

2021 Domestic Water System Plan

Final September 29, 2021

Lake Chelan Reclamation District

Manson, Washington

DOH Water System ID No. 43783U



Lake Chelan Reclamation District
80 Wapato Way
Manson, WA 98831



RH2 Engineering, Inc.
300 Simon Street SE, Suite 5
East Wenatchee, WA 98802



Lake Chelan Reclamation District 2021 Domestic Water System Plan

The material and data in this Water System Plan were prepared under the supervision and direction of the undersigned professional engineers registered in the State of Washington.



Signed:
4/12/2021



Signed:
4/12/2021

Table of Contents

1	INTRODUCTION.....	1
1.1	Executive Summary.....	1
2	DESCRIPTION OF WATER SYSTEM.....	2
2.1	Ownership and Management	2
2.2	System Background.....	2
2.3	Inventory of Existing Facilities	3
2.4	Related Plans	8
2.5	Existing and Future Service Area and Characteristics	8
2.6	Service Area Policies.....	9
2.6.1	Satellite Management and Private Sources.....	10
2.6.2	Service Areas.....	10
2.6.3	Duty to Serve.....	11
3	BASIC PLANNING DATA	12
3.1	Current Population.....	12
3.1.1	Full-Time Population.....	12
3.1.2	Seasonal Population	13
3.2	Current Water Use and Data Reporting	15
3.2.1	Water Supply Metering	15
3.2.2	Water Supply.....	16
3.2.3	Customer Metering	19
3.3	Distribution System Leakage	23
3.4	ERUs	23
3.5	Per Capita Consumption.....	26
3.6	Current and Projected Land Use.....	26
3.7	Future Population	28
3.8	Future ERUs	29
3.9	Future Water Use.....	30
4	SYSTEM ANALYSIS	32
4.1	Design and Performance Standards.....	32
4.1.1	Flow Rates.....	32
4.1.2	Sources.....	32
4.1.3	Fire Flow.....	32
4.1.4	Pressure Zones and System Pressures.....	33
4.1.5	Pipe Sizes and Valves.....	33

4.1.6	Water Main Location	34
4.2	Water Quality Analysis	34
4.2.1	Drinking Water Constituents.....	34
4.2.2	Water Quality Associated with Treatment	36
4.3	System Analysis.....	36
4.3.1	Water Source Description	36
4.3.2	Source Capacity Analysis.....	38
4.3.3	Water Rights Adequacy	39
4.3.4	Water Treatment.....	40
4.3.5	Storage.....	42
4.3.6	Distribution System/Hydraulics.....	44
4.4	Physical Capacity Summary	46
4.5	System Issues and Possible Improvements	48
4.5.1	Water Treatment.....	48
4.5.2	Control Systems.....	49
4.5.3	Storage.....	49
4.5.4	Distribution System	50
4.5.5	Interties.....	57
5	WATER USE EFFICIENCY	58
5.1	Program Development and Implementation	58
5.1.1	Introduction	58
5.1.2	Water Use Efficiency Rule.....	58
5.1.3	Past WUE Performance	58
5.1.4	Current WUE Program.....	59
5.1.5	Goals and Public Process	61
5.1.6	Mandatory Measures	62
5.1.7	Measures to be Evaluated or Implemented	63
5.1.8	Water Loss Control Action Plan.....	65
5.1.9	Monitoring of Conservation Measure Effectiveness.....	65
5.1.10	Assessment and Selection of Alternatives.....	66
6	SOURCE WATER	67
6.1	Water Right Evaluation	67
6.2	Water Supply Reliability	68
6.2.1	Source Reliability.....	68
6.2.2	Water Right Adequacy.....	68

6.2.3	Facility Reliability.....	69
6.2.4	Water Shortage Response Planning	69
6.3	Watershed Control Program.....	69
6.3.1	Watershed Description/Characteristics.....	69
6.3.2	Identification of Activities and Land Uses Detrimental to Water Quality	70
6.3.3	Watershed Management and Control Measures.....	70
6.4	Source Water Quality	71
7	OPERATIONS AND MAINTENANCE.....	73
7.1	Operations and Maintenance Program.....	73
7.1.1	Water System Management and Personnel	73
7.1.2	Normal Day-to-Day Operations.....	73
7.1.3	Preventive Maintenance.....	73
7.1.4	Field Engineering	74
7.1.5	Water Quality Monitoring.....	74
7.1.6	Emergency Response.....	74
7.1.7	Cross-Connection Control	74
7.1.8	Implementation of the Improvement Program	74
7.1.9	Budget Formulation.....	74
7.1.10	Response to Complaints	75
7.1.11	Public/Press Contact.....	75
7.1.12	Billing	75
7.1.13	Operator Certification	75
7.2	System Operation and Control	76
7.2.1	Normal Operations.....	76
7.2.2	Alternate Operations (Winter).....	76
7.2.3	Alternate Operations (Power Outage).....	77
7.3	Routine Operating Procedures	77
7.3.1	Water Treatment Plant Suppliers.....	78
7.4	Water Quality Sampling Procedures.....	80
7.4.1	Source Monitoring.....	80
7.4.2	Distribution Monitoring.....	80
7.4.3	Treatment Plant Monitoring	81
7.5	Emergency Response Program	83
7.5.1	Emergency Call-Up List	83
7.5.2	Notification Procedures.....	83

7.5.3	Emergency Response Plan	84
7.6	Safety Procedures	84
7.7	Cross-Connection Control Program	85
7.7.1	Legal Authority	85
7.7.2	Coordination with the Local Administrative Authority.....	86
7.7.3	Assessing Service Connections by Degree of Hazard	86
7.7.4	BAT QC Program.....	87
7.7.5	Responding to Backflow Incidences	87
7.7.6	Record Keeping and Reporting	87
7.8	Summary of Operations and Maintenance Deficiencies.....	87
8	DESIGN AND REVIEW PROCEDURES	88
8.1	Construction Standards for Distribution Mains and Other Related Projects	88
8.2	Internal Engineering Review Procedures	88
9	IMPROVEMENT PROGRAM.....	89
9.1	Improvement Plan.....	89
9.2	Costs and Schedule	89
10	FINANCIAL PROGRAM.....	93
10.1	Domestic Water System Accounting.....	93
10.1.1	Revenues.....	93
10.1.2	Expenses	93
10.1.3	Reserves.....	94
10.2	Water Rates and Rate Structures.....	94
10.3	Ten-Year Balanced Operating Budget	95
10.4	Connection Charges	97
10.4.1	Buy-In Method	98
10.4.2	Incremental Cost Method.....	98
10.4.3	Combined Cost Method.....	98

Table of Contents - Appendices

APPENDIX A – AGENCY REVIEWS

- Appendix A1 – WA Department of Health
- Appendix A2 – WA Department of Ecology
- Appendix A3 – Chelan County
- Appendix A4 – City of Chelan
- Appendix A5 – Lake Chelan Reclamation District

APPENDIX B – WATER FACILITIES INVENTORY

APPENDIX C – SEPA

APPENDIX D – RULES AND REGULATIONS

APPENDIX E – COUNTY RESOLUTION 2015-112

APPENDIX F – WATER USE EFFICIENCY

APPENDIX G – WATER RIGHTS

- Appendix G1 – Water Rights Self Assessment
- Appendix G2 – Water Rights
- Appendix G3 – Water Rights Extension

APPENDIX H – WATER QUALITY PROGRAM

- Appendix H1 – Monitoring Plan and Schedule
- Appendix H2 – Coliform Monitoring Plan
- Appendix H3 – Consumer Confidence Report
- Appendix H4 – Cross Connection Control Resolution

APPENDIX I – SANITARY SURVEY

APPENDIX J – CONSTRUCTION STANDARDS

- Appendix J1 – Construction Specifications
- Appendix J2 – Construction Details

APPENDIX K – PUMP CURVES

APPENDIX L – FIRE DISTRICT NESTING APPROVAL

1 INTRODUCTION

1.1 Executive Summary

The Lake Chelan Reclamation District (District) owns and operates a domestic water system on the north shore of Lake Chelan near Manson. With the addition of new pumps and the replacement of the motor control centers for the Manson and Lakeshore intakes in 2005, many of the major facilities have been upgraded. Health-related components are at a high level of repair and service with both modern facilities and programmable logic controller (PLC) controlled processes. The water treatment plant produces water of excellent quality that far exceeds state standards.

The majority of the work remaining on the system is associated with water distribution. As operators of a system that is over 100 years old, there is a wide variety of pipeline sizes, materials, and ages. The District will annually replace pipe as budget allows. Pipeline replacements are prioritized based upon both reliability and fire flow capacity issues. Other improvements primarily are associated with current and future growth and demand for various services.

Rate increases will be necessary in the next few years depending upon the rate of customer growth, inflation, and the likely need to construct a new reservoir and expand the water treatment plant (WTP) within 15 years. The District continues to use a conservation block rate structure that encourages efficient use of water.

Population growth has exceeded Chelan County's average growth rate by 20 percent over the last few years, and all indications are that growth will be strong for the next few years. There is significant interest in the Chelan Valley for summer homes and tourist-related activities and business. This makes the District's domestic system key to maintaining high levels of service in a rapidly expanding area. Tourist demands are hard to predict but add to the demands on the system over and above population projections by Chelan County and Washington Office of Financial Management (OFM). The District's domestic water system and its associated water rights are well positioned to accommodate the projected demands with safe, reliable, affordable water. The goal is to make sure that growth is orderly and that existing customers are insulated from the cost of rapid expansion.

2 DESCRIPTION OF WATER SYSTEM

2.1 Ownership and Management

The domestic drinking water system serving the Manson area is owned and operated by the Lake Chelan Reclamation District. The District is an irrigation district organized under Title 87 of Revised Code of Washington (RCW). Title 87 allows irrigation districts to provide other services to patrons within the District, including drinking water. The drinking water system is classified as a Group A public water system and has approximately 2,040 connections. Since 2015, approximately 88 percent of all service connections have been active at any one time.

The District is a quasi-municipal corporation with a five-person Board of Directors elected from eligible land owners. The Board of Directors is responsible for setting bylaws, rules, and regulations under which the domestic water system is run, which can be found in Appendix D. The Board of Directors hires a manager for the District who is the Chief Executive Officer and Secretary to the Board. The manager is responsible for hiring a staff of qualified individuals to operate and maintain the system. The manager also is responsible for formulating short and long range plans and finances together with annual work programs and budgets for the review and approval of the Board of Directors.

2.2 System Background

The domestic water system in the town of Manson originally was constructed and privately owned by J.R. Laycock sometime around 1910. Negotiations between the District and Mr. Laycock to purchase the system began in May of 1920, with a final settlement price of \$2,289 being paid in February of 1922.

The District made many improvements and expansions to the system between 1922 and 1971. A study undertaken in October 1971 indicated that the Manson Intake was at capacity to meet peak daily demands, with no capacity for fire flows during peak demand periods. The two 400 gallon per minute (gpm) pumps would run nearly continuously for 24 hours and the 150,000-gallon reservoir had no storage for fire flows during July and August. Much of the distribution system was undersized for providing fire flows with many dead-end lines.

The rebuilding of the irrigation system in 1971 through 1975 gave the District an opportunity to lay several miles of domestic water lines to the rural areas in the same trench as the irrigation distribution lines under construction. District crews were utilized to accomplish this task, and in doing so, expanded the service area quite significantly. In 1974, the District constructed a second domestic intake called the Lakeshore Intake. The new pump station contained two pumps with a combined capacity of 2.90 cubic feet per second (cfs). The station was located on District property that had been used historically to pump supplementary irrigation water into the old irrigation system. The District abandoned the irrigation station and used the station's 24-inch discharge line for the new Lakeshore Intake. Water was pumped through the 24-inch steel line to a new 1.0 million gallon (MG) reservoir located adjacent to Summit Avenue (the Lakeshore Tank).

In 1982, the Manson Intake was rebuilt to include three pumps with a total capacity of 6.68 cfs. A new 16-inch discharge line was installed, and in 1985 the 1.0 MG Manson Reservoir (now the WTP Raw Water tank) was constructed above Division Street. By 1990, over 45 miles of distribution system served customers in the Manson area.

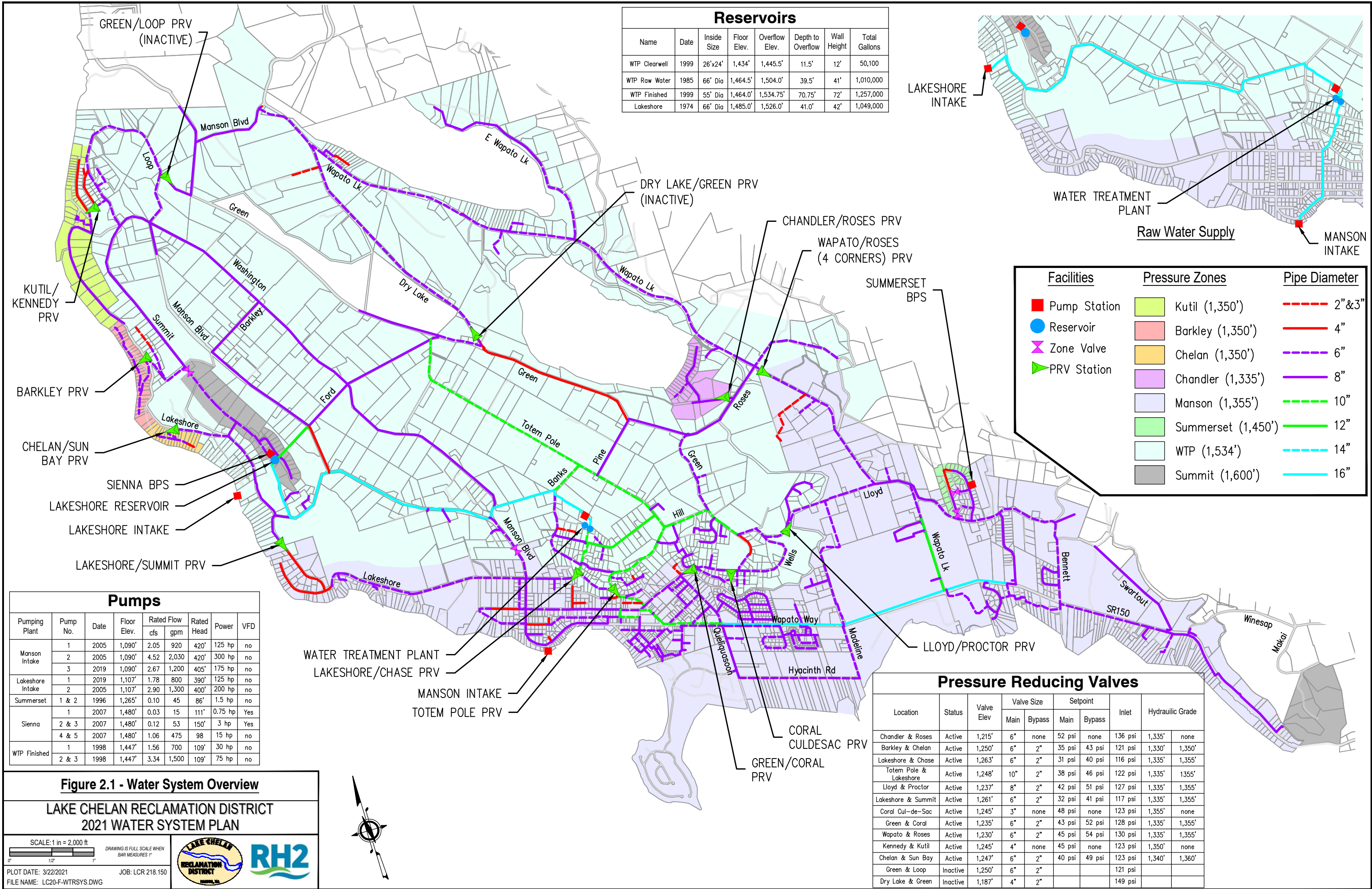
In 1991, the Washington State Department of Health (DOH) directed the District to begin planning for a water treatment plant to filter the domestic supplies coming from Lake Chelan. Studies were undertaken to determine if it was more efficient to combine the intakes for the District with the City of Chelan and build only one treatment plant. The City of Chelan is the only adjacent Group A system on the north shore of Lake Chelan. Two to five small Group B systems adjoined the system and may be incorporated in the domestic system in the future.

Geographically, the District's system and the City of Chelan's system would most logically meet near a rock outcrop along the lake called Rocky Point. HDR Engineering was the consulting engineer for both the District and the City and analyzed the opportunity to build either one treatment plant for both the District and the City or one treatment plant for each entity. It was determined to be more cost effective to build a plant at each location. In 1997, construction began on a 4.0 million gallon per day (MGD) treatment plant together with pipelines and other appurtenances to bring raw water from both the Manson Intake and the Lakeshore Intake to the treatment plant located near the Manson Reservoir. Construction included a new 1.25 MG finished water reservoir. Total cost of the project completed in 1999 was \$7.4 million.

Beginning in 2004 and finishing in 2005, the Manson Intake and Lakeshore Intake were rehabilitated to meet the construction obligations outlined in the expanded water right permits obtained in 1995. The Manson Intake was upgraded by replacing two pumps (No. 1 and No. 2) and motors, the motor control center, pump control valves, and discharge piping from the intake. The Lakeshore Intake was upgraded by replacing the pump and motor for pump No. 2, the motor control center, and several control valves. This project increased the pumping capacity of the Manson Intake to 9.25 cfs and the Lakeshore Intake to 4.68 cfs for a total of 13.93 cfs. In 2018, the Manson Intake pump No. 3 failed and was replaced in 2019.

2.3 Inventory of Existing Facilities

The District has operated the domestic water system since 1922. Many of the construction efforts since 1971 that were put out to bid are well accounted for. Pipelines put into operation prior to 1971 are difficult to account for as no as-built information and few planning documents are available prior to that time. Other construction efforts in the 1970 and 1980 were completed without as-built information. The pipe sizes and material types are generally known for pipelines installed in that era, but exact dates and connection points are sometimes not known. All pipelines installed since 1991 have followed District Standards, and as-built information has been kept and recorded for all work. By early 2020, the system included approximately 2,040 service connections, and the system is not presently limited to a maximum number of connections by the approval process. The distribution system also contains approximately 310 hydrants that are numbered, mapped, tested, and flowed on a periodic basis. The water system layout can be seen on Figure 2.1. The hydraulic profile is shown on Figure 2.2. Table 2.1 outlines the distribution of pipe size as it relates to age and type of pipe.



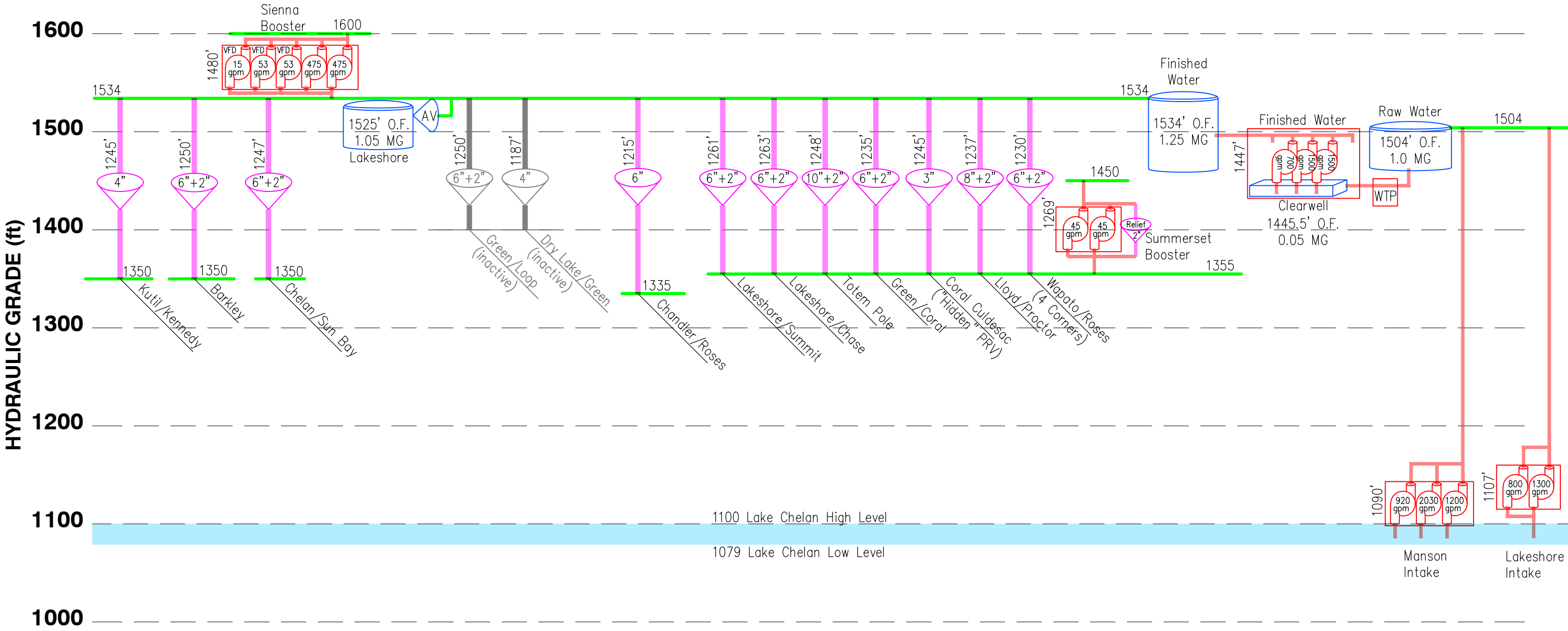


Figure 2.2: Hydraulic Profile

LAKE CHELAN RECLAMATION DISTRICT
2021 WATER SYSTEM PLAN

SCALE: No Scale

DRAWING IS FULL SCALE WHEN
BAR MEASURES 1"

LAKE CHELAN
RECLAMATION
DISTRICT

RH2

PLOT DATE: 3/22/2021

JOB: LCR 218.150

FILE NAME: LC20-F-HYDPR.DWG

ELEV

gpm

PUMP,
FLOWRATE and
FLOOR
ELEVATION

ELEV
D1+D2

PRV STATION
VALVE SIZES and
VALVE ELEVATION

O.F.
MG

RESERVOIR,
OVERFLOW ELEV.
AND CAPACITY

AV

ALTITUDE
VALVE

HGL

PRESSURE
ZONE

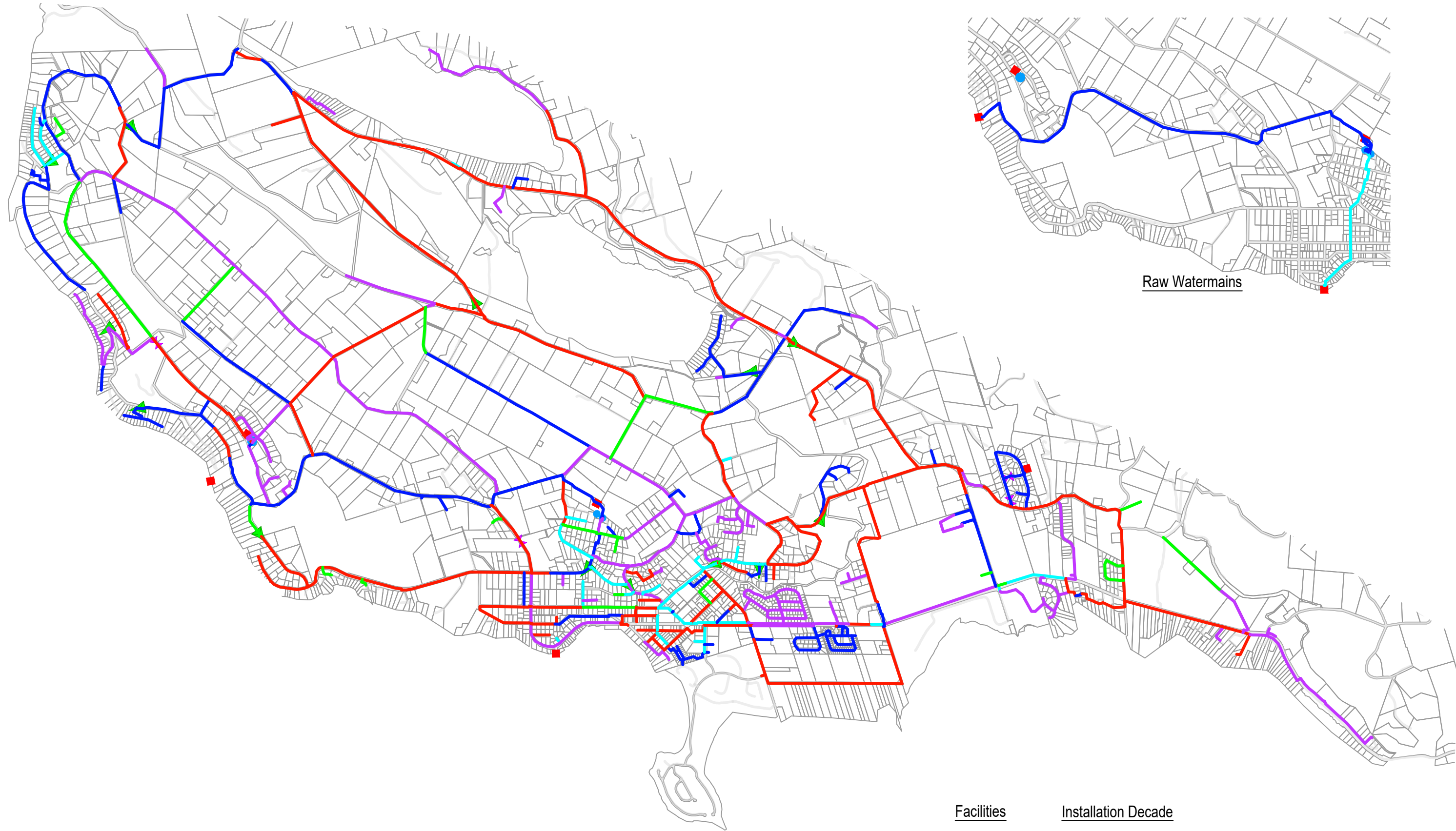
LEGEND

Table 2.1 – Distribution Main Inventory and Pipe Age

Material and Diameter	0-10 years	11-20 years	21-30 years	31-40 years	41-50 years	Grand Total
Asbestos Cement	0	0	2,137	8,833	95,444	106,414
4 inch				3,024	10,179	13,203
6 inch			2,137	5,676	78,616	86,429
8 inch				133	5,989	6,122
10 inch					660	660
Ductile Iron	542	5,587	14,093	0	63	20,285
6 inch	44		1,226		63	1,333
8 inch	498	2,677	2,165			5,340
10 inch		384	137			521
12 inch		1,180	1,855			3,035
16 inch		1,346	8,710			10,056
HDPE	0	374	0	0	0	374
8 inch		374				374
PVC	16,643	68,451	52,013	5,339	1,508	143,954
<= 2 inch			205	1,197	1508	2,910
4 inch		688	958			1,646
6 inch	1,114	9,230	20,967	1,010		32,321
8 inch	13,935	43,903	24,985	1,067		83,890
10 inch	982	8,599	4,898	2,065		16,544
12 inch	612	1,317				1,929
16 inch		4,714				4,714
Steel	0	0	0	1,725	2,470	4,195
<= 2 inch					753	753
3 inch					442	442
4 inch					341	341
6 inch					435	435
10 inch					15	15
14 inch				248		248
16 inch				1,477	484	1,961
Grand Total	17,185	74,038	68,243	15,897	99,485	274,848

The pipe diameters, ages, and materials are presented graphically on Figures 2.1, 2.3, and 2.4, respectively.

The District has two raw water intakes, two booster pump stations, one raw water reservoir, two finished water reservoirs, and a WTP. Pump data is presented in Table 2.2.



Raw Watermains

Facilities

- Pump Station
- Reservoir
- ✕ Zone Valve
- ▶ PRV Station

Installation Decade

- 1970–1979
- 1980–1989
- 1990–1999
- 2000–2009
- 2010–2019

Figure 2.3 - Pipe Age

**LAKE CHELAN RECLAMATION DISTRICT
2021 WATER SYSTEM PLAN**

SCALE: 1 in = 2,000 ft
DRAWING IS FULL SCALE WHEN
BAR MEASURES 1"
PLOT DATE: 3/22/2021
FILE NAME: LC20-F-PIPEAGE.DWG
JOB: LCR 218.150



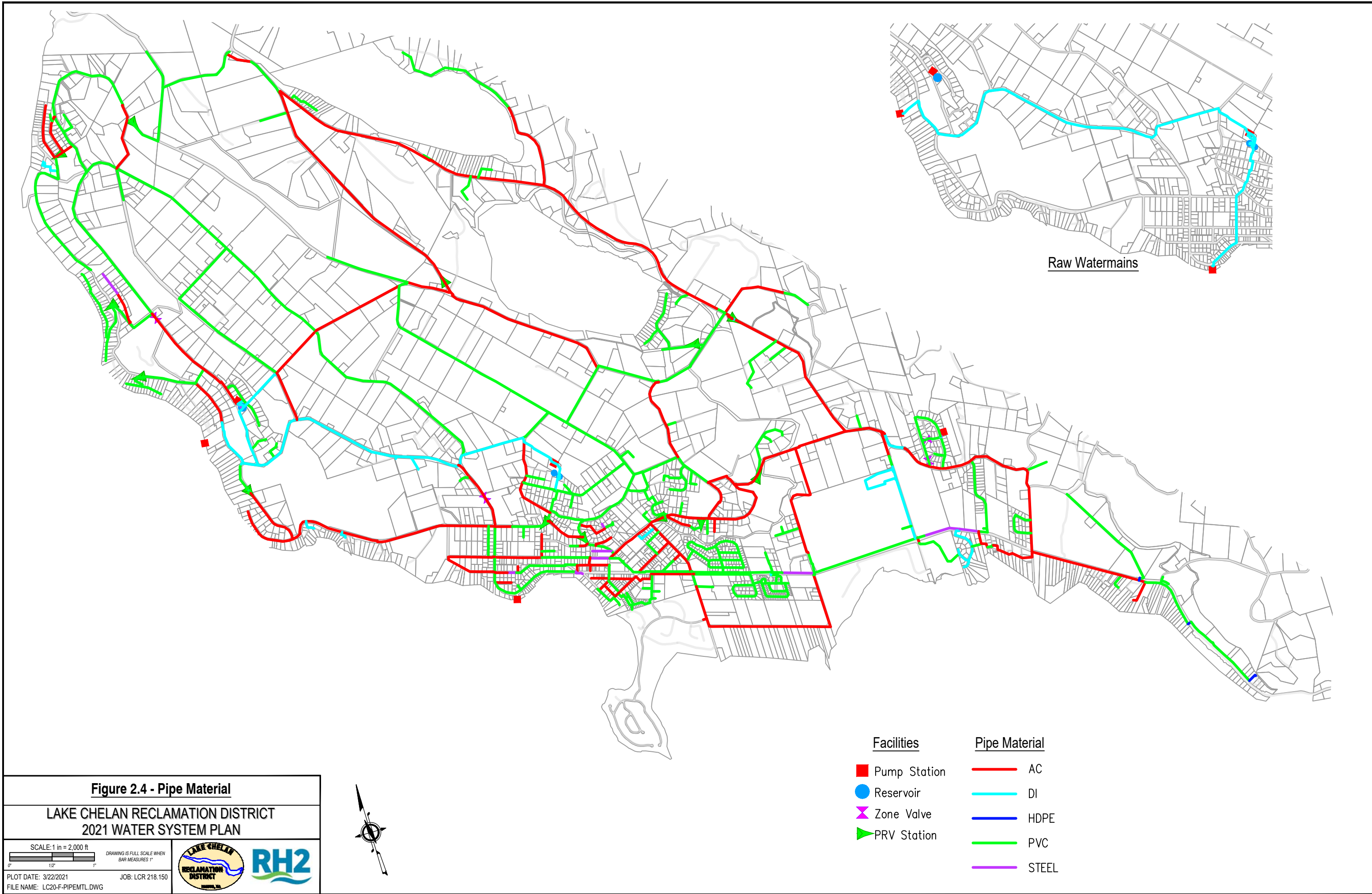


Table 2.2 – Pump Inventory

Pumping Plant and Year Built	Floor Elevation	Pump No.	Pump Date	Rated Flow (cfs)	Rated Flow (gpm)	Rated Head (ft)	Range of Heads (ft)	Motor Power (hp)	Speed (rpm)	Pump Best Eff. Point	Brand	Model
Manson Intake (1982)	1,090 ft	1	2005	2.05	920	420	380-445	125	1,760	81%	Flowserve	12EMM-7
		2	2005	4.52	2,030	420	380-445	300	1,760	85%	Flowserve	15EMM-5
		3	2019	2.67	1,200	405	380-445	175	1,770	88%	Goulds	12CHC
		Total		9.25	4,150							
Lakeshore Intake (1974)	1,107 ft	1	2019	1.78	800	390	380-445	125	1,800	84%	Hydroflo	12DC
		2	2005	2.90	1,300	400	380-445	200	1,770	84%	National	E12MC
		Total		4.68	2,100							
Summerset Booster Station (1996)	1,269 ft	1	1996	0.10	45	86	60-110	1.5	3,450	70%	Sta Rite	JBHF 51S
		2	1996	0.10	45	86	60-110	1.5	3,450	70%	Sta Rite	JBHF 51S
		Total		0.20	90							
Sienna Booster Station (2007)	1,480 ft	1 *	2007	0.03	15	111	111-155	0.75	3,439	59%	Grundfos	CR3-5
		2 *	2007	0.12	53	150	150-193	3	3,461	67%	Grundfos	CR10-4
		3 *	2007	0.12	53	150	150-193	3	3,461	67%	Grundfos	CR10-4
		4	2007	1.06	475	98	98-170	15	3,528	80%	Grundfos	CR90-1
		5	2007	1.06	475	98	98-170	15	3,528	80%	Grundfos	CR90-1
		Total		2.39	1,071							
WTP Finished Water Pumps (1998)	1,447 ft	1	1998	1.56	700	109	70-115	30	1,200	82%	Floway	12JKH
		2	1998	3.34	1,500	109	70-115	75	1,200	85%	Floway	16MKL
		3	1998	3.34	1,500	109	70-115	75	1,200	85%	Floway	16MKL
		Total		8.24	3,700							
WTP Backwash Residual Pumps (1998)	1,411 ft (pump)	1	1998	0.78	350	58	54-62	10	1,745	59%		
		2	1998	0.78	350	58	54-62	10	1,745	59%		
		Total		1.56	700							
WTP Backwash Return Pumps (1998)	1,417.5 ft (pump)	1	1998	0.60	270	77	65-86	10	1,745	55%		
		2	1998	0.60	270	77	65-86	10	1,745	55%		
		Total		1.20	540							

* Variable speed pump. Maximum speed is noted.

The Summerset Booster Pump Station (BPS) feeds a small closed zone with two fixed speed pumps discharging through a 2-inch pressure reducing valve (PRV) that sets the downstream pressure. A 2-inch pressure relief valve in a manhole adjacent to the BPS is set to open on high pressure if the PRV fails.

The Sienna BPS feeds a closed zone with three variable speed pumps to supply normal demands and two fixed speed pumps to supply fire flow. Although the two fire pumps are each rated at 476 gpm, hydraulic modeling indicates they could supply fire flow of 700 gpm to 750 gpm individually or 1,000 gpm to 1,450 gpm together. However, individual pump flow above 640 gpm is at the extreme end of their operational range and is not recommended by the manufacturer.

All other pump stations have fixed speed pumps controlled by reservoir levels.

Storage components of the Water Treatment Plant are presented in Table 2.3.

Table 2.3 – Treatment Plant Storage

Feature	No. of Units	Rated Capacity Each (cfs)	Rated Capacity Each (gpm)	Max Water Elev. (ft)	Depth (ft)	Area (sf)	Volume Each (gal)	Total Volume (gal)
Flocculation Basins	2	3.12	1,400	1,458.2	12.5	431	40,252	80,504
Filters	2	3.12	1,400	1,457.5	10	249	18,592	37,185
Clearwell	1	6.24 in 8.24 out	2,800 in 3,700 out	1,445.5	11	610	50,150	50,150
Backwash Basin	1	1.20	540	1,433.0	16	1,018	121,834	121,834
Backwash Return Basin	1	1.20	540	1,433.0	14.5	28.3	3,069	3,069

A summary of the transmission mains from the raw water pump stations to the raw water reservoir is presented in Table 2.4.

Table 2.4 – Raw Water Transmission Mains

Pumping Plant	Diam. (in)	Length (ft)	Flow (cfs)	Flow (gpm)	Velocity (fps)
Manson	16	3,400	9.25	4,150	6.6
Lakeshore	16	10,500	4.68	2,100	3.4

A summary of the raw and finished water reservoirs is presented in Table 2.5.

Table 2.5 – Reservoir Data

Reservoir	Date	Inside Diam. (ft)	Floor Elev (ft)	Overflow Elev (ft)	Depth to Overflow (ft)	Wall Height (ft)	Total Capacity (gal)	Interior Area (sf)	Exterior Area (sf)
WTP Raw	1985	66	1,464.5	1,504.0	39.5	41	1,010,828	15,344	11,922
WTP Finished	1999	55	1,464.0	1,534.75	70.75	72	1,257,316	17,192	14,817
Lakeshore	1974	66	1,485.0	1,526.0	41.0	42	1,049,214	15,551	12,130

The distribution system is supplied by one gravity fed pressure zone, with the hydraulic grade controlled by the WTP Finished Water Reservoir at 1,534 feet maximum. This zone also is served by the Lakeshore Reservoir, which has an overflow at 1,526 feet and an altitude valve to prevent overfilling. Five pressure zones are supplied by pressure reducing valves and two zones are supplied with pressure pumps. The pressure zones, along with the minimum and maximum elevations of the pipelines, are shown in Table 2.6.

Table 2.6 – Pressure Zones

Hydraulic Grade (ft)			Name	Elevation (ft)		Pressure (psi)		Source
Nominal	Min.	Max.		Min.	Max.	Min.	Max.	
1,335	1,334	1,335	Chandler	1,180	1,220	49	67	1 PRV Station
1,350	1,349	1,350	Kutil	1,180	1,245	45	74	1 PRV Station
1,350	1,349	1,350	Barkley	1,110	1,135	93	104	1 PRV Station
1,350	1,349	1,350	Chelan	1,130	1,155	84	95	1 PRV Station
1,355	1,328	1,355	Manson	1,105	1,272	24	108	7 PRV Stations
1,450	1,450	1,450	Summerset	1,228	1,305	63	96	Summerset BPS
1,534	1,515	1,527	WTP	1,165	1,443	31	157	Finished Water Tank
1,600	1,600	1,600	Summit	1,414	1,480	52	81	Sienna BPS

An inventory of the pressure reducing valves is shown in Table 2.7.

Table 2.7 – Pressure Reducing Valves

Location	Status	Valve Elev. (ft)	Valve Size		Setpoint		Inlet Pressure (psi)	Hydraulic Grade	
			Main (inch)	Bypass (inch)	Main (psi)	Bypass (psi)		Main (ft)	Bypass (ft)
Chandler & Roses	Active	1,215	6	-	52	-	136	1,335	-
Barkley Rd & Chelan Blvd	Active	1,250	6	2	35	43	121	1,330	1,350
Lakeshore & Chase	Active	1,263	6	2	31	40	116	1,335	1,355
Totem Pole & Lakeshore	Active	1,248	10	2	38	46	122	1,335	1,355
Lloyd & Proctor	Active	1,237	8	2	42	51	127	1,335	1,355
Lakeshore & Summit	Active	1,261	6	2	32	41	117	1,335	1,355
Coral Cul-de-Sac ("Hidden" PRV)	Active	1,245	3	-	48	-	123	1,355	-
Green & Coral	Active	1,235	6	2	43	52	128	1,335	1,355
Wapato & Roses (4 Corners)	Active	1,230	6	2	45	54	130	1,335	1,355
Kennedy & Kutil	Active	1,245	4	-	45	-	123	1,350	-
Chelan Blvd & Sun Bay Ln	Active	1,247	6	2	40	49	123	1,340	1,360
Green & Loop	Inactive	1,250	6	2	-	-	121	-	-
Dry Lake & Green	Inactive	1,187	4	2	-	-	149	-	-

2.4 Related Plans

Water quantity and quality issues in the Lake Chelan Basin are important study topics. Several existing plans are relevant to this study, including the following non-reprinted plans.

- *2017-2037 Chelan County Comprehensive Plan*, December 2017
 - This plan has been updated and revised on an annual basis per the guidelines of Chapter 36.70A RCW, the Growth Management Act. The vision statement for the Chelan-Manson study area is to
...strive to maintain and enhance the existing quality of life that includes: culture, customs, economy, agricultural economy, sense of community, water quality and recreational opportunities. This is a plan to promote the development of a 12-month economy utilizing the abundant natural resources of the area. This plan should provide for expansion of these opportunities, while maintaining an adequate infrastructure to accommodate this growth.
- *2017-2037 Chelan County Comprehensive Plan Appendix F – Manson Area Subarea Plan*, 2017
 - The 2017 *Manson Area Subarea Plan* is essentially unchanged since 2008, with only minor additions regarding vehicle parking in commercial areas.
- *Domestic Comprehensive Plan*, Lake Chelan Reclamation District, March 2014
 - Used as the basis of this Water System Plan (WSP) update.
- *City of Chelan Water System Plan*, August 2018
 - Reviewed to confirm service area boundary compatibility.
- The Washington State Department of Ecology's (Ecology) *2008 Lake Chelan DDT and PCB [total maximum daily load] TMDL Water Quality Implementation Plan*. July 2008
 - Refer to Section 6.4 of this WSP for a summary.
- Ecology's *Lake Chelan Wapato Basin Total Phosphorus Total Maximum Daily Load Water Quality Effectiveness Monitoring Report*, November 2011
 - Refer to Section 6.4 of this WSP for a summary.
- Ecology's *Lake Chelan Water Quality Plan*, 1991
 - Refer to Section 6.4 of this WSP for a summary.

2.5 Existing and Future Service Area and Characteristics

The Lake Chelan Basin is situated between the Sawtooth and Chelan Mountains. The basin is dominated by Lake Chelan, which is the largest and deepest natural lake in Washington State. Lake Chelan is approximately 50.5 miles long, with an average width of 1.5 miles and a maximum depth of 1,500 feet. The outfall to the lake is controlled through a hydroelectric dam and penstocks, with the final discharge into the Columbia River. Most of the development is in the Lower Chelan Basin, where the majority of the land is privately owned.

The majority of the geology in the study area is a result of complex interactions between glaciers. The area is characterized by underlying rock formations covered by a layer of soil in the valleys and frequent rock outcroppings in the mountains. Two large rock formations bound the potential northwesterly and southeasterly service area boundaries. Fourth of July Mountain serves as a natural boundary to extended service in the northeasterly direction. Rocky Point already serves as a natural geological boundary to the southeast, and the service area boundaries between the District and the City of Chelan have been reconciled at that point.

The potential for extending future domestic services into the foothill regions has been investigated by a number of potential developers but is challenged by the rapidly changing topography and geology mentioned. The existing retail service area primarily is contained within the lower valleys as described, up to elevations of approximately 1,450 feet above sea level. Future service areas into the foothills will be expensive and will require significant pumping facilities. Service into these areas can be done by amending the retail service area with Chelan County concurrence. The fact that groundwaters in the area are of both poor quantity and quality, together with the desire to have fire flow capabilities in these areas, ultimately will lead to the expansion of the retail service area into the foothills regions.

The District has a relatively large service area in proportion with the number of domestic water service connections and equivalent residential units (ERUs). The domestic service area is a subset of the legal corporate boundary of the District as the corporate boundary relates to the irrigation service area. The irrigation service area is much larger than the domestic service area and is served by a separate system of pumps, pipes and turnouts that do not provide potable water. Service also can be provided outside of the corporate boundary if individual contracts for service are executed with the users. Service area agreements presently are executed with both Wapato Point and the Mill Bay trust lands. These Tribal allotments are outside of the District boundary but are logical extensions to the service area.

2.6 Service Area Policies

The District's basic approach is that the District is in the customer service business for domestic water. The District exists to serve the needs of the community and to facilitate structured growth and development. The Board of Directors tries to set policies that require growth and development to pay their own way without subsidies from the existing customer base. The District is also in the business of protecting the public health so policies must be set that meet both the customer needs, the requirements of the Washington Administrative Code (WAC), and good practice. The District has developed bylaws, rules, and regulations as local laws to define the practices at the local level that will meet those objectives. Copies of the bylaws, rules, and regulations are found in Appendix D.

The District has tried to be proactive with utilities but not so active that the utilities drive land use policies. Irrigation districts have no control over land use decisions. Irrigation districts are not general-purpose governments. The District tries to work closely with Chelan County on concurrency of facility plans with the proposed land use plans. The District also works closely with the Chelan County Fire Marshall, and Chelan County Fire District No. 5 to provide sufficient levels of service for fire flow within the retail service area boundary. Hydrants are numbered, flow tested, and rated to meet the highest standards practical. The goal is to help the Fire

District obtain the highest rating practical with the Insurance Services Office. The Board of Directors supports coordinated efforts with the Fire District that result in lower insurance ratings for its customers.

2.6.1 Satellite Management and Private Sources

The District chooses not to be a satellite management agency at this time. There are a number of small water systems on the north shore of Lake Chelan (refer to Figure 2.5 for immediately adjacent systems) that may need assistance now or sometime in the future. The District is not opposed to providing services to these entities if requested to do so but is not actively pursuing management of any system without their request. The District and the City of Chelan (City) have coordinated a mutual service area boundary at Rocky Point. Any developer or system requiring assistance must coordinate with the larger system in that area. The City and the District will not allow third parties to try and negotiate a better deal between the two entities.

Over the years, Ecology has granted individual water rights for drinking water to single-family homes that live along the lake. Some of these permits have been within the service area of the District. The Board of Directors has protested the continual granting of these rights as they have been an impediment to orderly water line extensions. Chelan County Fire District No. 5 also has found it difficult to protect these homes without water line extensions where hydrants can be located as well. Current and future certificates and permits were already granted to serve these areas, and without constraint by Ecology, the ability to provide cost-effective service by the District could be negatively impacted. The District encourages properties located along Lake Chelan to obtain permits to pump irrigation water for outside landscape purposes when they are not served by the District's irrigation system.

2.6.2 Service Areas

The District boundary and service areas are shown on Figure 2.5. Booster pump service areas shall be designed to meet District Standards and shall serve logical segments of these service areas and pressure zones. Facilities shall be sized to meet both the peak demand and fire flow requirements set for the planning areas.

Land adjoining an existing water main is in the retail service area. If the land is within 500 feet of a water main extension (the "affordable" criteria for a single connection) and within the pressure zone, it is also in the retail service area. If the land is over 500 feet but within 1,000 feet (the "affordable" criteria for a subdivision) and within the pressure zone, it can be served by entering into a developer extension contract. The duty to serve criteria begins upon completion of the domestic water main extension. Areas over 1,000 feet from the existing distribution system are considered to be outside of the retail service area and need only receive service if desired by the developer.

Pressure zones above elevations of 1,450 feet and not adjacent to the existing domestic reservoirs are outside of the retail service area. These areas shall be identified as future service areas, although preliminary sizing of facilities, locations of booster pumps and reservoirs, and distribution networks may be made. Interim or staged construction concepts shall be

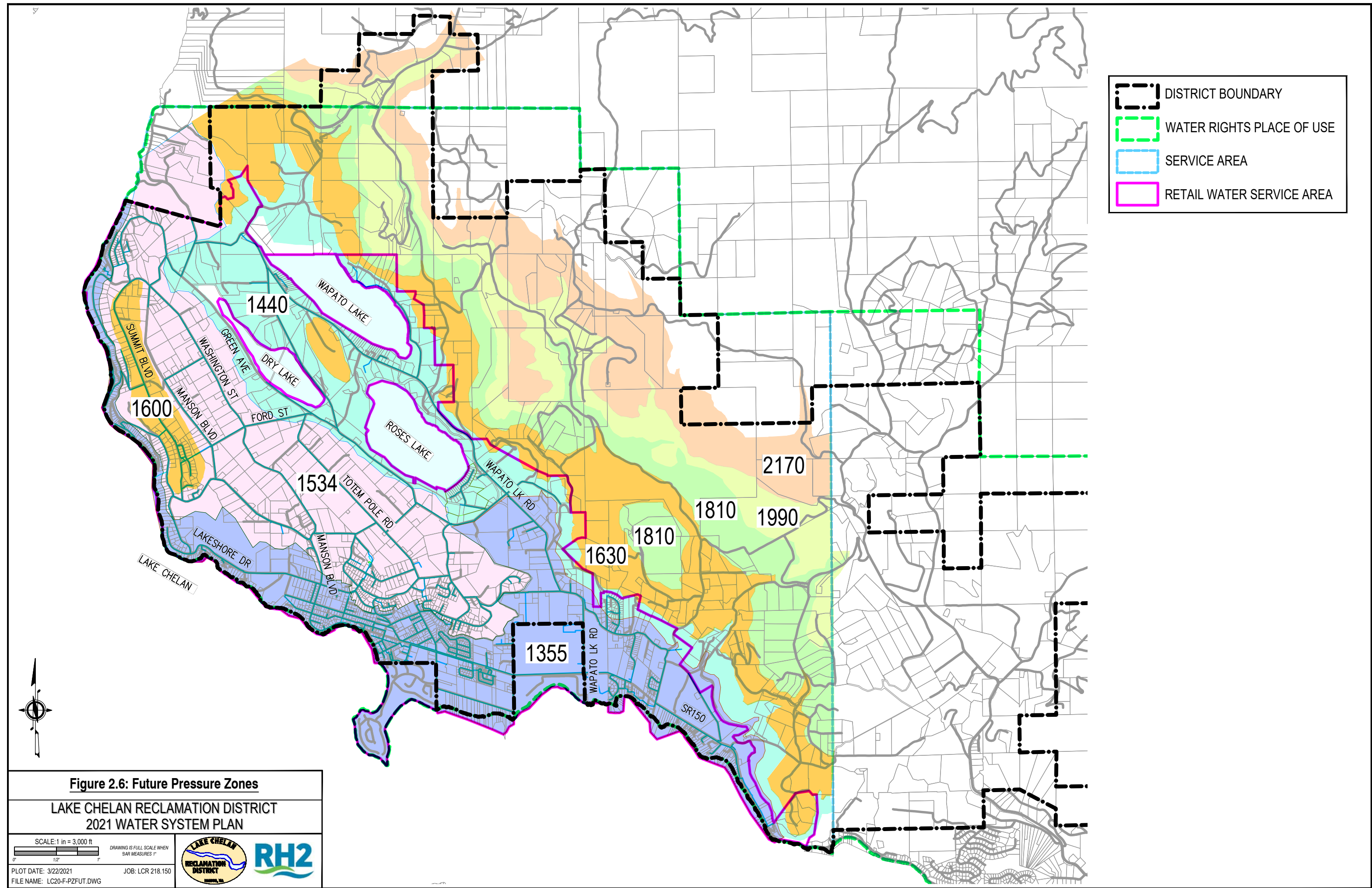
developed based upon fire flow requirements. This may include bypass back to the lower pressure zone to avoid stagnation of water. All booster pumps serving multiple homes installed after the year 1990 must be owned and controlled by the District per WAC 246-290-230(8).

Future higher elevation service areas outside of the retail service area have been identified and are represented on Figure 2.6. These are shown only as reference for how the service area may expand in the future, but service into these areas is not expected in the next 20 years.

2.6.3 Duty to Serve

The District has a duty to serve all customers within the retail water service area if the following conditions can be met.

1. The District has sufficient capacity to serve water in a safe and reliable manner.
 - a. The District's growth projections are shown in Table 3.17, with an estimate of 6,000 ERUs by the year 2040.
 - b. The 20-year water supply estimate is shown in Table 3.18 as up to 1.0 MGD (700 gpm) annual average and 2.3 MGD (1,650 gpm) on maximum day.
 - c. The treatment plant has a current capacity of 4.0 MGD (2,800 gpm).
 - d. The combined source pumping capacity is 9.0 MGD (6,250 gpm).
 - e. Physical supply and treatment capacity are sufficient for the 20-year projection.
2. The service request is consistent with adopted local plans and development regulations.
 - a. Development requests are handled by Chelan County, which will decide if the proposed project is consistent with existing land use. Conditions of service are described in Appendix D. Once a Request for Letter of Availability form is submitted, the District will review its policies and any County conditions to determine consistency and provide response via a Water Availability Letter.
3. The District has sufficient water rights to provide service.
 - a. Water use and 20-year forecasted rights and use are shown on Chart 4.1. Both annual and instantaneous water rights are expected to exceed projected 20-year water use by well over 50 percent.
4. The District can provide service in a timely and reasonable manner.
 - a. Duty to serve is immediate within the retail service area and timely service shall be defined in the District as 120 days after payment of the applicable hook-up fees in the retail service area. In areas requiring a developer's extension agreement, timely service does not start until after the provisions of the developer's extension agreement are satisfied, application forms are filled out, and hook-up fees are paid.



3 BASIC PLANNING DATA

3.1 Current Population

Population for the Manson area and the service area for the Lake Chelan Reclamation District are difficult to account and verify. The community of Manson is unincorporated, making its census information a subset of unincorporated Chelan County. The Chelan County Planning Department breaks census and projections from the State of Washington Office of Financial Management (OFM) population data into Census County Divisions or CCDs. Three CCDs cover but also extend outside of the District's service area. It should be noted that the OFM estimates are based primarily on 2010 Census information with annual adjustments. The 2020 Census had not been completed at the time this WSP was prepared.

Chelan County (County) also prepared population data for the Urban Growth Area (UGA); however, the UGA covers less than half of the retail service area. The other boundary studied is that of Fire District No. 5 (FD 5), which is approximately two times larger than the retail service area and covers roughly the same occupied lands, although a much smaller overall area, as the three CCDs. In prior WSPs, the population for FD 5 was used as the water service area population estimate.

The OFM estimates population using the last census (April 2010) as a basis, then adjusts annually by reviewing numerous actual trends, including housing starts, tax filings, and voters, using the assumption that initial statistical ratios remain consistent. This means that the farther the time from the last census, the less accurate the estimates may be.

3.1.1 Full-Time Population

For this WSP, the County's GIS data was used to estimate the number of dwelling units (DU) within the census planning areas, but outside of the District's water service area. For 2019, there may be approximately 90 DU in FD 5, and 220 DU in the CCDs that are outside of the water service area. Using the 2018 American Community Survey (ACS) estimate of 2.12 persons per owner-occupied household, and assuming all households outside of the service area are owner-occupied (primarily agricultural or seasonal homes), the planning area populations are reduced by 191 for FD 5, or 466 for the CCDs, for totals of 4,033 or 4,101 persons, respectively. These values are shown in Table 3.1.

Table 3.1 – April 2019 Population Estimates

Data Set	Total Population	Occupied DU	Outside Parcels	Outside Pop/DU	Population	
					Outside	Inside
Urban Growth Area	2,338	502	0		0	2,338
Census Block 1 (530079604001)	1,191	405	199	2.12	422	770
Census Block 2 (530079604002)	1,368	447	21	2.12	45	1,323
Census Block 3 (530079604003)	2,008	781	0	2.12	0	2,008
Census Block Total	4,568	1,632	220		466	4,101
Fire District No. 5	4,224	878	90	2.12	191	4,033

Refining these values further would not provide meaningfully different conclusions, so for this WSP the April 2019 population is established as the mean value, or 4,067 persons. For historical estimates and future forecasts, the relative water service area population proportion compared to the entire CCD is assumed to be constant or $4,067/4,101 = 0.99$.

3.1.2 Seasonal Population

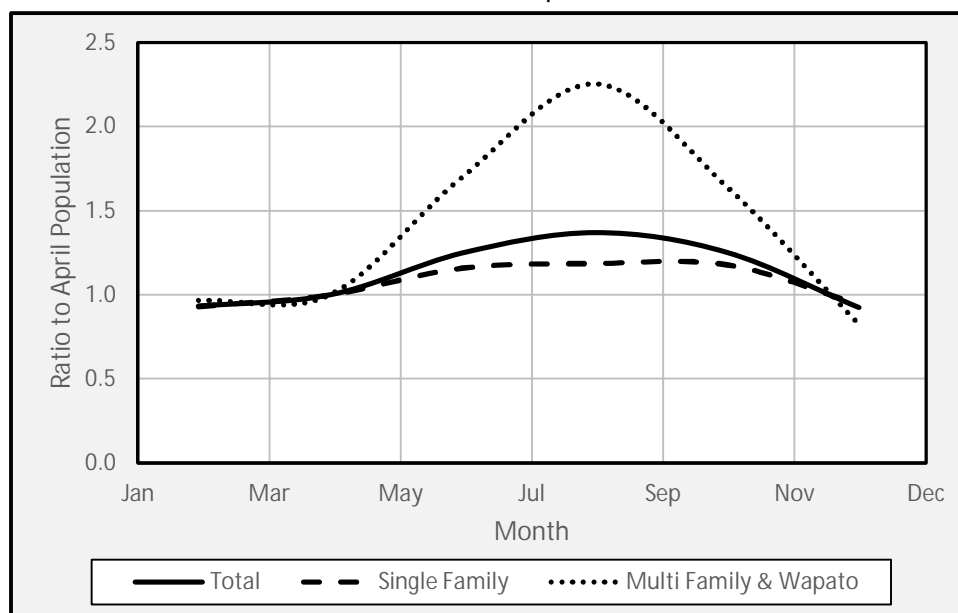
The census and OFM projections deal primarily with population in April. The District must plan for and serve both full-time and transient population groups. Estimating populations for both groups is difficult at best. Numerous sources were reviewed to develop seasonal population estimates.

- The County's *Comprehensive Plan* estimated seasonal housing (typically vacation homes) as 97 units in 2010 and 622 units in 2015.
- As part of the proposed 2020 revisions to the County's Short-Term Rental Code, the County tabulated private home rental listings (from AirBnB and HomeAway websites) for Manson starting with 6 in 2014 and increasing to 215 for 2018, 229 for 2019, and 290 for 2020. Most, though not all of these are located within the water service area and reportedly occupied approximately 46 percent of the time.
- Manson requires a permit for homes used as vacation rentals, although it is likely that not all owners obtain the permit, and a tally of the permits was not investigated for this WSP.
- The OFM estimates approximately 870 vacant housing units in FD 5 in 2019. Many, if not most of these reportedly vacant units likely are used as seasonal housing.

Due to the lack of definitive or consistent published information, the approach taken in this WSP assumes the reported population basis occurs on April 1st because the 2010 Census mailings were between March 15th and April 1st, with in-person follow-up through July for non-responders. To develop seasonal population changes, the residential accounts with active water use per billing period were assigned an average number of persons per dwelling unit to estimate population per billing period. Wapato Point is master metered with almost 400 dwelling units and tracks monthly occupancy at an average of about 85 percent in the summer and 30 percent in the winter.

Using these assumptions, winter and summer population are approximately 93 percent and 135 percent of April population, respectively. Single-family residential seasonal variations are less extreme at 93 and 120 percent, while Multi-Family (MF) and Wapato Point are higher at 90 and 230 percent. Occupancy appears to vary between 2.5 and 2.8 persons per dwelling unit (comparing active water services to published population estimates). Population variations are depicted graphically on Chart 3.1.

Chart 3.1 – Seasonal Population Ratios

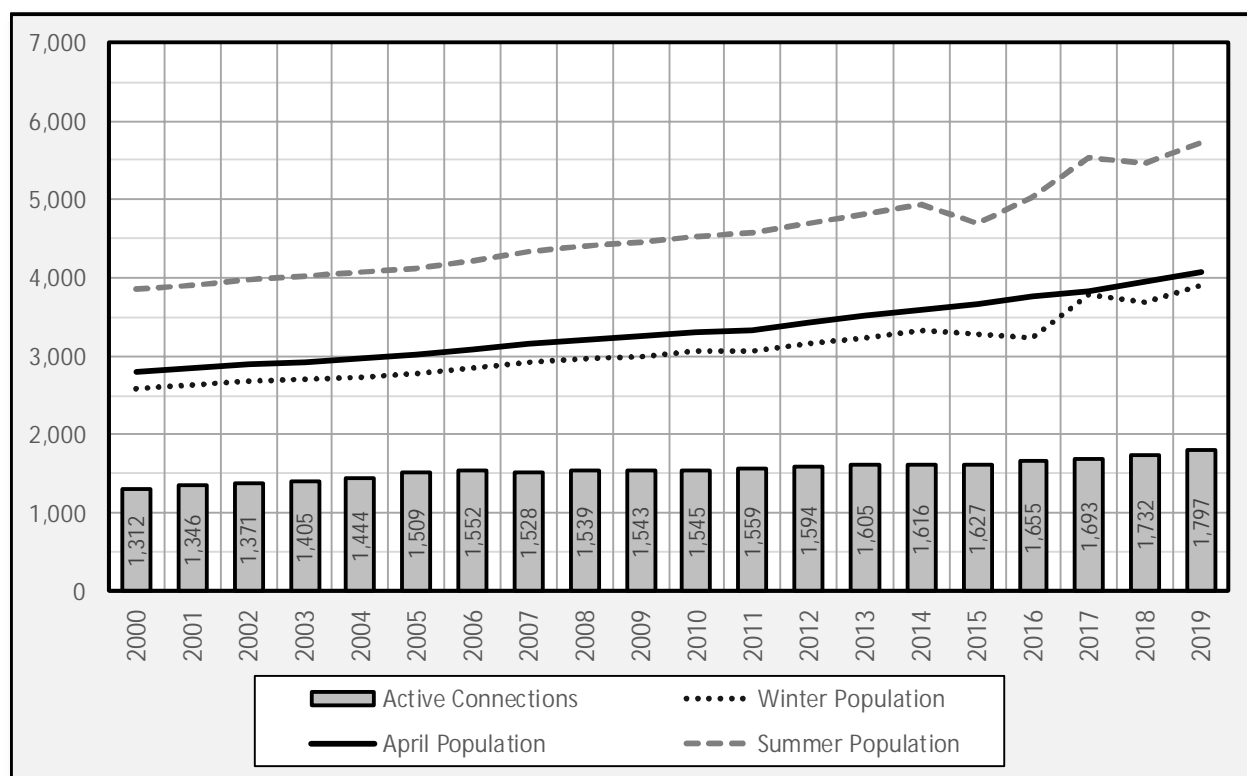


The estimates for transient populations in the 2006 and 2014 WSPs were based upon water use in seasonal homes and water and sewer use at major tourist-oriented locations like Wapato Point and the Mill Bay Casino, as well as the stage of agricultural production with its influx of seasonal workers. Re-evaluating the years from 2000 to 2014 using the newly developed population ratios presented above results in a summer population change approximately half of that previously estimated. The revised estimated historical population values are shown in Table 3.2. Historical population and active connections are displayed on Chart 3.2.

Table 3.2 – Seasonal Population Estimates

	2000	2005	2010	2015	2016	2017	2018	2019
April Population	2,809	3,015	3,311	3,676	3,766	3,828	3,952	4,067
Summer to April Ratio	1.37	1.37	1.37	1.28	1.34	1.45	1.38	1.41
Summer Population Increase	1,040	1,116	1,226	1,016	1,264	1,718	1,517	1,653
Summer Total Population	3,850	4,131	4,537	4,692	5,030	5,546	5,468	5,720
Winter to April Ratio	0.92	0.92	0.92	0.90	0.86	0.99	0.93	0.96
Winter Total Population	2,593	2,783	3,056	3,294	3,229	3,793	3,692	3,911

Chart 3.2 – Historical Population and Active Connections



Active connections are defined as water services that have consumption during the period being evaluated. In each period there are additional connections that are in service but without consumption. In 2019, about 12 percent of service connections were inactive in the summer and 22 percent were inactive in the winter.

From 2000 to 2015, the average population increase reported for April has been 1.8 percent annually, and the increase in service connections has averaged 1.5 percent annually. Since 2015, these annual rates have averaged 2.6 percent and 2.5 percent, respectively, reflecting the recent housing boom in Chelan County. The population drop in 2015 is believed to be due to the wildfires that reduced the typical summer influx of people.

3.2 Current Water Use and Data Reporting

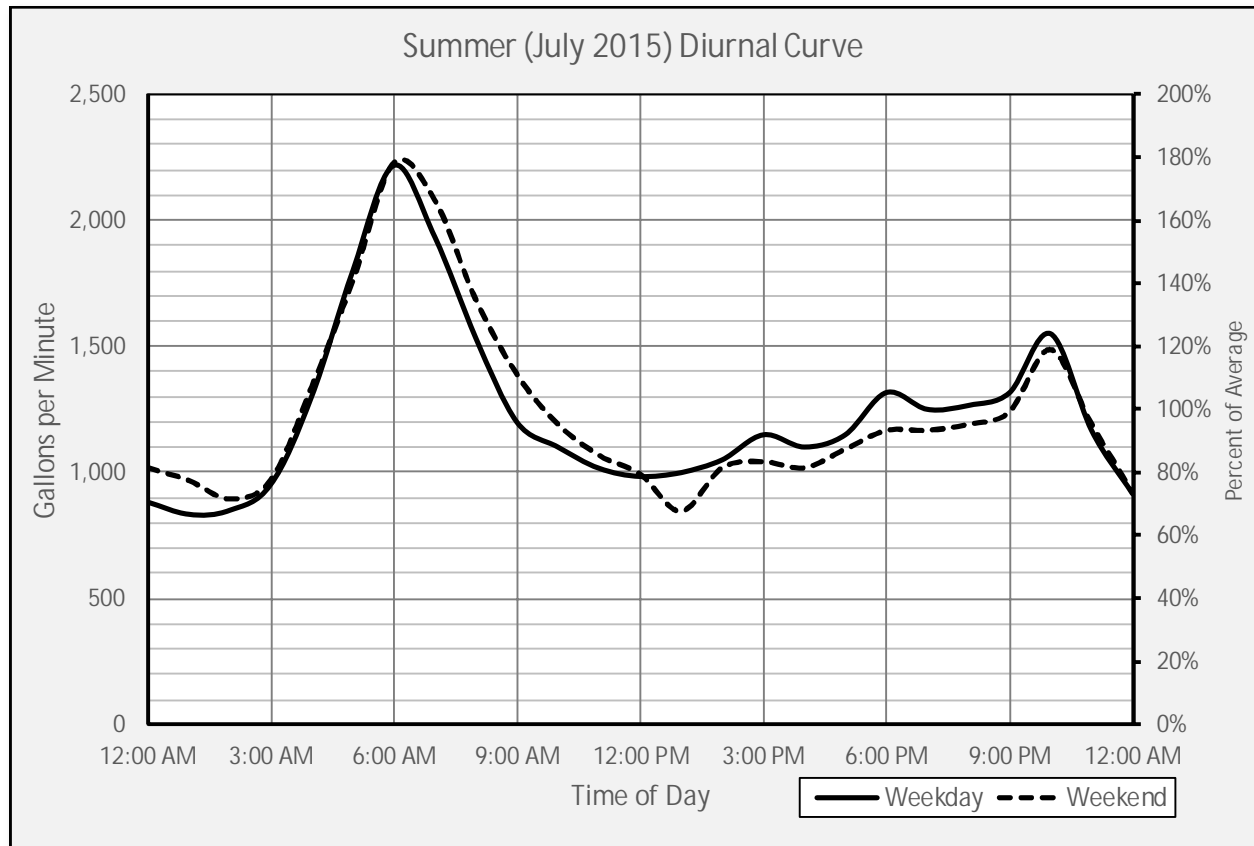
3.2.1 Water Supply Metering

The District keeps daily records of treated water volumes through the Water Treatment Plant. The total daily volume of backwash water also is recorded and subtracted from the treated total to obtain the volume supplied to the system. The volume of filter to waste water and the volume of water used for testing equipment are estimated at this time based upon the number of filters online and the average flow rates depending upon the season.

3.2.2 Water Supply

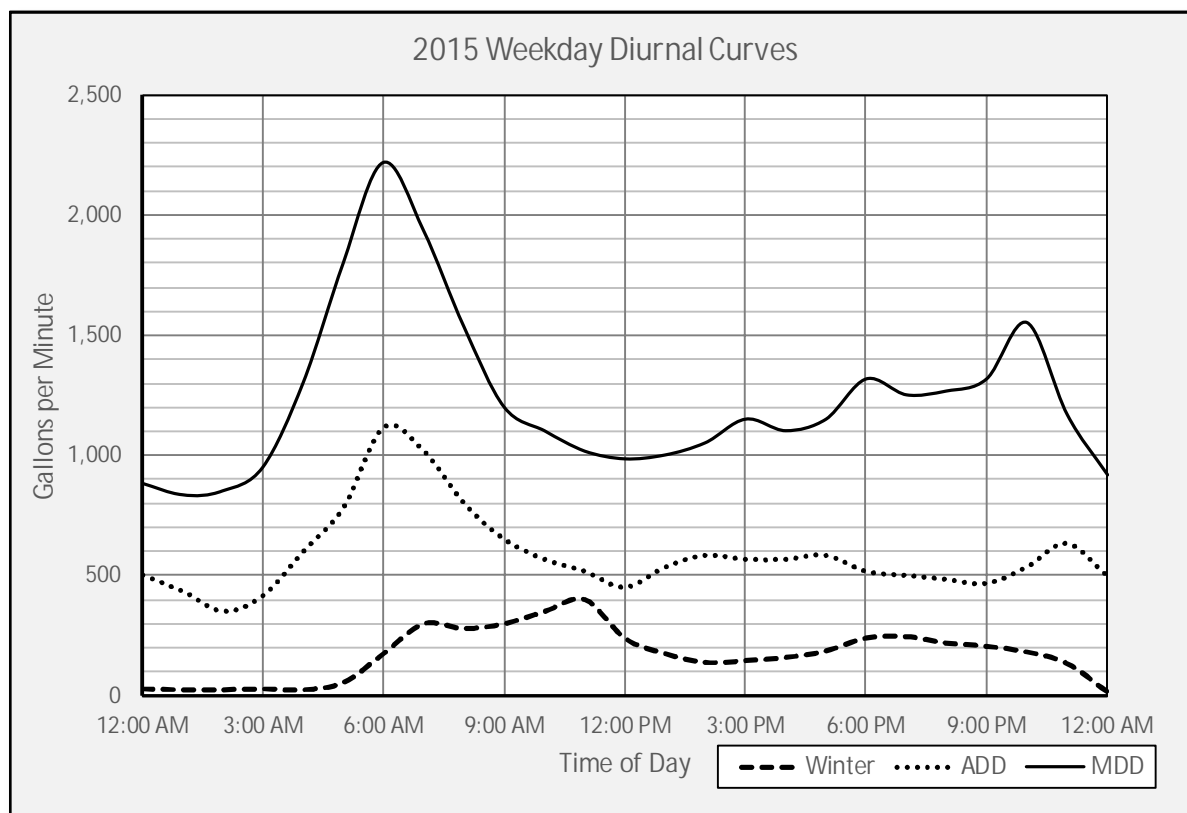
WTP meter and reservoir level data in 1-minute increments from 2015 was used to develop the winter, average, and maximum day diurnal curves for consumption. The weekday and weekend curves for maximum day are nearly identical, as shown on Chart 3.3.

Chart 3.3



Peak hour demand (PHD) in 2015 was 175 percent of maximum day demand (MDD) and is assumed to be typical. It is also apparent that many irrigation systems run continuously through the night. A comparison of MDD (July), average day demand (ADD) (October), and winter daily consumption is displayed on Chart 3.4.

Chart 3.4



A summary of annual, winter, average day, and maximum day supply to the system is presented in Table 3.3.

Table 3.3 – Water Supplied to System

	2014	2015	2016	2017	2018	2019
WTP Outflow (gpy)	272,023,000	276,255,000	276,700,000	270,330,999	274,349,000	268,390,000
Backwash (gpy)	4,485,000	5,430,000	5,333,000	4,629,000	5,208,000	4,992,000
To System (gpy)	267,538,000	270,825,000	271,367,000	265,701,999	269,141,000	263,398,000
Winter (gpd)	320,391	293,947	331,702	322,351	309,887	340,623
ADD (gpd)	732,981	741,986	741,440	727,951	737,373	721,638
WTP MDD (gpd)	1,860,000	2,000,000	1,750,000	1,840,000	1,920,000	1,740,000
System MDD (gpd)	1,740,000	1,930,000	1,620,000	1,740,000	1,760,000	1,600,000
PHD (gpm)	2,115	2,345	1,969	2,115	2,139	1,944

In previous WSPs, the value for MDD was taken directly from the WTP outflow meter. While this is indeed the maximum day treated water outflow, it is not the actual maximum day system demand due to the buffering effects of the reservoirs. For this WSP, a weighting factor was applied to account for water used to refill a low reservoir. Both values are shown in Table 3.3 (WTP MDD and System MDD, respectively).

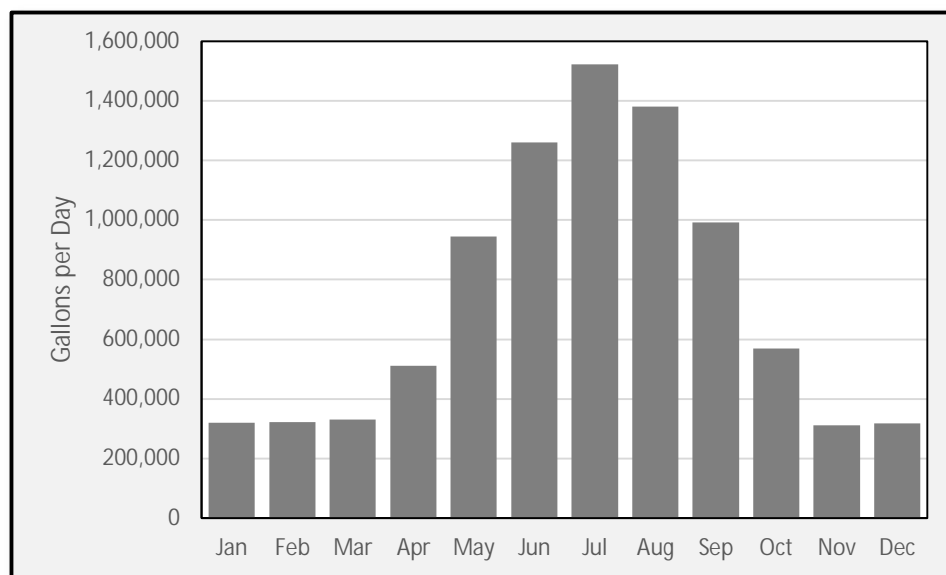
Various multipliers have been developed from the system records that are presented in Table 3.4. The “Max 2 Month” value is used to correspond to the 2-month customer meter reading cycles.

Table 3.4 – Demand Multipliers

	2014	2015	2016	2017	2018	2019	Average
Winter/ADD	0.44	0.40	0.45	0.44	0.42	0.47	0.44
MDD/ADD	2.37	2.60	2.18	2.39	2.39	2.22	2.36
MDD/Max 2 Month	1.24	1.31	1.16	1.13	1.15	1.16	1.19
PHD/MDD	1.75	1.75	1.75	1.75	1.75	1.75	1.75

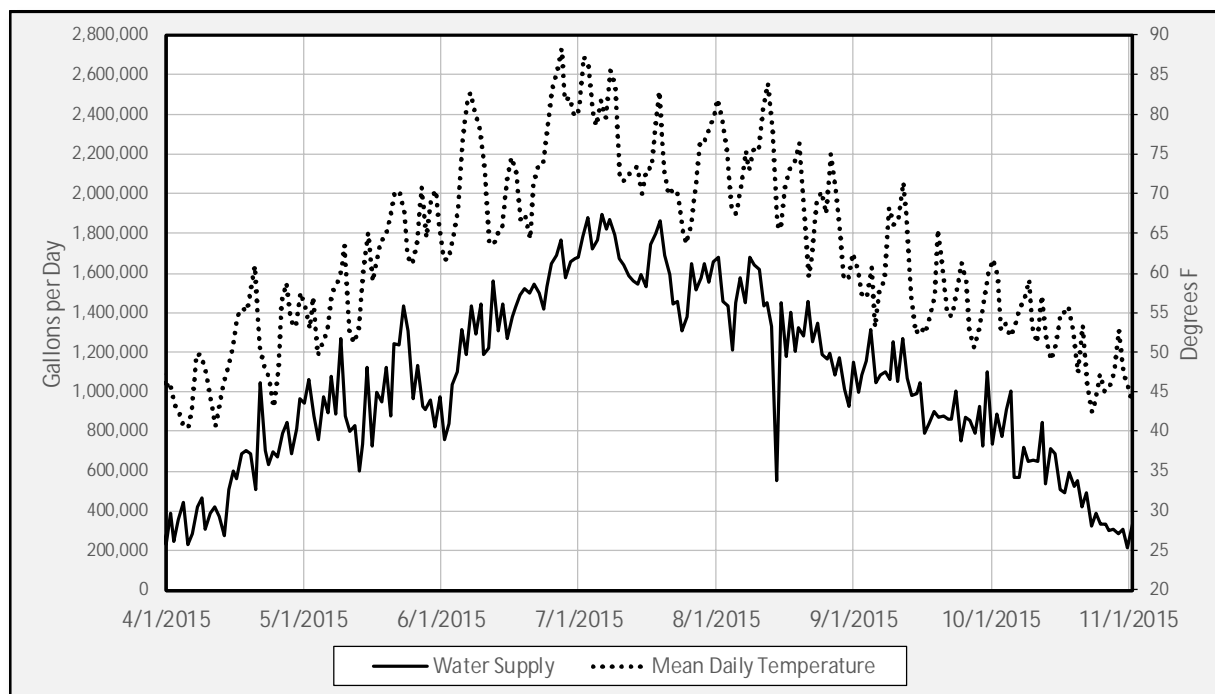
The average monthly consumption from 2014 to 2019 is depicted on Chart 3.5.

Chart 3.5 – Monthly Consumption



Water consumption tracks closely with air temperature during the irrigation season (April to October). This trend is displayed on Chart 3.6 for the year 2015.

Chart 3.6 – 2015 Water Supply Compared with Air Temperature



3.2.3 Customer Metering

All water delivered in the system for consumption is metered, with the exceptions of fire protection, line breaks, leaks, treatment plant filter recycling, treatment plant testing equipment, and construction flushing when metering is not practical. Customer meter readings are made every 2 months except for unusual winters when notable snow accumulations make the reading of some meters impractical. Hydrant meters and fill stations are used to record construction water, agricultural support, and other miscellaneous purposes.

In 2019 there were approximately 2,040 metered connections in the District, but due to seasonal and vacant housing, only 1,600 to 1,800 were active at any given time. Roughly 200 accounts have been inactive (no water use) for an entire year for each of the last few years, which represents approximately 10 percent of all connections. Of these inactive accounts, about 90 percent are residential, 7 percent are irrigation, and 3 percent are commercial. A summary of all service connections in the summer of 2019 is shown in Table 3.5.

Table 3.5 – 2019 Customer Meter Count

July-August 2019	Meter Size						Total
	3/4-inch	1-inch	1.5-inch	2-inch	3-inch	6-inch	
Active Connections							
Residential	1,107	27	1	0	0	0	1,135
Domestic/Irrig.	480	20	3	4	0	0	507
Multi-Family	7	10	0	2	0	3	22
Commercial/Industrial	25	19	0	5	0	2	51
Tourist	26	2	0	0	0	1	29
Irrigation Only	39	10	1	1	0	0	51
Fill Station	2	0	0	0	0	0	2
Subtotal Active	1,686	88	5	12	0	6	1,797
Inactive Connections							
Residential	180	3	0	0	0	0	183
Domestic/Irrig.	37	2	0	0	0	0	39
Multi-Family	0	0	0	0	0	0	0
Commercial/Industrial	3	1	0	0	0	0	4
Tourist	0	0	0	0	0	0	0
Irrigation Only	19	1	0	0	0	0	20
Fill Station	3	2	0	0	0	0	5
Subtotal Inactive	242	9	0	0	0	0	251
Total of All Connections	1,928	97	5	12	0	6	2,048

The number of accounts per customer class listed in this WSP will vary from those tabulated in the District's accounting system. For this WSP the type of customer was used rather than the billing classification. For example, some multi-family facilities are billed under a commercial classification but have been changed to "multi-family" for this planning effort. Wapato Point also is reclassified as multi-family only because it is fed by common master meters. The property includes a mix of single-family residences and condominiums, so it also could be classified as residential depending on the goal of an analysis.

The "Domestic/Irrig" class is customers that are assessed for irrigation water and use their domestic water connection for both domestic and irrigation use (primarily lawn watering, but some commercial agriculture). Approximately 255 acres are currently allotted irrigation shares through the domestic system. The "Residential" class are customers that either get irrigation water from the separate District irrigation system or have minimal irrigation needs.

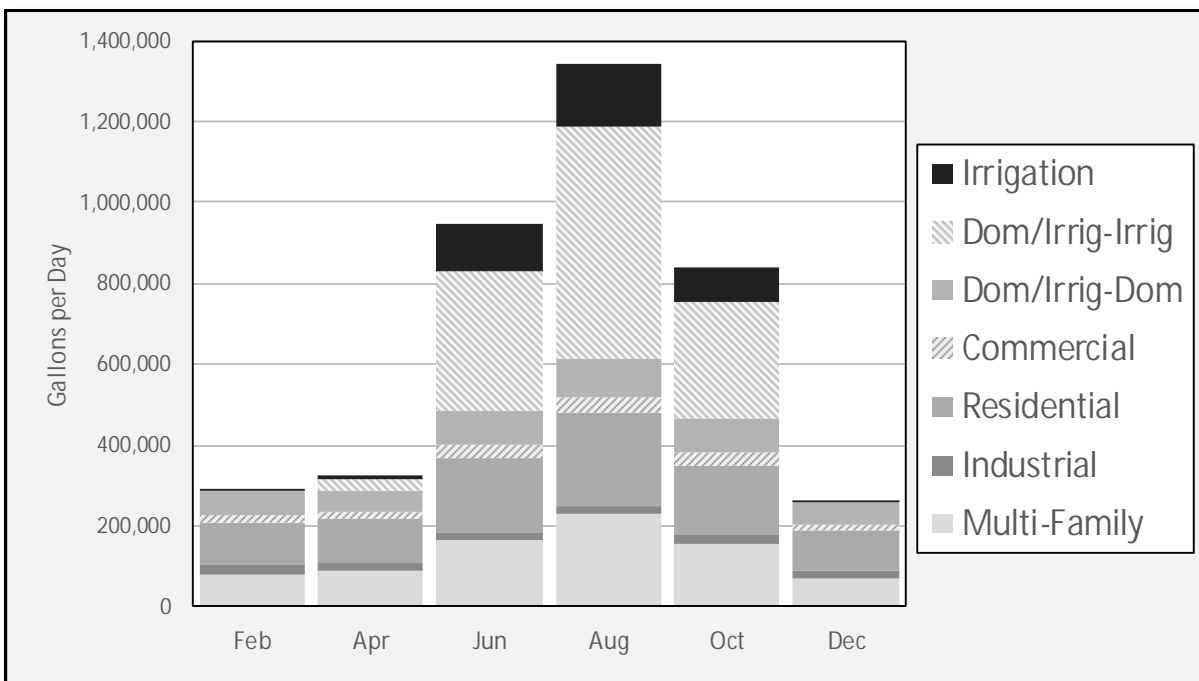
Similar to many Central Washington water systems, a significant portion of the domestic water is used for irrigation. Most irrigation water passes through the customers' domestic water meters and is not separately metered. To estimate irrigation demand in the Domestic/Irrig class, use up to the monthly base allotment is assumed to be entirely domestic, and the average excess use during the winter is assumed to be indoor use and constant for the entire year. Irrigation is then the total consumption less these two values. A summary of residential, non-residential, and irrigation consumption is shown in Table 3.6.

Table 3.6 – Annual Customer Consumption (gallons)

	2015	2016	2017	2018	2019
Residential	123,565,967	124,351,805	129,146,710	126,898,274	127,374,758
Non-Residential	16,361,513	16,692,346	16,777,389	17,803,552	16,811,594
Irrigation	105,869,742	100,218,903	100,328,339	99,683,141	89,071,449
Total	245,799,237	241,265,070	246,254,455	244,386,985	233,259,820

A relative comparison of consumption by customer class is presented in Chart 3.7. On the chart, Dom/Irrig-Irrig is irrigation use and Dom/Irrig-Dom is domestic use.

Chart 3.7 – Billing Period Consumption by Customer Class



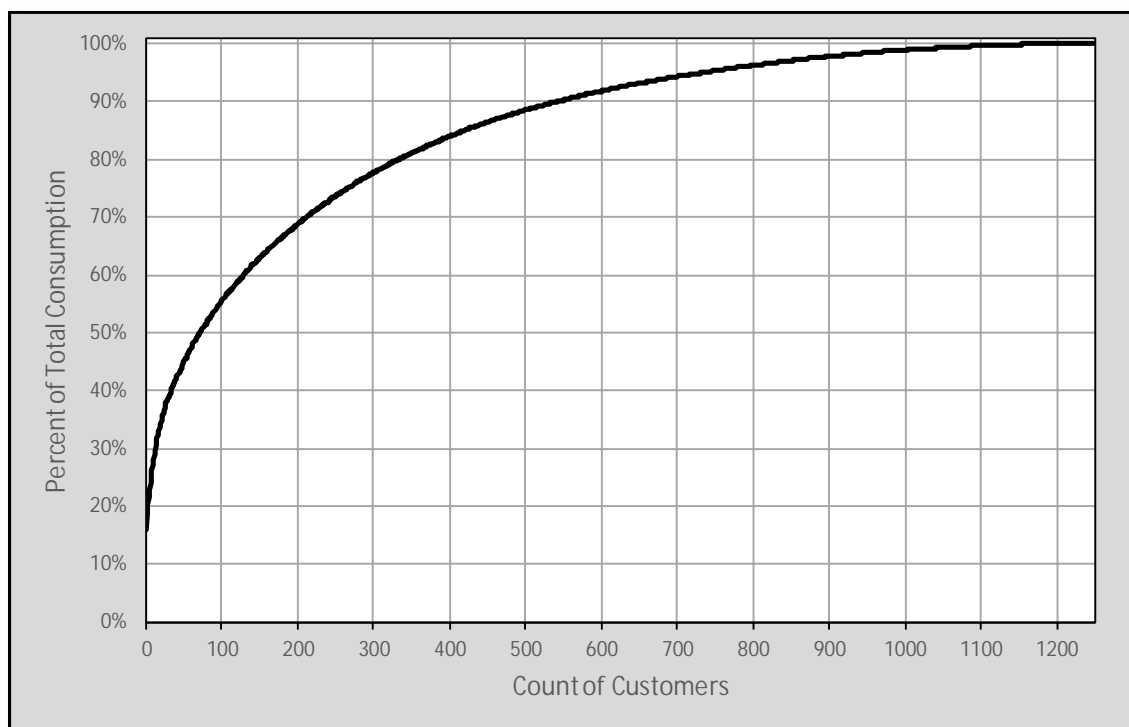
The 10 largest water users of the last 3 years are shown in Table 3.7. These customers account for approximately one-quarter of all sales.

Table 3.7 – Largest Customers

Name	Primary Use	2017-2019 Average		2018 MDD	
		gpm	% of Total	gpm	% of Total
Primarily Domestic Use					
W.P. Community Assoc.	Residential	74.4	16.2%	158.9	14.1%
Manson Growers	Industrial	12.3	2.7%	26.9	2.4%
Cricket Flat Dev Co.	Multi Family	7.3	1.6%	10.5	0.9%
Mill Bay Casino	Commercial	5.8	1.3%	9.1	0.8%
Buck Fruit II	Multi Family	4.8	1.1%	5.5	0.5%
Mansun Villa	Multi Family & Irrig.	4.8	1.0%	12.1	1.1%
Morning Sun Parks	Multi Family	3.9	0.9%	5.5	0.5%
Mt View Lodge	Domestic/Irrig.	3.6	0.8%	7.8	0.7%
Manson School District	Public	2.9	0.6%	9.4	0.8%
Eco Mining and Restoration	Multi Family	1.3	0.3%	1.5	0.1%
Primarily Irrigation Use					
Martinson	Irrigation	6.1	1.3%	20.8	1.8%
Sather	Irrigation	5.6	1.2%	14.6	1.3%
The Village at Lake Chelan	Irrigation	4.0	0.9%	11.4	1.0%
Kamei Inc	Irrigation	3.9	0.9%	10.5	0.9%
Mathewson	Irrigation	3.6	0.8%	9.2	0.8%
Hall	Irrigation	3.2	0.7%	9.3	0.8%

A graphical representation of customer consumption is presented in Chart 3.8. An example of how to read this graph is the 17 largest customers (1.4 percent of total) account for 30 percent of sales. And the 210 largest customers (17 percent of total) account for 70 percent of sales.

Chart 3.8 – Customer Sales Distribution



3.3 Distribution System Leakage

Distribution System Leakage (DSL) is water that leaves the system unmetered and undocumented. This is assumed to be primarily due to leaks and theft. The District meters all sources and customers. Hydrant meters are used to measure intermittent uses such as construction, water trailers, and entertainment events. The District makes estimates for authorized unmetered uses such as firefighting, WTP process water, and water trucks when a hydrant meter is not used. A summary of DSL is presented in Table 3.8.

Table 3.8 – Distribution System Leakage

	2014	2015	2016	2017	2018	2019
WTP Outflow (gpy)	272,023,000	276,255,000	276,700,000	270,330,999	274,349,000	268,390,000
WTP Backwash (gpy)	4,485,000	5,430,000	5,333,000	4,629,000	5,208,000	4,992,000
To System (gpy)	267,538,000	270,825,000	271,367,000	265,701,999	269,141,000	263,398,000
Metered Use (gpy)	224,059,582	245,797,222	241,263,054	246,252,438	244,384,967	233,257,801
Authorized Unmetered (gpy)	10,000,000	2,363,599	20,639,946	11,030,062	19,028,302	23,041,998
DSL (gpy)	33,478,418	22,664,179	9,464,000	8,419,499	5,727,731	7,098,201
DSL %	12.3%	8.2%	3.4%	3.1%	2.1%	2.6%
DSL % 3-Year Average	7.8%	9.2%	8.0%	4.9%	2.9%	2.6%

Some of these values differ slightly than those submitted by the District in its annual water use efficiency (WUE) reports due to data errors found and corrected while preparing this WSP. Revised WUE reports with these updated values are included in Appendix F. The District's 3-year average has been consistently below 10 percent for the last 10 years.

3.4 ERUs

In previous WSPs, the total ERUs was taken directly from the District's accounting system, which uses an ERU as a billing multiplier roughly equivalent to a residential customer. That value also is fixed, meaning it does not change seasonally except as new customers are added to the system. Additionally, irrigation service was significantly under-represented in the ERU count when compared to actual water use. This has little impact on supply and distribution analyses because those analyses were based on actual consumption, not ERUs, and irrigation use through the domestic water system has been relatively consistent over time. However, this method does have a large effect on storage calculations, which will be discussed in Chapter 4.

To be compliant with the 2019 DOH *Water System Design Manual* methodologies, the ERU values presented in this WSP will be different than those used in prior WSPs. For the remainder of this WSP, an ERU is defined as the amount of water used by an average single-family residence. When necessary, the term "billing ERU" will be used when referring to the District's accounting system ERU values.

To determine the ERU values, the consumption for each billing period for all residential customers with a ¾-inch meter was divided by the number of active accounts during that billing period. The Residential and Domestic/Irrig billing classes specifically were evaluated.

The winter periods are a good representation of indoor use, and the two residential customer classes have similar consumption, ranging from 90 gallons per day (gpd) to 140 gpd per connection since 2015. The Domestic/Irrig class trends approximately 15 percent higher for

indoor use than the Residential class. This could be due to slight differences in the average number of persons per household, but the difference is not significant enough to warrant further investigation.

The Residential class uses about twice as much water per connection in the summer than the winter, likely a combination of a small amount of landscape watering, filling pools, and seasonal visitors or renters.

After deducting irrigation use, the Domestic/Irrig class uses about 30 percent more water per connection in the summer than the winter.

Because customer meters are read every 2 months, it is not possible to directly measure maximum day customer sales. To estimate maximum day, the water supplied to the system on the maximum day is divided by the maximum 2-month water supply multiplier shown in Table 3.4. This multiplier is then applied to the maximum billing period value to obtain a maximum day value. What cannot be known is if this multiplier is an accurate representation of residential billing classes due to the inclusion of non-residential use, but more detailed information is not available.

Peak Hour Demand (PHD) per ERU is developed similarly, using the diurnal curve values and multipliers presented earlier. The results are shown in Table 3.10.

Table 3.9 – Residential ¾-inch Meter Summary (per Connection)

	2015	2016	2017	2018	2019
Winter (gpd)	107	99	105	94	102
Average (gpd)	141	135	136	136	134
Max 2 Month (gpd)	217	185	217	207	190
MDD/M2M	1.31	1.16	1.13	1.15	1.16
MDD (gpd)	285	214	246	239	221
PHD/MDD	1.75	1.75	1.75	1.75	1.75
PHD (gpm)	0.35	0.26	0.30	0.29	0.27

A residential customer with a ¾-inch meter and separate irrigation source will be used as the basis for an ERU. This is because it represents a larger number of customers (about 1,120 versus 480), and future customers are likely to have a separate irrigation water supply as orchards are redeveloped. Although 2015 MDD appears to have the highest recent day, it is actually a result of high irrigation use in other customer classes due to the extended hot summer that year, which increased the overall system demand multipliers. Therefore, the next highest value (2017) is used to represent MDD for future planning. Values used for ERUs are shown in Table 3.11.

Table 3.10 – ERU Values

Category	Value
ERU _{WDD} gpd	101
ERU _{ADD} gpd	136
ERU _{MDD} gpd	246
ERU _{PHD} gpm	0.30

- ERU_{WDD}: Demand during winter months per ERU (indoor use). Five-year average.
- ERU_{ADD}: Average of annual demand per ERU. Five-year average.
- ERU_{MDD}: Maximum day demand per ERU. Largest of the last 4 years.
- ERU_{PHD}: Peak hour demand per ERU; 1.75 times MDD.

A summary of ERUs by customer class using the values from Table 3.11 is presented in Table 3.12 for ADD and Table 3.13 for MDD.

Table 3.11 – ADD Historical ERU Summary

	2015		2016		2017		2018		2019	
	gpd	ERU	gpd	ERU	gpd	ERU	gpd	ERU	gpd	ERU
Residential	139,064	1,021	139,384	1,024	143,502	1,054	148,033	1,087	152,537	1,120
Domestic/Irrig. Domestic	71,643	526	71,034	522	69,254	509	66,197	486	69,734	512
Domestic/Irrig. Irrigation	211,403	1,553	204,801	1,504	205,364	1,508	204,933	1,505	180,836	1,328
Multi-Family	124,006	911	126,319	928	136,814	1,005	129,748	953	122,811	902
Commercial / Industrial	41,093	302	43,633	320	44,439	326	45,745	336	45,255	332
Tourist	3,823	28	3,953	29	4,255	31	3,688	27	3,890	29
Other Irrigation	78,651	578	69,771	512	69,508	511	68,172	501	63,195	464
Fill Station / FH	3,733	27	2,100	15	1,526	11	3,032	22	804	6
Unmetered	6,476	48	56,548	415	30,219	222	52,132	383	63,129	464
DSL	62,094	456	25,929	190	23,067	169	15,692	115	19,447	143
Total	741,986	5,450	743,471	5,461	727,951	5,347	737,373	5,416	721,638	5,300

Table 3.12 – MDD Historical ERU Summary

	2015		2016		2017		2018		2019	
	gpd	ERU	gpd	ERU	gpd	ERU	gpd	ERU	gpd	ERU
Residential	263,007	1,070	240,432	978	272,041	1,107	267,903	1,090	255,673	1,040
Domestic/Irrig. Domestic	113,166	461	97,996	399	97,706	398	99,676	406	102,460	417
Domestic/Irrig. Irrigation	792,030	3,223	511,098	2,080	745,075	3,032	693,304	2,821	535,535	2,179
Multi-Family	284,683	1,159	249,230	1,014	268,778	1,094	256,438	1,044	227,760	927
Commercial / Industrial	66,471	271	49,547	202	63,478	258	81,693	332	60,764	247
Tourist	12,241	50	9,907	40	10,789	44	8,873	36	11,265	46
Other Irrigation	257,508	1,048	190,095	774	244,261	994	209,621	853	181,817	740
Fill Station / FH	18,495	75	11,658	47	7,733	31	6,301	26	1,161	5
Unmetered	60,306	245	234,108	953	7,071	29	120,500	490	204,118	831
DSL	62,094	253	25,929	106	23,067	94	15,692	64	19,447	79
Total	1,930,000	7,854	1,620,000	6,593	1,740,000	7,081	1,760,000	7,162	1,600,000	6,511

3.5 Per Capita Consumption

Estimating per capita consumption is difficult due to the seasonal population changes and disproportionate irrigation water use within customer classes. Consistent with prior WSPs, total sales less irrigation use is divided by population to develop the value. Commercial and industrial use are included in the total sales under the assumption that these uses are consistently proportional to residential use over time. A further modification is made in this WSP to estimate per capita consumption seasonally rather than using one annual average as was done previously. The method used to estimate irrigation use (Customer Metering section) differs from that of prior WSPs. Historical per capita consumption is summarized in Table 3.13.

Table 3.13 – Per Capita Consumption (Irrigation not Included)

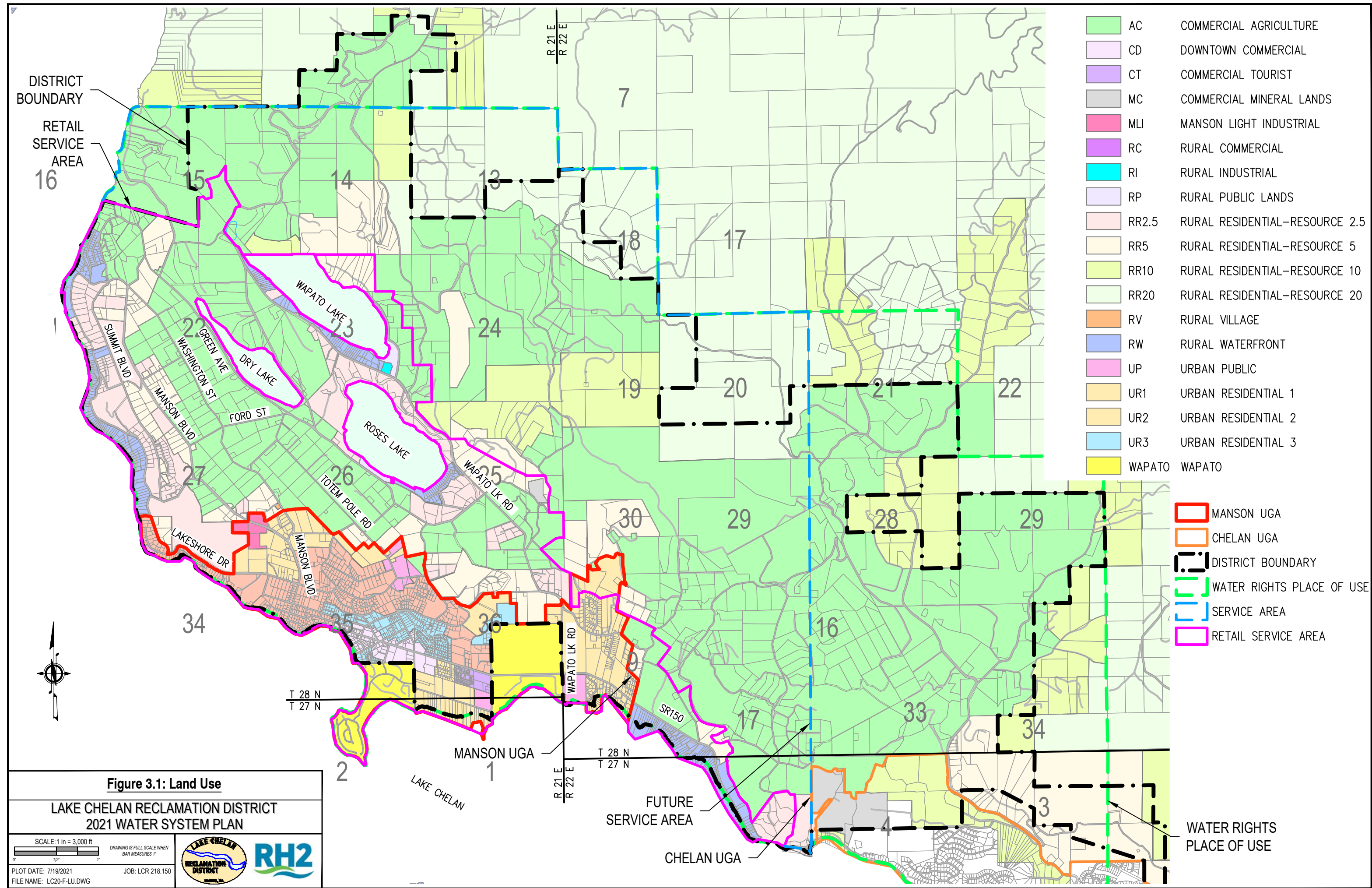
	2000	2005	2010	2015	2016	2017	2018	2019	5 Yr Avg
Winter Population	2,809	2,783	3,056	3,294	3,229	3,793	3,692	3,911	
Winter Use (gpd)	277,947	225,716	265,501	260,710	238,926	302,087	260,002	266,841	
Winter Per Capita (gpd)	107	81	87	79	74	80	70	68	74
April Population	2,809	3,015	3,311	3,676	3,766	3,828	3,952	4,067	
April Use (gpd)	-	-	-	383,363	386,422	399,792	396,443	395,031	
April per Capita (gpd)	125	106	114	104	103	104	100	97	102
Summer Population	3,850	4,131	4,537	4,692	5,030	5,546	5,468	5,720	
Summer Use (gpd)	-	-	-	758,063	658,770	720,526	720,883	659,083	
Summer per Capita (gpd)	-	-	-	162	131	130	132	115	139

Looking farther back, the 1992 WSP estimated per capita use of 173 gpd annual average and 130 gpd in the winter. Given the different methods of calculation, direct comparison of pre-2012 to post-2012 values may not be meaningful. However, each era's annual average shows a downward trend of approximately 1 percent per year. A graphical representation is presented in Chapter 5.

3.6 Current and Projected Land Use

Land use within the domestic service area is a combination of agricultural, rural, commercial, industrial, resource, and residential uses. The community of Manson is unincorporated, but has a designated UGA. Figure 3.1 shows the comprehensive plan designations within the domestic service area boundary. Within the UGA, developments have occurred at typically expected densities, while quite a bit of land remains undeveloped. Outside the UGA, development density is sparse, except along the lake where most buildable areas are already occupied.

Future changes in land use are difficult to predict. Currently, there are no known proposals to increase the Manson UGA size. The area continues to see significant home construction due to the influx of summer vacation homes. These users historically did not contribute much to the permanent population, but with the rise of short-term rentals they are already having a larger annual impact. Some interest has been expressed by large out-of-town developers to provide summer vacation homes in cluster or planned developments within the rural or commercial agricultural lands. Several of these inquiries have occurred on lands outside of the present retail service area and within lands designated by the District as future service areas. Non-residential growth currently seems centered around a growing wine grape industry. The wineries in the Manson area typically have been small in size, and the potable water demand from these



enterprises has been similar to a single-family home. Wash water and other industrial purposes of water commonly are provided through the separate non-potable irrigation system. Wineries are permitted in commercial agricultural lands and are more interested in being located in areas where fire flow is available.

The Wapato Point development and a large parcel of land adjacent to Mill Bay to the east of Wapato Point are trust lands controlled by the Bureau of Indian Affairs (BIA). This is important because land use and development within these trust lands are not controlled by conventional processes. Neither Chelan County land use policies nor the Growth Management Act apply to trust lands controlled by the BIA. The planned development at Wapato Point, designated (IA) for Indian Allotment, is nearly fully developed under the current management scheme. The Mill Bay trust lands (IA) are surrounded by the Manson UGA and have significant development potential near the Mill Bay Casino. Wapato Point and the Mill Bay Casino account for about 17 percent of all District consumption, as shown earlier on Table 3.7.

The total acres of each land use designation in the UGA, retail service area, and future service area are shown in Table 3.15.

Table 3.14 – Land Use Within Planning Areas (acres)

Land Use Description	UGA	Retail	Future	Total
Commercial Agriculture (AC)	-	1,549	5,976	7,525
Downtown Commercial (CD)	67	-	-	67
Commercial Tourist (CT)	20	-	-	20
Commercial Mineral Lands (MC)	-	9	-	9
Manson Light Industrial (MLI)	22	-	-	22
Rural Industrial (RI)	-	3	-	3
Rural Public Lands and Facilities (RP)	-	22	-	22
Rural Residential/Resource 2.5 (RR2.5)	-	719	-	719
Rural Residential/Resource 5 (RR5)	-	559	413	972
Rural Residential/Resource 10 (RR10)	-	-	574	574
Rural Residential/Resource 20 (RR20)	-	-	314	314
Rural Waterfront (RW)	-	279	-	279
Urban Public (UP)	53	-	-	53
Urban Residential 1 (UR1)	505	-	-	505
Urban Residential 2 (UR2)	389	-	-	389
Urban Residential 3 (UR3)	116	-	-	116
Wapato	263	-	-	263
Water (Lakes)	-	268	191	458
Total	1,435	3,407	7,467	12,310

Reviewing County GIS data, there are approximately 200 acres within the UGA that have no listed improvement valuation (indicating no structures) and could be subdivided for development. Assuming 4 DU per acre, up to 800 DU could be accommodated. Appendix F of the County's *Comprehensive Plan* proposes a more conservative approach of reducing land availability for market factors, public use, and critical areas with a final value of about 1.5 DU per acre, or 300 DU for this evaluation. Therefore, assuming 2.5 persons per DU, the existing UGA could accommodate between 750 and 2,000 additional persons.

Not included in these calculations is approximately 70 acres of undeveloped BIA land adjacent to the Mill Bay Casino.

3.7 Future Population

Future populations are evaluated using both the OFM projections by the State of Washington and Chelan County Planning projections and the population estimates for peak tourist populations. Starting in 2014, Chelan County Planning worked with cities to allocate the projected populations within various UGAs throughout the County, with the product being Resolution 2015-112 (Appendix E) forecasting rural and UGA growth through the year 2040. The estimates were based on the 2012 OFM medium growth projections. The values represent approximately 1.2-percent annual growth in the Manson UGA initially, then dropping progressively to 0.6-percent annually by 2040. The County-wide rural projections are less, at 1.0 percent and 0.5 percent, respectively.

The new 2019 OFM estimate for the Manson UGA exceeds the County's 2015 forecast for 2019 by 183 people (8 percent); however, the estimates are made using statistical sampling and do not reflect actual counts. Actual new active water system connections have increased by about 11 percent since 2015, which appears to support the higher, more recent, estimate.

As of the time this chapter was written, the County has not prepared a population forecast more recent than Resolution 2015-112. The OFM has updated the overall Chelan County 20-year forecasts to approximately 0.45-percent annually for the low range, 0.70-percent medium range, and 1.55-percent high range.

As of early 2020, the District has received development proposals for about 60 homes, 50 recreational vehicle sites, and a 50-unit hotel. The COVID-19 outbreak in 2020 may have some dampening effect on construction and home sales for the short term, so revenue forecasts presented in Chapter 10 assume growth rates closer to the low range projections.

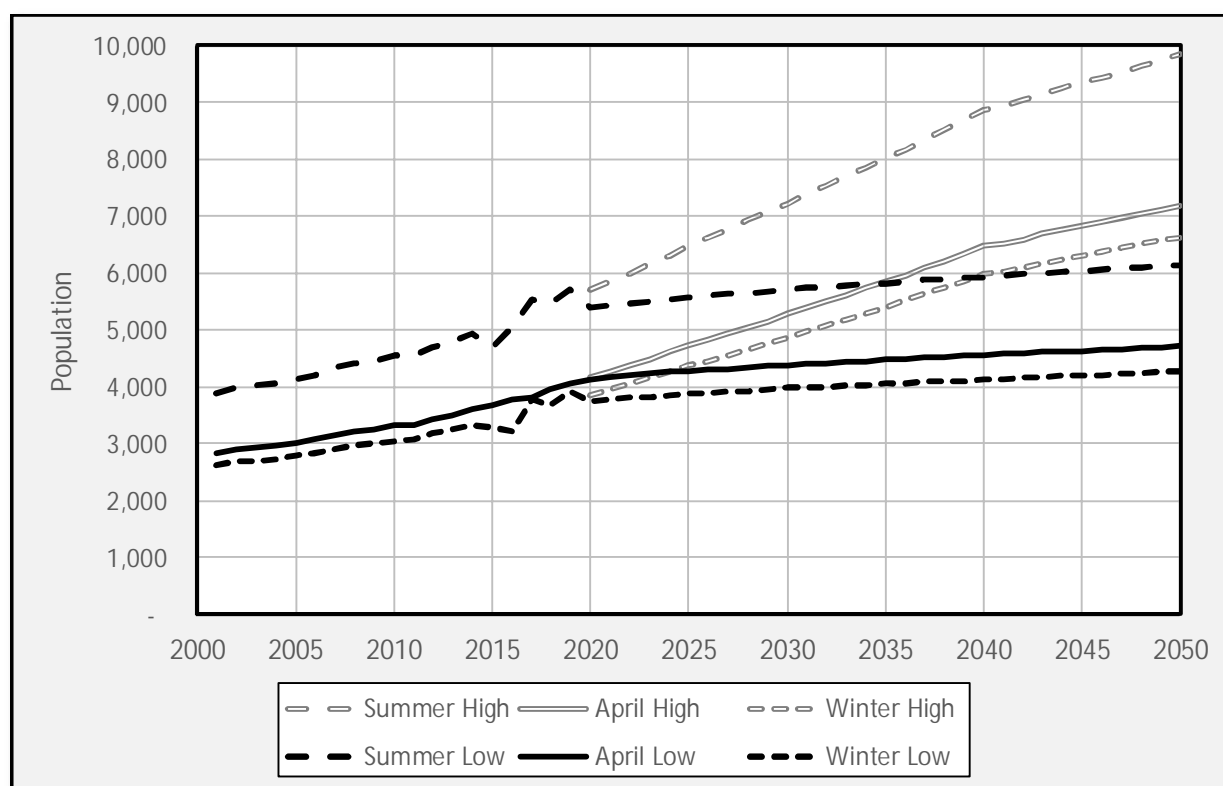
The District's population growth exceeded the average County-wide rate of growth by a factor of 2.0 between 2000 and 2015, and a factor of 1.2 from 2015 to 2019. For determining future system capacity and sizing infrastructure, a growth rate 1.4 times that of the OFM high range County-wide forecasted rate of growth will be used. This results in a rate of approximately 2.3 percent annually for the next 20 years, and just over 1 percent after that. Summer and winter variations are assumed to remain proportionally similar to recent values, or approximately 135 percent and 92 percent of April population, respectively.

Results of these assumptions are shown in Table 3.16 and graphically on Chart 3.9.

Table 3.15 – Population Forecasts

	2019	2020	2026	2030	2040	2050
Low Range Projection						
Annual Growth Rate	0.87%	2.04%	0.60%	0.78%	0.57%	0.35%
April Population	4,067	4,150	4,302	4,390	4,559	4,722
Summer Population	5,720	5,402	5,600	5,714	5,934	6,147
Winter Population	3,911	3,759	3,897	3,976	4,129	4,278
High Range Projection						
Annual Growth Rate	0.87%	2.04%	2.48%	2.26%	2.05%	1.05%
April Population	4,067	4,150	4,829	5,280	6,470	7,185
Summer Population	5,720	5,712	6,617	7,235	8,865	9,845
Winter Population	3,911	3,853	4,463	4,881	5,980	6,641

Chart 3.9 – Population Forecasts



3.8 Future ERUs

Future ERUs are calculated taking the population changes and assuming water use per capita will remain constant throughout the study period. No new industrial customers are proposed, and commercial consumption is assumed to trend proportionally with population change. Irrigation use is assumed to hold steady. Both the low and high range growth projections are presented in Table 3.17.

Table 3.16 – Future ERU Projections

	2015	2019	2020		2026		2030		2040		2050	
			Low	High	Low	High	Low	High	Low	High	Low	High
Winter												
Population	3,294	3,911	3,759	3,853	3,897	4,463	3,976	4,881	4,129	5,980	4,278	6,641
Domestic ERUs	2,572	2,632	2,755	2,824	2,856	3,271	2,914	3,577	3,026	4,382	3,135	4,867
Irrigation ERUs	0	0	0	0	0	0	0	0	0	0	0	0
DSL ERUs	612	192	277	367	283	320	287	338	294	386	300	415
Total ERUs	3,184	2,824	3,032	3,191	3,139	3,591	3,201	3,915	3,320	4,768	3,435	5,281
ADD												
Population	3,676	4,067	4,150	4,169	4,302	4,829	4,390	5,280	4,559	6,470	4,722	7,185
Domestic ERUs	2,816	2,901	3,102	3,116	3,215	3,609	3,281	3,947	3,407	4,836	3,530	5,370
Irrigation ERUs	2,130	1,792	1,689	1,910	1,689	1,910	1,689	1,910	1,689	1,910	1,689	1,910
Unmetered ERUs	48	464	367	441	367	441	367	441	367	441	367	441
DSL ERUs	456	143	206	273	211	238	213	252	219	287	223	309
Total ERUs	5,450	5,300	5,365	5,740	5,483	6,198	5,551	6,549	5,682	7,473	5,810	8,029
MDD												
Population	4,692	5,720	5,402	5,712	5,600	6,617	5,714	7,235	5,934	8,865	6,147	9,845
Domestic ERUs	3,085	2,682	3,517	3,221	3,646	3,731	3,720	4,080	3,864	4,999	4,003	5,552
Irrigation ERUs	4,271	2,919	3,271	3,698	3,271	3,698	3,271	3,698	3,271	3,698	3,271	3,698
Unmetered ERUs	245	831	610	814	610	814	610	814	610	814	610	814
DSL ERUs	253	79	114	151	117	132	118	140	121	159	124	171
Total ERUs	7,854	6,511	7,513	7,884	7,644	8,375	7,720	8,731	7,866	9,670	8,008	10,234

The count of ERUs in 2015 is much higher than 2019 because of the unusually high amount of irrigation use that year. DSL is assumed to be a constant, so the variation in DSL ERUs is due to dividing by the different seasonal ERU values from Table 3.11.

3.9 Future Water Use

Future water use has been evaluated assuming that a modest amount of additional outside water will be supplied to future homes. This assumption is based upon the fact that many buildable lots that have an irrigation water right through the domestic system already are being irrigated through irrigation-only meters. Other developments outside of the downtown core area have outside water delivered through the separate irrigation system. Developments on non-irrigable lands are happening, but in many cases outside landscaping is either limited or efficient use is driven by the existing rate structure that encourages conservation. There are no projected consumptive increases in non-revenue water, which is limited to use only on District lands, fire flow, flushing, construction, and street cleaning purposes.

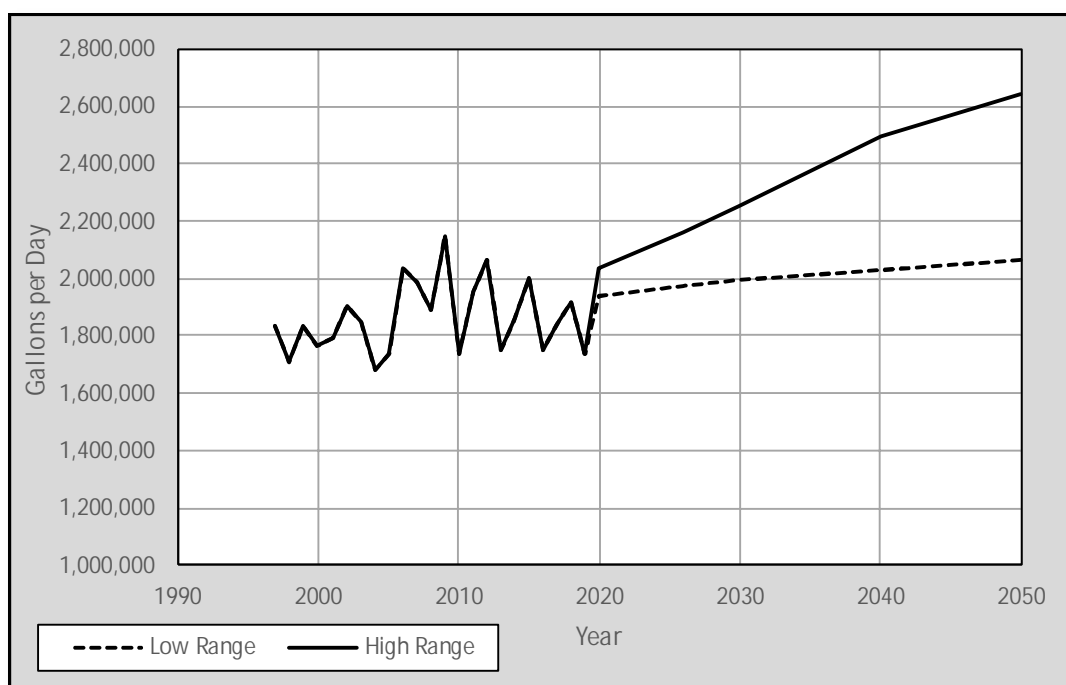
It is assumed that the current percentage of unaccounted-for water will not change over time. If it does, the amount of change should not meaningfully affect the overall water use projections and related infrastructure upgrade schedules. Future water use is then calculated based only upon increased population. The results are shown in Table 3.18 with both the low and high projections.

Table 3.17 – Future Water Use (gpd)

	2020		2026		2030		2040		2050	
	Low	High	Low	High	Low	High	Low	High	Low	High
Winter										
Domestic	279,279	286,272	289,510	331,594	295,402	362,598	306,778	444,279	317,797	493,379
Irrigation	0	0	0	0	0	0	0	0	0	0
DSL	28,092	37,211	28,711	32,455	29,067	34,293	29,755	39,135	30,422	42,045
Total	307,371	323,482	318,221	364,050	324,469	396,891	336,533	483,413	348,219	535,424
ADD										
Domestic	422,302	424,218	437,773	491,381	446,682	537,325	463,884	658,365	480,546	731,126
Irrigation	230,000	260,000	230,000	260,000	230,000	260,000	230,000	260,000	230,000	260,000
Unmetered	50,000	60,000	50,000	60,000	50,000	60,000	50,000	60,000	50,000	60,000
DSL	28,092	37,211	28,711	32,455	29,067	34,293	29,755	39,135	30,422	42,045
Total	730,395	781,429	746,484	843,837	755,749	891,618	773,639	1,017,500	790,968	1,093,171
MDD										
Domestic	864,326	791,569	895,990	916,891	914,224	1,002,619	949,431	1,228,474	983,533	1,364,241
Irrigation	803,755	908,593	803,755	908,593	803,755	908,593	803,755	908,593	803,755	908,593
Unmetered	150,000	200,000	150,000	200,000	150,000	200,000	150,000	200,000	150,000	200,000
DSL	28,092	37,211	28,711	32,455	29,067	34,293	29,755	39,135	30,422	42,045
Total	1,846,173	1,937,372	1,878,456	2,057,939	1,897,046	2,145,504	1,932,942	2,376,201	1,967,710	2,514,878

The historical and forecasted MDD, inclusive of an estimate for 5-percent WTP backwash, is displayed graphically on Chart 3.10. This represents the raw water supply and WTP capacity requirements.

Chart 3.10 – Historical and Forecasted MDD



4 SYSTEM ANALYSIS

4.1 Design and Performance Standards

Standardized performance and design criteria are essential for the efficient evaluation, construction, and operation of a water system. Establishing minimum criteria ensures a base level of system reliability and cost-effective service for all utility customers. Clearly identified criteria will enhance the ability of the utility to assess system deficiencies and plan for future improvements. Uniformity of the design also will allow developers to know in advance the minimum levels of water service.

Criteria pertinent to the water system service area are as follows.

4.1.1 Flow Rates

1. Distribution system capacity shall provide for peak hourly demand, or maximum daily demand plus required fire flow, whichever is greater.
2. Pipelines shall be sized for a maximum velocity of 5 feet per second (fps) when flowing under peak hour demand conditions.
3. When evaluating new construction, the maximum velocity for fire flow conditions shall be limited to 10 fps at the rated fire flow plus MDD to reduce the risk of damage from water hammer and mitigate for unforeseen field conditions.
4. The 10 fps standard will not be used to identify capital projects for serving existing structures.
5. Pipes shall be sized based upon computer model analysis.

4.1.2 Sources

1. Supply to the system and to each pressure zone must meet the average rate of MDD with the largest individual pump out of service.
2. Pumping capacity to closed zones must be sufficient to supply PHD. All non-emergency sources may be considered available.
3. DOH recommends derating the supply capacity to a 20-hour pumping day. The District will use this derating when deemed practical.
4. Source capacity must be compared to the 6-, 10-, and 20-year projected needs to see if additional pumping capacity is needed to meet those flows.

4.1.3 Fire Flow

The Capital Facilities element of the *Comprehensive Land Use Plan* for the Chelan Planning Area describes levels of service. Fire protection standards are discussed in detail in Chapter 15.40 of the Chelan County Code. The County has adopted the International Fire Code (IFC) with some exceptions and allows the Fire Marshal to make local determinations. A brief summary of the County standards are as follows:

- 750 gpm for 2 hours for one and two family residential buildings smaller than 3,600 square feet.
- All other protected structures per the IFC.

- Up to 75-percent credit for buildings with fire sprinklers, but not less than 1,500 gpm for 2 hours.
- Hydrant spacing (maximum):
 - 500 feet from one and two family residential lots on lots larger than 1 acre.
 - 300 feet from one and two family residential lots on lots less than 1 acre.
 - 150 feet from commercial lots.
 - 50 feet from commercial structures.
 - 150 feet (“as the hose lays”) from all points on a protected structure. It is assumed this does not apply to one and two family residential buildings.

The District’s additional goals are 1,000 gpm for 2 hours minimum within the UGA, and where practical, 4,000 gpm for 4 hours in commercial and industrial areas.

New fire hydrants shall not be allowed on mains less than 6 inches in diameter. Existing fire hydrants on currently active mains down to 4 inches in diameter shall be allowed to remain provided that the hydrant can provide at least 500 gpm without dropping the minimum pressure at any point in the water system below 20 pounds per square inch (psi).

Table 4.1 shows the minimum and maximum fire flow standards by pressure zone.

Table 4.1 – Fire Flow Standards

Pressure Zone	Minimum				Maximum			
	Criteria	gpm	hrs	gal	Criteria	gpm	hrs	gal
Kutik/Chelan/ Barkley/Chandler	Residential-Rural	750	2	90,000	Residential-Rural	750	2	90,000
Manson	Residential-Rural	750	2	90,000	Chelan Fruit Storage	5,000	4	1,200,000
Summerset	Residential-Urban	1,500	2	180,000	Residential-Urban	1,500	2	180,000
WTP	Residential-Rural	750	2	90,000	Manson Growers	5,750	4	1,380,000
Summit	Residential-Rural	750	2	90,000	Residential-Rural	750	2	90,000

4.1.4 Pressure Zones and System Pressures

1. The minimum pressure at a customer meter shall be 30 psi under peak hourly demand conditions where all equalizing storage has been depleted.
2. The maximum pressure goal within water mains is 100 psi where possible.
3. The minimum pressure at any point in the water system during the maximum day demand plus the required fire flow conditions shall be 20 psi under the condition where the designed volume of fire suppression and equalizing storage have been depleted.

4.1.5 Pipe Sizes and Valves

1. The minimum distribution pipe size allowed anywhere in the system shall be 6 inches in diameter.
2. The minimum distribution pipe size for any single line, non-looped extension up to 1,000 feet in residential areas shall be 8 inches in diameter.
3. The size of line extensions for greater distances or for extensions for commercial purposes shall be determined by hydraulic analysis but will be no less than 8 inches in diameter.

4. Isolation valves will be placed at pipeline intersections and on straight runs of pipe on 1,000-foot intervals.
5. All tees shall have three valves, and four valves at crosses, unless the District determines that fewer valves will provide adequate system isolation.

4.1.6 Water Main Location

Water mains shall follow County roads when possible or, alternatively, shall follow private roadways on easements dedicated to the District. Water mains following private roadways shall be along unrestricted areas of normal ingress and egress. The District requires developers to loop all mains where possible and has a program of looping existing dead-end lines through the District construction program.

4.2 Water Quality Analysis

The District is a Group A public water system that tests for a variety of substances in accordance with WAC 246-290-300. The water quality in the District system is excellent in nearly every measure.

4.2.1 Drinking Water Constituents

Bacteriological

The raw source water is tested once per month prior to disinfection and treatment for the combined source. The raw source water is tested for both total and fecal coliform and reported to DOH. Presence/absence testing for coliform bacteria occurs throughout the distribution system on a schedule consistent with the District's coliform monitoring plan. Samples are taken at regularly spaced intervals and at various collection sites that represent a dispersed sample of distribution system characteristics. Population estimates yield the need for either five or six samples per month. The District has had no coliform bacteria detected in a distribution sample since 2001.

Inorganic Chemical and Physical

The District has never had a detection in the primary chemical and physical substances regulated by the U.S. Environmental Protection Agency (EPA) that exceeded either the maximum contaminant level (MCL), the trigger level, or the state reporting level (SRL). This is also true of the EPA-regulated secondary chemical and physical substances. The state-regulated chemical and physical substances include aesthetic parameters like hardness, conductivity, turbidity, and color. The District has measured results in this category that meet or exceed the SRL but do not exceed either the trigger level or the MCL. Hardness has been measured at 21 milligrams per liter but is still considered soft water. Conductivity has been measured at 52 Umhos per centimeter but is typically below the threshold of 700 Umhos per centimeter that triggers the need to measure total dissolved solids. Natural turbidity was seen to be as high as 6.1 nephelometric turbidity units (NTU) but is typically in the range of 0.3 to 0.4 NTU, which is very clear natural water. Color units average 5 to 10, but was seen as high as 20 in past years but are typically less than the trigger and MCL of 15 color units. Aesthetically, the drinking water from the District is very good. These samples are taken once per year in autumn after treatment and prior to the point of entry to the distribution system.

Nitrate/Nitrite

The annual samples for nitrate and nitrite are measured as part of the annual inorganic chemical samples. Results for nitrate and nitrite have always been below the state reporting level.

Lead and Copper

The District has a monitoring plan for lead and copper in accordance with 40 Code of Federal Regulations (CFR) 141.86, 141.87, and 141.88. The District has been following the monitoring requirements and has never detected lead or copper at levels that exceed the action level for the 90th percentile measurements. The current requirements are for lead and copper to be measured at target sample tap locations every 3 years beginning in 1999 and thereafter unless the action level is met. Twenty target sample tap locations were taken in summer 2019 and will be scheduled again for the year 2022. The action levels for lead and copper were not exceeded in 2019.

Disinfection Byproducts (DBPs)

The quarterly sampling for total trihalomethanes (TTHM), haloacetic acids (HAA5), and the disinfection precursor's total organic compounds (TOC) was last done in October 2019 in locations and times consistent with the District's *Disinfection Byproduct Monitoring Plan*. The analysis revealed total TTHMs ranging from 11.34 to 12.15 micrograms per liter and HAA5 ranging from 2.53 to 8.94 micrograms per liter as compared to the maximum contaminant level of 80 and 60 micrograms per liter, respectively. TOC ranges from 0.34 to 1.13 milligrams per liter.

Volatile Organic Chemicals

The District performed a series of quarterly samples for each source in the late 1980s and the early 1990s. After the quarterly samples were over, the state chose to reduce the frequency of the volatile organic chemical (VOC) monitoring to once per year. With the change in the system to a combined source three (S03) in 1999, only one sample is taken annually. Ethylbenzene and total xylenes recently have been detected above the SRL but are well below the MCL. These petroleum products are probably in the lake water from boats and personal watercraft. The VOC sample is taken after treatment and prior to the point of entry to the distribution system.

Radionuclides

The Department of Health reduced the monitoring requirements for radionuclides from the composite of four consecutive quarterly samples to a single sample collected as per DOH's guidelines. The District last sampled for radionuclides in July 2016. The results showed gross alpha particle activity at less than three picoCuries per Liter (pCi/L) and radium 228 activity at less than 1 pCi/L. The District is required to monitor every 6 years, with the next sample date expected in October 2022. Radionuclides are taken from a point representative of the source, after treatment and prior to entry to the distribution system.

Asbestos

The District tested for asbestos in the distribution system and in the source water in 2002. The testing revealed concentrations of less than the detection level of 83 thousand fibers per liter longer than 10 microns in the sample from the distribution system. The District sampled again in 2009 and 2018, and both results were less than the state reporting level.

Other Substances

The District also performs monitoring for synthetic organic compounds (SOC) under test methods 515.1 and 525.2. The District will only sample again as per DOH guidelines.

4.2.2 Water Quality Associated with Treatment

Source Turbidity

Source water turbidity is continuously monitored and recorded at the WTP. Typical source turbidity is in the range of 0.3 to 0.4 NTU.

Filtered Water Turbidity

Filtered water turbidity is continuously monitored and recorded at the WTP. The District reports filtered water turbidity every 4 hours when the water treatment plant is online. Typical finished water turbidities are in the 0.01 to 0.03 NTU range. Removal percentages average over 90-percent removal.

Residual Disinfection Concentrations

The District monitors the residual disinfection concentration entering the distribution system continuously. Operators ensure that the chlorine residual remains above 0.2 milligrams per liter entering the distribution system. Typical chlorine residual ranges from 0.8 to 1.0 milligrams per liter prior to the distribution system. The District also monitors that a detectable amount of chlorine residual is within the distribution system. This monitoring is done daily and typically runs in the range of 0.6 to 0.8 milligrams per liter of residual chlorine.

4.3 System Analysis

The purpose of this section is to reference the inventory of existing facilities in Chapter 2 and to establish the capabilities of the various components of the existing system. For conservative planning, the capacity analyses in this section assume the high population growth projections from Chapter 3.

4.3.1 Water Source Description

4.3.1.1 Manson Intake

The pump station is located at 661 Manson Boulevard in the vacated right-of-way of Ustah Street where it intercepts Lake Chelan. The property was quit claimed to the District in 1980. The intake structure was re-built in 1982, with service provided by three pumping units. The Manson Intake originally was designed to provide both chlorine and fluoridation. Fluoridation

was discontinued in 1985 and chlorination was discontinued in 1998 upon the commissioning of the WTP. The three pumping units are submersible turbine pumps laid inside 24-inch-diameter caissons on a declining orientation of 9.4 degrees from horizontal and extending out into Lake Chelan approximately 125 feet. The suction end of the caisson pipes have an inlet invert elevation of 1,071 feet and a range of 8 to 29 feet of submergence depending upon the lake level and time of year. The caissons are suspended approximately 36-inches above the lake bottom. The pumping units can be safely removed from the intake pipes at lake levels below 1,091 feet without flooding the intake structure. When the lake level is at or above 1,091 feet, the pumps cannot be removed without first removing the end screens and placing a blind flange cover over the end of the caisson pipe by underwater divers. This intake has pump control valves for each pump, a common surge valve for slow discharge modulation, and a master meter for measuring both instantaneous and totalized flow.

The motor control center, two pumps and motors, and the main discharge header were replaced in 2005. The smallest pump is a 920 gpm, 125 horsepower (hp) unit with a 7-stage vertical turbine pump manufactured by Flowserve Pumps and installed in 2005. The medium-sized pump at the Manson Intake is a 6-stage, 1,200 gpm, 175 hp unit manufactured by Goulds Pumps, installed in 1996, rebuilt in 2005, and replaced in 2019. The large pump is a 5-stage, 2,030 gpm, 300 hp unit built by Flowserve, installed in 2005. The motor control center is a 1,000 Amp panel with starters, power factor correction capacitors, and breakers with key interlocks for feeding power to an emergency generator receptacle. The pumping units are controlled by water levels in the raw water reservoir with lead and lag pumps designated by the operator. The levels and operating instructions are transmitted to the pumping plant via the radio telemetry system.

4.3.1.2 Lakeshore Intake

The pump station is located at 2805 Chelan Boulevard and is reached via an access road beginning near the intersection of Lakeshore Drive and Chelan Place. The site was originally an irrigation intake built around 1940. The irrigation intake pumped water from Lake Chelan to Wapato Lake when supplemental water was needed. The District replaced the old pump house with a new pump station for drinking water purposes in 1974. The old 24-inch-diameter discharge line from the irrigation intake then transported water to the 1 MG Lakeshore Reservoir on Summit Avenue. The pump house was designed to provide both chlorine and fluoridation. Fluoridation was discontinued in 1985 and chlorination was discontinued in 1998 upon the commissioning of the WTP. This intake has pump control valves for each pump, a common surge valve for slow discharge modulation that was replaced in 2005, and a master meter for measuring both instantaneous and totalized flow.

The motor control center, one of the pumps and motors, and portions of the discharge header were upgraded in 2005. Pump No., 1 originally installed in 1974, was 800 gpm and 100 hp. It was replaced in 2019 with a 6-stage Hydroflo Model 12DC and 125 hp motor. The pump draws less than 100 hp. The pump design point is listed as 650 gpm at 475 feet total dynamic head (TDH), but the actual operating condition ranges from 760 to 800 gpm at about 400 feet TDH. The larger pumping unit is a 7-stage, 1,300 gpm, 200 hp vertical turbine manufactured by National Pump Company and was installed in 2005. The motor control center is a 600 Amp panel with starters, power factor correction capacitors, and breakers with key interlocks for feeding power to an emergency generator receptacle. The turbine intakes hang into a wet well

with columns measuring 28 feet, 10 inches in length. The bottom of the wet well is elevation 1,075 feet. The wet well is fed by one 24-inch intake pipe covered on the end with a fish screen. The intake pipe extends 50 feet into Lake Chelan and has an invert elevation of 1,074 feet. Therefore, the suction pipe is submerged to a depth of 5 to 26 feet depending upon the lake level and the time of year. The intake pipe sits approximately 18 inches off the lake bottom. The 24-inch discharge line was replaced in 1998 as part of the Water Treatment Plant and Pipeline Project. The new 16-inch-diameter discharge line routes water from the Lakeshore Intake to the raw water reservoir at the Water Treatment Plant. The pumping units are controlled by water levels in the raw water reservoir with lead and lag pumps designated by the operator. The levels and operating instructions are transmitted to the pumping plant via the radio telemetry system.

4.3.2 Source Capacity Analysis

The supply capacity available under the criteria described in Section 4.1.2 is shown in Table 4.2.

Table 4.2 – Supply Capacity (gpm)

Station Name	Pump No.	Flow (gpm)	Station Name	Pump No.	Flow (gpm)
Raw Water Supply			Summit (1600) Zone		
Manson	1	920	Sienna	1	15
Manson	2	2,030	Sienna	2	53
Manson	3	1,200	Sienna	3	53
Lakeshore	1	800	Sienna	4 **	475
Lakeshore	2	1,300	Sienna	5 **	475
Total		6,250	Total		1,071
Derated *		3,517	Derated *		101
WTP Finished Water			Summerset (1450) Zone		
WTP	1	700	Summerset	1	45
WTP	2	1,500	Summerset	2	45
WTP	3	1,500	Total		90
Total		3,700	Derated *		38
Derated *		1,833			

* 20 hour pumping day and largest pump out of service.

** Sienna pumps 4 & 5 are for fire protection. Not included in supply calculations.

The 1450 and 1600 Zones are closed zones, so the pump capacity must equal or exceed PHD. Both closed zones are served with a separate irrigation source, so domestic water use is modest throughout the year. Actual PHD records for these zones are not available, so the DOH *Water System Design Manual* Equation 3-1 is used for estimating. There are currently approximately 10 and 25 undeveloped lots in the 1450 and 1600 Zones, respectively. For planning, it is assumed these 35 lots will all be developed within 10 years.

Available supply capacity includes a component to refill storage over 3 days that is depleted during the maximum design fire event (refer to Section 4.3.5.4), which is 1,044,000 gallons/3 days = 242 gpm. Supply capacity compared to demands is shown in Table 4.3.

Table 4.3 – Supply Capacity Analysis

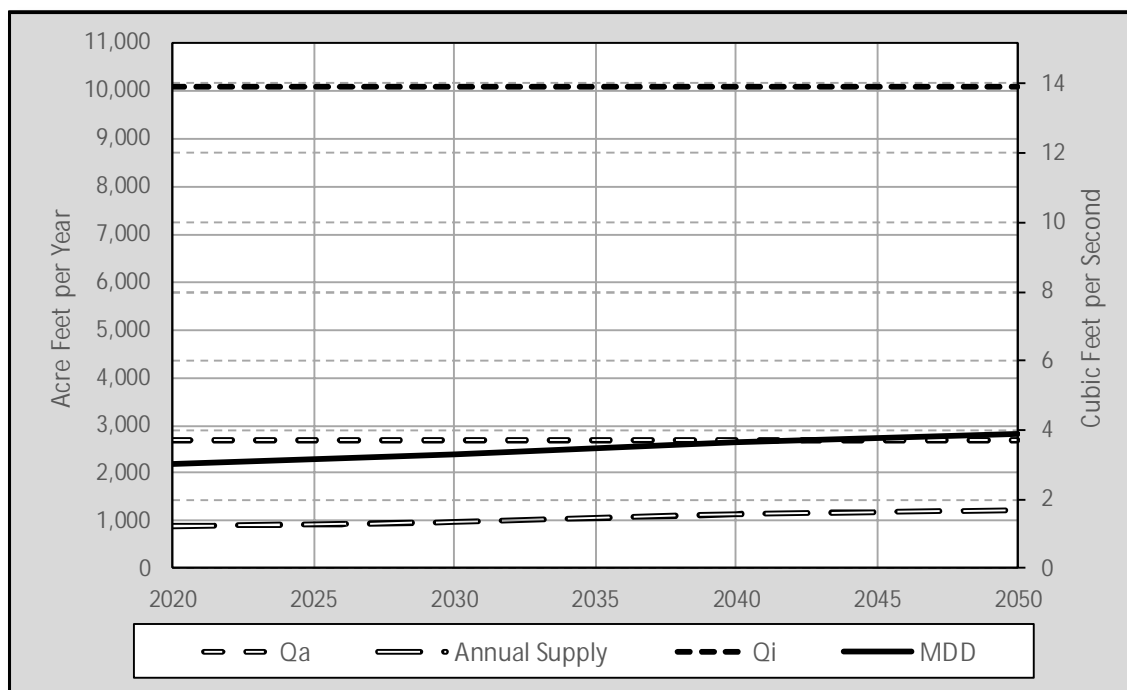
	2015	2019	2026	2030	2040	2050
Raw Water						
Supply Available (gpm)	3,517	3,517	3,517	3,517	3,517	3,517
MDD (gpm)	1,389	1,333	1,498	1,562	1,730	1,831
Excess (Deficit)	2,128	2,183	2,019	1,955	1,787	1,686
Finished Water (Overall System)						
Supply Available (gpm)	1,833	1,833	1,833	1,833	1,833	1,833
ERUs (No.)	7,854	6,511	8,375	8,731	9,670	10,234
MDD (gpm)	1,340	1,222	1,429	1,490	1,650	1,746
Backwash (gpm)	59	59	69	72	80	84
Fire Storage Refill (gpm)	242	242	242	242	242	242
Excess (Deficit) [20 hr]	192	310	94	30	(138)	(239)
Excess (Deficit) [24 hr]	559	677	460	396	228	128
Summerset (1450)						
Supply Available (gpm)	38	38	38	38	38	38
ERUs (No.)	16	24	29	34	34	34
MDD (gpm)	3	4	5	6	6	6
PHD (gpm)	26	30	33	35	35	35
Excess (Deficit)	11	7	5	2	2	2
Summit (1600)						
Supply Available (gpm)	101	101	101	101	101	101
ERUs (No.)	17	16	27	40	40	153
MDD (gpm)	3	3	5	7	7	26
PHD (gpm)	18	18	32	38	38	96
Excess (Deficit)	83	83	69	62	62	5

Future supply capacity is sufficient everywhere except for the WTP Finished Water pumps, which show a deficit starting after 2030 if applying the 20-hour pumping day derating. If available for 24 hours per day, the existing Finished Water pumps may be sufficient until the year 2050. Installation of a second small pump (700 gpm) may provide enough derated capacity for the foreseeable future.

4.3.3 Water Rights Adequacy

The District's water rights are sufficient for the foreseeable future. The annual right (Qa) is 2,672 acre-feet per year (afy) (871 million gallons per year (MGY)) and instantaneous right (Qi) is 13.93 cfs (6,252 gpm). The high range growth projections shown on Table 3.18 forecast an annual water supply of 1,225 afy (400 MGY) and instantaneous supply of 3.89 cfs (1,746 gpm) by the year 2050. These high range water demand projections and water rights are displayed on Chart 4.1.

Chart 4.1 – Demand Forecast and Water Rights Available



Peak demands and total annual quantities of water in the District system are presently less than 50 percent of all installed major physical supply system components and water rights. Future sources of supply could include recaptured leakage from leak detection and mainline replacement strategies. Other elements of the conservation program will not be quantifiable sources of supply but will lead to slower increases in demand as growth occurs on the system.

As described within the conservation program, interties and the use of reclaimed water are not viable alternatives as sources of supply due to the isolation of the domestic service area from adjoining Group A systems and the wastewater disposal strategy in the Chelan Valley.

4.3.4 Water Treatment

The Water Treatment Plant is located at 135 Lone Horse Lane. Substantial completion of the plant occurred in December 1998. The 4 MGD (two 2 MGD filter trains) treatment facility uses conventional direct filtration of Lake Chelan waters. Raw water is pumped to the raw water reservoir by both the Manson and Lakeshore Intakes. At the raw water meter vault, the raw water can be pre-chlorinated before it enters the Raw Water Reservoir. A main control valve after the Raw Water Reservoir then meters the flow into the treatment process. The water directed into the plant goes through a rapid mixer vault where additional chlorine can be added together with the primary coagulant (alum). The water then goes to the two flocculation basins, where it is gently mixed by three progressively slower mixers in each basin to help form more reliable flocs. After leaving the flocculation basins, the water enters the two filters, where filter aid polymer can be added to the water before it runs through 5 feet of single media anthracite coal. Chlorine also can be added to the filtered water after it leaves the filters.

Treated water leaving the filters enters the clearwell, where it is pumped to the Finished Water Reservoir. The clearwell is served by three vertical turbine pumps. The small unit is a three-stage vertical turbine manufactured by Floway Pumps. It has a capacity of 1.56 cfs

(700 gpm) with a 14-foot column length. The two large units are also three-stage vertical turbines manufactured by Floway Pumps. These units have a capacity of 3.34 cfs (1,500 gpm) each with a 13-foot, 10-inch long column. The floor of the clearwell is at elevation 1,434 feet. The 12-inch overflow in the clear well is at elevation 1,445.5 feet. Water then runs through a maze of Hypalon baffles in the finished water reservoir and out into the distribution system.

The backwash system incorporates a covered basin where residuals can accumulate and be pumped into the sewer system. Filter aid polymer can be added to the backwash drainpipe during the backwash cycle to assist in particle settlement in the backwash basin. Backwash water is decanted by the backwash return pump station after at least 2 hours after a backwash and is pumped back to the Raw Water Reservoir and mixed with raw water from either the Manson Intake or the Lakeshore Intake.

Flow rates currently require the use of only one filter and one flocculation basin at a time, although summer demands have matched the capacity of one filter train on occasion. The plant is run in batch mode to ensure minimum flow criteria are met.

The entire filtration and backwash processes of the WTP are controlled by the PLCs and the data acquired and displayed by human machine interface (HMI) computers running WINCC, last upgraded in 2013.

The plant was designed to be upgradable to a total capacity of 6 MGD with the addition of a third filter train. There is space in the finished water pump station to add a second small pump and third large pump.

For full redundancy, the WTP should be capable of meeting MDD with the largest single major component out of service, which is one flocculation basin or one filter. Chart 4.2 represents the last 5-year average WTP treated water rate (including backwash) during the summer, then projected with future growth until the treated water requirement exceeds 50 percent of plant capacity (2 MGD) for 4 continuous days. If the MDD/ADD ratio of 2.4 remains consistent (Table 3.4), this corresponds with an ADD of 0.93 MGD which, as shown on Chart 4.3, may occur as early as 2030 or not until beyond 2050 depending on actual growth rates.

Chart 4.2 – Treated Water Rate Future Forecast at 50-Percent WTP Capacity

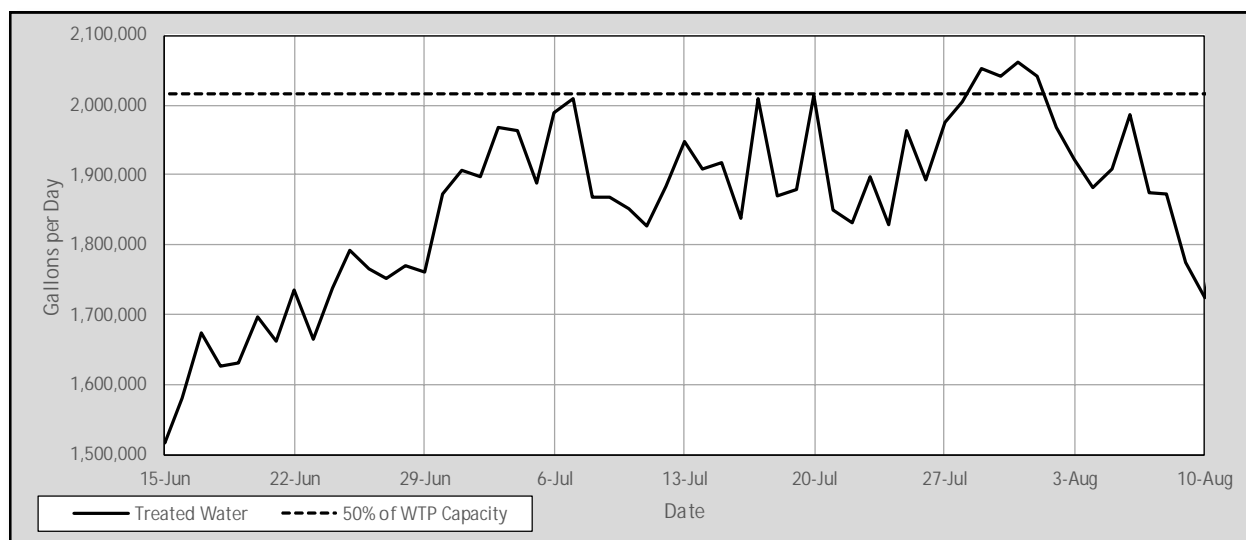
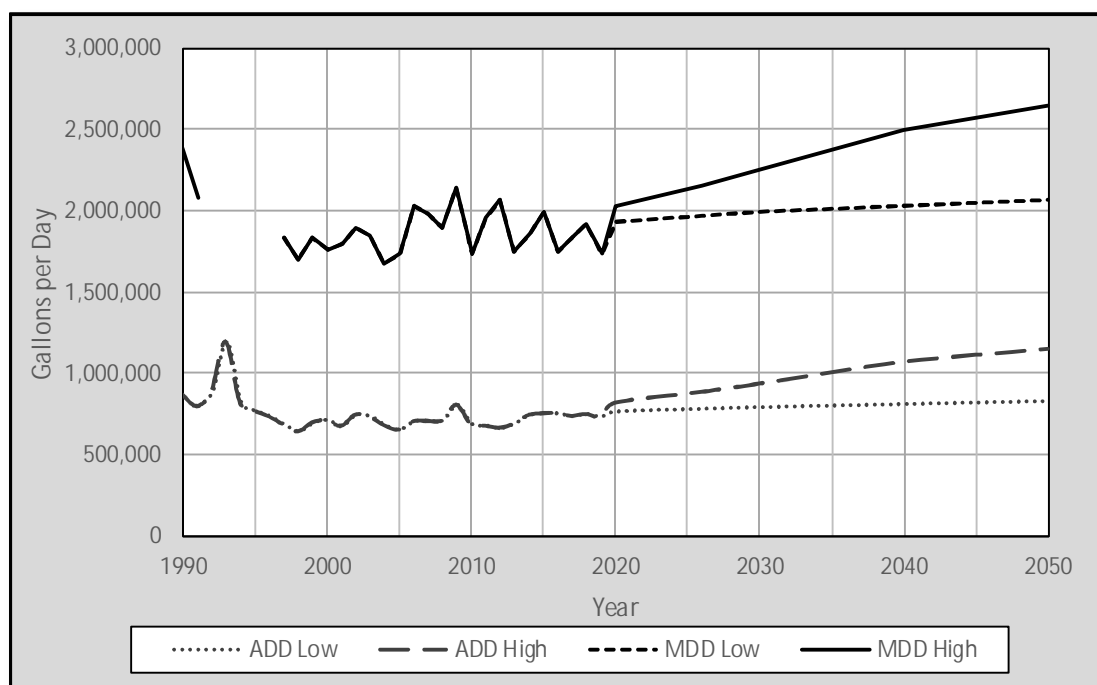


Chart 4.3 – Demand History and Forecast



4.3.5 Storage

The District has one raw water and two finished water reservoirs. Physical data is shown in Chapter 2. The Finished Water Reservoir overflow elevation is 9 feet higher than the Lakeshore Reservoir. To allow circulation in the Lakeshore Reservoir, the Finished Water Reservoir is usually operated with pump setpoints between 5 and 16 feet below the overflow.

Storage requirements are made up of four components: operational, equalizing, standby and fire flow. Each of these components is described and evaluated as follows.

4.3.5.1 Operational Storage

Operational Storage (OS) is the space in the tanks used for pump cycling, freeboard, and dead (unusable) storage. In the District, this is defined as the volume between the overflow pipe and the lag pump start point. Table 4.4 shows operational storage with current summer operational setpoints.

Table 4.4 – Operational Storage

Reservoir	Diameter (ft)	Floor Elev. (ft)	Overflow (ft)	Lead Pump Start (ft)		Lag Pump Stop (ft)		Volume (gal)
				Depth	Elev.	Depth	Elev.	
WTP Raw	66	1,464.5	1,504.0	34	1,498.5	38.5	1,503.0	140,748
WTP Finished	55	1,464.0	1,534.8	55	1,519.0	65	1,529.0	279,897
Lakeshore	66	1,485.0	1,526.0	34	1,519.0	41	1,526.0	179,134

4.3.5.2 Equalizing Storage,

Equalizing Storage (ES) is the space in the tanks needed to make up the difference between peak hour demand and pumping capacity.

The current maximum treatment capacity of the WTP is 2,800 gpm. Supply capacity is expected to exceed PHD for the next 20 years, resulting in ES of zero. After 20 years, a small amount of ES may be required unless the WTP capacity is increased as summarized in Table 4.5.

Table 4.5 – Equalizing Storage

	2015	2019	2026	2030	2040	2050
Supply (gpm)	2,800	2,800	2,800	2,800	2,800	2,800
ERUs	7,854	6,511	8,375	8,731	9,670	10,234
PHD (gpm)	2,345	1,944	2,501	2,607	2,888	3,056
Volume (gal)	0	0	0	0	13,162	38,441

4.3.5.3 Standby Storage

Standby Storage (SS) is the space in the tanks needed to supply demands should a failure result in the loss of the largest supply pump or pump station. DOH recommends considering at least 1 day of storage during MDD less the supply with the largest supply facility out of service, or 200 gpd per ERU, whichever is greater.

The WTP's finished water pumping capacity with the largest pump out of service (WTP Pump No. 3) exceeds forecasted MDD to the year 2050 projection. Therefore, SS would be 200 ERU. The WTP has a permanent generator sized to run all three pumps simultaneously, so the WTP finished water pump station is considered a reliable supply (Table 4.6).

Table 4.6 – Standby Storage

	2015	2019	2026	2030	2040	2050
Supply Available (gpm)	1,833	1,833	1,833	1,833	1,833	1,833
MDD (gpm)	1,340	1,111	1,429	1,490	1,650	1,746
Number of ERUs	7,854	6,511	8,375	8,731	9,670	10,234
SB Opt 1 (MDD - Supply) (gal)	0	0	0	0	0	0
SB Opt 2 (200 gal x ERU) (gal)	1,570,839	1,302,250	1,674,969	1,746,239	1,934,004	2,046,875
Larger of Opt 1 or Opt 2 (gal)	1,570,839	1,302,250	1,674,969	1,746,239	1,934,004	2,046,875

SS values exceed those of the 2014 WSP by a large amount due to the revised method of calculating ERUs discussed previously in Section 3.4. For comparison, the count of ERUs in the 2014 WSP was about 2,000, or roughly 1.3 times the count of active connections. The current summer ERU count for this WSP is about 8,000, roughly 4.5 times the count of active connections. This comes from including irrigation use and the summer population increase in the ERU count, which had not been done previously.

4.3.5.4 Fire Flow Storage

Fire Flow Storage (FFS) is the space in the tanks needed to supply fire flow assuming all water comes from the reservoirs. The largest current fire flow requirement is Manson Growers at 5,750 gpm for 4 hours, or 1.38 MG. FFS must be available to customers and hydrants at 20 psi.

As mentioned previously, the WTP has a backup generator large enough to run all three finished water pumps. Because of this reliability, two of the pumps (one small, one large) are assumed to be available for supplemental supply during a fire. To meet additional reliability requirements (WAC 246-293-660(b)), it is assumed that one WTP filter is out of service, which reduces the plant capacity to 2.0 MGD (1,400 gpm). For a 4-hour fire, the WTP filters and pump could supplement FFS with 0.34 MG, reducing the required storage to 1.04 MG.

4.3.5.5 Storage Summary

The total storage required is the sum of all four components. If agreed to by the local fire authority and the District, SS and FFS may occupy the same volume (nesting) under the assumption that both a high capacity fire and a major supply failure are unlikely to happen at the same time. Refer to Appendix L for the Fire District's approval of nesting. The results of the storage capacity analysis are shown in Table 4.7, with totals shown both with and without nesting.

Table 4.7 – Storage Summary (gallons)

	2015	2019	2026	2030	2040	2050
Operational	459,031	459,031	459,031	459,031	459,031	459,031
Equalizing	0	0	0	0	13,162	38,441
Standby	1,570,839	1,302,250	1,674,969	1,746,239	1,934,004	2,046,875
Fire	1,044,000	1,044,000	1,044,000	1,044,000	1,044,000	1,044,000
Required	3,075,885	2,807,300	3,180,026	3,251,300	3,452,237	3,590,397
Available	2,306,530	2,306,530	2,306,530	2,306,530	2,306,530	2,306,530
<i>Surplus (Deficit)</i>						
<i>Without Nesting</i>	<i>(769,355)</i>	<i>(500,770)</i>	<i>(873,496)</i>	<i>(944,770)</i>	<i>(1,145,707)</i>	<i>(1,283,867)</i>
<i>With Nesting</i>	<i>276,660</i>	<i>545,249</i>	<i>172,530</i>	<i>101,260</i>	<i>(99,667)</i>	<i>(237,817)</i>

Without nesting, the District currently has about a 0.5 MG deficit. With nesting, there may be no deficit until about the year 2035. The current operational setpoints on the Finished Water Reservoir could be raised to increase available storage by up to 150,000 gallons, although at the potential detriment of stagnant water in the Lakeshore Reservoir because the altitude valve would be closed most of the time.

4.3.6 Distribution System/Hydraulics

4.3.6.1 Hydraulic Model Setup

The District has the water system modeled using WaterCAD™ by Bentley Systems. The original hydraulic model was configured and calibrated by HDR Engineering as part of the Water Treatment Plant design in the late 1990s. Subsequent revisions to the model have been made by District staff and RH2 Engineering, Inc., (RH2) as modifications to the distribution system have occurred. All pipelines that are known are included in the model. The Hazen-Williams equations were used for the friction loss calculations. Customer demands were distributed evenly across the model nodes within each pressure zone, with concentrated demands at the three highest individual users. Elevations were obtained from available United States Geological Survey (USGS) and GIS contour maps and are estimated to be plus or minus 10 feet, except in steep slope areas (such as along the lake) where the estimate is plus or minus 20 feet. No calibration efforts have been performed for this WSP.

4.3.6.2 Water Mains

The distribution system consists of approximately 275,000 feet of pipe. The breakdown of pipe size, age, and type is presented in Chapter 2. The 4-inch piping is of concern as it is seldom possible to meet fire flow requirements with 4-inch-diameter pipe. The Washington Administrative Code (WAC) does not allow additional new hydrants to be placed on 4-inch lines. Existing hydrants on 4-inch lines are allowed only if hydraulic requirements are met.

The physical quality of the piping is assumed to be generally good based on observation by District crew of mains exposed for connections and the rarity of leaks. Some of the older steel lines are likely reaching the end of their useful life and should be scheduled for replacement. Leaks on these steel pipes are most predominant in more aggressive soil conditions where corrosion has accelerated. Lines that are a combination of a small size (4 inch and smaller) and made of steel are the most logical lines to replace first when other integrity concerns are not present.

The amount of asbestos cement (AC) pipe in the system also remains a concern. High levels of asbestos have been found in other drinking water systems, indicating that pipe deterioration is present. However, the physical quality of AC pipe in the District distribution system has been observed to be good, and asbestos has been measured in drinking water samples only at very low levels that are well within drinking water standards. Physical observations are made when tapping the main for water services and during other taps, repairs, and replacement projects. Concerns remain regarding asbestos exposure to workers who work with the pipe, making taps and repairs. The District has adopted standard operating procedures to protect workers that meet all Washington Industrial Safety and Health Act (WISHA) protection standards by following American Water Works Association (AWWA) workmanship standards.

4.3.6.3 Valves

The distribution system is lacking in the number of isolation valves. This results in large distances between valves requiring substantial areas to be shut down when making repairs or connections. The District has been installing additional distribution valves; however, the magnitude of the problem is not easily overcome in a short timeframe. A regular effort to add valves will need to be sustained for many years before the District goals are met.

4.3.6.4 Hydraulics

The distribution system is divided into one gravity pressure zone, five pressure reduced zones, and two boosted closed zones. Future zones will be mostly at higher elevations, requiring new booster stations and reservoirs. Extended Period Simulations (EPS) were run to evaluate performance over a 72-hour period on MDD to determine pressure and velocity deficiencies, if any. Several computer runs have been made for fire flow that indicate fire flow goals are not always achievable. Upgrades are made on a prioritized basis depending upon the level of service provided and the building or institution threatened by the deficiency.

4.3.6.5 Fire Flow

Most of the distribution system is capable of providing fire flows in the residential areas at 750 to 1,000 gpm for the 20-year growth projection without improvements. It is also capable of providing up to 3,500 gpm fire flow at the Manson schools and up to 2,000 gpm fire flow at Mill

Bay Casino without improvements, but some of the older steel lines should eventually be replaced. Leaks have occurred on steel mains when hydrant flows are initiated.

Modeling of a 5,750 gpm fire at Manson Growers using an EPS was performed to confirm the system response and the storage calculations in Section 4.3.5. The modeling showed 20 psi residual pressure was available throughout the entire 4-hour fire duration, and that water did remain in the reservoirs at the end of the fire, with the Lakeshore Reservoir being the lowest at 10 feet of water remaining.

The hydraulic model results for overall system fire flow reflect the estimated flow available within the water main at 20 psi residual pressure while also maintaining 20 psi to all customers. This is not necessarily the performance expected from a single hydrant. The results are not intended to imply that there are enough (or any) existing hydrants in the area. The model node map is shown in Figure 4.1. Results of the fire flow analyses are discussed further in Section 4.5.4.

4.4 Physical Capacity Summary

A summary of the rated and available capacity of each major water system component has been performed, with the results shown in Table 4.8. The year 2018 was used because it had the highest MDD ERU count of the last 4 years. The number of ERUs shown are for MDD, not ADD.

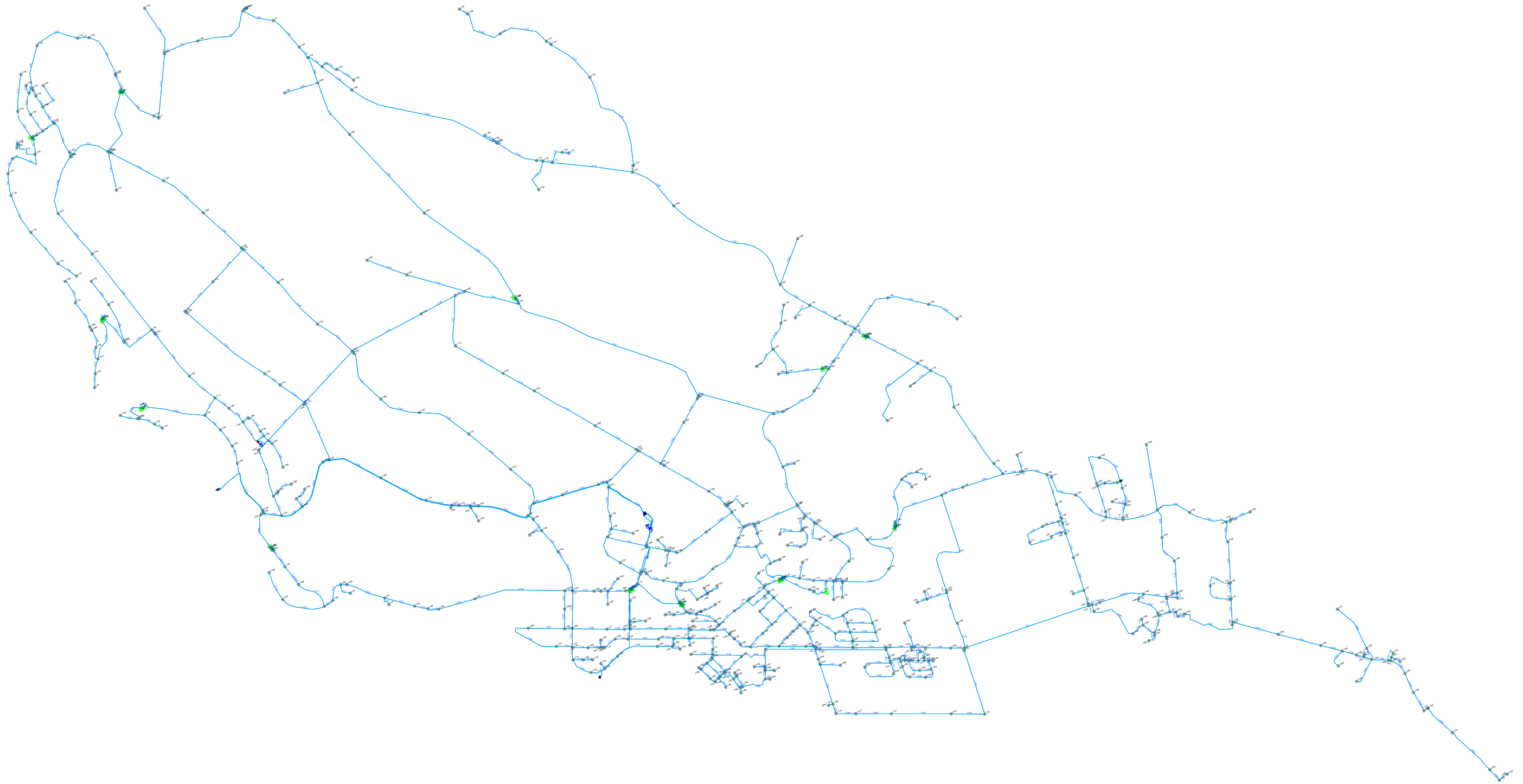


Figure 4.1 - Hydraulic Model

**LAKE CHELAN RECLAMATION DISTRICT
2021 WATER SYSTEM PLAN**

SCALE: 1 in = 2,000 ft
DRAWING IS FULL SCALE WHEN
BAR MEASURES 1"
PLOT DATE: 3/22/2021
FILE NAME: LC20-F-MODEL.DWG
JOB: LCR 218.150



Text on this figure is intended for viewing electronically and is likely too small to read on an 11x17 hardcopy sheet.

Table 4.8 – Physical Capacity Summary (2018)

	136	gpd per ERU ADD	
	246	gpd per ERU MDD	
Service Class	2018 MDD (gpd)	No. of Connections ⁽¹⁾	No. of ERUs
Single Family	367,578	1,829	1,496
Multi Family	256,438	563	1,044
Irrigation Subset ⁽²⁾	722,969	n/a	2,942
Irrigation Only ⁽³⁾	179,956	72	732
Commercial	81,693	55	332
Tourist	8,873	29	36
Other	126,801	n/a	516
DSL	15,692	n/a	64
Total	1,760,000	2,548	7,162
Facility Component		Capacity (gpd)	ERUs
Source (Raw Water)		5,064,000	20,608
Source (Treated Water)		2,640,000	10,744
Treatment		2,016,000	8,204
Equalizing and Standby Storage			
With Nesting		1,847,499	9,237
Without Nesting		803,499	4,017
Transmission		9,000,000	36,626
Water Rights Qi		9,002,569	36,636
Water Rights Qa		2,385,245	9,707
System Capacity (Without Nesting)			4,017
Excess Capacity			-3,145
System Capacity (With Nesting)			8,204
Excess Capacity			1,042

- (1) Connections is a count of metered services, except for Multi-Family, which is an estimate of the number of dwelling units.
- (2) Irrigation that is used through the customer's normal meter. Not a separate metered connection.
- (3) Irrigation that has a dedicated metered service.

The facility components are defined as follows:

Source (Raw Water): The Manson and Lakeshore Intake pump station, de-rated to a 20-hour day and with the largest pump out of service.

$$3,517 \text{ gpm (Table 4.2)} \times 1,440 \text{ minutes} = 5,064,000 \text{ gpd}$$

Source (Treated Water): The WTP finished water pumps, de-rated to a 20-hour day and with the largest pump out of service.

$$1,833 \text{ gpm (Table 4.2)} \times 1,440 \text{ minutes} = 2,640,000 \text{ gpd}$$

Treatment: Capacity of the WTP assuming one filter train is out of service.

$$1,400 \text{ gpm (one filter)} \times 1,440 \text{ minutes} = 2,016,000 \text{ gpd}$$

Storage:

See values from Table 4.7. To be conservative, the year 2015 was used because the consumptive needs in 2015 were higher than the most current year of this WSP (2019)

Equalizing and Standby Storage with Nesting: Available gravity storage after deducting operational and fire storage.

$$2,306,530 \text{ gallons available} - 459,031 \text{ gallons operational} = 1,847,499 \text{ gallons}$$

Equalizing and Standby Storage without Nesting: Available gravity storage after deducting operational storage. Allows fire and standby storage to occupy the same volume, whichever is larger.

$$2,306,530 \text{ gallons available} - 459,031 \text{ gallons operational} - 1,044,000 \text{ gallons fire} = 803,499 \text{ gallons}$$

Transmission: Refer to Chapter 2, Table 2.4.

$$4,150 \text{ gpm} + 2,100 \text{ gpm (Table 2.4)} \times 1,440 \text{ minutes} = 9,000,000 \text{ gpd}$$

Water Rights (Qi and Qa): Refer to Chapter 6.

$$2,672 \text{ ac ft/year} = 2,385,245 \text{ gpd (Appendix G Water Rights Self Assessment)}$$

The results are consistent with Section 4.3.5. showing a storage deficiency without nesting or no deficiency with nesting.

The next limiting component is Treatment, the capacity of which can be doubled by expanding the WTP to 6 MGD.

4.5 System Issues and Possible Improvements

The system analyses, together with an overview of system features yields, a number of system issues to be addressed. Improvements have been evaluated, and if more than one improvement is possible, multiple solutions are listed.

4.5.1 Water Treatment

WTP1: The WTP may regularly exceed 50-percent total capacity on multiple sequential days as early as 2030, or as late as 2050. The result is not having full redundancy during peak days.

- a. Add a third flocculation basin and filter, second small (700 gpm) finished water pump, and second backwash basin.

4.5.2 Control Systems

CS1: The WTP control system hardware is nearing an upgrade cycle. The last major upgrade was in 2013. Assuming a 15-year maximum cycle, the control system should be upgraded no later than 2028.

- a. The existing system has nine control panels. Replacing all panels may cost approximately \$100,000 per panel, which includes installation.
- b. The system could be reduced to fewer (one or two) panels using a central master system. Some cost savings could be expected, and this would be evaluated as the project timeline gets closer.

CS2: The WTP control system software is nearing an end-of-life cycle. The last major upgrade was in 2013. Assuming a 10- to 15-year maximum cycle, the control system should be upgraded soon.

- a. Software and programming are estimated to cost \$200,000.

CS3: There is no remote monitoring of distribution system pressure. Should a PRV fail open, it may take a while before the issue is acknowledged, exacerbating potential damage.

- a. Install pressure transmitters. Two locations may be at Sewer Lift Stations 1 and 1A, where existing telemetry systems can be used for communications. Electrical and control system cost is estimated at \$10,000 each, plus cost to run and plumb a water line at approximately \$10,000 each. These costs assume most of the work is performed by District personnel.
- b. Alternately, install pressure sensing flow meters that communicate by cell service.

CS4: Manson and Lakeshore Intake control systems are nearing their end-of-life cycle.

- a. Replace the control systems with new telemetry panels and programming estimated at \$75,000 each, which includes a new control panel at the raw water tank to relay water level information.

4.5.3 Storage

S1: As shown in Table 4.7, the District is currently deficient in storage by about 500,000 gallons if standby and fire flow storage are not nested. If they are nested, the storage deficiency may be delayed until about 2035. The deficiency is estimated to increase by about 20,000 gallons each year. Four optional approaches were reviewed and are described below.

- a. (Selected option) Allow nesting of standby and fire flow storage temporarily until new storage can be planned and funded. Construct a reservoir large enough to not require a permanent nesting policy. A 1.5 MG reservoir may be sufficient well beyond the year 2050.
 - The only lands within the distribution system and at the correct elevation for a new tank are adjacent to the existing Lakeshore and WTP tanks.
 - The District does not own enough land at the right elevation on the WTP site. There may be enough room on the adjacent property just west of the parking area, or on the hilltop about 500 feet northeast of the existing tanks.

- The District may own just enough land at the Lakeshore tank site for a second tank, but almost certainly will need construction easements on adjacent properties to build it. Building setbacks may limit the size of tank possible. The District may be able to purchase adjacent property for more room, but this has not been researched.
 - The existing Lakeshore tank could be removed, and a taller 2.5 MG tank constructed in its place, matching the WTP Finished Water Tank overflow elevation. This would provide the necessary storage and eliminate the 9-foot overflow elevation discrepancy between the tanks. This tank would be about 95-foot diameter and may only just fit on the site. Further research regarding constructability and setbacks is required.
- b. Make nesting a permanent policy. Construct a 1 MG reservoir by 2040.
 - c. Develop a policy and strategy to curtail irrigation use during a major supply outage. Irrigation use accounts for about 40 percent of summer consumption. This may allow a standby storage reduction of about 500,000 gallons. This would be difficult to enforce, and economically precarious for commercial agricultural customers.
 - d. Raise the operational setpoints in the Finished Water Reservoir to increase available storage by approximately 150,000 gallons. To mitigate for the resulting stagnation of the Lakeshore Reservoir, install a small jockey pump at the Lakeshore Reservoir to constantly pump water out when the altitude valve is closed. A 30 gpm pump should provide a 3-day drawdown. This is considered an interim fix.
- S3: Interior painting of all three reservoirs was last done in the late 1990s. The interiors should be inspected for condition.
- S4: Cathodic protection systems on all three tanks should be inspected and renewed.
- a. Perform inspection and install new anodes.
 - b. Replace or repair the corroded interior ladder in the Lakeshore tank. Improve cathodic protection of the ladder.
- S5: Evaluate the existing baffle system in the WTP Finished Water Reservoir for condition, effectiveness, and possible replacement.

4.5.4 Distribution System

Figure 4.2 shows the modeled system pressure under current conditions, with an emphasis on the high and low pressure areas.

4.5.4.1 Low Pressure

LP1: Existing water service just south of the Lakeshore Reservoir is at 24 to 27 psi.

- a. This service (elevation 1,465 feet) is not currently active. Should the adjacent property require service, it could be connected to the boosted 1600 Zone or the service could be relocated about 400 feet south along Summit Boulevard to an elevation no higher than 1,450 feet.

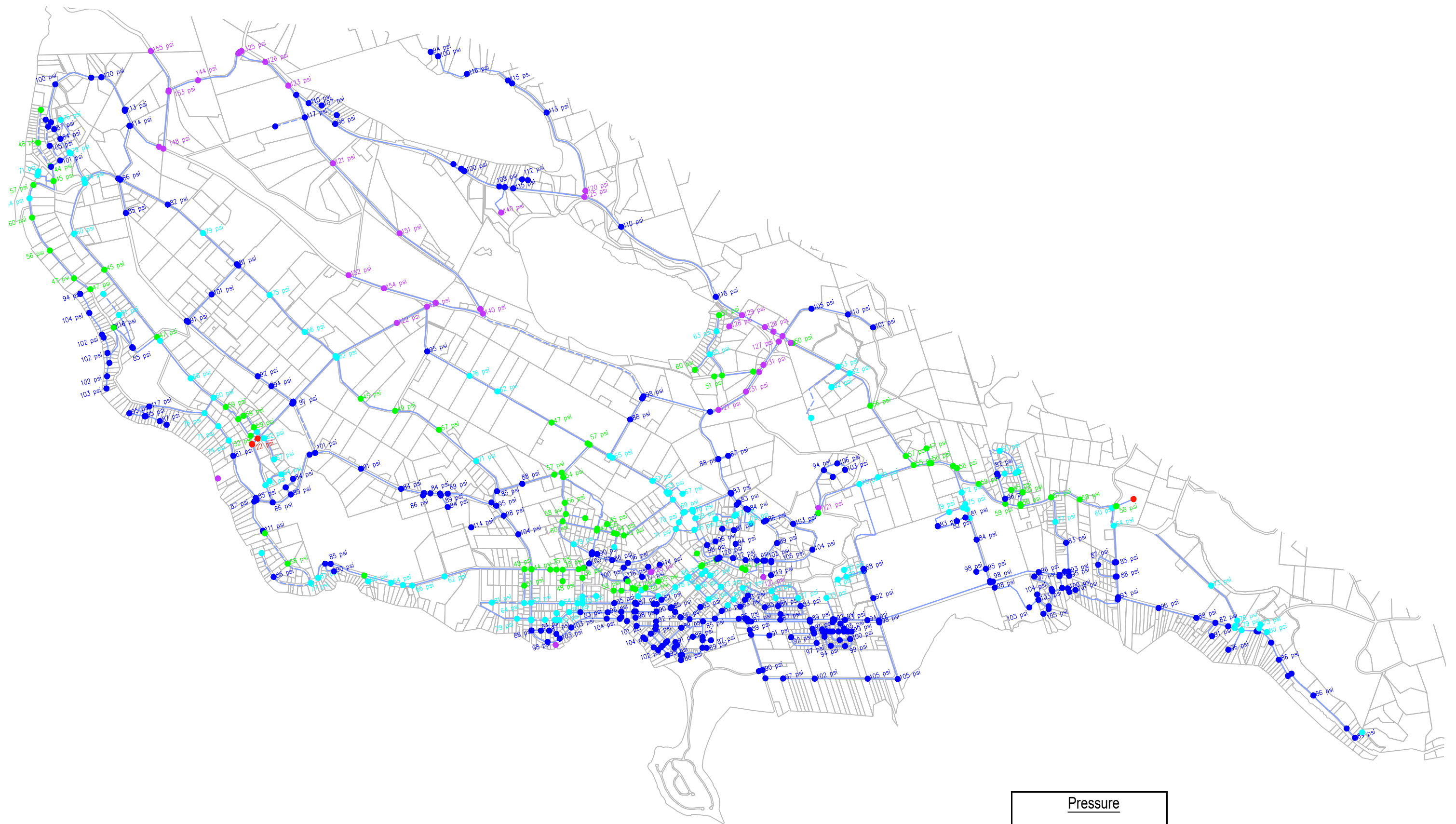


Figure 4.2 - System Pressures

**LAKE CHELAN RECLAMATION DISTRICT
2021 WATER SYSTEM PLAN**

SCALE: 1 in = 2,000 ft



DRAWING IS FULL SCALE WHEN
BAR MEASURES 1"

PLOT DATE: 3/22/2021

JOB: LCR 218.150

FILE NAME: LC20-F-PSI.DWG



Pressure

- 0–30 psi
- 30–60 psi
- 60–80 psi
- 80–120 psi
- > 120 psi

LP2: Five homes along Lakeshore Drive between Manson Boulevard and Chase Avenue are higher than the road and experience low pressure during high demand periods. The water service vaults along the road stay at or above 30 psi.

- a. Leave as is. This is a legacy issue and the customers are accustomed to the situation.
- b. Install a new PRV at the intersection of Lakeshore Drive and Manson Boulevard, creating a small pressure zone.
- c. Relocate the existing PRV from Lakeshore/Chase to Manson Boulevard/Chase. Configure the piping within the intersection to remove all dead ends. Pressure to the homes will exceed 100 psi, which will require installation of private PRVs in the residences.

LP3: The Summit 1600 closed zone has no way to admit water if there were a power failure, except as may pass through the inactive pumps.

- a. Install a check valve to bypass the pump station. Pressure may only be 20 psi at the high point, but this will prevent the pipes from going empty. PHD may be 11 gpm, so a 2-inch check valve should suffice.

LP4: The Summerset closed zone has no way to admit water if there were a power failure, except as may pass through the inactive pumps.

- a. Install a check valve to bypass the pump station. Pressure may only be 15 psi at the high point, but this will prevent the pipes from going empty. PHD may be 10 gpm, so a 2-inch check valve should suffice. It may be possible to reconfigure the existing 2-inch relief valve to add a reverse flow feature.

4.5.4.2 High Pressure

HP1: Much of the lowlands around the three lakes are above 100 psi, in some cases exceeding 140 psi. Two PRVs were installed years ago to reduce pressure to a portion of the area but were deactivated when the result was insufficient pressure to some customers' residences at high elevations, some located as much as 150 feet higher than the water main.

- a. It is not currently practical to create a new pressure zone for these few customers. Should future development create new pressure zones, an evaluation should be made to move these existing customers into the higher zones. A small pressure-reduced zone could be created around Dry Lake, though this only covers approximately one quarter of the high pressure area.

HP2: The central area downtown and near the lake is well above 100 psi. The high pressure is necessary to serve customers at upper elevations in the pressure zone. Currently, the high pressure is not causing undo difficulties to the District.

- a. Should the District wish to reduce the pressure, some customers will need to be moved into the upper zones. Some of these areas are:
 - o Lakeshore Drive, Quatas Street to Manson Boulevard. Also refer to Capital Improvement Plan (CIP) LP2; and
 - o Homes north of the intersection of Green Avenue and Quetilquasoon Road. Install small service main to the high pressure side of the Coral/Green PRV station.

4.5.4.3 High Velocity

The following existing pipes experience velocity exceeding the District's velocity standard for new pipes. This does not necessarily indicate any imminent problem but can be used to prioritize replacement when other factors (such as age, material, and criticality) are considered.

HV1: The 6-inch AC main in Green Avenue between Boetzkes Avenue and Totem Pole Road exceeds 6.7 fps during PHD by 2050. The pipe is 200 feet long, built in 1985.

- a. This pipe is planned for replacement in 2021.

HV2: The 6-inch AC main in Green Avenue between Coral Street and Quetilquasoon Road exceeds 6.2 fps during current PHD and 6.6 fps by 2050. The pipe is 400 feet long, built in 1985.

- a. The project is listed as an elective water main replacement as budget allows.

HV3: The 10-inch ductile iron (DI) main leaving the Finished Water Reservoir to the south and ending at Division Street exceeds 5.5 fps during PHD by 2050. The pipe is 360 feet long, built in 2000.

- a. A velocity of 5.5 fps is well within performance limits of a DI pipe. However, for redundancy purposes, 300 feet of 6 inch or larger main could be constructed from the reservoir to the existing dead end 6-inch main in the adjacent private driveway to the southeast (Stormy Vista Lane). An easement through private property would be required.

4.5.4.4 Fire Flow

The issues noted below are relative to fire flow standards for new construction. Existing structures are grandfathered to the standards at the time of original construction. Projects are listed primarily for reference if new construction is proposed in these areas.

FF1: Fire flow in the Summerset boosted zone is 60 gpm and limited by the domestic pump size. Fire flow available adjacent to this zone is about 700 gpm. The nearest hydrant with useful capacity (740 gpm) is at Summerset Boulevard and Swartout Road about 700 feet away.

- a. Add a zone valve just north of the first hydrant on Pinot Noir Lane. This hydrant may then reach 800 gpm (currently 60 gpm). This should not affect service pressure to any customers.
- b. Install a dedicated fire pump. A project report per DOH standards may be required.
- c. Construct gravity storage. This is not cost effective for the small number of lots. However, should a higher pressure zone be created in the future, it may be possible to connect to this area.

FF2: The Sienna closed zone booster does not have a permanent generator. It does have a transfer switch for a portable generator.

- a. Continue to rely on the District's existing portable generator.
- b. Install a permanent generator.

FF3: Fire flow at the schools is limited to about 3,500 gpm because of the high home elevations adjacent to the WTP. High fire flow can draw pressure below 20 psi at these homes.

- a. The fire flow requirement for the high school is not known, but 3,500 gpm is a common value for schools. The elementary school requires 3,000 gpm. No action is proposed.

- b. The project listed under CIP HV3 may increase fire flow to 4,500 gpm.

FF4: Fire flow is approximately 680 gpm along the lake at Sun Hills Lane (6-inch polyvinylchloride (PVC)). High flow can draw pressure below 20 psi at Summit Road and Barkley Road.

- a. Install 1,200 feet of 6-inch or larger main in the Barkley Road switchback between Manson Boulevard and Summit Road. Flow increases to 1,200 gpm (or 860 gpm at 10 fps). An additional benefit is creating a loop, remedying the 4,000-foot-long dead-end main on Summit.
- b. Install 250 feet of 6-inch or 8-inch main from the 6-inch main at the north end of Helios Hills Lane uphill to the dead-end 8-inch main in Chelan Boulevard. This would cross private property and require an easement. This increases fire flow in the Barkley Zone from 680 gpm to 850 gpm but lowers fire flow in the Kutil Zone from 1,000 gpm to 850 gpm. CIP FF4a resolves that issue.
- c. Connect the Kutil, Barkley, and Chelan Pressure Zones to increase fire flow and reliability. Flow increases to 1,000 gpm in the Barkley Zone and 1,500 gpm in the Chelan Zone.
 - i. Option 1 is to install 800 feet of 6-inch main between Getaway Lane and Clearwater Lane. The steep slopes and lack of existing right-of-way or easements makes this project challenging, unless a new driveway is constructed if these properties ever develop. This also eliminates two dead-end mains.
 - ii. Option 2 is to install 2,300 feet of 8-inch main along Chelan Boulevard between the PRV stations. This is an accessible right-of-way, but a longer distance, and does not eliminate the dead-end mains closer to the lake.
- d. Install a 4-inch PRV at the intersection of Summit Boulevard and Barkley Road, supplying water from the Sienna BPS fire pumps. Fire flow is improved dramatically everywhere west of Ford Street.

FF5: Fire flow is below 750 gpm along State Road (SR) 150 east of Bennet Road. High flow can draw pressure below 20 psi at Winesap Avenue.

- a. Install 1,000 feet of 8-inch main along Swartout Road from Bennet Road to the existing 8 inch in Swartout. Fire flow increases to over 1,000 gpm (or 840 gpm at 10 fps in the 6 inch AC main in SR 150). This also provides a redundant feed to the far east end of the system. This project is planned to be installed by the District in 2021.

FF6: Fire flow is below 450 gpm in Kutil Place, and is limited by the existing 4-inch AC main.

- a. Replace the main with 800 feet of 8-inch main to get within 500 feet of the farthest home. Flow rises to 1,020 gpm (or 860 gpm at 10 fps).

FF7: Fire flow is below 750 gpm along the east side of Wapato Lake. High flow can draw pressure below 20 psi at the end of the main. This is due to pressure loss in the 2,300 feet of existing 6-inch AC main.

- a. Replace 2,300 feet of the 6-inch AC main with 8 inch. This raises flow to between 800 and 1,000 gpm (not limited by velocity).
- b. Supply this area in the future from a higher pressure zone.

- c. Construct 6,000 feet of 8-inch main around the north end of Wapato Lake, connecting back to Manson Boulevard. Flow rises to just over 1,000 gpm.

FF8: Fire flow is 400 gpm along Willow Point Road. High flow draws pressure below 20 psi at the end of the 4-inch main.

- a. Replace 900 feet of 4-inch AC main with 8 inch. Flow rises to 750 gpm (or 700 gpm at 10 fps), but the main is still a dead end.
- b. Construct 350 feet of 6-inch main along a private driveway and yard (2159 Lakeshore Drive) from the end of the 4-inch main to Lakeshore Drive. Flow rises to 850 gpm (or 660 gpm at 10 fps). This also provides a redundant loop for the 23 residences.

FF9: Fire flow downtown is limited by 10 fps velocity in the 6-inch AC main in Green Avenue between Boetzkes Avenue and Totem Pole Road, and the 6-inch steel main in Boetzkes Avenue. This is a performance standard and not an actual limitation on fire flow. However, it does point to a weakness in the area as there is only one Wapato Way road crossing downtown (8 inch).

- a. Replace 200 feet of 6-inch AC in Green Avenue with 12 inch. Replace 450 feet of 6-inch steel in Boetzkes with 12 inch. Flow downtown rises from about 1,300 gpm to over 3,000 gpm. This project is currently planned for 2021 (CIP HV1).
- b. Install a new 12-inch road crossing of Wapato Way at Pedoi Street. This is primarily a redundancy project. Fire flow is only modestly improved. This could be a developer-funded project if redevelopment happens south of Wapato Way.

FF10: Fire flow around the Mill Bay Casino area is about 2,000 gpm, limited by maintaining 20 psi to the highest nearby customers in the Manson Zone, along Summerset Vista, and at 125 Summerset Boulevard at elevation 1,258 feet. These customers have only about 35 psi normal pressure.

- a. Moving these customers to the Summerset Zone would increase their service pressure to 80 psi and raise available fire flow to the casino vicinity to about 2,600 gpm.

The following figures show the modeled results of the fire flow analyses.

Figure 4.3 represents current conditions, with a fire flow draw while maintaining 20 psi at the fire location and to all customer services.

Figure 4.4 represents current conditions, with a fire flow draw while maintaining 20 psi at the fire location and to all customer services while limiting water velocity to no more than 10 fps.

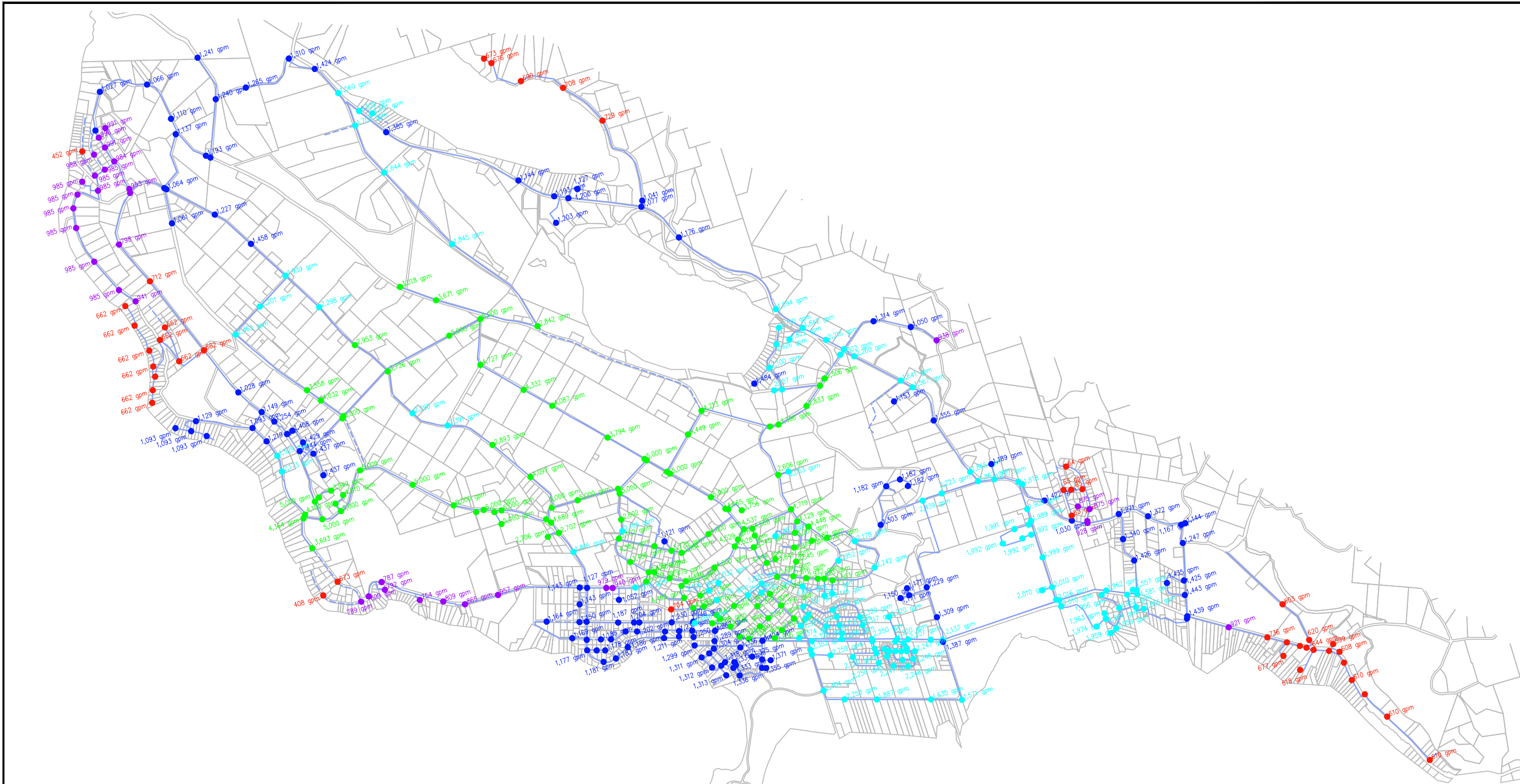
Figure 4.5 represents select system improvements in place, 2035 customer demands, and with a fire flow draw while maintaining 20 psi at the fire location and to all customers. The specific system improvements are:

- FF1a, FF4b, FF4ci, FF5a, and FF9a.

4.5.4.5 Fire Flow Sites

For the 2014 WSP, the local Fire Chief provided several high fire flow sites based on Washington Survey and Rating Bureau data. These sites and flow requirements are repeated from the 2014 WSP without requesting an update from the Fire Chief. The model results have been updated using the current model.

Table 4.9 shows the results from the hydraulic model. The table columns are defined as follows:



Fireflow at 20 psi residual pressure
and 20 psi to all customers.

- 0–749 gpm
- 750–999 gpm
- 1,000–1,499 gpm
- 1,500–2,499 gpm
- > 2,500 gpm

Figure 4.3 - Existing Fire Flow at 20 psi

**LAKE CHELAN RECLAMATION DISTRICT
2021 WATER SYSTEM PLAN**

SCALE: 1 in = 2,000 ft
DRAWING IS FULL SCALE WHEN
BAR MEASURES 1"
PLOT DATE: 3/22/2021
JOB: LCR 218.150
FILE NAME: LC20-F-FXEXIST.DWG



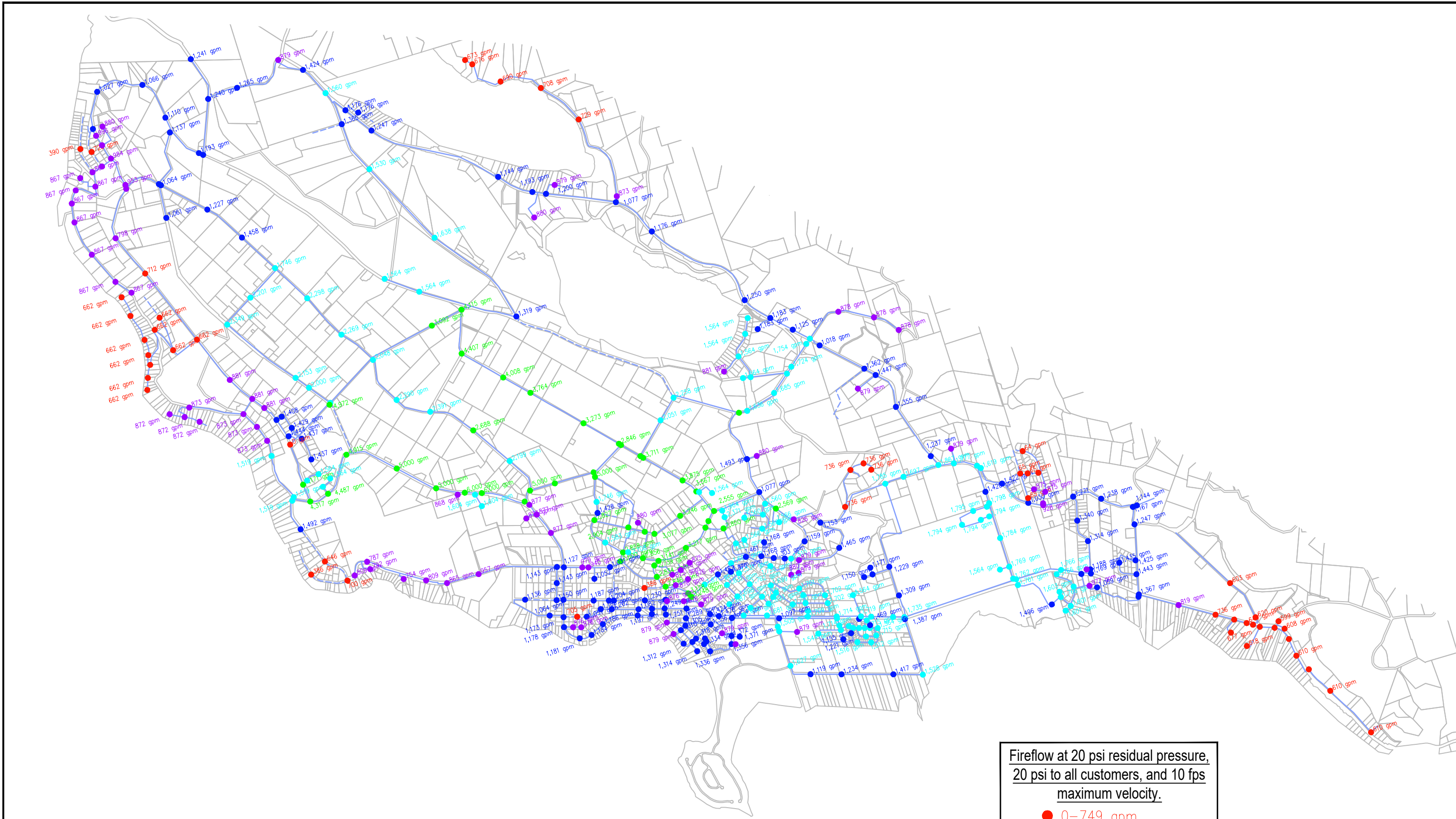


Figure 4.4 - Existing Fire Flow at 20 psi and 10 fps

LAKE CHELAN RECLAMATION DISTRICT
2021 WATER SYSTEM PLAN

SCALE: 1 in = 2,000 ft



DRAWING IS FULL SCALE WHEN
BAR MEASURES 1"

PLOT DATE: 3/22/2021

JOB: LCR 218.150

FILE NAME: LC20-F-FXEX10.DWG



Fireflow at 20 psi residual pressure,
20 psi to all customers, and 10 fps
maximum velocity.

● 0–749 gpm

● 750–999 gpm

● 1,000–1,499 gpm

● 1,500–2,499 gpm

● > 2,500 gpm

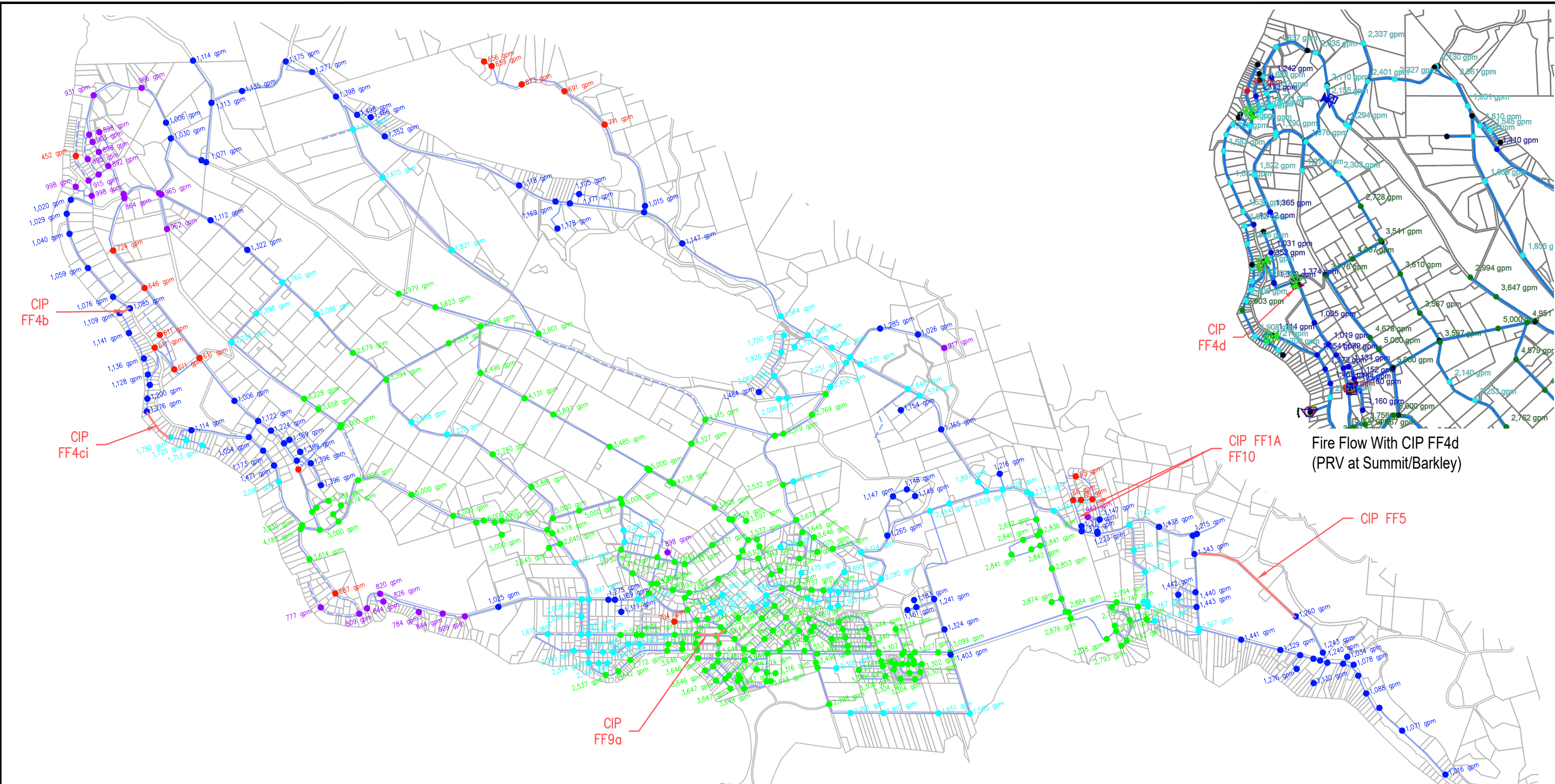


Figure 4.5 - CIP Fire Flow at 20 psi

LAKE CHELAN RECLAMATION DISTRICT

2021 WATER SYSTEM PLAN

SCALE: 1 in = 2,000 ft

DRAWING IS FULL SCALE WHEN BAR MEASURES 1"

PLOT DATE: 3/22/2021

JOB: LCR 218.150

FILE NAME: LC20-F-FFCIP.DWG



Fireflow at 20 psi residual pressure and 20 psi to all customers with selected capital projects complete.

- 0–749 gpm
- 750–999 gpm
- 1,000–1,499 gpm
- 1,500–2,499 gpm
- > 2,500 gpm

- “At 20 psi residual” is the fire flow available within the main when drawing the local pressure down to 20 psi. This draw often results in pressure lower than 20 psi elsewhere in the zone. This is the value that would be expected from a physical field test extrapolation.
- “At 20 psi zone” is the fire flow available within the main while keeping pressure at or above 20 psi at the fire draw and to all customers within the pressure zone.
- “At 10 fps” is the fire flow available within the main while keeping pressure at or above 20 psi at the fire draw and at all customers within the pressure zone and limiting maximum pipeline velocity to 10 fps.

No specific capital projects have been identified to serve these facilities because they already exist and were approved with the water system configuration at the time of construction. Table 4.9 shows both the modeled existing system performance and the performance if capital projects HV1a, FF5a, and FF9b are constructed. The highlighted cells in Table 4.9 represent conditions where the system cannot meet the required fire flow (disregarding the velocity constraint). Only two sites, Banjo Creek Farm and the Chelan Ridge Winery, cannot meet the required fire flow at 20 psi residual pressure. This could affect insurance ratings.

Table 4.9 – High Fire Flow Sites

Facility	Address	Goal	Currently Available			Available After CIP		
		at 20 psi	at 20 psi residual	at 20 psi zone	at 10 fps	at 20 psi residual	at 20 psi zone	at 10 fps
Trout	33 or 50 Wapato Way	6,750	2,600	1,300	1,300	9,000	3,300	3,300
Manson Growers	1680 Manson Blvd	5,750	>10,000	5,750	5,750	>10,000	5,750	5,750
Chelan Fruit Storage	135 Wapato Way	5,000	2,600	1,300	1,300	8,800	3,300	3,300
Manson High School	1000 Totem Pole Rd	4,000	6,700	3,600	3,500	6,700	3,600	3,500
Banjo Creek Farm	4848 Manson Blvd	4,000	2,400	1,050	1,050	2,400	1,050	1,050
North Shore Bible Church	123 Wapato Pt Pkwy	3,500	2,300	1,350	1,350	3,700	3,000	1,600
Baker Shed	1281 Totem Pole Rd	3,500	6,700	3,600	3,500	6,700	3,600	3,500
Lumber Yard	585 Wapato Way	3,250	5,800	1,750	1,650	6,300	2,050	2,050
Reed Marine Shop	70 Totem Pole Rd	3,000	6,200	2,100	1,400	7,500	2,650	2,650
Manson Elementary School	950 Totem Pole Rd	3,000	6,400	3,500	3,200	6,400	3,500	3,200
Chelan Ridge Winery	900 Swartout Rd	3,000	1,150	1,100	1,100	1,200	1,200	1,200
Lake Chelan Fruit Growers	Back of 135 Wapato Way	2,500	2,600	1,250	1,250	8,800	3,300	3,300
Grange	157 Wapato Way	2,500	6,250	2,050	1,450	7,500	2,500	2,500
Wapato Point Shop	300 Quetilquasoon Rd	2,250	4,700	1,750	1,500	5,000	2,000	1,500
Fire Station - LCRD Office	250 W Manson Blvd	2,000	2,600	1,200	1,200	5,100	3,350	1,250

4.5.4.6 Reliability

R1. Install premise isolation where needed to meet the goals and objectives of the cross-connection control program included in Appendix H. The District’s goal is to have backflow prevention devices on all water services. As of 2021, approximately 750 services have backflow devices. Future devices will be installed prioritized by risk.

R2. Install and transition into an automatic meter reading system. The District has begun phasing in Badger Meter’s Beacon cell-based system.

R3. Replace steel pipelines that are nearing their service life. About 4,000 feet of steel pipelines remain in the system.

- The 16-inch steel main in SR 150 (installed in 1985) was found in 2020 to be leaking near Wapato Lake Road. About 140 feet of pipe was replaced by the District crew, but the

remaining 1,300 feet to the east may be in similar poor condition. This should be replaced with 16-inch PVC or DI.

- b. Another 900 feet of 14-inch and 16-inch steel main from the same era, or older, is installed along SR150 from Hope Lane to Madeline Road. The condition is unknown; therefore, the District does not plan to replace this section until a problem occurs.
- c. Customers near and east of Bennett Road are fed by a 6-inch AC main along Swartout Road and a 6-inch AC main along a serpentine easement through multiple private properties between SR 150 and Lake Chelan. Constructing 1,400 feet of water main along SR 150 from the end of the 16-inch main to Bennett Road would increase reliability and capacity. This also will support future development east of Bennett Road. The project is not currently scheduled, and may be driven either by future development proposals or adjacent highway improvements.

R4. Replace and upsize 4-inch and 6-inch AC distribution lines. No projects have been selected solely based on size or material. Projects have been identified only where there are other benefits such as redundancy, or concurrent with road improvement projects as noted below.

- a. Chelan County has reconstruction scheduled for Totem Pole Road from Hill Street to Harris Avenue in 2023, but the County has not yet secured funds. The water main in Totem Pole Road is 10-inch PVC, so no replacement is anticipated. Depending on the extent of the road work, there may need to be adjustments or relocation of water services or hydrants.
- b. Chelan County has reconstruction scheduled for Wapato Lake Road in 2026 from Lloyd Road to E Wapato Lake Road (9,000 feet), but the County has not yet secured funds or fully defined the project scope. The water main in Wapato Lake Road is primarily 6-inch AC, which generally has a long service life. Unless the road project results in significant risk to the existing water main, replacement is not anticipated.

R5. There is no alert system or automated protection for zones served by PRVs. Should a PRV stick open, the zone could be over-pressurized. Modeling of a large PRV stuck open into the downtown zone shows the need to discharge 1,000 to 2,000 gpm.

- a. Add pressure relief valves to closed zones. Sites must be selected where the discharge water will not cause significant property damage and can be easily seen. Ideally, a relief valve could be in each PRV station, though this is usually impractical due to a lack of suitable discharge locations. For the downtown area, a single site will not protect the entire zone since there are six PRV stations feeding the area. Two sites would provide better coverage. One site either near Lift Station 1 or across Wapato Way along Pedoi Street would cover the west section, and one near Lift Station 1A for the east section. Four-inch pressure relief valves are recommended.
- b. Add one or more pressure transmitters in the downtown area connected to the District's supervisory control and data acquisition (SCADA) system to alert for high pressure events. Locating at sewer Lift Stations 1 and 1A would provide easy access to the existing SCADA. Alternately, install pressure sensing flow meters that can report by cell service.

R6. Connect the Kutil, Barkley, and Chelan Pressure Zones, which are each currently served by separate PRVs at roughly the same hydraulic grade link (HGL). Refer to projects FF4b and FF4c for additional information.

R7. No calibration has been performed on the hydraulic model since it was first created. For runs representing normal conditions up to PHD, the model is expected to be reasonably accurate. For high velocity conditions such as fire flow, the accuracy is not known. Model calibration can be a time consuming process and difficult to estimate, especially if the available mapping is not accurate (e.g., if a pipeline diameter has not been recorded accurately on system maps or actual pipe interconnections are not as they appear on maps).

- a. While calibration is always recommended, the character of new construction has, to date, not warranted the effort necessary. Field fire flow testing should be performed if hydraulic modeling for a new development shows results close, or below, what is required for service. At such time, the model can be compared to field testing and a determination made if calibration is needed.

4.5.5 Interties

The District is physically adjacent to only one other Group A system. The City of Chelan distribution system is approximately 1.5 miles away from the end of the District system through some very difficult geology. Rocky Point is not conducive to the installation of a domestic water intertie with the City and is at such a point in both systems where major pipeline improvements would be required to provide significant emergency flows back to major centers of use or storage. The closest City of Chelan pipes are at a hydraulic grade of 1,300 feet, where the District pipes are at a hydraulic grade of 1,380 feet. So, while the hydraulic grades are moderately compatible, it would not be practical to supply water from the District to the City since it would feed only a small pressure reduced zone containing a few dozen homes. Another 3 miles of pipe would be needed to get water into the closest usable area of the City's system, which is the Darnell's Pump Station. The City could supply somewhat more effectively into the District in an emergency, but only customers in the lower elevations of the 1355 Zone could be supplied. An evaluation of how much water the City could supply in this configuration has not been performed, as the project is not currently deemed necessary or affordable.

5 WATER USE EFFICIENCY

5.1 Program Development and Implementation

5.1.1 Introduction

The District is required to develop and implement a water use efficiency plan as described in WAC 246-290-800. To promote water use efficiency, a document titled *Water Use Efficiency Guidebook* was prepared by DOH. This document addresses water use data collection requirements for public water systems. It identifies the minimum data required to project water demand and to provide a basis for evaluating the effectiveness of conservation programs. At least 5 years of continuous water use data is required. Water use information is presented in Chapter 3.

5.1.2 Water Use Efficiency Rule

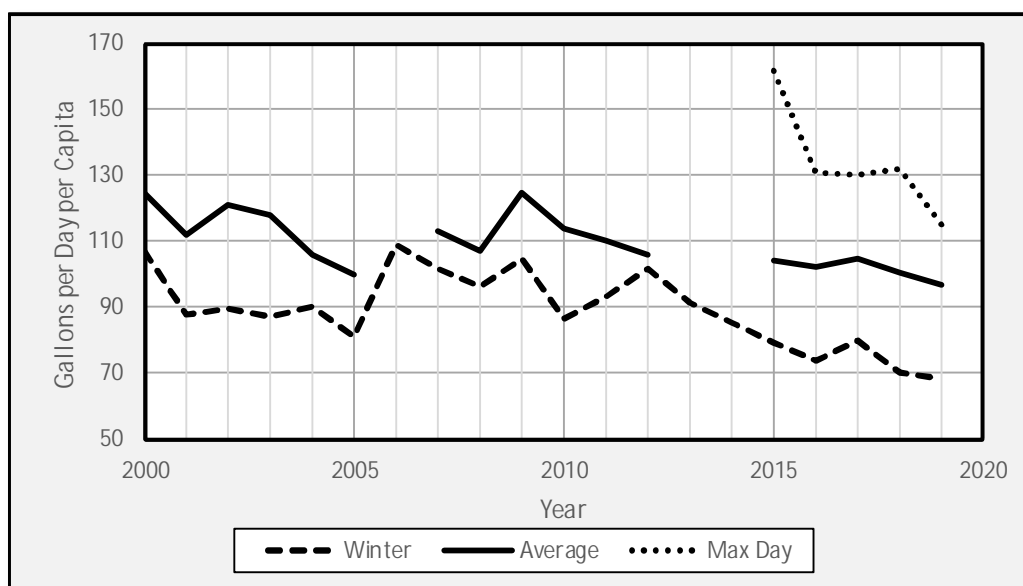
The Municipal Water Supply Efficiency Requirements Act, also known as the Municipal Water Law, became effective in 2007, and was upheld by the Washington State Supreme Court in 2010. The intent of the program is to help reduce the demand that growing communities, agriculture, and industry have placed on the state's water resources and to better manage these resources.

5.1.3 Past WUE Performance

The 2014 WUE program did not include specific numerical goals due to errors in historical data and the impracticality of correcting such data. Instead, the adopted goals were to improve recordkeeping to better estimate future water use.

As shown earlier in Table 3.12, average per capita water use has varied between 97 and 125 gallons per capita per day since the year 2000 and has trended downward at an average rate of approximately 1-percent per year (Chart 5.1). Irrigation use has remained relatively consistent since 2015 (Table 3.6), even as the population has increased, which is the District's objective.

Chart 5.1 – Historical Per Capita Consumption (Irrigation Excluded)



DSL was described in Section 3.3 and appears to be trending generally downward, with a current 3-year average under 3.0 percent. DSL values prior to 2014 are somewhat suspect due to the data errors previously discussed. The recent low DSL values appear reasonable due to the District's use of water main materials that have historically good performance (PVC, AC, and DI). Steel and cast iron mains have the highest rates of leakage among common materials, but the District's system has only 1.5-percent steel mains, and no cast iron mains.

5.1.4 Current WUE Program

The following lists the current water use efficiency efforts of the District.

5.1.4.1 Metering

All District water sources and customers are metered.

5.1.4.2 Leakage Reduction

Unaccounted-for water in the system is the sum of both potential leaks and unauthorized (stolen) water. Other unmetered water is accounted for through logs of use during flushing, hydrant testing, and firefighting, together with cooperation from Fire District No. 5 and Chelan County Public Works who report their use.

The District periodically uses an acoustic leak detector and has a program of leak detection that has been used since the spring of 1999. Few significant leaks have been detected to date, but the District has many miles of distribution system and several miles of pipeline over 40 years of age that are expected to have increasing leak rates in the future. The District previously had a program of replacing up to 5,000 feet of distribution system pipelines each year. This program was aimed partially at problematic lines that had a history of leaks and was very successful in reducing emergency pipe repairs over time. Due to this success, the District has been able to reduce the annual pipe replacement to just occasional small problem areas. As lines are replaced in the older parts of the system, existing customer service lines are evaluated and replaced if needed.

5.1.4.3 Conservation Oriented Rates

The District adopted a uniform block rate structure in 2000. Excess rates are presently equal on a per 100 cubic feet use basis. Water use appears to have been curtailed as a result of this pricing strategy. The District feels that a water conservation rate structure is a fair and cost-effective conservation strategy. When excess rates reach a level that is economically felt by the customer, voluntary changes take place in their water use habits.

The District tested using an increasing block rate structure prior to 1999. Customers with families expressed that they were being unfairly penalized as it was impossible to stay within the base allocation and incurring the inclining rates was punitive yet unavoidable. The District evaluated other rate methods, including research that indicated uniform block rates and inclining block rates have had nearly equal conservation results in other systems. The option of increasing the base allotment also was reviewed but dismissed as it did not promote conservation. The rate structure was converted to a uniform rate in 2000 to alleviate the concern of unfair cost distribution, yet still charging for actual consumption. The District feels the current uniform block rate structure has been a significant factor in the per capita reduction in water use.

5.1.4.4 Education

Promotion of water conservation measures occurs on the District website at www.lcrd.org and through brochures at the counter. Begun in 2012, the website includes tips on water saving opportunities either inside or outside the home, depending upon the time of year. The District promotes homeowner awareness about leaks in plumbing and plumbing fixtures and the impact on their water bills.

5.1.4.5 Indoor Residential Conservation Measures

Single-family and multi-family kit distribution programs previously have been considered but have not been implemented by the District as the purchase of any product for free distribution is prohibited by Irrigation District law. The concept of distributing low flow shower heads, aerators, and flow restrictors may be a good idea but cannot be accomplished due to the legal impediments. The same legal impediment is true for utility financed plumbing fixture replacements. The emphasis has moved towards customer assistance, which is practiced regularly in the District. Most assistance involves troubleshooting unexpected or unusually high excess water use inside the residence. Brochures have been developed to help troubleshoot indoor leaks and are sent out to homeowners when leaks are suspected.

5.1.4.6 Outdoor Residential Conservation Measures

Customer assistance is practiced regularly in the District. Most assistance revolves around troubleshooting unexpected or unusually high excess water use. The District has a full-time irrigation specialist that works with users on lawn and orchard irrigation practices when requested. Users who are interested in landscape management and xeriscape programs are directed to Chelan County Public Utility District's website

<https://www.chelanpud.org/conservationhome/water-conservation>,

which provides information on plants and landscaping native to Chelan County. This information is particularly valuable to residential homes that are built on lands without an

irrigation water right. The District provides water users who have an irrigation allotment on the domestic system with a tabulation on their bill showing how much water they have used outdoors. The report compares their use to a typical beneficial allotment for their size of parcel. Use over the beneficial allotment can result in large excess bills that provide an economic incentive to use water efficiently.

As a District with a small staff, programs such as school outreach, speaker's bureaus, and adult education on outdoor residential conservation are performed periodically when requested but are not performed on a regular basis.

5.1.4.7 Industrial, Commercial, and Institutional Conservation Measures

The District has worked to get the local parks and golf courses that previously used potable water for irrigation purposes off of the domestic water system. All four local parks and the local golf course either pump irrigation water directly out of Lake Chelan with their own pumps or have water rights for irrigation purposes through the non-potable separate irrigation system. Recycling water within the industrial uses like car washes, apple packing sheds, and commercial refrigeration units has been practiced for the past several years. The District's conservation rate structure made it uneconomical for these industries and business to use water for processing and cooling inefficiently. The conservation rate structure provided them with the incentive to install more efficient water use equipment that utilizes recycled water or to convert to electrical equipment for their cooling needs.

5.1.4.8 Reclamation

Reuse of treated municipal effluent is not practiced in the District because the District does not have a wastewater treatment plant. All sanitary sewage is pumped to the regional wastewater plant in Chelan, with the secondary effluent being discharged into the Columbia River. The secondary plant is approximately 15 miles from the District's domestic service area and approximately 400 feet lower in elevation.

5.1.5 Goals and Public Process

Recordkeeping for the years 2007 through 2012 had some data errors, making it necessary to estimate some of the quantities and impossible to accurately recreate all old records. These issues have since been resolved.

WUE goals must be set through a public process and be evaluated and reestablished a minimum of every 6 years. The District's current goals are listed as follows. The minutes of the July 14, 2020 meeting adopting the goals is attached in Appendix F. Due to COVID-19, an open public meeting was not held, but the draft WUE program was made available for public review and comment.

Per WAC 246-290-830(3), consumption reductions are not mandatory if justifiable by the District. While modest reductions in water use are still possible, the District prefers to monitor the effectiveness of the current measures over the next few years rather than implement new ones. The District considers the following reasons to support its current plan to not aggressively pursue new water reduction measures:

1. Current non-irrigation season consumption per capita is approximately 74 gpd. This compares well against some other local systems, including the City of Cashmere (92 gpd), City of Wenatchee (73 gpd), and Chelan County Public Utility District No. 1 (99 gpd).
2. The current rate structure provides a cost comparable to most nearby municipal systems for indoor use but is two to five times higher than those systems for excess use.
3. The historical per capita water use downward trend may continue in the future without enacting new measures. Available data does not suggest that the trend is leveling out (Chart 5.1).

Accordingly, the District's goals are:

1. Reduce per capita water use by 1 percent over the next 6 years; and
2. Maintain or reduce domestic water used for irrigation.

5.1.6 Mandatory Measures

The following conservation measures are mandatory, and do not count towards the District's quota of other conservation measures.

5.1.6.1 Source of Supply Meter Readings

Requirement: All sources must be metered.

Compliance Status: Water supply to the District is provided by two surface water sources, which are each metered. The water treatment plant has meters on both the raw water intake and the treated water discharge lines that are read and recorded daily and data-logged through the SCADA system approximately every 5 minutes.

5.1.6.2 Customer Service Meters

Requirement: All customer services must be metered.

Compliance Status: All customers are metered. Most customer meters are read every other month. However, some meters remain snow-covered and inaccessible through the winter months, in which case they are not read until the following spring. The District has grouped customers into several classes that meet the requirements stated above.

5.1.6.3 Meter Calibration

Requirement: Verify meter accuracy following generally accepted industry standards.

The source and treatment plant flow meters were last replaced as follows.

- 2005: Manson and Lakeshore Intakes
- 2016: WTP Finished Water
- 2017: WTP Backwash
- 2019: WTP Raw Water

Compliance Status: The source and WTP meters were inspected and tested in 2018. A 5- to 10-year testing schedule for source meters is recommended.

Customer meters are replaced when water use records become suspect. A 15- to 20-year replacement program for customer meters is generally followed. The District reviews water use on 2-inch and larger customer meters and will replace meters when water use appears inaccurate.

5.1.6.4 Leak Detection

Requirement: Conduct a leak detection survey and water audit until DSL is reduced to below 10 percent.

Compliance Status: Refer to the history of leak detection efforts under "Leakage Reduction" in Section 5.1.4. The last survey was performed in 2010.

5.1.6.5 Customer Education

Requirement: Provide yearly customer education forums.

Compliance Status: Current customer education is described under the "Education," "Indoor Residential Conservation Measures," and "Outdoor Residential Conservation Measures" paragraphs of Section 5.1.4. Formal forums have not been held.

5.1.6.6 Determine DSL Rate

Requirement: Record annual totals.

Compliance Status: Source and customer meters are totaled yearly, and authorized unmetered uses (firefighting, hydrant flushing, etc.) are estimated.

5.1.7 Measures to be Evaluated or Implemented

Because the District has more than 1,000 connections, at least 5 additional measures must be evaluated for applicability and cost-effectiveness. If a measure will not be implemented, it is evaluated on three bases: the cost-effectiveness to the District; the cost-effectiveness if costs are shared with other entities; and the cost-effectiveness on a societal view. Measures that will be, or are currently, implemented do not include any further cost evaluation. The following measures are presented and evaluated.

5.1.7.1 Conservation Rates

The District's current rate schedule and past evaluation of other rate schedules is described in prior sections. A return to an inclining rate structure would require approval of the Board and a modification of the billing system.

Status: A uniform block rate structure was implemented in 2000. Consideration of rate increases is made yearly. Block rates apply to the customer classes of Residential, Multi-Family, Domestic/Irrigation, Industrial, and Commercial.

5.1.7.2 Specific Customer Education

The District's current educational outreach is described under the "Education," "Indoor Residential Conservation Measures," and "Outdoor Residential Conservation Measures" paragraphs of Section 5.1.4.

Status: Implemented. Outreach is ongoing.

5.1.7.3 Landscape Management

The District's current approach to landscape management is described under "Outdoor Residential Conservation Measures" in Section 5.1.4.

Status: Implemented. Work is ongoing.

5.1.7.4 Review Bills for Abnormal Use

The District reviews billing trends and identifies individual customers whose usage increases dramatically. This can indicate a leak in a customer's private service. This measure applies to all customer classes the District tracks, which are Residential, Multi-Family, Domestic/Irrigation, Irrigation, Industrial, and Commercial.

Status: Implemented.

Add historical water use to customer bills. This would provide each customer the ability to track water use and determine the effectiveness of personal conservation efforts.

Status: The District's billing system does not allow for historical data to be shown on monthly billing. However, the District can provide this information to an individual customer upon request.

Cost to District: The cost of a new billing system would be substantial. Should a new billing system be warranted in the future due to technological or other changes, implementation of this feature will be evaluated.

Shared Cost: The District already provides a billing system that combines water, sewer, and waste disposal. The only other relevant local utility agency is the Chelan County Public Utility District (PUD), which provides electrical service to District customers. Combining these billing systems would be a substantial initial cost, estimated to be as high if not higher than implementing a new District billing system. Once implemented, the maintenance costs may or may not be lower due to reduction in meter reading and accounting personnel. It has not been determined if the PUD would consider shared billing. The District does not believe the PUD does this for any of the other water and/or sewer districts in the region.

Societal Cost: A billing system shared with the PUD could result in fewer miles travelled for meter reads, but given the small size of the District, the cost would be insignificant. Water savings from voluntary customer reductions could be used to supply new housing without the need for additional water rights.

5.1.7.5 Install an Automated Meter Reading System

An Automated Meter Reading (AMR) system will allow the District to read meters consistently and eliminate the times where snow prevents regular reads in the winter, thereby providing earlier opportunities to identify customer leaks. Read periods also could be shortened for larger customers to better profile their water use and for customers with suspect leakage.

Status: The District has begun installation of meters that communicate back to the office by cell service. The system being used also provides a web-based portal for customers to access their meter information at any time.

Cost to District: Estimated cost of \$400,000 over about 10 years. The District will apply for a grant to help with funding.

Shared Cost: Refer to the summary for the measure “Review Bills for Abnormal Use” in Section 5.1.7.

Societal Cost: Driving mileage for meter reads may be modestly reduced depending on the meter transmission distance but should not be assumed. Less time spent reading meters may free up staff to address other customer needs.

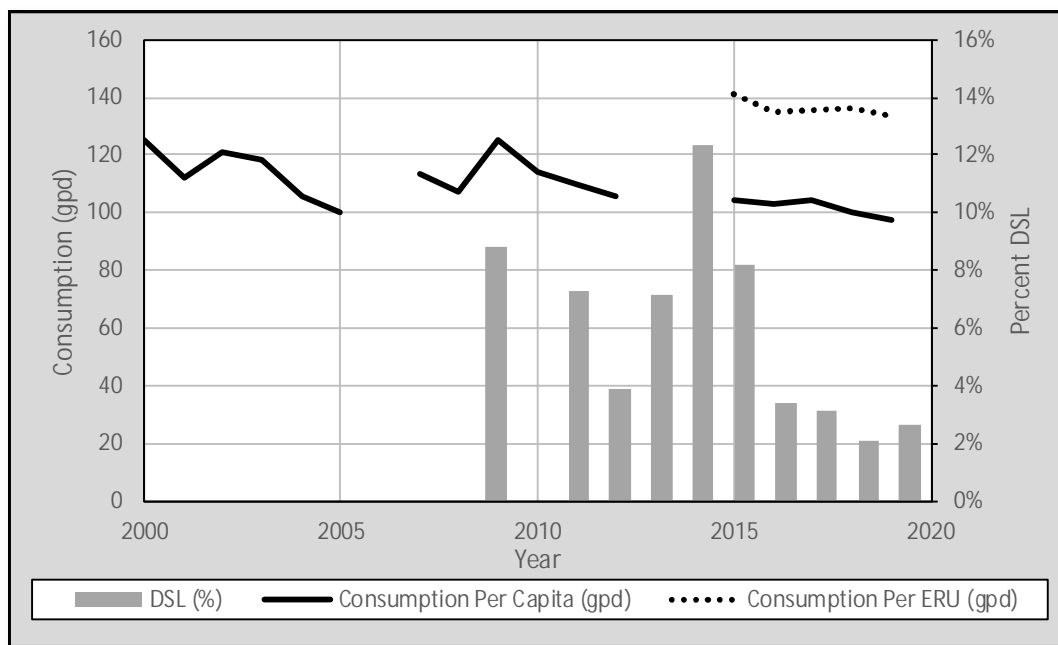
5.1.8 Water Loss Control Action Plan

The District’s current DSL is less than 3 percent for the last 3-year average. Per WAC 246-290-820(1)(b)(i), the District is in compliance, and a water loss control action plan is not required.

5.1.9 Monitoring of Conservation Measure Effectiveness

Water usage by the District as a whole and by customer class will continue to be tracked over time, as is shown in Chart 5.2. The per capita and per ERU values cannot be directly correlated to each other because per capita includes all non-irrigation consumption (residential, commercial, industrial, etc.) while per ERU is only residential. The overall per capita, per ERU, and DSL trends are downward.

Chart 5.2 – Water Use Efficiency History



5.1.10 Assessment and Selection of Alternatives

Elements of the District's conservation plan and strategies are already implemented. Service connections are 100 percent metered and efforts continue to evaluate and replace defective meters on an ongoing basis. Leak reductions are addressed through better accounting of unmetered usage, together with a program of line replacements in the distribution system. The backbone to the conservation plan is the use of a conservation rate structure to make it financially important for the customer to address inefficient or wasteful use. Education and customer assistance programs by the District will continue to be offered to the users to maintain a high level of cooperation with the customers. The District continues to monitor for abnormal use indicating leaks and contacts customers accordingly.

The District will continue to implement line replacements within the distribution system with a goal of replacing older, less reliable distribution pipelines. Interties and the use of reclaimed water are not viable alternatives due to the isolation of the domestic service area from adjoining Group A systems and the wastewater disposal strategy in the Chelan Valley. Irrigation District law prohibits other conservation strategies involving the funding of water conservation plumbing fixtures by the District.

6 SOURCE WATER

6.1 Water Right Evaluation

The District has adequate water right certificates and permits to meet current and future water demands on the system through the 20-year forecast period. Additional permits were issued in 1995 that stipulate that the combined certificates and permits shall not exceed 13.93 cubic feet per second and 2,672 acre-feet per year for continuous municipal use to a projected 9,000 residents.

The place of use in the water right certificates and permits is identified as:

- Sections 13 through 16, 21 through 28, and 34 through 36 of T28N, R21E;
- Section 1 and 2 of T27N, R21E.;
- Sections 18 through 21, and 27 through 34 of T28N, R22E; and
- Sections 3 through 5 and 10 of T27N, R22E.

The Existing Water Right Status and Forecasted Water Right Status are shown in the Self-Assessment table in Appendix G.

6.1.1.1 Source Type

The two domestic intakes on Lake Chelan pump surface waters to the Raw Water Reservoir that supplies the Water Treatment Plant.

6.1.1.2 Source Location

The locations of the Manson Intake and the Lakeshore Intake are shown in Figure 2.1 of this WSP in the Inventory of Existing Facilities.

6.1.1.3 Purpose of Use

The District supplies primarily municipal uses within the service area. Industries in the District are fruit packing and storage facilities, wineries, a casino, and typical commercial businesses.

6.1.1.4 Place of Use

Figure 2.6 shows the place of use described in the water right certificates and permits as compared to the existing and future service areas identified in the WSP.

6.1.1.5 Time of Use

There are no “time of use” restrictions in either the certificates or permits for the District.

6.1.1.6 Other Limiting Conditions

The District water right permits may not impair existing water rights. There may be a number of state-issued water rights and claims within the District service area who are receiving their water from the District. The total acre-feet authorized under the state rights, valid claims, and District rights shall not exceed the 2,672 acre-feet requested by the District for the same purposes.

6.1.1.7 Proof of Appropriation

Permits S4-30333P and S4-30334P both had original development schedules for water to be put to full use by January 1, 2020. On February 18, 2020, Ecology granted an extension to January 1, 2025 for a Proof of Appropriation of Water (Appendix G).

6.2 Water Supply Reliability

An adequate supply of safe and reliable water must be provided at all times. When water shortages or interruptions in service occur, public health can be threatened because customers may use other non-potable sources of water inappropriately, or system pressure may be reduced such that basic public health needs are not met or other backflow-related problems occur.

6.2.1 Source Reliability

Lake Chelan is an enormous source of water. The Chelan hydroelectric facility has the capacity to draw down the lake as much as 21 feet for power production purposes. The volume of water diverted from the lake for domestic purposes by the District is nearly immeasurable on the surface area of the lake. The ability of the District to divert water at all normal lake operational water levels makes the probability of a water supply shortage nearly impossible.

The two domestic intakes do require power to operate. The electrical supply in the Lake Chelan area is very reliable. There has been only one outage longer than 8 hours to a domestic intake in the past 20 years. This occurred during wildland fires in 2015 and lasted for about a full day.

Each intake is fed from a separate electrical substation, thereby reducing the likelihood that both intakes would be off for any substantial length of time. If power was off to both locations, each intake has new motor control centers equipped with receptacles for portable emergency generators. With the construction of the Water Treatment Plant, both intakes pump to the same location, making their use interchangeable. The Water Treatment Plant has its own standby generator that will run the plant for up to 8 hours on the diesel fuel present in the fuel tank and indefinitely if fuel supplies can be replenished. The District could face reduced capacity to supply raw water and to treat that water if met with a prolonged power outage. The worst-case scenario would be if the Manson Intake was offline for a prolonged period of time. The Lakeshore Intake has a capacity of 3.0 MGD, which would be the limiting factor in water supply. In 2020, the District received a grant to purchase a portable generator that can be moved to various pump stations. The generator is expected to be procured in 2021.

6.2.2 Water Right Adequacy

As shown on Tables 5-2 and 5-3, water rights are adequate for at least the next 20-year planning period. System reliability will not be compromised by a lack of water rights in the foreseeable future.

6.2.3 Facility Reliability

Few, if any, of the components are an immediate threat to cause a water shortage or a prolonged interruption in service. A detailed reliability and vulnerability analysis was done in the District's vulnerability assessment and emergency response planning documents that are used by operational supervisors. Line breaks can occur more frequently as pipes approach the end of their useful life. The interruption in service from these breaks is usually four hours or less and typically impacts only small portions of the service area. The District prioritizes line replacements based upon the frequency of line breaks and the inspected condition of the pipe. This practice helps reduce interruptions in service and improves system reliability.

6.2.4 Water Shortage Response Planning

Most water shortages in the District can be classified as minor water shortages that require only public information and voluntary conservation measures to address the issue in relatively small portions of the service area. Major water shortages would only occur in the time of a major environmental catastrophe, war, terrorist attack, fire, or earthquake. In this case, District personnel would rely on the overall emergency response plan to address those concerns.

6.3 Watershed Control Program

A watershed control program is an integral part of a water system's overall strategy to ensure public health protection.

6.3.1 Watershed Description/Characteristics

The Lake Chelan Basin, Water Resource Inventory Area (WRIA) 47, is situated between the Sawtooth and Chelan Mountains. The basin is dominated by Lake Chelan, which is the largest and deepest natural lake in the State of Washington. Lake Chelan is approximately 55 miles long, with an average width of 1.5 miles, and a maximum depth of 1,500 feet. The outfall of the lake is controlled through a hydroelectric dam and penstocks, with final discharge into the Columbia River. The upper portion of the basin is within the North Cascade National Park and the Lake Chelan National Recreation Area. Most of the development is in the Lower Chelan Basin, where most of the land is privately owned.

The climate of the area is characterized by hot, dry summers and mild to severe winters. Precipitation and temperature vary widely depending upon elevation and proximity to the Cascade Crest. Locally, Lake Chelan is a moderating influence on temperatures in both the summer and winter seasons.

Most of the geology within the basin is a result of complex interactions between glaciers. The area is characterized by underlying rock formations covered by a layer of soils in the valleys and frequent rock outcroppings in the mountains. Glacial features such as U-shaped valleys are common in the mountain areas, while alluvial deposits and glacial drift are often found along the valley floors.

6.3.2 Identification of Activities and Land Uses Detrimental to Water Quality

The Lake Chelan Basin has a total watershed area of 920 square miles. Less than 4 percent of the watershed is developed. Land use in the watershed is primarily divided into public forest lands (84 percent), private forest lands (7 percent), orchard agriculture (2 percent), non-orchard agriculture (1 percent), and residential and roadways (0.5 percent), with the remainder of the watershed consisting of lake surface and other water bodies.

The water quality of Lake Chelan is affected by a variety of factors, including recreational activities, septic tank systems, irrigation return flows, stormwater runoff, and leachate from old mine tailings. At the present time, Lake Chelan has been classified as having low biological productivity and high water clarity. Limited supplies of nutrients to the lake control algal growth and result in near pristine conditions. Bacteria levels near the surface and near the lake outlet exceed drinking water standards but are within the established limits for recreational activities.

6.3.3 Watershed Management and Control Measures

The Lake Chelan Research Institute was developed to be the primary group to research lake water quality issues, provide education, and advise public officials. The District is an active member of this organization.

Historically, the Lake Chelan Water Quality Advisory Committee has been a strong presence in the valley with the task of protecting the quality of Lake Chelan. The committee completed a Water Quality Plan in March of 1992 that includes many recommendations on pro-active and preventive measures to be taken to prevent the degradation of lake water quality. The areas of greatest concern to the committee and to the community revolved around wastewater collection and treatment, on-site sewage disposal, stormwater management, construction practices, boats and boat sewage disposal, and irrigation return flows. The recent emphasis of the Advisory Committee has been participating in the development of a total maximum daily load (TMDL) for the pollutants DDT and PCB. Both pollutants have been found in Lake Chelan fish at levels that exceed the human health criteria in the Clean Water Act. Neither component appears to be a significant problem relative to drinking water standards. The Advisory Committee also reviews the impacts of growth on water quality. The Advisory Committee provides comments on planning issues under Chelan County regulations, consistent with the Growth Management Act. The *Lake Chelan Water Quality Plan* was incorporated by reference to the *Chelan County Comprehensive Land Use Plan*. Additional input into the critical lands element helped prepare stream buffer regulations and setback agreements along Lake Chelan.

The Advisory Committee becomes the sounding board for community complaints about runoff and erosion problems into Lake Chelan. Citizens who do not know how to lodge a complaint about neighborhood violations of water quality standards often contact the Advisory Committee to find out who has regulatory authority to curb improper activities. The U.S. Forest Service is a member of the Advisory Committee and provides opportunities for comment by fellow committee members relative to their forest management practices.

The Advisory Committee does an outstanding job of using the newspaper, radio, and occasional mailings to keep residents and visitors apprised of water conservation and environmental practices that will help "Keep it Blue." The Advisory Committee also does periodic monitoring of

the water quality trends in the lake. High precision monitoring of water quality parameters including total phosphorus, total nitrogen, nitrate/nitrites, fecal coliform, chlorophyll a, temperature, dissolved oxygen, pH, conductivity, and secchi disk measurements are needed to measure the lake's trophic status and determine the relationships to the preventative TMDL for phosphorus.

Goals, objectives, and project priorities are re-evaluated every 5 to 7 years by the Advisory Committee to keep fresh the primary objectives of the committee. These efforts have led to many successful projects in the basin that have begun to reduce non-point source pollution in Lake Chelan. The objectives of the committee go beyond public health and attempt to protect the health of the lake itself. The committee is advisory only. It relies upon the willingness of the cities, County, and regulatory community to work with and enforce the regulations that will achieve these goals.

6.4 Source Water Quality

Ecology's 2008 *Lake Chelan [dichloro-diphenyl-trichloroethane] DDT and [polychlorinated biphenyl] PCB [total maximum daily load] TMDL Water Quality Implementation Plan* evaluated the water quality in Lake Chelan and Roses Lake. These chemicals become concentrated in fish and are consumed by humans. It concluded that DDT will continue to be deposited by soil erosion and groundwater from orchards that used the chemical in the past. PCB additions are primarily from rain. Water quality is expected to improve slowly as old chemical sources are used up, with an estimate of meeting quality standards by the year 2055. Wapato Lake and Joe Creek meet current standards. The report recommended continued monitoring and clean up if any direct sources are located.

Ecology's 2011 *Lake Chelan Wapato Basin Water Quality Report* focused on phosphorus concentrations in the lake. The conclusion was that total phosphorus has been decreasing slightly since 1987, with measurements in 2007 of 2.6 micrograms per Liter ($\mu\text{g/L}$), which is below the TMDL criteria of 4.5 $\mu\text{g/L}$. This was confirmed by the low presence of chlorophyll-a and excellent water transparency. Agriculture was estimated to be a source of 4 to 12 percent of phosphorus.

Total nitrogen concentrations were measured at 80 $\mu\text{g/L}$, although there have been no discernable trends since 1987.

Chlorophyll-a was measured at 0.7 $\mu\text{g/L}$, although there have been no discernable trends since 1987. The reporting limit is 0.5 $\mu\text{g/L}$, but this does not indicate a water quality problem. Chlorophyll-a is used as a marker for evaluating phosphorus impacts.

Water transparency improved slightly from 1987 to 2007, with the latter value of 14 meters compared to 11 meters in 1987, although the upward trend lacks statistical confidence.

Dissolved oxygen has shown no trend changes since 1987, with current values near the water surface of 9 to 12 milligrams per Liter (mg/L). This is common for lakes that are low in plant nutrients.

pH levels have shown no trend changes since 1987, with values ranging from 7.3 to 8.2.

The 2011 Water Quality report recommended continued monitoring and development of consistent pollution control efforts.

Ecology's *Lake Chelan Water Quality Plan* produced in May 1991 drew conclusions and made recommendations regarding agricultural return flows from the District. These include the need for further drain monitoring, farm plans, and grower education.

Agricultural inputs presently are estimated to contribute 8 ± 4 percent of the total phosphorus loading on the lake, 14 ± 8 percent of the total nitrogen loading, and approximately 1 percent of the total arsenic loading. These nutrients comprise about 50 percent of the man-induced contributions and are, to an extent, controllable. Although the 1991 Ecology report suggests that the potential exists for much greater agricultural loadings to occur in the future, this has not been verified based upon the available arable lands and irrigation water supply.

The volume of irrigation return flows is very small (less than 1 percent) relative to the other hydrologic inputs to the lake, *Lake Chelan Water Quality Assessment* (Ecology, 1989). Furthermore, the market for recreational housing in the area suggests that the total acreage in orchard production is likely to decrease in the future. This decrease will result from the conversion of orchard lands to recreational and permanent housing given the projected population increase for the lake basin.

The areal export rates for phosphorus from agricultural areas within the basin are comparable or less than export rates from urban runoff (Ecology, 1989). While the areal export rates of nitrogen from those agricultural areas adjacent to Lake Chelan are higher than for any other land use type, the total lake input on an annual basis is 14 ± 6 percent. Because phosphorus appears to be the more limited nutrient in the Lake Chelan ecosystem, it is unclear whether a reduction in nitrogen inputs, such as could be achieved from reduced fertilizer application, would result in any significant difference in the lake water quality.

7 OPERATIONS AND MAINTENANCE

7.1 Operations and Maintenance Program

To ensure satisfactory management of the operations of the water system, it is very important to have a program for proper and efficient operations. DOH requires that an operations program be developed and implemented to ensure continuous and reliable management of water system operations. This operations program is intended for routine use by the District's operations staff. A copy of this portion of the WSP will be kept at the District Office, Water Treatment Plant, Intake Buildings, and shop for ready accessibility.

The operations program consists of several major elements listed as follows. Under each item, the current operational status is described. These descriptions are standard operational procedures and not merely suggestions.

7.1.1 Water System Management and Personnel

The Board of Directors of the District is a five-person Board of landowners within the irrigation District elected by eligible voters who also own land within the District. The Board of Director's primary function is to set District Policy, including bylaws, rules, and regulations. The Board also adopts rate structures and financing programs adequate to properly operate and maintain the system, including both the short- and long-term improvement programs. The Secretary-Manager is appointed by the Board of Directors, works at the pleasure of the Board, and is the chief executive officer. The Secretary-Manager is responsible for all operations and maintenance functions.

The Secretary-Manager reports on the needs and status of the water system to the Board of Directors and recommends changes and updates to the Water System Plan when necessary. The Secretary-Manager is responsible for the direct and detailed daily supervision of water system operations. The Secretary-Manager establishes staff requirements, prepares job descriptions, and hires the personnel necessary to meet those needs. Functions listed below are all the responsibility of the Secretary-Manager but are delegated as to function to other personnel in a collaborative approach.

7.1.2 Normal Day-to-Day Operations

Operations is coordinated with the Field Manager, who is licensed by the state in several categories. Decisions are made using the Standard Operating Procedures and customer service requirements.

7.1.3 Preventive Maintenance

Maintenance is scheduled for daily, weekly, monthly, quarterly, and yearly routines. The Field Manager assigns maintenance personnel to the various tasks of providing preventive maintenance based upon this routine.

7.1.4 Field Engineering

Engineering services are contracted to various engineering firms. These consulting engineers are used when necessary to collaborate on areas of special concern or on projects requiring specific expertise.

7.1.5 Water Quality Monitoring

Water quality monitoring is planned for on an annual basis by the Secretary-Manager and the water treatment plant operator (WTPO) consistent with the water quality monitoring report (WQMR) provided by the Department of Health. Operational staff then takes samples and tests as required and prescribed by the sampling calendar. The Secretary-Manager reviews all test results and ensures no repeat or follow-up samples are required.

7.1.6 Emergency Response

Emergency response is handled on a routine basis by the operations staff. Evening and weekend problems are responded to by on-call staff. On-call staff is provided with both two-way radios and cellular phones for immediate communications. Water treatment plant operators are provided with a remote device with which they can call in to the water treatment plant and review current operational status, make changes in operations, or respond to alarms from any location with access to a phone. Catastrophic emergencies are coordinated with Chelan County Emergency Response (911) and the Chelan County Sheriff's office. The phone number of the Secretary-Manager is on file with the emergency personnel.

7.1.7 Cross-Connection Control

Cross-connection control is the responsibility of the Secretary-Manager and Cross-Connection Control Specialist. The Secretary-Manager is responsible for the administrative and public relations aspects of cross-connection control. The Cross-Connection Control Specialist is responsible for inspection of District-owned backflow devices, inspection of new installations off-premise, and classification of the types of devices needed for various applications.

7.1.8 Implementation of the Improvement Program

Implementation of the CIP is the responsibility of the Secretary-Manager and subject to adequate funding by the Board of Directors. The Secretary-Manager prepares and maintains a current long-term improvement plan for review by the Board of Directors. Annual construction budgets are based upon the long-term plan. Funding for the construction budget is approved by the Board of Directors once per year. The scheduling may call for certain improvements to be done by outside contractors. Some improvements are done in-house by the District's construction crew.

7.1.9 Budget Formulation

The budget is prepared by the Secretary-Manager and reviewed, revised, and approved by the Board of Directors. The Board also reviews and monitors the progress of the budget on a monthly basis. Preliminary budgets are presented to the Board of Directors in September each year and reviewed and approved at the regular November meeting of the Board of Directors.

7.1.10 Response to Complaints

Complaints are responded to by the administrative staff and the operations staff as a first response. Water quality complaints are logged in a customer database to see if trends present themselves in either identifiable locations, relate to the time of year, or are particular to the individuals involved. Service-related complaints generally are resolved in the field.

Billing-related complaints may be resolved in the office or through a meter re-read or clerical issue. If the administrative staff cannot solve a problem, the Secretary-Manager is brought in to provide additional perspective. If the customer is still not satisfied, the complaint can be brought to the Board of Directors. This is usually done only if a specific deviation in the bylaws, rules, and regulations is sought, or if extenuating circumstances require some other variance in District Policy.

A complaint log is kept and office staff makes every attempt to satisfy customer complaints by sharing District policies or scheduling work orders with field staff to address the issue. Taste and odor complaints are logged and reviewed to determine if operational activity or trends related to water quality are impacting multiple services.

7.1.11 Public/Press Contact

Contact with the public is done by the Secretary-Manager unless authorized and approved for other staff persons. Correspondence, newsletters, and radio interviews are done on a regular basis to notify the public of scheduled water outages, construction delays, and emergency water outages.

7.1.12 Billing

Billing is done by the administrative staff on a bi-monthly basis. The bill is sent on the first of the month following 2 months of service. Water at the base rate is due and payable whether there is any use or not. Water service that is discontinued due to removal of, or significant damage to (such as a fire), a structure can be reduced to a 75-percent rate. Water service that is discontinued for an indefinite period can have the water billing stopped, but a new hookup fee is due upon continuance of service.

7.1.13 Operator Certification

All domestic water systems with 100 or more service connections are required by state law (WAC 246-290-400) to be operated by one or more certified operators. The District must have an employee with at least a Water Distribution Manager (WDM) Level II and an employee with at least a Water Treatment Plant Operator (WTPO) Level III based upon state standards.

The District encourages all operational employees to obtain additional certification and supports license fees and recertification credits, and pays for travel and expenses to take tests. Certifications for operations personnel are as follows: Water Distribution Manager (WDM), Water Treatment Plant Operator (WTPO), Cross-Connection Control Specialist (CCS).

Dave Walters: WTPO3, WDM3, CCS
Jarred Teague: WTPO3, WDM2, CCS
Chad Gosvener: WDM2, WTPO1, CCS
Steve Davis: WDM1, WTPO2

7.2 System Operation and Control

Refer to the chapters on system descriptions and analysis for the location and description of each major component. These descriptions include the normal operation of each component as it works in its own independent operations. The description of interest in this chapter is how each component relates to the other components under normal operations, together with possible alternate operational modes and circumstances under which they would be used.

7.2.1 Normal Operations

All major components are controlled or directly influenced by the Water Treatment Plant. Under normal operations, the operator starts the day by deciding how much water to treat. This decision is based upon the previous day's use, the estimated demand that day, reservoir levels, and historical rates for that time of year.

Once a decision is made as to the rate of flow to run through the treatment plant, the filters are left in the online position with control valves that regulate the flow through the filters. The PLC tells the filters to turn on and off or backwash based upon reservoir level, headloss, or total gallons treated since the last backwash. The master control valve will control the rate of flow being released from the Raw Water Reservoir based upon maintaining filter levels. The Raw Water Reservoir has certain control elevations that tell lead and lag pumps from either the Manson Intake or the Lakeshore Intake to turn on or turn off. The determination of which pump is lead or lag and at what levels the pumps should turn off or turn on are controlled by the operator. Selections typically are made based upon trying to match pump combinations to plant flow to maximize pump run time and minimize pump starts and stops. Water from the backwash basin is decanted and pumped back to the raw water tank and blended with water from the raw water pumps in amounts that equal no more than 6 percent of the raw water flow. Control algorithms ensure the 6 percent target is not exceeded and that at least 2 hours has elapsed since the last backwash.

After water is processed through the filters, it passes into the clearwell at the Finished Water Pump Station. Lead and lag pumps come on at various clearwell levels based upon plant flow. Water in the clearwell is pumped to the Finished Water Reservoir, where it flows into the distribution system based upon demand. Some of the water from the Finished Water Reservoir is used to replenish the Lakeshore Reservoir. The levels in the Lakeshore Reservoir vary strictly by demand with the overflow level protected by an altitude valve.

7.2.2 Alternate Operations (Winter)

During the late fall, winter, and early spring, the water demand is lower than the minimum plant treatment rate with two filters in operation. The 24-hour demand is so small that it makes it difficult to properly adjust the flow control valves with two filters in operation. The District operations are then adjusted to a single filter mode. The plant is started when the Finished Water Reservoir is depleted to a level of approximately 54 feet. Flow is set at a rate that is easy to control with one filter, and the plant runs until the Finished Water Reservoir is filled to 62 feet. The filters are operated in alternate months.

7.2.3 Alternate Operations (Power Outage)

In the case of a power outage, the emergency generator will automatically energize and run the essential functions of the Water Treatment Plant. The emergency generator will only operate the smallest of the vertical turbine pumps in the Finished Water Pump Station. This reduces the capacity of the Water Treatment Plant to approximately 1.3 MGD, which can be handled by either one or two filters. If several backwash cycles were needed during a power outage, the backwash basin would be forced to spill into the overflow pipelines that run to the County road bar ditch. Care would be required to prevent damage to private property. Either domestic intake would be able to supply 1.3 MGD if the other were without power.

Intake, reservoir, and clearwell operations do not change during any of the forms of alternate operations and run as described during normal operations.

7.3 Routine Operating Procedures

Water Treatment Plant routine operations are outlined in the *Operations and Maintenance Manual*, May 1999. The manual outlines startup and shutdown procedures for the major system components, together with safety procedures associated therewith.

Customer meter reading is done every 2 months throughout the calendar year. Water use is billed retroactively. Large compound meters are read weekly. The large compound meters are entered on a spreadsheet, and the use is evaluated and compared to historic quantities. All other meter readings are collected with a hand-held meter reading device. The hand-held device knows the previous reading on each meter and alerts the meter reader when he or she enters in a reading that is out of the normal range. The meter reader then checks the reading entered and changes it if entered incorrectly. If the meter reading is correct, the reader makes note of the meter number and asks the administrative staff to investigate the unusual usage, which often is a leak on the customer's plumbing.

The administrative staff compiles the total usage by meter route and establishes a total amount of water metered per billing cycle. This is compared to the total amount of water diverted together with the total amount of water treated. This gives the Secretary-Manager the information needed to evaluate overall system performance. Water Treatment Plant performance also is monitored to evaluate gallons treated between backwashes and the ratio of treated water to backwash water on a monthly basis.

7.3.1 Water Treatment Plant Suppliers

Table 7.1 – Chemical Suppliers

Chemical	Manufacturer's Representative	Address 1	Address 2	Phone	Produce Order Code	Order Size
Coagulant	Univar Solutions	1745 Union Hill Rd.	Redmond, WA 98052	(509) 534-0405	602245 – Aluminum Sulfate	12,420 lbs.
Chlorine Gas	All Pure Chemical	2185 North California Blvd, Suite 500	Walnut Creek, CA 94596	(925) 280-2600	20016 – Chlorine	8 – 150 lbs. Cylinders
Chlorine Gas	Oxarc	P.O. Box 2605	Spokane, WA 99220-2605	(925) 280-2600		
Coagulant Aid Polymer	Cytec Industries	P.O. Box 60062	Charlotte, NC 28260	(800) 438-5615	Superfloc C-572 Flocculant	500 lbs.
Ammonia	McMaster Carr	P.O. Box 7690	Chicago, IL 60680	(562) 695-2449	63735T53 Ammonia	1 gal.

Table 7.2 – Treatment Equipment

Equipment Manufacturer	Manufacturer's Representative	Address 1	Address 2	Phone	Product
Lightnin	Whitney Equipment Company	14636 NE 95th Street	Redmond, WA 98052	(425) 556-1750	Flocculator 45Q75V & 45Q5V
Lightnin	Whitney Equipment Company	14636 NE 95th Street	Redmond, WA 98052	(425) 556-1750	In-line Rapid Mixer 8LBC200
Lightnin	Whitney Equipment Company	14636 NE 95th Street	Redmond, WA 98052	(425) 556-1750	Polymer Mixer EV5P33
US Filter/Wallace & Tiernan	Whitney Equipment Company	14636 NE 95th Street	Redmond, WA 98052	(425) 556-1750	Premia 75 Mega Metering Pump
Hydroflow Instruments	Correct Equipment	14576 NE 95th St.	Redmond, WA 98052	(425) 869-1233	GA-180 leak detector
Semplex	Whitney Equipment Company	14636 NE 95th Street	Redmond, WA 98052	(425) 556-1750	Polymax Blending Unit
Valcom	Whitney Equipment Company	14636 NE 95th Street	Redmond, WA 98052	(425) 556-1750	Calibration Chamber
Force Flow	Correct Equipment	14576 NE 95th St.	Redmond, WA 98052	(425) 869-1233	Solo G2 Chlorine gas scale

Table 7.3 – Pumping Equipment

Equipment Manufacturer	Manufacturer's Representative	Address 1	Address 2	Phone	Product
Flygt	Whitney Equipment Company	14636 NE 95th Street	Redmond, WA 98052	(425) 556-1750	Submersible Pump
Sta-Rite	Triangle Pump & Equipment	16169 SE 106th, P.O. Box 950	Clackamas, OR 97015	(503) 656-1473	Chlorine System Booster Pumps
MTH Pumps	Triangle Pump & Equipment	16169 SE 106th, P.O. Box 950	Clackamas, OR 97015	(503) 656-1473	Regenerative Turbine Sample Pump
Floway Pumps, Inc.	Triangle Pump & Equipment	16169 SE 106th, P.O. Box 950	Clackamas, OR 97015	(503) 656-1473	Finish Water Pumps
Triangle Pump & Equipment	Triangle Pump & Equipment	16169 SE 106th, P.O. Box 950	Clackamas, OR 97015	(503) 656-1473	Water Booster System

Table 7.4 – Plumbing Equipment

Equipment Manufacturer	Manufacturer's Representative	Address 1	Address 2	Phone	Product
Flygt	Whitney Equipment Company	14636 NE 95th Street	Redmond, WA 98052	(425) 556-1750	Submersible Pump
Sta-Rite	Triangle Pump & Equipment	16169 SE 106th, P.O. Box 950	Clackamas, OR 97015	(503) 656-1473	Chlorine System Booster Pumps
MTH Pumps	Triangle Pump & Equipment	16169 SE 106th, P.O. Box 950	Clackamas, OR 97015	(503) 656-1473	Regenerative Turbine Sample Pump
Floway Pumps, Inc.	Triangle Pump & Equipment	16169 SE 106th, P.O. Box 950	Clackamas, OR 97015	(503) 656-1473	Finish Water Pumps
Triangle Pump & Equipment	Triangle Pump & Equipment	16169 SE 106th, P.O. Box 950	Clackamas, OR 97015	(503) 656-1473	Water Booster System

Table 7.5 – Valves

Equipment Manufacturer	Manufacturer's Representative	Address 1	Address 2	Phone	Product
EIM Controls	H.D. Fowler	13440 SE 30th	Bellevue, WA 98005	(425) 746-8400	Electric Actuators for Control Valves
M&H Valve Company	H.D. Fowler	13440 SE 30th	Bellevue, WA 98005	(425) 746-8400	4067 Resilient Seat Gate Valve
M&H Valve Company	H.D. Fowler	13440 SE 30th	Bellevue, WA 98005	(425) 746-8400	4500 Butterfly Valve
M&H Valve Company	H.D. Fowler	13440 SE 30th	Bellevue, WA 98005	(425) 746-8400	929 Reliant Fire Hydrant
Milliken Valve Company	H.D. Fowler	13440 SE 30th	Bellevue, WA 98005	(425) 746-8400	Series 600 Eccentric Plug Valve
Milliken Valve, Pratt Valve	H.D. Fowler	13440 SE 30th	Bellevue, WA 98005	(425) 746-8400	Series 500 Butterfly Valve
Val-Matic Valve Company	H.D. Fowler	13440 SE 30th	Bellevue, WA 98005	(425) 746-8400	Swing Check Flex Valve
OCV Control Valves	OCV Valves	7400 East 42nd Place	Tulsa, OK 74145	(918) 627-1942	Altitude Valve
OCV Control Valves	OCV Valves	7400 East 42nd Place	Tulsa, OK 74145	(918) 627-1942	One-way Flow Valve
OCV Control Valves	OCV Valves	7400 East 42nd Place	Tulsa, OK 74145	(918) 627-1942	Two-way Flow Valve

Table 7.6 – Other Equipment

Equipment Manufacturer	Manufacturer's Representative	Address 1	Address 2	Phone	Product
US Foundry	Whitney Equipment Company	14636 NE 95th Street	Redmond, WA 98052	(425) 556-1750	Hoist
Lamson Corporation	Treatment Equipment Company	P.O. Box 25788	Portland, OR 97298	(503) 292-4690	Centrifugal Blowers w/ Reliance Motors
Cummins Engine Company, Inc.	Cummins Engine Company, Inc.	P.O. Box 9811	Renton, WA 98057-3000	(425) 235-3400	Onan Generator Set

7.4 Water Quality Sampling Procedures

7.4.1 Source Monitoring

Turbidity monitoring must be done at least once per day on a representative sample collected before disinfection and coagulation addition. The District has continuous source turbidity sampling and monitoring done for each intake.

Coliform sampling is done on the raw water prior to disinfection and treatment once per month at the combined intake monitoring location. Tests are done for both total and fecal coliform at a certified laboratory.

Inorganic chemical and physical monitoring is done for both primary and secondary substances from a point after treatment and prior to the point of entry to the distribution system. The District currently has a 9-year waiver through December 2028. Primary and secondary chemical and physical substances as listed in WAC 246-290-310(3) are tested in conformance with the required EPA and Standard Methods.

Organic chemical monitoring is done from a point after treatment and prior to the point of entry to the distribution system. The District tested for VOCs recently in 2019 and 2018 in conformance with EPA Method 524.2 and found no exceedances.

Nitrate/nitrite sampling is done annually and tested by a certified laboratory. The results determined that nitrates and nitrites were below the 10 mg/L threshold. Annual testing is done as part of the inorganic contaminants (IOC) sample in the fall of each year.

7.4.2 Distribution Monitoring

Coliform sampling is done in accordance with the coliform monitoring plan in Appendix H. Coliform samples are taken at equal intervals throughout the month. The number of samples is prescribed by the population base served during that month. Transient populations increase during the summer months as tourist-oriented activities increase. Transient populations also increase during harvest time for the various tree fruits and vines that are grown in the Lake Chelan Valley.

Samples are taken at locations identified as representative of various pressure zones and distances from the point of treatment and sent to a certified laboratory for analysis. The samples are taken from locations on a rotational basis. (Appendix H).

Disinfectant concentrations are taken at the same time and at the same location as the coliform samples throughout the distribution system. These values are measured by District staff, recorded on the coliform testing form, and reported to DOH on a monthly basis.

Trihalomethane sampling is done at the extreme end of the distribution system for TTHM and HAA(5) in conformance with the District's disinfection byproducts monitoring plan. Testing is done by a certified laboratory in accordance with 40 CRF 141.132(b)(1). These samples are taken annually in late summer or early fall (for warm weather). Total organic compounds (TOCs) were last taken in 2018 from the source prior to treatment.

Residual disinfectant concentrations are taken in the distribution system concurrently with coliform samples to ensure that residual chlorine concentrations are present in the drinking

water within the distribution system. The results are tested by a certified operator and recorded on the monthly report sent to DOH showing the water treatment plant performance.

Lead and copper monitoring is performed every 3 years at samples after the tap within homes. The samples are taken by the customers after at least 6 hours of non-use and tested by a certified laboratory. The population basis requires at least 20 samples be taken as long as the samples remain beneath the action level. No test results have exceeded the action level.

7.4.3 Treatment Plant Monitoring

Filtered water turbidity monitoring is automatically sampled and analyzed for each filter unit and at the system's combined filter effluent prior to clearwell storage. The District records turbidity measurements every 4 hours that the water treatment plant is online and reports the results to DOH at the end of each month. Turbidity levels are managed within an average of 0.11 NTU.

Level of inactivation and removal of *Giardia lamblia* cysts and viruses is monitored daily by collecting temperature, pH, and chlorine residual at each treatment sequence with a chlorine residual monitoring device during the peak hourly flow period. Chlorine residual, temperature, and pH are collected and measured continuously. Calculated contact time (CT) values are compared to the required CT values needed to achieve 2-log giardia and 1-log virus removal credits. The inactivation ratio of the calculated values divided by the required values must be greater than 1.0. DOH-created spreadsheets are used to calculate the CT values for two sequences in the treatment process. The macros in the spreadsheets automatically add the calculated CT values for each sequence and calculate the inactivation ratio based upon chlorine residual, temperature, and pH of the water.

Residual disinfectant concentrations are taken at a point prior to the entry to the distribution system continuously to ensure that residual chlorine concentrations exceed 0.2 mg/L at all times. The samples are automatically taken and tested, and District staff records the lowest value for each day on the monthly report sent to DOH that shows the water treatment plant performance.

Monthly summary reports, CT calculations, coliform results, filter performance reports, and water treatment plant reports are provided to DOH within 7 days of the end of each calendar month. The reports clarify the operational parameters and treatment results obtained by the District's system.

The most recent water quality test results are shown on Tables 7.7 and 7.8.

Table 7.7 – Water Treatment Plant Water Quality Test Results

Monitored Analyte	No. of Samples	Period	Last Sample	Result	MCL	SRL	Units	Next Sample
Nitrate	1	1 Year	9/15/2020	ND	10	0.5	mg/L	10/1/2021
Coliform/E.Coli (Raw water)			9/1/2020	ND	Presence	n/a	none	
Volatile Organic (VOC)								
Chloroform			4/23/2019	9.46	70	0.5	µg/L	
Bromodichloromethane			4/23/2019	0.83	n/a	0.5	µg/L	
Total Trihalomethane			4/23/2019	10.29	80	n/a	µg/L	
All others			4/23/2019	ND	Varies	Varies	Varies	
Disinfection Byproduct (DBP)								
Total Organic Carbon			11/13/2018	1.03	n/a	0.7	mg/L	
Complete Inorganic (IOC)	1	9 Year						9/1/2029
Antimony			9/15/2020	ND	0.006	0.003	mg/L	
Arsenic			9/15/2020	0.0002	0.01	0.0001	mg/L	
Asbestos					7		mg/L	
Barium			9/15/2020	0.0087	2	0.1	mg/L	
Beryllium			9/15/2020	ND	0.004	0.0003	mg/L	
Cadmium			9/15/2020	ND	0.005	0.001	mg/L	
Calcium			9/15/2020	6.81	n/a	0.05	mg/L	
Chloride			9/15/2020	0.9	250	20	mg/L	
Chromium			9/15/2020	ND	0.1	0.007	mg/L	
Color			9/15/2020	ND	15	15	CU	
Conductivity			9/15/2020	52	700	70	Umhos/cm	
Copper (action level)			9/15/2020	0.0007	1.3	0.02	mg/L	
Cyanide			9/15/2020	ND	0.2	0.05	mg/L	
Dissolved Solids			9/15/2020	52	500	100	mg/L	
Fluoride			9/15/2020	0.07	4	0.2	mg/L	
Hardness			9/15/2020	21	n/a	10	mg/L	
Iron			9/15/2020	ND	0.3	0.1	mg/L	
Lead (action level)			9/15/2020	ND	0.015	0.001	mg/L	
Magnesium			9/15/2020	0.96	n/a	0.1	mg/L	
Manganese			9/15/2020	0.0001	0.05	0.01	mg/L	
Mercury			9/15/2020	ND	0.002	0.0002	mg/L	
Nickel			9/15/2020	ND	0.1	0.005	mg/L	
Selenium			9/15/2020	ND	0.05	0.002	mg/L	
Silver			9/15/2020	ND	0.1	0.1	mg/L	
Sodium			9/15/2020	1.25	n/a	5	mg/L	
Sulfate			9/15/2020	5.5	250	50	mg/L	
Thallium			9/15/2020	ND	0.002	0.001	mg/L	
Turbidity			9/15/2020	0.11	n/a	0.1	NTU	
Zinc			9/15/2020	0.0008	5	0.2	mg/L	
Synthetic Organic (SOC)								
Herbicides	1	9 Year	12/19/2017	ND	Varies	Varies	Varies	2026
Pesticides	0	n/a	8/13/2008	ND	Varies	Varies	Varies	n/a
Soil Fumigants (EDB/DBCP)	0	n/a	4/23/2019	ND	Varies	Varies	Varies	n/a
Radionuclides								
Gross Alpha	1	6 Year	10/26/2016	ND	15	3	pCi/L	10/26/2022
Radium 228	1	6 Year	10/26/2016	ND	5	1	pCi/L	10/26/2022

ND = No Detection or less than reporting levels

Table 7.8 – Distribution System Water Quality Test Results

Monitoring Group	No. of Samples	Period	Last Sample	Result (max)	MCL	SRL	Units	Next Sample
Coliform	5	1 Month	9/1/2020	ND	Presence		none	
Lead	20	3 Year	9/20/2019	0.0008	0.015	0.001	mg/L	8/1/2022
Copper	20	3 Year	9/20/2019	0.544	1.3	0.02	mg/L	8/1/2022
Asbestos	1	9 Year	5/2/2018	ND	7	0.2	MFL	5/2/2027
Disinfection Byproducts	2	1 Year						12/1/2020
Total Trihalomethane			10/15/2019	12.15	80		µg/L	
Chloroform			10/15/2019	11.38	70	0.5	µg/L	
Bromodichloromethane			10/15/2019	0.77		0.5	µg/L	
Dibromochloromethane			10/15/2019	ND		0.5	µg/L	
Bromoform			10/15/2019	ND		0.5	µg/L	
Dibromoacetic Acid			10/15/2019	ND		1	µg/L	
Dichloroacetic Acid			10/15/2019	2.54		1	µg/L	
HAA5			10/15/2019	8.94	60	6	µg/L	
Trichloroacetic Acid			10/15/2019	6.4	20	1	µg/L	
Monobromoacetic Acid			10/15/2019	ND		1	µg/L	
Monochloroacetic Acid			10/15/2019	ND		2	µg/L	

ND = No Detection or less than reporting levels

7.5 Emergency Response Program

7.5.1 Emergency Call-Up List

The following list identifies, in ranking order, the water system personnel responsible for making decisions in specific emergency situations including, but not limited to, water quality and treatment, source protection, storage, distribution, pressure, and pumping facilities.

Rodney L. Anderson, Secretary-Manager	Work (509) 687-3548 Cell (509) 679-0639
Dave Walters, Primary Water Plant Operator	Work (509) 687-3548 Cell (509) 470-1960
Emergency After-Hours	(509) 470-2167
Jarred Teague, Secondary Water Plant Operator	Cell (509) 670-2026
Chad Gosvener, Field Supervisor	Cell (509) 670-3057
Steve Davis, Industrial Pump Mechanic	Cell (509) 630-5811

7.5.2 Notification Procedures

The Secretary-Manager is responsible for all emergency notifications, including boil water orders, of water system customers, the public, the Chelan-Douglas Health District, and the Department of Health. Mr. Dave Walters is responsible for these notifications in the absence of the Secretary-Manager. In localized water line repairs, locally impacted customers are sometimes notified in person or by door hangers. When larger areas are involved in a repair, break, or scheduled water outage, phone calls are made, letters are written, and the local radio station is provided with a public announcement. When violations occur, or when situations endanger public health, the Chelan-Douglas Health District is contacted, along with the Department of Health.

Important phone numbers are as follows.

KOZI Radio	(509) 682-4033
Department of Health Office of Drinking Water	(509) 329-2100
DOH "After Hour" Emergency Line	(877) 481-4901
Chelan-Douglas Health District	(509) 886-6450
Rodney L. Anderson, Secretary-Manager	(509) 679-0639

The District water system consists of vulnerable facilities, the malfunctioning of which would severely impact the system's capacity to provide demand and/or fire flow. The District has developed a vulnerability assessment that complies with Section 1433(a)(1) of the Safe Drinking Water Act, as amended by the Public Health Security and Bioterrorism Preparedness and Response Act of 2002. The assessment addresses the following components of the system.

- Pipes and constructed conveyances
- Physical barriers
- Water collection
- Pretreatment
- Treatment
- Storage
- Distribution facilities
- Electronic, computer, or other automated systems
- The use, storage, and handling of chemicals
- Operation and maintenance of systems

7.5.3 Emergency Response Plan

The vulnerability analysis and the emergency response plan are both internal documents that are used by personnel as action plans in the case of an emergency and to prioritize capital improvements to improve system security.

7.6 Safety Procedures

Water Treatment Plant safety procedures are outlined in the *Operations and Maintenance Manual*, May 1999. The manual outlines startup and shutdown procedures for the major system components, together with safety precautions associated therewith. Material Safety Data Sheets (MSDS) for all chemicals used are maintained in the communications center at the Water Treatment Plant. Plant operating staff reads and becomes familiar with the handling and safety precautions associated with the various chemicals. Some of the chemicals intended for use can be harmful if mishandled.

The District has developed an Accident Prevention Program that contains information about workplace safety and standard operating procedures. The total safety program includes the following elements.

- First aid
- Personal protective equipment
- Hazardous energy
- Ladders
- Telecommunications
- Electrical workers
- Hazardous chemical communications
- Respiratory protection
- Asbestos
- Confined space entry
- Asbestos removal and encapsulation
- Highly hazardous chemicals
- Fall restraint and fall arrest
- Hand and power tools
- Excavation, trenching, and shoring
- Ergonomics

District staff performs periodic safety and health reviews of various jobs and workstations that may contain various hazards and identifies the factors and causes that add risk to the job or station.

7.7 Cross-Connection Control Program

The District's cross-connection control policy is presented in Appendix H. Should that policy and this section differ, Appendix H shall govern. A cross connection is defined as any physical arrangement whereby the public water supply is connected, either directly or indirectly, with a non-potable or unapproved water supply system or any device that contains or may contain contaminated water, liquid, gases, sewage, or any other constituent that may contaminate a public water supply as a result of backflow. Washington State regulations place the primary responsibility for control of cross connections with the water purveyor. The purveyor may be held legally liable for any problem that may arise due to an unprotected cross connection.

7.7.1 Legal Authority

RCW 87.03.015 establishes that irrigation districts have the authority to provide domestic water service. The pumps, pipes, and treatment facilities that make up the domestic system are defined as a community public water system. Chapters 70.119 and 70.119A RCW require that public water systems like the District system conform to the rules and regulations adopted by the secretary of the Department of Health. WAC 246-290-490 was adopted by the secretary and requires that all community water systems comply with the cross-connection control requirements specified.

The District will be responsible for provisions as outlined in WAC 246-290-490 for premise isolation. The Chelan County Building Department is responsible for in-premise isolation.

Backflow devices are required on all premises that are assessed by a certified cross-connection specialist as posing a degree of hazard for backflow contamination. All backflow devices must be inspected and tested annually by a certified backflow assembly tester and repaired or replaced as necessary. The backflow assembly tester shall certify the test as complete on a form provided by the District. If the water user with a backflow device fails to contract for the annual test, the District will perform inspections, testing, and repairs to backflow devices at the owner's expense. If any water user should fail to test their devices and in turn deny the District reasonable access to the backflow device, the District shall shut off water service until the user complies.

7.7.2 Coordination with the Local Administrative Authority

The following delineations of responsibility have been coordinated with the Chelan County Building Department:

1. Chelan County Building Department has a certified Cross-Connection Control Specialist (CCS) assess the hazard potential of all new customers on the District water system as part of the building permit process.
2. If the CCS determines that a hazard exists, the Building Department shall require the customer to install and have tested by a certified Backflow Assembly Tester (BAT) the approved backflow prevention device commensurate with the hazard.
3. The BAT shall fill out the approved District form and return to the District with the exact location of the device, a description of the assembly, the assessed hazard level, the installation date, the inspection and test results, and the signature, name, address, and phone number of the BAT inspector. This shall be done prior to allowing occupancy of the premise by the water user.
4. The District will maintain a list of in-premise devices as supplied by the County on new services and will include a list of existing in-premise devices that are known by the District.
5. The District will notify all water users with in-premise devices 30 days in advance of the anniversary of their installation date that they are required to have the device tested, repaired, or replaced as needed by a BAT. If the user fails to test, repair, or replace the device as required, the District will test, repair, or replace the device for the user at the user's expense. If the user does not provide access to the device, water will be turned off and the District will notify the Building Department and the Chelan-Douglas Health District so appropriate action can be taken.
6. All backflow incidences found or reported to the District will be reported to the Department of Health, the Chelan County Building Department, and the Chelan-Douglas Health District as soon as possible but no later than the next business day.

7.7.3 Assessing Service Connections by Degree of Hazard

Existing Connections without a Backflow Device: The District has inspected and assessed all non-residential connections without a backflow device and either required the installation of an approved backflow device or found no hazard. Residential connections without an approved backflow device were sent self-assessment guides that show the requirement for a backflow

device. If the self-assessment showed uses requiring a backflow device, the District followed up and required the installation of an approved device commensurate with the degree of hazard.

Other Premises: The District CCS will endeavor to inspect other premises once every 5 years or at a change of use for all non-residential premises to see if the hazard assessment has changed.

7.7.4 BAT QC Program

The District will maintain a list of certified backflow assembly testers. The list will include the BAT's certification, address, phone number, and test kit calibration information. All BATs will be required to use the District form and return the completed form to the District within 30 days of testing and inspection.

7.7.5 Responding to Backflow Incidences

The District will endeavor to avoid backflow incidences. In the event a backflow incidence is unavoidable, the District will report the incident to the County Building Department, the Chelan-Douglas Health District and the Department of Health as soon as possible but in no case later than the next business day. The backflow incident will be described and reported a DOH-approved form.

7.7.6 Record Keeping and Reporting

The District will keep indefinitely a master list of connections with backflow devices, both premise and in-premise. The list will show the account number, the installation date or anniversary date if unknown, the exact location of the device, a description of the assembly, the assessed hazard level, the installation date, the inspection and test results, and the signature, name, address, and phone number of the BAT inspector. Air gaps will be considered a device on the master list and shall include the exact location of the device, the assessed hazard level, inspection results, and the signature, name, address, and phone number of the BAT inspector. A separate list is maintained of local inspectors, including their name, address, phone number, and certification number.

Information about individual devices shall be maintained for the life of the device or for 5 years, whichever is less. Annual reports are made over the internet. Backflow incident reports will be part of the annual report and will be kept for at least 5 years.

7.8 Summary of Operations and Maintenance Deficiencies

System upkeep on the distribution system has been very good over the years. The two domestic intakes were rehabilitated in 2004 and 2005 and are in very good condition from an electrical and mechanical point of view. The Water Treatment Plant continues to be in very good condition, except for a significant filter cell 1 underdrain failure in early 2021, which the District is repairing. Proactive maintenance is done on mechanical devices on a regular schedule. The HMI computers were upgraded in winter of 2012 and should be replaced soon. The goal of the District is to maintain the WTP at its current condition. No operations and maintenance deficiencies have been identified that are not being taken care of at regular intervals to maintain the condition of the WTP.

8 DESIGN AND REVIEW PROCEDURES

8.1 Construction Standards for Distribution Mains and Other Related Projects

The District uses the same construction standards for developer extensions, construction done by outside contractors, and construction done by in-house construction crews. Design and performance standards are discussed in Section 4.1.

The District's construction standards and details are found in Appendix J. The Washington State Department of Transportation (WSDOT) *Standard Specifications for Road, Bridge, and Municipal Construction* and Local Agency General Special Provisions are used as the basis for construction specifications.

8.2 Internal Engineering Review Procedures

The District has historically and successfully performed in-house reviews of distribution main projects and desires to renew its distribution main review exemption under WAC 246-290-125(2).

The District presently contracts for engineering services to outside consultants when the project will be advertised for bid to outside construction contractors. The District also requires that developers involved in extending services to new developments have their projects designed by professional engineers outside of the District. In both these cases, the project will be designed by the outside professional. The engineer of record will perform inspection services during construction. The District requires as-built record drawings and a DOH Construction Completion Report certified by the engineer of record as being installed per the plans and specifications.

The District currently has a contract with RH2 Engineering, Inc., (RH2) to perform review services on District projects on a time and expense basis. Upon receipt of a review letter from RH2, the District begins construction of the project and takes field notes of any deviations in the plans. As-built drawings and a Construction Completion Report are prepared from the field notes and are certified by the engineer of record.

All as-built drawings are transferred to the District's facilities management software. Most drawings are prepared in AutoCAD and transferred to the District's geographic information system (ArcView and Arc/Info). The WaterCAD model also is updated to reflect the type and size of the pipeline.

9 IMPROVEMENT PROGRAM

9.1 Improvement Plan

The improvement program is divided into two sections. The first are specific projects anticipated to be built. The second are elective projects that can be accomplished as budget and priorities allow.

The project lists are developed from the system evaluations in Chapter 4.

An extension for the water rights proof of appropriation (CIP WR1) is discussed in Section 6.1.1.7.

The WSDOT 6-year plan was reviewed, and no Manson area road projects were listed.

9.2 Costs and Schedule

Cost estimates are provided for planning purposes. To date, many pipelines have been designed in-house and installed by District crews, greatly reducing costs. To be conservative, the estimated costs for pipeline improvements use the following assumptions:

- Mains will be installed in roadways, requiring pavement patching or overlays.
- Design survey by licensed surveyor.
- Design and construction administration by a consulting engineer.
- Work performed by contractors using public bid process.
- Inspection by District crew.
- Contingency of 10 percent.

Individual project sites have not been reviewed for special construction requirements. Shallow bedrock, narrow working spaces, and major utility interferences can raise costs. When planning upcoming projects, the costs should be reviewed for each specific project location before budgeting.

Pipeline improvements will be done based upon funds available for a given year. The annual contribution would allow for up to 1,000 feet of water line replacement every year.

A 3.5-percent annual inflationary adjustment is provided in the cost estimates.

The 1534 Zone Reservoir structure is estimated at \$2.0 Million for a 1.5 MG tank. A 2.5 MG tank structure, including demolition of the Lakeshore tank, is estimated at \$3.0 Million. Site work, piping, electrical, and other construction costs are estimated at \$1.0 Million. Project administration, design, permitting, and construction services are estimated at 35 percent of construction cost. For conservative planning, the 10-year CIP includes the 2.5 MG tank and demolition of the Lakeshore tank.

The future WTP expansion has only been roughly estimated because it is assumed the project will not be started until at least 8 years from now. The purpose of the estimate is to begin the process of rate increases necessary to fund the project, assuming grants will not be available. As the project gets closer, a more accurate estimate must be prepared.

Projects FF5 (Swartout Road), R3a (16-inch SR 150), and the annual elective water main budget assume the work will be performed in-house; therefore, the cost estimates reflect only materials, equipment rentals, and pavement restoration.

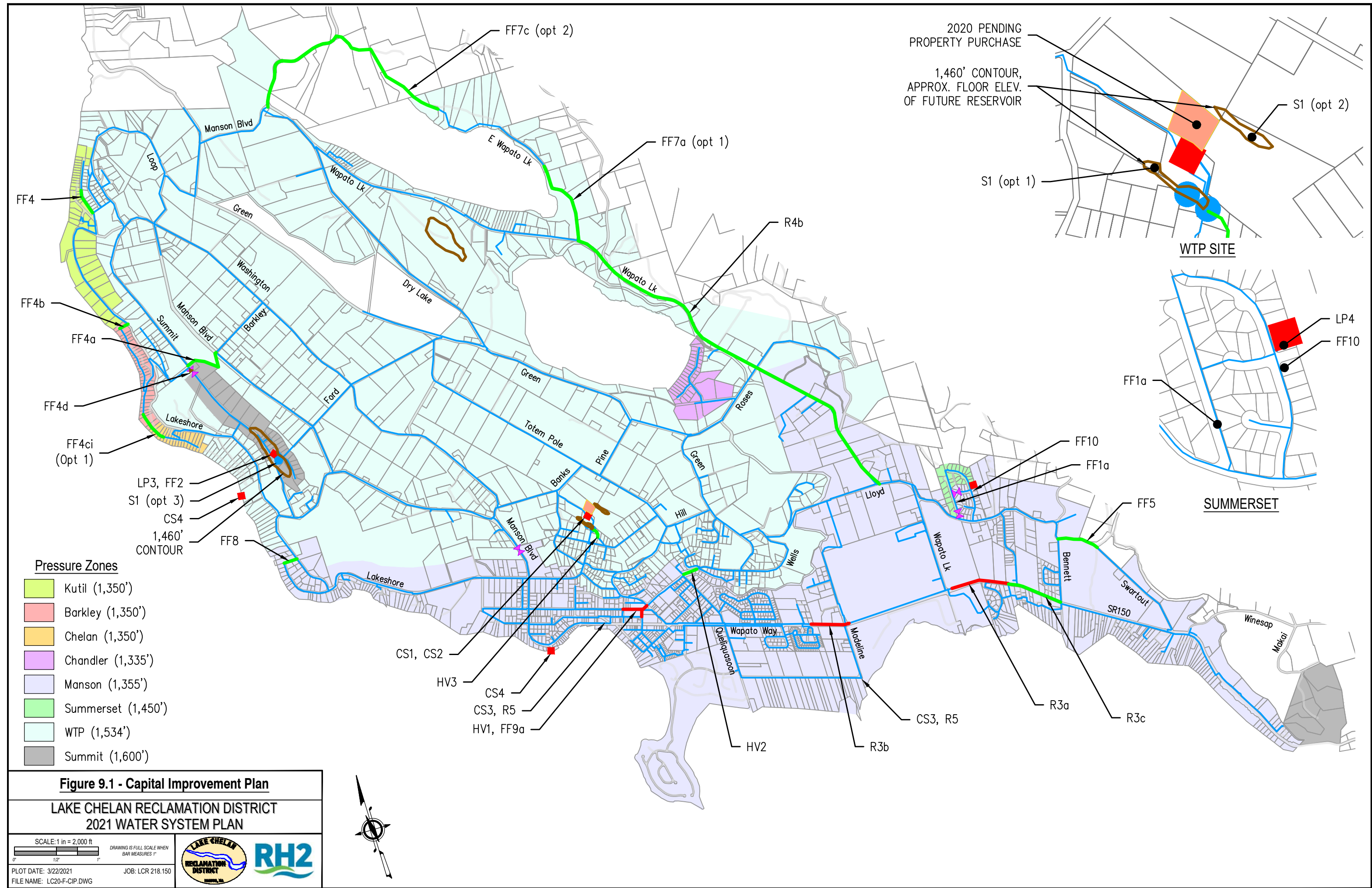
Cost estimates and schedule for projects in the next 10 years are shown on Tables 9.1 and 9.2.

Table 9.1 – 10-Year Capital Improvement Plan

CIP No.	Project Description	Existing Water System Facilities	Water System Work Planned	Watermain Size	Length	Along	Location		3.5% Assumed Inflation Rate											Later	
							From	To	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031		
Pipeline Projects																			2031	1.46	1.51
HV1	Boetzkies Avenue Watermain Replacement	6" Steel, 6" AC	12" main, 2 hydrants, 2 services	10 in	900 ft	Boetzkies & Green	Totem Pole	Tike / Henry Gray	\$368,000												
FF5	Swartout Rd watermain	None	8" main by LGRD. No labor costs.	8 in	1,000 ft	Swartout	Bennett	244 Swartout	\$101,000												
R2a	SR 150 Steel Main Replacement	16" Steel	16" main by LGRD. No labor costs.	16 in	1,300 ft	SR 150	Wapato Lk Rd	Sandy Beach Ln	\$178,000												
R3b	SR 150 Steel Main Replacement	16" Steel	16" main	16 in	900 ft	SR 150	Hope Ln	Madeline Rd									\$49,000	\$380,000			
R4	Elective Watermain Replacement Budget	Varies	Varies		1,000 ft												\$154,768	\$160,185			
Pipe Projects Subtotal									\$469,000	\$0	\$178,000	\$0	\$130,310	\$134,871	\$139,592	\$144,477	\$149,534	\$203,768	\$540,185		
Supply and Storage Projects																					
	Land for Facility Expansion	None	WTP Expansion or Other Facility						\$135,000												
S1a	Land for 1534 Zone Reservoir		Land Purchase						\$50,000												
S1a	1534 Zone Reservoir	Lakeshore Tank	2.5 MG Reservoir															\$1,285,000	\$7,447,000		
CS3,4	Reservoir Corrosion Control	All Tanks	Reservoir Refresh Protective Systems						\$6,000	\$17,000											
WTP1	Increase WTP supply		Add 700 gpm pump														\$89,951	\$93,100			
Supply and Storage projects Subtotal									\$135,000	\$56,000	\$17,000	\$0	\$0	\$0	\$0	\$0	\$89,951	\$93,100	\$1,285,000	\$7,447,000	
Water Treatment Plant Upgrade																					
WTP1	Increase WTP capacity.	2 MGD capacity (redundant)	Third filter train (2 MGD)														\$2,698,537	\$2,792,986			
WTP1	Increase WTP capacity.	2 MGD capacity (redundant)	Second backwash basin														\$539,707	\$558,597			
WTP Upgrade Subtotal									\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,238,244	\$3,351,583	\$0	\$0		
O&M Projects, Studies, Reports																					
R2	Automatic meter reading system								\$100,000	\$100,000	\$100,000										
CS3b	Remote pressure monitoring	None	Install pressure sensing meters						\$2,000												
CS4	Intake station control system replacements	Manson & Lakeshore Intakes	Control systems						\$50,000												
LP4	Summerset check valve	Summerset Pump station	2" check valve by District station						\$5,000												
LP3	Sienna check valve	Sienna Pump station	2" check valve by District						\$5,000												
FF1a	Pino Noir fire flow	8" PVC	Add zone valve by District						\$10,000												
S5	Finished Water Tank Circulation	Finished Water Tank	Evaluate baffle system						\$22,000												
NBS	New Billing System								\$100,000												
CS1	WTP control system hardware upgrade		2026 to 2028						\$322,000	\$666,000											
CS2	WTP control system software upgrade		2026 to 2028						\$54,000	\$167,000											
WR1	Water Rights Proof of Appropriation		Request extension.							\$5,000											
WSP	Water System Plan Update		Water System Plan Update						\$50,000					\$100,000							
O&M Project and Studies Subtotal									\$302,000	\$568,000	\$933,000	\$105,000	\$0	\$0	\$100,000	\$0	\$0	\$0	\$0		
Pipeline Projects Contingent on Currently Unfunded Road Projects																					
R4	Totem Pole Road Reconstruction 2023	10" PVC	Adjust services and hydrants							\$50,000											
R4	Wapato Lake Road Reconstruction 2026	6" AC	TBD	10 in	9,000 ft	Wapato Ld Rd	Lloyd	E Wapato Lk Rd					\$267,000	\$2,106,000							
Total Costs Not Including Unfunded Road Projects or Future Debt Service									\$906,000	\$624,000	\$1,128,000	\$105,000	\$130,310	\$134,871	\$239,592	\$144,477	\$3,477,729	\$3,648,450	\$1,825,185	\$7,447,000	

Table 9.2 – Capital Improvement Plan Elective Projects

CIP No.	Project Description	Existing Water System Facilities	Water System Work Planned	Watermain		Location			Total
				Size	Length	Along	From	To	
HV2	Green Ave high velocity pipe	6" AC	12" main, 2 hydrants, 2 services	8 in	400 ft	Green	Coral	Quettil-quasoon	\$209,000
HV3	WTP south redundant watermain	10" DI	8" main	8 in	300 ft	Stormy Vista	WTP		\$84,000
FF4a	Barkley redundancy and fire flow	None	8" main	8 in	1,200 ft	Barkley Rd	Manson Blvd	Summit Blvd	\$186,000
FF4b	Kuttil/Barkley redundancy & fire flow	None	8" main	8 in	250 ft	Easement	Helios Hills Ln	Chelan Blvd	\$75,000
FF4c	Kuttil/Barkley redundancy & fire flow	None	8" main	6 in	800 ft	Easement	Clearwater Ln	Getaway Ln	\$182,000
FF4d	Kuttil/Barkley redundancy & fire flow	None	4" PRV			Summit			\$50,000
FF6	Kuttil PI fire flow	4" AC	8" main	8 in	800 ft	Kuttil Pl	Kennedy	1st Hydrant	\$184,000
FF7	E Wapato Lake fireflow	6" AC	8" main	8 in	2,300 ft	E Wapato Lk Rd	Wapato Lk Rd		\$439,000
FF8	Willow Pt fire flow	4" AC	6" main	6 in	350 ft	Easement	Willow Pt Rd	Lakeshore Dr	\$82,000
FF10	Casino area fire flow		Adjust Summerset Pressure Zone Boundary						\$5,000
R3c	SR 150 Transmission	None	16" main	16 in	1,400 ft	SR 150	Hope Ln	Madeline Rd	\$505,000



10 FINANCIAL PROGRAM

10.1 Domestic Water System Accounting

Historical dollar values presented in this chapter are taken primarily from actual District financial summaries, but some values are the result of calculations and assumptions. Therefore, not all values will exactly match those of the District's records, but overall, the values are reasonably close. End of year totals for connection charges, base charges, excess charges, and reserves vary somewhat from District totals primarily because the calculations used in this WSP do not account for delayed customer payments or movement of funds between accounts.

The District operates domestic water, irrigation water, and sanitary sewer systems, each with its own accounts that are combined into a single enterprise fund. The District is authorized to collect funds to operate the system and fund improvements using various methods described under RCW 87.03.445. The District has adopted the rates and charges method listed under RCW 87.03.445(5).

10.1.1 Revenues

Revenues from 2015 to 2019 average to the following values:

- 52 percent from the base rate.
- 18 percent from excess water.
- 14 percent from new connection charges.
- 8 percent from irrigation assessment reimbursement.
- 4 percent from interest and leases.
- 4 percent from other sources (hydrant meters, latecomers, etc.).

10.1.2 Expenses

The District's only debt service payment is for the Water Treatment Plant financing at approximately \$68,000 per year, which will be paid off in 2024. Otherwise, expenses are typical for a water utility and have increased by approximately 5 percent per year since 2015, not including capital projects.

A simple summary of revenue and expenses since 2015 is presented in Table 10.1. Revenues shown vary slightly from District records by about 0.3 percent because of assumptions in the financial model built for this analysis. The accounting for 2020 was not completed as of the time this chapter was written, so the values are assumed based on the District budget and water use estimates. The drop in revenue from 2019 is due to a large condominium on Wapato Point being demolished and the resulting loss of 47 billing ERUs.

Table 10.1 – Historical Cash Flow Summary

	2015	2016	2017	2018	2019	2020
Revenue	\$ 1,492,054	\$ 1,637,162	\$ 1,666,262	\$ 1,785,412	\$ 1,909,616	\$ 2,084,084
Expenses	\$ 1,152,006	\$ 1,094,974	\$ 1,142,593	\$ 1,340,506	\$ 1,595,874	\$ 1,636,458
<i>Net Income</i>	<i>\$ 340,048</i>	<i>\$ 542,188</i>	<i>\$ 523,669</i>	<i>\$ 444,906</i>	<i>\$ 313,742</i>	<i>\$ 447,626</i>

10.1.3 Reserves

Net income at year end that exceeds the District's goal for cash on hand (30 percent of annual budget) is placed in short-term investments that the District can access on relatively short notice. At the end of 2020, the District had about \$3,600,000 in various investment funds for the domestic water system.

Net income has averaged \$430,000 since 2015, which is almost entirely from new connection charges that have averaged \$260,000 annually, and \$70,000 annual average from hydrant meters and latecomer's charges. These revenue sources are tied directly to the overall economy; therefore, they are the most volatile and unpredictable.

10.2 Water Rates and Rate Structures

The District's domestic water rates are established using the following criteria:

1. Domestic water is billed every 2 months.
2. The rate is a combination of a base monthly rate and excess rate.
 - a. The base rate is a fixed cost multiplied by the billing ERU value for the customer (not the same as a water consumption ERU value).
 - b. The base includes an allotment of 700 cubic feet (cf) per month (about 170 gallons per day) multiplied by the account's billing ERU value.
 - c. Water used in excess of the base allotment over 2 months is charged at a block rate per 100 cf.
3. All customers are assessed for irrigation water, which is comprised of an acreage charge (or Unit of Benefit, UOB) and a fixed per-parcel charge.
 - a. For those customers that do not have service from the District's separate irrigation system, the UOB component of the charge is retained in the domestic water fund and the rest is transferred to the irrigation fund.
 - b. The UOB value is generally, though not always, equal to the acreage served.
4. Customers with a UOB and a connection used solely for irrigation water are assessed as an irrigation customer (per parcel and UOB charges) and are not charged the domestic water base rate.

The District will implement a surcharge in 2021 for 1.5-inch and larger meters.

A summary of rates and charges since 2015 is shown in Table 10.2.

Table 10.2 – Historical Rates and Charges

	2015	2016	2017	2018	2019	2020	2021
Connection Charge per ERU	\$ 4,900	\$ 4,900	\$ 4,900	\$ 5,500	\$ 5,500	\$ 6,000	\$ 6,500
Base Rate per Billing Unit	\$ 30.00	\$ 30.00	\$ 30.00	\$ 30.00	\$ 33.00	\$ 33.50	\$ 34.50
Excess Rate per 100 cf	\$ 4.28	\$ 4.28	\$ 4.28	\$ 4.28	\$ 4.71	\$ 4.78	\$ 4.93
Base Irrigation Assessment per UOB	\$ 130.00	\$ 140.00	\$ 145.00	\$ 170.00	\$ 195.00	\$ 220.00	\$ 245.00
Minimum Irrigation Assessment	\$ 130.00	\$ 140.00	\$ 145.00	\$ 152.25	\$ 159.86	\$ 167.86	\$ 176.24
Meter Size Monthly Surcharge							
1.5"	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 7.50
2"	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 15.00
3"	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 25.00
4"	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 40.00
6"	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 65.00

10.3 Ten-Year Balanced Operating Budget

Projected income for the next 10 years is based on the following assumptions:

- The rate of new customer connections is higher than the low range growth projections by approximately one-quarter of the difference between the high and low projections. This results in growth of approximately 1 percent (about 20 connections) per year.
- Excess water will remain proportional to historical use.
- 10 percent of excess water charges are not recoverable due to delinquent payments or credits for leaks.
- Per capita consumption will reduce by 1 percent total over the next 6 years per the water use efficiency goals.
- For simplicity, future base rates and excess rates are increased by the same percentage.
- Other income sources are projected forward at historical average rates.

Projected expenses for the next 10 years are based on the following assumptions:

- Payroll and benefits increase by 8 percent annually.
- General and administrative costs increase by 5 percent annually.
- Operations and maintenance costs increase by 8 percent annually.
- Capital project cost inflation of 3.5 percent annually.

Tables 10.3, 10.4, and 10.5 show the revenue forecast, expense forecast, and overall budget forecast. Assuming the inflation rates mentioned above are accurate, a 4-percent annual rate increase is necessary to hold reserves steady through 2025, then may need to increase to 7 percent if the inflation rates listed above continue to prove accurate. If the WTP upgrade happens in 2029 and new reservoir in 2031, the annual debt service for these two projects may require another 2 to 3 percent increase.

Table 10.3 – Revenue Forecast

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Number of Connections												
Residential	1,365	1,379	1,395	1,411	1,427	1,442	1,455	1,469	1,483	1,497	1,511	1,523
Domestic / Irrigation	549	549	549	549	549	549	549	549	549	549	549	549
Multi Family	23	23	23	23	24	24	24	24	25	25	25	25
Commercial	59	59	59	59	59	59	59	59	59	59	59	59
Tourist	29	29	30	30	30	31	31	31	32	32	32	32
Irrigation Only	70	70	70	70	70	70	70	70	70	70	70	70
Total Connections	2,095	2,109	2,126	2,142	2,159	2,175	2,188	2,203	2,217	2,232	2,246	2,258
Meters by Size												
3/4 inch	1,972	1,985	1,999	2,014	2,029	2,044	2,057	2,070	2,084	2,097	2,110	2,122
1 inch	98	99	100	101	102	104	104	105	106	107	108	109
1.5 inch	6	6	7	7	7	7	7	7	7	7	7	7
2 inch	12	12	13	13	13	13	13	13	13	13	13	13
3 inch	1	1	1	1	1	1	1	1	1	1	1	1
4 inch	0	0	0	0	0	0	0	0	0	0	0	0
6 inch	6	6	6	6	6	6	6	6	6	6	6	6
Total Connections	2,095	2,109	2,126	2,142	2,159	2,175	2,188	2,203	2,217	2,232	2,246	2,258
Billing Units (BU)												
Residential	1,252	1,265	1,280	1,294	1,309	1,323	1,335	1,348	1,360	1,373	1,386	1,397
Domestic / Irrigation	564	564	564	564	564	564	564	564	564	564	564	564
Multi Family	493	498	513	528	543	549	554	559	565	570	575	580
Commercial	168	168	168	168	168	168	168	168	168	168	168	168
Tourist	57	57	57	57	57	57	57	57	57	57	57	57
Irrigation Only	12	12	12	12	12	12	12	12	12	12	12	12
Total Billing Units	2,546	2,564	2,594	2,623	2,653	2,673	2,690	2,708	2,726	2,744	2,762	2,777
Water Sales (gal/yr)	242,691,010	243,815,089	245,143,183	246,446,287	247,724,266	248,977,955	249,932,408	251,023,302	252,099,680	253,159,940	254,201,893	255,037,444
Excess Water Use (gal/yr)												
Residential	16,500,000	16,000,000	16,186,469	16,370,797	16,552,956	16,733,026	16,881,236	17,044,657	17,206,973	17,368,001	17,527,496	17,664,921
Domestic / Irrigation	1,900,000	1,700,000	1,700,000	1,700,000	1,700,000	1,700,000	1,700,000	1,700,000	1,700,000	1,700,000	1,700,000	1,700,000
Multi Family	17,000,000	16,500,000	16,692,296	16,882,384	17,070,236	17,255,933	17,408,774	17,577,303	17,744,691	17,910,751	18,075,231	18,216,950
Commercial	11,000,000	10,000,000	10,000,000	10,000,000	10,000,000	10,000,000	10,000,000	10,000,000	10,000,000	10,000,000	10,000,000	10,000,000
Tourist	300,000	200,000	202,331	204,635	206,912	209,163	211,015	213,058	215,087	217,100	219,094	220,812
Irrigation (No UOB)	4,500,000	3,500,000	3,500,000	3,500,000	3,500,000	3,500,000	3,500,000	3,500,000	3,500,000	3,500,000	3,500,000	3,500,000
Irrigation Excess (gal/yr)	5,500,000	5,200,000	5,200,000	5,200,000	5,200,000	5,200,000	5,200,000	5,200,000	5,200,000	5,200,000	5,200,000	5,200,000
Total Excess (gal/yr)	51,597,000	48,321,000	48,667,798	49,010,613	49,349,395	49,684,290	49,959,933	50,263,867	50,565,743	50,865,226	51,161,857	51,417,442
Rates and Charges per Month												
Connection Charge per BU	\$6,000	\$6,500	\$6,825	\$7,166	\$7,525	\$7,901	\$8,296	\$8,711	\$9,146	\$9,603	\$10,084	\$10,588
Rate per BU	\$33.50	\$34.50	\$35.88	\$37.32	\$38.81	\$40.75	\$42.79	\$44.92	\$47.17	\$51.42	\$56.04	\$61.09
Excess Rate	\$4.786	\$4.929	\$5.13	\$5.33	\$5.54	\$5.82	\$6.11	\$6.42	\$6.74	\$7.35	\$8.01	\$8.73
Excess Volume (cf)	100	100	100	100	100	100	100	100	100	100	100	100
1.5" Meter Charge	\$0.00	\$7.50	\$7.50	\$7.50	\$7.50	\$7.50	\$7.50	\$7.50	\$7.50	\$7.50	\$7.50	\$7.50
2" Meter Charge	\$0.00	\$15.00	\$15.00	\$15.00	\$15.00	\$15.00	\$15.00	\$15.00	\$15.00	\$15.00	\$15.00	\$15.00
3" Meter Charge	\$0.00	\$25.00	\$25.00	\$25.00	\$25.00	\$25.00	\$25.00	\$25.00	\$25.00	\$25.00	\$25.00	\$25.00
4" Meter Charge	\$0.00	\$40.00	\$40.00	\$40.00	\$40.00	\$40.00	\$40.00	\$40.00	\$40.00	\$40.00	\$40.00	\$40.00
6" Meter Charge	\$0.00	\$65.00	\$65.00	\$65.00	\$65.00	\$65.00	\$65.00	\$65.00	\$65.00	\$65.00	\$65.00	\$65.00
Total Connection Charge	\$408,495	\$117,508	\$202,992	\$211,928	\$221,235	\$159,158	\$137,548	\$159,249	\$166,079	\$173,001	\$179,921	\$162,776
Total Base Charge	\$1,023,525	\$1,069,242	\$1,124,781	\$1,182,696	\$1,243,378	\$1,315,000	\$1,388,865	\$1,467,767	\$1,551,037	\$1,701,029	\$1,865,406	\$2,043,847
Total Excess Charge	\$330,138	\$318,415	\$333,528	\$349,312	\$365,796	\$386,692	\$408,280	\$431,302	\$455,586	\$499,530	\$547,663	\$599,935
Total of Rates and Charges	\$1,762,158	\$1,505,166	\$1,661,301	\$1,743,937	\$1,830,409	\$1,860,850	\$1,934,693	\$2,058,317	\$2,172,702	\$2,373,560	\$2,592,991	\$2,806,558
Irrigation Shares												
UOBs at Full Rate	90.9	90	90	90	90	90	90	90	90	90	90	90
UOBs at Minimum Charge	590	600	600	600	600	600	600	600	600	600	600	600
Annual Assessment per UOB	\$220.00	\$245.00	\$253.58	\$262.45	\$271.64	\$286.03	\$301.19	\$317.16	\$333.96	\$351.66	\$360.46	\$370.55
Min. Assessment per UOB	\$167.86	\$176.24	\$182.41	\$188.79	\$195.40	\$205.76	\$216.66	\$228.14	\$240.24	\$252.97	\$259.29	\$266.55
Irrigation Base Revenue	\$119,035	\$127,794	\$132,267	\$136,896	\$141,687	\$149,197	\$157,104	\$165,431	\$174,199	\$183,431	\$188,017	\$193,282
Total Interest & Leases	\$98,877	\$100,855	\$102,872	\$104,929	\$107,028	\$109,168	\$111,352	\$113,579	\$115,850	\$118,167	\$120,531	\$122,941
Total Other Income	\$104,014	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000
Total Revenue	\$2,084,084	\$1,783,814	\$1,946,439	\$2,035,762	\$2,129,124	\$2,169,215	\$2,253,149	\$2,387,327	\$2,512,751	\$2,725,159	\$2,951,538	\$3,172,781

Table 10.4 – Expense Forecast

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Payroll												
Salaries & Wages	\$386,512	\$417,433	\$450,828	\$486,894	\$525,845	\$567,913	\$613,346	\$662,414	\$715,407	\$772,639	\$834,450	\$901,206
Overtime	\$38,033	\$41,076	\$44,362	\$47,911	\$51,743	\$55,883	\$60,354	\$65,182	\$70,396	\$76,028	\$82,110	\$88,679
Payroll Expenses	\$241,665	\$260,998	\$281,878	\$304,428	\$328,783	\$355,085	\$383,492	\$414,171	\$447,305	\$483,089	\$521,737	\$563,476
Unemployment	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Payroll	\$666,210	\$719,507	\$777,067	\$839,233	\$906,371	\$978,881	\$1,057,192	\$1,141,767	\$1,233,108	\$1,331,757	\$1,438,297	\$1,553,361
General and Administrative												
Office Expenses	\$35,578	\$37,001	\$38,481	\$40,020	\$41,621	\$43,286	\$45,018	\$46,818	\$48,691	\$50,639	\$52,664	\$54,771
Overhead	\$207,030	\$215,311	\$223,924	\$232,881	\$242,196	\$251,884	\$261,959	\$272,437	\$283,335	\$294,668	\$306,455	\$318,713
Sewer Payment	\$10,292	\$10,704	\$11,132	\$11,577	\$12,040	\$12,522	\$13,023	\$13,544	\$14,085	\$14,649	\$15,235	\$15,844
Total General and Administrative	\$252,900	\$263,016	\$273,537	\$284,478	\$295,857	\$307,692	\$319,999	\$332,799	\$346,111	\$359,956	\$374,354	\$389,328
Operations and Maintenance												
O&M	\$275,088	\$297,095	\$320,863	\$346,532	\$374,254	\$404,195	\$436,530	\$471,452	\$509,169	\$549,902	\$593,894	\$641,406
Capital Purchases	\$153,507	\$15,000	\$15,450	\$15,914	\$16,391	\$16,883	\$17,389	\$17,911	\$18,448	\$19,002	\$19,572	\$20,159
Vehicle Purchases	\$0	\$20,000	\$20,600	\$21,218	\$21,855	\$22,510	\$23,185	\$23,881	\$24,597	\$25,335	\$26,095	\$26,878
Total Operations and Maintenance	\$428,595	\$332,095	\$356,913	\$383,663	\$412,500	\$443,587	\$477,105	\$513,244	\$552,214	\$594,239	\$639,561	\$688,443
Total Operating Expenses	\$1,347,705	\$1,314,618	\$1,407,517	\$1,507,374	\$1,614,728	\$1,730,160	\$1,854,295	\$1,987,810	\$2,131,434	\$2,285,952	\$2,452,213	\$2,631,132
Transfers to Reserves												
Equipment Fund	\$8,984	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Construction Fund (Includes CIP)	\$211,140	\$906,000	\$624,000	\$1,128,000	\$105,000	\$130,310	\$134,871	\$239,592	\$144,477	\$3,477,729	\$3,648,450	\$1,825,185
Total Transfers to Reserves	\$220,124	\$906,000	\$624,000	\$1,128,000	\$105,000	\$130,310	\$134,871	\$239,592	\$144,477	\$3,477,729	\$3,648,450	\$1,825,185
Debt Payments												
2005 DWSRF (1998 Rev Bond Refinance)	\$68,629	\$68,057	\$67,403	\$66,749	\$66,094	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Debt Payments	\$68,629	\$68,057	\$67,403	\$66,749	\$66,094	\$0	\$0	\$0	\$0	\$0	\$0	\$0
TOTAL EXPENSES	\$1,636,458	\$2,288,675	\$2,098,920	\$2,702,123	\$1,785,822	\$1,860,470	\$1,989,167	\$2,227,402	\$2,275,911	\$5,763,681	\$6,100,663	\$4,456,317

Table 10.5 – Budget Forecast

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
INCOME												
Rates and Charges	\$1,881,193	\$1,632,960	\$1,793,567	\$1,880,833	\$1,972,097	\$2,010,047	\$2,091,798	\$2,223,748	\$2,346,901	\$2,556,991	\$2,781,008	\$2,999,840
Other Revenue	\$202,891	\$150,855	\$152,872	\$154,929	\$157,028	\$159,168	\$161,352	\$163,579	\$165,850	\$168,167	\$170,531	\$172,941
Loans/Bonds	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Grants	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Transfer from Capital Reserves	\$220,124	\$906,000	\$624,000	\$1,128,000	\$105,000	\$130,310	\$134,871	\$239,592	\$144,477	\$3,477,729	\$3,648,450	\$1,825,185
TOTAL INCOME	\$2,304,208	\$2,689,814	\$2,570,439	\$3,163,762	\$2,234,124	\$2,299,526	\$2,388,020	\$2,626,918	\$2,657,229	\$6,202,888	\$6,599,988	\$4,997,966
EXPENSES												
Operating Expenses	\$1,347,705	\$1,314,618	\$1,407,517	\$1,507,374	\$1,614,728	\$1,730,160	\$1,854,295	\$1,987,810	\$2,131,434	\$2,285,952	\$2,452,213	\$2,631,132
Capital Expenses	\$220,124	\$906,000	\$624,000	\$1,128,000	\$105,000	\$130,310	\$134,871	\$239,592	\$144,477	\$3,477,729	\$3,648,450	\$1,825,185
Existing Debt Service	\$68,629	\$68,057	\$67,403	\$66,749	\$66,094	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Future Debt Service	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$490,000	\$1,139,000	\$1,139,000
TOTAL EXPENSES	\$1,636,458	\$2,288,675	\$2,098,920	\$2,702,123	\$1,785,822	\$1,860,470	\$1,989,167	\$2,227,402	\$2,275,911	\$6,253,681	\$7,239,663	\$5,595,317
Recommended Minimum Balances												
O&M Reserve = 1/8 Operating Expenses	\$168,463	\$164,327	\$175,940	\$188,422	\$201,841	\$216,270	\$231,787	\$248,476	\$266,429	\$285,744	\$306,527	\$328,892
Emergency Reserve = Biggest Asset	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000
Capital Reserve = CIP	\$220,124	\$906,000	\$624,000	\$1,128,000	\$105,000	\$130,310	\$134,871	\$239,592	\$144,477	\$3,477,729	\$3,648,450	\$1,825,185
Recommended	\$2,388,587	\$3,070,327	\$2,799,940	\$3,316,422	\$2,306,841	\$2,346,580	\$2,366,658	\$2,488,068	\$2,410,907	\$5,763,473	\$5,954,977	\$4,154,076
Reserves												
Beginning Balance	\$3,164,553	\$3,612,179	\$3,107,318	\$2,954,838	\$2,288,477	\$2,631,779	\$2,940,524	\$3,204,506	\$3,364,431	\$3,601,272	\$6,662,576	\$2,374,451
Net Income Additions	\$667,750	\$401,139	\$471,519	\$461,639	\$448,302	\$439,055	\$398,854	\$399,516	\$381,318	(\$50,793)	(\$639,674)	(\$597,351)
Deposits from Financing										\$6,589,827		\$8,732,000
(Withdrawals) for CIP	(\$220,124)	(\$906,000)	(\$624,000)	(\$1,128,000)	(\$105,000)	(\$130,310)	(\$134,871)	(\$239,592)	(\$144,477)	(\$3,477,729)	(\$3,648,450)	(\$1,825,185)
Ending Balance	\$3,612,179	\$3,107,318	\$2,954,838	\$2,288,477	\$2,631,779	\$2,940,524	\$3,204,506	\$3,364,431	\$3,601,272	\$6,662,576	\$2,374,451	\$8,683,916
TOTAL REVENUE REQUIREMENT	\$2,304,208	\$2,689,814	\$2,570,439	\$3,163,762	\$2,234,124	\$2,299,526	\$2,388,020	\$2,626,918	\$2,657,229	\$6,202,888	\$6,599,988	\$4,997,966
INCOME MINUS REVENUE REQUIREMENT	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

10.4 Connection Charges

This section presents an abbreviated evaluation of a connection charge. This is not intended to represent a detailed determination of an appropriate connection charge but is to be used to help the District decide if a formal connection charge analysis should be performed.

The District's new customer connection charges are a fixed dollar amount multiplied by the billing ERU value for the new connection. Specific regulations for developing connection charges have not been found in Title 87 of the RCW, so it is assumed that the conditions

described for water and sewer districts under RCW 57.08.005(11) may be used for guidance. In general, this requires the connection charge to consider the following (paraphrased).

- May include a pro-rata share of existing facilities.
- May include a pro-rata share of system improvements planned for the next 10 years, and contained in an adopted comprehensive plan, and other costs directly attributable to improvements required by new customers.
- The charge may include interest from the date of construction to the time of connection or 10 years, whichever is less.
- Shall not include the cost of improvements that have been donated or paid by grants.

Beyond these requirements, several methods are presented by the AWWA as applicable for the type of system.

10.4.1 Buy-In Method

Most appropriate for mature systems with minimal anticipated growth. This takes the current value of the system and divides it by the servable number of connections.

10.4.2 Incremental Cost Method

Most appropriate for growing systems with little excess capacity for new growth. This takes the cost of improvements needed for growth and allocates them proportionate to the new customers' needs.

10.4.3 Combined Cost Method

Most appropriate for growing systems that have excess capacity in some facilities but not in others. The current value of all facilities is allocated to the servable base. Additionally, the current value of existing facilities with excess capacity and the cost of planned improvements are allocated proportional to the needs of new customers. This is the method used for this evaluation.

10.4.3.1 Criteria

Customer services and meters are not included as these costs are attributable to each individual customer.

Distribution mains are included and reduced by the amount contributed by others. The exact value of contributions has not been researched for this analysis, so 20 percent has been assumed. While newer mains are typically sized for MDD and fire flow, many older mains were not. Rather than allocating mains individually by purpose, the entire distribution system is allocated by MDD.

Hydrants have not been included in the system value because they are often contributed to the system at no charge, and each has a small localized benefit area.

The Sienna and Summerset Booster Stations are not included as they are assumed to have been contributed and have limited service areas.

Remaining debt principal is deducted from the system value. This is the 2005 Drinking Water State Revolving Fund (DWSRF) Loan with four remaining principal payments of \$65,444, for a total of \$261,776.

Costs of transmission mains, PRV stations, pumping facilities, and treatment facilities are based on the rate of supply per ERU during MDD, which is 246 gpd (0.17 gpm).

Cost of reservoirs is based on the volume required per connection. This is 200 gallons per ERU for standby storage, and a proportion of the remaining volume (operational, fire, and equalizing).

Transmission mains include the 16-inch raw water mains, the 16-inch finished water main, and all other mains 10 inches and larger.

Control system costs are distributed over the entire servable base.

Cost of existing facilities include 3 percent interest for 10 years following construction, then inflated to the replacement value, then depreciated to the percent of estimated life remaining.

Land purchases at original value. Lands currently built on are distributed over the entire servable base. Lands currently unbuilt on are distributed to future customers.

10.4.3.2 Results

The result of the evaluation is shown in Table 10.6.

Table 10.6 – Connection Charge Estimate

Description	Original Cost (\$M)	Less Contributions (\$M)	Original Value (\$M)	Replacement Value (\$M)	Value Remaining + Interest (\$M)		Basis of Allocation	Cost Per Unit		Cost per ERU
Distribution	\$ 16.4	\$ 3.3	\$ 13.1	\$ 36.6	\$ 23.5	1.8	MGD ADD	\$ 12.72	gpd	\$ 3,125
Transmission	\$ 7.3	\$ -	\$ 7.3	\$ 14.0	\$ 12.2	6,250	gpm MDD	\$ 1,948.96	gpm	\$ 333
Pump Stations	\$ 0.8	\$ 0.4	\$ 0.4	\$ 1.5	\$ 1.2	9.0	gpd MDD	\$ 0.13	gpd	\$ 32
Reservoirs	\$ 0.5	\$ 0.1	\$ 0.4	\$ 1.2	\$ 1.0	0.5	MG	\$ 1.94	gal	\$ 388
WTP (less debt principal)	\$ 7.5	\$ 1.2	\$ 6.3	\$ 13.4	\$ 11.2	1.8	gpd MDD	\$ 6.07	gpd	\$ 1,491
PRV Stations	\$ 0.2	\$ -	\$ 0.2	\$ 0.6	\$ 0	1.8	gpd MDD	\$ 0.15	gpd	\$ 37
Lands Built	\$ 0.0	\$ -	\$ 0.0	n/a	\$ 0	0.8	gpd ADD	\$ 0.05	gpd	\$ 7
Lands Unbuilt	\$ 0.1	\$ -	\$ 0.1	n/a	\$ 0	0.0	gpd fut ADD	\$ 3.12	gpd	\$ 425
Control systems	\$ 0.3	\$ -	\$ 0.3	\$ 0.4	\$ 0	0.8	gpd ADD	\$ 0.33	gpd	\$ 44
6 Year CIP for All	\$ 2.9	\$ -	\$ 2.9	\$ 2.9	\$ 2.9	0.8	gpd ADD	\$ 3.80	gpd	\$ 517
7-20 Year CIP for All	\$ 1.2	\$ -	\$ 1.2	\$ 1.2	\$ 1.2	0.8	gpd ADD	\$ 1.53	gpd	\$ 208
Future WTP Expansion	\$ 7.0	\$ -	\$ 7.0	\$ 7.0	\$ 7.0	1,400	gpm MDD	\$ 5,000.00	gpm	\$ 853
<i>Total</i>	<i>\$ 44.4</i>	<i>\$ 5.0</i>	<i>\$ 39.4</i>	<i>\$ 78.8</i>	<i>\$ 60.8</i>					<i>\$ 7,460</i>

The estimated connection charge is \$7,460 per ERU. If the future reservoir project discussed in Chapter 4 happens within 10 years, the connection charge could be increased by \$1,020.

The connection charge could be increased to include other assets, but a more detailed evaluation beyond the scope of this effort would be required. For example, buildings, vehicles, tools, equipment, and similar assets may be distributed to the entire customer base. Hydrants could be included and allocated by need.

Table of Contents - Appendices

APPENDIX A – AGENCY REVIEWS

- Appendix A1 – WA Department of Health
- Appendix A2 – WA Department of Ecology
- Appendix A3 – Chelan County
- Appendix A4 – City of Chelan
- Appendix A5 – Lake Chelan Reclamation District

APPENDIX B – WATER FACILITIES INVENTORY

APPENDIX C – SEPA

APPENDIX D – RULES AND REGULATIONS

APPENDIX E – COUNTY RESOLUTION 2015-112

APPENDIX F – WATER USE EFFICIENCY

APPENDIX G – WATER RIGHTS

- Appendix G1 – Water Rights Self Assessment
- Appendix G2 – Water Rights
- Appendix G3 – Water Rights Extension

APPENDIX H – WATER QUALITY PROGRAM

- Appendix H1 – Monitoring Plan and Schedule
- Appendix H2 – Coliform Monitoring Plan
- Appendix H3 – Consumer Confidence Report
- Appendix H4 – Cross Connection Control Resolution

APPENDIX I – SANITARY SURVEY

APPENDIX J – CONSTRUCTION STANDARDS

- Appendix J1 – Construction Specifications
- Appendix J2 – Construction Details

APPENDIX K – PUMP CURVES

APPENDIX L – FIRE DISTRICT NESTING APPROVAL

APPENDIX A – AGENCY REVIEWS

APPENDIX A1 – WA DEPARTMENT OF HEALTH

Department of Health, Office of Drinking Water
Eastern Regional Office
Pre-Plan Agreement

Notes...

Water system name:	<u>Lake Chelan Reclamation District</u>	Preplan date:	<u>November 14, 2019</u>
Public Water System ID No.:	<u>43783</u>	WSP submittal due date:	<u>November 14, 2020</u>
Planning Purpose:	<u>Large System WAC 246-290-100(2)(a)</u>	Target year of approval:	<u>2021</u>
Operating Permit Color:	<u>Green</u>	Existing WSP expiration date:	<u>August 30, 2020</u>
Initial/Update/Amend:	<u>Update</u>	End of plan approval period:	<u>discuss</u>
Number of Connections:	<u>1593 of unspecified</u>		(last year of all projections)

[WAC 246-290-100](#) requires purveyors of new water systems, systems in a water coordination act area, systems serving 1,000 or more service connections, systems with an unspecified number of approved connections and systems that are growing or experiencing capacity problems to gain approval for a Water System Plan (WSP). The purpose of this preplan is to determine the level of detail of the WSP and establish an approval schedule. This agreement is valid until the WSP submittal due date above. After that date, the agreement will need to be renegotiated. The operating permit color will change to yellow for planning purposes if the WSP is not approved by the existing WSP expiration date noted above.

Pre-Plan Attendees:	<u>Ryan Peterson, PE, RH2</u>	<u>David Walters, LCRD</u>
<u>Brenda Smits, Regional Planner</u>	<u>Rod Anderson, LCRD Manager</u>	<u></u>
<u>Jeff Johnson, PE, DOH</u>	<u>Jennifer Collins, LCRD</u>	<u></u>

<i>Include in plan</i>	<i>Content Description</i>	<i>WSP Page #</i>
(√)	Water System Plan Submittal Form – DOH Pub. 331-397-F	
(√)	Stamp, date and signature of Professional Engineer licensed in the State of Washington	
Chapter 1	Description of Water System	
(√)	Ownership and management	
(√)	System history and background	
(√)	Brief inventory of existing facilities	
(√)	Description of and discussion about related plans: CWSP , ground water management, basin, and City/County comprehensive plans & zoning. Include comprehensive plan and zoning maps for entire service area.	
(√)	Service area characteristics, agreements, and policies including conditions of service and how new service will be provided in the retail service area. Include maps for retail service area, future service area , and service area. – DOH Pub. 331-432 & DOH Pub. 331-438	
(√)	Duty to serve statement for the retail service area – DOH Pub. 331-366	
()	Satellite Management Agency information	
(√)	Local Government Consistency Determinations from Cities, Counties, and CWSP – DOH Pub. 331-568	
()	Consistency with the watershed plan for Chelan WRIA #47.	

Chapter 2 Basic Planning Data

- (√) **Current data:**
 - Population, service connections & ERUs _____
 - Monthly and annual production totals per source including purchased water _____
 - Annual usage by customer class (e.g. Single Family, Multifamily, Nonresidential) _____
 - ~~Annual usage for water supplied to other systems~~ _____
 - ≥ 1000 connections – description of seasonal variations in use by customer class _____
- (√) **Plan approval period & 20-year service area projections for:**
 - Population, service connections, & ERUs _____
 - Water demand without water use efficiency savings - use [WAC 246-290-221](#) _____
 - Narrative about development type, amount, location, and timing based on comprehensive plan and zoning _____
- (√) DSL percentage, volume, and ERUs (provide calculations in Chapters 3 and 4) _____

Chapter 3 System Analysis

- (√) System design standards (fire flow by land use type, system pressures, etc.) _____
- (√) System inventory, description and analysis – [Detailed description of current system](#) _____
- (√) Source _____
- (√) Storage _____
- (√) Distribution system/hydraulics (with equalization & FFS depleted) _____
- (√) Analysis of each pressure zone _____
- (√) Treatment _____
- (√) Written legal & physical system capacity analysis _____
- (√) Worksheet 4-1 ERU Capacity Summary [DOH Pub. 331-123 Water System Design Manual](#) _____
- (√) Water quality analysis, noting trends _____
- (√) Summary of system deficiencies _____
- (√) Analysis of possible improvement projects _____

Chapter 4 Water Resource Analysis & Water Use Efficiency (WUE)

Metering Program

- () If not fully metered (sources, services, and non-emergency interties):
 - Submit installation schedule & include costs in the budget
 - Describe activities to minimize leakage – [reported fully metered](#) _____
- (√) Discuss meter replacement schedule and include costs in the budget _____
- () Assess data accuracy and data collection if consumption exceeds production _____
- (√) **Distribution System Leakage (DSL)** - ____% 3-year DSL
 - Evaluate and report DSL, [WAC 246-290-820](#) _____
 - Compare calculated DSL with reported values in Water Use Efficiency Annual Performance Reports _____
- () **Water loss control action plan (WLCAP)**
 - If DSL exceeds 10 percent, submit the WLCAP per [WAC 246-290-820\(4\)](#) _____

(√) **Water Use Efficiency Program (WUE) for all systems**

See WUE Guidebook
DOH Pub. 331-375

A WUE program designed to achieve the WUE goal per [WAC 246-290-810](#)

1. Describe the current conservation (WUE) program
2. Updated WUE goal. Document public adoption process (include signed minutes). See [246-290-830\(7\)](#)
3. Describe measures that will be implemented to achieve the goal. Include schedule & costs in the budget – 1,000 to 2,499 connections: 5 additional methods.
4. Describe process used to evaluate the WUE measures you did not implement (see bracket below)
5. Describe yearly consumer education – or provide a sample
6. Estimate projected water savings from selected measures
7. Describe process that will be used to determine effectiveness of the program – who evaluates progress?
8. Plan approval period and 20-year water demand projection with water use efficiency savings

(√) **Additional Water Use Efficiency for systems with ≥ 1000 Connections**

For measures
evaluated
NOT
implemented

- Estimate water saved from efficiency measures over the past 6 years
- Demand forecast if all measures deemed cost-effective were implemented
- Quantitative evaluation of measures to determine if they are cost-effective, include marginal costs of water production
- Evaluate measures for cost-effectiveness if shared with other systems
- Quantitative or qualitative evaluation of measures to determine if they are cost-effective from the societal perspective

(√) **Source of supply analysis:**

- Evaluate water supply alternatives if additional water rights will be pursued within 20 years
- Describe water supply characteristics & discuss any foreseeable impact (quantity & quality) to the resource ([WAC 246-290-100 \(4\)\(f\)\(ii\)\(B\)](#)) – Describe the anticipated change due to use of the source

(√) **Water rights self-assessment: Consult with Ecology regarding water rights prior to plan submittal.**

Put all water right information together in Chapter 4, including water right self-assessment forms for existing, plan approval period, and 20 years.

() Depth to water – data for all groundwater sources and interpretation

(√) Water supply reliability analysis – address trends that threaten the long term viability of your sources

() Interties – descriptions of physical interties and associated agreements

(√) Explore reclaimed water opportunities (systems ≥ 1000 connections)

Chapter 5 Source Water Protection

() (Well/Spring) Sanitary Control Area covenants that address the requirements of [WAC 246-290-135\(2\)](#)

() (Well/Spring) Wellhead protection program/update (inventory, letters, and map) [WAC 246-290-135\(3\)](#)

(√) (Surface water/GWI) Watershed control program pursuant to [WAC 246-290-135\(4\)](#)

Chapter 6 Operation and Maintenance Program

(√) Water system management and personnel

(√) Operator certification

(√) Routine operating procedures and preventive maintenance

(√) Water quality sampling procedures & program. Provide legible LCR and DBP map(s).

(√) Coliform monitoring plan including addresses and map. Update for RTCR.

- (√) Emergency program, service reliability requirements & water shortage plan per [WAC 246-290-420](#). Consider Tier 1 Public Notification process, and multiple channels for notification. – [DOH Pub. 331-211](#) _____
- (√) Address sanitary survey findings – 2018 SS _____
- (√) Cross-connection control (CCC) program [DOH Pub. 331-234](#) & [DOH Pub. 331-355](#) _____
- (√) Systems with ≥1000 connections, provide a copy of your CCC annual summary report form _____
- (√) Recordkeeping, reporting, and customer complaint program _____
- (√) Summary of O&M deficiencies, include cost in budget _____

Chapter 7 (OPTIONAL) Distribution Facilities Design and Construction Standards – [see WAC 246-290-125](#)

- (√) Standard construction specifications for distribution mains (Question 13 on WSP Submittal Form) _____
- (√) Design and construction standards for distribution-related projects _____

Chapter 8 Capital Improvement Program

- (√) Capital Improvement Program (CIP) for plan approval period, including annual CIP schedule _____
- (√) 20-year (minimum) CIP for projects beyond the plan approval period _____

Chapter 9 Financial Program

- (√) Summary of past income and expenses, sufficient to establish trends _____
- (√) Balanced operational and capital budget projections for plan approval period _____
- (√) Show operational, capital, and emergency reserve goals. Describe the revenue requirements to achieve them. Demonstrate annual progress toward goals. _____
- (√) Evaluate rate affordability. Provide rate that would be unaffordable, income below which current and future rates are unaffordable, and programs available for low income customers. _____
- (√) Rate structure evaluation that considers the feasibility of implementing rate structure that encourages water demand efficiency. - [WAC 246-290-100\(4\)\(j\)\(iv\)\(B\)](#) and [DOH Pub. 331-375, section 5.4](#) _____

Chapter 10 Miscellaneous Documents

- (√) Updated Water Facilities Inventory with authorized signature _____
- (√) Informational meeting for the consumers, include notification and signed minutes _____
- (√) Notice to adjacent utilities that WSP is available for review & comment. Attach comments received. _____
- (√) SEPA: signed Environmental Checklist and Threshold Determination, if 1,000 or more connections. The water system is lead agency. _____
- (√) Agreements: intertie, service area, franchise, wheeling, mutual aid, inter-local and other agreements – *if any* _____
- () Satellite Management Contract and Water User Agreement _____
- (√) When DOH is ready to approve the final WSP, the plan must be adopted by the governing body. Include signed meeting minutes or signed resolution. _____

- **Mapping – All maps must be a minimum of 11”x17”**
- **Fee – The total review fee for the first and second drafts for 1,000 to 9,999 connections is \$3,705. Additional drafts are an additional \$926.25.**
- **Copies – Provide two (2) copies of the WSP. DOH sends one copy to the Dept. of Ecology. One copy may be provided on CD or USB drive.**
- **Timelines – Plans are reviewed in the order received. DOH will respond within ninety (90) days of receiving draft plans (i.e. 90 days after the first draft, and again, 90 days after the second draft). Dept. of Ecology has 60 days to review, and that is concurrent with the DOH 90-day period. Submittals are addressed in the order received.**



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.**

Lake Chelan Reclamation District	43783U	Lake Chelan Reclamation District
1. Water System Name	PWS ID# or Owner ID#	Water Systems Owner's Name
Rod Anderson	(509) 687-3548	Manager
Contact Name for Utility	Phone Number	Title
P.O. Box J	Manson	WA 98831
Contact Address	City	State Zip
Ryan Peterson, PE, RH2 Engineering, Inc.	(509) 886-2900	Project Manager
2. Project Engineer	Phone Number	Title
300 Simon St SE, Suite 5	East Wenatchee	WA 98802
Project Engineer Address	City	State Zip
Same as #1		
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?		<u>2,050</u>
5. Is your system expanding (<i>circle what applies</i> : seeking to extend service area or increase number of approved connections)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
6. If the number of services is expected to increase, how many <i>new</i> connections are proposed in the next six years?		<u>300</u>
7. If your system is private-for-profit, is it regulated by the State Utilities and Transportation Commission?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
8. Is the system located in a Critical Water Supply Service Area (i.e., have a Coordinated Water System Plan)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
9. Is your system a customer of a wholesale water system?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
10. Will your system be pursuing additional water rights from the Department of Ecology in the next 20 years?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
11. Is your system proposing a new intertie?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
12. Do you have projects currently under review by us?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> 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?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> 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?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
16. Are you proposing a change in the place of use of your water right?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
17. What is the last year of the plan approval period (the year the shortest WSP projection is made)?		<u>2026 / 2030</u>

If answer to questions 7,8, 11, 14 and/or 15 is "yes," list who you sent the WSP to: Chelan County, City of Chelan

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.

2 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).



STATE OF WASHINGTON
DEPARTMENT OF HEALTH
EASTERN DRINKING WATER REGIONAL OPERATIONS
16201 E Indiana Avenue, Suite 1500, Spokane Valley, Washington 99216-2830
711 Washington Relay Service

RECEIVED EAST WENATCHEE
RH2 ENGINEERING INC.
JOB NO. _____

April 28, 2021

APR 30 2021

ROUTE TO: _____
FILE: _____

Rod Anderson
Lake Chelan Reclamation District
PO Box J
Manson, WA 98831

Subject: Lake Chelan Reclamation District; PWS ID# 43783; Chelan County
Water System Plan; DOH Project #21-0412

Dear Mr. Anderson:

The Water System Plan for the above mentioned water system was received in this office on April 19, 2021, and is now in the review process. We wish to inform you that WAC 246-290-990 authorizes a fee to be charged for the review of water system plans, reports, and construction documents. A fee will be charged for the review and approval of your water system planning document. You will receive an invoice for payment after our initial review of the plan. Payment is due at that time. Please use this link to access our fee schedule:
<http://www.doh.wa.gov/portals/1/Documents/pubs/331-228.pdf>.

This project has been assigned the following unique project # 21-0412. **Please use this number on all future correspondence or submittals pertaining to this project.**

The department's review of your water system planning document will not confer or guarantee any right to a specific quantity of water. Our review will be based on your representation of available water quantity. If the Washington Department of Ecology, a local planning agency, or other authority responsible for determining water rights and water system adequacy determines that you have use of less water than you represent, the number of approved connections may be reduced commensurate with the actual amount of water and your legal right to use it.

In accordance with RCW 70.116.140, the Department of Health Office of Drinking Water will review and respond to your system's Water System Planning document within 90 days unless a longer period of time is necessary to adequately review the plan. If additional time is needed, the department will notify you.

If you have any questions, please contact me at (509) 329-2122.

Sincerely,

Brenda Smits
Regional Planner
Office of Drinking Water
Division of Environmental Public Health

cc: Chelan-Douglas Health District
Ryan Peterson, PE, RH2 Engineering, Inc.
Chelan County Planning Department
Jeff Johnson, PE, DOH Regional Engineer
Katrina McLaughlin, DOH Compliance Program Manager

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.**

Lake Chelan Reclamation District	43783U	Lake Chelan Reclamation District
1. Water System Name	PWS ID# or Owner ID#	Water Systems Owner's Name
Rod Anderson	(509) 687-3548	Manager
Contact Name for Utility	Phone Number	Title
P.O. Box J	Manson	WA 98831
Contact Address	City	State Zip
Ryan Peterson, PE, RH2 Engineering, Inc.	(509) 886-2900	Project Manager
2. Project Engineer	Phone Number	Title
300 Simon St SE, Suite 5	East Wenatchee	WA 98802
Project Engineer Address	City	State Zip
Same as #1		
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?	<u>2,050</u>	
5. Is your system expanding (<i>circle what applies</i> : seeking to extend service area or increase number of approved connections)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
6. If the number of services is expected to increase, how many <i>new</i> connections are proposed in the next six years?	<u>300</u>	
7. If your system is private-for-profit, is it regulated by the State Utilities and Transportation Commission?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
8. Is the system located in a Critical Water Supply Service Area (i.e., have a Coordinated Water System Plan)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
9. Is your system a customer of a wholesale water system?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
10. Will your system be pursuing additional water rights from the Department of Ecology in the next 20 years?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
11. Is your system proposing a new intertie?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
12. Do you have projects currently under review by us?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> 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?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> 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?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
16. Are you proposing a change in the place of use of your water right?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
17. What is the last year of the plan approval period (the year the shortest WSP projection is made)?	<u>2026 / 2030</u>	

If answer to questions 7,8, 11, 14 and/or 15 is "yes," list who you sent the WSP to: Chelan County, City of Chelan

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.

2 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).



July 28, 2021

Jeff Johnson, P.E.
Brenda Smits
Washington State Department of Health
Eastern Drinking Water Operations
16201 East Indiana Avenue, Suite 1500
Spokane Valley, WA 99216

Sent via: Email and US Mail

Subject: Lake Chelan Reclamation District (DOH System ID 43783U)
2021 Water System Plan First Draft Review Response

Dear Jeff and Brenda:

Thank you for your review of the District's draft Water System Plan (WSP). Our responses to your comments are presented below.

Chapter 2

1) *Figure 2.5 Service Areas. The Service Area Map identifies the Water Rights Place of Use covering a more expansive area than the water system Service Area. Please explain why the identified Water Rights Place of Use extends beyond the water system Service Area.*

The Water Rights Place of Use shown on Figure 2.5 is consistent with that described in the Water Rights documents, included in Appendix G. The current place of use is established in the 1995 Permits, with most of this area traceable back to the 1925 Certificate. It is risky to speculate as to the decisions made in the past. One thought is that we know the place of use was established before the Municipal Water Law (MWL) was developed, so it may have been a way for the District to establish the water rights for an ultimate future service area and not have to reapply at a later time. The MWL made this potential process simpler. The water rights documents have been accepted by the Department of Ecology.

Chapter 4

1) *Section 4.5.3 item S1(b): The suggestion of making nesting permanent does not seem realistic in view of the February 2021 email from the Fire Chief, in which he makes it clear that he views nesting as a temporary solution to the storage issue. He does not give a firm deadline for building enough storage to eliminate nesting but suggests that waiting until 2035 is too long and maybe 5 years is about the right timeframe to have it solved.*

WASHINGTON LOCATIONS

Bellingham
Bothell (Corporate)
East Wenatchee
Issaquah
Richland
Tacoma

OREGON LOCATIONS

Medford
Portland

IDAHO LOCATIONS

Meridian

S1(b) was presented as one of four alternatives reviewed for addressing the storage issue, but was not the selected alternative.

The calculation of storage deficit shown in Table 4.7 includes a significant contingency assuming loss of 50% of the water treatment plant (WTP) capacity, which has only happened once since the plant was built in 1998. The WTP loss would have to occur at the same time as a major fire (less than a 1% probability). The District currently has a WTP plant capacity increase planned to begin in 2029, though they are evaluating if that schedule can be accelerated.

Also, the Fire Chief has described a possible fire event (6,000 gpm) that exceeds standards required for current or anticipated structures. We understand their business is to plan high and minimize risk, but LCRD can only plan and budget for actual standards in place.

The Fire Chief does not propose 5 years to build a tank in his letter, he only notes that in 5 years the nested volume needed will increase (as it will each year, 5 years appears to be selected simply for the purpose of conversation).

The fire storage requirement is based on the highest rated structure in the District, which is only one facility. The next highest rated facility may not currently even be in operation. With no nesting required, the District's system can currently supply a fire flow of up to 3,500 gpm for 4 hours, and about 4,000 gpm if the WTP is at normal operational status. The fire storage standards of all but two of the District's 2,048 customers can currently be met with no nesting.

The District understands and shares the concerns of the Fire Chief that waiting until 2035 may be too long. In response, construction of new storage (project S1a described on page 49) is shown beginning in 2031 (Table 9.1). Even waiting this long, the effect to District customer rates of the overall capital plan is significant, increasing rates by almost 80% over 10 years. Unless grant funding can be obtained, the District does not feel that further accelerating the reservoir project warrants the even greater impact to the ratepayers.

- 2) *Section 4.5.3 item S1(c): If the LCRD is seriously considering the approach presented in this option, be aware that you will need to follow the principles in WAC 246-290-420(5) for the downward revision of the level of service.*

The District is not considering this approach. Section 4.5.3 describes four possible alternatives (a, b, c, and d) that were evaluated for addressing the storage issues. Alternative S1(a) was selected and is included in the 10-year capital improvement plan.

- 3) *Table 4.8 Physical Capacity Summary: Provide the calculations behind the ERU capacity figures presented for each facility component.*

The narrative of how each component is calculated is shown immediately following Table 4.8 on pages 47 and 48. The numerical values are as follows.

- Source (raw) = 3,517 gpm (Table 4.2) x 1,440 minutes = 5,064,000 gpd.
- Source (treated) = 1,833 gpm (Table 4.2) x 1,440 minutes = 2,640,000 gpd.
- Treatment = 1,400 gpm (one filter) x 1,440 minutes = 2,016,000 gpd.
- Storage: Values from Table 4.7 are used. To be conservative, the year 2015 was used because the consumptive needs in 2015 were higher than the most current year of the WSP (2019).

- With Nesting = 2,306,530 gallons available – 459,031 gallons operational = 1,847,499 gallons
- Without Nesting = 2,306,530 gallons available – 459,031 gallons operational – 1,044,000 gallons fire = 803,499 gallons.
- Transmission = 4,150 gpm + 2,100 gpm (Table 2.4) x 1,440 minutes = 9,000,000 gpd.
- Water Rights Qi = 13.93 cfs = 9,002,569 gpd (Appendix G Water Rights Self Assessment)
- Water Rights Qa = 2,672 ac ft/year = 2,385,245 gpd (Appendix G Water Rights Self Assessment)

4) *Please provide an analysis of the capacity for each pressure zone of the system.*

The supply capacity analysis is shown in Table 4.3 and storage capacity analysis in Table 4.7. Over 98% of the supply and 100% of the storage are into the 1534 pressure zone. Five other pressure zones are fed directly from the 1534 zone through pressure reducing valves, so they are a direct demand on the 1534 zone. They do not have supply and storage facilities of their own. Each of these pressure reduced zones are fed by pressure reducing valves sized for fire protection (Table 2.7, Figure 2.1, Figure 2.2), which exceed the domestic needs by roughly an order of magnitude. For example, a single 6-inch PRV can supply up to 1,800 gpm, which could support a peak hour demand for 6,000 ERUs (Table 3.10). The District currently has 10 PRVs that are 6-inch or larger.

The capacity evaluations of the two closed pressure zones (1450 and 1600) are shown in Table 4.3 where both are shown to have sufficient capacity for the foreseeable future.

Appendix J: Add an item describing the specification for separation between potable pipes and non-potable pipes, also describe the allowable measures for mitigation when minimum clearances cannot be maintained or when potable pipe crosses under non-potable pipe.

Section 44 has been added to the end of the design standards. See attached.

Appendix C Provide signed DNS.

Signed DNS is attached.

If you have any questions, please call me at (509) 679-9144 or via email at rpeterson@rh2.com. Thank you for the opportunity to assist you with this project.

Sincerely,



Ryan Peterson, PE

Attachments:

- DOH Submittal Form
- SEPA DNS **See Appendix C**
- Domestic water construction standards **See Appendix J**

Cc: Rod Anderson, Manager, Lake Chelan Reclamation District





STATE OF WASHINGTON
DEPARTMENT OF HEALTH

EASTERN DRINKING WATER REGIONAL OPERATIONS
16201 E Indiana Avenue, Suite 1500, Spokane Valley, Washington 99216-2830
711 Washington Relay Service

REC'D EAST WENATCHEE
RHZ ENGINEERING INC.
JOB NO: _____

September 29, 2021

OCT 01 2021

ROUTE TO: _____
FILE: _____

Rod Anderson
Lake Chelan Reclamation District
PO Box J
Manson, WA 98831

Subject: Lake Chelan Reclamation District; PWS ID #43783; Chelan County;
Water System Plan; Submittal #21-0412; **DOH Approval**

Dear Mr. Anderson:

The Lake Chelan Reclamation District Water System Plan (WSP) received in this office on April 19, 2021, with revisions submitted on August 2, 2021, has been reviewed and in accordance with the provisions of WAC 246-290-100, is hereby **APPROVED**.

An approved update of this WSP is required **on or before September 29, 2031**, unless the Department of Health (DOH) requests an update or plan amendment pursuant to WAC 246-290-100(9). Approval of this WSP is valid as it relates to current standards outlined in Washington Administrative Code (WAC) 246-290, revised January 2017, and is subject to the qualifications herein. Future revisions in the rules and statutes may be more stringent and require facility modification or corrective action.

Standard Construction Specifications for distribution main extensions have been approved as part of this WSP. With this approval and consistent with WAC 246-290-125(2), Lake Chelan Reclamation District may proceed with the installation of distribution main extensions without additional DOH approval provided that the District maintains on file completed construction completion reports (a copy of which is attached) in accordance with WAC 246-290-125(2) and makes them available for review upon request by DOH.

Disclaimer: The department's approval of your Water System Plan does not confer or guarantee any right to a specific quantity of water. The approved number of service connections is based on your representation of available water quantity. If the Washington Department of Ecology, a local planning agency, or other authority responsible for determining water rights and water system adequacy determines that you have use of less water than you represented, the number of approved connections may be reduced commensurate with the actual amount of water and your legal right to use it. A copy of the Department of Ecology's correspondence dated May 12, 2021, regarding your water rights are enclosed.

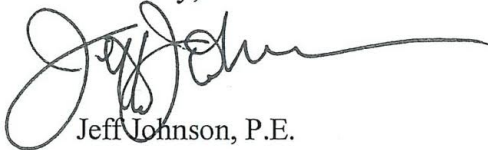
Rod Anderson
September 29, 2021
Page 3

Submittal of the WSP included local government consistency determinations from the City of Chelan and Chelan County. This WSP meets local government consistency requirements for WSP approval pursuant to RCW 43.20 for these entities.

The Lake Chelan Reclamation District is located within Chelan WRIA #47. Ecology has not determined whether the WSP was not inconsistent with an approved watershed plan. DOH encourages the water system to contact Ecology regarding this matter.

Thank you for your cooperation. DOH recognizes the significant effort and resource commitment involved in the preparation of this WSP. If you have any comments or questions concerning our review please contact either of us at (509) 329-2110 Jeff.Johnson@doh.wa.gov, or (509) 329-2122 Brenda.Smits@doh.wa.gov, respectively.

Sincerely,



Jeff Johnson, P.E.
Regional Engineer
Office of Drinking Water
Division of Environmental Public Health



Brenda Smits
Regional Planner
Office of Drinking Water
Division of Environmental Public Health

Enclosures: Construction Completion Form
Department of Ecology correspondence dated 5/12/21

cc: Chelan-Douglas Health District
Chelan County Planning
Ryan Peterson, PE, RH2 Engineers
Ying Fu, Department of Ecology, Eastern Regional Office
Sarita Preuss, DOH WFI Regional Specialist
Katrina McLaughlin, DOH Compliance Program Manager
Scott Mallery, PE, DOH Assistant Regional Manager

CONSTRUCTION COMPLETION REPORT FORM FOR DISTRIBUTION MAIN PROJECTS

In accordance with WAC 246-290-120(5), a **Construction Completion Report** is required for all construction projects. Under the submittal exception process for distribution main projects, designed by a professional engineer but not submitted to the Department of Health (DOH) for approval, the report does not need to be submitted. **However, the purveyor must keep the Construction Completion Report on file and make it available for review upon request by DOH in accordance with WAC 246-290-125 (2)(b).** Furthermore:

- (1) The report form **must** bear the seal, date and signature of a professional engineer (PE) licensed in the state of Washington; and
- (2) Per WAC 246-290-120(5)(c), the amount of change in the physical capacity of a system must be documented, if the project results in a change in physical capacity.

Name of Water System

DOH System ID No.:

Name of Purveyor (Owner or System Contact)

Date Water System Plan that includes

Standard Construction Specifications

Mailing Address

Date Standard Specifications

Approved by DOH:

City

State

Zip

PROJECT NAME AND DESCRIPTIVE TITLE:

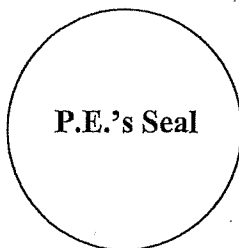
(Include the name of any development project and number of services.)

Date Project or Portions Thereof Completed

PROFESSIONAL ENGINEER'S ACKNOWLEDGMENT

The undersigned professional engineer (PE), or his/her authorized agent, has inspected the above-described project that, as to layout, size and type of pipe, valves and materials, and other designed physical facilities, has been constructed and is substantially completed in accordance with construction documents reviewed by the purveyor's engineer. In the opinion of the undersigned engineer, the installation, physical testing procedures, water quality tests, and disinfection practices were carried out in accordance with state regulations and principles of standard engineering practice.

I have reviewed the disinfection procedures, pressure test results, and results of the bacteriological test(s) for this project and certify that they comply with the requirements of the construction standards/specifications approved by DOH.



Date Signed

Name of Engineering Firm

Name of PE Acknowledging Construction

Mailing Address

City

State

Zip

Engineer's Signature

State/Federal Funding Type (if any)

Please keep a completed, signed, and stamped copy on file.

☐ Northwest Drinking Water
Department of Health
20425 72nd Ave S, Suite 310
Kent, WA 98032-2358
Phone: (253) 395-6750
Fax: (253) 395-6760

☐ Southwest Drinking Water
Department of Health
PO Box 47823
Olympia, WA 98504-7823
Phone: (360) 236-3030
Fax: (360) 664-8058

☒ Eastern Drinking Water
Department of Health
16201 E Indiana Ave, Suite 1500
Spokane Valley, WA 99216
Phone: (509) 329-2100
Fax: (509) 329-2104

If you need this publication in an alternate format, call (800) 525-0127. For TTY/TDD call (800) 833-6388.

APPENDIX A2 – WA DEPARTMENT OF ECOLOGY



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
4601 N Monroe Street • Spokane, WA 99205-1295 • 509-329-3400

May 12, 2021

Mr. Rod Anderson
Lake Chelan Reclamation Dist.
POB J
Manson, WA 98831-0399

Re: Lake Chelan Reclamation Dist.; PWS ID # 43783; Chelan County
Water System Plan; DOH Project #21-0412

Dear Mr. Anderson:

I have reviewed the above referenced document in accordance with the *2007 Memorandum of Understanding* between Department of Health (DOH) and Department of Ecology (DOE), and in accordance with RCW 90.03.386. Ecology's review is focused only on the subject water system's water rights legitimacy, adequacy and related issues affecting the submitted report.

Lake Chelan Reclamation Dist. (LCRD) Water System has 5 water rights. The Self-Assessment Table appears to be current and correct. The system has total Qi of 13.93 cfs (6,252 gpm) and total Qa of 2,672 ac-ft per year. The report indicates LCRD will have adequate water right to support its current operation and 20 year projected growth. The system has no past or on going water right issues.

These are my comments at this time. Please don't hesitate to contact me should you have any questions regarding this letter. I can be reached at (509) 209-3551 or by email at yifu461@ecy.wa.gov.

Sincerely,

Ying.Fu@ecy.wa.gov

Ying Fu
Water Resources Program

YF:em

cc: Brenda Smits, DOH/ERO
Scott Turner, DOE/CRO



APPENDIX A3 – CHELAN COUNTY

Local Government Consistency Determination Form

Water System Name: Lake Chelan Reclamation District PWS ID: 43783U

Planning/Engineering Document Title: 2021 Water System Plan Plan Date: April 2021

Local Government with Jurisdiction Conducting Review: Chelan County

Before the Department of Health (DOH) approves a planning or engineering submittal under Section 100 or Section 110, the local government must review the documentation the municipal water supplier provides to prove the submittal is consistent with **local comprehensive plans, land use plans and development regulations** (WAC 246-290-108). Submittals under Section 105 require a local consistency determination if the municipal water supplier requests a water right place-of-use expansion. The review must address the elements identified below as they relate to water service.

By signing this form, the local government reviewer confirms the document under review is consistent with applicable local plans and regulations. If the local government reviewer identifies an inconsistency, he or she should include the citation from the applicable comprehensive plan or development regulation and explain how to resolve the inconsistency, or confirm that the inconsistency is not applicable by marking N/A. See more instructions on reverse.

Local Government Consistency Statement	For use by water system	For use by local government
	Identify the page(s) in submittal	Yes or Not Applicable
a) The water system service area is consistent with the adopted <u>land use and zoning</u> within the service area.	26 to 27, Fig 3.1	<i>yes</i>
b) The <u>growth projection</u> used to forecast water demand is consistent with the adopted city or county's population growth projections. If a different growth projection is used, provide an explanation of the alternative growth projection and methodology.	12 to 15, 28 to 29	<i>yes - Res 2015-112 & estimator</i>
c) For <u>cities and towns that provide water service</u> : All water service area policies of the city or town described in the plan conform to all relevant <u>utility service extension ordinances</u> .	n/a	<i>n/a</i>
d) <u>Service area policies</u> for new service connections conform to the adopted local plans and adopted development regulations of all cities and counties with jurisdiction over the service area.	9 to 11, Appendix D	<i>yes</i>
e) <u>Other relevant elements</u> related to water supply are addressed in the water system plan, if applicable. This may include Coordinated Water System Plans, Regional Wastewater Plans, Reclaimed Water Plans, Groundwater Management Area Plans, and the Capital Facilities Element of local comprehensive plans.	8, 56, 67 to 72	<i>yes</i>

I certify that the above statements are true to the best of my knowledge and that these specific elements are consistent with adopted local plans and development regulations.

Molly McGuire
Signature
Molly McGuire, Planner I, Chelan County CO
Printed Name, Title, & Jurisdiction

5/11/2021
Date

APPENDIX A4 – CITY OF CHELAN

Local Government Consistency Determination Form

Water System Name: Lake Chelan Reclamation District PWS ID: 43783U

Planning/Engineering Document Title: 2021 Water System Plan Plan Date: April 2021

Local Government with Jurisdiction Conducting Review: City of Chelan

Before the Department of Health (DOH) approves a planning or engineering submittal under Section 100 or Section 110, the local government must review the documentation the municipal water supplier provides to prove the submittal is consistent with **local comprehensive plans, land use plans and development regulations** (WAC 246-290-108). Submittals under Section 105 require a local consistency determination if the municipal water supplier requests a water right place-of-use expansion. The review must address the elements identified below as they relate to water service.

By signing this form, the local government reviewer confirms the document under review is consistent with applicable local plans and regulations. If the local government reviewer identifies an inconsistency, he or she should include the citation from the applicable comprehensive plan or development regulation and explain how to resolve the inconsistency, or confirm that the inconsistency is not applicable by marking N/A. See more instructions on reverse.

Local Government Consistency Statement	For use by water system	For use by local government
	Identify the page(s) in submittal	Yes or Not Applicable
a) The water system service area is consistent with the adopted <u>land use and zoning</u> within the service area.	26 to 27, Fig 3.1	yes
b) The <u>growth projection</u> used to forecast water demand is consistent with the adopted city or county's population growth projections. If a different growth projection is used, provide an explanation of the alternative growth projection and methodology.	12 to 15, 28 to 29	yes
c) For cities and towns that provide water service: All water service area policies of the city or town described in the plan conform to all relevant <u>utility service extension ordinances</u> .	n/a	n/a
d) <u>Service area policies</u> for new service connections conform to the adopted local plans and adopted development regulations of all cities and counties with jurisdiction over the service area.	9 to 11, Appendix D	yes
e) <u>Other relevant elements</u> related to water supply are addressed in the water system plan, if applicable. This may include Coordinated Water System Plans, Regional Wastewater Plans, Reclaimed Water Plans, Groundwater Management Area Plans, and the Capital Facilities Element of local comprehensive plans.	8, 67 to 72	yes

I certify that the above statements are true to the best of my knowledge and that these specific elements are consistent with adopted local plans and development regulations.

Craig Polley
Signature
Planning Director City of Chelan
Printed Name, Title, & Jurisdiction

4-22-21
Date

APPENDIX A5 – LAKE CHELAN RECLAMATION DISTRICT

REGULAR MEETING
BOARD OF DIRECTORS

August 10, 2021

The Board of Directors of Lake Chelan Reclamation District met for their regular Board meeting at the office of the District on August 10, 2021. The meeting was called to order at 8:05 a.m. by Board President David Clark. Those in attendance were:

BOARD

David Clark
Paul Mogan
Chad Steiner
Carl Peterson

STAFF

Rodney L. Anderson
Mary Lou Brooks

GUESTS

MINUTES – FINANCIAL REVIEW – STATUS OF FUNDS

A motion was made by Director Mogan and seconded by Director Steiner to approve the July 13, 2021 minutes, budgets, and investments, as mailed. Motion carried unanimously.

ACCOUNTS PAYABLE

Secretary-Manager Anderson presented the accounts payables for review and approval. Accounts payable checks 16895 through 16945 (including EFT payments) totaled \$461,838.39 and were broken down as follows:

Irrigation O & M Investment	\$125,691.31
Irrigation Construction	\$ 9,241.34
Bond Proceeds – MCC Upgrade Costs	\$ 81,122.70
Domestic O & M Investment	\$165,853.99
Domestic Construction	\$ 12,210.51
Sewer O & M Investment	\$ 67,718.54
Sewer Construction	\$ 0.00

A motion was made by Director Mogan and seconded by Director Peterson to approve the accounts payable as listed. Motion passed unanimously.

MANAGER'S REPORT

Irrigation: Phase 1 of the MCC Upgrade project has been finished and the 1-year warranty period has begun.

A 1990s Irrigation Contract granting an additional water allotment to be pumped out of Wapato Lake for agricultural purposes is in default for non-payment of assessments, not using the water as intended and the lot being sub-divided and sold. The electrical breaker for the pump has been shut off and locked. At the end of this irrigation season, the Contract will be terminated. Our attorney will send a letter to the customer explaining our position. It was the consensus of the Board members to proceed with terminating this Contract.

Domestic: Nothing to report.

Sewer: The District was approved for a \$100,000 grant through the County for proposed upgrades to Lift Station No. 2.

Axtman Development – We are looking at requiring the developer to extend the sewer mainline to serve his development, as it will benefit the District for future development in the area. Manager Anderson is proposing we either cost share with the developer, or possibly have him pay the entire amount, then attach a late comers agreement to all lots that may benefit from this extension, allowing the developer to recoup a percentage of the cost in extending the mainline. After considerable discussion, the Board would like additional information provided to them before voting on any action for this project.

Administrative: The Centennial booklet is finished and ready for printing. There will be an initial 300 copies made available to the public.

The new shop is finished, except the concrete floor being poured, which should be completed within the next couple of weeks.

OLD BUSINESS

The appraisal for the Snyder property has been completed and we are moving forward with the purchase.

NEW BUSINESS

Jack Shaw would like to relinquish .04 acres of water, as it is not feasible for him to retain. After minimal discussion, a motion was made by Director Peterson and seconded by Director Steiner to approve the relinquishment of .04 acres by Jack Shaw. Motion carried unanimously.

Lift Station No. 2, at the corner of Madeline & SR 150, needs some upgrades. The electrical system is currently below ground and will be moved above ground, with a third pump being installed. The cost will be approximately \$750,000 and will be designed to go to bid this fall. After some discussion and clarifications, a motion was made by Director Mogan and seconded by Director Peterson to approve the engineering Contract for upgrades to Lift Station No. 2 as presented. Motion carried unanimously.

Manager Anderson presented the Board members with a Contract with RH2 Engineering for Phase II of the Sewer Comp Plan. The Engineer in charge of the project, Don Popoff, was waiting for the City of Chelan to finish their projects' costs list, as the District sends our sewage to their treatment facility and pays a portion of their sewer projects. After some discussion, a motion was made by Director Peterson and seconded by Director Mogan to accept the Contract with RH2 Engineering for Phase II of the Sewer Comp Plan as presented. Motion carried unanimously.

Manager Anderson brought to the attention of the Board that all bond proceeds need to be spent within 36 months of receiving. Therefore, Phases III and IV, irrigation pumping plants B, C, D and F electrical system upgrades, will need to be combined to expedite the process and spend the money within the time allowed. Pumping plants E, G and H will be remaining for future upgrades. They are the smallest plants and Manager Anderson believes we can pay for these upgrades without incurring any further debt. After significant discussion, a motion was made by Director

Mogan and seconded by Director Peterson to accept the engineering Contract to combine Phases III and IV, Irrigation pumping plants B, C, D and F electrical system upgrades, to be completed in the spring of 2023. Motion carried unanimously.

Manager Anderson presented to the Board members the Domestic Water System Comp Plan, Domestic Water Use Efficiency Program and Emergency Action Plan. After some discussion and clarification, a motion was made by Director Steiner and seconded by Director Mogan to accept the Domestic Water System Comp Plan, Domestic Water Use Efficiency Program and Emergency Action Plan all as presented. Motion carried unanimously.

The district has recently encountered a new ERU category for guest rooms, which was defined by the County as equivalent of a Bed and Breakfast. We will be adding this category to our ERU Chart Policy, defined as 1 ERU for the residence, with an additional ¼ ERU for each guest unit, comprising of one bedroom and one bathroom per unit. After considerable discussion, a motion was made by Director Peterson and seconded by Director Mogan to add the new Guest Inn ERU category to Lake Chelan Reclamation District Rules and Regulations as presented. Motion carried unanimously.

PUBLIC COMMENT

No public comment at this time.

ADJOURNMENT

Being no further business to come before the Board, Board President David Clark adjourned the meeting at 9:13 a.m.

Signed: _____

President

Attest: _____

Secretary-Manager

August 2021

APPENDIX B – WATER FACILITIES INVENTORY



WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 1
Updated: 12/10/2019

Printed: 1/15/2020
WFI Printed For: On-Demand

Submission Reason: Contact Update

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

1. SYSTEM ID NO. 43783 U	2. SYSTEM NAME LAKE CHELAN RECLAMATION DISTRICT	3. COUNTY CHELAN	4. GROUP A	5. TYPE Comm					
6. PRIMARY CONTACT NAME & MAILING ADDRESS RODNEY L. ANDERSON [OPERATOR] LAKE CHELAN RECLAMATION DISTRICT PO BOX J MANSON, WA 98831		7. OWNER NAME & MAILING ADDRESS LAKE CHELAN RECLAMATION DISTRICT RODNEY L. ANDERSON PO BOX J MANSON, WA 98831 MANAGER							
STREET ADDRESS IF DIFFERENT FROM ABOVE ATTN ADDRESS CITY STATE ZIP		STREET ADDRESS IF DIFFERENT FROM ABOVE ATTN ADDRESS CITY							
9. 24 HOUR PRIMARY CONTACT INFORMATION		10. OWNER CONTACT INFORMATION							
Primary Contact Daytime Phone: (509) 687-3548		Owner Daytime Phone: (509) 687-3548							
Primary Contact Mobile/Cell Phone: (509) 679-0639		Owner Mobile/Cell Phone: (509) 679-0639							
Primary Contact Evening Phone: (xxx)-xxx-xxxx		Owner Evening Phone:							
Fax: (509) 687-9884 E-mail: xxxxxxxxxxxxxxxxxxxx		Fax: (509) 687-9884 E-mail: xxxxxxxxxxxxxxxxxxxx							
11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)									
<input checked="" type="checkbox"/> Not applicable (Skip to #12) <input type="checkbox"/> Owned and Managed SMA NAME: SMA Number: <input type="checkbox"/> Managed Only <input type="checkbox"/> Owned Only									
12. WATER SYSTEM CHARACTERISTICS (mark all that apply)									
<input checked="" type="checkbox"/> Agricultural <input type="checkbox"/> Hospital/Clinic <input checked="" type="checkbox"/> Residential <input checked="" type="checkbox"/> Commercial / Business <input checked="" type="checkbox"/> Industrial <input checked="" type="checkbox"/> School <input checked="" type="checkbox"/> Day Care <input checked="" type="checkbox"/> Licensed Residential Facility <input checked="" type="checkbox"/> Temporary Farm Worker <input checked="" type="checkbox"/> Food Service/Food Permit <input checked="" type="checkbox"/> Lodging <input type="checkbox"/> Other (church, fire station, etc.): <input checked="" type="checkbox"/> 1,000 or more person event for 2 or more days per year <input checked="" type="checkbox"/> Recreational / RV Park									
13. WATER SYSTEM OWNERSHIP (mark only one)				14. STORAGE CAPACITY (gallons)					
<input type="checkbox"/> Association <input type="checkbox"/> County <input type="checkbox"/> Investor <input checked="" type="checkbox"/> Special District <input type="checkbox"/> City / Town <input type="checkbox"/> Federal <input type="checkbox"/> Private <input type="checkbox"/> State				2,250,000					
15	16 SOURCE NAME	17 INTERTIE	18 SOURCE CATEGORY	19 USE	20	21 TREATMENT	22 DEPTH	23	24 SOURCE LOCATION
	LIST UTILITY'S NAME FOR SOURCE AND WELL TAG ID NUMBER. Example: WELL #1 XYZ456 IF SOURCE IS PURCHASED OR INTERTIED, LIST SELLER'S NAME Example: SEATTLE	INTERTIE SYSTEM ID NUMBER	WELL WELL IN A WELL FIELD SPRING SPRING IN SPRINGFIELD SEA WATER SURFACE WATER RANNEY / INF. GALLERY OTHER	PERMANENT SEASONAL EMERGENCY SOURCE METERED NONE		CHLORINATION FILTRATION FLUORIDATION IRRADIATION (UV) OTHER	DEPTH TO FIRST OPEN TERNAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION SECTION NUMBER TOWNSHIP RANGE
S01	InAct 01/12/1999 Manson			X	X	X X	X	4000	NE SW 35 28N 21E
S02	InAct 01/12/1999 Lakeshore			X	X	X X	X	2100	NW SW 27 28N 21E
S03	Lake Chelan Reclamation Dist WTP			X	X	X X	X	2800	NE SW 35 28N 21E

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO. 43783 U	2. SYSTEM NAME LAKE CHELAN RECLAMATION DISTRICT	3. COUNTY CHELAN	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?)		1528	Unspecified
A. Full Time Single Family Residences (Occupied 180 days or more per year)	1088		
B. Part Time Single Family Residences (Occupied less than 180 days per year)	250		
26. MULTI-FAMILY RESIDENTIAL BUILDINGS (How many of the following do you have?)			
A. Apartment Buildings, condos, duplexes, barracks, dorms	35		
B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year	140		
C. Part Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied less than 180 days/year	50		
27. NON-RESIDENTIAL CONNECTIONS (How many of the following do you have?)			
A. Recreational Services and/or Transient Accommodations (Campsites, RV sites, hotel/motel/overnight units)	0	0	
B. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	65	65	
28. TOTAL SERVICE CONNECTIONS		1593	

29. FULL-TIME RESIDENTIAL POPULATION													
A. How many residents are served by this system 180 or more days per year? 3175													

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?					400	600	600	600	400			
B. How many days per month are they present?					20	20	20	20	20			

31. TEMPORARY & TRANSIENT USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. How many total visitors, attendees, travelers, campers, patients or customers have access to the water system each month?					500	1000	1000	1000	500			
B. How many days per month is water accessible to the public?					30	30	30	30	30			

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?	1271	1271	1271	1271	1271	523	523	523	1271	1271	1271	1271
B. How many days per month are they present?	31	28	31	30	31	30	31	31	30	31	30	31

33. ROUTINE COLIFORM SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
* Requirement is exception from WAC 246-290	5	5	5	5	5	5	5	5	5	5	5	5

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

35. Reason for Submitting WFI:

☐ Update - Change
 ☐ Update - No Change
 ☐ Inactivate
 ☐ Re-Activate
 ☐ Name Change
 ☐ New System
 ☐ Other _____

36. I certify that the information stated on this WFI form is correct to the best of my knowledge.	
SIGNATURE: _____	DATE: _____
PRINT NAME: _____	TITLE: _____

APPENDIX C – SEPA

SEPA Rules

WAC 197-11-970 Determination of non-significance (DNS).

DETERMINATION OF NON-SIGNIFICANCE

Description of proposal: *Domestic Comprehensive Plan - 2021*

Proponent: *Lake Chelan Reclamation District*

Location of proposal, including street address, if any: *Plan includes projects throughout the domestic service area boundaries of the Lake Chelan Reclamation District (LCRD). LCRD is located on the north shore of Lake Chelan in Chelan County, Washington.*

Lead agency: *Lake Chelan Reclamation District*

The lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An environmental impact statement (EIS) is not required under RCW 43.21C.030(2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public on request.

There is no comment period for this DNS.

✓ This DNS is issued under 197-11-340(2); the lead agency will not act on this proposal for 15 days from the date below. Comments must be submitted by May 2, 2021.

Responsible Official: *Rodney Anderson*

Position/Title: *Secretary/Manager* Phone: *(509) 687-3548*

Address: PO BOX "J"/ 80 Wapato Way, Manson, WA 98831

Date: April 16, 2021

Signature:



SEPA ENVIRONMENTAL CHECKLIST

Purpose of checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

Instructions for applicants:

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Instructions for Lead Agencies:

Please adjust the format of this template as needed. Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

Use of checklist for nonproject proposals:

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the [SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS \(part D\)](#). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in Part B - Environmental Elements –that do not contribute meaningfully to the analysis of the proposal.

A. Background

1. Name of proposed project, if applicable:
Domestic Water System Plan
2. Name of applicant:
Lake Chelan Reclamation District
3. Address and phone number of applicant and contact person:
Rod Anderson, Manager
Lake Chelan Reclamation District
PO Box J
Manson, WA 98831
(509) 687-3548
4. Date checklist prepared:
March 2021

5. Agency requesting checklist:

Washington State Department of Health

6. Proposed timing or schedule (including phasing, if applicable):

Plan adoption Spring 2021

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

The Water System Plan analyzes the water system and identifies improvements that are needed over the next 20 years. Construction of those future improvements will follow the regulatory requirements affective at that time.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

None known.

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

This is a planning effort. Not applicable.

10. List any government approvals or permits that will be needed for your proposal, if known.

Department of Health and Department of Ecology review and approve portions of this plan. Individual projects may require other approvals or permits as implementation begins.

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

The Water System Plan describes the physical and operational characteristics of the water system, and discusses possible future projects. The Plan itself is a non-project action.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available.

The District's water service area is located in Manson, WA, west of the City of Chelan and north of Lake Chelan, primarily the south half of Township 28N and a small amount of the north part of Township 27N, within Ranges 21E and 22E.

B. Environmental Elements

1. Earth

- a. General description of the site:

HILLY

- b. What is the steepest slope on the site (approximate percent slope)?

The steepest slopes generally lie along the shore of Lake Chelan, up to 50% grade.

- c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.

The soils on developed lands falls mainly under the Antilon and Chelan categories as defined by the USGS, which are sandy/silty loams well suited for agriculture. Much of land in the District is used for commercial agriculture. No changes will occur with this non-project action.

- d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

According to the Chelan County mapping there are no known geological or landslide hazards in the District service areas.

- e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.

Not applicable.

- f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

Not applicable.

- g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

Not applicable.

- h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

Not applicable.

2. Air

- a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known.

Some projects will require excavating and the use of construction equipment. Emissions including dust, equipment emissions and smoke will occur temporarily during construction.

- b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

None known.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

Water will be used for dust control when applicable

3. *Water*

a. Surface Water:

- 1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

Yes. Lake Chelan creates the District's western and southern limit. There are a multitude of small ephemeral streams and creeks that run through the service area, which ultimately feed into Lake Chelan and then the Columbia River on their way to the Pacific Ocean. Wapato, Dry, Roses Lakes are in the northwestern portion of the District. Wapato Lake is fed by Joe Creek and Dry Lake is drained through Stink Creek to Lake Chelan.

- 2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

Not applicable.

- 3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

Not applicable.

- 4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

The District obtains all of its water from a surface water intake on Lake Chelan. Future customer growth will increase capacity but will be within authorized water rights.

- 5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

Not applicable.

- 6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

No.

b. Ground Water:

- 1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.

No.

- 2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

None.

c. Water runoff (including stormwater):

- 1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

Not applicable.

- 2) Could waste materials enter ground or surface waters? If so, generally describe.

No.

- 3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.

Not applicable.

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:

Not applicable.

4. Plants

a. Check the types of vegetation found on the site:

- ☒ deciduous tree: alder, maple, aspen, other
☒ evergreen tree: fir, cedar, pine, other
☒ shrubs
☒ grass
☒ pasture
☐ crop or grain
☒ Orchards, vineyards or other permanent crops.
☒ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
☒ water plants: water lily, eelgrass, milfoil, other
☒ other types of vegetation

b. What kind and amount of vegetation will be removed or altered?

Local grasses around existing facilities may be altered during rehabilitation efforts on specific projects.

c. List threatened and endangered species known to be on or near the site.

None known of.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

Revegetation with similar plants will occur on a project by project basis where needed.

e. List all noxious weeds and invasive species known to be on or near the site.

The Washington State Noxious Weed Board lists many Class A, Class B, and Class C noxious weeds for eradication in Chelan County. It is not known which, if any, of those species are within the District's boundary, though Knapweed and Puncturevine are commonly found within Chelan County.

5. *Animals*

- a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site.

birds: raptors, hawk, heron, eagle, songbirds, ducks and geese

mammals: deer, bear, coyote, cougars, yellow bellied marmot, bobcats, mice, ferret

fish: bass, salmon, trout, perch, bluegill, sunfish, bonefish, catfish, sucker fish, northern pike minnow, burbot,

- b. List any threatened and endangered species known to be on or near the site.

The U.S. Fish and Wildlife lists the following animal species as threatened or endangered in Chelan County. It is not known if any of these have been found within the District service area.

Western Gray Squirrel

Grizzly bear/Ursus arctos horribilis

Northern Spotted Owl/Strix occidentalis caurina

Yellow-billed Cuckoo/Coccyzus americanus

Columbia Basin Pygmy Rabbit/Brachylagus idahoensis

Salmon, Steelhead, Bull Trout/Salvelinus confluentus

Gray Wolf/Canis lupus

- c. Is the site part of a migration route? If so, explain.

Yes. The entire state of Washington is within the Pacific flyway. The Columbia River is also a spawning route for salmon and steelhead trout.

- d. Proposed measures to preserve or enhance wildlife, if any:

Not applicable.

- e. List any invasive animal species known to be on or near the site.

None known.

6. *Energy and Natural Resources*

- a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

Electricity is used by the District to operate the pumps that move the water through the water system.

- b. Would your project affect the potential use of solar energy by adjacent properties?
If so, generally describe.

No.

- c. What kinds of energy conservation features are included in the plans of this proposal?

List other proposed measures to reduce or control energy impacts, if any:

Reduction of water use through conservation policies can result in less electricity used for pumping.

7. *Environmental Health*

- a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

Not applicable.

- 1) Describe any known or possible contamination at the site from present or past uses.

Past farming practices may have left residual contaminants which are expected to dissipate over time.

- 2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.

None known.

- 3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.

Not applicable.

- 4) Describe special emergency services that might be required.

Not applicable.

- 5) Proposed measures to reduce or control environmental health hazards, if any:

Not applicable.

b. Noise

- 1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)? **None**

- 2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site. **Not applicable**

- 3) Proposed measures to reduce or control noise impacts, if any:

None proposed.

8. *Land and Shoreline Use*

- a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe.

The predominant land use in the District is commercial agricultural land followed by residential and a small amount of commercial. The goal of the Plan is to be consistent with Chelan County planning.

- b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?

Yes. The District is composed of significant farmland. The Plan itself does not drive conversion of farmland, but as farmland is converted to other uses, the Plan describes projects to respond to such conversion.

- 1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting?
If so, how:

No.

- c. Describe any structures on the site.

The District covers a large area which includes typical residential, commercial, educational, and fruit processing structures.

- d. Will any structures be demolished? If so, what?

No.

- e. What is the current zoning classification of the site?

17 different zoning classifications are within the service area, with the largest being Commercial Agriculture at roughly 50% of land area.

- f. What is the current comprehensive plan designation of the site?

The District encompasses areas both rural and within the Manson Urban Growth Area.

- g. If applicable, what is the current shoreline master program designation of the site?

None known.

- h. Has any part of the site been classified as a critical area by the city or county? If so, specify.

Portions of the District have been classified as environmentally sensitive steep slopes, stream corridors, or wetlands. A summary map of these areas may be found on the City of Chelan Critical Areas map and Chelan County GIS.

- i. Approximately how many people would reside or work in the completed project?

Not applicable.

- j. Approximately how many people would the completed project displace?

None.

- k. Proposed measures to avoid or reduce displacement impacts, if any:

None.

- l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

The Plan will be submitted for review to City of Chelan and Chelan County planning departments.

- m. Proposed measures to reduce or control impacts to agricultural and forest lands of long-term commercial significance, if any:

None.

9. Housing

- a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

None.

- b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.
None.

- c. Proposed measures to reduce or control housing impacts, if any:
Not applicable.

10. Aesthetics

- a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?
Not applicable.

- b. What views in the immediate vicinity would be altered or obstructed?
Not applicable.

- c. Proposed measures to reduce or control aesthetic impacts, if any:
Not applicable.

11. Light and Glare

- a. What type of light or glare will the proposal produce? What time of day would it mainly occur?
None.

- b. Could light or glare from the finished project be a safety hazard or interfere with views?
No.

- c. What existing off-site sources of light or glare may affect your proposal?
None.

- d. Proposed measures to reduce or control light and glare impacts, if any:
Not applicable.

12. Recreation

- a. What designated and informal recreational opportunities are in the immediate vicinity?
Walking, hiking, biking, kayaking, water sports, golf and fishing.

- b. Would the proposed project displace any existing recreational uses? If so, describe.
No.

- c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:
None.

13. Historic and cultural preservation

- a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers? If so, specifically describe.
None known.

- b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.

The Colville Casino and Wapato Point are under Native American stewardship. There likely are areas of Native American cultural significance. Future projects proposed in this Plan are not anticipated to impact those areas. Cultural surveys will be performed when appropriate depending on the nature of future projects.

- c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.

Not applicable to this Plan, but applicable future projects would involve consultation with Washington State Department of Archeology and Historic Preservation and generate specific environmental documents (such as a Cultural Resource Survey) to identify any potential impacts to cultural and historic resources.

- d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.

Not applicable.

14. Transportation

- a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any.

SR 150 is the primary highway through the District. Other principal streets are owned and operated by Chelan County.

- b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop?

LINK Transit runs a bus route that stops within the District's service area.

- c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate?

Not applicable.

- d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private).

No.

- e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

No.

- f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates?

Not applicable.

- g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.

No.

- h. Proposed measures to reduce or control transportation impacts, if any:

None proposed.

15. Public Services

- a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe.

No.

- b. Proposed measures to reduce or control direct impacts on public services, if any.

None proposed.

16. Utilities

- a. Circle utilities currently available at the site:

Electricity, irrigation water, domestic water, refuse service, telephone, fiberoptic, TV, stormwater, sanitary sewer, septic systems.

- b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

Not applicable. Future projects would identify the utilities needed at the time.

C. Signature

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: _____



Name of signee: RODNEY L. ANDERSON

Position & Organization: SECRETARY-MANAGER, LAKE CHELAN RECLAMATION DISTRICT

Date Submitted: APRIL 16, 2021

D. Supplemental sheet for nonproject actions (IT IS NOT NECESSARY to use this sheet for project actions)

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment. When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

The proposal is a Water System Plan designed to provide reliable domestic water to the Lake Chelan Reclamation District service area. Therefore, it would not directly result in any discharge to water, or in the production, storage, or release of toxic or hazardous substances or noise.

Proposed measures to avoid or reduce such increases are: **None proposed.**

2. How would the proposal be likely to affect plants, animals, fish, or marine life? **Not applicable.**

Proposed measures to protect or conserve plants, animals, fish, or marine life are: **Not applicable.**

3. How would the proposal be likely to deplete energy or natural resources?

Future growth will result in more electricity needed to pump water.

Proposed measures to protect or conserve energy and natural resources are:

Selection of future equipment will include consideration for electrical efficiency.

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?

No impacts anticipated.

Proposed measures to protect such resources or to avoid or reduce impacts are:

None proposed.

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

Undeveloped land along the shoreline is already adjacent to existing domestic water mains. Future development must be consistent with Chelan County regulations.

Proposed measures to avoid or reduce shoreline and land use impacts are: **None proposed.**

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

No impacts anticipated.

Proposed measures to reduce or respond to such demand(s) are:

None proposed.

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

The Plan is intended to comply with all applicable regulations.

APPENDIX D – RULES AND REGULATIONS

LAKE CHELAN RECLAMATION DISTRICT

RULES AND REGULATIONS

Lake Chelan Reclamation District has operated the Manson Domestic Water System since the District was formed on May 8, 1920. The domestic system was in operation as a private enterprise prior to its conveyance to the District. The District has operated the Manson Sewer System since the merger with and dissolution of the Manson Sewer District on January 2, 1979. Title 87 of the Revised Code of Washington enables irrigation districts to be domestic water purveyors and to provide sewerage collection services within their boundaries.

A. DEFINITIONS.

1.1 Residence: A single family dwelling or trailer home. Only one residence is allowed per meter.

1.2 Apartment: Multi-family residential units built for two residences or more.

1.3 ERU: An equivalent residential unit (ERU) is a unit of measure that compares all users to the typical use patterns of an average single-family household.

1.4 ADU: An Accessory Dwelling Unit as defined by Chelan County code. An ADU with livable floor area of 1,000 square feet or less will qualify for one-half (1/2) of an ERU for allotment and assessment purposes. An ADU with livable floor area greater than 1,000 square feet will be treated as a full residence.

1.5 Orchard Cabin: A temporary dwelling occupied for six months per year or less, for agricultural workers. Orchard cabins can be on their own meter, with a residence, or with other cabins. An Orchard Cabin is treated as One-Half (1/2) of an ERU for allotment and assessment purposes.

- a. If an orchard cabin is on its own meter and has usage for more than six months per calendar year, it then becomes a residence.
- b. If a cabin is on the same meter as a residence and has usage more than six months per calendar year or if a residence has excess for more than six months per year, then the cabin becomes an apartment.
- c. If two or more cabins are on the same meter and has usage more than six months per calendar year the cabins become a residence plus apartment for each additional cabin.
- d. Once a cabin changes categories it cannot change back until the most recent twelve months show usage during only six months or less.

1.6 Shares and Electors: Shares in the District are assigned based on assessable lands, assessed land and ERU's. Each acre of assessable land within the District's boundaries is entitled to one share. Each acre of assessed land is entitled to one share (i.e., an acre of assessed land receives two shares, one for being assessable and one for being assessed. An acre assessable but not assessed receives one share). Each ERU receives two shares. All shareholder shall be

entitled to participate in the election of District directors as “Electors.” (See voting rules under General Terms 1.6, below).

B. DOMESTIC SYSTEM

I. Allotments, Assessments and Payments

1.1 Allotment: The basic allotment of domestic water per ERU is 700 cubic feet per month at the base rate. There is no credit or carry-over for use less than the base allotment for each two-month billing cycle.

1.2 Assessments: The basis for assessing domestic charges shall be the ERU. The rate per ERU is set by the Board of Directors. Domestic service shall be billed for every two months, shall be combined with the sewer service charges on one invoice, and shall be due when rendered, net 30 days. Domestic service charges may be attached to the irrigation assessment as a special assessment.

1.3 Excess Rates: All excess water will be billed at the rate as designated by the District Board of Directors.

1.4 Connection Charges: The connection charge for new users to the domestic system is based upon a pro-rata share of all joint use facilities plus physical appurtenances. Rates are set by the Board of Directors and are payable on a per ERU basis. Water availability will not be guaranteed within the District until applicable service fees for water are paid.

1.5 Payments: Bills are due when delivered and delinquent when 30 days past due.

II. System Operations

2.1 Service Requirements: Any District property owner may be served by the District’s domestic water system if they are located within the domestic retail service area, are located at or below the elevation 1250’ pressure zone, and pay all applicable fees. Any potential new customer must fill out a ‘Request for Letter of Availability’ form and if the requirements are met for service, an ‘Application for Water Service’ form is to be completed and submitted with applicable fees. Any property not adjoining an existing domestic water main may be required to extend existing mainlines and/or obtain easements for utility access. See ‘Meter Location’ section for additional information. If a service will provide water beyond the pressure zone, a private booster pump system may be required. Providing service beyond the pressure zone is at the discretion of the Secretary-Manager.

2.2 Meter Size and Installation: The District establishes the available meter sizes for residential and commercial users. The District provides a 3/4” x 5/8” meter as a part of a residential hookup purchase. For meters 1” and larger, when deemed appropriately sized by the District, the customer shall be responsible for an additional costs associated with the larger meter installation. In addition to the meter assembly, the District will provide a customer shut off valve and backflow device on the customer’s side of the meter. The customer is responsible for the protection and maintenance of the shut off valve and backflow device.

2.3 Meter Location: The District delivers water to the owner's side of the right-of-way. For a property to be eligible for District service, the property must border on a right-of-way containing a domestic mainline or within 150' from a mainline. If the property to be served is not adjoining the right-of-way, then the owner must obtain legal easement access for utilities to cross parcel(s) between the meter location and parcel to be served. Owners/developers with properties over 150' from a right-of-way containing a District mainline will be required to install a domestic mainline extension to District standards and specifications. Any exceptions to this 150' maximum distance from a mainline must first be reviewed and approved by the District Board of Directors. All side service materials between the main and the meter remain the property of the District and all other materials are the responsibility of the property owner.

2.4 Meter Testing: Water users may request to have their domestic meters tested for accuracy by District personnel on the District meter testing equipment. Such requests may be subject to a testing fee established by the District board unless the results show the meter to have an error margin of 5% or more.

2.5 Shared Meters: Domestic meters may not be shared between two or more residences or between a residence and cabins or between cabins unless they are pre-existing and in the same ownership. On new meter installations, each residence must be on a separate meter. On new connections, cabins may cluster onto one meter but must be separated from residences.

2.6 Extensions: All domestic extensions shall be subject to the latest version of the District's Standards, Conditions and Specifications for Water Main Extensions. Developer must enter into a Developer Extension Agreement and pay the required deposit to cover the District's costs associated. The Developer is required to pay all legal fees, third-party engineering review fees, surveying fees (if any), plot fees as well as other miscellaneous material and out-of-pocket costs the District may incur.

2.7 District-Initiated Extensions: From time to time, the District may choose to extend domestic main lines into lands within the Urban Growth Boundary that do not presently have service. In these cases, the costs of the domestic extension will be documented and customers that connect to the extension shall reimburse the District on a pro-rata basis for the total cost of construction in addition to the regular service fees.

2.8 Disconnects: Water users may request to discontinue service, if service is no longer needed. Disconnects will only be considered for properties that do not have any residence on them. All requests for disconnection must be made by the owner. If service is later requested to be reinstated, the user will be subject to a full connection charge as if services had never been provided.

2.9 Irrigation Delivery through Domestic System: Lands retaining irrigation water rights but served through the domestic system will receive three-acre feet per acre additional allotment during the months of March through October. There shall be an inter-company transfer from irrigation to domestic for all assessments collected including parcel fees for all parcels receiving irrigation water through the domestic system. The irrigation system shall reimburse the domestic system the assessment rate per acre plus the parcel fee collected for all parcels receiving

irrigation water through the domestic system. Irrigation use served through the domestic system in excess of the three-acre feet per acre shall be billed at the domestic excess rate and credited to the domestic system. The irrigation allotment will not be credited to the meter until the irrigation assessment is paid in full. "Irrigation only" meters on the domestic system will be converted to domestic meters by paying the applicable domestic connection charges.

2.10 Leaks: Leaks that occur in the private underground service lines or lines under the floor or within the walls of the residence or business that cannot be readily seen are eligible for a water charge rebate. Leaks within an irrigation system do not qualify. The rebate will be limited to 50% of billed water in excess of average consumption and shall not exceed two billing periods. The District must inspect and approve repairs for correction of all leaks prior to processing a rebate. If the water user has a second leak on the same line within one year, the District may at its discretion, require the entire line to be replaced before a third rebate will be processed. This policy applies only to lands within the District boundary and not to users outside the boundary served by special contracts. Leaks do not include hose bibs, drain valves and fixtures that are left on or leak in a manner that is avoidable or detectable. Leaks also do not include overuse where a leak cannot be identified unless the water user chooses to replace the entire line in lieu of searching for the individual leak.

2.11 Non-Use by Existing Customers: An existing user whose home has been removed and/or have had their water meter removed by the District may qualify for a reduced bill calculated at 75% of the full O&M rate at the request of the customer and at the discretion of the Secretary-Manager.

2.12 Illegal Connection: Any person or entity intentionally making connection to the District domestic distribution system without prior consent shall be subject to a \$500 fine plus costs of disconnection, in addition to possible criminal prosecution.

2.13 Recreational Vehicle Parks: RV Parks may have a single ownership or spaces may be sold individually. Where a single ownership exists, the park may be metered by master meters measuring all spaces collectively. The first pad shall be one equivalent residential unit (ERU) and each pad thereafter equal to 0.25 ERU's. Where individual spaces may be sold, each pad shall be metered and shall be billed per the domestic classification.

2.14 Trailer Parks and Mobile Home Parks: Every pad available at trailer and mobile home parks shall be metered either individually or by a master meter for the entire property. This determination is at the discretion of the Secretary-Manager.

2.15 Cross Connections: Domestic customers are expected to be familiar with the District's Cross Connections Control Policy and Procedures, as adopted by the board per board resolution number 2014-03 and attached, Washington State Department of Health and regulations or the Washington Code of Administrative Regulations.

2.16 Inspection Authority: The District reserves the right to enter all properties served by the domestic water system in order to inspect, observe, measure, test all processes directly correlated to waste discharges. All District employees and agents shall notify the property owner in advance and observe all safety rules.

C. SEWER SYSTEM

I. Assessments and Payments

1.1 Assessments: The basis for assessing sewer charges shall be the ERU. The rate per ERU is set by the Board of Directors. Sewer service shall be billed for every two months, shall be combined with the water service charges on one invoice, and shall be due when rendered, net 30 days. Sewer service charges may be attached to irrigation bills as a special assessment.

1.2 Connection Charges: The connection charge for new users to the sewer system is based upon a pro-rata share of all joint use facilities plus physical appurtenances. Rates are set by the Board of Directors and are payable on a per Equivalent Residential Unit (ERU) basis. Sewer availability will not be guaranteed within the District until applicable service fees for sewer are paid.

II. System Operations

2.1 Service Requirements: All new single-family residences on existing lots and existing single or multi-family residences with failing on site systems whose property lies within five hundred feet of planned gravity or low pressure sewerage collection facilities and within the Chelan County urban growth boundary shall extend gravity collection or low pressure collector mains if needing service to District facilities. Pumped services are not allowed except within planned low pressure collection service areas or when gravity collection mains are over 500 feet away, and then only on a temporary basis until gravity service is available. New short plats within the Chelan County urban growth boundary are required to extend gravity collection mains or low pressure collection mains for service as identified in the District planning areas. Pumped services are not allowed for short plats except within planned low pressure collection service areas or when gravity collection mains are over 1,000 feet away, and then only on a temporary basis until gravity service is available. Short plats allowed to temporarily pump must provide easements and make provisions for gravity service in the plat covenants. New plats or developments larger than 4 lots or 4 ERU and within the Chelan County urban growth boundary are required to extend gravity collection mains or low pressure collection mains for service as identified in the District planning areas. Pumped services are not allowed. Sanitary sewer service is not allowed outside of the urban growth area except as identified in the comprehensive sewer plan and allowed by the Chelan County land use plan. Any deviation from this policy is at the discretion of the Secretary-Manager.

Sewer service outside of the urban growth area is reserved to parcels adjoining the existing sewer system whose property can be served without a sewer extension or for areas of environmental concern. Extending sanitary sewer service to areas of environmental concern must be approved by the Board of Directors, by the Washington State Department of Ecology, by the Chelan County Planning Department and must be consistent with agreements with the City of Chelan and environmental compliance.

2.2 Side Sewers: Side sewers shall be installed by and at the expense of the owner. The District shall inspect the side sewer installation prior to trench backfill. Side sewers shall be a minimum of four inch. The District shall approve sizes for all commercial or industrial customers. The owner shall be responsible for any or all damages associated with side sewer

construction. Side sewers shall be installed to all applicable state codes including but not limited to Chelan County building and plumbing code, ASTM specifications, WPCF Manual 9, and the pipe manufacturer's specifications. Side sewers shall be gas and watertight. No roof drains or other gray water discharges are allowed without prior written approval. No side sewer shall be extended to serve more than one ownership except at District's Discretion.

2.3 Connection Permit: A "Sewer Hook Up Application" must be filed and approved by the District prior to physical connection to the sewerage collection system. Any connection done without written approval shall be considered an illegal connection.

2.4 Connections: The applicant shall notify the District when connection is to be made. All connections will be made under the supervision of District personnel or its agents.

2.5 Domestic Wastewater: Only water carrying human wastes, including kitchen, bath, and laundry wastes from residences, buildings, industrial establishments or other places, together with such ground water infiltration or surface waters as may be present, is permitted. Property runoff including gutter and storm water collection systems, and pool discharges, are expressly prohibited from being introduced to the sewer system. Discharges shall be limited to those allowed by the City of Chelan Wastewater Treatment Plant rules and regulations: Sewer System. Certain discharges requiring special monitoring, sampling, measurement or treatment may be subject to special assessments as determined by the District. Wastewater strength in terms of BOD5 and TSS shall not exceed 300 mg/l without written approval of the District.

2.6 Industrial Wastewater: Water or liquid-carried waste from industrial or commercial processes, are distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities. All discharges shall be limited to those allowed by the City of Chelan Wastewater Treatment Plant Rules and Regulations.

2.7 Inspection Authority: The District reserves the right to enter all properties served by the sewerage collection system in order to inspect, observe, measure, test all processes directly correlated to waste discharges. All District employees and agents shall notify the property owner in advance and observe all safety rules.

Measurement, sampling, tests and analysis of industrial wastewater shall be performed in accordance with APHA standard methods. The District may at its discretion require an on-site inspection manhole to inspect, observe, measure, sample or test the industrial wastewater discharge. The District may also conduct testing on the next available sewerage manhole downstream.

2.8 Disconnects: Sewer users may request to discontinue service, if service is no longer needed. Disconnects will only be considered for properties that do not have any residence on them. All requests for disconnection must be made by the owner. If service is later requested to be reinstated, the user will be subject to a full connection charge as if services had never been provided.

2.9 Non-Use by Existing Customers: An existing user whose home has been removed and/or have had their water meter removed by the District may qualify for a reduced bill calculated at 75% of the full O&M rate at the request of the customer and at the discretion of the Secretary-Manager.

2.10 Illegal Connection: Any person or entity intentionally making connection to the District sewer collection system without prior consent shall be subject to a \$500 fine plus costs of disconnection, in addition to possible criminal prosecution.

2.11 Extensions: All sewer extensions shall be subject to the latest version of the District's Standards, Conditions and Specifications for Sewer Main Extensions. Developer must enter into a Developer Extension Agreement and pay the required deposit to cover the District's costs associated. The Developer is required to pay all legal fees, third-party engineering review fees, surveying fees (if any), plot fees as well as other miscellaneous material and out-of-pocket costs the District may incur.

2.12 District-Initiated Extensions: From time to time, the District may choose to extend sewer main lines into lands within the Urban Growth Boundary that do not presently have service. In these cases, the costs of the sewer extension will be documented and customers that connect to the extension shall reimburse the District on a pro-rata basis for the total cost of construction in addition to the regular service fees.

D. IRRIGATION SYSTEM

I. Assessments, Allotments and Payments

1.1 Classification: All lands receiving irrigation water from the District must be classified as irrigable and be assessed. Lands within the District boundary that have never been classified or are class 6 lands that may be irrigable can petition to be reclassified. Reclassifications must be done and approved by USBR agronomists at the landowner expense.

1.2 Assessable Lands: All lands within the District Boundary are assessable. Lands within the District Boundary are presently assessed only for direct services received. Assessable lands are measured by the number of shares. The number of shares or fraction thereof is equivalent to the number of acres of assessable land.

1.3 Assessments: The District assessments shall be due in full on April 1st of each year and shall be payable prior to receiving District water. Interest charges of one percent (1%) shall be charged after April 30th, and shall accrue at one percent (1%) per month simple interest thereafter until paid in full. Assessments shall be delinquent on May 1st, unless one-half of the assessment is paid on or before April 30th. If one-half of the assessment is paid on or before April 30th, the remaining balance shall be due on or before the following October 31st and shall be delinquent after that date. Assessments are based upon the number of shares in the system. The number of shares or fraction thereof is equivalent to an equal number of units of benefit.

1.4 Allotments: The base allotment for irrigation supplies shall be 36 acre-inches per season. If water supplies are available, excess water may be purchased. The excess rate shall be

calculated based upon the annual O & M rate per acre-inch exclusive of construction repayment costs. The first six acre-inches of excess usage shall be at 100% of the excess rate. Any excess above 42 acre-inches per acre shall be at 120% of the excess rate. No credit shall be given for use less than the base allotment.

1.5 Irrigation Meter Capacity: Maximum delivery through any meter shall be the manufacturers recommended meter capacity. Users exceeding meter capacity shall be shut off and reminded of the meter capacity on the first offense. Repeat offenders shall be subject to some or all of the following: reduced pressures, flow restricting devices, meter repair costs and possible turnoffs.

1.6 Meter Testing: Water users may request to have their irrigation meters tested for accuracy by District personnel on the District testing equipment. Such requests may be subject to a testing fee as set by the District board unless the results show the meter to be over-reading.

1.7 Rationing: System capacity allows for approximately 6.5 gallons per minute per acre. The District will endeavor to provide higher rates of flow if they are available. During periods of high demand, rationing will occur on certain laterals or individual systems. The basis for rationing shall be irrigable acreage. Turnouts exceeding current rationing levels shall be turned off and reminded of current levels. Repeat offenders will be subject to some or all of the following: reduced pressures, flow restricting devices and possible turnoffs.

1.8 Short Water Supplies: In the event water supplies are limited due to drought, transmission or mechanical failure, the District assumes no liability for crop damages. The District will endeavor to supply an equitable, proportionate share of the total water supplies available.

1.9 Water Conservation: Lake Chelan Reclamation District promotes water conservation. The District encourages water users to have their distribution systems designed by qualified persons. Growers should utilize modern application and scheduling techniques as encouraged by the local conservation district. All irrigation water use must be beneficially used. Excess use that results in runoff, ponding, deep percolation or other effects of misapplication may be subject to some or all of the following: reduced pressures, flow restricting devices and possible turnoffs.

1.10 Segregation of Assessments: After an assessment roll has been filed, the Board of Directors may, at their discretion, allow the segregation of the assessments against any tract or parcel in accordance with the provisions of 87.03.285 through 87.03.305. The party making the request may be required to pay all costs associated with these procedures including but not limited to advertising costs, research and title costs, mailing costs and filing fees.

1.11 Shared Meters: District will consider all acreage as one farm when rationing or determining excess. Separate ownership may install their own internal metering system but any readings or monitoring must be done between parties.

1.12 Water Right Requests: The District will accept requests for additional water rights. These requests will be held with priority amongst the written requests given to agricultural lands with the earliest date of request. Requests retain their priority over time only for the person and

land requesting additional water. The request and its priority may stay with the land under a change in ownership only if specified in the sales contract. As water rights become available, they will go first to lands on the same pump system as those relinquished by entering into a contract for Reclassification of Land and Transfer of Water Allotment. Any lands requesting water rights must be classified as irrigable by the Secretary of Interior. The District reserves the right to establish overall priorities for new water rights and to change priorities when in the best interest of the District. The Board of Directors shall set the per acre rate of new water rights offered. Requests from lands outside of the District boundary will not be accepted until all requests from inside the boundary are satisfied. All requests outside the boundary will be separately held with priority among outside requests given to those lands with the earliest date of request. Annexation of properties outside the District will be a prerequisite to a water right offer.

1.13 Water Right Relinquishments: Water rights are appurtenant to the land. Any water user within the District who desires to relinquish their right to irrigation water must apply in writing to the District. The District reserves right to grant or deny the request solely at their own discretion. If the request is granted an agreement for permanent release of water allotment is executed and the water right is kept in trust by the District to be made available to other lands or kept as the District deems appropriate. Once lands have relinquished their water right they lose all priority to that right, and will become equal to all other lands requesting additional rights.

1.14 Water Right Sales: Water rights are not personal property rights of the water user. The District does not recognize any attempt of landholders to sell the water right from their land. The District reserves the right to sell water rights as allowed by the repayment contract with the U.S.B.R.

1.15 Water Right Transfers: Water rights are appurtenant to the land. Any water user within the District who desires to transfer the water right from one landholding to another must first apply in writing to the District. The landowner must own both properties fee title and provide evidence thereof. No transfers will be allowed from a lower system to a higher system. Any lands requested for transfer must be classified as irrigable by the Secretary of Interior. The District reserves the right to grant or deny the request solely at their own discretion. Two contracts must be executed to validate the transfer. First an agreement for Permanent Release of Water Allotment followed by a contract for Reclassification of Land and Transfer of Water Allotment.

II. System Operations

2.1 Domestic Use: District irrigation water absolutely may not be used as domestic supply or supplemented drinking water. Any person drinking District irrigation water do so at their own risk and is prohibited.

2.2 Unauthorized Use: Only lands classified as irrigable and assessed for District water may use District water. Any user found to be overplanted or otherwise using District water outside of its intended use will be notified and steps to resolve the issue will be determined by the District. The user will be responsible for resolving the unauthorized use.

2.3 Irrigation Season: The regular irrigation season shall be from April 1st to October 15th. The Board of Directors reserves the right to forward or extend the season at their discretion. Emergency situations may arise to alter the regular irrigation season.

2.4 New Irrigation Service: All irrigable lands entitled to water through the irrigation system and not currently connected may hook up to their assigned turnout. It is the responsibility of the new user to obtain easements or permits to cross other private or public properties.

2.5 Turnouts: All irrigable lands within the District have an assigned turnout on either the irrigation system or the domestic system. The District responsibility extends through the turnout to and including the outside valve. The outside valve, also referred to as the customer valve, may be operated by the customer. All other valves, piping, and fixtures, associated with the turnout are to be operated by authorized District personnel only. Any damages associated with unauthorized persons operating these devices will be subject to repair costs. The outside valve may not be used for regulating flow. Measurement of flow is by the District meter. Turnouts with upstream pressures in excess of one hundred psi will normally include a pressure regulator at the discretion of the District. Water user systems shall be designed to operate normally at the downstream pressures but to withstand pressures equal to the upstream pressure plus potential surge pressure caused by air entrapment. Customer must connect to the designated customer valve with a removable coupler to allow for District personnel to perform maintenance on the customer valve. Failure to do so will result in District personnel cutting the connecting pipe and notifying customer to repair.

2.6 New Turnouts: The District will install new turnouts only for ownerships of five (5) acres or larger, or at the discretion of the Manager. The acreage left on the existing turnout must also be five (5) acres or larger. The materials and labor costs of the new turnout must be borne solely by the parties requesting.

2.7 Spray Water: District water may be used for spray water at the users risk. Backflow prevention such as an air gap must be utilized to insure no contamination can enter the irrigation system at times of potential negative pressure. Irrigation use is the only recognized beneficial use of District water. The irrigation season will not be extended or forwarded to supply District water for spray uses.

2.8 Herbi-Fertigation: Herbigation or fertigation is allowed only on the users side of the turnout. It is the users responsibility to insure that District approved backflow prevention devices have been installed prior to beginning applications unless the District's Board of Directors authorizes an exception. Any damages caused to adjacent users or other users due to backflow or chemical trespass will be the sole responsibility of the user. Any person practicing herbigation or fertigation without District approved backflow prevention will be subject to discontinuation of District water use. Any deviation from this policy must be first approved by the District's Board of Directors in writing on a case by case basis. The user must also take responsibility in writing for any damages and agree to indemnify the District from damages that could be attributed to their use of unprotected fertigation. The irrigation season will not be extended or forwarded to supply water for herbigation or fertigation purposes. The cost for a District installed back flow shall be set by the Board of Directors.

2.9 Frost Protection: District water will not be provided for frost protection. Irrigation use is the only recognized beneficial use of District water. The irrigation season will not be extended or forwarded as a frost protection measure.

2.10 Fruit Cooling: District water will not be provided for fruit cooling. Irrigation use is the only recognized beneficial use of District water.

2.11 Cross-Connection: Farm irrigation lines shall not be connected to a secondary source of water without a District approved backflow prevention device. Cross-connections to the District domestic system will not be allowed under any circumstances.

2.12 System Alterations: Should any alterations to the existing irrigation system become necessary, the property owner will pay a deposit to the District to initiate any such project. The property owner/developer will be required to pay all legal fees, third-party engineering review fees, surveying fees (if any), plot fees as well as other miscellaneous material and out-of-pocket costs associated with design services. Should the costs exceed the deposit amount, the remaining balance will be billed to the property owner/developer and paid within 30 days.

2.13 Access to Lands: District employees, representatives and authorized agents shall receive free access at all hours to any and all tracts supplied with District water. The purposes of such access shall include but not be limited to making records, reading and observations on usage of District water. Water users refusing free access to said lands will be subject to a severance of water delivery until free access is granted.

2.14 Drainage: The District assumes no responsibility for drainage problems outside the operation and maintenance of USBR designated drains. The responsibility for other drainage problems may be assumed by the District on their own merits and at the discretion of the District.

2.15 Encroachment: All District facilities are held in title by the U.S. Bureau of Reclamation. No facilities within right of ways, easements, or Act of 1890 easements shall be encumbered in any way so as to restrict the District's ability to operate and maintain those facilities.

2.16 Free Water for Community Interest: No water will be available for community irrigation projects through the irrigation system. Approved air valve cans may be fitted for fire hose adapters and water withdrawn for emergency fire-fighting purposes.

2.17 Reclamation Reform Act: Lake Chelan Reclamation District has current repayment obligations with the U.S. Bureau of Reclamation. The District has conformed to the discretionary provisions of the Reclamation Reform Act. All qualified recipients who hold title and/or lease a total of 240 acres west wide in Bureau projects must file annual reporting forms with the District. All limited recipients who hold title and/or lease a total of 40 acres west wide in Bureau projects must also file annual reporting forms with the District. Failure to follow the requirements of the Reclamation Reform Act could lead to disqualification of water eligibility and/or penalties and full cost assessments.

2.18 Obligation to Repayment Contract: Lake Chelan Reclamation District has current repayment obligations and contractual obligations with the U.S. Bureau of Reclamation. All landowners of assessable lands shall be tied individually and collectively to those obligations.

E. GENERAL TERMS

1.1 Delinquent Accounts: A delinquency notice will be sent with a fifteen-day allowance to pay without further notice. If no payment is made within that fifteen day grace period, the District shall have the right to shut off or disconnect the customer from domestic water service. Delinquent accounts will be subject to a late fee as determined by the District Board of Directors or 1% per month of the outstanding balance, simple interest, whichever is greater. Additional posting and turn-off fees will be added for those whose service is posted and/or disconnected as a result of nonpayment and a reconnect fee will be charged for those whose services are reconnected following a nonpayment disconnect. The posting fee, turn off and reconnect fees will be set by the District Board of Directors.

Accounts delinquent over six months may be formally certified as a lien against the real property and recorded with Chelan County. Such liens shall not be removed until the assessment and plus all applicable fees are paid in full.

This policy does not preclude the District from bringing suit in foreclosure by civil action after one year as allowed by RCW 87.03.445 if it is in the best interest of the District. It only attempts to establish a methodology for collection of charges that provides for the maximum notice and the minimum additional costs to the property owners.

1.2 Transaction Process Fees: The Secretary-Manager may choose to accept forms of payments allowed under RCW 87.03.277 for the following specific transactions without adding the cost of the transaction if it is in best interest of the District: payment transactions made for a specific category of payments due the District, including, but not limited to, assessments, fines, interest, penalties, special assessments, fees, rates, tolls and charges.

1.3 Damage to District Facilities: Any person or entity doing damage to District facilities either intentional or non-intentional will be responsible for the costs of repairs. All repairs will be done with District materials by District personnel or its agents and shall be due and payable in full within 30 days. Interest penalties on delinquent invoices shall be at the rate of 1% per month.

1.4 Annexation: Lands outside the service area identified in the current addition of the District comprehensive plan must first make written request to the District. Acceptance will be based upon Board approval, and, as necessary, Washington State Department of Health approval, Washington State Department of Ecology approval, compliance with Chelan County land use regulations, compliance with agreements with the City of Chelan, and environmental compliance. Lands also outside of the District boundary must follow the procedures outlined in RCW 87.03.560 through RCW 87.03.610 unless special service contracts are executed.

1.5 District ROW/Property: Unauthorized use of District right of way or property is not allowed. Authority to use District right of way or property can be revocably granted by the

Board of Directors at their discretion or through the Bureau of Reclamation for Bureau of Reclamation rights of way. Sale of District right of way or property shall be in accordance with state and/or federal laws regarding surplus properties, typically the Assessed value plus costs for adjacent owners.

1.6 Elections: Elections for District Directors shall take place by vote of the Shareholders. Each shareholder (“elector”) shall be entitled to two votes for each five shares or fraction thereof. The total number of shares is the aggregate total of shares received from assessable lands, units of benefits for irrigation purposes, ERU’s for domestic purposes and equivalent residential units for sewer purposes. There shall be no additional votes for ADU’s. The division of votes for community properties or properties having multiple ownerships will follow the provisions of RCW 87.03.051.

1.7 Severability: If any provision of these rules and regulations or its application to any person or circumstance is held invalid, the remainder of the rules and regulations or the application of the provision to other persons or circumstances is not affected.

1.8 Disputes: In the event a customer has a dispute regarding any aspect of the District’s operations, including assessments, a complaint shall be filed with the District manager. In the event that the District manager is unable to resolve the dispute, the customer may present the complaint to the District Board of Directors.

1.9 Locates: Customer shall have the responsibility to call the District in the event any activity occurs on their property that would potentially disturb District infrastructure. This includes making all calls necessary to properly locate underground utilities, “Call Before You Dig 811 Utility Notification Center” as required by State or local laws or regulations. Damages incurred during digging without proper locates shall be subject to up to treble damages and repairs as provided by RCW 19.122.070.

1.10 Cross-Connection Control: RCW 87.03.015 establishes that irrigation districts have the authority to provide domestic water service. The pumps, pipes and treatment facilities that make up the domestic system are defined as a community public water system. Chapters 70.119 and 70.119A RCW require that public water systems like the Lake Chelan Reclamation District system conform to the rules and regulations adopted by the secretary of the department of health. WAC 246-290-490 was adopted by the secretary and requires that all community water systems comply with the cross-connection control requirements specified.

The District will be responsible for provisions as outlined in WAC 246-290-490 for premise isolation. Chelan County Building Department will be responsible for in-premise isolation. Backflow devices will be required on all premises that are assessed by a certified cross-connection specialist as posing a degree of hazard for backflow contamination. All backflow devices must be inspected and tested on an annual basis by a certified backflow assembly tester, and repaired or replaced if necessary. The backflow assembly tester shall certify the test as complete on a form provided by the District. If the water user with a backflow device fails to contract for the annual test, the District will perform inspections, testing and repairs to all backflow devices at the owner’s expense. If any water user should fail to test their devices and in turn deny

the District reasonable access to the backflow device, the District shall shut off water service until the water user complies.

1.10.1 Conditions for Service: As adopted by the District board, Resolution 2014-03 states the Conditions for Providing Service are based on the following terms and limitations:

- a. The customer agrees to take all measures necessary to prevent the contamination of the plumbing system within his/her premises and the District's distribution system that may occur from backflow through a cross connection. These measures shall include the prevention of backflow under any backpressure or backsiphonage condition, including the disruption of the water supply from the District's system that may occur during routine system maintenance or during emergency conditions, such as a water main break.
- b. The customer agrees to install, operate, and maintain at all times his plumbing system in compliance with the current edition of the Uniform Plumbing Code having jurisdiction as it pertains to the prevention of contamination and protection from thermal expansion, due to a closed system that could occur with the present or future installation of backflow preventers on the customer's service and/or at plumbing fixtures.
- c. For cross-connection control or other public health-related surveys, the customer agrees to provide for the District's employees, or agents, free access to all parts of the premises during reasonable working hours of the day for routine surveys and at all times during emergencies. Where agreement for free access for the District's survey is denied, the District may supply water service provided that premises isolation is provided through a DOH- approved reduced-pressure principle backflow assembly (RPBA).
- d. The customer agrees to install all backflow prevention assemblies requested by the District and to maintain those assemblies in good working order. The assemblies shall be of a type, size, and make approved by DOH and acceptable to the District. The assemblies shall be installed in accordance with the District's construction standards and specifications.
- e. The customer agrees to:
 - i. Have all assemblies (e.g., RPBA's and/or DCVAs) that the District relies upon to protect the public water distribution system tested upon installation, annually thereafter and/or more frequently if requested by the District, after repair, and after relocation;
 - ii. Have all testing done by a District-approved and currently DOH-certified Backflow Assembly Tester (BAT);
 - iii. Have the RPBA or DCVA tested in accordance with DOH-approved test procedures; and
 - iv. Submit to the District the results of the test(s) on District-supplied test report forms within the time period specified by the District.

- e. The customer agrees to bear all costs for the aforementioned installation, testing, repair, maintenance and replacement of the RPBA, RPDA, DCVA or DCDA installed to protect the District's distribution system.
- f. At the time of application for service, if required by the District, the customer agrees to submit to the District plumbing plans and/or a cross-connection control survey of the premises conducted by the District's Cross-Connection Control Specialist (CCS). The cross-connection control survey shall assess the cross-connection hazards and list the backflow preventers provided within the premises. The results of the survey shall be submitted prior to the District turning on water service to a new customer. The cost of the survey shall be borne by the customer.
- g. For classes of customers other than single-family residential, when required by the District, the customer agrees to periodically submit to a cross-connection control re-survey of the premises by the District's CCS. The District may require the re-survey to be performed in response to changes in the customer's plumbing or water use, or performed periodically (annually or less frequently) where the District considers the customer's plumbing system to be complex or subject to frequent changes in water use. The cost of the re-survey shall be borne by the customer.
- h. Within 30 days of a request by the District, a residential customer shall agree to complete and submit to the District a "Water Use Questionnaire" for the purpose of surveying the health hazard posed by the customer's plumbing system on the District's distribution system. Further, the residential customer agrees to provide within 30 days of a request by the District access for a cross-connection control survey of the premises by the District's CCS.
- i. The customer agrees to obtain the prior approval from the District for all changes in water use, and alterations and additions to the plumbing system, and shall comply with any additional requirements imposed by the District for cross-connection control.
- j. The customer agrees to immediately notify the District and the local health jurisdiction of any backflow incident occurring within the customer's premises (i.e., entry of any contaminant/pollutant into the drinking water) and shall cooperate fully with the District to determine the reason for the backflow incident.
- k. The customer acknowledges the right of the District to discontinue the water supply within 72 hours of giving notice to the customer, or a lesser period of time if required to protect public health, if the customer fails to cooperate with the District in the survey of premises, in the installation, maintenance, repair, inspection, or testing of backflow prevention assemblies or air gaps required by the District, or in the District's effort to contain a contaminant or pollutant that is detected in the customer's system. Without limiting the generality of the foregoing, in lieu of discontinuing water service, the District may install an RPBA on the service pipe to provide premises isolation, and recover all costs for the installation and subsequent maintenance and repair of the assembly, appurtenances, and enclosure from the customer as fees and charges for water. The failure of the customer to pay

these fees and charges may result in termination of water service in accordance with the District's water billing policies.

- l. The District will require premises isolation for a customer that is of the high-hazard type or category requiring "Mandatory Premises Isolation" established by the DOH regulations (Table 9, WAC 246-290-490).
- m. Where the District imposes mandatory premises isolation in compliance with DOH regulations, or agrees to the customer's voluntary premises isolation through the installation of a RPBA immediately downstream of the District's water meter, the customer acknowledges his obligation to comply with the other cross-connection control regulations having jurisdiction (i.e., Uniform Plumbing Code). Although the District's requirements for installation, testing, and repair of backflow assemblies may be limited to the RPBAs used for premises isolation, the customer agrees to the other terms herein as a condition of allowing a direct connection to the District's service pipe.
- n. The customer agrees to indemnify and hold harmless the District for all contamination of the customer's plumbing system or the District's distribution system that results from an unprotected or inadequately protected cross connection within the customer's premises. This indemnification shall pertain to all backflow conditions that may arise from the District's suspension of water supply or reduction of water pressure, recognizing that the air gap separation otherwise required would require the customer to provide adequate facilities to collect, store, and pump water for his/her premises.
- o. The customer agrees that, in the event legal action is required and commenced between the District and the customer to enforce the terms and conditions herein, the substantially prevailing party shall be entitled to reimbursement of all incurred costs and expenses including, but not limited to, reasonable attorney's fees as determined by the Court.
- p. The customer acknowledges that the District's survey of a customer's premises is for the sole purpose of establishing the District's minimum requirements for the protection of the public water supply system, commensurate with the District's assessment of the degree of hazard. It shall not be assumed by the customer or any regulatory agency that the District's survey, requirements for the installation of backflow prevention assemblies, lack of requirements for the installation of backflow prevention assemblies, or other actions by the District's personnel constitute an approval of the customer's plumbing system or an assurance to the customer of the absence of cross connections therein.
- q. The customer acknowledges the right of the District, in keeping with changes to Washington State regulations, industry standards, or the District's risk management policies, to impose retroactive requirements for additional cross-connection control measures.

F. FISCAL OPERATIONS

1.1 Capitalization Policy: In general, costs meeting the following criteria will be capitalized as fixed assets:

- a. Generally, an individual purchase cost must exceed \$5,000. Grouping of individual costs less than \$5,000 is not appropriate unless the costs are individual components of an entire project (e.g. machine components purchased with the machine as a unit).
- b. The expected useful life must exceed five years.
- c. Expenditures must result in something of physical existence or substance supporting District operations; or expenditures must benefit future years through increased revenues or reduced expenses.

In addition, “small attractive assets”, such as personal computers and peripherals and certain shop equipment and radios, which the District wishes to track, are capitalized for tracking purposes as determined by the Secretary-Manager.

1.1.1 Guidelines: All costs associated with obtaining a fixed asset (land, buildings, landscaping and paving, equipment) and getting it ready for its intended use are capitalized.

- a. In general, costs incurred to achieve greater future benefits are capitalized, whereas expenditures that simply maintain a given level of services are expensed. In order for costs to achieve greater future benefits, one of three conditions must be met: (1) the useful life of the asset must be increased from its original estimated life and not restoring an asset in poor condition to its original estimated life; (2) the quantity of services produced from the asset must be increased; (3) the quality of the units or services provided must be enhanced. If costs do not meet this criteria or are less than \$5,000 then they are expensed.
- b. Generally, existing facilities have the following three major types of costs: additions, improvements and replacements, and repairs/maintenance.
- c. Commissions owed on leases shall be capitalized at the inception of the lease, and amortized over the term, excluding any options to renew or extend the lease.
- d. Studies, master plans, strategic plans, development plans, updates to plans and other such costs may be capitalized as an intangible asset and amortized over the period of usefulness, generally for not more than 5 years.

Asset lives, for depreciation purposes, are assigned by the accounting assistant or internal auditor.

Depreciation begins in the accounting year following purchase or year after placed in service. If costs are incurred with original capitalization intent, and the decision is later made to abandon the project, costs incurred will be expensed in the current period.

1.2 Capital Purchases: The Secretary-Manager is responsible for approving all capital purchases over \$250. A capital purchases budget will be developed each year outlining the overall approved expenditures. The Secretary-Manager has authority to make any and all capital purchases under \$20,000 and within the overall capital purchases budget. Any purchases over \$20,000 or over the capital purchase budget shall be approved by the Board of Directors. The Secretary-Manager shall determine which purchases will be capitalized along with its depreciation schedule.

1.3 Small Works Roster:

1.3.1 Cost: The District need not comply with formal sealed bidding procedures for the construction, building, renovation, remodeling, alteration, repair, or improvement of real property where the estimated cost does not exceed Three Hundred Thousand Dollars (\$300,000), which includes the costs of labor, material, equipment and sales and/or use taxes as applicable. Instead, the District may use the small works roster procedures for public works projects as set forth herein. The breaking of any project into units or accomplishing any projects by phases is prohibited if it is done for the purpose of avoiding the maximum dollar amount of a contract that may be let using the small works roster process.

1.3.2 Number of Rosters: The District may create a single general small works roster or may create a small works roster for different specialties or categories of anticipated work.

1.3.3 Contractors on Small Works Roster(s): The small works roster(s) shall consist of all responsible contractors who have requested to be on the roster(s), and where required by law are properly licensed or registered to perform such work in this state. Contractors desiring to be placed on a roster, or rosters, must keep current records of all applicable licenses, certifications, registrations, bonding, insurance, or other appropriate matters on file with the District.

1.3.4 Publication: At least once a year, the District shall publish in a newspaper of general circulation within the jurisdiction a notice of the existence of the roster or rosters and solicit the names of contractors for such roster or rosters. Responsible contractors shall be added to the roster, at any time they submit an application and necessary records. The District may require master contracts to be signed that become effective when a specific award is made using a small works roster. An interlocal contract or agreement between the District and other local governments establishing a small works roster or rosters to be used by the parties to the agreement or contract must clearly identify the lead entity that is responsible for implementing the small works roster provisions.

1.3.5 Electronic Rosters: In addition to paper and/or electronic rosters kept on file, the District may also use the state wide electronic database developed and maintained jointly by the Daily Journal of Commerce and the Municipal Research and Services Center of Washington.

1.3.6 Telephone or Written Quotations: The District shall obtain telephone, written or electronic quotations for public works contracts from contractors on the small works roster to assure that a competitive price is established and to award contracts to the lowest responsible bidder, as defined in RCW 43.19.1911(9) as follows:

- a. A contract awarded from a small works roster need not be advertised. Invitations for quotations shall include an estimate of the scope and nature of the work to be performed as well as materials and equipment to be furnished. However, detailed plans and specifications need not be included in the invitation. This paragraph does not eliminate other requirements for architectural or engineering approvals as to quality and compliance with building codes.
- b. Quotations may be invited from at least five, or all, appropriate contractors on the small works roster in a manner that will equitably distribute the opportunity among the contractors on the roster. If the estimated cost of the work is from one hundred-fifty thousand dollars (\$150,000) to three hundred thousand dollars (\$300,000), the District may choose to solicit bids from less than all the appropriate contractors on the appropriate small works roster but must also notify the remaining contractors on the appropriate small works roster that quotations on the work are being sought. The District has the sole option of determining whether this notice to the remaining contractors is made by:
 - i. publishing notice in a legal newspaper in general circulation in the area where the work is to be done;
 - ii. mailing a notice to these contractors; or
 - iii. sending a notice to these contractors by facsimile or other electronic means.
- c. For purposes of this resolution, "equitably distribute" means that the District may not favor certain contractors on the small works roster over other contractors who perform similar services. At the time bids are solicited, the District representative shall not inform a contractor of the terms or amount of any other contractor's bid for the same project;
- d. A written record shall be made by the District representative of each contractor's bid on the project and of any conditions imposed on the bid. Immediately after an award is made, the bid quotations obtained shall be recorded, open to public inspection, and available by telephone inquiry.

1.3.7 Limited Public Works Process: If construction, alteration, repair, or an improvement project is estimated to cost less than thirty-five thousand dollars (\$35,000), the District may award such a contract using the limited public works process provided under RCW

39.04.155, subsection (3). The District will solicit electronic or written quotations from a minimum of three contractors from the small works roster and shall award the contract to the lowest responsible bidder as defined under RCW 43.19.1911(9).

1.3.8 Determining Lowest Responsible Bidder: The District shall award the contract for the public works project to the lowest responsible bidder provided that, whenever there is a reason to believe that the lowest acceptable bid is not the best price obtainable, all bids may be rejected and the District may call for new bids. RCW 43.19.1911(9) states:

In determining 'lowest responsible bidder', in addition to price, the following elements shall be given consideration:

- a. The ability, capacity, and skill of the bidder to perform the contract or provide the service required;
- b. The character, integrity, reputation, judgment, experience, and efficiency of the bidder;
- c. Whether the bidder can perform the contract within the time specified;
- d. The quality of performance of previous contracts or services;
- e. The previous and existing compliance by the bidder with laws relating to the contract or services;
- f. Such other information as may be secured having a bearing on the decision to award the contract.

1.3.9 Award: The Secretary Manager or his/her designee shall present all telephone quotations/bids and recommendation for award of the contract to the lowest responsible bidder to the Board of Directors. However, for public works projects under twenty-five thousand dollars (\$25,000) the Secretary Manager shall have the authority to award public works contracts without Board of Directors approval, provided that the Board of Directors shall ratify the Secretary Manager's approval at the next scheduled Board of Directors meeting. For public works projects over twenty-five thousand dollars (\$25,000) the Board of Directors shall award all public works contracts by resolution.

1.4 Investment Policy:

- a. It is the policy of the Lake Chelan Reclamation District to invest public funds in a manner which will provide maximum security with the highest investment return while meeting the daily cash flow demands of the District and conforming to all state and local statutes governing the investment of public funds.
- b. The purpose of this Investment Policy is to establish the investment objectives, delegation of authority, standards of prudence, eligible investments and transactions, internal controls, reporting requirements, and custodial procedures

necessary for the prudent management and investment of the funds of Lake Chelan Reclamation District.

1.4.1 Scope: This investment policy applies to all financial assets of the Lake Chelan Reclamation District and include all monies in the General Fund or any new fund created by the Lake Chelan Reclamation District Board of Directors, unless specifically exempted.

1.4.2 Prudence: Investments shall be made with judgement and care, and in the context of managing an overall portfolio. Investments are not for speculation, but for investment, considering the probable safety of the capital as well as the probable outcome to be derived. The investment officer shall act in accordance with the investment policy.

- 1.4.3 Objective: The primary objectives in the District's investment activities shall be:
- a. Safety: Safety of the principal is the foremost objective of the investment program. Investments shall be undertaken in a manner that seeks to ensure the preservation of capital in the overall portfolio.
 - b. Liquidity: The District's investment portfolio will remain sufficiently liquid to enable the District to meet all operating requirements that might be reasonably anticipated.
 - c. Return on Investment: The District's investment portfolio shall be designed with the objective of attaining a market rate of return throughout budgetary and economic cycles.

1.4.4 Delegation of Authority: Authority to manage the Lake Chelan Reclamation District's investment program is hereby delegated to the Secretary-Manager-Treasurer. The Secretary-Manager-Treasurer shall be responsible for all transactions undertaken and shall establish a system of controls to regulate the activities of subordinate officials.

1.4.5 Authorized and Suitable Investments: The Lake Chelan Reclamation District is empowered to invest in the following types of securities:

- a. Savings on time accounts, including certificates of deposit, in designated qualified public depositories, commercial banks, savings and loan associations, and mutual savings banks doing business in this state in accordance with RCW 39.58, in an amount not in excess of FDIC or FSLIC insurance coverage.
- b. Certificates, notes, or bonds of the United States, or other obligations of the U.S. government or its agencies.
- c. Federal home loan bank notes and bonds and land bank bonds.
- d. Bonds of the state of Washington and any local government in the state of Washington that carry one of the three highest ratings of a nationally recognized rating agency.
- e. Shares of money market funds with portfolios consisting of securities otherwise authorized by law for investment by local governments.

f. Washington State Local Government Investment Pool.

1.4.6 Safekeeping and Custody: All security transactions entered into by the District shall be conducted on a delivery-versus-payment basis. Securities purchased by the entity will be delivered against the payment and held in a custodial safekeeping account. The Secretary-Manager-Treasurer will designate a third party custodian and safekeeping receipts will evidence all transactions.

1.4.7 Maximum Maturities: To the extent possible, the District will attempt to match its investments with anticipated cash flow requirements. The District will not directly invest in securities maturing more than five (5) years from date of purchase.

1.4.8 Internal Controls: The transactions will be audited by the Washington State Auditor's Office, in accordance with its biennial audit of the District.

1.4.9 Reporting: The Secretary-Manager-Treasurer shall provide the District's Board of Directors with periodic accurate and meaningful reporting of the investment portfolio. The reporting will include, but not limited to, average life and final maturity of each investment, earnings rate, par and market value.

1.5 Small and Attractive Assets:

1.5.1 Purpose: The following policy and procedure documents a small and attractive assets system designed to ensure control over items that may not be noticed immediately after their disappearance. The intent of this policy is to obtain accountability over items that do not meet the criteria of a fixed asset and would NOT be noticed immediately upon disappearance or replacement.

1.5.2 Policy: It is the policy of the Lake Chelan Reclamation District to maintain accountability over all tangible items that may have the likelihood of disappearing without being noticed. The Deputy Treasurer shall maintain records to be verified by the Field Supervisor, or his designee, with a physical inventory. The Deputy Treasurer will monitor and record differences between years.

- a. General: A small and attractive item is an item that is priced under the \$5,000 criteria for fixed assets, that is priced over \$500, and has a life expectancy of more than one year. This item also is not likely to be missed immediately upon disappearance and could be replaced without suspicion. Examples include, but are not limited to: projectors, shop tools, laptops, mobile power equipment, etc. This would not include more permanent fixtures such as desks, tables and shelving, and specifically excludes small tools and minor equipment such as shovels, hand tools, supplies, etc.
- b. Asset Identification: The asset list will contain the serial number, model or other identifying information. Each piece of property will be tagged with the District's

name, city and telephone number. Tags will be removed only when the item is sold, scrapped, or otherwise disposed of.

1.5.3 Procedures:

- a. Additions: Lake Chelan Reclamation District may acquire property via purchase, construction, donation, or lease. Regardless of how it is acquired, when the property is received, either at date of acquisition or within the same calendar year, the Deputy Treasurer will add it to the Small & Attractive Assets Inventory List and mark the item with the District's name, city and telephone number tags.
- b. Deletions: Items previously acquired will eventually be disposed of and need to be deleted from the District's list. Deletions may be required due to a sale of the asset, scrapping, mysterious disappearance (lost), or involuntary conversion (fire, flood, theft, etc.) The Field Supervisor, or his designee, will determine when an asset is to be removed from the list. If an item is deleted, the Field Supervisor, or his designee, will note the reason and/or means of disposal and inform the Deputy Treasurer to have the reason added to the Notes section of the Small & Attractive Assets Inventory List.

CLASSIFICATION OF DOMESTIC USERS

<u>CLASSIFICATION</u>	<u>EQUIVALENT RESIDENTIAL UNITS</u>
1. Single Family Residential Units (on-site, manufactured or modular Construction) – For Accessory Living units see classification #3.	1 ERU
2. Churches	1 ERU
3. Multi-Family Residential Units (duplex, triplex residential dwelling units or condominiums)	1 ERU per dwelling unit, excepting additional living space designated as ‘accessory living’ units and under 1,000 sq. ft shall be 0.5 ERU for hookups and billing
4. Motels (without Restaurants)	1 ERU for the first unit <u>plus</u> 0.5 ERU for each additional unit
5. Commercial Units (on-site, manufactured or modular construction)	1 ERU
6. Nursing Homes, Rest Homes, or Convalescent Homes	1 ERU
7. Offices, Small Retail Establishments and Home Businesses (without food services)	1 ERU
8. Coin Operated or self-service Laundromats	1 ERU
9. Schools; public, parochial and preschools	1 ERU
10. Service Stations	1 ERU <u>plus</u> 1 ERU for trailer/camper sewage dump stations
11. Car Wash	1 ERU
12. Orchard Cabins	0.5 ERU if used less than 6 months per year for agricultural purposes, <u>plus</u> 0.5 ERU if used more than 6 months. Multi-unit used more than 6 months for agricultural purposes are 1.0 ERU for first unit <u>plus</u> 0.5 per each additional unit
13. Worker Housing and H-2A	1 ERU per 10 person occupancy
14. Bowling Alleys	1 ERU
15. Restaurants, Cafes, Taverns, Bakeries, Pizza Parlors and Delicatessens	1 ERU
16. Drive-in Eating Places	1 ERU
17. Shopping Centers	1 ERU

18. Supermarkets and Grocery Stores	1 ERU
19. Small Markets and Convenience Stores	1 ERU
20. Conference Centers and Club Houses	1 ERU
21. Large retail businesses (no food svc)	1 ERU
22. Swimming Pools	1 ERU
23. Apartments	1 ERU for first unit, <u>plus</u> 0.5 ERU for each additional unit
24. Recreational Vehicle or Travel Trailer Courts (Individually Metered)	1 ERU for first pad, <u>plus</u> 0.25 ERU per pad for each additional pad with no more than 1 BR and 400 sq. ft. (without laundry facilities or garbage disposal units); <u>plus</u> 0.25 ERU per pad if used more than 6 months per year or if 2 BR or more, or if more than 400 sq. ft., or with garbage disposal <u>plus</u> 0.5 ERU if with laundry facilities or if used more than 6 months and either 2 BR or more than 400 sq. ft. or garbage disposal
25. Multi-Unit Industrial Parks	1 ERU for first unit <u>plus</u> 0.5 ERU for each additional unit
26. Multi-Office Commercial Buildings	1 ERU for first business, <u>plus</u> 0.5 ERU for each additional business
27. Legion Halls and Grange Halls	1 ERU
28. Boat Moorage Water Service	1 ERU for first slip <u>plus</u> 0.06 ERU for each additional slip if for a marina
29. Mobile Home or Travel Trailer Courts (Master Metered)	1 ERU per dwelling unit <u>plus</u> a \$25 turn-on fee and \$50 refundable deposit

CLASSIFICATION OF SEWER USERS

<u>CLASSIFICATION</u>	<u>EQUIVALENT RESIDENTIAL UNITS</u>
1. Single Family Residential Units (on-site, manufactured or modular Construction) – For Accessory Dwelling units see classification #3.	1 ERU
2. Churches	1 ERU
3. Multi-Family Residential Units (duplex, triplex residential dwelling units or condominiums)	1 ERU per dwelling unit, excepting additional living space designated as 'accessory dwelling' units and 750 sq.ft. or less shall be 0.5 ERU for hookups and billing
4. Motels (without restaurants)	1 ERU for the first unit <u>plus</u> 0.5 ERU per for each additional unit
5. Commercial Units (on-site, manufactured or modular construction)	1 ERU
6. Nursing/Rest/Convalescent Homes	2 ERU's <u>plus</u> 0.5 ERU per month
7. Offices, Small Retail Establishments and Home Businesses (w/o food svcs)	1 ERU
8. Coin operated or self-service Laundromats	0.05 ERU per pound of washing machine capacity
9. Schools; public, parochial, and preschools	2 ERU's <u>plus</u> : (Grade Schools) + 0.04 ERU per Pupil and employed personnel; (Jr/Sr High Schools) + 0.06 ERU per pupil and employed personnel
10. Service Stations	1 ERU <u>plus</u> 1 ERU for trailer/camper sewage dump stations
11. Car Wash	3 ERU if properly filtered and recycled, 1 ERU per 5,200 gallons if not
12. Orchard Cabins	0.5 ERU if used less than 6 months per year for agricultural purposes
13. Worker Housing and H-2A	1 ERU per 10 person occupancy
14. Bowling Alleys	2 ERU up to 8 lanes <u>plus</u> 0.5 ERU per lane additional <u>plus</u> 0.015 ERU per seat of seating capacity of restaurant or bar
15. Restaurants, Cafes, Taverns, Bakeries Pizza Parlors and Delicatessens	1 ERU <u>plus</u> 0.015 ERU per seat measured by max seating capacity
16. Drive-in Eating Places	1 ERU <u>plus</u> 1 ERU if restrooms are available for Customers
17. Shopping Centers	2 ERU <u>plus</u> 0.07 ERU per 1000 sq. ft. for retail space over 1000 sq. ft.
18. Supermarkets and Grocery Stores	2 ERU <u>plus</u> 0.07 ERU per 1000 sq. ft. for retail space over 1000 sq. ft. <u>plus</u> 0.5 ERU per garbage disposal
19. Small Markets and Convenience Stores	2 ERU <u>plus</u> 0.07 ERU per 1000 sq. ft. for retail space over 1000 sq. ft. <u>plus</u> 0.5 ERU per garbage disposal. ERU's can be reduced to 1 ERU subject to verification that average monthly water use is at or below 700 cubic feet per month and no garbage disposal units are used

20.	Conference Centers and Club Houses	1.2 ERU's <u>plus</u> 0.6 ERU per kitchen <u>plus</u> 0.5 ERU per garbage disposal <u>plus</u> 0.025 ERU per seat measured by max seating capacity of the conference center or club house
21.	Large retail businesses (no food service)	1 ERU per <u>plus</u> 0.14 ERU per employee per 8-hour shift over 7 employees
22.	Swimming Pools	0.5 ERU per 1500 sq. ft. if tied into sewer
23.	Apartments	1 ERU for first unit, <u>plus</u> 0.5 ERU for each additional unit, <u>plus</u> 0.5 ERU for each additional unit with laundry facilities <u>plus</u> 0.05 ERU per pound of washing machine capacity of commercial laundry facilities
24.	RV or Travel Trailer Court	1 ERU for first pad, <u>plus</u> 0.25 ERU per pad for each additional pad with no more than 1 bedroom and 400 sq. ft. (w/o laundry facility or garbage disposal units) <u>plus</u> 0.25 ERU per pad if used more than 6 months per year or if 2 bedrooms or more or if more than 400 sq. ft. or with garbage disposal <u>plus</u> 0.5 ERU if with laundry facilities or if used more than 6 months and either 2 bedroom or more than 400 sq. ft. or garbage disposal
25.	Multi-unit Industrial Parks	1 ERU for first unit plus 0.5 ERU for each additional unit
26.	Multi-office Commercial Buildings	1 ERU per toilet
27.	Legion Halls and Grange Halls	1 ERU
28.	Trailer/Camper Sewage Dump or Boat Pump-out Sewage Dump	1 ERU
29.	Boat Moorage Sewage Service	1 ERU for first slip <u>plus</u> 0.06 ERU for each additional slip if for a marina
29.	Industrial Sewage – Off Season (Nov. 1 st to Apr. 20 th only)	ERU's shall be based upon total metered off-season wastewater quantity averaged over a 12-month period calculated on an averaged of 85,775 gallons per ERU per year. Industrial strength shall be limited to a max of 300 ppm BOD ₅ and TSS. O&M fees shall be estimated at the start of each off season and the billing adjusted for the actual flow at the end of each off season. The initial ERUs for hookup fees shall be estimated for the first year and adjusted for billing once at the end of the first season.



P.O. BOX "J"
MANSON, WASHINGTON 98831
PHONE: (509) 687-3548
FAX: (509) 687-9884

REQUEST FOR LETTER OF AVAILABILITY

PROPERTY OWNER NAME: _____

PROPERTY ADDRESS: _____

TAX PARCEL NUMBER: _____

MAILING ADDRESS: _____

PHONE NUMBER: _____ E-MAIL: _____

PROJECT TYPE:

- ☐ REMODEL OF EXISTING DWELLING
☐ NEW CONSTRUCTION ☐ RESIDENTIAL ☐ COMMERCIAL
☐ BOUNDARY LINE ADJUSTMENT OR CERTIFICATE OF EXEMPTION
☐ SHORT PLAT OR PLAT – *Please attach proposed map*
☐ NEW MULTI-FAMILY - *Please attach proposed map*
☐ GARAGE/DETACHED OR ACCESSORY DWELLING

SERVICES REQUESTED:

- ☐ DOMESTIC WATER
☐ SEWER WASTE WATER

THE LAKE CHELAN RECLAMATION DISTRICT’S BOARD OF DIRECTORS HAVE APPROVED RESOLUTION No. 14-03 ON MARCH 11TH, 2014 TITLED “CROSS-CONNECTION CONTROL POLICY”. THIS POLICY IMPLEMENTS A NEW CROSS-CONNECTION CONTROL PROGRAM AS REQUIRED BY THE DEPARTMENT OF HEALTH. ANY AND ALL REMODELS OF EXISTING DWELLINGS, ARE REQUIRED TO INSTALL A STATE APPROVED BACKFLOW PREVENTION DEVICE DIRECTLY AFTER THEIR METER FOR PREMISE ISOLATION, WITHIN 90 DAYS OF THIS LETTER BEING ISSUED. FAILURE TO DO SO WILL RESULT IN YOUR WATER METER BEING TURNED OFF UNTIL YOUR SERVICE IS BROUGHT UP TO COMPLIANCE. CUSTOMERS ARE REQUIRED TO HAVE THEIR BACKFLOW PREVENTION DEVICE INSPECTED AND TESTED ANNUALLY AT THEIR OWN COST. LAKE CHELAN RECLAMATION MUST INSPECT AND APPROVE THE INSTALLATION PRIOR TO ANY BACK FILL.

DATE OF REQUEST: _____

OWNER’S SIGNATURE: _____

PRINTED NAME: _____

HOW WOULD YOU LIKE TO RECEIVE
THE “LETTER OF AVAILABILITY”?

☐ EMAIL ☐ REGULAR MAIL

DATE RECEIVED BY LCRD: _____

IS THIS PARCEL LOCATED WITHIN THE BOUNDARIES OF LCRD? ☐ YES ☐ NO

IS THIS PARCEL ADJOINING A MAIN SERVICE LINE? ☐ YES ☐ NO

HAS THIS PROPERTY COMPLIED WITH OUR CROSS CONNECTION POLICY? ☐ YES ☐ NO

IF NO, APPROXIMATELY HOW FAR AWAY IS THE MAIN LINE? _____

ADDITIONAL NOTES: _____



P.O. Box "J"
MANSON, WASHINGTON 98831
PHONE: (509) 687-3548
FAX: (509) 687-9884

SERVICE ID: _____

APPLICATION FOR DOMESTIC WATER HOOK-UP

NAME: _____

PARCEL#: _____

MAILING ADDRESS: _____

TYPE OF SERVICE:

- ☐ SINGLE FAMILY RESIDENCE
☐ DUPLEX/TRIPLEX/MULTI
☐ COMMERCIAL BUILDING
☐ ACCESSORY DWELLING UNIT (ADU)
☐ OTHER: _____

PHONE NUMBER: _____

E-MAIL: _____

PROPERTY ADDRESS: _____

WHAT DATE WOULD YOU LIKE THE METER SERVICE INSTALLED BY? _____

* IF A METER BOX IS NOT ALREADY PRESENT, PLEASE USE A STAKE LABELED "WATER" TO MARK YOUR DESIRED LOCATION AND ATTACH A PARCEL MAP TO THIS FORM SHOWING ITS LOCATION. LCRD REQUIRES **30 DAYS ADVANCE NOTICE** PRIOR TO SERVICE INSTALLATION.

CUSTOMER ACKNOWLEDGES AND AGREES TO THE FOLLOWING BY SIGNING THIS DOCUMENT:

1. THE CUSTOMER WILL HAVE THE BACKFLOW PREVENTION ASSEMBLY (DCVA) INSPECTED AND TESTED ANNUALLY AT YOUR OWN COST AS REQUIRED BY THE DEPARTMENT OF HEALTH WAC 246-290-490.
2. THE CUSTOMER HAS READ THE BROCHURE ON HOW TO PREVENT THERMAL EXPANSION AND ACKNOWLEDGES THAT LCRD RECOMMENDS THE INSTALLATION OF THERMAL EXPANSION TANK.
3. THE CUSTOMER UNDERSTANDS THAT INSULATING THE METER AND DCVA BOX DURING THE WINTER MONTHS IS YOUR RESPONSIBILITY. LCRD RECOMMENDS PLACING INSULATION IN A GARBAGE BAG, TO KEEP IT FROM GETTING WET, AND PLACING IT BELOW AND ABOVE THE DCVA IN EFFORT TO PREVENT IT FROM FREEZING.
4. HIGH PRESSURE: IN ORDER TO PROVIDE DOMESTIC WATER SERVICE TO ALL AREAS OF OUR DISTRICT, SOME SERVICES WILL HAVE HIGH WATER PRESSURE AND MAY NEED TO INSTALL A PRESSURE REDUCING VALVE (PRV) ON YOUR MAIN WATER LINE.
5. LOW PRESSURE ZONE: LCRD IS REQUIRED TO PROVIDE A MINIMUM OF 30 PSI AT THE METER, WHICH IS LOCATED AT THE EDGE OF YOUR PROPERTY. A PRIVATE BOOSTER PUMP SYSTEM WILL BE NEEDED IF THE PSI AT YOUR HOUSE IS NOT ADEQUATE. YOU ARE RESPONSIBLE FOR PROVIDING POWER FOR THE PRIVATE PUMP AND MAINTAINING IT.

CUSTOMER SIGNATURE: _____

DATE: _____

NOTE: MONTHLY RATE SERVICE FEES WILL START 30 DAYS AFTER THE WATER METER IS INSTALLED REGARDLESS OF WHETHER YOU ARE PHYSICALLY USING THE WATER OR NOT. THE HOOK UP FEE WILL INCLUDE THE INSTALLATION OF A 3/4" METER, 3/4" DOUBLE CHECK VALVE ASSEMBLY AND A BLANK BALL VALVE WHICH IS THE CUSTOMER'S SHUT OFF VALVE.

Hook Up Fee (per ERU)	\$6,000
ADU Hook Up Fee (.5)	\$2,600
DCVA Install Fee	\$1,000
Tap Fee	\$1,000
Road Crossing Fee	\$1,500
Misc Fees/Latecomer:	\$ _____
TOTAL AMOUNT DUE:	\$ _____

AMOUNT PAID: _____

CHECK NUMBER: _____

DATE PAID: _____

RECEIVED BY: _____

LAKE CHELAN RECLAMATION DISTRICT

Hook Up Completed On: _____

Hook Up By: _____

Make: _____ Serial: _____

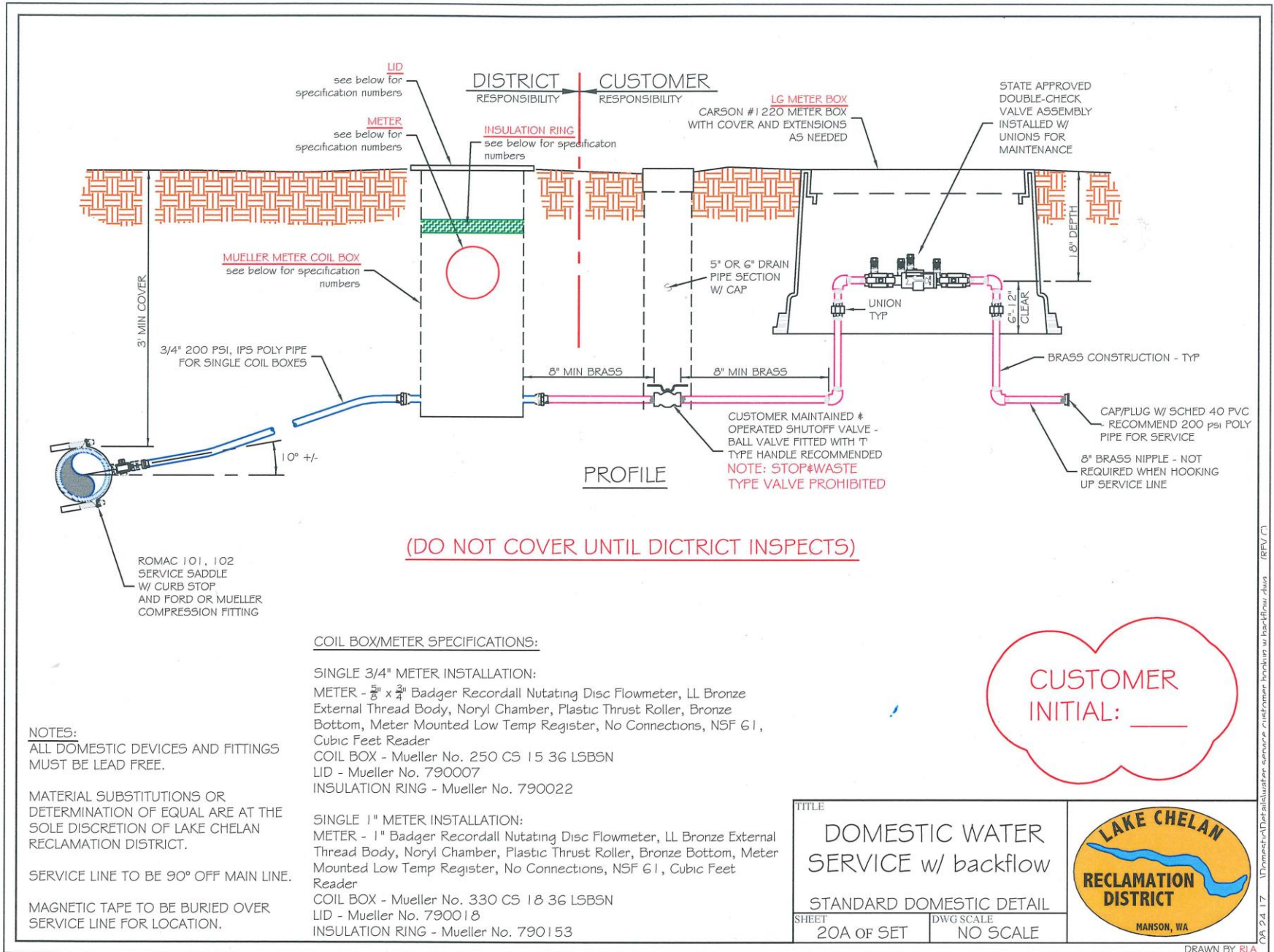
Backflow Serial: _____

Dials: _____ Starting Read: _____

Backflow Make/Model: _____

Chlorine Residual Test Result: _____ MG/L

Backflow Size: _____



APPENDIX E – COUNTY RESOLUTION 2015-112

RESOLUTION 2015-112

Regarding: Population allocations for Chelan County and each of the designated Urban Growth Areas including the incorporated cities of Cashmere, Chelan, Entiat, Leavenworth and Wenatchee.

WHEREAS, State law requires the review and update of the County and respective City's Comprehensive Plans and Development Regulations by June 30, 2017, pursuant to RCW 36.70A.110 and .130; and,

WHEREAS, the County is tasked with using the Office of Financial Management population estimates for the County and providing analysis of the population projections appropriate to each Urban Growth Boundary; and,

WHEREAS, the County and the Cities of Cashmere, Chelan, Entiat, Leavenworth and Wenatchee have come to an agreement on the proposed population projection method and determination; and

WHEREAS, the Board of County Commissioners finds that this is a necessary step in drafting proposed amendments to the County Comprehensive Plan and each of the Cities Comprehensive Plans;

WHEREAS, the population projections are for the purpose of review and consideration during the mandated 2017 Comprehensive Plan and Development Regulation Update and may be modified through the review and adoption process based on additional information, findings and public or agency comments; and,

WHEREAS, the Board of County Commissioners conducted a duly advertised public hearing on December 15, 2015, to examine the records and files and invite public testimony for or against the proposal;

NOW, THEREFORE, BE IT RESOLVED that the Board of County Commissioners hereby adopts Exhibit A proposed population projections; and,

BE IT FURTHER RESOLVED that this Resolution is hereby signed into authentication and shall take effect and be in force from and after the date of signing.

Dated this 15th day of December, 2015.

BOARD OF CHELAN COUNTY COMMISSIONERS

Keith W. Goehner
KEITH W. GOEHNER, CHAIRMAN

ATTEST: Kami Albers

Doug England
DOUG ENGLAND, COMMISSIONER

K. Albers
Deputy Clerk of the Board

Ron Walter
RON WALTER, COMMISSIONER



Exhibit A - Jurisdiction Specific Population Projections based on Share of Population Growth Between 1990 and 2010
Using OFM 2012 Medium Projection for Chelan County

	Share of 1990-2010 Population Growth	Adjusted Population Allocations	2014 OFM Estimate	2015 Projection	2020 Projection	2025 Projection	2030 Projection	2035 Projection	2037 Projection	2040 Projection
Manson UGA	3.69%	3.69%	2,032	2,064	2,190	2,312	2,418	2,507	2,538	2,583
Chelan UGA*	2.88%	3.61%	4,384	4,416	4,539	4,658	4,762	4,849	4,880	4,924
Entiat UGA	2.01%	2.01%	1,143	1,161	1,229	1,296	1,354	1,402	1,420	1,444
Leavenworth UGA	1.71%	1.71%	2,404	2,419	2,477	2,534	2,583	2,624	2,638	2,659
Peshastin UGA	0.32%	0.32%	671	674	685	695	705	712	715	719
Cashmere UGA	2.88%	2.88%	3,742	3,767	3,865	3,960	4,043	4,112	4,137	4,172
Wenatchee UGA	53.09%	53.09%	38,454	38,921	40,729	42,481	44,017	45,286	45,741	46,389
Urban	66.58%	67.31%	52,830	53,422	55,715	57,935	59,883	61,491	62,069	62,890
Rural	33.42%	32.69%	21,470	21,758	22,871	23,950	24,895	25,677	25,957	26,356
TOTAL	100.00%	100.00%	74,300	75,180	78,586	81,885	84,778	87,168	88,026	89,246

*Modified based on population changes from 1990-2015

APPENDIX F – WATER USE EFFICIENCY

12:01

LTE

AA

Not Secure — lcrd.org



Office: 509-687-3548



Get the latest News.

RSS

WUE Meeting Goals

Jun 30, 2020

At 8:00 am on July 14th, the Board of Directors will meet to discuss the Domestic Water Use Efficiency program goals for the upcoming System Comprehensive Plan

Request for Qualifications

May 26, 2020

Request for Qualification Statement for electrical engineering.

Rescheduled Board Mtg

Feb 28, 2020

The Board of Directors of the Lake Chelan Reclamation District has rescheduled their regular March board meeting for 8:00 a.m. on Monday, March 16, 2020 at the District office

Irrigation Newsletter

Jan 31, 2020

See the link for the most recent newsletter!

[/files/newsletters/2020/Volume-27--Issue-2-2020-](#)

Ryan Peterson

From: Jennifer Collins <jcollins@lcrd.org>
Sent: Thursday, June 25, 2020 11:58 AM
To: Ryan Peterson
Cc: Rod Anderson
Subject: WUE Forum notification

PUBLIC NOTICE

Lake Chelan Reclamation District WUE Meeting Goals

At 8:00 am on July 14th, the Board of Directors of the Lake Chelan Reclamation District, will meet and discuss the Domestic Water Use Efficiency program goals for the upcoming Domestic Water System Comprehensive Plan. The meeting agenda will be available on www.lcrd.org

Cc: KOZI Radio
The Lake Chelan Mirror

Jennifer Collins

Lake Chelan Reclamation District
P.O. Box J / 80 Wapato Way
Manson, WA 98831
P: (509) 687-3548
F: (509) 687-9884
jcollins@lcrd.org

Notice of Confidentiality:

The information transmitted is intended only for the person or entity to which it is addressed and may contain confidential and/or privileged material. Any review re-transmission or other use of or taking any action in reliance upon this information by persons or entities other than the intended recipient is prohibited. If you received this in error please contact the sender immediately by return electronic transmission and then immediately delete this transmission including all attachments without copying, distributing or disclosing same.

BOARD OF DIRECTORS

Tuesday, July 14, 2020

8:00 a.m.

AGENDA

NOTE to PUBLIC: If anyone from the public would like to attend the July board meeting please contact the District office (509-687-3548) by Monday July 13th, 2020 by 12:00 pm to make arrangements. Thank you.

- I. Call to Order
- II. Consent Agenda
 - a. Minutes
 - b. Budgets
 - c. Investments
- III. Accounts Payable
- IV. Manager's Report
- V. Old Business
 - a. WTP Property Acquisition
- VI. New Business
 - a. Water Use Efficiency Goals
 - b. Financial Management Policies
 - c. Bond Resolution – Resolution 20-08
 - d. Chelan View Orchards Latecomer Agreement – Resolution 20-09
 - e. Penny Hunt Letter
- VII. Public Comment
- VIII. Adjournment

REGULAR MEETING
BOARD OF DIRECTORS

July 14, 2020

The Board of Directors of Lake Chelan Reclamation District met for their regular Board meeting at the office of the District on July 14, 2020. The meeting was called to order at 8:00 a.m. by Board President Dave Clark. Those in attendance were:

BOARD

David Clark
Paul Mogan
Nathan England
Todd Jeffries
Chad Steiner

STAFF

Rodney L. Anderson
Mary Lou Brooks

GUESTS

MINUTES – FINANCIAL REVIEW – STATUS OF FUNDS

A motion was made by Director Mogan and seconded by Director Jeffries to approve the June 9, 2020 minutes, budgets, and investments, as mailed. Motion carried unanimously.

ACCOUNTS PAYABLE

Secretary-Manager Anderson presented the accounts payable for review and approval. Accounts payable checks 16223 through 16267 (including EFT payments) totaled \$233,448.13 and were broken down as follows:

Irrigation O & M Investment	\$ 80,079.09
Irrigation Construction	\$ 16,161.00
Domestic O & M Investment	\$ 97,560.86
Domestic Construction	\$ 233.74
Sewer O & M Investment	\$ 39,413.44
Sewer Construction	\$ 0.00

After some clarification on proposed payments, a motion was made by Director Mogan and seconded by Director Steiner to approve the accounts payable as listed. Motion passed unanimously.

MANAGER'S REPORT

Irrigation: The MCC upgrade project is on schedule. The contractor has ordered the equipment needed and will begin work in November after the irrigation system has been shut down.

Domestic: We are at a good time to move forward with the Automatic Meter Read (AMR) project this fall. District Manager Anderson believes installing all new meter heads throughout the District will take 3-4 years, and we will do one route at a time. Doing the work ourselves will save the District a considerable amount of money. The cost would be \$12,000 initially, then budget

\$150,000 per year thereafter, with the entire project costing approximately \$450,000. Rate increases will continue to increase slowly to cover costs, and it is believed the District will break even in approximately 10 years. Cellular service is currently \$0.89 per meter per month, and the batteries in the units are claimed to last a maximum of 10 years. There has been very positive feedback with the meters initially installed for testing, saving customers larger excess charges due to leaks and breaks. After considerable discussion, a motion was made by Director Steiner and seconded by Director Jeffries to proceed with the Automatic Meter Read (AMR) project.

AT&T would again like to renegotiate their current lease. They are adding upgrades by putting in a generator with a concrete pad.

A tilt trailer has been ordered costing the District \$8,000, which is considerably less than the \$15,000 that was budgeted. The trailer will haul the large 2017 Kubota Mini Excavator and expected delivery is 3-6 weeks.

We will be advertising for bids for the Boetzke/Green replacement project in the fall, for the work to be done in the spring of 2021. The project is in the middle of town and under pavement, which will have to be replaced, making it more difficult for the District to do ourselves. Approximately 1000 feet of line will be replaced, which is included in the District's comp plan. The District does not have the time or resources to take on this project.

There was a water main break at Quetilquasoon Road and Highway 150. The fix went very well with the crew working until late Friday evening.

There was a line break at Wapato Lake Road and Highway 150, in an old steel line. This is on the list of replacement projects to be done within the next few years.

Sewer: Nothing to report.

Administrative: Joyce Romberger leak rebate request: There was significant miscommunication between Ms. Romberger and the District office, resulting in the customer's excess overage. It is recommended to adjust Ms. Romberger's account by \$\$518.26 for the May - June Utility Billing Statement. Board approved.

Penny Hunt leak rebate request: Ms. Hunt is an 80-year-old lady on Social Security who was making payments from the date of the Irrigation Statement being received. She made her last payment a couple of days late, thereby giving her an excess overage. It is recommended to adjust Ms. Hunt's account by \$370.01 for the May - June Utility Billing Statement. Board approved.

Mark Janicke leak rebate request. Mr. Janicke had a fitting that broke but went undetected. The line was discovered watering a neighbor's hedge. The line has been disconnected and the valve fixed, but it is recommended to deny the rebate and inform Mr. Janicke to ask the neighbor for reimbursement of his excess charges. Board agreed.

Doug Storaasli leak rebate request. Mr. Storaasli is currently in Arizona. His landscaper turned on the water, but it was the wrong valve, and it ran for several days. It is recommended to deny the rebate and keep the issue between Mr. Storaasli and his landscaper. Board agreed.

We received bids from engineering firms regarding the federal generator grant. After grading each proposal, we are recommending RH2 Engineering, as they graded highest overall, and are the most familiar with our system. The proposed total amount for their portion of the grant work will be \$43,000. After some discussion, a motion was made by Director Steiner and seconded by Director Mogan to accept the proposal from RH2 Engineering for \$43,000 and sign the Professional Services Agreement with them. Motion passed unanimously.

We are at a point with our billing software where it will no longer be supported in approximately five years. We are looking at the upgrades needed with our current software, as well as other software companies that are more local to our area and closer for support issues. The cost is roughly estimated to be \$300,000 to \$400,000, due to the unique billing items we have incorporated into our system. We will take our time and get the right program for the District, anticipating future needs.

A public bond rating interview is being scheduled, which is necessary before bonds are sold. There will be a rehearsal conference call on August 11th at 2:00 pm, that will last approximately two hours, with a due diligence conference call scheduled to begin after the rehearsal conference. The interview itself is scheduled for August 14th at 1:00 pm. In attendance will be Jim Nelson, Senior Vice President of D.A. Davidson, Lee Marchisio of Foster Garvey, Tamara Dezellem, CPA of Cordell, Neher & Company, District Manager Rodney Anderson, Administrative Assistant Jennifer Collins and Deputy Treasurer Mary Lou Brooks. It is also recommended to invite a County Commissioner for their insight into the demographics of the county, and at least one board member to speak on behalf of the District. District Manager Anderson will contact the board members when the interview dates get closer to see who is interested in attending.

The employee over time is currently 32% below normal to date. The over time rate as been declining over the past two years.

The Board was provided a letter written to the District by a very satisfied customer praising the field crew's work.

Past due accounts that have not been paid since the COVID Resolutions went into effect in March total approximately \$10,000, from 35 customers. The District will put reminder door hangers on the customers' residences, but per the governor's order they will not be shut off for non-payment.

The amount paid for the Roses Lake milfoil treatment exceeded the amount approved by the Board by approximately \$1,000. The milfoil was worse than anticipated, so a second treatment had to be applied to be effective. After some discussion, the Board approved the additional amount paid.

OLD BUSINESS:

WTP Property Acquisition: Mr. Giles Sokei has verbally stated that he is willing to sell the District 1.25 acres of land for approximately \$135,000. The land is adjacent to the water treatment plant

and would be used for future expansion or storage. An appraisal will have to be conducted to determine value, as well as a boundary line adjustment filed with the County. After considerable discussion, a motion was made by Director Mogan and seconded by Director Steiner to move forward in negotiating the purchase of 1.25 acres from Mr. Giles Sokei. Motion passed unanimously.

NEW BUSINESS

Water Use Efficiency Goals: Department of Health (DOH) has established 8% of water loss as the goal to save water, with yearly positive progress, at each water distribution facility within the state of Washington. The District's current water loss is 3% to 4%, which is well within the DOH goal. The District goals will be to reduce domestic water use by 1% over the next six years and maintain or reduce irrigation water use. The District will use the Automatic Meter Read meters (AMR) and a yearly newsletter to achieve these goals. After considerable discussion, a motion was made by Director Mogan and seconded by Director Steiner to approve the Water Use Efficiency goals as presented. Motion passed unanimously.

Financial Management Policies: The Board was provided a copy of the Financial Management Policies. After some discussion, a motion was made by Director Jeffries and seconded by Director Steiner to approve the Financial Management Policies as presented. Motion passed unanimously.

Bond Resolution 2020-08: Language has been added to repay the Bond with domestic and/or sewer funds if needed. This would be a loan only and would have to be paid back as soon as the irrigation funds become available. The cap has been placed at \$10 Million but believe \$6.4 Million to \$8.5 Million would be the maximum financed at this time. Bond proceeds will be used for MCC replacement at LC, A, B and C pumping plants, new pump control valves, and new pumps or motors as approved by the District Board. After considerable discussion, a motion was made by Director Mogan and seconded by Director Steiner to approve Bond Resolution 2020-08 as presented. Motion passed unanimously.

PUBLIC COMMENT

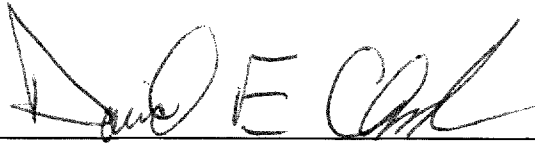
No public comment at this time.

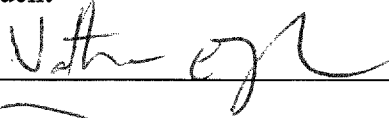
ADJOURNMENT

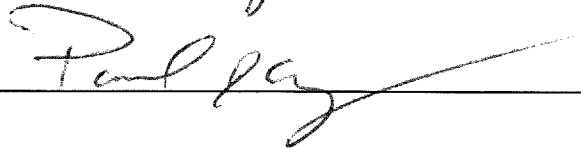
Being no further business to come before the Board, Board President David Clark adjourned the meeting at 9:14 a.m.

Signed: _____

President

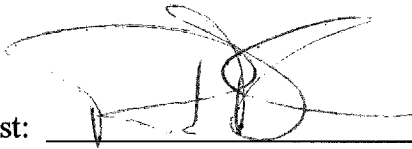






Attest: _____

Secretary-Manager



July 2020

Water Use Efficiency Annual Performance Report - 2014

WS Name: LAKE CHELAN RECLAMATION DISTRICT Water System ID# : 43783 WS County: CHELAN

Report submitted by: *Dave Walters*

Meter Installation Information:

Estimate the percentage of metered connections: *100%*

If not fully metered - Current status of meter installation:

Production, Authorized Consumption, and Distribution System Leakage Information:

12-Month WUE Reporting Period: *01/01/2014* To *12/31/2014*

Incomplete or missing data for the year? *No*

If yes, explain:

Corrected Values



Distribution System Leakage Summary:

Total Water Produced and Purchased (TP) – Annual Volume	242,023,000 gallons	272,023,000
Authorized Consumption (AC) – Annual Volume	234,059,582 gallons	238,544,582
Distribution System Leakage – Annual Volume TP – AC	7,963,418 gallons	33,478,418
Distribution System Leakage – Percent DSL = [(TP – AC) / TP] x 100	3.3 %	12.3%
3-year annual average	4.8 %	7.8%

Goal-Setting Information:

Date of Most Recent Public Forum: *06/10/2010* Has goal been changed since last performance report? *No*

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

WUE Goals:

Customer Goal (Demand Side):

Reduce irrigation water use through the domestic system

Describe Progress in Reaching Goals:

Customer (Demand Side) Goal Progress:

We improved our water loss through system leakage by over 10,000 gallons

Additional Information Regarding Supply and Demand Side WUE Efforts

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

We anticipate another 2 to 3% improvement due to the installation of new flow meters

Water Use Efficiency Annual Performance Report - 2019

WS Name: LAKE CHELAN RECLAMATION DISTRICT Water System ID# : 43783 WS County: CHELAN

Report submitted by: *Dave Walters*

Meter Installation Information:

Estimate the percentage of metered connections: *100%*

If not fully metered - Current status of meter installation:

Production, Authorized Consumption, and Distribution System Leakage Information:

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

Incomplete or missing data for the year? *No*

If yes, explain:

Corrected Values

Distribution System Leakage Summary:

Total Water Produced and Purchased (TP) – Annual Volume	268,400,400 gallons	268,390,000
Authorized Consumption (AC) – Annual Volume	256,299,799 gallons	261,291,799
Distribution System Leakage – Annual Volume TP – AC	12,100,601 gallons	7,098,2018
Distribution System Leakage – Percent DSL = $[(TP - AC) / TP] \times 100$	4.5 %	2.6%
3-year annual average	4.5 %	2.6%

Goal-Setting Information:

Date of Most Recent Public Forum: *06/10/2014* Has goal been changed since last performance report? *No*

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

WUE Goals:

Customer Goal (Demand Side):

Reduce irrigation water use through the domestic system

Describe Progress in Reaching Goals:

Customer (Demand Side) Goal Progress:

none

Additional Information Regarding Supply and Demand Side WUE Efforts

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

APPENDIX G – WATER RIGHTS

APPENDIX G1 – WATER RIGHTS SELF ASSESSMENT

Water Right Self-Assessment Form for Water System Plan

Water Right Permit, Certificate, or Claim # *If water right is interruptible, identify limitation in yellow section below	WFI Source # If a source has multiple water rights, list each water right on separate line	Existing Water Rights Qi= Instantaneous Flow Rate Allowed (CFS) Qa= Annual Volume Allowed (Acre-Feet/Year) This includes wholesale water sold				Current Source Production – Most Recent Calendar Year Qi = Max Instantaneous Flow Rate Withdrawn (CFS) Qa = Annual Volume Withdrawn (Acre-Feet/Year) This includes wholesale water sold				10-Year Forecasted Source Production (determined from WSP) This includes wholesale water sold				20-Year Forecasted Source Production (determined from WSP) This includes wholesale water sold			
		Primary Qi Maximum Rate Allowed	Non-Additive Qi Maximum Rate Allowed	Primary Qa Maximum Volume Allowed	Non-Additive Qa Maximum Volume Allowed	Total Qi Maximum Instantaneous Flow Rate Withdrawn	Current Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume Withdrawn	Current Excess or (Deficiency) Qa	Total Qi Maximum Instantaneous Flow Rate in 10 Years	10-Year Forecasted Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume in 10 Years	10-Year Forecasted Excess or (Deficiency) Qa	Total Qi Maximum Instantaneous Flow Rate in 20 Years	20-Year Forecasted Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume in 20 Years	20-Year Forecasted Excess or (Deficiency) Qa
1 Cert 212	#3 Lake Chelan		30		9,000												
2 Cert 213	#3 Lake Chelan	1.78															
3 S4-27077C	#3 Lake Chelan	4.90		672													
4 Total of 1-3	#3 Lake Chelan	6.68		672													
5 S4-30333P	#3 Lake Chelan	4.00		1,000													
6 S4-30334P	#3 Lake Chelan	4.00		1,000													
TOTALS =		13.93		2,672		10.09	3.84	824	1,848	10.09	3.84	1,000	1,672	13.93	0	1,140	1,532

Column Identifiers for Calculations:

A

B

C

=A-C

D

=B-D

E

= A-E

F

=B-F

G

=A-G

H

=B-H

PENDING WATER RIGHT APPLICATIONS: Identify any water right applications that have been submitted to Ecology.

Application Number	New or Change Application?	Date Submitted	Quantities Requested			
			Primary Qi	Non-Additive Qi	Primary Qa	Non-Additive Qa

INTERTIES: Systems receiving wholesale water complete this section. Wholesaling systems must include water sold through intertie in the current and forecasted source production columns above.

Name of Wholesaling System Providing Water	Quantities Allowed In Contract		Expiration Date of Contract	Currently Purchased Current quantity purchased through intertie				10-Year Forecasted Purchase Forecasted quantity purchased through intertie				20-Year Forecasted Purchase Forecasted quantity purchased through intertie			
	Maximum Qi	Maximum Qa		Maximum Qi	Current Excess or (Deficiency) Qi	Maximum Qa	Current Excess or (Deficiency) Qa	Maximum Qi	Future Excess or (Deficiency) Qi	Maximum Qa	Future Excess or (Deficiency) Qa	Maximum Qi	Future Excess or (Deficiency) Qi	Maximum Qa	Future Excess or (Deficiency) Qa
	Instantaneous Flow Rate	Annual Volume		Instantaneous Flow Rate		Annual Volume		10-Year Forecast		10-Year Forecast		20-Year Forecast		20-Year Forecast	
1															
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.

ADDITIONAL COMMENTS:

Water Right #	Conditions of Interruption	Time Period of Interruption
1		
3		

APPENDIX G2 – WATER RIGHTS

(A) E(B)
Super Cert
issued
11-18-24

CERTIFICATE RECORD No. ONE, Page No. 212

STATE OF WASHINGTON, COUNTY OF Chelan

CERTIFICATE OF WATER RIGHT

(For rights perfected under original, enlargement or secondary permits.)

(In accordance with the provisions of Chapter 117, Laws of Washington for 1917, and the regulations of the State Hydraulic Engineer thereunder.)

This is to certify, that Lake Chelan Reclamation District, of Manson,
State of Washington, has made proof to the satisfaction of the State Supervisor of
Hydraulics of Washington, of a right to the use of the waters of Lake Chelan,
a tributary of _____, for the purposes of irrigation and domestic use,
under Appropriation Permit No. 843, of the State Supervisor of Hydraulics, and
that said right to the use of said waters has been perfected in accordance with the laws of Washington,
and is hereby confirmed by the State Supervisor of Hydraulics of Washington and entered of record in
Volume One, at Page 212, on the 31st day of August, 1927; that
the right hereby confirmed dates from August 29, 1925; that the amount of water to
which such right is entitled and hereby confirmed, for the purposes aforesaid, is limited to an amount
actually beneficially used for said purposes, and shall not exceed 9000 ~~acres~~ ^{acres} ~~xxx~~ ^{xxx} feet ~~per second~~.

A description of the lands under such right, and to which the water hereby confirmed is appurtenant,
or if for other purposes, the place where such water is put to beneficial use, is as follows:

Township	Range	Section	Forty-Acre Tract	No. Acres Described in Permit	No. Acres Actually Irrigated
28 N.	21 E.	Secs.	14, 15, 22, 23, 24, 25, 26, 27, 34, 35, 36,	4500	1000
28 N.	22 E.	Secs.	28, 29, 30, 31, 32, 33.		
27 N.	22 E.	Secs.	4, 5.		

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of
use herein described, except as provided in Section 39, Chapter 117, Session Laws 1917.

WITNESS the seal and signature of the State Supervisor of Hydraulics affixed this 31st day
of August, 1927.

R. K. L. [Signature]
State Supervisor of Hydraulics.

CERTIFICATE RECORD No. One, Page No. 213STATE OF WASHINGTON, COUNTY OF Chelan**CERTIFICATE OF WATER RIGHT**

(For rights perfected under original, enlargement or secondary permits.)

(In accordance with the provisions of Chapter 117, Laws of Washington for 1917, and the regulations of the State Hydraulic Engineer thereunder.)

This is to certify, that Lake Chelan Reclamation, of Manson District, State of Washington, has made proof to the satisfaction of the State Supervisor of Hydraulics of Washington, of a right to the use of the waters of Lake Chelan, a tributary of _____, for the purposes of Irrigation and domestic use under Appropriation Permit No. 844, of the State Supervisor of Hydraulics, and that said right to the use of said waters has been perfected in accordance with the laws of Washington, and is hereby confirmed by the State Supervisor of Hydraulics of Washington and entered of record in Volume One, at Page 213, on the 31st day of August, 19 27; that the right hereby confirmed dates from August 29, 19 25; that the amount of water to which such right is entitled and hereby confirmed, for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed Five cubic feet per second.

A description of the lands under such right, and to which the water hereby confirmed is appurtenant, or if for other purposes, the place where such water is put to beneficial use, is as follows:

Township	Range	Section	Forty-Acre Tract	No. Acres Described in Permit	No. Acres Actually Irrigated
<u>28 N.</u>	<u>21 E.</u>	<u>35</u>		<u>40</u>	<u>60</u>

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in Section 39, Chapter 117, Session Laws 1917.

WITNESS the seal and signature of the State Supervisor of Hydraulics affixed this 31st day of August, 19 27.

R. K. Lafferty
State Supervisor of Hydraulics.

*Best. Reling.
2-14-86
Super Cut
issued 11-18-86*

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

file

CERTIFICATE OF WATER RIGHT

- ☒ **Surface Water** (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)
- ☐ **Ground Water** (Issued in accordance with the provisions of Chapter 885, Laws of Washington for 1948, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE August 25, 1980	APPLICATION NUMBER S4-27077	PERMIT NUMBER S4-27077P	CERTIFICATE NUMBER S4-27077C
----------------------------------	--------------------------------	----------------------------	---------------------------------

NAME
Lake Chelan Reclamation District

ADDRESS (ZIP CODE)	CITY	STATE	ZIP CODE
PO Box J	Manson	Washington	98831

This is to certify that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown, but is limited to an amount actually beneficially used.

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Lake Chelan

TRIBUTARY OF (IF SURFACE WATERS)
Chelan River

MAXIMUM CUBIC FEET PER SECOND 4.9	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR 672
--------------------------------------	----------------------------	-----------------------------------

QUANTITY, TYPE OF USE, PERIOD OF USE

To be used continuously for a municipal supply.

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL

3000 feet south and 1250 feet east from the northwest corner of Section 35

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	T.W.R.A.	COUNTY
NW1/4SW1/4	35	28	21 E.	47	Chelan

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDRESS)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

The municipal supply service area of the Lake Chelan Reclamation District within Sections 15, 16, 21, 22, 23, 24, 25, 26, 27, 28, 34, 35, and 36 of T. 28 N., R. 21 E.W.M.; AND Sections 30, 31, and 32 of T. 28 N., R. 22 E.W.M., Chelan County, Washington.

PROVISIONS

A combined annual diversion from Lake Chelan under this authorization and Surface Water Certificates No. 212 and No. 213 shall not exceed 672 acre-feet.

Diversion intake shall be tightly screened at all times with wire mesh having openings with dimensions not greater than 0.125 (1/8) inch.

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390, and 90.44.020.

This certificate of water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180.

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

this 17th day of March, 1995.

Department of Ecology

ENGINEERING DATA

OK 25x1164

PNK:ska

by Darlene M. Frye

Darlene M. Frye, Section Manager

FOR COUNTY USE ONLY

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

file

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 July 9, 1990	APPLICATION NUMBER S4-30333	PERMIT NUMBER S4-30333P	CERTIFICATE NUMBER
-------------------------------	--------------------------------	----------------------------	--------------------

NAME

Lake Chelan Reclamation District

ADDRESS (STREET)

PO Box J

(CITY)

Manson

(STATE)

Washington

(ZIP CODE)

98831-0399

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

Lake Chelan

TRIBUTARY OF (IF SURFACE WATERS)

Columbia River

MAXIMUM CUBIC FEET PER SECOND

4

MAXIMUM GALLONS PER MINUTE

MAXIMUM ACRE-FEET PER YEAR

1000

QUANTITY, TYPE OF USE, PERIOD OF USE

1000 acre-feet per year for continuous municipal supply.

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL

2500 feet south and 400 feet east from the northwest corner of Section 27 (Lakeshore pump station)

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) SW $\frac{1}{4}$ NW $\frac{1}{4}$	SECTION 27	TOWNSHIP N. 28	RANGE, (E. OR W.) W.M. 21 E.	W.R.I.A. 47	COUNTY Chelan
--	---------------	-------------------	---------------------------------	----------------	------------------

RECORDED PLATTED PROPERTY

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

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Sections 13-16, 21-28, and 34-36 of T. 28 N., R. 21 E.W.M.;
Sections 1 and 2 of T. 27 N., R. 21 E.W.M.;
Sections 18-21, and 27-34 of T. 28 N., R. 22 E.W.M.; and
Sections 3-5, and 10 of T. 27 N., R. 22 E.W.M.

DESCRIPTION OF PROPOSED WORKS

Two 100 horsepower turbine pumps which pump water from Lake Chelan to storage tanks. Water then flows through a distribution system for municipal use. A water treatment plant is to be built soon.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE: Begun	COMPLETE PROJECT BY THIS DATE: January 1, 2005	WATER PUT TO FULL USE BY THIS DATE: January 1, 2020
--------------------------------------	---	--

PROVISIONS

The diversion of water under instant application and that of existing LCRD rights and Application No. S4-30334 from the Manson and Lakeshore pump stations must not exceed a combined 13.93 cfs and 2672 acre-feet per year for continuous municipal use to a projected 9,000 residents.

A suitable measuring device approved by the Department of Ecology shall be installed and maintained in accordance with WAC 508-64-020 through WAC 508-64-040.

Whenever water is being diverted, bi-weekly (every two weeks) readings of the measuring device shall be recorded and maintained by the permittee. These records shall be made available to the Department of Ecology upon request.

The LCRD in conjunction with the Department of Ecology and water users within the LCRD service area should determine which of the LCRD water users have existing State issued water rights or Claims of their own and receiving water from the LCRD. In the event that the water made available for non-hydroelectric uses in Lake Chelan Water Basin becomes fully allocated, the State issued water rights and Claims should become supplemental to the LCRD authorization or relinquished. This could free up additional authorization of water for future uses.

This authorization is subject to Washington Department of Fisheries and Wildlife juvenile salmon and gamefish screening criteria (pursuant to RCW 75.20.040).

A proof inspection will be conducted prior to final certificate issuance. The certificate will reflect the extent of the project perfected within the limitations of the permit. Aspects will include as appropriate the source(s), system instantaneous capacity, beneficial use(s), annual quantity, home services designed, place of use, and satisfaction of provisions.

Pumps used to appropriate surface water must not discharge any product detrimental to the public, wildlife, or aquatic life into the source water.

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 Yakima, Washington,

this 5th day of April, 1995.

Department of Ecology

ENGINEERING DATA
OK *df*
19x116 PNK:ska

by

Darlene M. Frye
Darlene M. Frye, Section Manager

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

file

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 July 9, 1990	APPLICATION NUMBER S4-30334	PERMIT NUMBER S4-30334P	CERTIFICATE NUMBER
-------------------------------	--------------------------------	----------------------------	--------------------

NAME

Lake Chelan Reclamation District

ADDRESS (STREET)

PO Box J

(CITY)

Manson

(STATE)

Washington

(ZIP CODE)

98831-0399

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

Lake Chelan

TRIBUTARY OF (IF SURFACE WATERS)

Columbia River

MAXIMUM CUBIC FEET PER SECOND 4	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR 1000
------------------------------------	----------------------------	------------------------------------

QUANTITY, TYPE OF USE, PERIOD OF USE

1000 acre-feet per year for continuous municipal supply.

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL

3000 feet south and 1250 feet east from the northwest corner of Section 35 (Manson pump station)

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) NW $\frac{1}{4}$ SW $\frac{1}{4}$	SECTION 35	TOWNSHIP N. 28	RANGE, (E. OR W.) W.M. 21 E.	W.R.L.A. 47	COUNTY Chelan
--	---------------	-------------------	---------------------------------	----------------	------------------

RECORDED PLATTED PROPERTY

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

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Sections 13-16, 21-28, and 34-36 of T. 28 N., R. 21 E.W.M.;
Sections 1 and 2 of T. 27 N., R. 21 E.W.M.;
Sections 18-21, and 27-34 of T. 28 N., R. 22 E.W.M.; and
Sections 3-5, and 10 of T. 27 N., R. 22 E.W.M.

DESCRIPTION OF PROPOSED WORKS

Two 150 horsepower and one 75 horsepower submersible pumps which pump water from Lake Chelan to storage tanks. Water then flows through a distribution system for municipal use. A water treatment plant is to be built soon.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:

Begun

COMPLETE PROJECT BY THIS DATE:

January 1, 2005

WATER PUT TO FULL USE BY THIS DATE:

January 1, 2020

PROVISIONS

The diversion of water under instant application and that of existing LCRD rights and Application No. S4-30333 from the Manson and Lakeshore pump station must not exceed a combined 13.93 cfs and 2672 acre-feet per year for continuous municipal use to a projected 9,000 residents.

A suitable measuring device approved by the Department of Ecology shall be installed and maintained in accordance with WAC 508-64-020 through WAC 508-64-040.

Whenever water is being diverted, bi-weekly (every two weeks) readings of the measuring device shall be recorded and maintained by the permittee. These records shall be made available to the Department of Ecology upon request.

The LCRD in conjunction with the Department of Ecology and water users within the LCRD service area should determine which of the LCRD water users have existing State issued water rights or Claims of their own and receiving water from the LCRD. In the event that the water made available for non-hydroelectric uses in Lake Chelan Water Basin becomes fully allocated, the State issued water rights and Claims should become supplemental to the LCRD authorization or relinquished. This could free up additional authorization of water for future uses.

This authorization is subject to Washington Department of Fisheries and Wildlife juvenile salmon and gamefish screening criteria (pursuant to RCW 75.20.040).

A proof inspection will be conducted prior to final certificate issuance. The certificate will reflect the extent of the project perfected within the limitations of the permit. Aspects will include as appropriate the source(s), system instantaneous capacity, beneficial use(s), annual quantity, home services designed, place of use, and satisfaction of provisions.

Pumps used to appropriate surface water must not discharge any product detrimental to the public, wildlife, or aquatic life into the source water.

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 Yakima, Washington,

this 5th day of April, 1995.

Department of Ecology

by Darlene M. Frye
Darlene M. Frye, Section Manager

ENGINEERING DATA

OK df
20x116 PNK:ska

APPENDIX G3 – WATER RIGHTS EXTENSION



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
1250 W Alder St • Union Gap, WA 98903-0009 • (509) 575-2490

February 18, 2020

Lake Chelan Reclamation District
P.O. Box J
Manson, WA 98831-0399

Re: Water Right Permit Nos. S4-30333P and S4-30334P

Dear Lake Chelan Reclamation District:

In response to your request, you are hereby granted an extension to put the water to full beneficial use for the reason(s) below:

- Continuing to increase water used from the diversions.
- The population being served by the system continues to increase.
- Continuing to make upgrades to the system.

The new deadline to submit your *Proof of Appropriation of Water* is **January 1, 2025**.

As a result of this extension Ecology has updated your metering and Proof of Appropriation provisions and added the additional provisions:

Authority to Access Project

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.

Proof of Appropriation

Consistent with the development schedule given in this report (unless extended by Ecology), the water right holder must file a Notice of Proof of Appropriation (PA) of Water with Ecology. The PA documents the project is complete and all the water needed has been put to full beneficial use (perfected). In order to verify the extent of water use under this permit, an inspection of water use is typically required, known as a "proof exam". After filing the PA, the water right holder's next step is to hire a Certified Water Rights Examiner (CWRE) to conduct this proof exam. A list of CWREs is provided to the water right holder upon filing the PA with Ecology. The final water right document, a water right certificate, then may issue based upon the findings of the CWRE. Statutory county and state filing fees may apply prior to certificate issuance.



Water Measurement

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.

Recorded water use data shall be submitted via the Internet. To set up an Internet reporting account, contact the Regional Office. If you do not have Internet access, you can still submit hard copies by contacting the Regional Office for forms to submit your water use data.

Conservation

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.

If you have any questions, please contact Water Resources Help Desk at 509-575-2597.

YOUR RIGHT TO APPEAL

You have a right to appeal this Decision to the Pollution Control Hearings Board (PCHB) within 30 days of the date of receipt of this Decision. The appeal process is governed by chapter 43.21B RCW and chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do all of the following within 30 days of the date of receipt of this Decision:

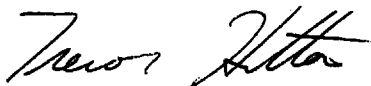
- File your appeal and a copy of this Decision with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of your appeal and this Decision on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in chapter 43.21B RCW and chapter 371-08 WAC.

ADDRESS AND LOCATION INFORMATION	
Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey WA 98503 Pollution Control Hearings Board 1111 Israel Road SW, Suite 301 Tumwater WA 98501	Department of Ecology Attn: Appeals Processing Desk PO Box 47608 Olympia WA 98504-7608 Pollution Control Hearings Board PO Box 40903 Olympia WA 98504-0903

For additional information visit the Environmental Hearings Office Website: <http://www.eho.wa.gov>
To find laws and agency rules visit the Washington State Legislature Website: <http://www.leg.wa.gov/CodeReviser>

Sincerely,



Trevor Hutton, Section Manager
Water Resources Program
Central Regional Office

TH:CK:SS/200278
WRTS No. 2085352 & 2085353

Enclosures: Your Right to Be Heard
Proof of Appropriation of Water (2)
Water Measurement Requirements
Form 1 – Measuring Device Information (2)
Form 2 – Water Use Data Collection Reporting (2)
Telemetered Metering Options
Fish Screening Criteria
Extensions for Water Right Permits & Change Authorizations

By certified mail: 9489 0090 0027 6130 3053 49

cc: Lois Trevino, Water Administrator, Colville Confederated Tribes
Phil Rigdon, Superintendent, Natural Resources Department, Yakama Nation

APPENDIX H – WATER QUALITY PROGRAM

APPENDIX H1 – MONITORING PLAN AND SCHEDULE



Water Quality Monitoring Schedule

System: LAKE CHELAN RECLAMATION DISTRICT
Contact: Rodney L Anderson

PWS ID: 43783 U
Group: A - Comm

Region: EASTERN
County: CHELAN

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

	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021
Coliform Monitoring Population	4446	4446	4446	4446	4446	4446	4721	4131	4118	4118	4730	4446
Number of Routine Samples Required	5	5	5	5	5	5	5	5	5	5	5	5

- Collect samples from representative points throughout the distribution system.
- Collect required repeat samples following an unsatisfactory sample. In addition, collect a sample from each operating groundwater source.
- For systems that chlorinate, record chlorine residual (measured when the coliform sample is collected) on the coliform lab slip.

Chemical Monitoring Requirements

Distribution Monitoring

<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	20	Jan 2020 - Dec 2022	standard - 3 year	09/20/2019	Aug 2022	
Asbestos	1	Jan 2020 - Dec 2028	standard - 9 year	05/02/2018	May 2027	
Total Trihalomethane (THM)	2	Jan 2020 - Dec 2020	reduced - 1 year	10/15/2019	Dec 2020	
Halo-Acetic Acids (HAA5)	2	Jan 2020 - Dec 2020	reduced - 1 year	10/15/2019	Dec 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.

Source S03	Lake Chelan Reclamation Dist WTP	Surface	Use - Permanent	Susceptibility - High		
<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 2020 - Dec 2020	standard - 1 year	10/13/2020		
Complete Inorganic (IOC)	1	Jan 2020 - Dec 2028	waiver - 9 year	09/15/2020		
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	12/19/2017		
Pesticides	0	Jan 2020 - Dec 2022	waiver - 3 year	08/13/2008		
Soil Fumigants	0	Jan 2020 - Dec 2022	waiver - 3 year	06/26/2002		
Gross Alpha	1	Jan 2020 - Dec 2025	standard - 6 year	10/26/2016	Oct 2022	
Radium 228	1	Jan 2020 - Dec 2025	standard - 6 year	10/26/2016	Oct 2022	



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):	07/01/2020
Submit CCR certification form to ODW (Community systems only):	10/01/2020
Submit Water Use Efficiency report online to ODW and to customers (Community and other municipal water systems only):	07/01/2020
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

Eastern Regional Water Quality Monitoring Contacts

For questions regarding chemical monitoring:	Stan Hoffman: (509) 329-2132: or Stan.Hoffman@doh.wa.gov
For questions regarding DBPs:	Stan Hoffman: (509) 329-2132 or Stan.Hoffman@doh.wa.gov
For questions regarding coliform bacteria and microbial issues:	Joseph Perkins: (509) 329-2134 or Joseph.Perkins@doh.wa.gov

Additional Notes

The information on this monitoring schedule is valid as of the date in the upper left corner on the first page. However, the information may change with subsequent updates in our water quality monitoring database as we receive new data or revise monitoring schedules. There is often a lag time between when you collect your sample and when we credit your system with meeting the monitoring requirement.

We have not designed this monitoring schedule to display all compliance requirements. The purpose of this schedule is to assist water systems with planning for most water quality monitoring, and to allow systems to compare their records with DOH ODW records. Please be aware that this monitoring schedule does not include constituents that require a special monitoring frequency, such as monitoring affiliated with treatment.

Any inaccuracies on this schedule will not relieve the water system owner and operator of the requirement to comply with applicable regulations.

If you have any questions about your monitoring requirements, please contact the regional office staff listed above.

APPENDIX H2 – COLIFORM MONITORING PLAN

Coliform Monitoring Plan for: Lake Chelan Reclamation District

A. System Information

Plan Date: Sept. 2020

Water System Name Lake Chelan Reclamation District	County Chelan	System I.D. Number 43783U
Name of Plan Preparer Dave Walters	Position Operator	Daytime Phone 509-687-3548
Sources: DOH Source Number, Source Name, Well Depth, Pumping Capacity	<u>03, Lake Chelan</u>	
Storage: List and Describe	<u>1.3 MG steel tank, 1 MG steel tank</u>	
Treatment: Source Number & Process	<u>03, Direct filtration & chlorination</u>	
Pressure Zones: Number and name	<u>Gravity zones 1100 to 1275 & 1275 to 1420</u>	
Population by Pressure Zone	<u>1000 upper, 2500, lower</u>	
Number of Routine Samples Required Monthly by Regulation:		<u>6</u>
Number of Sample Sites Needed to Represent the Distribution System:		<u>10</u>
*Request DOH Approval of Triggered Source Monitoring Plan?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>

*If approval is requested a fee will be charged for the review.

B. Laboratory Information

Laboratory Name <u>Cascade Analytical</u>	Office Phone 509-662-1888 After Hours Phone 608-332-2140
Address <u>3019 GS Center Rd. Wenatchee, WA</u> <u>98801</u>	Cell Phone - - Email <u>Office@cascadeanalytical.com</u>
Hours of Operation <u>8 am to 5 pm weekdays</u>	
Contact Name <u>Laura Mrachek</u>	
Emergency Laboratory Name <u>none</u>	Office Phone - - After Hours Phone - -
Address _____	Cell Phone - - Email _____
Hours of Operation _____	
Contact Name _____	

C. Wholesaling of Groundwater

	Yes	No
We are a consecutive system and purchase groundwater from another water system.	<input type="checkbox"/>	X
If yes, Water System Name: Contact Name: Telephone Numbers Office - - After Hours - -		
We sell groundwater to other public water systems.	<input type="checkbox"/>	X
If yes, Water System Name: Contact Name: Telephone Numbers Office - - After Hours - -		

D. Routine, Repeat, and Triggered Source Sample Locations*

Location/Address for <u>Routine</u> Sample Sites	Location/Address for <u>Repeat</u> Sample Sites	Groundwater Sources for <u>Triggered</u> Sample Sites**
X1.	1-1. 80 Wapato Way	S ____
80 Wapato Way	1-2. 400 W. Manson Blvd.	S ____
	1-3. 172 Wapato Way	S ____
X2.	2-1. 3410 Wapato Lake Rd.	S ____
3410 Wapato Lake Rd	2-2. 155 Upper Joe Creek Rd.	S ____
	2-3. 250 E. Wapato Lake Rd.	S ____
X3.	3-1. 245 N. Harris	S ____
245 N. Harris	3-2. 246 N. Harris	S ____
	3-3. 148 N. Harris	S ____
X4.	4-1. 1680 Manson Blvd.	S ____
1680 Manson Blvd	4-2. 910 Lakeshore Dr.	S ____
	4-3. 125 Washington St.	S ____

X5.	5-1. Washington St. & Manson Blvd	S ____
Washington St. & Manson Blvd	5-2. 2834 Washinton St.	S ____
	5-3. 2775 Washington St.	S ____
X6.	6-1. 1600 Totem Pole Rd.	S ____
1600 Totem Pole	6-2. 1835 Totem Pole Rd.	S ____
	6-3.450 Banks Ave.	S ____
X7.	7-1. Roses & Green Ave.	S ____
Roses & Green Ave.	7-2. 1821 Green Ave.	S ____
	7-3. 87 Roses Ave.	S ____
X8.	8-1. 400 Bennet Rd.	S ____
400 Bennet Rd.	8-2. 80 Bennet Rd.	S ____
	8-3. 1128 Swartout Rd.	S ____
X9.	9-1. 692 Hyacinth Rd.	S ____
692 Hyacinth Rd.	9-2. 144 Madeline Rd.	S ____
	9-3. 648 Hyacinth	S ____
X10.	10-1. 1791 Lakeshore Dr.	S ____
1791 Lakeshore Dr.	10-2. 1841 Lakeshore Dr.	S ____
	10-3. 1695 Lakeshore Dr.	S ____
		S ____

* If you need more than three routine samples to cover the distribution system, attach additional sheets as needed.

**** When you collect the repeats, you must sample every groundwater source that was in use when the original routine sample was collected.**

Important Notes for Sample Collector:

E. Reduced Triggered Source Monitoring Justification (add sheets as needed):

Does not apply

F. Routine Sample Rotation Schedule

Month	Routine Site(s)	Month	Routine Site(s)
January	7,8,9,10,1,2	July	3,4,5,6,7,8
February	3,4,5,6,7,8	August	9,10,1,2,3,4
March	9,10,1,2,3,4	September	5,6,7,8,9,10
April	5,6,7,8,9,10	October	1,2,3,4,5,6
May	1,2,3,4,5,6	November	7,8,9,10,1,2
June	7,8,9,10,1,2	December	3,4,5,6,7,8

G. Level 1 and Level 2 Assessment Contact Information

Name Dave Walters	Office Phone 509-687-3548 After Hours Phone 509-470-1960
Address 105 Hale St. Manson, WA 98801	Email dwalters@lcrd.org
Name Rod Anderson	Office Phone 509-687-3548 After Hours Phone 509-679-0639
Address 147 Waterview Dr. Chelan, WA 98816	Email randerson@lcrd.org

H. *E. coli*-Present Sample Response

Distribution System <i>E. coli</i> Response Checklist				
Background Information	Yes	No	N/A	To Do List
We inform staff members about activities within the distribution system that could affect water quality.	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We document all water main breaks, construction & repair activities, and low pressure and outage incidents.	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can easily access and review documentation on water main breaks, construction & repair activities, and low pressure and outage incidents.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	X
Our Cross-Connection Control Program is up-to-date.	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We test all cross-connection control devices annually as required, with easy access to the proper documentation.	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We routinely inspect all treatment facilities for proper operation.	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We identified one or more qualified individuals who are able to conduct a Level 2 assessment of our water system.	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have procedures in place for disinfecting and flushing the water system if it becomes necessary.	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can activate an emergency intertie with an adjacent water system in an emergency.	<input type="checkbox"/>	X	<input type="checkbox"/>	<input type="checkbox"/>
We have a map of our service area boundaries.	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have consumers who may not have access to bottled or boiled water.	<input type="checkbox"/>	X	<input type="checkbox"/>	<input type="checkbox"/>
There is a sufficient supply of bottled water immediately available to our customers who are unable to boil their water.	<input type="checkbox"/>	X	<input type="checkbox"/>	<input type="checkbox"/>
We have identified the contact person at each day care, school, medical facility, food service, and other customers who may have difficulty responding to a Health Advisory.	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have messages prepared and translated into different languages to ensure our consumers will understand them.	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have the capacity to print and distribute the required number of notices in a short time period.	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Policy Direction	Yes	No	N/A	To Do List
We have discussed the issue of <i>E. coli</i> -present sample results with our policy makers.	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If we find <i>E. coli</i> in a routine distribution sample, the policy makers want to wait until repeat test results are available before issuing advice to water system customers.	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(Cont.)				

Distribution System <i>E. coli</i> Response Checklist				
Potential Public Notice Delivery Methods	Yes	No	N/A	To Do List
It is feasible to deliver a notice going door-to-door.	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have a list of all of our customers' addresses.	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have a list of customer telephone numbers or access to a Reverse 9-1-1 system.	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have a list of customers	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We encourage our customers to remain in contact with us using social media.	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have an active website we can quickly update to include important messages.	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Our customers drive by a single location where we could post an advisory and expect everyone to see it.	<input type="checkbox"/>	X	<input type="checkbox"/>	<input type="checkbox"/>
We need a news release to supplement our public notification process.	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

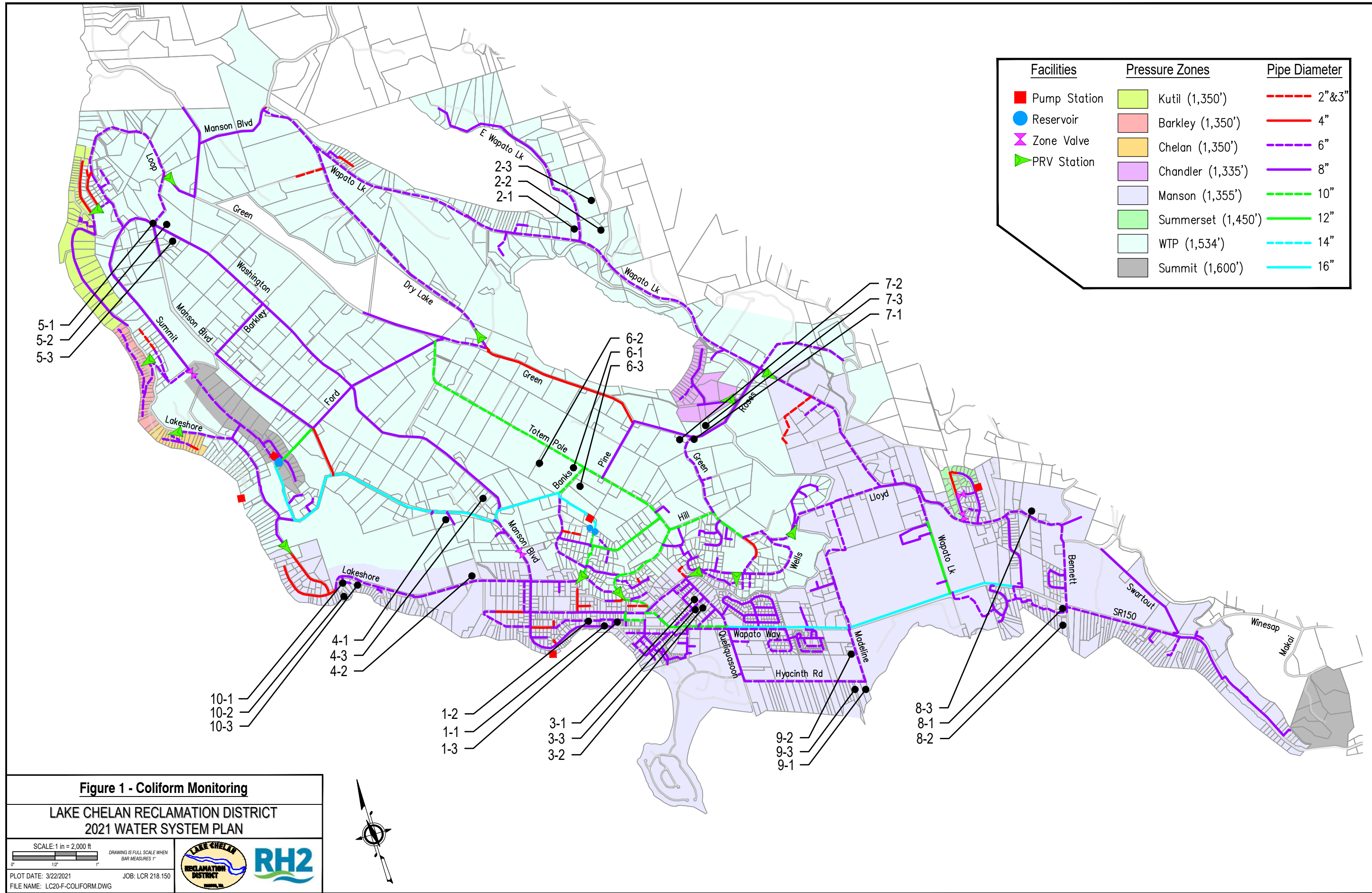
Distribution System <i>E. coli</i> Response Plan
<p>If we have <i>E. coli</i> in our distribution system we will immediately:</p> <ol style="list-style-type: none"> 1. Call DOH. 2. Collect repeat and triggered source samples per Part D. Collect additional investigative samples as necessary. 3. <u>Identify way to isolate the affected area and research possible cross connections</u> 4. <u>Prepare all media notifications, door hangers, educational pamphlets in English & spanish</u> 5. <u>Notify Chelan County Health District</u> 6. <u>Preorder bottled water</u> 7. Discuss with DOH whether to issue a Health Advisory based on the findings of steps 3-6.

<i>E. coli</i>-Present Triggered Source Sample Response Checklist – All Sources				
Background Information	Yes	No	N/A	To Do List
We review our sanitary survey results and respond to any recommendations affecting the microbial quality of our water supply.	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We address any significant deficiencies identified during a sanitary survey.	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There are contaminant sources within our Wellhead Protection Area that could affect the microbial quality of our source water, and If yes, we can eliminate them.	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	X X	<input type="checkbox"/> <input type="checkbox"/>
We routinely inspect our well site(s).	<input type="checkbox"/>	<input type="checkbox"/>	X	<input type="checkbox"/>
We have a good raw water sample tap installed at each source.	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
After we complete work on a source, we disinfect the source, flush, and collect an investigative sample.	<input type="checkbox"/>	<input type="checkbox"/>	X	<input type="checkbox"/>
Public Notice	Yes	No	N/A	To Do List
We discussed the requirement for immediate public notice of an <i>E. coli</i> -present source sample result with our water system's governing body (board of directors or commissioners) and received direction from them on our response plan.	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We discussed the requirement for immediate public notice of an <i>E. coli</i> -present source sample result with our wholesale customers and encouraged them to develop a response plan.	<input type="checkbox"/>	<input type="checkbox"/>	X	<input type="checkbox"/>
We have prepared templates and a communications plan that will help us quickly distribute our messages.	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<i>E. coli</i>-Present Triggered Source Sample Response Checklist – Source S__*				
Alternate Sources	Yes	No	N/A	To Do List
We can stop using this source and still provide reliable water service to our customers.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have an emergency intertie with a neighboring water system that we can use until corrective action is complete (perhaps for several months).	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can provide bottled water to all or part of the distribution system for an indefinite period.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can quickly replace our existing source of supply with a more protected new source.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Temporary Treatment	Yes	No	N/A	To Do List
This source is continuously chlorinated, and our existing facilities can provide 4-log virus treatment (CT = 6) before the first customer. If yes, at what concentration? .5 mg/L	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can quickly introduce chlorine into the water system and take advantage of the existing contact time to provide 4-log virus treatment to a large portion of the distribution system.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can reduce the production capacity of our pumps or alter the configuration of our storage quantities (operational storage) to increase the amount of time the water stays in the system before the first customer to achieve CT = 6.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can alter the demand for drinking water (maximum day or peak hour) through conservation messages to increase the time the water is in the system prior to the first customer in order to achieve 4-log virus treatment with chlorine.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

*NOTE: If your system has multiple sources, you may want to complete a separate checklist for each source.

<i>E. coli</i>-Present Triggered Source Sample Response Plan – Source ____
<p>If we have <i>E. coli</i> in Source ____ water, we will immediately:</p> <ol style="list-style-type: none"> 1. Call DOH. 2. Pump water from unaffected intake facility (same source, different location) _____ 3. Sample the water as it enters and exits the treatment facility _____ 4. Increase chlorination as much as possible _____ 5. Reduce pumping rates to increase contact time prior to distribution _____



APPENDIX H3 – CONSUMER CONFIDENCE REPORT



LAKE CHELAN RECLAMATION DISTRICT

Department of Health ID# 43783U

2019 Drinking Water Quality Report

We are pleased to present to you our Annual Water Quality Report for 2019. This report is designed to inform you about the water quality and services we deliver to you every day. Our constant goal is to provide you with a safe and dependable supply of drinking water. We want you to understand the efforts we make to continually maintain the quality of our water treatment process and protect our amazing water source, Lake Chelan.

This report explains the quality of our water and what it means. If you have any questions about this report or concerning your water utility, please contact our office at 509-687-3548. We want you to be informed about your water provider. If you want to learn more, you are welcome to attend any of our regularly scheduled Board meetings. District Board meetings are normally held on the second Tuesday of each month at 8:00 a.m. in our main office at 80 Wapato Way. Our Board members are President Dave Clark, Vice President Paul Mogan, and Board of Directors Nate England, Todd Jeffries, and Chad Steiner.

In order to ensure that tap water is safe to drink, the EPA prescribes limits on the amount of certain contaminants in water provided by public water systems. We are under the same guidelines that the FDA uses to regulate bottled drinking water. All drinking water both bottled and tap, may reasonably be expected to contain at least minute amounts of some contaminants. Our drinking water has never been close to meeting the MCL (maximum contaminate level) for any of these contaminants. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline 800-426-4791.

We monitor our water quality every hour that our treatment plant is in operation, as well as every day out in the distribution system. We are required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not your drinking water meets health standards. We met all our requirements for taking these required samples and found no harmful contaminants in the system at any time.

Here are our test results for the operating year:

2019 TEST RESULTS					
CONTAMINATE	VIOLATION Y/N	LEVEL DETECTED	UNIT OF MEASURE		LIKELY SOURCE OF CONTAMINATION
Turbidity (particles in water)	N	.04	NTU (turbidity units)		Soil runoff
Coliform (bacteria)	N	0	parts per millileter		organic matter
Volatile Organic Contaminates	N	0	parts per billion		Bi-product of chlorination
Total Trihalomethanes	N	12.15	parts per billion		Bi-product of chlorination
Halo-acetic acids	N	8.94	parts per billion		Bi-product of chlorination
Nitrates	N	< .07	parts per millileter		Soil runoff
Lead	N	.003	parts per million	trigger level .015	corrosive water lead piping
Copper	N	.54	parts per million	trigger level 1.3	corrosive water copper piping

The column labeled “MCL” is the maximum contaminate level allowed by the Department of Health. You will notice that the levels we’ve detected in our water fall way below that maximum. Here’s a brief description of each contaminate, how or why it might occur in our water and how we test for it.

Turbidity is simply a measurement of the clarity of water. It’s a tool we can use to help us determine how much filtration we need to employ to remove contaminants. Coliform bacteria are harmful bacteria that can result from the presence of organic matter in the water. Volatile organic contaminants, total trihalomethanes, and halo-acetic acids are bi-products of chlorination. Total organic carbon is simply a measurement of organic carbon. Again, because our source water is such high quality we are able to enjoy an exceptional low occurrence of these contaminants.

The most common cause of complaints about water quality from a public water system is taste and odor. The vast majority of these complaints are not the result of contamination and are easily resolved. If you notice any change in your drinking water, please let us know right away. Here at the District, we work around the clock to provide the best quality drinking water at every tap. Please feel free to contact us if you have any questions regarding the quality of our water and the methods we use to monitor that quality. You are welcome to visit our webpage at www.lcrd.org or call our office at 509-687-3548.

APPENDIX H4 – CROSS CONNECTION CONTROL RESOLUTION

LAKE CHELAN RECLAMATION DISTRICT

MANSON, WASHINGTON

RESOLUTION 14-03

CROSS-CONNECTION CONTROL POLICY

Finding of Fact

WHEREAS, it is the responsibility of a water purveyor to provide water to the customer at the meter that meets Washington state water quality standards; and

WHEREAS, it is the water purveyor's responsibility to prevent the contamination of the public water system from the source of supply (i.e., to the customer's connection to the service pipe or meter); and

WHEREAS, it is a requirement of the Washington State Department of Health (DOH) for the Purveyor to establish a cross connection-control program satisfactory to DOH; and

NOW THEREFORE BE IT RESOLVED, that the Lake Chelan Reclamation District, hereinafter referred to as the Purveyor, establishes the following service policy to protect the purveyor-owned water system from the risk of contamination. For public health and safety, this policy shall apply equally to all new and existing customers.

Definitions

Unless otherwise defined, all terms used in this resolution pertaining to cross-connection control have the same definitions as those contained in WAC 246-290-010 of the Washington State Drinking Water Regulations.

Prevention of Contamination

The customer's plumbing system, starting from the customer side of the meter, shall be considered a potential high-health hazard requiring the isolation of the customer's premises by a DOH-approved, customer-installed and maintained reduced-pressure principle backflow assembly (RPBA) or reduced-pressure detector assembly (RPDA). The RPBA or RPDA shall be located at the end of the Purveyor's water service pipe (i.e., immediately downstream of the meter). Water shall only be supplied to the customer through a DOH-approved, properly installed and maintained RPBA or RPDA.

Notwithstanding the aforesaid, the Purveyor, upon an assessment of the risk of contamination posed by the customer's plumbing system and use of water, may allow any customer, as a minimum, to be supplied through a DOH-approved, customer-installed and maintained double-check valve assembly (DCVA) or double-check detector assembly (DCDA) located at the end of the Purveyor's water service pipe (i.e., immediately downstream of the meter).

Conditions for Providing Service

Water service is provided based on the following terms and limitations:

1. The customer agrees to take all measures necessary to prevent the contamination of the plumbing system within his/her premises and the Purveyor's distribution system that may occur from backflow through a cross connection. These measures shall include the prevention of backflow under any backpressure or backsiphonage condition, including the disruption of the water supply from the Purveyor's system that may occur during routine system maintenance or during emergency conditions, such as a water main break.
2. The customer agrees to install, operate, and maintain at all times his plumbing system in compliance with the current edition of the Uniform Plumbing Code having jurisdiction as it pertains to the prevention of contamination and protection from thermal expansion, due to a closed system that could occur with the present or future installation of backflow preventers on the customer's service and/or at plumbing fixtures.
3. For cross-connection control or other public health-related surveys, the customer agrees to provide for the Purveyor's employees, or agents, free access to all parts of the premises during reasonable working hours of the day for routine surveys and at all times during emergencies. Where agreement for free access for the Purveyor's survey is denied, the Purveyor may supply water service provided that premises isolation is provided through a DOH- approved reduced-pressure principle backflow assembly (RPBA).
4. The customer agrees to install all backflow prevention assemblies requested by the Purveyor and to maintain those assemblies in good working order. The assemblies shall be of a type, size, and make approved by DOH and acceptable to the Purveyor. The assemblies shall be installed in accordance with the Purveyor's construction standards and specifications.
5. The customer agrees to:
 - (a) Have all assemblies (e.g., RPBA's and/or DCVA's) that the Purveyor relies upon to protect the public water distribution system tested upon installation, annually thereafter and/or more frequently if requested by the Purveyor, after repair, and after relocation;
 - (b) Have all testing done by a purveyor-approved and currently DOH-certified Backflow Assembly Tester (BAT);
 - (c) Have the RPBA or DCVA tested in accordance with DOH-approved test procedures; and

- (d) Submit to the Purveyor the results of the test(s) on Purveyor-supplied test report forms within the time period specified by the Purveyor.
6. The customer agrees to bear all costs for the aforementioned installation, testing, repair, maintenance and replacement of the RPBA, RPDA, DCVA or DCDA installed to protect the Purveyor's distribution system.
 7. At the time of application for service, if required by the Purveyor, the customer agrees to submit to the Purveyor plumbing plans and/or a cross-connection control survey of the premises conducted by the Purveyor's Cross-Connection Control Specialist (CCS). The cross-connection control survey shall assess the cross-connection hazards and list the backflow preventers provided within the premises. The results of the survey shall be submitted prior to the Purveyor turning on water service to a new customer. The cost of the survey shall be borne by the customer.
 8. For classes of customers other than single-family residential, when required by the Purveyor, the customer agrees to periodically submit to a cross-connection control re-survey of the premises by the Purveyor's CCS. The Purveyor may require the re-survey to be performed in response to changes in the customer's plumbing or water use, or performed periodically (annually or less frequently) where the Purveyor considers the customer's plumbing system to be complex or subject to frequent changes in water use. The cost of the re-survey shall be borne by the customer.
 9. Within 30 days of a request by the Purveyor, a residential customer shall agree to complete and submit to the Purveyor a "Water Use Questionnaire" for the purpose of surveying the health hazard posed by the customer's plumbing system on the Purveyor's distribution system. Further, the residential customer agrees to provide within 30 days of a request by the Purveyor access for a cross-connection control survey of the premises by the Purveyor's CCS.
 10. The customer agrees to obtain the prior approval from the Purveyor for all changes in water use, and alterations and additions to the plumbing system, and shall comply with any additional requirements imposed by the Purveyor for cross-connection control.
 11. The customer agrees to immediately notify the Purveyor and the local health jurisdiction of any backflow incident occurring within the customer's premises (i.e., entry of any contaminant/pollutant into the drinking water) and shall cooperate fully with the Purveyor to determine the reason for the backflow incident.
 12. The customer acknowledges the right of the Purveyor to discontinue the water supply within 72 hours of giving notice to the customer, or a lesser period of time if required to protect public health, if the customer fails to cooperate with the Purveyor in the survey of premises, in the installation, maintenance, repair, inspection, or testing of backflow prevention assemblies or air gaps required by the Purveyor, or in the Purveyor's effort to contain a contaminant or pollutant that is detected in the customer's system. Without limiting the generality of the foregoing, in lieu of discontinuing water service, the Purveyor may install an RPBA on the service pipe to provide premises isolation, and recover all costs for the installation and subsequent maintenance and repair of the assembly,

- appurtenances, and enclosure from the customer as fees and charges for water. The failure of the customer to pay these fees and charges may result in termination of water service in accordance with the Purveyor's water billing policies.
13. The Purveyor will require premises isolation for a customer that is of the high-hazard type or category requiring "Mandatory Premises Isolation" established by the DOH regulations (Table 9, WAC 246-290-490).
 14. Where the Purveyor imposes mandatory premises isolation in compliance with DOH regulations, or agrees to the customer's voluntary premises isolation through the installation of a RPBA immediately downstream of the Purveyor's water meter, the customer acknowledges his obligation to comply with the other cross-connection control regulations having jurisdiction (i.e., Uniform Plumbing Code). Although the Purveyor's requirements for installation, testing, and repair of backflow assemblies may be limited to the RPBAs used for premises isolation, the customer agrees to the other terms herein as a condition of allowing a direct connection to the Purveyor's service pipe.
 15. The customer agrees to indemnify and hold harmless the Purveyor for all contamination of the customer's plumbing system or the Purveyor's distribution system that results from an unprotected or inadequately protected cross connection within the customer's premises. This indemnification shall pertain to all backflow conditions that may arise from the Purveyor's suspension of water supply or reduction of water pressure, recognizing that the air gap separation otherwise required would require the customer to provide adequate facilities to collect, store, and pump water for his/her premises.
 16. The customer agrees that, in the event legal action is required and commenced between the Purveyor and the customer to enforce the terms and conditions herein, the substantially prevailing party shall be entitled to reimbursement of all incurred costs and expenses including, but not limited to, reasonable attorney's fees as determined by the Court.
 17. The customer acknowledges that the Purveyor's survey of a customer's premises is for the sole purpose of establishing the Purveyor's minimum requirements for the protection of the public water supply system, commensurate with the Purveyor's assessment of the degree of hazard. It shall not be assumed by the customer or any regulatory agency that the Purveyor's survey, requirements for the installation of backflow prevention assemblies, lack of requirements for the installation of backflow prevention assemblies, or other actions by the Purveyor's personnel constitute an approval of the customer's plumbing system or an assurance to the customer of the absence of cross connections therein.
 18. The customer acknowledges the right of the Purveyor, in keeping with changes to Washington State regulations, industry standards, or the Purveyor's risk management policies, to impose retroactive requirements for additional cross-connection control measures.

The Purveyor will record the customer's agreement to the above terms for service on an "Application for Domestic Water Hook-up" or other such form prepared by the Purveyor and signed by the customer.

Implementation of the Cross-Connection Control Policy

The Purveyor will engage the services of a DOH-certified CCS to develop, implement and be in responsible charge of the Lake Chelan Reclamation District Water System's cross-connection control program per requirements of Chapter 246-290 WAC (Group A Drinking Water Regulations).

The Purveyor will use the most recently published editions of the following publications as references and technical aids:

1. *Cross-Connection Control Manual, Accepted Procedures and Practice*, published by the Pacific Northwest Section, American Water Works Association, or latest edition thereof.
2. *Manual of Cross-Connection Control*, published by the Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California, or latest edition thereof.
3. *Cross-Connection Control Guidance Manual for Small Water Systems*, published by the DOH Office of Drinking Water.

The Purveyor will incorporate this resolution (program plan) into the Water System Plan and will submit the plan to DOH for approval when requested. The Purveyor, in consultation with the aforementioned CCS, shall have the authority to make reasonable decisions related to cross connections in cases and situations not provided for in this resolution or written program plan. If any provision in this resolution, or in the written cross-connection control program plan is found to be less stringent than or inconsistent with the Drinking Water Regulations (Chapter 246-290 WAC), or other Washington state statutes or rules, the more stringent state statute, rule, or regulation shall apply.

Adopted this 11th day of March, 2014 at the regular meeting of the Board of Directors.

LAKE CHELAN RECLAMATION DISTRICT

BY: _____
President

ATTEST:

Secretary-Manager

APPENDIX I – SANITARY SURVEY



STATE OF WASHINGTON
DEPARTMENT OF HEALTH
EASTERN DRINKING WATER REGIONAL OPERATIONS
16201 E Indiana Avenue, Suite 1500, Spokane Valley, Washington 99216-2830
TDD Relay 1-800-833-6388

June 5, 2018

Dave Walters
Lake Chelan Reclamation District
PO Box J
Manson, WA 98831

Subject: Lake Chelan Reclamation District; PWS # 43783; Chelan County.
Routine Sanitary Survey Inspection Report - Survey Date: May 21, 2018

Dear Mr. Walters:

Thank you for your time and attention given to Jeff Johnson, Russell Mau and me during your recent sanitary survey. This letter documents the information collected during this survey. I listed defects in your water system facilities or operations that need your immediate attention below as *significant deficiencies* or *significant findings*.

Significant Deficiencies, if left unaddressed, have the potential of causing an immediate or potential risk to the health of the water system customers. A **Significant Finding** is a problem that imparts a serious but less direct public health threat than a significant deficiency. If left unaddressed, a significant finding creates a risk to the physical safety, security or reliability of the public water supply.

Significant Deficiencies:

1. Manson Finished Water Reservoir. Install a gasket on the reservoir hatch to keep contaminants out. Refer to Picture #1.
2. Lakeshore Reservoir. Repair the gasket on the reservoir hatch to keep contaminants out. Refer to Picture #2.
3. Lakeshore Reservoir. Modify the reservoir vent to keep contaminants out. Refer to Picture #3. The existing vent may allow air-, dust-, rain-, and splatter-driven contaminants into the tank. Vents with openings not elevated far enough above the reservoir top can draw in contaminants. Please refer to the enclosed publication, *Sanitary Protection of Reservoir: Vents*, for examples of a good vent design.
4. Clearwell Pump Station. Secure a non-corrodible #24-mesh screen over the end of the six air/vacuum relief valves to keep out insects. Refer to Picture #4.
5. Clearwell Overflow Pipe. Secure a non-corrodible #4-mesh screen over the end of the overflow pipe to keep out contaminants. Refer to Picture #5.



6. Chlorinator Room Cross-Connection. Provide a physical break between the raw water chlorine solution piping and the finished water chlorine solution piping in the Chlorinator Room. The intertie piping between the raw water and finished water chlorine solution piping is a cross-connection. Refer to Picture #6.

Significant Findings - None

Please give these actions a high priority for completion. Within forty-five (45) days of the date of this letter, you must correct the *Significant Deficiencies* and *Significant Findings*, or provide a corrective action plan for completing each action.

We have logged these items and the completion date into the Department of Health's (DOH) sanitary survey database. Ensuring your system completes each corrective action is a high priority for the Office of Drinking Water. Failure to complete each of these corrections within the designated time may result in enforcement action.

After completing these corrective actions, please email verification of completion, including photographs and supporting narrative to: ero.sanitarysurveys@doh.wa.gov, or mail it to Attn: Mark Steward, Sanitary Survey Program Manager, at the address listed on our letterhead. In your transmittal, please reference your water system's name, PWS ID#, and date when you corrected these items.

If you believe, you have good cause and need additional time to correct any significant deficiency or significant finding, **please contact Mark Steward, Sanitary Survey Program Manager at (509) 329-2136.**

Prior to the survey, you inspected your reservoir hatches and vents and provided me with pictures of your findings. During the survey, we inspected the filtration facility, reservoir overflows, and we discussed the following items:

Water Facilities Inventory (WFI) Form – We reviewed the WFI form and no updates were required.

Water Quality Monitoring – As a reminder, your 2018 monitoring includes:

Distribution:

- Asbestos (due in May)
- Total Trihalomethane (due in August)
- Halo-Acetic Acids (due in August)

Source:

- VOC (due in March) - I did not find your March VOC results in our database. If you have already completed this monitoring, please send us a copy of the results so we can credit you for this monitoring.
- IOC (due in October)

Lead and Copper Monitoring. You asked why your Lead and Copper monitoring had increased from 10 to 20 samples. The number of samples is based on the population served. Since your last Lead and Copper monitoring, it appears you updated the WFI form to include the "Regular Non-

Residential Users” population, which increased your monitoring population to over 3,300 people. Your current monitoring population, as shown on your Water Quality Monitoring Schedule, ranges from 4,118 to 4,730 people. Water systems serving a population from 3,301 to 10,000 people are initially required to sample 40 monitoring sites. If the system qualifies for reduced monitoring, (which you do), the number of sampling sites is reduced to 20 sites.

Water System Plan (WSP) – Your WSP expires on August 13, 2020. If you have not already done so, you should start the process of updating your WSP. Please contact your Regional Planner, Brenda Smits (brenda.smits@doh.wa.gov, 509-329-2122), if you have any questions or to schedule a WSP pre-plan meeting.

Cross-Connection Control Program

- You reported that all new connections, connections that have a plumbing modification, or connections that have a cross-connection violation get premise isolation with a double check valve assembly.
- Your 2017 Annual Summary Report (ASR) shows a “beverage bottling plant” that does not have premise isolation. You stated that this was a typo. Please remember to correct this on your 2018 ASR.
- You reported that the backflow assemblies at the water treatment plant are not consistently being tested annually. Please remember that all backflow assemblies must be tested annually (WAC 246-290-490(7)).

Filter Backwash Recycling Rule (FBRR) – As a reminder, the FBRR requires that you collect and maintain recycling information on-site and make it available to the Department upon request. During the survey, I left with you a copy of a record-keeping form that you may use for this purpose. Please do not return this form to the department unless specifically requested.

Surface Water Treatment Monthly Operating Report (MOR) – You are currently using two disinfection sequences at your filtration facility, but the MOR form that we had provided you only has room to report a single sequence. As a result, you are not able to report information that reflects your actual disinfection process. The reported Inactivation Ratios (IR) on the form are correct, but the other information is a combination of the two sequences.

We recently developed a new MOR form that will allow you to report up to four disinfection sequences. I had earlier emailed you a copy of this new form. It is my understanding that you will need to hire a contractor to change your software equations before you can begin using the new form. **When do you think you can begin using the new MOR form?**

By completing this sanitary survey, your water system met the requirements in WAC 246-290-416. We will notify you of your next sanitary survey in three years. Please note that you should not interpret satisfying the requirements of the sanitary survey as meeting other applicable local, state or federal statutes, ordinances and regulations. Similarly, address other DOH requirements separately from the sanitary survey.

As provided by WAC 246-290-990(3)(c), a fee is charged to help recover the cost of conducting a sanitary survey. The Department of Health’s total cost to complete this sanitary survey is

Dave Walters
June 5, 2018
Page 4

\$1,412.10. The Office of Drinking Water has used state and federal funds to pay \$621.60 of this amount. An invoice for the remaining amount due of \$790.50 is enclosed.

If you have any questions regarding this letter, please contact me at (509) 329-2117 or by email at michael.wilson@doh.wa.gov.

Sincerely,



Michael D. Wilson, PE
Regional Engineer
Office of Drinking Water
Division of Environmental Health

Enclosure: Invoice
Pictures
Sanitary Protection of Reservoir: Vents (DOH Publication 331-250)

cc: Chelan-Douglas Health District
Rodney Anderson, Manager, LCRD
Mark Steward, DOH Regional Sanitary Survey Manager



Office of Drinking Water
INVOICE

Engineering, Planning, and Sanitary Survey Review Form

TO: DAVE WALTERS
LAKE CHELAN RECLAMATION DIST
PO BOX J
MANSON, WA 98831

Invoice Number	E002125
Invoice Date	June 5, 2018
Billing Period	30 DAYS

DATE	DESCRIPTION	QUANTITY	COST	AMOUNT
5/21/2018	SANITARY SURVEY LAKE CHELAN RECLAMATION DISTRICT CHELAN COUNTY – PWS ID # 43783 MAY 21, 2018	1		\$1,412.10
	DOH SHARE			\$621.60
	TOTAL			\$790.50
Payment due within 30 days. Interest shall accrue at 1% per month after 30 days.				

Make Checks Payable to Department of Health
Return Lower Portion to:

Department of Health
PO Box 1099
Olympia, WA 98507-1099

Office of Drinking Water
Engineering, Planning, and Sanitary Survey Review Form

NAME	LAKE CHELAN RECLAMATION DISTRICT
INVOICE NUMBER	E002125
INVOICE DATE	6/5/2018
AMOUNT	\$790.50

Return to:
Department of Health
Revenue Section
PO Box 1099
Olympia, WA 98507-1099

DOH Form #331-332

For persons with disabilities, this document is available on request in other formats. To submit a request, please call 1-800-525-0127 (TTY 1-800-833-6388).

SANITARY SURVEY FEE WORKSHEET

Department of Health Office of Drinking Water Sanitary Survey Time Tracking				
System Name	Lake Chelan Reclamation District		PWS ID # 43783	
County	Chelan County			
Surveyor	Michael Wilson		Date: 06/01/18	
System over 10,000 Connections?		NO		
	Quantity		Cost	
Department of Health Paid Costs	Hours/Miles			
Survey program RO Coordination	1	\$	102	\$ 102.00
Survey Program Administrative Support	1	\$	102	\$ 102.00
Travel expenses (Mileage)	180		(# Miles) x (\$.337/Mile)	\$ 60.60
Technical Assistance	0	\$	102	\$ -
Travel Time <10,000	3.5		102	\$ 357.00
Total Department of Health Costs to Perform All Surveys				\$ 621.60
Water System Paid Costs	Hours			
Scheduling, research, prep	1.5	\$	102	\$ 153.00
Survey Field Work	3.75	\$	102	\$ 382.50
Survey documentation – preparation of survey report to the purveyor	2.5	\$	102	\$ 255.00
Additional Water System Paid Costs for systems serving 10,000 or more connections				
	Hours			
	0	\$	-	\$ -
NOTES:	Total Cost of Survey			\$ 1,412.10
	Costs Covered by DOH			\$ 621.60
	Invoice amount due (Less than 10,000 Connections)			\$ 790.50

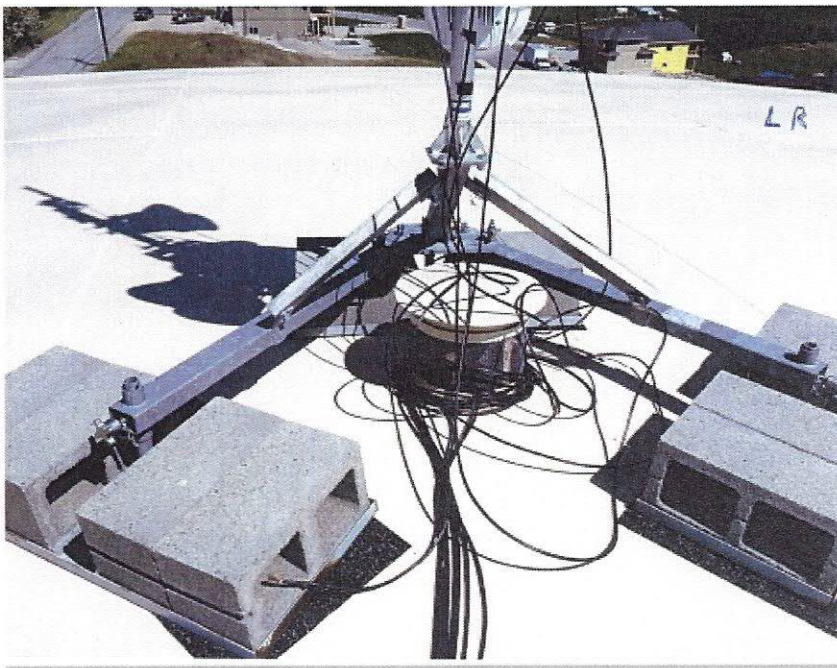
Picture #1 – Manson Finished Water Reservoir: Install a gasket on access hatch to prevent entry of contaminants.



Picture #2 – Lakeshore Reservoir: Repair the gasket on the reservoir hatch to keep contaminants out.



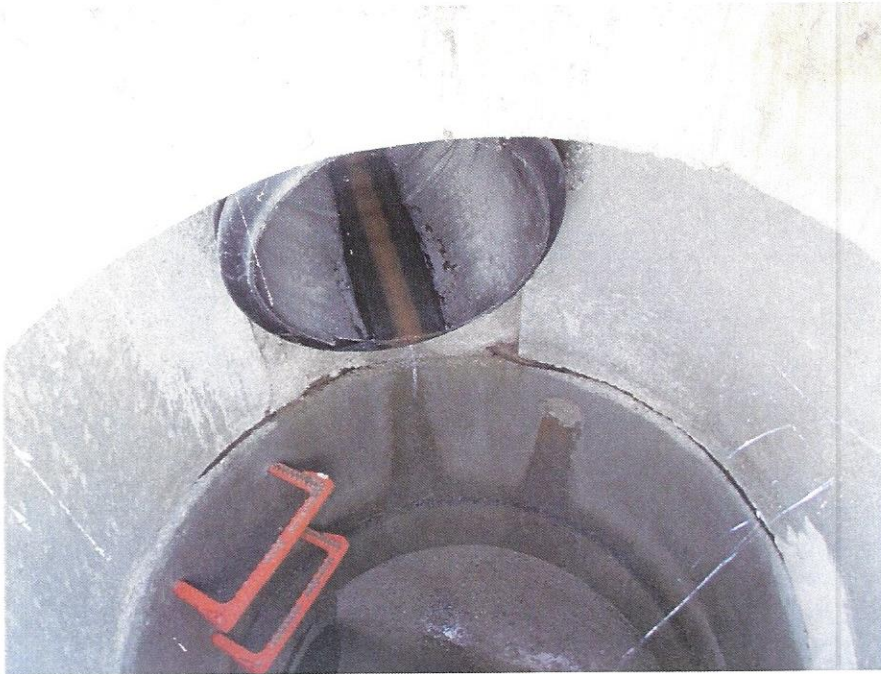
Picture #3 – Lakeshore Reservoir: Modify the vent to keep contaminants out.



Picture #4 – Clearwell Pump Station: Secure a non-corrodible 24-mesh screen over the end of the air/vacuum relief valve, typical of 6.



Picture #5 – Clearwell Overflow Pipe: Secure a four-mesh non-corrodible screen over the end of the overflow pipe.



Picture #6 – Chlorinator Room: This intertie is a cross-connection between the raw and finished water.



APPENDIX J – CONSTRUCTION STANDARDS

APPENDIX J1 – CONSTRUCTION SPECIFICATIONS

DOMESTIC
WATER MAIN EXTENSIONS
CHECKLIST

1. Developer submits legal description of proposed development.
2. District provides standards, conditions and specifications.
3. Developer submits distribution plan designed by licensed Professional Engineer.
4. Developer signs the agreement by the Friday prior to the Regular Board of Director's meeting on the second Tuesday of each month.
5. Board of Directors reviews plans and either accepts plan, modifies plan, asks for additional information or rejects plan.
6. After plan is accepted, District enters into Agreement with Developer for water main extension.
7. Water main extension constructed by licensed and bonded contractor to District Standards as certified by a licensed Professional Engineer.
8. District inspects and observes testing of water extension prior to approval.
9. Developer posts a one-year maintenance bond for the materials and workmanship if applicable.
10. Developer submits reproducible copy of as-built drawings and easements certified by the licensed Professional Engineer.
11. Developer conveys system to District for operation and maintenance and certifies the extension costs.
12. District notifies Chelan County, if applicable, that utility provisions for plat have been completed.
13. All services meters off of water main extension are installed by District as applicable hook-up fees paid by individual lot owners.
14. Prior to water service being turned on to property containing booster pump, District will verify proper installation and testing of backflow device.

STANDARDS, CONDITIONS & SPECIFICATIONS

DOMESTIC WATER MAIN EXTENSIONS

I. GENERAL:

The items herein contained are the Domestic Standards, Conditions, and Specifications of the Lake Chelan Reclamation District. These are minimums only and may be increased or altered to fit particular situations at the discretion of the District.

Definitions:

- A. District - Lake Chelan Reclamation District, a quasi-municipal corporation organized and operating pursuant to Title 87, Laws of the State of Washington.
- B. Developer(s) - The landowner, land developer, or agent responsible for installation of the water distribution system.
- C. Water Main - A pipe designed to convey water to more than two users or to properties over 150 feet from an existing water main.
- D. Water user - Any person, firm, or corporation having a water right within the District; this also includes the holders of title or evidence of title to land to which water service is furnished.
- E. Water Service Line - The pipe, valves, and necessary accessories designed to convey water from the water meter to each lot, unless said lot is over 150 feet from the water main.
- F. Water Distribution System - The collection of water mains and water service lines required to provide water service to each customer in a development.

II. STANDARDS AND CONDITIONS:

- A. When extensions of the existing water system is required for service, an Agreement for Domestic Water Main Extension shall be entered into between the Developer and the District. See "Domestic Water Extension Agreement".

III. SPECIFICATIONS:

- A. EXTENSIONS: All extensions to the water system shall conform to the design standards of the District. The system must be capable of future expansion if required and be constructed of permanent materials.
- B. PLANS AND SPECIFICATIONS: The installation of water extensions shall be in accordance with construction plans and specification approved by the District.

C. MATERIALS AND METHODS OF CONSTRUCTION:

1. Water pipe shall be ductile iron or C900 PVC. Ductile iron shall typically be class 50 in improved areas and class 52 in easement areas. PVC shall typically be class 235 in improved areas and class 305 in unimproved areas.
2. Fire hydrants shall be installed at a maximum spacing of 1,000 feet in rural areas and generally at 500 foot spacing in urban areas in accordance with appropriate Standard Detail.
3. Valving shall be installed at all intersections, on each end of easement lines and in-line at maximum spacing of 1,000 feet.
4. Minimum cover for all water mains shall be three (3) feet to top of pipe unless otherwise approved.
5. Except as otherwise noted herein, all work shall be accomplished in accordance with the 2018 Standards Specifications for Road, Bridge and Municipal Construction and according to the referenced AWWA standard and recommendations of the manufacturer of the material or equipment used. Work will not begin prior to the completion of a pre-construction conference and upon receipt of all necessary license and insurance certificates. The Developer shall have a copy of the specifications on the job site at all times. Developer shall furnish a watertight plug of the appropriate size, which shall be installed in the end of the water main when work is delayed or stopped at the end of workday.
6. All materials shall be new and undamaged. Unless otherwise approved by the District, the same manufacturer of each item shall be used throughout the work. Materials used on larger jobs will require shop drawing and / or material submittals for District review and approval prior to commencing the work. The District will at its sole discretion, determine which jobs are large enough to require submittals.
7. TRENCH EXCAVATION: Clearing and grubbing where required shall be performed within the easement or public right-of-way and as permitted by the property owner and/or governing agencies. Debris resulting from the clearing and grubbing shall be disposed of by the Developer in accordance with the terms of all applicable permits. Trenches shall be excavated to the line and depth designated by the water plan to provide a minimum of 36 inches of cover over the pipe, unless otherwise approved. Except for unusual circumstances where approved by the District, the trench sides shall be excavated vertically and the trench width shall be excavated only to such widths as are necessary for adequate working space. The minimum trench width at the top of the pipe shall normally be the outside diameter of the pipe barrel plus 16 inches. No trench width less than 30 inches will be allowed. The top width of the trench shall not exceed the outside diameter of the pipe plus 36 inches. The trench shall be kept free from water until complete. Surface water shall be diverted so as not to enter the trench. The Developer shall maintain sufficient pumping equipment on the job to insure that these provisions are carried out.

The Developer shall perform all excavation of every description and of whatever substance encountered and boulders, rocks, roots and other obstructions shall be entirely removed or cut out to the width of the trench and to a depth 6 inches below water main grade. Where material is removed from below subgrade, the trench shall be backfilled to grade with material satisfactory to the District and thoroughly compacted.

Trenching operations shall not proceed more than 300 feet in advance of pipe laying without written approval of the District.

8. **PIPE INSTALLATION WITHIN STREET RIGHT-OF-WAYS:** The Developer may use any method which provides satisfactory results and is acceptable to the District and the agency having control of the road, provided that the Developer restores the roadway to its original condition. Permits shall be required for all crossings. Highway crossings may require the placing of steel pipe casing by jacking or tunneling and laying the water main within this casing.
9. **PIPE IN FILLED AREAS:** Special treatment may be required at the discretion of the District. This treatment may consist of compacting the backfill in 6" layers, careful choice of backfill materials, use of restrained joint ductile iron pipe in short lengths, or such other reasonable methods or combinations as may be necessary in the opinion of the District.
10. **FOUNDATION MATERIALS:** Foundation materials needed shall be coarse graded gravel or crushed rock passing a 3-inch mesh. Pit run gravel passed through a 3-inch screen may be used provided that it is, in the opinion of the District, properly graded and otherwise suitable. Pipe zone backfill materials shall include the full width of the trench from four inches (4") below the bottom of pipe to six inches (6") above the top of the pipe. Pipe zone materials may be excavated native material containing no rock, organic matter, or materials larger than 1/2 inch. Where the volume or quality of native excavated materials is inadequate, import materials shall be used. Import materials shall pass a 3/4" mesh and shall contain only negligible amounts of materials finer than No. 30 sieve.
11. **DUCTILE IRON PIPE:** Ductile Iron pipe shall be cement-lined standard thickness Class 50 or 52 unless otherwise specified and shall conform to the standards of USA Standard A-21.51 (AWWA C-151).

Rubber gasket pipe joints to be push-on-joint (Tyton) or mechanical joint (M.J.) in accordance with USA Standard A21-11 (AWWA C-111), unless otherwise specified. Flanged joint shall conform to USA Standard B16.1.

Standard thickness cement lining shall be in accordance with USA Standard A21.4 (AWWA C-1-4).

The Developer shall furnish certification from the manufacturer of the pipe and gasket being supplied that the inspection and all of the specified tests have been made and the results thereof comply with the requirements of this standard.

12. DUCTILE IRON PIPE INSTALLATION: Ductile iron pipe shall be installed in accordance with AWWA Standard C-151 and the manufacturers recommendation.

The bottom of the trench shall be finished to grade with hand tools in such a manner that the pipe will have bearing along the entire length of the barrel. The bell holes shall be excavated with hand tools to sufficient size to make up the joint. Boltson mechanical joint pipe and fillings shall be tightened uniformly with a "Torque" wrench, which measures the torque applied. Required torque for mechanical joints shall be as follows:

4" - 24" pipe size 3/4" Bolts 60-90 # torque

Installation of push-on-joint (Tyton) pipe shall be in accordance with the manufacturer's instructions.

13. PVC PIPE: PVC pipe shall be AWWA C900 high-pressure water pipe. Class 235 pipe shall meet the requirements of DR 18 and class 305 shall meet the requirements of DR 14.

The gasketed joint assembly shall conform to ASTM D3139 with gaskets conforming to ASTM F477.

The Developer shall furnish certification from the manufacturer of the pipe and gasket being supplied that the inspections and all of the specified tests have been made and the results thereof comply with the requirements of this standard.

14. PVC PIPE INSTALLATION: PVC pipe shall be installed in accordance with AWWA M23 and the manufacturers recommendation. The bottom of the trench shall be finished to grade with hand tools in such a manner that the pipe will have bearing along the entire length of the barrel. The bell holes shall be excavated with hand tools to sufficient size to make up the joint.

15. IDENTIFYING TAPE AND TRACER WIRE: Identifying tape shall be installed twenty-four inches (24") below finished grade over all domestic pipeline in all locations. Pipe locator ribbon shall be two inches wide, plastic coated aluminum and shall be clearly marked, "CAUTION BURIED WATER LINE" continuously along the length of the ribbon with minimum 1 ½ inch letters. The ribbon shall be blue in color. Tracer wire shall be installed along all non-metalic pipe. Wire shall be 12-gage and shall terminate in every valve box. Wire splices shall be made with DryConn water proof connectors by King Innovation. Tape wire to pipe prior to backfill operations.

16. **CAST IRON FITTINGS:** Cast iron fittings shall be short body for pressure rating of 150 psi, unless otherwise noted. Metal thickness and manufacturing process shall conform to applicable portions of USA Standard A21.10, A21.11, B16.2 and B16.4.

Fittings shall be cement-lined in accordance with USA Standard A21.4 (AWWA C-104).

Rubber gaskets for push-on-joint (Tyton) or mechanical joint (MJ) in accordance with USA Standard A21.11 (AWWA C-111).

Gasket material for flanges shall be neoprene, Buna N, chlorinated butyl, or cloth-inserted rubber. Type of connections shall be specified as push-on-joint (Tyton), mechanical joint (MJ), plain end (PE), flanged (FL) or threaded (TH).

17. **BOLTS IN PIPING:** Bolts shall be cast iron, zinc, chromium plated or stainless steel.
18. **GALVANIZED IRON PIPE AND FITTINGS:** Where specified, galvanized iron pipe shall be standard weight, Schedule 80. Fittings shall be threaded malleable iron galvanized per USA Standard B16.3.
19. **CONCRETE THRUST BLOCKING:** Concrete thrust blocking shall be cast in place and have a minimum of 1/4 square foot bearing against the fitting and two square feet bearing area against undisturbed soil. Blocking shall bear against fittings only and shall be clear of joints so as to permit taking up or dismantling joint. All poured in place blocking shall have a minimum measurement of twelve inches (12") between the pipe and the undisturbed bank. All bends and tees shall be blocked in accordance with standard blocking which is adequate to withstand full test pressures as well as to continuously stand operating pressure under all conditions of service.
20. **BEDDING CONCRETE:** Bedding concrete shall be mixed from materials acceptable to the District and shall have a 30-day compressive strength of not less than 1,500 psi. The mix shall contain four sacks of cement per cubic yard and shall be of such consistency that the slump is between 1 inch and 5 inches.
21. **GATE VALVES:** All Gate valves shall, in design, material and workmanship, conform to the Standards of AWWA C-509. Buried gate valves shall be iron body, bronze mounted, resilient wedge, non rising stem, operating stems equipped with standard 2-inch operation nut, and o-ring stem seals, suitable for installation with the type and class of pipe being installed. Ends to be as specified. Valves not buried shall be specified as part of the submittal process.
22. **BUTTERFLY VALVES:** Butterfly valves shall conform to AWWA Standard C504, Class 150, with cast iron short body and o-ring stem seal. Valves in Valves in chambers shall have a mutual crank operation. Buried valves shall have a stem extension with AWWA 2-inch operating nut.

23. CHECK VALVES: Check valves shall conform to AWWA C508 and shall be specified for 150 psi working pressure, unless otherwise required. Valve shall have adjustable tension lever and spring to provide non-slamming action under all conditions unless otherwise specified.
24. AIR AND VACUUM RELEASE VALVES: Air and vacuum release valves shall be APCO - Valve and Primer Corporation, "Heavy-Duty", combination air release valve, or equal.

Installation shall be as shown on the standard detail.

Piping and fittings shall be galvanized iron. Location of the air release valves as shown on the plans is approximate. The installation shall be set at the high point of the line. Water line must be constructed so the air release valve may be installed in a convenient location.

25. VALVE INSTALLATION: The valve and valve box shall be set plumb with the valve box centered on the valve. Valves boxes shall be set flush in pavement and in gravel roads as required by the District. Black top around valve boxes in unimproved roads for 2 feet. Where valve-operating nut is more than 3 feet below finished grade, a stem extension shall be installed conforming to the Standard Detail.
26. VALVE BOXES: Valve boxes shall be cast iron, two-piece with tabs, for 42-inch trench with extension, equal to Rich Manufacturing Company, or Olympic Foundry Company.
27. VALVE MARKER INSTALLATION: When specified, concrete marker posts painted with two coats, Rust-Oleum No. 2766 Hi-Gloss White Paint shall be set for all valves except auxiliary hydrant valves. The post shall be set at right angles to the road from the valve and shall be situated in a safe and reasonable conspicuous location, normally on the property line. Distance to valve shall be neatly stenciled on the post with two-inch numerals. Valve markers shall be installed only in unimproved or unpaved areas.

Valve marker posts shall be reinforced concrete posts, 4" x 4" on one end, 6" x 6" on the other end, 42 inches long.

28. FIRE HYDRANTS: Fire hydrants shall be dry barrel, compression type with a minimum main valve opening of 5-1/4" "0" ring stem seal, (2) 2-1/2" N.S.T. hose nozzle connections, and (1) 4-1/2" pumper connection. The shoe connection shall be 6" Mechanical Joint or flanged. The bronze operating nut shall be 1-1/4" pentagonal. Hydrants shall be M&H Style 929 or equal. All hydrants shall be "Traffic Models" with approved breakaway features at the ground line. Hydrant shall have a minimum dimension of 18 inches from the ground line to the centerline of the pumper nozzle and 32 inches from the ground line to the top of the operating nut.

29. **HYDRANT GUARD POSTS:** Hydrant guard posts, when specified, shall be reinforced concrete posts, 8" X 8" X 6' long or 9" diameter X 6' long or 6" diameter Class 52 ductile iron pipe, concrete filled.
30. **SERVICE CONNECTIONS:** Connections shall be installed with pipe saddles on C900 PVC, asbestos cement, steel, and Class 50 ductile iron pipe and by direct tap into Class 52 or thicker ductile. Installation shall be as shown in the Standard Details. Minimum size tap is $\frac{3}{4}$ -inch.
31. **METER BOX:** Concrete meter boxes with full lid shall be Fog Tite No. 1 Meter Box or equal. Meter boxes shall be Mueller No 250CS with Lid and insulation ring.
32. **POLYETHYLENE SERVICE PIPE AND CONNECTIONS:** Polyethylene pipe shall be manufactured from high molecular weight polyethylene (average molecular weight of 1,750,000) defined by ASTM-1248, as polyethylene Type 111 (3306) (PE). Pipe shall be made of all virgin material and conform to CS-255-63. Polyethylene pipe shall meet all requirements of ASTM D2241-67. The pipe shall be Iron Pipe Size (IPS), and have a working pressure of 200 psi at 73.4 degrees F. It shall sustain 300 psi at 73.4 degrees F. for 1000 hours. It shall bear the NSF seal and the manufactured name of Carlon Hi-Mol, or Orangeburg SP. All connections to this pipe shall be of the Ford Packjoint, Mueller Company, or equal, compression type connection with a stainless steel insert stiffener or by o-ring type self-sealing fittings. All connections shall be rated at a working pressure of 200 psi.
33. **BACKFLOW DEVICES:** All backflow devices are to be certified yearly by a Department of Health certified backflow assembly tester (BAT). All backflow devices are to be installed in accordance with the most current version of AWWA manual "Cross Connection Control Manual, Accepted Procedure and Practice" and the District Cross Connection Control program.

Reduced pressure backflow devices will be installed on all closed fire protection systems where chemicals are used. See Standard Detail. All other backflow devices shall be specified based upon the degree of hazard consistent with the classification by a certified cross connection control specialist (CCS) and Washington state law.

34. **PRESSURE REDUCING STATIONS:** Pipe, fittings and equipment shall be supported and blocked against static and dynamic loading in accordance with Section, "Concrete Thrust Blocking", and the equipment manufacturer's recommendations.

Drain lines from pressure reducing stations shall be piped to a below grade drainage system or other open channel with adequate screening to prevent animals or insects to enter the station.

35. **BACKFILLING:** Backfilling and land surface restoration shall closely follow installation and testing of pipe, so that not more than 500 feet is left exposed without

written approval of the District. Selected backfill material shall be placed and compacted around and under the water mains by hand tools to a height of 6 inches above the top of the water main. The remaining backfill shall be compacted to 95% of the maximum density as determined by Modified Proctor, ASTM D 1557, T 180 Method A. Where other agencies have jurisdiction over roadways, the backfill and compaction shall be done to the satisfaction of the agency having jurisdiction.

36. **HYDROSTATIC TESTS:** Prior to the acceptance of the work, the installation shall be subjected to a hydrostatic pressure test of 200 psi for 60 minutes at the high point in the line, and any leaks or imperfections developing under said pressure shall be remedied by the Developer before final acceptance of the work. No air will be allowed in the line. The main shall be tested between valves. Insofar as possible, no hydrostatic pressure shall be placed against the opposite side of the valve being tested. Test pressure shall be maintained while the entire installation is inspected. The Developer shall provide all necessary equipment and shall perform all work connected with tests. Tests shall be made after all connections have been made. This is to include any and all connections as shown on the plan. Insofar as is practical, tests shall be made with pipe joints, fittings and valves exposed for inspection. For approval, pressure shall not drop more than 5 psi in 60 minutes. The Developer shall perform the test to assure that the equipment to be used for the test is adequate and in good operating condition and the air in the line has been released before requesting the District to witness the test. The District shall witness the test; if the test does not pass inspection for any reason, additional trips required to witness the test may be at the Developer's expense.
37. **STERILIZATION AND FLUSHING OF WATER MAINS:** Sterilization of water mains shall be accomplished by the owner in accordance with the requirements of the State Department of Health and in a manner satisfactory to the District. The section to be sterilized shall be thoroughly flushed at maximum flow prior to chlorination. At no time shall chlorinated water from a new main be flushed onto the ground or into a water body without adequate dechlorination equipment. Flushing period must be approved by the District. Sections will ordinarily be sterilized between adjacent valves unless, in the opinion of the District, a longer section may be satisfactorily handled. Chlorine shall be applied by solution fed at one end of the section with a valve or hydrant at the opposite end opened sufficiently to permit a flow through during chlorine application. The chlorine solution shall be fed into the pipeline already mixed by an automatically proportioning applicator so as to provide a steady application rate of not less than 60-ppm chlorine. Hydrants along the chlorinated section shall be opened during application until the presence of chlorine has definitely been detected. When a chlorine concentration of not less than 50 ppm has been established throughout the line, the valves shall be closed and the line left undisturbed for 24 hours. The line shall then be thoroughly flushed and water samples taken for approval by the local health agency. Flushing period must be approved by the District. The Developer shall exercise special care in flushing to avoid damage to surrounding property. Should the initial treatment result in an unsatisfactory bacteriological test, the original chlorination procedure shall be repeated by the Developer until satisfactory results are obtained.

38. **CONCRETE VAULTS:** Concrete vaults used for pressure reducing stations or air vacuum stations shall have walls of a uniform thickness and shall be plumb. Sections shall fit together with a close tolerance and shall be water tight. Aluminum hatches are required in non-traffic areas and manhole lids and covers in traffic areas.
39. **PIPE LINING:** Shall be allowed on rehabilitation of older lines when the system analysis shows that reductions in inside diameter will not impact target demand or fire flow conditions. All pipe lining projects will be in conformance with AWWA Standards for pipe lining.
40. **PRESSURE ZONE STANDARDS:** The Lake Chelan Reclamation District herein provides standards for providing domestic water service into future pressure zones identified in the comprehensive water plan. The comprehensive plan identifies future service areas with maximum service to elevations 1500, 1750 and 2000 feet in elevation. The service areas shall be served by booster pumps and storage tanks contemplating the current or future need for fire flow service. Permanent reservoirs shall be designed to meet specified hydraulic grade lines so that as systems are ultimately intertied and no operational problems are encountered. Reservoir overflow elevations are therefore specifically set at 1580, 1830 and 2080 to provide room for operational flows to meet a minimum of 30 psi in the service area.

If booster pump stations and reservoirs are required to serve expected development, the District will require the preparation of an engineering report to study the relationship of the project to the local service area, future growth, impact on the LCRD system and fire flow requirements. The engineering report shall meet the requirements of the Department of Health for a Project Report. The report will be reviewed and approved first by the District and then by the Department of Health. Fire flow capabilities and storage requirements will be reviewed and approved consistent with the requirements of the District and the Chelan County Fire Marshall. Upon approval of the engineering report, plans and specifications for the complete system shall be prepared for the review and approval of the District. In addition, the booster pump and reservoir designs shall be reviewed and approved by the Department of Health.

All designs shall incorporate the ultimate goal of the standard system configurations within the booster pump service areas. The District retains full review and revision rights over facility designs. Equipment equals can be proposed in lieu of those specified in these specifications, but must be clearly identified in the submittal process. The District retains full and final determination of what equipment shall be considered "equal". Interim system configurations may be acceptable when lower densities or the jumping of pressure zones is anticipated. The developer will design the interim system components with the understanding that items will be replaced in the future and that the cost of such future improvement will be borne by the customers receiving the benefits of the new standard system configurations. Impact fees will be assessed to users within the new service area as they connect to

the system. The impact fees will be used to pay for the future standard system components as calculated by the District.

All booster pump systems in the future service areas shall be open systems. Closed booster pump systems may be allowed only within the retail service area for small, isolated, high elevation areas where the service area is not contiguous with higher elevation lands as determined solely by the District.

The domestic water system shall be analyzed with a hydraulic modeling program to verify the capability of the system to provide the necessary flows supplying the booster system without a loss of pressure below established DOH and District design standards. Off-site mitigation by the developer to the distribution system may be required to meet instantaneous flow needs of the project.

41. **BOOSTER PUMP STATIONS:** All booster pump stations shall be a minimum of a duplex station and shall be housed in an above grade concrete utility building as manufactured by CXT Incorporated or an approved equal. No below grade vaults shall be allowed for use as a booster pump station. Colors and textures shall be approved by the District during the shop drawing submittal and review process. Access shall be through doorway openings large enough to adequately install and remove all pumps, motors, piping, motor control centers and other electrical or telemetry equipment. Roof hatches or removable skylights may be required at the discretion of the District to facilitate removal of pumps. The building will be equipped with security, lighting, heating and ventilation as necessary to protect the equipment and provide a safe and effective working environment. The building shall be sited on a stable, graveled or paved site with adequate space to park at least one operational vehicle. Adjoining banks shall be sloped, retained or stabilized so as to protect the building and provide access to the operational needs of the station. Severe or filled sites may require the review and approval of a licensed geotechnical engineer to approve the stability of the site for the intended use as determined by the District. The building design shall be in accordance with the latest edition of the International building code and County Standards. Calculations shall be provided, stamped by a licensed engineer registered in the state of Washington. The minimum design criteria shall be:

Snow load: 55 psf or as required by the Chelan County Building
Official for elevation above 1575
Base Wind Speed: 85 mph
Wind Exposure: C
Occupancy: Essential Facility
Seismic Parameters: $Sds=0.046$ $Sd1=0.022$
Site Coefficient: D

Site and building plans and structural calculations shall be of sufficient detail for the building permit approval by Chelan County.

The building shall be provided with double steel doors of adequate size to install and remove all equipment in the building. The doors shall have locking

mechanisms with cylinders interchangeable with District key sets. An intrusion alarm shall be wired to the door and the alarm system that can be disarmed with a separate key switch. Doors shall be fully weather-stripped and include hold-open hardware.

The building shall be provided with a wall mounted ventilation panel with a hand-off-auto switch for ventilation control. In the hand mode, a relay shall be energized to provide power to a 120 VAC single phase exhaust fan and motorized intake louver. In the auto position, the relay will be energized based upon a temperature setpoint from a remote Honeywell wall mounted cooling thermostat with a range of -30 to 100 degrees Fahrenheit in order to start and stop the exhaust fan and motorized intake louver. The fan and louver shall be sized depending upon building size.

Provide an Qmark brand wall mounted space heater with a built-in thermostat with a range of 40 to 100 degrees Fahrenheit sized for the space in the building. The building shall be lit with standard 120W four-foot fluorescent lamps on a switch located near the doorway and one exterior 150W metal halide light with an interior switch control. The building shall have one 20A exterior rated, one 20A interior wall mounted duplex outlet, weather head, mast and Yagi antenna for the radio controlled communications system. Two 2-inch sweep conduits for future use shall be provided as penetrations through the building floor and shall be located underneath the telemetry panel.

The package booster pump system shall be provided complete, including, but not be limited to base structure, pumps and motors, suction and discharge piping and valves, pump system accessories, and a complete motor control panel for pumps. The package booster pumps shall be end suction or multi-stage centrifugal pumps equal to Grundfos BoosterpaQ with integrated pump skid and control panel as designed and manufactured by a company with at least five years experience providing this type of equipment of a similar complexity. The panel may be located off skid and, if so, shall be wired by the contractor per the manufacturer's instructions. The manufacturer is required to be on site to help with the technical hookups of the equipment.

The manufacturer will bear all responsibility for the installation of the control panel. It will be the manufacturer's responsibility to inspect and warrant the integrity between the control panel and the pump skid. The control panel shall be NEMA 1A Hoffman panel and shall be labeled under the requirements of UL 508A. The panel shall have a backpan and shall have numbered terminal blocks for all external connections. Control wire shall be a minimum 16 AWG, MTW and shall be color-coded in accordance with all applicable codes and laws. All wires shall be labeled or number coded as to their purpose. Spiral wrap, tie wrap, fasteners and wire duct shall be provided as required for aesthetics and safety. All components mounted on the door shall be wired with insulated connectors (where "finger proof" terminals are not provided) to prevent accidental shock hazards. All components on the backpan shall be mounted on DIN rail or fastened via drilled and tapped screws to facilitate easy component replacement. Pop rivets shall not be allowed.

Booster pumps shall be designed in accordance with the Department of Health Design Manual. Motors that are 20 horsepower or larger shall be 480v, 1,800 rpm motors and shall be provided with solid state reduced voltage starters. Variable Frequency Drives with 5% line and load reactors may be required depending upon the pumping application. Average daily demand (ADD) in the District is 200 gallons per person per day. Maximum daily demand (MDD) is 2.5 times the ADD. Peak hour demand (PHD) in gallons per minute is 2.75 times the MDD divided by 1,440 minutes.

Submittals are required from the manufacturer prior to approval and shall include the following:

- System schematic diagrams with all components indicated.
- Technical data sheets for all components
- Detailed arrangements and dimensional drawings of the booster pump package with all devices and equipment indicated.
- Control panel schematic.
- Interior and exterior control panel layout drawing.

The booster pump system manufacturer shall guarantee the booster system to be free from defects in design, operations, materials and workmanship for a period of two (2) years warranty following the date of acceptance, by formal action of the District.

Warranty and guarantees by suppliers of various components in lieu of a single source responsibility by the manufacturer will not be accepted. The manufacturer shall be solely responsible for the guarantee of the pumping system and all components that make up the pumping system. In addition, the manufacturer agrees to provide manuals and on-site instructional information to the stations operation and maintenance after a successful startup. All components of the booster pump system shall be calibrated by the manufacturer after completion of the installation. Each component shall be adjusted to be within the manufacturer's required range and for the specific application. Components that cannot be properly calibrated or that are found to exceed the manufacturer's specified range or accuracy shall be removed and replaced at the developer's expense.

The completed pump system shall be factory tested prior to shipment. Testing shall include, but not be limited to, pump flow, pressure, control panel and accessory operation. The District shall have the right to visit the manufacturer's shop / office to inspect the pump system's fabrication at any time.

The entire booster station shall be factory prefabricated on a common structural skid with a minimum ¼" steel housekeeping pad. All metal fabrication shall be stainless steel or mild steel hot-dipped galvanized after fabrication. All metal fabrication bolts and connections to concrete shall be stainless steel. Any metals that are not stainless steel or aluminum shall be coated with an epoxy paint system equal to Tnemec series 66.

All interconnected piping shall be completed and testing prior to shipment. Discharge manifolds, as well as sensing lines with shut off cocks for gauges and pressure switches shall be furnished assembled. Suction and discharge headers shall be factory supplied stainless steel, epoxy coated steel (inside and outside) or field constructed ductile iron pipe, and shall be connected to a single pipe and shall be flanged or threaded. All electrical wiring shall be enclosed with galvanized rigid conduit, with final connections to vibrating equipment made with liquid tight flexible conduit. All other fittings shall be flanged or threaded.

The system manufacturer shall develop an operating and maintenance manual which includes the following operation and maintenance information:

- Normal operating procedures
- Preventive maintenance
- Troubleshooting
- Calibration
- Testing
- Replacement of components
- System drawings
- Catalog data and complete parts list for all equipment and control devices
- Listing of recommended spare parts
- Listing of recommended maintenance tools and equipment

Booster pumps systems shall include both a sampling tap and an injection tap. Pressure gages (both manual and electronic) shall be provided for both the discharge and the suction side of the pumps. Manual pressure gages shall be glycerine filled, 4-½" face, with stainless steel, brass and/or bronze components in contact with water. Gages shall be selected so the normal operating pressure resides at approximately 50% - 70% of full scale. Electronic gages shall be Keller pressure transmitters with 0.25% static accuracy, customizable pressure ranges and an analog output or equal. The control system shall be designed to monitor for low suction pressure and lockout the pumps during such occurrences. Each condition shall include a time delay feature adjustable from zero to 30 seconds to prevent nuisance tripping. An electronic transmitter shall be provided that has dual output, 4-20mA and pulse, with the flow meter mounted on the discharge side of the pumps. The Siemens Sitrans F Mag 8000W flow meter shall be sized for the application and shall be flanged or threaded with an accuracy range of plus or minus 0.5%. Include combination transmitter / totalizer on flow meter. Each pump shall be isolated on both the suction and discharge side with AWWA C-509 or C-515 resilient seated gate valves. Packaged systems may use ball valves on the discharge side only when configured by the manufacturer as standard. The discharge side of each pump shall include either an AWWA C-508 check valve with lever and spring or a pump control valve. Selection of the type of discharge valve will be solely by the District, generally chosen based upon the type of motor control and flow rates. The control panel shall include automatic alternation of the pumps, emergency generator receptacles equal to Crouse-Hinds Posi Lok systems, and manual transfer switch that will be a key operated mechanical lockout by Kirk Key in conjunction

with the main service disconnect. The utility meter base shall be externally mounted to the building to Chelan County PUD standards. Provide a current transformer cabinet if required by Chelan County PUD. Pump control setpoints shall be capable of being set at the control panel. Pressure reducing and sustaining valves shall be located between pressure zones and bypass modulation shall be provided by solenoid actuated control valves. All pump control, surge and pressure sustaining valves shall be Cla-Val brand valves. Control valves shall include a limit switch for remote position indication, wired to the control panel.

Electrical equipment required for the booster pump station includes a thermal magnetic main circuit breaker sized based upon two motors running at the same time with the addition of a full lighting panel load. Motor short circuit protector (MPC) breaker disconnect switches with padlock provisions shall be magnetic trip only. Motor starter units shall be combination type with components and wiring readily available. Motor overload protection shall be provided by a self-powered overload relay. The overload device shall provide phase loss protection and be ambient insensitive, sized to protect the motor actually installed with allowance for the power factor correction, if applicable. A UL listed digital power monitor shall interrupt the control power in the event of phase loss, phase reversal, low voltage and phase imbalance. The digital power meter shall be a Siemens 9300. It shall have primary fuse protection. Contacts shall be rated for 15A resistive at 120 VAC. The single phase power monitor shall automatically reset when proper power is restored. Lightning protection shall be provided with the electrical system and control panel.

The load panel shall be a minimum of 18 pole spaces to provide power to all building electrical equipment and lighting fixtures. If service feeder is 480 volt, provide a UL approved and NEC sized dry-type lightning transformer and transformer disconnect. Feeder circuit breakers shall be thermal magnetic and sized per NEC. Provide Siemens current limiting, 100% rated molded case breakers or equal. Provide two spare 20 amp single pole breakers. A 20A GFCI duplex outlet receptacle shall be provided with a dedicated 20A circuit breaker mounted on the backpan.

Run time meters shall be provided and shall be 2-½ inches square case type for flush panel mounting. The meters shall have a six-digit non-reset register with the last digit indicating tenths of an hour. Eight-digit LCD Remington 3301-300 operational counters shall be provided with a 7-year self-contained battery.

The I&C and telemetry system shall be provided under the supervision of a single system integrator who is regularly engaged in the design and installation of such systems of a similar scope and complexity. The integrator shall be solely and completely responsible for the final design and assembly of the entire control system. The PLC shall be a completely integrated distributed programmable controller system capable of analog and sequential control, data acquisition and display, alarm annunciation and communications using the PLC system. The device when connected to an Integra TR radio shall have telemetry capabilities for transmitting data using Modbus protocol to and from the master PLC located at the District Office. Pre-qualified system integrators include Stead & Associates or

Technical Systems, Inc. Any other integrator must be located within 200 miles of the District and must submit qualifications and experience in similar installations to qualify. The District will be the sole judge of qualified integrators.

Provide submittals for each item in the UL-508 listed telemetry panel which shall include as a minimum a wiring diagram or connection schematic showing all devices and terminals and their physical relationship to each other and an interconnection diagram showing all external connections between the terminals of equipment and outside points, such as field and auxiliary devices. Terminal blocks shall be shown as actually installed and shall identify the equipment connections. As-built drawings shall be supplied after startup and upon completion of the project.

The equipment provided for the telemetry panel shall be new industrial grade, free from defects, and the most recent version of the product. Obsolete or phased out versions of the product will not be allowed. Provide DC power supplies as required for specific equipment. Standard Gel Cell batteries shall provide smooth, non-mechanical transfer to backup power and shall be of sufficient ampere-hour capacity for 1 hour of battery backup power supply. The RTU power supply shall be connected to a UPS unit for power protection in the event of a utility power failure. The UPS shall be a minimum 350VA or equal. A transient protection unit shall isolate and protect the instrumentation and telemetry electronics against electrical surges on input and output signal and power lines for transients up to 2500V peak with a waveshape as required by ANSI / IEEE. Wiring shall be minimum 600-volt class, PVC insulated, 16 AWG conductor. All wiring shall be terminated at one-piece molded plastic terminal blocks rated for 300 volts. Fusible terminal blocks shall be provided with a LED blown fuse indicator for each terminal. Provide fusing on the line and load side of all field devices.

The 24 VDC power shall be derived from a properly sized power supply. The control panel shall have an over current protection device with suitable interrupting requirements for the system. Fused disconnects shall be provided in accordance with NEC and the system requirements.

The pumps will be required to run in both normal hand mode and in auto mode. In hand mode, each booster pump will be allowed to run under any circumstance. In auto mode, booster pump 1 will be started and stopped based upon the control system described in sections below. The level shall be converted to a 4-20 mA signal and shall be displayed on the user interface screen. The PLC will then send a "pump call" signal to the next pump based upon a user adjustable setpoint. The HOA switch for each pump shall be wired from the pump control panel to the telemetry panel in order to determine the position of the switch. The following is a list of conditions for the booster pump station:

- Pump 1 and pump 2 shall have the ability via a simple switch or control panel setting to either be alternated between each pump start or to be made the stand alone pump for this facility.
- All booster pumps shall be stopped in the auto mode based on high discharge pressure, low suction pressure and or no flow measured from each

pumps pressure switch or the flow meter. Adjustable time delays shall be provided for each condition.

- All setpoints shall be user adjustable from a color touch screen.
- In the event a pump fails, the telemetry system will remove the pump call from that pump and will take the pump offline until the pump fail alarm is manually reset from the touch screen. A pump fail alarm will be sent to the communications system for remote indication.

A non mercury type float switch shall be used as a high reservoir level alarm. This float shall be wired into the motor control logic in order to stop the pump to prevent overfilling the reservoir. The high reservoir level alarm shall have a time adjustable period to prevent nuisance tripping and shall be independent of the telemetry system. Additionally, a high level alarm signal shall be sent to the telemetry system to notify District personnel.

The PLC shall also receive a 4-20 mA signal as well as a pulse signal from the flowmeter. The PLC shall also monitor the pressure gages on both the suction and discharge pipes and the reservoir level. The contractor shall calibrate and tune all instruments, indicators, recorders, loops, etc. and record them in tabular form for submittal to the District with the O&M manuals.

Closed Systems

Closed booster pump systems will be allowed only within the retail service area for small, isolated, high elevation areas where the service area is not contiguous with higher elevation lands. Pump operations in closed booster pump systems may be governed by flow, pressure, VFD, pressure tank, timer or any combination depending upon the size and functions required within the service area. VFD motors shall be considered the default style unless the District determines that a more efficient and effective system is available. Provide calculations of demands and fire flows relative to pressure tank and or pump sizing criteria and selection. All service connections served by a closed booster pump system and located at a higher elevation than the booster pump station are required to have premise isolation commensurate with the degree of hazard of the user but at least a double check valve assembly.

Open Systems

Booster pumps on open systems shall be controlled by the water level in the receiving reservoir. Reservoir level shall be monitored by submersible level transmitters like or equal to Keller submersible level transmitters with 0.25% static accuracy, custom pressure range capable, analog outputs and with aneroid bellows as required. Conduit shall be installed between the booster pump control panel and the reservoir termination panel to house instrumentation wiring. All service connections served by an open booster pump system and located at a higher elevation than the booster pump station are required to have premise isolation commensurate with the degree of hazard of the user but at least a double check valve assembly.

42. **RESERVOIRS:** The District standard for storage reservoirs is welded steel reservoirs. Reservoirs will be sized in accordance with the Department of Health Design Manual. Standby storage shall be equal or greater than one times the calculated average day demand unless increased by the Department of Health or the District based upon the project requirements. Fire suppression storage may not be nested with standby storage unless specifically approved by the Chelan County Fire Marshall. Equalizing storage shall be provided at and above an elevation to provide at least 30 psi to the highest service location in the planning area. Operational storage shall be at least 20% of the total volume of the tank. The overflow elevations are set by standard in accordance with the pressure zone requirements.

Reservoirs shall be sited on stable, graveled or paved sites with adequate space to park at least one operational vehicle. Adjoining banks shall be sloped, retained or stabilized so as to protect the reservoir and provide access to the operational needs of the tank. Severe or filled sites may require the review and approval of a licensed geotechnical engineer to approve the stability of the site for the intended use if required by the District.

Design steel reservoir in accordance with applicable building codes, seismic requirements, API 650, NSF 61, the IBC, and AWWA D100. Contractor may elect to furnish the reservoir in accordance with Appendix C of AWWA D100. Design calculations or analysis on tank including design of foundation shall be submitted to the District by a licensed engineer registered in the state of Washington. Design tank as a cylindrical above-ground metal tank of all welded construction. Roof shall be designed as a low-cone type with a maximum slope of 1 inch in 12 inches and a 3" overhang. Provide columns and structural framing as needed for low-cone type roofs. Design reservoir walls, foundations and bottoms in accordance with the allowable soil bearing pressures at the site and the equivalent fluid pressures. Oil on the 4" minimum deep sand mat under the tank shall be food grade oil. Petroleum based oil is not acceptable.

Accessories for welded steel reservoirs shall include two shell manholes, one 24" in diameter and one 30" in diameter that are both accessible from ground level in the lowest ring of the reservoir shell in accordance with AWWA D100. Rubber gasketed cover plates shall be hinged to swing horizontally on a davit for ease of opening.

A caged outside ladder with landing and safety rails shall be provided and designed to meet safety standards. The ladder may be vertical, but must not have a backward slope at any point. Construct the ladder rails with bars not less than 2" x 3/8" in size spaced at 18". Construct rungs of round or square bars not less than 3/4" in size spaced at 12" intervals. Attach the ladder to the shell of the reservoir with brackets placed at intervals not to exceed 6 feet. An anti-climb guard consisting of a hinged ground level cover with a heavy duty safety clasp for padlocking from ground level shall be provided. Provide a safety climb device on any tanks taller than 20 feet.

Provide an interior heavy duty nylon / polypropylene rope safety ladder suspended from the edge of the hatch opening to the bottom of the tank. Rope shall be suitable

for continuous submergence in chlorinated drinking water and shall be of sufficient strength to support a minimum of 250 pounds. The ladder shall be weighted so that it hangs vertically in the tank when water is circulating. Suspend a closed cell polystyrene life ring from the mid-point of the ladder with a nylon / polypropylene rope to allow the life ring to float on the surface at any water surface elevation. The rope shall be the same material as the ladder.

One 36" x 36" roof hatch shall be provided near the top of the outside ladder and within the safety landing. The opening shall be curbed at least 6 inches high. The cover shall overlap the curb by at least 2 inches and shall be hinged with a locking clasp suitable for use with a padlock. One roof vent shall be located near the apex of the roof. The vent shall be sized to adequately exchange air during maximum fill and withdrawal rates. The vent shall be weatherproof and shall exclude birds, animals, and insects using non-corrodible dual wire mesh. Vent shall meet the requirements of AWWA D100 to provide fail safe operation if clogged or frosted over. Vent shall also be easily dismantled and cleaned. The vent shall be flange mounted.

The reservoir will be provided with separate steel pipe inlets and outlets. A drain pipe will be provided with a 6-inch tall removable protruded section in the bottom of the reservoir. The drain pipe attached to the floor shall be one continuous welded steel pipe flanged to and isolated by a resilient wedge gate valve exterior to the footprint of the tank. The drain pipe shall direct the flow to an overflow location identified in the site plan. The overflow pipe shall be a steel pipe set to the required elevation for the pressure zone as prescribed by the District standards. The overflow shall join with the drain pipe downstream of the isolation valve and shall be directed to an overflow location identified in the site plan. The overflow pipe shall be supplied with a 24 mesh non-corrodible screen and shall be installed at an accessible point within the pipe near the outlet to prevent ingress of birds or animals. The inlet, outlet, drain and overflow pipes shall be sized appropriately for the maximum fill and withdrawal rates. Pipe within the tank may be welded stainless steel or painted steel with flanged connections.

A painter's trolley track shall be provided on the inside of the reservoir for maintenance purposes. A graduated staff gage water level indicator with a one-half scale target shall be attached to the reservoir with a float driven pointer on the gage indicating the depth of the water in the tank. The orientation of the gage will be noted on the site plan for easy observation. Install a 2" PVC stilling well and cable hanger for the installation and maintenance of the submersible level transducer. A NEMA 3 panel shall be placed on top of the reservoir to tie the transducer into the control wire from the booster pump station.

The reservoir shall be protected with sacrificial anodes designed for the size of the reservoir and in consideration for the type of interior paint used on the project. Metal studs for mounting the anodes and a test hole on top of the reservoir will be installed in advance of final surface preparations or the application of coatings. The sacrificial anodes will be installed after coatings are complete and accepted. After installation of the anodes and the filling of the reservoir, the system must be tested and inspected by a corrosion engineer.

The reservoir shall be painted between April 15 and October 15. Surface preparation and coating applications shall be in strict accordance with the manufacturer's printed instructions and the NACE standards. Protection of surfaces not scheduled to be coated shall be determined by the District and if the potential exists for surrounding areas to be damaged by either the surface preparation or the application of the coating, adequate protections must be supplied.

Interior and exterior primers shall be Tnemec Hydro-Zinc 91-H₂O applied after a SP10 near-white blast cleaning. Grind all welds to remove nibs and high points and remove any weld splatter from plates prior to coating application. The final dry film thickness shall be 2.5 to 3.5 mils. The interior top coat shall be Tnemec Pota-Pox 80, Series 141 with a final dry film thickness of 10 to 12 mils. Total system dry film thickness of the interior coating system will be a minimum of 13.0 mils. The exterior top coat shall be Tnemec Endura-Shield, Series 73 with a final dry film thickness of 3.0 to 5.0 mils in the color of Desert Sand. Total system dry film thickness of the exterior coating system will be a minimum of 6.0 mils. All welds shall be stripe coated. Contractor shall provide holiday testing equipment for use by the District to inspect finished coating quality. Any areas that fail in thickness, pinholes, or other obvious defects shall be corrected prior to acceptance.

The reservoir must be disinfected after the coating system is complete, the coating systems have been fully cured per the manufacturer's recommendations, and field quality control inspection is complete. Disinfection procedures will follow AWWA C 652 methods.

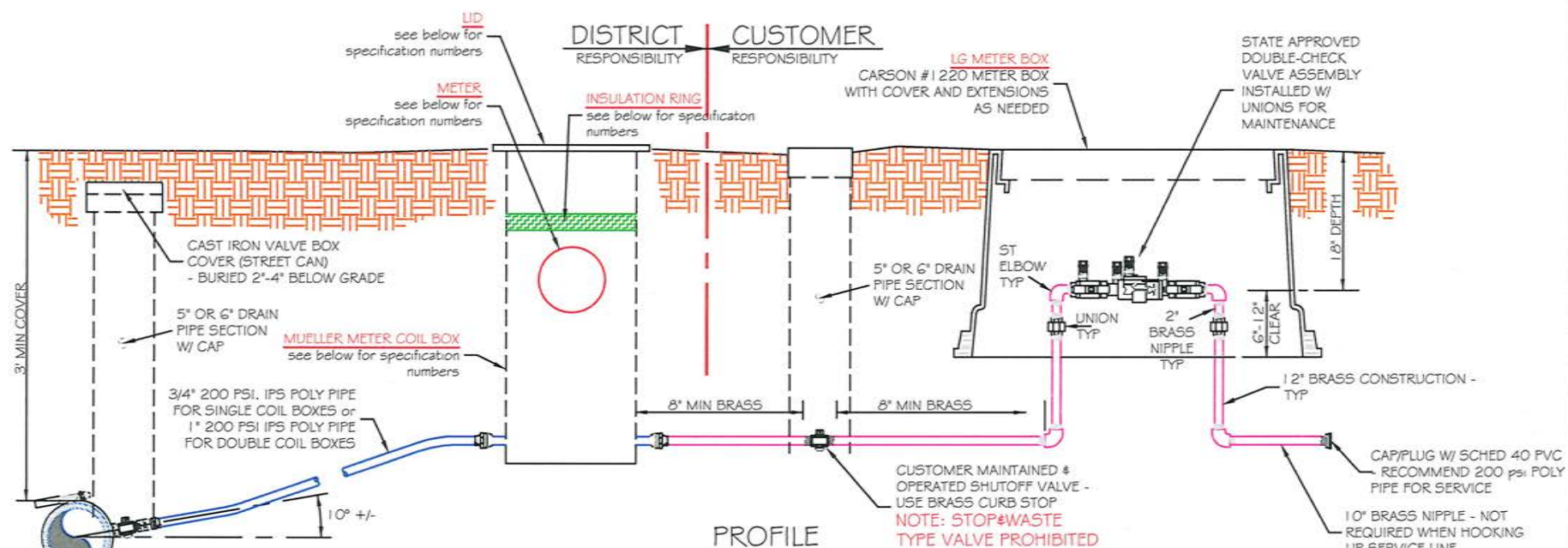
43. TRANSMISSION AND DISTRIBUTION LINES IN BOOSTED PRESSURE ZONES: Transmission lines from the booster pump to the reservoir shall be located within the County road right-of-way when possible. Alternatively, the transmission lines can be installed in private roads along areas of normal ingress and egress if the District is given unrestricted access to the roadways. Transmission and distribution mains following easements going "cross country" shall be discouraged, but when allowed, shall include a dedicated, unrestricted, graveled access way at least ten feet wide with no more than a 10% grade. Locations of booster pumps and reservoirs, sizes and service areas shall not be incompatible with the Domestic Comprehensive Plan. Booster pump stations shall be located on or adjacent to County road rights of ways. Storage reservoirs shall be located adjacent to County road rights of ways or on deeded or dedicated lands at the end of transmission lines. Transmission mains shall be at least 8" diameter lines and distribution lines shall be at least 8" diameter lines if dead-ended and at least 6" diameter lines if they can be looped. Transmission mains shall be sized so that the velocity during either maximum pumping demand (not including fire flow) does not exceed 5 feet per second. Final determination of transmission main size will be made solely by the District.
44. SEPARATION FROM SANITARY SEWER AND IRRIGATION MAINS: The WA Dept. of Health Water System Design Manual and Dept. of Ecology Criteria for Sewage Works Design are used for guidance for pipeline separation.

Where possible, watermains shall be installed with 10 foot horizontal clearance when parallel with sewer or irrigation mains. Where such clearance is not practical, and when approved by the District, separation may be reduced to 5 feet if the watermain is 18-inches above the non-potable pipe. Other configurations will be reviewed by the District on a case by case basis.

Crossings of sewer and irrigation mains shall be perpendicular with the watermain 18-inches above the non-potable pipe when possible. Where this clearance is not available, either the potable or non-potable pipe shall be encased in no less than 18-feet of ductile iron or C900 PVC pipe, centered on the utility crossing. Other configurations will be reviewed by the District on a case by case basis. Pipe through casings must be supported with manufactured casing runners.

APPENDIX J2 – CONSTRUCTION DETAILS

DEVELOPER/CONTRACTOR RESPONSIBILITY



(DO NOT COVER UNTIL DISTRICT INSPECTS)

COIL BOX/METER SPECIFICATIONS:

SINGLE 3/4" METER INSTALLATION:

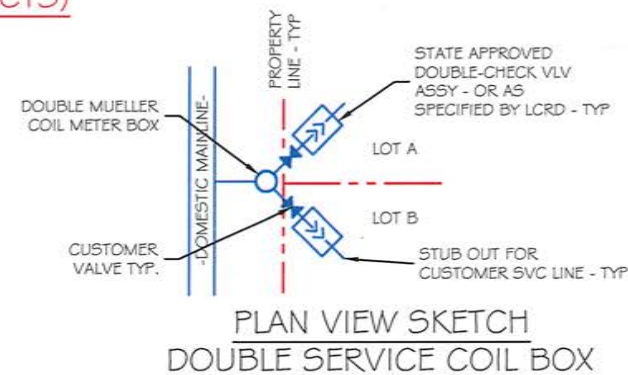
METER - $\frac{3}{4}$ " x $\frac{3}{4}$ " Badger Recordall Nutating Disc Flowmeter, LL Bronze External Thread Body, Noryl Chamber, Plastic Thrust Roller, Bronze Bottom, Meter Mounted Low Temp Register, No Connections, NSF 61, Cubic Feet Reader
 COIL BOX - Mueller No. 250 CS 15 36 L5BSN
 LID - Mueller No. 790007
 INSULATION RING - Mueller No. 790022

DOUBLE 3/4" METER INSTALLATION:

(2) METERS - see single $\frac{3}{4}$ " meter installation above
 COIL BOX - Mueller No. 250 CD 18 36 L5BSN
 LID - Mueller No. 790018
 INSULATION RING - Mueller No. 790153

SINGLE 1" METER INSTALLATION:

METER - 1" Badger Recordall Nutating Disc Flowmeter, LL Bronze External Thread Body, Noryl Chamber, Plastic Thrust Roller, Bronze Bottom, Meter Mounted Low Temp Register, No Connections, NSF 61, Cubic Feet Reader
 COIL BOX - Mueller No. 330 CS 18 36 L5BSN
 LID - Mueller No. 790018
 INSULATION RING - Mueller No. 790153



NOTES:
 ALL DOMESTIC DEVICES AND FITTINGS MUST BE LEAD FREE.

MATERIAL SUBSTITUTIONS OR DETERMINATION OF EQUAL ARE AT THE SOLE DISCRETION OF LAKE CHELAN RECLAMATION DISTRICT.

SERVICE LINE TO BE 90° OFF MAIN LINE.

MAGNETIC TAPE TO BE BURIED OVER SERVICE LINE FOR LOCATION.

TITLE
 DOMESTIC WATER
 SERVICE w/ DCVA -
 CONTRACTOR VS
 STANDARD DOMESTIC DETAIL
SHEET
 1 OF SET
DWG SCALE
 NO SCALE

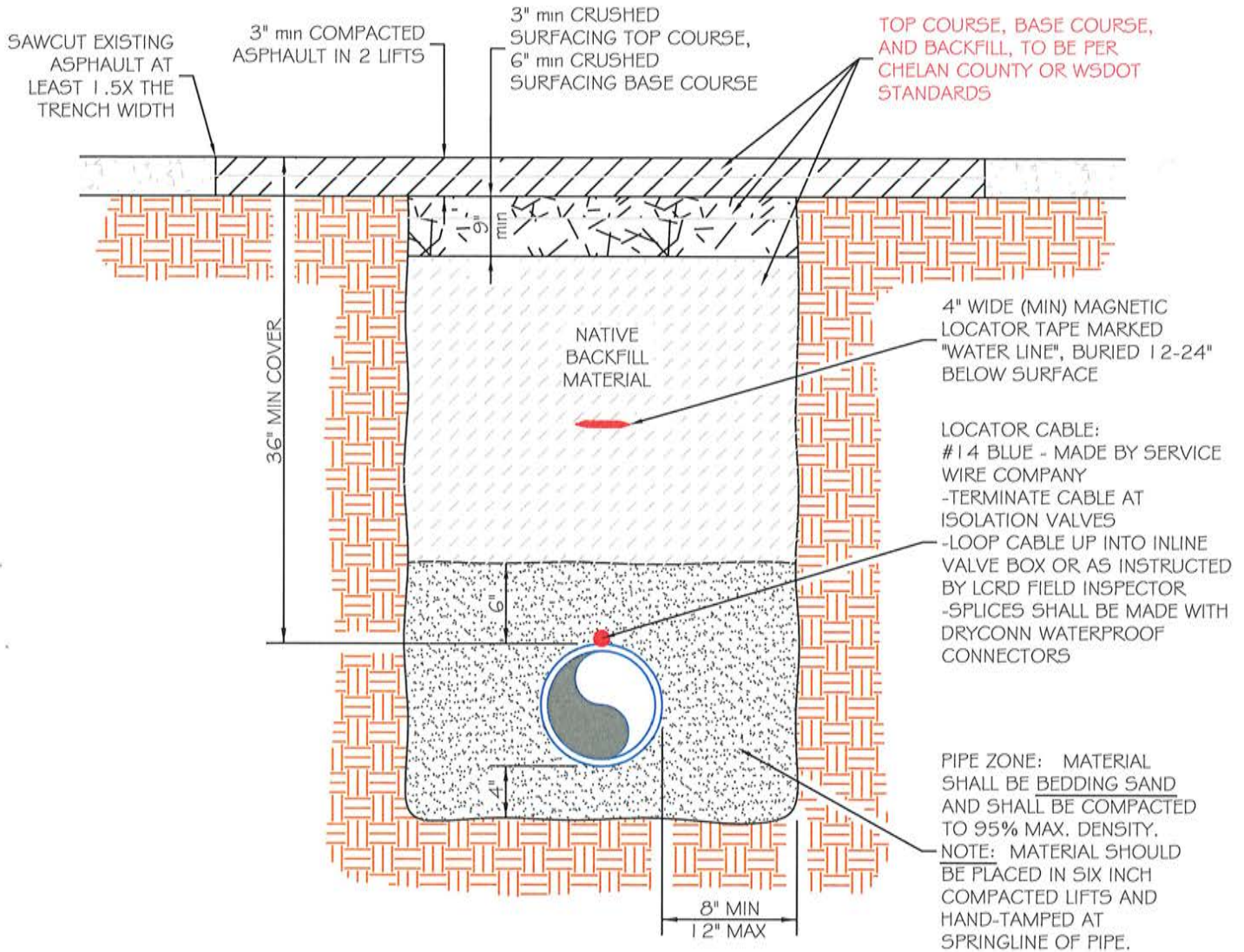


DRAWN BY RLA

12.17.20 \\Domestic\Details\water svc customer hookup w backflow - CONTRACTOR VERSION.dwg (REV 1)

CALL 48 HOURS
BEFORE YOU DIG:

Northwest Utility Notification Center
1-800-553-4344



PROFILE

NOTES:
MATERIAL SUBSTITUTIONS OR DETERMINATION OF EQUAL ARE AT THE SOLE DISCRETION OF LAKE CHELAN RECLAMATION DISTRICT.

BACKFILL, SURFACE RESTORATION, AND MINIMUM PIPE DEPTH SHALL CONFORM TO THE REQUIREMENTS OF THE AGENCY HAVING JURISDICTION OVER THE ROAD RIGHT-OF-WAY.

TITLE

TYPICAL TRENCH SECTION

STANDARD DOMESTIC DETAIL

SHEET

2 OF SET

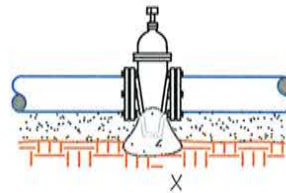
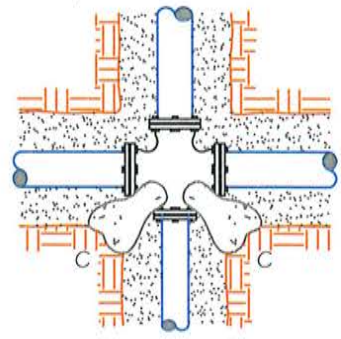
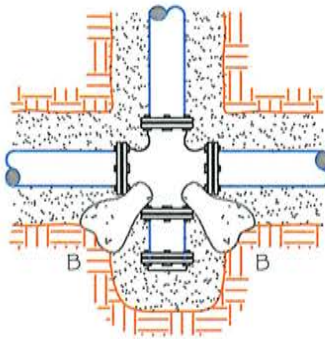
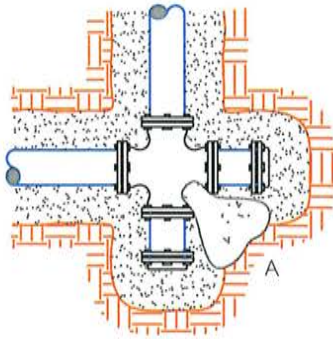
DWG SCALE

NO SCALE



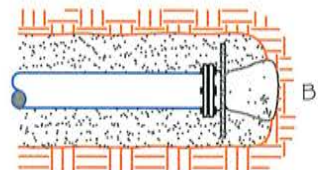
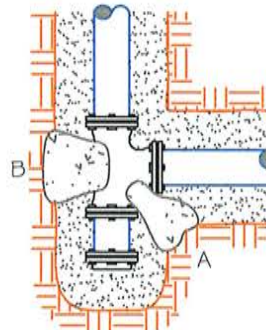
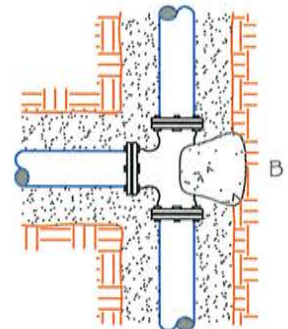
DRAWN BY RIA

09.17.20 D:\DomesticDetail\typical trench section.dwg (REV D)



THRUST BLOCK TABLE
MIN. BEARING AREA AGAINST UNDISTURBED SOIL
(FT²)

PIPE SIZE	A	B	C	D	E	X
4"	3	1	1	1	1	NONE
6"	4	4	2	1	1	NONE
8"	7	6	4	2	1	4
10"	11	10	6	3	2	6
12"	16	14	9	5	3	9
14"	22	19	12	6	3	12
16"	29	25	16	8	4	16
18"	36	31	20	10	5	20
20"	45	39	24	13	6	24
22"	54	47	29	15	8	29
24"	64	56	35	18	9	35
28"	87	76	48	24	12	48
30"	101	87	55	28	14	55
36"	145	125	78	40	20	78
42"	197	171	107	55	27	107
48"	257	223	140	71	36	140



NOTES:

BEARING AREA OF CONCRETE THRUST-BLOCK BASED ON 200 PSI PRESSURE AND SAFE SOIL BEARING LOAD OF 2,000 POUNDS PER SQUARE FOOT.

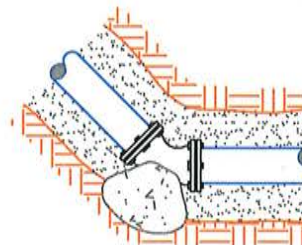
AREAS MUST BE ADJUSTED FOR OTHER PIPE SIZES, PRESSURES AND SOIL CONDITIONS.

CONCRETE BLOCKING SHALL BE CAST IN PLACE AND HAVE A MINIMUM OF 1/4 SQUARE FOOT BEARING AGAINST THE FITTING.

BLOCK SHALL BEAR AGAINST FITTINGS ONLY AND SHALL BE CLEAR OF JOINTS TO PERMIT TAKING UP OR DISMANTLING OF JOINT.

CONTRACTOR SHALL INSTALL BLOCKING ADEQUATE TO WITHSTAND FULL TEST PRESSURE AS WELL AS TO CONTINUOUSLY WITHSTAND OPERATION PRESSURE UNDER ALL CONDITIONS OF SERVICE.

MATERIAL SUBSTITUTIONS OR DETERMINATION OF EQUAL ARE AT THE SOLE DISCRETION OF LAKE CHELAN RECLAMATION DISTRICT.



A FOR 90° BEND
C FOR 45° BEND
D FOR 22-1/2° BEND
E FOR 11-1/4° BEND

TITLE

CONCRETE BLOCKING

STANDARD DOMESTIC DETAIL

SHEET

3 OF SET

DWG SCALE

NO SCALE



DRAWN BY R1A

09.17.20 DomesticDetails\concrete_blocking.dwg (REV B)

VERTICAL BLOCKING FOR 11-1/4°, 22-1/2°, 45° BENDS					
PIPE SIZE	VB	CU FT	S	d	L
4"	11-1/4°	8	2.0'	3/4"	1.5'
	22-1/2°	11	2.2'	3/4"	2.0'
	45°	30	3.1'	3/4"	2.0'
6"	11-1/4°	11	2.2'	3/4"	2.0'
	22-1/2°	25	2.9'	3/4"	2.0'
	45°	68	4.1'	3/4"	2.5'
8"	11-1/4°	16	2.5'	3/4"	2.0'
	22-1/2°	47	3.6'	3/4"	2.0'
	45°	123	5.0'	3/4"	2.0'
12"	11-1/4°	32	3.2'	3/4"	3.0'
	22-1/2°	88	4.5'	7/8"	3.0'
	45°	232	6.1'	3/4"	2.5'
16"	11-1/4°	70	4.1'	7/8"	3.0'
	22-1/2°	184	5.7'	1-1/8"	4.0'
	45°	478	7.8'	1-1/8"	4.0'
20"	11-1/4°	91	4.5'	7/8"	3.0'
	22-1/2°	225	6.1'	1-1/4"	4.0'
	45°	560	8.2'	1-1/4"	4.0'
24"	11-1/4°	128	5.0'	1"	3.5'
	22-1/2°	320	6.8'	1-3/8"	5.5'
	45°	820	9.4'	1-3/8"	4.5'

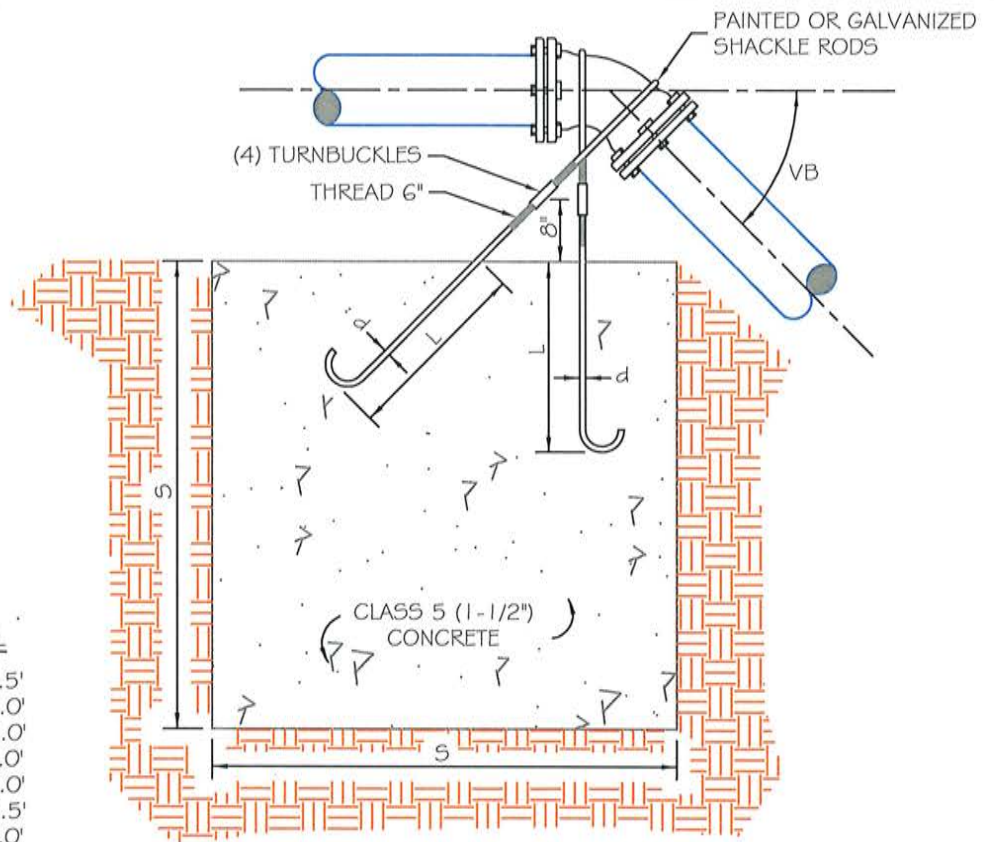
NOTES:

BEARING AREA OF CONCRETE THRUST-BLOCK BASED ON 200 PSI MAINLINE PRESSURE AND SAFE SOIL BEARING LOAD OF 2,500 POUNDS PER SQUARE FOOT.

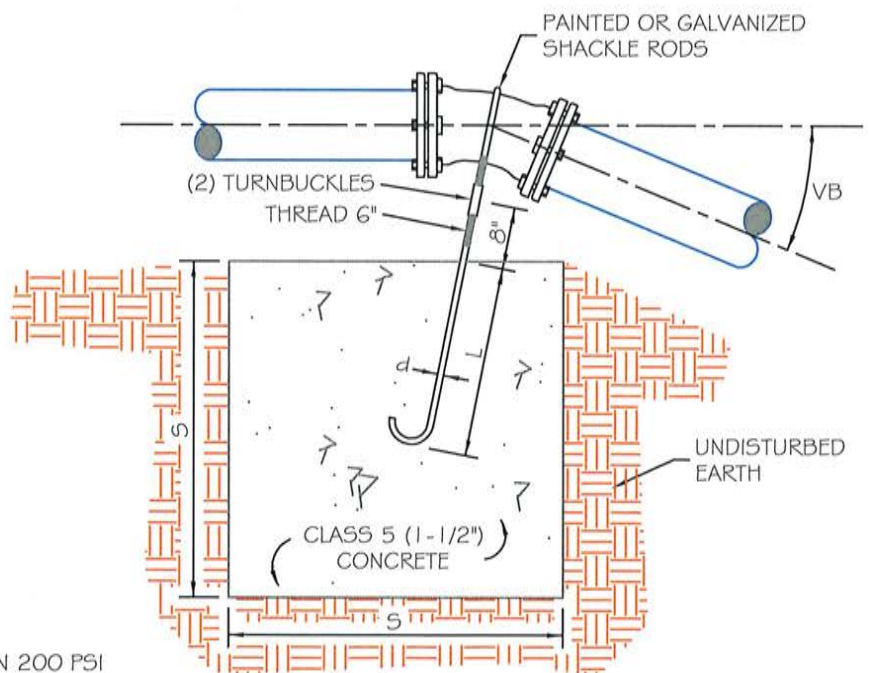
AREAS MUST BE ADJUSTED FOR OTHER PIPE SIZES, PRESSURES AND SOIL CONDITIONS.

CONTRACTOR SHALL INSTALL BLOCKING ADEQUATE TO WITHSTAND FULL TEST PRESSURE AS WELL AS TO CONTINUOUSLY WITHSTAND OPERATION PRESSURE UNDER ALL CONDITIONS OF SERVICE.

MATERIAL SUBSTITUTIONS OR DETERMINATION OF EQUAL ARE AT THE SOLE DISCRETION OF LAKE CHELAN RECLAMATION DISTRICT.



TYPE B BLOCKING - FOR
45° BENDS



TYPE A BLOCKING - FOR
11-1/4°, 22-1/2° BENDS

TITLE

CONCRETE BLOCKING
FOR VERTICAL BENDS

STANDARD DOMESTIC DETAIL

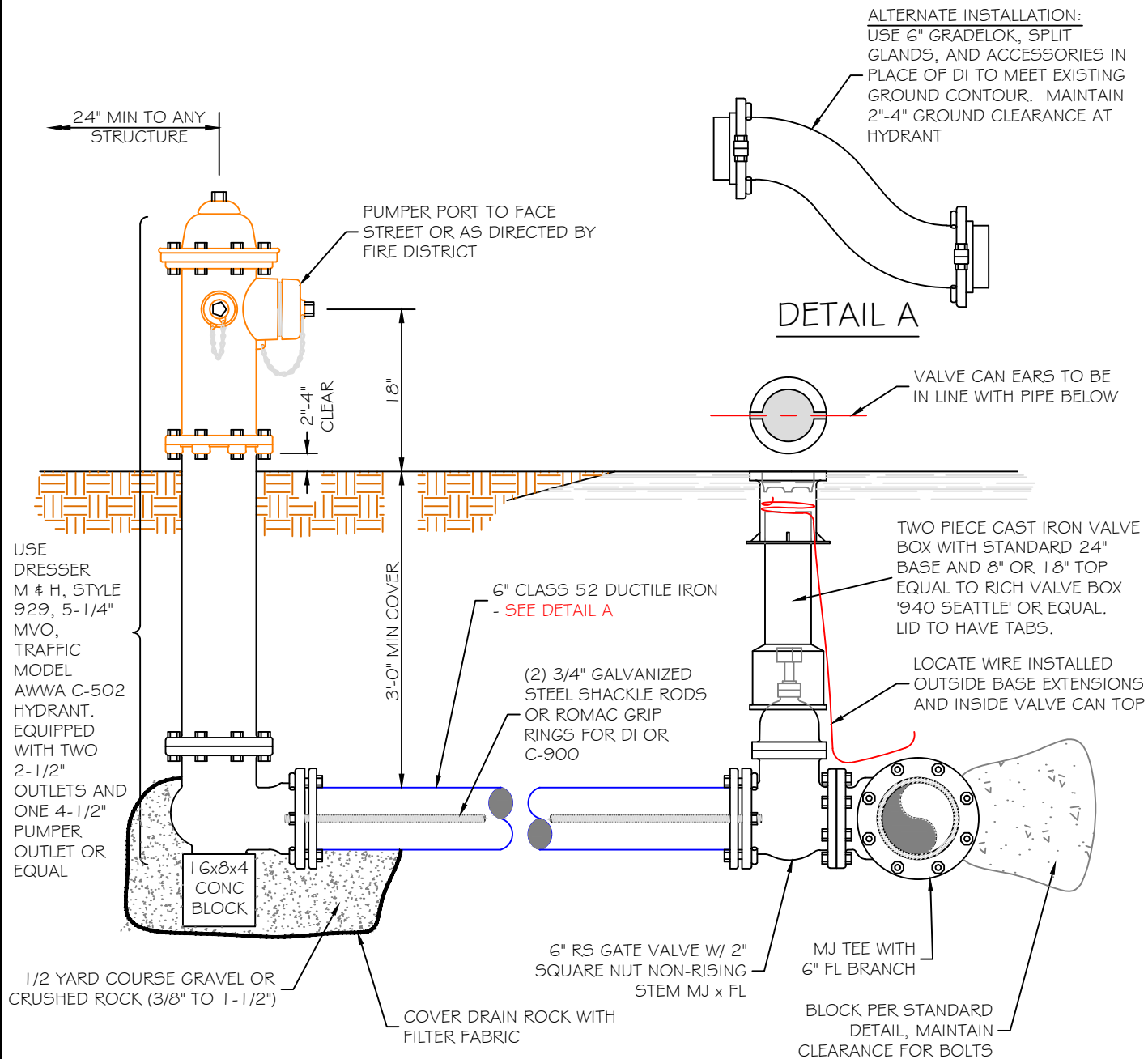
SHEET
4 OF SET

DWG SCALE
NO SCALE



DRAWN BY RIA

09.17.20 DomesticDetails\concrete blocking for vertical bends.dwg (REV B)



NOTES:
MATERIAL SUBSTITUTIONS OR DETERMINATION OF EQUAL ARE AT THE SOLE DISCRETION OF LAKE CHELAN RECLAMATION DISTRICT.

INSTALL HYDRANT GUARD POSTS PER STANDARD DETAIL.

TITLE

FIRE HYDRANT ASSEMBLY

STANDARD DOMESTIC DETAIL

SHEET

5 OF SET

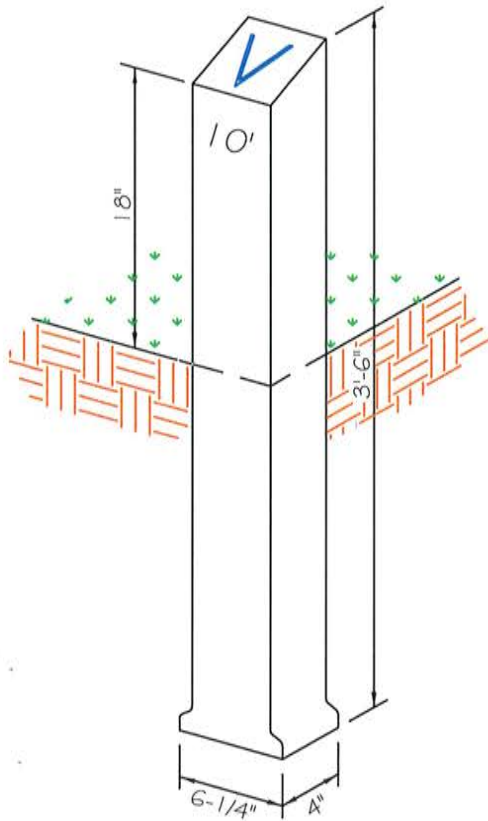
DWG SCALE

NO SCALE

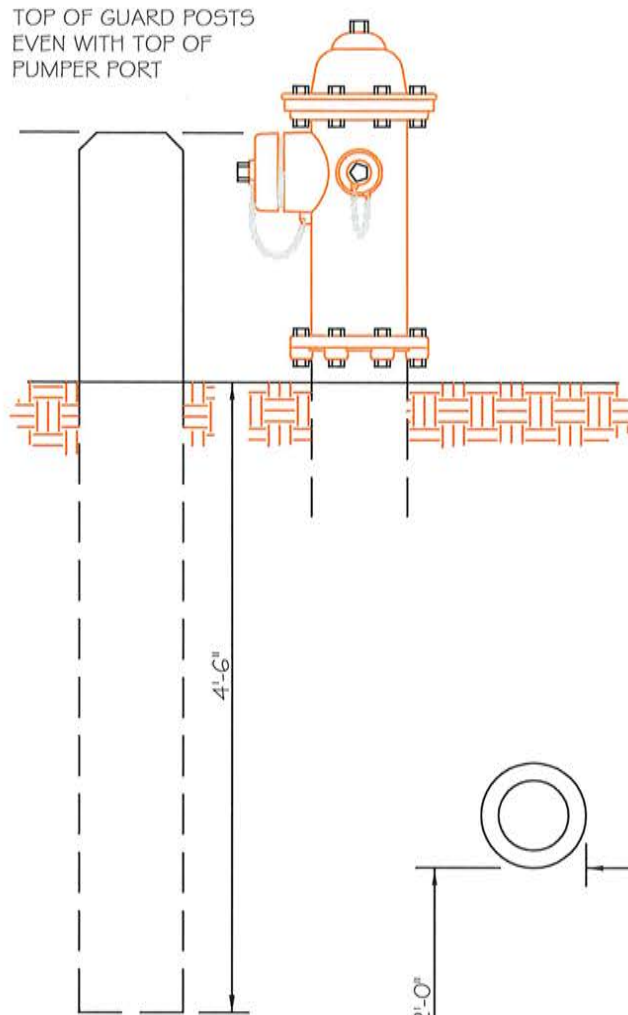


DRAWN BY RLA

12.17.20 DomesticDetailFireHydrant Assy.dwg (REV E)

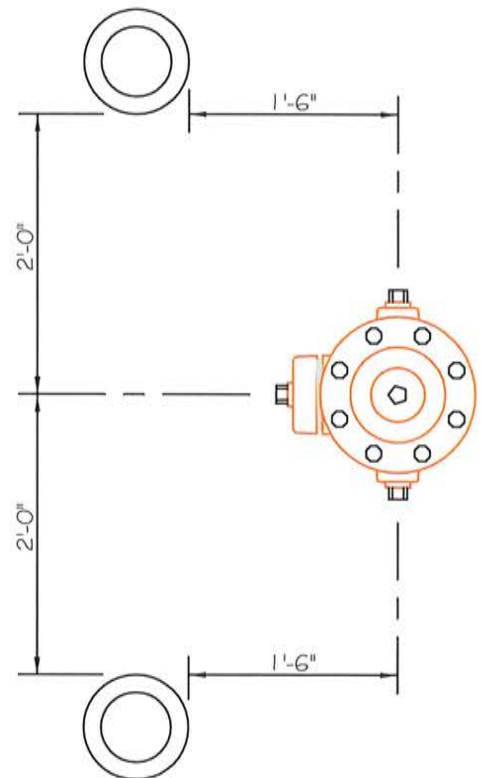


VALVE
MARKER
POST



ELEVATION

HYDRANT
GUARD
POSTS



PLAN

NOTES:

MATERIAL SUBSTITUTIONS OR DETERMINATION OF EQUAL ARE AT THE SOLE DISCRETION OF LAKE CHELAN RECLAMATION DISTRICT.

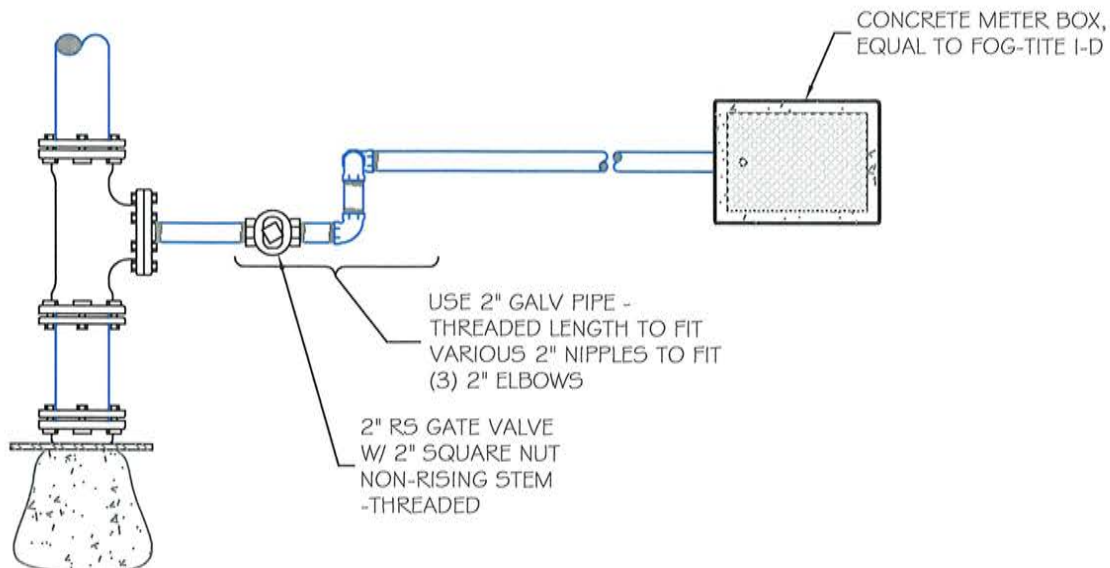
HYDRANT GUARD POST SHALL BE 6' LONG x 9" DIAMETER PRECAST CONCRETE POST OR 6' LONG x 6" DIAMETER FILLED DUCTILE IRON POSTS, PAINT WITH TWO COATS OF RUST-OLEUM NO. 2766-HI GLOSS WHITE PAINT.

VALVE MARKER POST SHALL BE EQUAL TO GREYSTONE PC 3.05 PAINT AS SPECIFIED FOR HYDRANT GUARD POST. PAINT DISTANCE FROM THE VALVE MARKER TO THE VALVE ON THE POST WITH BLACK ENAMEL PAINT.

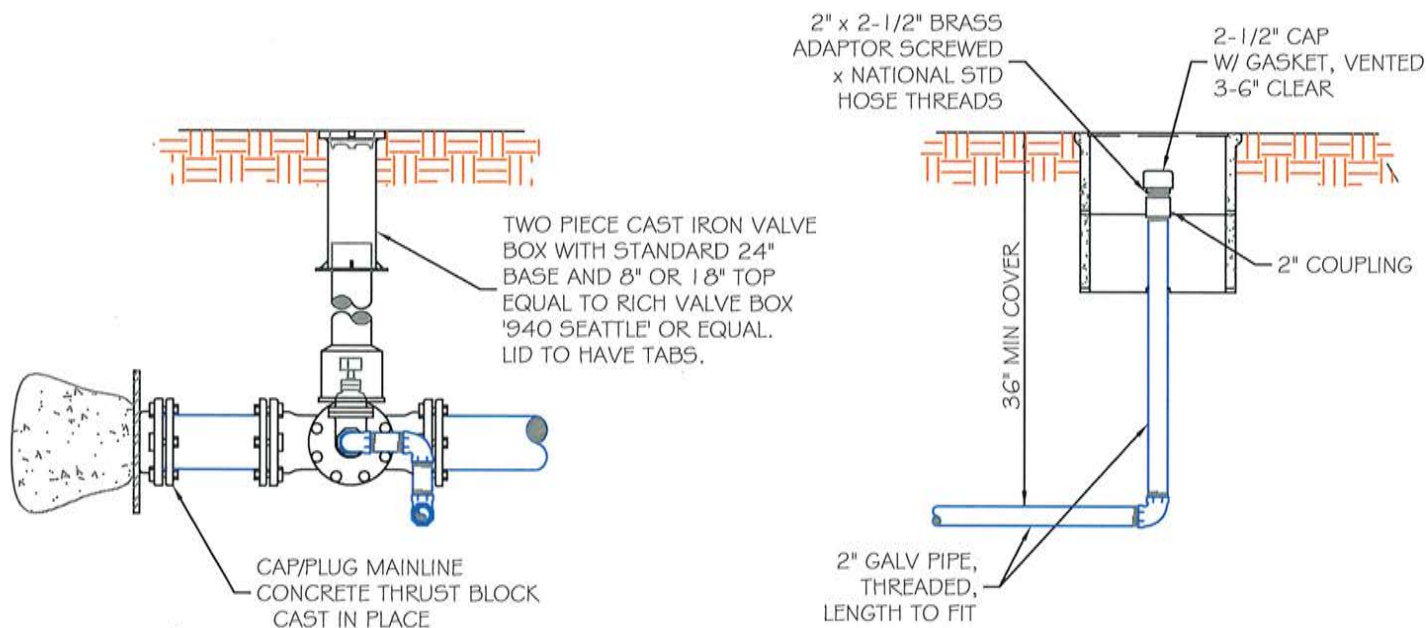
VALVE MARKER POST TO BE USED FOR ALL MAINLINE VALVES OUTSIDE PAVED AREAS.

TITLE	
FIRE HYDRANT GUARD POSTS & VALVE MARKER	
STANDARD DOMESTIC DETAIL	
SHEET	DWG SCALE
6 OF SET	NO SCALE





PLAN



PROFILE

NOTES:

MATERIAL SUBSTITUTIONS OR DETERMINATION OF EQUAL ARE AT THE SOLE DISCRETION OF LAKE CHELAN RECLAMATION DISTRICT.

PLASTIC METER BOXES CAN BE USED IN NON-TRAFFIC AREAS IN PLACE OF FOG-TITE I-D, USE BROOKS SERIES 1419.

INSTALL VALVE MARKER POST PER STANDARD DETAIL AND FIELD LOCATED ADJACENT TO METER BOX PAINTED TWO COATS OF RUSTOLEUM NO. 2766 WHITE.

ALL 2\" PIPE AND FITTINGS SHALL BE GALVANIZED IRON.

TITLE

(2\") BLOW-OFF
ASSEMBLY

STANDARD DOMESTIC DETAIL

SHEET

7 OF SET

DWG SCALE

NO SCALE

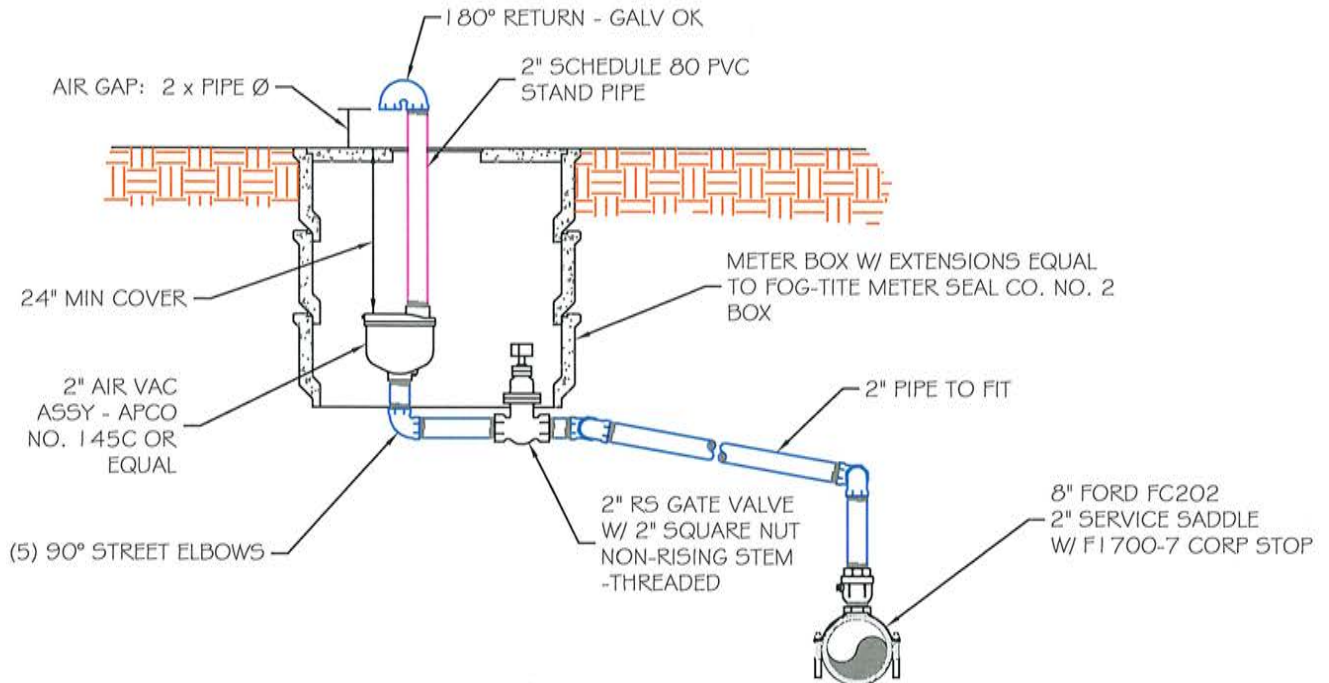


DRAWN BY RIA

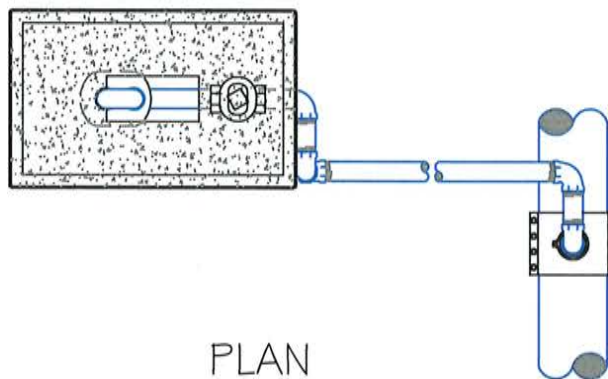
09.17.20 DomesticDetails\blow-off assembly.dwg (REV B)

NOTE:

AIR & VACUUM VALVE ASSEMBLY MUST BE INSTALLED AT HIGHEST POINT OF LINE. IF HIGH POINT FALLS IN A LOCATION WHERE ASSEMBLY CANNOT BE INSTALLED, PROVIDE ADDITIONAL DEPTH OF LINE TO CREATE HIGH POINT AT A LOCATION WHERE ASSEMBLY CAN BE INSTALLED.



PROFILE



PLAN

NOTES:

MATERIAL SUBSTITUTIONS OR DETERMINATION OF EQUAL ARE AT THE SOLE DISCRETION OF LAKE CHELAN RECLAMATION DISTRICT.

ALTERNATE OF A TAPPED CAST IRON COUPLING MAY BE INSTALLED IN THE MAIN.

VACUUM VALVE ASSEMBLY LOCATED IN STREET REQUIRES SPECIAL VAULT.

ALL 2" PIPE AND FITTINGS TO BE GALVANIZED IRON UNLESS OTHERWISE SHOWN.

TITLE

(2") AIR VACUUM
VALVE ASSEMBLY

STANDARD DOMESTIC DETAIL

SHEET

8 OF SET

DWG SCALE

NO SCALE



DRAWN BY RIA

09.17.20 I:\Domestic\Details\air vacuum vlv assy.dwg (REV C)

REDUCED PRESSURE DEVICE - WATTS
SERIES 909, FEBCO 825Y, OR EQUAL

LOCATED IN AN ABOVE GROUND AND
APPROVED ENCLOSURE ACCESSIBLE
FOR YEARLY TESTING BY A LICENCED
BACKFLOW DEVICE PROFESSIONAL -
SHALL NOT BE INSTALLED BELOW
GRADE



DOMESTIC SERVICE
BOOSTER PUMP

CUSTOMER
SERVICE LINE

RPD

MINIMUM 30psi
AT THE METER

LAKE CHELAN
RECLAMATION DISTRICT
DOMESTIC MAINLINE

DOMESTIC SERVICE
BOOSTER PUMP

RPD

REDUCED PRESSURE DEVICE
- WATTS SERIES 909, FEBCO
825Y, OR EQUAL

LOCATED IN AN ACCESSIBLE
PLACE FOR YEARLY TESTING
BY A LICENCED BACKFLOW
DEVICE PROFESSIONAL

MINIMUM 30psi
AT THE METER

CUSTOMER
SERVICE LINE

LAKE CHELAN
RECLAMATION DISTRICT
DOMESTIC MAINLINE

NOTES:

1. MATERIAL SUBSTITUTIONS OR DETERMINATION OF EQUAL ARE AT THE SOLE DISCRETION OF LAKE CHELAN RECLAMATION DISTRICT.
2. MAY BE INSTALLED IN A SEMI-BURIED PIT OR VAULT IF:
 - A. RELIEF VALVE IS INSTALLED ABOVE GROUND OR MAXIMUM FLOOD LEVEL
 - B. INSTALLED WITH APPROVED AIRGAP BETWEEN RELIEF VALVE VENT & TOP OF DAYLIGHT DRAIN
 - C. DRAIN MUST BE BORE SIGHTED TO THE DISCHARGE POINT ABOVE GROUND OR MAX FLOOD LEVEL - WHICHEVER IS HIGHER
 - D. DRAIN MUST BE ABLE TO HANDLE ALL WATER THAT COULD BE DISCHARGED FROM RELIEF VALVE
 - E. RPBA SHOULD NOT BE INSTALLED WHERE WATER DISCHARGED FROM ASSEMBLY WOULD BE OBJECTIONABLE

TITLE

BOOSTER PUMP SERVICE CONNECTION

STANDARD DOMESTIC DETAIL

SHEET

9 OF SET

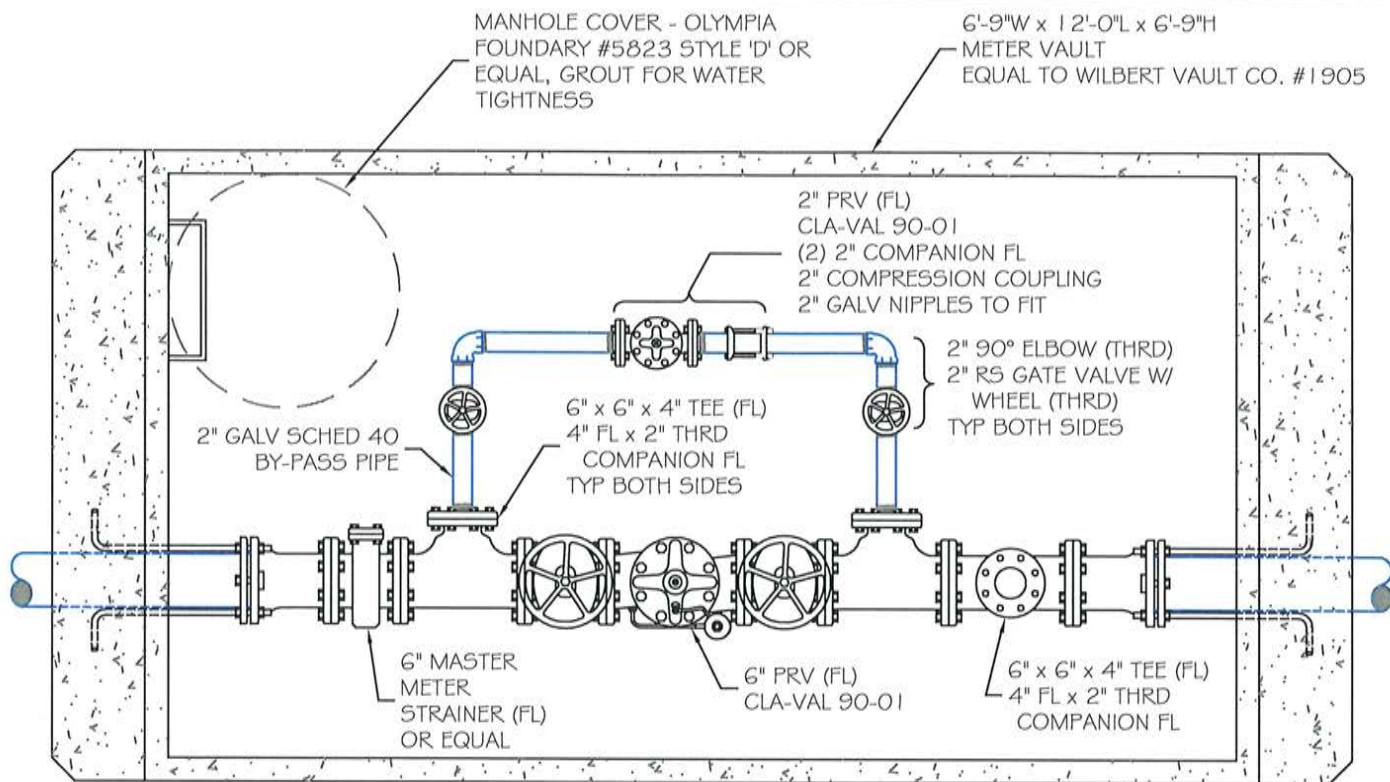
DWG SCALE

NO SCALE

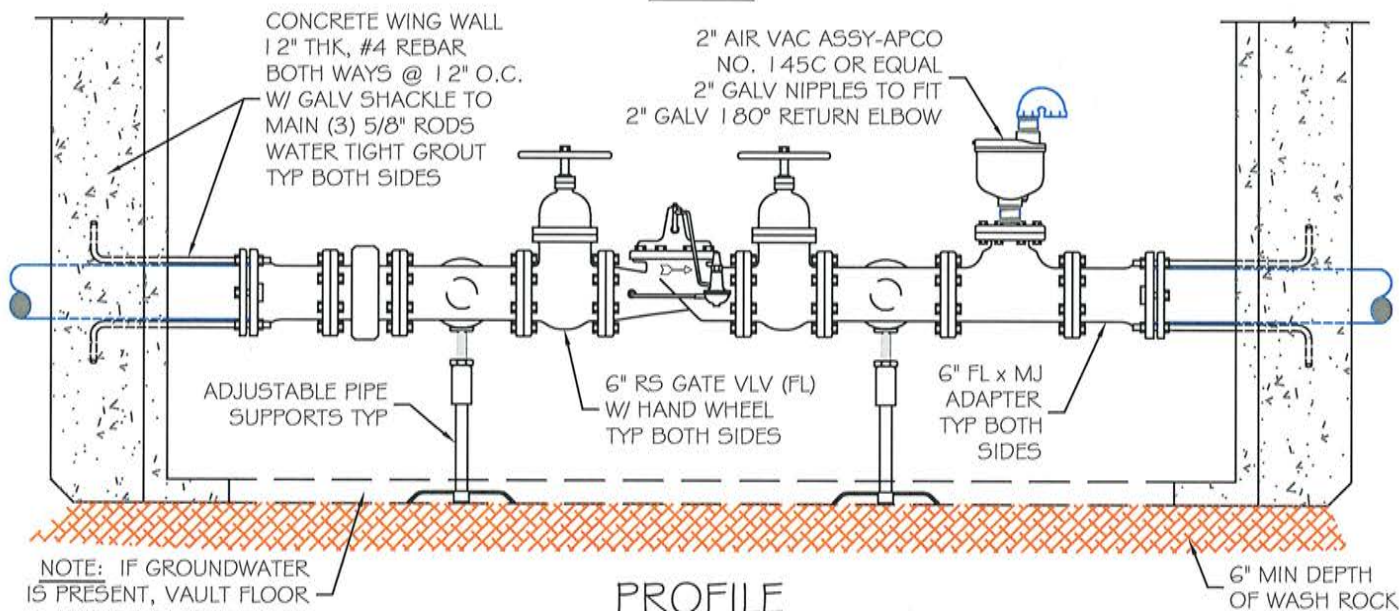


DRAWN BY RIA

09.17.20 DomesticDetails\booster pump service connection.dwg (REV B)



PLAN



PROFILE

NOTE:
MATERIAL SUBSTITUTIONS OR DETERMINATION OF EQUAL ARE AT
THE SOLE DISCRETION OF LAKE CHELAN RECLAMATION DISTRICT.

ALL 2" PIPE AND FITTINGS SHALL BE GALVANIZED IRON.

TITLE

(6") PRESSURE
REDUCING STATION

STANDARD DOMESTIC DETAIL

SHEET

10 OF SET

DWG SCALE

NO SCALE



DRAWN BY RIA

09.17.20 DomesticDetailpressure reducing station.dwg (REV B)

1. RESTRAINED JOINTS ARE PREFERRED IN MOST CASES, HOWEVER, THE DISTRICT WILL BE THE SOLE DETERMINER IF THE APPLICATION IS APPROPRIATE ON A GIVEN JOB. APPLICATIONS WHERE RESTRAINED JOINTS WOULD ALWAYS BE A REQUIREMENT WOULD INCLUDE:
 - 1.1. DEAD END MAINS THAT MAY BE EXTENDED IN THE FUTURE.
 - 1.2. SOILS NOT SUPPORTIVE OF THRUST BLOCKING OR INSUFFICIENT BEARING SOIL BEHIND FITTINGS (e.g. NEAR TOP OF A SLOPE).
2. MECHANICAL JOINT AND EXTERIOR BELL RESTRAINTS SHALL BE COATED WITH FUSION BONDED POLYESTER, OR ZINC & EPOXY COATING. EBAA MEGABOND, ROMAC ROMABOND, FORD ARMORGUARD E-COAT, OR APPROVED EQUAL.
3. TYLER TUFGRIP RESTRAINTS ARE NOT ALLOWED. SET-SCREW STYLE RESTRAINTS ARE NOT ALLOWED.
4. THE FOLLOWING TABLES ARE BASED ON EQUATIONS FROM THE DUCTILE IRON PIPE RESEARCH ASSOCIATIONS 2016 THRUST RESTRAINT DESIGN FOR DI AND PVC PIPE, WITH MODIFICATIONS OF SOIL PROPERTIES PER ASTM D2487. THE FOLLOWING CONDITIONS MUST BE MET FOR THESE RESULTS TO BE VALID. IF ANY OF THESE CONDITIONS CANNOT BE MET, PROJECT SPECIFIC CALCULATIONS MUST BE PROVIDED:
 - 4.1. PIPE LAYING CONDITION TYPE 4 or 5, DEFINED AS:
 - 4.1.1. SELECT GRANULAR BEDDING MATERIAL BELOW PIPE.
 - 4.1.2. PIPE ZONE MATERIAL EXTENDING TO TOP OF PIPE MECHANICALLY COMPACTED.
 - 4.2. PIPE RESTING DIRECTLY ON NATIVE TRENCH BOTTOM IS NOT ACCEPTABLE.
 - 4.3. BEDDING MATERIAL IS SANDY SILT. IF USING CLEAN SAND OR 5/8" MINUS CRUSHED SURFACING, LENGTHS MAY BE REDUCED BY 25%.
 - 4.4. DEPTH OF COVER IS 3.0 FEET MINIMUM. IF DEPTH IS 2.5 FEET AT TIME OF TESTING, MULTIPLY LENGTHS BY 120%.
 - 4.5. 200_{psi} TEST PRESSURE MAXIMUM. FOR OTHER PRESSURE, TABLE LENGTHS ARE MULTIPLIED BY THE PROPORTIONAL DIFFERENCE.
5. VERTICAL BENDS WITH THE FORCE DIRECTION UPWARDS ARE NOT COVERED HERE. MUST BE DESIGNED BY ENGINEER FOR EACH CASE.

THE LENGTH "L" GIVEN BELOW IS THE DISTANCE THAT PIPE MUST BE RESTRAINED PAST THE FITTING JOINT. ALL JOINTS WITHIN THIS DISTANCE MUST BE RESTRAINED, INCLUDING THE FITTING.

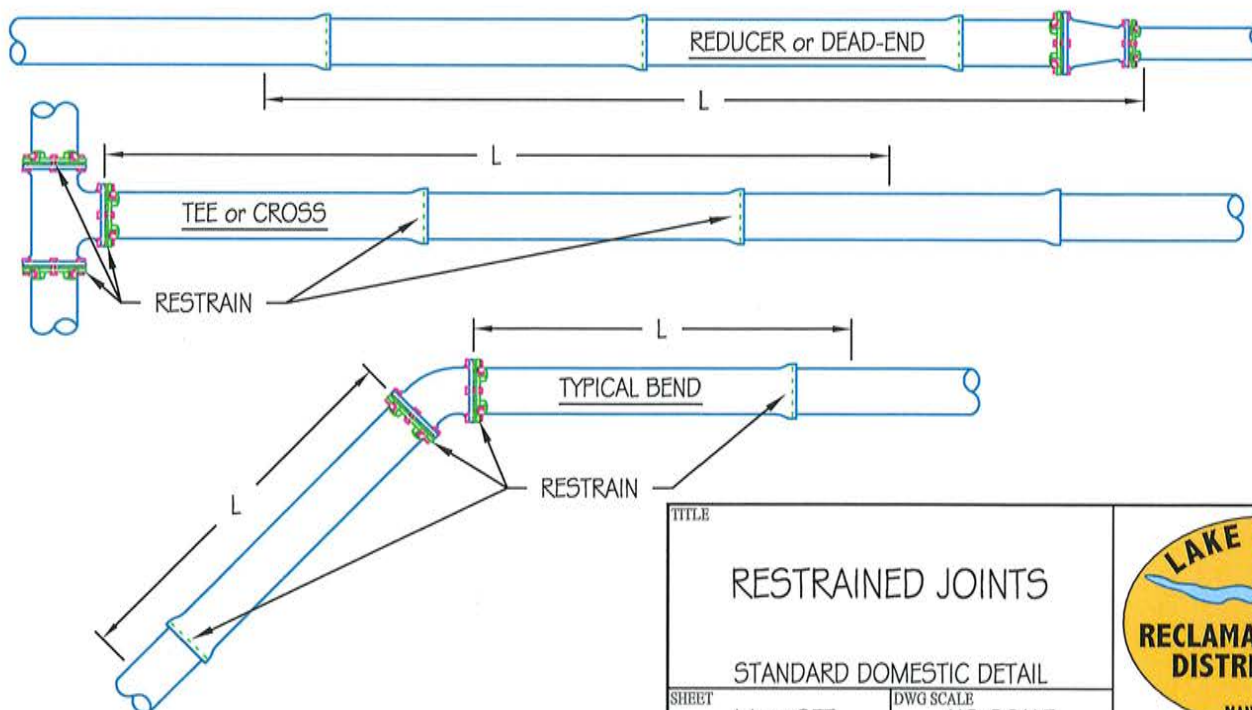
DIAMETER	1 1/4° BEND	22 1/2° BEND	45° BEND	90° BEND	DEAD END	REDUCER *
4"	3'	5'	10'	22'	65'	20'
6"	4'	7'	13'	32'	92'	62'
8"	5'	9'	17'	40'	119'	85'
10"	5'	10'	20'	48'	143'	88'
12"	6'	12'	23'	56'	168'	90'
16"	8'	14'	30'	70'	215'	92'
DI **	0.83x	0.83x	0.83x	0.83x	0.71x	0.71x

* Assumes reducer down 2 sizes. (example 12"x8"). Larger reductions shall be treated as a tee equal to the larger size.

** For Ductile Iron (DI) pipe, multiply the lengths by the value shown in the DI row.

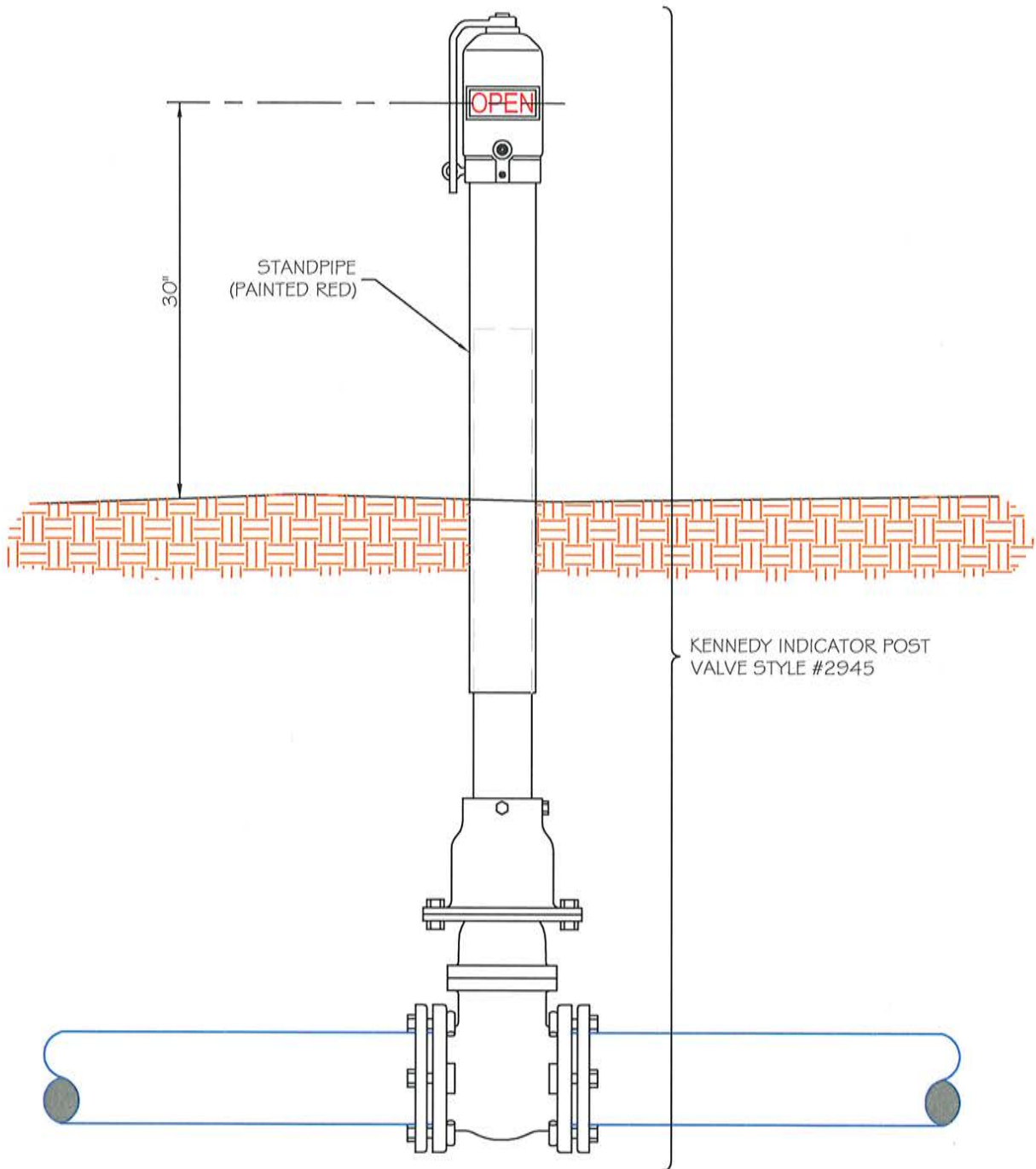
BRANCH REDUCING TEE TABLE (0.71x for DI)						
BRANCH DIAMETER	RUN DIAMETER					
	4"	6"	8"	10"	12"	16"
4"	48'	39'	31'	22'	13'	1'
6"	-	74'	68'	63'	56'	43'
8"	-	-	101'	96'	92'	82'
10"	-	-	-	125'	122'	118'
12"	-	-	-	-	150'	143'
16"	-	-	-	-	-	197'

Restrain all tee/cross legs with min 5' stick of pipe in each leg. "Bullhead" tees restrained per dead-end length for largest leg.



TITLE	
RESTRAINED JOINTS	
STANDARD DOMESTIC DETAIL	
SHEET	DWG SCALE
11 OF SET	NO SCALE





NOTES:
MATERIAL SUBSTITUTIONS OR DETERMINATION OF EQUAL ARE AT
THE SOLE DISCRETION OF LAKE CHELAN RECLAMATION DISTRICT.

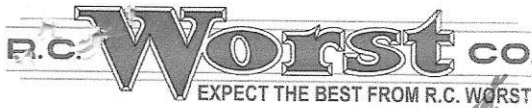
TITLE	
POST INDICATOR VALVE	
STANDARD DOMESTIC DETAIL	
SHEET	DWG SCALE
12 OF SET	NO SCALE



DRAWN BY RIA

03.29.01 \DomesticDetails\post indicator vlv.dwg (REV A)

APPENDIX K – PUMP CURVES



Lakeshore Intake Pump No. 1

SALES ORDER

R.C. Worst & Company Inc.
4101 E. Broadway
Spokane, WA 99202

Order Number: **50896**
Order Date: **1/17/2018**
Due Date: **4/26/2018**
Customer Number: **C302497**

BILL TO

Lake Chelan Reclamation District
PO Box J
Manson, WA 98831

SHIP TO

Lake Chelan Reclamation District
80 Wapato Way
Manson, WA 98831

Reference: **Lake Chelan Rec**

Employee: **Ray Koberstine**

Terms: **Net 30 Days**

Shipping Method:

Item Number	Description	Quantity	Units	Unit Price	Total
TMP	Hydroflo 12DC-6 Stg, 29.5' TPL, 8" discharge head, 100 hp	1.00	EA	\$19,156.00	\$19,156.00

HYDROFLO 12DC6C-30637-w_B1 12DC - 6 Stage W/L VERTICAL TURBINE PUMP ASSEMBLY

DRIVER ASSEMBLY SECTION

- GE 125HP, 1800RPM, 3PH/60Hz/460V, Premium Eff - Inverter Duty, L404TP16 Frame VHS-WP1 w/ NRR and 1.5" Drive Coupling
- Motor Type: Ultra WP1
- Motor CD = 36.94"
- Part Wind Start

DISCHARGE HEAD ASSEMBLY SECTION

- 1.5" x 42.94" x 416SS Head Shaft Assembly w/ 10TPI-LH Bronze Adjusting Nut and Key
- HF8 Ductile Iron Head with 8" 125# Discharge Flange
- 1.5" Cast Iron Packing Box Assembly w/ B10 C932 Bronze Bearing, John Crane
- #1345 Packing, Bronze Lantern Ring and SS Packing Gland

COLUMN ASSEMBLY SECTION

- 4 Piece Column Assembly: ~ 23.40' of 8" x .277" Wall x 9' 11-1/4" Steel Water Lubricated Column with Threaded Couplings
- Top 4' 11-1/4" Column
- Bottom 4' 11-1/4" Column
- 3 Pc(s): 8" x 2" x .75" 304SS Spiders w/ Rubber Inserts
- 3 Piece Lineshaft Assembly: 1.5" -10TPI x 120" x 416SS w/ 416SS Couplings
- Top Shaft: 1.5" -10TPI x 416SS w/ 416SS Coupling
- Lineshaft: 1.5" -10TPI x 416SS w/ 416SS Couplings

BOWL ASSEMBLY SECTION

- 12DC - 6 Stage Product Lubricated Bowl Assembly w/ 18-8 SS Fasteners including:
 - 8" Butt Thread, Ductile Iron Discharge Case with B10 C932 Bronze Bearing
 - Cast Iron Bowls
 - B10 C932 Bronze Bowl Bearings
 - 201SS Impellers with 3Cr13 Collets
 - 416SS Bowl Shaft: 8.00" Water Lube Projection x 1.5" DIA - 10 TPI
 - 8" NPT, Cast Iron Suction Case with B10 C932 Bronze Bearing
 - 304SS Bolt-On Basket Strainer
 - Crating and Painting
 - Min. Submergence from Bottom of Suction for Vortex Suppression = 25" (In.).
- **This does not include NPSHr requirements. NPSHr at Duty Point = 10.5' (Ft.).*

AR.FRT-IN FREIGHT-IN TAXABLE 3710.00 **Subtotal** **\$19,156.00**
\$0.30 \$1,113.00

509.534.5616

509.535.6539

info@rcworst.com

www.rcworst.com

Page 1 of 2

Company:

Name:

Date: 12/7/2017

Lakeshore Intake Pump No. 1

Hydroflo Pumps
Fluid Solutions™
A Taco Group Company

Pump:

Size: 12DC (6 stage)

Type: Vertical

Synch Speed: 1800 rpm

Curve: 12DC

Specific Speeds:

Dimensions:

Vertical Turbine:

Speed: 1760 rpm

Dia: 9.265 in

Impeller: 12CH SS ENCL

Ns: ---

Nss: ---

Suction: 8 in

Discharge: 8 in

Bowl Size: 11.6 in

Max Lateral: 0.812 in

Thrust K Factor: 5 lbf/ft

Search Criteria:

Flow: 650 US gpm

Head: 475 ft

Fluid:

Water

Density: 62.32 lb/ft³

Viscosity: 0.9946 cP

NPSHa: ---

Temperature: 68 °F

Vapor Pressure: 0.3391 psi a

Atm Pressure: 14.7 psi a

Motor:

Standard: NEMA

Enclosure: WP1

Size: 125 hp

Speed: 1800 rpm

Frame: 405T

Sizing Criteria: Max Power on Design Curve

Pump Limits:

Temperature: 140 °F

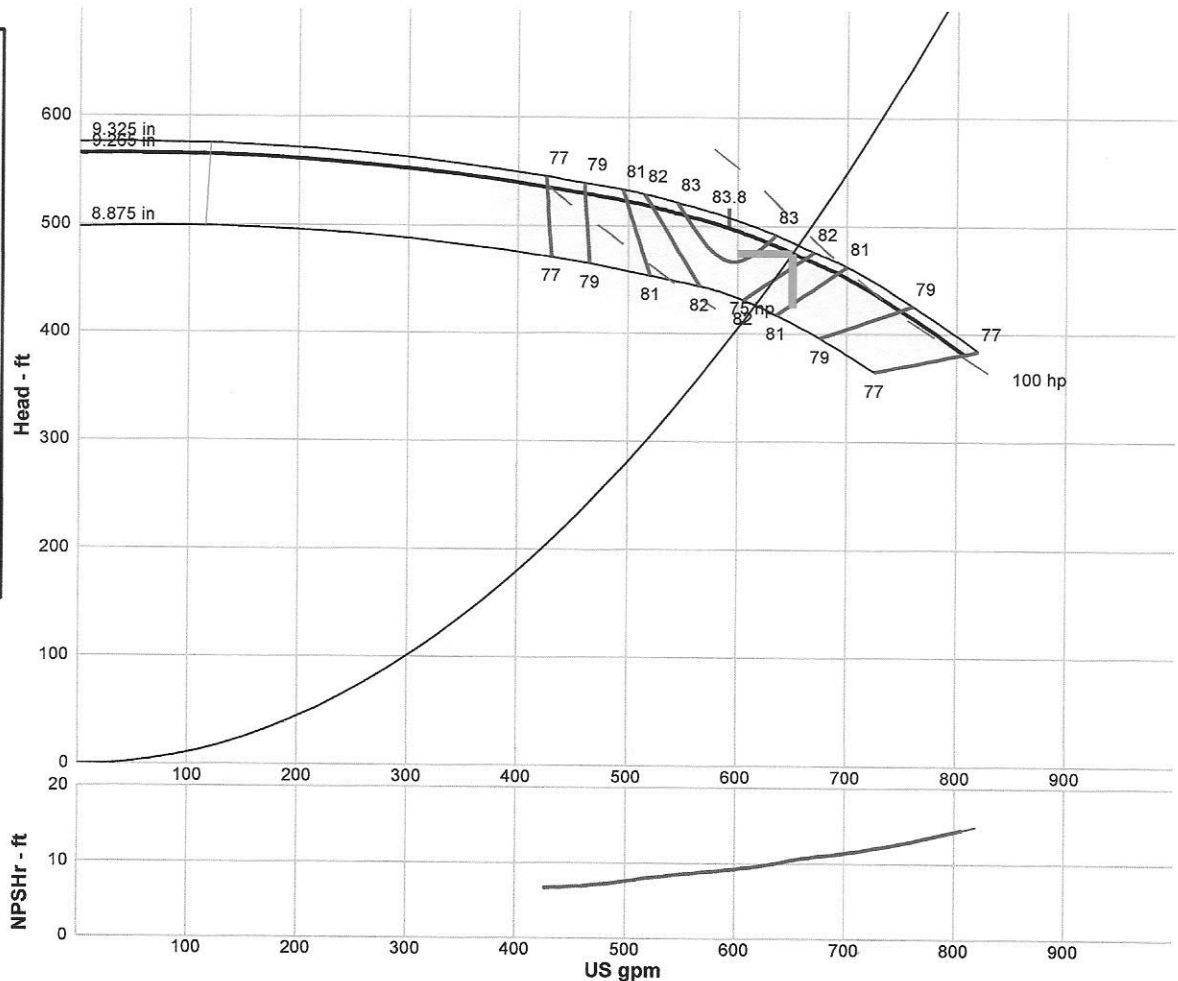
Pressure: 300 psi g

Sphere Size: 0.656 in

Power: 300 hp

Eye Area: ---

---- Duty Point ----	
Flow:	650 US gpm
Head:	475 ft
Eff:	82.3%
Power:	94.6 hp
NPSHr:	10.5 ft
---- Design Curve ----	
Shutoff Head:	566 ft
Shutoff dP:	245 psi
Min Flow:	118 US gpm
BEP:	83.8% @ 592 US gpm
NOL Power:	101 hp @ 749 US gpm
-- Max Curve --	
Max Power:	103 hp @ 760 US gpm

**Performance Evaluation:**

Flow US gpm	Speed rpm	Head ft	Efficiency %	Power hp	NPSHr ft
780	1760	400	77.9	101	13.7
650	1760	475	82.3	94.6	10.5
520	1760	518	81.9	83	8.09
390	1760	538	75	71.5	6.61
260	1760	548	67.5	59.5	6.07

**TPL and Total Column Lengths +/- 1.5"
All Dimensions In Inches

PROJECT SPECIFICATIONS

Date: 12/7/2017
Job:
Config #: C-30637-w
GPM: 650
Head FT: 475
Pump Model: 12DC - 6 Stage
Imp. Type: 12CH SS ENCL
Pump Materials: Cast Iron / 201SS
Bowl Bearings: B10 C932 Bronze
Bowl Shaft: 1.6875" 416SS
Strainer Type: 304SS Bolt-On Basket
Column: 8" x .277" wall
Lineshaft: 1.25" 416SS
Lineshaft Brgs: Rubber
Discharge Head: HF8 Ductile Iron Head
Discharge Flange: 8" 125# Discharge Flange
Seal Type: John Crane #1345 Packing
Head Shaft: 1.25" 416SS
Foundation Plate: N/A

Lakeshore Intake Pump No. 1

Minimum Submergence

Minimum Submergence from
bottom of suction for vortex
suppression: 25". *This does
NOT include NPSHr needs.

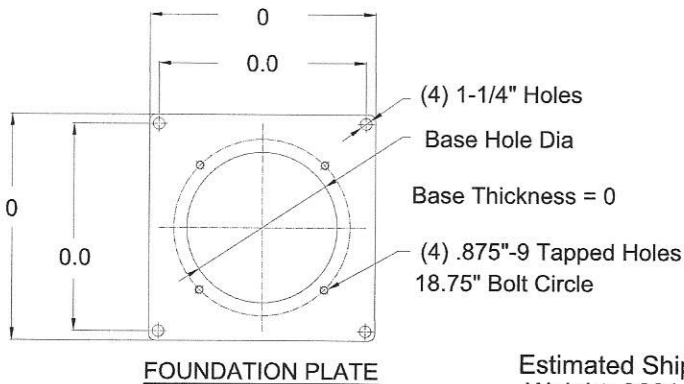
Column Piece(s)
Under Top Nipple
1pc. x 40.75

DRIVER INFORMATION

Mfr: GE
Enclosure: VHS-WP1
HP: 100
RPM: 1800
Phase/Volt: 3/460
Frame: L404TP16
Efficiency: Premium Eff - Inverter Duty
NRR or SRC: NRR

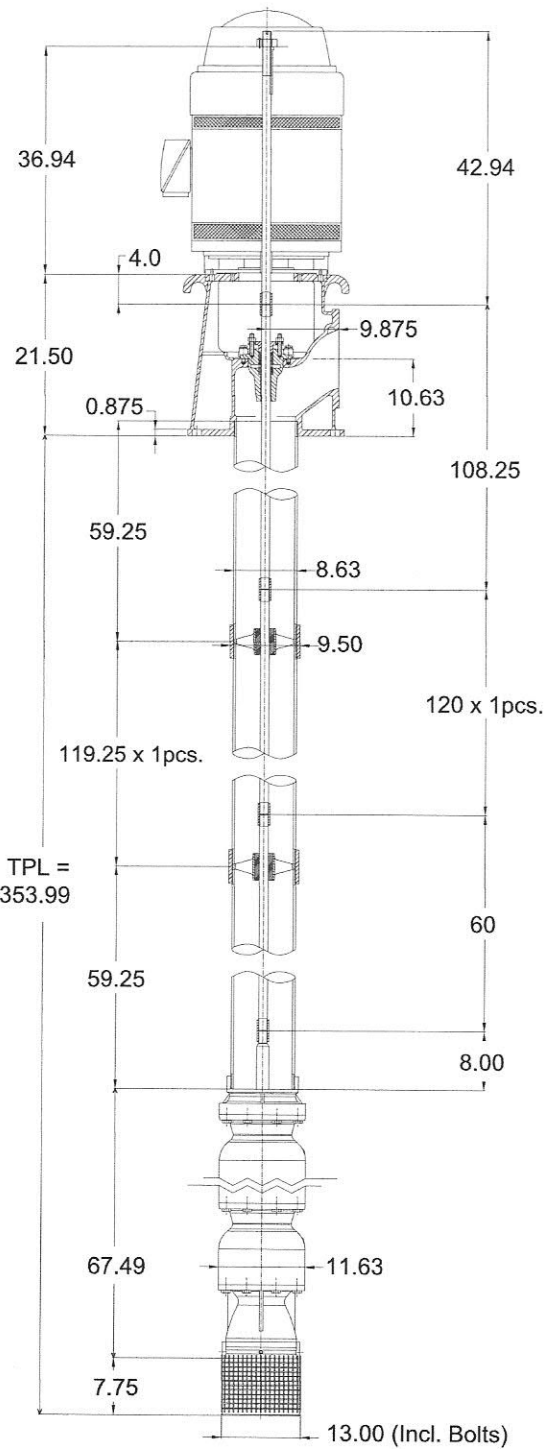
Column Note

The column
dimensions, on
this side, do not
include the
bearing spiders.



Estimated Shipping
Weight: 3601 Lbs.

NOT FOR CONSTRUCTION



NOTICE

This drawing is the confidential property of Hydroflo Pumps USA, Inc., a Taco Group Company and is furnished for your information only and must not be made public or copied and must be returned on demand. Manufacture of parts per this drawing is expressly forbidden except by written authorization from Hydroflo Pumps USA, Inc., a Taco Group Company. All rights of design and invention are reserved and patents pending.

HydrofloPumps
Fluid Solutions™
A Taco Group Company

HYDROFLO PUMPS USA, INC.
7118 LOBLOLLY PINE BLVD.
FAIRVIEW, TN 37062
PHONE: 615.799.9662
FAX: 615.799.5654

12DC - 6 Stage Water Lube Vertical Turbine Pump System

REV	DATE	REVISION	CH
-----	------	----------	----

REFERENCE	HYDROFLO PUMPS INC. WORK ORDER NO.
-----------	---------------------------------------

PUMP S.N.	NO. REQD:	Qty
-----------	-----------	-----

MATERIAL: NOTED

CUSTOMER P.O. NO.

DR BY: Config DATE: 12/7/2017

CK BY: DATE:

General Arrangement
Design Specifications

DWG. NO.

SHT.

REV.

Selection list: ---

Search Criteria:

Flow: 1175 US gpm
Head: 447 ft
Tolerance: --- % of head

Fluid: Water

Temperature: 60 °F
SG: 1
Viscosity: 1.105 cP
Vapor pressure: 0.2563 psi a
Atm pressure: 14.7 psi a

NPSHa: --- ft

Advanced Criteria:

Preferred Operating Area: ---
Secondary Operating Point: ---
Max temperature: --- °F
Max suction pressure: --- psi g
Max sphere size: --- in
Max power: --- bhp
Max suction specific speed: --- (Nss)
Min trim: --- % of max diameter
Min head rise: --- % to shutoff

Curve Corrections: none

**Lakeshore Intake
Pump No. 2**

Catalog: 60CY VERS 1

Pump: E12MC (7 stages)
Type: VERT.TURBINE
Synch speed: 1800 rpm
Speed: 1770 rpm
Dia: 9.5394 in
Curve no.: CVE12M4P6CY

Specific Speeds

Ns: 2507 Nss: 2353

Dimensions:

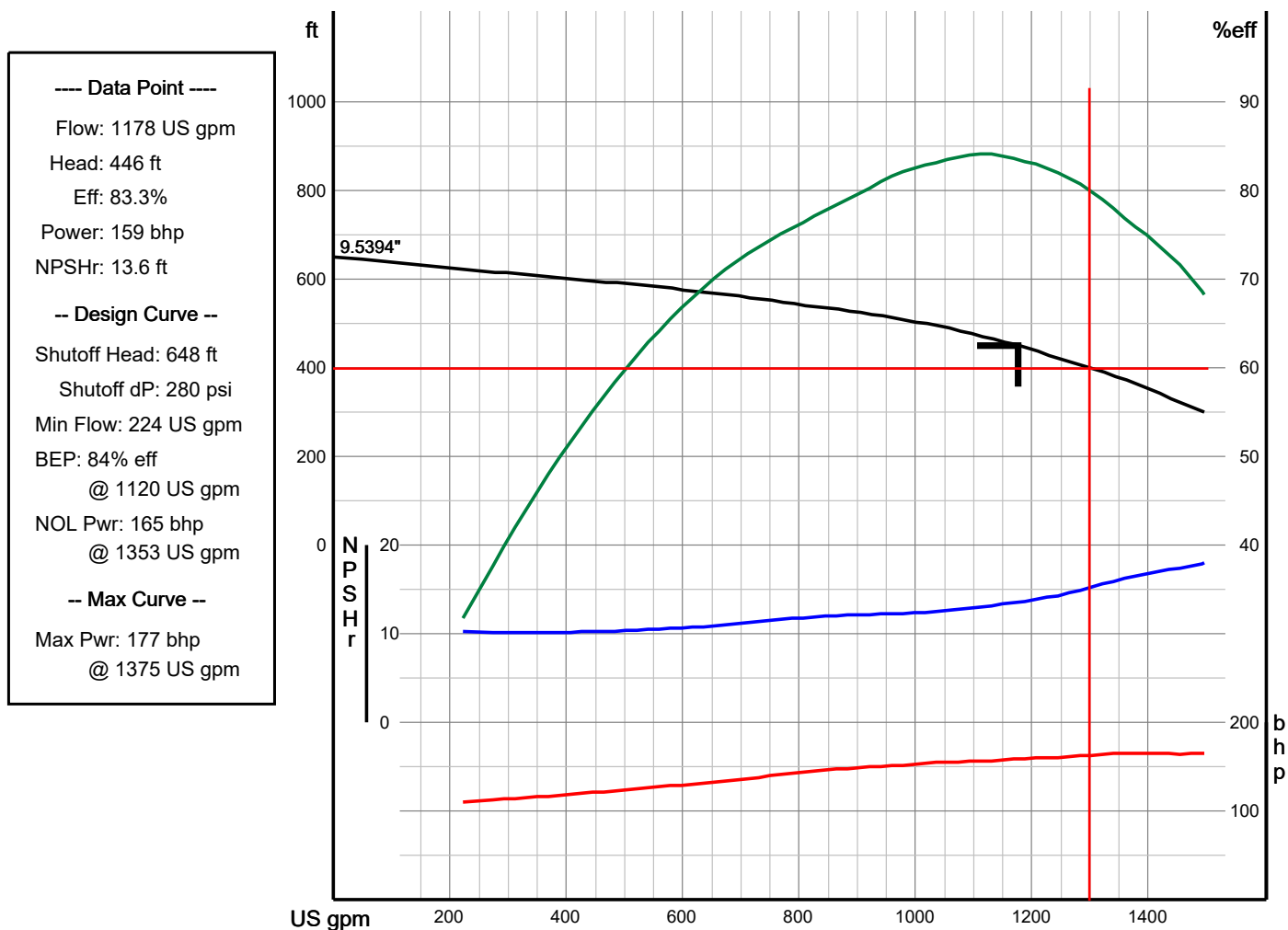
Suction: 8 in Discharge: 8 in

Pump Limits:

Temperature: 180 °F
Pressure: 377 psi g
Sphere size: 0.63 in
Power: --- bhp

Motor: 200 hp

Speed: 1800
Frame: 445T
Standard: NEMA
Enclosure: ODP
Sizing criteria: Max Power on Design Curve



National Pump
Bill Guin
PUMPTECH-ED SMITH

PUMP DATA SHEET
National Pump Company

10/05/04

Selection list: ---

Catalog: 60CY VERS 1

Pump: E12MC (7 stages)

Performance Evaluation:

Flow US gpm	Speed rpm	Head ft	Pump %eff	Power bhp	NPSHr ft	Motor %eff	Motor kW	Hrs/yr	Cost /kWh
1410	1770	343	73.7	165	16.9				
1175	1770	447	83.3	159	13.6				
940	1770	515	80.8	151	12.2				
705	1770	557	72.3	137	11.2				
470	1770	589	53.2	124	10.6				

**Lakeshore Intake
Pump No. 2**

Lakeshore Intake Pump No. 2

PUMP DATA SHEET National Pump Company

PUMP-FLO ver: 6.04
11/15/04

Selection file: (untitled)

Catalog: 60CY.CBP v 1

Curve: CVE12M4P6CY

Design Point: Flow: 1175 US gpm
Head: 447 ft

Pump: VERT.TURBINE - 1800 **Size:** E12MC (7 stages)
Speed: 1770 rpm Dia: 9.5394 in

Limits: Temperature: 180 °F Sphere size: 0.63 in
Pressure: 377 psi_g Power: --- bhp

Specific Speed: Ns: 2507 Nss: 2353

Dimensions: Suction: 8 in Discharge: 8 in

Motor: 200 hp Speed: 1800 Frame: 447T
NEMA Standard TEFC Enclosure
sized for Max Power on Design Curve

Fluid: Water

Temperature: 60 °F

SG: 1

Viscosity: 1.122 cP

Vapor pressure: 0.2568 psi_a

Atm pressure: 14.7 psi_a

NPSHa: --- ft

Piping:

System: ---

Suction: --- in

Discharge: --- in

---- Data Point ----

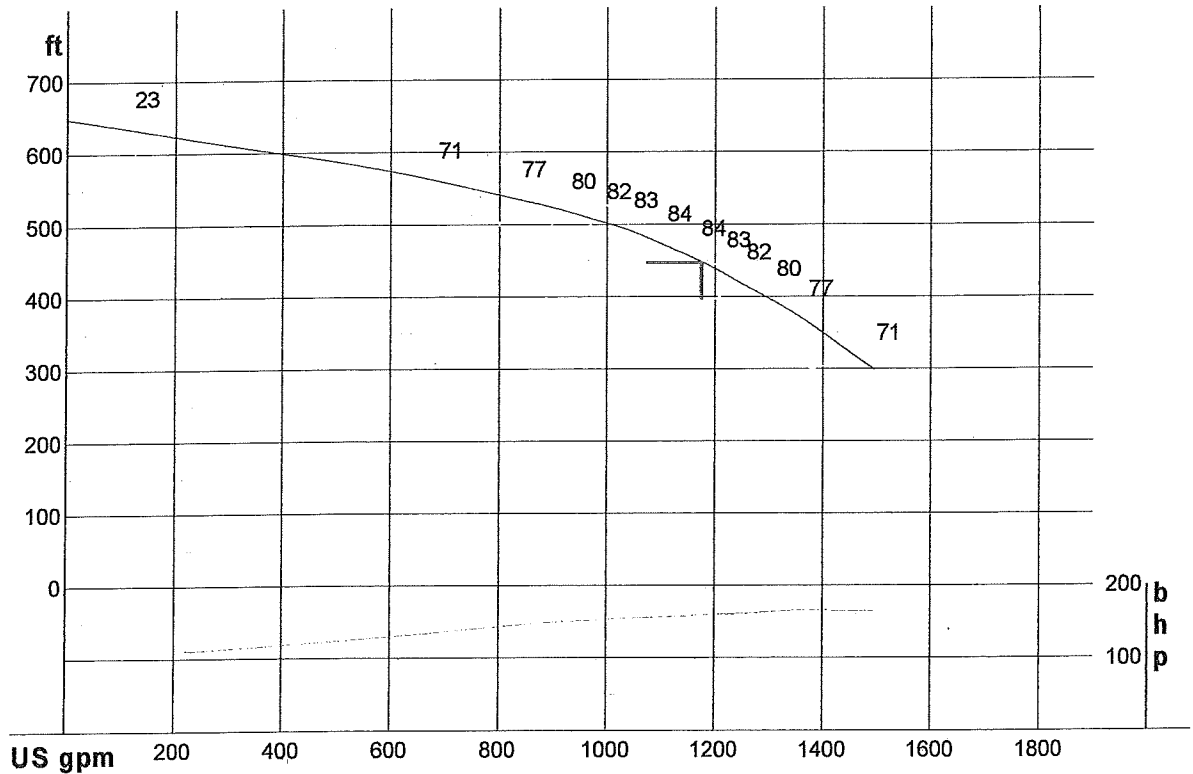
Flow: 250 US gpm
Head: 617 ft
Eff: 34%
Power: 112 bhp
NPSHr: 18.2 ft

-- Design Curve --

Shutoff Head: 648 ft
Shutoff dP: 281 psi
Min Flow: 224 US gpm
BEP: 84% eff
@ 1120 US gpm
NOL Pwr: 166 bhp
@ 1353 US gpm

-- Max Curve --

Max Pwr: 177 bhp
@ 1375 US gpm



--- PERFORMANCE EVALUATION ---

Flow	Speed	Head	Pump	Power	NPSHr	Motor	Motor	Hrs/yr	Cost
US gpm	rpm	ft	%eff	bhp	ft	%eff	kW		/kWh
1410	1770	343	73.7	165	38.8				
1175	1770	447	83.3	159	26.2				
940	1770	515	80.8	151	21.3				
705	1770	557	72.3	137	19.3				
470	1770	589	53.2	124	18.6				

Lakeshore Intake Pump No. 2

BOWL ASSEMBLY

INCHES

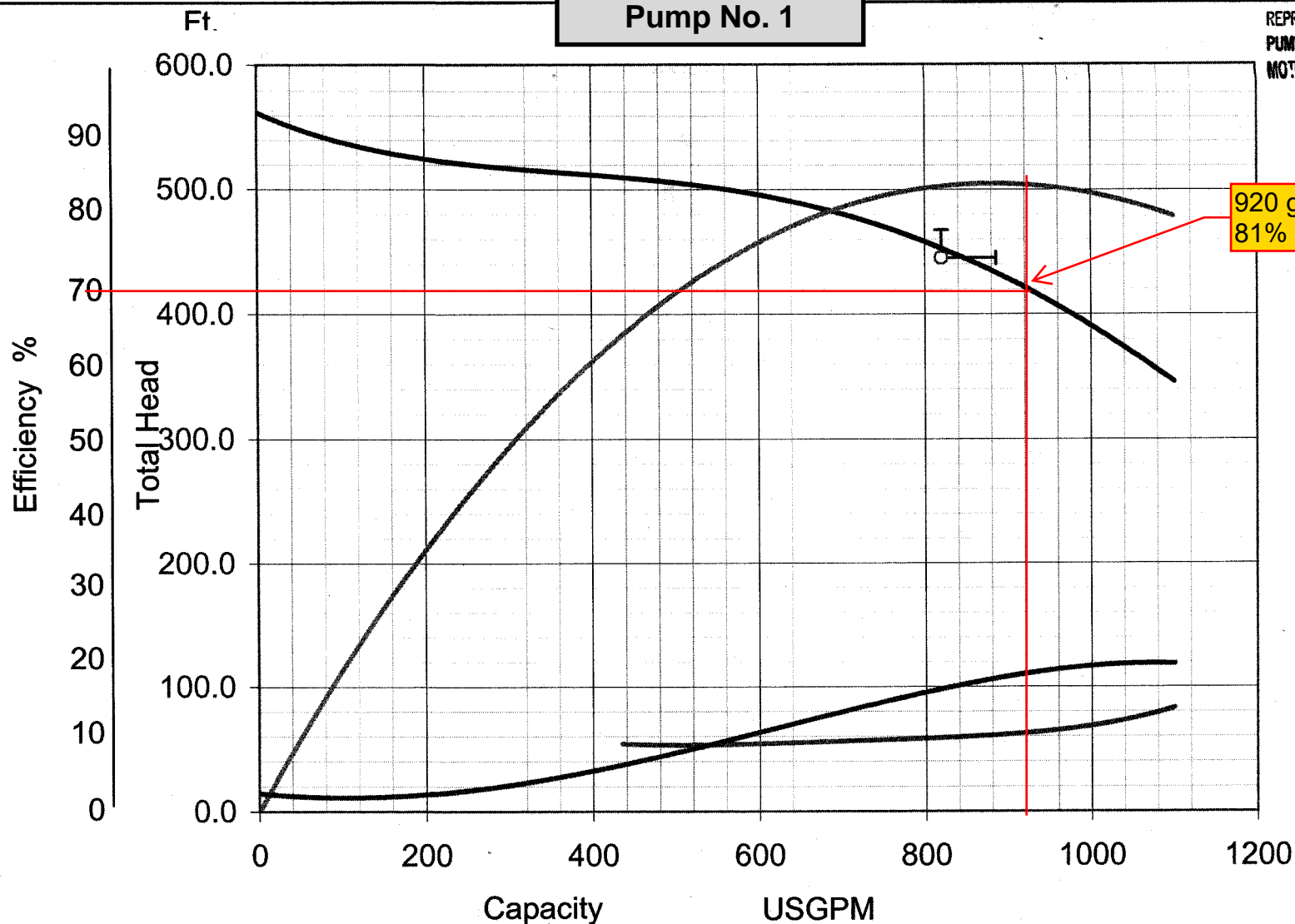
1	MODEL SELECTION	E12BELL	ie, J11SCT, J11BELL, M14BELL (SCT= THD'D CASE)	
2	NUMBER STAGES	7	BOWLS	73.50
	SUCTION TYPE/REF POINT	BELL/LIP	OAL REF.TO BOTT SCT, BELL LIP OR BELL HUB)	7.25
4	STRAINER TYPE	BASKET	(BASKET, THDBASKET, OR NONE)	10.06
5	DISC. TYPE	ADPT	(BUTT,TAPER ,ADPT OR NONE)	1.56
6	Bwl shaft proj.	16		16
			BOWL ASSEMBLY OVERALL LENGTH	92.37
HEAD ASSEMBLY				
7	Total Head Height (THH)	27.5		27.5
8	Head Box Plate (HTP)	17.75		17.75
9	BASE PLATE	0	Plate thickness or "0" if not used	0.00
10	Motor Shaft Proj (MSP)	3.25		3.25
11	MOTOR CD	44.75		44.75
COLUMN ASSEMBLY				
12	COL DIA	8		
13	COL TYPE	THD	ENTER (THD OR FLG)	
14	TCF TYPE	N8260	ENTER N420, HP16X10 OR NONE	2.00
15	SHAFT SIZE	1.000	NUT	1.50
PUMP OVERALL LENGTH				
16	OAL OF PUMP	348	Base To Bott. Of Strainer	348.00
REFERENCE DATA				
			"D" Dimension(For Bwl shaft Lgth.Calculation)	9.56
			TOTAL HD HEIGHT (THH)	27.50
			MTR SHAFT PROJ (MSP)	3.25
			TOP COL FLG LGTH	2.00
			BRG RET THICKNESS	0.75
CALCULATED DATA				INCHES
	BWL SHFT LGTH			100.620
	HD SHFT LGTH			49.500
	TOTAL COL LGTH		(INCLUDES TCF, IF USED)	255.628
	COL LGTH MINUS TCF		COL LGTH MINUS TCF	253.628
	TOTAL LINESHFT LGTH			263.878
COL CALCULATION				
	INPUT COL LGTHS		No. Pcs	Lengths
17	TOP COL	24.000	1	24
18	BOTT COL	47.000	1	47
19	col #3	119.250	1	119.250
20	col #4	59.25	1	59.250
21	col #5	0	0	0.000
	TOTAL COL JOINTS		4	
	TOTAL BRG RETAINERS		3	2.250
	TOP COL FLG LGTH			2.00
	TOTAL COL ASSY LGTH			253.750
THIS MUST MATCH TOTAL COL LGTH IN CALCULATED DATA SECTION				253.750
SHAFT CALCULATION				
	INTERMEDIATE LINESHAFT	60		60.000
24	INTERMEDIATE LINESHAFT	120		120.000
25	BOTTOM LINESHAFT	47.75		47.750
	TOP LINESHAFT	36		36.000
	TOTAL LINESHAFT			263.750

THIS MUST MATCH TOTAL COL LGTH IN CALCULATED DATA SECTION R7/29/04 BG

Manson Intake Pump No. 1

I CERTIFY THAT WITHIN THE ACCURACY
OF TEST INSTRUMENTATION THIS TEST
REPRESENTS THE PERFORMANCE OF
PUMP # 0501SN062199-01
MOTOR # 130101611-03

Benny Bony



BHP
1.00
SpGr Ft.
Power NPSHR
125 20
100 10
75 0

This pump is guaranteed to deliver:

820 USGPM	445 Ft.	81% Efficiency
-----------	---------	----------------

This curve shows the expected heads and efficiencies at other flows but this data is approximate only and not guaranteed.

FLOWSERVE

MODEL	12EMM-7
Speed	1750
Curve Number	
0501SN062199-01	



**Manson Intake
Pump No. 1**

Test No: 0501SN062199-01
Job No: N062199

SUBMERSIBLE PUMP TEST DATA

CUSTOMER: Pumptech

DESIGN CONDITIONS: FLOW GPM: 820 HEAD FT: 445

PUMP DESCRIPTION: MODEL: 12EMM-7 #STAGES 7
IMP. MATERIAL: Bronze IMP. DIA: 8.94
BOWL MAT: Cast Iron IMP UNDERFILE: Std

TEST MOTOR: MODEL: MI10-740-4 SERIAL #: 130101611-03
HP: 125 Volts / Ph / Hz: 480/3/60
Full Load AMPS: 167 Full Load RPM: 1750

MEASURED RESULTS

<u>FLOW</u> <u>(gpm)</u>	<u>HEAD</u> <u>(FT)</u>	<u>BHP</u>	<u>BOWL EFF %</u>	<u>P.F.</u>	<u>Wire-to-Water Eff</u>
0	562	81	0		0
304	518	85	47	0.730	41
435	507	89	63	0.745	55
592	496	102	73	0.777	64
742	474	112	80	0.795	70
822	452	116	81	0.800	71
888	430	119	81	0.802	71
1100	346	124	77	0.808	68

TESTED BY: Barry Gray

NAME

DATE: 02/02/05

DATE

SIGNATURE

Motor **MI10-740-4**

Serial No. **130101611-04**

Order No. **130101611**

**Manson Intake
Pump No. 1**

145 hp

Nominal Data Motor

Output	P_N	[kW]	108	Frequency	f	[Hz]	60	Direction of rotation	cw
Voltage 1	U_1	[V]	480	Speed	n	[min ⁻¹]	1740	Connection	Delta
Voltage 2	U_2	[V]	-	Power factor	$\cos\varphi$	[-]	0,790	Starting method	DOL
Current	I	[A]	189	Efficiency	η	[-]	0,870		
Winding resistance, cold (mean)	$R_{mean, K}$	[Ω]	0,1441	Test cable			7,5m 4 Rd 1x25mm ² P		
Winding resistance, warm (mean)	$R_{mean, W}$	[Ω]	0,1489	Signal cable					
Ambient temperature, cold	$\theta_{W, K}$	[°C]	20,2	Insulation resistance, cold	$R_{iso, K}$	[MΩ]	1234		
Ambient temperature, warm	$\theta_{W, W}$	[°C]	20,3	Insulation resistance, warm	$R_{iso, W}$	[MΩ]	512		
Temperature rise (mean)	Θ_{mean}	[K]	8,4	High-voltage test (1 min)	U_{HV}	[kV]	2		

Measured Data

Test-point	Voltage	Current phase 1	Current phase 2	Current phase 3	Diff. phase currents	Mean current	Power input	Frequency	Ambient temp.	Ambient temp. air	Temp. filling liquid 1	Temp. filling liquid 2
No.	U	I_{L1}	I_{L2}	I_{L3}	Diff. I	I	P_{in}	f	θ_W	θ_L	θ_{F1}	θ_{F2}
	[V]	[A]	[A]	[A]	[%]	[A]	[kW]	[Hz]	[°C]	[°C]	[°C]	[°C]
1	181,5	15,86	15,72	15,93	0,7	15,84	1,776	60,64	20,3	21,2	0,0	0,0
2	212,6	17,80	17,81	17,89	0,3	17,84	1,867	60,64	20,3	21,2	0,0	0,0
3	231,9	19,26	19,26	19,34	0,3	19,28	1,925	60,63	20,3	21,2	0,0	0,0
4	251,7	20,82	20,85	20,93	0,3	20,87	1,999	60,63	20,3	21,2	0,0	0,0
5	347,0	30,72	30,81	31,04	0,6	30,86	2,446	60,65	20,3	21,2	0,0	0,0
6	405,9	41,92	42,14	42,47	0,7	42,18	2,972	60,66	20,3	21,2	0,0	0,0
7	465,9	65,55	64,19	66,05	1,7	65,26	4,130	60,64	20,3	21,2	0,0	0,0
8	507,9	95,07	89,55	94,36	3,8	92,99	5,924	60,61	20,3	21,2	0,0	0,0

Evaluation

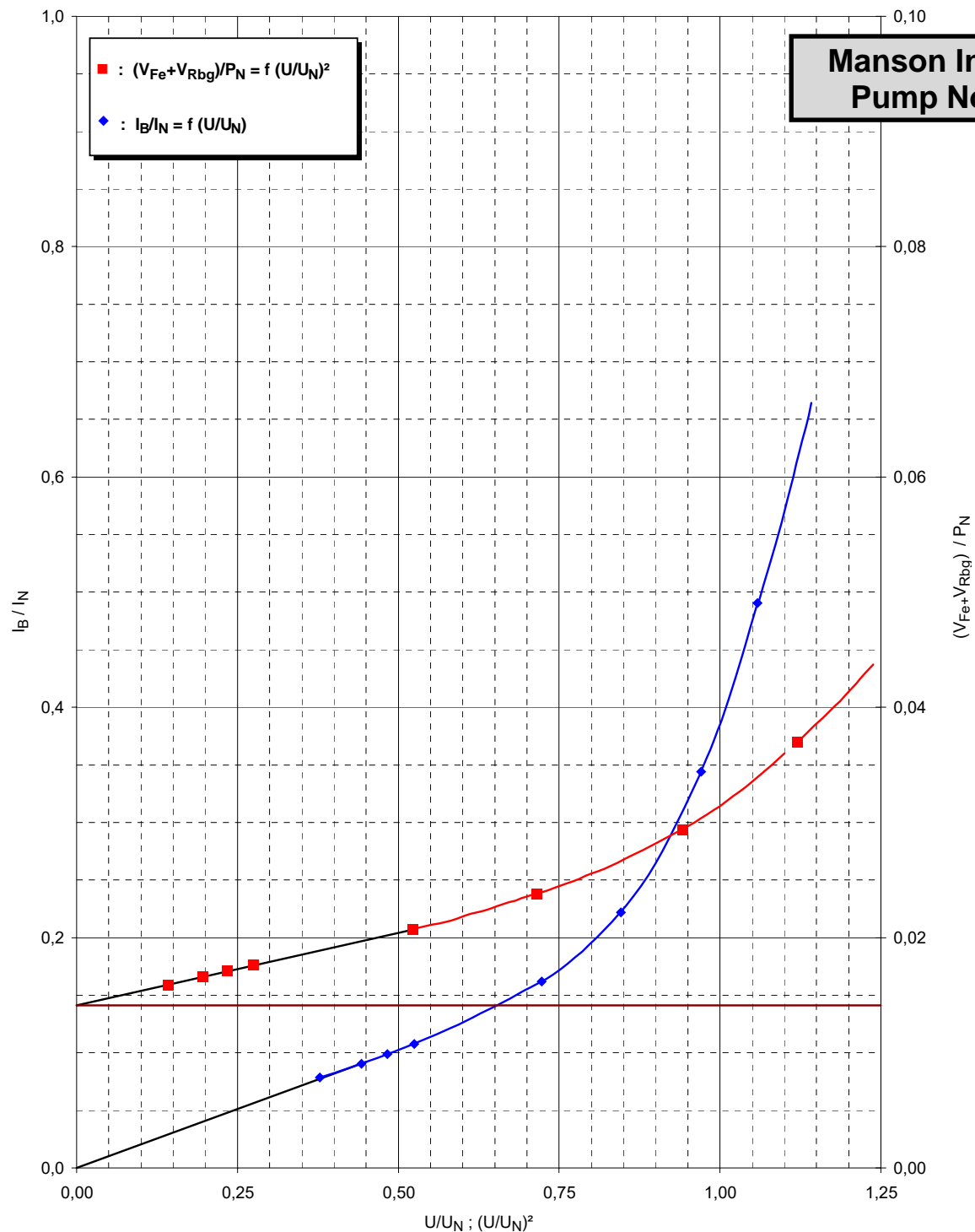
Test-point	Ratio voltage	Magnetizing current	Ratio magnet. current	Ratio current	Square ratio voltage	Iron and friction losses	Copper losses stator	Ratio Power input	Ratio iron+frict. losses	Cable losses	Power factor
No.	U/U_N	I_B	I_B/I_N	I/I_N	$(U/U_N)^2$	V_{Fe+Rbg}	V_{Cu1}	P_{in}/P_N	V_{Fe+Rbg}/P_N	V_{Ltg}	$\cos\varphi$
	[-]	[A]	[-]	[-]	[-]	[kW]	[kW]	[-]	[kW]	[kW]	[-]
1	0,3781	14,79	0,0783	0,0838	0,1430	1,720	0,056	0,0164	0,0159	0,004	0,357
2	0,4429	17,1	0,0905	0,0944	0,1962	1,796	0,071	0,0173	0,0166	0,006	0,284
3	0,4831	18,68	0,0988	0,1020	0,2334	1,842	0,083	0,0178	0,0171	0,007	0,249
4	0,5244	20,36	0,1077	0,1104	0,2750	1,901	0,097	0,0185	0,0176	0,008	0,220
5	0,7229	30,59	0,1619	0,1633	0,5226	2,233	0,213	0,0226	0,0207	0,017	0,132
6	0,8456	41,96	0,2220	0,2232	0,7151	2,574	0,397	0,0275	0,0238	0,031	0,100
7	0,9706	65,06	0,3442	0,3453	0,9421	3,179	0,952	0,0382	0,0294	0,075	0,078
8	1,0581	92,75	0,4907	0,4920	1,1196	3,992	1,932	0,0549	0,0370	0,152	0,072

Iron losses at voltage U1 : 1,88 [kW]
 Friction losses at voltage U1 : 1,526 [kW] (calculated by linear regression with 3 measured values)
 Magnetizing current at voltage U1 : 73,1 [A]
 Spin down time 22,2 [s]
 Date of test: 09.07.2004
 test engineer: W. Kübler
 This document has been produced automatically and is valid without signature.

Motor **M110-740-4**

Serial No. **130101611-04**

Order No. **130101611**

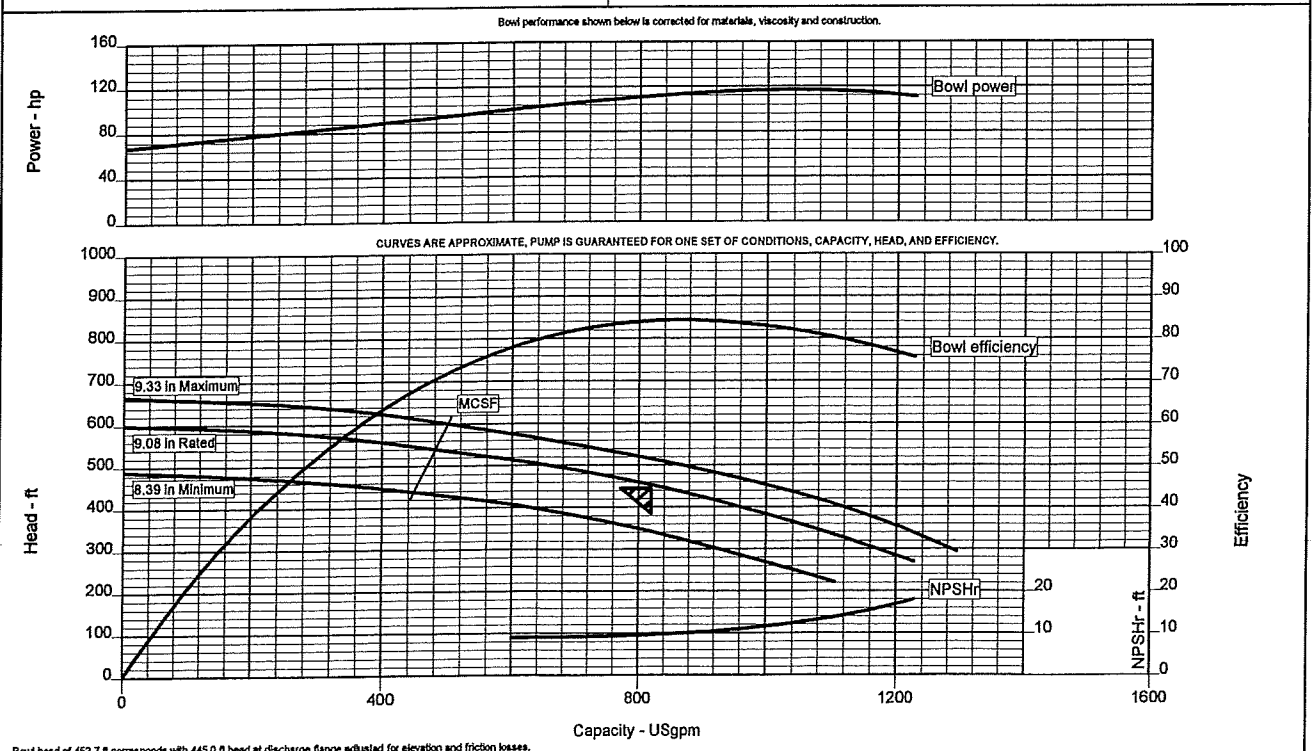


I_B	Magnetisierungsstrom Magnetizing Current	P	Bemessungsleistung Rated Output	U_N	Bemessungsspannung Rated Voltage
V_{Fe}	Eisenverluste Iron Losses	I_N	Bemessungsstrom Full Load Current	U	Spannung Voltage
V_{Rbg}	Reibungsverluste Friction Losses				

Customer	:	Pump / Stages	: 12EMM	/ 7
Customer reference	:	Based on curve no.	: EC-2633	
Item number	:	Vendor reference	: 1391-W0000	
Service	:	Date	: October 12, 2004	

Operating Conditions		Materials / Specification	
Capacity	: 820.0 USgpm	Material column code	: B30
Water capacity (CQ=1.00)	: -	Pump specification	:
Normal capacity	: -	Other Requirements	
Total Developed Head	: 445.00 ft		
Water head (CH=1.00)	: -		
NPSH available (NPSHa)	: Ample		
NPSHa less NPSH margin	: -		
Maximum suction pressure	: 0.0 psig		
Liquid		Hydraulic selection : No specification Construction : No specification Test tolerance : Hydraulic Institute Level A Speed Set : 1750 rpm Driver Sizing : Max Power(MCSF to EOC)with SF	
Liquid type	: Other		
Liquid description	:		
Temperature	: 60 °F		
Specific gravity / Viscosity	: 1.000 / 1.0 cSt		

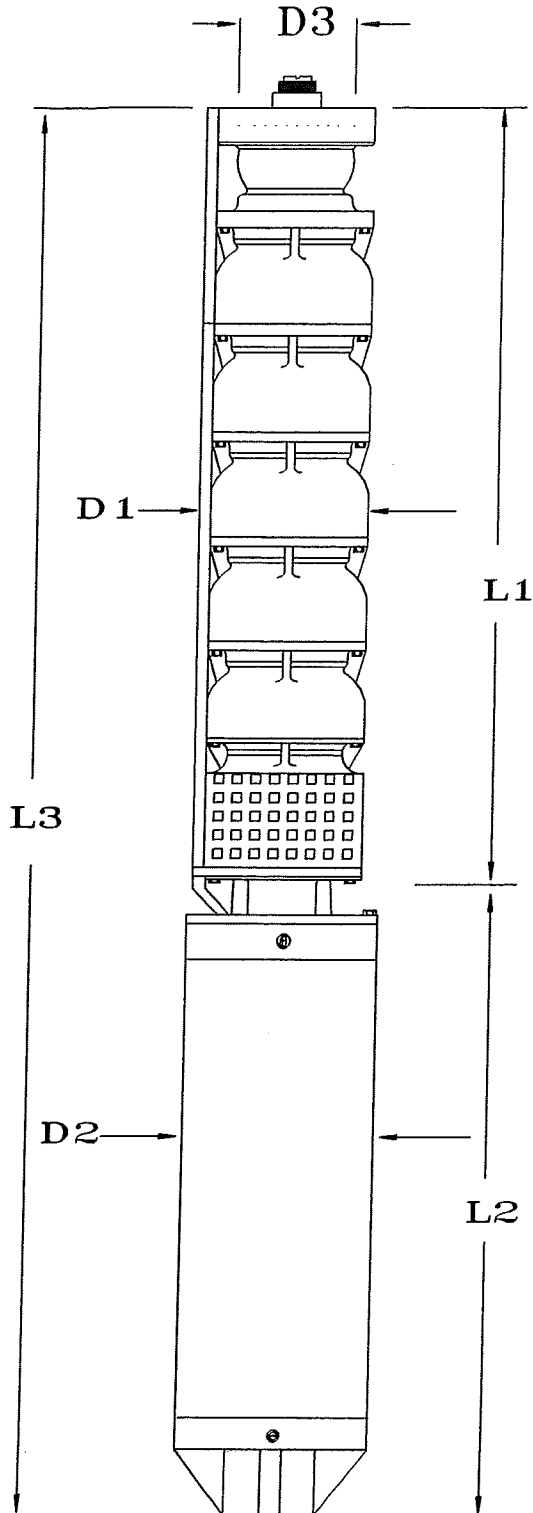
Performance			
Hydraulic power	: 93.5 hp	Impeller diameter	
Pump speed	: 1750 rpm	Rated	: 9.08 in
Efficiency (CE=1.00)	: 83.7 %	Maximum	: 9.33 in
NPSH required (NPSHr)	: 9.6 ft	Minimum	: 8.39 in
Rated power	: 112 hp	Suction specific speed	: 9200 US units
Maximum power	: 117 hp	Minimum continuous flow	: 485.8 USgpm
Driver power	: 125 hp / 93.2 kW	Maximum head @ rated dia	: 599.8 ft
Casing working pressure	: 259.6 psig	Flow at BEP	: 864.8 USgpm
(based on shut off @ cut dia)		Flow as % of BEP	: 94.8 %
Maximum allowable	: 259.6 psig	Efficiency at normal flow	: -
Bowl & column hydrotest	: 324.6 psig	Impeller dia ratio (rated/max)	: 97.3 %
Minimum submergence	: 24.00 in	Head rise to shut off	: 32.4 %
Pump thrust at rated flow	: 2664.7 lbf	Total head ratio (rated/max)	: 87.9 %





**Manson Intake
Pump No. 1**

**Statesville Operations
Lake Chelan Reclamation District**



PUMP DATA

PUMP MODEL:	12EMM
NO. STAGES:	7
CAPACITY (USGPM):	820 GPM ^{445'}
TDH (FEET WATER):	44 ⁵

MOTOR DATA

MOTOR MODEL:	MI10-740-4
MOTOR HP:	125
MOTOR RPM:	1760
F.L. MOTOR EFFICIENCY:	87.5%
F.L. AMPS:	167
F.L. KW:	93.25
VOLTAGE:	480
PHASE:	3
HERTZ:	60
CABLE SIZE REQUIRED (AWG):	2/0 AWG GGC

LENGTH

MOTOR LENGTH (IN) = L2	92.50"
PUMP LENGTH (IN) = L1	85.87" To Face of Flange not shown.
OVERALL LENGTH (IN) = L3	178.37"

DIAMETER

MOTOR DIAMETER (IN) = D2	9.09"
PUMP DIAMETER (IN) = D1	12.50"

DISCHARGE

DISCHARGE SIZE NPT (IN) = D3	6" Flanged
------------------------------	------------

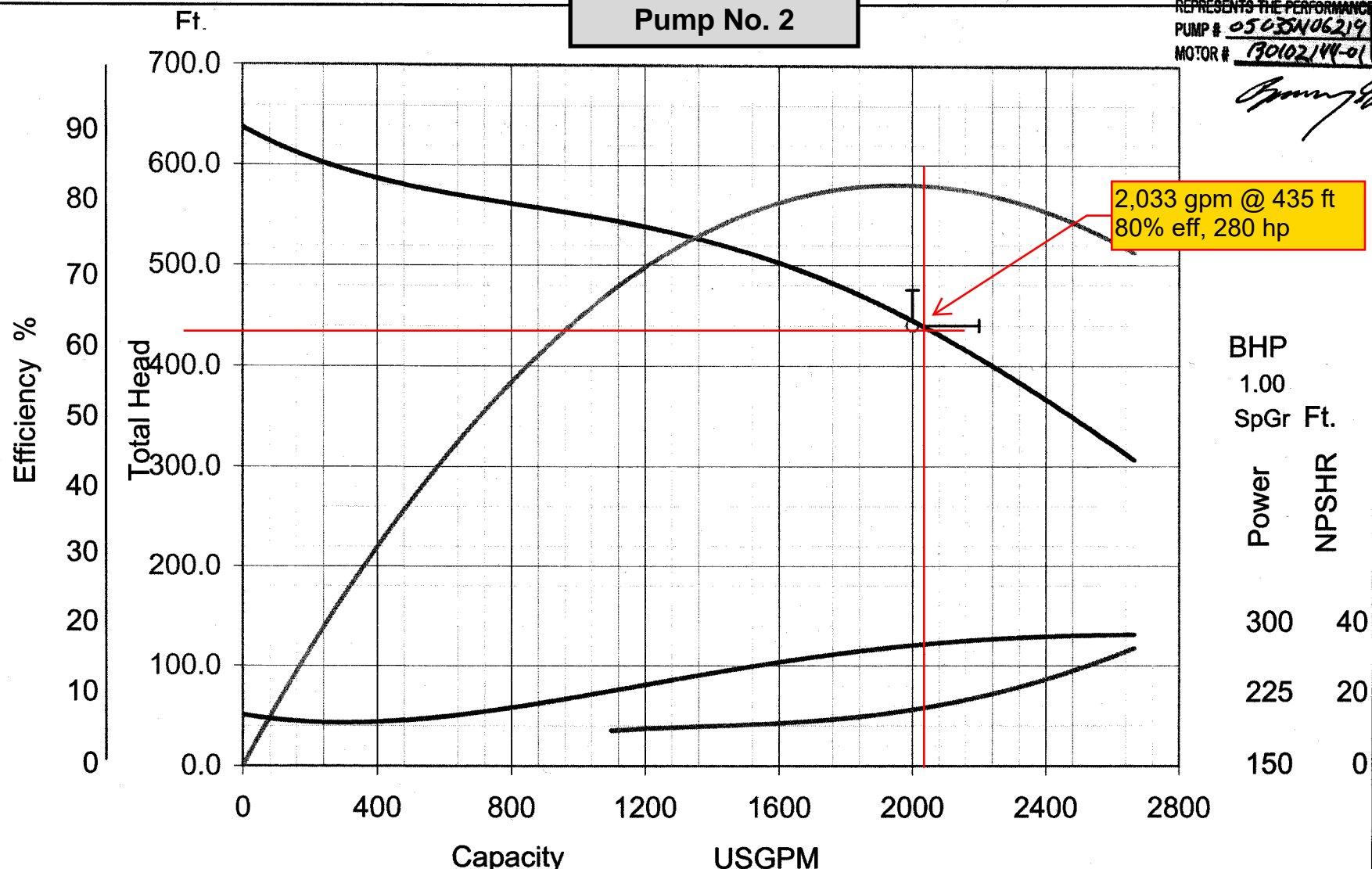
WEIGHT

NET WEIGHT - PUMP & MOTOR (LBS)	1700#
---------------------------------	-------

Manson Intake Pump No. 2

I CERTIFY THAT WITHIN THE ACCURACY
OF TEST INSTRUMENTATION THIS TEST
REPRESENTS THE PERFORMANCE OF
PUMP # 0503SN062199-02
MOTOR # 130102144-01

Boonying Boony



BHP
1.00
SpGr Ft.
Power NPSHR
300 40
225 20
150 0

This pump is guaranteed to deliver:

2000 USGPM | 440 Ft. | 81% Efficiency

This curve shows the expected heads and efficiencies at other flows but this data is approximate only and not guaranteed.

FLOWSERVE

MODEL	15EMM-5
Speed	1750
Curve Number	
0503SN062199-02	



Manson Intake
Pump No. 2

Test No:
Job No:

0503SN062199-02
N062199

SUBMERSIBLE PUMP TEST DATA

CUSTOMER:

Pumpteck

DESIGN CONDITIONS:

FLOW GPM:

2000

HEAD FT:

440

PUMP DESCRIPTION:

MODEL:

15EMM-5

#STAGES

5

IMP. MATERIAL:

Bronze

IMP. DIA:

11

BOWL MAT:

Cast Iron

IMP UNDERFILE:

0.12 x 2.5

TEST MOTOR:

MODEL:

MI16-750-4

SERIAL #:

130102144-01

HP:

300

Volts / Ph / Hz:

480/3/60

Full Load AMPS:

380

Full Load RPM:

1750

MEASURED RESULTS

<u>FLOW</u> <u>(gpm)</u>	<u>HEAD</u> <u>(FT)</u>	<u>BHP</u>	<u>BOWL EFF %</u>	<u>P.F.</u>	<u>Wire-to-Water Eff</u>
0	637	204	0		0.00
682	569	208	47	0.792	42.64
1098	542	227	66	0.804	59.99
1565	508	260	77	0.818	69.81
1854	470	276	80	0.821	72.18
2011	443	279	81	0.821	73.07
2220	402	283	80	0.823	72.16
2664	307	291	71	0.824	64.24

TESTED BY:

Barry Gray

NAME

DATE:

03/17/05

DATE


SIGNATURE

Motor **MI16-75-4**

Serial No. **130102144**

Order No. **130102144**
**Manson Intake
Pump No. 2**

Nominal Data Motor

Output	P_N	[kW]	265	Frequency	f	[Hz]	60	Direction of rotation	cw
Voltage 1	U_1	[V]	480	Speed	n	[min ⁻¹]	1740	Connection	Delta
Voltage 2	U_2	[V]	-	Power factor	$\cos\varphi$	[-]	0,800	Starting method	DOL
Current	I	[A]	445	Efficiency	η	[-]	0,900		
Winding resistance, cold (mean)	$R_{mean, K}$	[Ω]	0,0308	Test cable			10,5m 2 Rd 3/4x50mm ² II		
Winding resistance, warm (mean)	$R_{mean, W}$	[Ω]	0,0326	Signal cable			35,5m 1 Rd 3x2,5mm ²		
Ambient temperature, cold	$\theta_{W, K}$	[°C]	20,0	Insulation resistance, cold	$R_{iso, K}$	[M Ω]	69000		
Ambient temperature, warm	$\theta_{W, W}$	[°C]	21,1	Insulation resistance, warm	$R_{iso, W}$	[M Ω]	5430		
Temperature rise (mean)	Θ_{mean}	[K]	13,8	High-voltage test (1 min)	U_{HV}	[kV]	2		

Measured Data

Test-point	Voltage	Current phase 1	Current phase 2	Current phase 3	Diff. phase currents	Mean current	Power input	Frequency	Ambient temp.	Ambient temp. air	Temp. filling liquid 1	Temp. filling liquid 2
No.	U	I_{L1}	I_{L2}	I_{L3}	Diff. I	I	P_{in}	f	θ_W	θ_L	θ_{F1}	θ_{F2}
	[V]	[A]	[A]	[A]	[%]	[A]	[kW]	[Hz]	[°C]	[°C]	[°C]	[°C]
1	200,5	42,05	38,82	38,77	5,2	39,88	6,486	60,95	21,1	19,5	36,6	0,0
2	250,8	48,09	44,80	44,71	4,6	45,87	6,821	60,98	21,1	19,5	36,7	0,0
3	303,7	56,86	53,48	53,31	4,1	54,55	7,316	60,93	21,1	19,5	36,7	0,0
4	350,2	66,72	62,95	62,52	4,0	64,06	7,779	60,73	21,1	19,5	36,7	0,0
5	400,3	80,46	77,05	75,64	3,4	77,72	8,379	60,65	21,1	19,5	36,7	0,0
6	445,0	98,18	94,86	93,05	2,9	95,36	9,198	60,62	21,1	19,5	36,5	0,0
7	480,9	119,7	117,0	115,0	2,1	117,3	10,07	60,47	21,1	19,5	36,2	0,0
8	517,3	156,4	153,1	150,4	2,0	153,3	11,77	60,08	21,1	19,4	36,0	0,0

Evaluation

Test-point	Ratio voltage	Magnetizing current	Ratio magnet. current	Ratio current	Square ratio voltage	Iron and friction losses	Copper losses stator	Ratio Power input	Ratio iron+frict. losses	Cable losses	Power factor
No.	U/U_N	I_B	I_B/I_N	I/I_N	$(U/U_N)^2$	V_{Fe+Rbg}	V_{Cu1}	P_{in}/P_N	V_{Fe+Rbg}/P_N	V_{Ltg}	$\cos\varphi$
	[-]	[A]	[-]	[-]	[-]	[kW]	[kW]	[-]	[kW]	[kW]	[-]
1	0,4177	35,24	0,0792	0,0896	0,1745	6,408	0,078	0,0245	0,0242	0,010	0,468
2	0,5225	43,09	0,0968	0,1031	0,2730	6,718	0,103	0,0257	0,0254	0,013	0,342
3	0,6327	52,75	0,1185	0,1226	0,4003	7,170	0,146	0,0276	0,0271	0,018	0,255
4	0,7296	62,77	0,1411	0,1440	0,5323	7,578	0,201	0,0294	0,0286	0,025	0,200
5	0,8340	76,77	0,1725	0,1747	0,6955	8,084	0,295	0,0316	0,0305	0,037	0,156
6	0,9271	94,61	0,2126	0,2143	0,8595	8,753	0,445	0,0347	0,0330	0,055	0,125
7	1,0019	116,6	0,2620	0,2636	1,0038	9,396	0,672	0,0380	0,0355	0,083	0,103
8	1,0777	152,7	0,3431	0,3445	1,1615	10,62	1,149	0,0444	0,0401	0,142	0,086

Iron losses at voltage U1 : 3,578 [kW]

Friction losses at voltage U1 : 5,864 [kW] (calculated by linear regression with 3 measured values)

Magnetizing current at voltage U1 : 116,8 [A]

Spin down time 23,5 [s]

Date of test: 31.01.2005

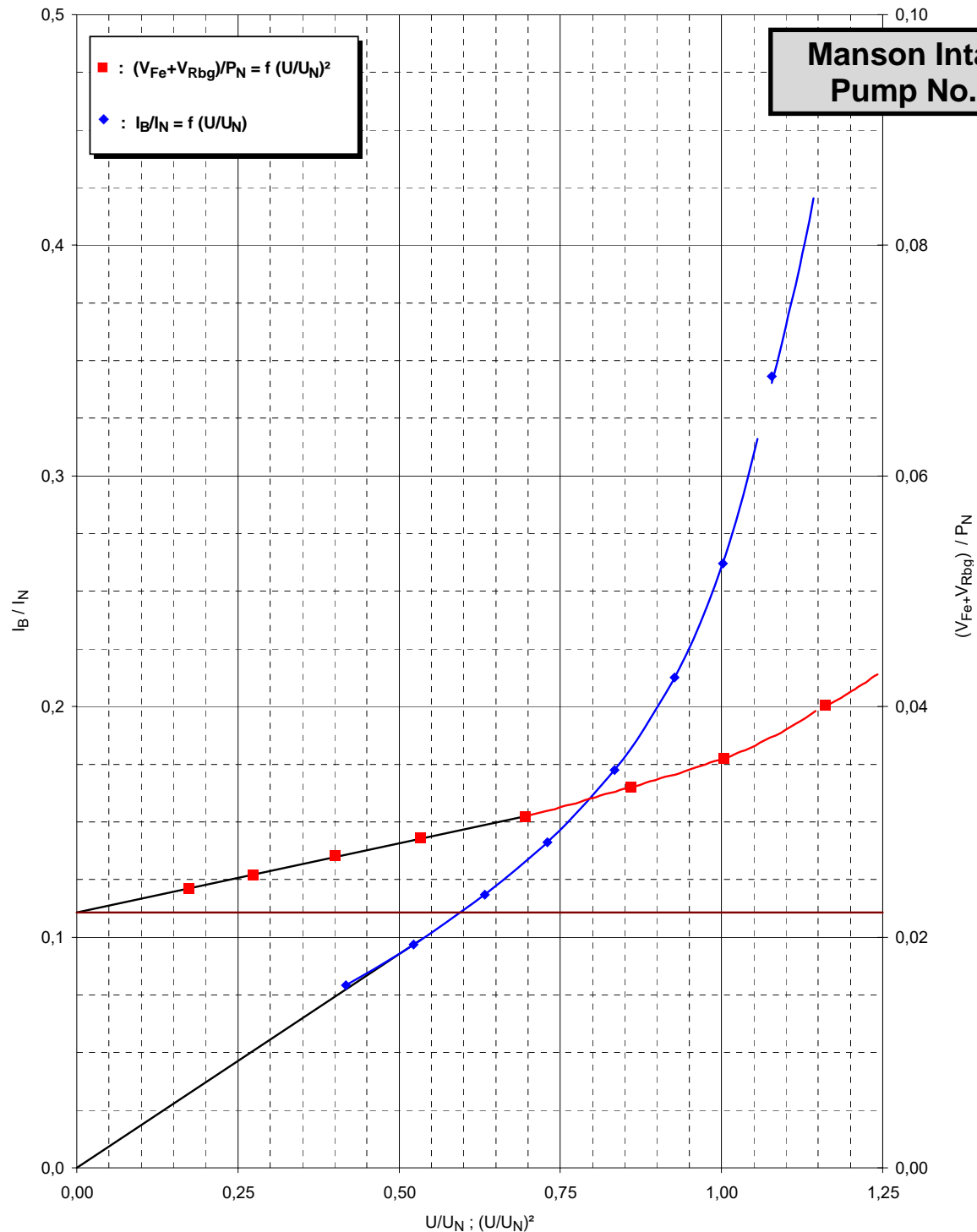
test engineer: G. Mix

This document has been produced automatically and is valid without signature.

Motor **MI16-75-4**

Serial No. **130102144**

Order No. **130102144**

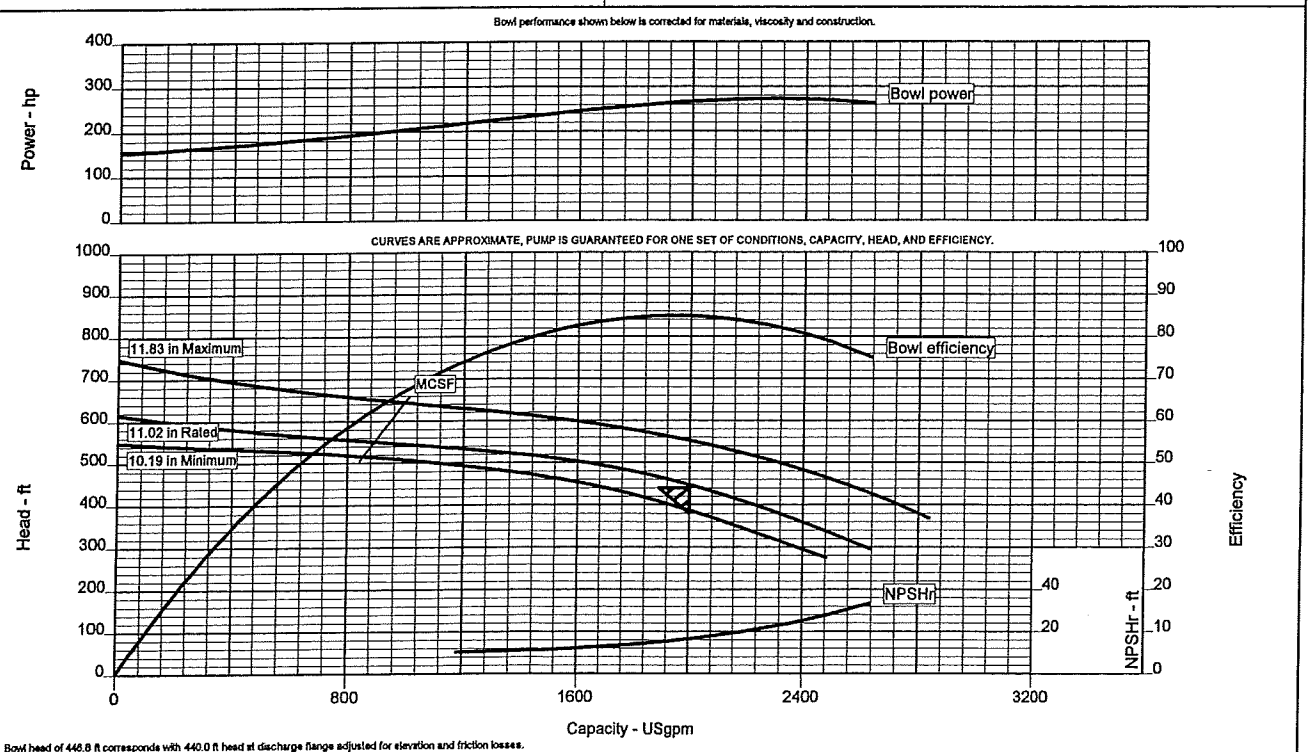


I_B	Magnetisierungsstrom Magnetizing Current	P	Bemessungsleistung Rated Output	U_N	Bemessungsspannung Rated Voltage
V_{Fe}	Eisenverluste Iron Losses	I_N	Bemessungsstrom Full Load Current	U	Spannung Voltage
V_{Rbg}	Reibungsverluste Friction Losses				

Customer	:	Pump / Stages	: 15EMM	/ 5
Customer reference	:	Based on curve no.	: EC-2377	
Item number	:	Vendor reference	: 1391-W0000	
Service	:	Date	: October 12, 2004	

Operating Conditions		Materials / Specification	
Capacity	: 2000.0 USgpm	Material column code	: B30
Water capacity (CQ=1.00)	: -	Pump specification	:
Normal capacity	: -	Other Requirements Hydraulic selection : No specification Construction : No specification Test tolerance : Hydraulic Institute Level A Speed Set : 1750 rpm Driver Sizing : Max Power(MCSF to EOC)with SF	
Total Developed Head	: 440.00 ft		
Water head (CH=1.00)	: -		
NPSH available (NPSHa)	: Ample		
NPSHa less NPSH margin	: -		
Maximum suction pressure	: 0.0 psig		
Liquid			
Liquid type	: Other		
Liquid description	:		
Temperature	: 60 °F		
Specific gravity / Viscosity	: 1.000 / 1.0 cSt		

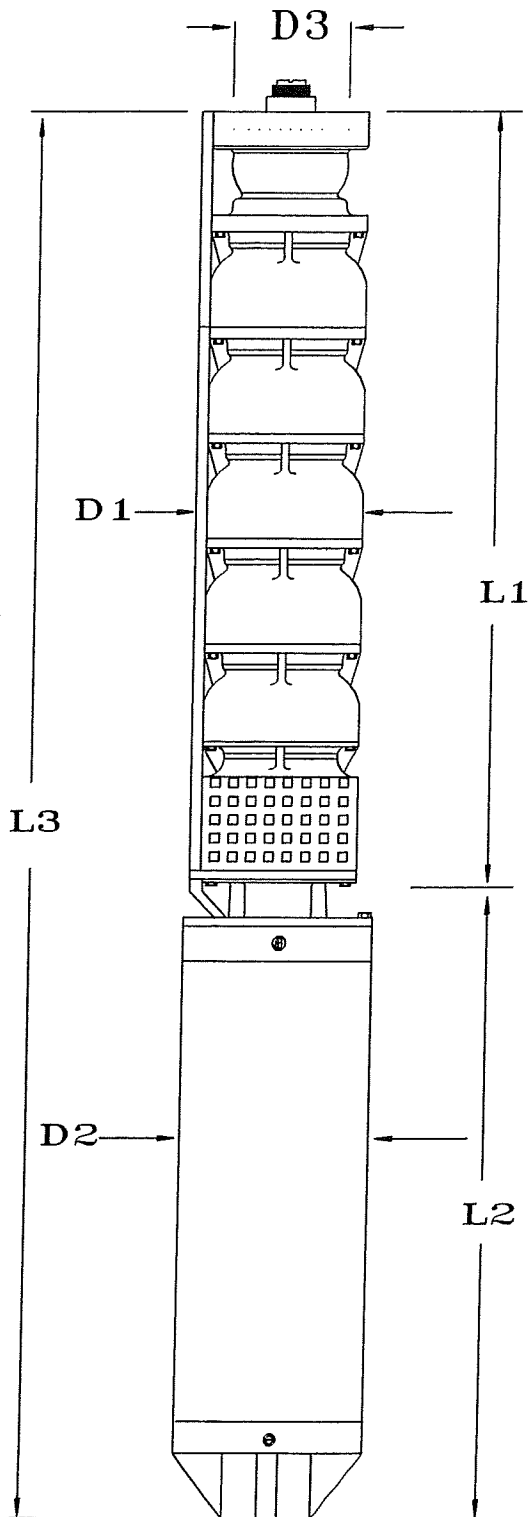
Performance			
Hydraulic power	: 225 hp	Impeller diameter	
Pump speed	: 1750 rpm	Rated	: 11.02 in
Efficiency (CE=1.00)	: 84.6 %	Maximum	: 11.83 in
NPSH required (NPSHr)	: 16.5 ft	Minimum	: 10.19 in
Rated power	: 266 hp	Suction specific speed	: 9100 US units
Maximum power	: 272 hp	Minimum continuous flow	: 926.2 USgpm
Driver power	: 300 hp / 224 kW	Maximum head @ rated dia	: 615.7 ft
Casing working pressure	: 266.5 psig	Flow at BEP	: 1942.9 USgpm
(based on shut off @ cut dia)		Flow as % of BEP	: 102.9 %
Maximum allowable	: 266.5 psig	Efficiency at normal flow	: -
Bowl & column hydrotest	: 333.2 psig	Impeller dia ratio (rated/max)	: 93.1 %
Minimum submergence	: 32.00 in	Head rise to shut off	: 37.7 %
Pump thrust at rated flow	: 4151.4 lbf	Total head ratio (rated/max)	: 81.0 %





**Manson Intake
Pump No. 2**

**Statesville Operations
Lake Chelan Reclamation District**



PUMP DATA

PUMP MODEL:	15EMM
NO. STAGES:	5
CAPACITY (USGPM):	2000
TDH (FEET WATER):	440'

MOTOR DATA

MOTOR MODEL:	MI16-75-4
MOTOR HP:	300
MOTOR RPM:	1760
F.L. MOTOR EFFICIENCY:	90.5%
F.L. AMPS:	380
F.L. KW:	225
VOLTAGE:	480
PHASE:	3
HERTZ:	60
CABLE SIZE REQUIRED (AWG):	Dual 2/0 AWG GGC

LENGTH

MOTOR LENGTH (IN) = L2	82.05"
PUMP LENGTH (IN) = L1	113.00" To Face of Flange not shown
OVERALL LENGTH (IN) = L3	195.05"

DIAMETER

MOTOR DIAMETER (IN) = D2	14.25"
PUMP DIAMETER (IN) = D1	15.50"

DISCHARGE

DISCHARGE SIZE NPT (IN) = D3	10" Flanged
------------------------------	-------------

WEIGHT

NET WEIGHT - PUMP & MOTOR (LBS)	3100#
------------------------------------	-------



**Manson Intake
Pump No. 3**

PumpTech Inc.
209 S Hamilton Rd
Moses Lake, WA 98837
Phone: 509-766-6330
Fax: 509-766-6331
nstark@pumptechnw.com

Page: 1

Sales Quotation

Customer#: 0084400

TO:
Dave Walters
Lake Chelan Reclamation Dist
PO Box J
Manson, WA 98831
Fax: 509-687-9884

Salesperson: Nathan Stark / Jason Haughton
Lead Time: 6-8 WEEKS
FOB: FOB ORIGIN - PPA
Ship Via: BEST WAY

Quote #: 0142032-A
Date: 11/5/2018
Expires: 12/5/2018

Project Name: Submersible Turbine Options

Item		Price	Qty	Extend
12CHC	GOULDS VIS -Submersible Vertical Turbine (Borehole) Pumps	49,545.00	1.00	49,545.00
	Submersible Turbine: VIS-BATM 12CHC, 6 Stages with duty point of 1130GPM @ 420'TDH Consisting of:			
Bowl Assembly	12CHC, 6 Stage(s), Manufacturer's Standard	0.00	1.00	0.00
S23932H	Submersible 150.00 Hp 1770 RPM S23932H	0.00	1.00	0.00
020126	250/3C W/G PAIGE PLUS HD FLAT JKT PUMP CABLE UL 600V P7271SP	0.00	80.00	0.00
250 CABLE, SUBMERSIBLE CUT	250 CABLE, SUBMERSIBLE, PVC FLAT JACKETED CUT CHARGE	0.00		0.00
	-----	0.00		0.00
Freight	FOB; FACTORY PRE-PAY & ADD	0.00	1.00	0.00
NOT INCLUDED:	Not included unless expressly noted in the document above:	0.00		0.00
	* loading, unloading, storage			
	* installation or supervision			
	* certified drawings or other documentation not specified			
	in the quote			
	* witness or non-witness factory testing of any kind			
	* certified performance testing			
	* piping, valves, fittings, or the installation thereof			
	* controls, conduit, or electrical connections			
	* start-up/commissioning services			
	* special manuals outside standard supplied by factory			
	* spare parts or other goods or services			
	* seismic calculations, anchor bolt calculations or supply			
	* freight to the jobsite			
	* any other goods or services not listed in the quote			
	above			

SubTotal 49,545.00

The above order is subject to Pumptech Inc. standard terms and conditions and credit approval which are attached and made part of this agreement. We appreciate your interest in our products and services and if you have any questions on our offerings please do not hesitate to call.

By signature below, I accept this offering:

Signed: _____

Name: _____ Title: _____

Sales Tax: 4,062.70

Total: 53,607.70

Manson Intake Pump No. 3

SUBMITTAL

Quote ID: 9001-180919-046:0:2 QTY: 1
VIS-BATM 12CHC, 6 Stages

PERFORMANCE ON DESIGN CURVE AT 1770 RPM

	Shut Off	Design [2]	Run Out [5]		
Flow (USGPM)	0.0	1130.0	0.0	Best Efficiency	89.80 % at 1089.0 USgpm
TDH-Bowl (ft)	514.0	422.0	0.0	Design Flow % BEP	103.76 %
TDH-Disch Flange (ft)	514.0	422.0	-	Pump Efficiency	89.23 %
Bowl Efficiency (%)	-	89.50	-	Overall Efficiency	0.00 %
Power (Hp)	-	134.0	-	Max Power (NOL)	150.0 Hp at 1558.0 USgpm
NPSHr (ft) [1]	-	14.7	-	Max Power (NOL) at Max Trim	168.0 Hp at 1614.0 USgpm
NPSH Margin (ft) [1]	-	25.1	-	Specified NPSH Ratio	1.1
Hydraulic Thrust(lb)	3855.0	3165.0	0.0	Thrust Load Power Loss	0.44764 Hp
Thrust (lb)	4330.1	3582.0	0.0	Total Flow Derate Factor	1.00
Pressure-Bowl (psi)	222.5	182.7	-	Total Head Derate Factor	1.00
Pressure-Disch Flange (psi)	222.5	182.7	-	Total Efficiency Derate Factor	1.00
Min Submergence (Inch) [3]	-	28.73	-	Actual Submergence	97.25 in
Friction Loss (ft) [4]	-	0.00	-	Shaft Friction Power Loss	-0.04 Hp
Lineshaft Elongation (Inch)	0.00000	0.00000	-	Min Flow (MCSF)	272.0 USgpm
Column Elongation (Inch)	0.00000	0.00000	-	kWh per 1000 gal	0.00000
Lateral (Inch)	0.13000	0.13000	-	Impeller Running Clearance	0.13 in

[1] at 1st impeller eye [2] rated values [3] from bottom of pump [4] from bowl to disch flange [5] based on user entered TDH

OPERATING CONDITIONS

Specified Flow	1130.00 USgpm
Design TDH (Bowl)	422.0 ft
Rated Speed	1770 RPM
Atmospheric Pressure	14 psi
TPL	12.80 ft
NPSHa at 1st Impeller	39.8 ft
Well Diameter	Over 20 inch [508mm] Casing

FLUID CHARACTERISTICS

Fluid	Water
Fluid Temperature	68.0 °F
Specific Gravity	1.0000
Viscosity	1.0017 cP
Vapor Pressure	0.3393 psi
Density	62 lbs/ft³

MATERIALS & DIMENSIONS

Bowl Data

Bowl Material	Cast Iron with Glass Enamel
Bowl Material Derate Factor	1.00
Impeller Material	316SS
Additional Stage Impeller Material	316SS
Impeller Matl Derate Factor	1.00
Bowl Shaft Material	416SS
Impeller Attachment	Taper Lock
Taper Lock Material	Carbon Steel
Discharge Bowl Material	Cast Iron
Suction Type	Bowl
Bowl Bolting Material	Carbon Steel
Motor Adapter	12" [304.8 mm]
Motor Adapter Bearing	Bronze
Discharge Bowl Bearing	Bronze
Intermediate Bowl Bearing	Bronze
Impeller Trim	8.25 in

Bowl Data

Max Impeller Trim	8.69 in
Thrust K-Factor	7.5 Lb/Ft
Bowl Pressure Limit	630 psi
Available Lateral	1.00 in
Shut Off Lateral	0.13000 in
Design Lateral	0.13000 in
Bowl Assembly Length (BL)	91.25 in
Bowl Shaft Diameter	1 11/16" [42.9 mm]
Impeller Balance	Manufacturer's Standard
Bowl Wear Ring	Not Included
Impeller Wear Ring	Not Included
Bowl Diameter (D)	11.75 in
Min Column Diameter	6 in
Max Column Diameter	10 in
Bowl Shaft Length	181.50 in
Bowl Shaft Power Limit	384.01 Hp

Bowl Specials

DO NOT USE FOR CONSTRUCTION UNLESS CERTIFIED

Certified By	
Project	LCRD PUMP
Tag	
PO Number	
Serial Number	



Manson Intake Pump No. 3

SUBMITTAL

Quote ID: 9001-180919-046:0:2 QTY: 1
VIS-BATM 12CHC, 6 Stages

Motor Data

Driver Type	Submersible
Motor Manufacturer	
Voltage	460 V
Phase / Frequency	3 PH / 60 Hz
Enclosure	SUBM
Motor Frame	12
Motor Adapter	12" [304.8 mm]
ML [Motor Length]	56.30 in
MD [Motor Base Diameter]	12.00 in
Insulation Class	Y

Motor Data

Service Factor	1.15
Motor Provided By	Xylem
Motor Mounted By	Customer
Motor Part Number	S23932H
Driver Size Criteria	Max power on design curve (NOL)

Motor Specials

Coating Data

Bowl OD	Goulds Water Technology Standard Blue Enamel
Column ID	Not Included

Coating Data

Column OD	Goulds Water Technology Standard Blue Enamel
Head ID	Not Included

Testing Data

Miscellaneous Specials

Weight Data

Total Bowl Weight	990 lbs
Unit Bowl Weight	345 lbs / 129 lbs
Motor Weight	1047 lbs

Weight Data

Total Weight	2037 lbs
Total Rotating Weight	151 lbs

INFO, WARNING & ERROR MESSAGES

Invalid is invalid

Our offer does not include specific review and incorporation of any Statutory or Regulatory Requirements and the offer is limited to the requirements of the design specifications. Should any Statutory or Regulatory requirements need to be reviewed and incorporated then the Customer is responsible to identify those and provide copies for review and revision of our offer.

Our quotation is offered in accordance with our comments and exceptions identified in our proposal and governed by our standard terms and conditions of sale – Xylem Americas attached hereafter.

For units requiring performance test, all performance tests will be conducted per ANSI/HI 14.6 standards unless otherwise noted in the selection software submittal documents. Test results meeting with grade 2B tolerances for pumps with a rated shaft power of 134HP or less and grade 1B for greater than 134HP will be considered passing.

Customer is responsible for verifying that the recommendations made and the materials selected are satisfactory for the Customer's intended environment and Customer's use of the selected pump. Customer is responsible for determining the suitability of Xylem recommendations for all operating conditions within Customer's and/or End User's control. Xylem disclaims all warranties, express or implied warranties, including, but not limited to, warranties of merchantability and fitness for a particular purpose and all express warranties other than the limited express warranty set forth in the attached standard terms and conditions of sale – Xylem Americas attached hereafter.

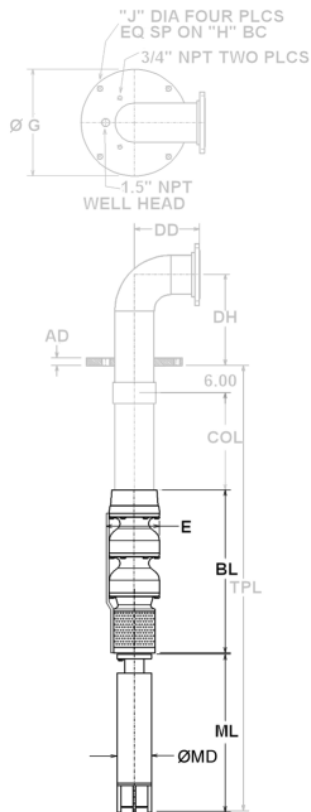
DO NOT USE FOR CONSTRUCTION UNLESS CERTIFIED

Certified By	
Project	LCRD PUMP
Tag	
PO Number	
Serial Number	

Manson Intake Pump No. 3

OUTLINE DRAWING

Quote ID: 9001-180919-046:0:2 QTY: 1
VIS-BATM 12CHC, 6 Stages



DIMENSIONS

E	12.10 in
BL [Bowl Assembly Length]	91.25 in
TPL [Total Pump Length]	153.55 in
ML [Motor Length]	56.30 in
MD [Motor Base Diameter]	12.00 in

PUMP DATA

Column Diameter	8" [203mm]
Lineshaft Diameter	1 in [25.4 mm]
Specified Flow	1130.00 USgpm
Specified TDH	420.00 ft
Motor Manufacturer	
Driver Type	Submersible
Selected Motor Power	150.00 Hp
Phase / Frequency	3 PH / 60 Hz
Voltage	460 V

WEIGHTS

Total Bowl Weight	990 lbs
Unit Bowl Weight	345 lbs / 129 lbs
Motor Weight	1047 lbs
Total Weight	2037 lbs
Total Rotating Weight	151 lbs

NOTES

1	Total Pump Length \pm 1.0 inch.
2	Tolerance on all dimensions is .12 or \pm .12 inch per 5 ft, whichever is greater.
3	All dimensions shown are in inches unless otherwise specified.
4	Drawing not to scale.
5	1/2" NPT – Gauge Conn (plugged)
6	Driver may be rotated at 90° intervals about vertical centerline for details refer to driver dimension drawing.
7	Refer to product IOM for impeller setting requirements.
8	This assembly has been designed so that its natural frequency responses avoid the specific operating speeds by an adequate safety margin. The design has assumed the foundation to be rigid.

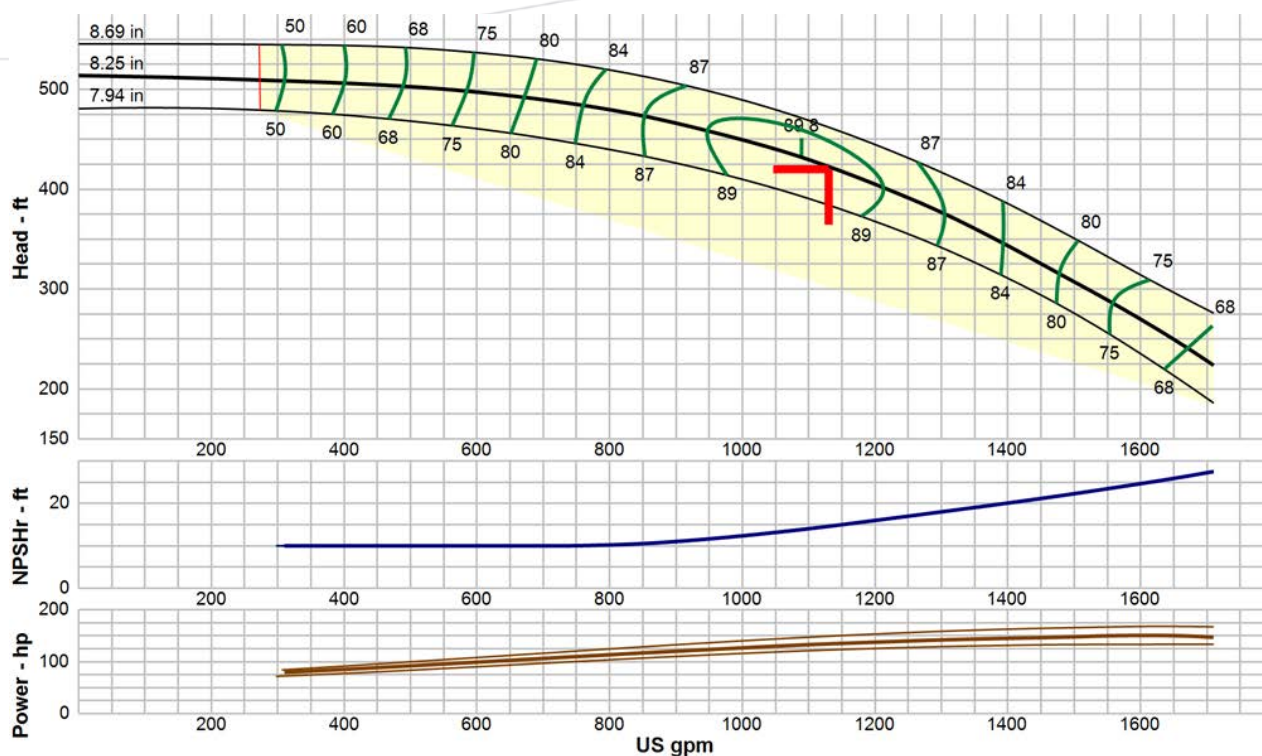
DO NOT USE FOR CONSTRUCTION UNLESS CERTIFIED

Certified By	
Project	LCRD PUMP
Tag	
PO Number	
Serial Number	

Manson Intake Pump No. 3

PERFORMANCE CURVE

Quote ID: 9001-180919-046:0:2 QTY: 1
VIS-BATM 12CHC, 6 Stages



CURVE DATA

Specified Flow	1130.00 USgpm	Design Pressure (Disch Flange)	182.7 psi	Specified NPSH Ratio	1.1
Specified TDH	420.00 ft	Shut Off TDH (Bowl)	514.0 ft	NPSH Margin at Design	25.1 ft
Atmospheric Pressure	14 psi	Shut Off TDH (Disch Flange)	514.0 ft	Min Submergence at Design	28.73 in
TPL	12.80 ft	Shut Off Pressure (Bowl)	222.5 psi	Actual Submergence	97.25 in
Elevation	800 ft	Shut Off Pressure (Disch Flange)	222.5 psi	Shaft Friction Power Loss	-0.04 Hp
NPSHa at Grade	32.9 ft	Bowl Efficiency at Design	89.50 %	Thrust Load Power Loss	0.44764 Hp
NPSHa at 1st Impeller	39.8 ft	Best Efficiency	89.80 %	Hydraulic Thrust at Design	3165.0 lb
Well Diameter	Over 20 inch [508mm] Casing	BEP Flow	1089.0 USgpm	Thrust at Design	3582.0 lb
Fluid	Water	Design Flow % BEP	103.76 %	Hydraulic Thrust at Shut Off	3855.0 lb
Fluid Temperature	68.0 °F	Pump Efficiency	89.23 %	Thrust at Shut Off	4330.1 lb
Specific Gravity	1.0000	Power at Design	134.0 Hp	Bowl Material	Cast Iron with Glass Enamel
Viscosity	1.0017 cP	NOL Power	150.0 Hp	Bowl Material Derate Factor	1.00
Vapor Pressure	0.3393 psi	Max Power (NOL) Flow	1558.0 USgpm	Impeller Material	316SS
Density	62 lbs/ft³	Max Power (NOL) at Max Trim	168.0 Hp	Impeller Matl Derate Factor	1.00
Design Flow	1130.0 USgpm	Max Power (NOL) Flow at Max Trim	1614.0 USgpm	Total Flow Derate Factor	1.00
Min Flow (MCSF)	272.0 USgpm	Recommended Power	150.00 Hp	Total Head Derate Factor	1.00
Design TDH (Bowl)	422.0 ft	kWh per 1000 gal	0.00000	Total Efficiency Derate Factor	1.00
Design TDH (Disch Flange)	422.0 ft	NPSHr at Design	14.7 ft	Curve ID	E6412CCPC3
Design Pressure (Bowl)	182.7 psi				

DO NOT USE FOR CONSTRUCTION UNLESS CERTIFIED

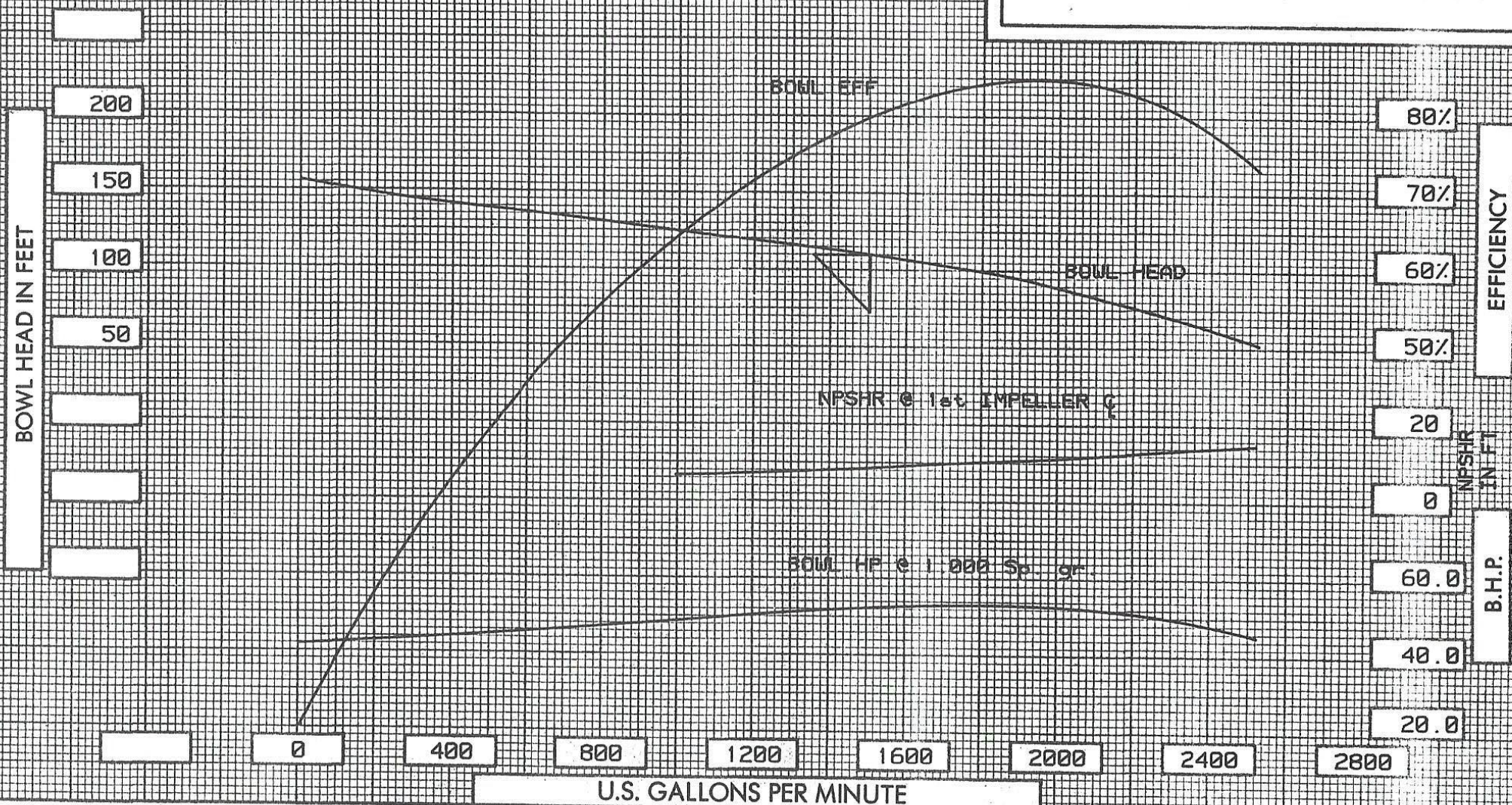
Certified By	
Project	LCRD PUMP
Tag	
PO Number	
Serial Number	

NOTE:
HEAD AND HP CAN BE MORE
PER H.T. TOLERANCE

WTP Finished Water Pump No.s 1 & 2

TOWN OF MANSON WA.

75 HP FINISHED WATER PUMP Δ



McCLURE & SONS INC.
16300 MILL CREEK BLVD. SUITE G4
MILL CREEK WA 98012

DWG. NO. 2747403A REV. 1

Floway PUMPS

FRESNO, CALIFORNIA

A **WCR** COMPANY

TYPE 16MKL
NO. OF STAGES 3
R.P.M. 1190 Δ
PUMP SERIAL NO. 27474-3-1

DWN. BY GP DATE 27-Jun-97

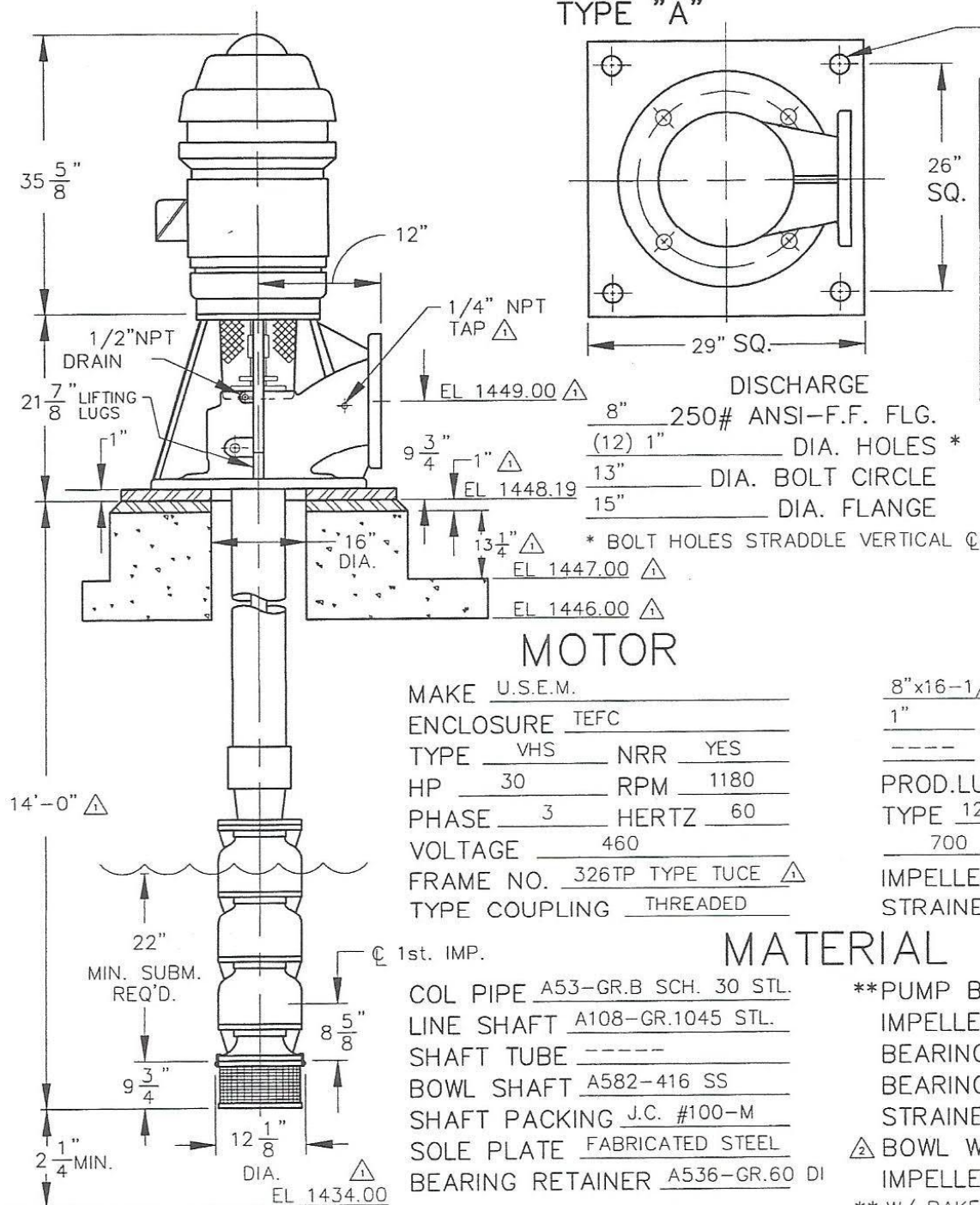
WTP Finished Water Pump No. 3

Floway Pumps

FWP-602

VERTICAL TURBINE PUMP

TYPE "A"



THIS DRAWING IS
CERTIFIED

☐ FOR APPROVAL
NO PRODUCTION WILL START
UNTIL APPROVED IN WRITING.


☒ FOR CONSTRUCTION
PRODUCTION HAS STARTED.
ANY CHANGES MAY AFFECT
PRICE AND DELIVERY.

OUR ORDER No.: 27474-1

CUST. ORDER No.: 3064

BY: GP DATE: 3/6/98

MOTOR

MAKE U.S.E.M.
ENCLOSURE TEFC
TYPE VHS NRR YES
HP 30 RPM 1180
PHASE 3 HERTZ 60
VOLTAGE 460
FRAME NO. 326TP TYPE TUCE 
TYPE COUPLING THREADED

COL PIPE A53-GR.B SCH. 30 STL.
 LINE SHAFT A108-GR.1045 STL.
 SHAFT TUBE -----
 BOWL SHAFT A582-416 SS
 SHAFT PACKING J.C. #100-M
 SOLE PLATE FABRICATED STEEL
 BEARING RETAINER A536-GR.60 DI

PUMP

8"x16-1/2" "A" C.I. DISCH HD.
1" LINE SHAFT 8" COL
---- SHAFT TUBE
PROD.LUBE YES OIL LUBE NO
TYPE 12JKH STAGE 3
700 GPM 109' BOWL HD
IMPELLER ENCLOSED
STRAINER YES

MATERIAL

**PUMP BOWL A48-CL.30 CIE
IMPELLER B584-838 BRZ
BEARINGS(BOWL) B505-932 BRZ
BEARINGS(LINESHAFT) NEOPRENE
STRAINER GALVANIZED STEEL
△ BOWL W/R B505-943 BRZ
IMPELLER W/R ----
** W/ BAKED ENAMEL COATING △

CUSTOMER TOWN OF MANSON, WA.

ORDER NO. 3064
SUPPLIER McCLURE & SONS, INC.
16300 MILL CREEK BLVD. SUITE G4
MILL CREEK, WA 98012

DWG. NO. 2747401B

SERIAL NO. 27474-1-1

A **WEIR** COMPANY

REMARKS
NO. UNITS REQ'D. <u>1</u>
FINISHED WATER PUMP
#FWP-602

FLUID WATER
SPEC. GRAVITY 1.0
VISCOSITY ----
TEMPERATURE AMBIENT
PH ----

NOT TO BE USED
FOR CONSTRUCTION
UNLESS CERTIFIED

REV 02 3/16/98

REV 01 10/16/97

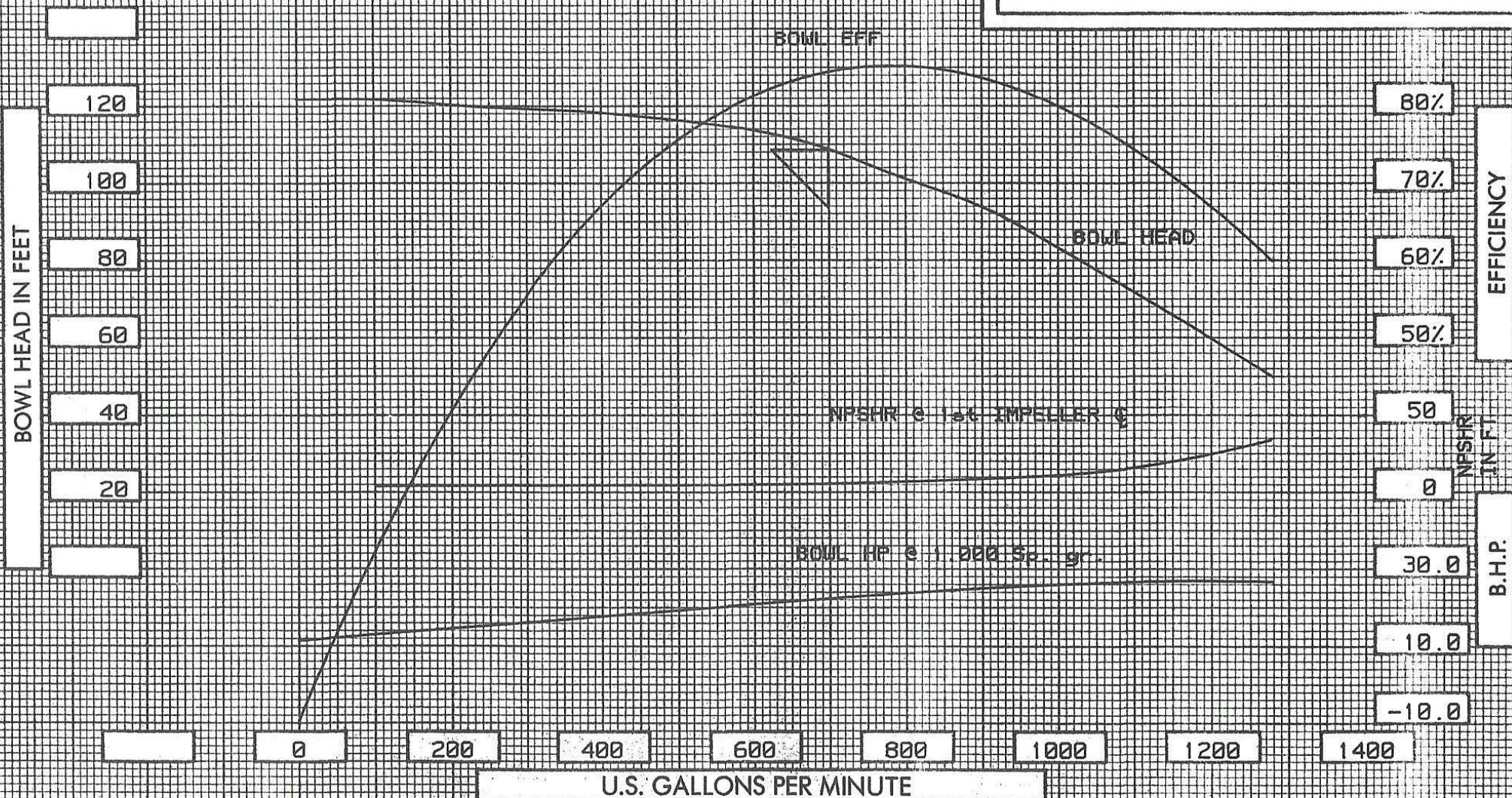
By : GP/SP Date : 6/26/97

NOTE:
HEAD AND HP CAN BE MORE PER
H.I. TOLERANCE

WTP Finished Water Pump No. 3

TOWN OF MANSON WA.

30 HP FINISHED WATER PUMP



McCLURE & SONS INC.
16300 MILL CREEK BLVD SUITE G4
MILL CREEK WA 98012

Floway PUMPS
FRESNO, CALIFORNIA

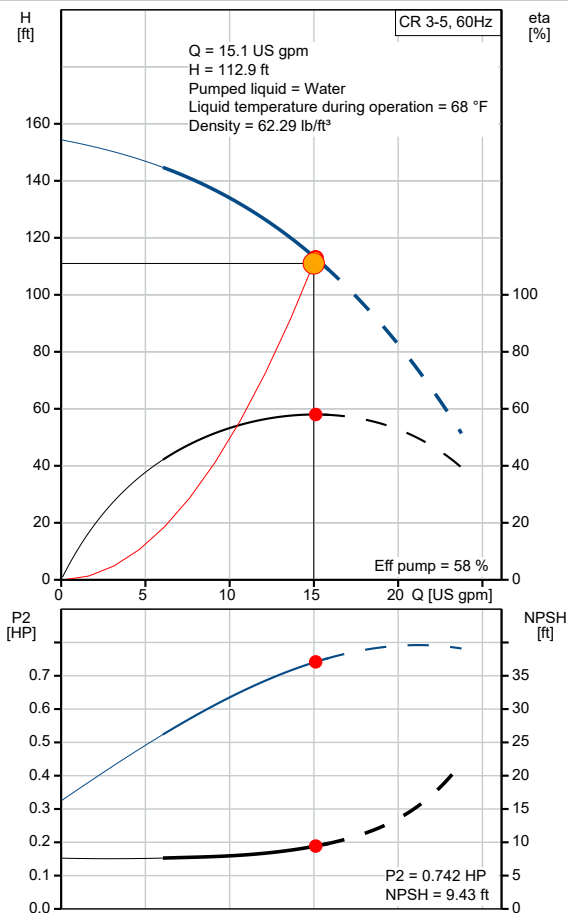
TYPE 12JKH
NO. OF STAGES 3
R.P.M. 1180
PUMP SERIAL NO. 27474-1-1

DWG. NO. 2747401A

A WEBB COMPANY

DWN. BY GP DATE 27-Jun-97

Description	Value
General information:	
Product name:	CR 3-5 A-B-A-E-HQQE
Product No.:	96083061
EAN:	5700395182293
	5700395182293
Technical:	
Rated pump speed:	3464 rpm
Actual calculated flow:	15.1 US gpm
Resulting head of the pump:	112.9 ft
Maximum head:	154.5 ft
Stages:	5
Impellers:	5
Number of reduced-diameter impellers:	0
Low NPSH:	N
Pump orientation:	Vertical
Shaft seal arrangement:	Single
Code for shaft seal:	HQQE
Approvals on nameplate:	CURUS, NSF61
Curve tolerance:	ISO9906:2012 3B
Pump version:	A
Model:	A
Cooling:	TEFC
Materials:	
Base:	Cast iron
	EN 1561 EN-GJL-200
	ASTM A48-25B
Impeller:	Stainless steel
	EN 1.4301
	AISI 304
Material code:	A
Code for rubber:	E
Bearing:	SIC
Installation:	
Maximum ambient temperature:	104 °F
Maximum operating pressure:	232.06 psi
Max pressure at stated temperature:	232 psi / 250 °F
	232 psi / -4 °F
Type of connection:	Oval / NPT(F)
Size of suction port:	1 inch
Size of outlet port:	1 inch
Pressure rating for connection:	PN 16
Flange size for motor:	56C
Connect code:	B
Liquid:	
Pumped liquid:	Water
Liquid temperature range:	-4 .. 248 °F
Selected liquid temperature:	68 °F
Density:	62.29 lb/ft³
Kinematic viscosity:	1 cSt
Electrical data:	
Motor standard:	NEMA
Motor type:	BALDOR
Rated power - P2:	0.75 HP
Power (P2) required by pump:	0.75 HP
Main frequency:	60 Hz
Rated voltage:	1 x 115/208-230 V
Service factor:	1.25
Rated current:	9,60/5,00-4,80 A





Company name:

Created by:

Phone:

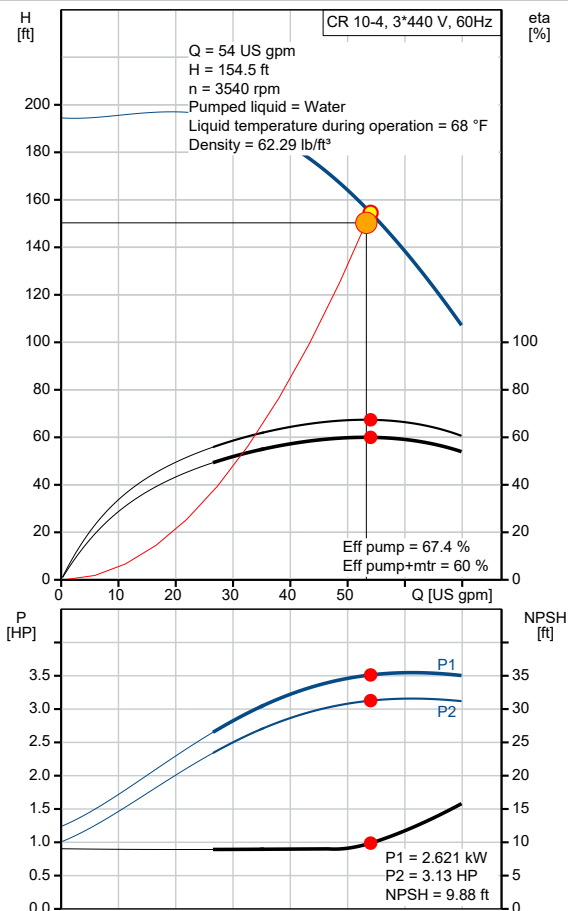
Sienna Pump No. 1

Date:

4/21/2020

Description	Value
Load current:	11.4/6.0-5.7 A
Rated speed:	3450 rpm
Number of poles:	2
Enclosure class (IEC 34-5):	IP54
Insulation class (IEC 85):	B
Motor protection:	NONE
Motor Number:	84Z04001
Controls:	
Frequency converter:	NONE
Others:	
Net weight:	57.4 lb
Gross weight:	68.4 lb
Shipping volume:	4.94 ft³
Country of origin:	US
Custom tariff no.:	8413.70.2040

Description	Value
General information:	
Product name:	CR 10-4 A-FJ-A-E-HQQE
Product No.:	96503173
EAN:	5700396264592
	5700396264592
Technical:	
Rated pump speed:	3511 rpm
Actual calculated flow:	54 US gpm
Resulting head of the pump:	154.5 ft
Maximum head:	193.9 ft
Stages:	4
Impellers:	4
Number of reduced-diameter impellers:	0
Low NPSH:	N
Pump orientation:	Vertical
Shaft seal arrangement:	Single
Code for shaft seal:	HQQE
Approvals on nameplate:	CE, EAC, ACS
Curve tolerance:	ISO9906:2012 3B
Pump version:	A
Model:	A
Materials:	
Base:	Cast iron
	EN 1561 EN-GJL-200
	ASTM A48-25B
Impeller:	Stainless steel
	EN 1.4301
	AISI 304
Material code:	A
Code for rubber:	E
Bearing:	SIC
Installation:	
Maximum ambient temperature:	140 °F
Maximum operating pressure:	232.06 psi
Max pressure at stated temperature:	232 psi / 250 °F
	232 psi / -4 °F
Type of connection:	DIN / JIS
Size of inlet connection:	DN 40
Size of outlet connection:	DN 40
Pressure rating for connection:	PN 25
Flange rating inlet:	300 lb
Flange size for motor:	FT130
Connect code:	FJ
Liquid:	
Pumped liquid:	Water
Liquid temperature range:	-4 .. 248 °F
Selected liquid temperature:	68 °F
Density:	62.29 lb/ft³
Kinematic viscosity:	1 cSt
Electrical data:	
Motor standard:	IEC
Motor type:	100LC
IE Efficiency class:	IE2 - IE3
Rated power - P2:	4 HP
Power (P2) required by pump:	4 HP
Main frequency:	60 Hz
Rated voltage:	3 x 220-277D/380-480Y V





Company name:

Created by:

Phone:

Sienna Pump No. 2 &

Date:

4/21/2020

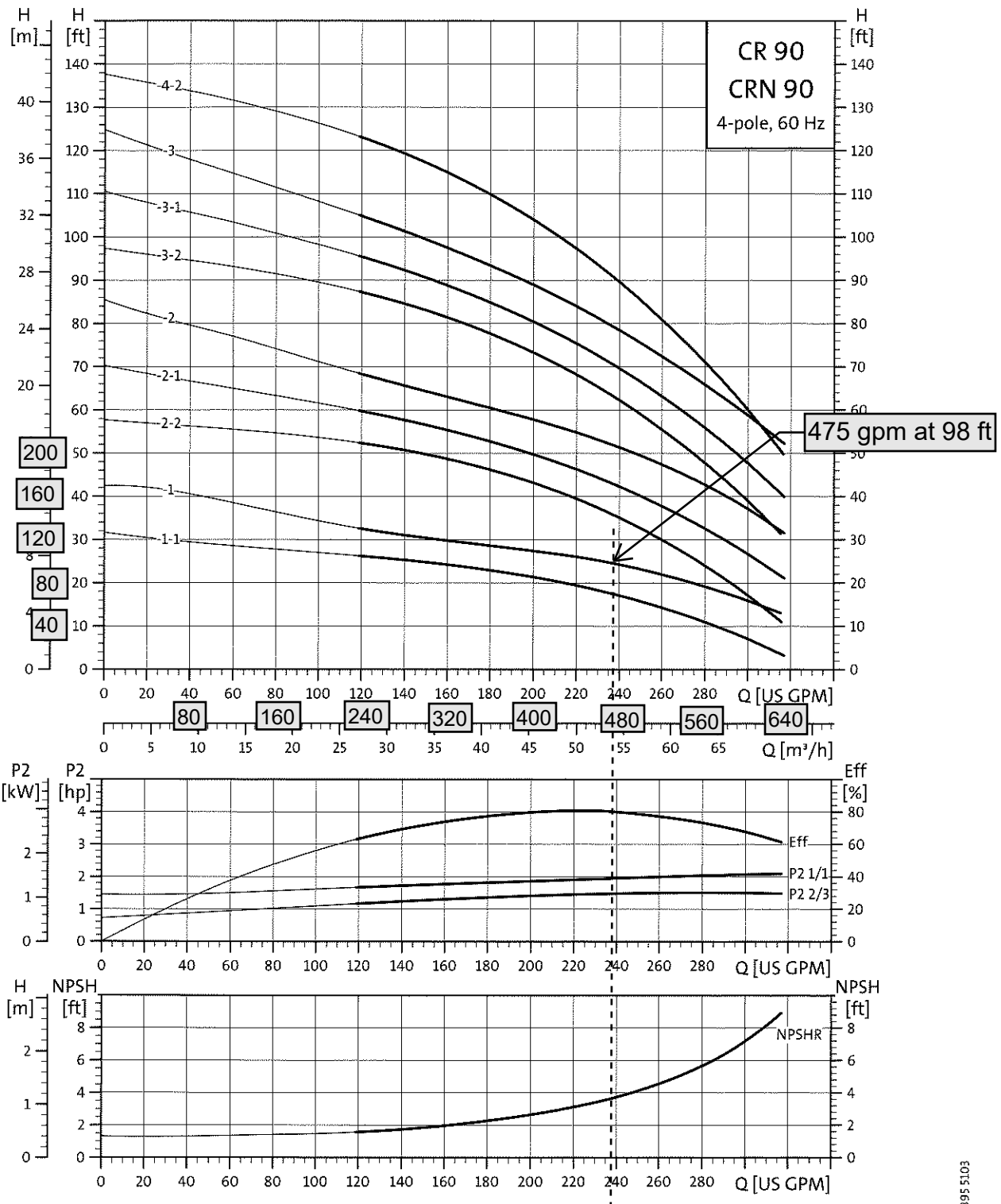
Description	Value
Rated current:	10,8-9,35/6,20-5,40 A
Starting current:	860-1100 %
Cos phi - power factor:	0.91-0.84
Rated speed:	3480-3530 rpm
IE efficiency:	IE2 87,5% - IE3 88,5%
Motor efficiency at full load:	87.5-88.5 %
Motor efficiency at 3/4 load:	88.0 %
Motor efficiency at 1/2 load:	87.7 %
Number of poles:	2
Enclosure class (IEC 34-5):	55 Dust/Jetting
Insulation class (IEC 85):	F
Motor protection:	PTC
Motor Number:	85U05510
Controls:	
Frequency converter:	NONE
Others:	
Minimum efficiency index, MEI $\eta_{\%}$:	0.70
Net weight:	123 lb
Gross weight:	130 lb
Shipping volume:	3.67 ft ³
Country of origin:	US
Custom tariff no.:	8413.70.2040

Performance curves

Sienna Pump No. 4 & 5 Model CR90-1

4-pole versions
CR 90, CRN 90

A 2-pole (3,500 rpm) curve was not found. This curve assumed to be correct if adjusted for speed.



TMA02 8395 5103

STA-RITE® J/JB Series

General purpose centrifugal pumps



The J/JB Series Pumps have a heavy-duty cast iron construction and are offered in high and medium head models, with Noryl® or silicon bronze impeller.

APPLICATIONS

Water systems and sprinkling...
for homes, farms and industry.

SPECIFICATIONS

Body and Seal Plate: Close-grained cast iron

Base: Steel 12 gauge

Impeller: J Series – Noryl

Impeller: JB Series – Silicon bronze

Shaft: 416 stainless steel

Mechanical Seal: Carbon/ceramic, Buna-N

FEATURES

1/3 through 2-1/2 HP: High head and medium head models, with heavy-duty motors, easy service design and four-position discharge.

Maximum Case Pressure:

JH & JBH – all HP max case 125PSI

JM & JBM – 1/3-1HP 75 PSI

JM & JBM – 1.5-2.5 HP 125 PSI

Drain Port: Provided for easy winterizing.

Medium Head Models: Deliver up to 110' of head with capacities to 140 GPM.

High Head Models: Deliver up to 140' of head with capacities to 90 GPM.

Easy Serviceability: All models include replaceable wear ring and feature back pull-out design.

J Series with Noryl Impellers:

Abrasion-resistant for normal applications with working temperatures to 140°F.

JB Series with Silicon Bronze:

JB pumps equipped with shaft seals rated for temperatures to 225°F.

ORDERING INFORMATION

HIGH HEAD

Catalog Number		HP	Pipe Tapping Sizes		Motor Voltage	Phase	Approx. Wt. Lbs.
Noryl® Impeller	Silicon Bronze Impeller		Suct.	Disch.			
JHB	JBHB	1/3	1-1/4"	1"	115/230	1	38
JHC	JBHC	1/2	1-1/4"	1"	115/230	1	39
JHC2	JBH2C		1-1/4"	1"	200	1	39
JHC3	JBHC3	3/4	1-1/4"	1"	208-230/460	3	39
JHD	JBHD		1-1/4"	1"	115/230	1	42
JH2D3	-	1	1-1/4"	1"	200	3	42
JHD3	JBHD3		1-1/4"	1"	208-230/460	3	42
JHE	JBHE	1	1-1/4"	1"	115/230	1	45
JH2E	JBH2E		1-1/4"	1"	200	1	45
JHE3	JBHE3	1-1/2	1-1/4"	1"	208-230/460	3	45
JHF	JBHF		1-1/4"	1"	115/230	1	49
JH2F	-	2	1-1/4"	1"	200	1	49
JH2F3	-		1-1/4"	1"	200	3	49
JHF3	JBHF3	2-1/2	1-1/4"	1"	208-230/460	3	49
JHG	JBHG		1-1/2"	1-1/4"	115/230	1	69
JHG3	-	2	1-1/2"	1-1/4"	200	3	69
JHG3	JBHG3		1-1/2"	1-1/4"	208-230/460	3	69
JHHG	JBHHG	2-1/2	2"	1-1/2"	115/230	1	74
JHHG3	JBHHG3		2"	1-1/2"	208-230/460	3	74

ORDERING INFORMATION

MEDIUM HEAD

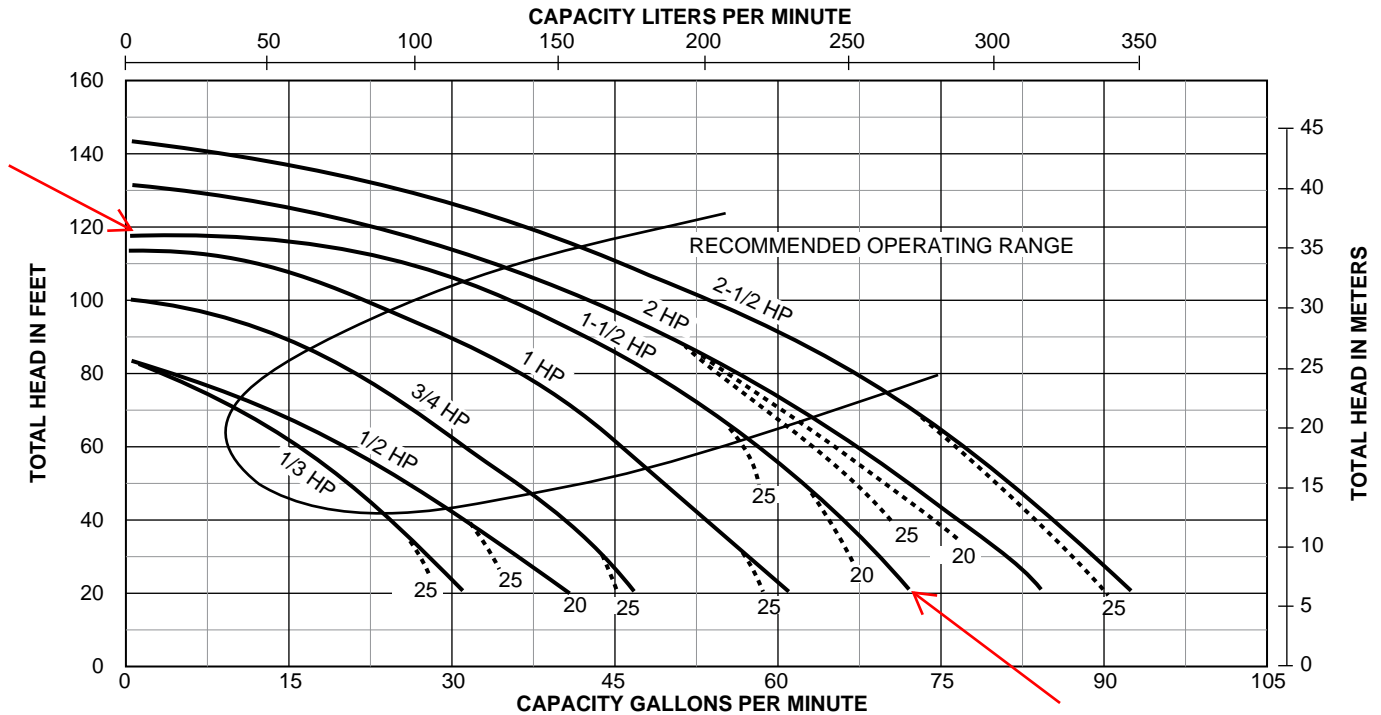
Catalog Number		HP	Pipe Tapping Sizes		Motor Voltage	Phase	Approx. Wt. Lbs.
Noryl® Impeller	Silicon Bronze Impeller		Suct.	Disch.			
JMB	JBMB	1/3	1-1/4"	1"	115/230	1	38
JMC	JBMC	1/2	1-1/4"	1"	115/230	1	39
JMC3	JBMC3		1-1/4"	1"	208-230/460	3	39
JMD	JBMD	3/4	1-1/4"	1"	115/230	1	42
-	JBMD2		1-1/4"	1"	200	1	42
-	JBMD2D3	1	1-1/4"	1"	200	3	42
JMD3	JBMD3		1-1/4"	1"	208-230/460	3	42
JME	JBME	1	1-1/2"	1-1/4"	115/230	1	43
JME	-		1-1/2"	1-1/4"	200	1	43
-	JBME2E3	1-1/2	1-1/2"	1-1/4"	200	3	43
JME3	JBME3		1-1/2"	1-1/4"	208-230/460	3	43
JMF	JBMF	1-1/2	1-1/2"	1-1/4"	115/230	1	54
JMF	-		1-1/2"	1-1/4"	200	1	54
-	JBMF2F3	2	1-1/2"	1-1/4"	200	3	54
JMF3	JBMF3		1-1/2"	1-1/4"	208-230/460	3	54
JMG	JBMG	2	1-1/2"	1-1/4"	115/230	1	66
-	JBMG2G3		1-1/2"	1-1/4"	200	3	66
JMG3	JBMG3	2-1/2	1-1/2"	1-1/4"	208-230/460	3	66
-	JBMMG		2"	1-1/2"	115/230	1	74
-	JBMMG3		2"	1-1/2"	208-230/460	3	74

Pentair trademarks and logos are owned by Pentair plc or its affiliates. All other third party registered and unregistered trademarks and logos are the property of their respective owners.

STA-RITE® J/JB Series

General purpose centrifugal pumps

PUMP PERFORMANCE: HIGH HEAD



NOTE: Dotted lines indicate performance reduction at high suction lift.

PUMP PERFORMANCE (Capacity in gallons per minute)

HIGH HEAD

HP	Discharge Pressure		Dynamic Suction Lift				
	PSI	Feet Head	5'	10'	15'	20'	25'
1/3	10	23.1	—	26	24	22	20
	20	46.2	20	18	15	11	10
	30	69.3	6	—	—	—	—
1/2	10	23.1	—	34	32	29	26
	20	46.2	25	21	18	15	11
	30	69.3	10	—	—	—	—
3/4	10	23.1	—	—	42	39	37
	20	46.2	35	32	30	28	26
	30	69.3	24	22	19	15	10
1	20	46.2	48	46	45	43	40
	30	69.3	38	35	31	28	25
	40	92.4	23	20	15	—	—

PUMP PERFORMANCE (Capacity in gallons per minute)

HIGH HEAD

HP	Discharge Pressure		Dynamic Suction Lift				
	PSI	Feet Head	5'	10'	15'	20'	25'
1-1/2	20	46.2	62	60	58	55	52
	30	69.3	50	48	44	40	37
	40	92.4	37	32	29	22	—
2	20	46.2	71	68	66	62	60
	30	69.3	60	57	52	59	45
	40	92.4	45	40	36	31	24
	50	115.5	22	15	—	—	—
2-1/2	20	46.2	81	79	76	74	71
	30	69.3	69	67	63	60	56
	40	92.4	56	51	47	44	38
	50	115.5	33	30	22	15	—

Tested and rated in accordance with Water Systems Council Standards.

NOTE: Pumps installed with a Pro-Source® tank require a 100 PSI relief valve. Pumps with a conventional tank require a 75 PSI relief valve. Relief valve must be capable of relieving entire flow of pump at relief pressure.

APPENDIX L – FIRE DISTRICT NESTING APPROVAL

Nesting of Fire Flow and Standby Storage

From: Arnold Baker [<mailto:arnoldb@mansonfire.org>]

Sent: Thursday, February 25, 2021 11:21 AM

To: Rod Anderson <randerson@lcrd.org>

Cc: Bob Plumb (bob.plumb@co.chelan.wa.us)

Subject: RE: Reservoir storage nesting

Rod,

I forwarded to Bob Plumb, Chelan County Fire Marshal, (included in this email) we had a discussion this morning. He has used nesting on other areas of the County, mostly because of a lack of funding to build more storage. Like you have a spare \$5M in your account!

So Bob and I are agreeable to allow nesting, providing you have a plan for building more storage. Nesting is a temporary fix and putting off till 2035 isn't resolving the problem. In 5 years the current problem gets bigger. Nesting is a strategy to buy a little bit of time. Those strategies don't help when the supply hose goes flat.

I have a couple of high-risk issues in the community that concern me. Knowing risks on the fire side and on the water supply side is the business we are in. If I get into a large fire, I will be calling probably Dave Walters to keep an eye on what is happening on the water supply side so I know what to expect. Then I can change tactics to go into exposure protection when limited water situation exists. That means I am writing something off and protecting what isn't burning yet.

With our last fall purchase of an aerial truck, we now have enough master stream devices to flow 6000-gpm. Not sure the hydrants would like that much draw, and no I don't have to use them all at once. We have converted over to 5" supply line on 3 trucks so we can move a lot of water. Our standard operation in commercial is laying 5" and 3" together. I have just completed a couple of training sessions with the crew to maximize water delivery. I told them that 25-psi residual is desired, 20-psi in a pinch, and there isn't much flow difference between 25 and 20. I will do my best to protect your system so it can keep delivering.

Arnold Baker, Chief
Chelan County Fire District 5
arnoldb@mansonfire.org

From: Ryan Peterson [<mailto:rpeterson@rh2.com>]

Sent: Wednesday, February 24, 2021 10:24 AM

To: Rod Anderson <randerson@lcrd.org>; Jennifer Collins <jcollins@lcrd.org>

Subject: Reservoir storage nesting

The Lake Chelan Reclamation District has two domestic water reservoirs, a 1.05 million gallon, and a 1.25 million gallon, for 2.3 MG total. Historically, the District has calculated the required storage by assuming that fire storage and standby storage (water needed during a temporary supply failure) occupy different spaces in the tanks (see attached diagram).

RH2 Engineering is updating the District's Water System Plan, but we are revisiting how water consumption is calculated for the summer, compared to prior Plans. The result being that the existing 2.3 MG is not mathematically sufficient. However, this assumes that a 5,750 gpm, 4-hour duration fire is happening at the same time there is a major water treatment plant failure, and it's also in the middle of July. While this is a theoretically possible scenario, it's not particularly likely.

Though another reservoir would resolve this, the cost to do so is extremely high, upwards of \$5 million, which is not in the District's current budget.

What we propose is to "nest" the fire and standby storage so they occupy the same space in the tank (see the asterisk note on the attached diagram). Using this method, the District can defer a new reservoir and work on allocating funds. Our current estimate is that a new tank would not be needed until the year 2035. See the table below.

	2015	2019	2026	2030	2040	2050
Operational	459,031	459,031	459,031	459,031	459,031	459,031
Equalizing	0	0	0	0	13,162	38,441
Standby	1,570,839	1,302,250	1,674,969	1,746,239	1,934,004	2,046,875
Fire	1,044,000	1,044,000	1,044,000	1,044,000	1,044,000	1,044,000
Required	3,075,885	2,807,300	3,180,026	3,251,300	3,452,237	3,590,397
Available	2,306,530	2,306,530	2,306,530	2,306,530	2,306,530	2,306,530
Surplus (Deficit)						
Without Nesting	(769,355)	(500,770)	(873,496)	(944,770)	(1,145,707)	(1,283,867)
With Nesting	276,660	545,249	172,530	101,260	(99,667)	(237,817)

WA Dept. of Health requires approval from the local fire authority to "nest" the storage volumes. Would you be willing to provide that approval? Please feel free to contact me directly to discuss if you have any questions.



Ryan Peterson PE

RH2 Engineering, Inc.

300 Simon St SE, STE 5

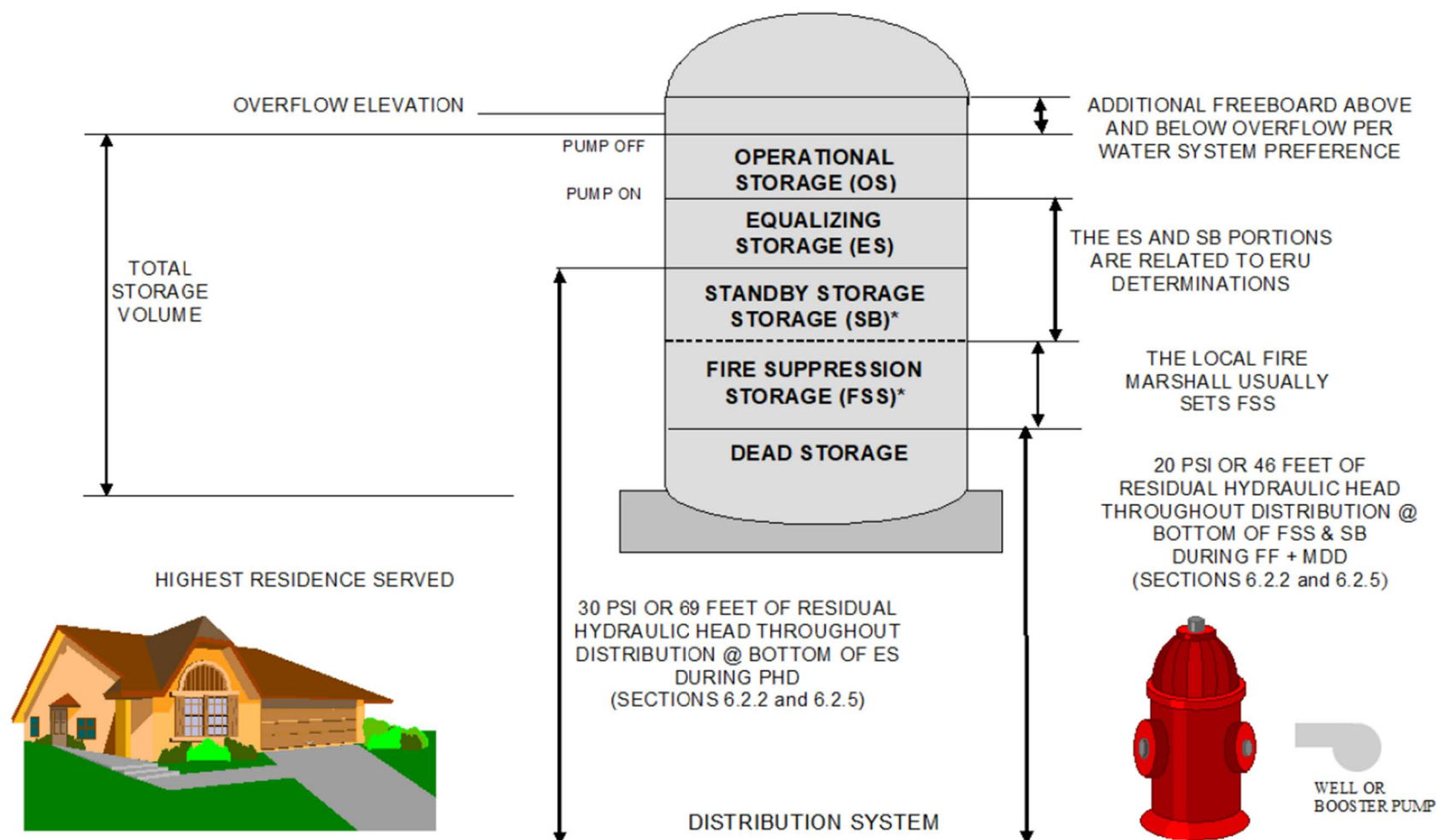
East Wenatchee, WA 98802

O: 509.886.6770

C: 509.679.9144

rpeterson@rh2.com

Figure 7-1: Reservoir Storage Components



* WAC 246-290-235(4) allows consolidation of these components with approval of local fire protection authority. If consolidation ("nesting") is approved, apply whichever the greater of SB or FSS.