City of Scappoose

WATER MANAGEMENT AND CONSERVATION PLAN

FINAL | December 2019

City of Scappoose

WATER MANAGEMENT AND CONSERVATION PLAN

Digitally signed by Daniel L. Reisinger
Contact Info: Carollo Engineers, Inc.
Date: 2019.12.10 16:18:39-08'00'

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Abbreviations

ADD	Average Day Demand
AMR	Advanced Meter Reading
ASR	Aquifer Storage and Recovery
AWWA	American Water Works Association
City	City of Scappoose
cfs	cubic feet per second
DI	Ductile Iron
DPS	Distinct Population Segment
ERU	Equivalent Residential Unit
ESA	Endangered Species Act
ESU	Evolutionary Significant Unit
ft	Feet
gpd	gallons per day
gpd/ERU	gallons per day per Equivalent Residential Unit
gpm	gallons per minute
HDPE	high-density polyethylene
LF	Linear Feet
MDD	Maximum Day Demand
MG	million gallons
mgd	million gallons per day
MR1	Miller Road 1
MR2	Miller Road 2
MR3	Miller Road 3
NOAA	National Oceanic and Atmospheric Administration
O&M	Operations and Maintenance
OAR	Oregon Administrative Rules
ODFW	Oregon Department of Fish and Wildlife
OMIC	Oregon Manufacturing Innovation Center
POA	Point of Appropriation
POD	Point of Diversion
PRV	Pressure Reducing Valve
psi	pounds per square inch
PVC	polyvinyl chloride
PZ	Pressure Zone
R&R	Repair and Replacement
RWSA	Retail Water Service Area
SCADA	Supervisory Control and Data Acquisition
SMC	City of Scappoose Municipal Code
UGA	Urban Growth Area
UGB	Urban Growth Boundary
UIC	Underground Injection Control
WMCP	Water Management and Conservation Plan
WRD	Water Resources Division
WTP	Water Treatment Plant

Chapter 1

INTRODUCTION

1.1 Purpose

The purpose of this Water Management and Conservation Plan (WMCP) is to define the City of Scappoose's (City) current and future water resource needs and the management of its existing resources through conservation and, during times of water shortage, curtailment.

In Oregon, water conservation is now considered a critical element in the State's water resource inventory. As such, municipal water suppliers are required to have a current, Water Resources Division (WRD) approved, WMCP or complete one within three years of approval of extension of water rights. The WMCP is a mechanism for utilities to demonstrate that they have minimized their needs and are developing resources in an environmentally responsible manner. This WMCP is designed to meet the regulatory requirements outlined by Oregon Administrative Rules (OAR) 690-086.

This WMCP describes the City's:

- Source of supply reliability and capacity.
- Current and future estimated population and water demands.
- Existing water rights inventory.
- Current and planned Water Conservation Program.
- The City's Water Curtailment Plan.

1.2 Regulatory Requirement

OAR 690-086 sets forth the requirement for the development of WMCP's. This requirement is tied to OAR 690-315 which sets forth the requirement for suppliers serving populations greater than 1,000 to complete a WMCP in association with water permit extensions. This WMCP has been developed to meet all applicable OAR requirements for WMCP's.

1.3 Progress Report

This WMCP is an update to its existing 2012 Plan. Since the 2012 Plan, the City is developing a future Dutch Canyon Well #2 to meet new system demands, which requires additional "green light" water to put into use. Additionally, the transfer of G-8615 and G17643 has been approved. This WMCP update was developed in part to meet the requirements needed to make the well permanent. As described in the following Chapters, the City has continued its water conservation programs and maintains a water curtailment plan, which has been used to request voluntary curtailment in the past. The City's calculated water loss has increased to greater than 15 percent. In response, the City has instituted a water loss control program, including leak detection, main repair and replacement, and expanded its meter replacement program. The WMCP describes measures to reduce water loss to 15 percent in the next five years.

1.4 Summary of Data Sources

The WMCP is an update to the 2012 WMCP to reflect the City's future Dutch Canyon Well #2, as well as new demand projections developed as part of the 2018 Water System Master Plan Update. Throughout this WMCP are references to data, most of which were obtained from City files and records including population projections, customer billing rates, and conservation program implementation. Historical data, such as connections and demands, were obtained from the City's billing software and operational records.

1.5 Affected Local Governments and their Comments

The City of Scappoose's nearest neighboring community water systems are the Warren Water Association, the City of McNulty, Oregon and the City of St. Helens, Oregon. There is currently no physical connection between the water systems and there are no shared sources of supply.

As there are no other communities impacted by the City's water resource management and conservation practices, at this time no review or comment by other local governments is required.

To meet the requirement for notifying local governments a Notice of Availability was sent to the neighboring communities listed above and Columbia County. Review will be included in Appendix A.

1.6 Date for Submittal of Next Update

The City plans to move forward with Conservation Program elements as outlined in this WMCP. Based on this outlook, the City plans an update to this WMCP in 2028 unless the City's situation should change requiring a revision of the document sooner (i.e. due to State requirements as part of a water right application, etc.).

1.7 Plan Checklist

Table 1.1 summarizes WMCP requirements, indicates inclusion in this document, and identifies the location of the pertinent information.

Table 1.1 Checklist of Required WMCP Contents

Item	Item Included	OAR Reference	Location
WMCP Plan Elements			
Notice to Affected Local Government(s)	X	690-086-0125(5)	Section 1.5
Proposed WMCP Update Schedule	X	690086-0125(6)	Section 1.6
Additional Time to Implement Conservation Benchmarks	X	690-086-0125(7)	Section 5.15
Water Supplier Description			
Supplier's Sources	X	690-086-0140(1)	Section 2.4, Section 2.5
Current Service Area & Population Served	X	690-086-0140(2)	Section 2.2, Figure 2.1

Item	Item Included	OAR Reference	Location
Assessment of Adequacy and Reliability of Existing Water Supplies	X	690-089-0140(3)	Section 2.7 Section 2.8
Present and Historic Water Use	X	690-086-0140(4)	Section 3.2
Water Rights Inventory Table and Environmental Resource Issues	X	690-086-0140(5)	Table 2.4, Table 2.5, Table 2.6, Section 2.6
Customers Served and Water Use Summary	X	690-086-0140(6)	Section 3.3 Section 3.4
Interconnections with Other Systems	X	690-086-0140(7)	Section 2.9
System Schematic	X	690-086-0140(8)	Figure 2.1
Quantification of System Leakage	X	690-086-0140(9)	Section 5.9
Water Conservation Element			
Progress Report on Implementation of Conservation Measures	X	690-086-0150(1)	Section 5.2 Table 5.2
Water Use Measurement and Reporting Program	X	690-086-0150(2)	Section 5.14
Currently Implemented Conservation Measures	X	690-086-0150(3)	Section 5.2 Table 5.2
Annual Water Audit	X	690-086-0150(4)(a)	Section 5.4
Full Metering of System	X	690-086-0150(4)(b)	Section 5.5
Meter Testing and Maintenance Program	X	690-086-0150(4)(c)	Section 5.5
Rate Structure	X	690-086-0150(4)(d)	Section 5.6
Leak Detection Program	X	690-086-0150(4)(e)	Section 5.7
Public Education Program	X	690-086-0150(4)(f)	Section 5.8
System Leakage Reduction Program <15%	X	690-086-0150(5)	Section 5.9 Section 5.10
Technical and Financial Assistance Programs	X	690-086-0150(6)(b)	Section 5.11
Retrofit/Replacement of Inefficient Fixtures	X	690-086-0150(6)(c)	Section 5.12
Rate Structure and Billing Practices to Encourage Conservation	X	690-086-0150(6)(d)	Section 5.6
Reuse, Recycling and Non-Potable Opportunities	X	690-086-0150(6)(e)	Section 5.13
Water Curtailment			
Water Supply Assessment and Description of Past Deficiencies	X	690-086-0160(1)	Section 6.2
Stages of Alert	X	690-086-0160(2)	Section 6.2 Section 6.3

Item	Item Included	OAR Reference	Location
Triggers for Each Stage of Alert	X	690-086-0160(3)	Section 6.2 Section 6.3
Water Curtailment (continued)			
Curtailment Actions	X	690-086-0160(4)	Section 6.2 Section 6.3
Water Supply Element			
Future Service Area and Population Projections	X	690-086-0170(1)	Figure 2.1 Section 3.5
Schedule to Fully Exercise Each Permit	X	690-086-0170(2)	Section 4.5
Demand Forecast	X	690-086-0170(3)	Section 3.6
Comparison of Projected Need & Available Sources	X	690-086-0170(4)	Table 4.4
Analysis of Alternative Sources	X	690-086-0170(5) and (8)	Section 4.5 Section 4.6
Maximum Rate and Monthly Volume Quantification	X	690-086-0170(6)	Section 4.5
Mitigation Actions Under State and Federal Laws	X	690-086-0170(7)	Section 4.5
Other proposed conservation measures	X	690-086-0150(6)(f)	Table 5.2

Chapter 2

WATER SUPPLIER DESCRIPTION

2.1 Introduction

This Chapter provides a description of the City's water system, including service area, water sources, distribution system, and a system schematic. Additionally, it summarizes water supplies, water rights, and environmental resources issues of concern, which are evaluated in subsequent chapters.

Table 2.1 summarizes the WMCP Plan Elements included in this Chapter and their locations.

Table 2.1 Location of WMCP Elements Included in Chapter 2

Location	OAR Reference	Location
Water Supplier Description		
Supplier's Sources	690-086-0140(1)	Section 2.4, Section 2.5
Current Service Area/Population Served	690-086-0140(2)	Section 2.2, Figure 2.1
Assessment of Existing Water Supplies	690-089-0140(3)	Section 2.7, Section 2.8
Water Right Inventory Table and Environmental Resource Issues of Concern	690-086-0140(5)	Table 2.4, Table 2.5, Table 2.6, Section 2.6
Interconnection with Other Systems	690-086-0140(7)	Section 2.9
System Schematic	690-086-0140(8)	Figure 2.1
Water Supply Element		
Future Service Area	690-086-0170(1)	Figure 2.1

2.2 Service Area

As of 2016, the City served a population of approximately 7,560 people through 2,328 accounts. The City's existing service area is within the current City limits with the exception of the Dutch Canyon Service Area and in the far southern portion of pressure zone (PZ) 1, as shown in Figure 2.1. The City intends to provide water service to all customers, as required, within its Urban Growth Boundary (UGB) in the future. The City is annexing portions of its northern urban growth area, including to aid in the development of the Oregon Manufacturing Innovation Center (OMIC) and the East Airport development. Future population and demand projections are presented in Chapter 3.

The population and employment estimate was developed as part of the City's Transportation System Plan. For population estimates to 2030, the Transpiration Plan used the February 2008 Population Forecasts for Columbia County Oregon, its Cities and Unincorporated Area 2010 to 2030, prepared by Portland State University (Medium Growth Forecast). The employment forecast was based on the City of Scappoose Economic Opportunities Analysis, by Johnson Reid, 2011.

The future 2035 estimates were based on land use projection as an estimate of the amount of each land use (household and employment) that the demographic projections could accommodate at expected build-out of vacant or underdeveloped lands assuming Comprehensive Plan zoning. This 2035 estimate was inflated to 2039 assuming a continued growth at the same rate. Note, growth beyond 2035 will likely require changes in land use planning.

2.3 System Schematic

The City water system consists of five elements:

1. Supplies.
2. Treatment.
3. Distribution.
4. Storage.
5. Pumping.

A map of the water system is presented in Figure 2.1. The hydraulic profile or system schematic is presented in Figure 2.2.

2.3.1 Supplies

The City obtains water supplies from three (3) surface water diversions and four (4) permanent groundwater wells and one (1) temporary well. Surface water sources are on South Scappoose Creek or its tributaries. Raw surface water is combined into a single transmission main and conveyed to water treatment. Groundwater wells are located in two (2) well fields: Dutch Canyon and Miller Road. All supplies are treated before entering the distribution system. Supplies are discussed in detail in the following sections and in Chapter 4.

2.3.2 Treatment

Surface water supplies are treated at the Keys Road Water Treatment Plant (WTP). The surface water sources are treated using conventional filtration and chlorine disinfection. Treated water undergoes fluoride addition for dental health and caustic soda addition for pH adjustment. Following treatment, treated flow is conveyed by gravity to finished water storage reservoirs in the PZ1 prior to distribution.

Groundwater supplies are treated at two WTP: Keys Road WTP and Miller Road WTP:

- Dutch Canyon groundwater sources (Well #1 and future Well #2) are treated at Keys Road WTP.
- The Miller Road groundwater sources (Wells #1, #2 and #3) are treated at the Miller Road WTP.

Both facilities use greensand filtration to remove iron with chlorine and potassium permanganate addition. Treated water undergoes fluoride addition for dental health and caustic soda addition for pH adjustment.

Following treatment at Keys Road WTP, treated groundwater supplies are blended with treated surface water supplies and conveyed by gravity to finished water storage reservoirs for distribution into the system. Treated water from the Miller Road WTP is pumped directly into the distribution system.

Legend

- Reservoir
- Well
- Surface Water Source
- Water Treatment Plant
- Raw Water Main

Water Distribution Main

- <= 6 inches
- 8 inches
- 10 - 16 inches
- > 16 inches
- City Boundary
- Urban Growth Boundary
- Streets

Pressure Zone Boundaries

1 | 3 | 2 | 4

Feet
0 1,000 2,000

Data Sources: City of Scappoose, ESRI

Disclaimer: Features shown in this figure are for planning purposes and represent approximate locations. Engineering and/or survey accuracy is not implied.

Bella Vista Reservoirs
Keys Road WTP
Keys Road Reservoirs
Miller Road WTP
MR-1
MR-2
MR-3
Dutch Canyon Well #1
Dutch Canyon Well #2

Detail Map
Approx. 2.5 miles

Detail Map

South Scappoose Creek Diversion Reservoir
Lazy Creek Diversion Reservoir
Gourlay Creek Diversion Reservoir

Figure 2.1 City of Scappoose Water System

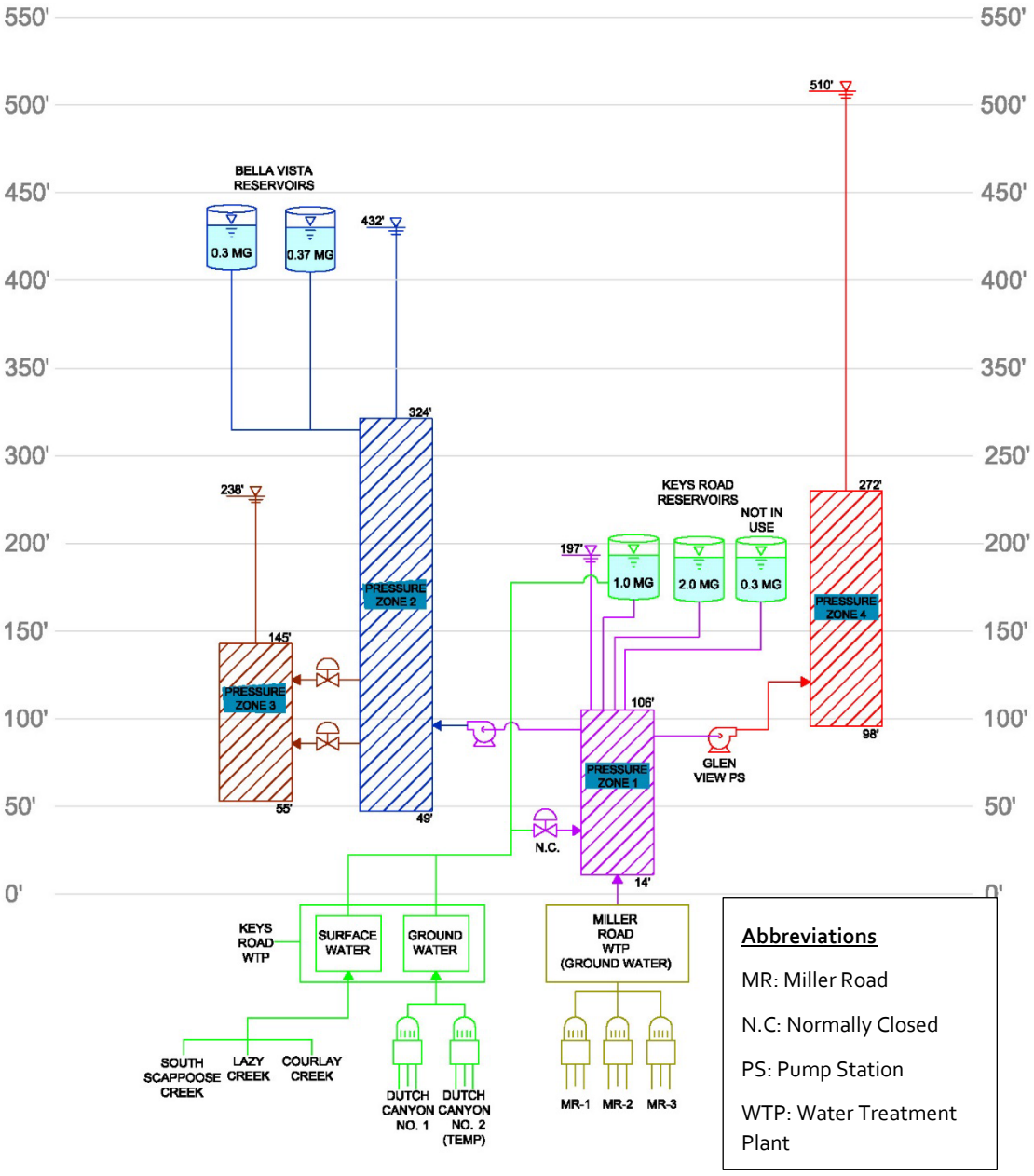

Figure 2.2 City of Scappoose Hydraulic Profile

2.3.3 Distribution and Pumping

The transmission and distribution system includes 52 miles of pipe, ranging in size from 2-inch to 24-inch diameter. The transmission piping conveys raw water from surface water supplies and Dutch Canyon wells (both existing and future) to treatment at Keys Road. The distribution piping delivers water to customers. Sixty five percent of the distribution system pipe material is polyvinyl chloride (PVC) with 22 percent of the system older steel pipe and some cast iron pipe. The remainder is ductile iron (DI), galvanized iron, or high-density polyethylene (HDPE).

The City's distribution system consists of four (4) pressure zones:

- PZ1 includes the majority of the residential, commercial, and some industrial customers.
- PZ2 serves higher elevation residential customers on the western side of the City.
- PZ3 is a small pressure reducing valve (PRV) feed sub pressure zone of PZ2. It serves residential customers and a City Park.
- Dutch Canyon Service Area (PZ4) provides domestic only (no fire suppression) supply to residential customers on Glen View Lane and further up Dutch Canyon Road.

Static pressure in the City generally ranges from 30 to 90 pounds per square inch (psi); however, portions of PZ2 exceed 120 psi. The City goal is to provide domestic supply at pressures between 35 psi and 80 psi at customer meters. Additionally, the City provides fire flows at a minimum of 20 psi residual pressure. A minimum of 1,000 gallons per minute (gpm) fire flow is provided to residential customers and up to 3,500 gpm fire flow is provided to non-residential customers (i.e. commercial, industrial, governmental, etc.). The Public Works Design Standards provide additional guidance for calculating fire flow for individual buildings, which may exceed these general fire flows.

2.3.4 Storage

The City operates five finished water storage reservoirs. Three reservoirs are located at the Keys Road WTP with capacities of 1.0 million gallons (MG), 2.0 MG and 0.3 MG. Currently, the 0.3 MG reservoir is not in use. These reservoirs serve PZ1 and the small Dutch Canyon Service Area (PZ4). PZ2 and PZ3 are served by two elevated reservoirs located on NE Bella Vista Road with capacities of 0.3 and 0.37 MG. The reservoirs service the upper zone at a hydraulic grade line of 430 feet (ft).

2.3.5 Pumping

A booster pump station is located near the Keys Road WTP to elevate water to the upper pressure zone (PZ2) with and hydraulic grade of 432 feet. Additionally, PZ4 (Dutch Canyon Service Area) is served via a booster pump station located at the corner of Glen View Lane and Dutch Canyon Road.

2.4 Surface Water Supplies

The City's supply sources are from surface water sources originating from South Fork Scappoose Creek, Lazy Creek, and Gourlay Creek. A summary of the surface water sources is presented in Table 2.2. The City holds water rights to withdraw a combined total of 9.0 million gallons per day (mgd) (14 cubic feet per second [cfs]) from all three sources. Water from each of these sources is diverted at a diversion structure on each of the creeks. Diversions have fish screens to limit injury to protected species and stilling basins to limit sediment within the transmission mains. A transmission line transports raw water from the three surface water diversions to the Keys Road WTP. The capacity of the transmission main currently limits the total maximum instantaneous diversion from the three diversions to 2.0 mgd (3 cfs). The City has the ability to operate each surface water diversion individually up to the water right or a maximum rate of 3.0 cfs.

2.5 Groundwater Supply

The City also exercises ground water rights for four production wells within the system. A summary of the groundwater sources is presented in Table 2.3. Those well sources include the existing Dutch Canyon Well #1 (Permits G-8615) and future Well #2, (G-17643) – which is under construction at the time of this report - and Miller Road Wells #1, #2, and #3 (Permit G-17644) with rights to withdraw a combined maximum instantaneous withdrawal total of 1.1 mgd (1.74 cfs). The City also has a water claim (GR-926) for 0.07 mgd on another well that is not for municipal use. The City's groundwater wells are not located within the designated boundaries of any critical groundwater area according to WRD information.

Water from the Dutch Canyon Wells is transmitted through a 12-inch C-900 PVC pipe to the junction of Dutch Canyon Road and E.M. Watts Road and up to the Keys Road WTP. Transmission capacity of the main exceeds the available water right.

Miller Road Wells and WTP are co-located on the same site, where the existing yard pipe is sufficient for existing wells. Future supplies to the WTP are anticipated to be located offsite and require a new transmission main(s).

2.6 Water Rights Summary

The City holds total water permits for 11.93 mgd (18.46 cfs) in the South Scappoose and Jackson Creek Basins. Within the South Scappoose Basin, the City holds surface water rights for 9.05 mgd (14.0 cfs) and groundwater rights for another 0.94 mgd (1.45 cfs). Within the Jackson Creek Basin, the City holds groundwater rights for 1.94 mgd (3.00 cfs). The detailed summary of the existing water rights and copies of the water right permits and certificates are documented in Appendix B.

The City currently operates three surface water sources and four wells under five separate water rights, all of which allow for municipal use. Table 2.4 summarizes the City's existing water rights. Table 2.5 summarizes the average day water right use in 2016. Table 2.6 summarizes the maximum instantaneous existing source capacity. The available data is not recorded by individual water right but is combined by Point of Diversion (POD) location. Data reflecting maximum instantaneous rate by individual water right is not available. The City collects daily data and plans to begin the collection of maximum instantaneous rate diversion data for each water right to meet monitoring requirements.

Table 2.2 Surface Water Sources

Point of Diversion (POD) Description	Approximate POD Location	Diversion Structure	Fish Screen	Permit Number	Priority Date	Permitted Allocation		Maximum Instantaneous Supply (cfs)
						cfs	mgd	
Gourlay Creek (tributary to South Scappoose Creek)	NE ¼ SE ¼, Section 12, T3N, R2W	Concrete	Yes	S-5813	1/24/1923	10.00	6.46	3.0
Lazy Creek (tributary to South Scappoose Creek)	POD 1: SE ¼ NW ¼, Section 18, T3N, R2W	Concrete	Yes	S-25918	11/24/1958	1.50	0.97	1.5
South Fork Scappoose Creek (tributary to Scappoose Creek)	POD 2: NW ¼ SE ¼, Section 7, T3N, R2W	Concrete	Yes			2.50	1.62	2.5

Note:
(1) The surface water supply transmission main capacity limits maximum instantaneous source capacity for the surface water sources to a total of 3.0 cfs (2 mgd). The City has the ability to operate each surface water diversion individually up to a maximum rate of 3.0 cfs.

Table 2.3 Groundwater Sources

POD Description	Well Name	Approximate Location	Aquifer Name	Well Depth	Casing Diameter	Screened Intervals	Permit Number	Permitted Allocation (cfs)	Maximum Instantaneous Supply (cfs)
Dutch Canyon Area (1 well under each permit in South Scappoose Creek Basin)	Dutch Canyon Well #1 & #2	NE ¼ SW ¼, Section 13, T3N, R2W	Sand and gravel	227′	12″	186′9″ - 226′9″	G-8615	0.89	0.74
		NE ¼ SW ¼, Section 13, T3N, R2W					G-17643	0.557	0.0
Miller Road Area (3 wells in Jackson Creek basin)	MR-3	POD 1 & 2: SE ¼ NW ¼, Section 7, T3N, R1W	Sand and gravel				G-17644		1.0
	MR-2		Sand and gravel	190′	6″, 5.5″	170′ -190′		2.23	
	MR-1		Sand and gravel	197′	16″, 12	142′ -187′		0.67	
Oak Street Area (a well in Jackson Creek Basin)	Oak Street Well	NE ¼ SE ¼, Section 12, T3N, R2W	Sand and gravel	203′	16″, 12″, 10″	160′ -194′	GR-926 (claim)	0.11	0.0

Table 2.4 City of Scappoose Existing Municipal Water Rights Summary

POD Description	Approximate POD Location	Application Number	Permit Number	Beneficial Uses	Permitted Allocation (cfs)	Allowed Rate under Development Limitations Condition and/or Perfected Rate of Certificate (cfs)	Permitted Allocation (mgd)	Permit Date	Certificate Number	Certificate Date	Certified Allocation (cfs)	Certified Allocation (mgd)	Completion of Development Date (Extended Completion Date)	Priority Date
Gourlay Creek (tributary to South Scappoose Creek)	NE ¼ SE ¼ , Section 12, T3N, R2W	S-8815	S-5813	Municipal Use	10.00	N/A	6.46	4/12/1923	5573	11/30/1925	10.00	6.46	N/A	1/24/1923
Lazy Creek (tributary to South Scappoose Creek)	POD 1: SE ¼ NW ¼ , Section 18, T3N, R2W	S-27859	S-25918	Municipal Use	1.50	N/A	0.97	3/16/1959	42700	12/5/1975	1.50	0.97	N/A	11/24/1958
South Fork Scappoose Creek (tributary to Scappoose Creek)	POD 2: NW ¼ SE ¼ , Section 7, T3N, R2W	S-27859	S-25918	Municipal Use	2.50	N/A	1.62	3/16/1959	42700	12/5/1975	2.50	1.62	N/A	11/24/1958
Dutch Canyon Area (1 well under each permit in South Scappoose Creek Basin)	NE ¼ SW ¼ , Section 13, T3N, R2W	G-9218 (Transfer T-12586)	G-8615	Municipal Use	0.89	N/A	0.58	8/31/1979	N/A	N/A	0.40	N/A	N/A	4/30/1979
	NE ¼ SW ¼ , Section 13, T3N, R2W Additional Points of Appropriation: NE ¼ SW ¼ , NE ¼ SW ¼, NE ¼ SW ¼, NE ¼ SW ¼, NE ¼ SW ¼ Of Section 13, T3N, R2W	G-15135 (Transfer T-12258)	G-17643 (supersedes G-15295)	Municipal Use	0.55	0.0[1]	0.36	12/20/2002	N/A	N/A	N/A	N/A	10/1/2050 (10/1/2050)	3/10/2000
Miller Road Area (3 wells in Jackson Creek basin)	POD 1 & 2: SE ¼ NW ¼ , Section 7, T3N, R1W Additional Points of Appropriation: SE ¼ NW ¼ , NE ¼ SW ¼, SW ¼ NW ¼, NW ¼ NW ¼, SE ¼ NW ¼ , Of Section 7, T3N, R1W	G-15792 (Transfer T-12284)	G-17644 (supersedes G-15491)	Municipal Use	2.23 Well #1	0.76[2]	1.44	9/15/2003	N/A	N/A	N/A	N/A	10/1/2007 (10/1/2050)	7/5/2002
				Municipal Use	0.67 Well #2	0.58[2]	0.43		N/A	N/A	N/A	N/A		
Oak Street Area (a well in Jackson Creek Basin)	NE ¼ SE ¼ , Section 12, T3N, R2W	GR-926 (claim)	GR-926 (claim)	Municipal Use	0.11	N/A	0.07	N/A	N/A	N/A	N/A	N/A	N/A	12/31/1950
Total					**18.46**	**1.34**	**11.93**				**14.00**	**9.05**		

Notes:
(1) As established by the "Development Limitations" condition in the Final Order issued December 12, 2014.
(2) As established by the "Development Limitations" condition in the Final Order issued August 29, 2014.

Table 2.5 Average Monthly and Average Daily Diversions by Water Right

POD Description	Permit Number	Annual Diversion in MG (Average Daily Diversion in cfs) [1]						Average Daily Diversion for Previous 6 years (cfs)
		2011	2012	2013	2014	2015	2016	
Surface Water Total		90.7 (0.033)	112.3 (0.041)	107.4 (0.039)	128.2 (0.047)	99.4 (0.036)	71.5 (0.026)	0.037
Dutch Canyon Well #1	G-8615	91.2 (0.033)	89.7 (0.033)	78.5 (0.029)	73.1 (0.027)	139.8 (0.051)	100.6 (0.037)	0.035
Miller Road Well 1	G-17644 (supersedes G-15491)	60.5 (0.022)	41.1 (0.015)	12.8 (0.005)	6.8 (0.002)	22.1 (0.008)	76.9 (0.028)	0. 013
Miller Road Well 2	G-17644 (supersedes G-15491)	40.94 (0.015)	38.88 (0.014)	48.63 (0.018)	61.7 (0.023)	63.6 (0.023)	57.49 (0.021)	0.019
Miller Road Well 3	G-17644 (supersedes G-15491)	0	2 (0.001)	41.6 (0.015)	47.7 (0.017)	28 (0.01)	100.6 (0.037)	0.009
Oak Street Area	GR-926 (claim)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Annual Total All Sources (MG)		283	284	289	318	353	310	

Note:
(1) Average month is calculated by dividing annual demand by 12. Average day is calculated by dividing annual demand by 365.

Table 2.6 Maximum Instantaneous Existing Source Capacity

Source	Permit Number	Maximum Instantaneous Existing Source Capacity (cfs)
Gurley Creek	*S-5813*	3.0 [1]
Lazy Creek and South Fork	S-25918	3.0 [1]
Dutch Canyon Well #1	G-17643	0.73
Miller Road Well 1, 2	G-17644	1.0

Note:
(1) The surface water supply transmission main capacity limits maximum instantaneous source capacity for the surface water sources to a total of 3.0 cfs (2 mgd). The City has the ability to operate each surface water diversion individually to achieve the maximum rate of 3.0 cfs per water right.

2.6.1 Instream Water Rights

Instream water rights have been established on South Scappoose Creek and Gourlay Creek, which are summarized in Table 2.7. The City currently operates its surface water diversions to maintain flows in the creeks; the City plans to measure streamflow in coming years to better understand supply available for its senior water rights.

Table 2.7 Instream Flows on South Scappoose and Gourlay Creeks

Period	South Scappoose Creek Flows (cfs)	Gourlay Creek Flows (cfs)
October 1 – October 31	5	0.5
November 1 – May 31	25	10.0
June 1 – July 15	12	2.0
July 16 – Sep 30	5	0.5

2.6.2 Water Quality

The Oregon Department of Environmental Quality's *Water Quality Assessment Database – 2012 Integrated Report* lists Scappoose Creek as water quality impaired due to dissolved oxygen. The City's surface water withdrawals are not currently regulatory affected by the impairment.

2.6.3 Sensitive Species

The City's surface water sources are located within the Lower Willamette 4th Field or 8 digit Hydrologic Unit (ID # 1709012). Oregon Department of Fish and Wildlife's (ODFW) Sensitive Species List identifies the following streamflow-dependent species currently known distribution is within the area:

- **Lower Willamette Chum Salmon**
  (Columbia River Evolutionary Significant Unit [ESU]) [*Oncorhynchus keta*]
  - State of Oregon Listing Status: **Sensitive – Critical**
- **Lower Willamette Steelhead**
  (Lower Columbia ESU/SMU, winter run) [*Oncorhynchus mykiss*]
  - State of Oregon Listing Status: **Sensitive – Critical**
- **Lower Willamette Chinook Salmon**
  (Lower Columbia River Chinook ESU/SMU, fall run, spring run) [*Oncorhynchus tshawytscha*]
  - State of Oregon Listing Status: **Sensitive – Critical**
- **Coastal Cutthroat Trout**
  (Lower Columbia Coastal Cutthroat Trout SMU / Southwestern Washington / Columbia River ESU) [*Oncorhynchus clarkii clarkii*]
  - State of Oregon Listing Status: **Sensitive – Vulnerable**
- **Bull Trout**
  (Willamette SMU) [*Salvelinus confluentus*]
  - State of Oregon Listing Status: **Sensitive**
- **Steelhead: Summer/Coastal Rainbow Trout**
  (Lower Columbia SMU/ESU) [*Oncorhynchus mykiss / irideus*]
  - State of Oregon Listing Status: **Sensitive – Critical**
- **Oregon Chub**
  (Range-Wide) [*Oregonichthys crameri*]
  - State of Oregon Listing Status: **Sensitive**

- **Western Brook Lamprey**
  (Range-Wide) [Lampetra richardsoni]
  - State of Oregon Listing Status: **Sensitive**

The National Oceanic and Atmospheric Administration's (NOAA) identifies the City's surface water sources possibly located within the Lower Columbia River ESU. NOAA's Endangered Species Act (ESA) salmon listing shows the following streamflow-dependent species listed for the Lower Columbia River Evolutionary Significant Unit:

- **Lower Columbia River Chinook Salmon ESU**
  [*Oncorhynchus tshawytscha*]
  - Federal Listing Status: **Threatened**
- **Columbia River Chum Salmon ESU**
  [*Oncorhynchus keta*]
  - Federal Listing Status: **Threatened**
- **Lower Columbia River Coho ESU**
  [*Oncorhynchus kisutch*]
  - Federal Listing Status: **Threatened**
- **Lower Columbia River Steelhead Distinct Population Segment (DPS)**
  [*Oncorhynchus mykiss*]
  - Federal Listing Status: **Threatened**
- **Upper Willamette River Chinook Salmon**
  [*Oncorhynchus tshawytscha]*
  - Federal Listing Status: **Threatened**
- **Upper Willamette River Steelhead**
  [*Oncorhynchus mykiss*]
  - Federal Listing Status**: Threatened**

The City operates its surface water withdrawals in accordance with established regulatory constraints.

2.7 Water Right Limitations

The City has development limitations on its groundwater sources. As a result the full beneficial use for the following permits will have a completion of development by:

- G-17643 – October 1, 2050.
- G-17644 – October 1, 2050.

The City has constructed a future Dutch Canyon Well (#2) that is currently under construction at the time of writing and currently operated in temporary status. The Water Right Transfer Application (T-12586) was submitted on February 6, 2017 and approved on February 14, 2018. Full beneficial use of the well is anticipated on or before October 1, 2018. The City anticipates the combination of the existing and new well will be able to make full use of Permit G-8615.

The City filed an Application for Permit Amendment on February 24, 2016 for Permit # G-15491. The Permit Amendment application requested additional Points of Appropriation (POAs) for municipal water supply. The application seeks to add the City's existing Miller Road 3 (MR3) well as an additional point of appropriation, which will supersede the City's Limited Use License for MR3. Additional POAs are included to allow the City to expand their ground water supply to meet growing system demands and make full use of the permit. Permit # G-17644 was approved on January 25, 2017, superseding Permit # G-15491.

The City makes use of surface water supplies year around. The City's two surfacewater rights on Gourlay Creek (S-5813) and South Fork Scappoose/ Lazy Creek (S-25918); however, they are seasonally limited in capacity due to a combination of low streamflow. With the existing infrastructure, the surface water source supply is restricted for the combined sources to as low as 0.55 cfs (250 gpm) in the dry season (summer and early fall).

2.8 Adequacy and Reliability of Existing Water Supply

As described in Section 4, the City does not have adequate and reliable supply to meet MDD supplies during the next 10 years and in the 11 to 20 year period given the water right limitations described above. As detailed in Section 4.5, the City has requested greenlight water to make full use of its groundwater rights to meet the projected future growth.

Additionally, the City will also need a very small amount of demand - 0.03 mgd (0.06 cfs) - before the end of the 20 year period from a new unidentified source. Potential new sources of supply are discussed in Section 4.6 to allow the City to investigate potential new sources further; no new source was selected in this Plan.

2.9 Interconnections with Other Municipal Supply Systems

The existing sources of water supply, treatment, storage, and distribution are owned and operated by the City of Scappoose. The closest neighboring water systems are the Warren Water Association, City of McNulty, and the City of St. Helens. At this time, there are no water system interconnections with other water systems. The distance between the systems currently makes such interconnections cost prohibitive.

Chapter 3

WATER SYSTEM SUPPLY AND DEMAND ASSESSMENT

3.1 Introduction

This section of the WMCP describes the City's 2018 demand projections made as part of the Water System Plan Update. It includes a summary of historical demand and production, seasonal water use, demographic growth estimates, and the future demand projections.

Table 3.1 summarizes the WMCP Plan Elements included in this Chapter and their locations.

Table 3.1 Location of WMCP Elements Included in Chapter 3

Location	OAR Reference	Location
Water Supplier Description		
Present and Historical Use	690-086-0140(4)	Section 3.2
Customer Served and Water Use Summary	690-086-0140(6)	Section 3.3, Section 3.4
Water Supply Element		
Future Service Area and Population Projections	690-086-0170(1)	Section 3.5
Demand Forecast	690-086-0170(3)	Section 3.6

3.2 Demand and Production History

Water production varies annually in response to system demand, which is correlated to weather, development, economic conditions, and conservation activities. As per the requirements of OAR 690-85 for a municipality holding water rights, the City annually submits a Water Use Measurement Report to the state. This historical production data, along with consumption data, were evaluated for the years 2011 through 2016. Historical data were evaluated to characterize the unique water use of the City's customers.

3.2.1 Historical Water Production

The City's water system has been historically supplied by four wells and three surface water supplies. Miller Road #1 (MR1), Miller Road #2 (MR2), and Miller Road #3 (MR3) are treated at the Miller Road WTP. The Dutch Canyon well #1 is treated at the Keys Road Water Treatment Plant. Surface water from the South Fork Scappoose Creek, Gourlay Creek, and Lazy Creek are treated at the Keys Road Water Treatment Plant.

3.2.1.1 Raw Water Production

Raw water production for the period of record are shown in Table 3.2. Raw water production is total metered source water production entering the treatment plant, and treated water production represents metered water entering the distribution system.

Total raw water production, shown in Figure 3.1 by source, has increased slightly starting in 2014 after 3 years of essential unchanged production. Note, combined surface water sources are measured at the intake of the Keys Road WTP. Production by source has varied year-to-year, but the majority of the water produced, 67 percent between 2011 and 2016, has come from the groundwater sources. Note, the 203 and 2014 time frame the Miller Road wells were rehabilitated, resulting in variations in annual use as each well was taken offline one at a time.

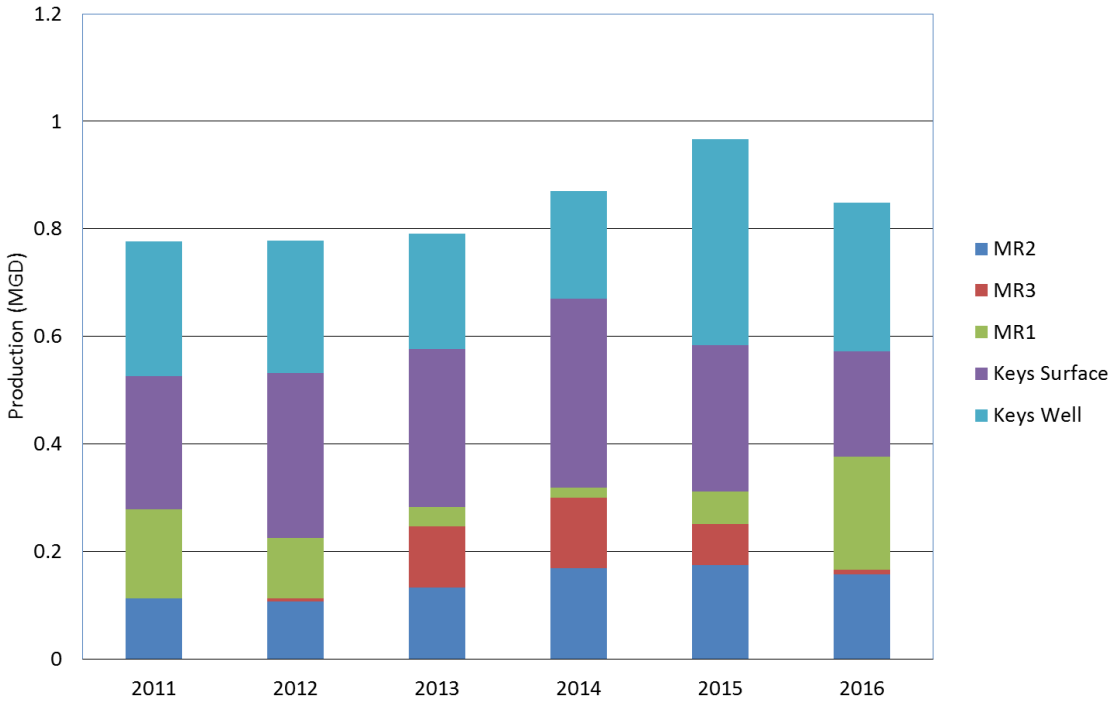

Figure 3.1 Historical Raw Water Production by Source

3.2.1.2 Average Day Demand

The Average Day Demand (ADD) represents the average daily demand for treated water over a year. It is calculated by dividing the total treated water produced by the number of days per year. Table 3.2 presents the ADD for the years 2011 through 2016. The relatively steady water production results in little difference between the summary statistics (e.g. average and 75th percentile). The maximum ADD of 0.79 mgd occurred in 2015, which corresponds to a relatively hot and dry summer.

3.2.1.3 Maximum Day Demand

Identifying Maximum Day Demand (MDD) is critical for establishing system supply capacity, pump station discharge rates, reservoir capacity, and pump sizes. Historical MDD, presented in Table 3.2, was the highest daily production of treated water by all sources. MDD has also been relatively consistent over the period analyzed, with a maximum of 1.59 mgd in 2011. The MDD to ADD peaking factor reflects the magnitude of peak demands relative to the average demand. Consistent ADD and MDD values resulted in consistent peaking factors, save for the maximum of 2.23 in 2011.

Table 3.2 Historical Water Use

Year	Raw Water		Treated Water			
	Average Production (mgd)	Maximum Production (mgd)	Average Day Demand (mgd)	Maximum Day Demand (mgd)	Date of Maximum Day Demand	Max Day/Avg. Day Peaking Factor
2011	0.78	1.61	0.71	1.59	8/2/2011	2.23
2012	0.80	1.46	0.73	1.38	9/19/2012	1.88
2013	0.79	1.53	0.72	1.27	8/16/2013	1.78
2014	0.87	1.62	0.73	1.31	7/30/2014	1.79
2015	0.97	1.87	0.79	1.37	8/1/2015	1.72
2016	0.85	1.56	0.75	1.34	6/4/2016	1.78
Average	0.84	1.61	0.73	1.38		1.86
75th Percentile	0.86	1.62	0.74	1.38		1.86

3.2.1.4 Seasonal Water Use

The City has a strong dry/wet season variability that is typical for western Oregon utilities. Production is greatest from June through September, coinciding with the dry season, as shown in Figure 3.2. Figure 3.2 presents water production by month and source from June 2016 through May 2017. The remaining months corresponding to the wet season have lower and relatively similar production.

On average, surface water supplies provide the greatest supply in the dry season averaging greater than the minimum flow of 250 gpm. Miller Road wells are rotated for operational reasons, with MR1 and MR2 providing the majority of the supply throughout the year. Note, surface water supplies were offline from October through December 2017 to repair damage to a diversion structure. Groundwater wells were used to a greater extent to compensate for the loss supply. However, surface water supply is typically lower in the wet season months due to operational and maintenance preferences.

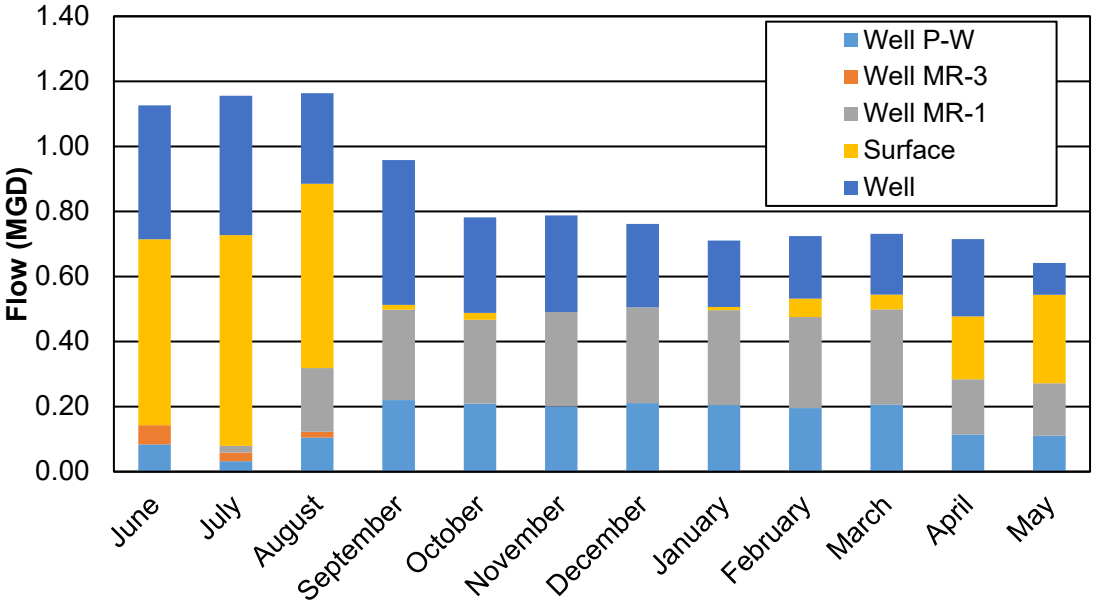

Figure 3.2 Water Production by Source from June 2016 through May 2017

3.3 Historical Water Accounts

For analysis of water consumption, the City divided its customers into 5 categories as follows:

1. General Residential: Generally single family homes, with some multi-family residences, with typical residential landscaping common to the region.
2. Commercial: Restaurants, bars, and retail establishments with indoor water needs and relatively little outdoor water usage.
3. Industrial: Light manufacturing and the Cascades Tissue plant.
4. Manufactured Home: Manufactured or mobile homes.
5. Public Lands: Schools, parks, and City facilities (City Hall, police station, library, water and wastewater treatment plants, etc.).

The City also tracks authorized water use for utility activities, such as treatment plant process water and hydrant flushing. Hydrant meters are also available for customer use during construction, where water use is billed to the user.

The number of accounts in each customer category for the years 2011 through 2016 is summarized in Table 3.3. The City had a net increase of 137 accounts, about 1 percent per year, from 2011 to 2016. Account growth has mainly been residential, through the increase in General Residential accounts and the new Manufactured Home designation created in 2015. Public lands represent City parks, schools, and other facilities.

Table 3.3 Historical Number of Connections

Year	General Residential	Commercial	Industrial	Manufactured Homes	Public Lands	Total
2011	2,087	88	9	0	7	2,191
2012	2,087	89	9	0	7	2,192
2013	2,091	89	9	0	7	2,196
2014	2,634	122	9	0	12	2,776
2015	2,129	93	9	66	9	2,306
2016	2,144	97	9	69	9	2,328

Note:
(1) Historical number of connections based on information provided by City Staff.

3.4 Historical Water Consumption

Historical annual water consumption data by customer class for the years 2011 through 2016 was obtained from the City's billing records and is presented in Table 3.4 as gallons per day (gpd).

During this period, overall water consumption has been generally consistent, with peak consumption in 2015. General Residential accounts for 83 percent of total water consumption.

Table 3.4 Historical Water Consumption by Customer Class

Year	General Residential (gpd)	Commercial (gpd)	Industrial (gpd)	Manufactured Homes (gpd)	Public Lands (gpd)	Unbilled Metered (gpd)	Total (gpd)
2011	418,410	47,649	1,965	-	7,262	58,830	534,115
2012	442,222	52,418	2,933	-	6,321	67,827	571,721
2013	425,382	55,504	2,165	-	6,017	68,271	557,338
2014	452,844	52,554	1,783	-	6,113	61,603	574,897
2015	435,693	29,148	1,849	102,318	3,026	58,178	630,212
2016	361,671	57,790	1,882	62,453	6,426	52,867	543,089
Average	422,703	49,177	2,096	27,462	5,861	61,263	568,562
75th Percentile	440,589	54,766	2,115	46,840	6,399	66,271	574,103

Notes:
(1) Bimonthly water and wastewater consumption data by customer type was provided by City staff through 2015.
(2) Monthly water and wastewater consumption data by customer type was provided by City staff in 2016.
(3) Total water consumption by demand type was estimated using total water consumption and distributed relative based on wastewater consumption.

Average water use per customer account is presented in Figure 3.3. General Residential and Industrial water users have the lowest per account usage. Commercial and Public Land accounts used approximately three times as much water per account in 2016. Manufactured homes water use is unclear, as it has varied considerably in the two years it has been tracked.

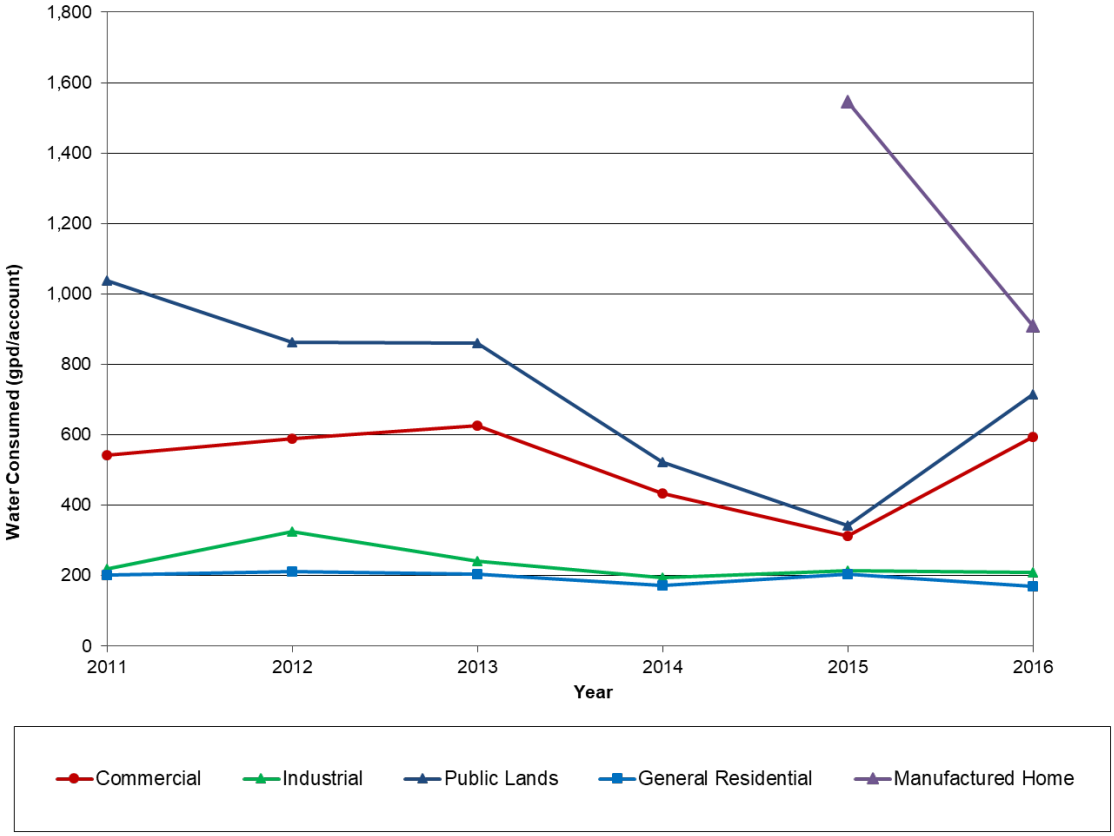

Figure 3.3 Historical Water Consumed per Account

3.4.1 Historical Seasonal Water Consumption

Seasonal water consumption by customer class was evaluated based on billing records from 2016, which is shown in Figure 3.4. Water consumption peaks in the months of June, July, August, and September due to increased residential use and summer irrigation. This trend mirrors seasonal production trends. General Residential water use drives peak summer demands on a volume basis. Commercial, industrial, and public lands demand is relatively consistent throughout the year.

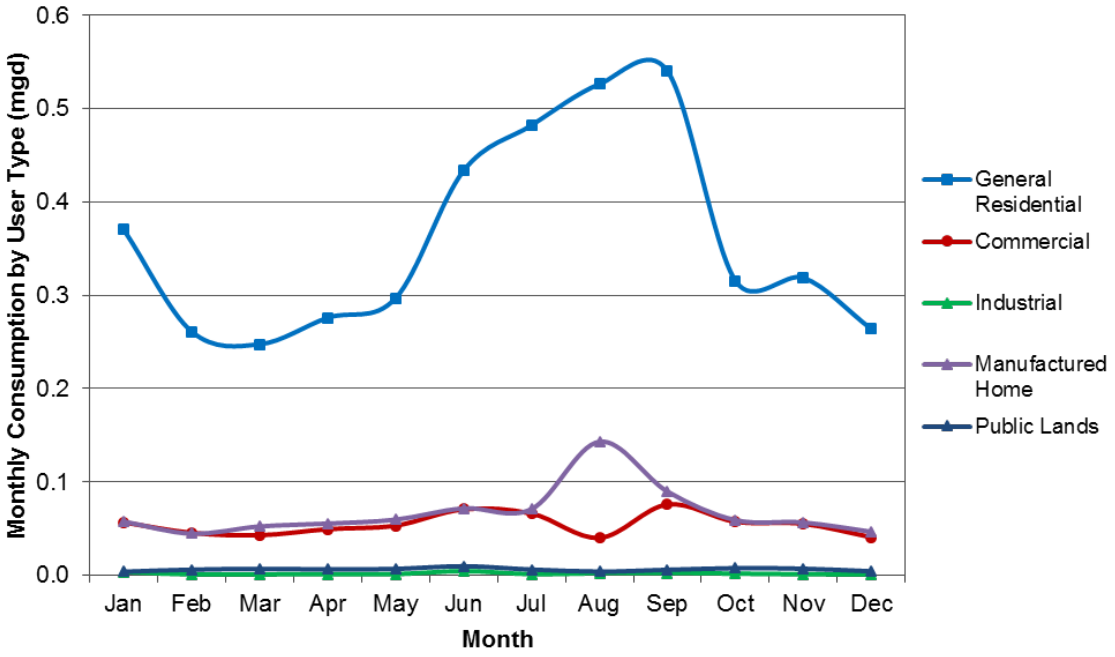

Figure 3.4 Seasonal Consumption by Customer Class (2016)

3.5 Demographic Projections

A demographic analysis was performed for the City's retail water service area (RWSA). The RWSA boundary coincides with the City's urban growth area (UGA) that includes both the City and potential annexation areas. Demographic analyses for the City limits, and areas of the UGA with existing water service, were based on the City's population and employment growth forecasts, as documented in the City's Transportation System Plan. The annual growth rates for population and employee growth are provided in Table 3.5.

To be consistent with other City and regional planning, growth rates were developed from the City's Transportation System Plan for areas currently served by the City. City staff developed growth projections for the Northern UGA.

In order to predict the City's future water demand, the population growth forecasts were used to calculate residential growth rates and the employment forecasts were used to project non-residential growth rates. During demand projection development, the City's existing number of water accounts is grown by these annual growth rates to predict future number of accounts within the 20-year planning period.

Demographic and demand growth for potential annexation areas was made separately using the City's understanding of proposed developments, as presented in Section 3.6.

Table 3.5 Demographic Growth Rates

	Current (2016)	Future (2038)	Annual Growth (percent)
Population	7,560	10,935	1.7
Jobs	2,210	4,520	3.4

3.6 Water Demand Forecast

The City's water demand forecast was developed based on historical water demand trends and future growth assumptions. A thorough review of the City's historical water production and consumption trends was conducted. The unique consumption trends of the City's various customer classes are evaluated using historical customer billing data. Other resulting key demand planning parameters are presented in Table 3.6, include Equivalent Residential Unit (ERU) value, future customer water use, MDD to ADD peaking factor, and water loss percentage.

Future customer water use by customer class was based on equivalent ERU per account values, shown in Table 3.7. These values are based on the 75th percentile of historical data, except Industrial. Future Industrial water use was based on water use from existing industrial areas in other Northwest Utilities. When projecting future ERUs for each customer type, a factor of 0.95 was applied, because it was assumed that new development will consume less water due to low-flow fixtures, water efficient appliances, smaller lot sizes, and other factors.

The City is anticipating to expand the water service to future customers in the Northern UGA (i.e., OMIC, E. Airport, etc.). Since this area has no existing customers, a different demand projection approach was taken. City staff identified the expected types of customers and their acreage for new development in the 10- and 20-year planning horizons. Future demands were projected by applying a water use per acre rate to the anticipated acreage for new development. UGA industrial and airport employment were expected to be significantly different from the City's existing industrial accounts; water use rates were selected based on an analysis of actual water use rates of other industrial and manufacturing areas in the Pacific Northwest. For UGA commercial, a water use rate was selected based on the City's existing commercial water demands:

- Northern UGA Water Use in 10-year Horizon = 300,900 gpd.
- Northern UGA Water Use in 20-year Horizon = 522,800 gpd.

Table 3.6 Demand Projection Parameters

Parameter	Medium
ERU Value (gpd/ERU)	204
Future Customer Water Use (percent of existing use)	95
MDD/ADD Peaking Factor	1.86
Annexation Peaking Factor	1.40
Water Loss (percent)	25.3

Table 3.7 Future Water Use by Customer Type

Account Type	Existing Accounts (ERUs per Account)	Future Accounts (ERUs per Account)
Residential	1.0	0.95
Commercial	2.9	2.8
Industrial	10.0	10.0
Manufactured Home	6.8	6.5
Public Lands	4.2	4.0

The water use parameters found in the historical production and consumption data along with the growth rates developed in the demographic analysis are used to predict future water demand. For areas with existing customers, demand projections were calculated by predicting the growth of accounts due to new customers and redevelopment and assigning the assumed water use per customer type, presented in Table 3.8.

ADD projections for each customer class were calculated by converting consumption in ERUs to gpd using the ERU values presented in Table 3.7. Water losses were included, starting at 25.3 percent and decreasing to the target of 15 percent over 20 years to establish total ADD projections. While water loss control was conservative considered for demand projections, Chapter 5 presents the City's aggressive Water Loss Control program to reduce loss to at or below 15 percent in the next 5 years. MDD projections were established by multiplying ADD projections by ADD to MDD peaking factor

ADD is projected to reach 1.73 mgd by 2038, with MDD projected to reach approximately 3.0 mgd by 2038 in the medium scenario. This represents a near doubling of existing water use in the next 20 years, as presented in Table 3.8 and Figure 3.5.

Table 3.8 Projected Demands

Year	2018	2023	2028	2033	2038
ERUs	3,654	4,484	5,240	6,330	7,187
ADD (mgd)	0.98	1.16	1.36	1.54	1.73
MDD (mgd)	1.79	2.08	2.40	2.67	2.97

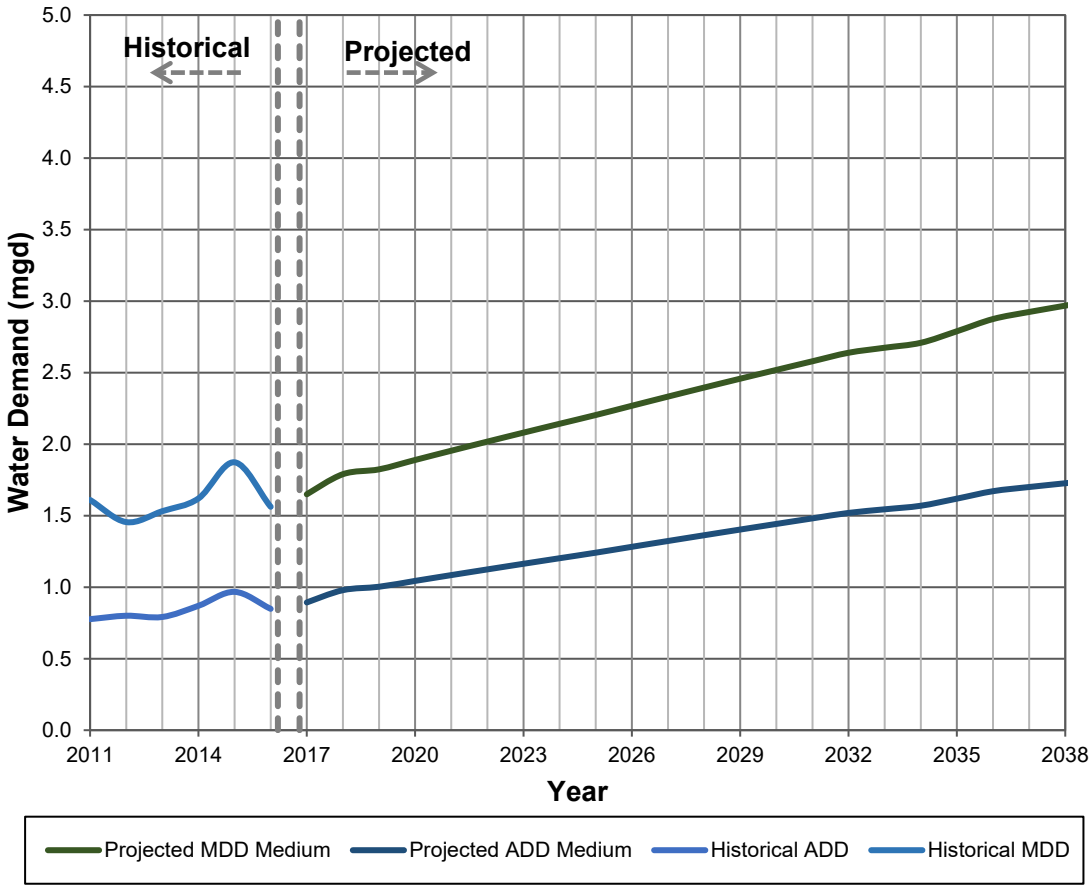

Figure 3.5 Historical and Projected Average and Maximum Day Demands

Chapter 4

WATER SUPPLY ELEMENT

4.1 Introduction

This Chapter describes the City's existing water supply capabilities and future water supply needs. It includes an analysis of alternative supply sources and strategies to meet future supply needs. Table 4.1 summarizes the WMCP Elements included in this Chapter and their locations.

Table 4.1 Location of WMCP Elements Included in Chapter 3

Location	OAR Reference	Location
Water Supply Element		
Schedule to Fully Exercise Each Permit	690-086-0170(2)	Section 4.5
Comparison of Projected Need & Available Sources	690-086-0170(4)	Table 4.4
Analysis of Alternative Sources	690-086-0170(5) and (8)	Section 4.5 Section 4.6
Maximum rate and monthly volume quantification	690-086-0170(6)	Section 4.5
Mitigation actions under state and federal laws	690-086-0170(7)	Section 4.5

4.2 Ability to Supply

While the City has permitted access to 10.49 mgd (16.3 cfs) of supply, operational constraints severely limit the City's ability to supply. The Ability to Supply represents the City's supply capacity used in long-term planning considering water rights, diversion/pumping capacity, treatment plant capacity, and operational limitations. The Ability to Supply combined surface water supplies and existing well fields and is presented in Table 4.2.

As previously stated, surface water supply (S-5813 / S-25918) is limited to as low as 0.36 mgd (0.557 cfs) in the summer and fall due to low flows. The Miller Road wells (G-17644) and Dutch Canyon well #1 (G 8615) has limited production capacity and unable to match its water rights. The City's total existing Ability to Supply during normal conditions is 1.49 mgd (2.3 cfs).

Table 4.2 Existing Ability to Supply during Normal Conditions

Existing Supply	Permit #	Permitted Diversion		Diversion/ Production Capacity		Treatment		Operational/ Seasonal Limitations		Ability to Supply	
		mgd	cfs	mgd	cfs	mgd	cfs	mgd	cfs	mgd	cfs
Surface Water	S-5813/ S-25918	9.05	14.0	2.00	3.09	1.01	1.56	0.36	0.557	0.36	0.557
Miller Road	G-17644	0.86	1.33	0.65	1.01	1.44	2.23	NA		0.65	1.01
Dutch Canyon	G-8615	0.58	0.897	0.48	0.74	1.15	1.78	NA		0.48	0.74
Total		**12.02**		**3.13**		**3.60**				**1.49**	

4.3 Reliable Ability to Supply

The City conducts water supply planning based on the reliable ability to supply; acknowledging periodic maintenance and repair may be required at any time. The surface water supply is not considered a reliable supply during peak summer demands and assumed to be out-of-service for water supply planning. Surface water supplies (S-5813 / S-25918) are considered to be unreliable for supply planning due to:

- The diversion structures or transmission pipelines' remote locations and permitting requirements has historically resulted in extended supply outage when substantial maintenance and repair activities are required.
- While the City conducts preventative maintenance and maintains a spare parts stock, the Keys Road treatment plant has infrastructure that requires specialized contractors to repair; historically resulting in extended supply outage when required.
- The direct filtration treatment process is sufficient for typical conditions; however, unusual conditions, such as an algae bloom or a wild fire in its tributary area, would likely result in an extended supply outage.
- The Keys Road Treatment Plant is not seismically resilient. The City's groundwater sources are more resilient to seismic events.

Without the surface water sources, the City's existing reliable ability to supply is 1.13 mgd (1.75 cfs).

Table 4.3 Existing Reliable Ability to Supply

Existing Supply	Permit #	Ability to Supply		Reliable Ability to Supply	
		mgd	cfs	mgd	cfs
Surface Water		0.36	0.557	0	0
Miller Road	G-17644	0.65	1.01	0.65	1.01
Dutch Canyon	G-8615	0.48	0.743	0.48	0.743
Total		**1.49**	**2.31**	**1.13**	**1.75**

4.4 Future Supply Needs

The City's future supply needs are calculated as the difference between the City's demand projections and its existing Ability to Supply. Future supply needs were evaluated for both normal conditions and under the City's reliability scenario (surface water supply out-of-service). Ability to Supply was compared to the MDD from 2016 through 2038, as shown in Tables 4.4.

At this time, the City may not have sufficient supply to meet MDD supplies in both normal and reliability scenarios. By 2038, the reliable supply deficiency during the MDD is anticipated to be approximately 1.48 mgd (2.29 cfs) in the normal scenario and 1.84 mgd (2.85 cfs) in the reliability scenario. Note, during the 2038 ADD, the reliable supply deficiency is anticipated to be approximately 0.6 mgd (0.928 cfs).

Table 4.4 Projected Future Supply Deficiencies with Reliable Existing Sources

Year	Projected Maximum Daily Demand		Projected Maximum Daily Supply		Projected Maximum Daily Demand Excess/Deficiency	
	mgd	cfs	mgd	cfs	mgd	cfs
2016	1.59	2.46	1.13	1.75	-0.46	-0.712
2028	2.4	3.71	1.13	1.75	-1.27	-1.96
2038	2.97	4.60	1.13	1.75	-1.84	-2.85

4.5 Analysis of Future Supply

To meet these shortages, the City will reduce its water loss, make full use of its existing water rights, and develop additional supplies if needed. Additionally, it is the City's intention to continue to implement cost-effective conservation measures in order to maximize the social, environmental, and business benefits.

The City will develop an additional 1.84 mgd (2.85 cfs) of future supply to meet the reliability scenario deficiency by 2038. The City's surface water supplies are not able to provide additional reliable supplies due to previously discussed limitations. The City's groundwater supplies can provide future supplies, given additional well capacity and green light water. Table 4.5 shows the future supplies planned, including full use of exiting supplies and a new future supply. Table 4.6 provides Greenlight Water Requests for each permit with development limitations.

The City is developing Dutch Canyon Well No. 2 to use supply from Permit G-17643 to meet growth in demand of 0.36 mgd (0.557 cfs) in the next 10-years. A greenlight request of 0.36 mgd (0.557 cfs) from Permit G-17643 is requested to allow use of the needed supply.

The City has observed a decline in yield from Dutch Canyon Well No. 1 (Permit G-17643) of approximately 0.1 mgd (0.15 cfs) in recent years from the full allowable withdrawal. The City is working with a hydrogeologist to determine how to rehabilitate Dutch Canyon Well No. 1 to restore the lost yield. This work is anticipated to be completed in the 10-year period. The G-17643 transfer request has additional points of diversion to provide additional capacity to make full use of its water right in case Dutch Canyon Well No. 1 capacity cannot be recovered or the future Dutch Canyon Well No. 2 yield is less than anticipated.

The City plans to make full use of its Miller Road Water Right (G-17644) through additional points of diversion to provide increased capacity and meet future demands. An additional 0.47 mgd (0.73 cfs) of new greenlight water from Permit G-17644 is requested to meet demand growth in the next 10 years. Further, an additional 0.54 mgd (0.83 cfs) of green light water from G-17644 is requested to meet demand growth from year 11 to year 20. A total of 1.56 cfs of greenlight water from Permit G-17644 is requested in the 20 year period. Additional points of diversion for Permit G-17644 will be required to withdrawal the requested supply and timed to meet demand growth.

The City has seen a decline in yield from the Existing Miller Road Wells (Permit G-17644) of 0.22 mgd (0.34 cfs) from the full allowable withdrawal. The City recently cleaned the Miller Road wells and conducted maintenance on the well pumps, but observed limited restoration of yield. Future cleanings are planned to attempt to restore the existing well yield in the 10 year period;

however, additional points of withdrawal, stated in Permit G-17644, may be required to fully restore the lost yield.

As discussed in Chapter 5, the City's Water Loss Control program is anticipated to reduce water loss to 10 percent reducing the need for 0.13 mgd (0.201 cfs) of supply. This water loss savings delays the need for new supplies.

The City will need to address the very small amount of demand - 0.03 MGD (0.06 cfs) - needed before the 20 years from a source other than its existing groundwater rights. Since the City is not anticipated to be built out at that time, the new supply source will also be needed to meet future growth beyond 20 years. The City has multiple options for potential new sources and plans to further investigate those options in the next 20 years, as discussed in Section 4.6.

Based on the above development schedule, the City anticipates the ground water rights to be fully exercised by December 31, 2034.

Table 4.5 Future Supplies Required to Meet Existing Sources

Permit	New Supply Sources Daily Demand	Reliable Withdrawal		Restore Full Allowable Withdrawal		Greenlight Water Request		Total Cumulative Withdrawal	
		mgd	cfs	mgd	cfs	mgd	cfs	mgd	cfs
	Existing Reliable Supply	1.12	1.74					1.12	1.74
	10 years Planning Period								
G-8615	Dutch Canyon No. 1 Rehab[2]			0.10	0.15	0.00	0.00	0.10	0.15
G-17644	New Miller Road Wells[1]			0.22	0.34	0.47	0.73	0.69	1.07
G-17643	Dutch Canyon Well No. 2					0.36	0.56	0.36	0.56
	Water Loss Control [3]							0.13	0.20
	20 Year Planning Period								
G-17644	New Miller Road Wells					0.54	0.83	0.54	0.83
	New Supply							0.03	0.06
	20 Year Supply Total							2.97	4.70

Notes:
(1) City has observed a decline in yield from its Miller Road wells. The City cleaned the wells and conducted maintenance on the well pumps, but has not restored the full yield from the wells. Permit G-17644 provides seven well withdrawal locations to provide the capacity for full use of the water right.
(2) City has observed a decline in yield from Dutch Canyon Well No. 1. The City is working with a hydrogeologist to determine next steps as part of the ongoing Dutch Canyon Well No. 2 construction project.
(3) The water loss control program "supply" equates to maintaining a water loss of approximately 10 percent through the end of 20-year period. This includes the initial 0.13 MG (0.20 cfs) reduction of real losses from the 2-year Water Loss Control program which is anticipated to reduce the system to 10 percent water loss.

4.5.1 Greenlight Water Request

The City has identified the lowest cost alternative for full use of the existing groundwater permits to meet future growth. The City has treatment plant capacity to treat the full permitted groundwater water rights, providing substantial savings over new water supplies. As described in Table 4.6 the following is requested to meet 20 year demands:

- Request 1.56 cfs of greenlight water under Permit G-17644.
- Request 0.557 cfs (0.36 mgd) of greenlight water under Permit G-17643.

4.5.2 Quantification of Maximum Rate

The City's has requested green light water to fully exercise the full extent of the water rights using the currently permitted diversion locations. To meet requirements that City has calculated and estimate of the water that would be diverted within the next 20 years for each permit based on maximum rate shown in Table 4.6. The City's water rights are based on rate of production, not volume; therefore, no maximum monthly volume

Table 4.6 Estimate of Diverted Water under the City's Existing Permits in 20 years

Permit	Current Maximum Withdrawal Rate		Greenlight water request above current authorization	20 year Maximum Withdrawal Rate
	cfs	MG	cfs	cfs
G-17644	1.34	0.866	1.56	2.9
G-17643	0	0	0.557	0.557

4.5.3 Consideration of Alternative Measures to Reduce Need for Additional Water Supply

4.5.3.1 Water Loss Control

As discussed in Section 5, the City has a 2-year Water Loss Control Plan, described in Appendix D, to reduce water loss to 10 percent from the 2018 loss of 33 percent. The City's Water Loss Control Plan seeks both apparent (recording error) and real losses, as described in Chapter 5; it is currently the portion of the City's loss that is real vs apparent. Water loss control is anticipated to be the most effective measure to reduce water use for the City.

The City anticipates 13 percent of current water loss to be real losses, equating to approximately 0.13 mgd (0.20 cfs). This value is based on the water loss reduction that would been required to reduce water loss to 10 percent from a mix of real and apparent losses (as described in Chapter 5). Water loss control savings are included as a future "source" of supply in Table 4.5.

4.5.3.2 Water Use Conservation

The City believes there are minimal amounts of reliable and low cost demand reduction available from water use conservation. The City's population has doubled since the mid 1990's; therefore, most homes and many business in the City have been constructed with relatively water efficient fixtures and appliances. Further, City has had an active and effective water conservation program for over a decade; making any additional substantial reductions from existing older structures unlikely. The City's future customers incorporate water saving fixtures due to code requirements. Additionally, existing and future industrial and commercial clients are incentivized to have the lowest effective water use based on City financial policies (Connection charges by meter size and tiered consumption charges). Therefore, the City does not believe there is water use conservation measures that can provide water a cost that is equal to or lower than the cost of other identified sources.

4.5.3.3 City Operational Authorized Water Use

The City is committed to make efficient use of its authorized, non-billed water uses. These include water use at City properties, as well as operational water use at its treatment plants and distribution system. In recent years, the City has made substantial reductions in its water use by focusing on irrigation water use and does not anticipate future gains. Treatment plant and distributions system operational use are driven by factors beyond the City's control, such as source water quality, and vary year to year. Therefore, the City believes there are minimal amounts of reliable and low cost reductions available from City Authorized water use.

4.5.3.4 Connection with Other Systems

At the current time the interconnection with a neighboring system is not a financially feasible alternative. The closest system with available supply is the City of St. Helens. Connection with the City of St. Helens would require an 8 mile pipeline which has been evaluated and found not to be cost-effective. A discussion of this alternative is included in Section 4.6.

4.5.4 Mitigation Requirements Related to Further Development of Extended Permit

The City is currently required to take any mitigation actions under state or federal law related to Permit G-17643 or Permit G-17644.

4.5.5 Consideration of Alternative Measures to Reduce Need for Additional Water Supply

Three alternatives the City has, or will be, addressing in order to extend the time frame for extension of current water rights are inter-connection with other communities, increasing supply through the reduction of water loss, and conservation measures.

4.6 New Supply Source

As discussed above, the City will need to bring online new supply by the end of the planning period to meet largely future growth, while supplying a small amount of demand in the 20 year period. The 2012 WMCP summarized multiple new sources of supply from past City studies. The City evaluated each option considering the hydrogeologic potential, available infrastructure, water quality, and operational considerations. Supply options are summarized in Table 4.7. Table 4.7 provides a description of the supply source with approximate high level costs per volume, which were summarized from previous studies. In many cases, the cost of a large infrastructure components are unknown. General assumptions and Benefits/Risks are also summarized.

The 2012 recommendation was to primarily pursue additional alluvial groundwater supplies as the lowest cost option. Consistent with this recommendation, the City has made a greenlight water request to make full use of its existing groundwater rights to meet the 20 year demand.

With the exception of additional Alluvial Groundwater supply wells, little is known about the new supply sources. For new supplies, the City needs to conduct additional studies in the next 10 years to better understand the cost, benefits, and risks of new supply sources. The following supplies were considered less feasible.

The City's existing surface water source is limited during the summer months. The City is measuring streamflow for its existing surface water sources prior to making any changes. The existing surface water supply's lack of reliability and difficulties in transferring surface water rights (i.e., water rights permits, water quality, etc.) led the City to consider additional future supply sources.

Since the 2012 WMCP, Basalt groundwater supply wells were eliminated from consideration due availability concerns and potentially high iron content. The City previously drilled a test basalt groundwater supply well at Keys Road, and it did not provide sufficient capacity to serve as a supply source. Additionally, a gravel pit or canal source was removed from consideration due to the expectation that a collector well would prove to have less complex permitting and treatment considerations.

Aquifer storage and recovery (ASR) wells will require additional study to determine if it is feasible and cost-effective source of summer supply. It has several challenges for implementation. First, the existing surface water supply is hard to operate in the winter without treatment plant upgrades, limiting the availability of supply for storage. Second, a previous test well drilled at Keys Road indicated the Basalt Aquifer had limited capacity for recovery. Third, the relative cost-effectiveness could be poor if ASR requires transmission from the Keys Road site or additional treatment. The City is open to using ASR as a potential means of further utilizing its surface water supplies. Further study is required to confirm ASR is viable; therefore, it was not included in the above analyses.

Based on existing knowledge, the City considered the following supply sources:

- Increased surface water use.
- Additional Alluvial Groundwater Supply Wells.
- Ranney Collector well.
- Interconnection with St. Helens

As part of the Water System Master Plan Update, four alternatives for new supplies were considered in detail. A summary of the new supply sources are provided with respect to availability, reliability, feasibility, and environmental impact considerations. In addition, the interconnection with St. Helens was evaluated and found to not be a cost-effective supply source.

- Increased Surface Water Use:
  - Availability: City will need to measure streamflow to better understand available supply. City holds senior water rights.
  - Reliability: Limited supply available during dry season.
  - Feasibility: Existing surface water treatment plant and surface water transmission main may need replacement to provide long-term supply, which may make increased surface water use less financially feasible for the City.
  - Environmental Impact: City will need to consult with water rights attorney to balance senior water rights while still providing streamflow to protect aquatic life.
- Additional Alluvial Groundwater Supply Wells:
  - Availability: Individual wells have not produced reliably more than 250 gpm, a large number of wells may be needed in the long-term. Siting sufficient wells may be a challenge to pursuing additional wells as a future supply source.

  - Reliability: Treatment to remove iron and manganese will likely be needed to meet customer expectations.
  - Feasibility: Alluvial groundwater supply wells have been shown to be a feasible source of supply for the City.
  - Environmental Impact: No impacts anticipated, wells will be sited outside the 1/4 mile surface water buffer and separated from underground injection control (UIC) wells.
- Ranney Collector Well:
  - Availability: Collector well adjacent to the Multnomah Channel is expected to provide a long-term source of supply.
  - Reliability: Supply is expected to be available year-round. City anticipates collector will be groundwater under the influence of surface water and may have water quality considerations that require additional treatment.
  - Feasibility: Collector well is anticipated to be feasible adjacent to the Multnomah Channel. St. Helens successfully operates a collector well upstream on the Columbia River. Further study will be needed to confirm feasibility.
  - Environmental Impact: No anticipated environmental impacts. Collector well has no intake in the channel that would impact fish. The anticipated flows from the collector well are anticipated to be small in comparison to overall flow through the channel.

The City is pursuing cost-effective opportunities for these three supply sources. Specific studies have been identified to better understand each supply source over the next decade. The City will reevaluate the supplies based on new findings before moving forward with a new supply in the late 2020's.

Table 4.7 New Water Supply Options

Drinking water options	Description	Approximate Cost per mgd	Assumptions	Benefits/Risks
Transferring surface water rights	• Moving the surface water right to a location where there is more water available in Scappoose Creek or potentially in the Multnomah Channel.	• Unknown. Study and flow monitoring needed to determine appropriate location before costs may be developed	• Will not impact other water rights. • New location of an intake structure. • New transmission main. • Treatment plant upgrades or replacement likely required. • Ability to obtain a permit to construct a new diversion.	• Uses City's substantial surface water rights. • Improved O&M(1) of the surface water system. • Water Quality likely more challenging than existing location.
Additional Alluvial Groundwater Supply Wells	• Complete additional well in the alluvial aquifer beyond the City's current wells. Wells near the Dutch Canyon and Miller Road sites are preferred to make use of existing infrastructure.	• $1.0 Million per well. • Available treatment capacity for 3 new wells. • Treatment costs up to $1.5 Million per mgd of treatment, if required.	• Similar construction to existing wells. • Similar water quality to existing wells. • Production rate of 250 gpm. • Treatment needed to remove Iron & Manganese.	• Known source of water. • Known water quality issues (O&M needed). • Cost of transmission mains unknown.
New Basalt Groundwater Supply Wells	• Obtain new groundwater permit and develop well in Columbia River Basalt Group. The well capacity, water quality and treatment needs are uncertain.	• $1.6 Million per well. • Treatment costs unknown. • Test well recommended to refine costs.	• Potential for production rates similar to Warren Water (~200 gpm). • New water right for basalt aquifer needed. • Costs do not include advanced treatment.	• Unknown water quality and yield. • Additional testing necessary.

Drinking water options	Description	Approximate Cost per mgd	Assumptions	Benefits/Risks
Gravel Pit or District Canal Source	• Obtain new surface water supplies from CalPortland Santosh Property or District Canal Requires new water right, transmission, and treatment infrastructure.	• >$10 Million. • Cost of transmission main unknown.	• Water right and access can be obtained. • Requires new transmission main to existing system. • Requires new surface water treatment plant.	• New Water Treatment Plant. • New Transmission Main • Source is susceptible to contamination. • Unknown water quality.
Collector Well	• Install a collector (Ranney) well adjacent to the Multnomah Channel. The well capacity, water quality and treatment needs are uncertain.	• >$10 Million. • Cost of transmission main unknown.	• Additional feasibility and testing needed. • Long transmission is required. • Requires new transmission main to existing system. • Requires new surface water treatment plant.	• New Water Treatment Plant. • New Transmission Main. • Possibility of treating for surface water constituents. • Possibility of biofouling.
Interconnection with St Helens	• Interconnection to the City of St Helens, which is approximately seven miles from Scappoose.	• >$10 Million. • Capital Buy-In cost unknown.	• Considered if no City-owned water right options are available. • Would require Capital Buy-In charger to St Helens. • Requires ~7 mile transmission main and booster pump station.	• Unknown cost for treatment capital and operations costs. • High cost for transmission.
Aquifer Storage and Recovery Well	• Storing "excess" surface water into an aquifer to recover during summer months.	• $0.6 M per well. • Unknown surface water treatment upgrades costs. • Unknown costs for transmission.	• Suitable aquifer is available. • Permitting and feasibility/pilot study needed. • Requires Surface Water Treatment Plant upgrades. • New well(s) required.	• Will not require additional groundwater treatment after recovery. • Potential for increased sustained yields if injected to existing well.

Note:
(1) O&M – operations and maintenance.

4.7 Supply Strategy

The City is developing alluvial groundwater wells to fully use existing groundwater rights and treatment plant capacity to provide reliable supply through 2034. The following wells are planned, as previously identified:

- Dutch Canyon Well #2 in 2019.
- Miller Road Well No. 4 in 2020.
- Water Loss Control in 2022.
- Dutch Canyon Well Rehab in 2023.
- Miller Road Well Recovery in 2024.
- Miller Rd Well #5 in 2028.
- Miller Rd Well #6 in 2034.
- New Supply Source by 2038.

The City will continue its active conservation and water loss control programs to potentially delay the need for new supplies.

Chapter 5

WATER SYSTEM CONSERVATION

5.1 Introduction

The City of Scappoose meets all basic conservation measures required in OAR 690-086:

- An Annual Water Audit;
- Full Metering of the system;
- A meter testing and maintenance program;
- A rate structure based, in part, on the quantity of water metered;
- A leak detection program; and
- A public education program on efficient water use.

Additionally, the City has implemented enhanced conservation measures to address its relatively high water loss.

This section describes the City's past, current, and planned conservation activities, compares them to the required and additional program elements and packages them in a programmatic fashion. It demonstrates the City's commitment to implement both supply- and demand-side conservation measures that make economic and environmental sense.

Table 5.1 summarizes the WMCP Plan Elements included in this Chapter and their locations.

Table 5.1 Location of WMCP Elements Included in Chapter 5

Location	OAR Reference	Location
Water Supplier Description		
Quantification of System Leakage	690-086-0140(9)	Section 5.9
Water Conservation Element		
Progress Report on Implementation of Conservation Measures	690-086-0150(1)	Section 5.2 Table 5.2
Water Use Measurement and Reporting Program	690-086-0150(2)	Section 5.14
Currently Implemented Conservation Measures	690-086-0150(3)	Section 5.2 Table 5.2
Annual Water Audit	690-086-0150(4)(a)	Section 5.4
Full Metering of System	690-086-0150(4)(b)	Section 5.5
Meter Testing and Maintenance Program	690-086-0150(4)(c)	Section 5.5
Rate Structure	690-086-0150(4)(d)	Section 5.6
Leak Detection Program	690-086-0150(4)(e)	Section 5.7
Public Education Program	690-086-0150(4)(f)	Section 5.8
System Leakage Reduction Program <15%	690-086-0150(5)	Section 5.9 Section 5.10

Location	OAR Reference	Location
Technical and Financial Assistance Programs	690-086-0150(6)(b)	Section 5.11
Retrofit/Replacement of Inefficient Fixtures	690-086-0150(6)(c)	Section 5.12
Rate Structure and Billing Practices to Encourage Conservation	690-086-0150(6)(d)	Section 5.6
Reuse, Recycling and Non-Potable Opportunities	690-086-0150(6)(e)	Section 5.13
Other Proposed Conservation Measures	690-086-0150(6)(f)	Table 5.2
Additional time to implement conservation benchmarks	690-086-0125(7)	Section 5.15

5.2 Status Report

This WMCP is an update of the 2012 plan. Table 5.2 includes each conservation element, whether it is a requirement for the City of Scappoose, the City's proposed actions and target date for implementation.

The City has completed implementation of a conservation billing structure, moving to monthly billing in 2015.

As per the requirements of OAR 690-085, the City annually submits a Water Use Measurement Report to the state.

The City's water loss has remained over 15 percent in the intervening period. It has developed a 2-year Water Loss Control Plan with the goal of reducing its water loss to less than 10 percent, which is provided in Appendix D. Components and benchmarks of the 2-year water loss control plan are summarized in the following sections.

Table 5.2 City of Scappoose Water Conservation Requirements and Planned Implementation

Conservation Plan Element	Required Element	Status or Proposed Action	Date for Implementation or Completed
Full metering of system	X	Complete	
Meter Testing/Maintenance Program	X	Conducted on a regular schedule	
Annual water audit	X	Completed Annually	
Leak Detection Program	X	Conducted on a regular schedule	
Leak Repair/ Line Replacement Program	X	Completed as needed	As funding permits
Conservation Rate Structure	X	Complete	
Conservation Billing Structure		Complete	
Public Education Program	X	Conducted Annually	
Technical and Financial Assistance Program	X	Complete	

Conservation Plan Element	Required Element	Status or Proposed Action	Date for Implementation or Completed
Retrofit/Replacement Program	X	Faucet aerators and toilet leak detection tabs provided.	As funding permits
Reuse/Recycle Program	X	Complete	
Water use measurement and reporting	X	Completed	
Other measures		No other conservation measures are currently underway or previously completed.	

5.3 Basic Conservation Measures Required of All Suppliers.

The City has implemented all basic conservation measures required of all suppliers (OAR 690-086-0150(4), including:

- Annual Water Audit.
- Full Metering.
- Meter testing and Maintenance.
- Rate Structure, based upon the amount metered.
- Leak detection.
- Public Education.

The following sections describe the basic conservation measures.

5.4 Annual Water Audit Results

To aid in identifying water losses, the City has implemented the American Water Works Association (AWWA) Water Audit framework and tool. The AWWA framework has a defined step-by-step process to define and track water throughout the system and identify potential sources of water loss. Terminology used in the Water Audit are presented in Table 5.3.
The City conducts an annual system wide water audit in two parts: supply and billing data. The supply based water audit conducted by City water operators focuses on supply, water loss and performance of the water treatment plants. The water supply audit is used to optimize system performance and consistent with state requirements. The billing data based water audit conducted by the City financial staff focuses on metered water use and primarily is used for internal operations. The water supply and billing audits are combined to determine water loss, which is reported to the state. The 2018 annual water audits can be found in Appendix E.

Table 5.3 Water Loss Terminology

Water Loss Term	Description
Raw Water Supplied	Total metered raw source water production.
Treated Water Production	Total metered treated water production and sent to the distribution system.
Billed Metered consumption	All metered consumption billed to customers as tracked through customer service meters. This is also known as Revenue Water.
Unbilled authorized consumption	All authorized, unbilled consumption includes metered and unmetered (estimated) consumption. The City's unbilled authorized consumption includes metered consumption for activities such as firefighting, plant backwash and unmetered consumption for hydrant flushing activities. This is also known as non-revenue water.
Authorized Consumption	The volume of water authorized for use by the water system. This includes both billed metered consumption as well as other authorized unbilled consumption. Also known as Accounted-for-water.
Real losses	Water that is lost from the system, after supply production but before deliveryto the customer.
Apparent losses	Water that is produced and delivered to users but is recorded as a loss due to meter inaccuracy, human error in recording data, computing errors, and theft.
Water losses	The sum total of "real" and "apparent" losses. Also known as Unaccounted for water.

The City identified historical water losses from water use and production data from 2011 through 2018. Water loss is defined as the difference between raw water supplied and total authorized consumption. Total authorized consumption includes both billed metered authorized consumption and unbilled authorized consumption. Table 5.4 shows raw water supplied, total authorized consumption, and water losses for this period. Water loss has increased since 2012, with a maximum of 37.8 percent in 2015. This represents a potential large loss of supply and potential revenue. Any water loss greater than 10 percent triggers regulatory requirements.

Table 5.4 Historical Water Losses

Year	Raw Water Supplied[3] (mgd)	Billed Metered Consumption[2] (mgd)	Unbilled Authorized Consumption (mgd)	Total Authorized Consumption (mgd)	Water Losses (mgd)	Water Losses (percent)
Formula	**A**	**B**	**C**	**D = B+C**	**A-D**	**(A-D)/A**
2011	0.78	0.53	0.06	0.59	0.18	23%
2012	0.78	0.57	0.07	0.64	0.14	17%
2013	0.79	0.56	0.07	0.63	0.17	21%
2014	0.87	0.57	0.06	0.64	0.23	26%
2015	0.97	0.54	0.06	0.60	0.37	37%
2016	0.85	0.48	0.05	0.54	0.31	36%
2017	0.80	0.54 [5]	-	0.54	0.26	33%
2018	0.86	0.58 [5]	-	0.58	0.28	33%

Notes:
(1) All production and consumption based on Data provided by City Staff.
(2) Raw water supplied is based on metered water supplied to City's treatment plants.
(3) Metered consumption is based on metered customer use.
(4) Unbilled authorized consumption includes City provided water use data for backwash, filter-to-waste, and hydrant flushing.
(5) Billed Meter Consumption for 2017 an d2018 includes unmetered authorized consumption.

Staff believe that these losses are a combination of Real Losses, Apparent Losses and Non-Revenue Authorized Consumption:

- Real Losses: Real losses are likely due to leaks in the distribution system, especially in older parts of the system. City crews repair approximately 20 leaks per year in the distribution system.
- Apparent Losses: Meter inaccuracy, water theft, recording and computing errors.
- Non-Revenue Authorized Use: Lack of usage recording for system flushing, firefighting, fire training and construction of new infrastructure.

The City performed an acoustic water loss detection survey of the distribution system in 2016 and repaired identified leaks. A relatively small decrease in water loss was observed in 2017 and 2018. This indicates to the City that a substantial portion of the losses may be apparent losses from an unknown cause.

The City has formulated a 2-year water loss control plan with benchmarks to achieve 10 percent water loss, which can be found in Appendix D. The City believes that water loss control plan may reduce supplies by will reduce real losses by 13 percent, which is the water loss control needed to reduce the average pre-2015 water loss to 10 percent. This equates to 0.12 MGD (0.185 cfs) for the 2018 production of 0.86 mgd (1.33 cfs). The City assumes the approximately 10 percent jump in water loss in 2015 is due to apparent losses from an unknown cause. The remaining real water loss is likely due to real losses.

5.5 System Metering Practices

The City has a fully metered water system. The City tests, repairs, and replaces meters on a regular cycle. The City has an aggressive meter replacement program to upgrade aging meters to advanced meter reading (AMR) technology to allow remote "drive by" reads.

5.5.1 Meter Testing

City staff standard practice is to test, calibrate, and maintain customer account water meters. The City contracts with Measure Tech to conduct the testing and calibration of customer meters on a regular schedule. Meters are repaired or replaced based on the findings of the regular testing and manufacturer's recommendations. As part of the City's Meter Replacement Program, older meters suspected of issues are currently replaced, rather than repaired.

All meters enclosures are maintained regularly by City staff.

5.5.2 Meter Replacement Program

The City has an ongoing Meter Replacement Program to install AMR meters for all customers. The City allocates a set budget each year to replace older meters with new AMR meters. Initially, existing meters were retrofitted with radios to create an AMR system. Unfortunately, the radio retrofits are failing prematurely. When a radio fails, the City installs a new AMR meter for the customer. The City has installed new AMR meters or retrofitted existing meters with radios for 80 percent of customers.

The most recent AMR meters used by the City have the ability with additional software purchase to provide advanced water use statistics and potentially identify leaks; however, the City has not purchased this software to date.

5.5.3 Water Source and Treatment Master Metering

The City has eight (8) water master meters associated with its sources and treatment plants. Plant operators are responsible for maintaining the master meters per manufacturer recommendations.

5.5.4 Evaluate Production and Consumption Measurement and Tracking

As part of the City's efforts to reduce apparent water losses, the City plans to evaluate water production and consumption use measurement during the 2019/2020 Fiscal year. The following actions are planned:

- Evaluate the City's current data logging and billing practices to identify potential areas to improve coordination, efficiency, and potentially accuracy.
- Coordinate with the Scappoose Fire Department to develop and method of tracking water usage for fires and training.
- Implement better methods of tracking water used for construction of both City and private projects. The City requires hydrant meters for construction projects; billing for the metered consumption. However, this process is difficult to track due to the short duration of the hydrant meters and may be improved.
- Upgrade Water Treatment Plant supervisory control and data acquisition (SCADA) systems to improve metering accuracy of water production. The City has high-accuracy flow meters at its treatment plants and seeks more robust flow display and recording (historian) from SCADA. The City believes the improved SCADA could potentially also lead to reduced backwash cycles, which is an authorized unbilled water use.

Table 5.5 Metering Benchmark

Benchmark	Start Date	Frequency
Customer AMR replacement	2019	Annually
Customer AMR testing	2019	Annually
Customer AMR calibration	2019	Annually
Water Master Meters maintenance	2019	Annually

5.6 Water Utility Rate Structure

5.6.1 Water Utility Billing Practices

The City has billed all customers on a monthly billing cycle since October 2015. The City implemented a monthly billing cycle to aid in financial operations and to support conservation measures. A monthly billing cycle allows customers to identify their water use, especially summer irrigation use, and change their water use to aid in conservation or to lower future water bills. Prior to 2015, the City billed on a bi-monthly cycle.

5.6.2 Water Utility Rates

The City has a base rate plus commodity rate structure in place for all customer classes. Under this structure, each customer is charged a base "meter" fee and "debit service" fee each month based on meter size. In addition to these base fees, customers are charged an inclining block "commodity" fee based on use. Tables 5.5 and 5.6 summarize the current water utility rate structure.

Table 5.6 City of Scappoose Water Utility Base Rate Structure

Meter Size	Meter Fee	Debit Service Fee	Total Fee
3/4 inch or 1 inch meter	$8.00	$22.70	$30.70
1.5 inch or 2 inch meter not requiring max fire flow	$35.00	$99.14	$134.14
1.5 inch or 2 inch meter requiring max fire flow	$59.00	$167.14	$226.14
3 inch meter	$164.00	$464.56	$628.56
4 inch or greater meter	$230.00	$651.49	$881.49
Outside the City, except Dutch Canyon Service Area	$18.00	$51.03	$69.03
Dutch Canyon Service Area	$12.00	$22.70	$34.70

Table 5.7 City of Scappoose Water Utility Commodity Rate Structure

Volume of Water Used per Month (gallons)	Cost ($/100 gallons)
0 -5,000	$0.38
5,001 -7,500	$0.38
7,501 -10,000	$0.42
10,001+	$0.43

In addition to this rate structure, Chapter 13.08 of the Scappoose Municipal Code allows the Mayor, with majority consent of the City Council, to raise rates during water shortage emergencies to promote conservation. This may be done in anticipation of water shortages and during periods of curtailment.

Table 5.8 Water Utility Rate Benchmarks

Benchmark	Start Date	Frequency
Change all customers to monthly billing	2015	Completed
Utilize base rate + commodity rate	Current	Ongoing

5.7 Leak Detection Program

OAR 86-0150 (4) (e) requires water suppliers with unaccounted-for water losses in excess of 10 percent to implement a leak detection program. The City currently has a calculated water loss in excess of 15 percent.

5.7.1 Acoustic Leak Detection

The City will contract for a distribution system wide acoustic detection effort in the 2019/2020 fiscal year. The City's previous benchmark was to monitor the entire system every 5 years (planned in 2021); however, the detection survey will be moved up due to the City's high water loss. The City will reconsider the 5-year timing based on the results of the 2019/2020 effort. All leaks identified in the City System from this new survey will be repaired through the City's Leak Repair Program.

Previously, the City contracted with Matchpoint Water Asset Management, Inc. to conduct a distribution system wide leak detection survey in August 2016. The survey detected 60 leaks with a combined estimated rate of 91.3 gallons per minute in the 42.57 miles of distribution main surveyed. The City has repaired all identified leaks in the City system.

Over 50 percent of the leaks identified in 2016 were on customer's service mains. The City has alerted customers with leaks and has encouraged customers to make the necessary repairs, which are the responsibility of the customer. The City does not track when private leaks are repaired.

5.7.2 Visual Leak Detection

In addition to contracted acoustic efforts, City distribution system operators are trained to identify and fix leaks at hydrants and meters in the course of their typical work. While these leaks are uncommon, these operator efforts are an important part of the City's leak detection efforts.

5.7.3 Remote Read Meters

As discussed in Section 5.5, some of the City's newest AMR meters can potentially identify leaks with additional software/vendor costs. This software is currently not considered cost-effective by the City; however, it may be reconsidered as a greater number of customers receive the AMR meters.

Table 5.9 Leak Detection Benchmarks

Benchmark	Start Date	Frequency
Complete system wide acoustic leak detection	2019	Complete by 2020
System monitoring	2021 (Dependent on detection test results)	Every 5 years

5.8 Public Education Program

The City recognizes the value of a Water Conservation Public Education Program to raise and maintain public awareness. The City's main education platform is "bill stuffers" that are sent to all customers as part of their regular water bill. Additionally, the City has limited water conservation literature available on the City website. The City is working on making additional conservation literature available to customers. Literature includes practical tips on how to conserve water. A copy of the inserts are provided in Appendix F.

Table 5.10 Public education benchmarks

Benchmark	Start Date	Frequency
Continue sending bill stuffers	Current	Ongoing
Availability of water conservation literature on website	Current	Ongoing
Additional water conservation literature available	Current	Ongoing

The City views these actions as essential to supporting the overall water conservation program. However, estimating water savings from public education is subject to extensive assumptions and was not attempted with the limited budget available for water conservation planning.

5.9 Leak Repair Program

The City of Scappoose currently addresses distribution leakage issues when identified. When considered an emergency, issues are typically repaired within 24 hours. The City currently repairs approximately 20 pipe leaks per year.

Pipelines known or suspected to be a source of water loss, but do not pose any risk to public safety, public health, or property are scheduled for repair during normal operations. Both repair and replacement of small defects are typically completed by City Staff.

Table 5.11 Leak Repair Benchmarks

Benchmark	Start Date	Frequency
Repair of leaking pipes when identified	Currently available	Ongoing

5.10 Pipe Replacement Program

The City replaces pipes suspected of being in poor condition that have a high potential for main breaks or leaks when financial resources allow. To cost-effectively replace pipes, the City tries to include replacements often occur in coordination with other road or utility projects. Recent pipe replacement projects have included:

1. JP West Bridge – Replace approximately 300 linear feet (LF) of existing 12-inch DI built in 1976 with new 12-inch DI, built in 2015.

2. Lufkin Apartments – Replace approximately 135 LF of existing 6-inch steel waterline built in <1950 with 8-inch C900 built in 2019.
3. E. Airport Subdivision – Replace approximately 300 LF of existing 18-inch HDPE built in 2004 with 18-inch C900 in construction 2019.
4. Urie Subdivision – Replace approximately 820 LF of 4-inch Steel pipe with 8-inch C900, in construction 2019.
5. Wheeler Street – Replace high zone to low zone pressure regulator built in <1950 with new system (to be determined) in construction 2019.

The City's 2-year Water loss Control Plan will specifically target those pipelines that are the highest suspected sources of water loss for replacement. The City plans to replace pipes in the 2020/2021 fiscal year. The extent of pipe replacement will be determined by leak detection surveys and the City's fiscal resources.

Table 5.12 Pipe replacement Benchmarks

Benchmark	Start Date	Frequency
Replacement of poor condition pipes		Ongoing
Replacement of pipelines suspected for high water loss	2020	Ongoing, To be completed by 2021

5.11 Technical and Financial Assistance Programs

The City currently offers water audits when requested by customers. Additionally, the City has worked with the Parks Department to reduce water use for irrigation. The City utility staff provided technical support to the Parks Department in 2016 to improve irrigation efficiency. City and Parks Department will continue to review irrigation every 3 years to help continue and improve on the water use savings from the 2016 technical assistance. The City has limited resources to provide financial assistance programs; therefore, rebate and financial assistance programs are not practical for the City at this time. The City is willing to provide staff technical expertise to help customers save water.

Table 5.13 Technical and Financial Assistance Benchmarks

Benchmark	Start Date	Frequency
Conduct irrigation study with Parks Department	2016	Every 3 years
Provide water audits to customers	Currently available	Ongoing
Provide technical expertise to help customers save water	Currently available	Ongoing

5.12 Retrofit/Replacement of Inefficient Fixtures

The City has faucet aerators and toilet leak detection tabs to available to customers. Given the small size of the City, the City does not have available resources to create, fund, and administer rebate programs for more expensive fixtures and appliances. The City has no way of knowing if customers use the conservation measures, therefore, the City anticipates saving 5,000 gallons or less from them.

5.13 Identification of Reuse, Recycle, Non-potable Use Opportunities

The City currently has limited water reuse at City water treatment Plants. Treated effluent is used as process water at the City's wastewater treatment facility. Production of reclaimed water is not cost-effective for the City, based on the City's recent wastewater master plan effort. The City reuses water to the full extent possible at the wastewater treatment facility. No additional reuse water is anticipated to be needed in the future at the plant.

5.14 Water Loss Program

To aid in addressing the high water loss, the City will develop a specific Water Loss Program in the 2019/2020 fiscal year, including specific funding in its biannual budgets. This program focus is on reducing water loss in the City's system. It is complemented by mandatory conservation measures and existing enhanced conservation measures targeted City customers. The Water Loss Program has been formulated to achieve the City's 2-year Water Loss Control Plan, as well as meet 5-year benchmarks.

The progress of the program will be evaluated and additional activities added as needed annually as part of the City's planning and budgeting processes.

5.14.1 Water Loss Activities

The City evaluated and prioritized potential water loss activities for the Water Loss Program, which are shown in Table 5.6. The goal the program is to reduce water loss to 10 percent. The activities have been divided into those that address real and apparent losses. Real loss control activities aim to reduce the physical leakage from the system. Apparent loss control activities aim at reducing errors in water measurement and analysis, as well as unauthorized water use. The City intends to implement all activities in Table 5.7 over the 20 year planning period. Specific efforts in the City's 2-year Water Loss Control Plan have been called out in the table. Additionally, 5-year benchmarks have been establish, as shown in the Table.

The activities were prioritized based on:

- Perceived Effectiveness: Cost effectiveness of water loss reduction activity in terms of cost per water saved. See Table 5.6 for more detail.
- Implementation Cost: Cost to implement water loss activity. Implementation costs may include both ongoing operational activities and infrastructure upgrades.
- Staff Resources: Amount of staff resources needed to conduct and/or manage water loss activities.
- Community Acceptance: Perceived acceptance of the community to activities. For most activities, the community will be unaware of the activities unless highlighted as part of the public education program.

Table 5.8 presents a qualitative prioritization of the recommended activities and priority ranking. All criteria were ranked low, moderate, and high by City Staff. A relative Prioritization was developed independently of if activities addressed real or apparent losses.

Based on the comparison of recommended activities, the priority of water loss control activities are:

1. Production Master Meter Readings.
2. Verification of Water Use.
3. Leak Detection Survey.
4. Leak Repair Program.

5. Service Meter Testing and Replacement.
6. Water Theft Reduction.
7. Pipeline Replacement Program.
8. Water Treatment Plant Best Practices.
9. System Service Pressure Management.

Activities were primarily prioritized by perceived effectiveness and secondarily by cost. While the City will address each item in the next five years, City resources will likely limit the extent of high cost efforts, such as Pipe Replacement and Meter Replacement.

Table 5.14 Water Loss Control Activities to Address Real and Apparent Losses

Real Water Loss Control Activities	Activity Description	Recent Activities	Perceived Effectiveness (Cost per water saved)	2 Year Action Plan	5 Year Benchmark
Real Losses					
Leak Detection Survey	• Detect leaks in Raw Water Transmission, treatment/reservoir site piping, distribution mains, and service line leak detection.	• System-wide acoustic leak detection was performed in 2016. • City Staff identify approximately 20 leaks per year as part of typical work.	• High. 2016 leak system-wide distribution detection survey and subsequent R&R(1) was cost-effective.	• Conduct system-wide acoustic water leak testing in 2019/2020.	• City will continue to perform system-wide leak detection surveys every 5 years. • City staff continue to seek out leaks in typical work.
Leak Repair Program	• Repair pipeline leaks on the City System when detected.	• City Staff address approximately 20 leaks per year.	• High. Repair of detected leaks directly reduces water loss.	• Repairs leaks detected in the 2019/2020 system-wide detection effort.	• Continue pipe repairs when leaks are detected in system.
Pipeline Replacement Program	• Replace water mains in poor condition that have a high potential of main breaks.	• City replaced aging water lines when there was a cost effective opportunity.	• Moderate. High cost for pipeline replacement. Difficult to identify specific water loss reduction if pipe is not currently leaking.	• Replace pipes in poor condition with the greatest leak reduction potential. Pipe replacement limited by available fiscal resources.	• Continue replacement of pipes in poor condition as financial resources are available.
System Service Pressure Management	• This is an operational activity that reduces system pressure to minimize water losses from leaks and main breaks.	• Evaluation of the distribution system confirmed the City's service pressures are acceptable (<100 psi).	• Low. Unknown effectiveness. Implementation would be require expensive system improvements.	• City Staff will evaluate reducing service pressures in Zone 3.	• None.
Water Treatment Plant Best Practices	• More efficient treatment plant operations to limit water use during filter-to-waste and backwash activities.	• Operators are conducting these activities based on operational data, rather than a set schedule to reduce water use.	• Low. Implementation would require expensive treatment plant improvements.	• Improve SCADA to allow operators to better manage backwash and filter-to-waste cycles.	• None.
Apparent Losses					
Verification of Water Use	• Accurately account for all finished water uses, verify accuracy of metered use, and account for un-metered uses.	• Began tracking water used in City hydrant flushing and testing operations in 2016. • Evaluated water loss as part of Water System Master Plan Update.	• High. A standardized annual water audit may decrease apparent losses. Little to no cost to implement.	• Conduct water audit using AWWA methodology for 2019 and 2020. • Evaluate the City's current data logging and billing practices • Coordinate with the Scappoose Fire Department to develop and method of tracking water usage for fires and training.	• Continue annual water audits using AWWA methodology.
Production Master Meter Readings	• Collect accurate readings from production master meters. This verification provides a baseline to measure water loss against.	• Established schedule for calibration of master meters based on manufacturer recommendation.	• High. Master meter accuracy may lead to a water production data.	• Upgrade Water Treatment Plant SCADA systems to improve metering accuracy of water production	• Continue accurate master metering on all sources.
Service Meter Testing and Replacement	• Ongoing program to test and replace failing meters to reduce inaccurate measurement. Meters with failing remote read retrofits are replaced with AMR meters.	• Nearly 80 percent of the customer meters are new AMR meters or have been retrofitted with radios.	• High. Meter calibration or replacement will decrease errors in water billing data. New AMR meters also support other water loss activities.	• Continue to replace / install new remote read meters, as needed.	• Continued replacement of aging service meters.
Water Theft Reduction	• Restrict unauthorized water uses.	• All customers are metered. • Private use of hydrants is metered.	• Moderate. No improvement required; continue City's best practices.	• Implement better methods of tracking water used for Construction of both City and Private projects	• Continued best practices for water theft reduction

Note:
(1) R&R – repair and replacement.

Table 5.15 Water Loss Reduction Activity Prioritization Matrix

Real Water Loss Control Activities	Perceived Effectiveness (Cost per water saved)	Investigation Cost	Implementation Cost	Staff Resources	Community Acceptance	Priority Ranking (1 to 9)
Real Losses						
Leak Detection Survey	High		Moderate	Moderate	High	3
Leak Repair Program	High		Moderate	Moderate	High	4
Pipeline Replacement Program	Moderate		Moderate	High	Moderate	7
System Service Pressure Management	Low		High	High	Low	9
Water Treatment Plant Best Practices	Low		Moderate	Moderate	High	8
Apparent Losses						
Verification of Water Use	High	Low	Low	Low	High	2
Production Master Meter Readings	High	Low	Low	Low	High	1
Service Meter Testing and Replacement	High	Moderate	High	High	High	5
Water Theft Reduction	Moderate	Low	Low	Low	High	6

5.15 Additional Time to Implement Conservation Benchmarks

The City is not requesting additional time for completion of conservation benchmarks.

Chapter 6

WATER CURTAILMENT PLAN

6.1 Introduction

Curtailment planning is required to address management of water supply when emergency conditions arise, such as when there are changes in groundwater/surface water supply availability, water quality or temporary failures in a water supply system.

Table 6.1 summarizes the WMCP Plan Elements included in this Chapter and their locations.

Table 6.1 Location of WMCP Elements Included in Chapter 6

Location	OAR Reference	Location
Water Curtailment Element		
Water Supply Assessment and Description of Past Deficiencies	690-086-0160(1)	Section 6.2
Stages of Alert	690-086-0160(2)	Section 6.2, Section 6.3
Triggers for Each Stage of Alert	690-086-0160(3)	Section 6.2, Section 6.3
Curtailment Actions	690-086-0160(4)	Section 6.2, Section 6.3

6.2 Existing Curtailment Plan

In April 2005, faced with the prospect of a summer water shortage due to an unseasonably dry winter, The City of Scappoose drafted and accepted into the City's Municipal Code (SMC) 13.08 - *Water Conservation Measures During Water Crises*, which is provided in Appendix C. While this City code refers to "conservation," it is, for all practical purposes, the beginning of a Water Curtailment Plan. The City has not experienced a water supply deficiency since 2005.

The City's SMC 13.08 outlines:

- Authority of the Mayor and City Council in declaring a water emergency.
- The process of notification, fines, and discontinuance of service.
- Voluntary measures.
- Tier 1 use restrictions.
- Tier 2 use restrictions.

Table 6.2 outlines each curtailment tier of the plan.

Table 6.2 Water Conservation Measures During Water Crises (SMC 13.08)

Curtailment Tier	Trigger	Usage Reduction Goal	Reduction Measures
Voluntary	Opinion of Mayor, Council, and Staff	Not defined	• Restrict landscape watering to evening hours • Alternate watering based on address • Avoid pavement washing • Avoid vehicle washing outside of commercial facilities • Provide water where food is sold only when requested • Avoid building cleaning • Refrigerate water for drinking to avoid running tap • Consider installing water efficient appliances
Tier 1	Opinion of Mayor, Council, and Staff	Not defined	• Prohibit lawn watering between 7 am – 11 pm • Require compliance with alternate day landscape watering plan • Restrict hydrant permit use to those already in effect
Tier 2	Opinion of Mayor, Council, and Staff	Not defined	• Prohibit landscape watering except in special circumstances • Prohibit washing down of pavement • Prohibit vehicle washing outside of commercial facilities

6.3 Potential Revised Draft Water Supply Curtailment Plan

Because SMC 13.08 was developed in response to a potential pending water shortage, the City understands there are elements that can be refined and added to develop a more comprehensive, effective, and measurable Water Curtailment Plan. A revised Draft Water Supply Curtailment Plan has been developed and will be considered by the City Council to replace SMC 13.08 in the future.

The need for curtailment can result from unexpected loss of supply or facilities or from slowly developing supply issues. The rapid need for a curtailment plan results from unexpected events occurring quickly. These may be short lived and an endpoint can be identified. Conversely, curtailment plans can be phased in over time in anticipation of developing causes such as drought. In these cases, implementation can be planned for months in advance; however, an endpoint cannot be identified with certainty. Once codified, the City will conduct appropriate training so that staff are knowledgeable on Curtailment Plan activation procedures and timing for both anticipated and unexpected events.

The Revised Water Supply Curtailment Plan requires City Council approval to be adopted:

- Quantitative trigger rather than "Mayor's opinion" trigger.
- Triggers for activation and increase of restrictions based on percent demand of actual capacity.
- Elimination of measures that are long term conservation focused such as installation of water efficient appliances.
- Identifies staff and responsibilities for implementing plan.
- Methods of notification.
- Voluntary conservation measures.
- Tier 1 – Voluntary measures + Mandatory restrictions.
- Tier 2 – Voluntary measures + Enhanced mandatory restrictions.
- Tier 3 – Voluntary measures + Mandatory restrictions + Prohibited uses.
- Demand reduction goals for each Tier.
- Activation of Curtailment Plan for anticipated or controlled water shortages.
- Activation of Curtailment Plan for uncontrolled events of unknown duration.
- Staff responsibilities.
- Notification procedures of Curtailment Plan activation.
- Enforcement actions.

The following tables outline staff and roles responsible for implementation of the Water Curtailment Plan (Table 6.3) and the Draft Water Supply Curtailment Plan (Table 6.4). This plan will be considered by the City Council in the future. In addition to a final Curtailment Plan the City of Scappoose will develop appropriate enforcement tools such as fines and discontinuance of service resulting from failure to abide byrestrictions.

Table 6.3 Roles and Responsibilities Associated with Water Curtailment Actions

Staff	Title	Responsibilities
Michael Sykes	City Manger	Coordination with Council, Mayor on curtailment action
Dave Sukau	Public Works Director	Initiation of Curtailment Plan and media relations
Darryl Sykes	Treatment Plant Supervisor	Supply and demand data tracking
Doug Nassimbene	Field Services Supervisor	Reduction of City water uses
Laurie Oliver	City Planner	Communication with businesses
Norm Miller	Police Chief	Enforcement of prohibited practices

Table 6.4 Proposed Water Curtailment Plan

Curtailment Tier	Trigger	Usage Reduction Goal	Reduction Measures
Voluntary	Projected supply limitations	Awareness and 5 percent reduction in daily demand	• Implement Curtailment Plan. • Public notification and awareness. • Personal water conservation measure education. • Voluntary irrigation reduction. **Prioritized Notification Methods:** • Door hangers/Bill stuffers/Web page.
Tier 1 Mild	Use reaches 85 percent of capacity of three consecutive days and/or state drought declaration affecting service area	10 percent reduction in demand	• Continue all *Voluntary* measures. • Stop system flushing except for essential needs. • Reduce municipal irrigation and aesthetic uses and post information explaining reduction. • Restrict landscape watering to evening hours. • Restrict pavement washing to needs related to health. • Prohibit un-valved vehicle washing. • Prohibit building cleaning. **Prioritized Notification Methods:** • Posters/sandwich boards/Web page/Media.
Tier 2 Moderate	Use reaches 90 percent of capacity for two consecutive days	15 percent reduction in demand	• Continue all *Tier 1* measures • Prohibit landscape watering between 7 am - 11pm • Restrict landscape watering to every 5th day on an alternating schedule • Cease municipal water uses such as street cleaning, flushing (unless health related), park and landscape irrigation • Prohibit vehicle washing outside of commercial facilities • Prohibit non-irrigation outdoor water use except when required for public health • Request businesses reduce demand by 10% **Prioritized Notification Methods:** • Media/Door hangers/Posters/ Sandwich boards/Web
Tier 3 Critical	Use reaches 95 percent of capacity for one day	20 percent reduction in demand	• Continue *Tier 2* measures • Prohibit landscape watering except for hand watering of new trees and shrubs • Prohibit vehicle washing with City supplied water **Prioritized Notification Methods:** • Media/Door hangers/Posters/ Sandwich boards/Web

Chapter 7

References

7.1 References

Wagner, D.L., 2013, Hydrogeologic Characterization of Dutch Canyon, Scappoose, Oregon. Portland State University Dissertations and Theses, Paper 1020.

Kennedy/Jenks Consultants, 2012, City of Scappoose Water Management and Conservation Plan. Submitted to Oregon Water Resources Department.

Evarts, R.C., 2004, Geologic Map of the Saint Helens Quadrangle, Columbia County, Oregon, and Cowlitz and Clark Counties, Washington. USGS Scientific Investigations Map 2834.

Phillips, W.M., 1987, Geologic Map of the Vancouver Quadrangle, Washington. Washington Division of Geology and Earth Resources Open File Report 87-10.

Ranney Method Western Corporation, 1975, Re: Phase III –City of Scappoose, Oregon, Phase III - Test Hole Drilling Program. Letter to Barrett & Associates, Inc. dated June 20, 1975.

Appendix A

AGENCY REVIEW LETTERS AND COMMENTS

Oregon Water Resources Department (OWRD)
Municipal Water Management and Conservation Plan (WMCP) Review Worksheet
(OAR Chapter 690, Division 086)

Name of Supplier: City of Scappoose (Date WMCP Received by OWRD: Feb. 25, 2019_)	
OWRD Reviewer:	Kerri H. Cope
Date of OWRD Review:	April, 2019
Reason for submittal of the WMCP:	Extension of time for Permit G-15491 signed August 29, 2014 required submittal of WMCP by August 29, 2017, and an extension of time for Permit G-15295 signed December 12, 2014 required submittal by December 12, 2017. The earlier date of August 29, 2017 trumped the second date. The City asked for additional time for submittal to march 29, 2018.
If a previous WMCP has been submitted, was it approved contingent upon the completion of certain **Work Plan** activities? If so, list those Work Plan items here:	No, a work plan was not required in the Final Order approving the City's previous WMCP.
Are there any "Development Limitation" conditions established by a Final Order approving a previous WMCP or Permit Extension of Time?	Yes: ➢ Permit G-17644 (formerly G-15491) includes a development limitation of 1.34cfs (out of the total permitted rate of 2.9cfs) being 0.76 cfs from Miller Road Well 1 and 0.58cfs from Miller Road Well 2. ➢ Permit G-17643 (formerly G-15295) includes a development limitation of 0.0 cfs (out of the total permitted rate of 0.557 cfs). ➢ Both development limitations require submittal of a WMCP and evidence provided within the WMCP that support removal of all or a portion of the development limitation under each permit, which can only be achieved through a Final Order approving this WMCP and removing or modifying the development limitations.

Rule Reference	**OWRD Review Comment**
ORS 536.050(1)(u) – Fees for Water Management and Conservation Plans	
$1040 – for examination of a Plan submitted by a municipal water supplier serving a population of 1,000 or fewer; or **$2090** – for examination of a Plan submitted by a municipal water supplier serving a population of more than 1,000. ***Current fee schedule effective July 1, 2017 (ORS 536.050).***	$2090 was paid 2/11/19; however, plan was not complete until Feb. 25, 2019 due to local gov. notice. Service population est. of 7560.

OAR 690-086-0125 – Additional Requirements	
(5) A list of the affected local governments to whom the draft plan was made available pursuant to 690-086-0120(8) and a copy of any comments on the plan provided by the local governments;	Meets requirement. See page 1-2 and appendix A.
(6) A proposed date for submittal of an updated plan within no more than 10 years based on the proposed schedule for implementation of conservation measures, any relevant schedules for other community planning activities, and the rate of growth or other changes expected by the water supplier; or an explanation of why submittal of an updated plan is unnecessary and should not be required by the Department; and	Meets requirement. See Table 1.1 on page 1-2 and Section 7.5.
(7) If the municipal water supplier is requesting additional time to implement metering as required under OAR 690-086-0150(4)(b) or a benchmark established in a previously approved plan, documentation showing additional time is necessary to avoid unreasonable and excessive costs.	Meets requirement. See Section 5.3, page 5-2. System is fully metered.
OAR 690-086-0140 – Water Supplier Description	
(1) A description of the supplier's source(s) of water; including diversion, storage and regulation facilities; exchange agreements; intergovernmental cooperation agreements; and water supply or delivery contracts;	Clarification required to meet requirement. See pages 2-6 through 2-9 and Table 2.2. This section neglects to include the development limitations for the following: ➢ Permit G-17644 of 1.34cfs being 0.76 cfs from well 1 and 0.58 cfs from well 2 (out of the total permitted rate of 2.9cfs being 2.23 from well 1 and 0.67 cfs from well 2) and; ➢ Permit G-17643 of 0.0 cfs (out of the total permitted rate of 0.557 cfs). ➢ In order to meet this requirement. Please modify this section and Table 2.2 to reflect this. ➢ Additionally, it is unclear which permits are being referred to under "Section 2.5 – Groundwater supply" as the City has multiple wells named "Dutch Canyon" well but two different permits, one of which they are not allowed to divert water under at this point (Permit G-17643) due to a development limitation of 0.0cfs. Please modify this section and provide clarification as to which permit the City is referring. Meets requirement.
(2) A delineation of the current service areas and an estimate of the population served and a description of the methodology(ies) used to make the estimate;	Additional information needed to meet requirement. See page 2-1 and Figure 2.1. ➢ Please include the methodology used to make the population estimate given (for example US census Bureau, PSU, etc.). Meets requirement.

(3) An assessment of the adequacy and reliability of the existing water supply considering potential limitations on continued or expanded use under existing water rights resulting from existing and potential future restrictions on the community's water supply;	Does not meet requirement. See pages 2-12 through 2-13. ➢ Please modify this section to include whether the City's current supplies are adequate to fulfill the City's needs considering potential restrictions, such as declining groundwater aquifer levels, etc. ➢ Are the City's current water sources – both groundwater and surface water (the City has a 10 cfs water right with a 1923 priority date for Gourley Creek for instance) and access to over 2.34cfs of groundwater (out of the total permitted rate of 4.457 cfs) – is this an adequate and reliable supply for City? ➢ Please note: Permit G-15295 was superseded by Permit G-17643 and currently has an extended completion date to 10/1/2050. ➢ Permit G-17644 has an extended completion date to 10/1/2050 as well. Still does not meet – Is the City's current inventory with the current restrictions and development limitations adequate or does the City need greenlight water under one of its extended permits in order to adequately fulfill its needs within the next 10 years?
(4) A quantification of the water delivered by the water supplier that identifies current and available historic average annual water use, peak seasonal use, and average and peak day use;	Meets requirement. See pages 3-1 through 3-6, Sections 3.2-3.4.

General Comment pertaining to OAR 690-086-0140(5) below:

The listing of water rights in Table 2.2 and 2.4 of the City's WMCP needs some clarification/additional information to address all of the items required by this section of the rules.

NOTE: A blank template is attached for your review and an electronic version can be provided.

(5) A tabular list of water rights held by the municipal water supplier that includes the following information:	
(a) Application, permit, transfer, and certificate numbers (as applicable);	Does not meets requirement. See pages 2-9 through 2-11 and Table 2.4, Table 2.5. ➢ Transfers T-12258 (App G-15135), 12284 (App G-15792), and 12586 (App G-9218) are missing from this table. Meets requirement.
(b) Priority date(s);	Meets requirement. See pages 2-9 through 2-11 and Table 2.4, Table 2.
(c) Source(s) of water;	Clarification required to meets requirement. See pages 2-9 through 2-11 and Table 2.4, Table 2.5 ➢ The transfers that added additional points of appropriation under Permits G-17643 and G-17644) are not listed. Meets requirement.

(d) Type(s) of beneficial uses specified in the right;	Does not meet requirement. See pages 2-9 through 2-11 and Table 2.4, Table 2.5 ➢ This information is missing from the tabular list of water rights. Meets requirement.
(e) Maximum instantaneous and annual quantity of water allowed under each right;	Does not meet requirement. See pages 2-9 through 2-11 and Table 2.4, Table 2.5 The following information needs to be modified in the table: ➢ Permit G-17644 is currently limited to 1.34cfs being: o 0.76 cfs (0.49 mgd) from well 1 and; o 0.58 cfs (0.37mgd) from well 2 o (out of the total permitted rate of 2.9cfs being 2.23 from well 1 and 0.67 cfs from well 2) and; ➢ Permit G-17643 is currently limited to 0.0 cfs (out of the total permitted rate of 0.557 cfs). ➢ In order to meet this requirement. Please update the table to reflect this and the allowed totals. ➢ Please note: the permit amendments T-12258 and T-12284, which added additional POA's do not change the extension of time and development limitation, which can only be removed or changed through a Final Order approving this WMCP that removes or modifies the development limitations. Meets requirement.
(f) Maximum instantaneous and annual quantity of water diverted under each right to date;	Does not meet requirement. See pages 2-9 through 2-11 and Table 2.4, Table 2. ➢ This information is missing from the table. Does not meet requirement – this information (max instant) seems to still be missing. – please note – the max instantaneous is typically the rate that a right is certificated at.
(g) Average monthly and daily diversions under each right for the previous year, and if available for the previous five years;	Does not meet requirement. See pages 2-9 through 2-11 and Table 2.4, Table 2. ➢ Average daily diversion is missing from the table. Meets requirement.
(h) Currently authorized date for completion of development under each right; and	Does not meet requirement. See pages 2-9 through 2-11 and Table 2.4, Table 2. ➢ This information is missing from the table. Meets requirement.

Environmental Concerns: **(i)** Identification of any streamflow-dependent species listed by a state or federal agency as sensitive, threatened or endangered that are present in the source, any listing of the source as water quality limited and the water quality parameters for which the source was listed, and any designation of the source as being in a critical ground water area.	Additional information needed to meet requirement. See pages 2-7 and 2-11 through 2-12. Sections 2.5 and 2.6.2 ➢ The following are missing from the sensitive species list for ODFW: • Bull Trout – Sensitive • Steelhead: Summer/Coastal Rainbow Trout – Sensitive Critical • Lower Willamette Chinook Salmon needs to include spring run • Oregon Chub – Sensitive • Western Brook Lamprey – Sensitive ➢ The following is missing from this section for Federal NOAA Designations: • Lower Columbia Chinook Salmon: Threatened • Upper Willamette River Chinook Salmon: Threatened • Upper Willamette River Steelhead: Threatened Meets requirement.
(6) A description of customers served including other water suppliers and the estimated numbers; general water use characteristics of residences, commercial and industrial facilities, and any other uses; and a comparison of the quantities of water used in each sector with the quantities reported in the water supplier's previously submitted water management and conservation plan and progress reports;	Meets requirement. See pages 3-4 through 3, sections 3.3-3.4.
(7) Identification and description of interconnections with other municipal supply systems;	Meets requirement. See page 2-13, Section 2.8
(8) A schematic of the system that shows the sources of water, storage facilities, treatment facilities, major transmission and distribution lines, pump stations, interconnections with other municipal supply systems, and the existing and planned future service area; and	Clarification needed to meet requirement. See pages 2-3 and 2-5 and Figures 2-1 and 2-2. ➢ Since the plan does not follow the rule guidance format, the reviewer used the checklist and table of contents to find each OAR reference and the location in the plan. For this rule requirement, the guidance states that Figure 2-1 meets this requirement, however Figure 2-1 is the City's hydraulic profile, and Figure 2-2 is listed as the City map/schematic. ➢ Please clarify which is intended to meet this requirement. ➢ Meets requirement.

(9) A quantification and description of system leakage that includes any available information regarding the locations of significant losses.	Additional information needed to meet requirement. See pages 5-4 through 5-9, Section 5.8 ➢ Please provide water loss date for 2017 and 2018. ➢ Meets requirement. – 2018 water loss = 33%
OAR 690-086-0150 – Water Conservation Element	
(1) A progress report on the conservation measures scheduled for implementation in a water management and conservation plan previously approved by the Department, if any;	Meets requirement. See page 5-12, Table 5.8
(2) A description of the water supplier's water use measurement and reporting program and a statement that the program complies with the measurement standards in OAR Chapter 690, Division 85, that a time extension or waiver has been granted, or that the standards are not applicable;	Meets requirement. See page 5-11, Section 5.13
(3) A description of other conservation measures, if any, currently implemented by the water supplier, including any measures required under water supply contracts;	Meets requirement. See page 5-12, Table 5.8 The City has no additional conservation measures.
(4) A description of the specific activities, along with a schedule that establishes five-year benchmarks, for implementation of each of the following conservation measures that are required of all municipal water suppliers:	
(a) An annual water audit that includes a systematic and documented methodology for estimating any un-metered authorized and unauthorized uses;	Meets requirement. See page 5-2, section 5.2
(b) If the system is not fully metered, a program to install meters on all un-metered water service connections. The program shall start immediately after the plan is approved and shall identify the number of meters to be installed each year with full metering completed within five years of approval of the water management and conservation plan;	Meets requirement. See page 5-2, section 5.3
(c) A meter testing and maintenance program;	Meets requirement. See page 5-2, section 5.3
(d) A rate structure under which customers' bills are based, at least in part, on the quantity of water metered at the service connections;	Meets requirement. See page 5-3, section 5.4
(e) If the annual water audit indicates that system leakage exceeds 10 percent:	

(A) Within two years or approval of the water management and conservation plan, the water supplier shall provide a description and analysis identifying potential factors for the loss and selected action for remedy;	Additional information needed to meet requirement. See page Section 5.6 and Table 5.6 ➢ Since the City's 2016 water loss was 36.9%, and unless more recent water loss data is available to demonstrate that the City's water loss is less than 10%, this section will need to be modified or provide additional information in order to meet the requirement with a two (2) year benchmark. ➢ Additionally, please modify this section to reflect dates that are more recent or provide the results of the planned and recent activities. Currently it states that the City will begin flushing and testing operation in 2016 and conduct, a water audit using AWWA tools in 2018. As it is currently 2019, this section requires an update. ➢ In order to meet this requirement, please modify this section with a two (2) year benchmark as required by the revised OAR 690-086, which became effective 12/22/2018. Meets requirement – SEE appendix D as well.
(B) If actions identified under subsection (A) do not result in the reduction of Water Losses to 10 percent or less, within five years or approval of the water management and conservation plan, the water supplier shall:	Additional information needed to meet requirement. ➢ See comment above under OAR 690-086-0150 (4)(e)(A). Meets requirement
(i) Develop and implement a regularly scheduled and systematic program to detect and repair leaks in the transmission and distribution system using methods and technology appropriate to the size and capability of the Municipal Water Supplier or a line replacement program detailing the size and length of pipe to be replaced each year; or	Additional information needed to meet requirement. ➢ See comment above under OAR 690-086-0150 (4)(e)(A). Meets requirement
(ii) Develop and implement a water loss control program consistent with American Water Works Associations Standards;	Additional information needed to meet requirement. See page Section 5.6 and Table 5.6 ➢ See comment above under OAR 690-086-0150 (4)(e)(A). Meets requirement
(f) A public education program to encourage efficient water use and the use of low water use landscaping that includes regular communication of the supplier's water conservation activities and schedule to customers;	Additional information needed to meet requirement. See page 5-10, Section 5.9 ➢ Please provide copies of the information provided with bills and on the City's website. Meets requirement
(5) If the supplier serves a population greater than 1,000 and proposes to expand or initiate diversion of water under an extended permit for which resource issues have been identified under OAR 690-086-0140(5)(i), or if the supplier serves a population greater than 7,500, a description of the specific activities, along with a schedule that establishes five-year benchmarks, for implementation of each of the following measures; or documentation showing that implementation of the measures is neither feasible nor appropriate for ensuring the efficient use of water and the prevention of waste:	
(a) Technical and financial assistance programs commensurate to the size of the Municipal Water Supplier to encourage and aid residential, commercial and industrial customers in implementation of conservation measures;	Meets requirement. See page 5-11, section 5.10

(b) Supplier financed retrofitting or replacement of existing inefficient water using fixtures, including distribution of residential conservation kits and rebates for customer investments in water conservation;	Meets requirement. See page 5-11, section 5.11
(c) Adoption of rate structures, billing schedules, and other associated programs that support and encourage water conservation;	Meets requirement. See page 5-3, section 5.4-5.5
(d) Water reuse, recycling, and non-potable water opportunities; and	Clarification needed to meet requirement. See page 5-11, section 5.12 ➢ This section states: "it is recommended that the City investigate the cost/benefit of infrastructure upgrades to allow as part of an ongoing facility plan." By whom? Please revise statement as to what the City will be doing or has done, not what is recommended. Meets requirement
(e) Any other conservation measures identified by the water supplier that would improve water use efficiency.	Meets requirement. See page 5-12, Table 5-.8. Plan states the City has no other conservation measures at this point.
OAR 690-086-0160 – Municipal Water Curtailment Element	
(1) A description of the type, frequency and magnitude of supply deficiencies within the past 10 years and current capacity limitation. The description shall include an assessment of the ability of the water supplier to maintain delivery during long-term drought or other source shortages caused by a natural disaster, source contamination, legal restrictions on water use, or other circumstances;	Meets requirement. See pages 6-1 through 6-2, Section 6.2
(2) A list of three or more stages of alert for potential shortage or water service difficulties. The stages shall range from a potential or mild alert, increasing through a serious situation to a critical emergency;	Clarification needed to meet requirement. See pages 6-1 through 6-5, Sections 6.2-6.3 ➢ Section 6.3 states that the draft curtailment plan "will be considered" by the City council during 2018. As this plan was submitted in 2019, what was the outcome? Meets requirement
(3) A description of pre-determined levels of severity of shortage or water service difficulties that will trigger the curtailment actions under each stage of alert to provide the greatest assurance of maintaining potable supplies for human consumption; and	Meets requirement. See pages 6-4 through 6-5, Table 6-.4 and Sections 6.2-6.3 Four (4) stages of alert with stage one being voluntary.
(4) A list of specific standby water use curtailment actions for each stage of alert ranging from notice to the public of a potential alert, increasing through limiting nonessential water use, to rationing and/or loss of service at the critical alert stage.	Meets requirement. See pages 6-4 through 6-5, Table 6-.4 and Sections 6.2-6.3 Four (4) stages of alert with stage one being voluntary.

OAR 690-086-0170 – Municipal Water Supply Element	
(1) A delineation of the current and future service areas consistent with state land use law that includes available data on population projections and anticipated development consistent with relevant acknowledged comprehensive land use plans and urban service agreements or other relevant growth projections;	Meets requirement. See pages 3-7 through 3-10, Figure 2.1, Section 3.5 Current demand projections show demonstrated the city will need by 2038 access to a total of 2.97mgd (4.59cfs) out of the current authorized total of 10.56mgd (16.33cfs) of which 2.34cfs (out of total permitted rate of 4.457cfs) they are currently authorized to divert in groundwater and 14.0cfs in surface water. However it is unclear if or how much greenlight water they are requesting to divert under their extended permits to meet their needs for the next 10 and eventually 20 years.

(2) An estimated schedule that identifies when the water supplier expects to fully exercise each of the water rights and water use permits currently held by the supplier;	Additional information needed to meet requirement. Section 4.5 ➢ For this section, please include permit numbers when referencing wells as it's unclear which permit is being referenced when both are call "Dutch Canyon Well" and Table 2.4 states that former Permit 15295 (now 17643) is listed as Dutch Canyon Well and Table 2.5 lists is as "Miller Road Well 1." ➢ Additionally, this section states that "New Dutch Canyon" well will begin operating in 2018, but it is unclear to which permit this is referring and as this plan was submitted in 2019, this will need to be updated to reflect status for current year. ➢ Finally, table 2.4 states that Permit G-17644 has well #1 and Well #2 and is the Miller road area (3 wells), Table 2.5 lists Permit G-17644 has Miller Road well 2 and Miller Road well 3 and Section 4.5 is referring to Miller Road well no. 4 and 5? ➢ It is very unclear which permits the City is stating they need greenlight water under and how much? ➢ For reference: Permit G-17644 (which after Transfer T-12284 has seven (7) wells permitted under it is currently limited to 1.34cfs being: o 0.76 cfs (0.49 mgd) from well 1 and; o 0.58 cfs (0.37mgd) from well 2 o (out of the total permitted rate of 2.9cfs being 2.23 from well 1 and 0.67 cfs from well 2) and; ➢ Permit G-17643 is currently limited to 0.0 cfs (out of the total permitted rate of 0.557 cfs). **If the city is requesting greenlight water under either of its extended permits with development limitations, that request needs to be made in cfs based on the permit numbers and evidence needs to clearly demonstrate this need.** **It's still unclear what the City is requesting. The section now states that the City plans to divert through 7 points of appropriation under Permit G-17643 which has 6 points of appropriation and mentions they need 0.540cfs (is this a greenlight water request?) – the permit is for up to 0.557 and that in the future they will need 1.02cfs – but don't state under which permit as any further diversion beyond the permitted rate of 0.557cfs under Permit G-17643 would be considered enlargement. Additionally, this permit's wells are referred to as Miller Road Water right but according to Table 2.4 these wells are considered the Dutch Canyon well area?** **Additionally, Table 4.5 lists a greenlight water request under a Permit G-8315 – is this supposed to G-8615?This section needs to be cleaned up prior to approval so that the greenlight water request on the next page matches what is being written.**

(3) Based on the information in (1), an estimate of the water supplier's water demand projections for 10 and 20 years, and at the option of the municipal water supplier, longer periods;	Meets requirement. See page 3-9, Section 3.6
(4) A comparison of the projected water needs and the sources of water currently available to the municipal water supplier and to any other suppliers to be served considering the reliability of existing sources;	Clarification required. See pages 4-3 through 4-4, Figure 4.1, Table 4.4 ➢ Please modify this section to reflect what is listed in OAR 690-086-0170 (2) above. As it is unclear which permits the City is requesting greenlight water under and how much they are requesting under each permit. See comments above.
(5) If any expansion or initial diversion of water allocated under existing permits is necessary to meet the needs shown in (3), an analysis of alternative sources of water that considers availability, reliability, feasibility and likely environmental impacts. The analysis shall consider the extent to which the projected water needs can be satisfied through:	
(a) Implementation of conservation measures identified under OAR 690-086-0150;	Does not meet requirement. See pages 4-6 through 4-10, Section 4.6 and 4.7. ➢ This section does not address how implementation of conservation measures such as a reduction in non-revenue water will delay the need to initiate diversion of water under either of the City's extended permits is mentioned in this section? ➢ With water loss of approximately 36.9% the City is potentially losing 0.86cfs of groundwater to leakage. Meets requirement. See page 4-5.
(b) Interconnection with other municipal supply systems and cooperative regional water management; and	Meets requirement. See pages 4-6 through 4-10, Section 4.6 and 4.7.
(c) Any other conservation measures that would provide water at a cost that is equal to or lower than the cost of other identified sources.	Does not meet requirement. See pages 4-6 through 4-10, Section 4.6 and 4.7. ➢ This is not addressed in this section. Meets requirement.

(6) If any expansion or initial diversion of water allocated under existing permits is necessary to meet the needs shown in (3), a quantification of the maximum rate and monthly volume of water to be diverted under each of the permits;	Clarification needed to meet requirement. See page 7-1, Section 7.2. ➢ This section states that the City will need to divert 695gpm or 1.548 cfs under each permit being: G-8615, G-15295 (now G-17643), and G-15492 (now G-17644). ➢ Permit G-1764 is only permitted for 0.557cfs and; ➢ Permit G-8615 is permitted for 0.89cfs. ➢ Why is the City stating they will need to divert a higher rate than what they are currently permitted for? ➢ In order to meet this requirement, modify this section to clearly state what the City will need to divert under their extended permits in order to meet their needs by 2039. ➢ Please note; additional points of appropriation under existing permits do not change the original rate that was permitted. The rate is split amongst the additional points of appropriation. Meets requirement.
(7) For any expansion or initial diversion of water under existing permits, a description of mitigation actions the water supplier is taking to comply with legal requirements including but not limited to the Endangered Species Act, Clean Water Act, Safe Drinking Water Act; and	Meets requirement. See page 7-2, section 7.3
(8) If acquisition of new water rights will be necessary within the next 20 years to meet the needs shown in (3), an analysis of alternative sources of the additional water that considers availability, reliability, feasibility and likely environmental impacts and a schedule for development of the new sources of water. The analysis shall consider the extent to which the need for new water rights can be eliminated through:	
(a) Implementation of conservation measures identified under OAR 690-086-0150;	Meets requirement. See pages 4-6 through 4-9. Section 4.6 and Table 4.5. ➢ Please note: this section references the City's Water System Master Plan, to which WRD does not have access.
(b) Interconnection with other municipal supply systems and cooperative regional water management; and	Meets requirement. See pages 4-6 through 4-9. Section 4.6 and Table 4.5.
(c) Any other conservation measures that would provide water at a cost that is equal to or lower than the cost of other identified sources.	Does not meet requirement. See pages 4-10. ➢ Rule requires the City review any other conservation measures other than required by rule that would provide water at a cost that is equal to or lower than the cost of other identified sources. Meets requirement.

OAR 690-086-0130 – Approval Criteria for Access to Water under an Extended Permit	
Requests for Greenlight Water: **(7)** If during the next 20 years the maximum rate of water diverted under an extended permit will be greater than the maximum rate authorized for diversion under the extension or previously approved water management and conservation plan;	
(a) The plan includes a schedule for development of any conservation measures that would provide water at a cost that is equal to or lower than the cost of other identified sources, unless the supplier has provided sufficient justification for the factors used in selecting other sources for development or the supplier serves a population of less than 1,000;	Does not meet requirement. ➢ It is unclear if or how much greenlight water the City is requesting under each of its extended permits with development limitations (G-17644 and G-17643). To meet this requirement. Please modify this plan to clearly demonstrate how much water the City will require based on current supply and water rights to meet demands during the next 20 years and how much water under each extended permit the City will require to meet those demands. Meets requirement.
(b) Increased use from the source is the most feasible and appropriate water supply alternative available to the supplier; and	Does not meet requirement. ➢ It is unclear if or how much greenlight water the City is requesting under each of its extended permits with development limitations (G-17644 and G-17643). To meet this requirement. Please modify this plan to clearly demonstrate how much water the City will require based on current supply and water rights to meet demands during the next 20 years and how much water under each extended permit the City will require to meet those demands. Meets requirement.
(c) If mitigation is legally required to address limitations or restrictions on the development of permits for which resource issues are identified under OAR 690-086-0140(5)(i), the plan contains documentation that the supplier is complying with the mitigation requirements. The Department may consult with federal and state agencies in making this determination; and	Meets requirement. See pages 7-2, Section 7.3.

February 7, 2003 – dp
REVISED: July 1, 2010 – ljj
REVISED: April 1, 2019 -khc

Oregon
Kate Brown, Governor

Water Resources Department
North Mall Office Building
725 Summer St NE, Suite A
Salem, OR 97301
Phone (503) 986-0900
Fax (503) 986-0904
www.Oregon.gov/OWRD

April 23, 2019

City of Scappoose
Attn: Darryl Sykes
33568 E. Columbia Ave.
Scappoose, OR 97056

SUBJECT: Water Management and Conservation Plan

Dear Mr. Sykes:

Thank you for preparing the City of Scappoose's (City) Water Management and Conservation Plan (WMCP) for submittal on February 25, 2019. The Department appreciates the City's commitment to water conservation and management.

Our Department has completed a review of the City's WMCP, and pursuant to OAR 690-086-0905, the Department published notice of the availability of the plan for review on February 26, 2019. We received no comments during the 30-day public comment period.

Overall, the City's plan was very good and includes most of the elements required by OAR 690-086. The results of our review are provided in the attached review worksheet.

There are two alternatives available to the City of Scappoose in response to this review. The City may choose to:

1. Identify information in the draft plan that we may have missed that would alter the results of the review and provide a basis for concluding that the plan is fully consistent with OAR Chapter 690, Division 86; ***or***

2. Modify the draft plan to address the deficiencies identified in the attached comments and review worksheet.

   NOTE: The Department's preferred method is to receive a "preliminary" revised plan with edits identified *(i.e., track-changes, red-line, etc.)*. You may also use the review worksheet format to assist in responding to the Department's comments. The Department will review the "preliminary" revised plan and, when all deficiencies have been sufficiently addressed, will notify you to submit the final revised plan.

Please notify us by **May 24, 2019**, of the alternative you wish to pursue or if you would like additional time to evaluate these alternatives. If you select to modify your plan under Alternative 2, please indicate the date by which you can submit the additional

information. If you do not notify us by **August 22, 2019** of the alternative you wish to pursue, we will issue an order on your water management and conservation plan, as we understand it now.

Please do not hesitate to contact me by telephone at 503-986-0919 or by e-mail at Kerri.H.Cope@oregon.gov if you have any questions or if I can be of any assistance.

Sincerely,

Kerri H. Cope

Kerri H. Cope
Water Management and Conservation Analyst
Water Right Services Division

Enclosure

cc: WMCP File
District 18 Watermaster, Jake Constans
Carollo, Attn: Daniel Reisinger, 720 SW Washington St. Ste 550, Portland, OR 97205

Oregon Water Resources Department (OWRD)
Municipal Water Management and Conservation Plan (WMCP) Review Worksheet
(OAR Chapter 690, Division 086)

Name of Supplier: City of Scappoose (Date WMCP Received by OWRD: Feb. 25, 2019_)	
OWRD Reviewer:	Kerri H. Cope
Date of OWRD Review:	April, 2019
Reason for submittal of the WMCP:	Extension of time for Permit G-15491 signed August 29, 2014 required submittal of WMCP by August 29, 2017, and an extension of time for Permit G-15295 signed December 12, 2014 required submittal by December 12, 2017. The earlier date of August 29, 2017 trumped the second date. The City asked for additional time for submittal to march 29, 2018.
If a previous WMCP has been submitted, was it approved contingent upon the completion of certain **Work Plan** activities? If so, list those Work Plan items here:	No, a work plan was not required in the Final Order approving the City's previous WMCP.
Are there any "Development Limitation" conditions established by a Final Order approving a previous WMCP or Permit Extension of Time?	Yes: ➢ Permit G-17644 (formerly G-15491) includes a development limitation of 1.34cfs (out of the total permitted rate of 2.9cfs) being 0.76 cfs from Miller Road Well 1 and 0.58cfs from Miller Road Well 2. ➢ Permit G-17643 (formerly G-15295) includes a development limitation of 0.0 cfs (out of the total permitted rate of 0.557 cfs). ➢ Both development limitations require submittal of a WMCP and evidence provided within the WMCP that support removal of all or a portion of the development limitation under each permit, which can only be achieved through a Final Order approving this WMCP and removing or modifying the development limitations.

Rule Reference	**OWRD Review Comment**
ORS 536.050(1)(u) – Fees for Water Management and Conservation Plans	
$1040 – for examination of a Plan submitted by a municipal water supplier serving a population of 1,000 or fewer; or **$2090** – for examination of a Plan submitted by a municipal water supplier serving a population of more than 1,000. ***Current fee schedule effective July 1, 2017 (ORS 536.050).***	$2090 was paid 2/11/19; however, plan was not complete until Feb. 25, 2019 due to local gov. notice. Service population est. of 7560.

OAR 690-086-0125 – Additional Requirements	
(5) A list of the affected local governments to whom the draft plan was made available pursuant to 690-086-0120(8) and a copy of any comments on the plan provided by the local governments;	Meets requirement. See page 1-2 and appendix A.
(6) A proposed date for submittal of an updated plan within no more than 10 years based on the proposed schedule for implementation of conservation measures, any relevant schedules for other community planning activities, and the rate of growth or other changes expected by the water supplier; or an explanation of why submittal of an updated plan is unnecessary and should not be required by the Department; and	Meets requirement. See Table 1.1 on page 1-2 and Section 7.5.
(7) If the municipal water supplier is requesting additional time to implement metering as required under OAR 690-086-0150(4)(b) or a benchmark established in a previously approved plan, documentation showing additional time is necessary to avoid unreasonable and excessive costs.	Meets requirement. See Section 5.3, page 5-2. System is fully metered.
OAR 690-086-0140 – Water Supplier Description	
(1) A description of the supplier's source(s) of water; including diversion, storage and regulation facilities; exchange agreements; intergovernmental cooperation agreements; and water supply or delivery contracts;	Clarification required to meet requirement. See pages 2-6 through 2-9 and Table 2.2. This section neglects to include the development limitations for the following: ➢ Permit G-17644 of 1.34cfs being 0.76 cfs from well 1 and 0.58 cfs from well 2 (out of the total permitted rate of 2.9cfs being 2.23 from well 1 and 0.67 cfs from well 2) and; ➢ Permit G-17643 of 0.0 cfs (out of the total permitted rate of 0.557 cfs). ➢ In order to meet this requirement. Please modify this section and Table 2.2 to reflect this. ➢ Additionally, it is unclear which permits are being referred to under "Section 2.5 – Groundwater supply" as the City has multiple wells named "Dutch Canyon" well but two different permits, one of which they are not allowed to divert water under at this point (Permit G-17643) due to a development limitation of 0.0cfs. Please modify this section and provide clarification as to which permit the City is referring.
(2) A delineation of the current service areas and an estimate of the population served and a description of the methodology(ies) used to make the estimate;	Additional information needed to meet requirement. See page 2-1 and Figure 2.1. ➢ Please include the methodology used to make the population estimate given (for example US census Bureau, PSU, etc.).

(3) An assessment of the adequacy and reliability of the existing water supply considering potential limitations on continued or expanded use under existing water rights resulting from existing and potential future restrictions on the community's water supply;	Does not meet requirement. See pages 2-12 through 2-13. ➢ Please modify this section to include whether the City's current supplies are adequate to fulfill the City's needs considering potential restrictions, such as declining groundwater aquifer levels, etc. ➢ Are the City's current water sources – both groundwater and surface water (the City has a 10 cfs water right with a 1923 priority date for Gourley Creek for instance) and access to over 2.34cfs of groundwater (out of the total permitted rate of 4.457 cfs) – is this an adequate and reliable supply for City? ➢ Please note: Permit G-15295 was superseded by Permit G-17643 and currently has an extended completion date to 10/1/2050. ➢ Permit G-17644 has an extended completion date to 10/1/2050 as well.
(4) A quantification of the water delivered by the water supplier that identifies current and available historic average annual water use, peak seasonal use, and average and peak day use;	Meets requirement. See pages 3-1 through 3-6, Sections 3.2-3.4.

General Comment pertaining to OAR 690-086-0140(5) below:

The listing of water rights in Table 2.2 and 2.4 of the City's WMCP needs some clarification/additional information to address all of the items required by this section of the rules.

NOTE: A blank template is attached for your review and an electronic version can be provided.

(5) A tabular list of water rights held by the municipal water supplier that includes the following information:	
(a) Application, permit, transfer, and certificate numbers (as applicable);	Does not meets requirement. See pages 2-9 through 2-11 and Table 2.4, Table 2.5. ➢ Transfers T-12258 (App G-15135), 12284 (App G-15792), and 12586 (App G-9218) are missing from this table.
(b) Priority date(s);	Meets requirement. See pages 2-9 through 2-11 and Table 2.4, Table 2.
(c) Source(s) of water;	Clarification required to meets requirement. See pages 2-9 through 2-11 and Table 2.4, Table 2.5 ➢ The transfers that added additional points of appropriation under Permits G-17643 and G-17644) are not listed.
(d) Type(s) of beneficial uses specified in the right;	Does not meet requirement. See pages 2-9 through 2-11 and Table 2.4, Table 2.5 ➢ This information is missing from the tabular list of water rights.

(e) Maximum instantaneous and annual quantity of water allowed under each right;	Does not meet requirement. See pages 2-9 through 2-11 and Table 2.4, Table 2.5 The following information needs to be modified in the table: ➢ Permit G-17644 is currently limited to 1.34cfs being: o 0.76 cfs (0.49 mgd) from well 1 and; o 0.58 cfs (0.37mgd) from well 2 o (out of the total permitted rate of 2.9cfs being 2.23 from well 1 and 0.67 cfs from well 2) and; ➢ Permit G-17643 is currently limited to 0.0 cfs (out of the total permitted rate of 0.557 cfs). ➢ In order to meet this requirement. Please update the table to reflect this and the allowed totals. ➢ Please note: the permit amendments T-12258 and T-12284, which added additional POA's do not change the extension of time and development limitation, which can only be removed or changed through a Final Order approving this WMCP that removes or modifies the development limitations.
(f) Maximum instantaneous and annual quantity of water diverted under each right to date;	Does not meet requirement. See pages 2-9 through 2-11 and Table 2.4, Table 2. ➢ This information is missing from the table.
(g) Average monthly and daily diversions under each right for the previous year, and if available for the previous five years;	Does not meet requirement. See pages 2-9 through 2-11 and Table 2.4, Table 2. ➢ Average daily diversion is missing from the table.
(h) Currently authorized date for completion of development under each right; and	Does not meet requirement. See pages 2-9 through 2-11 and Table 2.4, Table 2. ➢ This information is missing from the table.
Environmental Concerns: **(i)** Identification of any streamflow-dependent species listed by a state or federal agency as sensitive, threatened or endangered that are present in the source, any listing of the source as water quality limited and the water quality parameters for which the source was listed, and any designation of the source as being in a critical ground water area.	Additional information needed to meet requirement. See pages 2-7 and 2-11 through 2-12. Sections 2.5 and 2.6.2 ➢ The following are missing from the sensitive species list for ODFW: • Bull Trout – Sensitive • Steelhead: Summer/Coastal Rainbow Trout – Sensitive Critical • Lower Willamette Chinook Salmon needs to include spring run • Oregon Chub – Sensitive • Western Brook Lamprey – Sensitive ➢ The following is missing from this section for Federal NOAA Designations: • Lower Columbia Chinook Salmon: Threatened • Upper Willamette River Chinook Salmon: Threatened • Upper Willamette River Steelhead: Threatened

(6) A description of customers served including other water suppliers and the estimated numbers; general water use characteristics of residences, commercial and industrial facilities, and any other uses; and a comparison of the quantities of water used in each sector with the quantities reported in the water supplier's previously submitted water management and conservation plan and progress reports;	Meets requirement. See pages 3-4 through 3, sections 3.3-3.4.
(7) Identification and description of interconnections with other municipal supply systems;	Meets requirement. See page 2-13, Section 2.8
(8) A schematic of the system that shows the sources of water, storage facilities, treatment facilities, major transmission and distribution lines, pump stations, interconnections with other municipal supply systems, and the existing and planned future service area; and	Clarification needed to meet requirement. See pages 2-3 and 2-5 and Figures 2-1 and 2-2. ➢ Since the plan does not follow the rule guidance format, the reviewer used the checklist and table of contents to find each OAR reference and the location in the plan. For this rule requirement, the guidance states that Figure 2-1 meets this requirement, however Figure 2-1 is the City's hydraulic profile, and Figure 2-2 is listed as the City map/schematic. ➢ Please clarify which is intended to meet this requirement.
(9) A quantification and description of system leakage that includes any available information regarding the locations of significant losses.	Additional information needed to meet requirement. See pages 5-4 through 5-9, Section 5.8 ➢ Please provide water loss date for 2017 and 2018.
OAR 690-086-0150 – Water Conservation Element	
(1) A progress report on the conservation measures scheduled for implementation in a water management and conservation plan previously approved by the Department, if any;	Meets requirement. See page 5-12, Table 5.8
(2) A description of the water supplier's water use measurement and reporting program and a statement that the program complies with the measurement standards in OAR Chapter 690, Division 85, that a time extension or waiver has been granted, or that the standards are not applicable;	Meets requirement. See page 5-11, Section 5.13
(3) A description of other conservation measures, if any, currently implemented by the water supplier, including any measures required under water supply contracts;	Meets requirement. See page 5-12, Table 5.8 The City has no additional conservation measures.
(4) A description of the specific activities, along with a schedule that establishes five-year benchmarks, for implementation of each of the following conservation measures that are required of all municipal water suppliers:	
(a) An annual water audit that includes a systematic and documented methodology for estimating any un-metered authorized and unauthorized uses;	Meets requirement. See page 5-2, section 5.2

(b) If the system is not fully metered, a program to install meters on all un-metered water service connections. The program shall start immediately after the plan is approved and shall identify the number of meters to be installed each year with full metering completed within five years of approval of the water management and conservation plan;	Meets requirement. See page 5-2, section 5.3
(c) A meter testing and maintenance program;	Meets requirement. See page 5-2, section 5.3
(d) A rate structure under which customers' bills are based, at least in part, on the quantity of water metered at the service connections;	Meets requirement. See page 5-3, section 5.4
(e) If the annual water audit indicates that system leakage exceeds 10 percent:	
(A) Within two years or approval of the water management and conservation plan, the water supplier shall provide a description and analysis identifying potential factors for the loss and selected action for remedy;	Additional information needed to meet requirement. See page Section 5.6 and Table 5.6 ➢ Since the City's 2016 water loss was 36.9%, and unless more recent water loss data is available to demonstrate that the City's water loss is less than 10%, this section will need to be modified or provide additional information in order to meet the requirement with a two (2) year benchmark. ➢ Additionally, please modify this section to reflect dates that are more recent or provide the results of the planned and recent activities. Currently it states that the City will begin flushing and testing operation in 2016 and conduct, a water audit using AWWA tools in 2018. As it is currently 2019, this section requires an update. ➢ In order to meet this requirement, please modify this section with a two (2) year benchmark as required by the revised OAR 690-086, which became effective 12/22/2018.
(B) If actions identified under subsection (A) do not result in the reduction of Water Losses to 10 percent or less, within five years or approval of the water management and conservation plan, the water supplier shall:	Additional information needed to meet requirement. ➢ See comment above under OAR 690-086-0150 (4)(e)(A).
(i) Develop and implement a regularly scheduled and systematic program to detect and repair leaks in the transmission and distribution system using methods and technology appropriate to the size and capability of the Municipal Water Supplier or a line replacement program detailing the size and length of pipe to be replaced each year; or	Additional information needed to meet requirement. ➢ See comment above under OAR 690-086-0150 (4)(e)(A).
(ii) Develop and implement a water loss control program consistent with American Water Works Associations Standards;	Additional information needed to meet requirement. See page Section 5.6 and Table 5.6 ➢ See comment above under OAR 690-086-0150 (4)(e)(A).

(f) A public education program to encourage efficient water use and the use of low water use landscaping that includes regular communication of the supplier's water conservation activities and schedule to customers;	Additional information needed to meet requirement. See page 5-10, Section 5.9 ➢ Please provide copies of the information provided with bills and on the City's website.
(5) If the supplier serves a population greater than 1,000 and proposes to expand or initiate diversion of water under an extended permit for which resource issues have been identified under OAR 690-086-0140(5)(i), or if the supplier serves a population greater than 7,500, a description of the specific activities, along with a schedule that establishes five-year benchmarks, for implementation of each of the following measures; or documentation showing that implementation of the measures is neither feasible nor appropriate for ensuring the efficient use of water and the prevention of waste:	
(a) Technical and financial assistance programs commensurate to the size of the Municipal Water Supplier to encourage and aid residential, commercial and industrial customers in implementation of conservation measures;	Meets requirement. See page 5-11, section 5.10
(b) Supplier financed retrofitting or replacement of existing inefficient water using fixtures, including distribution of residential conservation kits and rebates for customer investments in water conservation;	Meets requirement. See page 5-11, section 5.11
(c) Adoption of rate structures, billing schedules, and other associated programs that support and encourage water conservation;	Meets requirement. See page 5-3, section 5.4-5.5
(d) Water reuse, recycling, and non-potable water opportunities; and	Clarification needed to meet requirement. See page 5-11, section 5.12 ➢ This section states: "it is recommended that the City investigate the cost/benefit of infrastructure upgrades to allow as part of an ongoing facility plan." By whom? Please revise statement as to what the City will be doing or has done, not what is recommended.
(e) Any other conservation measures identified by the water supplier that would improve water use efficiency.	Meets requirement. See page 5-12, Table 5-.8. Plan states the City has no other conservation measures at this point.
OAR 690-086-0160 – Municipal Water Curtailment Element	
(1) A description of the type, frequency and magnitude of supply deficiencies within the past 10 years and current capacity limitation. The description shall include an assessment of the ability of the water supplier to maintain delivery during long-term drought or other source shortages caused by a natural disaster, source contamination, legal restrictions on water use, or other circumstances;	Meets requirement. See pages 6-1 through 6-2, Section 6.2

(2) A list of three or more stages of alert for potential shortage or water service difficulties. The stages shall range from a potential or mild alert, increasing through a serious situation to a critical emergency;	Clarification needed to meet requirement. See pages 6-1 through 6-5, Sections 6.2-6.3 ➢ Section 6.3 states that the draft curtailment plan "will be considered" by the City council during 2018. As this plan was submitted in 2019, what was the outcome?
(3) A description of pre-determined levels of severity of shortage or water service difficulties that will trigger the curtailment actions under each stage of alert to provide the greatest assurance of maintaining potable supplies for human consumption; and	Meets requirement. See pages 6-4 through 6-5, Table 6-.4 and Sections 6.2-6.3 Four (4) stages of alert with stage one being voluntary.
(4) A list of specific standby water use curtailment actions for each stage of alert ranging from notice to the public of a potential alert, increasing through limiting nonessential water use, to rationing and/or loss of service at the critical alert stage.	Meets requirement. See pages 6-4 through 6-5, Table 6-.4 and Sections 6.2-6.3 Four (4) stages of alert with stage one being voluntary.
OAR 690-086-0170 – Municipal Water Supply Element	
(1) A delineation of the current and future service areas consistent with state land use law that includes available data on population projections and anticipated development consistent with relevant acknowledged comprehensive land use plans and urban service agreements or other relevant growth projections;	Meets requirement. See pages 3-7 through 3-10, Figure 2.1, Section 3.5 Current demand projections show demonstrated the city will need by 2038 access to a total of 2.97mgd (4.59cfs) out of the current authorized total of 10.56mgd (16.33cfs) of which 2.34cfs (out of total permitted rate of 4.457cfs) they are currently authorized to divert in groundwater and 14.0cfs in surface water. However it is unclear if or how much greenlight water they are requesting to divert under their extended permits to meet their needs for the next 10 and eventually 20 years.

(2) An estimated schedule that identifies when the water supplier expects to fully exercise each of the water rights and water use permits currently held by the supplier;	Additional information needed to meet requirement. Section 4.5 ➢ For this section, please include permit numbers when referencing wells as it's unclear which permit is being referenced when both are call "Dutch Canyon Well" and Table 2.4 states that former Permit 15295 (now 17643) is listed as Dutch Canyon Well and Table 2.5 lists is as "Miller Road Well 1." ➢ Additionally, this section states that "New Dutch Canyon" well will begin operating in 2018, but it is unclear to which permit this is referring and as this plan was submitted in 2019, this will need to be updated to reflect status for current year. ➢ Finally, table 2.4 states that Permit G-17644 has well #1 and Well #2 and is the Miller road area (3 wells), Table 2.5 lists Permit G-17644 has Miller Road well 2 and Miller Road well 3 and Section 4.5 is referring to Miller Road well no. 4 and 5? ➢ It is very unclear which permits the City is stating they need greenlight water under and how much? ➢ For reference: Permit G-17644 (which after Transfer T-12284 has seven (7) wells permitted under it is currently limited to 1.34cfs being: o 0.76 cfs (0.49 mgd) from well 1 and; o 0.58 cfs (0.37mgd) from well 2 o (out of the total permitted rate of 2.9cfs being 2.23 from well 1 and 0.67 cfs from well 2) and; ➢ Permit G-17643 is currently limited to 0.0 cfs (out of the total permitted rate of 0.557 cfs). **If the city is requesting greenlight water under either of its extended permits with development limitations, that request needs to be made in cfs based on the permit numbers and evidence needs to clearly demonstrate this need.**
(3) Based on the information in (1), an estimate of the water supplier's water demand projections for 10 and 20 years, and at the option of the municipal water supplier, longer periods;	Meets requirement. See page 3-9, Section 3.6
(4) A comparison of the projected water needs and the sources of water currently available to the municipal water supplier and to any other suppliers to be served considering the reliability of existing sources;	Clarification required. See pages 4-3 through 4-4, Figure 4.1, Table 4.4 ➢ Please modify this section to reflect what is listed in OAR 690-086-0170 (2) above. As it is unclear which permits the City is requesting greenlight water under and how much they are requesting under each permit.

(5) If any expansion or initial diversion of water allocated under existing permits is necessary to meet the needs shown in (3), an analysis of alternative sources of water that considers availability, reliability, feasibility and likely environmental impacts. The analysis shall consider the extent to which the projected water needs can be satisfied through:	
(a) Implementation of conservation measures identified under OAR 690-086-0150;	Does not meet requirement. See pages 4-6 through 4-10, Section 4.6 and 4.7. ➢ This section does not address how implementation of conservation measures such as a reduction in non-revenue water will delay the need to initiate diversion of water under either of the City's extended permits is mentioned in this section? ➢ With water loss of approximately 36.9% the City is potentially losing 0.86cfs of groundwater to leakage.
(b) Interconnection with other municipal supply systems and cooperative regional water management; and	Meets requirement. See pages 4-6 through 4-10, Section 4.6 and 4.7.
(c) Any other conservation measures that would provide water at a cost that is equal to or lower than the cost of other identified sources.	Does not meet requirement. See pages 4-6 through 4-10, Section 4.6 and 4.7. ➢ This is not addressed in this section.
(6) If any expansion or initial diversion of water allocated under existing permits is necessary to meet the needs shown in (3), a quantification of the maximum rate and monthly volume of water to be diverted under each of the permits;	Clarification needed to meet requirement. See page 7-1, Section 7.2. ➢ This section states that the City will need to divert 695gpm or 1.548 cfs under each permit being: G-8615, G-15295 (now G-17643), and G-15492 (now G-17644). ➢ Permit G-1764 is only permitted for 0.557cfs and; ➢ Permit G-8615 is permitted for 0.89cfs. ➢ Why is the City stating they will need to divert a higher rate than what they are currently permitted for? ➢ In order to meet this requirement, modify this section to clearly state what the City will need to divert under their extended permits in order to meet their needs by 2039. ➢ Please note; additional points of appropriation under existing permits do not change the original rate that was permitted. The rate is split amongst the additional points of appropriation.
(7) For any expansion or initial diversion of water under existing permits, a description of mitigation actions the water supplier is taking to comply with legal requirements including but not limited to the Endangered Species Act, Clean Water Act, Safe Drinking Water Act; and	Meets requirement. See page 7-2, section 7.3
(8) If acquisition of new water rights will be necessary within the next 20 years to meet the needs shown in (3), an analysis of alternative sources of the additional water that considers availability, reliability, feasibility and likely environmental impacts and a schedule for development of the new sources of water. The analysis shall consider the extent to which the need for new water rights can be eliminated through:	

(a) Implementation of conservation measures identified under OAR 690-086-0150;	Meets requirement. See pages 4-6 through 4-9. Section 4.6 and Table 4.5. ➢ Please note: this section references the City's Water System Master Plan, to which WRD does not have access.
(b) Interconnection with other municipal supply systems and cooperative regional water management; and	Meets requirement. See pages 4-6 through 4-9. Section 4.6 and Table 4.5.
(c) Any other conservation measures that would provide water at a cost that is equal to or lower than the cost of other identified sources.	Does not meet requirement. See pages 4-10. ➢ Rule requires the City review any other conservation measures other than required by rule that would provide water at a cost that is equal to or lower than the cost of other identified sources.
OAR 690-086-0130 – Approval Criteria for Access to Water under an Extended Permit	
Requests for Greenlight Water: **(7)** If during the next 20 years the maximum rate of water diverted under an extended permit will be greater than the maximum rate authorized for diversion under the extension or previously approved water management and conservation plan;	
(a) The plan includes a schedule for development of any conservation measures that would provide water at a cost that is equal to or lower than the cost of other identified sources, unless the supplier has provided sufficient justification for the factors used in selecting other sources for development or the supplier serves a population of less than 1,000;	Does not meet requirement. ➢ It is unclear if or how much greenlight water the City is requesting under each of its extended permits with development limitations (G-17644 and G-17643). To meet this requirement. Please modify this plan to clearly demonstrate how much water the City will require based on current supply and water rights to meet demands during the next 20 years and how much water under each extended permit the City will require to meet those demands.
(b) Increased use from the source is the most feasible and appropriate water supply alternative available to the supplier; and	Does not meet requirement. ➢ It is unclear if or how much greenlight water the City is requesting under each of its extended permits with development limitations (G-17644 and G-17643). To meet this requirement. Please modify this plan to clearly demonstrate how much water the City will require based on current supply and water rights to meet demands during the next 20 years and how much water under each extended permit the City will require to meet those demands.
(c) If mitigation is legally required to address limitations or restrictions on the development of permits for which resource issues are identified under OAR 690-086-0140(5)(i), the plan contains documentation that the supplier is complying with the mitigation requirements. The Department may consult with federal and state agencies in making this determination; and	Meets requirement. See pages 7-2, Section 7.3.

City of _____ – Water Right Inventory

Application No.	Permit No.	Priority Date	Certificate No.	Transfer No.	Source	Use	Allowed Rate (cfs)	Source	Actual Diversion				Authorized Completion Date	Notes/Environmental concerns
									Maximum Instantaneous Rate Diverted to Date (cfs)	Maximum Annual Quantity Diverted to Date (MG)	Average Monthly Diversion (MG)	Average Daily Diversion (Gallons)		

Chapter 2 - Water Supplier Description

Record of Comment Log

PROJECT : **Water Management and Conservation Plan**
City of Scappoose
JOB # : 10738A.00
DATE UPDATED: 4/30/2019

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COMMENT NO.	SECTION	COMMENT BY	COMMENT	RESPONSE	CHANGE TO PLAN
1	Pages 2-6 - 2-9 and Table 2.2	Kerri Cope	This section neglects to include the development limitations for the following: Permit G-17644 of 1.34cfs being 0.76 cfs from well 1 and 0.58 cfs from well 2 (out of the total permitted rate of 2.9cfs being 2.23 from well 1 and 0.67 cfs from well 2) and; Permit G-17643 of 0.0cfs (out of the total permitted rate of 0.557 cfs). In order to meet this requirement, please modify this section and Table 2.2 to reflect this.	The section will be modified to reflect the development limitations.	The section will be modified to reflect the development limitations.
2	Pages 2-6 - 2-9 and Table 2.2	Kerri Cope	Additionally, it is unclear which permits are being referred to under "Section 2.5-Groundwater supply" as the City has multiple wells named "Dutch Canyon" well but two different permits, one of which they are not allowed to divert water under at this point (Permit G-17643) due to a development limitation of 0.0cfs. Please modify this section and provide clarification as to which permit the City is referring.	The WMCP has been modified to reflect the development limitations. And refer specifically to Dutch Canyon Well #1 (G-8615) and Well #2 (G-17643).	The section will be modified to reflect the development limitations.
3	Page 2-1 and Figure 2.1	Kerri Cope	Please include the methodology used to make the population estimate given (for example US census Bureau, PSU,etc.)	The population and employment estimate was developed as part of the City's Transportation System Plan. For population estimates to 2030, the Transportation Plan used the February 2008 Population Forecasts for Columbia County Oregon, its Cities and Unincorporated Area 2010 to 2030, prepared by Portland State University (Medium Growth Forecast). Employment forecast based on City of Scappoose Economic Opportunities Analysis, by Johnson Reid, 2011. The future 2035 estimates were based on land use projection is an estimate of the amount of each land use (household and employment) that the TAZ could accommodate at expected build-out of vacant or underdeveloped lands assuming Comprehensive Plan zoning. This 2035 estimate was inflated to 2039 assuming a continued growth at the same rate. Note, growth beyond 2035 will likely require changes in land use planning.	The Plan will be updated to reference the population estimates sources.
4	Pages 2-12 and 2-13	Kerri Cope	Please modify this section to include whether the City's current supplies are adequate to fulfill the City's needs considering potential restrictions, such as declining groundwater aquifer levels, etc.	Water right limitations are discussed in Section 2.7. Additional reliability concerns are discussed in Section 4.3	Water Right limitations have been clarified in the Plan.
5	Pages 2-12 and 2-13	Kerri Cope	Are the City's current water sources-both groundwater and surface water (the City has a 10 cfs water right with a 1923 priority date for Gourley Creek for instance) and access to over 2.34cfs of groundwater (out of the total permitted rate of 4.457cfs) - is this an adequate and reliable supply for City?	As discussed in Sections 2.7 and 4.3, the surface water supplies do not provide adequate or reliable supply for the City. The City requests green light water for its groundwater supplies to make full use of the water rights to meet future demands. See Section 4.3 for additional details.	Issues with the surface water Plan has been clarified. See Section 4.3 for additional details.
6	Pages 2-12 and 2-13	Kerri Cope	Please note: Permit G-15295 was superseded by Permit G-17643 and currently has an extended completion date to 10/1/2050	Change will be made in the Plan.	Table 2.4 was changed to accurately reflect the provided information.

Chapter 2 - Water Supplier Description

Record of Comment Log

PROJECT : **Water Management and Conservation Plan**
City of Scappoose
JOB # : 10738A.00
DATE UPDATED: 4/30/2019

COMMENT NO.	SECTION	COMMENT BY	COMMENT	RESPONSE	CHANGE TO PLAN
7	Pages 2-12 and 2-13	Kerri Cope	Permit G-17644 has an extended completion date to 10/1/2050 as well	Change will be made in the Plan.	Change was made in the Plan.
8	Pages 2-9 - 2-11 and Table 2.4 and 2.5	Kerri Cope	Transfers T-12258 (App G-15135), 12284 (App G-15792), and 12586 (App G-9218) are missing from this table.	The transfers will be added to this Plan.	The transfers were added to Table 2.4.
9	Pages 2-9 - 2-11 and Table 2.4 and 2.5	Kerri Cope	The transfers that added additional points of appropriation under Permits G-17643 and G-17644) are not listed.	Additional points of appropriation added to Table 2.4.	The transfers will be added to this Plan.
10	Pages 2-9 - 2-11 and Table 2.4 and 2.5	Kerri Cope	[Type(s) of beneficial uses specified in the right] This information is missing from the tabular list of water rights.	The beneficial use has been added to Table 2.4.	The beneficial use will be added to Table 2.4.
11	Pages 2-9 - 2-11 and Table 2.4 and 2.5	Kerri Cope	Permit G-17644 is currently limited to 1.34cfs being: 0.76cfs (0.49 mgd) from well 1 and; 0.58cfs (0.37mgd) from well 2; (out of the total permitted rate of 2.9cfs being 2.23 from well 1 and 0.67 cfs from well 2) and;	The section will be modified to reflect the development limitations.	Table 2.4 was changed to accurately reflect the provided information.
12	Pages 2-9 - 2-11 and Table 2.4 and 2.5	Kerri Cope	Permit G-17643 is currently limited to 0.0 cfs (out of the total permitted rate of 0.557 cfs) In order to meet this requirement, please update the table to reflect this and the allowed totals	The section will be modified to reflect the development limitations.	The section will be modified to reflect the development limitations.
13	Pages 2-9 - 2-11 and Table 2.4 and 2.5	Kerri Cope	Please note: the permit amendments T-12258 and T-12284, which added additional POA's do not change the extension of time and development limitation, which can only be removed or changed through a Final Order, approving this WMCP that removes or modifies the development limitations.	Noted. Thank you for the clarification.	No change.
14	Pages 2-9 - 2-11 and Table 2.4, Table 2	Kerri Cope	[Maximum instantaneous and annual quantity of water diverted under each right to date;] This information is missing from the table	The annual quantity of water diverted is provided in Table 2.5. The available data is not recorded by individual water right but is combined by Point of Diversion (POD) location. Data reflecting maximum instantaneous rate by individual water right is not available.	Average Monthly and Average Daily Diversions by Water Right updated to include units of MGD .
15	Pages 2-9 - 2-11 and Table 2.4, Table 2	Kerri Cope	Average daily diversion is missing from the table	The table will be reformatted to better show the average daily diversion.	Table 2.5 was changed to provide the average daily diversion.
16	Pages 2-9 - 2-11 and Table 2.4, Table 2	Kerri Cope	[Currently authorized date for completion of development under each right;] This information is missing from the table.	This information will be added to the table.	Table 2.4 was changed to accurately reflect the provided information.

Chapter 2 - Water Supplier Description

Record of Comment Log

PROJECT : **Water Management and Conservation Plan**
City of Scappoose
JOB # : 10738A.00
DATE UPDATED: 4/30/2019

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COMMENT NO.	SECTION	COMMENT BY	COMMENT	RESPONSE	CHANGE TO PLAN
17	Pages 2-7, 2-11, 2-12, Sections 2.5 and 2.6.2	Kerri Cope	The following are missing from the sensitive species list for ODFW: Bull Trout - Sensitive; Steelhead: Summer/Coastal Rainbow Trout - Sensitive Critical; Lower Willamette Chinook Salmon needs to include spring run; Oregon Chub - Sensitive; Western Brook Lamprey - Sensitive	The information will be added to the section.	The information was added to Section 2.6.3.
18	Pages 2-7, 2-11, 2-12, Sections 2.5 and 2.6.2	Kerri Cope	The following is missing from this section for Federal NOAA Designations: Lower Columbia Chinook Salmon: threatened; Upper Willamette River Chinook Salmon: Threatened; Upper Willamette River Steelhead: Threatened	The information will be added to the section.	The information was added to Section 2.6.3.
19	Pages 2-3 and 2-5 and Figures 2-1 and 2-2	Kerri Cope	Since the plan does not follow the rule guidance format, the reviewer used the checklist and table of contents to find each OAR reference and the location in the plan. For this rule requirement, the guidance states that Figure 2-1 meets this requirement, however Figure 2-1 is the City's hydraulic profile, and Figure 2-2 is listed as the City map/schematic. Please clarify which is intended to meet this requirement.	Figure 2-2 is intended to meet the requirement.	The Checklist has been updated to refer to Figure 2-2.
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Chapter 3 - Water System Supply and Demand Assessment

Record of Comment Log

PROJECT : **Water Management and Conservation Plan**
City of Scappoose
JOB # : 10738A.00
DATE UPDATED: 4/30/2019

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COMMENT NO.	SECTION	COMMENT BY	COMMENT	RESPONSE	CHANGE TO PLAN
1	Pages 3-7-3-10, Figure 3.1, Section 3.5	Kerri Cope	Current demand projections show demonstrated the city will need by 2038 access to a total of 2.97mgd (4.59cfs) out of the current authorized total of 10.56mgd (16.33cfs) of which 2.34cfs (out of the total permitted rate of 4.457cfs) they are currently authorized to divert in groundwater and 14.0cfs in surface water. However it is unclear if or how much greenlight water they are requesting to divert under their extended permits to meet their needs for the next 10 and eventually 20 years.	Please see Chapter 4 for the City's green light water request.	None.
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Chapter 4 - Water Supply Element

Record of Comment Log

PROJECT : Water Management and Conservation Plan
City of Scappoose
JOB # : 10738A.00
DATE UPDATED: 4/30/2019

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COMMENT NO.	SECTION	COMMENT BY	COMMENT	RESPONSE	CHANGE TO PLAN
1	4.5	Kerri Cope	For this section, please include permit numbers when referencing wells as it's unclear which permit is being referenced when both are call "Dutch Canyon Well" and Table 2.4 states that former Permit 15295 (now 17643) is listed as Dutch Canyon Well and Table 2.5 lists is as "Miller Road Well 1."	Section 4.5 will be modified to reference the Permit #s.	In Table 2.5, Miller Road Well 1 was changed to have the permit number G-17644
2	4.5	Kerri Cope	Additionally, this section states that "New Dutch Canyon" well will begin operating in 2018, but it is unclear to which permit this is referring and as this plan was submitted in 2019, this will need to be updated to reflect status for current year.	Section 4.5 will be modified to reference the Permit #s.	The text has been updated to reflect the well is under construction. Figure 4.2 was updated to reflect the 2019 construction Date.
3	4.5	Kerri Cope	Finally, table 2.4 states that Permit G-17644 has well #1 and well #2 and is the Miller road area (3 wells) ,Table 2.5 lists Permit G-17644 has Miller Road well 2 and Miller Road well 3 and Section 4.5 referring to Miller Road well no. 4 and 5?	Section 4.5 will be modified to reference the Permit #s.	Updated to reflect that permit G-17644 includes all of these mentioned wells, as said in comment 5 below. Permit #'s have been added to the text.
4	4.5	Kerri Cope	It is very unclear which permits the City is stating they need greenlight water under and how much?	Section 4.5.1 has been added to clearly state the Green Water Request.	Section 4.5.1 has been added.
5	4.5	Kerri Cope	For reference: Permit G-17644 (which after Transfer T-12284 has seven (7) wells permitted under it is currently limited to 1.34cfs being: 0.76 cfs(0.49 mgd) from well 1 and; 0.58cfs (0.37 mgd) from well 2 (out of the total permitted rate of 2.9cfs being 2.23 from well 1 and 0.67 cfs from well 2) and; Permit G-17643 is currently limited to 0.0 cfs (out of the total permitted rate of 0.557 cfs).	Section 4.5 will be modified to reference the Permit #s.	Section 4.5 has been updated.
6	4.5	Kerri Cope	If the city is requesting greenlight water under either of its extended permits with development limitations, that request needs to be made in cfs based on the permit numbers and evidence needs to clearly demonstrate this need.	Section 4.5.1 has been added to clearly state the Green Water Request.	Section 4.5.1 has been added.
7	Pages 4-3 - 4-4, Figure 4.1, Table 4.4	Kerri Cope	Please modify this section to reflect what is listed in OAR 690-086-0170 (2) above. As it is unclear which permits the City is requesting greenlight water under and how much they are requesting under each permit.	Section 4.5.1 has been added to clearly state the Green Water Request.	Section 4.5.1 has been added.

Chapter 4 - Water Supply Element

Record of Comment Log

PROJECT : **Water Management and Conservation Plan**
City of Scappoose
JOB # : 10738A.00
DATE UPDATED: 4/30/2019

Engineers...Working Wonders With Water®

COMMENT NO.	SECTION	COMMENT BY	COMMENT	RESPONSE	CHANGE TO PLAN
8	Pages 4-6 - 4-10, Section 4.6 and 4.7	Kerri Cope	This section does not address how implementation of conservation measures such as a reduction in non-revenue water will delay the need to initiate diversion of water under either of the City's extended permits is mentioned in this section? With water loss of approximately 36.9% the City is potentially losing 0.86cfs of groundwater to leakage.	Section 4.5 has been added to clearly state the City's anticipated water recovered from its Water Loss Control Plan.	Section 4.5 has been modified.
9	Pages 4-6 - 4-9, section 4.6 and Table 4.5	Kerri Cope	Please note: this section references the City's Water System Master Plan, to which WRD does not have access	The reference has been removed.	Plan text updated.
10	Page 4-10	Kerri Cope	Rule requires the City review any other conservation measures other than required by rule that would provide water at a cost that is equal to or lower than the cost of other identified sources.	Section 4.5.1 has been updated to discuss potential conservation water savings.	Section 4.5.1 has been added.
11	Pages 4-6 through 4-10, Section 4.6 and 4.7	Kerri Cope	[Any other conservation measures that would provide water at a cost that is equal to or lower than the cost of other identified sources.] This requirement is not met.	Section 4.5.1 has been updated to discuss potential conservation water savings.	Section 4.5.1 has been added.
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Chapter 5 - Water System Conservation

Record of Comment Log

PROJECT : **Water Management and Conservation Plan**
City of Scappoose
JOB # : 10738A.00
DATE UPDATED: 4/30/2019

COMMENT NO.	SECTION	COMMENT BY	COMMENT	RESPONSE	CHANGE TO PLAN
1	Pages 5-4 - 5-9, Section 5.8	Kerri Cope	Please provide water loss date for 2017 and 2018	The Chapter has been updated with the requested data.	Table 5.4 has been updated to include 2017 and 2018 data.
2	Section 5.6 and Table 5.6	Kerri Cope	Since the City's 2016 water loss was 36.9%, and unless more recent water loss data is available to demonstrate that the City's water loss is less than 10%, this section will need to be modified or provide additional information in order to meet the requirement with a two (2) year benchmark.	A 2-year Water Loss Control Plan has been added in Appendix D. Plan action items have been summarized throughout Chapter 5.	Added Appendix D - 2-year Water Loss Control Plan.
3	Section 5.6 and Table 5.6	Kerri Cope	Additionally, please modify this section to reflect dates that are more recent or provide the results of the planned and recent activities. Currently it states that the City will begin flushing and testing operation in 2016 and conduct, a water audit using AWWA tools in 2018. As it is currently 2019, this section requires an update.	Section 5.6 has been updated to reflect the most recent activity dates.	Various Changes in Chapter 5. The 2018 Annual Water Audit is provided in Appendix E.
4	Section 5.6 and Table 5.6	Kerri Cope	In order to meet this requirement, please modify this section with a two (2) year benchmark as required by the revised OAR 690-086, which became effective 12/22/2018	A 2-year Water Loss Control Plan has been added in Appendix D. Plan action items have been summarized throughout Chapter 5.	Added Appendix D - 2-year Water Loss Control Plan.
5	Page 5-10, Section 5.9	Kerri Cope	Please provide copies of the information provided with bills and on the City's website	A copy of the inserts can be found in Appendix F.	Added Appendix F - Water Conservation Inserts
6	Page 5-11, section 5.12	Kerri Cope	This section states: "it is recommended that the City investigate the cost/benefit of infrastructure upgrades to allow as part of an ongoing facility plan." By whom? Please revise statement as to what the City wil be doing or has done, not what is recommended.	The City is planning for a future Facility Plan of the Water Treatment Facilities. As this project is not currently budgeted, it has been removed.	Statement has been removed.
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Chapter 6 - Water Curtailment Plan

Record of Comment Log

PROJECT : **Water Management and Conservation Plan**
City of Scappoose
JOB # : 10738A.00
DATE UPDATED: 4/30/2019

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COMMENT NO.	SECTION	COMMENT BY	COMMENT	RESPONSE	CHANGE TO PLAN
1	Pages 6-1 - 6-5, Sections 6.2-6.3	Kerri Cope	Section 6.3 states that the draft curtail plan "will be considered" by the City council during 2018. As this plan was submitted in 2019, what was the outcome?	The City's priority in 2018 and 2019 has been to adequately plan and manage rapid growth and have not had an opportunity to take the revised rules to the Council. Public Works staff will continue to seek a future opportunity to seek Council adoption of a new Water Supply Curtailment Plan.	Section 6.3 has been changed to reference the revised language will be considered by City Council in the future.
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Chapter 7 - Other Water Management and Conservation Planning Issues

Record of Comment Log

PROJECT : **Water Management and Conservation Plan**
City of Scappoose
JOB # : 10738A.00
DATE UPDATED: 4/30/2019

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COMMENT NO.	SECTION	COMMENT BY	COMMENT	RESPONSE	CHANGE TO PLAN
1	7-1, Section 7.2	Kerri Cope	This section states that the City will need to divert 695gpm or 1.548 cfs under each permit being: G-8615, G-15295 (now G-17643), and G-15492 (now G-17644)	This section has been updated and moved to Chapter 4 in conjunction with the green light water request.	
2	7-1, Section 7.2	Kerri Cope	Permit G-1764 is only permitted for 0.557cfs	Thank you for the clarification.	
3	7-1, Section 7.2	Kerri Cope	Permit G-8615 is permitted for 0.89cfs.	Thank you for the clarification.	
4	7-1, Section 7.2	Kerri Cope	Why is the City stating they will need to divert a higher rate than what they are currently permitted for?	This section has been updated and moved to Chapter 4 in conjunction with the green light water request.	
5	7-1, Section 7.2	Kerri Cope	In order to meet this requirement, modify this section to clearly state what the City will need to divert under their extended permits in order to meet their needs by 2039.	This section has been updated and moved to Chapter 4 in conjunction with the green light water request.	
6	7-1, Section 7.2	Kerri Cope	Please note; additional points of appropriation under existing permits do not change the original rate that was permitted. The rate is split amongst the additional points of appropriation.	This section has been updated and moved to Chapter 4 in conjunction with the green light water request.	
7	*General Note about the entire plan	Kerri Cope	It is unclear if or how much greenlight water the City is requesting under each of its extended permits with development limitations (G-17644 and G-17643). To meet this requirement, please modify this plan to clearly demonstrate how much water the City will require based on current supply and water rights to meet demands during the next 20 years and how much water under **each extended permit** the City will require to meet those demands.	This section has been updated and moved to Chapter 4 in conjunction with the green light water request.	
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Febuary 25, 2019 Review Worksheet

Record of Comment Log

PROJECT : **Water Management and Conservation Plan**
City of Scappoose
JOB # : 10738A.00
DATE UPDATED: 12/10/2019

carollo
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COMMENT NO.	SECTION	COMMENT BY	COMMENT	RESPONSE	CHANGE TO PLAN
1	Section 2.7	Kerri Cope	Still does not meet – Is the City's current inventory with the current restrictions and development limitations adequate or does the City need greenlight water under one of its extended permits in order to adequately fulfill its needs within the next 10 years?	The reliability existing water supply is not adequate to meet the growth in demands in the next 10 years. Section 2.8 has been added to directly address your question.	Section 2.8 has been added to identify the adequacy and reliability of the existing water supply.
2	Table 2.5	Kerri Cope	Does not meet requirement – this information (max instant) seems to still be missing. – please note – the max instantaneous is typically the rate that a right is certificated at.	The maximum existing instaneous diversion has been added in Table 2.6.	Table 2.6 has been added to the Plan
3	Section 4.5	Kerri Cope	It's still unclear what the City is requesting. The section now states that the City plans to divert through 7 points of appropriation under Permit G-17643 which has 6 points of appropriation and mentions they need 0.540cfs (is this a greenlight water request?) – the permit is for up to 0.557 and that in the future they will need 1.02cfs – but don't state under which permit as any further diversion beyond the permitted rate of 0.557cfs under Permit G-17643 would be considered enlargement. Additionally, this permit's wells are referred to as Miller Road Water right but according to Table 2.4 these wells are considered the Dutch Canyon well area? Additionally, Table 4.5 lists a greenlight water request under a Permit G-8315 – is this supposed to G-8615?This section needs to be cleaned up prior to approval so that the greenlight water request on the next page matches what is being written.	Section 4.5 has been revised for consistency with Table 4.5 and Section 4.5.1. Text has been edited to more clearly state that the City is requesting full use of its existing rights and is not seeking an enlargement of its water rights. Additionally, the text has been revised to better identify the Greenlight water Requests from improvments to restore the reliable yield on the City's existing wells.	Edits to Section 4.5 text.
4	Table 4.4	Kerri Cope	See Comments (Section 4.5) above.	Please see Response 3.	Please see Response 3.

Appendix B

WATER RIGHT DOCUMENTATION

BEFORE THE WATER RESOURCES DEPARTMENT

OF THE

STATE OF OREGON

In the Matter of Transfer Application T-12586, Columbia County	)))	FINAL ORDER APPROVING AN ADDITIONAL POINT OF APPROPRIATION

Authority

Oregon Revised Statutes (ORS) 537.705 and 540.505 to 540.580 establish the process in which a water right holder may submit a request to transfer the point of appropriation, place of use, or character of use authorized under an existing water right. Oregon Administrative Rules (OAR) Chapter 690, Division 380 implement the statutes and provides the Department's procedures and criteria for evaluating transfer applications.

Applicant

CITY OF SCAPPOOSE
33568 E. COLUMBIA AVE.
SCAPPOOSE OR 97056

Agent

GSI WATER SOLUTIONS, INC.
Attn: JASON MELADY
55 SW YAMHILL STREET, SUITE 300
PORTLAND OR 97204

Findings of Fact

1. On February 6, 2017, the City Of Scappoose filed an application for an additional point of appropriation under Certificate 91496. The Department assigned the application number T-12586.

2. Notice of the application for transfer was published on February 14, 2017, pursuant to OAR 690-380-4000. No comments were filed in response to the notice.

3. On August 31, 2017, the Department sent a copy of the draft Preliminary Determination proposing to approve Transfer Application T-12586 to the applicant. The draft Preliminary Determination cover letter set forth a deadline of September 31, 2017, for the applicant to respond. On October 9, 2017, the agent for the applicant requested that the Department proceed with issuance of a Preliminary Determination and provided the necessary information to demonstrate that the applicant is authorized to pursue the transfer.

4. On November 21, 2017, the Department issued a Preliminary Determination proposing to approve Transfer T-12586 and mailed a copy to the applicant. Additionally, notice of the Preliminary Determination for the transfer application was published on the Department's weekly notice on November 28, 2017, pursuant to ORS 540.520 and OAR 690-380-4020. No protests were filed in response to the notice.

This final order is subject to judicial review by the Court of Appeals under ORS 183.482. Any petition for judicial review must be filed within the 60-day time period specified by ORS 183.482(1). Pursuant to ORS 536.075 and OAR 137-003-0675, you may petition for judicial review or petition the Director for reconsideration of this order. A petition for reconsideration may be granted or denied by the Director, and if no action is taken within 60 days following the date the petition was filed, the petition shall be deemed denied.

5. The right to be transferred is as follows:

Certificate: 91496, in the name of the CITY OF SCAPPOOSE (perfected under Permit G-8615)
Use: MUNICIPAL USE
Priority Date: APRIL 30, 1979
Rate: 0.89 CUBIC FOOT PER SECOND
Source: A WELL within the SOUTH SCAPPOOSE CREEK BASIN

Authorized Point of Appropriation:

Twp	Rng	Mer	Sec	Q-Q	Measured Distances
3 N	2 W	WM	13	NE SW	DUTCH CANYON WELL - 1470 FEET NORTH AND 1820 FEET EAST FROM THE SW CORNER OF SECTION 13

Authorized Place of Use:

MUNICIPAL				
Twp	Rng	Mer	Sec	Q-Q
3 N	1 W	WM	7	NE SW
3 N	1 W	WM	7	NW SW
3 N	1 W	WM	7	SE SW
3 N	2 W	WM	1	SW SW
3 N	2 W	WM	1	SE SW
3 N	2 W	WM	2	SW SE
3 N	2 W	WM	2	SE SE
3 N	2 W	WM	11	NE NE
3 N	2 W	WM	11	NW NE
3 N	2 W	WM	11	SE NE
3 N	2 W	WM	11	NE NW
3 N	2 W	WM	11	NE SE
3 N	2 W	WM	11	NW SE
3 N	2 W	WM	11	SE SE
3 N	2 W	WM	12	NE NE
3 N	2 W	WM	12	NW NE
3 N	2 W	WM	12	SW NE
3 N	2 W	WM	12	SE NE
3 N	2 W	WM	12	NE NW
3 N	2 W	WM	12	NW NW
3 N	2 W	WM	12	SW NW
3 N	2 W	WM	12	SE NW
3 N	2 W	WM	12	NE SW
3 N	2 W	WM	12	NW SW
3 N	2 W	WM	12	SW SW
3 N	2 W	WM	12	SE SW
3 N	2 W	WM	12	NE SE
3 N	2 W	WM	12	NW SE
3 N	2 W	WM	12	SW SE
3 N	2 W	WM	12	SE SE
3 N	2 W	WM	13	NE NE
3 N	2 W	WM	13	NW NE
3 N	2 W	WM	13	SW NE
3 N	2 W	WM	13	SE NE
3 N	2 W	WM	13	NE NW
3 N	2 W	WM	13	NW NW

MUNICIPAL				
Twp	Rng	Mer	Sec	Q-Q
3 N	2 W	WM	13	SW NW
3 N	2 W	WM	13	SE NW
3 N	2 W	WM	13	NE SW
3 N	2 W	WM	13	NW SW
3 N	2 W	WM	13	SW SW
3 N	2 W	WM	13	SE SW
3 N	2 W	WM	13	NW SE
3 N	2 W	WM	13	SW SE
3 N	2 W	WM	14	SE NE
3 N	2 W	WM	14	NE SW
3 N	2 W	WM	14	NW SW
3 N	2 W	WM	14	NE SE
3 N	2 W	WM	14	NW SE
3 N	2 W	WM	24	NW NE

6. Transfer Application T-12586 proposes to an additional point of appropriation southeast approximately 100 feet from the authorized Dutch Canyon Well located as follows:

Twp	Rng	Mer	Sec	Q-Q	Measured Distances
3 N	2 W	WM	13	NE SW	WELL DC-E - 1425 FEET NORTH AND 1855 FEET EAST FROM SW CORNER OF SECTION 13

Transfer Review Criteria (OAR 690-380-4010)

7. Water has been used within the last five years prior to the submittal of Transfer Application T-12586 according to the terms and conditions of the right. There is no information in the record that would demonstrate that the right is subject to forfeiture under ORS 540.610.

8. A well, turbine pump and municipal delivery system sufficient to use the full amount of water allowed under the existing right was present within the five-year period prior to submittal of Transfer Application T-12586.

9. The proposed change would not result in enlargement of the right.

10. The proposed change would not result in injury to other water rights.

11. The Department has determined that the proposed additional point of appropriation, Well DC-E, will develop the same source of water as the authorized existing Dutch Canyon Well.

12. The City of Scappoose is a municipality as defined in ORS Chapter 540.510(3)(b), Chapter 261 and a water supplier defined in ORS 448.115. Therefore, pursuant to OAR 690-380-3000(13)(b), the applicant is not required to provide a report of ownership information.

13. All other application requirements are met.

Conclusions of Law

The additional point of appropriation proposed in Transfer Application T-12586 is consistent with the requirements of ORS 537.705 and 540.505 to 540.580 and OAR 690-380-5000.

Now, therefore, it is ORDERED:

1. The additional point of appropriation proposed in Transfer Application T-12586 is approved.

2. The right to the use of the water is restricted to beneficial use at the place of use described, and is subject to all other conditions and limitations contained in Certificate 91496 and any related decree.

3. Water right Certificate 91496 is cancelled.

4. The quantity of water diverted at the new additional point of appropriation, together with that diverted at the original point of appropriation, shall not exceed the quantity of water lawfully available at the original point of appropriation.

5. Water shall be acquired from the same aquifer (water source) as the original point of appropriation (Dutch Canyon Well).

6. Water use measurement conditions:

   a. Before water use may begin under this order, the water user shall install a totalizing flow meter, or, with prior approval of the Director, another suitable measuring device at **each** (new and existing) points of appropriation.

   b. The water user shall maintain the meters or measuring devices in good working order.

   c. The water user shall allow the Watermaster access to the meters or measuring devices; provided however, where the meters or measuring devices are located within a private structure, the Watermaster shall request access upon reasonable notice.

7. Full beneficial use of the water shall be made, consistent with the terms of this order, on or before **October 1, 2019**. A Claim of Beneficial Use prepared by a Certified Water Right Examiner shall be submitted by the applicant to the Department within one year after the deadline for completion of the change and full beneficial use of the water.

8. After satisfactory proof of beneficial use is received, a new certificate confirming the right transferred will be issued.

Dated at Salem, Oregon this day FEB 14 2018.

Dwight French, Water Right Services Administrator, for
Thomas M. Byler, Director
Oregon Water Resources Department

Mailing date: FEB 15 2018

USAGE AREA BOUNDARY LINE

USAGE AREA BOUNDARY LINE

Application No. G9218
Permit No. G 8615

SCALE: 1" = 400 FT.

USAGE AREA IS COMPOSED OF

S. 7, T. 3N., R. 1 W.W.M.
S. 1-2-11-12-13-14-24, T. 3N., R. 2 W.W.M.

CITY OF SCAPPOOSE

OREGON

COMPILED FROM OFFICIAL RECORDS BY
ROBERT M. SWANEY, P.L.S.

NOVEMBER 25, 1977

Application No. G-9218 Permit No. G 8615

STATE OF OREGON WATER RESOURCES DEPARTMENT

Application for a Permit to Appropriate Ground Water

RECEIVED
APR 30 1979
WATER RESOURCES DEP
SALEM, OREGON

I, City of Scappoose
(Name of Applicant)

of P.O. Drawer "P", Scappoose
(Mailing Address) (City)

State of Oregon, 97056 Phone No. 503-543-7146 do hereby
(Zip Code)

make application for a permit to appropriate the following described ground waters of the State of Oregon:

1. The development will consist of One Well
(Give number of wells, tile lines, infiltration galleries, etc.)

having a diameter of 12" and an estimated depth of 227 feet.

2. The well or other source is to be located 1563.91 ft. North and 1935.80 ft. East
(N. or S.) (E. or W.)

from the S.W. corner of Sec. 13, TWP 3N, R2 WWM
(Public Land Survey Corner)

.....
(If there is more than one well, each must be described)

.....being within the N.E. ¼ of the S.W. ¼ of

Sec. 13 Tp. 3N R. 2W, W. M., in the county of Columbia.

3. Location of area to be irrigated, or place of use if use other than irrigation.

Township	Range	Section	List ¼ ¼ of Section	List use and/or number of acres to be irrigated
City of	Scappoose	Water	System - see	Municipal
Attachment One		for Description of the		
Property	on which	water is	to be used.	

4. It is estimated that 227 feet of the well will require Steel casing.
(Kind)

5. Depth to water table is estimated 61.0' Well drilled by S. & M. Drilling & Supply, Inc.
(Feet) Canby, Oregon

6. *The amount of water which the applicant intends to apply to beneficial use is* ..... *cubic feet per second or* 400 ..... *gallons per minute.*

7. *The use to which the water is to be applied is* Municipal

8. *If the flow to be utilized is artesian, the works to be used for the control and conservation of the supply when not in use must be described.*

-

9. *If the location of the well, or other development work is less than one-fourth mile from a natural stream channel, give the distance to the channel and the difference in elevation between the stream bed and the ground surface at the source of development.*

-

10. *DESCRIPTION OF WORKS*

Include length and dimensions of supply ditch or pipeline, size and type of pump and motor, type of irrigation system to adequately describe the proposed distribution system.

Pump: Worthington Oil Lubricated-Lineshaft, Vertical Turbine, 10M41 Bowls, 11 stage, 185' in length, airline, gauge and flowmeter.

Motor: U.S. Motors 364T-21, Type RU, 60 HP, 1770 RPM.

Distribution Pipeline:

Well water discharges through pump into 100 LF of 8" Diameter Ductile Iron Pipe, through 3300 LF of 12" Diameter Ductile Iron Pipe, ties into existing 12" I.D. Steel supply line, and flows 5700 LF to Water Treatment Plant. From there water is distributed throughout existing Municipal Water System.

11. *Construction work will begin on or before* September 7, 1978

12. *Construction work will be completed on or before* June 30, 1979

13. *The water will be completely applied to the proposed use on or before* June 30, 1979

14. *If the ground water supply is supplemental to an existing supply, identify the supply and existing water right.* 1. Gourley Creek, Permit No. 5813.

2. Lazy Creek and South Fork Scappoose Creek, Permit No. 25918.

Application No. G-9218 *Permit No.* G 8615

2012

RESUBMITTAL ATTACHMENT ONE

APPLICATION FOR PERMIT TO APPROPRIATE GROUND WATER
CITY OF SCAPPOOSE, OREGON
August 6, 1979

Permit No. G-9218 Item No. 3 "See Resubmittal Map"

Note: The quarter/quarter sections listed include any land either encroached upon by the City of Scappoose corporate city limit lines, and existing distribution lines or existing users of water derived from any existing lines owned and operated by the City of Scappoose, Oregon.

Quarter/Quarter Description	Section	Township	Range
N.W. 1/4 of S.W. 1/4	7	3 N.	1 W.W.M.
N.E. 1/4 of S.W. 1/4	7	3 N.	1 W.W.M.
S.E. 1/4 of S.W. 1/4	7	3 N.	1.W.W.M.
S.E. 1/4 of S.W. 1/4	1	3 N.	2 W.W.M.
S.W. 1/4 of S.W. 1/4	1	3 N.	2 W.W.M.
S.E. 1/4 of S.E. 1/4	2	3 N.	2 W.W.M.
S.W. 1/4 of S.E. 1/4	2	3 N.	2 W.W.M.
N.E. 1/4 of N.W. 1/4	11	3 N.	2 W.W.M.
N.W. 1/4 of N.E. 1/4	11	3 N.	2 W.W.M.
N.E. 1/4 of N.E. 1/4	11	3 N.	2 W.W.M.
S.E. 1/4 of N.E. 1/4	11	3 N.	2 W.W.M.
N.W. 1/4 of S.E. 1/4	11	3 N.	2 W.W.M.
N.E. 1/4 of S.E. 1/4	11	3 N.	2 W.W.M.
S.E. 1/4 of S.E. 1/4	11	3 N.	2 W.W.M.
N.W. 1/4 of N.W. 1/4	12	3 N.	2 W.W.M.
N.E. 1/4 of N.W. 1/4	12	3 N.	2 W.W.M.
S.E. 1/4 of N.W. 1/4	12	3 N.	2 W.W.M.
S.W. 1/4 of N.W. 1/4	12	3 N.	2 W.W.M.
N.W. 1/4 of N.E. 1/4	12	3 N.	2 W.W.M.
N.E. 1/4 of N.E. 1/4	12	3 N.	2 W.W.M.
S.E. 1/4 of N.E. 1/4	12	3 N.	2 W.W.M.
S.W. 1/4 of N.E. 1/4	12	3 N.	2 W.W.M.
N.W. 1/4 of S.E. 1/4	12	3 N.	2 W.W.M.
N.E. 1/4 of S.E. 1/4	12	3 N.	2 W.W.M.
S.E. 1/4 of S.E. 1/4	12	3 N.	2 W.W.M.
S.W. 1/4 of S.E. 1/4	12	3 N.	2 W.W.M.
N.W. 1/4 of S.W. 1/4	12	3 N.	2 W.W.M.
N.E. 1/4 of S.W. 1/4	12	3 N.	2 W.W.M.
S.E. 1/4 of S.W. 1/4	12	3 N.	2 W.W.M.
S.W. 1/4 of S.W. 1/4	12	3 N.	2 W.W.M.

Application No. G-9218
Permit No. G 8615

Quarter/Quarter Description	Section	Township	Range
N.W. 1/4 of N.W. 1/4	13	3 N.	2 W.W.M.
N.E. 1/4 of N.W. 1/4	13	3 N.	2 W.W.M.
S.E. 1/4 of N.W. 1/4	13	3 N.	2 W.W.M.
S.W. 1/4 of N.W. 1/4	13	3 N.	2 W.W.M.
N.W. 1/4 of N.E. 1/4	13	3 N.	2 W.W.M.
N.E. 1/4 of N.E. 1/4	13	3 N.	2 W.W.M.
S.E. 1/4 of N.E. 1/4	13	3 N.	2 W.W.M.
S.W. 1/4 of N.E. 1/4	13	3 N.	2 W.W.M.
N.W. 1/4 of S.E. 1/4	13	3 N.	2 W.W.M.
S.W. 1/4 of S.E. 1/4	13	3 N.	2 W.W.M.
N.W. 1/4 of S.W. 1/4	13	3 N.	2 W.W.M.
N.E. 1/4 of S.W. 1/4	13	3 N.	2 W.W.M.
S.E. 1/4 of S.W. 1/4	13	3 N.	2 W.W.M.
S.W. 1/4 of S.W. 1/4	13	3 N.	2 W.W.M.
S.E. 1/4 of N.E. 1/4	14	3 N.	2 W.W.M.
N.W. 1/4 of S.E. 1/4	14	3 N.	2 W.W.M.
N.E. 1/4 of S.E. 1/4	14	3 N.	2 W.W.M.
N.W. 1/4 of S.W. 1/4	14	3 N.	2 W.W.M.
N.E. 1/4 of S.W. 1/4	14	3 N.	2 W.W.M.
N.W. 1/4 of N.E. 1/4	24	3 N.	2 W.W.M.

2,000 acres M/L

Application No. G-9218.
Permit No. G 8615

Remarks:.....

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.....

.....

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.....

.....

Virginia R. Sheldon Recorder-Treas
Signature of Applicant
City of Scappoose

This is to certify that I have examined the foregoing application, together with the accompanying maps and data, and return the same for correction and completion

In order to retain its priority, this application must be returned to the Water Resources Director with corrections on or before August 13, *19* 79

RECEIVED
AUG 3 - 1979
WATER RESOURCES DEPT
SALEM, OREGON

WITNESS my hand this 12th *day of* June, *19*79

James E. Sexson *Water Resources Director*

By Robt G. Mucken
Robert G. Mucken

This instrument was first received in the office of the Water Resources Director at Salem, Oregon, on the 30th *day of* April, *19*79, *at* 8:00 *o'clock* A *M.*

Application No. G-9218 *Permit No.* G 8615

Application No. G-9218 Permit No. G 8615

Permit to Appropriate the Public Waters of the State of Oregon

This is to certify that I have examined the foregoing application and do hereby grant the same, SUBJECT TO EXISTING RIGHTS INCLUDING THE EXISTING MINIMUM FLOW POLICIES ESTABLISHED BY THE WATER POLICY REVIEW BOARD and the following limitations and conditions:

The right herein granted is limited to the amount of water which can be applied to beneficial use and shall not exceed 0.89 *cubic feet per second measured at the point of diversion from the well or source of appropriation, or its equivalent in case of rotation with other water users, from* a well.

The use to which this water is to be applied is municipal.

If for irrigation, this appropriation shall be limited to ..... of one cubic foot per second or its equivalent for each acre irrigated and shall be further limited to a diversion of not to exceed ..... acre feet per acre for each acre irrigated during the irrigation season of each year;

and shall be subject to such reasonable rotation system as may be ordered by the proper state officer.

The well shall be constructed in accordance with the General Standards for the Construction and Maintenance of Water Wells in Oregon.

The works constructed shall include an air line and pressure gauge or an access port for measuring line, adequate to determine water level elevation in the well at all times.

The permittee shall install and maintain a weir, meter, or other suitable measuring device, and shall keep a complete record of the amount of ground water withdrawn.

The priority date of this permit is April 30, 1979

Actual construction work shall begin on or before August 31, 1980 *and shall thereafter be prosecuted with reasonable diligence and be completed on or before October 1, 19*80

Extended to Oct. 1985

*Complete application of the water to the proposed use shall be made on or before October 1, 19*81

Extended to Oct. 1985

WITNESS my hand this 31st *day of* August, *19*79

James E. Sexton

Water Resources Director

STATE OF OREGON

COUNTY OF COLUMBIA

DRAFT PERMIT TO APPROPRIATE THE PUBLIC WATERS

THIS PERMIT IS HEREBY ISSUED TO

CITY OF SCAPPOOSE
33568 E COLUMBIA AVE
SCAPPOOSE, OREGON 97056

This superseding permit is issued to describe an amendment for additional points of appropriation proposed under Permit Amendment Application T-12284 and approved by Special Order Vol. 103, Page 816, entered JAN 25 2017, and to describe an extension of time for complete application of water approved August 29, 2014 and a Water Management and Conservation Plan approved on November 21, 2012. This permit supersedes Permit G-15491.

The specific limits and conditions of the use are listed below.

APPLICATION FILE NUMBER: G-15792

SOURCE OF WATER: SEVEN WELLS IN JACKSON CREEK BASIN

PURPOSE OR USE: MUNICIPAL USE

MAXIMUM RATE: 2.90 CUBIC FEET PER SECOND

PERIOD OF USE: YEAR ROUND

DATE OF PRIORITY: JULY 5, 2002

WELL LOCATION:

Twp	Rng	Mer	Sec	Q-Q	Measured Distances
3 N	1 W	WM	7	SE NW	MR-1 - 380 FEET NORTH AND 3700 FEET WEST FROM THE E1/4 CORNER OF SECTION 7
3 N	1 W	WM	7	SE NW	MR-2 - 370 FEET NORTH AND 3490 FEET WEST FROM THE E1/4 CORNER OF SECTION 7
3 N	1 W	WM	7	SE NW	MR-3 - 2475 FEET SOUTH AND 1795 FEET EAST FROM THE NW CORNER OF SECTION 7
3 N	1 W	WM	7	NE SW	MP-1 - 2330 FEET NORTH AND 1345 FEET EAST FROM THE SW CORNER OF SECTION 7
3 N	1 W	WM	7	SW NW	CZ-1 - 1590 FEET SOUTH AND 680 FEET EAST FROM THE NW CORNER OF SECTION 7
3 N	1 W	WM	7	NW NW	CZ-2 - 900 FEET SOUTH AND 1120 FEET EAST FROM THE NW CORNER OF SECTION 7

Twp	Rng	Mer	Sec	Q-Q	Measured Distances
3 N	1 W	WM	7	SE NW	CZ-3 - 1410 FEET SOUTH AND 1855 FEET EAST FROM THE NW CORNER OF SECTION 7

THE PLACE OF USE IS LOCATED AS FOLLOWS:

WITHIN THE SERVICE BOUNDARIES OF THE CITY OF SCAPPOOSE

Permit Amendment T-12284 Conditions

The combined quantity of water diverted at the new points of appropriation, together with that diverted at the old point of appropriation, shall not exceed the quantity of water lawfully available at the original point of appropriation.

Water use measurement conditions:

a. Before water use may begin under this order, the water user shall install a totalizing flow meter, or, with prior approval of the Director, another suitable measuring device at each point of appropriation (new and existing) or at each new point of appropriation.

b. The water user shall maintain the meters or measuring devices in good working order.

c. The water user shall allow the Watermaster access to the meters or measuring devices; provided however, where the meters or measuring devices are located within a private structure, the Watermaster shall request access upon reasonable notice.

Water shall be acquired from the same aquifer as the original points of appropriation.

Extension of Time Conditions

Development Limitations

Appropriation of any water beyond 1.34 cfs, being 0.76 cfs from Miller Road Well 1 (COLU 52428), and 0.58 cfs from Miller Road Well 2 (COLU 51685), under Permit G-15491 shall only be authorized upon issuance of a final order approving a Water Management and Conservation Plan (WMCP) under OAR Chapter 690, Division 86 that authorizes access to a greater rate of appropriation of water under the permit consistent with OAR 690-086-0130(7). The required WMCP shall be submitted to the Department BY August 29, 2017. The amount of water used under Permit G-15491 must be consistent with this and subsequent WMCP's approved under OAR Chapter 690, Division 86 on file with the Department.

The deadline established in the Extension Final Order for submittal of a WMCP shall not relieve a permit holder of any existing or future requirement for submittal of a WMCP at an earlier date as established through other orders of the Department. A WMCP submitted to meet the requirements of the final order may also meet the WMCP submittal requirements of other Department orders.

Water Management and Conservation Plan

Duration of Plan Approval:

The City of Scappoose Water Management and Conservation Plan is approved and shall remain in effect until **November 21, 2022**, unless this approval is rescinded pursuant to OAR 690-086-0920.

Progress Report Schedule:

The City of Scappoose shall submit a progress report containing the information required under OAR 690-086-0120(4) by **November 21, 2017**.

Other Requirements for Plan Submittal:

The deadline established herein for the submittal of an updated Water Management and Conservation Plan (consistent with OAR Chapter 690, Division 086) shall not relieve the City of Scappoose from any existing or future requirement(s) for submittal of a Water Management and Conservation Plan at an earlier date as established through other final orders of the Department.

Existing Permit Conditions

Measurement, recording and reporting conditions:

A. Before water use may begin under this permit, the permittee shall install a meter or other suitable measuring device as approved by the Director. The permittee shall maintain the meter or measuring device in good working order, shall keep a complete record of the amount of water used each month and shall submit a report which includes the recorded water use measurements to the Department annually or more frequently as may be required by the Director. Further, the Director may require the permittee to report general water use information, including the place and nature of use of water under the permit.

B. The permittee shall allow the watermaster access to the meter or measuring device; provided however, where the meter or measuring device is located within a private structure, the watermaster shall request access upon reasonable notice.

The well(s) shall produce groundwater from the Troutdale gravel groundwater reservoir between approximately 160 and 195 below land surface.

The use may be restricted if the quality of the source stream or downstream waters decrease to the point that those waters no longer meet existing state or federal water quality standards due to reduced flows.

STANDARD CONDITIONS

If substantial interference with a senior water right occurs due to withdrawal of water from any well listed on this permit, then use of water from the well(s) shall be discontinued or reduced and/or the schedule of withdrawal shall be regulated until or unless the Department approves or

implements an alternative administrative action to mitigate the interference. The Department encourages junior and senior appropriators to jointly develop plans to mitigate interferences.

The wells shall be constructed in accordance with the General Standards for the Construction and Maintenance of Water Wells in Oregon. The works shall be equipped with a usable access port, and may also include an air line and pressure gauge adequate to determine water level elevation in the well at all times.

The use shall conform to such reasonable rotation system as may be ordered by the proper state officer.

Prior to receiving a certificate of water right, the permit holder shall submit the results of a pump test meeting the department's standards, to the Water Resources Department. The Director may require water level or pump test results every ten years thereafter.

Failure to comply with any of the provisions of this permit may result in action including, but not limited to, restrictions on the use, civil penalties, or cancellation of the permit.

This permit is for the beneficial use of water without waste. The water user is advised that new regulations may require the use of best practical technologies or conservation practices to achieve this end.

By law, the land use associated with this water use must be in compliance with statewide land-use goals and any local acknowledged land-use plan.

The use of water shall be limited when it interferes with any prior surface or ground water rights.

The Director finds that the proposed use(s) of water described by this permit, as conditioned, will not impair or be detrimental to the public interest.

Complete application of the water to the use was to be made on or before October 1, 2007, when the permit was originally issued on September 15, 2003. By Extension of Time Final Order dated August 29, 2014, the completion of the application of water was extended to on or before October 1, 2050.

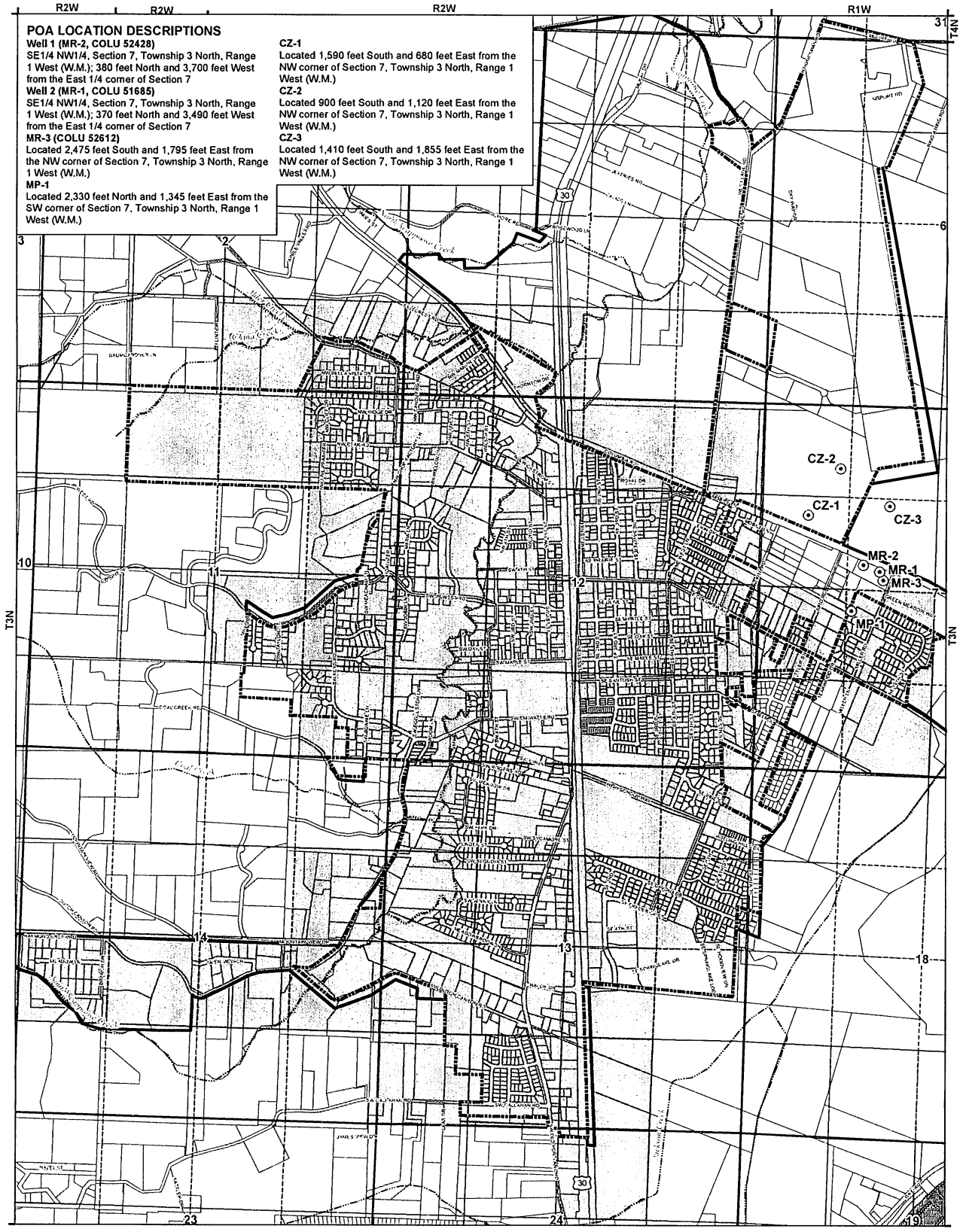
Within one year after complete application of water to the proposed use, the permittee shall submit a claim of beneficial use, which includes a map and report, prepared by a Certified Water Rights Examiner (CWRE).

Issued JAN 25 2017, 2017

Dwight French, Water Right Services Division Administrator, for
Thomas M. Byler, Director
Oregon Water Resources Department

REAL ESTATE TRANSACTIONS: Pursuant to ORS 537.330, in any transaction for the conveyance of real estate that includes any portion of the lands described in this permit, the seller of the real estate shall, upon accepting an offer to purchase that real estate, also inform the purchaser in writing whether any permit, transfer approval order, or certificate evidencing the water right is available and that the seller will deliver any permit, transfer approval order or certificate to the purchaser at closing, if the permit, transfer approval order or certificate is available.

CULTURAL RESOURCES PROTECTION LAWS: Permittees involved in ground-disturbing activities should be aware of federal and state cultural resources protection laws. ORS 358.920 prohibits the excavation, injury, destruction or alteration of an archeological site or object, or removal of archeological objects from public and private lands without an archeological permit issued by the State Historic Preservation Office. 16 USC 470, Section 106, National Historic Preservation Act of 1966 requires a federal agency, prior to any undertaking to take into account the effect of the undertaking that is included on or eligible for inclusion in the National Register. For further information, contact the State Historic Preservation Office at 503-378-4168, extension 232.



POA LOCATION DESCRIPTIONS

Well 1 (MR-2, COLU 52428)
SE1/4 NW1/4, Section 7, Township 3 North, Range 1 West (W.M.); 380 feet North and 3,700 feet West from the East 1/4 corner of Section 7

Well 2 (MR-1, COLU 51685)
SE1/4 NW1/4, Section 7, Township 3 North, Range 1 West (W.M.); 370 feet North and 3,490 feet West from the East 1/4 corner of Section 7

MR-3 (COLU 52612)
Located 2,475 feet South and 1,795 feet East from the NW corner of Section 7, Township 3 North, Range 1 West (W.M.)

MP-1
Located 2,330 feet North and 1,345 feet East from the SW corner of Section 7, Township 3 North, Range 1 West (W.M.)

CZ-1
Located 1,590 feet South and 680 feet East from the NW corner of Section 7, Township 3 North, Range 1 West (W.M.)

CZ-2
Located 900 feet South and 1,120 feet East from the NW corner of Section 7, Township 3 North, Range 1 West (W.M.)

CZ-3
Located 1,410 feet South and 1,855 feet East from the NW corner of Section 7, Township 3 North, Range 1 West (W.M.)

LEGEND

- Point of Appropriation (POA)
- Place of Use (POU)
- Scappoose City Limits
- Scappoose Urban Growth Boundary
- Tax Lots
- Watercourses
- Waterbodies

MAP NOTES:
Date: January 29, 2016
Data Sources: Columbia Co. GIS, OWRD, OGIC, US BLM, ESRI

Document Path: P:\Portland 347-Scappoose 007-Miller Road Permit Amendment Project_GIS Project_mxds App_for_Permit_Amendment_G15491.mxd

DISCLAIMER

This map was prepared for the purpose of identifying the location of a water right only and it is not intended to provide legal dimensions or location of property ownership lines.

Application for a Permit Amendment in the Name of the City of Scappoose

Place of Use/Point of Appropriation

Permit G-15491, Application G-15792
Township 3 North, Ranges 1 & 2 West (W.M.)

N

0 660 1,320 1,980
1 inch = 1,320 feet

GSI Water Solutions, Inc.

T 12284

Oregon Water Resources Department
Water Right Services Division

Water Rights Application
Number G-15792

Final Order
Extension of Time for Permit Number G-15491
Permit Holder: City of Scappoose

Permit Information
Application File G-15792/ Permit G-15491
Basin 2 – Willamette Basin / Watermaster District 18
Date of Priority: July 5, 2002

Authorized Use of Water

Source of Water:	Two Wells within the Jackson Creek Basin
Purpose or Use:	Municipal
Maximum Rate:	2.9 Cubic Feet per Second (CFS), being 2.23 from Miller Road Well 1, and 0.67 cfs from Miller Road Well 2

This Extension of Time request is being processed in accordance with Oregon Revised Statute 537.630 and 539.010(5), and Oregon Administrative Rule Chapter 690, Division 315

Appeal Rights

This is a final order in other than a contested case. This order is subject to judicial review under ORS 183.484. A request for judicial review must be filed within the 60 day time period specified by ORS 183.484(2). Pursuant to ORS 536.075 and OAR 137-004-0080 you may either file for judicial review, or petition the Director for reconsideration of this order. A petition for reconsideration may be granted or denied by the Director, and if no action is taken within 60 days following the date the petition was filed, the petition shall be deemed denied.

Application History

Permit G-15491 was issued by the Department on September 15, 2003. The permit called for complete application of water to beneficial use by October 1, 2007. On April 11, 2012, the City of Scappoose submitted an application to the Department for an extension of time for Permit G-15491. In accordance with OAR 690-315-0050(2), on July 8, 2014, the Department issued a

Proposed Final Order proposing to extend the time to fully apply water to beneficial use to October 1, 2050. The protest period closed August 22, 2014, in accordance with OAR 690-315-0060(1). No protest was filed.

FINDINGS OF FACT

The Department adopts and incorporates by reference the findings of fact in the Proposed Final Order dated July 8, 2014.

At time of issuance of the Proposed Final Order the Department concluded that, based on the factors demonstrated by the applicant, the permit may be extended subject to the following conditions:

CONDITIONS

1. **Development Limitations**

   Appropriation of any water beyond 1.34 cfs, being 0.76 cfs from Miller Road Well 1 (COLU 52428), and 0.58 cfs from Miller Road Well 2 (COLU 51685), under Permit G-15491 shall only be authorized upon issuance of a final order approving a Water Management and Conservation Plan (WMCP) under OAR Chapter 690, Division 86 that authorizes access to a greater rate of appropriation of water under the permit consistent with OAR 690-086-0130(7). The required WMCP shall be submitted to the Department within 3 years of this Final Order. The amount of water used under Permit G-15491 must be consistent with this and subsequent WMCP's approved under OAR Chapter 690, Division 86 on file with the Department.

   The deadline established in the Extension Final Order for submittal of a WMCP shall not relieve a permit holder of any existing or future requirement for submittal of a WMCP at an earlier date as established through other orders of the Department. A WMCP submitted to meet the requirements of the final order may also meet the WMCP submittal requirements of other Department orders.

CONCLUSION OF LAW

The applicant has demonstrated good cause for the permit extension pursuant to ORS 537.630, 539.010(5) and OAR 690-315-0080(3).

ORDER

The extension of time for Application G-15792, Permit G-15491, therefore, is approved subject to conditions contained herein. The deadline for applying water to full beneficial use within the terms and conditions of the permit is extended from October 1, 2007 to October 1, 2050.

DATED: August 29, 2014

Dwight French
Water Right Services Division Administrator, for
Director
Oregon Water Resources Department

If you have any questions about statements contained in this document, please contact Ann Reece at (503) 986-0834.

If you have other questions about the Department or any of its programs, please contact our Water Resources Customer Service Group at (503) 986-0900.

Oregon Water Resources Department
Water Right Services Division

Application for Extension of Time

In the Matter of the Application for an Extension of Time for Permit G-15491, Water Right Application G-15792, in the name of the City of Scappoose	)))	PROPOSED FINAL ORDER

Permit Information

Application File G-15792/ Permit G-15491
Basin 2 – Willamette Basin / Watermaster District 18
Date of Priority: July 5, 2002

Authorized Use of Water

Source of Water:	Two Wells within the Jackson Creek Basin
Purpose or Use:	Municipal
Maximum Rate:	2.9 Cubic Feet per Second (CFS), being 2.23 from Miller Road Well 1, and 0.67 cfs from Miller Road Well 2

This Extension of Time request is being processed in accordance with Oregon Administrative Rule Chapter 690, Division 315.

Please read this Proposed Final Order in its entirety as it contains additional conditions not included in the original permit.

This Proposed Final Order applies only to Permit G-15491, water right Application G-15792.

Summary of Proposed Final Order for Extension of Time

The Department proposes to:

- Grant an extension of time to apply water to full beneficial use from October 1, 2007 to October 1, 2050.
- Make the extension of time subject to certain conditions as set forth below.

ACRONYM QUICK REFERENCE

Department – Oregon Department of Water Resources
City – City of Scappoose
ODFW – Oregon Department of Fish and Wildlife
PFO – Proposed Final Order
WMCP – Water Management and Conservation Plan

Units of Measure
cfs – cubic feet per second

AUTHORITY

Generally, see ORS 537.630 and OAR Chapter 690 Division 315.

ORS 537.630(2) provides in pertinent part that the Oregon Water Resources Department (Department) may, for good cause shown, order and allow an extension of time, for the completion of the well or other means of developing and securing the ground water or for complete application of water to beneficial use. In determining the extension, the department shall give due weight to the considerations described under ORS 539.010 (5) and to whether other governmental requirements relating to the project have significantly delayed completion of construction or perfection of the right.

ORS 539.010(5) provides in pertinent part that the Water Resources Director, for good cause shown, may extend the time within which the full amount of the water appropriated shall be applied to a beneficial use. This statute instructs the Director to consider: the cost of the appropriation and application of the water to a beneficial purpose; the good faith of the appropriator; the market for water or power to be supplied; the present demands therefore; and the income or use that may be required to provide fair and reasonable returns upon the investment.

OAR 690-315-0080 provides in pertinent part that the Department shall make findings to determine if an extension of time for municipal and/or quasi-municipal water use permit holders may be approved to complete construction and/or apply water to full beneficial use.

OAR 690-315-0090(3) authorizes the Department, under specific circumstances, to condition an extension of time for municipal and/or quasi-municipal water use permit holders to provide

that diversion of water beyond the maximum rate diverted under the permit or previous extension(s) shall only be authorized upon issuance of a final order approving a Water Management and Conservation Plan under OAR Chapter 690, Division 86.

FINDINGS OF FACT

Background

1. Permit G-15491 was granted by the Department on September 15, 2003. The permit authorizes the use of up to 2.9 cfs of water, being 2.23 from Miller Road Well 1 (COLU 52428), and 0.67 cfs from Miller Road Well 2 (COLU 51685), both within the Jackson Creek Basin, for municipal use. It specified that complete application of water was to be made on or before October 1, 2007.

2. The permit holder, the City of Scappoose (City), submitted an "Application for Extension of Time" to the Department on April 11, 2012, requesting the time apply water to full beneficial use under the terms and conditions of Permit G-15491 be extended from October 1, 2007 to October 1, 2050. This is the first extension of time request for Permit G-15491.

3. Notification of the City's Application for Extension of Time for Permit G-15491 was published in the Department's Public Notice dated April 24, 2012. No public comments were received regarding the extension application.

Review Criteria for Municipal Quasi-Municipal Water Use Permits *[OAR 690-315-0080(1)]*
The time limits to complete construction and/or apply water to full beneficial use may be extended if the Department finds that the permit holder has met the requirements set forth under OAR 690-315-0080. This determination shall consider the applicable requirements of ORS 537.230[1], 537.630[2] and/or 539.010(5)[3]

Complete Extension of Time Application *[OAR 690-315-0080(1)(a)]*

4. On April 11, 2012, the Department received a completed Application for Extension of Time and the fee specified in ORS 536.050 from the permit holder.

Start of Construction *[OAR 690-315-0080(1)(b)]*

5. A date by which actual construction was to begin is not specified in Permit G-15491.

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[1] ORS 537.230 applies to surface water permits only.

[2] ORS 537.630 applies to ground water permits only.

[3] ORS 537.010(5) applies to surface water and ground water permits.

Duration of Extension *[OAR 690-315-0080(1)(c) and (1)(d)]*

Under OAR 690-315-0080(1)(c),(d), in order to approve an extension of time for municipal and quasi-municipal water use permits the Department must find that the time requested is reasonable and the applicant can complete the project within the time requested.

6. The remaining work to be accomplished under Permit G-15491 consists of applying water to full beneficial use.

7. As of October 1, 2007, the permit holder had appropriated 1.34 cfs of the 2.9 cfs, being 0.76 cfs from Miller Road Well 1 (COLU 52428), and 0.58 cfs from Miller Road Well 2 (COLU 51685), authorized under Permit G-15491 for municipal purposes. There is an undeveloped portion of 1.56 cfs of water, being 1.47 from Miller Road Well 1 and 0.09 cfs from Miller Road Well 2, under Permit G-15491 as per OAR 690-315-0010(6)(g).

8. In addition to the 2.9 cfs of water authorized under Permit G-15491, the City holds the following municipal water rights:

   - Permit G-8615 for 0.89 cfs of water from Dutch Canyon Well (COLU 100);
   - Permit G-15295 for 0.557 cfs of water from Dutch Canyon Well (COLU 100);
   - Certificate 5573 for 10.0 CFS of water from Gourlay Creek, tributary to Scapposse Creek; and
   - Certificate 42700 for 4.0 cfs of water, being 1.5 cfs from Lazy Creek and 2.5 cfs from South Fork Scappoose Creek, both tributary to Scappoose Creek;

   These water rights and permits total 18.347 cfs of water, being 4.347 cfs of ground water and 14.0 cfs of live flow (surface) water.

9. The City also holds a Ground water Registration GR-926 for 50 gpm (0.11) of water from a Pump Well and Limited License LL-1404 for 500 gpm (1.11 cfs) from Miller Road Well 3 (COLU 52612) for use of water through November 15, 2015. The well authorized under GR-926 no longer exists.

10. The City utilizes both surface water and ground water sources to meet current water demands. Water from its surface water sources and water from the Dutch Canyon well are diverted to the Keys Road Water Treatment Plant. The Miller Road ground water sources are treated at the Miller Road Water Treatment Plant. Use of the City's surface water rights are restricted to 3.1 cfs due to facility limitations, and to as low as 0.55 cfs during peak season due to seasonal lack of water availability during the summer months. The Dutch Canyon Well currently has a maximum production capacity of 0.73 cfs due to stresses on the well, and the Miller Road Wells currently produce up to 1.0 cfs of water. Thus the City has 4.85 cfs of production capacity in the winter months, but only 2.29 cfs in the summer months. (November 2012 WMCP, p. 14.)

11. According to the City, their peak water demand within its service area boundaries was 2.46 cfs in 2009.

12. According to the City, in 2009, the population within the service boundary of the City of Scappoose was 6,204. The City of Scappoose estimates the population will increase at growth rate of 1.8 percent per year, reaching an estimated population of 13,747 by the year 2050.

13. According to the City, their peak day demand is projected to be approximately 5.52 cfs of water by the year 2050.

14. Full development of Permit G-15491 is needed to address the present and future water demand of the City, including system redundancy and emergency use.

15. The City's request for an extension of time until October 1, 2050, to apply water to full beneficial use under the terms and conditions of Permit G-15491 is both reasonable and necessary.

Good Cause *[OAR 690-315-0080(1)(e) and (3)(a-g)and (4)]*
The Department's determination of good cause shall consider the requirements set forth under OAR 690-315-0080(3) and OAR 690-315-0080(4).

Reasonable Diligence and Good Faith of the Appropriator *[OAR 690-315-0080(3)(a),(3)(c) and (4)]*
Reasonable diligence and good faith of the appropriator must be demonstrated during the permit period or prior extension period as a part of evaluating good cause in determining whether or not to grant an extension. In determining the reasonable diligence and good faith of a municipal or quasi-municipal water use permit holder, the Department shall consider activities associated with the development of the right including, but not limited to, the items set forth under OAR 690-315-0080(4) and shall evaluate how well the applicant met the conditions of the permit or conditions of a prior extension period.

16. Prior to the issuance of Permit G-15491 on September 15, 2003, the City constructed Miller Road Well 1 (COLU 52428).

17. During the original development time frame under Permit G-15491 the City constructed Miller Road Well 2 (COLU 51685), installed water meters, and submitted water use reports.

18. Since October 1, 2007 the City has submitted a Water Management and Conservation Plan (WMCP) to the Department.

19. According to the City, as of April 11, 2012, they have invested approximately $6,376,400, which is the total projected cost for complete development of this project. At this time the City does anticipate any further investment is needed for the completion of this project. The Department recognizes that while some of these investment costs are unique to construction and development solely under G-15491, other costs included in this accounting are not partitioned out for G-15491 because (1) they are incurred under the development of a water supply system jointly utilized

under other rights held by the City, and/or (2) they are generated from individual activities counted towards reasonable diligence and good faith as listed in ORS 690-315-0080(4) which are not associated with just this permit, but with the development and exercise of all the City's water rights.

20. As of October 1, 2007, 1.34 cfs being 0.76 from Miller Road Well 1 (COLU 52428), and 0.67 cfs from Miller Road Well 2 (COLU 51685), of the 2.9 cfs has been appropriated from for beneficial municipal purposes under the terms of this permit.

21. The Department has considered the City's compliance with conditions and did not identify any concerns.

Cost to Appropriate and Apply Water to a Beneficial Purpose *[OAR 690-315-0080(3)(b)]*

22. According to the City, as of April 11, 2012, they have invested approximately $6,376,400, which is the total projected cost for complete development of this project.

The Market and Present Demands for Water *[OAR 690-315-0080(3)(d) and (5)(a-f)]*
For municipal or quasi-municipal water use permits issued after November 2, 1998, in making a determination of good cause pursuant to 690-315-0080(3)(d), the Department shall also consider, but is not limited to, the factors in 690-315-0080(5)(a-f).

23. The amount of water available to satisfy other affected water rights and scenic waterway flows; special water use designations established since permit issuance, including but not limited to state scenic waterways, federal wild and scenic rivers, serious water management problem areas or water quality limited sources established under 33 U.S.C. 1313(d); or the habitat needs of sensitive, threatened or endangered species, in consultation with the Oregon Department of Fish and Wildlife *[OAR 690-315-0080(5)(a-f)]*.

    a. The amount of water available to satisfy other affected water rights and scenic waterway flows was determined at the time of issuance of Permit G-15491; furthermore, water availability for other affected water rights and scenic waterway flows after the permit was issued is determined at such time that such application for a new water right is submitted. The points of appropriation for Permit G-15491 are not located within a limited or critical ground water area. The points of appropriation for Permit G-15491, located within the Jackson Creek Basin, are not located within or above any state or federal scenic waterway. The points of appropriation are within an area ranked highest for stream flow restoration needs as determined by the Department in consultation with the Oregon Department of Fish and Wildlife, and are located within a Sensitive, Threatened or Endangered Fish Species Area as identified by the Department in consultation with Oregon Department of Fish and Wildlife. The points of appropriation are not in an area listed by the Department of Environmental Quality as a water quality limited stream.

Economic investment in the project to date *[OAR 690-315-0080(5)(d)]*.

24. According to the City, as of April 11, 2012, they have invested $6,376,400, which is the total projected cost for complete development of this project.

Other economic interests dependent on completion of the project *[OAR 690-315-0080(5)(e)]*.

25. None have been identified.

Other factors relevant to the determination of the market and present demand for water and power *[OAR 690-315-0080(5)(f)]*.

26. As described in Findings 7 through 14 the City of Scappoose has indicated, and the Department finds that the City must rely on full development of Permit G- 15491 to meet its present and future water demands.

27. City of Scappoose projects a population increase of 1.8 percent per year over the next forty-one years.

28. Given the current water supply situation of the City as well as current and expected demands, and the need for redundancy in water sources, there is a market and present demand for the water to be supplied under Permit G-15491.

29. OAR 690-315-0090(3) requires the Department to place a condition on this extension of time to provide that appropriation of any water beyond 1.34 cfs, being 0.76 cfs from Miller Road Well 1 (COLU 52428), and 0.58 cfs from Miller Road Well 2 (COLU 51685), under Permit G-15491, shall only be authorized upon issuance of a final order approving a Water Management and Conservation Plan(s) (WMCP) under OAR Chapter 690, Division 86 which grants access to a greater appropriation of water under the permit consistent with OAR 690-086-0130(7). A "Development Limitation" condition" is specified under Item 1 of the "Conditions" section of this PFO to meet this requirement.

Fair Return Upon Investment *[OAR 690-315-0080(3)(e)]*

30. Use and income from the permitted water development project would likely result in reasonable returns upon the investment made in the project to date.

Other Governmental Requirements *[OAR 690-315-0080(3)(f)]*

31. Delays caused by any other governmental requirements in the development of this project have not been identified.

Events which Delayed Development under the Permit *[OAR 690-315-0080(3)(g)]*

32. Delay of development under Permit G-15491 was due, in part, to the size and scope of the municipal water system, which was designed to be phased in over a period of years.

CONCLUSIONS OF LAW

1. The City is entitled to apply for an extension of time to complete construction and/or completely apply water to the full beneficial use pursuant to ORS 537.630(2).

2. The City has submitted a complete extension application form and the fee specified under ORS 536.050(1)(k), as required by OAR 690-315-0080(1)(a).

3. Pursuant to Section 5, Chapter 410, Oregon Laws 2005, the permit holder is not required to demonstrate that actual construction of the project began within one year of the date of issuance of the permit, as otherwise required by OAR 690-315-0080(1)(b).

4. The time requested to apply water to full beneficial use is reasonable, as required by OAR 690-315-0080(1)(c).

5. Full application of water to beneficial use can be completed by October 1, 2050[4] pursuant to OAR 690-315-0080(1)(d).

6. The Department has considered the reasonable diligence and good faith of the appropriator, the cost to appropriate and apply water to a beneficial purpose, the market and present demands for water to be supplied, the financial investment made and the fair return upon the investment, the requirements of other governmental agencies, and unforeseen events over which the water right permit holder had no control, and the Department has determined that the City has shown good cause for an extension of time to apply the water to full beneficial use pursuant to OAR 690-315-0080(1)(e).

7. As required by OAR 690-315-0090(3) and as described in Finding 29, above, and specified under Item 1 of the "Conditions" section of this PFO, the appropriation of water beyond 1.34 cfs, being 0.76 cfs from Miller Road Well 1 (COLU 52428), and 0.58 cfs from Miller Road Well 2 (COLU 51685), under Permit G-15491 shall only be authorized upon issuance of a final order approving a Water Management and Conservation Plan(s) under OAR Chapter 690, Division 86 that authorizes access to a greater rate of appropriation of water under the permit consistent with OAR 690-086-

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[4] Pursuant to ORS 537.630(4), upon the completion of beneficial use of water allowed under the permit, the permit holder shall hire a certified water rights examiner to survey the appropriation. Within one year after the complete application of water to a beneficial use (or by the date allowed for the complete application of water to a beneficial use), the permit holder shall submit a map of the survey and the claim of beneficial use.

0130(7).

Proposed Order

Based upon the foregoing Findings of Fact and Conclusions of Law, the Department proposes to issue an order to:

> Extend the time to apply the water to beneficial use under Permit G-15491 from October 1, 2007 to October 1, 2050.

Subject to the following conditions:

CONDITIONS

1. **Development Limitations**

   Appropriation of any water beyond 1.34 cfs, being 0.76 cfs from Miller Road Well 1 (COLU 52428), and 0.58 cfs from Miller Road Well 2 (COLU 51685), under Permit G-15491 shall only be authorized upon issuance of a final order approving a Water Management and Conservation Plan (WMCP) under OAR Chapter 690, Division 86 that authorizes access to a greater rate of appropriation of water under the permit consistent with OAR 690-086-0130(7). The required WMCP shall be submitted to the Department within 3 years of this Final Order. The amount of water used under Permit G-15491 must be consistent with this and subsequent WMCP's approved under OAR Chapter 690, Division 86 on file with the Department.

   The deadline established in the Extension Final Order for submittal of a WMCP shall not relieve a permit holder of any existing or future requirement for submittal of a WMCP at an earlier date as established through other orders of the Department. A WMCP submitted to meet the requirements of the final order may also meet the WMCP submittal requirements of other Department orders.

DATED: July 8, 2014

Dwight French
Water Right Services Division Administrator

If you have any questions, please check the information box on the last page for the appropriate names and phone numbers.

Proposed Final Order Hearing Rights

1. Under the provisions of OAR 690-315-0100(1) and 690-315-0060, the applicant or any other person adversely affected or aggrieved by the proposed final order may submit a written protest to the proposed final order. The written protest must be received by the Water Resources Department no later than **August 22, 2014,** being 45 days from the date of publication of the proposed final order in the Department's weekly notice.

2. A written protest shall include:
   a. The name, address and telephone number of the petitioner;
   b. A description of the petitioner's interest in the proposed final order and if the protestant claims to represent the public interest, a precise statement of the public interest represented;
   c. A detailed description of how the action proposed in the proposed final order would adversely affect or aggrieve the petitioner's interest;
   d. A detailed description of how the proposed final order is in error or deficient and how to correct the alleged error or deficiency;
   e. Any citation of legal authority supporting the petitioner, if known;
   f. Proof of service of the protest upon the water right permit holder, if petitioner is other than the water right permit holder; and
   g. The applicant or non-applicant protest fee required under ORS 536.050.

3. Within 60 days after the close of the period for requesting a contested case hearing, the Director shall:
   a. Issue a final order on the extension request; or
   b. Schedule a contested case hearing if a protest has been submitted, and:
      1) Upon review of the issues, the Director finds there are significant disputes related to the proposed agency action; or
      2) The applicant submits a written request for a contested case hearing within 30 days after the close of the period for submitting protests.

- If you have any questions about statements contained in this document, please contact Ann Reece at 503-986-0834.
- If you have questions about how to file a protest or if you have previously filed a protest and you want to know the status, please contact Patricia McCarty at 503-986-0820.
- If you have any questions about the Department or any of its programs, please contact our Water Resources Customer Service Group at 503-986-0801.
- Address any correspondence to: Water Right Services Division
  725 Summer St NE, Suite A
- Fax: 503-986-0901 Salem, OR 97301-1266

BEFORE THE WATER RESOURCES DEPARTMENT
OF THE
STATE OF OREGON

In the Matter of the Proposed Water Management and Conservation Plan for the City of Scappoose, Columbia County	)))	FINAL ORDER APPROVING A WATER MANAGEMENT AND CONSERVATION PLAN

Authority

OAR Chapter 690, Division 086, establishes the process and criteria for approving water management and conservation plans required under the conditions of permits, permit extensions and other orders of the Department.

Findings of Fact

1. The City of Scappoose submitted a Water Management and Conservation Plan (plan) to the Water Resources Department (Department) on November 15, 2011. The required statutory fee for review of the plan was received by the Department on November 28, 2011. The plan was required by a condition set forth under Permit G-15491.

2. The Department published notice of receipt of the plan on December 6, 2011, as required under OAR Chapter 690, Division 086. No comments were received.

3. The Department provided written comments on the plan to the City on February 16, 2012, and in response, the City submitted the final revised plan on November 14, 2012.

4. The Department reviewed the final revised plan and finds that it is consistent with the relevant requirements under OAR Chapter 690, Division 086.

Conclusion of Law

The Water Management and Conservation Plan submitted by the City of Scappoose is consistent with the criteria in OAR Chapter 690, Division 086.

Now, therefore, it is ORDERED:

1. The City of Scappoose Water Management and Conservation Plan is approved and shall remain in effect until November 21, 2022, unless this approval is rescinded pursuant to OAR 690-086-0920.

This is a final order in other than a contested case. This order is subject to judicial review under ORS 183.484. Any petition for judicial review must be filed within the 60-day time period specified by ORS 183.484(2). Pursuant to ORS 536.075 and OAR 137-004-0080, you may petition for judicial review or petition the Director for reconsideration of this order. A petition for reconsideration may be granted or denied by the Director, and if no action is taken within 60 days following the date the petition was filed, the petition shall be deemed denied.

2. The City of Scappoose shall submit an updated plan meeting the requirements of OAR Chapter 690, Division 086 within 10 years and no later than November 21, 2021.

3. The City of Scappoose shall submit a progress report containing the information required under OAR 690-086-0120(4) by November 21, 2017.

4. The deadline established herein for the submittal of an updated Water Management and Conservation Plan (consistent with OAR Chapter 690, Division 086) shall not relieve the City of Scappoose from any existing or future requirement(s) for submittal of a Water Management and Conservation Plan at an earlier date as established through other final orders of the Department.

Dated at Salem, Oregon this 21 day of November, 2012.

Dwight French, Water Right Services Administrator *for*
PHILLIP C. WARD, DIRECTOR

Mailing date: NOV 27 20..

STATE OF OREGON

COUNTY OF COLUMBIA

PERMIT TO APPROPRIATE THE PUBLIC WATERS

THIS PERMIT IS HEREBY ISSUED TO

CITY OF SCAPPOOSE
33568 E COLUMBIA AVE
SCAPPOOSE, OREGON 97056

This superseding permit is issued to describe an amendment for additional points of appropriation proposed under Permit Amendment Application T-12258 and approved by Special Order Vol. 103, Page 196, entered October 27th, and to describe an extension of time for complete application of water approved December 12, 2014 and a Water Management and Conservation Plan approved on November 21, 2012. This permit supersedes Permit G-15295.

The specific limits and conditions of the use are listed below.

APPLICATION FILE NUMBER: G-15135

SOURCE OF WATER: 6 WELLS IN SCAPPOOSE CREEK BASIN

PURPOSE OR USE: MUNICIPAL USE

MAXIMUM RATE: 0.557 CUBIC FOOT PER SECOND

PERIOD OF USE: YEAR ROUND

DATE OF PRIORITY: MARCH 10, 2000

WELL LOCATIONS :

Twp	Rng	Mer	Sec	Q-Q	Measured Distances
3 N	2 W	WM	13	NE SW	1544.48 FEET NORTH AND 2000.48 FEET EAST FROM THE SW CORNER OF SECTION 13
3 N	2 W	WM	13	NE SW	DC-A - 1360 FEET NORTH AND 1870 FEET EAST FROM THE SW CORNER OF SECTION 13
3 N	2 W	WM	13	NE SW	DC-B - 1395 FEET NORTH AND 1785 FEET EAST FROM THE SW CORNER OF SECTION 13
3 N	2 W	WM	13	NE SW	DC-C - 1530 FEET NORTH AND 1785 FEET EAST FROM THE SW CORNER OF SECTION 13
3 N	2 W	WM	13	NE SW	DC-D - 1475 FEET NORTH AND 1920 FEET EAST FROM THE SW CORNER OF SECTION 13
3 N	2 W	WM	13	NE SW	DC-E - 1425 FEET NORTH AND 1855 FEET EAST FROM THE SW CORNER OF SECTION 13

THE PLACE OF USE IS LOCATED AS FOLLOWS:

WITHIN THE SERVICE BOUNDARY OF THE CITY

Permit Amendment T-12258 Conditions

The combined quantity of water diverted at the new points of appropriation, together with that diverted at the old point of appropriation, shall not exceed the quantity of water lawfully available at the original point of appropriation.

Water use measurement conditions:

a. Before water use may begin under this order, the water user shall install a totalizing flow meter, or, with prior approval of the Director, another suitable measuring device at each point of appropriation (new and existing) or at each new point of appropriation.

b. The water user shall maintain the meters or measuring devices in good working order.

c. The water user shall allow the Watermaster access to the meters or measuring devices; provided however, where the meters or measuring devices are located within a private structure, the Watermaster shall request access upon reasonable notice.

Water shall be acquired from the same aquifer as the original points of appropriation.

Extension of Time Conditions

Development Limitations

Appropriation of any water up to 0.557 cfs under Permit G-15295 shall only be authorized upon issuance of a final order approving a Water Management and Conservation Plan (WMCP) under OAR Chapter 690, Division 86 that authorizes access to a greater rate of appropriation of water under the permit consistent with OAR 690-086-0130(7). The required WMCP shall be submitted to the Department by August 29, 2017. The amount of water used under Permit G-15295 must be consistent with this and subsequent WMCP's approved under OAR Chapter 690, Division 86 on file with the Department.

The deadline established in this Extension Final Order for submittal of a WMCP shall not relieve a permit holder of any existing or future requirement for submittal of a WMCP at an earlier date as established through other orders of the Department. A WMCP submitted to meet the requirements of this final order may also meet the WMCP submittal requirements of other Department orders.

Water Management and Conservation Plan

Duration of Plan Approval:

The City of Scappoose Water Management and Conservation Plan is approved and shall remain in effect until **November 21, 2022**, unless this approval is rescinded pursuant to OAR 690-086-0920.

Progress Report Schedule:

The City of Scappoose shall submit a progress report containing the information required under OAR 690-086-0120(4) by **November 21, 2017**.

Other Requirements for Plan Submittal:

The deadline established herein for the submittal of an updated Water Management and Conservation Plan (consistent with OAR Chapter 690, Division 086) shall not relieve the City of Scappoose from any existing or future requirement(s) for submittal of a Water Management and Conservation Plan at an earlier date as established through other final orders of the Department.

Existing Permit Conditions

Measurement, recording and reporting conditions:

A. Before water use may begin under this permit, the permittee shall install a meter or other suitable measuring device as approved by the Director. The permittee shall maintain the meter or measuring device in good working order, shall keep a complete record of the amount of water used each month and shall submit a report which includes the recorded water use measurements to the Department annually or more frequently as may be required by the Director. Further, the Director may require the permittee to report general water use information, including the place and nature of use of water under the permit.

B. The permittee shall allow the watermaster access to the meter or measuring device; provided however, where the meter or measuring device is located within a private structure, the watermaster shall request access upon reasonable notice.

Within 3 years of permit issuance, the permittee shall submit a Water Management and Conservation Plan consistent with OAR Chapter 690, Division 86. The Director may approve an extension of this timeline to complete the required Water Management and Conservation Plan.

The use may be restricted if the quality of the source stream or downstream waters decrease to the point that those waters no longer meet existing state or federal water quality standards due to reduced flows.

STANDARD CONDITIONS

If substantial interference with a senior water right occurs due to withdrawal of water from any well listed on this permit, then use of water from the well(s) shall be discontinued or reduced and/or the schedule of withdrawal shall be regulated until or unless the Department approves or implements an alternative administrative action to mitigate the interference. The Department encourages junior and senior appropriators to jointly develop plans to mitigate interferences.

The wells shall be constructed in accordance with the General Standards for the Construction and Maintenance of Water Wells in Oregon. The works shall be equipped with a usable access port, and may also include an air line and pressure gauge adequate to determine water level elevation in the well at all times.

The use shall conform to such reasonable rotation system as may be ordered by the proper state officer.

Prior to receiving a certificate of water right, the permit holder shall submit the results of a pump test meeting the department's standards, to the Water Resources Department. The Director may require water level or pump test results every ten years thereafter.

Failure to comply with any of the provisions of this permit may result in action including, but not limited to, restrictions on the use, civil penalties, or cancellation of the permit.

This permit is for the beneficial use of water without waste. The water user is advised that new regulations may require the use of best practical technologies or conservation practices to achieve this end.

By law, the land use associated with this water use must be in compliance with statewide land-use goals and any local acknowledged land-use plan.

The use of water shall be limited when it interferes with any prior surface or ground water rights.

The Director finds that the proposed use of water described by this permit, as conditioned, will not impair or be detrimental to the public interest.

The original permit was issued December 20, 2002. Complete application of the water to the use was to be made on or before October 1, 2007. By extension of time final order dated December 12, 2014 the deadline for complete application of water to use was extended to October 1, 2050. If the water is not completely applied before this date, and the permittee wishes to continue development under the permit, the permittee must submit an application for extension of time. which may be approved based upon the merit of the application.

Within one year after complete application of water to the proposed use, the permittee shall submit a claim of beneficial use, which includes a map and report, prepared by a Certified Water Rights Examiner (CWRE).

Issued October 27th, 2016

Dwight French, Water Right Services Division Administrator, for
Thomas M. Byler, Director
Oregon Water Resources Department

REAL ESTATE TRANSACTIONS: Pursuant to ORS 537.330, in any transaction for the conveyance of real estate that includes any portion of the lands described in this permit, the seller of the real estate shall, upon accepting an offer to purchase that real estate, also inform the purchaser in writing whether any permit, transfer approval order, or certificate evidencing the water right is available and that the seller will deliver any permit, transfer approval order or certificate to the purchaser at closing, if the permit, transfer approval order or certificate is available.

CULTURAL RESOURCES PROTECTION LAWS: Permittees involved in ground-disturbing activities should be aware of federal and state cultural resources protection laws. ORS 358.920 prohibits the excavation, injury, destruction or alteration of an archeological site or object, or removal of archeological objects from public and private lands without an archeological permit issued by the State Historic Preservation Office. 16 USC 470, Section 106, National Historic Preservation Act of 1966 requires a federal agency, prior to any undertaking to take into account the effect of the undertaking that is included on or eligible for inclusion in the National Register. For further information, contact the State Historic Preservation Office at 503-378-4168, extension 232.

POA LOCATION DESCRIPTIONS

Dutch Canyon Well
NE1/4 SW1/4, Section 14, T3N, R2W (W.M.); 1,544.48 feet North and 2,000.48 feet East from SW corner, Section 13

DC-A
Located 1,360 feet North and 1,870 feet East from the SW corner of Section 13, Township 3 North, Range 2 West (W.M.)

DC-B
Located 1,395 feet North and 1,785 feet East from the SW corner of Section 13, Township 3 North, Range 2 West (W.M.)

DC-C
Located 1,530 feet North and 1,785 feet East from the SW corner of Section 13, Township 3 North, Range 2 West (W.M.)

DC-D
Located 1,475 feet North and 1,920 feet East from the SW corner of Section 13, Township 3 North, Range 2 West (W.M.)

DC-E
Located 1,425 feet North and 1,855 feet East from the SW corner of Section 13, Township 3 North, Range 2 West (W.M.)

R2W R2W R2W R1W T4N T3N T3N

Scappoose Creek
North Scappoose Creek
Alder Creek
China Creek
Coal Creek
South Scappoose Creek
Jackson Creek

DC-C DC-D
Dutch Canyon Well
DC-E
TL 2200
DC-B DC-A

LEGEND

- Proposed Point of Appropriation (POA)
- Authorized POA
- Authorized Place of Use (POU)
- Scappoose City Limits
- Scappoose Urban Growth Boundary
- Tax Lots
- Watercourses
- Waterbodies

DISCLAIMER
This map was prepared for the purpose of identifying the location of a water right only and it is not intended to provide legal dimensions or location of property ownership lines.

MAP NOTES:
Date: January 6, 2016
Data Sources: Columbia Co. GIS, OWRD, OGIC, US BLM, ESRI

RECEIVED BY OWRD
JAN 29 2016
SALEM, OR
T 12258

Application for a Permit Amendment in the Name of the City of Scappoose

Place of Use/Point of Appropriation

Permit G-15295, Application G-15135
Township 3 North, Ranges 1 & 2 West (W.M.)

N
0 660 1,320 1,980
1 inch = 1,320 feet

GSI Water Solutions, Inc.

Document Path: P:\Portland\547-Scappoose\008-Dutch Canyon Permit Amendment\Project_GIS\Project_mxds\App_for_Permit_Amendment_G15295.mxd

BEFORE THE WATER RESOURCES DEPARTMENT
OF THE
STATE OF OREGON

In the Matter of Permit Amendment T-12258, Columbia County	)))	FINAL ORDER APPROVING ADDITIONAL POINTS OF APPROPRIATION

Authority

Oregon Revised Statute (ORS) 537.211 establishes the process in which a water right permit holder may submit a request to change the point of appropriation and/or place of use authorized under an existing water right permit.

Applicant

CITY OF SCAPPOOSE
33568 E COLUMBIA AVE
SCAPPOOSE, OR 97056

Findings of Fact

1. On January 29, 2016, THE CITY OF SCAPPOOSE filed an application for additional points of appropriation under Permit G-15295. The Department assigned the application number T-12258.

2. On December 12, 2014, the Department approved an extension of time for complete application of water to October 1, 2050.

3. On November 21, 2012 the Department approved a Water Management and Conservation Plan submitted by the City of Scappoose. The approval order was entered at Volume 88, Page 750.

4. Notice of the application for the permit amendment was published in the Department's weekly notice on February 9, 2016, pursuant to ORS 540.520(5). No comments were filed in response to the notice.

5. Permit Amendment Application T-12258 proposes additional points of appropriation with approximate distances from the existing point of appropriation as follows:

Twp	Rng	Mer	Sec	Q-Q	Measured Distances	Distance from Authorized Well
3 N	2 W	WM	13	NE SW	DC-A - 1360 FEET NORTH AND 1870 FEET EAST FROM THE SW CORNER OF SECTION 13	226.3 feet

This is a final order in other than contested case. This order is subject to judicial review under ORS 183.484. Any petition for judicial review must be filed within the 60 day time period specified by ORS 183.484(2). Pursuant to ORS 536.075 and OAR 137-004-0080 and OAR 690-01-0005 you may either petition for judicial review or petition the Director for reconsideration of this order. A petition for reconsideration may be granted or denied by the Director, and if no action is taken within 60 days following the date the petition was filed, the petition shall be deemed denied.

Twp	Rng	Mer	Sec	Q-Q	Measured Distances	Distance from Authorized Well
3 N	2 W	WM	13	NE SW	DC-B - 1395 FEET NORTH AND 1785 FEET EAST FROM THE SW CORNER OF SECTION 13	264 feet
3 N	2 W	WM	13	NE SW	DC-C - 1530 FEET NORTH AND 1785 FEET EAST FROM THE SW CORNER OF SECTION 13	214.8 feet
3 N	2 W	WM	13	NE SW	DC-D - 1475 FEET NORTH AND 1920 FEET EAST FROM THE SW CORNER OF SECTION 13	107.3 feet
3 N	2 W	WM	13	NE SW	DC-E - 1425 FEET NORTH AND 1855 FEET EAST FROM THE SW CORNER OF SECTION 13	188.8 feet

Permit Amendment Review Criteria

6. The change would not result in injury to other water rights.

7. The change does not enlarge the permit.

8. The change does not alter any other terms of the permit.

Conclusions of Law

The additional points of appropriation proposed by Permit Amendment Application T-12258 are consistent with the requirements of ORS 537.211.

Now, therefore, it is ORDERED:

1. The additional points of appropriation proposed by Permit Amendment Application T-12258 are approved.

2. Permit G-17643, in the name of CITY OF SCAPPOOSE, is issued to replace Permit G-15295, and incorporates the amendments approved by this order, the extension of time, and the Water Management and Conservation Plan. Permit G-15295, in the name of CITY OF SCAPPOOSE, JOHN HANKEN, is no longer of any force or effect.

3. The combined quantity of water diverted at the new points of appropriation, together with that diverted at the old point of appropriation, shall not exceed the quantity of water lawfully available at the original point of appropriation.

4. Water use measurement conditions:

   a. Before water use may begin under this order, the water user shall install a totalizing flow meter, or, with prior approval of the Director, another suitable measuring device at each point of appropriation (new and existing) or at each new point of appropriation.

   b. The water user shall maintain the meters or measuring devices in good working order.

c. The water user shall allow the Watermaster access to the meters or measuring devices; provided however, where the meters or measuring devices are located within a private structure, the Watermaster shall request access upon reasonable notice.

5. Water shall be acquired from the same aquifer as the original points of appropriation.

6. All other terms and conditions of Permit G-15295 remain the same.

Dated at Salem, Oregon this 17 day of October, 2016.

Dwight French, Water Right Services Administrator, for
Thomas M. Byler, Director
Oregon Water Resources Department

Mailing Date: OCT 21 2016

Oregon Water Resources Department
Water Right Services Division

Water Rights Application
Number G-15135

Final Order
Extension of Time for Permit Number G-15295
Permit Holder: City of Scappoose

Permit Information
Application File G-15135/ Permit G-15295
Basin 2 – Willamette Basin / Watermaster District 18
Date of Priority: March 10, 2000

Authorized Use of Water

Source of Water:	One Well within the Scappoose Creek Basin
Purpose or Use:	Municipal
Maximum Rate:	0.557 Cubic Feet per Second (CFS)

This Extension of Time request is being processed in accordance with Oregon Revised Statute 537.630 and 539.010(5), and Oregon Administrative Rule Chapter 690, Division 315

Appeal Rights
This is a final order in other than a contested case. This order is subject to judicial review under ORS 183.484. A request for judicial review must be filed within the 60 day time period specified by ORS 183.484(2). Pursuant to ORS 536.075 and OAR 137-004-0080 you may either file for judicial review, or petition the Director for reconsideration of this order. A petition for reconsideration may be granted or denied by the Director, and if no action is taken within 60 days following the date the petition was filed, the petition shall be deemed denied.

Application History
Permit G-15295 was issued by the Department on December 20, 2002. The permit called for complete application of water to beneficial use by October 1, 2007. On April 11, 2012, the City of Scappoose submitted an application to the Department for an extension of time for Permit G-15295. In accordance with OAR 690-315-0050(2), on October 21, 2014, the Department issued a Proposed Final Order proposing to extend the time to fully apply water to beneficial

use to October 1, 2050. The protest period closed December 5, 2014, in accordance with OAR 690-315-0060(1). No protest was filed.

FINDINGS OF FACT

The Department adopts and incorporates by reference the findings of fact in the Proposed Final Order dated October 21, 2014.

At time of issuance of the Proposed Final Order the Department concluded that, based on the factors demonstrated by the applicant, the permit may be extended subject to the following conditions:

CONDITIONS

1. **Development Limitations**

Appropriation of any water up to 0.557 cfs under Permit G-15295 shall only be authorized upon issuance of a final order approving a Water Management and Conservation Plan (WMCP) under OAR Chapter 690, Division 86 that authorizes access to a greater rate of appropriation of water under the permit consistent with OAR 690-086-0130(7). The required WMCP shall be submitted to the Department within 3 years of this Final Order. The amount of water used under Permit G-15295 must be consistent with this and subsequent WMCP's approved under OAR Chapter 690, Division 86 on file with the Department.

The deadline established in this Extension Final Order for submittal of a WMCP shall not relieve a permit holder of any existing or future requirement for submittal of a WMCP at an earlier date as established through other orders of the Department. A WMCP submitted to meet the requirements of this final order may also meet the WMCP submittal requirements of other Department orders.

CONCLUSION OF LAW

The applicant has demonstrated good cause for the permit extension pursuant to ORS 537.630, 539.010(5) and OAR 690-315-0080(3).

ORDER

The extension of time for Application G-15135, Permit G-15295, therefore, is approved subject to conditions contained herein. The deadline for applying water to full beneficial use within the terms and conditions of the permit is extended from October 1, 2007 to October 1, 2050.

DATED: December 12, 2014

Dwight French
Water Right Services Division Administrator, for
Thomas M. Byler Director,
Oregon Water Resources Department

If you have any questions about statements contained in this document, please contact Ann Reece at (503) 986-0834.

If you have other questions about the Department or any of its programs, please contact our Water Resources Customer Service Group at (503) 986-0900.

Oregon Water Resources Department
Water Right Services Division

Application for Extension of Time

In the Matter of the Application for an Extension of Time for Permit G-15295, Water Right Application G-15135, in the name of the City of Scappoose	)))	PROPOSED FINAL ORDER

Permit Information

Application File G-15135/ Permit G-15295
Basin 2 – Willamette Basin / Watermaster District 18
Date of Priority: March 10, 2000

Authorized Use of Water

Source of Water:	One Well within the Scappoose Creek Basin
Purpose or Use:	Municipal
Maximum Rate:	0.557 Cubic Feet per Second (CFS)

This Extension of Time request is being processed in accordance with Oregon Administrative Rule Chapter 690, Division 315.

Please read this Proposed Final Order in its entirety as it contains additional conditions not included in the original permit.

This Proposed Final Order applies only to Permit G-15295, water right Application G-15135.

Summary of Proposed Final Order for Extension of Time

The Department proposes to:

- Grant an extension of time to apply water to full beneficial use from October 1, 2007 to October 1, 2050.
- Make the extension of time subject to certain conditions as set forth below.

ACRONYM QUICK REFERENCE

Department – Oregon Department of Water Resources
City – City of Scappoose
ODFW – Oregon Department of Fish and Wildlife
PFO – Proposed Final Order
WMCP – Water Management and Conservation Plan

Units of Measure
cfs – cubic feet per second

AUTHORITY

Generally, see ORS 537.630 and OAR Chapter 690 Division 315.

ORS 537.630(2) provides in pertinent part that the Oregon Water Resources Department (Department) may, for good cause shown, order and allow an extension of time, for the completion of the well or other means of developing and securing the ground water or for complete application of water to beneficial use. In determining the extension, the department shall give due weight to the considerations described under ORS 539.010 (5) and to whether other governmental requirements relating to the project have significantly delayed completion of construction or perfection of the right.

ORS 539.010(5) provides in pertinent part that the Water Resources Director, for good cause shown, may extend the time within which the full amount of the water appropriated shall be applied to a beneficial use. This statute instructs the Director to consider: the cost of the appropriation and application of the water to a beneficial purpose; the good faith of the appropriator; the market for water or power to be supplied; the present demands therefore; and the income or use that may be required to provide fair and reasonable returns upon the investment.

OAR 690-315-0080 provides in pertinent part that the Department shall make findings to determine if an extension of time for municipal and/or quasi-municipal water use permit holders may be approved to complete construction and/or apply water to full beneficial use.

OAR 690-315-0090(3) authorizes the Department, under specific circumstances, to condition an extension of time for municipal and/or quasi-municipal water use permit holders to provide that diversion of water beyond the maximum rate diverted under the permit or previous

extension(s) shall only be authorized upon issuance of a final order approving a Water Management and Conservation Plan under OAR Chapter 690, Division 86.

FINDINGS OF FACT

Background

1. Permit G-15295 was granted by the Department on December 20, 2002. The permit authorizes the use of up to 0.557 cfs of water from one well (COLU 100) within the Scappoose Creek Basin, for municipal use. It specified that complete application of water was to be made on or before October 1, 2007.

2. The permit holder, the City of Scappoose (City), submitted an "Application for Extension of Time" to the Department on April 11, 2012, requesting the time to apply water to full beneficial use under the terms and conditions of Permit G-15295 be extended from October 1, 2007 to October 1, 2050. This is the first extension of time request for Permit G-15295.

3. Notification of the City's Application for Extension of Time for Permit G-15295 was published in the Department's Public Notice dated April 24, 2012. No public comments were received regarding the extension application.

4. On May 13, 2012, and October 10, 2014, the permit holder submitted additional information to supplement their Application for Extension of Time.

Review Criteria for Municipal Quasi-Municipal Water Use Permits *[OAR 690-315-0080(1)]*
The time limits to complete construction and/or apply water to full beneficial use may be extended if the Department finds that the permit holder has met the requirements set forth under OAR 690-315-0080. This determination shall consider the applicable requirements of ORS 537.230[1], 537.630[2] and/or 539.010(5)[3]

Complete Extension of Time Application *[OAR 690-315-0080(1)(a)]*

5. On April 11, 2012, the Department received a completed Application for Extension of Time and the fee specified in ORS 536.050 from the permit holder.

Start of Construction *[OAR 690-315-0080(1)(b)]*

6. A date by which actual construction was to begin is not specified in Permit G-15295.

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[1] ORS 537.230 applies to surface water permits only.

[2] ORS 537.630 applies to ground water permits only.

[3] ORS 537.010(5) applies to surface water and ground water permits.

Duration of Extension *[OAR 690-315-0080(1)(c) and (1)(d)]*

Under OAR 690-315-0080(1)(c),(d), in order to approve an extension of time for municipal and quasi-municipal water use permits the Department must find that the time requested is reasonable and the applicant can complete the project within the time requested.

7. The remaining work to be accomplished under Permit G-15295 consists applying to the Department for a permit amended to add additional point(s) of appropriation, constructing additional well(s) and associated installations, and applying water to full beneficial use.

8. As of October 1, 2007, the permit holder had not appropriated any of the 0.557 cfs of water authorized under Permit G-15295 for municipal purposes. There is an undeveloped portion of 0.557 cfs of water under Permit G-15295 as per OAR 690-315-0010(6)(g).

9. In addition to the 0.557 cfs of water from Dutch Canyon Well (COLU 100) authorized under Permit G-15295, the City holds the following municipal water rights:

   - Permit G-8615 for 0.89 cfs of water from Dutch Canyon Well (COLU 100);
   - Permit G-15491 for 2.9 cfs of water, being 2.23 from Miller Road Well 1 (COLU 52428) and 0.67 cfs from Miller Road Well 2 (COLU 51685);
   - Certificate 5573 for 10.0 CFS of water from Gourlay Creek, tributary to Scapposse Creek;
   - Certificate 42700 for 4.0 cfs of water, being 1.5 cfs from Lazy Creek and 2.5 cfs from South Fork Scappoose Creek, both tributary to Scappoose Creek;

   These water rights and permits total 18.347 cfs of water, being 4.347 cfs of ground water and 14.0 cfs of live flow (surface) water.

10. The City also holds a Groundwater Registration GR-926 for 50 gpm (0.11) of water from a Pump Well and Limited License LL-1404 for 500 gpm (1.11 cfs) from Miller Road Well 3 (COLU 52612) for use of water through November 15, 2015. The well authorized under GR-926 no longer exists.

11. The City utilizes both surface water and ground water sources to meet current water demands. Water from its surface water sources and water from the Dutch Canyon well are diverted to the Keys Road Water Treatment Plant. The Miller Road ground water sources are treated at the Miller Road Water Treatment Plant. Use of the City's surface water rights are restricted to 3.1 cfs due to facility limitations, and to as low as 0.55 cfs during peak season due to seasonal lack of water availability during the summer months. The Dutch Canyon Well currently has a maximum production capacity of 0.73 cfs due to stresses on the well, and the Miller Road Wells currently produce up to 1.0 cfs of water. Thus the City has 4.85 cfs of production capacity in the winter months, but only 2.29 cfs in the summer months. (November 2012 WMCP, p. 14.)

12. According to the City, their peak water demand within its service area boundaries was 2.46 cfs in 2009.

13. According to the City, in 2009, the population within the service boundary of the City of Scappoose was 6,204. The City of Scappoose estimates the population will increase at growth rate of 1.8 percent per year, reaching an estimated population of 13,598 by the year 2050.

14. According to the City, their peak day demand is projected to be approximately 5.3 cfs of water by the year 2050.

15. Full development of Permit G-15295 is needed to address the present and future water demand of the City, including system redundancy and emergency use.

16. The City's request for an extension of time until October 1, 2050, to apply water to full beneficial use under the terms and conditions of Permit G-15295 is both reasonable and necessary.

Good Cause *[OAR 690-315-0080(1)(e) and (3)(a-g)and (4)]*
The Department's determination of good cause shall consider the requirements set forth under OAR 690-315-0080(3) and OAR 690-315-0080(4).

Reasonable Diligence and Good Faith of the Appropriator *[OAR 690-315-0080(3)(a),(3)(c) and (4)]*
Reasonable diligence and good faith of the appropriator must be demonstrated during the permit period or prior extension period as a part of evaluating good cause in determining whether or not to grant an extension. In determining the reasonable diligence and good faith of a municipal or quasi-municipal water use permit holder, the Department shall consider activities associated with the development of the right including, but not limited to, the items set forth under OAR 690-315-0080(4) and shall evaluate how well the applicant met the conditions of the permit or conditions of a prior extension period.

17. Prior to the issuance of Permit G-15295 on December 20, 2002, the City constructed Dutch Canyon Well (COLU 100).

18. During the original development time frame under Permit G-15295 the City installed a water meter and submitted water use reports.

19. Since October 1, 2007 the City has submitted a Water Management and Conservation Plan (WMCP) to the Department.

20. According to the City, as of April 11, 2012, they have invested approximately $30,000 which is about 5 percent of the total projected cost for complete development of this project. The City anticipates $600,000 needed for the completion of this project. The Department recognizes that while some of these investment costs are unique to construction and development solely under G-15295, other costs included in this

accounting are not partitioned out for G-15295 because (1) they are incurred under the development of a water supply system jointly utilized under other rights held by the City, and/or (2) they are generated from individual activities counted towards reasonable diligence and good faith as listed in ORS 690-315-0080(4) which are not associated with just this permit, but with the development and exercise of all the City's water rights.

21. As of October 1, 2007, none of the 0.557 cfs allowed has been appropriated from the Dutch Canyon Well for beneficial municipal purposes under the terms of this permit.

22. The Department has considered the City's compliance with conditions and did not identify any concerns.

Cost to Appropriate and Apply Water to a Beneficial Purpose *[OAR 690-315-0080(3)(b)]*

23. According to the City, as of April 11, 2012, they have invested approximately $30,000, which the total projected cost for complete development of this project. The City anticipates $600,000 needed for the completion of this project.

The Market and Present Demands for Water *[OAR 690-315-0080(3)(d) and (5)(a-f)]*

For municipal or quasi-municipal water use permits issued after November 2, 1998, in making a determination of good cause pursuant to 690-315-0080(3)(d), the Department shall also consider, but is not limited to, the factors in 690-315-0080(5)(a-f).

24. The amount of water available to satisfy other affected water rights and scenic waterway flows; special water use designations established since permit issuance, including but not limited to state scenic waterways, federal wild and scenic rivers, serious water management problem areas or water quality limited sources established under 33 U.S.C. 1313(d); or the habitat needs of sensitive, threatened or endangered species, in consultation with the Oregon Department of Fish and Wildlife *[OAR 690-315-0080(5)(a-f)]*.

    a. The amount of water available to satisfy other affected water rights and scenic waterway flows was determined at the time of issuance of Permit G-15295; furthermore, water availability for other affected water rights and scenic waterway flows after the permit was issued is determined at such time that such application for a new water right is submitted. The point of appropriation for Permit G-15295 is not located within a limited or critical ground water area. The point of appropriation for Permit G-15295, located within the Jackson Creek Basin, is not located within or above any state or federal scenic waterway. The point of appropriation is within an area ranked highest for stream flow restoration needs as determined by the Department in consultation with the Oregon Department of Fish and Wildlife, and is located within a Sensitive, Threatened or Endangered Fish Species Area as identified by the Department in consultation with Oregon Department of Fish and Wildlife. The point of

appropriation is not in an area listed by the Department of Environmental Quality as a water quality limited stream.

Economic investment in the project to date *[OAR 690-315-0080(5)(d)]*.

25. According to the City, as of April 11, 2012, they have invested approximately $30,000 which is about 5 percent of the total projected cost for complete development of this project. The City anticipates $600,000 needed for the completion of this project.

Other economic interests dependent on completion of the project *[OAR 690-315-0080(5)(e)]*.

26. None have been identified.

Other factors relevant to the determination of the market and present demand for water and power *[OAR 690-315-0080(5)(f)]*.

27. As described in Findings 8 through 15 the City of Scappoose has indicated, and the Department finds that the City must rely on full development of Permit G- 15295 to meet its present and future water demands.

28. City of Scappoose projects a population increase of 1.8 percent per year over the next forty-one years.

29. Given the current water supply situation of the City as well as current and expected demands, and the need for redundancy in water sources, there is a market and present demand for the water to be supplied under Permit G-15295.

30. OAR 690-315-0090(3) requires the Department to place a condition on this extension of time to provide that appropriation of any water under Permit G-15295 shall only be authorized upon issuance of a final order approving a Water Management and Conservation Plan(s) (WMCP) under OAR Chapter 690, Division 86 which grants access to a greater appropriation of water under the permit consistent with OAR 690-086-0130(7). A "Development Limitation" condition" is specified under Item 1 of the "Conditions" section of this PFO to meet this requirement.

Fair Return Upon Investment *[OAR 690-315-0080(3)(e)]*

31. Use and income from the permitted water development project would likely result in reasonable returns upon the investment made in the project to date.

Other Governmental Requirements *[OAR 690-315-0080(3)(f)]*

32. Delays caused by any other governmental requirements in the development of this project have not been identified.

Events which Delayed Development under the Permit *[OAR 690-315-0080(3)(g)]*

33. Delay of development under Permit G-15295 was due, in part, to the size and scope of the municipal water system, which was designed to be phased in over a period of years, and due to low productivity of the Dutch Canyon Well. The City intends to apply to the Department for a permit amendment to add additional point(s) of appropriation in order to increase the amount of water that can be appropriated under this permit.

CONCLUSIONS OF LAW

1. The City is entitled to apply for an extension of time to complete construction and/or completely apply water to the full beneficial use pursuant to ORS 537.630(2).

2. The City has submitted a complete extension application form and the fee specified under ORS 536.050(1)(k), as required by OAR 690-315-0080(1)(a).

3. Pursuant to Section 5, Chapter 410, Oregon Laws 2005, the permit holder is not required to demonstrate that actual construction of the project began within one year of the date of issuance of the permit, as otherwise required by OAR 690-315-0080(1)(b).

4. The time requested to apply water to full beneficial use is reasonable, as required by OAR 690-315-0080(1)(c).

5. Full application of water to beneficial use can be completed by October 1, 2050[4] pursuant to OAR 690-315-0080(1)(d).

6. The Department has considered the reasonable diligence and good faith of the appropriator, the cost to appropriate and apply water to a beneficial purpose, the market and present demands for water to be supplied, the financial investment made and the fair return upon the investment, the requirements of other governmental agencies, and unforeseen events over which the water right permit holder had no control, and the Department has determined that the City has shown good cause for an extension of time to apply the water to full beneficial use pursuant to OAR 690-315-0080(1)(e).

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[4] Pursuant to ORS 537.630(4), upon the completion of beneficial use of water allowed under the permit, the permit holder shall hire a certified water rights examiner to survey the appropriation. Within one year after the complete application of water to a beneficial use (or by the date allowed for the complete application of water to a beneficial use), the permit holder shall submit a map of the survey and the claim of beneficial use.

7. As required by OAR 690-315-0090(3) and as described in Finding 30, above, and specified under Item 1 of the "Conditions" section of this PFO, the appropriation of any water under Permit G-15295 shall only be authorized upon issuance of a final order approving a Water Management and Conservation Plan(s) under OAR Chapter 690, Division 86 that authorizes access to a greater rate of appropriation of water under the permit consistent with OAR 690-086-0130(7).

Proposed Order

Based upon the foregoing Findings of Fact and Conclusions of Law, the Department proposes to issue an order to:

Extend the time to apply the water to beneficial use under Permit G-15295 from October 1, 2007 to October 1, 2050.

Subject to the following conditions:

CONDITIONS

1. **Development Limitations**

Appropriation of any water up to 0.557 cfs under Permit G-15295 shall only be authorized upon issuance of a final order approving a Water Management and Conservation Plan (WMCP) under OAR Chapter 690, Division 86 that authorizes access to a greater rate of appropriation of water under the permit consistent with OAR 690-086-0130(7). The required WMCP shall be submitted to the Department within 3 years of this Final Order. The amount of water used under Permit G-15295 must be consistent with this and subsequent WMCP's approved under OAR Chapter 690, Division 86 on file with the Department.

The deadline established in the Extension Final Order for submittal of a WMCP shall not relieve a permit holder of any existing or future requirement for submittal of a WMCP at an earlier date as established through other orders of the Department. A WMCP submitted to meet the requirements of the final order may also meet the WMCP submittal requirements of other Department orders.

DATED: October 21, 2014

Dwight French
Water Right Services Division Administrator

If you have any questions, please check the information box on the last page for the appropriate names and phone numbers.

Proposed Final Order Hearing Rights

1. Under the provisions of OAR 690-315-0100(1) and 690-315-0060, the applicant or any other person adversely affected or aggrieved by the proposed final order may submit a written protest to the proposed final order. The written protest must be received by the Water Resources Department no later than **December 5, 2014,** being 45 days from the date of publication of the proposed final order in the Department's weekly notice.

2. A written protest shall include:
   a. The name, address and telephone number of the petitioner;
   b. A description of the petitioner's interest in the proposed final order and if the protestant claims to represent the public interest, a precise statement of the public interest represented;
   c. A detailed description of how the action proposed in the proposed final order would adversely affect or aggrieve the petitioner's interest;
   d. A detailed description of how the proposed final order is in error or deficient and how to correct the alleged error or deficiency;
   e. Any citation of legal authority supporting the petitioner, if known;
   f. Proof of service of the protest upon the water right permit holder, if petitioner is other than the water right permit holder; and
   g. The applicant or non-applicant protest fee required under ORS 536.050.

3. Within 60 days after the close of the period for requesting a contested case hearing, the Director shall:
   a. Issue a final order on the extension request; or
   b. Schedule a contested case hearing if a protest has been submitted, and:
      1) Upon review of the issues, the Director finds there are significant disputes related to the proposed agency action; or
      2) The applicant submits a written request for a contested case hearing within 30 days after the close of the period for submitting protests.

- If you have any questions about statements contained in this document, please contact Ann Reece at 503-986-0834.
- If you have questions about how to file a protest or if you have previously filed a protest and you want to know the status, please contact Patricia McCarty at 503-986-0820.
- If you have any questions about the Department or any of its programs, please contact our Water Resources Customer Service Group at 503-986-0801.
- Address any correspondence to: Water Right Services Division
  725 Summer St NE, Suite A
- Fax: 503-986-0901 Salem, OR 97301-1266

WATER RESOURCES DEPARTMENT

MEMO Dec. 8 ,20 15

TO: **Application Ø-** LL- 1619

FROM: **GW:** Aurora C. Bouchier
(Reviewer's Name)

SUBJECT: Scenic Waterway Interference Evaluation

☐ YES
The source of appropriation is within or above a Scenic Waterway
☑ NO

☐ YES
Use the Scenic Waterway condition (Condition 7J)
☑ NO

☐ Per ORS 390.835, the Groundwater Section is **able** to calculate ground water interference with surface water that contributes to a Scenic Waterway. The calculated interference is distributed below.

☐ Per ORS 390.835, the Groundwater Section is **unable** to calculate ground water interference with surface water that contributes to a scenic waterway; **therefore, the Department is unable to find that there is a preponderance of evidence that the proposed use will measurably reduce the surface water flows necessary to maintain the free-flowing character of a scenic waterway.**

DISTRIBUTION OF INTERFERENCE

Calculate the percentage of consumptive use by month and fill in the table below. If interference cannot be calculated, per criteria in 390.835, do not fill in the table but check the "unable" option above, thus informing Water Rights that the Department is unable to make a Preponderance of Evidence finding.

Exercise of this permit is calculated to reduce monthly flows in _____ Scenic Waterway by the following amounts expressed as a proportion of the consumptive use by which surface water flow is reduced.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date **December 8, 2015**

FROM: Groundwater Section **Aurora C Bouchier**
Reviewer's Name

SUBJECT: Application LL- **1619** Supersedes review of **na**
Date of Review(s)

PUBLIC INTEREST PRESUMPTION; GROUNDWATER

OAR 690-310-130 (1) *The Department shall presume that a proposed groundwater use will ensure the preservation of the public welfare, safety and health as described in ORS 537.525.* Department staff review groundwater applications under OAR 690-310-140 to determine whether the presumption is established. OAR 690-310-140 allows the proposed use be modified or conditioned to meet the presumption criteria. **This review is based upon available information and agency policies in place at the time of evaluation.**

A. GENERAL INFORMATION: Applicant's Name: **City of Scappoose** County: **Columbia**

A1. Applicant(s) seek(s) **1.1** cfs from **1** well(s) in the **Willamette** Basin, **Lower Willamette** subbasin

A2. Proposed use **Municipal** Seasonality: **year round**

A3. Well and aquifer data **(attach and number logs for existing wells; mark proposed wells as such under logid)**:

Well	Logid	Applicant's Well #	Proposed Aquifer*	Proposed Rate(cfs)	Location (T/R-S QQ-Q)	Location, metes and bounds, e.g. 2250' N, 1200' E fr NW cor S 36
1	CLAC 52612	MR #3	Alluvium	1.1	T7N/R1W-7 SE-NW	2475' S, 1795' E fr NW cor S 7
2						
3						
4						
5						

* Alluvium, CRB, Bedrock

Well	Well Elev ft msl	First Water ft bls	SWL ft bls	SWL Date	Well Depth (ft)	Seal Interval (ft)	Casing Intervals (ft)	Liner Intervals (ft)	Perforations Or Screens (ft)	Well Yield (gpm)	Draw Down (ft)	Test Type
1	13	147	7.5	11/12/2004	203	0-30	0-201	194-201	160-194	560	111	Pump

Use data from application for proposed wells.

A4. **Comments:**

A5. ☒ **Provisions of the** Willamette Basin rules relative to the development, classification and/or management of groundwater hydraulically connected to surface water ☐ **are**, *or* ☒ **are not**, activated by this application. (Not all basin rules contain such provisions.)
Comments: The applicant's well is greater than ¼ mile from the nearest surface water body, so the pertinent basin rules do not apply.

A6. ☐ **Well(s) #** _____, _____, _____, _____, _____, tap(s) an aquifer limited by an administrative restriction.
Name of administrative area:
Comments:

B. GROUNDWATER AVAILABILITY CONSIDERATIONS, OAR 690-310-130, 400-010, 410-0070

B1. **Based upon available data**, I have determined that groundwater* for the proposed use:

a. ☐ **is** over appropriated, ☐ **is not** over appropriated, *or* ☒ **cannot be determined to be** over appropriated during any period of the proposed use. * This finding is limited to the groundwater portion of the over-appropriation determination as prescribed in OAR 690-310-130;

b. ☐ **will not** *or* ☐ **will** likely be available in the amounts requested without injury to prior water rights. * This finding is limited to the groundwater portion of the injury determination as prescribed in OAR 690-310-130;

c. ☐ **will not** *or* ☐ **will** likely to be available within the capacity of the groundwater resource; or

d. ☒ **will, if properly conditioned**, avoid injury to existing groundwater rights or to the groundwater resource:
   i. ☒ The permit should contain condition #(s) **7C**;
   ii. ☐ The permit should be conditioned as indicated in item 2 below.
   iii. ☐ The permit should contain special condition(s) as indicated in item 3 below;

B2. a. ☐ **Condition** to allow groundwater production from no deeper than _____ ft. below land surface;

b. ☐ **Condition** to allow groundwater production from no shallower than _____ ft. below land surface;

c. ☒ **Condition** to allow groundwater production only from the **alluvial** groundwater reservoir ~~between approximately _____ ft. and _____ ft. below land surface;~~

d. ☐ **Well reconstruction** is necessary to accomplish one or more of the above conditions. The problems that are likely to occur with this use and without reconstructing are cited below. Without reconstruction, I recommend withholding issuance of the permit until evidence of well reconstruction is filed with the Department and approved by the Groundwater Section.

Describe injury –as related to water availability– that is likely to occur without well reconstruction (interference w/ senior water rights, not within the capacity of the resource, etc): _____

B3. **Groundwater availability remarks:** The applicant's well is located in an area that contains mostly coarse-grained alluvial sediments from land surface to a depth of approximately 195 feet (COLU 52428, COLU 51685, and COLU 52612). The permeable coarse-grained sediments are underlain be a sequence of mostly fine-grained alluvial sediments that are approximately 300 feet thick locally. Shallow wells in the area are strongly connected to nearby surface water sources, so water level declines are not anticipated.

C. GROUNDWATER/SURFACE WATER CONSIDERATIONS, OAR 690-09-040

C1. **690-09-040 (1):** Evaluation of aquifer confinement:

Well	Aquifer or Proposed Aquifer	Confined	Unconfined
1	**Alluvium**	☐	☒
		☐	☐
		☐	☐
		☐	☐
		☐	☐

Basis for aquifer confinement evaluation: The review for application LL-1404 and driller's well reports for nearby wells (including COLU 51685) indicate unconfined conditions.

C2. **690-09-040 (2) (3):** Evaluation of distance to, and hydraulic connection with, surface water sources. All wells located a horizontal distance less than ¼ mile from a surface water source that produce water from an unconfined aquifer shall be assumed to be hydraulically connected to the surface water source. Include in this table any streams located beyond one mile that are evaluated for PSI.

Well	SW #	Surface Water Name	GW Elev ft msl	SW Elev ft msl	Distance (ft)	Hydraulically Connected? YES	NO	ASSUMED	Potential for Subst. Interfer. Assumed? YES	NO
1	**1**	**Jackson Creek**	**5**	**5**	**2660**	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: Water levels in nearby wells are coincident with the elevation of local surface water bodies, indicating hydraulic connection between the aquifer system and local streams.

Water Availability Basin the well(s) are located within: None, Columbia River Drainage

C3a. **690-09-040 (4):** Evaluation of stream impacts for each well that has been determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water source. Limit evaluation to instream rights and minimum stream flows that are pertinent to that surface water source, and not lower SW sources to which the stream under evaluation is tributary. Compare the requested rate against the 1% of 80% *natural* flow for the pertinent Water Availability Basin (WAB). If Q is not distributed by well, use full rate for each well. Any checked ☒ box indicates the well is assumed to have the potential to cause PSI.

Well	SW #	Well < ¼ mile?	Qw > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Qw > 1% ISWR?	80% Natural Flow (cfs)	Qw > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
1	**1**	☐	☐			☐		☐	**7.36%**	☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

C3b. **690-09-040 (4):** Evaluation of stream impacts by total appropriation for all wells determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water source. **Complete only if Q is distributed among wells**. Otherwise same evaluation and limitations apply as in C3a above.

	SW #		Qw > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Qw > 1% ISWR?	80% Natural Flow (cfs)	Qw > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
			☐			☐		☐		☐
			☐			☐		☐		☐
			☐			☐		☐		☐
			☐			☐		☐		☐

Comments: Stream depletion was estimated using the Hunt 1999 model using a 3 foot clogging layer at the base of the stream. Pumping impacts to Jackson Creek will be <<25% of the pumping rate after 30 days of pumping due to the narrow width (~35 feet) of the stream channel.

C4a. **690-09-040 (5):** Estimated impacts on **hydraulically connected surface water sources greater than one mile** as a percentage of the proposed pumping rate. Limit evaluation to the effects that will occur up to one year after pumping begins. This table encompasses the considerations required by 09-040 (5)(a), (b), (c) and (d), which are not included on this form. Use additional sheets if calculated flows from more than one WAB are required.

Non-Distributed Wells													
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													

Distributed Wells													
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													

(A) = Total Interf.												
(B) = 80 % Nat. Q												
(C) = 1 % Nat. Q												
(D) = (A) > (C)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(E) = (A / B) x 100	%	%	%	%	%	%	%	%	%	%	%	%

(A) = total interference as CFS; (B) = WAB calculated natural flow at 80% exceed. as CFS; (C) = 1% of calculated natural flow at 80% exceed. as CFS; (D) = highlight the checkmark for each month where (A) is greater than (C); (E) = total interference divided by 80% flow as percentage.

Basis for impact evaluation:

C4b. **690-09-040 (5) (b) The potential to impair or detrimentally affect the public interest is to be determined by the Water Rights Section.**

C5. ☐ **If properly conditioned**, the surface water source(s) can be adequately protected from interference, and/or groundwater use under this permit can be regulated if it is found to substantially interfere with surface water:

i. ☐ The permit should contain condition #(s)_____;

ii. ☐ The permit should contain special condition(s) as indicated in "Remarks" below;

C6. **SW / GW Remarks and Conditions:**

References Used:

Hunt, B., 1999, Unsteady stream depletion from ground water pumping: Ground Water, v. 37, no. 1, p. 98-102.

OWRD groundwater review for LL-1404

Personal communication with Daryl Sykes, 12/8/2015 regarding location of wells at the Miller Road Water Treatment Facility.

D. WELL CONSTRUCTION, OAR 690-200

D1. **Well #:** _____ **Logid:** _____

D2. **THE WELL does not appear to meet current well construction standards based upon:**

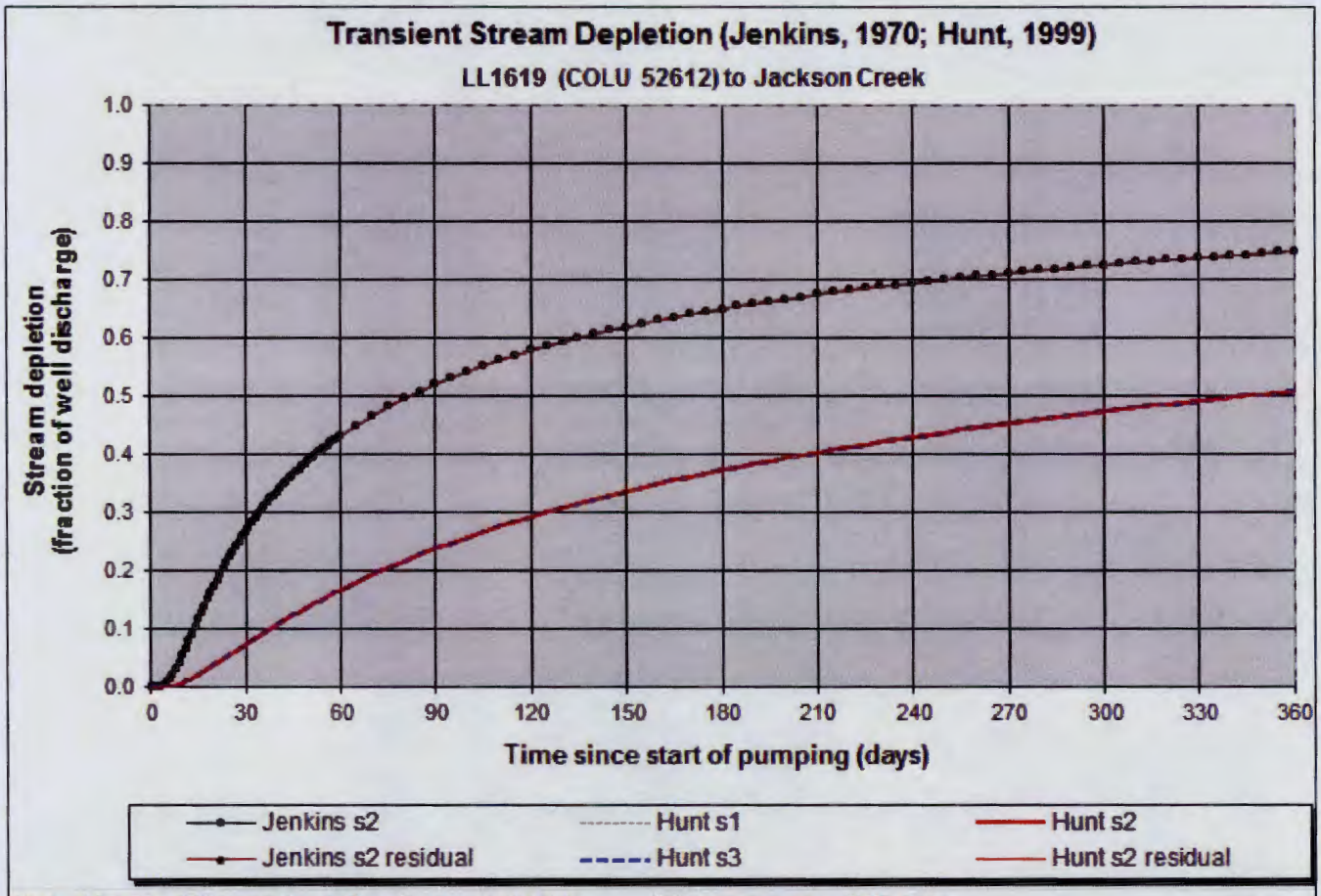
a. ☐ review of the well log;
b. ☐ field inspection by _____;
c. ☐ report of CWRE _____;
d. ☐ other: (specify) _____

D3. **THE WELL construction deficiency or other comment is described as follows:** _____

D4. ☐ **Route to the Well Construction and Compliance Section for a review of existing well construction.**

Well Location Map

Stream Depletion Model



Output for Hunt Stream Depletion, Scenerio 2 (s2):	Time pump on = 365 days											
Days	30	60	90	120	150	180	210	240	270	300	330	360
Qw, cfs	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100
Jenk SD s2 %	26.52	43.08	52.01	57.75	61.83	64.92	67.37	69.36	71.04	72.46	73.69	74.77
Jen SD s2 cfs	0.292	0.474	0.572	0.635	0.680	0.714	0.741	0.763	0.781	0.797	0.811	0.823
Hunt SD s2 %	7.36	16.71	23.75	29.21	33.59	37.21	40.28	42.93	45.24	47.28	49.11	50.75
Hunt SD s2 cfs	0.081	0.184	0.261	0.321	0.369	0.409	0.443	0.472	0.498	0.520	0.540	0.558

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate	Qw	1.1	1.1	1.1	cfs
Distance to stream	a	2660	2660	2660	ft
Aquifer hydraulic conductivity	K	100	100	100	ft/day
Aquifer thickness	b	190	190	190	ft
Aquifer transmissivity	T	19000	19000	19000	ft*ft/day
Aquifer storage coefficient	S	0.2	0.2	0.2	
Stream width	ws	35	35	35	ft
Streambed hydraulic conductivity	Ks	1	1	1	ft/day
Streambed thickness	bs	3	3	3	ft
Streambed conductance	sbc	11.66666667	11.66666667	11.66666667	ft/day
Stream depletion factor (Jenkins)	sdf	74.48	74.48	74.48	days
Streambed factor (Hunt)	sbf	1.633333333	1.633333333	1.633333333	

Oregon Water Resources Department

Final Order
Limited License Application LL-1619

Appeal Rights

This is a final order in other than a contested case. This order is subject to judicial review under ORS 183.484. Any petition for judicial review must be filed within the 60-day time period specified by ORS 183.484(2). Pursuant to ORS 536.075 and OAR 137-004-0080 you may either petition for judicial review or petition the Director for reconsideration of this order. A petition for reconsideration may be granted or denied by the Director, and if no action is taken within 60 days following the date, the petition was filed, the petition shall be deemed denied.

Requested Water Use

On November 16, 2015, the Water Resources Department received completed application **LL-1619** from the City of Scappoose for the use of 1.1 cubic feet per second from a well (COLU 52612), located in the SE ¼, NW ¼, Section 7, Township 3 North, Range 1 West, W.M., for municipal uses, for the period November 1, 2015 through November 1, 2020, or issuance of a permit amendment to add this well to permit G-15491, whichever occurs first.

Authorities

The Department may approve a limited license pursuant to its authority under ORS 537.143, 537.144 and OAR 690-340-0030.

ORS 537.143(2) authorizes the Director to revoke the right to use water under a limited license if it causes injury to any water right or a minimum perennial streamflow.

A license will not be issued for more than five consecutive years for the same use, as directed by ORS 537.143(8).

Findings of Fact

1. The forms, fees, and map have been submitted, as required by OAR 690-340-0030(1).

2. The Department provided public notice of the application, on December 8, 2015, as required by OAR 690-340-0030(2).

3. This license request is limited to an area within a single drainage basin as required by OAR 690-340-0030(3).

4. The Department has determined that there is water available for the requested use.

5. The Department has determined that the proposed source has not been withdrawn from further appropriation.

6. As part of its review to determine ground water availability, the Department's Ground Water/Hydrology Section has stipulated conditions pertaining to measurement and reporting, and decline in static water level.

7. The Department has not received comments related to the possible issuance of the license.

8. Pursuant to OAR 690-340-0030(4)(5), conditions have been added with regard to notice and water-use measurement.

9. The City of Scappoose has indicated that the proposed use is compatible with the applicable acknowledged comprehensive land-use plan.

Conclusions of Law

The proposed water use will not impair or be detrimental to the public interest pursuant to OAR 690-340-0030(2), as limited in the order below.

Order

Therefore, pursuant to ORS 537.143, ORS 537.144, and OAR 690-340-0030, application **LL-1619** is approved as conditioned below.

1. The period and rate of use for **LL-1619** shall be from January 4, 2016, through November 1, 2020, for the use of 1.1 cubic feet per second, for municipal use, or until a permit amendment is issued to add this well to permit G-15491, whichever occurs first.

2. The licensee shall give notice to the Watermaster in the district where use is to occur not less than 15 days or more than 60 days in advance of using the water under the license. The notice shall include the location of the diversion, the quantity of water to be diverted and the intended use and place of use.

3. Before water use may begin under this license, the licensee shall install a totalizing flow meter at each point of appropriation. The totalizing flow meter must be installed and maintained in good working order. In addition, the licensee shall maintain a record of all water use, including the total number of hours of pumping, the total quantity pumped, and the categories of beneficial use to which the water is applied. During the period of the license, the record of use shall be submitted to the Department annually, and shall be submitted to the Watermaster upon request.

4. The Director may revoke the right to use water for any reason described in ORS 537.143(2), and OAR 690-340-0030(6). Such revocation may be prompted by field regulatory activities or by any other information.

5. Use of water under a limited license shall not have priority over any water right exercised according to a permit or certificate, and shall be subordinate to all other authorized uses that rely upon the same source.

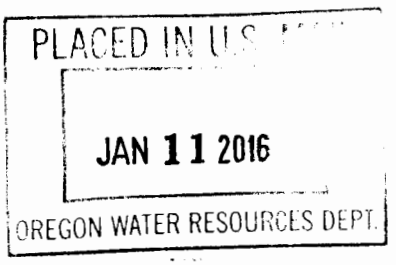
6. The use of water under this license is contingent upon the applicant submitting an application for a permit amendment toad this well to permit G-15491 by June 1, 2016. If no such application is filed by that date, this license will no longer be in effect.

7. A copy of this license shall be kept at the place of use, and be available for inspection by the Watermaster or other state authority.

NOTE: This water-use authorization is temporary. Applicants are advised that issuance of this final order does not guarantee that any permit for the authorized use will be issued in the future; any investments should be made with that in mind.

Issued January 4, 2016

E. Timothy Wallin, Water Rights Program Manager
for Director, Oregon Water Resources Department



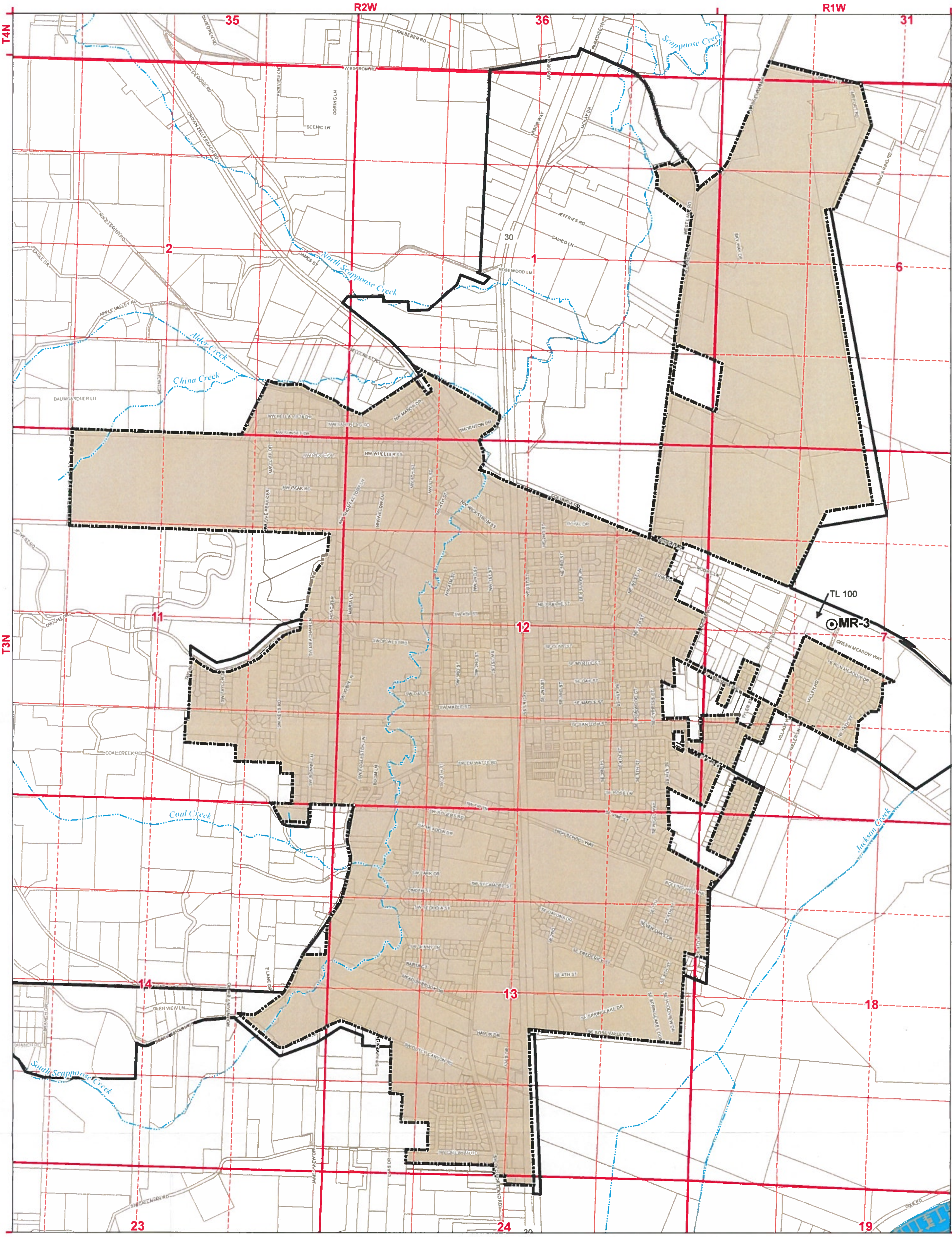
Enclosures - limited license
cc: Jake Constans, District 18 Watermaster
Ben Walczak, ODFW
Steve Mrazik, DEQ
Hydrographics
File

If you need further assistance, please contact the Water Rights Section at the address, phone number, or fax number below. When contacting the Department, be sure to reference your limited license number for fastest service.

Remember, this limited license does not provide a secure source of water. Water use can be revoked at any time. Such revocation may be prompted by field regulatory activities or many other reasons.

Water Rights Section
Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem OR 97301-1271
Phone: (503) 986-0817 Fax: (503) 986-0901

LL-1619



LEGEND

- Point of Appropriation (POA)
- Place of Use (POU)
- Scappoose City Limits
- Scappoose Urban Growth Boundary
- Tax Lots
- Watercourses
- Waterbodies

DISCLAIMER

This map was prepared for the purpose of identifying the location of a water right only and it is not intended to provide legal dimensions or location of property ownership lines.

MAP NOTES:

Date: November 6, 2015
Data Sources: Columbia Co. GIS, OWRD, OGIC, US BLM, ESRI

POA LOCATION DESCRIPTION

MR-3
Located 2,475 feet South and 1,795 feet East from the NW corner of Section 7, Township 3 North, Range 1 West (W.M.)

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NOV 16 2015

SALEM, OR

Application for a Limited Water Use License in the Name of the City of Scappoose

Place of Use/Point of Appropriation

Township 3 North, Ranges 1 & 2 West (W.M.)

N

0 660 1,320 1,980
1 inch = 1,320 feet

GSI Water Solutions, Inc.

Document Path P \Portland\547-Scappoose\006-Miller Rd Limited License\Project_GIS\Project_mxds\LL_App_Map mxd

Last revised: Feb 5, 2015

State of Oregon
Water Resources Department
725 Summer Street NE, Suite A
Salem, Oregon 97301
(503) 986-0900

Application for
Limited Water Use License

A summary of review criteria and procedures that are generally applicable to these applications is available at www.wrd.state.or.us/OWRD/PUBS/forms.shtml.

License No. LL-1619

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NOV 16 2015

SALEM, OR

Applicant(s): City of Scappoose

Contact Person: Michael Sykes

Mailing Address: 33568 E Columbia Ave

Scappoose (City) Oregon (State) 97056 (Zip)

Telephone No: 503-543-7146

I (We) make application for a Limited License to use or store the following described surface waters or groundwater-not otherwise exempt, or to use stored water of the State of Oregon for a use of a short-term or fixed duration:

1. SOURCE(S) OF WATER for the proposed use: Groundwater a tributary of N/A.

2. TOTAL AMOUNT OF WATER to be diverted: 1.1 cubic feet per second, or 500 gallons per minute. If water is to be used from more than one source, give the quantity from each: N/A.

3. INTENDED USE(S) OF WATER: (check all that apply)
   - ☐ Road construction or maintenance
   - ☐ General construction
   - ☐ Forestland and rangeland management; or
   - ☑ Other: Municipal Supply

4. DESCRIPTION OF PROPOSED PROJECT: Include a description of the intended place of use as shown on the accompanying site map, the method of water diversion, the type of equipment to be used (including pump horsepower, if applicable), length and dimensions of supply ditches and pipelines:

The purpose of this limited license is to provide temporary authorization of Miller Road Well #3 (COLU 52612) for municipal water supply purposes while a permanent permit amendment is sought to add the well as an authorized point of appropriation to permit G-15491, recently granted an extension of time for development in 2014. The water will be pumped from Miller Road #3 and used throughout the City's existing water distribution system.

This page to be completed by the local Watermaster.

WATER AVAILABILITY STATEMENT

Name of Applicant: City of Scappoose Limited License Number: _____

1. To your knowledge, has the stream or basin that is the source for this application ever been regulated for prior rights? ○Yes ⊗No

If yes, please explain:

2. Based on your observations, would be there water available in the quantity and at the times needed to supply the use proposed by this application? ○ Yes ○ No

• Groundwater will review

3. Do you observe this stream system during regular fieldwork? ○ Yes ⊗ No

If yes, what are your observations for the stream?

4. If the source is a well and if WRD were to determine that there is the potential for substantial interference with nearby surface water sources, would there still be ground water and surface water available during the time requested and in the amount requested without injury to existing water rights? ⊗Yes ○No ○ N/A

• Groundwater will review

What would you recommend for conditions on a limited license that may be issued approving this application?

• Standard Limited License conditions should apply.

5. Any other recommendations you would like to make?

Signature _____ WM District #: 18 Date: 11/25/15

5. PROJECT SCHEDULE: (List day, month, and year)

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SALEM, OR

Date water use will begin 1 November 2015

Date project will be completed 1 November 2020

Date water use will be completed 1 November 2015

Is this project fully or partially funded by the American Recovery and Reinvestment Act? (Federal stimulus dollars) ○ Yes ◉ No

PLEASE READ CAREFULLY

NOTE: A completed water availability statement from the local watermaster, Land Use Information Form completed by the local Planning Department, fees and site map meeting the requirements of OAR 690-340-030 must accompany this request. The fee for this request is $280 for the first point of diversion plus $30 for each additional point of diversion. Please review the Department's fee schedule to view fees required to request a limited license for Aquifer Storage and Recovery testing purposes or for Artificial Groundwater Recharge testing purposes.

Failure to provide any of the required information will result in return of your application. The license, if granted, will not be issued or replaced by a new license for a period of more than five consecutive years. The license, if granted, will be subordinate to all other authorized uses that rely upon the same source, or water affected by the source, and may be revoked at any time it is determined the use causes injury to any other water right or minimum perennial streamflow.

If water source is a well, well logs or adequate information for the Department to determine aquifer, well depth, well seal and open interval, etc. are required. The licensee shall indicate the intended aquifer. If for multiple wells, each map location shall be clearly tied to a well log.

If a limited license is approved, the licensee shall give notice to the Department (Watermaster) at least 15 days in advance of using the water under the Limited License and shall maintain a record of use. The record of use shall include, but need not be limited to, an estimate of the amount of water used, the period of use and the categories of beneficial use to which the water is applied. During the period of the Limited License, the record of use shall be available for review by the Department upon request.

REMARKS:

SIGNATURE of Applicant: Michael J Dyllan DATE: 11/10/15

Title: City Manager

Mapping Requirements (OAR 690-340-0030):

(1) A request for a limited license shall be submitted on a form provided by the Water Resources Department, and shall be accompanied by the following:

(c) A site map of reproducible quality, drawn to a standard, even scale of not less than 2 inches = 1 mile, showing:

(A) The locations of all proposed points of diversion referenced by coordinates or by bearing and distance to the nearest established or projected public land survey corner;

(B) The general course of the source for the proposed use, if applicable;

(C) Other topographical features such as roads, streams, railroads, etc., which may be helpful in locating the diversion points in the field.

LL4619

This page to be completed by the local Watermaster.

WATER AVAILABILITY STATEMENT

Name of Applicant: _____ Limited License Number: _____

1. To your knowledge, has the stream or basin that is the source for this application ever been regulated for prior rights? ○Yes ○No

If yes, please explain:

2. Based on your observations, would be there water available in the quantity and at the times needed to supply the use proposed by this application? ○ Yes ○ No

3. Do you observe this stream system during regular fieldwork? ○ Yes ○ No
If yes, what are your observations for the stream?

4. If the source is a well and if WRD were to determine that there is the potential for substantial interference with nearby surface water sources, would there still be ground water and surface water available during the time requested and in the amount requested without injury to existing water rights? ○Yes ○No ○ N/A

What would you recommend for conditions on a limited license that may be issued approving this application?

5. Any other recommendations you would like to make?

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NOV 16 2015

SALEM, OR

Signature _____ WM District #: ____ Date: _____

LL-1619

Land Use Information Form

Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem, Oregon 97301-1266
(503) 986-0900
www.wrd.state.or.us

LOC 16-12

NOTE TO APPLICANTS

In order for your application to be processed by the Water Resources Department (WRD), this Land Use Information Form must be completed by a local government planning official in the jurisdiction(s) where your water right will be used and developed. The planning official may choose to complete the form while you wait, or return the receipt stub to you. Applications received by WRD without the Land Use Form or the receipt stub will be returned to you. Please be aware that your application will not be approved without land use approval.

This form is NOT required if:

1) Water is to be diverted, conveyed, and/or used only on federal lands; **OR**
2) The application is for a water right transfer, allocation of conserved water, exchange, permit amendment, or ground water registration modification, and **all** of the following apply:
   a) The existing and proposed water use is located entirely within lands zoned for exclusive farm-use or within an irrigation district;
   b) The application involves a change in place of use only;
   c) The change does not involve the placement or modification of structures, including but not limited to water diversion, impoundment, distribution facilities, water wells and well houses; and
   d) The application involves irrigation water uses only.

NOTE TO LOCAL GOVERNMENTS

The person presenting the attached Land Use Information Form is applying for or modifying a water right. The Water Resources Department (WRD) requires its applicants to obtain land-use information to be sure the water rights do not result in land uses that are incompatible with your comprehensive plan. Please complete the form or detach the receipt stub and return it to the applicant for inclusion in their water right application. You will receive notice once the applicant formally submits his or her request to the WRD. The notice will give more information about WRD's water rights process and provide additional comment opportunities. You will have 30 days from the date of the notice to complete the land-use form and return it to the WRD. If no land-use information is received from you within that 30-day period, the WRD may presume the land use associated with the proposed water right is compatible with your comprehensive plan. Your attention to this request for information is greatly appreciated by the Water Resources Department. If you have any questions concerning this form, please contact the WRD's Customer Service Group at 503-986-0801.

RECEIVED BY OWRD

NOV 16 2015

SALEM, OR

LL-1619

Land Use Information Form

Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem, Oregon 97301-1266
(503) 986-0900
www.wrd.state.or.us

LUC 16-12
3107_BD-0000

Applicant: City of Scappoose (First) _____ (Last)

Mailing Address: 33568 E Columbia Ave

Scappoose (City) OR (State) 97056 (Zip) Daytime Phone: 503-543-7146

A. Land and Location

Please include the following information for all tax lots where water will be diverted (taken from its source), conveyed (transported), and/or used or developed. Applicants for municipal use, or irrigation uses within irrigation districts may substitute existing and proposed service-area boundaries for the tax-lot information requested below.

Township	Range	Section	¼ ¼	Tax Lot #	Plan Designation (e.g., Rural Residential/RR-5)	Water to be:			Proposed Land Use:
3N	1W	7	SE-NW	100	CS-U	☑ Diverted	☐ Conveyed	☐ Used	
						☐ Diverted	☐ Conveyed	☐ Used	
						☐ Diverted	☐ Conveyed	☐ Used	
						☐ Diverted	☐ Conveyed	☐ Used	

List all counties and cities where water is proposed to be diverted, conveyed, and/or used or developed:

City of Scappoose, Columbia County

B. Description of Proposed Use

Type of application to be filed with the Water Resources Department:

☐ Permit to Use or Store Water ☐ Water Right Transfer ☐ Permit Amendment or Ground Water Registration Modification
☑ Limited Water Use License ☐ Allocation of Conserved Water ☐ Exchange of Water

Source of water: ☐ Reservoir/Pond ☑ Ground Water ☐ Surface Water (name) _____

Estimated quantity of water needed: 500 ☐ cubic feet per second ☑ gallons per minute ☐ acre-feet

Intended use of water: ☐ Irrigation ☐ Commercial ☐ Industrial ☐ Domestic for _____ household(s)
☑ Municipal ☐ Quasi-Municipal ☐ Instream ☐ Other _____

Briefly describe:

Groundwater will be diverted from a well (MR-3, COLU 52612) and used for Municipal drinking water throughout the City's distribution system.

Note to applicant: If the Land Use Information Form cannot be completed while you wait, please have a local government representative sign the receipt at the bottom of the next page and include it with the application filed with the Water Resources Department.

See bottom of Page 3. →

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NOV 16 2015
SALEM, OR

LL-1619

For Local Government Use Only

LUC 16-02

The following section must be completed by a planning official from each county and city listed unless the project will be located entirely within the city limits. In that case, only the city planning agency must complete this form. This deals only with the local land-use plan. Do not include approval for activities such as building or grading permits.

Please check the appropriate box below and provide the requested information

☐ Land uses to be served by the proposed water uses (including proposed construction) are allowed outright or are not regulated by your comprehensive plan. Cite applicable ordinance section(s): _____.

☑ Land uses to be served by the proposed water uses (including proposed construction) involve discretionary land-use approvals as listed in the table below. (Please attach documentation of applicable land-use approvals which have already been obtained. Record of Action/land-use decision and accompanying findings are sufficient.) **If approvals have been obtained but all appeal periods have not ended, check "Being pursued."**

Type of Land-Use Approval Needed (e.g., plan amendments, rezones, conditional-use permits, etc.)	Cite Most Significant, Applicable Plan Policies & Ordinance Section References	Land-Use Approval:	
Zone Change Site Design Review	Zoning Ordinance Sec. 1010 Community Service Utility Building	☑ Obtained ☐ Denied	☐ Being Pursued ☐ Not Being Pursued
		☐ Obtained ☐ Denied	☐ Being Pursued ☐ Not Being Pursued
		☐ Obtained ☐ Denied	☐ Being Pursued ☐ Not Being Pursued
		☐ Obtained ☐ Denied	☐ Being Pursued ☐ Not Being Pursued
		☐ Obtained ☐ Denied	☐ Being Pursued ☐ Not Being Pursued

Local governments are invited to express special land-use concerns or make recommendations to the Water Resources Department regarding this proposed use of water below, or on a separate sheet.

RECEIVED BY OWRD

NOV 16 2015

SALEM, OR

COLUMBIA COUNTY LAND DEVELOPMENT SERVICES OREGON

Name: Glen C. Higgins Title: Planning Manager

Signature: [signature] Phone: 503-397-7217 Date: 11/5/15

Government Entity: _____

Note to local government representative: Please complete this form or sign the receipt below and return it to the applicant. If you sign the receipt, you will have 30 days from the Water Resources Department's notice date to return the completed Land Use Information Form or WRD may presume the land use associated with the proposed use of water is compatible with local comprehensive plans.

Receipt for Request for Land Use Information

Applicant name: _____

City or County: _____ Staff contact: _____

Signature: _____ Phone: _____ Date: _____

LL-1619

BEFORE THE COLUMBIA COUNTY
PLANNING COMMISSION
ST. HELENS, OREGON

Zone Change - Minor Map Amendment and Site Design Review

Sign OFF

In the Matter of the Application of the City of Scappoose for a Minor Map Amendment to change the zoning from Single-Family Residential (R-10) to Community Service-Utility (CS-U) and for a Site Design Review	))))))	**Final Order ZC 02-01 / DR 02-13**

This matter came before the Columbia County Planning Commission on the application of the City of Scappoose, owner of the subject property. The applicant requests to change the zoning on a 3.00 acre property that is within the City of Scappoose Urban Growth Boundary and a site design review for a municipal well and water treatment plant.

The subject property is currently designated as planned for Urban Growth on the County Comprehensive Plan Designation Map. The City of Scappoose has planned the area for future suburban residential growth. The current zoning is Single-Family Residential (R-10). The zone change application proposes to change the zoning to Community Service-Utility (CS-U) in order to operate a municipal well and water treatment plant.

The subject property is located on Miller Road, near the Scappoose City limits. The site is further described on the Assessor's records as tax account number 3107-030-00101.

All owners of property within 100 feet of the subject property and appropriate government agencies were notified. No comments in opposition were received. A quasi-judicial public hearing was held on May 6, 2002. The Planning Commission heard testimony from the applicants and all interested parties, and considered all written materials submitted and the Planning Commission staff report.

The Planning Commission hereby adopts the findings and conclusions in the Staff Report (ZC 02-01 / DR 02-13), and orders this application for a Conditional Use Permit **APPROVED** with the following conditions:

Conditions of Approval:

OK per Betty 4/1/03

1. The Site Design Review shall become void 4 years from the date of the final decision if development has not begun on the property. Extensions of time may be granted by the Planning Director if requested in writing before the expiration date and if the applicant was not responsible for the failure to develop.

see attached records

2. Prior to receiving a building permit, the applicant will be required to submit a hazardous material storage and handling safety plan.

LL-1619

3. Prior to receiving a building permit, the applicant will be required to submit documentation from the Scappoose Rural Fire District indicating that all fire, life, and safety issues have been properly addressed, including the handling of hazardous materials.

4. Prior to receiving a building permit, the applicant shall submit a County Road Access Permit with construction approval of the driveway apron.

5. Prior to receiving final inspection and occupancy, the applicant shall provide Documentation from the County Public Works Director that the half street improvements along the Miller Road frontage have been completed. The half street improvements shall include a 20' wide paved travel surface, curb, sidewalk, and street barricade.

6. Prior to receiving a building permit, the applicant shall submit a detailed drainage plan for the property. The drainage plan shall include an oil water separator catch basin in the parking area and a culvert between the two low point drainage areas. The drainage plan shall also off-site impacts to surrounding properties and address where excess surface water will be routed off of the subject property.

7. Prior to receiving a final inspection and occupancy for the building, the applicant will be required to submit evidence that the driveway and parking area have been paved and that three standard parking spaces and one handicap parking space have marked.

8. The applicant shall maintain a 5' landscaped strip between the parking area and the building or any walkways. sidewalk next to bldg on east side

9. The applicant will be required to maintain screening vegetation and fencing around the perimeter of the site. Fencing shall be at least 6' high chainlink fence with slats, preferably earth tones such as green or brown.

10. Prior to receiving a building permit, the applicant shall submit a revised landscaping plan indicating a continuous evergreen hedge and at least one tree, every 50' along the entire perimeter of the property.

11. Prior to receiving a final inspection and occupancy for the building, the applicant shall provide evidence that all of the required landscaping has been installed.

LL-1619

12. Exterior lighting shall be minimized as much as possible while still providing for basic security lighting. All Exterior lights shall be mounted horizontally, focused on the ground, shielded with no visible light bulb or diffuser. Exterior light shall not illuminate adjacent properties and shall not create glare or confusion with airport lighting.

13. Prior to receiving a final inspection and occupancy for the building, the applicant shall provide evidence that a small (6 sq. ft. or less), non-illuminated, identification sign with address has been posted near the driveway entrance.

14. Prior to receiving a building permit, the applicant shall dedicate 5' of additional public right-of-way along the Miller Road frontage.

15. Prior to receiving a building permit, the applicant shall submit documentation from Tom Highland of the Oregon Department of Aviation indicating that the project will not conflict with airport operations. Any recommendations shall be considered required conditions of approval.

16. Prior to receiving a building permit, the applicant shall submit a report from a qualified hydrogeologist that discusses the threat of contamination of the aquifer, the depth to the impervious layer, potential impacts to domestic wells in the area, and potential future conflicts with wells that may support the proposed expanded airport industrial area.

COLUMBIA COUNTY PLANNING COMMISSION

JEFFREY VANNATTA, CHAIRMAN

DATE 5/10/02

***

GH/ML/mos

[h:\zone change\ZC02-01.DR02-13.Scappoose.fo.ml)

[s:\Planning\PC\2002\5-6-02\Final Order\ZC02-01.DR02-13.Scappoose.fo.ml]

CC: City of Scappoose
File

RECEIVED BY OWRD

NOV 16 2015

SALEM, OR

LL-1619

42700

Permit No. 25918

*APPLICATION FOR PERMIT

To Appropriate the Public Waters of the State of Oregon

I, CITY OF SCAPPOOSE (Name of applicant)

of Scappoose, Oregon (Mailing address)

State of Oregon, do hereby make application for a permit to appropriate the following described public waters of the State of Oregon, SUBJECT TO EXISTING RIGHTS:

If the applicant is a corporation, give date and place of incorporation

1. The source of the proposed appropriation is Lazy Creek, a tributary of South Scappoose (Name of stream)
Creek, and South Scappoose Creek, a tributary of the Columbia River

2. The amount of water which the applicant intends to apply to beneficial use is 8.0 cubic feet per second as follows: Lazy Creek 3.0 c.f.s.; South Fork Scappoose Creek 5.0 c.f.s. (If water is to be used from more than one source, give quantity from each)

**3. The use to which the water is to be applied is Municipal water system (Irrigation, power, mining, manufacturing, domestic supplies, etc.)

proposed
4. The point of diversion is located ..... ft. (N or S) and ..... ft. (E or W) from the corner of Lazy Creek - ~~1300~~ 1957.6 ft. S. and ~~900~~ 1244.8 Ft. W. of the N.E. Corner of Sect. 18, (Section or subdivision)
T 3 N, R 2 W, W. M.; Columbia County

So. Fk. Scappoose Creek - 1,723 ft. N. and 1961 ft. W. of S.E. Corner of Sect. 7, T 3 N, R 2 W, W. M.; Columbia County (If preferable, give distance and bearing to section corner)

(If there is more than one point of diversion, each must be described. Use separate sheet if necessary)

being within the ..... of Sec. ..... Tp. ..... (N or S) R. ..... (E or W.), W. M., in the county of .....
(Give smallest legal subdivision)

5. The pipe line to be 30,000 feet (Main ditch, canal or pipe line) (Miles or feet)
in length, terminating in the approx. 680 ft. N. & 510 ft. W. of Sec. the SE Corner of Sect 11 Tp. 3N (N or S)
(Smallest legal subdivision)
R. 2W (E. or W.), W. M., the proposed location being shown throughout on the accompanying map.

DESCRIPTION OF WORKS

Diversion Works—

6. (a) Height of dam 5 feet, length on top 30 feet, length at bottom 20 feet; material to be used and character of construction Concrete (Loose rock, concrete, masonry)
rock and brush, timber crib, etc., wasteway over or around dam)

(b) Description of headgate Coarse bar racks and fine screening facilities; (Timber, concrete, etc., number and size of openings)
sluice gates 18" sq. or 18" x 24"

(c) If water is to be pumped give general description No pumping; gravity diversions (Size and type of pump)
(Size and type of engine or motor to be used, total head water is to be lifted, etc.)

*A different form of application is provided where storage works are contemplated.

**Application for permits to appropriate water for the generation of electricity, with the exception of municipalities, must be made to the Hydroelectric Commission. Either of the above forms may be secured, without cost, together with instructions by addressing the State Engineer, Salem, Oregon.

3-48—6M

25918

Canal System or Pipe Line—

7. *(a) Give dimensions at each point of canal where materially changed in size, stating miles from headgate. At headgate: width on top (at water line)* ..... *feet; width on bottom* ..... *feet; depth of water* ..... *feet; grade* ..... *feet fall per one thousand feet.*

(b) At ..... *miles from headgate: width on top (at water line)* ..... *feet; width on bottom* ..... *feet; depth of water* ..... *feet; grade* ..... *feet fall per one thousand feet.*

(c) Length of pipe ± 30,000 *ft.; size at intake,* Lazy Creek 8" So. Fk. 12" *in.; size at* ..... *ft. from intake* 12" ..... *in.; size at place of use* 12" ..... *in.; difference in elevation between intake and place of use,* 370 - City 220 - Reservoir *ft. Is grade uniform?* Pressure line below hydraulic gradient at all points *Estimated capacity.* 3.96 *sec. ft.*

8. *Location of area to be irrigated, or place of use* City of Scappoose, farm houses along route of pipe line, and area contiguous to Scappoose

Township North or South	Range E. or W. of Willamette Meridian	Section	Forty-acre Tract	Number Acres To Be Irrigated
T3NR2W	2W	18	NW¼ of NE¼	
T3N	2W	18	NE¼ of NE¼	
T3N	See Attached Map 2W	17	SW¼ of NE¼	
T3N	2W	17	SE¼ of NE¼	
T3N	2W	16	NW¼ of NW¼ SW¼ of NW¼	
T3N	2W	15	NW¼ of NW¼ NE¼ of NW¼	
T3N	2W	15	NW¼ of NE¼ SW¼ of NE¼	
T3N	2W	14	NW¼ of SW¼ SE¼ of SW¼	
T3N	2W	14	NW¼ of SE¼ NE¼ of SE¼	
T3N	2W	14	SE¼ of NE¼ NE¼ of NE¼	
T3N	2W	11	SE¼ of SE¼	—
T3N	2W	12	NW¼ of SW¼ SW¼ of SW¼	

(If more space required, attach separate sheet)

(a) Character of soil .....

(b) Kind of crops raised .....

Power or Mining Purposes—

9. *(a) Total amount of power to be developed* ..... *theoretical horsepower.*

(b) Quantity of water to be used for power ..... *sec. ft.*

(c) Total fall to be utilized ..... *feet.* (Head)

(d) The nature of the works by means of which the power is to be developed .....

.....

(e) Such works to be located in ..... (Legal subdivision) *of Sec.* ....., *Tp.* ..... (No. N. or S.), *R.* ..... (No. E. or W.), *W. M.*

(f) Is water to be returned to any stream? ..... (Yes or No)

(g) If so, name stream and locate point of return .....

....., *Sec.* ....., *Tp.* ..... (No. N. or S.), *R.* ..... (No. E. or W.), *W. M.*

(h) The use to which power is to be applied is .....

(i) The nature of the mines to be served .....

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CITY OF SCAPPOOSE
WATER DISTRIBUTION

TWP N&S	RGE E or W	SECTION	FORTY Ac. Tr.				
T3N	2W	12	NE¼ of NW¼				
T3N	2W	12	SE¼ of NW¼				
T3N	2W	12	NW¼ of NE¼				
		12	SW¼ of NE¼				
		12	NE¼ of NE¼				
		12	SE¼ of NE¼				
		12	NW¼ of SE¼				
		12	SW¼ of SE¼				
		12	NE¼ of SE¼				
		12	SE¼ of SE¼				
		12	NE¼ of SW¼				
T3N	2W	12	SE¼ of SW¼				
T3N	2W	1	SE¼ of SW¼				
T3N	2W	1	SW¼ of SE¼				
T3N	2W	1	NE¼ of SE¼				
T3N	2W	1	SE¼ of SE¼				
T3N	1W	18	NW¼ of NW¼				
T3N	2W	13	NW¼ of NW¼				
		13	SW¼ of NW¼				
		13	NE¼ of NW¼				
		13	SE¼ of NW¼				
		13	NW¼ of NE¼				
		13	SW¼ of NE¼				
		13	NE¼ of NE¼				
		13	NW¼ of SE¼				
		13	SW¼ of SE¼				
		13	NW¼ of SW¼				
		13	NE¼ of SW¼				
T3N	2W	13	SE¼ of SW¼				
T3N	2W	24	NE¼ of NW¼				

Municipal or Domestic Supply—

25918

10. (a) To supply the city of SCAPPOOSE

Columbia (Name of) County, having a present population of 960 in City & serving 400

and an estimated population of 3,000 in 19 60

(b) If for domestic use state number of families to be supplied

(Answer questions 11, 12, 13, and 14 in all cases)

11. Estimated cost of proposed works, $ 100,000

12. Construction work will begin on or before Contemplated spring 1953

13. Construction work will be completed on or before October 1953
Se. Fk. intake in initial construction; Lazy Creek in future

14. The water will be completely applied to the proposed use on or before

Sa. Fk. Scappoose Creek, October 1953; Lazy Creek 5 years

CITY OF SCAPPOOSE
(Signature of applicant)

By City Recorder Winifred Elder

Remarks: The proposed diversions herein outlined and the pipe lines, dams and appurtenances necessary to convey water to the City of Scappoose are predicated upon authorization and sale of bonds for the construction. The existing 5" wood stave pipe to Gourley Creek, a tributary of the South Fork of Scappoose Creek, is in poor repair and inadequate in capacity and must be replaced. The flow of the existing pipe line plus approximately 200 G.P.M. from a drilled well are together insufficient for the City's needs.

The hydraulic gradient of the proposed pipe line will be determined by elevation of existing distribution storage at 200 and proposed diversion at elevation 420. Should it be decided to direct connect the supply line to the distribution grid & "float" the reservoir on the line, at times of heavy draft the gradient will be steepened if and when the distribution reservoir empties.

STATE OF OREGON,
County of Marion, } ss.

This is to certify that I have examined the foregoing application, together with the accompanying maps and data, and return the same for completion

In order to retain its priority, this application must be returned to the State Engineer, with corrections on or before February 16 1959 / November 8 15th 1957 / December 1958

WITNESS my hand this 9th day of May 1957

LEWIS A. STANLEY
STATE ENGINEER

By Chris L. Wheeler, Assistant James W. Carver, Jr.

eh eh

PERMIT

STATE OF OREGON, }
County of Marion, } ss.

This is to certify that I have examined the foregoing application and do hereby grant the same, SUBJECT TO EXISTING RIGHTS and the following limitations and conditions:

The right herein granted is limited to the amount of water which can be applied to beneficial use and shall not exceed 4.0 cubic feet per second measured at the point of diversion from the stream, or its equivalent in case of rotation with other water users, from Lazy Creek and South Fork Scappoose Creek, being 1.5 cfs from Lazy Creek and 2.5 cfs from South Fork Scappoose Creek

The use to which this water is to be applied is municipal

If for irrigation, this appropriation shall be limited to - - - - of one cubic foot per second or its equivalent for each acre irrigated

and shall be subject to such reasonable rotation system as may be ordered by the proper state officer.

The priority date of this permit is November 24, 1958

Actual construction work shall begin on or before March 16, 1960 and shall thereafter be prosecuted with reasonable diligence and be completed on or before October 1, 1960.

Complete application of the water to the proposed use shall be made on or before October 1, 1961.

WITNESS my hand this 16th day of March, 1959

STATE ENGINEER

Application No. 29152

Permit No. 25918

PERMIT
TO APPROPRIATE THE PUBLIC WATERS OF THE STATE OF OREGON

This instrument was first received in the office of the State Engineer at Salem, Oregon, on the 26th day of November, 1952, at 8:00 o'clock A. M.

Returned to applicant:
December 15, 1958
May 9, 1957

Approved:
March 16, 1959

Recorded in book No. 70 of Permits on page 25918

LEWIS A. STANLEY STATE ENGINEER

State Printing 6240

BEFORE THE STATE ENGINEER OF OREGON

Marion County

IN THE MATTER OF APPLICATIONS FOR EXTENSIONS OF TIME IN WHICH TO COMPLETE CONSTRUCTION WORK AND MAKE COMPLETE APPLICATION OF WATER UNDER CERTAIN PERMITS ISSUED BY THE STATE ENGINEER

O R D E R

The above entitled matter now coming on for the consideration of the State Engineer, and it appearing that:

The holders of the following water right permits issued by the State Engineer have submitted applications for extensions of time limits within which to complete the construction work and make complete application of water to beneficial use under their respective water right permits;

The State Engineer is authorized under the provisions of ORS 537.230 to grant extensions of time for good cause shown, within which t complete work or perfect a right under a water right permit;

The statements in the applications for extensions filed regarding completion of the projects represented indicate that each has shown such reasonable diligence as entitles him to an extension of time; and

No protests or objections to the granting of an extension under any of the following permits have been filed by any subsequent permit holders;

It is THEREFORE ORDERED that extensions of time be and the same are hereby granted as follows:

Name	Permit Number	To complete work	To apply water
Frank Cluster	U-327	October 1, 1961	October 1, 1961
Frank Cluster	U-335	October 1, 1961	October 1, 1961
Jess Miles	U-341	October 1, 1961	October 1, 1961
L.M. & Lloyd L. Hankins and Gene & Vera L. Carl	U-343	October 1, 1962	October 1, 1962
L.J. & Anne S. Horton	U-399	October 1, 1962	October 1, 1962
Leota Nell Martin	U-530	October 1, 1961	October 1, 1961

Name	Permit Number	To complete work	To apply water
Annette Shafer	U-634	October 1, 1962	October 1, 1962
Charles W. Boley	U-712	October 1, 1961	October 1, 1961
John W. & Angie B. Stark	U-756	October 1, 1961	October 1, 1961
Alfred Brown	U-759	October 1, 1961	October 1, 1961
T. J. & Bessie Duhaime	G-16	October 1, 1962	October 1, 1962
Frank D. Baird	G-35	October 1, 1961	October 1, 1961
Ronald E. Jones, Jr.	G-40	October 1, 1962	October 1, 1962
Howard Boehler	G-56	October 1, 1961	October 1, 1961
City of Echo	G-64		October 1, 1963
Charles R. Jackson	G-73	October 1, 1961	October 1, 1961
Edward Seufert	G-82	October 1, 1962	October 1, 1962
Cecil C. Haley	G-108	October 1, 1961	October 1, 1961
Ralph W. Stewart	G-111		October 1, 1961
E. J. Fischer	G-148	October 1, 1962	October 1, 1962
D. R. Gilson	G-158	October 1, 1960	October 1, 1960
Ella K. Spencer	G-210	October 1, 1961	October 1, 1961
Rainbow Water District & McKenzie Highway Water Dist.	G-237	October 1, 1962	October 1, 1962
Herbert Malarkey	G-242		October 1, 1963
Howard E. McGee	G-245	October 1, 1962	October 1, 1962
John C. Fecht	G-272		October 1, 1961
Moyina Heights Company	G-349	October 1, 1962	October 1, 1962
Brooks-Scanlon, Inc.	G-367	October 1, 1963	October 1, 1963
George Ivor Rees Williams	G-397	October 1, 1961	October 1, 1961
Marvin W. & Helen Fletcher	G-429		October 1, 1961
Leo M. & Agnes H. Sullivan	G-463	October 1, 1961	October 1, 1961
Thos. C. McElroy, Jr.	G-519		October 1, 1961
Roy W. Saxton	G-521	October 1, 1962	October 1, 1962
Fred and Echo Fish	G-555	October 1, 1961	October 1, 1961
Nicolaas Klerk	G-580	October 1, 1961	October 1, 1961
John H. Skirving, et al.	G-620	October 1, 1962	October 1, 1962
Ross Overholser	G-640		October 1, 1961
Maude E. Liskey	G-700	October 1, 1962	October 1, 1962
Jordan Valley Cemetery Maintenance District	G-733		October 1, 1962
Steve Gacey	G-739	October 1, 1961	October 1, 1961
Jackson Ranch	G-745	October 1, 1961	October 1, 1962
Maude E. Liskey	G-764	October 1, 1962	October 1, 1962
B. J. Oppek	G-771	October 1, 1961	October 1, 1961
Harry E. Mitchell	G-773	October 1, 1961	October 1, 1961
Kernville-Gleneden Beach-Lincoln Beach Water District	G-786	October 1, 1962	October 1, 1962
John F. Jones	G-804	October 1, 1961	October 1, 1961
Neal W. Miller	G-815	October 1, 1961	October 1, 1961
Portland Medical Center, Inc.	G-822		October 1, 1961
James A. & Marion C. Dunbar	G-844		October 1, 1961
George B. McClure	G-848	October 1, 1961	October 1, 1961
Everett Ramboz	G-856	October 1, 1961	October 1, 1961
Joseph Otter	G-865	October 1, 1961	October 1, 1961
Lawrence H. Bride	G-868		October 1, 1961
Leonard & Betty Jean Forster	G-876	October 1, 1961	October 1, 1961
George Walters	G-877	October 1, 1961	October 1, 1961

Name	Permit Number	To complete work	To apply water
Joseph J. Zach	G-880		October 1, 1961
F. Ralph DuRette	G-882	October 1, 1960	October 1, 1961
Leonard H. Hughet	G-888		October 1, 1961
West Foods, Inc.	G-912		October 1, 1961
John W. McQuade	G-937	October 1, 1961	
Lee Roy Stallings	G-942	October 1, 1961	
James H. Ware	G-948	October 1, 1961	
James and Audrey Hayes	G-961	October 1, 1961	
Albert Francois	G-980		October 1, 1961
James E. Nail	G-996		October 1, 1961
L. J. and Anne S. Horton	G1002	October 1, 1962	October 1, 1962
Squaw Butte-Harney Experiment Station	G-1009	October 1, 1965	October 1, 1965
Oregon State College	G-1013		October 1, 1961
U.S. Army Corps Engineers	G-1017	October 1, 1961	
Waldo H. Cramer	G-1070	October 1, 1962	October 1, 1962
Thelma C. Owsley	G-1092	October 1, 1962	October 1, 1962
William H. Tackman	G-1096	October 1, 1961	October 1, 1961
Jessie D. Mallett	G-1124	October 1, 1961	
Henry C. Kelley	G-1155	October 1, 1961	
Edwin K. & Bonnie B. Vieira	G-1156	October 1, 1961	
Herman & John Miller	G-1189	October 1, 1961	
E. D. Furrer	G-1198	October 1, 1961	
City of Arlington	G-1201	October 1, 1963	October 1, 1963
R. A. Long	G-1205	October 1, 1961	
John L. Geyer	G-1235	October 1, 1961	
Richard Schaub	G-1237	October 1, 1961	
L. M. Waters	G-1277	October 1, 1961	
Mildred F. Carmer	G-1284	October 1, 1961	
Ross H. Levanger	G-1286	October 1, 1961	
Laddie & Carl Rajnus	G-1296	October 1, 1961	
Lelco, Inc.	G-1305	October 1, 1961	
Lelco, Inc.	G-1308	October 1, 1961	
Luther W. Cramer	G-1319	October 1, 1961	
City of Stanfield	G-1321	October 1, 1961	
Ernest R. Cramer	G-1322	October 1, 1962	October 1, 1962
Dean Bremer	G-1343	October 1, 1961	
Clarence G. & Geneva Rogers	G-1377	October 1, 1961	
Bert Brink	G-1403	October 1, 1961	October 1, 1962
Doris L. LaMade	G-1408	October 1, 1961	
Paul Sunderland	G-1414	October 1, 1961	
DeWitt Tiger	G-1434	October 1, 1961	
Harold D. & Revella Stalker	G-1438	October 1, 1961	
City of Reedsport	R-184	October 1, 1965	
Bureau of Reclamation	R-726	October 1, 1962	
City of Reedsport	R-755	October 1, 1965	
Clarence C. Clement	R-1410	October 1, 1962	
Robert D. Thompson	R-1883	October 1, 1962	
Oscar Loe	R-2014	October 1, 1961	
Earl L. Bigham	R-2016	October 1, 1961	
Estle L. Paris	R-2047	October 1, 1961	
Joel Robert Griffin	R-2052	October 1, 1961	
Verne Hanna	R-2102	October 1, 1961	
Edith L. Sowell	R-2118	October 1, 1961	
City of Roseburg	R-2119	October 1, 1962	
Samuel A. Appleton	R-2120	October 1, 1961	
John A. Ratzeburg	R-2136	October 1, 1961	

Name	Permit Number	To complete work	To apply water
Harry C. Youngberg	R-2163	October 1, 1961	
L. C. Hodges	R-2168	October 1, 1961	
Dan Carnegie	R-2201	October 1, 1961	
Walter Winslow	R-2206	October 1, 1961	
Oswald Kraxberger	R-2218	October 1, 1961	
U.S. Department of Interior	R-2223	October 1, 1961	
Ralph Siegmund	R-2228	October 1, 1961	
Eugene H. Moore	R-2235	October 1, 1961	
Santiam Water Control District	E-82	October 1, 1963	October 1, 1963
City of Reedsport	1149	October 1, 1965	October 1, 1965
Santiam Water Control District	1401	October 1, 1963	October 1, 1963
City of Silverton	3226	October 1, 1965	October 1, 1965
City of Dallas	4053	October 1, 1964	October 1, 1964
Eagle Point Irrigation District	6396	October 1, 1964	October 1, 1964
City of Medford	6703	October 1, 1965	October 1, 1965
City of Medford	6884	October 1, 1965	October 1, 1965
City of Hood River	8387	October 1, 1965	October 1, 1965
City of Sheridan	9701	October 1, 1963	October 1, 1963
Summer Lake Irrigation District	10447	October 1, 1962	October 1, 1962
Corbett Water District	11882	October 1, 1965	October 1, 1965
Corbett Water District	12154	October 1, 1965	October 1, 1965
Bureau of Reclamation	13565	October 1, 1962	October 1, 1962
City of Reedsport	14579	October 1, 1965	October 1, 1965
City of Coquille	16275	October 1, 1965	October 1, 1965
City of Manzanita	17073	October 1, 1963	October 1, 1963
City of Forest Grove	17549	October 1, 1965	October 1, 1965
Rankin Crow	17709		October 1, 1962
Clarence C. Clement	17832	October 1, 1962	October 1, 1962
Rankin Crow	18516		October 1, 1962
City of Cave Junction	18785	October 1, 1965	October 1, 1965
J. S. Burres	19069	October 1, 1961	October 1, 1961
Rankin Crow	19175		October 1, 1962
Lacomb Irrigation District	19629	October 1, 1962	October 1, 1962
Coos Bay-North Bend Water Board	19689		October 1, 1964
Frank W. Obenchain	19940		October 1, 1962
Clarence C. Clement	21668	October 1, 1962	October 1, 1962
Oscar H. Loe	21924		October 1, 1961
George Shroyer	21995		October 1, 1961
Francis Paul Bailey	22084	October 1, 1961	October 1, 1961
W. C. & Charles Kik	22091	October 1, 1962	October 1, 1962
Mrs. John E. Wood	22392		October 1, 1961
Grant F. Brown, et al.	22823		October 1, 1961
Scio Water Improvement District	22902		October 1, 1961
Hudspeth Land & Livestock Co.	22983	October 1, 1961	October 1, 1961
Hudspeth Land & Livestock Co.	22984	October 1, 1961	October 1, 1961
Shorewood Water Corporation	22987	October 1, 1964	October 1, 1964

Name	Permit Number	To complete work	To apply water
Lennie Haldorson	23037		October 1, 1960
Western Kraft Corporation	23102		October 1, 1962
North Unit Irrigation District	23196	October 1, 1962	October 1, 1962
Wayne D. & Theresa E. Ransom	23284	October 1, 1962	October 1, 1962
Marion C. Ribble	23367	October 1, 1961	October 1, 1961
Roseland E. & Willard Howell	23448	October 1, 1961	October 1, 1961
Kenneth Boyer	23638		October 1, 1961
Willamette View Manor, Inc.	23707		October 1, 1961
Theodore R. Burns	23727		October 1, 1959
Joe H. Hanby	23781	October 1, 1961	October 1, 1961
Theodore Bloomberg, et al.	23906	October 1, 1962	October 1, 1962
Wm. R. McCormack	23916		October 1, 1961
Benton Memorial Park Assn.	24033	October 1, 1962	October 1, 1962
Robert von der Hellen	24075		October 1, 1961
Ruth R. & Bob L. Farris	24095	October 1, 1962	October 1, 1962
Herman C. & Constance K. Mitten	24139	October 1, 1960	October 1, 1960
Floyd T. Fox	24152		October 1, 1961
R. T. Renner	24208	October 1, 1961	October 1, 1961
James A. & Isabelle J. Blythe	24265		October 1, 1961
Georgia-Pacific Plywood Co.	24288	October 1, 1961	October 1, 1961
Wilhelm & Charlotte Gutnecht	24295	October 1, 1961	October 1, 1961
Robert D. Thompson	24305	October 1, 1962	October 1, 1962
Ivan S. Pearce	24309	October 1, 1961	October 1, 1961
Edward Kohlhagen	24363	October 1, 1961	October 1, 1961
Wm. R. McCormack	24428		October 1, 1961
Archie Kimsey	24593	October 1, 1961	October 1, 1961
Estate of Elizabeth Kuypers	24638	October 1, 1961	October 1, 1961
Robert von der Hellen	24687		October 1, 1961
Jerry Barry, Jr.	24697		October 1, 1961
Nathan O. Wright	24723		October 1, 1961
Hans Fuchs	24764		October 1, 1961
Hudspeth Land & Livestock Co.	24774	October 1, 1962	October 1, 1962
Hudspeth Land & Livestock Co.	24775	October 1, 1962	October 1, 1962
B, A. White	24802		October 1, 1961
Vernon F. & Fredora I. Rock	24812		October 1, 1961
Ruth McClain	24820	October 1, 1961	October 1, 1961
Haven T. Benson	24821		October 1, 1963
Fred Viesko	24850		October 1, 1961
Maxwell L. & Marcia E.Thayer	24868	October 1, 1961	October 1, 1961
Earl L. Bigham	24885		October 1, 1961
Joe & Mary E. Woodcock	24897		October 1, 1961
Burton C. & Delta L. Jensen	24902	October 1, 1961	October 1, 1961
Oregon Water Corporation	24914	October 1, 1963	October 1, 1963
Jupe Holm	24916		October 1, 1961
Jess McNiel & Jess McNiel,Jr.	24965	October 1, 1962	October 1, 1962
Donald H. Rees	24980	October 1, 1961	October 1, 1961
Phillip C. McGovern	24997		October 1, 1961

Name	Permit Number	To complete work	To apply water
Estle L. Paris	25017	October 1, 1961	October 1, 1961
Tom Helfrich & Herbert Hughes	25023	October 1, 1961	October 1, 1961
James L. Payne	25024		October 1, 1961
Joel Robert Griffin	25030	October 1, 1961	October 1, 1961
Henry C. Simmons	25032	October 1, 1962	October 1, 1962
E. L. Culbertson	25041	October 1, 1961	October 1, 1961
Eagle Point Irrigation District	25063	October 1, 1964	October 1, 1964
Dwayne D. Prose	25072	October 1, 1961	October 1, 1961
Charles E. & Blanche Howe	25075	October 1, 1961	October 1, 1961
Robert E. Wicklund	25086	October 1, 1961	October 1, 1961
Doloris B. & Earl H. Baker, Jr.	25093	October 1, 1961	October 1, 1961
R. J. Hendrie	25109	October 1, 1962	October 1, 1962
Melvin E. & Martha Jean Crawford	25150		October 1, 1962
Sidney J. Miles	25174		October 1, 1961
Ralph H. Cake	25193	October 1, 1961	October 1, 1961
L. D. Rose	25195		October 1, 1961
Thomas Parkinson	25216	October 1, 1961	October 1, 1961
Edgar E. Soults	25217		October 1, 1961
W. H. Damewood	25226		October 1, 1961
James R. Collins	25237	October 1, 1962	October 1, 1962
Verne Hanna	25239	October 1, 1961	October 1, 1961
Arion D. Christensen	25242	October 1, 1962	October 1, 1962
Juniper Flat District Improvement Co.	25275		October 1, 1962
Raymond E. Leach	25302		October 1, 1961
Gib Wiley	25310		October 1, 1961
Fred L. & Maxine A. Ashley	25313	October 1, 1961	October 1, 1961
Marvin R. Anderson	25336	October 1, 1961	October 1, 1961
Dayton O. Williams	25337	October 1, 1961	October 1, 1961
Milton F. & Agnes Hoyser	25343	October 1, 1961	October 1, 1961
Howard Veach	25351		October 1, 1962
Lloyd F. Whiteaker & Truman Chase	25380		October 1, 1961
Edith L. Sowell	25404	October 1, 1961	
City of Roseburg	25405	October 1, 1962	October 1, 1962
Samuel A. Appleton	25406	October 1, 1961	
T. DeLaRhue	25431	October 1, 1961	
T. DeLaRhue	25432	October 1, 1962	
Allan Anderson	25502	October 1, 1961	
John A. Ratzeburg	25512		October 1, 1961
Eugene Cluff	25552	October 1, 1961	
Delbert Sandner	25554	October 1, 1961	
Arnold F. & Beatrice W. Sattler	25611	October 1, 1962	October 1, 1962
Kora Prichard	25615	October 1, 1961	
Harold F. Willingham	25620	October 1, 1961	
Clifford Bissett	25641	October 1, 1961	
Harry C. Youngberg	25661	October 1, 1961	
Emil Zwicker	25663	October 1, 1961	
Virgil Gibson & James Fall, Jr.	25752	October 1, 1961	

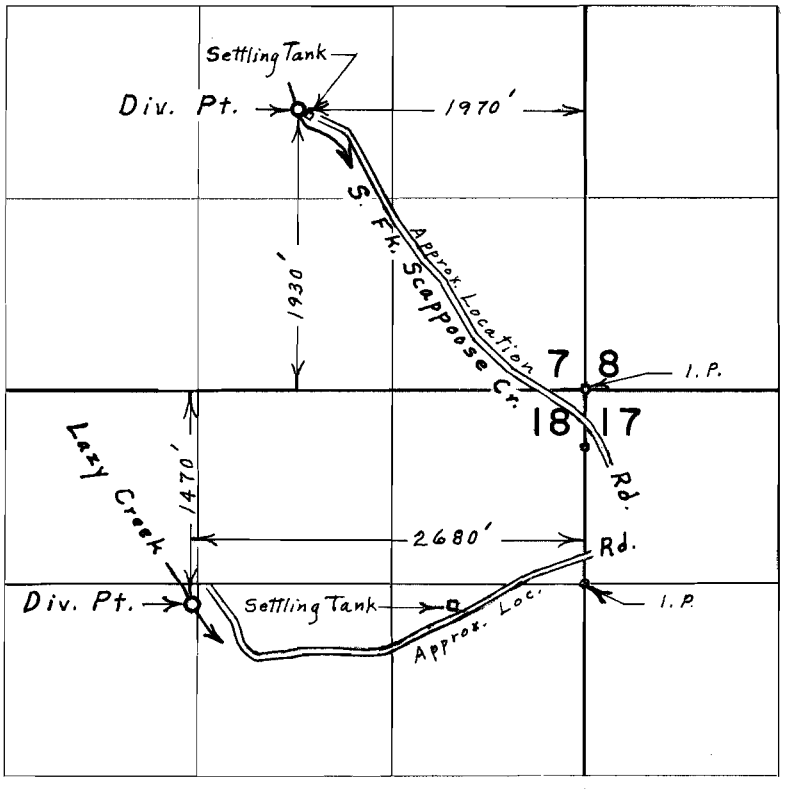
Name	Permit Number	To complete work	To apply water
Carl Schmid	25755	October 1, 1961	
Marion F. George	25803	October 1, 1961	
John R. Buren	25804	October 1, 1961	
Everett Ramboz	25811	October 1, 1961	
Dan Carnegie	25846	October 1, 1961	October 1, 1962
Russell J. Belshaw	25869	October 1, 1961	
J. A. Stone	25872	October 1, 1961	
Joseph M. & Mae K. Goddotti	25881	October 1, 1961	
Walter Winslow	25885	October 1, 1961	
City of Scappoose	25918	October 1, 1965	October 1, 1965
Wilfred Firsick	25931	October 1, 1962	October 1, 1962
Jesse Y. Teague	25947	October 1, 1961	
Oswald Kraxberger	25961	October 1, 1961	
U.S. Department of Interior	25991	October 1, 1961	October 1, 1964
Kenneth & Barbara H. Toner	26032	October 1, 1961	
J. V. Thomas	26034	October 1, 1961	
Ralph Siegmund	26047	October 1, 1961	
Thomas C. Boone	26075	October 1, 1961	
Avery & Sydna Greenman	26082	October 1, 1961	October 1, 1961
Carl C. Hering	26086	October 1, 1961	October 1, 1961
Dale T. Crafton	26104	October 1, 1961	
Eugene H. Moore	26108	October 1, 1961	

Dated at Salem, Oregon, this 28th day of March 1961.

Lewis A. Stanley

LEWIS A. STANLEY
State Engineer

T. 3 N. R. 2 W. W.M.



FINAL PROOF SURVEY

UNDER

Application No. 27859 Permit No. 25918

IN NAME OF

CITY OF SCAPPOOSE

Surveyed June 25, 1974, by L. E. Gould

1974-L

STATE OF OREGON

COUNTY OF **COLUMBIA**

CERTIFICATE OF WATER RIGHT

This Is to Certify, *That* **CITY OF SCAPPOOSE**

of **Scappoose** **97056** *, State of* **Oregon** *, has made proof to the satisfaction of the STATE ENGINEER of Oregon, of a right to the use of the waters of* **Lazy Creek and South Fork Scappoose Creek**

a tributary of **Columbia River** *for the purpose of* **municipal**

under Permit No. **25918** *of the State Engineer, and that said right to the use of said waters has been perfected in accordance with the laws of Oregon; that the priority of the right hereby confirmed dates from* **November 24, 1958**

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 **4.0 cubic feet per second, being 1.5 c.f.s. from Lazy Creek and 2.5 c.f.s. from South Fork Scappoose Creek**

or its equivalent in case of rotation, measured at the point of diversion from the stream. The point of diversion is located in the **S. Fk. Scappoose Cr.-NW¼ SE¼, Section 7, Lazy Cr.-SE¼ NW¼, Section 18, T. 3 N., R. 2 W., W. M., 1930 ft. North & 1970 ft. West, 1470 ft. South & 2680 ft. West, both from NE Corner, Section 18.**

The amount of water used for irrigation, together with the amount secured under any other right existing for the same lands, shall be limited to ---------- *of one cubic foot per second per acre,*

and shall conform to such reasonable rotation system as may be ordered by the proper state officer.

A description of the place of use under the right hereby confirmed, and to which such right is appurtenant, is as follows:

NW¼ NW¼
Section 18
T. 3 N., R. 1 W., W. M.

S½ SW¼
NE¼ SE¼
S½ SE¼
Section 1

SE¼ SE¼
Section 2

E½ NE¼
N½ SE¼
SE¼ SE¼
Section 11
T. 3 N., R. 2 W., W. M.

All
Section 12

N½ NE¼
SW¼ NE¼
NW¼
N½ SW¼
SE¼ SW¼
W½ SE¼
Section 13

E½ NE¼
N½ SW¼
SE¼ SW¼
N½ SE¼
Section 14
T. 3 N., R. 2 W., W. M.

W½ NE¼
N½ NW¼
NE¼ SE¼
Section 15

W½ NW¼
Section 16

S½ NE¼
N½ NW¼
Section 17

NE¼ NE¼
Section 18

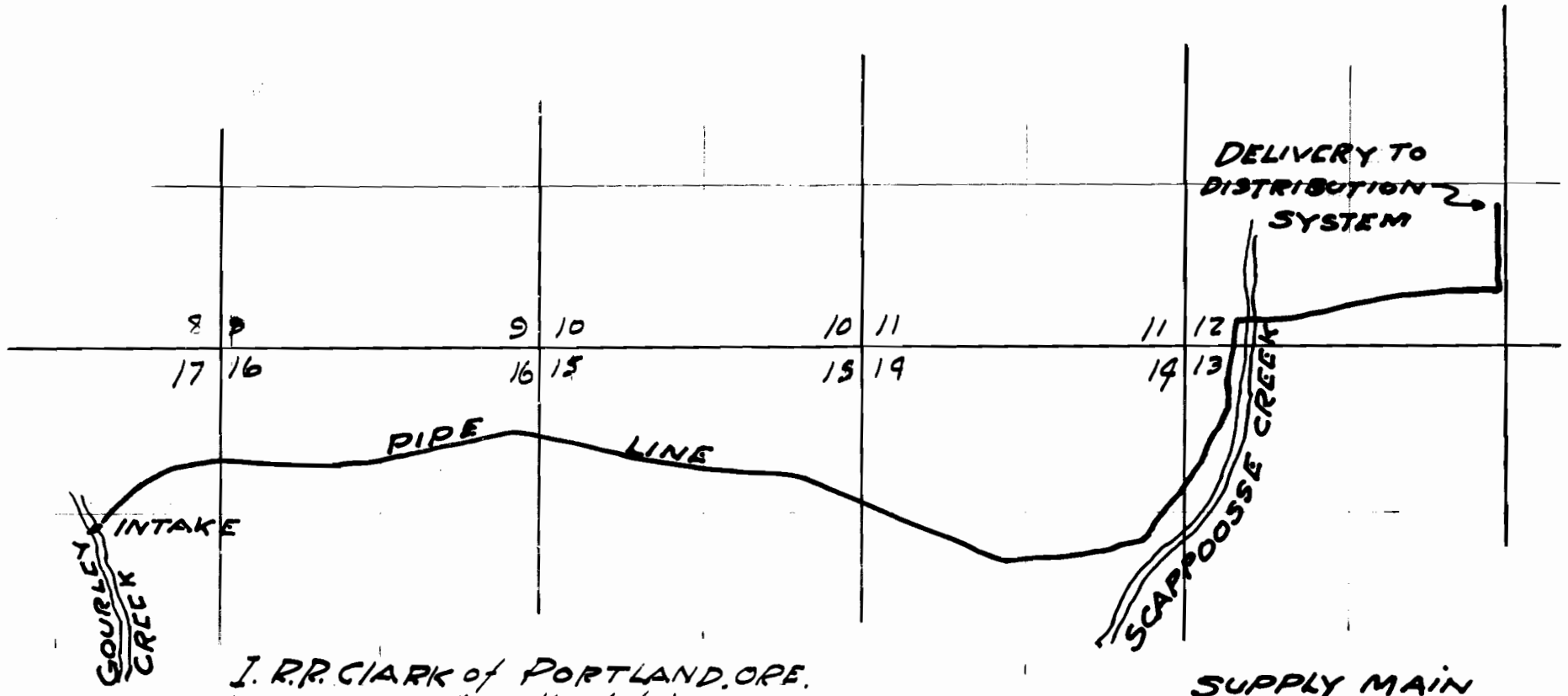
W½ NE¼
NE¼ NW¼
Section 24
T. 3 N., R. 2 W., W. M.

The right to the use of the water for the purposes aforesaid is restricted to the lands or place of use herein described.

WITNESS the signature of the State Engineer, affixed this date. **December 5, 1975**

James E. Sexton
Water Resources Director XXXXXXXXXXXX

Recorded in State Record of Water Right Certificates, Volume **34** *, page* **42700**



I. R.R. CLARK of PORTLAND. ORE.
do hereby certify that this map
was made from notes taken during
during an actual survey made under
my direction about March 1921. and
that it correctly represents the works
described in the accompaning application
together with the location of streams in
in the imediate vicinity.

R.R. Clark
Registered professional Engineer
OREGON No 779
Date of Registration: Dec. 8th 1919.

SUPPLY MAIN
For
SCAPPOOSE.
COLUMBIA CO. OREGON

App-8815
Per-5813

STATE OF OREGON

COUNTY OF COLUMBIA

CERTIFICATE OF WATER RIGHT

This is to Certify, *That* City of Scappoose

of Scappoose , *State of* Oregon , *has made proof to the satisfaction of the STATE ENGINEER of Oregon, of a right to the use of the waters of* Gourley Creek, a tributary of Scappoose Creek and *a tributary of* Columbia River *for the purpose of* Municipal *under Permit No.* 5813 *of the State Engineer, and that said right to the use of said waters has been perfected in accordance with the laws of Oregon; that the priority of the right hereby confirmed dates from* January 24, 1923;

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 10.0 cubic feet per second;

The use hereunder for irrigation shall conform to such reasonable rotation system as may be ordered by the proper state officer.

The amount of water used for irrigation, together with the amount secured under any other right existing for the same lands, shall be limited to one-eightieth of one cubic foot per second per acre, or its equivalent in case of rotation.

A description of the lands irrigated under the right hereby confirmed, and to which such right is appurtenant (or, if for other purposes, the place where the water is put to beneficial use), is as follows: Northeast Quarter of the Southeast Quarter (NE¼SE¼) of Section Twelve (12), Township Three North, Range Two West of the Willamette Meridian, in the City of Scappoose, Columbia County, Oregon.

The right to the use of the water for irrigation purposes is restricted to the lands or place of use herein described.

Rights to the use of water for power purposes are limited to a period of forty years from the date of priority of the right, as herein set forth, subject to a preference right of renewal under the laws existing at the date of the expiration of the right for power purposes, as hereby confirmed and limited.

WITNESS the signature of the State Engineer, affixed this 30th *day of* November , *192* 5.

Rhea Luper.
State Engineer.

Recorded in State Record of Water Right Certificates, Volume 6 , *page* 5573 .

5813

*Permit No. 5813

CERTIFICATE NO. 5513

APPLICATION FOR A PERMIT

To Appropriate the Public Waters of the State of Oregon

I, City of Scappoose
(Name of Applicant)

of Scappoose (Postoffice), County of Columbia,

State of Ore., do hereby make application for a permit to appropriate the following described public waters of the State of Oregon subject to existing rights:

If the applicant is a corporation, give date and place of incorporation .....

1. The source of the proposed appropriation is Gourley Creek (Scappoose Creek)
(Name of stream)

tributary of Scappoose Creek & Columbia River

2. The amount of water which the applicant intends to apply to beneficial use is .....

10 cubic feet per second.

3. The use to which the water is to be applied is .....
(Irrigation, power, mining, manufacturing,

Municipal .....
domestic supplies, etc.)

4. The point of diversion is located .....
(Give distance and bearing to section corner)

being within the NW SE of Sec. 17, Tp. 3 N
(Give smallest legal subdivision) (No. N. or S.)

R. 2 West, W. M., in the county of Columbia
(No. E. or W.)

5. The pipeline to be - miles
(Main ditch, canal or pipe line)

in length, terminating in the NE SE of Sec. 12, Tp. 3 N
(Smallest legal subdivision) (No. N. or S.)

R. 2 W, W. M., the proposed location being shown throughout on the accompanying map.
(No. E. or W.)

6. The name of the ditch, canal or other works is .....

DESCRIPTION OF WORKS

DIVERSION WORKS—

7. (a) Height of dam 5 feet, length on top 80 feet, length at bottom 70 feet; material to be used and character of construction .....
(Loose rock, concrete,

Timber & Concrete.
masonry, rock and brush, timber crib, etc., wasteway over or around dam)

(b) Description of headgate Sand filter box with wood pipe, valve and valve chamber.
(Timber, concrete, etc., number and size of openings)

* A different form of application is provided where storage works are contemplated. These forms can be secured without charge, together with instructions, by addressing the State Engineer, Salem, Oregon.

CANAL SYSTEM—

8. (a) Give dimensions at each point of canal where materially changed in size, stating miles from headgate. At headgate: Width on top (at water line) ..... feet; width on bottom ..... feet; depth of water ..... feet; grade ..... feet fall per one thousand feet.

(b) At ..... miles from headgate. Width on top (at water line) ..... feet; width on bottom ..... feet; depth of water ..... feet; grade ..... feet fall per one thousand feet.

.....

.....

.....

FILL IN THE FOLLOWING INFORMATION WHERE THE WATER IS USED FOR:

IRRIGATION—

9. The land to be irrigated has a total area of ..... acres, located in each smallest legal subdivision, as follows: .....
(Give area of land in each smallest legal subdivision which you intend to irrigate)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(If more space required, attach separate sheet)

POWER, MINING, MANUFACTURING, OR TRANSPORTATION PURPOSES—

10. (a) Total amount of power to be developed ..... theoretical horsepower.

(b) Total fall to be utilized ..... *feet.*
(Head)

(c) The nature of the works by means of which the power is to be developed .....

.....

(d) Such works to be located in ..... *of Sec.*.....,
(Legal subdivision)

Tp......, *R.*....., *W. M.*
(No. N. or S.) (No. E. or W.)

(e) Is water to be returned to any stream? .....
(Yes or No)

(f) If so, name stream and locate point of return .....

....., *Sec.*....., *Tp.*....., *R.*....., *W. M.*
(No. N. or S.) (No. E. or W.)

(g) The use to which power is to be applied is .....

.....

(h) The nature of the mines to be served .....

.....

MUNICIPAL SUPPLY—

11. To supply the city of Scappoose

Columbia *County, having a present population of* 500,
(Name of)

and an estimated population of ..... *in 19*.....

(Answer questions 12, 13, 14 and 15 in all cases)

12. Estimated cost of proposed works, $ 25,000.00

13. Construction work will begin on or before One yr. from date of application.

14. Construction work will be completed on or before Two years from date of application.

15. The water will be completely applied to the proposed use on or before Thirty years from the date of application.

Duplicate maps of the proposed ditch or other works, prepared in accordance with the rules of the State Water Board, accompany this application.

City of Scappoose
(Name of applicant)
By J. G. Watts, Mayor.
Attest: C. F. Cathcart, Recorder.

Signed in the presence of us as witnesses:

(1) J. E. Miller (Name), ... (Address of Witness)

(2) D. W. Price (Name), ... (Address of Witness)

Remarks:

STATE OF OREGON,
County of Marion, } *ss.*

This is to certify that I have examined the foregoing application, together with the accompanying maps and data, and return the same for correction or completion, as follows:

Answers to Questions Nos. 4 & 5 and maps

In order to retain its priority, this application must be returned to the State Engineer, with corrections, on or before April 7, 1923.

WITNESS my hand this 8 *day of* March, 1923.

Percy A. Cupper,
State Engineer.

L.A.

5813(c)

3

Application No. 8815

Permit No. 5813

PERMIT

TO APPROPRIATE THE PUBLIC WATERS OF THE STATE OF OREGON

District No.

This instrument was first received in the office of the State Engineer at Salem, Oregon, on the 24 *day of* January, *192*3, *at* 11:30 *o'clock* A *M.*

Returned to applicant for correction

March 8, 1923

Corrected application received

March 30, 1923

Approved:

April 12, 1923

Recorded in Book No. 20 *of Permits, on Page* 5813

Percy A. Cupper
State Engineer.

1 map CR

$8.00

STATE OF OREGON,
County of Marion, } *ss.*

This is to certify that I have examined the foregoing application and do hereby grant the same, subject to the following limitations and conditions: If for irrigation, this appropriation shall be limited to one-eightieth of one cubic foot per second, or its equivalent, for each acre irrigated, and shall be subject to such reasonable rotation system as may be ordered by the proper state officer.

The right herein granted is limited tothe appropriation of water from Courley Creek for municipal supply.

The amount of water appropriated shall be limited to the amount which can be applied to beneficial use and not to exceed 10.0 *cubic feet per second, or its equivalent in case of rotation. The priority date of this permit is* January 24, 1923.

Actual construction work shall begin on or before April 12, 1924 *and shall thereafter be prosecuted with reasonable diligence and be completed on or before* June 1, 1927

Complete application of the water to the proposed use shall be made on or before October 1, 1929

WITNESS my hand this 12th *day of* April, 1923.

Percy A. Cupper.
State Engineer.

Permits for power development are subject to the limitation of franchise as provided in Section 5728, Oregon Laws, and the payment of annual fees as provided in Section 5803, Oregon Laws.

This form approved by the State Water Board, March 11, 1909.

Registration No. GR- 926

Certificate No. GR- 899

Registration Statement

OF CLAIMANT OF RIGHT TO APPROPRIATE GROUND WATER

TO THE STATE ENGINEER OF OREGON:

I, City of Scappoose

of Scappoose (Mailing address) County of Columbia

State of Oregon, do hereby make application for a certificate of registration as evidence of a right to appropriate ground water.

1. **Source** from which water is withdrawn is Pump Well (Flowing well, pump well, infiltration trench, or tunnel)

2. **Location** is: in Scappoose (Approximate distance and direction from nearest city or town)

and is more particularly described as follows:

(a) South - 726.51 Feet & West 529.78 feet from East ¼ corner of Sec. 12, T. 3N. R. 2W. (Give distance and bearing to corner of section or other legal subdivision)

being within N.E. ¼ of S.E. ¼ (Smallest legal subdivision) of Sec. 12, Twp. 3N. (N. or S.), Rge. 2W. (E. or W.)

or (b) within limits of recorded platted property, town or city: 20 Feet West of East City Limits and 20 feet South of Oak St. Not subdivided

in Lot ....., Block ....., of ..... (Name of plat or addition)

..... (If within city or town, give name) County of Columbia

3. **Construction Work** was begun on 1950 (Date); was completed on June 1, (Date)

and the ground water claimed was first used for the purposes set out below on 1950 (Date),

since which time the water has been used intermittantly (Continuously or intermittently)

from 1950 (Date) to date (Date)

4. **Quantity** of water claimed and used is 50 gallons per minute; 81 ± acre feet per year.

5. **Purpose or Purposes** for which water is used Municipal Supply

(Domestic, irrigation, municipal, manufacturing, industrial, etc.)

6. **Description of Well:** Depth 116 feet. Type Drilled (Dug or drilled)

diameter 8 inches. Elevation of ground at well site 32 (As near as known) feet, mean sea level.

Depth to water table 50 feet.

7. **Capacity of Well:** 200 g.p.m. with 25 feet drawdown.

300 g.p.m. with 35 feet drawdown.

Date of test June 1950

If Flowing Well: Measured discharge ..... g.p.m. on ..... (Date)

Shut-in pressure at ground surface ..... lbs. per sq. in. on ..... (Date)

Water is controlled by ..... (Cap, valve, etc.)

4M—4-57

8. **Casing:** (Give diameter, commercial specifications and depth below ground surface of each casing size.)

8 inch diameter from 32 to 116 feet

inch diameter from to feet

inch diameter from to feet

inch diameter from to feet

Describe and show depth of shoe, plug, adapter, liner or other details: Gravel filled to 82 foot level

Perforated from 50 foot to 60 foot level

9. **Perforated Casings or Screens:**

Pipe perforated from 50 foot to 60 foot levels from to
(Number per foot and size of perforations, or describe screen)

from to

from to

from to

10. **Log of Well:** (Describe each stratum or formation clearly, indicate if water bearing, and give thickness and depth as indicated.)

MATERIAL	Thickness (Feet)	Depth to Bottom (Feet)

GR - 899 A

If log of well is not available, give name and address of driller. Steinman Bros. Drilling Co.

8332 S. E. 16th St., Portland, Oregon

11. **Infiltration Trench:** Covered or open .....

Dimensions: Length ..... ft. Minimum depth ..... ft. Maximum depth ..... ft.

Bottom width ..... ft. Discharge ..... g.p.m. Date of test .....

12. **Tunnel:** Type of lining .....

Dimensions: ..... (Length, course, and cross sectional size)

Position of water bearing stratum with reference to portal of tunnel .....

Log of tunnel: (Preceding table for log of well may be used, if desired. Give footage from portal and character of materials, as pertinent.)

13. **Pumping Equipment:** 5K326XA10A Model G.E. Motor# 5709201

(a) Pump Serial # 0L 16651 (Make, type and size) Capacity ..... g.p.m.

(b) Motor H.P. 30 AT 1760 R.P.M. (Type and horsepower)

14. Location of area irrigated or to be irrigated, or place of use if for purposes other than irrigation.

Township North or South	Range E. or W. of Willamette Meridian	Section	Forty-acre Tract	Number Acres To Be Irrigated	Date of Reclamation
T3N	R2W	12	NE¼ of SE¼	Municipal	1955

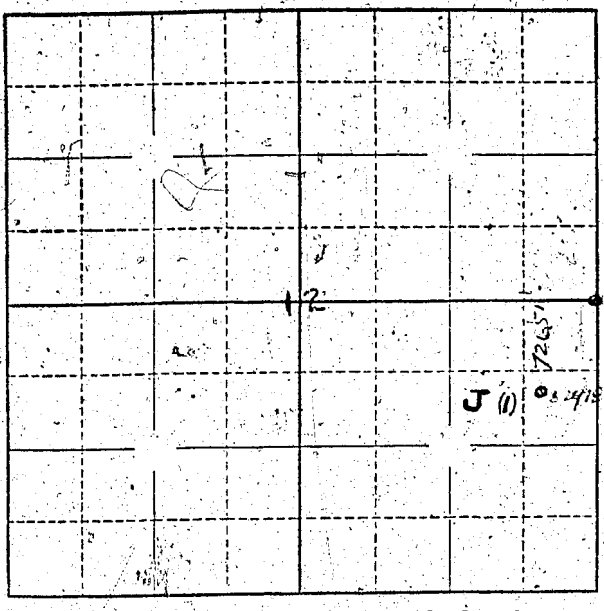
15. If the ground water supply is supplemental to an existing water supply, identification of any application for a permit, permit, certificate or adjudicated right to appropriate water made or held by the registrant.

Application for Water Rights on Scappoose Creek & Lacey Creek pending.

GR-899 B

Township 3 N Range 2 W W.M.

North



Locate well and acreage of irrigated land on plat.

Scale: 2" = 1 Mile

STATE OF OREGON }
County of ..... } ss.

I, Virginia R. Sheldon, being first duly sworn, do hereby certify that I have read the foregoing Registration Statement and that all of the items therein contained are true to the best of my knowledge and belief.

Virginia R. Sheldon
(Signature of Registrant)

Subscribed and sworn to before me this 13 day of January, 1958

My commission expires MY COMMISSION EXPIRES FEB. 23, 1960 Winifred Ekker
(Notary Public)

(SEAL)

CERTIFICATE OF REGISTRATION

STATE OF OREGON }
County of Marion } ss.

This is to certify that the foregoing Registration Statement was received in the office of the State Engineer on the 24th day of January, 19 58, at 8:00 o'clock A.M. and has been duly recorded in said office in Book No. 5 of Registration Statements on page 899.

Witness my hand this 7 day of May, 1958

(State Engineer)

By .....
(Deputy)

GR - 899 C

Registration No. GR- 926

Certificate No. GR- 899

Registration Statement

OF CLAIMANT OF RIGHT TO APPROPRIATE GROUND WATER

TO THE STATE ENGINEER OF OREGON:

I, City of Scappoose

of Scappoose (Mailing address) County of Columbia

State of Oregon, do hereby make application for a certificate of registration as evidence of a right to appropriate ground water.

1. **Source** from which water is withdrawn is Pump Well (Flowing well, pump well, infiltration trench, or tunnel)

2. **Location** is: in Scappoose (Approximate distance and direction from nearest city or town)

and is more particularly described as follows:

(a) South - 726.51 Feet & West 529.78 feet from East ¼ corner of Sec. 12, T. 3N. R. 2W. (Give distance and bearing to corner of section or other legal subdivision)

being within N.E. ¼ of S.E. ¼ (Smallest legal subdivision) of Sec. 12, Twp. 3N. (N. or S.), Rge. 2W. (E. or W.)

or (b) within limits of recorded platted property, town or city: 20 Feet West of East City Limits and 20 feet South of Oak St. Not subdivided

in Lot ....., Block ....., of ..... (Name of plat or addition)

..... (If within city or town, give name) County of Columbia

3. **Construction Work** was begun on 1950 (Date); was completed on June 1, (Date)

and the ground water claimed was first used for the purposes set out below on 1950 (Date),

since which time the water has been used intermittantly (Continuously or intermittently)

from 1950 (Date) to date (Date)

4. **Quantity** of water claimed and used is 50 gallons per minute; 81 ± acre feet per year.

5. **Purpose or Purposes** for which water is used Municipal Supply

(Domestic, irrigation, municipal, manufacturing, industrial, etc.)

6. **Description of Well:** Depth 116 feet. Type Drilled (Dug or drilled)

diameter 8 inches. Elevation of ground at well site 32 (As near as known) feet, mean sea level.

Depth to water table 50 feet.

7. **Capacity of Well:** 200 g.p.m. with 25 feet drawdown.

300 g.p.m. with 35 feet drawdown.

Date of test June 1950

If Flowing Well: Measured discharge ..... g.p.m. on ..... (Date)

Shut-in pressure at ground surface ..... lbs. per sq. in. on ..... (Date)

Water is controlled by ..... (Cap, valve, etc.)

4M—4-57

8. **Casing:** (Give diameter, commercial specifications and depth below ground surface of each casing size.)

8 inch diameter from 32 to 116 feet

inch diameter from to feet

inch diameter from to feet

inch diameter from to feet

Describe and show depth of shoe, plug, adapter, liner or other details: Gravel filled to 82 foot level

Perforated from 50 foot to 60 foot level

9. **Perforated Casings or Screens:**

Pipe perforated from 50 foot to 60 foot levels from to
(Number per foot and size of perforations, or describe screen)

from to

from to

from to

10. **Log of Well:** (Describe each stratum or formation clearly, indicate if water bearing, and give thickness and depth as indicated.)

MATERIAL	Thickness (Feet)	Depth to Bottom (Feet)

GR - 899 A

If log of well is not available, give name and address of driller. Steinman Bros. Drilling Co.

8332 S. E. 16th St., Portland, Oregon

11. **Infiltration Trench:** Covered or open .....

Dimensions: Length ..... ft. Minimum depth ..... ft. Maximum depth ..... ft.

Bottom width ..... ft. Discharge ..... g.p.m. Date of test .....

12. **Tunnel:** Type of lining .....

Dimensions: ..... (Length, course, and cross sectional size)

Position of water bearing stratum with reference to portal of tunnel .....

Log of tunnel: (Preceding table for log of well may be used, if desired. Give footage from portal and character of materials, as pertinent.)

13. **Pumping Equipment:** 5K326XA10A Model G.E. Motor# 5709201

(a) Pump Serial # 0L 16651 (Make, type and size) Capacity ..... g.p.m.

(b) Motor H.P. 30 AT 1760 R.P.M. (Type and horsepower)

14. Location of area irrigated or to be irrigated, or place of use if for purposes other than irrigation.

Township North or South	Range E. or W. of Willamette Meridian	Section	Forty-acre Tract	Number Acres To Be Irrigated	Date of Reclamation
T3N	R2W	12	NE¼ of SE¼	Municipal	1955

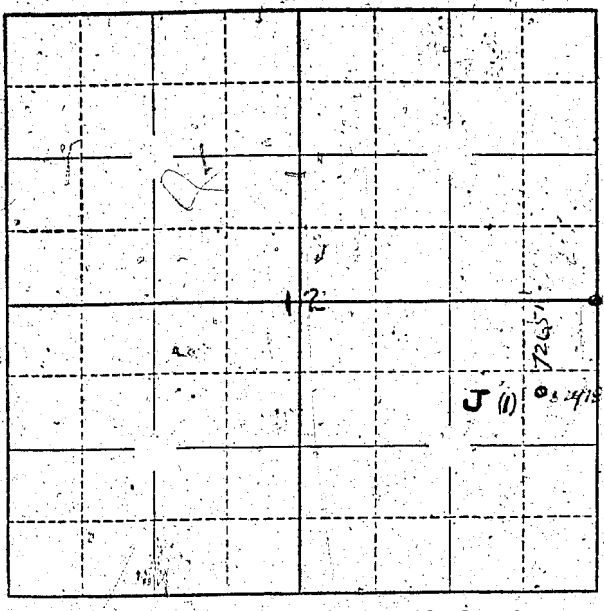
15. If the ground water supply is supplemental to an existing water supply, identification of any application for a permit, permit, certificate or adjudicated right to appropriate water made or held by the registrant.

Application for Water Rights on Scappoose Creek & Lacey Creek pending.

GR-899 B

Township 3 N Range 2 W W.M.

North



Locate well and acreage of irrigated land on plat.

Scale: 2" = 1 Mile

STATE OF OREGON }
County of ..... } ss.

I, Virginia R. Sheldon, being first duly sworn, do hereby certify that I have read the foregoing Registration Statement and that all of the items therein contained are true to the best of my knowledge and belief.

Virginia R. Sheldon
(Signature of Registrant)

Subscribed and sworn to before me this 13 day of January, 1958

My commission expires MY COMMISSION EXPIRES FEB. 23, 1960 Winifred Ekker
(Notary Public)

(SEAL)

CERTIFICATE OF REGISTRATION

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Witness my hand this 7 day of May, 1958

(State Engineer)

By .....
(Deputy)

GR - 899 C

Appendix C

2005 WATER CONSERVATION MEASURES DURING WATER CRISES (SMC 13.08)

Chapter 13.08

WATER CRISES

Sections:

13.08.010 Water crisis emergency. At any regular or special meeting of the city council, the mayor, with the consent of a majority of the council, may declare a water crisis state of emergency if, in the opinion of the mayor and a majority of the council, the adequacy of the water supply for the city is sufficiently endangered to create a risk of danger to the health, safety and welfare of the people of Scappoose. (Ord. 372 §1, 1977)

13.08.020 Water conservation measures during water crisis emergency. During a water crisis state of emergency, the following water conservation measures may be implemented by the mayor:

A. Voluntary Measures:

1. Restrict landscape watering to the hours between six p.m. and ten a.m. except new lawn, grass or turf that has been seeded within the ninety days prior to declaration of water shortage.

2. Alternate landscape watering depending on address.

3. Don’t hose or wash sidewalks, driveways, streets, parking lots, etc., except where necessary for public health or safety.

4. Don’t wash cars, boats, trailers, or other vehicles without using a shut-off nozzle.

5. Wash vehicles at commercial or fleet facilities using water-recycling equipment.

6. Provide drinking/serving water at restaurants, motels, cafeterias, or other public places where food is sold or served only when expressly requested.

7. Restrict cleaning buildings (walls or roof) to preparation for painting only.

8. Use bottled water stored in the refrigerator instead of running the tap to obtain cold water.

9. Consider installing more efficient appliances such as low water consumption stools and taking showers instead of tub baths.

B. Mandatory Measures:

1. Tier 1 - Serious. Flow reductions have taken place in city watersheds and the Dutch Canyon Well.

a. Prohibit lawn watering between the hours of seven a.m. and eleven p.m.

b. Require compliance with alternate day system for landscape watering.

c. Restrict hydrant permit use to those already in effect.

2. Tier 2 - Critical. A declared water crisis emergency in accordance with Chapter 13.08 of the city municipal code.

a. Prohibit watering, sprinkling, or irrigating lawns, grass, or turf unless it is a new lawn, grass or turf that has been seeded after March 1 of the calendar year in which any restrictions are implemented. In such cases, it may be watered until established.

b. Prohibit washing down, wetting down, or sweeping with water sidewalks, driveways, parking lots, open ground, or other hard surfaced areas unless:

(1) In the opinion of the city manager or delegate, there is a demonstrable need to meet public health or safety requirements including but not limited to alleviation of fire, sanitation hazards, or dust control to meet air quality requirements mandated by the Oregon Department of Environmental Quality; or

(2) Power washing of building, roofs, and homes prior to painting is for repair, remodeling or reconstruction and not solely for aesthetic purposes.

c. Prohibit washing cars, trucks, trailers, tractors, or other land vehicles or boats, or other water craft except by commercial establishments or fleet washing facilities which recycle or reuse the water in their washing processes, or by bucket and hose with a shut-off mechanism, unless the city manager or delegate finds that the public health, safety, and welfare is contingent upon frequent vehicle cleaning of solid waste transfer vehicles, vehicles that transport food and other perishables or otherwise required by law. (Ord. 724 §1, 2002; Ord. 372 §2, 1977)

13.08.030 Emergency power of mayor during water crisis emergency.

A. During a water crisis state of emergency, the mayor may, with the consent of a majority of the city council:

1. Impose a rate schedule for the purchase of water supplied by the city with higher rates for higher use. Such rate schedule shall be in writing, subscribed by the mayor and city recorder-treasurer, and state the effective time and date of such rate schedule.

2. a. Impose such other water-saving measures upon the city as, in the opinion of the mayor and city council, are reasonable and necessary to protect the health, safety and welfare of the people of the city. Any such measures shall be in writing, subscribed by the mayor and city recorder-treasurer, and state the effective time and date of such measure.

b. The willful violation of any such measure shall be a misdemeanor punishable by a fine not to exceed five hundred dollars.

B. Enforcement procedures for the above water-saving measures are as follows.

1. For Tier 1-Mandatory Measures. The Scappoose city council, through the public works department, shall enforce any violation of the restrictions or prohibitions stated in the Tier 1-Mandatory Measures as follows:

a. Scappoose public works department shall deliver a notice of violation to the occupant at the premises. If the occupant is not present, notice may be posted on the premises advising occupant of violation and notifying the occupant that the violation shall cease.

b. The city shall also mail a notice of violation by regular mail to the occupant at the address of the premises where the violation has occurred.

2. For Tier 2 - Mandatory Measures. City council, through the city police department, shall enforce any violation of restrictions or prohibitions stated in the Tier 2 - Mandatory Measures as follows:

a. Scappoose police department shall personally deliver a notice of violation to the occupant at the premises. If the occupant is not present, the officer may post the notice on the premises advising the occupant of the violation and warning that service may be discontinued if violations continue.

b. The city shall also mail notice of violation by regular mail to the occupant at the address of the premises where violation has occurred. If water service is discontinued, a fee may be charged to restore it.

c. If violation occurs after notice, water service may be discontinued.

d. If discontinuance of service will cause a health or safety situation to develop at the location where violation has occurred, a citation may be issued in accordance with Section 13.08.030(A) of the Scappoose Municipal Code. (Ord. 724 §1, 2002; Ord. 372 §3, 1977)

13.08.040 Termination or suspension of state of emergency. At any general or special meeting of the city council, the mayor, with the consent of a majority of the council, or a majority of the council, may declare the termination or suspension of a water crisis state of emergency. Any declaration of a termination or suspension of a water crisis state of emergency shall be in writing, subscribed by the mayor and the city recorder-treasurer, and shall state the effective date and time of such declaration. (Ord. 372 §4, 1977)

Matchpoint Water Asset Management

Water. That's the Point.

215 RACINE DRIVE,
SUITE 201
WILMINGTON, NC. 28403

Address: 33240 Meadowbrook Ct.

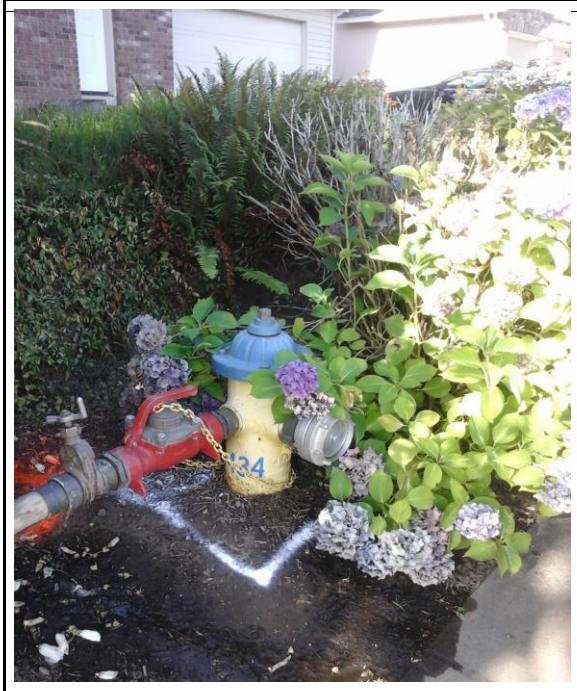
Urgency: Minimal	**Gradient:** Dirt	**Leak Type:** Fitting/Hydrant	**Pipe Size:** 6-in.	**Pipe Material:** Ductile Iron
Leak Detection Method: Sounding		**Visible Water:** Yes	**Person Submitted To:** Mr. Doug Nassinbene	
Lattitude: 45.743662		**Longitude:** -122.883937		

Matchpoint Estimated GPM

GALLONS PER MINUTE:	0.10
GALLONS PER DAY (24 Hours):	144.00
GALLONS PER MONTH (30 Days):	4,320.00
GALLONS PER YEAR (365 Days):	52,560.00

Leak Description/Comments

Hydrant Cap



Leakage Technician: Dave Gunderson

Date: August 16, 2016

Matchpoint Water Asset Management

Water. That's the Point.

215 RACINE DRIVE,
SUITE 201
WILMINGTON, NC. 28403

Address: 33355 Mountain Way

Urgency: Moderate	**Gradient:** Asphalt	**Leak Type:** Service	**Pipe Size:** 3/4-in	**Pipe Material:** Galvanized Iron
Leak Detection Method: Sounding		**Visible Water:** No	**Person Submitted To:** Mr. Doug Nassinbene	
Lattitude: 45.750789		**Longitude:** -122.881018		

Matchpoint Estimated GPM

GALLONS PER MINUTE:	5.00
GALLONS PER DAY (24 Hours):	7,200.00
GALLONS PER MONTH (30 Days):	216,000.00
GALLONS PER YEAR (365 Days):	2,628,000.00

Leak Description/Comments

Service Leak Between Meter And Main

Leakage Technician: Dave Gunderson

Date: August 16, 2016

Matchpoint Water Asset Management

Water. That's the Point.

215 RACINE DRIVE,
SUITE 201
WILMINGTON, NC. 28403

Address: 33271 Evergreen Way

Urgency: Moderate	**Gradient:** Asphalt	**Leak Type:** Service	**Pipe Size:** 1-in	**Pipe Material:** HDPE
Leak Detection Method: Sounding		**Visible Water:** No	**Person Submitted To:** Mr. Doug Nassinbene	
Lattitude: 45.751149		**Longitude:** -122.882778		

Matchpoint Estimated GPM

GALLONS PER MINUTE:	5.00
GALLONS PER DAY (24 Hours):	7,200.00
GALLONS PER MONTH (30 Days):	216,000.00
GALLONS PER YEAR (365 Days):	2,628,000.00

Leak Description/Comments

Service Leak Between Meter And Main

Leakage Technician: Dave Gunderson

Date: August 16, 2016

Matchpoint Water Asset Management

Water. That's the Point.

215 RACINE DRIVE,
SUITE 201
WILMINGTON, NC. 28403

Address: 33260 Em Watts

Urgency: Minimal	**Gradient:** Grass	**Leak Type:** Fitting/Setting	**Pipe Size:** 1-in.	**Pipe Material:** Copper
Leak Detection Method: Sounding		**Visible Water:** No	**Person Submitted To:** Mr. Doug Nassinbene	
Lattitude: 45.75194271		**Longitude:** -122.8827068		

Matchpoint Estimated GPM

GALLONS PER MINUTE:	0.30
GALLONS PER DAY (24 Hours):	432.00
GALLONS PER MONTH (30 Days):	12,960.00
GALLONS PER YEAR (365 Days):	157,680.00

Leak Description/Comments

Meter Setting Leak

Leakage Technician: Dave Gunderson

Date: August 16, 2016

Matchpoint Water Asset Management

Water. That's the Point.

215 RACINE DRIVE,
SUITE 201
WILMINGTON, NC. 28403

Address: 33019 NW Laurel St.

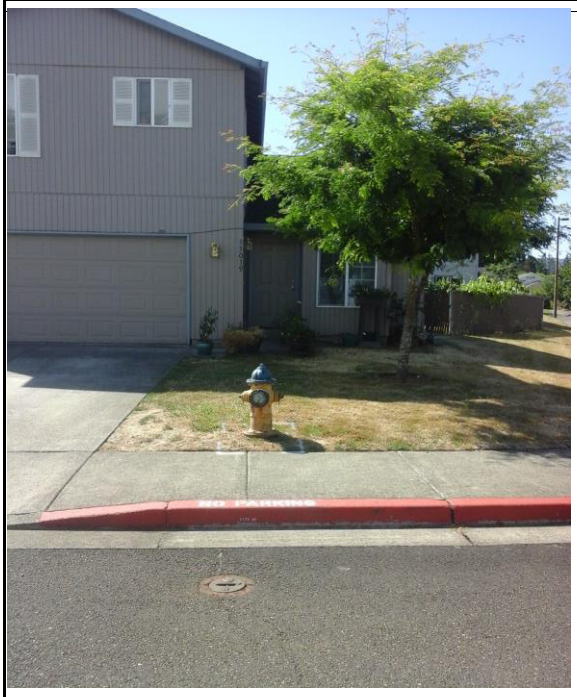
Urgency: Minimal	**Gradient:** Grass	**Leak Type:** Fitting/Hydrant	**Pipe Size:** 6-in.	**Pipe Material:** Ductile Iron
Leak Detection Method: Sounding		**Visible Water:** No	**Person Submitted To:** Mr. Doug Nassinbene	
Lattitude: 45.75966057		**Longitude:** -122.8813079		

Matchpoint Estimated GPM

GALLONS PER MINUTE:	0.25
GALLONS PER DAY (24 Hours):	360.00
GALLONS PER MONTH (30 Days):	10,800.00
GALLONS PER YEAR (365 Days):	131,400.00

Leak Description/Comments

Hydrant Seat



Leakage Technician: Austin Deaver

Date: August 17, 2016

Matchpoint Water Asset Management

Water. That's the Point.

215 RACINE DRIVE,
SUITE 201
WILMINGTON, NC. 28403

Address: 52579 NW Eastview Dr.

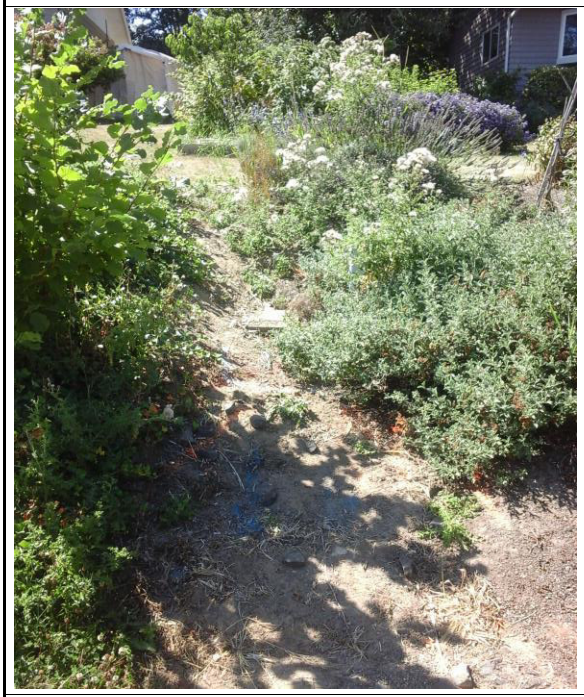
Urgency: Moderate	**Gradient:** Dirt	**Leak Type:** Service	**Pipe Size:** 1-in.	**Pipe Material:** Galvanized Iron
Leak Detection Method: Sounding		**Visible Water:** No	**Person Submitted To:** Mr. Doug Nassinbene	
Lattitude: 45.75835790		**Longitude:** -122.8888607		

Matchpoint Estimated GPM

GALLONS PER MINUTE:	5.00
GALLONS PER DAY (24 Hours):	7,200.00
GALLONS PER MONTH (30 Days):	216,000.00
GALLONS PER YEAR (365 Days):	2,628,000.00

Leak Description/Comments

Service Leak Between Meter And Main



Leakage Technician: Dave Gunderson

Date: August 17, 2016

Matchpoint Water Asset Management

Water. That's the Point.

215 RACINE DRIVE,
SUITE 201
WILMINGTON, NC. 28403

Address: 32828 NW Sunset Dr.

Urgency: Minimal	**Gradient:** Dirt	**Leak Type:** Fitting/Coupling	**Pipe Size:** 1-in.	**Pipe Material:** Copper
Leak Detection Method: Sounding		**Visible Water:** No	**Person Submitted To:** Mr. Doug Nassinbene	
Lattitude: 45.76482966		**Longitude:** -122.8912472		

Matchpoint Estimated GPM

GALLONS PER MINUTE:	0.10
GALLONS PER DAY (24 Hours):	144.00
GALLONS PER MONTH (30 Days):	4,320.00
GALLONS PER YEAR (365 Days):	52,560.00

Leak Description/Comments

Fitting In Meter Box

Leakage Technician: Dave Gunderson

Date: August 18, 2016

Matchpoint Water Asset Management

Water. That's the Point.

215 RACINE DRIVE,
SUITE 201
WILMINGTON, NC. 28403

Address: 32779 NW Ridge Dr.

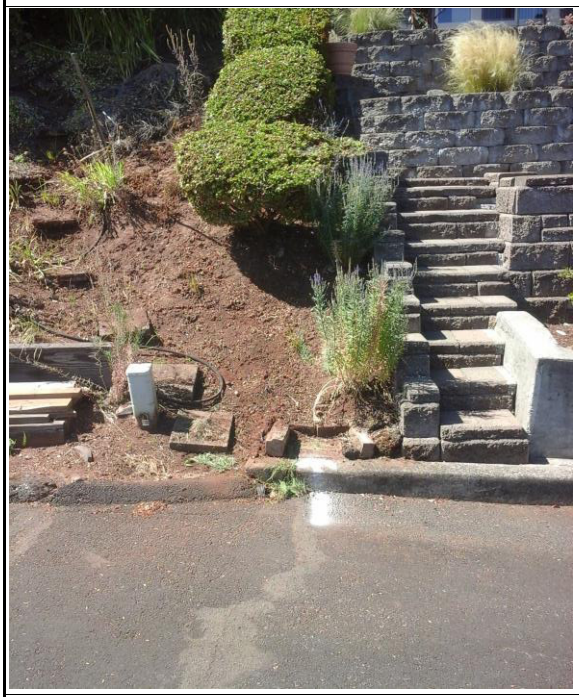
Urgency: Minimal	**Gradient:** Concrete	**Leak Type:** Fitting/Coupling	**Pipe Size:** 1-in.	**Pipe Material:** Copper
Leak Detection Method: Sounding		**Visible Water:** No	**Person Submitted To:** Mr. Doug Nassinbene	
Lattitude: 45.76288920		**Longitude:** -122.8927942		

Matchpoint Estimated GPM

GALLONS PER MINUTE:	0.10
GALLONS PER DAY (24 Hours):	144.00
GALLONS PER MONTH (30 Days):	4,320.00
GALLONS PER YEAR (365 Days):	52,560.00

Leak Description/Comments

Fitting In Meter Box



Leakage Technician: Dave Gunderson

Date: August 18, 2016

Matchpoint Water Asset Management

Water. That's the Point.

215 RACINE DRIVE,
SUITE 201
WILMINGTON, NC. 28403

Address: JP West Rd. @ SW 4th St.

Urgency: Minimal	**Gradient:** Asphalt	**Leak Type:** Main	**Pipe Size:** 2-in.	**Pipe Material:** Galvanized Iron
Leak Detection Method: Sounding		**Visible Water:** No	**Person Submitted To:** Mr. Doug Nassinbene	
Lattitude: 45.75655710		**Longitude:** -122.8819674		

Matchpoint Estimated GPM

GALLONS PER MINUTE:	3.00
GALLONS PER DAY (24 Hours):	4,320.00
GALLONS PER MONTH (30 Days):	129,600.00
GALLONS PER YEAR (365 Days):	1,576,800.00

Leak Description/Comments

2-in. Connection At The 8-in. ODS Main

Leakage Technician: Austin Deaver

Date: August 18, 2016

Matchpoint Water Asset Management

Water. That's the Point.

215 RACINE DRIVE,
SUITE 201
WILMINGTON, NC. 28403

Address: 29710 Dutch Canyon Rd.

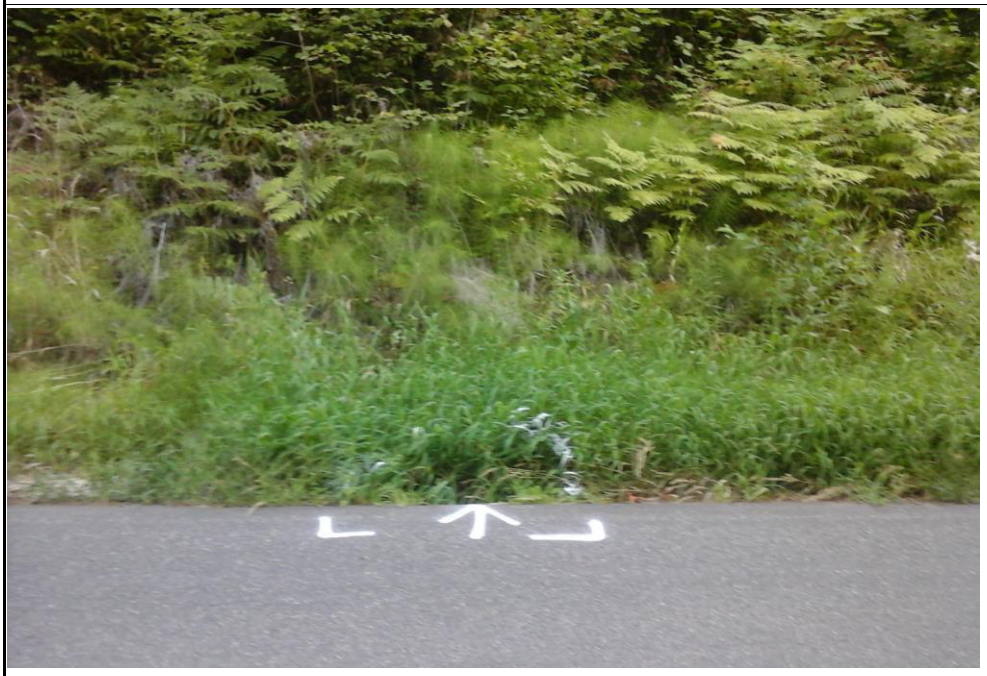
Urgency: Moderate	**Gradient:** Asphalt	**Leak Type:** Main	**Pipe Size:** 8-in.	**Pipe Material:** ODS
Leak Detection Method: Sounding		**Visible Water:** Yes	**Person Submitted To:** Mr. Doug Nassinbene	
Lattitude: 45.74490187		**Longitude:** -122.9587713		

Matchpoint Estimated GPM

GALLONS PER MINUTE:	10.00
GALLONS PER DAY (24 Hours):	14,400.00
GALLONS PER MONTH (30 Days):	432,000.00
GALLONS PER YEAR (365 Days):	5,256,000.00

Leak Description/Comments

Leak On Main



Leakage Technician: Austin Deaver

Date: August 19, 2016

Matchpoint Water Asset Management

Water. That's the Point.

215 RACINE DRIVE,
SUITE 201
WILMINGTON, NC. 28403

Address: 32700 Dutch Canyon Rd.

Urgency: Minimal	**Gradient:** Gravel	**Leak Type:** Service	**Pipe Size:** 1-in.	**Pipe Material:** Copper
Leak Detection Method: Sounding		**Visible Water:** Yes	**Person Submitted To:** Mr. Doug Nassinbene	
Lattitude: 45.74164650		**Longitude:** -122.8943782		

Matchpoint Estimated GPM

GALLONS PER MINUTE:	1.00
GALLONS PER DAY (24 Hours):	1,440.00
GALLONS PER MONTH (30 Days):	43,200.00
GALLONS PER YEAR (365 Days):	525,600.00

Leak Description/Comments

Service Leak Near Box

Leakage Technician: Dave Gunderson

Date: August 19, 2016

Matchpoint Water Asset Management

Water. That's the Point.

215 RACINE DRIVE,
SUITE 201
WILMINGTON, NC. 28403

Address: NW 7th St. @ Smth Rd.

Urgency: Moderate	**Gradient:** Dirt	**Leak Type:** Main	**Pipe Size:** 4-in.	**Pipe Material:** ODS
Leak Detection Method: Correlation		**Visible Water:** No	**Person Submitted To:** Mr. Doug Nassinbene	
Lattitude: 45.76270612		**Longitude:** -122.8849273		

Matchpoint Estimated GPM

GALLONS PER MINUTE:	5.00
GALLONS PER DAY (24 Hours):	7,200.00
GALLONS PER MONTH (30 Days):	216,000.00
GALLONS PER YEAR (365 Days):	2,628,000.00

Leak Description/Comments

Main Leak 25' From Valve

Leakage Technician: Austin Deaver

Date: August 19, 2016

Matchpoint Water Asset Management

Water. That's the Point.

215 RACINE DRIVE,
SUITE 201
WILMINGTON, NC. 28403

Address: 32987 Bellavista

Urgency: Moderate	**Gradient:** Asphalt	**Leak Type:** Main	**Pipe Size:** 8-in.	**Pipe Material:** ODS
Leak Detection Method: Correlation		**Visible Water:** No	**Person Submitted To:** Mr. Doug Nassinbene	
Lattitude: 45.76543476		**Longitude:** -122.8883833		

Matchpoint Estimated GPM

GALLONS PER MINUTE:	10.00
GALLONS PER DAY (24 Hours):	14,400.00
GALLONS PER MONTH (30 Days):	432,000.00
GALLONS PER YEAR (365 Days):	5,256,000.00

Leak Description/Comments

Main Leak 50' From Valve

Leakage Technician: Austin Deaver

Date: August 19, 2016

Matchpoint Water Asset Management

Water. That's the Point.

215 RACINE DRIVE,
SUITE 201
WILMINGTON, NC. 28403

Address: 32903 Bellavista

Urgency: Moderate	**Gradient:** Asphalt	**Leak Type:** Service	**Pipe Size:** 1-in.	**Pipe Material:** Copper
Leak Detection Method: Sounding		**Visible Water:** No	**Person Submitted To:** Mr. Doug Nassinbene	
Lattitude: 45.76566437		**Longitude:** -122.8902797		

Matchpoint Estimated GPM

GALLONS PER MINUTE:	5.00
GALLONS PER DAY (24 Hours):	7,200.00
GALLONS PER MONTH (30 Days):	216,000.00
GALLONS PER YEAR (365 Days):	2,628,000.00

Leak Description/Comments

Service Leak At The Main

Leakage Technician: Dave Gunderson

Date: August 19, 2016

Matchpoint Water Asset Management

Water. That's the Point.

215 RACINE DRIVE,
SUITE 201
WILMINGTON, NC. 28403

Address: 53787 West Lane Rd.

Urgency: Minimal	**Gradient:** Dirt	**Leak Type:** Fitting/Hydrant	**Pipe Size:** 6-in.	**Pipe Material:** Ductile Iron
Leak Detection Method: Sounding		**Visible Water:** No	**Person Submitted To:** Mr. Doug Nassinbene	
Lattitude: 45.77467730		**Longitude:** -122.8678646		

Matchpoint Estimated GPM

GALLONS PER MINUTE:	0.30
GALLONS PER DAY (24 Hours):	432.00
GALLONS PER MONTH (30 Days):	12,960.00
GALLONS PER YEAR (365 Days):	157,680.00

Leak Description/Comments

Hydrant Seat

Leakage Technician: Austin Deaver

Date: August 22, 2016

Matchpoint Water Asset Management

Water. That's the Point.

215 RACINE DRIVE,
SUITE 201
WILMINGTON, NC. 28403

Address: NW Peak Rd.-E-NW Cliff

Urgency: Minimal	**Gradient:** Asphalt	**Leak Type:** Main	**Pipe Size:** 4-in.	**Pipe Material:** ODS
Leak Detection Method: Correlation		**Visible Water:** No	**Person Submitted To:** Mr. Doug Nassinbene	
Lattitude: 45.76268487		**Longitude:** -122.8908191		

Matchpoint Estimated GPM

GALLONS PER MINUTE:	3.00
GALLONS PER DAY (24 Hours):	4,320.00
GALLONS PER MONTH (30 Days):	129,600.00
GALLONS PER YEAR (365 Days):	1,576,800.00

Leak Description/Comments

Main Leak East Of NW Cliff

Leakage Technician: Austin Deaver

Date: August 22, 2016

Matchpoint Water Asset Management

Water. That's the Point.

215 RACINE DRIVE,
SUITE 201
WILMINGTON, NC. 28403

Address: 52396 SW 2nd St.

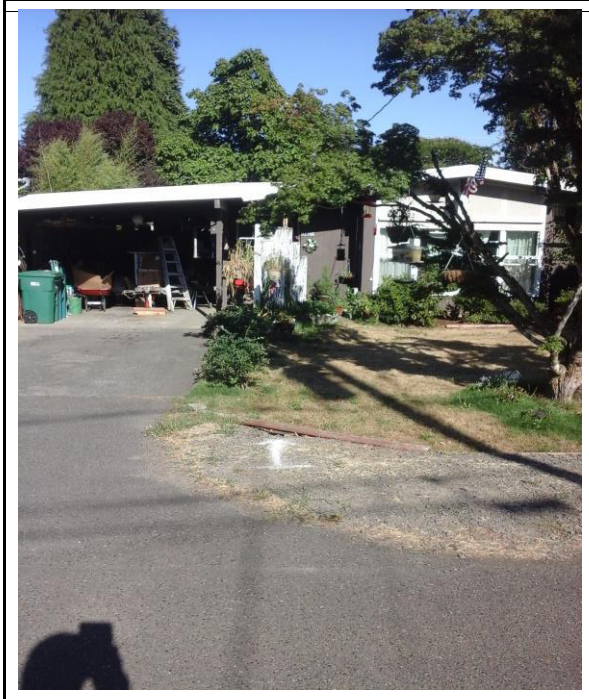
Urgency: Minimal	**Gradient:** Gravel	**Leak Type:** Service	**Pipe Size:** 1-in.	**Pipe Material:** Copper
Leak Detection Method: Sounding		**Visible Water:** No	**Person Submitted To:** Mr. Doug Nassinbene	
Lattitude: 45.75580155		**Longitude:** -122.8799502		

Matchpoint Estimated GPM

GALLONS PER MINUTE:	3.00
GALLONS PER DAY (24 Hours):	4,320.00
GALLONS PER MONTH (30 Days):	129,600.00
GALLONS PER YEAR (365 Days):	1,576,800.00

Leak Description/Comments

Service Leak Between Meter And Main



Leakage Technician: Dave Gunderson

Date: August 22, 2016

Matchpoint Water Asset Management

Water. That's the Point.

215 RACINE DRIVE,
SUITE 201
WILMINGTON, NC. 28403

Address: 52167 SE 5th St.

Urgency: Minimal	**Gradient:** Grass	**Leak Type:** Fitting/Coupling	**Pipe Size:** 1-in.	**Pipe Material:** Copper
Leak Detection Method: Sounding		**Visible Water:** No	**Person Submitted To:** Mr. Doug Nassinbene	
Lattitude: 45.75258470		**Longitude:** -122.8707679		

Matchpoint Estimated GPM

GALLONS PER MINUTE:	0.10
GALLONS PER DAY (24 Hours):	144.00
GALLONS PER MONTH (30 Days):	4,320.00
GALLONS PER YEAR (365 Days):	52,560.00

Leak Description/Comments

Service Leak In Box

Leakage Technician: Dave Gunderson

Date: August 23, 2016

Matchpoint Water Asset Management

Water. That's the Point.

215 RACINE DRIVE,
SUITE 201
WILMINGTON, NC. 28403

Address: 33859 SE Oak St.

Urgency: Minimal	**Gradient:** Grass	**Leak Type:** Fitting/Curbstop	**Pipe Size:** 1-in.	**Pipe Material:** Copper
Leak Detection Method: Sounding		**Visible Water:** No	**Person Submitted To:** Mr. Doug Nassinbene	
Lattitude: 45.75559561		**Longitude:** -122.8705175		

Matchpoint Estimated GPM

GALLONS PER MINUTE:	0.50
GALLONS PER DAY (24 Hours):	720.00
GALLONS PER MONTH (30 Days):	21,600.00
GALLONS PER YEAR (365 Days):	262,800.00

Leak Description/Comments

Service Leak In Box

Leakage Technician: Austin Deaver

Date: August 23, 2016

Matchpoint Water Asset Management

Water. That's the Point.

215 RACINE DRIVE,
SUITE 201
WILMINGTON, NC. 28403

Address: SE 6th St. @ Vine St.

Urgency: Moderate	**Gradient:** Asphalt	**Leak Type:** Main	**Pipe Size:** 6-in.	**Pipe Material:** Ductile Iron
Leak Detection Method: Correlation		**Visible Water:** No	**Person Submitted To:** Mr. Doug Nassinbene	
Lattitude: 45.74912435		**Longitude:** -122.8694813		

Matchpoint Estimated GPM

GALLONS PER MINUTE:	10.00
GALLONS PER DAY (24 Hours):	14,400.00
GALLONS PER MONTH (30 Days):	432,000.00
GALLONS PER YEAR (365 Days):	5,256,000.00

Leak Description/Comments

Leak At Hydrant Tee

Leakage Technician: Deaver/Gunderson

Date: August 24, 2016

Matchpoint Water Asset Management

Water. That's the Point.

215 RACINE DRIVE,
SUITE 201
WILMINGTON, NC. 28403

Address: 52265 Ironwood Ct.

Urgency: Minimal	**Gradient:** Grass	**Leak Type:** Service	**Pipe Size:** 1-in.	**Pipe Material:** Copper
Leak Detection Method: Sounding		**Visible Water:** No	**Person Submitted To:** Mr. Doug Nassinbene	
Lattitude: 45.75422261		**Longitude:** -122.8708308		

Matchpoint Estimated GPM

GALLONS PER MINUTE:	1.00
GALLONS PER DAY (24 Hours):	1,440.00
GALLONS PER MONTH (30 Days):	43,200.00
GALLONS PER YEAR (365 Days):	525,600.00

Leak Description/Comments

Service Leak Near Box

Leakage Technician: Dave Gunderson

Date: August 24, 2016

MATCHPOINT

Matchpoint Water Asset Management

Water. That's the Point.

215 RACINE DRIVE,
SUITE 201
WILMINGTON, NC. 28403

Address: 33904 SE Fayway

Urgency: Moderate	**Gradient:** Asphalt	**Leak Type:** Service	**Pipe Size:** 1-in.	**Pipe Material:** Copper
Leak Detection Method: Sounding		**Visible Water:** No	**Person Submitted To:** Mr. Doug Nassinbene	
Lattitude: 45.75124935		**Longitude:** -122.8692694		

Matchpoint Estimated GPM

GALLONS PER MINUTE:	5.00
GALLONS PER DAY (24 Hours):	7,200.00
GALLONS PER MONTH (30 Days):	216,000.00
GALLONS PER YEAR (365 Days):	2,628,000.00

Leak Description/Comments

Service Leak Between Meter And Main

Leakage Technician: Austin Deaver

Date: August 24, 2016

Matchpoint Water Asset Management

Water. That's the Point.

215 RACINE DRIVE,
SUITE 201
WILMINGTON, NC. 28403

Address: 51901 Woodmere St.

Urgency: Minimal	**Gradient:** Grass	**Leak Type:** Fitting/Riser	**Pipe Size:** 1-in.	**Pipe Material:** Copper
Leak Detection Method: Sounding		**Visible Water:** No	**Person Submitted To:** Mr. Doug Nassinbene	
Lattitude: 45.74890938		**Longitude:** -122.8705770		

Matchpoint Estimated GPM

GALLONS PER MINUTE:	1.00
GALLONS PER DAY (24 Hours):	1,440.00
GALLONS PER MONTH (30 Days):	43,200.00
GALLONS PER YEAR (365 Days):	525,600.00

Leak Description/Comments

Service Leak In Box

Leakage Technician: Austin Deaver

Date: August 24, 2016

MATCHPOINT

Matchpoint Water Asset Management

Water. That's the Point.

215 RACINE DRIVE,
SUITE 201
WILMINGTON, NC. 28403

Address: Miller Road Water Treatment Plant

Urgency: Moderate	**Gradient:** Grass	**Leak Type:** Main	**Pipe Size:** 8-in.	**Pipe Material:** Ductile Iron
Leak Detection Method: Sounding		**Visible Water:** No	**Person Submitted To:** Mr. Doug Nassinbene	
Lattitude: 45.75823019		**Longitude:** -122.8602448		

Matchpoint Estimated GPM

GALLONS PER MINUTE:	5.00
GALLONS PER DAY (24 Hours):	7,200.00
GALLONS PER MONTH (30 Days):	216,000.00
GALLONS PER YEAR (365 Days):	2,628,000.00

Leak Description/Comments

Main Leak Near Well House

Leakage Technician: Deaver/Gunderson

Date: August 24, 2016

Matchpoint Water Asset Management

Water. That's the Point.

215 RACINE DRIVE,
SUITE 201
WILMINGTON, NC. 28403

Address: 52615 NE 3rd St.

Urgency:	Gradient:	Leak Type:	Pipe Size:	Pipe Material:
Minimal	Concrete	Service	1-in.	Copper

Leak Detection Method:	Visible Water:	Person Submitted To:
Sounding	No	Mr. Doug Nassinbene

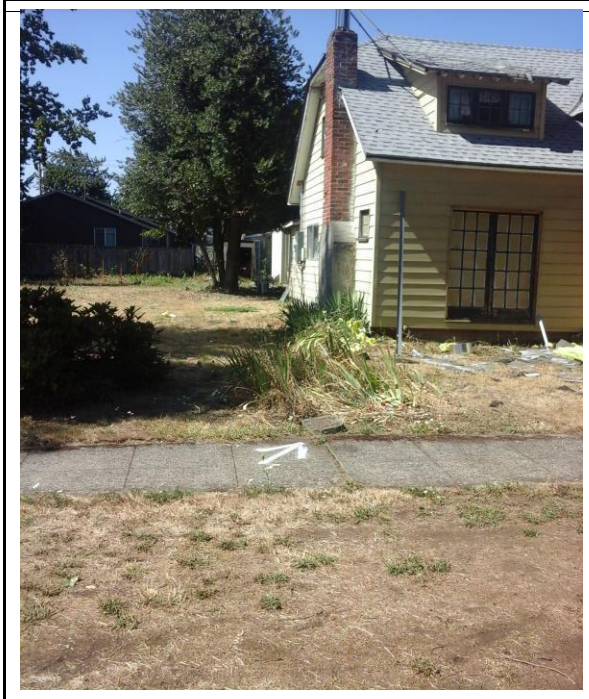
Lattitude: 45.75893015 **Longitude:** -122.8602448

Matchpoint Estimated GPM

GALLONS PER MINUTE:	0.50
GALLONS PER DAY (24 Hours):	720.00
GALLONS PER MONTH (30 Days):	21,600.00
GALLONS PER YEAR (365 Days):	262,800.00

Leak Description/Comments

Service Leak Near Box



Leakage Technician: Austin Deaver **Date:** August 25, 2016

MATCHPOINT

Matchpoint Water Asset Management

Water. That's the Point.

215 RACINE DRIVE,
SUITE 201
WILMINGTON, NC. 28403

Address: 51536 SE 2nd St.

Urgency: Minimal	**Gradient:** Asphalt	**Leak Type:** Fitting/Valve	**Pipe Size:** 12-in.	**Pipe Material:** C900
Leak Detection Method: Sounding		**Visible Water:** No	**Person Submitted To:** Mr. Doug Nassinbene	
Lattitude: 45.74271688		**Longitude:** -122.8752169		

Matchpoint Estimated GPM

GALLONS PER MINUTE:	2.00
GALLONS PER DAY (24 Hours):	2,880.00
GALLONS PER MONTH (30 Days):	86,400.00
GALLONS PER YEAR (365 Days):	1,051,200.00

Leak Description/Comments

Leak At Valve

Leakage Technician: Austin Deaver

Date: August 25, 2016

Matchpoint Water Asset Management

Water. That's the Point.

215 RACINE DRIVE,
SUITE 201
WILMINGTON, NC. 28403

Address: 34484 E. Columbia Ave.

Urgency: Moderate	**Gradient:** Grass	**Leak Type:** Service	**Pipe Size:** 1.5-in.	**Pipe Material:** PVC
Leak Detection Method: Sounding		**Visible Water:** No	**Person Submitted To:** Mr. Doug Nassinbene	
Lattitude: 45.75226074		**Longitude:** -122.8564516		

Matchpoint Estimated GPM

GALLONS PER MINUTE:	5.00
GALLONS PER DAY (24 Hours):	7,200.00
GALLONS PER MONTH (30 Days):	216,000.00
GALLONS PER YEAR (365 Days):	2,628,000.00

Leak Description/Comments

Service Leak Between Meter And Main

Leakage Technician: Deaver/Gunderson

Date: August 25, 2016

Matchpoint Water Asset Management

Water. That's the Point.

215 RACINE DRIVE,
SUITE 201
WILMINGTON, NC. 28403

Address: 33867 NE Prairie St.

Urgency: Moderate	**Gradient:** Gravel	**Leak Type:** Main	**Pipe Size:** 4-in.	**Pipe Material:** ODS
Leak Detection Method: Correlation		**Visible Water:** No	**Person Submitted To:** Mr. Doug Nassinbene	
Lattitude: 45.75803562		**Longitude:** -122.8701873		

Matchpoint Estimated GPM

GALLONS PER MINUTE:	5.00
GALLONS PER DAY (24 Hours):	7,200.00
GALLONS PER MONTH (30 Days):	216,000.00
GALLONS PER YEAR (365 Days):	2,628,000.00

Leak Description/Comments

Leak At Main

Leakage Technician: Austin Deaver

Date: August 25, 2016

Appendix D

2-YEAR WATER LOSS CONTROL PLAN

7/1/2019

2 Year Water Loss Reduction Plan

History

Within recent years, the City of Scappoose has undergone many changes. Those changes include: new City Management and Staff, several new housing developments and substantial new commercial development. Subsequently, the City has been working to update its Master Plans for Water, Wastewater and Stormwater.

During these updates, City Staff and Engineers from Carollo have identified a 10% or greater increase in water loss from previous years. Since 2015, the City has been experiencing between 33% - 38% loss.

City Staff believe that these losses are a combination of Real Losses, Apparent Losses and Non-Revenue Authorized Consumption.

- **Real Losses**: much of the City's distribution system is aged and has zones with pressures exceeding 100 psi. City crews are responding to approximately 20 leaks per year.
- **Apparent Losses**: meter inaccuracy, water theft, recording and computing errors.
- **Non-Revenue Authorized**: lack of usage recording for system flushing, fire fighting, fire training and construction of new infrastructure.

The City of Scappoose operates from a Budget that renews annually on July 1st. Therefore, this Plan will follow projects identified the City's fiscal year Budgets.

Plan

2019-20

- Develop a Leak Detection Program
- Contract a City-wide leak detection update
- Continue to replace/install new remote read meters
- Evaluate the City's current data logging and billing practices
- Coordinate with the Scappoose Fire Department to develop and method of tracking water usage for fires and training
- Implement better methods of tracking water used for Construction of both City and Private projects
- Identify pipelines in need of replacement
- Upgrade Water Treatment Plant SCADA systems to improve metering accuracy of water production and potentially reduce backwash cycles and associated non-revenue authorized water use

2020-21

- Evaluate 2019-20 progress
- Continue leak detection program
- Continue water meter replacement
- Begin engineering of pipeline replacement and pressure zone improvement projects
- Begin construction of pipeline replacements

Note – This Plan to be updated annually

Appendix E

2018 ANNUAL WATER AUDIT

AWWA Free Water Audit Software v5.0

This spreadsheet-based water audit tool is designed to help quantify and track water losses associated with water distribution systems and identify areas for improved efficiency and cost recovery. It provides a "top-down" summary water audit format, and is not meant to take the place of a full-scale, comprehensive water audit format.

Auditors are strongly encouraged to refer to the most current edition of AWWA M36 Manual for Water Audits for detailed guidance on the water auditing process and targetting loss reduction levels

The spreadsheet contains several separate worksheets. Sheets can be accessed using the tabs towards the bottom of the screen, or by clicking the buttons below.

Please begin by providing the following information

Name of Contact Person:	Darryl Sykes
Email Address:	dsykes@cityofscappoose.org
Telephone | Ext.:	5033690297
Name of City / Utility:	City of Scappoose
City/Town/Municipality:	Scappoose
State / Province:	Oregon (OR)
Country:	USA
Year:	2018 Calendar Year
Audit Preparation Date:	6/4/2018
Volume Reporting Units:	Million gallons (US)
PWSID / Other ID:	4100792

The following guidance will help you complete the Audit

All audit data are entered on the ***Reporting Worksheet***

- Value can be entered by user
- Value calculated based on input data
- These cells contain recommended default values

Use of Option (Radio) Buttons: Pcnt: 0.25% Value:

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell to the right

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

Instructions
The current sheet. Enter contact information and basic audit details (year, units etc)

Reporting Worksheet
Enter the required data on this worksheet to calculate the water balance and data grading

Comments
Enter comments to explain how values were calculated or to document data sources

Performance Indicators
Review the performance indicators to evaluate the results of the audit

Water Balance
The values entered in the Reporting Worksheet are used to populate the Water Balance

Dashboard
A graphical summary of the water balance and Non-Revenue Water components

Grading Matrix
Presents the possible grading options for each input component of the audit

Service Connection Diagram
Diagrams depicting possible customer service connection line configurations

Definitions
Use this sheet to understand the terms used in the audit process

Loss Control Planning
Use this sheet to interpret the results of the audit validity score and performance indicators

Example Audits
Reporting Worksheet and Performance Indicators examples are shown for two validated audits

Acknowledgements
Acknowledgements for the AWWA Free Water Audit Software v5.0

If you have questions or comments regarding the software please contact us via email at: wlc@awwa.org

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0
American Water Works Association

? Click to access definition
+ Click to add a comment

Water Audit Report for: City of Scappoose (4100792)
Reporting Year: 2018 1/2018 - 12/2018

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<---------- Enter grading in column 'E' and 'J' ---------->

					Pcnt:	Value:	
Volume from own sources:	5	316.446	MG/Yr	3	1.00%		MG/Yr
Water imported:	n/a		MG/Yr				MG/Yr
Water exported:	n/a		MG/Yr				MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 313.313 MG/Yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

			Pcnt:	Value:	
Billed metered:	5	204.029	MG/Yr		
Billed unmetered:	n/a		MG/Yr		
Unbilled metered:	5	0.910	MG/Yr		
Unbilled unmetered:		3.916	MG/Yr	1.25%	MG/Yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: 208.855 MG/Yr

Use buttons to select percentage of water supplied **OR** value

WATER LOSSES (Water Supplied - Authorized Consumption) 104.457 MG/Yr

Apparent Losses

			Pcnt:	Value:	
Unauthorized consumption:		0.783	MG/Yr	0.25%	MG/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	3	0.000	MG/Yr		MG/Yr
Systematic data handling errors:		0.510	MG/Yr	0.25%	MG/Yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 1.293 MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 103.164 MG/Yr

WATER LOSSES: 104.457 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 109.284 MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	3	45.7	miles
Number of active AND inactive service connections:	7	2,673	
Service connection density:		58	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	4	55.0	psi

COST DATA

Total annual cost of operating water system:	7	$2,105,834	$/Year
Customer retail unit cost (applied to Apparent Losses):	9	$91.73	$/1000 gallons (US)
Variable production cost (applied to Real Losses):	4		$/Million gallons ☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 53 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Customer metering inaccuracies
3: Billed metered

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

WAS v5.0

American Water Works Association.

Water Audit Report for: City of Scappoose (4100792)

Reporting Year: 2018 | 1/2018 - 12/2018

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 53 out of 100 ***

System Attributes:

	Apparent Losses:	1.293	MG/Yr
+	Real Losses:	103.164	MG/Yr
=	**Water Losses:**	**104.457**	MG/Yr
?	Unavoidable Annual Real Losses (UARL):	13.01	MG/Yr
	Annual cost of Apparent Losses:	$118,639	
	Annual cost of Real Losses:		Valued at **Variable Production Cost**

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	34.9%	
	Non-revenue water as percent by cost of operating system:	5.6%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	1.33	gallons/connection/day
	Real Losses per service connection per day:	105.74	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	1.92	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	103.16	million gallons/year
?	Infrastructure Leakage Index (ILI) [CARL/UARL]:	7.93	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

Use this worksheet to add comments or notes to explain how an input value was calculated, or to document the sources of the information used.

General Comment:	

Audit Item	Comment
Volume from own sources:	
Vol. from own sources: Master meter error adjustment:	
Water imported:	
Water imported: master meter error adjustment:	
Water exported:	
Water exported: master meter error adjustment:	
Billed metered:	
Billed unmetered:	
Unbilled metered:	

Audit Item	Comment
Unbilled unmetered:	
Unauthorized consumption:	
Customer metering inaccuracies:	
Systematic data handling errors:	
Length of mains:	
Number of active AND inactive service connections:	
Average length of customer service line:	
Average operating pressure:	
Total annual cost of operating water system:	
Customer retail unit cost (applied to Apparent Losses):	
Variable production cost (applied to Real Losses):	

AWWA Free Water Audit Software: Water Balance

WAS v5.0

American Water Works Association.

Water Audit Report for:	City of Scappoose (4100792)	
Reporting Year:	2018	1/2018 - 12/2018
Data Validity Score:	53	

		Water Exported 0.000			Billed Water Exported	Revenue Water 0.000
Own Sources (Adjusted for known errors) 313.313	System Input 313.313	Water Supplied 313.313	Authorized Consumption 208.855	Billed Authorized Consumption 204.029	Billed Metered Consumption (water exported is removed) 204.029	Revenue Water 204.029
					Billed Unmetered Consumption 0.000	
				Unbilled Authorized Consumption 4.826	Unbilled Metered Consumption 0.910	Non-Revenue Water (NRW) 109.284
					Unbilled Unmetered Consumption 3.916	
			Water Losses 104.457	Apparent Losses 1.293	Unauthorized Consumption 0.783	
					Customer Metering Inaccuracies 0.000	
					Systematic Data Handling Errors 0.510	
Water Imported 0.000				Real Losses 103.164	Leakage on Transmission and/or Distribution Mains Not broken down	
					Leakage and Overflows at Utility's Storage Tanks Not broken down	
					Leakage on Service Connections Not broken down	

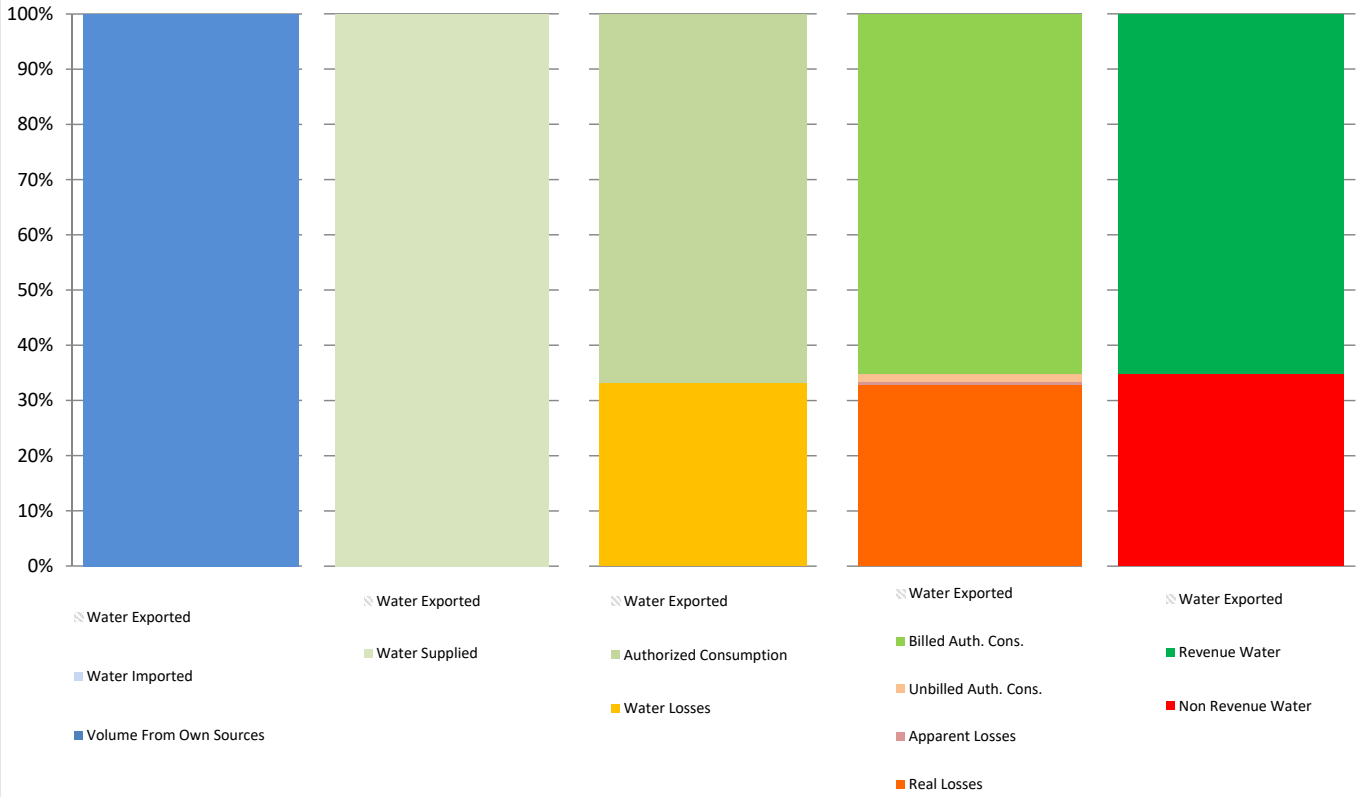
AWWA Free Water Audit Software:
Dashboard

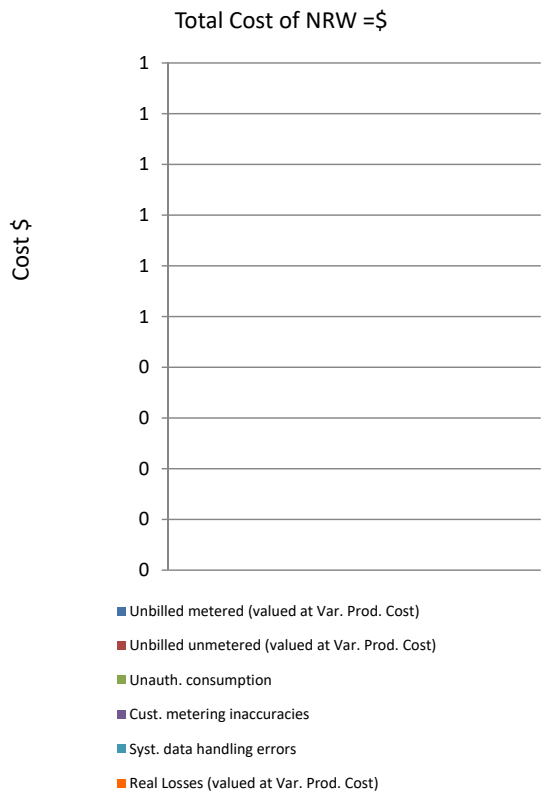
WAS v5.0
American Water Works Association.

The graphic below is a visual representation of the Water Balance with bar heights propotional to the volume of the audit components

Water Audit Report for: City of Scappoose (4100792)
Reporting Year: 2018 | 1/2018 - 12/2018
Data Validity Score: 53

○ Show me the VOLUME of Non-Revenue Water
◉ Show me the COST of Non-Revenue Water





AWWA Free Water Audit Software: Grading Matrix

WAS 5.0

The grading assigned to each audit component and the corresponding recommended improvements and actions are highlighted in yellow. Audit accuracy is likely to be improved by prioritizing those items shown in red

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
WATER SUPPLIED											
Volume from own sources:	Select this grading only if the water utility purchases/imports all of its water resources (i.e. has no sources of its own)	Less than 25% of water production sources are metered, remaining sources are estimated. No regular meter accuracy testing or electronic calibration conducted.	25% - 50% of treated water production sources are metered; other sources estimated. No regular meter accuracy testing or electronic calibration conducted.	Conditions between 2 and 4	50% - 75% of treated water production sources are metered, other sources estimated. Occasional meter accuracy testing or electronic calibration conducted.	Conditions between 4 and 6	At least 75% of treated water production sources are metered, or at least 90% of the source flow is derived from metered sources. Meter accuracy testing and/or electronic calibration of related instrumentation is conducted annually. Less than 25% of tested meters are found outside of +/- 6% accuracy.	Conditions between 6 and 8	100% of treated water production sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted annually, less than 10% of meters are found outside of +/- 6% accuracy	Conditions between 8 and 10	100% of treated water production sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually, with less than 10% found outside of +/- 3% accuracy. Procedures are reviewed by a third party knowledgeable in the M36 methodology.
Improvements to attain higher data grading for "Volume from own Sources" component:		to qualify for 2: Organize and launch efforts to collect data for determining volume from own sources	to qualify for 4: Locate all water production sources on maps and in the field, launch meter accuracy testing for existing meters, begin to install meters on unmetered water production sources and replace any obsolete/defective meters.		to qualify for 6: Formalize annual meter accuracy testing for all source meters; specify the frequency of testing. Complete installation of meters on unmetered water production sources and complete replacement of all obsolete/defective meters.		to qualify for 8: Conduct annual meter accuracy testing and calibration of related instrumentation on all meter installations on a regular basis. Complete project to install new, or replace defective existing, meters so that entire production meter population is metered. Repair or replace meters outside of +/- 6% accuracy.		to qualify for 10: Maintain annual meter accuracy testing and calibration of related instrumentation for all meter installations. Repair or replace meters outside of +/- 3% accuracy. Investigate new meter technology; pilot one or more replacements with innovative meters in attempt to further improve meter accuracy.		to maintain 10: Standardize meter accuracy test frequency to semi-annual, or more frequent, for all meters. Repair or replace meters outside of +/- 3% accuracy. Continually investigate/pilot improving metering technology.
Volume from own sources master meter and supply error adjustment:	Select n/a only if the water utility fails to have meters on its sources of supply	Inventory information on meters and paper records of measured volumes exist but are incomplete and/or in a very crude condition; data error cannot be determined	No automatic datalogging of production volumes; daily readings are scribed on paper records without any accountability controls. Flows are not balanced across the water distribution system: tank/storage elevation changes are not employed in calculating the "Volume from own sources" component and archived flow data is adjusted only when grossly evident data error occurs.	Conditions between 2 and 4	Production meter data is logged automatically in electronic format and reviewed at least on a monthly basis with necessary corrections implemented. "Volume from own sources" tabulations include estimate of daily changes in tanks/storage facilities. Meter data is adjusted when gross data errors occur, or occasional meter testing deems this necessary.	Conditions between 4 and 6	Hourly production meter data logged automatically & reviewed on at least a weekly basis. Data is adjusted to correct gross error when meter/instrumentation equipment malfunction is detected; and/or error is confirmed by meter accuracy testing. Tank/storage facility elevation changes are automatically used in calculating a balanced "Volume from own sources" component, and data gaps in the archived data are corrected on at least a weekly basis.	Conditions between 6 and 8	Continuous production meter data is logged automatically & reviewed each business day. Data is adjusted to correct gross error from detected meter/instrumentation equipment malfunction and/or results of meter accuracy testing. Tank/storage facility elevation changes are automatically used in "Volume from own sources" tabulations and data gaps in the archived data are corrected on a daily basis.	Conditions between 8 and 10	Computerized system (SCADA or similar) automatically balances flows from all sources and storages; results are reviewed each business day. Tight accountability controls ensure that all data gaps that occur in the archived flow data are quickly detected and corrected. Regular calibrations between SCADA and sources meters ensures minimal data transfer error.
Improvements to attain higher data grading for "Master meter and supply error adjustment" component:		to qualify for 2: Develop a plan to restructure recordkeeping system to capture all flow data; set a procedure to review flow data on a daily basis to detect input errors. Obtain more reliable information about existing meters by conducting field inspections of meters and related instrumentation, and obtaining manufacturer literature.	to qualify for 4: Install automatic datalogging equipment on production meters. Complete installation of level instrumentation at all tanks/storage facilities and include tank level data in automatic calculation routine in a computerized system. Construct a computerized listing or spreadsheet to archive input volumes, tank/storage volume changes and import/export flows in order to determine the composite "Water Supplied" volume for the distribution system. Set a procedure to review this data on a monthly basis to detect gross anomalies and data gaps.		to qualify for 6: Refine computerized data collection and archive to include hourly production meter data that is reviewed at least on a weekly basis to detect specific data anomalies and gaps. Use daily net storage change to balance flows in calculating "Water Supplied" volume. Necessary corrections to data errors are implemented on a weekly basis.		to qualify for 8: Ensure that all flow data is collected and archived on at least an hourly basis. All data is reviewed and detected errors corrected each business day. Tank/storage levels variations are employed in calculating balanced "Water Supplied" component. Adjust production meter data for gross error and inaccuracy confirmed by testing.		to qualify for 10: Link all production and tank/storage facility elevation change data to a Supervisory Control & Data Acquisition (SCADA) System, or similar computerized monitoring/control system, and establish automatic flow balancing algorithm and regularly calibrate between SCADA and source meters. Data is reviewed and corrected each business day.		to maintain 10: Monitor meter innovations for development of more accurate and less expensive flowmeters. Continue to replace or repair meters as they perform outside of desired accuracy limits. Stay abreast of new and more accurate water level instruments to better record tank/storage levels and archive the variations in storage volume. Keep current with SCADA and data management systems to ensure that archived data is well-managed and error free.
Water Imported:	Select n/a if the water utility's supply is exclusively from its own water resources (no bulk purchased/ imported water)	Less than 25% of imported water sources are metered, remaining sources are estimated. No regular meter accuracy testing.	25% - 50% of imported water sources are metered; other sources estimated. No regular meter accuracy testing.	Conditions between 2 and 4	50% - 75% of imported water sources are metered, other sources estimated. Occasional meter accuracy testing conducted.	Conditions between 4 and 6	At least 75% of imported water sources are metered, meter accuracy testing and/or electronic calibration of related instrumentation is conducted annually for all meter installations. Less than 25% of tested meters are found outside of +/- 6% accuracy.	Conditions between 6 and 8	100% of imported water sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted annually, less than 10% of meters are found outside of +/- 6% accuracy	Conditions between 8 and 10	100% of imported water sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually for all meter installations, with less than 10% of accuracy tests found outside of +/- 3% accuracy.
Improvements to attain higher data grading for "Water Imported Volume" component: *(Note: usually the water supplier selling the water - "the Exporter" - to the utility being audited is responsible to maintain the metering installation measuring the imported volume. The utility should coordinate carefully with the Exporter to ensure that adequate meter upkeep takes place and an accurate measure of the Water Imported volume is quantified.)*		to qualify for 2: Review bulk water purchase agreements with partner suppliers; confirm requirements for use and maintenance of accurate metering. Identify needs for new or replacement meters with goal to meter all imported water sources.	To qualify for 4: Locate all imported water sources on maps and in the field, launch meter accuracy testing for existing meters, begin to install meters on unmetered imported water interconnections and replace obsolete/defective meters.		to qualify for 6: Formalize annual meter accuracy testing for all imported water meters, planning for both regular meter accuracy testing and calibration of the related instrumentation. Continue installation of meters on unmetered imported water interconnections and replacement of obsolete/defective meters.		to qualify for 8: Complete project to install new, or replace defective, meters on all imported water interconnections. Maintain annual meter accuracy testing for all imported water meters and conduct calibration of related instrumentation at least annually. Repair or replace meters outside of +/- 6% accuracy.		to qualify for 10: Conduct meter accuracy testing for all meters on a semi-annual basis, along with calibration of all related instrumentation. Repair or replace meters outside of +/- 3% accuracy. Investigate new meter technology; pilot one or more replacements with innovative meters in attempt to improve meter accuracy.		to maintain 10: Standardize meter accuracy test frequency to semi-annual, or more frequent, for all meters. Continue to conduct calibration of related instrumentation on a semi-annual basis. Repair or replace meters outside of +/- 3% accuracy. Continually investigate/pilot improving metering technology.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Water imported master meter and supply error adjustment:	Select n/a if the Imported water supply is unmetered, with Imported water quantities estimated on the billing invoices sent by the Exporter to the purchasing Utility.	Inventory information on imported meters and paper records of measured volumes exist but are incomplete and/or in a very crude condition; data error cannot be determined Written agreement(s) with water Exporter(s) are missing or written in vague language concerning meter management and testing.	No automatic datalogging of imported supply volumes; daily readings are scribed on paper records without any accountability controls to confirm data accuracy and the absence of errors and data gaps in recorded volumes. Written agreement requires meter accuracy testing but is vague on the details of how and who conducts the testing.	Conditions between 2 and 4	Imported supply metered flow data is logged automatically in electronic format and reviewed at least on a monthly basis by the Exporter with necessary corrections implemented. Meter data is adjusted by the Exporter when gross data errors are detected. A coherent data trail exists for this process to protect both the selling and the purchasing Utility. Written agreement exists and clearly states requirements and roles for meter accuracy testing and data management.	Conditions between 4 and 6	Hourly Imported supply metered data is logged automatically & reviewed on at least a weekly basis by the Exporter. Data is adjusted to correct gross error when meter/instrumentation equipment malfunction is detected; and to correct for error confirmed by meter accuracy testing. Any data gaps in the archived data are detected and corrected during the weekly review. A coherent data trail exists for this process to protect both the selling and the purchasing Utility.	Conditions between 6 and 8	Continuous Imported supply metered flow data is logged automatically & reviewed each business day by the Exporter. Data is adjusted to correct gross error from detected meter/instrumentation equipment malfunction and/or results of meter accuracy testing. Any data errors/gaps are detected and corrected on a daily basis. A data trail exists for the process to protect both the selling and the purchasing Utility.	Conditions between 8 and 10	Computerized system (SCADA or similar) automatically records data which is reviewed each business day by the Exporter. Tight accountability controls ensure that all error/data gaps that occur in the archived flow data are quickly detected and corrected. A reliable data trail exists and contract provisions for meter testing and data management are reviewed by the selling and purchasing Utility at least once every five years.
Improvements to attain higher data grading for "Water imported master meter and supply error adjustment" component:		<u>to qualify for 2:</u> Develop a plan to restructure recordkeeping system to capture all flow data; set a procedure to review flow data on a daily basis to detect input errors. Obtain more reliable information about existing meters by conducting field inspections of meters and related instrumentation, and obtaining manufacturer literature. Review the written agreement between the selling and purchasing Utility.	<u>to qualify for 4:</u> Install automatic datalogging equipment on Imported supply meters. Set a procedure to review this data on a monthly basis to detect gross anomalies and data gaps. Launch discussions with the Exporters to jointly review terms of the written agreements regarding meter accuracy testing and data management; revise the terms as necessary.		<u>to qualify for 6:</u> Refine computerized data collection and archive to include hourly Imported supply metered flow data that is reviewed at least on a weekly basis to detect specific data anomalies and gaps. Make necessary corrections to errors/data errors on a weekly basis.		<u>to qualify for 8:</u> Ensure that all Imported supply metered flow data is collected and archived on at least an hourly basis. All data is reviewed and errors/data gaps are corrected each business day.		<u>to qualify for 10:</u> Conduct accountability checks to confirm that all Imported supply metered data is reviewed and corrected each business day by the Exporter. Results of all meter accuracy tests and data corrections should be available for sharing between the Exporter and the purchasing Utility. Establish a schedule for a regular review and updating of the contractual language in the written agreement between the selling and the purchasing Utility; at least every five years.		<u>to maintain 10:</u> Monitor meter innovations for development of more accurate and less expensive flowmeters; work with the Exporter to help identify meter replacement needs. Keep communication lines with Exporters open and maintain productive relations. Keep the written agreement current with clear and explicit language that meets the ongoing needs of all parties.
Water Exported:	Select n/a if the water utility sells no bulk water to neighboring water utilities (no exported water sales)	Less than 25% of exported water sources are metered, remaining sources are estimated. No regular meter accuracy testing.	25% - 50% of exported water sources are metered; other sources estimated. No regular meter accuracy testing.	Conditions between 2 and 4	50% - 75% of exported water sources are metered, other sources estimated. Occasional meter accuracy testing conducted.	Conditions between 4 and 6	At least 75% of exported water sources are metered, meter accuracy testing and/or electronic calibration conducted annually. Less than 25% of tested meters are found outside of +/- 6% accuracy.	Conditions between 6 and 8	100% of exported water sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted annually, less than 10% of meters are found outside of +/- 6% accuracy	Conditions between 8 and 10	100% of exported water sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually for all meter installations, with less than 10% of accuracy tests found outside of +/- 3% accuracy.
Improvements to attain higher data grading for "Water Exported Volume" component: (*Note: usually, if the water utility being audited sells (Exports) water to a neighboring purchasing Utility, it is the responsibility of the utility exporting the water to maintain the metering installation measuring the Exported volume. The utility exporting the water should ensure that adequate meter upkeep takes place and an accurate measure of the Water Exported volume is quantified.*)		<u>to qualify for 2:</u> Review bulk water sales agreements with purchasing utilities; confirm requirements for use & upkeep of accurate metering. Identify needs to install new, or replace defective meters as needed.	<u>To qualify for 4:</u> Locate all exported water sources on maps and in field, launch meter accuracy testing for existing meters, begin to install meters on unmetered exported water interconnections and replace obsolete/defective meters		<u>to qualify for 6:</u> Formalize annual meter accuracy testing for all exported water meters. Continue installation of meters on unmetered exported water interconnections and replacement of obsolete/defective meters.		<u>to qualify for 8:</u> Complete project to install new, or replace defective, meters on all exported water interconnections. Maintain annual meter accuracy testing for all exported water meters. Repair or replace meters outside of +/- 6% accuracy.		<u>to qualify for 10:</u> Maintain annual meter accuracy testing for all meters. Repair or replace meters outside of +/- 3% accuracy. Investigate new meter technology; pilot one or more replacements with innovative meters in attempt to improve meter accuracy.		<u>to maintain 10:</u> Standardize meter accuracy test frequency to semi-annual, or more frequent, for all meters. Repair or replace meters outside of +/- 3% accuracy. Continually investigate/pilot improving metering technology.
Water exported master meter and supply error adjustment:	Select n/a only if the water utility fails to have meters on its exported supply interconnections.	Inventory information on exported meters and paper records of measured volumes exist but are incomplete and/or in a very crude condition; data error cannot be determined Written agreement(s) with the utility purchasing the water are missing or written in vague language concerning meter management and testing.	No automatic datalogging of exported supply volumes; daily readings are scribed on paper records without any accountability controls to confirm data accuracy and the absence of errors and data gaps in recorded volumes. Written agreement requires meter accuracy testing but is vague on the details of how and who conducts the testing.	Conditions between 2 and 4	Exported metered flow data is logged automatically in electronic format and reviewed at least on a monthly basis, with necessary corrections implemented. Meter data is adjusted by the utility selling (exporting) the water when gross data errors are detected. A coherent data trail exists for this process to protect both the utility exporting the water and the purchasing Utility. Written agreement exists and clearly states requirements and roles for meter accuracy testing and data management.	Conditions between 4 and 6	Hourly exported supply metered data is logged automatically & reviewed on at least a weekly basis by the utility selling the water. Data is adjusted to correct gross error when meter/instrumentation equipment malfunction is detected; and to correct for error found by meter accuracy testing. Any data gaps in the archived data are detected and corrected during the weekly review. A coherent data trail exists for this process to protect both the selling (exporting) utility and the purchasing Utility.	Conditions between 6 and 8	Continuous exported supply metered flow data is logged automatically & reviewed each business day by the utility selling (exporting) the water. Data is adjusted to correct gross error from detected meter/instrumentation equipment malfunction and any error confirmed by meter accuracy testing. Any data errors/gaps are detected and corrected on a daily basis. A data trail exists for the process to protect both the selling (exporting) Utility and the purchasing Utility.	Conditions between 8 and 10	Computerized system (SCADA or similar) automatically records data which is reviewed each business day by the utility selling (exporting) the water. Tight accountability controls ensure that all error/data gaps that occur in the archived flow data are quickly detected and corrected. A reliable data trail exists and contract provisions for meter testing and data management are reviewed by the selling Utility and purchasing Utility at least once every five years.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Improvements to attain higher data grading for "Water exported master meter and supply error adjustment" component:		to qualify for 2: Develop a plan to restructure recordkeeping system to capture all flow data; set a procedure to review flow data on a daily basis to detect input errors. Obtain more reliable information about existing meters by conducting field inspections of meters and related instrumentation, and obtaining manufacturer literature. Review the written agreement between the utility selling (exporting) the water and the purchasing Utility.	to qualify for 4: Install automatic datalogging equipment on exported supply meters. Set a procedure to review this data on a monthly basis to detect gross anomalies and data gaps. Launch discussions with the purchasing utilities to jointly review terms of the written agreements regarding meter accuracy testing and data management; revise the terms as necessary.		to qualify for 6: Refine computerized data collection and archive to include hourly exported supply metered flow data that is reviewed at least on a weekly basis to detect specific data anomalies and gaps. Make necessary corrections to errors/data errors on a weekly basis.		to qualify for 8: Ensure that all exported metered flow data is collected and archived on at least an hourly basis. All data is reviewed and errors/data gaps are corrected each business day.		to qualify for 10: Conduct accountability checks to confirm that all exported metered flow data is reviewed and corrected each business day by the utility selling the water. Results of all meter accuracy tests and data corrections should be available for sharing between the utility and the purchasing Utility. Establish a schedule for a regular review and updating of the contractual language in the written agreements with the purchasing utilities; at least every five years.		to maintain 10: Monitor meter innovations for development of more accurate and less expensive flowmeters; work with the purchasing utilities to help identify meter replacement needs. Keep communication lines with the purchasing utilities open and maintain productive relations. Keep the written agreement current with clear and explicit language that meets the ongoing needs of all parties.
AUTHORIZED CONSUMPTION											
Billed metered:	n/a (not applicable). Select n/a only if the entire customer population is not metered and is billed for water service on a flat or fixed rate basis. In such a case the volume entered must be zero.	Less than 50% of customers with volume-based billings from meter readings; flat or fixed rate billing exists for the majority of the customer population	At least 50% of customers with volume-based billing from meter reads; flat rate billing for others. Manual meter reading is conducted, with less than 50% meter read success rate, remaining accounts' consumption is estimated. Limited meter records, no regular meter testing or replacement. Billing data maintained on paper records, with no auditing.	Conditions between 2 and 4	At least 75% of customers with volume-based, billing from meter reads; flat or fixed rate billing for remaining accounts. Manual meter reading is conducted with at least 50% meter read success rate; consumption for accounts with failed reads is estimated. Purchase records verify age of customer meters; only very limited meter accuracy testing is conducted. Customer meters are replaced only upon complete failure. Computerized billing records exist, but only sporadic internal auditing conducted.	Conditions between 4 and 6	At least 90% of customers with volume-based billing from meter reads; consumption for remaining accounts is estimated. Manual customer meter reading gives at least 80% customer meter reading success rate; consumption for accounts with failed reads is estimated. Good customer meter records eixst, but only limited meter accuracy testing is conducted. Regular replacement is conducted for the oldest meters. Computerized billing records exist with annual auditing of summary statistics conducting by utility personnel.	Conditions between 6 and 8	At least 97% of customers exist with volume-based billing from meter reads. At least 90% customer meter reading success rate; or at least 80% read success rate with planning and budgeting for trials of Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) in one or more pilot areas. Good customer meter records. Regular meter accuracy testing guides replacement of statistically significant number of meters each year. Routine auditing of computerized billing records for global and detailed statistics occurs annually by utility personnel, and is verified by third party at least once every five years.	Conditions between 8 and 10	At least 99% of customers exist with volume-based billing from meter reads. At least 95% customer meter reading success rate; or minimum 80% meter reading success rate, with Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) trials underway. Statistically significant customer meter testing and replacement program in place on a continuous basis. Computerized billing with routine, detailed auditing, including field investigation of representative sample of accounts undertaken annually by utility personnel. Audit is conducted by third party auditors at least once every three years.
Improvements to attain higher data grading for "Billed Metered Consumption" component:	If n/a is selected because the customer meter population is unmetered, consider establishing a new policy to meter the customer population and employ water rates based upon metered volumes.	to qualify for 2: Conduct investigations or trials of customer meters to select appropriate meter models. Budget funding for meter installations. Investigate volume based water rate structures.	to qualify for 4: Purchase and install meters on unmetered accounts. Implement policies to improve meter reading success. Catalog meter information during meter read visits to identify age/model of existing meters. Test a minimal number of meters for accuracy. Install computerized billing system.		to qualify for 6: Purchase and install meters on unmetered accounts. Eliminate flat fee billing and establish appropriate water rate structure based upon measured consumption. Continue to achieve verifiable success in removing manual meter reading barriers. Expand meter accuracy testing. Launch regular meter replacement program. Launch a program of annual auditing of global billing statistics by utility personnel.		to qualify for 8: Purchase and install meters on unmetered accounts. If customer meter reading success rate is less than 97%, assess cost-effectiveness of Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) system for portion or entire system; or otherwise achieve ongoing improvements in manual meter reading success rate to 97% or higher. Refine meter accuracy testing program. Set meter replacement goals based upon accuracy test results. Implement annual auditing of detailed billing records by utility personnel and implement third party auditing at least once every five years.		to qualify for 10: Purchase and install meters on unmetered accounts. Launch Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) system trials if manual meter reading success rate of at least 99% is not achieved within a five-year program. Continue meter accuracy testing program. Conduct planning and budgeting for large scale meter replacement based upon meter life cycle analysis using cumulative flow target. Continue annual detailed billing data auditing by utility personnel and conduct third party auditing at least once every three years.		to maintain 10: Continue annual internal billing data auditing, and third party auditing at least every three years. Continue customer meter accuracy testing to ensure that accurate customer meter readings are obtained and entered as the basis for volume based billing. Stay abreast of improvements in Automatic Meter Reading (AMR) and Advanced Metering Infrastructure (AMI) and information management. Plan and budget for justified upgrades in metering, meter reading and billing data management to maintain very high accuracy in customer metering and billing.
Billed unmetered:	Select n/a if it is the policy of the water utility to meter all customer connections and it has been confirmed by detailed auditing that all customers do indeed have a water meter; i.e. no intentionally unmetered accounts exist	Water utility policy does not require customer metering; flat or fixed fee billing is employed. No data is collected on customer consumption. The only estimates of customer population consumption available are derived from data estimation methods using average fixture count multiplied by number of connections, or similar approach.	Water utility policy does not require customer metering; flat or fixed fee billing is employed. Some metered accounts exist in parts of the system (pilot areas or District Metered Areas) with consumption read periodically or recorded on portable dataloggers over one, three, or seven day periods. Data from these sample meters are used to infer consumption for the total customer population. Site specific estimation methods are used for unusual buildings/water uses.	Conditions between 2 and 4	Water utility policy does require metering and volume based billing in general. However, a liberal amount of exemptions and a lack of clearly written and communicated procedures result in up to 20% of billed accounts believed to be unmetered by exemption; or the water utility is in transition to becoming fully metered, and a large number of customers remain unmetered. A rough estimate of the annual consumption for all unmetered accounts is included in the annual water audit, with no inspection of individual unmetered accounts.	Conditions between 4 and 6	Water utility policy does require metering and volume based billing but established exemptions exist for a portion of accounts such as municipal buildings. As many as 15% of billed accounts are unmetered due to this exemption or meter installation difficulties. Only a group estimate of annual consumption for all unmetered accounts is included in the annual water audit, with no inspection of individual unmetered accounts.	Conditions between 6 and 8	Water utility policy does require metering and volume based billing for all customer accounts. However, less than 5% of billed accounts remain unmetered because meter installation is hindered by unusual circumstances. The goal is to minimize the number of unmetered accounts. Reliable estimates of consumption are obtained for these unmetered accounts via site specific estimation methods.	Conditions between 8 and 10	Water utility policy does require metering and volume based billing for all customer accounts. Less than 2% of billed accounts are unmetered and exist because meter installation is hindered by unusual circumstances. The goal exists to minimize the number of unmetered accounts to the extent that is economical. Reliable estimates of consumption are obtained at these accounts via site specific estimation methods.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Improvements to attain higher data grading for "Billed Unmetered Consumption" component:		to qualify for 2: Conduct research and evaluate cost/benefit of a new water utility policy to require metering of the customer population; thereby greatly reducing or eliminating unmetered accounts. Conduct pilot metering project by installing water meters in small sample of customer accounts and periodically reading the meters or datalogging the water consumption over one, three, or seven day periods.	to qualify for 4: Implement a new water utility policy requiring customer metering. Launch or expand pilot metering study to include several different meter types, which will provide data for economic assessment of full scale metering options. Assess sites with access difficulties to devise means to obtain water consumption volumes. Begin customer meter installation.		to qualify for 6: Refine policy and procedures to improve customer metering participation for all but solidly exempt accounts. Assign staff resources to review billing records to identify errant unmetered properties. Specify metering needs and funding requirements to install sufficient meters to significant reduce the number of unmetered accounts		to qualify for 8: Push to install customer meters on a full scale basis. Refine metering policy and procedures to ensure that all accounts, including municipal properties, are designated for meters. Plan special efforts to address "hard-to-access" accounts. Implement procedures to obtain a reliable consumption estimate for the remaining few unmetered accounts awaiting meter installation.		to qualify for 10: Continue customer meter installation throughout the service area, with a goal to minimize unmetered accounts. Sustain the effort to investigate accounts with access difficulties, and devise means to install water meters or otherwise measure water consumption.		to maintain 10: Continue to refine estimation methods for unmetered consumption and explore means to establish metering, for as many billed remaining unmetered accounts as is economically feasible.
Unbilled metered:	select n/a if all billing-exempt consumption is unmetered.	Billing practices exempt certain accounts, such as municipal buildings, but written policies do not exist; and a reliable count of unbilled metered accounts is unavailable. Meter upkeep and meter reading on these accounts is rare and not considered a priority. Due to poor recordkeeping and lack of auditing, water consumption for all such accounts is purely guesstimated.	Billing practices exempt certain accounts, such as municipal buildings, but only scattered, dated written directives exist to justify this practice. A reliable count of unbilled metered accounts is unavailable. Sporadic meter replacement and meter reading occurs on an as-needed basis. The total annual water consumption for all unbilled, metered accounts is estimated based upon approximating the number of accounts and assigning consumption from actively billed accounts of same meter size.	Conditions between 2 and 4	Dated written procedures permit billing exemption for specific accounts, such as municipal properties, but are unclear regarding certain other types of accounts. Meter reading is given low priority and is sporadic. Consumption is quantified from meter readings where available. The total number of unbilled, unmetered accounts must be estimated along with consumption volumes.	Conditions between 4 and 6	Written policies regarding billing exemptions exist but adherence in practice is questionable. Metering and meter reading for municipal buildings is reliable but sporadic for other unbilled metered accounts. Periodic auditing of such accounts is conducted. Water consumption is quantified directly from meter readings where available, but the majority of the consumption is estimated.	Conditions between 6 and 8	Written policy identifies the types of accounts granted a billing exemption. Customer meter management and meter reading are considered secondary priorities, but meter reading is conducted at least annually to obtain consumption volumes for the annual water audit. High level auditing of billing records ensures that a reliable census of such accounts exists.	Conditions between 8 and 10	Clearly written policy identifies the types of accounts given a billing exemption, with emphasis on keeping such accounts to a minimum. Customer meter management and meter reading for these accounts is given proper priority and is reliably conducted. Regular auditing confirms this. Total water consumption for these accounts is taken from reliable readings from accurate meters.
Improvements to attain higher data grading for "Unbilled Metered Consumption" component:		to qualify for 2: Reassess the water utility's policy allowing certain accounts to be granted a billing exemption. Draft an outline of a new written policy for billing exemptions, with clear justification as to why any accounts should be exempt from billing, and with the intention to keep the number of such accounts to a minimum.	to qualify for 4: Review historic written directives and policy documents allowing certain accounts to be billing-exempt. Draft an outline of a written policy for billing exemptions, identify criteria that grants an exemption, with a goal of keeping this number of accounts to a minimum. Consider increasing the priority of reading meters on unbilled accounts at least annually.		to qualify for 6: Draft a new written policy regarding billing exemptions based upon consensus criteria allowing this occurrence. Assign resources to audit meter records and billing records to obtain census of unbilled metered accounts. Gradually include a greater number of these metered accounts to the routes for regular meter reading.		to qualify for 8: Communicate billing exemption policy throughout the organization and implement procedures that ensure proper account management. Conduct inspections of accounts confirmed in unbilled metered status and verify that accurate meters exist and are scheduled for routine meter readings. Gradually increase the number of unbilled metered accounts that are included in regular meter reading routes.		to qualify for 10: Ensure that meter management (meter accuracy testing, meter replacement) and meter reading activities for unbilled accounts are accorded the same priority as billed accounts. Establish ongoing annual auditing process to ensure that water consumption is reliably collected and provided to the annual water audit process.		to maintain 10: Reassess the utility's philosophy in allowing any water uses to go "unbilled". It is possible to meter and bill all accounts, even if the fee charged for water consumption is discounted or waived. Metering and billing all accounts ensures that water consumption is tracked and water waste from plumbing leaks is detected and minimized.
Unbilled unmetered:		Extent of unbilled, unmetered consumption is unknown due to unclear policies and poor recordkeeping. Total consumption is quantified based upon a purely subjective estimate.	Clear extent of unbilled, unmetered consumption is unknown, but a number of events are randomly documented each year, confirming existence of such consumption, but without sufficient documentation to quantify an accurate estimate of the annual volume consumed.	Conditions between 2 and 4	Extent of unbilled, unmetered consumption is partially known, and procedures exist to document certain events such as miscellaneous fire hydrant uses. Formulae is used to quantify the consumption from such events (time running multiplied by typical flowrate, multiplied by number of events).	Default value of 1.25% of system input volume is employed	Coherent policies exist for some forms of unbilled, unmetered consumption but others await closer evaluation. Reasonable recordkeeping for the managed uses exists and allows for annual volumes to be quantified by inference, but unsupervised uses are guesstimated.	Conditions between 6 and 8	Clear policies and good recordkeeping exist for some uses (ex: water used in periodic testing of unmetered fire connections), but other uses (ex: miscellaneous uses of fire hydrants) have limited oversight. Total consumption is a mix of well quantified use such as from formulae (time running multiplied by typical flow, multiplied by number of events) or temporary meters, and relatively subjective estimates of less regulated use.	Conditions between 8 and 10	Clear policies exist to identify permitted use of water in unbilled, unmetered fashion, with the intention of minimizing this type of consumption. Good records document each occurrence and consumption is quantified via formulae (time running multiplied by typical flow, multiplied by number of events) or use of temporary meters.
Improvements to attain higher data grading for "Unbilled Unmetered Consumption" component:		to qualify for 5: Utilize the accepted default value of 1.25% of the volume of water supplied as an expedient means to gain a reasonable quantification of this use. to qualify for 2: Establish a policy regarding what water uses should be allowed to remain as unbilled and unmetered. Consider tracking a small sample of one such use (ex: fire hydrant flushings).	to qualify for 5: Utilize accepted default value of 1.25% of the volume of water supplied as an expedient means to gain a reasonable quantification of this use. to qualify for 4: Evaluate the documentation of events that have been observed. Meet with user groups (ex: for fire hydrants - fire departments, contractors to ascertain their need and/or volume requirements for water from fire hydrants).		to qualify for 5: Utilize accepted default value of 1.25% of the volume of water supplied as an expedient means to gain a reasonable quantification of all such use. This is particularly appropriate for water utilities who are in the early stages of the water auditing process, and should focus on other components since the volume of unbilled, umetered consumption is usually a relatively small quatity component, and other larger-quantity components should take priority.	to qualify for 6 or greater: Finalize policy and begin to conduct field checks to better establish and quantify such usage. Proceed if top-down audit exists and/or a great volume of such use is suspected.	to qualify for 8: Assess water utility policy and procedures for various unmetered usages. For example, ensure that a policy exists and permits are issued for use of fire hydrants by persons outside of the utility. Create written procedures for use and documentation of fire hydrants by water utility personnel. Use same approach for other types of unbilled, unmetered water usage.		to qualify for 10: Refine written procedures to ensure that all uses of unbilled, unmetered water are overseen by a structured permitting process managed by water utility personnel. Reassess policy to determine if some of these uses have value in being converted to billed and/or metered status.		to maintain 10: Continue to refine policy and procedures with intention of reducing the number of allowable uses of water in unbilled and unmetered fashion. Any uses that can feasibly become billed and metered should be converted eventually.
APPARENT LOSSES											

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Unauthorized consumption:		Extent of unauthorized consumption is unknown due to unclear policies and poor recordkeeping. Total unauthorized consumption is guesstimated.	Unauthorized consumption is a known occurrence, but its extent is a mystery. There are no requirements to document observed events, but periodic field reports capture some of these occurrences. Total unauthorized consumption is approximated from this limited data.	conditions between 2 and 4	Procedures exist to document some unauthorized consumption such as observed unauthorized fire hydrant openings. Use formulae to quantify this consumption (time running multiplied typical flowrate, multiplied by number of events).	Default value of 0.25% of volume of water supplied is employed	Coherent policies exist for some forms of unauthorized consumption (more than simply fire hydrant misuse) but others await closer evaluation. Reasonable surveillance and recordkeeping exist for occurrences that fall under the policy. Volumes quantified by inference from these records.	Conditions between 6 and 8	Clear policies and good auditable recordkeeping exist for certain events (ex: tampering with water meters, illegal bypasses of customer meters); but other occurrences have limited oversight. Total consumption is a combination of volumes from formulae (time x typical flow) and subjective estimates of unconfirmed consumption.	Conditions between 8 and 10	Clear policies exist to identify all known unauthorized uses of water. Staff and procedures exist to provide enforcement of policies and detect violations. Each occurrence is recorded and quantified via formulae (estimated time running multiplied by typical flow) or similar methods. All records and calculations should exist in a form that can be audited by a third party.
Improvements to attain higher data grading for "Unauthorized Consumption" component:		to qualify for 5: Use accepted default of 0.25% of volume of water supplied. to qualify for 2: Review utility policy regarding what water uses are considered unauthorized, and consider tracking a small sample of one such occurrence (ex: unauthorized fire hydrant openings)	to qualify for 5: Use accepted default of 0.25% of system input volume to qualify for 4: Review utility policy regarding what water uses are considered unauthorized, and consider tracking a small sample of one such occurrence (ex: unauthorized fire hydrant openings)		to qualify for 5: Utilize accepted default value of 0.25% of volume of water supplied as an expedient means to gain a reasonable quantification of all such use. This is particularly appropriate for water utilities who are in the early stages of the water auditing process.	to qualify for 6 or greater: Finalize policy updates to clearly identify the types of water consumption that are authorized from those usages that fall outside of this policy and are, therefore, unauthorized. Begin to conduct regular field checks. Proceed if the top-down audit already exists and/or a great volume of such use is suspected.	to quality for 8: Assess water utility policies to ensure that all known occurrences of unauthorized consumption are outlawed, and that appropriate penalties are prescribed. Create written procedures for detection and documentation of various occurrences of unauthorized consumption as they are uncovered.		to qualify for 10: Refine written procedures and assign staff to seek out likely occurrences of unauthorized consumption. Explore new locking devices, monitors and other technologies designed to detect and thwart unauthorized consumption.		to maintain 10: Continue to refine policy and procedures to eliminate any loopholes that allow or tacitly encourage unauthorized consumption. Continue to be vigilant in detection, documentation and enforcement efforts.
Customer metering inaccuracies:	select n/a only if the entire customer population is unmetered. In such a case the volume entered must be zero.	Customer meters exist, but with unorganized paper records on meters; no meter accuracy testing or meter replacement program for any size of retail meter. Metering workflow is driven chaotically with no proactive management. Loss volume due to aggregate meter inaccuracy is guesstimated.	Poor recordkeeping and meter oversight is recognized by water utility management who has allotted staff and funding resources to organize improved recordkeeping and start meter accuracy testing. Existing paper records gathered and organized to provide cursory disposition of meter population. Customer meters are tested for accuracy only upon customer request.	Conditions between 2 and 4	Reliable recordkeeping exists; meter information is improving as meters are replaced. Meter accuracy testing is conducted annually for a small number of meters (more than just customer requests, but less than 1% of inventory). A limited number of the oldest meters are replaced each year. Inaccuracy volume is largely an estimate, but refined based upon limited testing data.	Conditions between 4 and 6	A reliable electronic recordkeeping system for meters exists. The meter population includes a mix of new high performing meters and dated meters with suspect accuracy. Routine, but limited, meter accuracy testing and meter replacement occur. Inaccuracy volume is quantified using a mix of reliable and less certain data.	Conditions between 6 and 8	Ongoing meter replacement and accuracy testing result in highly accurate customer meter population. Testing is conducted on samples of meters of varying age and accumulated volume of throughput to determine optimum replacement time for various types of meters.	Ongoing meter replacement and accuracy testing result in highly accurate customer meter population. Statistically significant number of meters are tested in audit year. This testing is conducted on samples of meters of varying age and accumulated volume of throughput to determine optimum replacement time for these meters.	Good records of all active customer meters exist and include as a minimum: meter number, account number/location, type, size and manufacturer. Ongoing meter replacement occurs according to a targeted and justified basis. Regular meter accuracy testing gives a reliable measure of composite inaccuracy volume for the customer meter population. New metering technology is embraced to keep overall accuracy improving. Procedures are reviewed by a third party knowledgeable in the M36 methodology.
Improvements to attain higher data grading for "Customer meter inaccuracy volume" component:	If n/a is selected because the customer meter population is unmetered, consider establishing a new policy to meter the customer population and employ water rates based upon metered volumes.	to qualify for 2: Gather available meter purchase records. Conduct testing on a small number of meters believed to be the most inaccurate. Review staffing needs of the metering group and budget for necessary resources to better organize meter management.	to qualify for 4: Implement a reliable record keeping system for customer meter histories, preferably using electronic methods typically linked to, or part of, the Customer Billing System or Customer Information System. Expand meter accuracy testing to a larger group of meters.		to qualify for 6: Standardize the procedures for meter recordkeeping within an electronic information system. Accelerate meter accuracy testing and meter replacements guided by testing results.		to qualify for 8: Expand annual meter accuracy testing to evaluate a statistically significant number of meter makes/models. Expand meter replacement program to replace statistically significant number of poor performing meters each year.		to qualify for 9: Continue efforts to manage meter population with reliable recordkeeping. Test a statistically significant number of meters each year and analyze test results in an ongoing manner to serve as a basis for a target meter replacement strategy based upon accumulated volume throughput.	to qualify for 10: Continue efforts to manage meter population with reliable recordkeeping, meter testing and replacement. Evaluate new meter types and install one or more types in 5-10 customer accounts each year in order to pilot improving metering technology.	to maintain 10: Increase the number of meters tested and replaced as justified by meter accuracy test data. Continually monitor development of new metering technology and Advanced Metering Infrastructure (AMI) to grasp opportunities for greater accuracy in metering of water flow and management of customer consumption data.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Systematic Data Handling Errors:	Note: all water utilities incur some amount of this error. Even in water utilities with unmetered customer populations and fixed rate billing, errors occur in annual billing tabulations. Enter a positive value for the volume and select a grading.	Policies and procedures for activation of new customer water billing accounts are vague and lack accountability. Billing data is maintained on paper records which are not well organized. No auditing is conducted to confirm billing data handling efficiency. An unknown number of customers escape routine billing due to lack of billing process oversight.	Policy and procedures for activation of new customer accounts and oversight of billing records exist but need refinement. Billing data is maintained on paper records or insufficiently capable electronic database. Only periodic unstructured auditing work is conducted to confirm billing data handling efficiency. The volume of unbilled water due to billing lapses is a guess.	Conditions between 2 and 4	Policy and procedures for new account activation and oversight of billing operations exist but needs refinement. Computerized billing system exists, but is dated or lacks needed functionality. Periodic, limited internal audits conducted and confirm with approximate accuracy the consumption volumes lost to billing lapses.	Conditions between 4 and 6	Policy and procedures for new account activation and oversight of billing operations is adequate and reviewed periodically. Computerized billing system is in use with basic reporting available. Any effect of billing adjustments on measured consumption volumes is well understood. Internal checks of billing data error conducted annually. Reasonably accurate quantification of consumption volume lost to billing lapses is obtained.	Conditions between 6 and 8	New account activation and billing operations policy and procedures are reviewed at least biannually. Computerized billing system includes an array of reports to confirm billing data and system functionality. Checks are conducted routinely to flag and explain zero consumption accounts. Annual internal checks conducted with third party audit conducted at least once every five years. Accountability checks flag billing lapses. Consumption lost to billing lapses is well quantified and reducing year-by-year.	Conditions between 8 and 10	Sound written policy and procedures exist for new account activation and oversight of customer billing operations. Robust computerized billing system gives high functionality and reporting capabilities which are utilized, analyzed and the results reported each billing cycle. Assessment of policy and data handling errors are conducted internally and audited by third party at least once every three years, ensuring consumption lost to billing lapses is minimized and detected as it occurs.
Improvements to attain higher data grading for "Systematic Data Handling Error volume" component:		to qualify for 2: Draft written policy and procedures for activating new water billing accounts and oversight of billing operations. Investigate and budget for computerized customer billing system. Conduct initial audit of billing records by flow-charting the basic business processes of the customer account/billing function.	to qualify for 4: Finalize written policy and procedures for activation of new billing accounts and overall billing operations management. Implement a computerized customer billing system. Conduct initial audit of billing records as part of this process.		to qualify for 6: Refine new account activation and billing operations procedures and ensure consistency with the utility policy regarding billing, and minimize opportunity for missed billings. Upgrade or replace customer billing system for needed functionality - ensure that billing adjustments don't corrupt the value of consumption volumes. Procedurize internal annual audit process.		to qualify for 8: Formalize regular review of new account activation process and general billing practices. Enhance reporting capability of computerized billing system. Formalize regular auditing process to reveal scope of data handling error. Plan for periodic third party audit to occur at least once every five years.		to qualify for 10: Close policy/procedure loopholes that allow some customer accounts to go unbilled, or data handling errors to exist. Ensure that billing system reports are utilized, analyzed and reported every billing cycle. Ensure that internal and third party audits are conducted at least once every three years.		to maintain 10: Stay abreast of customer information management developments and innovations. Monitor developments of Advanced Metering Infrastructure (AMI) and integrate technology to ensure that customer endpoint information is well-monitored and errors/lapses are at an economic minimum.
SYSTEM DATA											
Length of mains:		Poorly assembled and maintained paper as-built records of existing water main installations makes accurate determination of system pipe length impossible. Length of mains is guesstimated.	Paper records in poor or uncertain condition (no annual tracking of installations & abandonments). Poor procedures to ensure that new water mains installed by developers are accurately documented.	Conditions between 2 and 4	Sound written policy and procedures exist for documenting new water main installations, but gaps in management result in a uncertain degree of error in tabulation of mains length.	Conditions between 4 and 6	Sound written policy and procedures exist for permitting and commissioning new water mains. Highly accurate paper records with regular field validation; or electronic records and asset management system in good condition. Includes system backup.	Conditions between 6 and 8	Sound written policy and procedures exist for permitting and commissioning new water mains. Electronic recordkeeping such as a Geographical Information System (GIS) and asset management system are used to store and manage data.	Conditions between 8 and 10	Sound written policy exists for managing water mains extensions and replacements. Geographic Information System (GIS) data and asset management database agree and random field validation proves truth of databases. Records of annual field validation should be available for review.
Improvements to attain higher data grading for "Length of Water Mains" component:		to qualify for 2: Assign personnel to inventory current as-built records and compare with customer billing system records and highway plans in order to verify poorly documented pipelines. Assemble policy documents regarding permitting and documentation of water main installations by the utility and building developers; identify gaps in procedures that result in poor documentation of new water main installations.	to qualify for 4: Complete inventory of paper records of water main installations for several years prior to audit year. Review policy and procedures for commissioning and documenting new water main installation.		to qualify for 6: Finalize updates/improvements to written policy and procedures for permitting/commissioning new main installations. Confirm inventory of records for five years prior to audit year; correct any errors or omissions.		to qualify for 8: Launch random field checks of limited number of locations. Convert to electronic database such as a Geographic Information System (GIS) with backup as justified. Develop written policy and procedures.		to qualify for 10: Link Geographic Information System (GIS) and asset management databases, conduct field verification of data. Record field verification information at least annually.		to maintain 10: Continue with standardization and random field validation to improve the completeness and accuracy of the system.
Number of active AND inactive service connections:		Vague permitting (of new service connections) policy and poor paper recordkeeping of customer connections/billings result in suspect determination of the number of service connections, which may be 10-15% in error from actual count.	General permitting policy exists but paper records, procedural gaps, and weak oversight result in questionable total for number of connections, which may vary 5-10% of actual count.	Conditions between 2 and 4	Written account activation policy and procedures exist, but with some gaps in performance and oversight. Computerized information management system is being brought online to replace dated paper recordkeeping system. Reasonably accurate tracking of service connection installations & abandonments; but count can be up to 5% in error from actual total.	Conditions between 4 and 6	Written new account activation and overall billing policies and procedures are adequate and reviewed periodically. Computerized information management system is in use with annual installations & abandonments totaled. Very limited field verifications and audits. Error in count of number of service connections is believed to be no more than 3%.	Conditions between 6 and 8	Policies and procedures for new account activation and overall billing operations are written, well-structured and reviewed at least biannually. Well-managed computerized information management system exists and routine, periodic field checks and internal system audits are conducted. Counts of connections are no more than 2% in error.	Conditions between 8 and 10	Sound written policy and well managed and audited procedures ensure reliable management of service connection population. Computerized information management system, Customer Billing System, and Geographic Information System (GIS) information agree; field validation proves truth of databases. Count of connections recorded as being in error is less than 1% of the entire population.
Improvements to attain higher data grading for "Number of Active and Inactive Service Connections" component:	**Note: The number of Service Connections does not include fire hydrant leads/lines connecting the hydrant to the water main**	to qualify for 2: Draft new policy and procedures for new account activation and overall billing operations. Research and collect paper records of installations & abandonments for several years prior to audit year.	to qualify for 4: Refine policy and procedures for new account activation and overall billing operations. Research computerized recordkeeping system (Customer Information System or Customer Billing System) to improve documentation format for service connections.		to qualify for 6: Refine procedures to ensure consistency with new account activation and overall billing policy to establish new service connections or decommission existing connections. Improve process to include all totals for at least five years prior to audit year.		to qualify for 8: Formalize regular review of new account activation and overall billing operations policies and procedures. Launch random field checks of limited number of locations. Develop reports and auditing mechanisms for computerized information management system.		to qualify for 10: Close any procedural loopholes that allow installations to go undocumented. Link computerized information management system with Geographic Information System (GIS) and formalize field inspection and information system auditing processes. Documentation of new or decommissioned service connections encounters several levels of checks and balances.		to maintain 10: Continue with standardization and random field validation to improve knowledge of system.
	Note: if customer water	Gradings 1-9 apply if customer properties are unmetered, if customer meters exist and are located inside the customer building premises, or if the water utility owns and is responsible for the entire service connection piping from the water main to the customer building. In any of these cases the average distance between the curb stop or boundary separating utility/customer responsibility for service connection piping, and the typical first point of use (ex: faucet) or the customer meter must be quantified. Gradings of 1-9 are used to grade the validity of the means to quantify this value. (See the "Service Connection Diagram" worksheet)									Either of two conditions can be met for a grading of 10:

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Average length of customer service line:	meters are located outside of the customer building next to the curb stop or boundary separating utility/customer responsibility, then the auditor should answer "Yes" to the question on the Reporting Worksheet asking about this. If the answer is Yes, the grading description listed under the Grading of 10(a) will be followed, with a value of zero automatically entered at a Grading of 10. See the Service Connection Diagram worksheet for a visual presentation of this distance.	Vague policy exists to define the delineation of water utility ownership and customer ownership of the service connection piping. Curb stops are perceived as the breakpoint but these have not been well-maintained or documented. Most are buried or obscured. Their location varies widely from site-to-site, and estimating this distance is arbitrary due to the unknown location of many curb stops.	Policy requires that the curb stop serves as the delineation point between water utility ownership and customer ownership of the service connection piping. The piping from the water main to the curb stop is the property of the water utility; and the piping from the curb stop to the customer building is owned by the customer. Curb stop locations are not well documented and the average distance is based upon a limited number of locations measured in the field.	Conditions between 2 and 4	Good policy requires that the curb stop serves as the delineation point between water utility ownership and customer ownership of the service connection piping. Curb stops are generally installed as needed and are reasonably documented. Their location varies widely from site-to-site, and an estimate of this distance is hindered by the availability of paper records of limited accuracy.	Conditions between 4 and 6	Clear written policy exists to define utility/customer responsibility for service connection piping. Accurate, well-maintained paper or basic electronic recordkeeping system exists. Periodic field checks confirm piping lengths for a sample of customer properties.	Conditions between 6 and 8	Clearly worded policy standardizes the location of curb stops and meters, which are inspected upon installation. Accurate and well maintained electronic records exist with periodic field checks to confirm locations of service lines, curb stops and customer meter pits. An accurate number of customer properties from the customer billing system allows for reliable averaging of this length.	Conditions between 8 and 10	a) Customer water meters exist outside of customer buildings next to the curb stop or boundary separating utility/customer responsibility for service connection piping. If so, answer "Yes" to the question on the Reporting Working asking about this condition. A value of zero and a Grading of 10 are automatically entered in the Reporting Worksheet . b). Meters exist inside customer buildings, or properties are unmetered. In either case, answer "No" to the Reporting Worksheet question on meter location, and enter a distance determined by the auditor. For a Grading of 10 this value must be a very reliable number from a Geographic Information System (GIS) and confirmed by a statistically valid number of field checks.
Improvements to attain higher data grading for "Average Length of Customer Service Line" component:		to qualify for 2: Research and collect paper records of service line installations. Inspect several sites in the field using pipe locators to locate curb stops. Obtain the length of this small sample of connections in this manner.	to qualify for 4: Formalize and communicate policy delineating utility/customer responsibilities for service connection piping. Assess accuracy of paper records by field inspection of a small sample of service connections using pipe locators as needed. Research the potential migration to a computerized information management system to store service connection data.		to qualify for 6: Establish coherent procedures to ensure that policy for curb stop, meter installation and documentation is followed. Gain consensus within the water utility for the establishment of a computerized information management system.		to qualify for 8: Implement an electronic means of recordkeeping, typically via a customer information system, customer billing system, or Geographic Information System (GIS). Standardize the process to conduct field checks of a limited number of locations.		to qualify for 10: Link customer information management system and Geographic Information System (GIS), standardize process for field verification of data.		to maintain 10: Continue with standardization and random field validation to improve knowledge of service connection configurations and customer meter locations.
Average operating pressure:		Available records are poorly assembled and maintained paper records of supply pump characteristics and water distribution system operating conditions. Average pressure is guesstimated based upon this information and ground elevations from crude topographical maps. Widely varying distribution system pressures due to undulating terrain, high system head loss and weak/erratic pressure controls further compromise the validity of the average pressure calculation.	Limited telemetry monitoring of scattered pumping station and water storage tank sites provides some static pressure data, which is recorded in handwritten logbooks. Pressure data is gathered at individual sites only when low pressure complaints arise. Average pressure is determined by averaging relatively crude data, and is affected by significant variation in ground elevations, system head loss and gaps in pressure controls in the distribution system.	Conditions between 2 and 4	Effective pressure controls separate different pressure zones; moderate pressure variation across the system, occasional open boundary valves are discovered that breech pressure zones. Basic telemetry monitoring of the distribution system logs pressure data electronically. Pressure data gathered by gauges or dataloggers at fire hydrants or buildings when low pressure complaints arise, and during fire flow tests and system flushing. Reliable topographical data exists. Average pressure is calculated using this mix of data.	Conditions between 4 and 6	Reliable pressure controls separate distinct pressure zones; only very occasional open boundary valves are encountered that breech pressure zones. Well-covered telemetry monitoring of the distribution system (not just pumping at source treatment plants or wells) logs extensive pressure data electronically. Pressure gathered by gauges/dataloggers at fire hydrants and buildings when low pressure complaints arise, and during fire flow tests and system flushing. Average pressure is determined by using this mix of reliable data.	Conditions between 6 and 8	Well-managed, discrete pressure zones exist with generally predictable pressure fluctuations. A current full-scale SCADA System or similar realtime monitoring system exists to monitor the water distribution system and collect data, including real time pressure readings at representative sites across the system. The average system pressure is determined from reliable monitoring system data.	Conditions between 8 and 10	Well-managed pressure districts/zones, SCADA System and hydraulic model exist to give very precise pressure data across the water distribution system. Average system pressure is reliably calculated from extensive, reliable, and cross-checked data. Calculations are reported on an annual basis as a minimum.
Improvements to attain higher data grading for "Average Operating Pressure" component:		to qualify for 2: Employ pressure gauging and/or datalogging equipment to obtain pressure measurements from fire hydrants. Locate accurate topographical maps of service area in order to confirm ground elevations. Research pump data sheets to find pump pressure/flow characteristics	to qualify for 4: Formalize a procedure to use pressure gauging/datalogging equipment to gather pressure data during various system events such as low pressure complaints, or operational testing. Gather pump pressure and flow data at different flow regimes. Identify faulty pressure controls (pressure reducing valves, altitude valves, partially open boundary valves) and plan to properly configure pressure zones. Make all pressure data from these efforts available to generate system-wide average pressure.		to qualify for 6: Expand the use of pressure gauging/datalogging equipment to gather scattered pressure data at a representative set of sites, based upon pressure zones or areas. Utilize pump pressure and flow data to determine supply head entering each pressure zone or district. Correct any faulty pressure controls (pressure reducing valves, altitude valves, partially open boundary valves) to ensure properly configured pressure zones. Use expanded pressure dataset from these activities to generate system-wide average pressure.		to qualify for 8: Install a Supervisory Control and Data Acquisition (SCADA) System, or similar realtime monitoring system, to monitor system parameters and control operations. Set regular calibration schedule for instrumentation to insure data accuracy. Obtain accurate topographical data and utilize pressure data gathered from field surveys to provide extensive, reliable data for pressure averaging.		to qualify for 10: Annually, obtain a system-wide average pressure value from the hydraulic model of the distribution system that has been calibrated via field measurements in the water distribution system and confirmed in comparisons with SCADA System data.		to maintain 10: Continue to refine the hydraulic model of the distribution system and consider linking it with SCADA System for real-time pressure data calibration, and averaging.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
COST DATA											
Total annual cost of operating water system:		Incomplete paper records and lack of financial accounting documentation on many operating functions makes calculation of water system operating costs a pure guesstimate	Reasonably maintained, but incomplete, paper or electronic accounting provides data to estimate the major portion of water system operating costs.	Conditions between 2 and 4	Electronic, industry-standard cost accounting system in place. However, gaps in data are known to exist, periodic internal reviews are conducted but not a structured financial audit.	Conditions between 4 and 6	Reliable electronic, industry-standard cost accounting system in place, with all pertinent water system operating costs tracked. Data audited periodically by utility personnel, but not a Certified Public Accountant (CPA).	Conditions between 6 and 8	Reliable electronic, industry-standard cost accounting system in place, with all pertinent water system operating costs tracked. Data audited at least annually by utility personnel, and at least once every three years by third-party CPA.	Conditions between 8 and 10	Reliable electronic, industry-standard cost accounting system in place, with all pertinent water system operating costs tracked. Data audited annually by utility personnel and annually also by third-party CPA.
Improvements to attain higher data grading for "Total Annual Cost of Operating the Water System" component:		to qualify for 2: Gather available records, institute new financial accounting procedures to regularly collect and audit basic cost data of most important operations functions.	to qualify for 4: Implement an electronic cost accounting system, structured according to accounting standards for water utilities		to qualify for 6: Establish process for periodic internal audit of water system operating costs; identify cost data gaps and institute procedures for tracking these outstanding costs.		to qualify for 8: Standardize the process to conduct routine financial audit on an annual basis. Arrange for CPA audit of financial records at least once every three years.		to qualify for 10: Standardize the process to conduct a third-party financial audit by a CPA on an annual basis.		to maintain 10: Maintain program, stay abreast of expenses subject to erratic cost changes and long-term cost trend, and budget/track costs proactively
Customer retail unit cost (applied to Apparent Losses):	Customer population unmetered, and/or only a fixed fee is charged for consumption.	Antiquated, cumbersome water rate structure is used, with periodic historic amendments that were poorly documented and implemented; resulting in classes of customers being billed inconsistent charges. The actual composite billing rate likely differs significantly from the published water rate structure, but a lack of auditing leaves the degree of error indeterminate.	Dated, cumbersome water rate structure, not always employed consistently in actual billing operations. The actual composite billing rate is known to differ from the published water rate structure, and a reasonably accurate estimate of the degree of error is determined, allowing a composite billing rate to be quantified.	Conditions between 2 and 4	Straight-forward water rate structure in use, but not updated in several years. Billing operations reliably employ the rate structure. The composite billing rate is derived from a single customer class such as residential customer accounts, neglecting the effect of different rates from varying customer classes.	Conditions between 4 and 6	Clearly written, up-to-date water rate structure is in force and is applied reliably in billing operations. Composite customer rate is determined using a weighted average residential rate using volumes of water in each rate block.	Conditions between 6 and 8	Effective water rate structure is in force and is applied reliably in billing operations. Composite customer rate is determined using a weighted average composite consumption rate, which includes residential, commercial, industrial, institutional (CII), and any other distinct customer classes within the water rate structure.	Conditions between 8 and 10	Current, effective water rate structure is in force and applied reliably in billing operations. The rate structure and calculations of composite rate - which includes residential, commercial, industrial, institutional (CII), and other distinct customer classes - are reviewed by a third party knowledgeable in the M36 methodology at least once every five years.
Improvements to attain higher data grading for "Customer Retail Unit Cost" component:		to qualify for 2: Formalize the process to implement water rates, including a secure documentation procedure. Create a current, formal water rate document and gain approval from all stakeholders.	to qualify for 4: Review the water rate structure and update/formalize as needed. Assess billing operations to ensure that actual billing operations incorporate the established water rate structure.		to qualify for 6: Evaluate volume of water used in each usage block by residential users. Multiply volumes by full rate structure.	Launch effort to fully meter the customer population and charge rates based upon water volumes	to qualify for 8: Evaluate volume of water used in each usage block by all classifications of users. Multiply volumes by full rate structure.		to qualify for 10: Conduct a periodic third-party audit of water used in each usage block by all classifications of users. Multiply volumes by full rate structure.		to maintain 10: Keep water rate structure current in addressing the water utility's revenue needs. Update the calculation of the customer unit rate as new rate components, customer classes, or other components are modified.
Variable production cost (applied to Real Losses):	Note: if the water utility purchases/imports its entire water supply, then enter the unit purchase cost of the bulk water supply in the Reporting Worksheet with a grading of 10	Incomplete paper records and lack of documentation on primary operating functions (electric power and treatment costs most importantly) makes calculation of variable production costs a pure guesstimate	Reasonably maintained, but incomplete, paper or electronic accounting provides data to roughly estimate the basic operations costs (pumping power costs and treatment costs) and calculate a unit variable production cost.	Conditions between 2 and 4	Electronic, industry-standard cost accounting system in place. Electric power and treatment costs are reliably tracked and allow accurate weighted calculation of unit variable production costs based on these two inputs and water imported purchase costs (if applicable). All costs are audited internally on a periodic basis.	Conditions between 4 and 6	Reliable electronic, industry-standard cost accounting system in place, with all pertinent water system operating costs tracked. Pertinent additional costs beyond power, treatment and water imported purchase costs (if applicable) such as liability, residuals management, wear and tear on equipment, impending expansion of supply, are included in the unit variable production cost, as applicable. The data is audited at least annually by utility personnel.	Conditions between 6 and 8	Reliable electronic, industry-standard cost accounting system in place, with all pertinent primary and secondary variable production and water imported purchase (if applicable) costs tracked. The data is audited at least annually by utility personnel, and at least once every three years by a third-party knowledgeable in the M36 methodology.	Conditions between 8 and 10	Either of two conditions can be met to obtain a grading of 10: 1) Third party CPA audit of all pertinent primary and secondary variable production and water imported purchase (if applicable) costs on an annual basis. or: 2) Water supply is entirely purchased as bulk water imported, and the unit purchase cost - including all applicable marginal supply costs - serves as the variable production cost. If all applicable marginal supply costs are not included in this figure, a grade of 10 should not be selected.
Improvements to attain higher data grading for "Variable Production Cost" component:		to qualify for 2: Gather available records, institute new procedures to regularly collect and audit basic cost data and most important operations functions.	to qualify for 4: Implement an electronic cost accounting system, structured according to accounting standards for water utilities		to qualify for 6: Formalize process for regular internal audits of production costs. Assess whether additional costs (liability, residuals management, equipment wear, impending infrastructure expansion) should be included to calculate a more representative variable production cost.		to qualify for 8: Formalize the accounting process to include direct cost components (power, treatment) as well as indirect cost components (liability, residuals management, etc.) Arrange to conduct audits by a knowledgable third-party at least once every three years.		to qualify for 10: Standardize the process to conduct a third-party financial audit by a CPA on an annual basis.		to maintain 10: Maintain program, stay abreast of expenses subject to erratic cost changes and budget/track costs proactively

Average Length of Customer Service Line

The three figures shown on this worksheet display the assignment of the Average Length of Customer Service Line, Lp, for the three most common piping configurations.

Figure 1 shows the configuration of the water meter outside of the customer building next to the curb stop valve. In this configuration Lp = 0 since the distance between the curb stop and the customer metering point is essentially zero.

Figure 2 shows the configuration of the customer water meter located inside the customer building, where Lp is the distance from the curb stop to the water meter.

Figure 3 shows the configuration of an unmetered customer building , where Lp is the distance from the curb stop to the first point of customer water consumption, or, more simply, the building line.

In any water system the Lp will vary notably in a community of different structures, therefore the average Lp value is used and this should be approximated or calculated if a sample of service line measurements has been gathered.

Click for more information

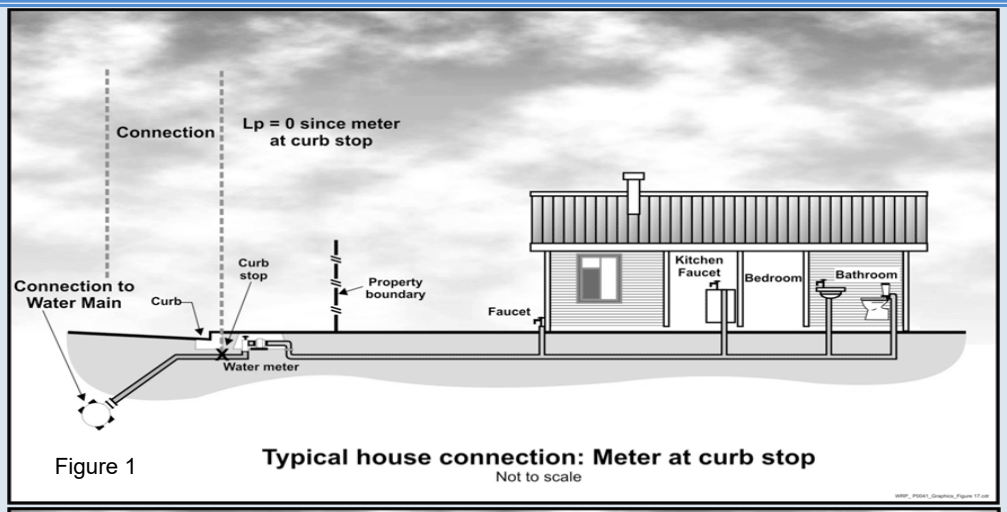


Figure 1 **Typical house connection: Meter at curb stop**
Not to scale

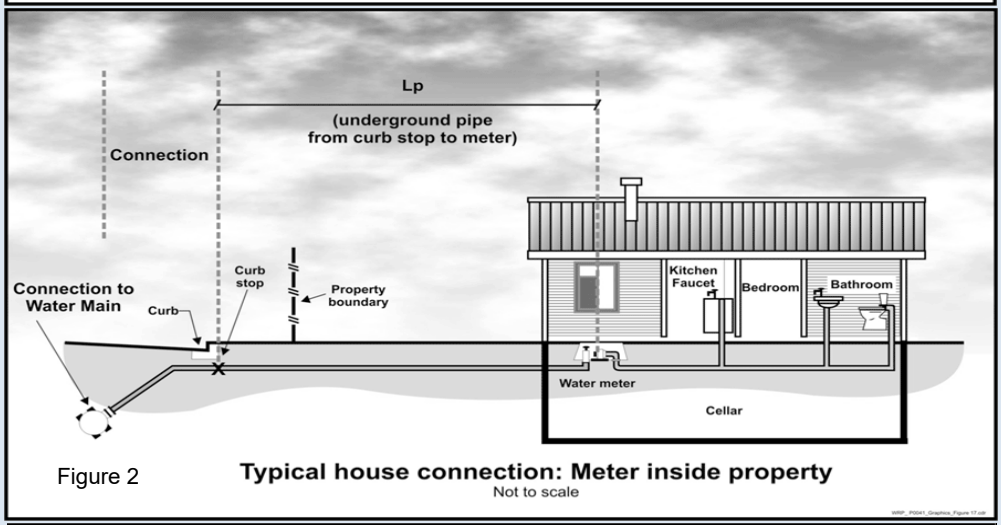


Figure 2 **Typical house connection: Meter inside property**
Not to scale

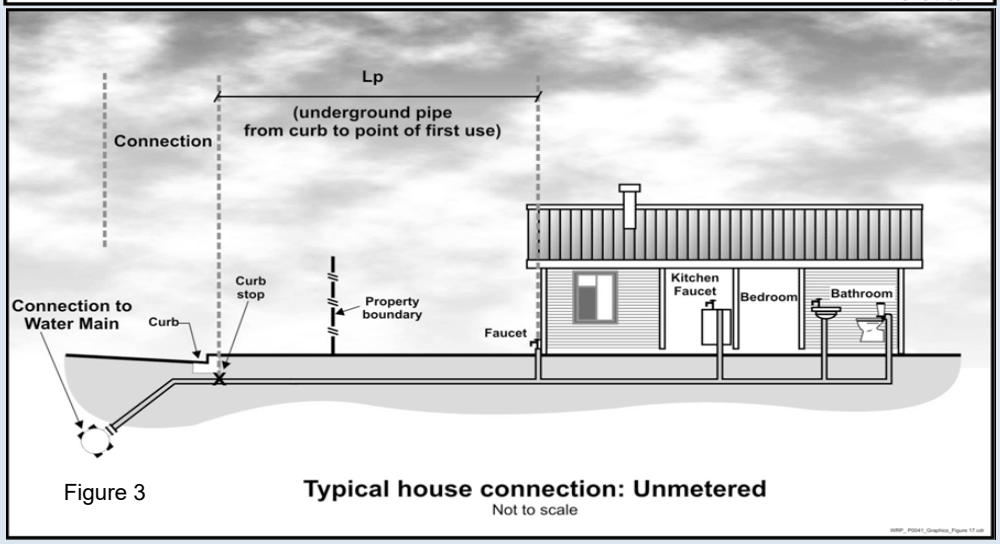
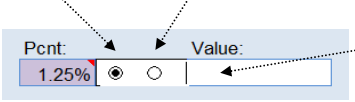


Figure 3 **Typical house connection: Unmetered**
Not to scale

Item Name	Description
Apparent Losses Find	= unauthorized consumption + customer metering inaccuracies + systematic data handling errors Apparent Losses include all types of inaccuracies associated with customer metering (worn meters as well as improperly sized meters or wrong type of meter for the water usage profile) as well as systematic data handling errors (meter reading, billing, archiving and reporting), plus unauthorized consumption (theft or illegal use). NOTE: Over-estimation of Apparent Losses results in under-estimation of Real Losses. Under-estimation of Apparent Losses results in over-estimation of Real Losses.
AUTHORIZED CONSUMPTION Find	= billed water exported + billed metered + billed unmetered + unbilled metered + unbilled unmetered consumption The volume of metered and/or unmetered water taken by registered customers, the water utility's own uses, and uses of others who are implicitly or explicitly authorized to do so by the water utility; for residential, commercial, industrial and public-minded purposes. Typical retail customers' consumption is tabulated usually from established customer accounts as billed metered consumption, or - for unmetered customers - billed unmetered consumption. These types of consumption, along with billed water exported, provide revenue potential for the water utility. **Be certain to tabulate the water exported volume as a separate component and do not "double-count" it by including in the billed metered consumption component as well as the water exported component.** Unbilled authorized consumption occurs typically in non-account uses, including water for fire fighting and training, flushing of water mains and sewers, street cleaning, watering of municipal gardens, public fountains, or similar public-minded uses. Occasionally these uses may be metered and billed (or charged a flat fee), but usually they are unmetered and unbilled. In the latter case, the water auditor may use a default value to estimate this quantity, or implement procedures for the reliable quantification of these uses. This starts with documenting usage events as they occur and estimating the amount of water used in each event. (See Unbilled unmetered consumption)
View Service Connection Diagram **Average length of customer service line** Find	This is the average length of customer service line, Lp, that is owned and maintained by the customer; from the point of ownership transfer to the customer water meter, or building line (if unmetered). The quantity is one of the data inputs for the calculation of Unavoidable Annual Real Losses (UARL), which serves as the denominator of the performance indicator: Infrastructure Leakage Index (ILI). The value of Lp is multiplied by the number of customer service connections to obtain a total length of customer owned piping in the system. The purpose of this parameter is to account for the unmetered service line infrastructure that is the responsibility of the customer for arranging repairs of leaks that occur on their lines. In many cases leak repairs arranged by customers take longer to be executed than leak repairs arranged by the water utility on utility-maintained piping. Leaks run longer - and lose more water - on customer-owned service piping, than utility owned piping. If the customer water meter exists near the ownership transfer point (usually the curb stop located between the water main and the customer premises) this distance is zero because the meter and transfer point are the same. This is the often encountered configuration of customer water meters located in an underground meter box or "pit" outside of the customer's building. The Free Water Audit Software asks a "Yes/No" question about the meter at this location. If the auditor selects "Yes" then this distance is set to zero and the data grading score for this component is set to 10. If water meters are typically located inside the customer premise/building, or properties are unmetered, it is up to the water auditor to estimate a system-wide average Lp length based upon the various customer land parcel sizes and building locations in the service area. Lp will be a shorter length in areas of high density housing, and a longer length in areas of low density housing and varied commercial and industrial buildings. General parcel demographics should be employed to obtain a composite average Lp length for the entire system. Refer to the "Service Connection Diagram" worksheet for a depiction of the service line/metering configurations that typically exist in water utilities. This worksheet gives guidance on the determination of the Average Length, Lp, for each configuration.
Average operating pressure Find	This is the average pressure in the distribution system that is the subject of the water audit. Many water utilities have a calibrated hydraulic model of their water distribution system. For these utilities, the hydraulic model can be utilized to obtain a very accurate quantity of average pressure. In the absence of a hydraulic model, the average pressure may be approximated by obtaining readings of static water pressure from a representative sample of fire hydrants or other system access points evenly located across the system. A weighted average of the pressure can be assembled; but be sure to take into account the elevation of the fire hydrants, which typically exist several feet higher than the level of buried water pipelines. If the water utility is compiling the water audit for the first time, the average pressure can be approximated, but with a low data grading. In subsequent years of auditing, effort should be made to improve the accuracy of the average pressure quantity. This will then qualify the value for a higher data grading.
Billed Authorized Consumption	All consumption that is billed and authorized by the utility. This may include both metered and unmetered consumption. See "Authorized Consumption" for more information.
Billed metered consumption Find	All metered consumption which is billed to retail customers, including all groups of customers such as domestic, commercial, industrial or institutional. **It does NOT include water supplied to neighboring utilities (water exported) which is metered and billed. Be sure to subtract any consumption for exported water sales that may be included in these billing roles. Water supplied as exports to neighboring water utilities should be included only in the Water Exported component.** The metered consumption data can be taken directly from billing records for the water audit period. The accuracy of yearly metered consumption data can be refined by including an adjustment to account for customer meter reading lag time since not all customer meters are read on the same day of the meter reading period. However additional analysis is necessary to determine the lag time adjustment value, which may or may not be significant.
Billed unmetered consumption Find	All billed consumption which is calculated based on estimates or norms from water usage sites that have been determined by utility policy to be left unmetered. This is typically a very small component in systems that maintain a policy to meter their customer population. However, this quantity can be the key consumption component in utilities that have not adopted a universal metering policy. **This component should NOT include any water that is supplied to neighboring utilities (water exported) which is unmetered but billed. Water supplied as exports to neighboring water utilities should be included only in the Water Exported component.**

Item Name	Description
Customer metering inaccuracies Find	Apparent water losses caused by the collective under-registration of customer water meters. Many customer water meters gradually wear as large cumulative volumes of water are passed through them over time. This causes the meters to under-register the flow of water. This occurrence is common with smaller residential meters of sizes 5/8-inch and 3/4 inch after they have registered very large cumulative volumes of water, which generally occurs only after periods of years. For meters sized 1-inch and larger - typical of multi-unit residential, commercial and industrial accounts - meter under-registration can occur from wear or from the improper application of the meter; i.e. installing the wrong type of meter or the wrong size of meter, for the flow pattern (profile) of the consumer. For instance, many larger meters have reduced accuracy at low flows. If an oversized meter is installed, most of the time the routine flow will occur in the low flow range of the meter, and a significant portion of it may not be registered. It is important to properly select and install all meters, but particularly large customer meters, size 1-inch and larger. The auditor has two options for entering data for this component of the audit. The auditor can enter a percentage under-registration (typically an estimated value), this will apply the selected percentage to the two categories of metered consumption to determine the volume of water not recorded due to customer meter inaccuracy. Note that this percentage is a composite average inaccuracy for all customer meters in the entire meter population. The percentage will be multiplied by the sum of the volumes in the Billed Metered and Unbilled Metered components. Alternatively, if the auditor has substantial data from meter testing activities, he or she can calculate their own loss volumes, and this volume may be entered directly. Note that a value of zero will be accepted but an alert will appear asking if the customer population is unmetered. Since all metered systems have some degree of inaccuracy, a positive value should be entered. A value of zero in this component is valid only if the water utility does not meter its customer population.
Customer retail unit cost Find	The Customer Retail Unit Cost represents the charge that customers pay for water service. This unit cost is applied routinely to the components of Apparent Loss, since these losses represent water reaching customers but not (fully) paid for. Since most water utilities have a rate structure that includes a variety of different costs based upon class of customer, a weighted average of individual costs and number of customer accounts in each class can be calculated to determine a single composite cost that should be entered into this cell. Finally, the weighted average cost should also include additional charges for sewer, storm water or biosolids processing, but only if these charges are based upon the volume of potable water consumed. For water utilities in regions with limited water resources and a questionable ability to meet the drinking water demands in the future, the Customer Retail Unit Cost might also be applied to value the Real Losses; instead of applying the Variable Production Cost to Real Losses. In this way, it is assumed that every unit volume of leakage reduced by leakage management activities will be sold to a customer. Note: the Free Water Audit Software allows the user to select the units that are charged to customers (either $/1,000 gallons, $/hundred cubic feet, or $/1,000 litres) and automatically converts these units to the units that appear in the "WATER SUPPLIED" box. The monetary units are United States dollars, $.
Infrastructure Leakage Index (ILI) Find	The ratio of the Current Annual Real Losses (Real Losses) to the Unavoidable Annual Real Losses (UARL). The ILI is a highly effective performance indicator for comparing (benchmarking) the performance of utilities in operational management of real losses.
Length of mains Find	Length of all pipelines (except service connections) in the system starting from the point of system input metering (for example at the outlet of the treatment plant). It is also recommended to include in this measure the total length of fire hydrant lead pipe. Hydrant lead pipe is the pipe branching from the water main to the fire hydrant. Fire hydrant leads are typically of a sufficiently large size that is more representative of a pipeline than a service connection. The average length of hydrant leads across the entire system can be assumed if not known, and multiplied by the number of fire hydrants in the system, which can also be assumed if not known. This value can then be added to the total pipeline length. Total length of mains can therefore be calculated as: Length of Mains, miles = (total pipeline length, miles) + [{(average fire hydrant lead length, ft) x (number of fire hydrants)} / 5,280 ft/mile] or Length of Mains, kilometres = (total pipeline length, kilometres) + [{(average fire hydrant lead length, metres) x (number of fire hydrants)} / 1,000 metres/kilometre]
NON-REVENUE WATER Find	= Apparent Losses + Real Losses + Unbilled Metered Consumption + Unbilled Unmetered Consumption. This is water which does not provide revenue potential to the utility.
Number of active AND inactive service connections Find	Number of customer service connections, extending from the water main to supply water to a customer. Please note that this includes the actual number of distinct piping connections, including fire connections, whether active or inactive. This may differ substantially from the number of customers (or number of accounts). **Note: this number does not include the pipeline leads to fire hydrants - the total length of piping supplying fire hyrants should be included in the "Length of mains" parameter.**
Real Losses Find	Physical water losses from the pressurized system (water mains and customer service connections) and the utility's storage tanks, up to the point of customer consumption. In metered systems this is the customer meter, in unmetered situations this is the first point of consumption (stop tap/tap) within the property. The annual volume lost through all types of leaks, breaks and overflows depends on frequencies, flow rates, and average duration of individual leaks, breaks and overflows.
Revenue Water	Those components of System Input Volume that are billed and have the potential to produce revenue.
Service Connection Density Find	=number of customer service connections / length of mains

Item Name	Description
Systematic data handling errors Find	Apparent losses caused by accounting omissions, errant computer programming, gaps in policy, procedure, and permitting/activation of new accounts; and any type of data lapse that results in under-stated customer water consumption in summary billing reports. **Systematic Data Handling Errors result in a direct loss of revenue potential. Water utilities can find "lost" revenue by keying on this component.** Utilities typically measure water consumption registered by water meters at customer premises. The meter should be read routinely (ex: monthly) and the data transferred to the Customer Billing System, which generates and sends a bill to the customer. Data Transfer Errors result in the consumption value being less than the actual consumption, creating an apparent loss. Such error might occur from illegible and mis-recorded hand-written readings compiled by meter readers, inputting an incorrect meter register unit conversion factor in the automatic meter reading equipment, or a variety of similar errors. Apparent losses also occur from Data Analysis Errors in the archival and data reporting processes of the Customer Billing System. Inaccurate estimates used for accounts that fail to produce a meter reading are a common source of error. Billing adjustments may award customers a rightful monetary credit, but do so by creating a negative value of consumption, thus under-stating the actual consumption. Account activation lapses may allow new buildings to use water for months without meter readings and billing. Poor permitting and construction inspection practices can result in a new building lacking a billing account, a water meter and meter reading; i.e., the customer is unknown to the utility's billing system. Close auditing of the permitting, metering, meter reading, billing and reporting processes of the water consumption data trail can uncover data management gaps that create volumes of systematic data handling error. Utilities should routinely analyze customer billing records to detect data anomalies and quantify these losses. For example, a billing account that registers zero consumption for two or more billing cycles should be checked to explain why usage has seemingly halted. Given the revenue loss impacts of these losses, water utilities are well-justified in providing continuous oversight and timely correction of data transfer errors & data handling errors. If the water auditor has not yet gathered detailed data or assessment of systematic data handling error, it is recommended that the auditor apply the default value of 0.25% of the the Billed Authorized Consumption volume. However, if the auditor has investigated the billing system and its controls, and has well validated data that indicates the volume from systematic data handling error is substantially higher or lower than that generated by the default value, then the auditor should enter a quantity that was derived from the utility investigations and select an appropriate grading. Note: negative values are not allowed for this audit component. If the auditor enters zero for this component then a grading of 1 will be automatically assigned.
Total annual cost of operating the water system Find	These costs include those for operations, maintenance and any annually incurred costs for long-term upkeep of the drinking water supply and distribution system. It should include the costs of day-to-day upkeep and long-term financing such as repayment of capital bonds for infrastructure expansion or improvement. Typical costs include employee salaries and benefits, materials, equipment, insurance, fees, administrative costs and all other costs that exist to sustain the drinking water supply. Depending upon water utility accounting procedures or regulatory agency requirements, it may be appropriate to include depreciation in the total of this cost. This cost should not include any costs to operate wastewater, biosolids or other systems outside of drinking water.
Unauthorized consumption Find	Includes water illegally withdrawn from fire hydrants, illegal connections, bypasses to customer consumption meters, or tampering with metering or meter reading equipment; as well as any other ways to receive water while thwarting the water utility's ability to collect revenue for the water. Unauthorized consumption results in uncaptured revenue and creates an error that understates customer consumption. In most water utilities this volume is low and, if the water auditor has not yet gathered detailed data for these loss occurrences, it is recommended that the auditor apply a default value of 0.25% of the volume of water supplied. However, if the auditor has investigated unauthorized occurrences, and has well validated data that indicates the volume from unauthorized consumption is substantially higher or lower than that generated by the default value, then the auditor should enter a quantity that was derived from the utility investigations. Note that a value of zero will not be accepted since all water utilities have some volume of unauthorized consumption occurring in their system. Note: if the auditor selects the default value for unauthorized consumption, a data grading of 5 is automatically assigned, but not displayed on the Reporting Worksheet.
Unavoidable Annual Real Losses (UARL) Find	UARL (gallons)=(5.41Lm + 0.15Nc + 7.5Lc) xP, or UARL (litres)=(18.0Lm + 0.8Nc + 25.0Lc) xP where: Lm = length of mains (miles or kilometres) Nc = number of customer service connections Lp = the average distance of customer service connection piping (feet or metres) (see the Worksheet "Service Connection Diagram" for guidance on deterring the value of Lp) Lc = total length of customer service connection piping (miles or km) Lc = Nc X Lp (miles or kilometres) P = Pressure (psi or metres) The UARL is a theoretical reference value representing the technical low limit of leakage that could be achieved if all of today's best technology could be successfully applied. It is a key variable in the calculation of the Infrastructure Leakage Index (ILI). Striving to reduce system leakage to a level close to the UARL is usually not needed unless the water supply is unusually expensive, scarce or both. NOTE: The UARL calculation has not yet been proven as fully valid for very small, or low pressure water distribution systems. If, in gallons: (Lm x 32) + Nc < 3000 or P <35psi in litres: (Lm x 20) + Nc < 3000 or P < 25m then the calculated UARL value may not be valid. The software does not display a value of UARL or ILI if either of these conditions is true.
Unbilled Authorized Consumption	All consumption that is unbilled, but still authorized by the utility. This includes Unbilled Metered Consumption + Unbilled Unmetered Consumption. See "Authorized Consumption" for more information. For Unbilled Unmetered Consumption, the Free Water Audit Software provides the auditor the option to select a default value if they have not audited unmetered activities in detail. The default calculates a volume that is 1.25% of the Water Supplied volume. If the auditor has carefully audited the various unbilled, unmetered, authorized uses of water, and has established reliable estimates of this collective volume, then he or she may enter the volume directly for this component, and not use the default value.

Item Name	Description
Unbilled metered consumption Find	Metered consumption which is authorized by the water utility, but, for any reason, is deemed by utility policy to be unbilled. This might for example include metered water consumed by the utility itself in treatment or distribution operations, or metered water provided to civic institutions free of charge. **It does not include water supplied to neighboring utilities (water exported) which may be metered but not billed.**
Unbilled unmetered consumption Find	Any kind of Authorized Consumption which is neither billed or metered. This component typically includes water used in activities such as fire fighting, flushing of water mains and sewers, street cleaning, fire flow tests conducted by the water utility, etc. In most water utilities it is a small component which is very often substantially overestimated. **It does NOT include water supplied to neighboring utilities (water exported) which is unmetered and unbilled – an unlikely case.** This component has many sub-components of water use which are often tedious to identify and quantify. Because of this, and the fact that it is usually a small portion of the water supplied, it is recommended that the auditor apply the default value, which is 1.25% of the Water Supplied volume. Select the default percentage to enter this value. If the water utility has carefully audited the unbilled, unmetered activities occurring in the system, and has well validated data that gives a value substantially higher or lower than the default volume, then the auditor should enter their own volume. However the default approach is recommended for most water utilities. Note that a value of zero is not permitted, since all water utilities have some volume of water in this component occurring in their system.
Units and Conversions	The user may develop an audit based on one of three unit selections: 1) Million Gallons (US) 2) Megalitres (Thousand Cubic Metres) 3) Acre-feet Once this selection has been made in the instructions sheet, all calculations are made on the basis of the chosen units. Should the user wish to make additional conversions, a unit converter is provided below (use drop down menus to select units from the yellow unit boxes): Enter Units: 1 | Convert From… Million Gallons (US) = **Converts to…..** 3.06888329 Acre-feet (conversion factor = 3.06888328973723)
Use of Option Buttons	To use the default percent value choose this button To enter a value choose this button and enter the value in the cell to the right  **NOTE:** For Unbilled Unmetered Consumption, Unauthorized Consumption and Systematic Data Handling Errors, a recommended default value can be applied by selecting the Percent option. The default values are based on fixed percentages of Water Supplied or Billed Authorized Consumption and are recommended for use in this audit unless the auditor has well validated data for their system. Default values are shown by purple cells, as shown in the example above. If a default value is selected, the user does not need to grade the item; a grading value of 5 is automatically applied (however, this grade will not be displayed).
Variable production cost (applied to Real Losses) Find	The cost to produce and supply the next unit of water (e.g., $/million gallons). This cost is determined by calculating the summed unit costs for ground and surface water treatment and all power used for pumping from the source to the customer. It may also include other miscellaneous unit costs that apply to the production of drinking water. It should also include the unit cost of bulk water purchased as an import if applicable. It is common to apply this unit cost to the volume of Real Losses. However, if water resources are strained and the ability to meet future drinking water demands is in question, then the water auditor can be justified in applying the Customer Retail Rate to the Real Loss volume, rather than applying the Variable Production Cost. The Free Water Audit Software applies the Variable Production costs to Real Losses by default. However, the auditor has the option on the Reporting Worksheet to select the Customer Retail Cost as the basis for the Real Loss cost evaluation if the auditor determines that this is warranted.
Volume from own sources Find	The volume of water withdrawn (abstracted) from water resources (rivers, lakes, streams, wells, etc) controlled by the water utility, and then treated for potable water distribution. Most water audits are compiled for utility retail water distribution systems, so this volume should reflect the amount of treated drinking water that entered the distribution system. Often the volume of water measured at the effluent of the treatment works is slightly less than the volume measured at the raw water source, since some of the water is used in the treatment process. Thus, it is useful if flows are metered at the effluent of the treatment works. If metering exists only at the raw water source, an adjustment for water used in the treatment process should be included to account for water consumed in treatment operations such as filter backwashing, basin flushing and cleaning, etc. If the audit is conducted for a wholesale water agency that sells untreated water, then this quantity reflects the measure of the raw water, typically metered at the source.
Volume from own sources: Master meter and supply error adjustment Find	An estimate or measure of the degree of inaccuracy that exists in the master (production) meters measuring the annual Volume from own Sources, and any error in the data trail that exists to collect, store and report the summary production data. This adjustment is a weighted average number that represents the collective error for all master meters for all days of the audit year and any errors identified in the data trail. Meter error can occur in different ways. A meter or meters may be inaccurate by under-registering flow (did not capture all the flow), or by over-registering flow (overstated the actual flow). Data error can occur due to data gaps caused by temporary outages of the meter or related instrumentation. All water utilities encounter some degree of inaccuracy in master meters and data errors in archival systems are common; thus a value of zero should not be entered. Enter a negative percentage or value for metered data under-registration; or, enter a positive percentage or value for metered data over-registration.

Item Name	Description
Water exported Find	The Water Exported volume is the bulk water conveyed and sold by the water utility to neighboring water systems that exists outside of their service area. Typically this water is metered at the custody transfer point of interconnection between the two water utilities. Usually the meter(s) are owned by the water utility that is selling the water: i.e. the exporter. If the water utility who is compiling the annual water audit sells bulk water in this manner, they are an exporter of water. Note: The Water Exported volume is sold to wholesale customers who are typically charged a wholesale rate that is different than retail rates charged to the retail customers existing within the service area. Many state regulatory agencies require that the Water Exported volume be reported to them as a quantity separate and distinct from the retail customer billed consumption. For these reasons - and others - the Water Exported volume is always quantified separately from Billed Authorized Consumption in the standard water audit. **Be certain not to "double-count" this quantity by including it in both the Water Exported box and the Billed Metered Consumption box of the water audit Reporting Worksheet. This volume should be included only in the Water Exported box.**
Water exported: Master meter and supply error adjustment Find	An estimate or measure of the volume in which the Water Exported volume is incorrect. This adjustment is a weighted average that represents the collective error for all of the metered and archived exported flow for all days of the audit year. Meter error can occur in different ways. A meter may be inaccurate by under-registering flow (did not capture all the flow), or by over-registering flow (overstated the actual flow). Error in the metered, archived data can also occur due to data gaps caused by temporary outages of the meter or related instrumentation. All water utilities encounter some degree of error in their metered data, particularly if meters are aged and infrequently tested. Occasional errors also occur in the archived data. Thus, a value of zero should not be entered. Enter a negative percentage or value for metered data under-registration; or enter a positive percentage or value for metered data over-registration. If regular meter accuracy testing is conducted on the meter(s) - which is usually conducted by the water utility selling the water - then the results of this testing can be used to help quantify the meter error adjustment. Corrections to data gaps or other errors found in the archived data should also be included as a portion of this meter error adjustment.
Water imported Find	The Water Imported volume is the bulk water purchased to become part of the Water Supplied volume. Typically this is water purchased from a neighboring water utility or regional water authority, and is metered at the custody transfer point of interconnection between the two water utilities. Usually the meter(s) are owned by the water supplier selling the water to the utility conducting the water audit. The water supplier selling the bulk water usually charges the receiving utility based upon a wholesale water rate.
Water imported: Master meter and supply error adjustment Find	An estimate or measure of the volume in which the Water Imported volume is incorrect. This adjustment is a weighted average that represents the collective error for all of the metered and archived imported flow for all days of the audit year. Meter error can occur in different ways. A meter may be inaccurate by under-registering flow (did not capture all the flow), or by over-registering flow (overstated the actual flow). Error in the metered, archived data can also occur due to data gaps caused by temporary outages of the meter or related instrumentation. All water utilities encounter some level of meter inaccuracy, particularly if meters are aged and infrequently tested. Occasional errors also occur in the archived metered data. Thus, a value of zero should not be entered. Enter a negative percentage or value for metered data under-registration; or, enter a positive percentage or value for metered data over-registration. If regular meter accuracy testing is conducted on the meter(s) - which is usually conducted by the water utility selling the water - then the results of this testing can be used to help quantify the meter error adjustment.
WATER LOSSES Find	= apparent losses + real losses Water Losses are the difference between Water Supplied and Authorized Consumption. Water losses can be considered as a total volume for the whole system, or for partial systems such as transmission systems, pressure zones or district metered areas (DMA); if one of these configurations are the basis of the water audit.

Water Audit Report for: City of Scappoose (4100792)
Reporting Year: 2018 1/2018 - 12/2018
Data Validity Score: 53

Water Loss Control Planning Guide

	Water Audit Data Validity Level / Score				
Functional Focus Area	**Level I** (0-25)	**Level II** (26-50)	**Level III** (51-70)	**Level IV** (71-90)	**Level V** (91-100)
Audit Data Collection	Launch auditing and loss control team; address production metering deficiencies	Analyze business process for customer metering and billing functions and water supply operations. Identify data gaps.	Establish/revise policies and procedures for data collection	Refine data collection practices and establish as routine business process	Annual water audit is a reliable gauge of year-to-year water efficiency standing
Short-term loss control	Research information on leak detection programs. Begin flowcharting analysis of customer billing system	Conduct loss assessment investigations on a sample portion of the system: customer meter testing, leak survey, unauthorized consumption, etc.	Establish ongoing mechanisms for customer meter accuracy testing, active leakage control and infrastructure monitoring	Refine, enhance or expand ongoing programs based upon economic justification	Stay abreast of improvements in metering, meter reading, billing, leakage management and infrastructure rehabilitation
Long-term loss control		Begin to assess long-term needs requiring large expenditure: customer meter replacement, water main replacement program, new customer billing system or Automatic Meter Reading (AMR) system.	Begin to assemble economic business case for long-term needs based upon improved data becoming available through the water audit process.	Conduct detailed planning, budgeting and launch of comprehensive improvements for metering, billing or infrastructure management	Continue incremental improvements in short-term and long-term loss control interventions
Target-setting			Establish long-term apparent and real loss reduction goals (+10 year horizon)	Establish mid-range (5 year horizon) apparent and real loss reduction goals	Evaluate and refine loss control goals on a yearly basis
Benchmarking			Preliminary Comparisons - can begin to rely upon the Infrastructure Leakage Index (ILI) for performance comparisons for real losses (see below table)	Performance Benchmarking - ILI is meaningful in comparing real loss standing	Identify Best Practices/ Best in class - the ILI is very reliable as a real loss performance indicator for best in class service

For validity scores of 50 or below, the shaded blocks should not be focus areas until better data validity is achieved.

Once data have been entered into the Reporting Worksheet, the performance indicators are automatically calculated. How does a water utility operator know how well his or her system is performing? The AWWA Water Loss Control Committee provided the following table to assist water utilities is gauging an approximate Infrastructure Leakage Index (ILI) that is appropriate for their water system and local conditions. The lower the amount of leakage and real losses that exist in the system, then the lower the ILI value will be.

Note: this table offers an approximate guideline for leakage reduction target-setting. The best means of setting such targets include performing an economic assessment of various loss control methods. However, this table is useful if such an assessment is not possible.

General Guidelines for Setting a Target ILI (without doing a full economic analysis of leakage control options)

Target ILI Range	Financial Considerations	Operational Considerations	Water Resources Considerations
1.0 - 3.0	Water resources are costly to develop or purchase; ability to increase revenues via water rates is greatly limited because of regulation or low ratepayer affordability.	Operating with system leakage above this level would require expansion of existing infrastructure and/or additional water resources to meet the demand.	Available resources are greatly limited and are very difficult and/or environmentally unsound to develop.
>3.0 -5.0	Water resources can be developed or purchased at reasonable expense; periodic water rate increases can be feasibly imposed and are tolerated by the customer population.	Existing water supply infrastructure capability is sufficient to meet long-term demand as long as reasonable leakage management controls are in place.	Water resources are believed to be sufficient to meet long-term needs, but demand management interventions (leakage management, water conservation) are included in the long-term
>5.0 - 8.0	Cost to purchase or obtain/treat water is low, as are rates charged to customers.	Superior reliability, capacity and integrity of the water supply infrastructure make it relatively immune to supply shortages.	Water resources are plentiful, reliable, and easily extracted.
Greater than 8.0	Although operational and financial considerations may allow a long-term ILI greater than 8.0, such a level of leakage is not an effective utilization of water as a resource. Setting a target level greater than 8.0 - other than as an incremental goal to a smaller long-term target - is discouraged.		
Less than 1.0	If the calculated Infrastructure Leakage Index (ILI) value for your system is 1.0 or less, two possibilities exist. a) you are maintaining your leakage at low levels in a class with the top worldwide performers in leakage control. b) A portion of your data may be flawed, causing your losses to be greatly understated. This is likely if you calculate a low ILI value but do not employ extensive leakage control practices in your operations. In such cases it is beneficial to validate the data by performing field measurements to confirm the accuracy of production and customer meters, or to identify any other potential sources of error in the data.		

Example 1a: Million Gallons: | **Example 1b**: Million Gallons: | **Example 2a**: Megalitres: Reporting Worksheet | **Example 2b**: Megalitres: Reporting Worksheet

Example Audit 1a:

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0

? Click to access definition
+ Click to add a comment

Water Audit Report for: City of Asheville (01-11-010)
Reporting Year: 2013 7/2012 - 6/2013

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter Error Adjustments

WATER SUPPLIED

<---------- Enter grading in column 'E' and 'J' ----------> Pcnt: Value:

				Pcnt:	Value:	
Volume from own sources:	7	7,352.880	MG/Yr	3	285.450	MG/Yr
Water imported:	n/a	0.000	MG/Yr			MG/Yr
Water exported:	n/a	0.000	MG/Yr			MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 7,067.430 MG/Yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:	
Billed metered:	8	4,782.250	MG/Yr			
Billed unmetered:	n/a	0.000	MG/Yr			
Unbilled metered:	7	27.757	MG/Yr			
Unbilled unmetered:	8	157.790	MG/Yr		157.790	MG/Yr

Unbilled Unmetered volume entered is greater than the recommended default value

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: 4,967.797 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption)

2,099.633 MG/Yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:		17.669	MG/Yr	0.25%		MG/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	7	111.220	MG/Yr	2.26%		MG/Yr
Systematic data handling errors:	5	11.956	MG/Yr	0.25%		MG/Yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 140.844 MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 1,958.789 MG/Yr

WATER LOSSES: 2,099.633 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 2,285.180 MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	4	1,236.5	miles
Number of active AND inactive service connections:	7	55,256	
Service connection density:		45	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: 4 145.3 psi

COST DATA

Total annual cost of operating water system:	10	$33,630,676	$/Year	
Customer retail unit cost (applied to Apparent Losses):	10	$3.22	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	6	$335.94	$/Million gallons	☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 72 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Variable production cost (applied to Real Losses)
3: Unauthorized consumption

Example Audit 1b:

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

WAS v5.0

Water Audit Report for: City of Asheville (01-11-010)
Reporting Year: 2013 7/2012 - 6/2013

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 72 out of 100 ***

System Attributes:

	Apparent Losses:	140.844	MG/Yr
+	Real Losses:	1,958.789	MG/Yr
=	**Water Losses:**	**2,099.633**	MG/Yr
?	Unavoidable Annual Real Losses (UARL):	794.34	MG/Yr
	Annual cost of Apparent Losses:	$606,265	
	Annual cost of Real Losses:	$658,036	Valued at **Variable Production Cost**

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	32.3%	
	Non-revenue water as percent by cost of operating system:	3.9%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	6.98	gallons/connection/day
	Real Losses per service connection per day:	97.12	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.67	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	1,958.79	million gallons/year
?	Infrastructure Leakage Index (ILI) [CARL/UARL]:	2.47	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

Example Audit 2a:

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0

Click to access definition
Click to add a comment

Water Audit Report for: The City of Calgary
Reporting Year: 2013 (1/2013 - 12/2013)

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MEGALITRES (THOUSAND CUBIC METRES) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

WATER SUPPLIED

<---------- Enter grading in column 'E' and 'J' ----------> | Master Meter Error Adjustments

	Grading	Value		Grading	Pcnt:	Value:	
Volume from own sources:	7	174,324.000	ML/Yr	7	1.00%		ML/Yr
Water imported:	n/a	0.000	ML/Yr				ML/Yr
Water exported:	7	8,190.131	ML/Yr	7	1.00%		ML/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 164,488.979 ML/Yr

AUTHORIZED CONSUMPTION

Click here: for help using option buttons below

	Grading	Value		Pcnt:	Value:	
Billed metered:	6	125,111.268	ML/Yr			
Billed unmetered:	8	3,503.386	ML/Yr			
Unbilled metered:	7	166.157	ML/Yr			
Unbilled unmetered:	6	1,444.000	ML/Yr		1,444.000	ML/Yr

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: 130,224.811 ML/Yr

WATER LOSSES (Water Supplied - Authorized Consumption)

34,264.168 ML/Yr

Apparent Losses

	Grading	Value		Pcnt:	Value:	
Unauthorized consumption:		411.222	ML/Yr	0.25%		ML/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

	Grading	Value		Pcnt:	Value:	
Customer metering inaccuracies:	6	1,265.429	ML/Yr	1.00%		ML/Yr
Systematic data handling errors:		312.778	ML/Yr	0.25%		ML/Yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 1,989.429 ML/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 32,274.739 ML/Yr

WATER LOSSES: 34,264.168 ML/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 35,874.325 ML/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

	Grading	Value	
Length of mains:	8	4,945.0	kilometers
Number of active AND inactive service connections:	8	312,075	
Service connection density:		63	conn./km main
Are customer meters typically located at the curbstop or property line?		No	
Average length of customer service line:	8	12.0	metres
Average operating pressure:	8	50.8	metres (head)

(length of service line, beyond the property boundary, that is the responsibility of the utility)

COST DATA

	Grading	Value	
Total annual cost of operating water system:	9	$169,973,759	$/Year
Customer retail unit cost (applied to Apparent Losses):	9	$2.35	$/1000 litres
Variable production cost (applied to Real Losses):	9	$73.54	$/Megalitre

☑ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 72 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Billed metered
3: Customer metering inaccuracies

Example Audit 2b:

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

WAS v5.0

Water Audit Report for: The City of Calgary
Reporting Year: 2013 | 1/2013 - 12/2013

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 72 out of 100 ***

System Attributes:

	Apparent Losses:	1,989.429	ML/Yr
+	Real Losses:	32,274.739	ML/Yr
=	**Water Losses:**	**34,264.168**	ML/Yr
?	Unavoidable Annual Real Losses (UARL):	8,015.57	ML/Yr
	Annual cost of Apparent Losses:	$4,675,159	
	Annual cost of Real Losses:	$75,845,637	Valued at **Customer Retail Unit Cost**

Return to Reporting Worksheet to change this assumption

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	21.8%	
	Non-revenue water as percent by cost of operating system:	49.6%	Real Losses valued at Customer Retail Unit Cost
Operational Efficiency:	Apparent Losses per service connection per day:	17.47	litres/connection/day
	Real Losses per service connection per day:	283.34	litres/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per meter (head) pressure:	5.58	litres/connection/day/m
	From Above, Real Losses = Current Annual Real Losses (CARL):	32,274.74	ML/year
?	Infrastructure Leakage Index (ILI) [CARL/UARL]:	4.03	

* This performance indicator applies for systems with a low service connection density of less than 20 service connections/kilometre of pipeline

AWWA Water Audit Software Version 5.0 Developed by the Water Loss Control Committee of the American Water Works Association August, 2014

This software is intended to serve as a basic tool to compile a preliminary, or "top-down", water audit. It is recommended that users also refer to the current edition of the AWWA M36 Publication, Water Audits and Loss Control Programs, for detailed guidance on compiling a comprehensive, or "bottom-up", water audit using the same water audit methodology.

DEVELOPED BY:

Andrew Chastain-Howley, PG, MCSM. Black & Veatch*
Will J. Jernigan, P.E. Cavanaugh & Associates, P.A.
George Kunkel, P.E. Philadelphia Water Department
Alain Lalonde, P.Eng. Master Meter Canada Inc.
Ralph Y. McCord, P.E. Louisville Water Company
David A. Sayers Delaware River Basin Commission
Brian M. Skeens, P.E. CH2M HILL
Reinhard Sturm Water Systems Optimization, Inc.
John H. Van Arsdel M.E. Simpson Company, Inc.

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- AWWA Water Audits and Loss Control Programs, M36 Publication, 3rd Edition, 2009

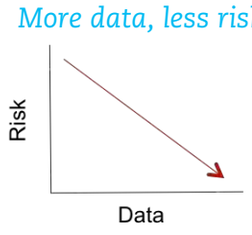
- Service Connection Diagrams courtesy of Ronnie McKenzie, WRP Pty Ltd.

VERSION HISTORY:

Version:	Release Date:	Number of Worksheets:	Key Features and Developments
v1	2005/ 2006	5	The AWWA Water Audit Software was piloted in 2005 (v1.0 beta). The early versions (1.x) of the software restricted data entry to units of Million Gallons per year. For each entry into the audit, users identified whether the input was measured or estimated.
v2	2006	5	The most significant enhancement in v2 of the software was to allow the user to choose the volumetric units to be used in the audit, Million Gallons or Thousand Cubic Metres (megalitres) per year. Two financial performance indicators were added to provide feedback to the user on the cost of Real and Apparent losses.
v3	2007	7	In v3, the option to report volumetric units in acre-feet was added. Another new feature in v3 was the inclusion of default values for two water audit components (unbilled unmetered and unauthorized consumption). v3 also included two examples of completed audits in units of million gallons and Megalitres. Several checks were added into v3 to provide instant feedback to the user on common data entry problems, in order to help the user complete an accurate water audit.
v4 - v4.2	2010	10	v4 (and versions 4.x) of the software included a new approach to data grading. The simple "estimated" or "measured" approach was replaced with a more granular scale (typically 1-10) that reflected descriptions of utility practices and served to describe the confidence and accuracy of the input data. Each input value had a corresponding scale fully described in the Grading Matrix tab. The Grading Matrix also showed the actions required to move to a higher grading score. Grading descriptions were available on the Reporting Worksheet via a pop-up box next to each water audit input. A water audit data validity score is generated (max = 100) and priority areas for attention (to improve audit accuracy) are identified, once a user completes the requied data grading. A service connection diagram was also added to help users understand the impact of customer service line configurations on water losses and how this information should be entered into the water audit software. An acknoweldgements section was also added. Minor bug fixes resulted in the release of versions 4.1 and 4.2. A French language version was also made available for v4.2.
v5	2014	12	In v5, changes were made to the way Water Supplied information is entered into software, with each major component having a corresponding Master Meter Error Adjustment entry (and data grading requirement). This required changes to the data validity score calculation; v5 of the software uses a weighting system that is, in part, proportional to the volume of input components. The Grading Matrix was updated to reflect the new audit inputs and also to include clarifications and additions to the scale descriptions. The appearance of the software was updated in v5 to make the software more user-friendly and several new features were added to provide more feedback to the user. Notably, a dashboard tab has been added to provide more visual feedback on the water audit results and associated costs of Non-Revenue Water. A comments sheet was added to allow the user to track notes, comments and to cite sources used.

Risk Management

Matchpoint's multi-faceted risk management program provides the technology and tools for remotely and continuously assessing the condition of the water network, thus minimizing risk by instantaneously highlighting any anomalies. As a result, along with the implementation of our leak detection program, water loss and lead times from leak discovery to repair are drastically reduced and storm water run-off becomes manageable.



Continuous Condition Assessment

Evaluates the health of the water network

KEY FEATURES

- Data accrual through continual and remote pipe monitoring
- Analysis of historical data
- Reduces leak runtime
- Decreases risk of damage to assets
- Improves water quality assurance
- Reduces overall water loss and non-revenue water
- Monitor up to 100 inch pipe

Infrastructure Management

A comprehensive leak detection package

KEY FEATURES

- Pinpoint and confirm leaks across the network
- Quantify the leakage rate to prioritize repairs
- Reduces water loss and non-revenue water
- GPS leak location
- GIS integration
- Accurate reporting
- Reduces leak runtime

Manage Storm Water Run-Off & Sewer Intrusion

Minimize ground water saturation

KEY FEATURES

- Reduces ground saturation and overland flow from detection of underground leakage
- Minimize risk of flooding, pollutant transport, and damage to underground assets
- Protects water quality
- Reduces sewer intrusion

MATCHPOINT
Water. That's the point.

For more information contact
sales@matchpointinc.us or 910-509-7225

Appendix F

WATER CONSERVATION INSERTS

Use Water Wisely…

Shaving/Toothbrushing

Leave the water off when brushing your teeth or shaving. Turn it on again to rinse. A faucet left running wide open puts about 3 to 5 gallons a minute down the drain.

Kitchen

Make sure the dishwasher is full before you turn it on. For most dishwashers, you do not need to rinse the dishes first—just scrape them clean.

When you wash dishes by hand, don't leave the water running. Use a sink or dish pan full of wash water and one of rinse water.

Keep a jug of water in the refrigerator for drinking so you don't need to let the faucet run while waiting for the water to get colder.

When waiting for hot water from the faucet, save the cool water for other uses.

When preparing vegetables and foods, put a stopper in the sink instead of letting the faucet run.

Laundry

A washing machine can use 40 gallons of water or more– whether you wash a full load or one sock! Use water more efficiently by washing full loads.

Studies have shown that front-loading machines reduce water use by up to 40% or 16 gallons per load.

Save hot water and energy by using detergents formulated for cold water washing. Cold water is gentler on synthetics and delicate fibers.

Remodeling

If you are remodeling, shop for appliances that are designed to reduce water use. Many manufacturers offer washing machines, dishwashers, toilets and showerheads that can help you save water.

Water Conservation - Making the most efficient use of the state's most precious natural resource.

State of Oregon
WATER RESOURCES DEPARTMENT
725 Summer Street NE, Suite A
Salem, OR 97301-1271

Phone: 503-986-0900
Fax: 503-986-0904
Website: www.wrd.state.or.us

Water Conservation

Indoor Water Use

A GUIDE TO WATER CONSERVATION

Use Water Wisely…

Most people use 70 to 90 gallons of water per day indoors. While it may be difficult to imagine how all that water is used, a quick look often shows that much is wasted due to leaks or careless habits.

From the kitchen, to the bathroom, to the laundry room, changing your habits can save money on your water, sewer and energy bill and help conserve a vital resource.

Water conservation is not just for emergencies. Water conservation today saves you money on your next water bill, reduces the cost for developing new supplies, and leaves more water in the rivers for fish and recreation.

This pamphlet provides a few tips on how to conserve water in your home. For further information on water conservation, please contact your local water utility, Extension agent or the Oregon Water Resources Department.

The key to using water efficiently is knowing your water use habits. Do you take long, hot showers? Do you leave the water running while brushing your teeth? Do you flush the toilet needlessly? Do you have plumbing leaks? Water conservation actions involve both changing habits and replacing old, inefficient plumbing fixtures.

Leaks

Check every faucet in your home for leaks. Just a slow drip can waste 15 to 20 gallons a day. Fix it and you will save almost 6,000 gallons a year.

Check for hidden leaks in your water system. Turn off all faucets in and around your house, then locate your water meter and check the reading. Wait 15 minutes without turning any water on, then check the meter again. If the reading has changed, you have a leak.

Showers and Baths

A 5-minute shower uses from 15 to 40 gallons of water. A low volume showerhead, however, uses only 12 to 15 gallons for a 5-minute shower. Low volume showerheads are inexpensive and can pay for themselves in water, sewer and energy savings in less than a year.

Shower or bath? It depends on how long you stand in the shower and how you fill the tub. A partially filled tub uses far less water than a long shower… and a short shower uses less than a full tub.

Toilets

Flush only when needed. Do not use the toilet for discarding tissue, gum wrappers, cigarette butts, spiders and so on.

Put a water displacement device inside the tank of every toilet. You can make one with a plastic bottle of water weighted down with pebbles.

Check your toilets for leaks. Drop a dye tablet or a teaspoon of food coloring in the tank. If the color appears in the bowl after 15 minutes, replace the "flapper" valve.

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Use Water Wisely…

Learn How Much is Enough

Depending on the weather, it's generally better to water about once a week and provide 1 inch to 1 1/2 inches of water. (If it's hot, you might have to water more often.)

Water early in the morning before 10:00 a.m. Watering in the heat of the day allows the water to evaporate and watering late in the day may promote fungus and other lawn diseases.

Time how long it takes to apply one inch of water by placing a flat-bottomed can about 6-ft. away from the sprinkler. Turn the water on and time how long it takes to fill the can with one inch of water. For the next watering, set a timer as a reminder to turn off or move the sprinkler.

Don't over water. Puddles of water and runoff definitely indicate too much water.

Puddles may also indicate your soil isn't able to absorb enough water and needs conditioning. Thatch and aerate the soil. To do any good, the water must be able to penetrate the soil.

You can put off watering another day if there is heavy dew on the grass.

Try Other Ways to Save Water Outdoors

- When you wash your car, use a bucket, sponge, and shut-off nozzle on the hose.
- Sweep sidewalks, driveways and patios instead of hosing.
- Restrict play in the sprinklers to when the lawn needs watering.
- Clean gutters and downspouts manually, without using a hose.

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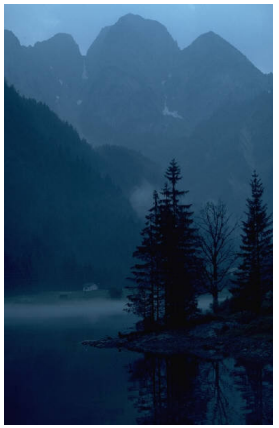

Use Water Wisely…

In the summer each of us uses about 250 gallons of water a day—that's more than twice what we use in the winter. And research suggests much of that extra use is simply wasted.

Nobody has enough water to waste. Please use what you need, but don't waste it.

Water conservation is not just for emergencies. Water conservation today saves you money on your next water bill, reduces the cost for developing new supplies, and leaves more water in the rivers for fish and recreation. Even if you're not connected to public water and sewer services, conservation is a good idea. You'll save money on water pumping and heating, extend the life of your well and septic system, and avoid depleting groundwater supplies.

This pamphlet provides a few tips on outdoor water use. For more information, please contact your local water utility, Extension agent or the Oregon Water Resources Department.

Choose the Right Plants

When landscaping, buy plants that are low water-users. A good nursery will be able to advise you.

Consider replacing turf with ground covers such as junipers or heathers.

Group high-water use plants and water them together by area.

Use the Right Equipment

A good stationary sprinkler or soil soaker will water a large area evenly. Avoid oscillating sprinklers since they tend to over-water at the ends when they reverse direction.

Check hoses for leaks and replace washers in hose connectors. Leaks will cost you more money and distribute water unevenly.

Use a hand-held sprayer to water shrubs and special plantings so you can control where the water goes.

Take Care of Your Lawn

Keep your lawn in good shape. Keep weeds down. They rob your lawn and plants of nutrients and water.

Mow your lawn regularly to the height recommended for the type of grass you have. Leave the clippings on the lawn as mulch if they aren't thick and matted.

Start a new lawn in early fall to take advantage of autumn rains and moderate temperatures.

Maintain Planted Beds

Cultivate the soil regularly so water can penetrate and develop a good root system.

Use mulch in rows and around plants to retain moisture.

Keep weeds down so they don't compete for water and nutrients.

Consider using a soaker hose or drip irrigation system instead of a sprinkler if your garden is large. These methods also help prevent evaporation of water from leaves and upper parts of plants.

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