gravel		
water 20 gpm	18'	49'
gray clay	49'	58'
gray sand & gravel		
water 15 gpm	58'	71'
gray sand & clay	71'	84'
gray sand & gravel		
water 20 gpm	84'	91'
gray sand & gravel		
seamed 20 gpm	91'	135'
gravel, some sand & clay		
seams water 45-50 gpm	135'	141'
gray shale	141'	142'

Work started 10-7-91, 19. Completed 10-9-91, 19.

WELL CONSTRUCTOR CERTIFICATION:
 I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME S-K PUMP & DRILLING (TYPE OR PRINT)
 (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
 Address 32519 MT. HWY. EATONVILLE, WA. 98328
 (Signed) Thomas J. Vetterling License No. 0840
 (WELL DRILLER)
 Contractor's Registration No. _____ Date 8-21, 1993

(USE ADDITIONAL SHEETS IF NECESSARY)

Appendix B:

Susceptibility Assessments Water Facilities Inventory

PART II: Well Construction and Source Information

1) Date well originally constructed: 08/27/92 month/day/year

last reconstruction: ___/___/___ month/day/year

Information unavailable

2) Well driller: S-K Pump & Drilling, 32519 Mountain HWY, Eatonville, WA 98326

Well driller unknown

3) Type of well: ___ Drilled: rotary bored cable (percussion) Dug

___ other: spring(s) lateral collector (Ranney)

driven jetted other: _____

4) Well report available Yes (attach copy to form) No

5) Average pumping rate: 85 (gallons/min)

Source of information water meter

If not documented, how was pumping rate determined? _____

Pumping rate unknown

6) Is this source treated?

If so, what type of treatment:

disinfection filtration carbon filter air stripper other

Purpose of treatment (describe materials to be removed or controlled by treatment):

Disinfection

7) If source is chlorinated, is a chlorine residual maintained: Yes No

Residual level: 0.3 (At the point closest to the source.)

7) Sanitary setback:

< 100ft* 100-120ft 120-200 ft >200ft

* If less than 100ft, describe the site conditions:

8) Wellhead construction:

wellhead enclosed in a wellhouse

controlled access (describe): fenced area with locked gate

other uses for wellhouse (describe): _____

no wellhead control

9) Surface seal:

18 ft 20 ft per well report

<18 ft (no Department of Ecology approval)

<18 ft (Approved by Ecology, include documentation)

depth of seal unknown

no surface seal

10) Annual rainfall (inches per year):

<10 in/yr 10-25 in/yr >25 in/yr

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: 7,798,408 (gallons)

How was this determined?

meter

estimated: pumping rate (_____)

pump capacity (_____)

other: _____

2) "Calculated Fixed Radius" estimate of ground water movement:
(see Instruction Packet)

6-month ground water travel time: 274 feet

1-year ground water travel time: 388 feet

5-year ground water travel time: 868 feet

10-year ground water travel time: 1,228 feet

Information available on length of screened/open interval?

Yes No

Length of screened/open interval: 10 feet

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6-month time of travel boundary?

Yes No (mark and identify on map)

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the 6-month time of travel boundary?

Yes No (mark and identify on map)

Comments: _____

PART V: Assessment of Water Quality

1) Regional sources of risk to ground water:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five-year ground water travel time. If you do not know if one of the following is present, mark the "unknown" space.

	<u>6-month</u>	<u>1-year</u>	<u>5-year</u>	<u>unknown</u>
• likely pesticide application	_____	_____	_____	_____
• stormwater injection wells	_____	_____	_____	_____
• other injection wells	_____	_____	_____	_____
• abandoned ground water well	_____	_____	_____	_____
• landfills, dumps, disposal areas	_____	_____	_____	_____
• known hazardous materials clean-up site	_____	_____	_____	_____
• water system(s) with known quality problems	_____	_____	_____	_____
• population density >1 house/acre	_____	_____	_____	_____
• residences commonly have septic tanks	X__	X__	X__	_____
• Wastewater treatment lagoons	_____	_____	_____	_____
• sites used for land application of waste	_____	_____	_____	_____

Mark and identify on map any of the risks listed above which are located within the 6-month time of travel boundary. (Please include a map of the wellhead and time of travel areas with this form. Please locate and mark any of the following.)

If other recorded or potential sources of ground water contamination exist within the ten-year time of travel circular zone around your water supply, please describe:

Surface water ponds on the north side and south side of the 107th Lane roadway embankment approximately 130 feet east of the well. The surface water does not appear to influence groundwater. The well report shows multiple clay layers above the water bearing strata.

2) Source-specific water quality records: For each type of test below, mark the row that applies to the sample results for this source. Consider all the sample results from the past 12 years. (MCLs are noted next to the specific test or listed in assistance package.)

A. **Nitrate:** (Nitrate MCL = 10 mg/l)
 Results greater than MCL _____

<2 mg/liter nitrate X__
2-5 mg/liter nitrate ____
<5 mg/liter nitrate ____
Nitrate sampling records unavailable ____

B. **VOCs:** (VOC detection level is 0.5 ug/l or 0.0005 mg/l)
Results greater than MCL or SAL ____
VOCs detected at least once ____
VOCs never detected X__
VOC sampling records unavailable ____

C. **EDB/DBCP:**
(EDB MCL = 0.05 ug/l or 0.00005 mg/l. DBCP MCL = 0.2 ug/l or 0.0002 mg/l.)
EDB/DBCP detected below MCL at least once ____
EDB/DBCP detected above MCL at least once ____
EDB/DBCP never detected ____
EDB/DBCP tests required but not yet completed ____
EDB/DBCP tests not required X__

D. **Other SOCs (Pesticides):**
Other SOCs detected
(pesticides and other synthetic organic chemicals) ____
Other SOC tests performed but none detected
(list test methods in comments) X__
Other SOC tests not performed ____

If any SOCs in addition to EDB/DBCP were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list test methods here: _____

E. **Bacterial contamination:**

Any bacterial detection(s) in the past 3 years in samples taken from the source (not distribution sampling records)? N__

Has source (in past 3 years) had a bacteriological contamination problem

found in distribution samples that was attributed to the source? N____

Source sampling records for bacteria unavailable _____

PART VI: Geographic or Hydrologic Factors Contributing to a Non-Circular Zone of Contribution

The following questions will help identify those ground water systems which may not be accurately represented by the calculated fixed radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for these sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the 10-year time of travel zone of the CFR? (Does the largest circle extend over a stream, river, lake, up a steep hillside, and/or over a mountain or ridge?)

Yes No

Describe with references to map produced in Part IV:

A shallow lake lying southwesterly of the well is within the 5 year time of travel. The lake appears to be fed by surface water and does not appear to influence groundwater flow.

A very small creek easterly of the well site

2) Aquifer Material:

A) Does the drilling log, well log or other geologic/engineering reports identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

Yes No

B) Does the drilling log, well log or other geologic/engineering reports indicate that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

Yes No

3) Is the source located in an aquifer with a high horizontal flow rate? (These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)

Yes No

4) Are there other high capacity wells (agricultural, municipal and/or industrial) located within the CFRs?

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within...

	YES	NO	unknown
<6-month travel time	_____	X____	_____
6 month—1 year travel time	_____	X____	_____
1—5 year travel time	_____	X____	_____
5—10 year travel time	_____	X____	_____

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within...

	YES	NO	unknown
<1-year travel time	_____	X____	_____
1—5 year travel time	_____	X____	_____
5—10 year travel time	_____	X____	_____

Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the zone of contribution for this source. Where possible, reference them to locations on the map produced in Part IV.

FORM COMPLETED BY:

Doug Eklund
Print Name

5/15/019
Date


Signature

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO. 02938 6	2. SYSTEM NAME CEDAR RIDGE #617	3. COUNTY THURSTON	4. GROUP A	5. TYPE 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?)		64	64
A. Full Time Single Family Residences (Occupied 180 days or more per year)	64		
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	0		
B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year	0		
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	0
B. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	0	0	0
28. TOTAL SERVICE CONNECTIONS		64	64

29. FULL-TIME RESIDENTIAL POPULATION
A. How many residents are served by this system 180 or more days per year? <u>186</u>

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?												
B. How many days per month is water accessible to the public?												

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?												
B. How many days per month are they present?												

33. ROUTINE COLIFORM SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Requirement is exception from WAC 246-290	1	1	1	1	1	1	1	1	1	1	1	1

34. NITRATE SCHEDULE (One Sample per source by time period)	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS

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: _____

Appendix C:

**Potential Contaminant Source List
Notification Letters**

Cedar Ridge #617 Water System

WHP Area Potential Contaminant Source List

Potential Contaminant Source	Address	Phone Number
Residential Septic System	See Attached List	

This list was provided to the following agencies:

- Washington State Department of Ecology
- Thurston County Department of Emergency Management
- Local Fire District
- Local Law Enforcement Officials and County Sheriff's Office

Parcel Number	Owner Name	Mailing Address	City	State	Zip Code	Site Address	Site City	Site Zip
12725310201	WESTERMAN FAMILY TR	10825 MAYA LN SE	OLYMPIA WA	WA	98501	10825 MAYA LN SE	OLYMPIA	98501
12725232500	PETERSON, DENNIS & JENNIFER	10642 WILMER LN SE	OLYMPIA WA	WA	98501	10642 WILMER LN SE	OLYMPIA	98501
12725241800	EISENTROUT, JULIA	2905 BRIARWOOD CT SE	OLYMPIA WA	WA	98501	1627 SE 105TH LN	OLYMPIA	98501
12725130900	OLSON, KRISTEN & BRENT	2222 107TH LN SE	OLYMPIA WA	WA	98501	2222 107TH LN SE	OLYMPIA	98501
12725214800	PETERSON, WARREN & LAWNI	PO BOX 853	EAST OLYN WA	WA	98540	1706 105TH LN SE	OLYMPIA	98501
12725310301	WILSON, IAN	34000 N 27TH DR UNIT 3086	PHOENIX AZ	AZ	85085	1502 MCCORKLE RD SE	OLYMPIA	98501
12725131100	WRIGHT, STEPHANIE D	PO BOX 15239	TUMWATE WA	WA	98511-523	1077H LN SE	OLYMPIA	98501
12725410403	JUSTICE, JOHN E & LISA K	10802 MAYA LN SE	OLYMPIA WA	WA	98501	10802 MAYA LN SE	OLYMPIA	98501
12725241100	WRIGHT, STEPHANIE D	PO BOX 15239	TUMWATE WA	WA	98511-523	1077H LN SE	OLYMPIA	98501
12725135700	HITZKE, MELVIN A & MARY ANN	10543 NYLA LN SE	OLYMPIA WA	WA	98501	10543 NYLA LN SE	OLYMPIA	98501
12725242100	SANDERS, THOMAS & TERESA	1515 106TH LN SE	OLYMPIA WA	WA	98501	1515 106TH LN SE	OLYMPIA	98501
12725140400	MERCIER, LOU ANN	PO BOX 13035	OLYMPIA WA	WA	98508	2233 107TH LN SE	OLYMPIA	98501
12725131300	CORVIN, SCOTT A & EVONNE E	PO BOX 14844	TUMWATE WA	WA	98511-484	10640 MYRA LN SE	OLYMPIA	98501
12725131500	WILSON, ROBERT L & KELLY	10542 MYRA LN SE	OLYMPIA WA	WA	98501	10542 MYRA LN SE	OLYMPIA	98501
12725420000	FITZSIMMONS, LENARD N	2010 MCCORKLE RD SE	OLYMPIA WA	WA	98501	2010 MCCORKLE RD SE	OLYMPIA	98501
12725410401	JORDAN, DAVID A & SARAH L	10919 MAYA LN SE	OLYMPIA WA	WA	98501	10919 MAYA LN SE	OLYMPIA	98501
12725121700	SRSEN, THOMAS J & CORINNE	10440 MYRA LN SE	OLYMPIA WA	WA	98501	10440 MYRA LN SE	OLYMPIA	98501
12725310303	WILSON, IAN	34000 N 27TH DR UNIT 3086	PHOENIX AZ	AZ	85085	1502 MCCORKLE RD SE	OLYMPIA	98501
12725232300	KERBER, JASON E	10544 WILMER LN SE	OLYMPIA WA	WA	98501-959	10544 WILMER LN SE	OLYMPIA	98501
12725131000	CREW, JOSEPH N & MARY M	PO BOX 14173	TUMWATE WA	WA	98511-417	2221 107TH LN SE	OLYMPIA	98501
12725232600	GYDESEN, WALTER PATT	4609 NE 189TH PL	LAKE FORE WA	WA	98155	10718 WILMER LN SE	OLYMPIA	98501
12725241200	STAFFORD, RYAN	1641 106TH LN SE	OLYMPIA WA	WA	98501	1641 106TH LN SE	OLYMPIA	98501
12725241900	GREEF, A FRED & ELISE SMITH	1512 105TH LN SE	OLYMPIA WA	WA	98501	1512 105TH LN SE	OLYMPIA	98501
12725410402	TREPANIER, THEODORE J & PEGGY L	10821 MAYA LN SE	OLYMPIA WA	WA	98501	10821 MAYA LN SE	OLYMPIA	98501
12725232400	GIAGRANDE LIVING TRUST	10626 WILMER LN SE	OLYMPIA WA	WA	98501	10626 WILMER LN SE	OLYMPIA	98501
12725140300	HENEGAN JR, RICHARD N & JAMI L	2245 107TH LN SE	OLYMPIA WA	WA	98501	2245 107TH LN SE	OLYMPIA	98501
12725130800	ROBERTS, DAVID J	10533 NYLA LN SE	OLYMPIA WA	WA	98501	10533 NYLA LN SE	OLYMPIA	98501
12725242000	BRESLER, HELEN T	1617 106TH LN SE	OLYMPIA WA	WA	98501	1617 106TH LN SE	OLYMPIA	98501
12725131600	JONES, MAUREEN	10514 MYRA LN SE	OLYMPIA WA	WA	98501	10514 MYRA LN SE	OLYMPIA	98501
12725410300	HARTNELL, COLLIE ANNE	1936 MCCORKLE RD SE	OLYMPIA WA	WA	98501	1936 MCCORKLE RD SE	OLYMPIA	98501
12725310100	HARTNELL, COLLIE ANNE	1936 MCCORKLE RD SE	OLYMPIA WA	WA	98501	1936 MCCORKLE RD SE	OLYMPIA	98501
12725131400	KNUTZEN, KRISTIAN E & LINDSEY S	10622 MYRA LN SE	OLYMPIA WA	WA	98501	10622 MYRA LN SE	OLYMPIA	98501



Letter of Notification - Wellhead Protection Plan

September 17, 2018

Dear Cedar Ridge Residents:

Thurston PUD is required by the Washington Department of Health to develop a wellhead protection plan for the Cedar Ridge #617 water system. Wellhead protection involves protecting the land area surrounding our wells in order to prevent contamination of our drinking water supply. Cedar Ridge has one well located at 2121 107th Ln SE, Olympia WA. Part of the plan is this letter of notification to all potential sources of contamination to our wells. Most of Cedar Ridge residents live within the wellhead protection zones surrounding our well field, all which use septic systems (see map on other side).

This letter is intended to inform you of the location of our well and protection zone, and to serve as a reminder that any hazardous material put onto the ground or into your septic system has the potential of contaminating our drinking water supply. Some potentially harmful activities to avoid are...

- Improper use of a septic system (dumping paint, household cleaners, or solvents into your septic system).
- Dumping motor oil, gasoline, antifreeze or similar fluids onto the ground.
- Heavy use of fertilizers and pesticides.
- Dumping or burying garbage in the ground.

Any unwanted or unused household hazardous materials (like those mentioned above) can be disposed of at Thurston County Waste and Recovery Center. Call 360-867-2912 for details, hours of operation, etc.

We are fortunate to have a very good supply of high quality water. It should be everyone's intent to keep it that way for our continued good use, and for the ones that come along after us. Thank you for following these guidelines. If you have any questions about this matter, please feel free to contact Kim at Thurston PUD 360-357-8783 ext. 125.

TIPS TO AVOID SEPTIC SYSTEM TROUBLE:

- DO take leftover household chemicals to a hazardous waste collection center for disposal.
- DO practice water conservation. Repair dripping faucets and leaking toilets, run dishwashers and washing machines only when full.
- DO learn the location of your septic system and drain field.
- DON'T allow anyone to drive or park over any part of the system. Areas should be left undisturbed with only a mowed grass cover. Roots from nearby trees or shrubs may clog and damage your drain lines.
- DON'T use commercial septic tank additives. These products usually do not help and some may hurt your system in the long run.
- DON'T poison your system by pouring chemicals down the drain. They can kill the beneficial bacteria that treat your wastewater.



Letter of Notification: Wellhead Protection Plan

September 17, 2018

RE: CEDAR RIDGE #617 WATER SYSTEM ID #29386

Dear Emergency Responder:

Thurston PUD is developing a wellhead protection plan as required by the State Department of Health for the Cedar Ridge #617 water system (2121 107th Ln SE, Olympia WA). As part of this plan, the Cedar Ridge water system must provide wellhead protection information to agencies responsible for incident/spill response procedures. Using the results of the susceptibility assessment and the findings of the wellhead protection area inventory, local emergency responders are asked to evaluate whether changes in incident/spill response procedures are needed to better protect groundwater within wellhead protection areas. As stated in the Wellhead Protection Program Guidance Document, "If a public water system's source water is determined to be vulnerable to surface activities, special procedures may need to be incorporated into local emergency response plans."

The State DOH has given the Cedar Ridge #617 Water System SO1 well a low susceptibility rating.

A map of the wellhead protection areas with potential contaminant sources are enclosed for your review. An acknowledgement of receipt of this information or a response from your office is not required as part of the wellhead protection plan documentation.

Thank you for your attention in this matter. If you have any questions about the plan, please feel free to contact me.

Sincerely,

Kim Gubbe
Director of Planning and Compliance
Thurston PUD
360-357-8783 ext. 125



September 17, 2018

Washington State Department of Ecology
Southwest Regional Office
PO Box 47600
Olympia, WA 98504-7600

Regarding: Abandoned wells

Dear Sir or Madam:

As part of the Cedar Ridge #617 water system wellhead protection plan, Thurston PUD is required to provide notification of the existence of abandoned wells within wellhead protection areas. We are unsure if there are any abandoned wells within the Cedar Ridge wellhead protection area.

The association is unaware of whether any wells which may be abandoned or inactive, have been properly closed according to DOE guidelines. We have enclosed a map depicting the location of the Cedar Ridge source well and the associated Wellhead Protection Area (WHPA). This map is intended to serve as a tool for you to manage the closure of any wells located on private property within our WHPA.

For additional information, please feel free to contact me at 360-357-8783 ext. 125.

Sincerely;

Kim Gubbe
Director of Planning and Compliance
Thurston PUD



September 17, 2018

Washington State Department of Ecology
Southwest Regional Office
PO Box 47600
Olympia, WA 98504-7600

Regarding: Cedar Ridge #617 Water System's Wellhead Protection Area (WHPA)

Dear Sir or Madam:

As part of the Cedar Ridge's Wellhead Protection Plan, Thurston PUD is required to provide notification of the WHPA boundary and the potential contaminant sources within that boundary. Please use the enclosed WHPA map and potential contaminant source list accordingly when considering future inspections and permitting for the storage, use, and disposal of hazardous materials within our WHPA.

Sincerely;

Kim Gubbe
Director of Planning and Compliance
Thurston PUD
360-357-8783 ext. 125

Appendix D: Resource Contacts

1. DOH regional planner and engineer

Kay Rottell, P.E.
SW Drinking Water Regional Operations
PO Box 47823
Olympia, WA 98504-7823
360-236-3034

2. DOE Regional Office

Department of Ecology
300 Desmond Dr
Lacey, WA 98503
360-407-6000

3. County Health District

Thurston County
Environmental Health
360-786-5490

4. County Fire District, Local Fire Department, County Emergency Response Unit, DOE
Emergency Spill Response Unit.

DOE 24 Hour Spill Respond
SW Regional Office
360-407-6300

Thurston County Sheriff
2000 Lakeridge Dr SW
Olympia, WA 98502
360-786-5527

East Olympia Fire District #6
8047 Normandy St SE
Olympia WA, 98501
Phone: 360-491-5533

Thurston County Emergency Management
2703 Pacific Avenue SE, Suite B
Olympia, WA 98501-2036

Phone (360) 754-3360
Fax (360) 704-2775

5. Evergreen Rural Water of WA

ERWoW
18840 N US Highway 101
Shelton, WA 98584
360-462-9287

6. US EPA:

US EPA Region 10
1200 Sixth Ave, Suite 900
(OWW-136)
Seattle, WA 98101
Phone: 206-553-1806
Toll free: 800-424-4372

7. Any other agencies, companies, or individuals you feel may be helpful with protecting your drinking water. Include consultants and attorneys contracted by the water system.

Thurston PUD
1230 Ruddell Rd SE
Lacey, WA 98503
360-357-8783

Doug Eklund, P.E.
JWM&A
1700 Cooper Point Rd SW #B-2
Olympia, WA 98502
360-352-9456

Asset Management Plan

Capital Asset Management Plan Class A Systems

Name of System Cedar Ridge

System Infrastructure		Aprox. Date Built	Pipe Footage or # of Items	Depreciated on Period on Years	Full Depreciated on Date	Replacement Cost per Ft/ 2018	Total Replacement Cost 2018	Replacement Cost at end of Service Life
Pump House								
Building	size:	1996	1	50	2046	\$ 15,000.00	\$ 15,000.00	\$34,318.92
Building extension		2019	1	50	2069	\$ 10,000.00	\$ 10,000.00	\$45,154.23
Building Electrical		1996	1	30	2026	\$ 3,000.00	\$ 3,000.00	\$3,800.31
Well,								
size: 8" S01 pitless:		1993	135	75	2068	\$ 300.00	\$ 40,500.00	\$177,548.19
Water Quality Tests		1993	1	75	2068	\$ 1,200.00	\$ 1,200.00	\$5,260.69
Well Pumps & Controls	size: 7.5 make	2018	1	13	2031	\$ 10,500.00	\$ 10,500.00	\$15,419.60
Source Meter	size:	1996	1	25	2021	\$ 1,000.00	\$ 1,000.00	\$1,092.73
Booster Station								
Booster Pumps	size: 3 HP make:	1996	2	20	2016	\$ 3,000.00	\$ 6,000.00	\$6,180.00
Booster Pumps	size:5 HP make:	1996	2	20	2016	\$ 5,000.00	\$ 10,000.00	\$10,300.00
Pressure Tanks	size:119 gal make:	1996	4	10	2006	\$ 425.00	\$ 1,700.00	\$1,751.00
Water Mains								
6"	# of feet	1996	6030	65	2061	\$ 106.00	\$ 639,180.00	\$2,278,367.83
4"		1996	1125	65	2061	\$ 81.00	\$ 91,125.00	\$324,816.59
3"	# of feet	1996	2150	65	2061	\$ 81.00	\$ 174,150.00	\$620,760.60
2.5"		1996	2920	65	2061	\$ 31.00	\$ 90,520.00	\$322,660.06
Service Lines								
	1" SERVICE LINES=	1996	64	65	2061	\$ 400.00	\$ 25,600.00	\$91,251.63
Isolation Valves								
2"		1996	7	65	2061	\$ 500.00	\$ 3,500.00	\$12,475.81
4"		1996	12	65	2061	\$ 750.00	\$ 9,000.00	\$32,080.65
Blow Offs								
		1996	7	65	2061	\$ 750.00	\$ 5,250.00	\$18,713.71
Reservoirs								
		1996	80,000	75	2071	\$ 4.00	\$ 320,000.00	\$1,532,931.99
Treatment:								
Chlorine Metering Pump	Stenner	2013	1	8	2021	\$ 1,000.00	\$ 1,000.00	\$1,092.73
Chlorine Solution Tank	size: make:	2018	1	50	2068	\$ 500.00	\$ 500.00	\$2,191.95
Softner		2019	1	25	2044	\$ 10,000.00	\$ 10,000.00	\$21,565.91
Meter Replacement								
3/4"	#	1996	64	20	2016	\$ 85.00	\$ 5,440.00	\$5,603.20
Generator								
		2012	1	25	2037	\$ 30,000.00	\$ 30,000.00	\$51,072.99
Total Estimated Costs							\$ 1,504,165.00	\$ 5,616,411.32

3% inflationary rate

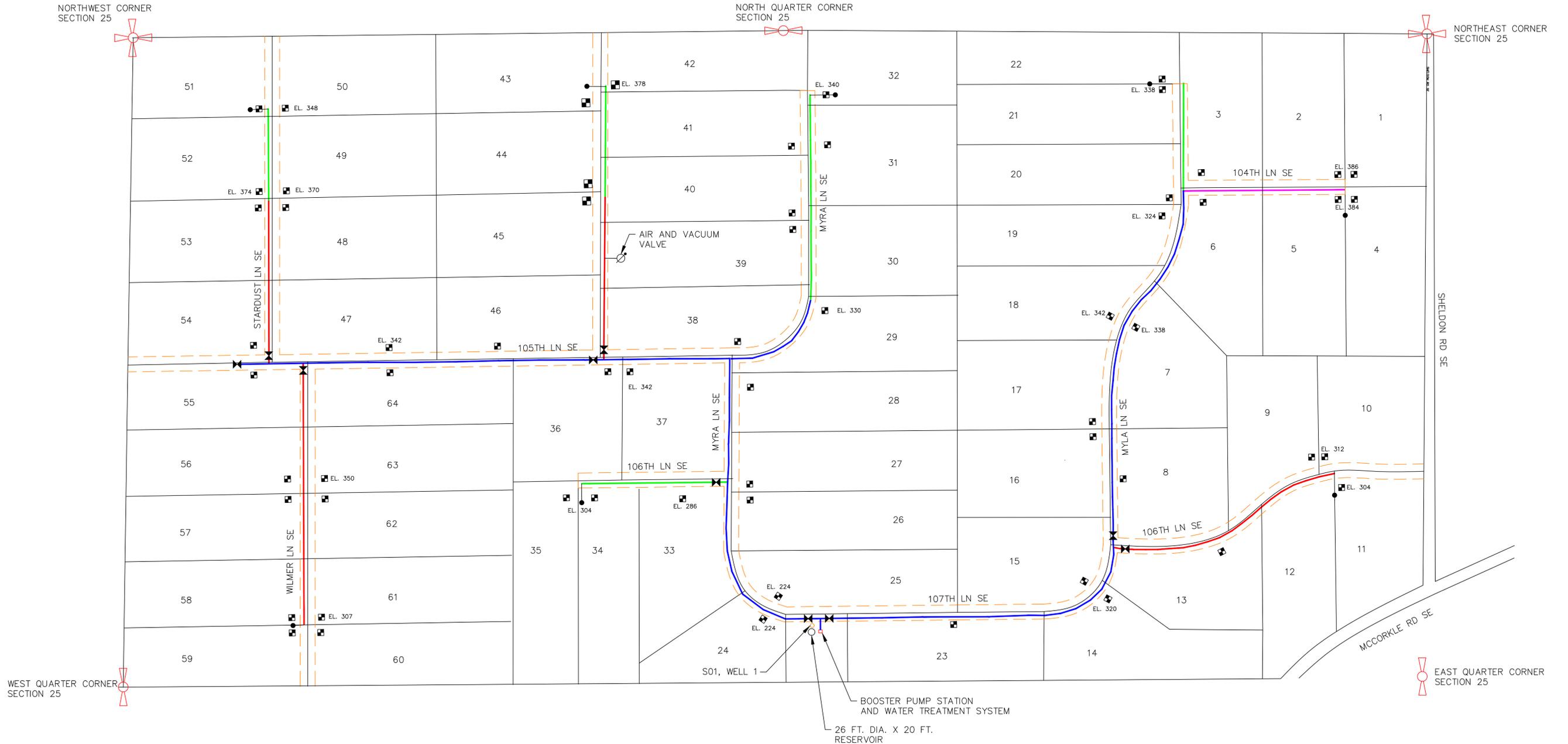
Capital Asset Management Plan Class A Systems

Name of System - Cedar Ridge

System Infrastructure	Aprox. Date Built	Pipe Footage or # of Items	Depreciat on Period Years	Full Depreciat on Date	Replacement Cost per FV/ 2018	Total Replacement Cost 2018	Replacement Cost at end of Service Life		Costs Per Year																							
									2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040			
Pump House																																
Building size:	1996	1	50	2046	\$ 15,000.00	\$ 15,000.00	\$34,318.92																									
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Generator																																
	2012	1	25	2037	\$ 30,000.00	\$ 30,000.00	\$51,072.99																									
Total Estimated Costs						\$ 1,604,165.00	\$ 5,616,411.32	TOTALS	\$ 23,834.20	\$ 2,185.45	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,800.31	\$ -	\$ -	\$ 1,384.23	\$ 2,353.20	\$ 15,419.60	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 52,826.50	\$ -	\$ -	\$ 43,047.22

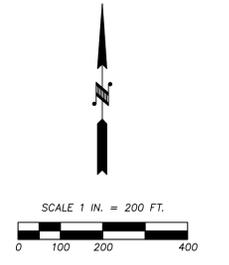
System Map

NORTH HALF OF SECTION 25, T 17 N, R 02 W, W.M. THURSTON COUNTY



LEGEND

- | | |
|---------------------------|---------------------|
| ROAD AND UTILITY EASEMENT | SERVICE WATER METER |
| 2 IN. PVC | BLOW OFF |
| 3 IN. PVC | GATE VALVE |
| 4 IN. PVC | |
| 6 IN. PVC | |



NO	DATE	BY	APPR	REVISIONS

Civil and Municipal Engineering and Planning
Jerome W. Morrissette & Associates Inc., P.S.
1700 Cooper Pt. Road S.W. #B-2, Olympia, Wa. 98502-1110 Ph 360.352.9456 Fx 360.352.9990

Approved By _____

DESIGNED BY	06/03/2019
DATE	DATE
MH	06/03/2019
C.A.D.D. BY	DATE
DE	06/03/2019
CHECKED BY	DATE
06/03/2019	DATE PLOTTED

THURSTON PUD

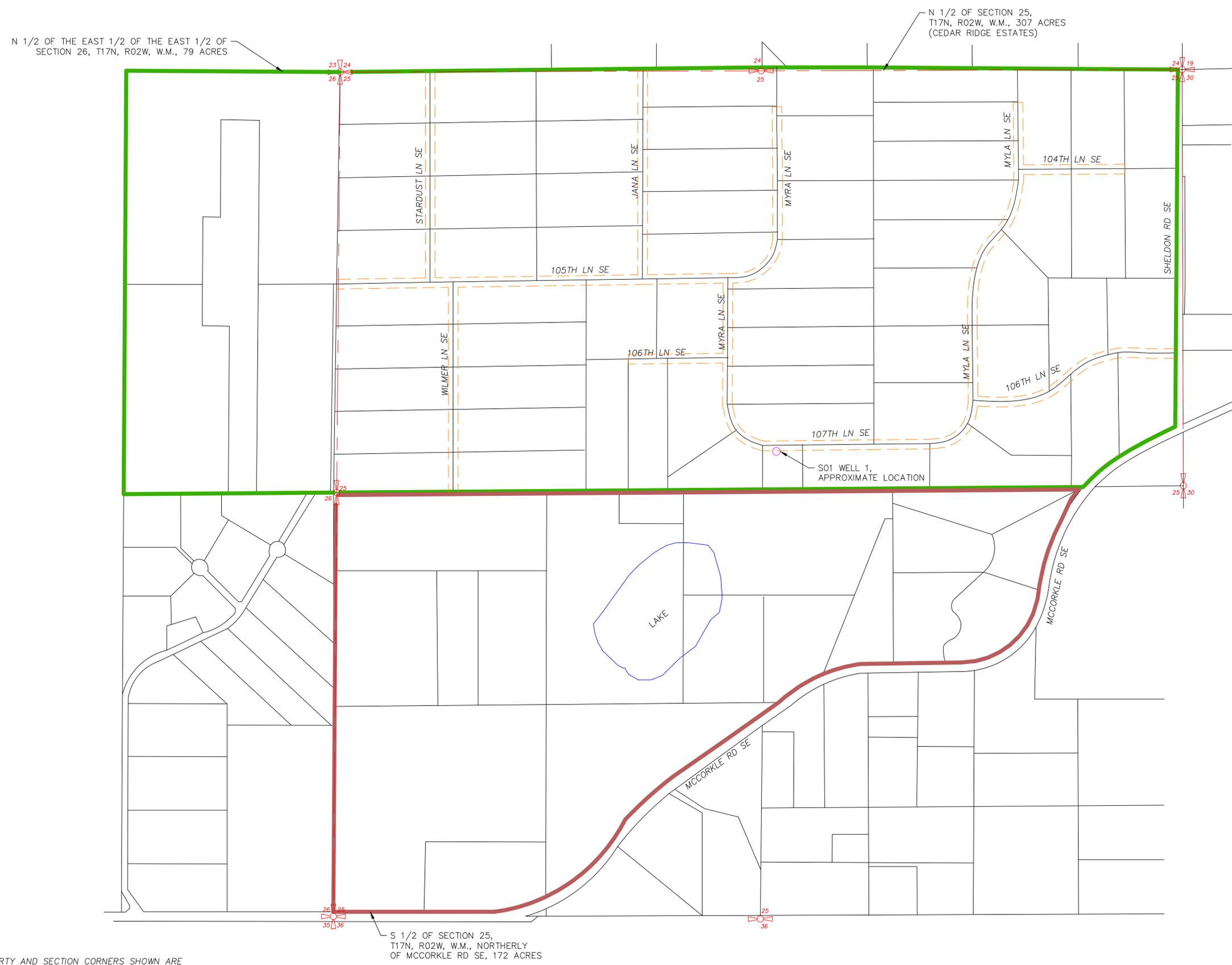
CEDAR RIDGE WATER SYSTEM PLAN
SYSTEM MAP

17132

SHT 1 OF 1

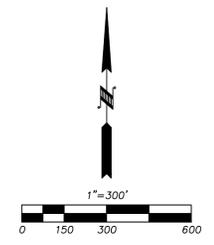
Z:\2017 Projects\17132 Thurston PUD Cedar Ridge WSP\WMA Drawings\CURRENT\17132 SERVICE MAP TIME OF TRAVEL.dwg, 6/3/2019 9:17:45 AM

Service Area Map



UPON APPROVAL OF THE WATER SYSTEM PLAN BY THE WASHINGTON STATE DEPARTMENT OF HEALTH, THE WATER RIGHTS PLACE OF USE SHALL CONSIST OF THE FUTURE SERVICE AREAS NOTED HEREON IN ADDITION TO THE RETAIL SERVICE AREA.

- LEGEND**
- RETAIL SERVICE AREA
 - FUTURE SERVICE AREA
 - - - ROAD AND UTILITY EASEMENT



NOTE: PROPERTY AND SECTION CORNERS SHOWN ARE BASED ON THURSTON COUNTY GEODATA.

NO	DATE	BY	APPR	REVISIONS

JWM&A Civil and Municipal Engineering and Planning

Jerome W. Morrissette & Associates Inc., P.S.

1700 Cooper Pt. Road S.W. #B-2, Olympia, Wa. 98502-1110 Ph 360.352.9456 Fx 360.352.9990

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DE	06/03/2019
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C.A.D. BY	DATE
DE	06/03/2019
CHECKED BY	DATE
06/03/2019	
DATE PLOTTED	

THURSTON COUNTY PUD
CEDAR RIDGE #617
WATER SYSTEM

SERVICE AREA MAP

2/2017 Project 17132 Thurston PUD Cedar Ridge WSP/WMA Drawings/CURRENT/SERVICE AREA MAP.dwg 6/2/2019 9:19:47 AM