Engineering Report

CITY OF CANBY

WASTEWATER FACILITIES PLAN UPDATE

Clackamas County

Revised April 2020

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Oregon
Kate Brown, Governor

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February 5, 2020

RECEIVED
FEB 10 2020
CURRAN-McLEOD, INC.

JERRY NELZEN
PUBLIC WORKS SUPERVISOR
CITY OF CANBY
PO BOX 930
CANBY, OR 97013

RE: City of Canby STP
NPDES File No: 13691 / NPDES Permit No: 101063
Clackamas County
Acceptance - Wastewater Facilities Plan Update- September 2019

Dear Mr. Nelzen,

The Oregon Department of Environmental Quality (DEQ) has accepted the Wastewater Facilities Plan Update- September 2019. Mr. Curt McLeod PE (Curran-McLeod Inc.) submitted the draft facility plans and September 10th, 2019, for the City of Canby, per Oregon Administrative Rule (OAR) Chapter 340, Division 052.

Plan Conclusions:

- The City of Canby Wastewater Treatment Facility (WWTF) is at 55% of hydraulic capacity and 83% of organic treatment capacity;
- Several of the pump station are in need of updating and future expansion to deal with growth;
- There are relatively small areas of collection system repair and upgrading;
- The near-term improvements, 1-5 years out, are manageable financially and needs–wise;
- The financial impact of the plan is minimal as the City has planned well for the maintenance and upgrading needed;
- The City can finance the improvements itself without incurring loans in the near-term.

The plan is comprehensive and well-written. The City is poised for continued growth as the neighboring city's property costs escalate. As the treatment facility is filled to 83% organic capacity, action may be needed soon to forestall a shortfall of capacity. This would require a significant investment.

Inflow and infiltration, a problem confronting many of Oregon's cities older collection systems, appears to be under control and will not absorb much of the available funds. That is very fortunate.

Canby has exercised excellent foresight building up a cache of funds for addressing ongoing needs and maintenance without having to take on a significant debt load.

DEQ approval of the plan would be required if the City of Canby were requesting public funding agencies loans for infrastructure investment. However, the City is not asking for public funding.

The Department of Environmental Quality accepts the plan as written.

INQUIRIES:
Please contact me at (503) 229-5310 if you have any questions.

Respectfully,

Michael Pinney PE
Senior Environmental Engineer

CC : Curt McLoed PE, Curran-McLoed Inc Consulting Engineers, 6655 SW Hampton St., Ste.210, Portland OR 97223

eCC (w/o): Tiffany Yelton-Bram, Manager, Source Control Section, NWR-WQ

CITY OF CANBY

WASTEWATER FACILITIES PLAN UPDATE

Clackamas County, Oregon

Revised April 2020

CURRAN-McLEOD, INC., Consulting Engineers
Portland, Oregon 97223

CITY OF CANBY
WASTEWATER FACILITIES PLAN UPDATE
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LIST OF ACRONYMS

ADWF	Average Dry Weather Flow
BMP	Best Management Practices
BNR	Biological Nutrient Removal
BOD	Biochemical Oxygen Demand
$CBOD_5$	5-Day Carbonaceous Biochemical Oxygen Demand
CCI	Construction Cost Index
CPU	Central Processing Unit
CWA	Clean Water Act
CY	Cubic Yard
DEQ	Dept of Environmental Quality
DLCD	Department of Land Conservation and Development
DMR	Discharge Monitoring Report
EDU	Equivalent Dwelling Units
EFU	Exclusive Farm Use
ENR	Engineering News Record
ESCP	Erosion & Sediment Control Permit
FOG	Fats, Oils and Greese
FY	Fiscal Year
GO	General Obligation
gpcd	Gallons per Capita per Day
gpd	Gallons per Day
gpm	Gallons per Minute
HDPE	High Density Polyethylene
I/I	Infiltration & Inflow
ID	Interchange Development
ISD	Interchange Service District
lbs/d	Pounds per Day
LF	Lineal Foot
LS	Lump Sum
MG	Million Gallons
mg/L	Milligrams per Liter
MGD	Million Gallons per Day
mL	Milliliters
NPDES	National Polutant
NWR	Northwest Region
OAR	Oregon Administrative Rules
OCDD	Business Oregon, Community Development Department
OHCS	Oregon Housing & Community Services
ORS	Oregon Revised Statutes
ORS	Oregon Revised Statutes
PLC	Programmable Logic Controller
PPH	Persons per Household
psi	Pounds per Square Inch
PSU	Portland State University
PVC	Polyvinyl Chloride
RAS	Return Activated Sludge
RPA	Reasonal Potenal Analyses
RV	Recreational Vehicle
SCADA	Supervisory Control & Data Acquisition
SCS	Soil Conservation Service
SDC	System Development Charge
STEG	Septic Tank Effluent Gravity
STEP	Septic Tank Effluent Pump
SU	Standard Units
SY	Square Yard
TSS	Total Suspended Solids
UGB	Urban Growth Boundary
USDA	United States Department of Agriculture
UV	Ultraviolet Irradiation
WAS	Waste Activated Sludge
WLA	Waste Load Allocation
WPCF	Water Pollution Control Facility
WQ	Water Quality
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

CITY OF CANBY
WASTEWATER FACILITIES PLAN UPDATE
Revised April 2020

EXECUTIVE SUMMARY

The City of Canby commissioned CURRAN-MCLEOD, INC. to review the City's Wastewater system operations and prepare a Wastewater Facilities Plan to update the previous plan prepared in 1992. This Facility Plan update addresses the gravity collection system, collection system pumping stations and the wastewater treatment and disposal facilities.

The City has a current population of approximately 16,800 and 5,235 sanitary sewer service connections. Average daily flows have been very consistent at 1.0 million gallons per day (MGD) for the past five years, although the concentration of the wastes has increased, as a result of conservation and more efficient water use.

System loading has been projected through the planning window to reflect the Portland State University Population Research Center projected population of 25,748, which results in average daily plant flows of 1.544 MGD in the year 2040, and organic loads of 3,860 pounds per day.

The City's existing wastewater collection, pumping and treatment systems currently have adequate capacity to serve the existing and future planning window loadings. The average daily flow hydraulic capacity of the treatment facility is 2.8 MGD, with peak capability of 5 MGD. Organic capacity is 4,670 pounds per day. The projected 2040 loadings would equate to 55% of the hydraulic capacity and 83% of the organic treatment capacity.

In an overview, although adequate to meet current and future demands, the existing collection, pumping and treatment systems have multiple needs for optimize operations, provide redundancy, improve reliability, and reduce maintenance efforts.

The collection system improvements include a few remaining projects that were identified in the 1999 Collection System Master Plan. In addition, several system deficiencies have been identified and growth pressures are prompting completion of some of the remaining projects.

Following is a summary of the capital improvements recommended for the collection system:

Table 4.2: City of Canby
Collection System Capital Improvement Plan
May 2019 ENR CCI 11,230

		Est Cost	*Priority*
1	South Ivy St Collection System Improvement (County Project):		
	S 2nd Ave to S 8th Ave, 2,000 LF 12" Sewer	$400,000	1-5 yr
	S 8th Ave to S 10th Avenue, 600 LF 10" Sewer	100,000	1-5 yr
2	S Ivy St, S 10th Ave to S 13th, 1,000 LF 10" Pipe	170,000	1-5 yr
3	N Locust, 4th to 10th, Add Cleanouts to Existing Services	60,000	1-5 yr
4	N Maple, 10th to 14th Add Cleanouts to Existing Services	50,000	1-5 yr
5	Hwy 99E to SE 1st Ave, 1,000 LF 8" Sewer Extension	150,000	1-5 yr
6	N 9th, Locust to Knott Sewer, Repair Isolated Root Intrusion	40,000	1-5 yr
	Subtotal	**$970,000**	
7	NE 12th Sewer, E of Ivy, Add Cleanouts to Existing Services	30,000	6-10 yr
8	N Pine, 4th to 8th Ave, 500 LF 8" Sewer Extension	75,000	6-10 yr
	Subtotal	**$105,000**	

Table 4.3: City of Canby
Pumping Stations Capital Improvement Plan
May 2019 ENR CCI 11,230

		Est Cost	*Priority*
1	Abandon Shopping Center Pump Station	$400,000	1-5 yr
2	Future South Ivy Pumping Station	870,000	1-5 yr
3	Mulino Road Pump Station	5,000	1-5 yr
	Subtotal	**$1,275,000**	
4	3rd & Baker Pump Station	$250,000	6-10 yr
5	Hazel Dell Pump Station	50,000	6-10 yr
	Subtotal	**$300,000**	
6	Abandon Knights Bridge Road Pump Station	600,000	11-20 yr
7	Future North 22nd Avenue Pump Station	400,000	11-20 yr
8	Future North Birch Pump Station	400,000	11-20 yr
	Subtotal	**$1,400,000**	
	Total	**$2,975,000**	

Three future pumping stations were identified in the 1999 Collection System Master Plan that are still required to fully serve the Urban Growth Boundary. Due to expansion of the gravity collection system since 1999, the City now has the opportunity to abandon two stations by connecting to the gravity system. Additionally, several of the existing pumping stations warrant upgrades to remain reliable and serve the continuing growth of the City:

The treatment facility requires multiple improvements to ensure all unit processes have full redundancy and operate efficiently. Following is a summary of capital improvements anticipated over the 20-year planning window:

Table 4.4: City of Canby
Treatment Facility Capital Improvement Plan
May 2019 ENR CCI 11,230

		Priority 1 - 5 Year Cost	*Priority 6-10 Year Cost*	*Priority 11-20 Year Cost*
1	New Primary Clarifier & Refurbish Clarifier No. 1; Primary Scum Process Facility Primary & WAS Pump Upgrades	1,365,000		
2	WWTP Site Improvements	400,000		
3	UV Disinfection Replacement	900,000		
4	Belt Press Equip Replacement	900,000		
5	Eq Storage & Maintenance Bld	400,000		
6	Pressate Storage Basin Repairs	250,000		
7	Diffuser Expansion / Mixing Zone Study / RPA Study	100,000		
8	Odor Control Improvements		500,000	
9	PLC & SCADA Upgrades		300,000	
10	Replace Primary Clarifier No. 1		300,000	
11	Sludge Ponds Lining Repairs		100,000	
12	Effluent Irrigation Impr			$600,000
13	Aux Generator 1 Replacement			200,000
14	300,000 g Sludge Storage Tank			800,000
15	Lime Silo Relocation			100,000
16	Influent Pump Station Rehab			500,000
17	RV Waste Receiving Station			200,000
18	Planning & SDC Updates		25,000	50,000
	Total	**$4,315,000**	**1,225,000**	**$2,450,000**

The following table is a summary of all capital improvements anticipated over the 20-year planning window:

Table 4.5: City of Canby
Capital Improvement Cost Summary
May 2019 ENR CCI 11,230

	Total Cost	*Average/Yr*
1-5 Years	$8,490,000	$1,700,000
6-10 Years	$1,555,000	$310,000
11-20 Years	$2,750,000	$275,000

The City is in a strong financial position to undertake each of these improvements without incurring debt. The current unrestricted reserves exceed $4,000,000, and SDC reserves total nearly $650,000.

The City should begin the process of budgeting the improvements and implementing the plan over the next few years.

City of Canby

Wastewater Facilities Plan Update

1. PROJECT PLANNING

A. LOCATION

The City of Canby is located 25 miles south of Portland, Oregon in the northern Willamette Valley. The Wastewater Treatment Facility serves the area within the City Limits of the City of Canby in Clackamas County. The treatment facility is located at 1480 NE Territorial Road approximately 8 miles east of Interstate Highway 5 and 1 mile west of highway 99E.

The City of Canby is characterized by near level terrain, on a low terrace between the Willamette River to the north and the Molalla River to the south and west and covers approximately 2,100 acres within City limits, and approximately 3,400 acres within the UGB. The wastewater treatment facility serves residential, commercial, and industrial dischargers. A map of the City of Canby and UGB is shown in Figure 1.1 on the following page.

B. ENVIRONMENTAL RESOURCES PRESENT

1) Economy

The City lies in the heart of very productive agricultural lands and accordingly, the City's economic growth has traditionally been tied to local agriculture. The City is surrounded by large farm tracts which produce a variety of products, most notably row crops, fruits, nuts, and berries, as well as nursery stock.

More recently, the City has experienced growth due to the demand for housing from local employment opportunities and the nearby metropolitan area. This is due, in part, to the demographics of the population and the relatively close location of other larger employment centers which encourages commuting. This is reflected by the fact that approximately 75 percent of the working residents in Canby commute to nearby communities such as Wilsonville, Salem or the Greater Portland area for employment.

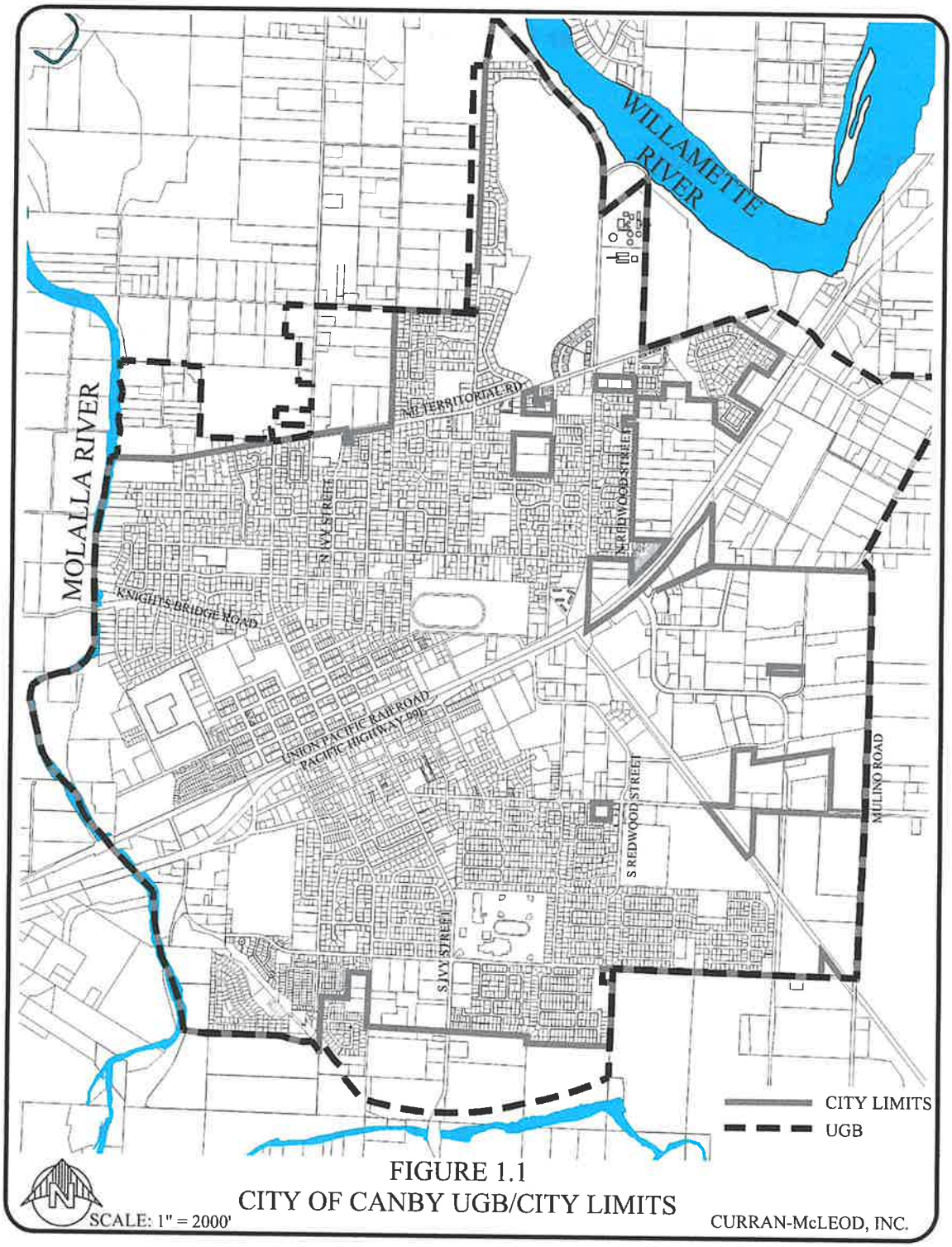


FIGURE 1.1
CITY OF CANBY UGB/CITY LIMITS

J:\Canby\MASTER MAPS\MASTER WATER\City of Canby UGB & Urban Renewal.dwg, 6/27/2019 3:11:51 PM, DWG To PDF.pc3

The City has taken steps towards diversification into commercial, industrial, professional, and other service related opportunities to actively promote employment opportunities within the City. Canby's small town, rural atmosphere also attracts individuals desiring to escape more congested urban areas.

2) Geography

The City of Canby is located in the Willamette Valley which is the population center of the State of Oregon. The Willamette Valley is nestled between the Coast and Cascade Mountain Ranges and is from 20 to 40 miles wide and 130 miles long extending from Eugene-Springfield in the south to Portland in the north.

The Canby area is bordered to the east and south by the Molalla River and to the north by the Willamette River. The Molalla River converges with the Willamette River northwest of the City.

The Willamette River is the major waterway in the Willamette Valley, draining a total of 11,200 square miles. The Willamette River provides significant recreational opportunities, serves as a major transportation link, provides water for agricultural, municipal and industrial uses and provides habitat for significant wildlife populations.

The City is accessible from the Interstate 5 corridor and Interstate 205 via State Highway 99E. The transportation system provides direct connections to the surrounding communities of Oregon City, Woodburn, Wilsonville, and Salem as well as the greater Portland metropolitan area. The City is also on the main north-south Union Pacific Rail line.

3) Topography

The community of Canby is located on a relatively flat terrace overlooking the Willamette and Molalla Rivers. With few exceptions, only gentle changes in the topography of less than 30 feet occur within the City limits and UGB (between 120 to 170 feet above mean sea level). This can be easily observed throughout the residential, industrial and commercial districts.

South and West of the City, the landscape drops abruptly at the Molalla River to an elevation of approximately 80 feet. This is very evident when approaching the City from the west on Knights Bridge Road or Highway 99E, or from the south across Goods Bridge on Ivy Street. This drop along the Molalla River establishes a natural boundary for the south and west areas of the City.

At the northern extreme, the UGB extends to the Willamette River. The topography gradually changes and slopes to the Willamette River, dropping from an elevation of approximately 130 feet to an elevation of 100 feet at the City's Wastewater Treatment Facility.

To the east of Canby, the topography changes very little until beyond the UGB, where the ground has undulating gentle hills in the southeastern areas and steep rocky cliffs in the northeastern areas along the Willamette River.

4) Geology

The area we know today as the Willamette Valley was at one time part of the Oligocene ocean continental shelf extending from the cascades to beyond the current coast line. With uplifting of the Coast Range during the Miocene epoch, the trough like shape of the Willamette Valley was created. Later, during the Miocene, basaltic lava from fissures and vents in northeastern Oregon poured into the Willamette Valley where they reached as far south as Salem. Volcanic activity was renewed along the western edge of the Cascade Mountains at the close of the Miocene epoch, culminating in the deposition of the Sardine Formation. This formation is composed of agglomerates, flow breccias, mud flows, and lavas.

Low lands and lakes were formed by folding that occurred during the Pliocene. The low lands and lakes later filled with sediments from upland areas. These sediments, the Sandy River Mudstone and overlaying Troutdale Formation were then subjected to warping and subsequent erosion. Also, during the Pliocene, volcanism preceded the viscous lavas, agglomerates, and flow breccias of the Boring Lava. In areas of Clackamas County where these lava flows are exposed and weathering has nearly completely altered the lava flows to red clay soils.

Following the Boring Lava event, gravel and finer sediments were deposited in the Portland area. Glacial floods produced channeled scab lands and deltaic deposits of torrentially cross-bedded gravels. Continued erosion by Willamette Valley river systems, earthquakes and weathering of the area through geologic time, continued to carve and shape the Willamette Valley into its shape today. In the Canby area, this has resulted in a terrace overlooking the Willamette and Molalla Rivers.

The Oregon Department of Geology and Mineral Industries identified the prominent Surficial Geologic Units in the Canby Area. The results of the study were published in 1979. From the study, there are predominantly Alluviums and Lacustrine Sediments underlying the Canby urban area. The Lacustrine Sediments are unconsolidated cross-bedded to graded sedimentary beds deposited by the

late Pleistocene glacial floods. There are three classifications of these sediments: Qws, Qls and Qdg.

In general, the Lacustrine Sediments are well drained when on terraces. However, when located in concave areas and within drainage ways, they are poorly drained. The Alluvium located adjacent to the Willamette River has, in the past, been subject to flooding and has a high groundwater table. Thus, the Alluvium surficial unit is anticipated to be poorly drained during winter wet weather periods.

5) Soils

United States Department of Agriculture, Soil Conservation Service (SCS) information was used in identifying soil types in Canby. The SCS classifications indicate the effects the soil features will have on the infiltration in the Canby area The predominate soils are Canderly Sandy Loam (12A) and Latourell Loam (53A, 53B, and 53C) with small inclusions of Amity Silt loam (3) and McBee Silt Clay Loam (56), Newberg Fine Sandy Loam (67), Newberg Loam (68), Willamette Silt Loam (68A) and Xerochrepts and Haploxerolls (92F). A general overburden of the area indicates that capability Class I Latourell soils are located in the Southeast and capability Class II Canderly Sandy Loam is generally found in the Northwest. See the appendix for the Soils Map of the area.

6) Groundwater Supplies

The Canby area is bounded on three sides by river basins that are at slightly lower elevations. As a result, groundwater is plentiful and accessible at relatively shallow depths. Due to the topography and soil composition, groundwater is estimated to be similar to the pattern documented for the Willamette River Valley. This indicates that there is an unconfined shallow aquifer that varies dramatically with the seasonal weather, and a much deeper confined aquifer with higher quality water supplies.

There are a substantial number of domestic wells within the Canby area. The majority of these wells exceed 100 foot depths, although numerous wells are logged at as little as 30 feet to 40 feet deep. Well logs indicate a confining barrier is present, varying in depth but less than 100 feet below the ground surface.

7) Climate

The climate in the study area is temperate. Summers are warm with daily temperatures averaging from 70 to 75 degrees with occasional hot days where the temperature exceeds 100 degrees. Winters are cool with average daily temperatures

of about 40 degrees. Freezing temperatures occur periodically throughout the winter with lows in the teens.

Due to the temperate climate, snowfall is rare, but can occur annually. Accumulations of from 1 to 4 inches of snow have been recorded during December and January. Unofficially, accumulations of as much as 12 inches of snow have been reported in the Canby area for short periods of time.

Normal rainfall, as recorded at the North Willamette Experimental Station averages 41 inches per year. The driest months of the year are July and August, with normal precipitation of less than one inch per month. During these two months, several weeks may pass without precipitation. The balance of the year, frequent rain showers occur with the wettest months being November, December and January. During these three months, rainfall normally exceeds six inches per month. A summary of 1981 - 2010 Monthly Normal Rainfall from the National Oceanic & Atmospheric Administration is contained in the appendix.

C. POPULATION TRENDS

The City of Canby has grown steadily over the past several decades. From 1920 through 1980 the City population increased from 852 to 7,659 people according to the Bureau of Municipal Research and Service as reported in the City's 2007 Comprehensive Plan. Population growth from 1990 to 2018 continued to increase according to the Portland State University (PSU) *College of Urban & Public Affairs Population Research Center.*

The estimates in the following table were obtained from Table 4. *Populations for Oregon and Its counties and Incorporated Cities and Towns: July 1, 2010 - July 1 2017 estimates; and Census Counts 1990 - 2010" and* the July 2018 Certified Estimate provided by the PSU center for population research.

Table 1.1: City of Canby
Population History

Year	Population	Population Increase	Annual Increase
1990	8,990	--	--
2000	12,790	3,800	3.6%
2010	15,830	3,040	2.2%
2011	15,830	0	0.0%
2012	15,865	35	0.2%
2013	15,910	45	0.3%
2014	16,010	100	0.6%
2015	16,010	0	0.0%
2016	16,420	410	2.6%
2017	16,660	240	1.5%
2018	16,800	140	0.8%

Population forecasting methodology was changed in 2013 by House Bill 2253 which requires all municipal population projections for Department of Land Conservation & Development (DLCD) use be completed by the PSU Population Research Center. As a result, PSU developed population forecasts for the City of Canby Urban Growth Boundary (UGB) as shown in the following table, including revised figures for 2017:

Table 1.2: City of Canby
Population Projections

Year	Population	Population Increase	Annual Increase
2017	17,976	--	--
2020	18,933	957	1.7%
2025	20,607	1,674	1.7%
2030	22,318	1,711	1.6%
2035	24,045	1,727	1.5%
2040	25,748	1,703	1.4%

It should be noted that the June, 2017 PSU forecast for the City of Canby UGB is 17,976 residents, whereas the PSU certified population within the City limits for 2017 was 16,660 residents. This represents a significant difference in population which will be reflected in the wastewater facility planning process for subsequent years, and may result in over estimating future needs as a result of anticipating providing service to areas outside of the existing City Limits service area. The PSU forecasts

include the areas outside of the City limits but within the UGB areas, that will not be served with the City's infrastructure.

D. COMMUNITY ENGAGEMENT

In an effort to encourage public participation in the planning process, the City notifies residents of the hearings by posting notices in conspicuous places around town, placing legal advertisements, publishing special articles in the local newspaper and website, and with notices mailed to individuals.

Citizens are also involved in the planning and operation of the City. All Planning Commission, Budget Committee and City Council meetings are publicized and open to the public. Executive sessions are occasionally called to discuss personnel matters or other items specifically allowed by State law (i.e., ORS Chapter 192), but citizen participation is encouraged in all but the most unusual circumstances.

When conducting public hearings on items such as zone changes, the City has traditionally notified residents well beyond the required area and made extra efforts for newspaper coverage in an effort to involve citizens in the decision-making process. The City Council relies on a number of different citizen committees for advice on matters ranging from traffic safety to the fiscal budget. As the City continues to grow citizens will continue to play a major role as appointed officials of the City.

2. EXISTING FACILITIES

A. LOCATION

The Canby collection system and treatment facility location is shown on the plates attached at the end of this Facility Plan. The treatment facility was located at its current site, at 1480 NE Territorial Road, in 1948 with the first plant construction.

B. HISTORY

The municipal sanitary sewer system was constructed beginning in the late 1940's, and currently has approximately 21 miles of sewer lines varying from 6 to 30 inches in diameter. Most of the gravity sewers constructed before 1980 are concrete pipe. Newer sewer lines are typically polyvinylchloride (PVC).

The collection system also has a total of 7 pump stations with a total of approximately 9,000 feet of 4" and 6" diameter force mains. All pump stations discharge into adjacent manholes within the collection system with the exception of the 34th Place pump station, which discharges into a manhole on the treatment facility site.

The treatment facility has gone through several upgrades since its original construction. The original Cornell, Howland, Hayes and Merryfield plans, dated April 1948, consisted of:

- Headworks with solids comminution,
- Primary clarification with chlorine disinfection,
- Anaerobic digestion and
- Sludge drying beds.

In 1961, Ronald Tatone, the City Engineer, designed a new PE pump station, trickling filter, and secondary clarifier to provide secondary treatment. In 1968, Clark & Groff Engineers added a chlorine contact basin and made process piping improvements.

In 1971, an aeration basin with submerged aerators was constructed to upgrade and replace the existing trickling filter treatment process, and in 1982, the first major upgrade was designed and implemented by Lee Engineering. Improvements completed in 1982 included:

- A new headworks with screening and grit removal;
- Construction of a new primary clarifier;
- Conversion of one of three existing sludge storage ponds to a second aerobic digester with the addition of floating aerators;
- Removal of the existing floating aerators in the aeration basin and installation of a new diffused aeration system along with a blower support building; and
- Modification of the sludge pumping system and the raw sewage pump station.

Curran-McLeod, Inc. has completed eight plant upgrades and expansions beginning with the first project in 1993. In 1993 the $3.2 million improvements included:

- A new influent pump station;
- New Influent screening and grit removal system;
- Two new Secondary clarifiers;
- New RAS/WAS pump station;

- New Standby power system;
- New UV disinfection system;
- Solids handling building (gravity belt thickening);
- Lime feed system (for lime stabilization of sludge); and
- New office and control building; and

The existing abandoned anaerobic digester building, raw sewage pump station and headworks structures were demolished and the aerators were removed from the sludge storage pond.

In 1996, modifications to existing facilities included the addition of a chemical odor control facility and conversion of the existing secondary clarifier to a covered waste activated sludge storage tank, partitioning of the existing of the aerobic digester tank for covered stabilized sludge storage, and lining two of the sludge holding ponds.

In 1998, new biological nutrient removal (BNR) aeration basins, a blower building, a second standby generator and a filtrate pump station were constructed at a cost of $2.2 million. Modifications were made to the old aeration basin to convert it to a holding basin for the filtrate from the gravity belt thickener.

In 2002, a new effluent filtration system (with capacity to add a second train of discs to double the capacity), biosolids dewatering system (belt filter press) and lime stabilization system were constructed at a cost of $1.9 million.

In 2009, new biosolids drying system and solids receiving station were constructed at a cost of $2.3 million. Modifications to the existing biosolids storage area were completed enclosing the building for the new sludge dryer. The existing open channel UV system was abandoned and a new in vessel UV system was installed. Due to inadequate performance, the biosolids drying system was subsequently removed from service in 2010 and dismantled in 2014.

Improvements completed in 2014 at a cost of $1.6 million included:

- Replacing the influent screening and grit removal systems, and numerous plug valves around the site which had reached the end of their life cycle;
- Placing a protective coating in the main pump station wet well to protect from hydrogen sulfide corrosion;
- Addition of a second train of effluent disk filters for redundancy;
- A new secondary clarifier scum pump station;

- Off gas collection and discharge equipment for the headworks, biosolids storage building and dewatering building;
- Upgrading of the process water system pump controls; and
- Addition of hoisting equipment at the aeration basins for removal of the submersible recirculation pumps.

The existing biosolids storage building was expanded in 2016 by 7,500 square feet to accommodate additional solids storage and an enclosed drive-through biosolids loadout facility. In addition, the existing biosolids storage building was partitioned with a center wall to isolate two bays for the potential of utilizing a biosolids lime stabilization process. The new sludge storage and loadout building, as well as the existing biosolids building, was totally enclosed and two additional odor/off-gas collection and discharge systems were added as additional odor control measures. These improvements were completed at a cost of approximately $900,000.

In 2017, improvements were completed at a cost of $1.9 million to:

- Renovate the existing sludge storage tanks with new aeration diffusers, and add a new 300,000 gallon covered concrete tank for additional primary and WAS storage;
- Construct a new sludge transfer pumping station;
- Modify the process piping to accommodate the use of two of the existing sludge storage tanks for either sludge or pressate storage;
- Add an additional blower for aeration of the new sludge storage tank;
- Add off gas collection and discharge equipment for odor control on the three sludge storage tanks; and
- Remove/replace failing motor control equipment in several locations.

1) NPDES Permit Compliance

The Oregon Department of Environmental Quality NPDES Permit and Permit Evaluation Reports were reviewed for NPDES permit violations. Over the past five years the City has received only one warning letter and no permit violations.

In 2014, the City was issued a Warning Letter (NWR-WQ-2014-0024-WL) for not having notified DEQ of the designated signatory authority for the NPDES permit . This notification is required if reports required by the permit are going to be signed by individuals other than a principal executive officer or ranking elected official. The City of Canby resolved this issue by submitting an "*NPDES Duly Authorized Representative Form*" to DEQ on May 12, 2014. No enforcement action was taken by DEQ.

The City of Canby's wastewater treatment facility National Pollutant Discharge Elimination System (NPDES) permit establishes seasonal effluent discharge limitations for $CBOD_5$ and TSS as shown in the following table.

Table 2.1: City of Canby
NPDES $CBOD_5$ & TSS Permit Requirements

May 1 - October 31:

Parameter	Average Effluent Concentrations Monthly	Weekly	Monthly* Average lb/day	Weekly* Average lb/day	Daily* Maximum lbs
$CBOD_5$ (See Note 1)	10 mg/l	15 mg/l	167	250	334
TSS	10 mg/l	15 mg/l	167	250	334

November 1 – April 30:

Parameter	Average Effluent Concentrations Monthly	Weekly	Monthly* Average lb/day	Weekly* Average lb/day	Daily* Maximum lbs
$CBOD_5$ (See Note 1)	25 mg/l	40 mg/l	417	667	834
TSS	30 mg/l	45 mg/l	500	750	1000

* Average dry weather design flow to the facility equals 2.0 mgd. Mass load limits based on dry weather design flow to the facility.

A summary of the treatment facility's performance meeting $CBOD_5$ and TSS Monthly Average concentration and pound/day effluent limitations for 2018 was obtained from the DMRs and is shown in the following table.

Table 2.2: City of Canby
WWTP 2018 Effluent $CBOD_5$ & TSS Averages

Month	*Effluent flow Monthly Average (mgd)*	*$CBOD_5$*		*TSS*	
		mg/L	*Lb/day*	*mg/L*	*Lb/day*
January	1.0121	5	39	8	68
February	0.9743	4	35	7	60
March	0.9829	4	30	7	54
April	1.0210	3	28	6	49
May	0.9866	3	21	5	41
June	0.9910	2	16	4	31
July	0.9757	2	16	5	44
August	0.9978	3	21	4	33
September	0.9978	2	18	5	41
October	0.9889	3	21	5	40
November	0.9958	3	27	6	49
December	1.0110	6	26	6	53

The NPDES permit also establishes limitations for *E. coli* Bacteria, pH, BOD_5 and TSS removal Efficiency, and Ammonia as shown in the following table.

Table 2.3: City of Canby
NPDES E. coli, pH, BOD Removal & Ammonia Requirements

Other parameters (year-round)	Limitations
E. coli Bacteria	Shall not exceed 126 organisms per 100 ml monthly geometric mean. No single sample shall exceed 406 organisms per 100 ml. (See Note 2)
pH	Shall be within the range of 6.0 - 9.0
BOD_5 and TSS Removal Efficiency	Shall not be less than 85% monthly average for BOD_5 and 85% monthly for TSS.
Ammonia (NH_3-N)	Shall not exceed 33.0 mg/l daily maximum and 18 mg/l monthly average

A summary of the facility's compliance with these limitations in 2018 is shown in the following table.

Table 2.4: City of Canby
WWTP 2018 Effluent E. coli, pH, BOD_5/TSS Removal & Ammonia Averages

2018 Compliance with Other Parameters								
Month	*E. coli* Bacteria (organisms/100 ml)		*pH (SU)*		*Monthly Avg Removal Efficiency (%)*		*Ammonia (mg/L)*	
	Monthly Geometric Mean	*Single Sample*	*Min*	*Max*	*BOD_5*	*TSS*	*Daily Maximum*	*Monthly Average*
January	14	74	6.9	7.3	98	97	1.63	2.54
February	24	88	7.0	7.3	98	98	4.67	2.17
March	4	12	7.0	7.4	98	98	4.10	1.58
April	30	161	7.1	7.4	99	98	0.22	0.14
May	10	29	7.0	7.4	99	98	7.22	1.37
June	6	18	7.1	7.4	99	99	0.1	0.05
July	11	107	6.4	7.4	99	98	0.19	0.10
August	19	173	7.2	7.6	99	99	0.17	0.11
September	14	46	7.2	7.6	99	98	0.16	0.09
October	22	86	7.2	7.4	99	98	0.16	0.07
November	8	47	7.1	7.4	98	98	0.27	0.11
December	2	4	7.1	7.3	98	98	1.14	0.35

From the 2018 data, the treatment facility has been able to meet all these NPDES limitations. The DMRs also showed that the facility has been able to meet all weekly averages and daily maximum limits for $CBOD_5$ and TSS during 2018.

Primary and secondary sludges are blended, held in aerated sludge storage tanks and then dewatered by a belt filter press. The solids are then stored on site in an enclosed biosolids storage building. The City of Canby contracts with Heard Farms to haul the Biosolids to Roseburg, Oregon for disposal on the Heard Farms' properties.

Heard Farms holds the biosolids until they can be land applied and ensures the City's compliance with all disposal and regulatory requirements. Prior to contracting with Heard Farms, biosolids were transported to the Coffin Butte Landfill by Canby Disposal. The City uses Canby Disposal only as a backup if Heard Farms is unable to

make the multiple weekly trips. When needed, Canby Disposal hauls biosolids to Wasco County.

C. CONDITION OF EXISTING FACILITIES

1) Collection System Evaluation

A comprehensive Wastewater Master Plan was completed in 1999 for the City of Canby and identified the City's existing major sewers, their respective drainage areas, deficiencies and capital improvements. City staff have also subsequently identified additional deficiencies that require attention either for capacity limitations, pipeline defects or options to improvement maintenance requirements.

These prior plans have specifically:

- Identified and inventoried the City's collection system and the respective collection basins;
- Determined the location and elevations of manholes on existing trunk and interceptor sewers;
- Evaluated the capacity of existing sewers;
- Provided a master plan to serve remaining un-serviced areas;
- Inventoried existing pump station designs;
- Identified locations for new pump station; and
- Identified a Capital Improvement Plan.

The existing collection system consists of approximately 21 miles of gravity sewer lines ranging in size from 6 to 30 inches in diameter. Most of the older gravity sewers installed before 1980 were constructed of concrete or asbestos cement pipe. New sewers as constructed of PVC pipe.

The Collection System is in good condition as demonstrated by the low I/I contribution. However, the Master Plan, SDC Capital Improvement Plan and staff have identified several deficiencies in the collection system for both capacity limitations and maintenance impacts that warrant improvements. These improvements resolve capacity limitations and pipeline deficiencies such as root intrusions, and include the potential abandonment of two of the City's pumping stations by construction of additional gravity collection lines.

Capital improvements for the collection system are listed in the Capital Improvement Plan portion of this plan update.

2). Sewage Pump Station Evaluation

The City has eight sewage pumping stations, seven are owned and operated by the City of Canby and one is under private ownership. The City has an ongoing effort to standardize equipment such as the pump controls and standby power systems as pump stations are renovated or added to the system. Fiberglass wet wells are also integrated into new pump station designs, and into pump station renovations where possible.

The City has retrofitted all pump stations with cellular telemetry and Supervisory Control and Data Acquisition (SCADA) by Mission Communications over the last few years, eliminating the previous radio communication systems.

Stationary standby power systems are located at all but three stations. The city has a single portable generator to provide power to each of these sites. The portable generator is a vintage unit, but is regularly maintained and has been serving the City well for many years. It has the ability to serve the three pumps stations, but requires staff actions upon each power fail, and does not have sound attenuation, resulting in the unit being extremely loud when in operation.

Figure 2.1: Portable Standby Generator

An evaluation of each of the existing pump stations is provided in the following narratives along with any recommendations based on field observations and City maintenance staff comments.

a. 3rd and Baker Pump Station

The 3rd and Baker Pump Station, constructed in 1999, is located in a field north of the Union Pacific Railroad tracks and east of the Canby police station. The pump station was originally located at the intersection of 3rd and NW Baker. The pump station is accessed from the police station parking lot through a secured gate.

Sewage flows by gravity to the pump station through two 8" gravity sewer lines, one from the north and one from the south. The 4 inch, 580 foot-long PVC force main discharges into a manhole at the intersection of 3rd and NW Baker. The pump station consists of the following:

- 6 foot diameter x 21 foot deep concrete wet well.
- Two 7 1/2 Hp submersible pumps: 165 gpm @ 65 feet.
- Below grade valve vault with (2) 4" gate valves and (2) 4" swing check valves.
- Controls are PLC with across the line starters.
- Level controls include a pressure transducer with backup float switches.
- Manual Transfer switch with standby power receptacle for portable generator.
- 4" Bypass pumping connection in valve vault with cam lock connector.

The existing pump station appears to be in good condition structurally. With regard to the submersible pumps, one pump was replaced two years ago. The other pump is in poor condition and needs to be replaced. The run time records confirm this need and show an imbalance in operating times. City staff also consider the pump discharge valves to be in poor condition and in need of replacement.

Figure 2.2: 3rd and Baker Pump Station

Figure 2.3: 3rd and Baker Pump Station Wet Well

The pump station controls need to be upgraded. The existing control system is an obsolete programmable logic controller (PLC). The City has been replacing the PLCs at their pump stations with a pump controller as needed. According to City staff the system also does not have a backup level control system.

Power bumps have recently become an issue causing frequent power outages at the station. When power failures occur at the station, the City must bring their portable standby power generator to the site. Due to the frequency of these events, a permanent standby generator with an automatic transfer switch needs to be installed at the site.

One of the safety issues with the station is fall protection. There are no physical barriers to prevent personnel from accidently falling into the wet well when the wet well hatch is open. The wet well opening should be retrofitted with a safety grating or physical barriers around the perimeter to protect personnel.

Cost of the identified improvements is estimated at $250,000, as detailed in the appendix.

b. 34th Street Pump Station

The 34th Street Pump Station was renovated in 2016 to replace the concrete wet well and remove a below grade, self-priming station that was in a metal enclosure. Sewage flows by gravity through a 12 inch gravity mainline in 34th Avenue from the west, and a 6" sewer main from the south. A 4 inch, 3,400 foot-long thin-wall PVC force main discharges to a manhole located adjacent to the blower building at the City's Wastewater Treatment Facility. The pump station consists of the following:

- 5 foot diameter x 28 foot deep fiberglass wet well.
- Two Wilo 10.2 Hp fixed speed submersible pumps: 150 gpm @ 71 feet.
- Below grade valve vault with (2) 4" plug valves and (2) 4" swing check valves.
- Pump controller with across the line starters.
- Level controls include a pressure transducer and backup float switches.
- 25 kW diesel powered standby generator with 24 hr fuel tank and ATS .
- 4" Bypass pumping connection in valve vault with cam lock connector.
- Meets EPA Class I reliability requirements.

Figure 2.4: 34th Street Pump Station

Due to the recent renovation of the station in 2016, it is good condition and is not in need of any improvements.

c. Knights Bridge Road Pump Station

In 2010, the knights Bridge Pump Station replaced an antiquated station located in the street, west of its current site. The pump station was relocated out of the street to provide better access and safety for City staff, and consists of a package fiberglass wet well with submersible pumps and an integral valve vault.

Station controls were upgraded since 2010 to replace the failing programmable logic controller with a pump controller. The pump station control system and standby generator are located in a fenced enclosure approximately 40 feet north of the wet well, in an easement on private property.

Sewage flows by gravity to the pump station through an 8" C900 PVC line, which according to City staff is in good condition. A 6 inch, 30 foot long, C900 PVC force main discharges to a manhole in Knights Bridge Road east of the station.

The pump station consists of the following:

- 5 foot diameter x 20 foot deep fiberglass wet well.
- Two Hydromatic 5 Hp fixed speed submersible pumps: 322 gpm @ 22 feet.
- Below grade valve vault with (2) 4" plug and (2) 4" swing check valves.
- Pump controller with across the line starters.
- Level controls include a pressure transducer and backup float switches.
- 15 kW diesel powered standby generator with 24 hour sub-base fuel tank and automatic transfer switch.
- Meets EPA Class I reliability.

Figure 2.5: Knights Bridge Pump Station (in sidewalk)

At one time there were odor complaints received from adjacent property owners due to gasses venting out of the station. The vents were subsequently sealed and there have been no complaints since.

There were concerns raised on the pump station cycle times, on too frequent on/off cycles. This station cycles more frequently than some other stations in the collection system due to the relatively small wet well, but the cycle times are not in excess of the recommended motor cycle time parameters.

Operational records indicate this station operates approximately 45 cycles per day on average, on each pump. The pumps are designed for a maximum of 16 cycles per

hour. Each pump is easily capable of handling the flows within the recommended cycle times, either in duplex or simplex modes.

After construction of the Knights Bridge Pump Station, the gravity collection system was extended to the intersection of NW Territorial Road and N Birch Street at an elevation that would permit abandoning the pump station. The elevations of the pipelines have a differential head of approximately 5 feet over a distance of 2,600 feet. The slope on a gravity sewer would be slightly less than 0.2%, which is less than the typical minimum, however, would be very feasible. This option should be implemented when substantial renovations are required at the station, anticipated in the next 10 to 15 years.

Cost to abandon the existing station and construct a 10" gravity line to Territorial Road is estimated at $525,000, as detailed in the appendix.

d. Hazeldell Way Pump Station

The Hazeldell Pump Station was constructed in 2007 and is located on the north side of SE 1st Avenue, approximately 500 feet west of SE Hazeldell Way. The wet well, controls and standby power systems are located in a fenced enclosure in a wooded area with tall fir trees. Access to the site is through a rolling gate along the SE 1st Avenue.

Sewage flows by gravity to the station through a 12 inch 3034 PVC gravity sewer line constructed in 2007 and in good condition. The pump station force main is a 6 inch, 624 foot long, C900 PVC pipe that discharges to a manhole on SE 1st Avenue west of the pump station.

The pump station consists of:

- 6 foot diameter x 18 foot deep fiberglass wet well.
- Two 5 Hp fixed speed submersible pumps: 325 gpm @ 32 feet.
- Below grade valve vault with (2) 4" plug valves and (2) 4" swing check valves.
- Pump controller with across the line starters.
- Level controls include a pressure transducer and backup float switches.
- Bypass pumping connection in valve vault with cam lock connector.
- Meets EPA Class I reliability requirements.
- 40 kW diesel powered standby generator with 24 hour sub-base fuel tank and automatic transfer switch.

Figure 2.6: Hazeldell Pump Station

The pump station, gravity sewer line and force main are in good condition. There are no significant concerns with it operation or system components. However, city staff expressed a desire to improve the access to the wet well to allow access for the vactor truck to service the wet well without encroaching into the traveled roadway.

Currently the site is graveled. The surface is uneven with grass and weeds which requires care when working around the site and creates additional maintenance. The site easement was granted to the City with a deferred condition that the site be landscaped in the future, concurrently with development of the adjoining residentially zoned property.

Unlike all other stations, which are all served by Canby Utility, power to the Hazeldell Pump Station power is provided by PGE under an interim agreement. When this area develops and infrastructure is in-place in SE 1st Avenue, the power supply will need to be converted to Canby Utility. At that time, the operators would like to have the access point changed to enter the station from the east side, out of the traveled roadway. This can be accomplished with a modified easement when the power is converted to Canby Utility and the PGE pole is removed.

Cost of the identified improvements is estimated at $50,000, in the appendix.

City staff also expressed a concern that the trees on and around the site pose a threat to the pump station should there be a significant storm event which might result in damage to the station. The City needs to periodically survey the condition of the surrounding trees and remove trees as required to prevent damage.

The area along Highway 99E, between this site and South Territorial Road is essentially undeveloped. The elevation of the existing sewer lines and local topography were reviewed to determine if this station could potentially be abandoned upon development of the intervening properties.

The existing sewer pipeline invert at South Territorial Road is at an elevation of 115.45 feet. The invert of the last gravity manhole at the Hazeldell Pump Station is at elevation 113.51 feet. There is a straight line length of approximately 3,600 feet between these two locations, which would require a minimum of approximately 9.4 feet of elevation difference to extend a 12" gravity line with manholes to Territorial Road. Regardless of the topography between these two locations, the pipe invert elevations eliminate any potential of abandoning this station in favor of gravity service.

e. Shopping Center Pump Station

The Shopping Center Pump Station (also known as the Safeway Station) was constructed in 1975. The station is located behind the southeast corner of the Big 5 and Safeway stores, in a landscaped area along the center's service access road.

The 4" PVC force main discharges to a manhole approximately 30 feet north of the pump station. Controls for the pump station are located approximately 175 feet away from the wet well, in a mechanical room in the store building, with access through a back-wall service door.

The pump station consists of:

- 4 foot diameter x 18 foot deep concrete wet well.
- Two 2 Hp fixed speed submersible pumps: 50 gpm at approximately 25' TDH.
- (2) 4" plug valves and (2) 4" swing check valves located in the wet well.
- Programmable Logic Controller with across the line starters.
- Float switch level controls.
- Generator receptacle and manual transfer switch for standby power connection.

Figure 2.7: Shopping Center Pump Station

Figure 2.8: Shopping Center Pump Station Wet Well

In general, this pump station is in poor condition and difficult to maintain, with check and isolation valves located in the vertical pipe run in the wet well. The control system has an obsolete PLC, and the controls are located in the commercial building approximately 175 distant from the station. The exterior lock on the building has

been changed on at least 2 occasions inadvertently preventing the City from entering the building.

Similar to the Knights Bridge Road station, this station can be abandoned by construction of additional gravity sewer construction. A new 8" gravity line approximately 1,500 feet long would need to be constructed from the wet well to Berg Parkway, north of Highway 99E. The invert elevation of the piping at the pump station is approximately 145 feet. This new gravity line will likely need to enter Berg Parkway in the second manhole north of the highway, which has an invert elevation of approximately 139 feet.

No interim improvements are recommended for this station, however, this station is the City's highest priority to replace or abandoned. The pump station should be maintained until such time as it can be removed from service and a gravity line installed to Berg Parkway. The cost to abandon the station and install 1,500 LF of 8" pipeline and a highway crossing is estimated at $400,000, as detailed in the appendix.

f. Mulino Pump Station

The Mulino Road pump station was constructed in 2018. The pump station is located approximately 325 feet north of SE 13th Avenue on South Mulino Road. The pump station controls and standby power system are located in a CMU block building. The site is fenced.

Sewage flows by gravity to the pump station through an 8 inch, C900 PVC sewer line from SE 13th Avenue, which crosses under the railroad. Sewage is discharged from the station through 2,460 feet of 6" SDR 17 HDPE force main to a manhole in Sequoia Parkway.

The pump station consists of the following:

- 10 foot diameter x 20 foot deep fiberglass wet well.
- Two Wilo 15.5 Hp fixed speed submersible pumps: 325 gpm @ 72 feet.
- Below grade valve vault with (2) 6" plug valves and (2) 6" swing check valves.
- Pump controller with across the line starters.
- Level controls include a pressure transducer and back up float switches.
- 40 kW diesel powered standby generator with 48 hour sub-base fuel tank and automatic transfer switch.
- Compressed air odor control system.
- 4" Bypass pumping connection with cam lock connector.

- Meets EPA Class I Reliability requirements.

Due to the pump station having been recently constructed it is in very good condition. The only issue with the pump station is access to a sewer line manhole on the west side of the site. The pump station was constructed by permit adjacent to a wetland. Access to the upstream pipeline is difficult during wet weather due to the presence of standing water and soft soils.

Figure 2.9: Mulino Road Pump Station

The cost to provide an all-weather access road to the west of the station to access the existing manhole is estimated at $5,000.

g. Willow Creek Pump Station

The Willow Creek Pump Station was also constructed in 2018. The pump station is located on NE Territorial Road approximately 670 Feet west of Teakwood Street. The pump station replaced an existing pump station at the site that had reached the end of its service life.

Sewage flows by gravity to the station from the east and west along NE Territorial Road. Sewage is pumped through a 750 foot long 6 inch SDR-17 HDPE force main

to a manhole located at the intersection of NE Territorial Road and NE Redwood Street, west of the pump station.

The pump station consists of the following:

- 10 foot diameter x 20 foot deep fiberglass wet well.
- Two Wilo 10.2 Hp fixed speed submersible pumps: 400 gpm @ 40 feet.
- Below grade valve vault with (2) 6" plug valves and (2) 6" swing check valves.
- Pump controller with across the line starters.
- Level controls include a pressure transducer and backup float switches.
- 35 kW diesel powered standby generator with 48 hour sub-base fuel tank and automatic transfer switch.
- 4" Bypass pumping connection with cam lock connector.
- Meets EPA Class I Reliability requirements.

Figure 2.10: Willow Creek Pump Station

Due to the pump station having been recently constructed, it is in very good condition. No additional improvements are needed at the pump station.

h. Village of the Lochs Pump Station

The Village of the Lochs Pump Station was constructed in 1992. The pump station is privately owned and maintained. The station consists of two 20 Hp submersible pumps with a capacity of 150 gpm at 71 feet. Sewage is discharged to the City collection system through 1,650 feet of 4 inch PVC pipe. There is no standby power at the site, but there is a receptacle for a standby power generator. The condition of this private station is not known.

Figure 2.11: Village on the Lochs Pump Station

i. Future Pump Station Locations

The 1999 Collection System Master Plan identified three additional pumping stations that will be required to serve buildout of the UGB. Two of these stations are located in the northwest quadrant of the UGB, and identified as the 22nd Avenue Pumping Station and the North Birch Pumping Station, and the third on South Ivy Street. Each station serves relatively small areas which are not able to be served by gravity.

These stations will be required when development approaches the area and the gravity system is extended as far as possible.

j. Pump Station Run times

The City's pump station telemetry system, provided by Mission Communications, provides the City with the operational status of each station. This information includes the minutes of operation for each pump and gives an indication of the remaining capacity of each station.

The 2018 Monthly Runtime Summary data was reviewed for each pump station and is summarized in the following table:

Table 2.1: City of Canby
Pumping Station Average Run Times

Pump Station	***2018 Runtime (Average hours per day)***											
	Jan	***Feb***	***Mar***	***Apr***	***May***	***Jun***	***Jul***	***Aug***	***Sept***	***Oct***	***Nov***	***Dec***
34th Street	1.88	1.58	1.49	1.81	1.41	1.45	1.27	1.45	1.26	1.16	1.18	1.52
3rd & Baker	2.97	2.65	2.68	2.95	2.71	2.69	2.52	2.62	2.60	2.61	2.72	2.90
Hazeldell	0.12	0.16	0.12	0.13	0.17	0.12	0.15	0.16	0.10	0.11	0.14	0.11
Knights Br Rd	2.36	2.37	2.31	2.40	2.45	2.76	2.69	2.82	2.63	2.52	2.39	2.58
Mulino	0.41	0.03	0.00	0.01	0.00	0.03	0.00	0.01	0.02	0.03	0.03	0.08
Safeway	0.59	0.64	0.71	0.75	0.82	0.92	0.83	0.78	0.65	0.60	0.59	0.70
Willow Cr	1.12	1.10	1.14	1.16	1.03	1.06	1.08	1.13	1.02	1.02	1.01	1.15

As can be seen from the preceding table, all pump stations operate only a very few hours per day on average, and seasonal variations do not have a significant impact on run times. A daily run time of approximately 16 hours per day would be considered the station's capacity. All of the stations are operating well below their capacity.

Table 2.2: City of Canby
Pump Station Design Summary

Sewage Pump Station Operational Summary								
Pump Station	**Installation/ Renovation**	**Pump Type and Manufacturer**	**Pump Design Capacity**	**Controls**	**Overflow Point**	**Standby Power**	**Force Main**	**Sulfide Control**
Willow Creek	Renovated Nov 2018	Submersible WILO	(2) 10.2 HP, 400 gpm @ 40'	Pump Controller w/float backup	Adjacent wetlands	Diesel Generator w/48 hr fuel tank	Approx 750 ft of 6" HDPE	None
Mulino	New Nov 2018	Submersible WILO	(2) 15.5 HP, 325 gpm @ 72'	Pump Controller w/float backup	Drainage way to Molalla River	Diesel Generator w/48 hr fuel tank	Approx 2,460 ft of 6" HDPE	Air injection
34th Street	Renovated July 2016	Submersible WILO	(2) 10.2 HP, 150 gpm @ 71'	Pump Controller w/float backup	Sanitary MH on 34th Place	Diesel Generator w/24 hr fuel tank	Approx 3,400 ft of 4" PVC	None
Knight's Bridge	Renovated Sept 2010	Submersible Hydromatic	(2) 5 HP, 325 gpm @ 22'	Pump Controller w/float backup	Storm drain Knight's Bridge and N. Cedar	Diesel Generator w/24 hr fuel tank	Approx 30 ft of 6" PVC	None
Village on the Lochs (1)	New Oct 1992	Submersible Hydromatic	(2) 20 HP, 150 gpm @ 71'	Floats with 90-20 PLC	Pump Station	Receptacle for Portable Generator (2)	Approx 1,650 ft of 4" pipe	Rotary Blower
Shopping Center	New Oct 1975	Submersible Enpo-Cornell	(2) 2 HP Approx. 50 gpm each	Floats with 90-20 PLC	MH Q-3 in S. Berg St. at Hwy 99E	Receptacle for Portable Generator (2)	Approx 30 ft of 4" pipe	None
3rd and Baker	New 1999	Submersible	(2) pumps 165 gpm @ 65'	Floats with 90-20 PLC	Pump Station	Receptacle for Portable Generator (2)	Approx 580 ft of 4" PVC	None

(1) Village on the Lochs Pump Station is not owned or operated by the City.
(2) 100 Kw Portable generator is stored at the City's PW complex.

3) Wastewater Treatment Facility

The following text provides an overview of the Wastewater Treatment Facility site and unit processes. Drawings of the overall site are located on the following pages, including:

- Aerial Overview Drawing.
- Design Criteria - Drawings G2 and G3.

a. Influent Screening

The raw sewage screening system consists of two 6 mm perforated plate spiral screens operating in parallel. Each screen has a hydraulic design capacity of 4.0 mgd. The screenings are washed, compacted, and discharged into a refuse collection container for transport to a state approved landfill.

Figure 2.12: WWTP Duplex 4.0 mgd Spiral Screens

For Class I reliability the EPA guidance document requires mechanically cleaned bar screens or equivalent devices where one bar screen can be manually cleaned. Each spiral screen at this facility has an integral bypass if the screens are blinded, and a manual bar screen is located downstream of the two spiral screens should it become necessary to bypass one or both spiral screens.

CITY OF CANBY

WASTEWATER TREATMENT FACILITY

SEPTEMBER 2019

SCALE: 1"=100'

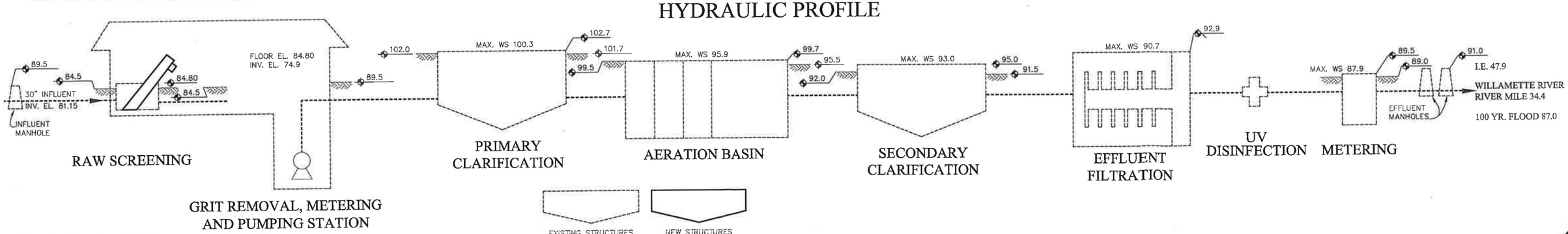
CITY OF CANBY
WASTEWATER TREATMENT FACILITY
HYDRAULIC DESIGN CRITERIA

DESIGN LOADINGS :	AVERAGE DRY WEATHER FLOW (ADWF)	2.8 MGD
	MAXIMUM DRY WEATHER MONTH (MMDWF)	2.8 MGD
	AVERAGE WET WEATHER FLOW (AWWF)	2.8 MGD
	PEAK DAILY FLOW (PDF)	5.6 MGD
	PEAK INSTANTANEOUS FLOW (PIF)	7.0 MGD
	BOD AVERAGE CONCENTRATION	300 MG/L
	BOD TOTAL, ADWF/AWWF	4,670 LBS/DAY
	TSS AVERAGE CONCENTRATION	240 MG/L
	TSS TOTAL, ADWF/AWWF	4,904 LBS/DAY
	DESIGN POPULATION	28,000
	EPA RELIABILITY CLASS	I
	SEPTAGE	EXCLUDED
REQUIRED EFFLUENT QUALITY		
MAY 1 - OCTOBER 31	CBOD, MONTHLY AVERAGE	10 MG/L (167 LBS/DAY)
	CBOD, WEEKLY AVERAGE	15 MG/L (251 LBS/DAY)
	CBOD, DAILY MAXIMUM	334 LBS/DAY
	BOD, PERCENT REMOVAL	85% MONTHLY AVERAGE
	TSS, MONTHLY AVERAGE	10 MG/L (167 LBS/DAY)
	TSS, WEEKLY AVERAGE	15 MG/L (251 LBS/DAY)
	TSS, DAILY MAXIMUM	334 LBS/DAY
	TSS, PERCENT REMOVAL	85% MONTHLY AVERAGE
	NH?-N, MONTHLY AVERAGE	18 MG/L
	NH?-N, DAILY MAXIMUM	33.0 MG/L
NOV 1 - APRIL 30	CBOD, MONTHLY AVERAGE	25 MG/L (417 LBS/DAY)
	CBOD, WEEKLY AVERAGE	40 MG/L (667 LBS/DAY)
	CBOD, DAILY MAXIMUM	834 LBS/DAY
	BOD, PERCENT REMOVAL	85% MONTHLY AVERAGE
	TSS, MONTHLY AVERAGE	30 MG/L (500 LBS/DAY)
	TSS, WEEKLY AVERAGE	45 MG/L (750 LBS/DAY)
	TSS, DAILY MAXIMUM	1,000 LBS/DAY
	TSS, PERCENT REMOVAL	85% MONTHLY AVERAGE
	NH3-N, MONTHLY AVERAGE	18 MG/L
	NH3-N, DAILY MAXIMUM	33.0 MG/L
INFLUENT METERING	PRIMARY ELEMENT	12" PARSHALL FLUME
	MAXIMUM FLOW	10.4 MGD
RAW SCREENING	TYPE	PERFORATED SPIRAL SCREEN
	QUANTITY	2
	BAR SCREEN WIDTH	24"
	CHANNEL DEPTH	3'-9"
	DRIVE MOTOR	1 HP
	PERFORATIONS	1/4" DIAMETER
	CAPACITY (EACH)	4 MGD
GRIT REMOVAL	TYPE	INDUCED VORTEX
	MAXIMUM FLOW	7.0 MGD
	CHAMBER DIAMETER	10'-0"
	DRIVE MOTOR	1 HP
	GRIT PUMP	10 HP
	SCREW CONVEYOR DIA.	9"
RAW SEWAGE PUMPING STATION	TYPE	IMMERSIBLE SCREW CENTRIFUGAL
	NO. OF PUMP CHAMBERS	4
	VARIABLE FLOW MECHANISM	ADJUSTABLE FREQUENCY DRIVE
	FLOW RANGE/PUMP	300-1,200 GPM
	MOTOR HP	18.8
	CURRENT DESIGN CAPACITY (3 PUMPS)	5 MGD (3,500 GPM)

PRIMARY CLARIFICATION (1)	DIAMETER	50'-0"
	SIDE WATER DEPTH	15'-0"
	OVERFLOW AT ADWF	1,426 GPD/SF
	OVERFLOW AT PDF	2,852 GPD/SF
	WEIR LOADING AT ADWF	17,800 GPD/LF
	WEIR LOADING AT PDF	35,600 GPD/LF
	DESIGN CAPACITY AT 2,000 GPD/SF	3.9 MGD
	SLUDGE PUMP TYPE (1)	PNEUMATIC DIAPHRAGM
	SLUDGE PUMPING CAPACITY @ 60 PSI	200 GPM
	VARIABLE FLOW MECHANISM	TIMER/COUNTER
	COMPRESSOR TYPE	RECEIVER-MOUNTED DUPLEX RECIPROCAL
	COMPRESSOR HP (EACH)	7.5 HP
AERATION BASIN (2)	VOLUME TOTAL	870,000 G
	ANAEROBIC/ANOXIC TANK TOTAL	120,000 G
	ANAEROBIC/ANOXIC/AEROBIC TANKS TOTAL	240,000 G
	AEROBIC TANK TOTAL	510,000 G
	DETENTION AT ADWF, TOTAL BASIN	7.5 HOURS
	DETENTION AT ADWF TOTAL, ANAEROBIC/ANOXIC TANKS	1.0 HOURS
	DETENTION AT ADWF TOTAL, ANAEROBIC/ANOXIC/AEROBIC TANKS	2.1 HOURS
	DETENTION AT ADWF TOTAL, AEROBIC TANKS	4.4 HOURS
	DESIGN BOD LOADING	2,800 LBS/DAY
	DESIGN MLSS	3,000-4,000 MG/L
	F/M RATIO, AEROBIC TANKS	0.22 - 0.15
	DESIGN HYDRAULIC CAPACITY	2.8 MGD
	ANOXIC MIXER (4)	SUBMERSIBLE AXIAL FLOW
	MIXER HP, EACH	5 HP
	BASIN RECIRCULATION	SUBMERSIBLE CENTRIFUGAL PUMPS
	RECIRCULATION CAPACITY	4,000 GPM
	AIR SUPPLY, TOTAL	5,400 CFM
	BLOWERS (3) TYPE	VARIABLE SPEED CENTRIFUGAL
	CAPACITY, EACH	1,800 CFM
	MOTOR, EACH	125 HP
	MAX. OXYGEN UPTAKE RATE @ 0.075 OTE	1.0 MG/L/MINUTE
	TOTAL NO. DIFFUSERS	2,620
	DIFFUSER TYPE	FINE BUBBLE
	PH ADJUSTMENT (NEW), TYPE	LIME SLURRY
	BULK STORAGE CAPACITY	36,000 LBS SILO
	SLURRY FEED CAPACITY	370 GAL
	APPLICATION POINT	PRIMARY EFFLUENT
	APPLICATION RATE	12 CU FT / DAY
SECONDARY CLARIFIER (2)	DIAMETER	54'-0"
	TYPE	INBOARD WEIR FLOCCULATOR
	SIDEWATER DEPTH	15'-0"
	OVERFLOW AT ADWF	600 GPD/SF
	OVERFLOW AT PDF	1,200 GPD/SF
	WEIR LOADING AT ADWF	5,430 GPD/LF
	WEIR LOADING AT PDF	10,860 GPD/LF
	DESIGN CAPACITY (TOTAL)	5.6 MGD
	RAS PUMP TYPE (2)	VERTICAL SCREW CENTRIFUGAL
	VARIABLE SPEED CONTROLLER	VARIABLE FREQUENCY DRIVE
	RAS PUMP CAPACITY, EACH	150 - 800 GPM
	RAS MOTOR HP	10 HP
	WAS PUMP TYPE (2)	PNEUMATIC DIAPHRAGM
	WAS PUMP CAPACITY	0-200 GPM
	SCUM PUMP (NEW)	
	TYPE	SUBMERSIBLE CENTRIFUGAL
	MOTOR	3 HP
	CAPACITY	120 GPM

EFFLUENT FILTRATION (1 UNIT)	TYPE	FABRIC MEMBRANE DISC
	DISC DIAMETER	36"
	DISCS	6
	FILTER AREA (TOTAL)	645 SF
	AVERAGE HYDRAULIC LOADING	2.7 MGD
	MAXIMUM HYDRAULIC LOADING	5.5 MGD
	MAXIMUM SOLIDS LOADING (TSS)	1,200 LBS/DAY
	BACKWASH PUMP, TYPE	SELF PRIMING CENTRIFUGAL
	CAPACITY	130 GPM
	MOTOR HP	3 HP
DISINFECTION (NEW)	TYPE	ULTRAVIOLET IRRADIATION
	DOSAGE, MINIMUM	32,000 MICRO WATT S/SQ. CM
	MAX FLOW CAPACITY	8.0 MGD
	NUMBER OF VESSELS	2
	LAMPS PER CHANNEL	8
	LAMP CONFIGURATION	PERPENDICULAR TO FLOW
	RECIRCULATION PUMP	
	PUMP TYPE	SUBMERSIBLE
	PUMP CAPACITY	360 GPM @ 20 PSI
	PUMP HP	5 HP
EFFLUENT METERING	PRIMARY ELEMENT	90° V NOTCH WEIR
	MAXIMUM FLOW	4.45 MGD
	FLOW SENSOR TYPE	ULTRASONIC
OUTFALL	DIAMETER	18" CONCRETE
	LENGTH	800'
	DIFFUSER TYPE	SUBMERGED OPEN PIPE
PROCESS WATER SYSTEM	PUMP TYPE	VERTICAL TURBINE
	QUANTITY	2
	PUMP CAPACITY (EACH)	90 GPM @ 100 PSI
	PUMP HP	10 HP
	PUMP CONTROLLER	ADJUSTABLE FREQUENCY DRIVE
	HYDROPNEUMATIC TANK VOLUME	700 GAL
ALARM TELEMETRY	TYPE	AUTODIALER/DATA LOGGER
	NUMBER OF INPUT/OUTPUT	40
STANDBY POWER GENERATORS	TYPE	DIESEL
	AUTOMATIC TRANSFER CAPACITY	250 KVA
	FUEL STORAGE	8 HOURS
	SYSTEM COVERAGE	PRIMARY AND UV
	TYPE	DIESEL
	AUTOMATIC TRANSFER CAPACITY	750 KVA
	FUEL STORAGE	12 HOURS
	SYSTEM COVERAGE	SECONDARY

HYDRAULIC PROFILE



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ADJUST SCALE AS SHOWN ACCORDINGLY.

REV.	DESCRIPTION	REVISED BY	DATE

REVISIONS

CURRAN-McLEOD, INC.
CONSULTING ENGINEERS

6655 S.W. HAMPTON ST., SUITE 210
PORTLAND, OREGON 97223
PHONE (503) 684-3478

CITY OF CANBY

HYDRAULIC DESIGN CRITERIA

2017 WWTP SLUDGE STORAGE IMPROVEMENTS
CLACKAMAS COUNTY, OREGON

DATE	OCT 2016
P/N	1658
D/S	REF
D/S	REF
CAD#	1658-G02

G2 *OF* G5

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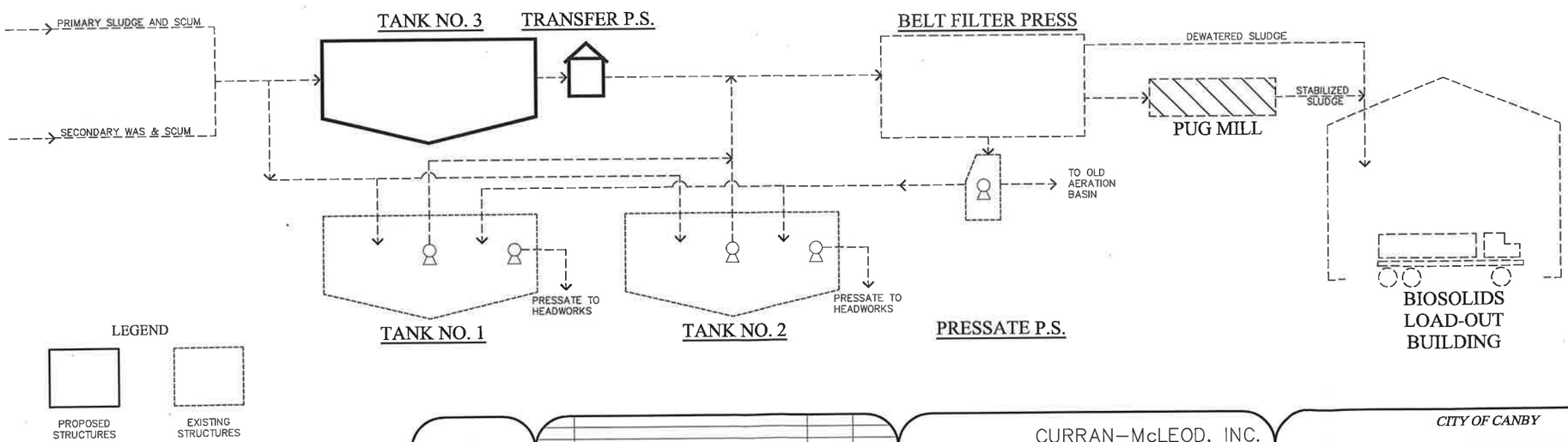
CANBY WASTEWATER TREATMENT FACILITY
SOLIDS PROCESS DESIGN CRITERIA

TANK NO. 1 (WASH)	VOLUME	143,000 GALLONS
	DIAMETER	50'-0"
	SIDE WATER DEPTH	9'-9"
	AERATION SYSTEM	DIFFUSED AIR
	AERATION CAPACITY	340 – 700 CFM
	TOTAL NO. DIFFUSERS	360
	DIFFUSER TYPE	FINE-BUBBLE MEMBRANE DISK
	WASH TANK TRANSFER PUMP (NEW)	SUBMERSIBLE SCREW CENTRIFUGAL
	PUMP CAPACITY	100-200 GPM
	PUMP MOTOR	12.9 HP
	VARIABLE SPEED CONTROLLER	ADJUSTABLE FREQUENCY DRIVE
TANK NO. 2 (SSH)	NO. OF CELLS	6
	VOLUME, CELLS 1-3, EACH	15,000 GAL
	VOLUME, CELLS 4-6, EACH	26,000 GAL
	VOLUME, TOTAL	123,000 GAL
	TRANSFER PUMP TYPE	IMMERSIBLE DISC CENTRIFUGAL
	TRANSFER PUMP CAPACITY	250 GPM
	ODOR CONTROL, CELLS 1-3	ACTIVATED CARBON SCRUBBER
	ODOR CONTROL, SYSTEM CAPACITY	1,000 CFM
TANK NO. 3	VOLUME	300,000 GALLONS
	DIAMETER	54'-0"
	SIDE WATER DEPTH	17'-0"
	AERATION SYSTEM	DIFFUSED AIR
	AERATION CAPACITY	600 – 1200 CFM
	TOTAL NO. DIFFUSERS	360
	DIFFUSER TYPE	FINE-BUBBLE MEMBRANE DISK
	TRANSFER PUMP	ROTARY LOBE PUMP
	PUMP CAPACITY	50-200 GPM
	PUMP MOTOR	7.5 HP
BELT PRESS FEED PUMP	TYPE	PROGRESSIVE CAVITY
	MOTOR	15 HP
	FLOW RATE	100-200 GPM
	VARIABLE FLOW MECHANISM	ADJUSTABLE FREQUENCY DRIVE

SLUDGE DEWATERING	TYPE	BELT FILTER PRESS
	SIZE	2 METER
	DESIGN LOADING	1,300 LBS/HR
	CAPTURE MINIMUM	95%
	DEWATERED SLUDGE TRANSFER TYPE	CONVEYOR
	CONVEYOR SIZE	5 CFM
	CONVEYOR HP	7.5 HP
	POLYMER FEED SYSTEM TYPE	DRY POLYMER FEEDER
	DOSAGE	18 LBS/TON
	TYPE	COVERED BINS
	VOLUME	720 GAL.
PRESSATE P.S.	PRESSATE PUMP TYPE	SUBMERSIBLE CENTRIFUGAL
	CAPACITY	300 GPM
	HP	5 HP
	FILTRATE STORAGE (OLD AERATION BASIN)	280,000 GALLONS
	AERATION SYSTEM	DIFFUSED AIR
	TOTAL NUMBER OF DIFFUSERS	380
	FILTRATE DECANT PUMP TYPE	SUBMERSIBLE CENTRIFUGAL
	CAPACITY	30 GPM
	HP	1/4 HP
LIME STABILIZATION	TYPE	DRY, HYDRATED LIME
	BULK STORAGE CAPACITY	40,000 LBS, SILO
	FEED SYSTEM	VOLUMETRIC FEED
	CONVEYING SYSTEM	SCREW CONVEYOR
	CONVEYOR HP	1 HP
	APPLICATION METHOD	PUG MILL
	PUG MILL HP	10 HP
	LIME DOSAGE	0.3 LBS/LB, DRY SOLID
	APPLICATION RATE	18 CU. FT / HOUR

SOLIDS TREATMENT PROCESS PROFILE



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REVISIONS

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CITY OF CANBY

SOLIDS PROCESS DESIGN CRITERIA

2017 WWTP SLUDGE STORAGE IMPROVEMENTS
CLACKAMAS COUNTY, OREGON

DATE	OCT 2016
D/N	1658
D/B	REF
D/S	REF
CAD#	1658-G03

G3 *OF* G5

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The screening system is in good condition having been installed in 2014. There have been no major issues with the screens although periodic clearing of the compaction zone at the upper end of the screen is required in order to maintain solids discharge.

b. Grit Removal

Grit is removed from the sewage by a Pista Grit system with a 7.0 mgd design capacity. The system consists of a grit chamber, and grit classifier. Solids are moved out of the classifier by an auger which deposits the solids in the same refuse collection container as the screenings. The existing Pista Grit mechanical components were replaced in 2014.

Figure 2.13: WWTP Pista Grit Removal System

Inspection of the existing channels and basin in 2014 did not reveal any structural damage, however, there was some significant corrosion on the galvanized grating in isolated locations. Damaged gratings were subsequently replaced. The Pista Grit area was also covered at the time to better protect the equipment and personnel from the inclement weather. The system functions as designed and there are no operational deficiencies.

c. Influent Flow Measurement

After the grit separator, sewage passes through a 12" Parshall flume. The flume has a staff gauge to measure the incoming sewage flow. The flume was also equipped with a ultrasonic level sensor, however, due to excessive turbulence, influent flow measurement were inaccurate. Due to the inaccuracies, the influent flow metering was discontinued and the ultrasonic flow meter was removed from service. Effluent flow metering provides accurate daily loading, so replacement of the influent flow measurement system in not under consideration.

d. Influent Pump Station

The influent raw sewage pump station was constructed in 1992 and has a current capacity of 5 MGD with three pumps, and a provisions to add a fourth pump to increase capacity to 7 MGD. The pump station wet well consists of dual chambers which can be isolated for maintenance.

There are three variable speed submersible pumps installed in the wet well. The east wet well chamber has two submersible pumps and the west chamber has one pump, with space provided for installation of a fourth pump. Each pump has a variable capacity from 300 to 1,200 gpm. The pump station discharges wastewater to the primary clarifier diversion structure through a 16" force main.

Figure 2.14: WWTP Influent Pump Station

Inspection of the influent pump station in 2012-13 showed deterioration of the concrete wet well surfaces, and ferrous metals due to hydrogen sulfide attack. The pump station was taken off line in 2014, the pump discharge piping was replaced and a protective coating was applied to all concrete surfaces. Since installation of the new coating, some coating system failures have occurred warranting another evaluation of repair systems.

In 2014 new aluminum cover plates and gratings were installed along with a ventilation system to remove toxic and corrosive gases from the wet well and headworks building. The ventilation system replaced a 1992 carbon filtration system that proved to be ineffective and easily fouled by the moist, high particulate air pulled out of the headworks building.

Sewage flows at the treatment facility averaged 1.0 mgd for the past three years, and peak day flows have only exceeded 1.8 mgd one time in the pasts three years. Each pump has a 1,200 gpm (1.7 mgd) capacity, which provides a reliable capacity of 3.4 mgd with one of the three pumps out of service.

For a Class I reliability facility as defined by EPA, a backup pump is to be provided for each set of pumps, and the capacity of the pumps, with any one pump out of service, needs to exceed the peak flow. The existing pump configuration and capacity meets the EPA requirements for Class I reliability.

The three submersible pumps are at the end of their useful life and are scheduled to be replaced. Additionally, the wet well coating system will require a new protection system.

e. Primary Treatment

The influent pump station discharges to a concrete diversion structure which directs influent flow to the existing primary clarifier. The diversion structure has provisions to split the flow to a second primary clarifier in the future, and also diverts the return primary effluent into the downstream aeration basin trains.

Figure 2.15: WWTP Primary Clarifier Diversion Structure

The 50-foot diameter primary clarifier has a 15 foot side water depth, and a peak design capacity of 3.9 mgd at 2,000 gpd/sf.

EPA Class I reliability requirements as called for in EPA's *Design Criteria for Mechanical, Electrical and Fluid System component Reliability Document*, Paragraph 212.1.4, are to have a sufficient number of units of a size that with the largest flow

capacity unit out of service, the remaining units shall have a design capacity of at least 50 percent of the total design flow to that unit operation.

The existing primary clarifier has the ability to meet current and future projected flows. However, with one primary clarifier, the primary sedimentation unit process does not meet EPA Class I reliability. Also, any long term failure of the clarifier would severely reduce the ability of the treatment facility to meet NPDES permit effluent limitations. Therefore a second primary clarifier is needed.

Performance of the primary clarifier is not measured monthly, but only infrequently throughout the year. From the data supplied by the City, BOD removal has varied from 10 - 30% and TSS from 50 - 70%.

The mechanical components of the existing primary clarifier are showing signs of substantial corrosion and will need to be replaced soon. Some structural repairs have already been made to the bridge due to personnel safety issues. The concrete tank structure will need to be inspected to determine if any concrete repairs are needed.

Figure 2.16: WWTP Primary Clarifier & Sludge Pumping Vault (foreground)

The primary clarifier provides a substantial benefit to the treatment facility operations. Failure of the primary clarifier would substantially increase the organic loading to the secondary treatment process. A second primary clarifier is needed to provide redundancy, and to also reduce organic loading to the aeration basins. A second clarifier would ensure better solids removal based on the lower hydraulic loading rates with flow split to two units.

Settled solids as well as collected surface scum are removed from the clarifier by a pneumatic diaphragm pump located in the Primary Sludge Pumping Vault. The sludge/scum pump at the primary clarifier is an air driven diaphragm pump. The pump is well maintained by staff.

Figure 2.17: WWTP Primary Sludge Pump

The primary and secondary sludge wasting systems are dependent on a single air compressor unit located in the primary sludge vault. This is an essential auxiliary service as defined by EPA. Operation of the compressed air system is vital to maintaining the performance of the treatment facility since its failure would impact the ability to waste primary or secondary sludge. This would very quickly degrade effluent quality and is contrary to EPA's Design Criteria document, Section 250 *"Auxiliary Systems."*

The existing air compressor was installed in 1982. In conjunction with improvements to the waste activated sludge pumps discussed in a following section, a redundant compressor should be considered to provide needed redundancy. The second air compressor should be located at the Secondary Sludge Pumping Building due to limited spacing in the primary sludge pumping vault and to distribute the compressed air system sources.

An alternative method of pumping waste sludge with electric motor driven pumps should be considered during the design process. That approach could eliminate the need for a second air compressors and expansion of the existing Secondary Sludge Pumping Building to create space for a new compressor.

Figure 2.18: WWTP Air Compressor in Primary Sludge Vault

Scum removed from the primary clarifier is held in a scum pit near the primary clarifier. The pit is periodically pumped out and the scum is transported to an offsite facility where the scum is filtered through a granular material to separate fats, oils and greases (FOG) along with any other material from the liquid component. The receiving site is also used for the filtration of stormwater debris removed from the City's stormwater drywells and sedimentation basins. The site is not well suited for treatment of wastewater scum by its configuration for the treatment of stormwater debris.

A scum disposal facility specifically designed for treatment of primary scum is needed on the treatment facility site adjacent to the primary clarifiers. Onsite treatment eliminates hauling, by allowing it to be pumped directly to the facility and drain the liquid component directly back to the treatment plant. The facility is anticipated to be a covered concrete basin similar to the stormwater facility that permits dewatering the scum prior to loadout and disposal off-site.

f. pH/Alkalinity Adjustment System

The existing pH/Alkalinity adjustment system was repurposed from the prior biosolids stabilization process, to now being used to increase the alkalinity in the primary effluent ahead of the aeration basins. The system was refurbished with new control panels and the slurry system tank was de-scaled in 2017. A second slurry pump was also added for redundancy. Operation of the system is critical to the biological treatment process by adding alkalinity to maintain the proper pH for the mixed liquor and in the plant effluent.

Figure 2.19: WWTP pH Adjustment Silo

The system is in good condition, although the operation would be more efficient if the silo were relocated to be adjacent to the primary clarifiers. Long range plan would be to relocate the silo and slurry feed pumps.

g. Aeration Basins

In 1998, two new aeration basins trains were constructed to replace the original aeration basin. The basins have a total volume 870,000 gallons. At the average dry weather flow (ADWF) of 2.8 mgd, the basins have a detention time of 7.5 hours. At a peak of 5.0 MGD, the detention time is reduced to 4 hours.

Figure 2.20: WWTP Aeration Basins

The system has surplus air supplies and adequate detention time. Organic capacity by design is 30 pounds per 1,000 cubic feet of volume, which equates to 3,500 pounds per day. Based on a minimum 20% removal in the primary clarifier, the raw sewage influent BOD nominal design capacity is 4,400 pounds per day.

Each train has an anaerobic zone, two (2) anoxic/aerobic swing cells, and an aerobic zone. The 2015- 2018 DMRs were reviewed to determine the BOD loading on the aeration basins. A summary of the raw sewage influent BOD based on the reported monthly average flow and concentrations is shown in the following Table:

Table 2.3: City of Canby
Average Influent BOD_5 Loading

Month	2015		2016		2017		2018	
	mg/L	*lbs/day*	*mg/L*	*lbs/day*	*mg/L*	*lbs/day*	*mg/L*	*lbs/day*
January	299	2,499	339	2,900	305	2,555	335	2,828
February	318	2,648	354	3,182	316	2,891	306	2,486
March	276	2,,287	305	2,520	284	2,537	307	2,517
April	309	2,549	311	2,535	284	2,421	334	2,844
May	332	2,708	305	2,457	272	2,236	295	2,427
June	311	2,556	304	2,424	290	2,365	270	2,232
July	300	2,469	309	2,425	294	2,393	314	2,555
August	236	1,979	288	2,309	269	2,207	359	2,987
September	287	2,376	320	2,582	278	2,335	330	2,746
October	314	2,613	319	2,724	282	2,423	332	2,738
November	322	2,721	323	2,734	315	2,694	320	2,658
December	312	2,818	312	2,595	327	2,700	287	2,420
Annual Ave	**301**	**2,519**	**316**	**2,616**	**293**	**2,480**	**316**	**2,620**

BOD Loadings on the aeration system have been well below the design capacity for the last four years, even as BOD concentrations have increased slightly during this same period above the average influent design concentration of 300 mg/L.

From the DMR data the average TSS influent concentrations tend to be higher than the design criteria and in 2018 increased to an annual average of 300 mg/L. The primary clarifier removes approximately 60% of the TSS on average and between the secondary clarifiers and effluent filtration, higher TSS loadings do not present any operational concerns for the facility.

The treatment facility is designed for Total Suspended Solids (TSS) average concentration of 250 mg/L. Although not directly related to the aeration basin performance, a summary of the Influent TSS Loadings for the same time period is shown in the following table.

Table 2.4: City of Canby
Average Influent TSS Loading

Month	2015		2016		2017		2018	
	mg/L	lbs/day	mg/L	lbs/day	mg/L	lbs/day	mg/L	lbs/day
January	290	2,424	236	2,019	239	2,002	277	2,338
February	240	1,999	232	2,085	247	2,260	313	2,543
March	246	2,038	268	2,214	215	1,920	336	2,754
April	297	2,450	251	2,046	246	2,097	317	2,699
May	318	2,594	221	1,781	253	2,080	295	2,427
June	239	1,964	233	1,858	241	1,965	335	2,769
July	246	2,025	239	1,876	231	1,880	247	2,010
August	218	1,828	240	1,925	266	2,183	280	2,330
September	210	1,739	249	2,009	259	2,176	300	2,496
October	268	2,230	253	2,161	269	2,311	291	2,400
November	238	2,011	273	2,311	301	2,574	278	2,309
December	227	2,050	248	2,063	261	2,155	324	2,732
Annual Avg.	**253**	**2,113**	**245**	**2,029**	**252**	**2,134**	**300**	**2,484**

Air is provided to the basin by one of the three centrifugal blowers located in the adjacent blower/chemical feed building. All the blowers are in good condition. Each blower has a 1,800 cfm capacity. One blower provides adequate capacity to serve both basins.

Figure 2.21: WWTP Centrifugal Blowers

The aeration process is controlled by oxygen probes located in the basins. An automated control valve is used to bleed excess air to vent in the pressate storage tank, and sludge storage Tanks No. 1 and No. 2. There is an adequate number of blowers with sufficient capacity to meet EPA Class I reliability requirements.

The chlorine and caustic chemical feed systems, also located in the blower/chemical feed building, are no longer in use. Chlorination of the RAS was discontinued when a more efficient control method was developed to deal with filamentous organisms through strict monitoring of the dissolved oxygen levels and sludge age.

The caustic soda feed operation was discontinued after the belt filter press improvements were constructed in 2003. At that time the lime silo and slurry feed system that served the previous gravity belt thickening process was converted to feed lime into the primary clarifier for alkalinity adjustment.

The detention times and BOD loadings are conservative at design flows. There are no known structural, capacity or equipment deficiencies pertaining to the aeration basins or aeration system equipment.

h. Recirculation Pumps

Two submersible recirculation pumps are located at the discharge end of the aeration basin structure to recirculate a portion of the aeration basin discharge back to the upstream influent to the basins for nutrient reduction. Each pump is dedicated to an aeration basin train, with a maximum capacity of approximately 1,300 gpm, or the equivalent of approximately 3.5Q at the current average daily flows. The pumps are typically operated at approximately 950 to 1,100 gpm.

In 2014, improvements were made to increase personnel safety with the installation of davit cranes, modification to access gratings and electrical disconnecting means. The pumps are in good condition, suitable for continued use and should be adequately sized for future needs.

i. Secondary Clarifiers, WAS and RAS Pumps

The two 54 foot diameter, 15 foot side water depth secondary clarifiers each have a peak day design capacity of 2.8 mgd at 1,200 gpd/sf, and an ADWF overflow capacity of 1.4 MGD each at 600 gpd/sf.

Figure 2.22: WWTP Secondary Clarifiers
(Secondary Sludge Pumping Building to the right)

Each clarifier has a dedicated air driven waste activated (WAS) diaphragm pump and a variable speed centrifugal return activated sludge (RAS) pump. The pumps are located in the adjacent secondary sludge pumping building. Scum skimmed from each clarifier flows by gravity to the below grade scum pump station where it can be pumped to any of three waste sludge holding tanks, or can drain by gravity back to the headworks and be removed with the primary clarifier scum.

The secondary clarifiers, installed in 1992, are in good condition. Metal surfaces have been recoated since that time and the clarifier weirs were replace in 2014 along with the installation of an automated weir cleaning system. There are also no issues that are apparent relating to the clarifier drive mechanisms.

The air driven diaphragm wasting pumps are well maintained. Approximately 11,000 gallons of WAS is pumped to waste each day. With each diaphragm pump having a 200 gpm capacity (288,000 gpd), the existing pumps have adequate capacity to meet future demands.

Figure 2.23: WWTP Waste Activated Sludge Pumps

The air source for the WAS pumps is located in the primary sludge pumping vault next to the primary clarifier. A new air line was installed from the vault to the secondary sludge pumping building a few years ago due to a failure of the existing air line. This points to a deficiency that needs to be addressed relating to redundancy of the compressed air system. A second air compressor should be located near or at the secondary sludge pumping building, or alternatively powered pumping equipment should be considered.

The two RAS pumps installed in 1992 have a design capacity of from 150 - 800 gpm each. They are typically operated at a nominal flow of 150 gpm each. They are periodically ramped up to 450 - 500 gpm for a short period of time to clean the RAS tubes in the clarifiers.

Figure 2.24: WWTP Return Activated Sludge Pumps

These pumps experience cavitation when operated above 300 gpm due to the low suction head. Repairs have been made to the pumps and the pump VFDs have been replaced. The two RAS pumps have adequate capacity to meet current and future needs, however, the pumps need to be replaced due to their age. With replacement of the pumps, the issue of pump cavitation needs to be reviewed to determine what corrective measures could be taken to ensure proper operation of the new pumps over the full operating range.

j. Effluent Filtration

Secondary effluent can be filtered by two trains of disk filters. Each train contains 6 rotary disks with deep pile fabric to capture solids, and have hydraulic capacity of 2.7 mgd and maximum capacity of 5.5 mgd. The filters are capable of filtering a maximum loading of up to 1,200 lbs of TSS per day and are only placed on line as needed to meet waste discharge permit requirements for TSS.

Figure 2.25: WWTP Disc Filter (North Unit Shown)

The disc filter installed in 2002 had deterioration of the galvanized sludge and backwash piping, which have subsequently been replaced with stainless steel pipe. The second filter unit, which was installed in 2014, has only minor corrosion and the piping was coated in 2018 to protect it from further deterioration. Both filters are in good condition as is the building and ancillary equipment. With a hydraulic capacity of 2.7 mgd per unit and maximum combined capacity of 5.5 mgd, the filter will be adequate to meet the plant flows well beyond the planning window.

k. UV Disinfection

Secondary effluent is disinfected using ultraviolet light disinfection. The system consists of two in-vessel disinfection units which each have a design capacity of up to 4.0 mgd depending on the transmissivity and TSS of the secondary effluent.

Figure 2.26: WWTP Ultraviolet Disinfection System

The UV disinfection system has had issues requiring additional ongoing maintenance. Part of the issue has been the buildup of fibrous material in the upstream piping having a tendency to foul the lamps. Staff installed an improvised screen ahead of the UV system to prevent this material from reaching the UV system.

The two 14" buried isolation values for each UV train are becoming more difficult to operate with time. These two values should be reconfigured to be accessible if possible if the UV equipment is upgraded in its current location.

The UV system continues to adequately disinfect secondary effluent as shown by the DMR results for *E. coli*, however, the system is not performing as per the manufacturer's design criteria. The manufacturer has been working closely with the City to determine the cause of the varied performance, and until better solutions are identified, the manufacturer is recommending replacing the light elements more frequently, and is providing the lights at a steep discount.

The City has been testing the pre and post UV treatment to record the *E. coli*, log reduction and two additional chemical pumps have also been provided by the manufacturer to aide in UV lamp cleaning. Aquionics is continuing to work with the City to determine the cause and resolution to the unpredictable performance of the units.

The City has experienced performance problems with the UV disinfection system for many years. The system was installed in 2010, with an anticipated life of 20 years. No improvements have been proposed, although the City is anticipating potential improvements being identified by the manufacturer to resolve the performance issues. The ultimate solution is to replace the equipment with newer technology in the next few years. This may include utilizing the adjacent basin for a horizontally UV system or the existing building for modified closed tube treatment.

I. Effluent Metering Chamber

Effluent flow is measured by a 90 degree V-notch weir located on the discharge of the Effluent Metering Chamber (original chlorine contact chamber). The V-notch has a maximum capacity of 4.45 mgd. An ultrasonic level transducer measures the water level upstream of the weir and transmits flow information to the treatment facility SCADA system.

Figure 2.27: WWTP Effluent Metering Chamber

There are no operational issues with the effluent flow measurement system, the 90 degree V-notch weir is cable of measuring up to 4.45 mgd which is well in excess of the peak flows observed at the plant. The maximum flow reading capability of the V-Notch weir should be adequate for the foreseeable future.

Minimal improvements are needed in the existing effluent metering chamber. The existing drain valve needs to be replaced and the walls of the chamber need to be coated with the same coating system as the floor to make cleaning of the chamber more efficient.

m. Outfall Line

The outfall line was constructed with the first treatment facility in 1949 and is approximately 1,300 feet in length. It is mostly 18" diameter concrete pipe with a short section of steel pipe near the Willamette River outfall.

A mixing zone study was completed by MixZon, Inc. in November of 2013. The results of that study indicated that at the 7Q10 flow of the Willamette River, the 10-foot Zone of Initial Dilution had a centerline dilution of 13. The 100-foot Regulatory Mixing Zone has a bulk dilution of 28 at a 7Q10 river event. As a result of that study, a 14" diameter HDPE diffuser was installed with four 8" diameter discharge ports, each with integral check valves, to maintain the required river water quality.

The existing 18" outfall line is slow draining and deteriorated once it enters into the wooded area north of the plant. Recent TV inspection of a limited portion of the line showed substantial root intrusion at each failed joint. The steel line extending from just downstream of the last manhole to the diffuser is in poor condition. The steel outlet portion of the outfall line is at a very steep grade and will perform acceptably through the planning window without any improvements.

The existing line has slope of approximately 0.4% and an unobstructed capacity of 4.6 MGD. The effluent pipeline through the forested area is currently being replaced with a 24" PVC pipeline to increase the hydraulic capacity and ensure continued performance. The capacity of the new 24" line at 0.3% slope is 8 MGD at anticipated high river water levels without any surcharging. At normal water levels and with acceptable surcharging, the 24" outfall pipe would have a capacity of over 15 MGD.

The remaining portions of the outfall pipe should perform adequately through the 20-year planning window without any modifications. Root intrusion is not an issue within the treatment plant site, and the existing 18" pipeline has sufficient capacity for the 20-year projected flows.

The Willamette River outfall has multiple diffusers to achieve better dilution, and is designed to add additional diffusers as flows increase. It is anticipated that in the NPDES permit renewal process over the next twenty years, the City will be required to complete a new mixing zone study and a Reasonable Potential Analysis on toxic pollutants to verify permit compliance. These studies should be completed after the additional diffusers are added to the outfall. The HDPE diffuser and associated studies are estimated to cost $60,000.

Excess thermal loading may also become a concern for continued discharge to the Willamette River once the final allocations are defined by DEQ. One long range options to address excess thermal loading would be to develop an irrigation system for the adjoining City park property or golf course, depending upon the effluent water quality.

n. Sludge Storage

Waste sludge and scum can be pumped to any of three storage tanks. The three storage tanks have a combined storage capacity of 566,000 gallons.

Storage Tank No. 1 was the original secondary clarifier. It was converted to a sludge storage tank in 1996 and has an approximate capacity of 143,000 gallons with a fine bubble diffused aeration system and nominal 100 - 200 gpm submersible transfer pump. The tank was covered and ducting was installed to originally move the off gasses to a chemical scrubber.

Figure 2.28: WWTP Sludge Storage Tank No. 1

Tank 1 was renovated in 2017 to replace the aeration systems, make repairs to the tank cover, remove the failing abandoned clarifier bridge structure, increase the slope of the tank floor to improve drainage, make level control and pump disconnect improvements, and replace the existing pump removal hoist.
The aluminum cover and support structure was inspected and was in good condition. The concrete showed some corrosion around the top of the tank, but was otherwise is in good condition. No additional improvements are needed.

Tank No. 2 was the original aerobic digester. In 1992, the tank was converted to a stabilized sludge holding tank with 6 pie shaped cells and a central submersible pump chamber. Individual cells were anticipated to hold treated product for the required 24 hours prior to discharge, when lime stabilization was used to meet the 40 CFR Part 503 biosolids treatment requirements. The tank has 123,000 gallons of storage.

Figure 2.29: WWTP Sludge Storage Tank No. 2

Like Tank No. 1, Tank 2 was also covered with aluminum checker plate, but was originally ducted to a carbon scrubber system located adjacent to the tank. The carbon scrubber system proved to be ineffective and was abandoned and removed. A new chemical scrubber and the ducting of both Tank No. 1 and Tank No. 2 to the scrubber was installed in 1993.

The tank was renovated in 2017 to replace the aeration system, make repairs to the tank cover, and make level control and pump disconnect improvements. The aluminum cover support structure was inspected in 2017 and was in good condition. The concrete showed some corrosion around the top of the tank, but was otherwise is in good condition.

The original submersible pump was a Discflow pump capable of pumping lime stabilized solids to the wet sludge loadout station. With the addition of the belt filter press in 2002, the gravity belt thickening process was abandoned and dismantled and a conventional submersible pump was installed in the center well. The submersible transfer pump has a capacity of from 100 - 200 gpm.

Figure 2.30: WWTP Sludge Storage Tank No. 3

Tank No. 3 was constructed in 2017 and has a capacity of 300,000 gallons. The tank is covered to contain odors and is aerated with fine bubble diffusers with an aeration capacity of from 600 and 1200 cfm. Air is supplied by a single blower. Sludge is transferred from the tank to the belt press by a rotary lobe pump with a flow range of 50 to 200 gpm.

Inspection of Tank No. 3 in 2018 revealed a failure of the floor coating system as well as corrosion of the aluminum support columns. These failures are being analyzed to determine the cause of the problem in order to determine what warranty actions are needed to prevent further corrosion and to repair the existing damage.

In 2019, in conjunction with construction of Tank number 3, all three sludge storage tanks were ducted together and the off-gasses collected and discharged through a new venturi ventilation system. This odor control process has been performing well and is anticipated to only require routine maintenance for the foreseeable future.

Figure 2.31; WWTP Sludge Tanks Ventilation System

Long range plans anticipate construction of a twin 300,000 gallon storage tank adjacent to the existing Tank No. 3. This new tank volume would provide additional detention for sludge conditioning prior to dewatering.

o. Sludge Solids Dewatering and Storage

Prior to 1992, the blended primary and secondary sludge was gravity thickened in the aerobic digester, lime stabilized in one large batch, and then land applied to approved sites. In 1992, a gravity belt thickener was installed and the sludge was lime stabilized prior to storage and subsequent land application. In 2003, a belt filter press replaced the gravity belt thickener, and a second lime silo was installed to stabilize the sludge prior to storage in a covered sludge storage tank.

Figure 2.32: WWTP Sludge Belt Filter Press

In 2009 a biosolids drying system was installed to further treat the belt filter press discharge. The system was intended to produce dry solids for reuse or disposal, however, the system failed to meet performance needs and had persistent operational problems. The sludge dryer system was ultimately removed from service, disassembled and removed from the site.

In 2014, the belt press room improvements were made which included restoration of the building coating systems and installation of a ventilation system to removed off gasses and moisture that were causing deterioration of the building and equipment. An additional off gas collection and venturi ventilation system was also added to the adjoining dewatered biosolids storage building.

The enclosed biosolids storage building was expanded to 2016 to increase solids storage capacity, along with a new conveyor system, truck load out ramp, additional odor control facilities and site improvements to facilitate truck traffic. Although not included in the recent facility improvement, the load out facility is designed to include a truck scale at the truck loading position. This scale can be added very easily in the future, when warranted.

Figure 2.33: WWTP Biosolids Dewatering & Storage Building

Figure 2.34: WWTP Biosolids Building Storage Bay

Figure 2.35: WWTP Biosolids Storage Building Truck Loadout

Sludge continues to be dewatered by the belt filter press, which has a design capacity of 1,300 pounds per hour at a feed rate of from 100 to 200 gpm, with the option to feed lime into a plug mill prior to conveying the dewatered solids to the biosolids storage area. Lime addition is determined by the need for odor control or the beneficial use application site classification. Lime is not added if the solids are disposed of at a landfill and if odor control is not an issue.

The recent facility improvements are in good condition and functioning as per the design parameters. The capacity of the belt filter press is adequate for the foreseeable future. The belt press currently runs 3-4 days per week and will need to be run more frequently as sludge volumes increase. The belt filter press and polymer feed system will need repairs in the next 5-10 years to replace bearings, rollers spray nozzles, grid strips and other components that are nearing their service life, or it may be more cost effective to replace the equipment with newer technology within the planning window.

p. Pressate Storage and Treatment

The pressate extracted from the belt filter press process is discharged into a wet well and pumped with a 300 gpm pump to either Sludge Storage Tank No. 1 or No. 2, or the Pressate Storage Basin (old aeration basin). The Pressate Storage Basin has a storage capacity of approximately 325,000 gallons and is mixed by a diffused air system. Due to the high BOD and ammonia concentrations, pressate is slowly metered back into the wastewater stream at the influent pump station through the onsite drainage system.

The old concrete aeration basin was constructed in 1971 with submerged aerators and later retrofitted with fine bubble diffusers. With construction of a new aeration basin and support facilities in 1998, this old aeration basin was converted to a pressate storage facility with the addition of the pressate pump station.

This current process includes discharging the belt filter press pressate into Sludge Storage Tank Number 2, which provides a very effective solids removal function as well as some air stripping, which is then followed by transfer to the Pressate Storage Basin. Ammonia is stripped by the aeration process in the storage basins and the pressate is then metered back to the headworks.

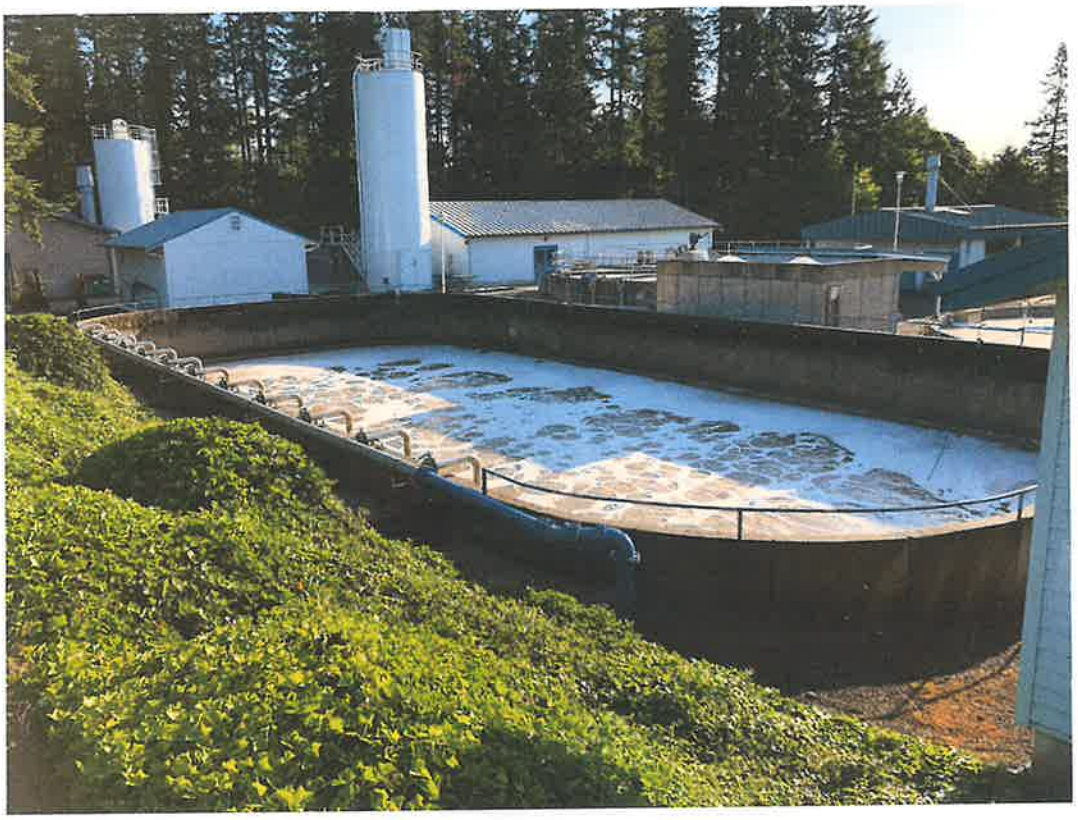

Figure 2.36: WWTP Pressate Storage Basin

The pressate basin is showing signs of deterioration with settling of the basin walls and areas where reinforcing steel is exposed in the basin floor, although it is still watertight. This basin provides an effective treatment process for ammonia in the pressate, and provides an effective relief for excess air from the blower systems, so is anticipated to be repaired as needed over time.

Repairs should include application of a coating system to protect any exposed reinforcing steel, repairs of any spalled or cracked concrete components, and reinforcing wall joints that have separated to the extent that they cause a structural concern. A new sloped concrete floor should also be installed over the existing to improve the accumulated sludge removal process.

q. Storage Ponds

The two of the three original storage ponds were asphalt lined in 1993 to store lime stabilized sludge. The practice was subsequently discontinued due to odor complaints from the public. The ponds are now used as all-purpose ponds to temporally hold the contents pumped from other tanks.

Figure 2.37: WWTP South Storage Pond

Figure 2.38: WWTP North Storage Pond

The asphalt lining in the north and south storage ponds is distressed in many areas due to the lime addition and age. Each pond should be re-sealed to preserve the integrity of the surfacing to retain the potential use of the ponds.

Storage pond number 3 was abandoned prior to the 1992 improvements and remains unused.

Figure 2.39: WWTP Abandoned Pond No. 3

r. Standby Power Systems

The wastewater treatment facility has two standby generators that provide power to vital operations in the event of a utility power outage. Both systems utilize automatic transfer switches to switch between utility and standby power systems.

A 250 Kilowatt diesel generator was installed in 1992 to provide power to the headworks, raw sewage pumps, primary clarifier and UV disinfection system. The generator was installed in the old sludge pumping building, which has since been renamed the power distribution building. An existing 85 kilowatt generator with a manual transfer switch supplied power to the solids handling processes, secondary clarifiers, RAS pumps and other miscellaneous equipment.

Fig 2.40: Power Distribution Building

Fig. 2.41: 250 kW Aux Generator

In 1998, a 750 kilowatt diesel generator was installed in a sound attenuated weather-proof enclosure with the new aeration basin and other system improvements. With installation of the new generator, the 85 kW generator was removed and the electrical loads were connected to the new 750 kW generator.

Figure 2.42: WWTP 750 kW Aux Generator

The City routinely exercises each generator and performs all scheduled maintenance. Both generators are in good condition and are capable of maintaining operation of critical processes. With the minimal operating time of weekly exercising of the generators and infrequent power outages, both generators will continue to be suitable to operate for the foreseeable future.

s. Power Distribution

Utility power is provided to the treatment facility from two separate primary transformers. Each transformer provides 480 volt 3-phase power to a switchboard which in turn distributes power to motor control centers (MCCs) and panel boards throughout the site. As facility improvements have occurred over the years, outdated and failing power distribution equipment has been removed and replaced. In addition, several of the MCCs were relocated to better serve the facility as the treatment facility has been expanded.

The oldest MCC in its original location is in the primary sludge pumping vault from the 1982 improvements. This MCC is anticipated to be relocated with the construction of the new primary clarifier, scheduled for 2020.

The existing roof of the power distribution building is leaking and needs to be replaced. In addition, standing water in the wire through under the motor control center needs to be addressed by sealing the conduits to prevent the migration of water into the building.

t. PLC and SCADA Systems

In 1992, major improvements included installation of General Electric 90-30 series programmable logic controllers (PLCs) and network communications with a personal computer running Wonderware software. This provided the first centralized treatment system control, and permitted viewing of system operations and alarms for system failures and faults. Subsequently, additional GE PLCs have been added with each plant improvement.

With the exception of the failure of one PLC located in the first UV disinfection control system, all PLCs have continued to function without any failures. However, many of the PLCs are now more than 20 years old. These PLCs are projected to have a service life of 15 to 20 years and have reached the end of their useful life.

GE no longer manufacturers or supports the 90-30 product which controls most of the treatment facility operations. The City does have some spare modules, and Central Processing Units (CPUs) for the existing systems, but the supply is limited.

A major failure of a key PLC such as the PLC in the main control building would revert facility operations back to primarily manual control and require increased operational oversight, if the spare parts are not on hand. Replacement of the existing PLCs needs to take place starting with the oldest systems. If possible, this

should be done in a staged approach if communications between the older version PLCs and new PLCs and Wonderware can be maintained; if not, all PLCs will need to be replaced at once.

Wonderware supervisory control and data acquisition (SCADA) software was updated in 2018 and has been functioning well. As long as the software is compatible with the PLC hardware, it should continue to function well into the future with upgrades as they become available.

u. Odor Control

Multiple odor control regimes have been applied to the Canby Wastewater Treatment Facility over the past three decades. These have included using neutralizing agents dispersed in the area of odors, which proved to be effective for a localized odor, but were costly, created an additional offensive odor and was ineffective for more wide spread odor sources.

Carbon adsorption units were next used for the headworks and sludge processing and storage facilities. These units were expensive and prone to fowling quickly with the moisture and contaminants in the off-gasses. These units remained in-place for many years but were out of service.

Vapor phase chemical scrubbing was implemented to replace the carbon units in the mid 1990's. This unit was used for the sludge processing and storage areas only, and was effective but had limited capacity. In addition, the chemical costs were high and the safety of handling the acids and caustic materials required for the operation ultimately resulted in abandoning this process. The blower and exhaust system on the chemical scrubber was continued after chemical addition was abandoned to continue collecting the off-gasses and ventilating them in the exhaust stack.

Most recently, the City has installed multiple off-gas collection and ventilation systems that have proven to be the most effective. These systems collect thousands of cubic feet of off gasses per minute, add more than double dilution air through venturi systems, and discharge the air with a high vertical velocity several hundred feet in the air. These systems have been in service for several years and have proven to be the most effective and least operation and maintenance intensive. No additional odor control systems are proposed.

v. Treatment Facility Site Improvements

Capital improvement planning of the Wastewater Treatment Plant facility has resulted in numerous plant upgrades and expansions over the past three decades without restoration of broken curbs, asphalt and gravel travel surfaces or attention to access improvements. Upon completion of the major unit process improvements identified in this facility plan, the site restoration can be completed. This would include repaving all traveled surfaces, replacing broken or missing curb lines, restoring damaged landscape areas, and improving the site access with automated gates and signage.

w. Equipment Storage & Maintenance Building

The operators utilize many service vehicles to operate and maintain the facilities. Vehicles, service equipment and materials are currently stored outside and exposed to the weather. There is a need to provide a shelter and storage area to service and protect these assets. At a minimum, a carport style structure with multiple bays, including one enclosed bay, needs to be provided to meet these needs.

x. RV Waste Receiving Station

The City has explored providing a receiving station for recreational vehicle sanitary waste at a facility adjacent to the wastewater treatment facility. A tentative design would allow access outside of the fenced treatment facility grounds, with a video monitored, card lock system to allow the station to be unmanned. This facility was designed several years ago and the construction postponed as a cost saving measure. The long range plan would be to install this facility on the access road to the treatment plant.

D. FINANCIAL STATUS OF EXISTING FACILITIES

The wastewater and stormwater systems are one combined fund and are financially strong. The City of Canby has been able to fund all major improvements in the last 25 years with capital reserves, without incurring debt. As of 2018, the systems have no debt and no reserve requirements.

A summary of the past three years of audited financial records of the utility system and the current budget year is summarized in the following table:

Table 2.5: City of Canby
2016 - 2019 Summary of Sewer Combined Fund

	Actual 2016	*Actual 2017*	*Actual 2018*	*Projected 2019*
Resources				
Beginning Fund Balance	$4,940,249	$4,974,250	$4,405,135	$4,513,368
Total Revenues	4,204,396	4,026,032	4,671,564	4,745,248
Total Resources	**$9,144,645**	**$9,000,282**	**$9,076,699**	**$9,258,616**
Requirements				
WWTP O&M	$2,110,654	$2,569,512	$1,609,401	$1,249,627
Collection System O&M	808,863	720,319	1,737,828	693,547
Stormwater System O&M	349,986	408,008	291,462	297,384
Utility Billings - Energy Costs	88,384	92,267	79,448	67,939
Debt Service	302,284	297,050	300,900	0-
Not Allocated (Franchise fee, rate study, Overhead, etc…)	510,223	507,991	544,293	799,478
Total Requirements	**$4,170,394**	**$4,595,147**	**$4,563,332**	**$3,107,975**

The City also maintains System Development Charge (SDC) accounts with revenues dedicated to capital improvements to the wastewater system. The current balance of the combined fund, which includes sanitary and stormwater SDC revenues, is approximately $790,00.

The City completed the most recent rate study in 2011, which has provided the basis for the current operations. The Master Fee Schedule for the City is adjusted annually to keep pace with inflation.

The sanitary and stormwater operating costs are included in a common monthly fee. The current fee is $46.20 per single family residential connection, and is based on an average flow of 800 cubic feet of sanitary wastes per month. Commercial/industrial connections are charged proportionately at $5.78 per 100 cubic feet per month, with the commercial/industrial waste flows based on water use for the non-irrigating months.

The sanitary sewer component of the monthly fee equates to 76%, or $35.10 per EDU, and the stormwater component is 24%, or $11.10 per EDU. The typical

residential utility fee of $46.20 per month equates to 0.69% of the average household income in the City of Canby of $80,660.

E. ENERGY AUDITS

The City of Canby Wastewater Treatment Facility has not undertaken an overall energy audit, however, treatment facility staff have been proactive in increasing operational efficiency and reducing energy costs associated with treatment processes and support facilities.

In 2015, improvements were made to reduce energy consumption by installing adjustable frequency drives on the 3 pumps in the influent pump station and 2 process water pumps. The facility also participated in an incentive program with the Bonneville Power Administration and Canby Utility to upgrade the treatment facility with energy efficient lighting. Not only were energy costs reduced due to these improvements, but BPA reimbursed the City $8,297.00 for completion of the influent pump station AFD improvements.

3. NEED FOR THE PROJECT

The treatment facility meets all NPDES permit requirements and has sufficient capacity to meet the projected loadings over the 20-year planning window. As a result, the primary purpose of this facility plan update is to evaluate the aging infrastructure at the treatment facility, provide process redundancy and ensure continued compliance with the NPDES permit.

A. ENVIRONMENTAL REGULATIONS

1) Current Regulatory Requirements

The Clean Water Act (CWA) 33 U.S.C. §1251 et seq establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. The basis of the CWA was enacted in 1948 and was called the Federal Water Pollution Control Act, but the Act was significantly reorganized and expanded in 1972. "Clean Water Act" became the Act's common name with amendments in 1972.

Under the CWA, EPA implemented pollution control programs and set wastewater standards for industry. EPA has also developed national water quality criteria recommendations for pollutants in surface waters.

The CWA made it unlawful to discharge any pollutant from a point source into navigable waters, unless a National Pollutant Discharge Elimination System (NPDES) permit was obtained.

The treatment facility discharges treated and disinfected effluent to the Willamette River at river mile 33.0 under a National Pollutant Discharge Elimination System (NPDES) permit as authorized by the Clean Water Act and under the authority of the Oregon Department of Environmental Quality, OAR 340, Division 45. Regulatory requirements are listed in the NPDES permit contained in the appendix.

2) Known Future Regulatory Requirements

Total Maximum Daily Loads (TMDLs) for the Willamette River have been established for Temperature and Mercury. The Oregon Department of Environmental Quality developed a Water Quality Management Plan for the Willamette River to address the TMDL issue. The Management plant set forth the procedures for attaining compliance with the TMDLs.

TMDL Waste Load Allocations (WLAs) are implemented through the NPDES permits that DEQ issues to industrial and municipal point sources that discharge into surface waterways. NPDES permits are issued for five years and are revised as appropriate upon renewal. With approval of the Willamette TMDL by EPA, new and renewed permits are anticipated to include new TMDL Waste Load Allocations.

a. Temperature

A temperature WLA could be added to the City of Canby's wastewater treatment facility NPDES permit during the next permit cycle since a temperature TMDL has been approved for the Willamette basin. This may include a compliance schedule describing the timeline for the facility to implement the WLA. However, lawsuits by Northwest Environmental Advocates may delay the implementation of temperature WLAs.

b. Mercury

In September 2006, EPA approved DEQ's mercury TMDL for the entire Willamette Basin. DEQ developed the TMDL to meet a mercury criterion in place at the time. Northwest Environmental Advocates filed a lawsuit in 2012, which argued the validity of the mercury TMDL and EPA's approval of the TMDL. In April 2017, the US District

Court issued a ruling requiring EPA to revise the TMDL by April 2019, and allowing the 2006 TMDL to remain in effect until EPA issues or approves the revised TMDL.

It is possible that in the next permit cycle the City of Canby will see a concentration limit and a WLA for mercury in the NPDES permit.

3) Potential Future Regulatory Requirements

Discharge limits may be placed on copper and aluminum. EPA currently utilizes Biotic Ligand Modeling (BLM) to model copper toxicity. BLM may be used to establish concentration limits and/or WLAs for these two pollutants. The BLM models aquatic toxicology that examines the bioavailability of metals in the aquatic environment and the affinity of these metals to accumulate on gill surfaces.

4) Sludge Management

The biosolids program is regulated by DEQ in accordance with Federal regulations as outlined in 40 CFR, Part 503 and Oregon Administrative Rule 340-050. Provisions of the Plan are part of the City of Canby's NPDES permit. The City manages biosolids in accordance with a Biosolids Management Plan approved by DEQ. A copy of the biosolids management plan is attached to this report in the appendix.

5) Stormwater Discharges

Stormwater discharges are controlled through the use of dry wells throughout the City of Canby under a Water Pollution Control Facilities Permit for Class V Stormwater Underground Injection Control Systems. The Permit was issue to the City in April 2014. The permit is issued pursuant to ORS 468B.195 and 40 CFP Parts 144, 145 and 146, implementing Federal Safe Drinking Water Act requirements for Underground Injection Control.

The City manages stormwater through a DEQ approved Stormwater Management Plan. The City also submits an annual report to DEQ that describes monitoring, action level results and UIC management plan implementation, modifications and actions. To date concentrations of sampled pollutants of concern have been well below WPCF Action Levels.

6) Erosion Control

Erosion control practices for the City of Canby are managed in accordance with Clackamas County's *Erosion Prevention Planning and Design Manual.* Clackamas County as the administrator of a 1200-C NPDES permit has the authority to grant permits for construction activities clearing, grading, excavation, and stockpiling. Under the permit the permittee or the permittee's contractor is authorized to construct, install, modify, or operate erosion and sediment control measures and storm water treatment and control facilities, and to discharge storm water to public waters in conformance with all the requirements, limitations, and conditions set forth within the NPDES permit and Best Management Practices (BMP's). Unless authorized by another NPDES permit, all other direct and indirect discharges to public waters are prohibited.

Also an Erosion and Sediment Control Plan (ESCP) is required to be prepared and implemented for construction activities regulated by the permit and under the authority of Clackamas County and the City of Canby.

B. AGING INFRASTRUCTURE

The wastewater collection system operates without problems, although there are some known limitations noted in previous planning documents, which are addressed as needed with development. The treatment facility is maintained in new condition and has sufficient capacity to operate efficiently for all flow regimes. In general, the Canby wastewater collection and treatment systems are well managed and maintained, and frequently upgraded to provide operational improvements. These systems do not have any immediate deficiencies requiring attention.

Collection system infiltration and inflow is defined by 40 CFR 35.2120. If rainfall induced peak flows exceed 275 gallons per capita per day (gpcd) during a storm event, excessive inflow into the collection system is occurring. Excessive Infiltration is defined as occurring if the flow rate at the existing treatment facility is more than 120 gpcd during periods of high groundwater. If either of these situations occur, a cost effective sewer rehabilitation plan will need to be developed and implemented to eliminate excessive I/I, or treat and/or store excessive inflow.

Discharge monitoring reports were reviewed for the last 3-years to determine if excessive I/I is a component of the contributing flows to the wastewater treatment facility. A summary of the DMR Monthly Average and Peak Day flows are shown in the following table.

Table 3.1: City of Canby
2016 - 2018 Effluent Flow Summary

Month	2016		2017		2018	
	Monthly Average (mgd)	Peak Day (mgd)	Monthly Average (mgd)	Peak Day (mgd)	Monthly Average (mgd)	Peak Day (mgd)
Jan	1.0257	1.0587	1.0046	1.1817	1.0121	1.1455
Feb	1.0777	1.8560	1.0971	1.4966	0.9743	1.0432
Mar	0.9906	1.1725	1.0710	1.2650	0.9829	1.0731
Apr	0.9774	1.0901	1.0221	1.1436	1.0210	1.2007
May	0.9661	1.1099	0.9856	1.0698	0.9866	1.0677
Jun	0.9562	1.0283	0.9777	1.0569	0.9910	1.0842
July	0.9410	1.0060	0.9758	1.0839	0.9757	1.0218
Aug	0.9615	1.1070	0.9839	1.0437	0.9978	1.0367
Sept	0.9674	1.1286	1.0073	1.0847	0.9978	1.1128
Oct	1.0240	1.2342	1.0303	1.3285	0.9889	1.1424
Nov	1.0150	1.1825	1.0255	1.1735	0.9958	1.0649
Dec	0.9974	1.1383	0.9901	1.0977	1.0110	1.1437
Ave	0.992	1.176	1.014	1.169	0.995	1.095

Wet weather flows are defined by the treatment facility's NPDES permit as occurring from November 1 through April 30. Using the peak day for each year during the wet weather period and the Portland State University population estimate, a determination of the gallons per day per capita is shown in the following table.

Table 3.2: City of Canby
Peak Day Per Capita Waste Loading

Year	Peak Day (mgd)	Population	Per Capita gpd/c
2016	1.8560	16,420	113
2017	1.4966	16,660	90
2018	1.2007	16,800	71
Ave	**1.518**	-	**92**

From the data, a determination can be made that I/I flow to the treatment facility from the collection system is "non-excessive" as defined by EPA's criteria so a sewer rehabilitation plan is not required. However, the City continues to be proactive in

maintaining the collection system, locating and finding sources of infiltration and preventing inflow into the collection system from surface sources.

As a typical contributor to I/I, it is significant to note that the City of Canby prohibits any stormwater runoff from private property onto the public rights of way. The soils in the Canby area are able to percolate the majority of all stormwater on each private property, thereby minimizing any runoff flows that could potentially enter the collection system.

C. REASONABLE GROWTH

1) Population Based Flow Projections

Discharge Monitoring Reports were reviewed to provide information on the wastewater flows to the treatment facility in order to determine the 20-year increase in wastewater flows and per capita contribution to the system. Influent flow to the facility is not monitored. The Monthly Average Effluent flow data from the last 5-years of the DMRs is summarized in the following Table.

Table 3.3: City of Canby
2014-2018 Average Effluent Flow (mgd)

Month	2014	2015	2016	2017	2018
January	0.9356	1.0023	1.0257	1.0046	1.0121
February	0.9874	0.9985	1.0777	1.0971	0.9743
March	0.9912	0.9935	0.9906	1.0710	0.9829
April	0.9748	0.9893	0.9774	1.0221	1.0210
May	0.9494	0.9780	0.9661	0.9856	0.9866
June	0.9518	0.9854	0.9562	0.9777	0.9910
July	0.9566	0.9868	0.9410	0.9758	0.9757
August	0.9836	1.0054	0.9615	0.9839	0.9978
September	1.0157	0.9927	0.9674	1.0073	0.9978
October	1.0203	0.9977	1.0240	1.0303	0.9889
November	1.0400	1.0132	1.0150	1.0255	0.9958
December	1.0213	1.0830	0.9974	0.9901	1.0110
Annual Total (MG)	11.8277	12.0258	11.9	12.171	11.9349
Annual Avg (MG)	0.98564	1.00215	0.99167	1.01425	0.994575
5-year Ave	0.9977				

Projected flow estimates are suggested to be based on DEQ guidelines for making wet-weather and Peak flow projections. This guidance presents the methodology for projecting these flows as:

- $MMDWF_{10}$: The Maximum Monthly Average Dry-Weather Flow with a 10% Probability of Occurrence,
- $MMWWF_5$: The Maximum Monthly Average Wet-Weather Flows with a 20% Probability of Occurrence,
- $PDAF_5$: The Peak Daily Average Flow Associated with a 5-Year Storm, and
- PIF_5: The Peak Instantaneous Flow Attained During a 5-Year PDAF.

The wastewater treatment facility records daily rainfall amounts for each month. A comparison of monthly average effluent flow and monthly total rainfall for the period from January through May 2018 is shown in the following table.

Table 3.4: City of Canby
2018 Flow & Rainfall Summary

Month	Average Effluent Flow (MGD)	Peak Day Effluent Flow (MGD)	Total Monthly Rainfall (Inches)
January	1.0121	1.1455	6.1
February	0.9743	1.0432	2.56
March	0.9829	1.0731	3.34
April	1.0210	1.2007	5.99
May	0.9866	1.0677	0.43

As can be seen from this information, there is little if any impact on wastewater flows from rainfall whether there is 0.43" or 6.1" of rainfall per month during the 2018 January - May wet weather period. Plotting the actual flows against the corresponding rainfall would result in essentially a flat line so projecting the $MMDWF_{10}$, and $MMWWF_5$ would show essentially no difference from the actual flows.

This is also true for projecting $PDAF_5$ when plotting the Peak Day flows against the total rainfall for each month. This would again results in a nearly flat line and no appreciable change in the measured Peak Day from the projected $PDAF_5$.

The Average and Peak Day flows, when compared to the total rainfall for the month, shows that there is an insignificant impact on wastewater flows due to rainfall and storm events. Therefore, projections of treatment facility flows based on DEQ's $MMDWF_{10}$,and $MMWWF_5$, $PDAF_5$, and PIF_5 guidelines would not yield any significant difference in estimating future flows from that of simply using the forecasted population growth, gallons per capita and current flow data.

In addition, the flow data indicates there has been no significant increase in wastewater flows to the treatment facility over this time period, although BOD concentrations have increased from 200 mg/L in the early 1990's to over 300 mg/L currently. Based on a five year average annual flow of 1.0 mgd and the current of population of 16,800, there is an average daily flow of 60 gpd per capita, including commercial and industrial loadings and a peak day flow rounded up to 100 gpd per capita.

Portland State University has identified the number of Persons Per Household (PPH) in the City of Canby in the *Coordinated Population Forecast 2014 through 2067, Clackamas County* on Page 16, Figure 14 as 2.8 PPH. The PPH is based on the U.S. Census Bureau 2000 and 2010 Census. As a result, the average annual wastewater loading per household is 2.8 PPH times 60 gpcd, for a total of 170 gpd/household.

A breakdown of the domestic potable water service connections was provided to the City of Canby from Canby Utility, the municipal water provider, to develop a breakdown of the estimated wastewater contributions. Water use for 2018 by service type is shown in the following Table:

Table 3.5: City of Canby

2018 Drinking Water Service Connections

Service	No. of Service Connections	Annual water usage (gallons)	Average Daily Water Use (gpd)
Residential	**4,313**	**414,198,531**	**263**
Commercial/Industrial:			
Multi-Family	447	145,302,178	890
Commercial	325	95,004,220	800
Industrial	8	14,556,343	4,985
Total Commercial/Industrial	**780**	**254,862,741**	**895**
Municipal/Other:			
Municipal	13	9,567,210	2,000
Internal	2	389,735	533
Free to City	12	24,979,227	2,535
Total Municipal/Other	**27**	**35,581,135**	**3,610**
Total	**5,120**	**703,997,445**	**377**

The City lists a total of 5,225 sanitary sewer connections. The list of the sewer connection types is shown in the following Table. A total of 10 municipal hookups were not included in the City's sanitary billing account listings, but have been included in the summary below:

Table 3.6: City of Canby

2018 Sanitary Sewer Connections

Service Connections	No. of Connections
Residential:	
Single Family Residential	4,659
Single Residential Reduced Rate	18
Transient Housing	1
Subtotal	**4,678**
Commercial/Industrial:	
Multi-Family Residential	200
Mobile Home Parks	5
Multi-Family Reduced Sewer Rate	10
Commercial/Retail	18
Commercial/Annual Water Average	15
Commercial/5 Month Water Average	286
Nursing Homes	6
Subtotal	**540**
Municipal/Other:	
Schools/Elementary	7
Municipal/Other	10
Subtotal	**17**
Total Connections	**5,235**

Assuming the proportion of commercial/industrial wastewater contribution to residential contributions remains relatively constant, loading projections can be made based on population. Using the Portland State University population forecast and the average per capita flow of 60 gpd, which includes an allocation for commercial/industrial loads, wastewater flows are estimated to increase over the next 20 years as shown in the following table:

Table 3.7: City of Canby
PSU Population Projections

Year	Population	MGD
2020	18,933	1.136
2025	20,607	1.236
2030	22,318	1.339
2035	24,045	1.442
2040	25,748	1.544

4. CAPITAL IMPROVEMENTS

The Canby wastewater collection and treatment systems operate well within their available capacity, and will not exceed their current capacity within the 20-year planning window. Capital improvements are planned to provide redundancy and optimize operations, but will not modify the current operating process or increase capacity. As a result, there are no alternative analyses that are important to this evaluation.

All of the collection system, pumping stations, and treatment facility capital improvements, excepting the three future pumping stations, are located on existing facility sites and will not require additional land. All improvements are intended to improve operational efficiency, and minimize energy costs and natural resource requirements.

A. DESIGN CRITERIA

In the 1999 Collection System Master Plan, all areas within the Urban Growth Boundary were divided into basins and wastewater flows projected for each land use. The UGB has only had minimal changes since 1999, and the additions to the UGB were essentially in fully serviced areas, which did not impact the capital improvement planning.

All sewers were designed to have a 25% surplus capacity using a Manning Formula roughness coefficient of 0.013. Manholes were anticipated to be spaced no more than 400 feet, and all pipeline slopes were to meet or exceed the minimum standards required to maintain minimum velocities.

Design criteria for the wastewater treatment facility are summarized in the following table:

Table 4.1: City of Canby
2040 Treatment Facility Design Criteria

2040 Population	25,748
Average Dry Weather Flow	1.54 MGD
Peak Day Flow	2.6 MGD
Design BOD Loading	300 mg/L
BOD Design Loading	3,860 lbs
Design TSS Loading	300 mg/L
TSS Design Loading	3,860 lbs

B. COLLECTION SYSTEM IMPROVEMENTS

Collection system conceptual plans were prepared for the 1999 Collection System Master Plan and are included in the appendices with edits to reflect current conceptual plans.

A summary of current capital improvements identified to resolve deficiencies in the existing collection system and to provide for buildout of the UGB, is shown in the following table. The table lists an estimate of cost based on the Engineering News Record (ENR) Construction Cost Index (CCI) for May 2019, and the project priority:

Table 4.2: City of Canby
Collection System Capital Improvement Plan
May 2019 ENR CCI 11,230

		Est Cost	***Priority***
1	South Ivy St Collection System Improvements:		
	S 2nd Ave to S 8th Ave, 2,000 LF 12" Sewer at $250 per LF	$500,000	1-5 yr
	S 8th Ave to S 10th Avenue, 600 LF 10" Sewer at $200 per LF	120,000	1-5 yr
	S Ivy St, S 10th Ave to S 13th, 1,000 LF 10" Pipe	200,000	1-5 yr
2	N Locust, 4th to 10th, Add Cleanouts to Existing Services	60,000	1-5 yr
3	Hwy 99E to SE 1st Ave, 1,000 LF 8" Sewer Extension at $180/LF	180,000	1-5 yr
4	N 9th, Locust to Knott Sewer, Repair Isolated Root Intrusion	40,000	1-5 yr
5	N Pine, 4th to 8th Ave, 500 LF 8" Sewer Extension	75,000	1-5 yr
	Subtotal	**$1,175,000**	
6	NE 12th Sewer, E of Ivy, Add Cleanouts to Existing Services	30,000	6-10 yr
	Subtotal	**$30,000**	
7	S 2nd Trunk, MH R-26 to O-39, 1,500 LF 10" Pipe	300,000	11-20 yr
	Subtotal	**$300,000**	
	Total	**$1,505,000**	

C. PUMPING STATION IMPROVEMENTS

Pumping station improvements identified in the 1-5 year priority will allow abandoning two stations, and provide new service as the areas develop:

Table 4.3: City of Canby
Pumping Stations Capital Improvement Plan
May 2019 ENR CCI 11,230

		Est Cost	*Priority*
1	South Ivy Pumping Station Construction	$1,000,000	1-5 yr
2	Knights Bridge Road Pump Station Removal	700,000	1-5 yr
3	Shopping Center (Safeway) Pump Station Removal	700,000	1-5 yr
4	N Birch St Pump Station Construction	300,000	1-5 yr
5	N 22nd Ave Pump[Station Construction	300,000	1-5 yr
	Subtotal	**$3,000,000**	
6	3rd & Baker Pump Station Modifications	$250,000	6-10 yr
7	Hazel Dell Pump Station Access Improvements	50,000	6-10 yr
	Subtotal	**$300,000**	
	Total	**$3,300,000**	

D. WASTEWATER TREATMENT FACILITY IMPROVEMENTS

The treatment facility has sufficient capacity to easily serve the community over the 20-year planning window so there is no need for expansion. There are several capital improvements identified to optimize and improve the current operation. The following table lists all Wastewater Treatment facility improvements, estimates of cost for each component, and an estimated time frame when each improvement is required:

Table 4.4: City of Canby
Treatment Facility Capital Improvement Plan
May 2019 ENR CCI 11,230

		Priority 1 - 5 Year Cost	*Priority 6-10 Year Cost*	*Priority 11-20 Year Cost*
1	New Primary Clarifier & Refurbish Clarifier No. 1; Primary Scum Process Facility Primary & WAS Pump Upgrades	1,365,000		
2	WWTP Site Improvements	400,000		
3	UV Disinfection Replacement	900,000		
4	Belt Press Equip Replacement	900,000		
5	Eq Storage & Maintenance Bld	400,000		
6	Pressate Storage Basin Repairs	250,000		
7	Diffuser Expansion / Mixing Zone Study / RPA Study	100,000		
8	Odor Control Improvements		500,000	
9	PLC & SCADA Upgrades		300,000	
10	Replace Primary Clarifier No. 1		300,000	
11	Sludge Ponds Lining Repairs		100,000	
12	Effluent Irrigation Impr			$600,000
13	Aux Generator 1 Replacement			200,000
14	300,000 g Sludge Storage Tank			800,000
15	Lime Silo Relocation			100,000
16	Influent Pump Station Rehab			500,000
17	RV Waste Receiving Station			200,000
18	Planning & SDC Updates		25,000	50,000
	Total	**$4,315,000**	**1,225,000**	**$2,450,000**

A general description of each capital improvement at the Wastewater Treatment facility includes:

SHORT TERM IMPROVEMENTS 1 – 5 YEARS:

1. The new Primary Clarifier No.2 and refurbishing Clarifier No. 1 project is currently underway, and includes replacing the primary sludge and WAS pumps with electric double disc pumps, and construction of the primary scum receiving building and debris container building.

2. WWTP Site improvements is intended to replace all damaged travel surfaces, replace damaged curbs, improve vehicle access including increasing truck turning radius, replace damaged fencing, and restoration of damaged landscape areas.

3. U.V Disinfection Replacement is to upgrade the equipment to current technology and restore the design capacity of the units. This will include piping modifications, valve replacements, instrumentation and controls, and building modifications as required.

4. Belt Press Equipment Replacement is to restore the capacity of the sludge dewatering process including replacing the belt press equipment and polymer feed system.

5. Equipment Storage and Maintenance Building is to provide covered storage area for the rolling stock and provide an enclosed conditioned work space for equipment repairs with overhead crane rail and three phase power.

6. Pressate Storage Basin Repairs is to repair the wall joint failures, and install a new sloped floor to drain to a pump sump, with hoist for pump removal.

7. Diffuser Expansion/Mixing Zone Study is in anticipation of future NPDES requirement to evaluate the river outfall system, and is anticipated to require replacing the outfall pipe entering the river and doubling the length of the existing diffuser system.

INTERMEDIATE TERM IMPROVEMENTS 6-10 YEARS:

8. Odor Control Improvements are anticipated to include evaluation of each of the treatment plant unit process' odor generation and installing new or refurbishing odor control equipment as required.

9. PLC & SCADA Upgrades includes replacing any outdated programable logic controllers and HMI screens, and upgrading the SCADA equipment including the monitoring and alarm call out functions,

10. Replace Primary Clarifier No. 1 equipment includes upgrading the drive and replacing the bridge, collection rake arms, sludge piping and diffuser as needed.

11. Sludge Pond Lining Repairs is to repair the AC surfacing and restore the integrity of the pond, and to provide a primary clarifier bypass line to pond storage.

LONG TERM IMPROVEMENTS 11-20 YEARS:

12. Effluent Irrigation Improvements are to include effluent reuse on the plant grounds and adjacent fields to reduce excess thermal loading.

13. Auxiliary Generator No. 1 Replacement including roll up door and building modifications as needed.

14. 300,000 Gallon Sludge Storage Tank is to provide a twin the existing aerated sludge holding tank for increased storage capacity.

15. Lime Silo Relocation to be adjacent to the Primary Clarifiers for more efficient injection.

16. Influent Pump station Rehabilitation includes pump replacements and potential wet pit / dry pit revisions, and screening rehabilitation as needed.

17. RV Waste Receiving Station including a monitored dump area and holding tank for testing.

18. Planning & SDC Updates to include future Facility Plan updates and periodic SDC updates.

E. OPERATION & MAINTENANCE

Implementing the capital improvements will have minimal impact on the operation and maintenance of the wastewater system. No additional training would be required to operate the improvements beyond those required to operate and maintain the existing facilities, which are fully funded.

The City also adequately budgets for short-lived asset replacements with the $66,000 budgeted annually for maintenance and pump and motor repairs.

F. PERMIT ISSUES

The existing NPDES permit will not require any immediate amendments to implement the capital improvement plan. In the long term, if effluent irrigation is implemented, a Recycled Water Use Plan will be required. Monitoring and reporting requirements should remain the same.

Permitting for construction of the capital improvements will require only the typical building, electrical, mechanical and plumbing permits.

5. FUNDING PROGRAM

The City of Canby's sanitary sewer system has always maintained a strong financial basis, and the City has completed all improvements undertaken over the past 25 years without debt. The capital improvements identified in this Facility Plan could be funded with the anticipated revenues from the enterprise fund and system development charges. The following table is a summary of all capital improvement costs and the annual revenues required to fully fund the improvements.

Table 4.5: City of Canby
Capital Improvement Cost Summary
May 2019 ENR CCI 11,230

	Total Cost	*Average/Yr*
1-5 Years	$8,490,000	$1,700,000
6-10 Years	$1,555,000	$310,000
11-20 Years	$2,750,000	$275,000

If the City elects to incur debt, there are a variety of mechanisms available.

A. GENERAL OBLIGATION BONDS

If debt is incurred, General Obligation Bonds are a traditional means of funding capital improvements that benefit the entire community. GO bonds require a positive vote from the community, and the debt service is allocated based on property valuations and collected with annual property tax payments. The cost allocation with GO bonds impacts all residents with guarantee of the full faith and credit of the City.

A twenty-year annual debt service based on a 4% interest rate would equate to $625,000 per year for the short-term improvements, or approximately $0.38 per $1,000 assessed value based on the current net assessed value of $1,645,626,255 for the City.

B. REVENUE BONDS

Revenue bonds require a commitment of user fees to retire debt. This revenue stream is guaranteed by the City's commitment to collect sufficient user fees to retire the debt.

Based on the current 5,235 connections, the short term improvements would increase user fees for a period of 5 years by approximately $27 per month, plus any additional reserves depending upon the funding agency.

C. GOVERNMENTAL GRANT/LOAD PROGRAMS

Oregon Business Infrastructure Finance Authority Water Wastewater program, USDA Rural Development Water and Waste Disposal Loan and Grant Program, and the Oregon DEQ Clean Water State Revolving Fund program commonly provide funding for municipal wastewater projects. Each program has attributes that would benefit the City if they elect to incur debt.

D. SYSTEM DEVELOPMENT CHARGES

System Development Charges will collect sufficient revenues to cover the total cost of all improvements due to the equity in the system, however, SDC collections are made at the time of issuing building permits as opposed to at the time of completing the capital construction.

SDC revenues are not assured, so cannot be used as a primary debt service source when applying for funding assistance. If available, SDC funds can, however, be used to pay for improvements or make the annual debt service payments for any funding agency. The City currently has an SDC fund balance of approximately $650,000 that can be applied to these projects, and annual SDC revenues are budgeted to be approximately $370,000 per year.

E. RECOMMENDED FUNDING PROGRAM

The City of Canby has many options to fund needed capital improvements. The current cash balance of unrestricted funds available to support capital improvements is over $4,000,000, and with the current revenue sources, funding all improvements with cash is very feasible and the most cost effective.

F. SCHEDULING

The City's wastewater collection, pumping and treatment systems currently have sufficient capacity to support growth. All improvements identified in this Facility Plan are to maintain operations and optimize performance. The recommended improvements should be completed as soon as possible to improve operations, provide redundancy and reduce excessive maintenance costs.

APPENDIX A

Discharge Monitoring Reports

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0636	Month/Year	January, 2014
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X

Authorized Signature Date

Darvin Tramel

Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Darvin Tramel	Certification No. & Grade	#C-11726 III
Treatment Sys. Class	IV	Principal Operator Name (print)	Darvin Tramel	Certification No. & Grade	#8216 IV

Date	INFLUENT			EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30)															Date
		BOD	TSS				BOD		CBOD		TSS					Disinfection			
		Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	
	pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli		
	S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1		361	289	61.7	7.3	0.9377	7	98	5	39	13	98	102		1.21	310	2		1
2	7.9	430	326	61.5	7.3	0.9615	8	98	4	32	11	97	88		0.91	207	1		2
3	8.3			61.7	7.2	0.9233										145			3
4				61.1	7.2	0.9317										358			4
5				61.0	7.2	0.9913										255			5
6	8.1			61.0	7.2	0.9364								95		150			6
7	8.3	344	337	61.2	7.1	0.9431	7	98	3	24	10	97	79		1.08	130	2	Milltronics OCM III Eff. Flow Meter Calibrated	7
8	8.3	343	266	61.4	7.1	1.0166	8	98	4	34	11	98	93		1.86	124	6		8
9	8.1			61.1	7.1	0.9972										91		Honeywell Effluent Temperature Sensor Calibrated	9
10	8.4			61.3	7.2	0.9803										103			10
11				61.3		1.0185										208			11
12		252	371	61.8		1.0347	7	97	4	35	11	97	95		2.28	178	1		12
13	8.5	250	276	61.9	7.2	1.0530	7	97	5	44	10	96	88	103	8.16	114	2		13
14	8.0			61.7	7.2	0.9425										96			14
15				61.8	7.3	0.9465										115			15
16	8.3			61.8	7.2	0.9980										156			16
17	8.2			61.2	7.3	0.8760										134			17
18				61.0	7.4	0.9214										300			18
19				61.9	7.4	0.9333										532			19
20	8.3			60.4	7.4	0.9449								145		339			20
21	8.4			60.3	7.4	0.6194										248		Low recorded flow is result putting half the A,B back on line after replacing the diffusers	21
22	8.4	260	247	59.7	7.3	0.9397	6	98	3	24	8	97	63		18.60	176	1		22
23	8.5	339	259	59.9	7.2	0.9359	9	97	4	31	11	98	86		20.90	111	1		23
24	8.4			59.3	7.3	0.8929										110			24
25				59.7	7.5	0.9190										396			25
26				60.2	7.6	0.9488										592			26
27	8.4			60.4	7.3	0.9574								157		119			27
28	8.3			60.4	7.2	0.8490										133			28
29	8.4	331	281	60.9	7.2	0.8916	7	98	3	22	11	96	82		16.50	120	1		29
30	8.4	242	336	61.0	7.3	0.8572	8	97	4	29	11	97	79		16.00	102	4		30
31	8.5			61.0	7.3	0.9046										126			31
TOTAL																		TOTAL	
DAILY MINIMUM	7.9			59.3	7.1											91		DAILY MINIMUM	
DAILY MAXIMUM	8.5			61.9	7.6					44			102		20.90	592	6	DAILY MAXIMUM	
WKLY. AVG. MAX.									5	39	12		95					WEEKLY AVERAGE MAX.	
MONTHLY AVG.		315	299	61.0		0.9356	7	98	4	31	11	96	85	125	8.75	203	2	MONTHLY AVERAGE	
DAILY LIMITS					6.00-9.00					834			1000		33		406	DAILY LIMITS	
WEEKLY LIMITS									40	667	45		750					WEEKLY LIMITS	
MONTHLY LIMITS								85	25	417	30	85	500		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.	3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	**Phone Number**	503-266-0636	**Month/Year**	February, 2014
DEQ Permit No.	101063	**DEQ File No./Facility ID**	13691	**EPA Reference No.**	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	**County**	CLACKAMAS	**Population Served**	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X

Authorized Signature Date

Darvin Tramel

Name (Print)

Operator Certification

Collection Sys. Class	III	**Principal Operator Name (print)**	Darvin Tramel	**Certification No. & Grade**	#C-11726 III
Treatment Sys. Class	IV	**Principal Operator Name (print)**	Darvin Tramel	**Certification No. & Grade**	#8216 IV

Date		INFLUENT			EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30)															Date
			BOD	TSS				BOD		CBOD		TSS					Disinfection			
			Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp	Grab		UV	Bacteria		
		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1					60.6	7.3	1.0083										228			1
2					60.6	7.4	1.0373										255			2
3		8.3			60.7	7.3	0.9451								133		175			3
4		8.4	248	259	59.9	7.3	0.8452	4	98	2	14	7	97	49		6.41	167	1		4
5		8.4	315	260	58.6	7.2	0.9694	6	98	3	24	7	97	57		5.14	134	2		5
6		8.2			57.3	7.2	0.9363										125			6
7		8.4			57.4	7.3	0.9726										203			7
8					57.3	7.4	1.0147										256			8
9					58.3	7.3	1.0430										266			9
10		8.2			59.1	7.3	1.0717								139		183			10
11		8.4	249	236	59.5	7.1	0.9450	9	96	4	32	12	95	95		3.59	118	26		11
12		8.4	288	237	60.1	7.1	0.9246	6	98	3	23	7	97	54		2.19	128	1		12
13		8.4			60.4	7.1	1.0487										109			13
14		8.4			60.3	7.1	0.9686										103			14
15					59.7	7.2	1.1423										232			15
16					59.6	7.4	0.9886										246			16
17					60.0	7.3	1.0470										104			17
18		8.3	235	354	59.5	7.2	1.0375	9	96	6	52	29	92	251		1.07	114			18
19		8.3	295	181	59.9	7.3	0.9588	6	98	3	24	6	97	48	129	0.61	103	20		19
20		8.4			59.7	7.3	1.0109										107	1		20
21		8.4			60.3	7.2	0.9660										98			21
22					60.4	7.3	0.9647										248			22
23					60.8	7.3	1.0039										207			23
24		7.7			60.6	7.3	1.0133								136		104			24
25		8.4	263	231	60.9	7.3	0.8992	5	98	4	30	9	96	67		0.33	112	29		25
26		8.4	224	224	60.4	7.2	0.9033	4	98	4	30	7	97	53		0.20	112	1		26
27		8.2			60.6	7.3	0.9907										129			27
28		8.3			61.4	7.3	0.9893										190			28
TOTAL																			TOTAL	
DAILY MINIMUM		7.7			57.3	7.1											98		DAILY MINIMUM	
DAILY MAXIMUM		8.4			61.4	7.4					52			251		6.41	266	29	DAILY MAXIMUM	
WKLY. AVG. MAX.										5	38	18		149					WEEKLY AVERAGE MAX.	
MONTHLY AVG.			265	248	59.8		0.9874	6	98	4	29	11	96	84	134	2.44	163	4	MONTHLY AVERAGE	
DAILY LIMITS						6.00-9.00					834			1000		33		406	DAILY LIMITS	
WEEKLY LIMITS										40	667	45		750					WEEKLY LIMITS	
MONTHLY LIMITS									85	25	417	30	85	500		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	**Phone Number**	503-266-0636	**Month/Year**	March, 2014
DEQ Permit No.	101063	**DEQ File No./Facility ID**	13691	**EPA Reference No.**	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	**County**	CLACKAMAS	**Population Served**	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X

Authorized Signature Date

Darvin Tramel

Name (Print)

Operator Certification

Collection Sys. Class	III	**Principal Operator Name (print)**	Darvin Tramel	**Certification No. & Grade**	#C-11726 III
Treatment Sys. Class	IV	**Principal Operator Name (print)**	Darvin Tramel	**Certification No. & Grade**	#8216 IV

		INFLUENT			EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30)																
			BOD	TSS				BOD		CBOD		TSS					Disinfection				
			Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria			
Date		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.		Date
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2				
1					60.4		0.9650										182				1
2					60.8		1.1317										128				2
3		8.5			61.3	7.3	1.0287										108				3
4		8.1	224	254	61.6	7.3	0.9178	6	97	4	31	10	96	77		0.36	109				4
5		8.4	255	217	61.7	7.3	1.1555	6	98	4	39	5	98	48	132	0.95	106	26			5
6		8.4			61.0	7.2	1.0740										102	9			6
7		8.4			61.5	7.2	0.9955										120				7
8					61.9	7.3	1.0686										209				8
9					62.5	7.3	1.0676										141				9
10		8.2			62.7	7.1	1.0410										137				10
11		8.4			62.8	7.6	0.9996								143		112				11
12		8.3	275	234	62.4	7.3	0.9387	5	98	4	31	6	97	47		0.47	107	31			12
13		8.4	293	228	62.6	7.3	0.9108	5	98	3	23	6	97	46		0.33	132	4			13
14		8.5			63.0	7.3	0.9272										155				14
15					63.1		1.0458										412				15
16					63.0		1.1343										357				16
17		8.5			63.0	7.3	1.0117										102				17
18		8.3	341	247	63.6	7.3	0.9083	5	99	3	23	6	98	45	139	0.29	123	144			18
19		8.4	326	193	63.0	7.3	0.8580	3	99	2	14	5	97	36		0.17	159	4			19
20		8.4			62.7	7.3	0.9437										113				20
21		8.4			62.6	7.4	0.9518										122				21
22					62.7	7.4	0.9233										322				22
23					63.0	7.4	0.9276										470				23
24		8.3			63.2	7.4	0.9603								140		188				24
25		8.2	270	276	62.8	7.1	0.9036	8	97	3	23	12	96	90		0.38	130	68			25
26		8.3	304	226	63.3	7.3	0.9642	7	98	4	32	10	96	80		0.56	147	21			26
27		8.2			63.2	7.3	0.9926										127				27
28		8.2			62.9	7.3	1.0183										113				28
29					62.4	7.3	0.9692										187				29
30					63.0	7.2	1.0059										248				30
31		8.3			63.3	7.2	0.9890								116		157				31
TOTAL																				TOTAL	
DAILY MINIMUM		8.1			60.4	7.1											102			DAILY MINIMUM	
DAILY MAXIMUM		8.5			63.6	7.6					39			90		0.95	470	144		DAILY MAXIMUM	
WKLY. AVG. MAX.										4	35	11		85						WEEKLY AVERAGE MAX.	
MONTHLY AVG.			286	234	62.5		0.9912	6	98	3	27	8	97	59	134	0.44	172	20		MONTHLY AVERAGE	
DAILY LIMITS						6.00-9.00					834			1000		33		406		DAILY LIMITS	
WEEKLY LIMITS										40	667	45		750						WEEKLY LIMITS	
MONTHLY LIMITS									85	25	417	30	85	500		18		126		MONTHLY LIMITS	
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W		MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	**Phone Number**	503-266-0648	**Month/Year**	April, 2014
DEQ Permit No.	101063	**DEQ File No./Facility ID**	13691	**EPA Reference No.**	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	**County**	CLACKAMAS	**Population Served**	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X

Authorized Signature **Date**

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	**Principal Operator Name (print)**	Jerry Nelzen	**Certification No. & Grade**	#C-11532 III
Treatment Sys. Class	IV	**Principal Operator Name (print)**	David Conner	**Certification No. & Grade**	T - 9031 IV

	INFLUENT			EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30)															
		BOD	TSS		Grab		BOD		CBOD		TSS					Disinfection			
		Comp.	Comp				Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria		
Date	pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
	S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1	8.2	280	254	63.5	7.4	0.8827	4	99	3	22	4	98	29		0.62	119	13		1
2	8.4	284	235	63.8	7.4	0.8827	3	99	2	15	4	98	29		0.44	100	1		2
3	8.3			63.9	7.2	0.8937										126			3
4	8.3			64.4	7.2	0.9708										127			4
5				63.8	7.3	1.0471										279			5
6				64.3	7.3	1.0373										360			6
7	8.3			65.3	7.3	0.9885								107		231			7
8	8.4	401	269	65.5	7.2	0.9769	9	98	6	49	15	94	122		1.98	102	93		8
9	8.4	328	217	66.2	7.2	0.9851	9	97	5	41	13	94	107		1.99	104	120		9
10	8.4			65.8	7.2	1.3364										103			10
11	8.3			65.3	7.2	0.9365										98			11
12				65.2	7.3	0.9228										143			12
13				65.7	7.3	0.9907										182			13
14	8.4			65.5	7.2	0.9805										134			14
15	8.0	300	306	65.6	7.2	0.9097	9	97	4	30	10	97	76	123	1.08	80	54		15
16	8.5	307	286	65.8	7.3	0.9409	7	98	3	24	13	95	102		0.69	107	44		16
17	8.0			65.2	7.2	0.9499										102			17
18	8.3			65.6	7.2	0.9566										102			18
19				66.3	7.4	0.9941										263			19
20				65.8	7.4	0.9984										404			20
21	8.2			66.7	7.2	0.9916								107		114			21
22	8.4	258	368	65.9	7.2	0.9718	8	97	4	32	12	97	97		0.41	87	141		22
23	8.3	280	270	65.4	7.2	1.0227	6	98	4	34	10	96	85		0.47	91	41		23
24	8.4			65.4	7.2	0.9684										103			24
25	8.3			65.5	7.2	0.8843										106			25
26				65.6		0.9310										233			26
27				65.3		1.0095										308			27
28	8.3			66.2	7.2	0.9690								121		130			28
29	8.2	238	194	66.9	7.2	0.9440	5	98	3	24	8	96	63		0.29	96	96	Milltronics OCM III Flow Meter Calibrated	29
30	8.3	284	223	67.3	7.2	0.9700	5	98	3	24	7	97	57		0.30	99	34		30
TOTAL																		TOTAL	
DAILY MINIMUM	8.0			63.5	7.2											80		DAILY MINIMUM	
DAILY MAXIMUM	8.5			67.3	7.4					49			122		1.99	404	141	DAILY MAXIMUM	
WKLY. AVG. MAX.									6	45	14		115					WEEKLY AVERAGE MAX.	
MONTHLY AVG.		296	262	65.4		0.9748	7	98	4	30	10	96	77	115	0.83	155	38	MONTHLY AVERAGE	
DAILY LIMITS					6.00-9.00					834			1000		33		406	DAILY LIMITS	
WEEKLY LIMITS									40	667	45		750					WEEKLY LIMITS	
MONTHLY LIMITS								85	25	417	30	85	500		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.	3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	May, 2014
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X
Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	#C-11532 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T- 9031 IV

Date	INFLUENT pH	INFLUENT BOD Comp. Concentration	INFLUENT TSS Comp. Concentration	EFFLUENT (Outfall 001) - Summer Limits (May 1 - Oct. 31) Temperature (Daily Max.)	pH Grab	Total Flow	BOD Comp. Concentration	BOD Calc. Removal	CBOD Comp. Concentration	CBOD Comp. Loading	TSS Comp. Concentration	TSS Calc. Removal	TSS Comp. Loading	Alkalinity Grab	Ammonia Nitrogen	Disinfection UV Radiation Intensity (Dosage)	Disinfection Bacteria E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
	S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1	8.5			68.2	7.1	0.9630										101			1
2	8.4			68.5	7.2	0.9011										105			2
3				67.1	7.2	0.9321										185			3
4				66.6	7.3	1.0231										302			4
5	8.2			67.8	7.3	0.9956								119		204			5
6	8.3	234	260	67.7	7.2	0.9441	5	98	2	16	6	98	47		0.95	102	141		6
7	8.4	299	238	67.7	7.1	0.9457	3	99	2	16	5	98	39		0.86	95	4		7
8	8.2			67.4	7.2	0.9816										103			8
9	8.4			67.3	7.1	0.9286										87			9
10				67.6	7.2	0.9200										292			10
11				68.3	7.3	0.9724										299			11
12	8.2			68.7	7.2	0.9754								109		89			12
13	8.1	257	300	69.6	7.1	0.9432	6	98	2	16	10	97	79		1.03	104	260		13
14	8.3	270	216	68.3	7.3	0.9613	7	97	4	32	10	95	80		0.95	84	88		14
15	8.3			71.0	7.3	0.9436										99			15
16	8.4			69.9	7.6	0.9162										88			16
17				70.0	7.5	0.9785										213			17
18				69.3	7.6	1.1796										160			18
19	8.2			69.8	7.4	1.0781								168		124			19
20	8.2	244	425	71.2	7.4	0.6962	3	99	2	12	8	98	46		0.10	95	10		20
21	8.3	284	381	70.7	7.5	0.9318	2	99	2	16	6	98	47		0.23	205	8		21
22	8.4			71.1	7.4	0.9365										88			22
23	8.1			70.5	7.4	1.0924										108			23
24				70.8	7.4	0.8673										111			24
25				70.7	7.4	0.8425										145			25
26				70.7	7.5	0.9964										259			26
27	8.0	257	286	70.7	7.4	0.9016	3	99	2	15	5	98	38	176	0.02	74			27
28	8.3	272	286	71.0	7.5	0.8075	3	99	2	13	4	99	27		0.09	199	6		28
29	8.2			70.9	7.4	0.9597										83	1		29
30	8.1			71.5	7.4	0.9422										83			30
31				71.8	7.6	0.9538										247			31
TOTAL																		TOTAL	
DAILY MINIMUM	8.0			66.6	7.1											74		DAILY MINIMUM	
DAILY MAXIMUM	8.5			71.8	7.6					32			80		1.03	302	260	DAILY MAXIMUM	
WKLY. AVG. MAX.									3	24	10		79					WEEKLY AVERAGE MAX.	
MONTHLY AVG.		265	299	69.4		0.9494	4	98	2	17	7	98	50	143	0.53	146	16	MONTHLY AVERAGE	
DAILY LIMITS					6.00-9.00					334			334		33		406	DAILY LIMITS	
WEEKLY LIMITS									15	250	15		250					WEEKLY LIMITS	
MONTHLY LIMITS								85	10	167	10	85	167		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.	3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	**Phone Number**	503-266-0648	**Month/Year**	June, 2014
DEQ Permit No.	101063	**DEQ File No./Facility ID**	13691	**EPA Reference No.**	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	**County**	CLACKAMAS	**Population Served**	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X
Authorized Signature - Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	**Principal Operator Name (print)**	Jerry Nelzen	**Certification No. & Grade**	#C-11532 III
Treatment Sys. Class	IV	**Principal Operator Name (print)**	David Conner	**Certification No. & Grade**	T- 9031 IV

	INFLUENT			EFFLUENT (Outfall 001) - Summer Limits (May 1 - Oct. 31)												Disinfection			
		BOD	TSS				BOD		CBOD		TSS								
		Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp	Comp.	Calc.	Comp.	Grab		UV	Bacteria		
Date	pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
	S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1				71.7	7.6	0.9932										460			1
2	8.2			72.2	7.5	0.9758								168		277			2
3	8.3	294	321	72.3	7.3	0.9405	3	99	2	16	7	98	55		0.21	80	17		3
4	8.2	263	254	72.1	7.4	0.9610	3	99	3	24	5	98	40		0.21	98	14		4
5	8.3			72.5	7.4	0.9251										87			5
6	8.1			72.7	7.4	0.8893										96			6
7				72.5		0.9380										309			7
8				72.5		0.9671										301			8
9	8.1			73.1	7.3	0.9683										90			9
10	8.0	288	472	73.3	7.4	0.9270	3	99	2	15	5	99	39	180	0.18	91	17		10
11	8.0	299	403	73.7	7.4	0.9301	2	99	1	8	5	99	39		0.19	142	5		11
12	8.1			72.5	7.5	0.9273										128			12
13	8.2			71.9	7.5	0.9271										117			13
14				72.0		0.8975										116			14
15				71.9		0.9472										175			15
16	8.2			72.0	7.5	1.0363								157		200			16
17	8.0	244	218	71.0	7.3	0.9434	2	99	1	8	4	98	31		0.23	163	9		17
18	8.1	264	243	72.1	7.4	0.9297	2	99	1	8	4	98	31		0.22	96	3		18
19	8.0			72.8	7.3	0.9724										125			19
20	8.0			72.9	7.4	0.9028										157			20
21				72.7	7.4	0.9248										213			21
22				73.1	7.4	0.9333										290			22
23	7.6			73.9	7.4	0.9506								137		186			23
24	8.1	202	249	74.1	7.3	0.9405	4	98	3	24	4	98	31		0.28	117			24
25	8.0	334	295	74.7	7.3	0.9626	4	99	3	24	5	98	40		0.31	143	5		25
26	8.1			73.4	7.4	1.0450										132	21		26
27	7.8			73.3	7.3	0.9955										128			27
28				73.2	7.4	0.9331										225			28
29				73.4	7.5	0.9720										268			29
30	8.1			74.4	7.4	0.9963								145		276			30
TOTAL																		TOTAL	
DAILY MINIMUM	7.6			71.0	7.3											80		DAILY MINIMUM	
DAILY MAXIMUM	8.3			74.7	7.6					24			55		0.31	460	21	DAILY MAXIMUM	
WKLY. AVG. MAX.									3	24	6		47					WEEKLY AVERAGE MAX.	
MONTHLY AVG.		276	307	72.8		0.9518	3	99	2	16	5	98	38	157	0.23	176	9	MONTHLY AVERAGE	
DAILY LIMITS					6.00-9.00					334			334		33		406	DAILY LIMITS	
WEEKLY LIMITS									15	250	15		250					WEEKLY LIMITS	
MONTHLY LIMITS								85	10	167	10	85	167		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.	3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	July, 2014
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X
Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	#C-11532 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T- 9031 IV

		INFLUENT			EFFLUENT (Outfall 001) - Summer Limits (May 1 - Oct. 31)															
			BOD	TSS				BOD		CBOD		TSS					Disinfection			
			Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria		
Date		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1		7.8	273	243	74.7	7.3	0.9493	3	99	3	24	4	98	32		0.24	120	7		1
2		7.9	273	297	75.4	7.4	0.9682	3	99	2	16	6	98	48		0.18	154	7		2
3		8.0			75.2	7.4	0.9528										183			3
4					74.8	7.4	0.8896										205			4
5					76.1	7.4	0.9014										325			5
6					76.1	7.5	0.9651										259			6
7		8.1			76.4	7.4	0.9868								127		223			7
8		7.9	253	251	77.1	7.3	0.9654	2	99	1	8	4	98	32		0.12	146	6		8
9		7.9	218	116	77.3	7.3	0.9592	2	99	1	8	2	98	16		0.26	141	5	Effluent Flow Meter Calibrated (Milltronics OCM III)	9
10		8.0			77.4	7.3	0.9701										132			10
11		7.9			77.6	7.4	0.9067										127			11
12					78.0	7.4	0.9190										213			12
13					76.5	7.5	0.9738										268			13
14		7.9			77.7	7.3	0.9656								129		202			14
15		8.0	315	282	78.0	7.3	0.9568	2	99	1	8	3	99	24		0.25	159	13		15
16		7.9	267	222	78.3	7.4	0.9663	1	100	1	8	4	98	32		0.02	142	5		16
17		8.1	302	208	78.2	7.3	0.9536	2	99	1	8	3	99	24		0.13	129			17
18		8.1			77.9	7.4	0.9421										122		Annual Certified Calibration of Lab Equipment By Quality Control Services	18
19					78.7		0.9145										96			19
20					77.4		0.9494										122			20
21		7.8			77.2	7.3	0.9751								81		354			21
22		7.7	248	250	77.9	7.2	0.9683	1	100	1	8	4	98	32		0.02	129	9		22
23		8.1	283	206	76.5	7.0	1.0319	1	100	1	9	4	98	34		0.02	132	6		23
24		7.9			74.8	7.2	0.9729										129			24
25		7.9			76.9	7.3	0.9238										147			25
26					77.2	7.3	0.9365										150			26
27					77.2	7.4	0.9949										282			27
28		7.9			77.9	7.2	0.9992								85		246			28
29		7.9	228	195	78.1	7.2	0.9598	3	99	2	16	7	98	56		0.33	132	31		29
30		7.9	312	259	78.1	7.3	0.9770	3	99	2	16	5	98	41		0.02	156	40		30
31		7.9			78.3	7.3	0.9602										147			31
TOTAL																			TOTAL	
DAILY MINIMUM		7.7			74.7	7.0											96		DAILY MINIMUM	
DAILY MAXIMUM		8.1			78.7	7.5					24			56		0.33	354	40	DAILY MAXIMUM	
WKLY. AVG. MAX.										3	20	6		48					WEEKLY AVERAGE MAX.	
MONTHLY AVG.			270	230	77.1		0.9566	2	99	1	12	4	98	34	106	0.14	177	10	MONTHLY AVERAGE	
DAILY LIMITS						6.00-9.00					334			334		33		406	DAILY LIMITS	
WEEKLY LIMITS										15	250	15		250		18			WEEKLY LIMITS	
MONTHLY LIMITS									85	10	167	10	85	167				126	MONTHLY LIMITS	
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	August, 2014
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X
Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	#C-11532 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T- 9031 IV

Date		INFLUENT			EFFLUENT (Outfall 001) - Summer Limits (May 1 - Oct. 31)															Date
			BOD Comp.	TSS Comp.		Grab		BOD Comp.	BOD Calc.	CBOD Comp.	CBOD Comp.	TSS Comp.	TSS Calc.	TSS Comp.	Grab		Disinfection UV	Disinfection Bacteria		
		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1		7.5			79.1	7.1	0.8989										112			1
2					78.4		0.9949										172			2
3					79.3		0.9858										481			3
4		8.1			79.0	7.3	0.9346										145			4
5		7.9	249	236	78.6	7.2	0.8987	4	98	2	15	6	97	45	88	0.60	155	11		5
6		7.8	361	368	78.8	7.1	0.9514	3	99	2	16	5	99	40		0.60	124	41		6
7		7.9			79.0	7.2	0.9667										95			7
8		8.0			78.5	7.4	0.9680										103			8
9					78.3	7.4	1.0024										346			9
10					78.5	7.4	1.0050										546			10
11		7.4			79.0	7.0	0.9919										141			11
12		7.7	253	309	78.4	7.0	0.9915	5	98	3	25	8	97	66	76	2.68	131	56		12
13		7.9	291	237	78.7	7.4	0.9976	4	99	3	25	7	97	58		3.65	74	96		13
14		8.0			78.4	7.4	1.0302										99			14
15		8.1			78.5	7.4	0.9758										76			15
16					78.9	7.4	0.9974										90			16
17					79.6	7.4	1.0278										229			17
18		7.7			79.4	7.4	1.0130								116		84		Installed new flow meter Siemens LUT 400, set up and calibrated by seimens technician.	18
19		7.9	289	291	80.0	7.3	0.9793	6	98	3	25	10	97	82		1.11	88	28		19
20		7.8	294	224	78.9	7.3	1.0781	4	99	2	18	9	96	81		0.96	58	5		20
21		8.2			78.4	7.4	1.0036										80			21
22		8.1			78.3	7.3	0.9863										75			22
23					78.5	7.4	0.9562										148			23
24					78.1	7.4	1.0138										248			24
25		8.1			78.9	7.2	1.0247								119		78			25
26		8.1	258	220	79.4	7.2	0.9823	6	98	3	25	12	95	98		0.87	55	51		26
27		7.9	264	244	79.7	7.2	1.0117	7	97	3	25	9	96	76		1.31	110	26		27
28		8.0			79.3	7.1	0.9602										54			28
29		7.9			78.9	7.3	0.9399										54			29
30					77.8	7.3	0.9592										131			30
31					77.8	7.2	0.9635										88			31
TOTAL																			TOTAL	
DAILY MINIMUM		7.4			77.8	7.0											54		DAILY MINIMUM	
DAILY MAXIMUM		8.2			80.0	7.4					25			98		3.65	546	96	DAILY MAXIMUM	
WKLY. AVG. MAX.										3	25	11		87					WEEKLY AVERAGE MAX.	
MONTHLY AVG.			282	266	78.8		0.9836	5	98	3	22	8	97	68	100	1.47	144	29	MONTHLY AVERAGE	
DAILY LIMITS						6.00-9.00					334			334		33		406	DAILY LIMITS	
WEEKLY LIMITS										15	250	15		250					WEEKLY LIMITS	
MONTHLY LIMITS									85	10	167	10	85	167		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	September, 2014	I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.	
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4		
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206	X Authorized Signature	Date

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	#C-11532 III	David Conner	
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T- 9031 IV	Name (Print)	

		INFLUENT			EFFLUENT (Outfall 001) - Summer Limits (May 1 - Oct. 31)																
			BOD	TSS				BOD		CBOD		TSS					Disinfection				
			Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria			
Date		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.		Date
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2				
1					77.9	7.2	1.2166										53				1
2		8.1	275	235	78.7	7.2	1.0243	4	99	3	26	4	98	34	96	1.10	66	4			2
3		7.5	313	245	77.7	7.2	1.0381	3	99	1	9	5	98	43		0.44	52	44			3
4		8.2			77.3	7.2	1.0533										52				4
5		7.7			77.2	7.3	0.9453										42				5
6					77.6		0.9768										210				6
7					77.2		1.0788										143				7
8		7.4			77.9	7.2	1.0563								100		64				8
9		7.9	268	241	77.7	7.3	0.9870	6	98	4	33	7	97	58		0.02	67	345			9
10		7.8	267	332	77.6	7.3	1.0309	6	98	3	26	8	98	69		0.02	40	71			10
11		8.4			76.7	7.3	0.9995										48				11
12		8.1			75.7	7.4	0.9204										45				12
13					76.3	7.4	0.9833										166				13
14					76.8	7.4	1.0593										205				14
15		7.6			76.8	7.3	1.0024										41				15
16		7.7	305	250	77.2	7.2	1.0114	3	99	2	17	3	99	25		0.22	96	28			16
17		7.8	304	275	76.7	7.3	1.0173	7	98	5	42	10	96	85		0.32	106	27			17
18		8.2			77.1	7.3	0.9889										47				18
19		8.3			77.8	7.4	0.9199										56				19
20					77.7	7.4	0.9994										121				20
21					77.7	7.4	1.0703										192				21
22		7.7			77.3	7.3	1.0367								112		65				22
23		8.3	310	355	78.8	7.2	1.0832	11	96	6	53	12	97	106		0.24	50	192			23
24		7.8	303	362	77.2	7.3	1.0203	5	98	4	34	9	98	77		0.23	106				24
25		8.1			76.7	7.3	0.9888										100	16	DEQ Facility Inspection		25
26		7.9			76.3	7.2	0.9156										128				26
27					76.0	7.3	0.9798										182				27
28					76.4	7.4	1.0646										160				28
29		7.6			75.9	7.3	1.0357								111		105				29
30		7.7			75.5	7.3	1.0051										112				30
TOTAL																			TOTAL		
DAILY MINIMUM		7.4			75.5	7.2											40		DAILY MINIMUM		
DAILY MAXIMUM		8.4			78.7	7.4					53			106		1.10	210	345	DAILY MAXIMUM		
WKLY. AVG. MAX.										5	44	11		91					WEEKLY AVERAGE MAX.		
MONTHLY AVG.			293	267	77.0		1.0157	6	98	4	30	7	97	62	105	0.32	97	42	MONTHLY AVERAGE		
DAILY LIMITS						6.00-9.00					334			334		33		406	DAILY LIMITS		
WEEKLY LIMITS										15	250	15		250					WEEKLY LIMITS		
MONTHLY LIMITS									85	10	167	10	85	167		18		126	MONTHLY LIMITS		
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.		

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	**Phone Number**	503-266-0648	**Month/Year**	October, 2014
DEQ Permit No.	101063	**DEQ File No./Facility ID**	13691	**EPA Reference No.**	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	**County**	CLACKAMAS	**Population Served**	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X

Authorized Signature Date

David Conner

Name (Print)

Operator Certification

Collection Sys. Class	III	**Principal Operator Name (print)**	Mark Gunter	**Certification No. & Grade**	#C-11871 III
Treatment Sys. Class	IV	**Principal Operator Name (print)**	David Conner	**Certification No. & Grade**	T - 9031 IV

Date		INFLUENT			EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30)																Date
			BOD	TSS				BOD		CBOD		TSS					Disinfection				
			Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria			
		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.		
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2				
1		6.0	282	237	75.7	7.2	1.0163	8	97	4	34	10	98	85		0.81	80	155			1
2		8.1	316	211	75.1	7.3	1.0118	7	98	4	34	9	96	76		0.39	83	25			2
3		8.3			75.0	7.4	0.9171										102				3
4					75.4	7.4	0.9653										192				4
5					75.8	7.3	1.0645										131				5
6		7.4			75.6	7.3	1.0221								121		89				6
7		8.0	269	269	75.7	7.3	0.9809	6	98	3	25	8	97	65		0.38	82	115	Calibration checked on Siemans Effluent flow meter		7
8		8.3	304	308	75.8	7.3	0.9893	5	98	2	17	8	97	66		0.37	74	15			8
9		8.2			75.7	7.3	0.9540										91				9
10		8.0			75.0	7.3	0.9569										103				10
11					75.2		0.9607										92				11
12					74.8		1.0749										70				12
13		7.6			74.2	7.4	1.0658								132		94				13
14		8.0	299	343	74.3	7.3	1.0038	7	98	5	42	12	97	100		0.32	73	186			14
15		8.3	309	304	73.4	7.3	1.0477	5	98	3	26	8	97	70		0.34	94	24			15
16		8.3			73.7	7.3	0.9557										90				16
17		8.1			73.4	7.2	0.9763										96				17
18					74.2	7.3	0.9842										106				18
19					74.5	7.4	1.0541										283				19
20		7.8			74.0	7.3	1.0314								119		97				20
21		8.2	284	213	73.5	7.3	0.9781	3	99	2	16	6	97	49		0.25	92				21
22		8.2	300	219	73.0	7.2	1.1211	3	99	1	9	5	98	47		0.17	187	4			22
23		8.1			73.2	7.2	1.0444										75	7			23
24		8.2			72.3	7.3	0.9747										94				24
25					71.7		1.0693										187				25
26					71.1		1.1426										167				26
27		7.5			71.5	7.3	1.0406								121		88				27
28		8.0	318	212	71.4	7.3	1.0421	4	99	3	26	8	98	70		0.16	89	120			28
29		8.2	308	267	71.6	7.3	1.0208	3	99	2	17	7	97	60		0.20	79	19			29
30		8.2			72.1	7.2	1.1913										95				30
31		8.2			71.1	7.3	0.9722										64				31
TOTAL																			TOTAL		
DAILY MINIMUM		8.0			71.1	7.2											64		DAILY MINIMUM		
DAILY MAXIMUM		8.3			75.8	7.4					42			100		0.81	283	186	DAILY MAXIMUM		
WKLY. AVG. MAX.										4	34	10		85					WEEKLY AVERAGE MAX.		
MONTHLY AVG.			299	258	73.8		1.0203	5	98	3	25	8	97	69	123	0.34	108	34	MONTHLY AVERAGE		
DAILY LIMITS						6.00-9.00					834			1000		33		406	DAILY LIMITS		
WEEKLY LIMITS										40	667	45		750					WEEKLY LIMITS		
MONTHLY LIMITS									85	25	417	30	85	500		18		126	MONTHLY LIMITS		
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.		

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	November, 2014
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X
Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	#C-11532 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T - 9031 IV

		INFLUENT			EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30)																
			BOD	TSS				BOD		CBOD		TSS					Disinfection				
			Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria			
Date		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.		Date
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2				
1					70.2	7.4	1.0018										205				1
2					70.2	7.3	1.0585										102				2
3		8.3			70.8	7.4	1.0563								141		118				3
4		8.0	315	425	70.9	7.4	0.9859	5	98	2	16	7	98	58		0.22	89	345			4
5		8.2	314	254	71.4	7.4	0.9960	3	99	2	17	4	98	33		0.55	73	32			5
6		8.4			71.0	7.3	1.0109										103				6
7		8.3			72.0	7.3	0.9052										99				7
8					70.1	7.3	0.9744										201				8
9					69.5	7.3	1.0555										181				9
10		8.2			70.0	7.3	1.0149								123		100				10
11			259	242	67.7	7.5	0.9612	5	98	3	24	8	98	48		0.03	176	48			11
12		8.3	340	243	65.5	7.3	0.9895	4	98	2	17	5	98	41		0.09	105	13			12
13		8.3			65.3	7.3	1.0107										81				13
14		8.4			65.7	7.5	0.9359										114				14
15					64.9		1.0963										104				15
16					65.5		1.1679										121	2	E.coli sample on 11-19 exceeded the 406/100ml limit, 5 resamples at 4 hour intervals resulted		16
17		8.2			65.4	7.3	1.0762								132		85	6	In the following E.coli counts,2,6,1,4 and 3 resulting in a geometric mean of 3		17
18		8.3	264	261	64.8	7.2	1.0732	9	97	5	45	11	96	98		1.36	80	1	The five resamples were done at 4 hour intervals within 48 hours of the original sample but are		18
19		8.0	287	243	64.9	7.2	1.0946	4	99	2	18	6	98	55		0.32	87	4	listed on the following days. 16th, 17th, 18th, 19th and 20th so they could be included		19
20		8.4	230	235	66.3	7.2	1.0751	2	99	1	9	7	97	63		0.02	108	3	in the daily max and monthly geometric mean.		20
21		8.4			66.2	7.2	1.1170										95	7			21
22					66.0	7.4	1.1446										195				22
23					66.1	7.3	1.1897										121				23
24		8.3	267	210	66.5	7.4	1.0745	3	99	2	18	5	98	45	159	0.10	97	3			24
25		7.9	323	252	66.8	7.3	0.9955	4	99	2	17	5	98	42		0.04	125	6			25
26		8.1			67.3	7.4	1.0199										85				26
27					67.4	7.5	1.0471										205				27
28					67.0	7.3	1.0640										179				28
29					66.4	7.5	0.9695										220				29
30					65.7	7.4	1.0391										328				30
TOTAL																				TOTAL	
DAILY MINIMUM		7.9			64.8	7.2											73			DAILY MINIMUM	
DAILY MAXIMUM		8.4			72.0	7.5					45			98		1.36	328	345		DAILY MAXIMUM	
WKLY. AVG. MAX.										3	24	8		72						WEEKLY AVERAGE MAX.	
MONTHLY AVG.			289	263	67.6		1.0400	4	98	2	20	6	98	54	139	0.30	132	8		MONTHLY AVERAGE	
DAILY LIMITS						6.00-9.00					834			1000		33		406		DAILY LIMITS	
WEEKLY LIMITS										40	667	45		750						WEEKLY LIMITS	
MONTHLY LIMITS									85	25	417	30	85	500		18		126		MONTHLY LIMITS	
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W		MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

acility Name	City of Canby	Phone Number	503-266-0648	Month/Year	December, 2014
EQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
lant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X _____ Authorized Signature Date

David Conner Name (Print)

Operator Certification

ollection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	#C-11532 III
reatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T - 9031 IV

	INFLUENT			EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30)															
		BOD	TSS				BOD		CBOD		TSS					Disinfection			
		Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria		
Date	pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
	S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1	7.6			64.8	7.2	0.9972								145		56			1
2	7.8	306	279	64.1	7.1	0.9728	6	98	3	24	8	97	65		0.68	58	104		2
3	8.2	260	226	63.6	7.0	0.9838	5	98	2	16	8	96	66		0.61	53	30		3
4	8.1			64.3	7.1	1.0300										53			4
5	7.8			64.6	7.2	0.9753										65			5
6				64.5	7.2	0.9952										91			6
7				65.1	7.1	1.0225										56			7
8	7.9			66.0	7.1	1.0213								148		48			8
9	8.0	317	450	65.6	7.0	1.0114	6	98	3	25	10	98	84		0.26	65	74		9
10	8.1	272	243	65.7	7.1	1.1122	6	98	3	28	11	95	102		0.63	61	75	E.coli sample on 12-16 exceeded the 406/100ml limit, (727) the result is recorded on the 16th	10
11	7.8			65.2	7.0	0.9922										66	186	with an asterisk but is not included in the monthly geometric mean. Five resamples were done	11
12	8.1			64.8	7.1	0.9092										67	7	at 4 hour intervals within 28 hours of original sample. The results are recorded on	12
13				65.2		0.9755										78	14	the 11th, 12th, 13th, 14th and 15th so they could be included in the daily max and	13
14				65.0		1.0359										123	4	monthly geometric mean. The results are as follows 186, 7, 14, 4, 4 with a geometric mean of 12	14
15	7.7			64.3	7.1	1.0067								160		64	4		15
16	8.3			64.4	7.2	0.9830								141		60			16
17	8.4	315	264	64.8	7.2	1.2050	5	98	2	20	7	97	70		0.56	85			17
18	8.3	259	257	64.8	7.2	1.0129	8	97	4	34	10	96	84		0.69	135	26		18
19	8.3			64.6	7.2	0.9421										142			19
20				64.7	7.3	1.2085										329			20
21				64.4	7.4	1.0620										360			21
22	8.0			64.9	7.2	1.0592								152		121	16		22
23	8.1			64.7	7.3	1.1395										130	5		23
24		284	223	64.5		1.1206	2	99	1	9	4	98	37		0.96	121			24
25		343	255	64.1		0.9288	2	99	1	8	5	98	39		0.98	320			25
26	7.7			64.5	7.3	0.9914										375			26
27				63.6		0.9972										210			27
28				64.0		1.0066										277			28
29	8.2	285	243	63.7	7.2	1.0219	4	99	2	17	7	97	60	137	0.72	148	3		29
30	8.2	333	281	62.0	7.2	0.9832	3	99	2	16	5	98	41		0.72	136	3		30
31	8.2			63.1	7.2	0.9580										181			31
OTAL																		TOTAL	
AILY MINIMUM	7.6			62.0	7.0											48		DAILY MINIMUM	
AILY MAXIMUM	8.4			66.0	7.4					31			102		0.98	375	186	DAILY MAXIMUM	
/KLY. AVG. MAX.									3	27	11		93					WEEKLY AVERAGE MAX.	
IONTHLY AVG.		297	242	64.5		1.0213	5	99	2	20	8	97	65	147	0.68	133	16	MONTHLY AVERAGE	
AILY LIMITS					6.0-9.00					834			1000		33		406	DAILY LIMITS	
/EEKLY LIMITS									40	667	45		750					WEEKLY LIMITS	
IONTHLY LIMITS								85	25	417	30	85	500		18		126	MONTHLY LIMITS	
IN. MON. FREQ.	3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	**Phone Number**	503-266-0648	**Month/Year**	January, 2015
DEQ Permit No.	101063	**DEQ File No./Facility ID**	13691	**EPA Reference No.**	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	**County**	CLACKAMAS	**Population Served**	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X _____ Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	**Principal Operator Name (print)**	Jerry Nelzen	**Certification No. & Grade**	#C-11532 III
Treatment Sys. Class	IV	**Principal Operator Name (print)**	David Conner	**Certification No. & Grade**	T - 9031 IV

	INFLUENT			EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30)															
		BOD	TSS				BOD		CBOD		TSS					Disinfection			
		Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria		
Date	pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
	S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1				61.9	7.3	0.9052										400			1
2	7.9			61.5	7.4	0.9500										322			2
3				62.1	7.3	0.9512										210			3
4				62.6	7.2	1.0402										290			4
5	7.9			63.0	7.2	0.9964								140		118			5
6	8.2	298	368	63.0	7.1	0.9735	6	98	3	24	10	97	81		1.05	117	21	Seimans LUT 400 Flow Meter Calibration Check	6
7	8.2	288	328	62.9	7.1	0.9782	6	98	3	24	10	97	82		1.19	115	23		7
8	8.4			62.7	7.0	0.9833										117			8
9	8.3			62.3	7.1	0.9282										116			9
10				62.6		0.9546										194			10
11				62.5		1.0403										262			11
12	7.7			63.1	7.0	0.9837								85		98		Honeywell STT 3000 Eff. Temperature Sensor Calibrated	12
13	8.2	314	408	62.7	6.9	1.0078	5	98	4	34	6	99	50		2.18	91	11		13
14	7.9	314	281	62.2	7.0	0.9796	4	99	3	25	5	98	41		2.67	137	18		14
15	8.2			61.9	7.1	1.1765										104			15
16	8.1			61.8	7.0	0.9514										109			16
17				62.4	7.2	1.2356										202			17
18				61.9	7.2	1.0872										201			18
19	8.2			62.5	7.2	1.1118								139		137			19
20	8.4	330	284	62.7	7.2	0.9915	8	98	6	50	14	95	116		1.92	94			20
21	8.3	369	243	62.6	7.3	1.0066	8	98	6	50	10	96	84		2.05	229	12		21
22	8.4			62.8	7.5	0.9505										262	10		22
23	8.3			63.8	7.2	0.9167										147			23
24				64.0	7.3	0.9784										388			24
25				64.3	7.4	1.0459										429			25
26	8.4			63.8	7.3	1.0229								152		95			26
27	8.3	203	174	63.9	7.2	1.0025	6	97	4	33	12	93	100		2.68	104	56		27
28	8.2	273	234	64.3	7.2	1.0119	6	98	3	25	11	95	93		2.52	120	26		28
29	8.4			63.5	7.1	0.9873										98			29
30	8.4			63.5	7.1	0.9344										93			30
31				63.2	7.2	0.9892										210			31
TOTAL																		TOTAL	
DAILY MINIMUM	7.7			61.5	6.9					50			116			91		DAILY MINIMUM	
DAILY MAXIMUM	8.4			64.3	7.5										2.68	429	56	DAILY MAXIMUM	
WKLY. AVG. MAX.									6	50	12		100					WEEKLY AVERAGE MAX.	
MONTHLY AVG.		299	290	62.8		1.0023	6	98	4	33	10	97	81	129	2.03	181	19	MONTHLY AVERAGE	
DAILY LIMITS					6.00-9.00					834			1000		33		406	DAILY LIMITS	
WEEKLY LIMITS									40	667	45		750					WEEKLY LIMITS	
MONTHLY LIMITS								85	25	417	30	85	500		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.	3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	**Phone Number**	503-266-0648	**Month/Year**	February, 2015
DEQ Permit No.	101063	**DEQ File No./Facility ID**	13691	**EPA Reference No.**	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	**County**	CLACKAMAS	**Population Served**	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X _____ Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	**Principal Operator Name (print)**	Jerry Nelzen	**Certification No. & Grade**	#C-11532 III
Treatment Sys. Class	IV	**Principal Operator Name (print)**	David Conner	**Certification No. & Grade**	T - 9031 IV

Date		INFLUENT			EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30)															Date
			BOD	TSS				BOD		CBOD		TSS					Disinfection			
			Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria		
		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1					63.7	7.3	0.8975										256			1
2		8.1			64.4	7.1	1.0230								140		94			2
3		8.3	355	280	63.7	7.1	0.9740	5	99	5	41	4	99	32		1.63	115	16		3
4		8.2	293	251	63.6	7.2	1.0152	3	99	3	25	3	99	25		1.53	141	3		4
5		8.2			64.1	7.0	1.1016										93			5
6		8.2			63.6	7.1	1.0686										82			6
7					63.6	7.3	1.0671										153			7
8					64.5	7.2	1.0994										177			8
9		8.2			63.8	7.2	1.0816								159		99			9
10		8.0	285	231	63.8	7.3	1.0047	4	99	3	25	9	98	75		2.59	127	7		10
11		8.3	318	234	64.0	7.2	0.9480	6	98	4	32	14	94	111		3.58	168	25		11
12		7.7			63.8	7.1	0.9250										65			12
13		8.3			63.3	7.2	0.9081										104			13
14					63.3		0.9992										94			14
15					63.6		1.0174										169			15
16					63.2		1.0503										77			16
17		8.2	300	234	63.2	7.2	0.9823	4	99	2	16	6	97	46		2.41	113			17
18		8.4	263	244	63.0	7.2	0.9574	5	98	3	24	7	97	56		2.10	102	64		18
19		8.4			63.5	7.2	0.9560										121	65		19
20		8.4			63.9	7.1	0.9081										127			20
21					63.7	7.2	1.0061										266			21
22					63.1	7.3	1.0802										366			22
23		8.2			62.9	7.2	1.0268								120		121			23
24		8.3	465	191	63.1	7.1	0.9864	4	99	2	16	5	97	41		1.08	73			24
25		8.4	263	258	63.0	7.3	0.9474	3	99	1	8	5	98	40		1.88	84	36		25
26		8.4			63.3	7.9	0.9581										77	15		26
27		8.4			63.5	7.2	0.9622										73			27
28					63.4	7.2	1.0053										185			28
TOTAL																			TOTAL	
DAILY MINIMUM		7.7			62.9	7.0											65		DAILY MINIMUM	
DAILY MAXIMUM		8.4			64.5	7.9					41			111		3.58	366	65	DAILY MAXIMUM	
WKLY. AVG. MAX.										4	33	12		93					WEEKLY AVERAGE MAX.	
MONTHLY AVG.			318	240	63.6		0.9985	4	99	3	23	7	97	54	140	2.10	133	19	MONTHLY AVERAGE	
DAILY LIMITS						6.00-9.00					834			1000		33		406	DAILY LIMITS	
WEEKLY LIMITS										40	667	45		750					WEEKLY LIMITS	
MONTHLY LIMITS									85	25	417	30	85	500		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	March, 2015
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X

Authorized Signature Date

David Conner

Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	#C-11532 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T - 9031 IV

Date	INFLUENT pH	INFLUENT BOD Comp. Concentration	INFLUENT TSS Comp. Concentration	EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30) Temperature (Daily Max.)	pH Grab	Total Flow	BOD Comp. Concentration	BOD Calc. Removal	CBOD Comp. Concentration	CBOD Comp. Loading	TSS Comp. Concentration	TSS Calc. Removal	TSS Comp. Loading	Alkalinity Grab	Ammonia Nitrogen	Disinfection UV Radiation Intensity (Dosage)	Disinfection Bacteria E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
	S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1				62.8	7.2	1.0884										208			1
2	8.2			63.1	7.1	0.9380								107		124			2
3	8.4	335	275	63.1	7.1	0.9408	4	99	1	8	3	99	24		1.42	97	61		3
4	8.5	266	106	63.0	7.3	0.9693	3	99	1	8	5	95	40		0.98	422	10		4
5	8.5			63.1	7.1	0.9486										111			5
6	8.3			63.5	7.2	0.9142										67			6
7				63.6		0.9505										147			7
8				63.6		1.0085										103			8
9	8.3			64.0	7.2	0.9833								133		145			9
10	8.2	259	382	64.2	7.1	0.9289	5	98	2	15	7	98	54		1.00	102	53		10
11	8.2	291	250	65.1	7.2	0.9788	4	99	2	16	5	98	41		0.82	102	28		11
12	8.4			65.3	7.2	1.0704										90			12
13	8.3			65.4	7.1	0.9359										123			13
14				65.2	7.2	1.2206										156			14
15				64.5	7.1	1.1759										128			15
16	8.3			64.8	7.0	1.0145								194		101			16
17	8.4	291	251	64.8	7.2	0.9893	6	98	4	33	9	96	74		0.56	100	192		17
18	8.4	279	224	65.1	7.1	0.9367	7	97	4	31	14	94	109		0.57	119	63		18
19	8.3			65.2	7.2	0.9589										116			19
20	8.5			65.1	7.1	0.9657										150			20
21				64.8		0.9860										126			21
22				64.8		1.0122										84			22
23	8.1			64.6	7.1	1.0247								111		159			23
24	8.1	236	216	64.3	7.1	1.1016	4	98	3	26	9	98	83		1.62	152	23		24
25	8.2	252	260	65.3	7.2	0.8277	6	98	3	21	13	95	90		0.97	233	23		25
26	8.3			65.2	7.1	0.9187										212			26
27	8.0			65.5	7.3	0.9259										328			27
28				65.6	7.2	0.9932										118			28
29				65.7	7.2	1.0600										102			29
30	7.8			65.9	7.2	1.2326								137		93			30
31	8.3			65.9	7.2	0.8026										65			31
TOTAL																		TOTAL	
DAILY MINIMUM	7.8			62.8	7.0											65		DAILY MINIMUM	
DAILY MAXIMUM	8.5			65.9	7.3					33			109		1.62	422	192	DAILY MAXIMUM	
WKLY. AVG. MAX.									4	32	12		92					WEEKLY AVERAGE MAX.	
MONTHLY AVG.		276	246	64.6		0.9935	5	98	3	20	8	97	64	136	0.99	141	39	MONTHLY AVERAGE	
DAILY LIMITS					6.00-9.00					834			1000		33		406	DAILY LIMITS	
WEEKLY LIMITS									40	667	45		750					WEEKLY LIMITS	
MONTHLY LIMITS								85	25	417	30	85	500		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.	3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	April, 2015
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X
Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	#C-11532 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T - 9031 IV

	INFLUENT			EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30)														
		BOD	TSS				BOD		CBOD		TSS					Disinfection		
		Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria	
Date	pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.
	S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2		
1	8.4	170	230	65.4	7.2	1.0800	6	98	4	38	9	96	81		1.66	70	15	
2	8.4	290	289	66.0	7.3	0.9578	7	98	4	32	7	98	56		0.14	95	5	
3	8.4			65.5	7.2	0.9729										94		
4				65.3	7.2	1.0328										230		
5				65.4	7.2	1.0466										99		
6	8.0			65.9	7.4	0.9325								153		144		
7	8.2	295	288	65.6	7.3	0.9773	6	98	3	24	11	98	90		0.48	89	22	
8	8.3	299	232	65.9	7.1	1.0130	5	98	3	25	7	97	59		0.02	86	1	
9	8.4			66.0	7.3	0.9920										93		
10	8.3			65.9	7.3	0.9721										119		
11				65.8	7.4	1.0055										306		
12				66.5	7.4	1.0272										310		
13	8.4			66.1	7.3	1.0127								133		143		
14	8.4	325	336	65.6	7.4	0.9724	5	98	3	24	9	97	73		0.45	139	3	
15	8.4	269	304	66.1	7.3	0.9880	4	99	2	16	7	98	58		0.02	117	9	
16	8.5			66.0	7.3	0.9308										88		
17	8.3			66.5	7.3	0.9852										85		
18				67.0		0.9960										311		
19				67.2		1.0439										191		
20	8.1			67.8	7.4	0.9918								171		82		
21	8.4	283	302	67.6	7.4	0.9486	4	99	2	16	8	97	63		0.43	70	1	
22	8.3	322	255	66.5	7.4	0.9614	5	98	3	24	6	98	48		0.53	64	1	
23	8.5			66.6	7.3	0.9609										86		
24	8.4			66.0	7.5	0.8710										99		
25				66.9	7.3	1.0213										132		
26				66.6	7.5	1.0432										131		
27	7.9			68.0	7.4	1.0214								169		126		
28	7.9	335	375	68.1	7.4	0.9445	6	98	3	24	8	98	63		0.80	187	33	
29	8.4	473	358	67.9	7.4	1.0158	6	99	3	25	8	98	68		0.61	88	33	
30	8.3			68.3	7.4	0.9617										85		
TOTAL																		TOTAL
DAILY MINIMUM	7.9			65.3	7.1											64		DAILY MINIMUM
DAILY MAXIMUM	8.5			68.3	7.5					38			90		1.66	311	33	DAILY MAXIMUM
WKLY. AVG. MAX.									4	34	9		74					WEEKLY AVERAGE MAX.
MONTHLY AVG.		308	297	66.5		0.9893	5	98	3	25	8	97	66	157	0.51	132	6	MONTHLY AVERAGE
DAILY LIMITS					6.00-9.00					834			1000		33		406	DAILY LIMITS
WEEKLY LIMITS									40	667	45		750					WEEKLY LIMITS
MONTHLY LIMITS								85	25	417	30	85	500		18		126	MONTHLY LIMITS
MIN. MON. FREQ.	3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	May, 2015
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

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X _____ Authorized Signature Date

David Conner Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	#C-11532 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T- 9031 IV

		INFLUENT			EFFLUENT (Outfall 001) - Summer Limits (May 1 - Oct. 31)																	
			BOD	TSS				BOD		CBOD		TSS					Disinfection					
			Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria				
Date		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.			Date
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2					
1		8.5			68.5	7.3	0.9205										91					1
2					68.0	7.4	1.0013										612					2
3					68.9	7.5	1.0558										109					3
4		8.3			68.9	7.4	0.9688								180		102					4
5		8.5	323	289	68.8	7.4	0.9495	5	98	3	24	6	98	48		0.46	103	8				5
6		8.4	353	258	68.1	7.4	0.9874	4	99	3	25	6	98	49		0.49	96	18				6
7		8.3			69.7	7.3	0.9671										102					7
8		8.5			69.6	7.3	0.9371										100					8
9					69.7	7.4	0.9440										97					9
10					69.5	7.3	0.9900										193					10
11		8.1			68.8	7.3	1.0077								169		149					11
12		7.3	314	437	68.7	7.5	0.9811	3	99	2	16	4	99	33		0.25	97	9				12
13		8.1	323	443	69.1	7.5	0.9743	2	99	1	8	4	99	33		0.14	95	11				13
14		8.4			70.2	7.4	0.9293										105					14
15		8.2			69.5	7.4	0.9144										95					15
16					69.3	7.4	0.9916										596					16
17					69.8	7.3	1.0400										128					17
18		8.1			70.6	7.5	1.0159								188		114					18
19		8.3	284	315	70.2	7.4	0.9575	4	99	2	16	7	98	56		0.88	92	40				19
20		8.3	302	236	70.7	7.4	0.9629	2	99	1	8	3	99	24		0.43	89	38				20
21		8.3			70.9	7.3	0.9496										136					21
22		7.9			69.8	7.4	0.9512										110					22
23					70.4		0.9266										123					23
24					70.7		0.9189										161					24
25					70.5		1.0624										101					25
26		8.3	299	269	71.0	7.3	0.9801	4	99	3	25	7	97	57	165	0.11	136	12				26
27		8.2	457	295	72.0	7.5	0.9955	4	99	3	25	8	97	66		0.83	76	7				27
28		8.4			72.3	7.3	0.9750										92					28
29		8.0			73.2	7.3	0.9325										77					29
30					73.0	7.6	1.0254										379					30
31					73.1	7.5	1.1054										345					31
TOTAL																			TOTAL			
DAILY MINIMUM		7.3			68.0	7.3											76		DAILY MINIMUM			
DAILY MAXIMUM		8.5			73.2	7.6					25			66		0.88	612	40	DAILY MAXIMUM			
WKLY. AVG. MAX.										3	25	8		62					WEEKLY AVERAGE MAX.			
MONTHLY AVG.			332	318	70.1		0.9760	4	99	2	18	6	98	46	176	0.42	158	14	MONTHLY AVERAGE			
DAILY LIMITS						6.00-9.00					334			334		33		406	DAILY LIMITS			
WEEKLY LIMITS										15	250	15		250					WEEKLY LIMITS			
MONTHLY LIMITS									85	10	167	10	85	167		18		126	MONTHLY LIMITS			
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.			

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	**Phone Number**	503-266-0648	**Month/Year**	June, 2015
DEQ Permit No.	101063	**DEQ File No./Facility ID**	13691	**EPA Reference No.**	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	**County**	CLACKAMAS	**Population Served**	14206

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X

Authorized Signature Date

David Conner

Name (Print)

Operator Certification

Collection Sys. Class	III	**Principal Operator Name (print)**	Jerry Nelzen	**Certification No. & Grade**	#C-11532 III
Treatment Sys. Class	IV	**Principal Operator Name (print)**	David Conner	**Certification No. & Grade**	T- 9031 IV

Date		INFLUENT			EFFLUENT (Outfall 001) - Summer Limits (May 1 - Oct. 31)														DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
			BOD	TSS				BOD		CBOD		TSS					Disinfection			
			Comp.	Comp.		Grab		Comp.	Calc	Comp.	Comp.	Comp.	Calc	Comp.	Grab		UV	Bacteria		
		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli		
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1		8.1			72.3	7.4	0.9853								212		89			1
2		8.2	338	227	71.5	7.4	0.9815	3	99	2	16	6	97	49		0.42	107	31		2
3		8.3	322	272	72.1	7.8	0.9564	2	99	1	8	5	98	40		0.94	95	8		3
4		8.3			72.7	7.4	1.0076										98			4
5		8.4			73.2	7.4	0.9534										89			5
6					74.0		0.9772										218			6
7					74.6		1.0379										114			7
8		7.7	378	212	75.1	7.4	1.0250	4	99	2	17	7	97	60	188	0.03	90			8
9		7.8	290	208	75.7	7.4	0.9461	3	99	1	8	6	97	47		0.02	83	39		9
10		8.0			74.7	7.5	0.9677										89	13		10
11		8.1			74.8	7.3	0.9562										120			11
12		8.3			74.0	7.5	0.9801										163			12
13					74.4	7.5	1.0211										143			13
14					74.3		1.0439										90			14
15		7.8			75.2	7.6	0.9890								198		133			15
16		8.1	253	217	75.1	7.6	0.9845	3	99	2	16	7	97	57		0.07	99	8		16
17		8.3	322	211	74.8	7.4	0.9661	4	99	2	16	8	98	64		0.18	130	48		17
18		8.1			75.9	7.5	0.9655										93			18
19		8.2			76.2	7.5	0.9846										145			19
20					75.4		0.9975										221			20
21					75.5		1.0053										358			21
22		8.1			75.6	7.5	0.9808								184		140			22
23		8.2	288	355	75.9	7.5	0.9843	4	99	3	24	7	98	56		0.03	63	208		23
24		8.0	300	206	76.8	7.4	0.9558	3	99	2	16	6	97	48		0.29	68			24
25		8.2			77.0	7.5	0.9424										108	30		25
26		8.0			77.8	7.6	0.9753										126			26
27					77.5	7.4	0.9878										175			27
28					78.1	7.5	1.0170										256			28
29		8.0			78.1	7.4	1.0116								173		134			29
30		7.8			78.4	7.4	0.9956										174			30
TOTAL																			**TOTAL**	
DAILY MINIMUM		7.7			71.5	7.3											63		**DAILY MINIMUM**	
DAILY MAXIMUM		8.4			78.4	7.8					24			64		0.94	358	206	**DAILY MAXIMUM**	
WKLY. AVG. MAX.										3	20	8		61					**WEEKLY AVERAGE MAX.**	
MONTHLY AVG.			311	239	75.2		0.9854	3	99	2	15	7	97	53	191	0.25	134	27	**MONTHLY AVERAGE**	
DAILY LIMITS						6.00-9.00					334			334		33		406	**DAILY LIMITS**	
WEEKLY LIMITS										15	250	15		250					**WEEKLY LIMITS**	
MONTHLY LIMITS									85	10	167	10	85	167		18		126	**MONTHLY LIMITS**	
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	**MIN. MONITORING FREQ.**	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	**Phone Number**	503-266-0648	**Month/Year**	July, 2015
DEQ Permit No.	101063	**DEQ File No./Facility ID**	13691	**EPA Reference No.**	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	**County**	CLACKAMAS	**Population Served**	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X _____ Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	**Principal Operator Name (print)**	Jerry Nelzen	**Certification No. & Grade**	#C-11532 III
Treatment Sys. Class	IV	**Principal Operator Name (print)**	David Conner	**Certification No. & Grade**	T- 9031 IV

		INFLUENT			EFFLUENT (Outfall 001) - Summer Limits (May 1 - Oct. 31)																
			BOD	TSS				BOD		CBOD		TSS					Disinfection				
			Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria			
Date		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.		Date
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2				
1		7.8	328	243	78.7	7.5	0.9677	3	99	2	16	6	98	48		0.32	147	3			1
2		7.8	398	254	78.9	7.6	0.9987	3	99	2	17	4	98	33		0.11	186	1			2
3		7.3			79.3	7.5	0.9541										174				3
4					79.7	7.6	0.8951										222				4
5					79.2	7.5	0.9887										297				5
6		8.0			79.2	7.4	0.9788								183		126				6
7		7.8	248	242	79.5	7.4	0.9591	4	98	2	16	6	98	48		0.49	110	64			7
8		8.1	220	205	79.0	7.4	0.9992	4	98	2	17	6	97	50		0.22	178	25			8
9		7.9			79.6	7.5	0.9816										131				9
10		7.5			78.3	7.5	0.9800										78		Calibration verified on the Siemens LUT 400 Flow meter		10
11					77.7	7.4	0.8931										88				11
12					78.5	7.5	1.0307										258				12
13		8.1			79.2	7.5	0.9958								184		140				13
14		8.0	243	234	78.6	7.5	0.9725	3	99	2	16	5	98	41		0.24	111	91			14
15		7.9	320	275	78.6	7.6	0.9562	2	99	2	16	4	99	32		0.19	60	7			15
16		8.0			78.1	7.6	1.0320										110				16
17		7.8			78.3	7.5	1.0067										126				17
18					78.8	7.5	1.0104										120				18
19					79.2	7.5	1.0380										191				19
20		7.7			79.8	7.4	1.0074								191		132				20
21		7.7	280	249	79.2	7.5	1.0246	3	99	3	26	6	98	51		0.02	112	21			21
22		7.9	383	299	77.8	7.6	1.0045	2	99	2	17	4	99	34		0.27	182	16			22
23		8.1			78.6	7.4	0.9987										72				23
24		7.5			78.6	7.5	0.9861										336				24
25					77.9		0.9941										115				25
26					78.0		0.9908										219				26
27		7.9			78.2	7.3	1.0014								140		118				27
28		7.6	289	242	78.7	7.4	0.9801	3	99	2	16	4	98	33		0.43	111	16			28
29		7.9	287	213	79.1	7.5	0.9622	2	99	1	8	4	98	32		0.03	118	4			29
30		7.9			79.9	7.4	0.9484										97				30
31		7.6			79.9	7.6	0.9537										94		Annual calibration of lab equipment completed by Quality Control Services		31
TOTAL																			TOTAL		
DAILY MINIMUM		7.3			77.7	7.3											60		DAILY MINIMUM		
DAILY MAXIMUM		8.1			79.9	7.6					26			51		0.49	336	91	DAILY MAXIMUM		
WKLY. AVG. MAX.										3	21	6		49					WEEKLY AVERAGE MAX.		
MONTHLY AVG.			300	246	78.8		0.9868	3	99	2	16	5	98	40	177	0.23	147	12	MONTHLY AVERAGE		
DAILY LIMITS						6.00-9.00					334			334		33		406	DAILY LIMITS		
WEEKLY LIMITS										15	250	15		250					WEEKLY LIMITS		
MONTHLY LIMITS									85	10	167	10	85	167		18		126	MONTHLY LIMITS		
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.		

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	**Phone Number**	503-266-0648	**Month/Year**	August, 2015
DEQ Permit No.	101063	**DEQ File No./Facility ID**	13691	**EPA Reference No.**	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	**County**	CLACKAMAS	**Population Served**	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X

Authorized Signature Date

David Conner

Name (Print)

Operator Certification

Collection Sys. Class	III	**Principal Operator Name (print)**	Jerry Nelzen	**Certification No. & Grade**	#C-11532 III
Treatment Sys. Class	IV	**Principal Operator Name (print)**	David Conner	**Certification No. & Grade**	T- 9031 IV

Date	INFLUENT pH	INFLUENT BOD Comp. Concentration	INFLUENT TSS Comp. Concentration	EFFLUENT (Outfall 001) - Summer Limits (May 1 - Oct. 31) Temperature (Daily Max.)	pH Grab	Total Flow	BOD Comp. Concentration	BOD Calc. Removal	CBOD Comp. Concentration	CBOD Comp. Loading	TSS Comp. Concentration	TSS Calc. Removal	TSS Comp. Loading	Alkalinity Grab	Ammonia Nitrogen	Disinfection UV Radiation Intensity (Dosage)	Disinfection Bacteria E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
	S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1				79.7	7.4	0.9707										126			1
2				78.8	7.4	1.0210										137			2
3	7.9	253	192	79.3	7.3	1.0072	2	99	1	8	2	99	17	198	0.39	111			3
4	7.8	213	161	79.4	7.5	0.9728	2	99	1	8	2	99	16		0.56	120	1		4
5	7.7	272	221	79.0	7.5	0.9495	2	99	1	8	3	99	24		0.25	152	1		5
6	7.9			78.9	7.4	0.9669										129			6
7	7.9			79.3	7.6	0.9636										109			7
8				78.8		0.9925										236			8
9				79.5		1.0106										506			9
10	7.3			79.4	7.4	0.9616								177		216			10
11	7.7	273	179	80.2	7.6	0.9721	3	99	1	8	3	98	24		0.25	95	3		11
12	7.7	265	209	80.0	7.4	0.9878	3	99	2	16	4	98	33		0.20	101	2		12
13	8.0			79.9	7.4	0.9797										114			13
14	7.6			79.2	7.4	0.9706										109			14
15				78.8	7.4	1.0130										212			15
16				78.7	7.4	1.0360										158			16
17	7.8			78.9	7.4	1.0284								176		124			17
18	7.8	288	244	79.0	7.5	1.0021	3	99	1	8	6	98	50		0.08	99	4		18
19	7.4	268	232	79.9	7.5	0.9922	2	99	1	8	4	98	33		0.11	288	2		19
20	7.9			78.7	7.6	0.9960										152			20
21	8.0			79.1	7.5	1.0392										102			21
22				78.3		1.0155										295			22
23				78.7		1.0844										280			23
24	7.8			78.8	7.5	1.0108								186		102			24
25	8.0	261	322	78.7	7.4	0.9460	3	99	2	16	4	98	32		0.68	100	89		25
26	7.5	277	204	78.4	7.4	0.9908	2	99	1	8	2	99	17		0.25	97	3		26
27	8.1			78.9	7.4	0.9925										94			27
28	8.1			78.6	7.6	1.0092										175			28
29				78.5	7.5	1.0617										314			29
30				77.9	7.6	1.1221										227			30
31	7.8			78.2	7.4	1.0987								179		82			31
TOTAL																		TOTAL	
DAILY MINIMUM	7.3			77.9	7.3											82		DAILY MINIMUM	
DAILY MAXIMUM	8.1			80.2	7.6					16			50		0.68	506	89	DAILY MAXIMUM	
WKLY. AVG. MAX.									2	12	5		42					WEEKLY AVERAGE MAX.	
MONTHLY AVG.		263	218	79.0		1.0054	2	99	1	10	3	98	27	183	0.31	167	3	MONTHLY AVERAGE	
DAILY LIMITS					6.00-9.00					334			334		33		406	DAILY LIMITS	
WEEKLY LIMITS									15	250	15		250					WEEKLY LIMITS	
MONTHLY LIMITS								85	10	167	10	85	167		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.	3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	September, 2015
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X

Authorized Signature Date

David Conner

Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	#C-11532 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T- 9031 IV

Date		INFLUENT			EFFLUENT (Outfall 001) - Summer Limits (May 1 - Oct. 31)														DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
			BOD	TSS				BOD		CBOD		TSS					Disinfection			
			Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria		
		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli		
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1		8.0	285	209	78.4	7.6	1.0248	2	99	1	9	4	98	34		0.32	53	3		1
2		8.1	270	199	78.4	7.7	0.9960	2	99	1	8	3	98	25		0.06	67	1		2
3		8.4			78.0	7.5	0.9569										89			3
4		8.2			77.1	7.5	0.9157										104			4
5					76.8	7.5	0.9734										128			5
6					76.1	7.5	0.9213										174			6
7					78.2	7.6	1.0837										109			7
8		7.7	216	231	77.3	7.5	0.9917	1	100	1	8	2	99	17	184	0.02	101	22		8
9		8.1	219	195	77.3	7.5	0.9843	1	100	1	8	2	99	16		0.02	125	5		9
10		8.3			77.4	7.6	0.9755										137			10
11		8.2			77.8	7.6	0.9295										84			11
12					78.3		0.9983										295			12
13					77.8		1.0830										243			13
14		7.6			76.5	7.7	0.9915								198		145			14
15		8.3	315	211	75.6	7.5	0.9626	3	99	2	16	4	98	32		0.02	150	9		15
16		7.7	330	259	75.7	7.7	1.0065	3	99	1	8	7	97	59		0.02	92	2		16
17		8.1			75.7	7.4	0.9977										94			17
18		8.3			76.4	7.5	0.9373										179			18
19					76.3		1.0200										205			19
20					76.1		1.0918										258			20
21		7.6			76.3	7.4	1.0133								198		97			21
22		8.2	291	213	75.5	7.4	0.9616	4	99	2	16	4	98	32		0.02	95	2		22
23		8.2	339	144	75.3	7.4	0.9821	3	99	1	8	4	97	33		0.02	85	4		23
24		8.2			75.5	7.4	0.9768										98			24
25		8.1			75.6	7.5	0.9585										94			25
26					75.0	7.5	1.0283										156			26
27					74.9	7.4	1.0814										128			27
28		8.0	310	216	75.0	7.4	0.9932	2	99	1	8	4	98	33	177	0.02	82			28
29		8.2	290	222	74.7	7.4	0.9676	2	99	1	8	4	96	32		0.02	87	3		29
30		8.3			75.1	7.5	0.9742										81	4		30
TOTAL																			TOTAL	
DAILY MINIMUM		7.6			74.7	7.4											53		DAILY MINIMUM	
DAILY MAXIMUM		8.4			78.4	7.7					16			59		0.32	295	22	DAILY MAXIMUM	
WKLY. AVG. MAX.										2	12	6		45					WEEKLY AVERAGE MAX.	
MONTHLY AVG.			287	210	76.5		0.9927	2	99	1	10	4	98	31	189	0.05	128	4	MONTHLY AVERAGE	
DAILY LIMITS						6.00-9.00					334			334		33		406	DAILY LIMITS	
WEEKLY LIMITS										15	250	15		250					WEEKLY LIMITS	
MONTHLY LIMITS									85	10	167	10	85	167		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	**Phone Number**	503-266-0648	**Month/Year**	October, 2015
DEQ Permit No.	101063	**DEQ File No./Facility ID**	13691	**EPA Reference No.**	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	**County**	CLACKAMAS	**Population Served**	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X
Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	**Principal Operator Name (print)**	Jerry Nelzen	**Certification No. & Grade**	#C-11532 III
Treatment Sys. Class	IV	**Principal Operator Name (print)**	David Conner	**Certification No. & Grade**	T- 9031 IV

Date	INFLUENT BOD Comp. Concentration	INFLUENT TSS Comp. Concentration	EFFLUENT (Outfall 001) - Summer Limits (May 1 - Oct. 31) Temperature (Daily Max.)	pH Grab	Total Flow	BOD Comp. Concentration	BOD Calc. Removal	CBOD Comp. Concentration	CBOD Comp. Loading	TSS Comp. Concentration	TSS Calc. Removal	TSS Comp. Loading	Alkalinity Grab	Ammonia Nitrogen	Disinfection UV Radiation Intensity (Dosage)	Disinfection Bacteria E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
	pH																	
	S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1	7.9			74.7	7.4	0.9744										96			1
2	8.2			74.0	7.4	0.9580										103			2
3				74.3	7.5	1.0103										216			3
4				74.5	7.4	1.0498										235			4
5	7.7			75.0	7.5	0.9864								181		262			5
6	8.4	213	267	74.6	7.4	0.9271	2	99	2	15	4	99	31		0.02	100	118		6
7	7.9	255	259	75.1	7.4	0.9722	2	99	2	16	4	98	32		0.36	100	31		7
8	7.9			75.1	7.4	0.9387										104			8
9	7.9			74.7	7.4	0.9519										146			9
10				74.8		0.9986										307			10
11				74.5		1.0497										241			11
12	7.8			74.3	7.3	1.0120								171		126			12
13	8.1	398	267	74.1	7.3	0.9594	2	99	1	8	4	99	32		0.02	79	1		13
14	8.1	328	227	74.5	7.4	0.9788	2	99	1	8	3	99	24		0.02	117	1		14
15	8.3			73.8	7.4	0.9323										123		Calibration verification of LUT 400 Eff. flow meter.	15
16	8.1			73.6	7.3	0.9663										123			16
17				73.4	7.1	0.9975										142			17
18				73.9	7.2	1.0506										113			18
19	8.0			73.8	7.0	1.0036								79		103			19
20	8.0	365	276	74.0	7.2	0.9629	3	99	2	16	5	98	40		0.02	94	1		20
21	8.2	319	392	73.4	7.2	0.9774	3	99	1	8	4	99	33		0.02	126	17		21
22	7.8			72.8	7.2	0.9623										138			22
23	8.0			72.0	7.2	0.9520										110			23
24				72.1	7.4	1.0062										273			24
25				71.9	7.4	1.1434										352			25
26	8.0			71.5	7.3	0.9993								157		93			26
27	8.3	329	229	71.5	7.3	0.9502	3	99	2	16	4	98	32		0.02	115	1		27
28	8.1	302	225	71.9	7.3	0.9456	3	99	1	8	4	98	32		0.07	97	3		28
29	8.1			71.8	7.3	0.9732										93			29
30	7.9			71.4	7.3	1.0562										113			30
31				71.0	7.4	1.2814										169			31
TOTAL																		TOTAL	
DAILY MINIMUM	7.7			71.0	7.0											79		DAILY MINIMUM	
DAILY MAXIMUM	8.4			75.1	7.5					16			40		0.36	352	118	DAILY MAXIMUM	
WKLY. AVG. MAX.									2	16	5		36					WEEKLY AVERAGE MAX.	
MONTHLY AVG.		314	268	73.5		0.9977	3	99	2	12	4	99	32	147	0.07	149	5	MONTHLY AVERAGE	
DAILY LIMITS					6.00-9.00					334			334		33		406	DAILY LIMITS	
WEEKLY LIMITS									15	250	15		250					WEEKLY LIMITS	
MONTHLY LIMITS								85	10	167	10	85	167		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.	3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	November, 2015	I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.	X
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4		Authorized Signature Date
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206		David Conner
							Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	#C-11532 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T - 9031 IV

Date		INFLUENT			EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30)															DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
			BOD	TSS				BOD		CBOD		TSS					Disinfection				
			Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria			
		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli			
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2				
1					70.3	7.3	1.1908										169				1
2		8.3			70.3	7.3	1.0012								140		89				2
3		8.3	313	223	70.1	7.2	0.9470	3	99	2	16	4	93	32		0.02	116	1			3
4		8.1	307	242	69.6	7.2	0.9534	4	99	2	16	4	98	32		0.16	181	6			4
5		8.1			69.7	7.3	0.9718										106				5
6		8.3			69.9	7.2	0.9466										65				6
7					69.5		1.0680										196				7
8					69.6		1.1085										172				8
9		8.2			69.0	7.2	0.9640								145		96				9
10		7.9	409	290	69.0	7.2	0.9306	3	99	2	16	6	98	47		1.15	67	2			10
11		7.6	287	195	68.9	7.3	1.0298	3	99	2	17	5	97	43		0.53	109	1			11
12		8.1			68.6	7.1	0.9594										98				12
13		8.0			68.5	7.1	0.9268										91				13
14					68.7	7.3	1.0197										145				14
15					68.2	7.2	1.1367										214				15
16		8.3			67.4	7.1	1.0451								129		80				16
17		8.1	297	274	67.4	7.1	1.1031	4	99	3	28	7	97	64		0.12	73	1			17
18		8.1	290	217	67.4	7.1	1.1470	4	99	3	29	5	98	48		0.36	73	4			18
19		8.2			67.0	7.1	0.9961										73				19
20		8.0			66.5	7.1	0.9364										105				20
21					65.9		1.0104										257				21
22					65.8		1.0574										193				22
23		8.4	302	229	65.5	7.3	1.0270	3	99	2	17	4	98	34	164	0.67	134	2			23
24		7.9	370	230	65.2	7.3	1.0011	3	99	2	17	4	98	33		0.46	95	1			24
25		8.1			64.5	7.2	1.0055										87				25
26					64.8		1.0463										114				26
27					64.9		0.9387										143				27
28					64.0		0.9415										98				28
29					64.0		1.0372										141				29
30		8.2			63.6	7.3	0.9485								177		73				30
TOTAL																			TOTAL		
DAILY MINIMUM		7.6			63.6	7.1											65		DAILY MINIMUM		
DAILY MAXIMUM		8.4			70.3	7.3					29			64		1.15	257	6	DAILY MAXIMUM		
WKLY. AVG. MAX.										3	28	6		56					WEEKLY AVERAGE MAX.		
MONTHLY AVG.			322	238	67.5		1.0132	3	99	2	19	5	98	42	151	0.43	122	2	MONTHLY AVERAGE		
DAILY LIMITS						6.00-9.00					834			1000		33		406	DAILY LIMITS		
WEEKLY LIMITS										40	667	45		750					WEEKLY LIMITS		
MONTHLY LIMITS									85	25	417	30	85	500		18		126	MONTHLY LIMITS		
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.		

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	December, 2015
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X
Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Mark Gunter	Certification No. & Grade	#C-11871 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T - 9031 IV

Date		INFLUENT			EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30)															DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
			BOD	TSS				BOD		CBOD		TSS					Disinfection				
			Comp.	Comp.		Grab		Comp.	Calc.	Comp	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria			
		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli			
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2				
1		8.3	329	270	63.9	7.3	0.9952	2	99	1	8	4	99	33		0.36	95	5			1
2		8.4	347	267	63.7	7.3	1.0005	2	99	1	8	2	99	17		0.35	83	1			2
3		8.5			63.7	7.4	1.0118										92				3
4		8.4			63.8	7.3	0.9362										75				4
5					64.0	7.4	1.0529										108				5
6					64.5	7.4	1.2828										87				6
7		7.7			63.7	7.4	1.5783								208		54				7
8		8.1	278	240	64.0	7.2	1.4047	4	99	2	23	5	98	59		1.51	51	1			8
9		8.2	294	219	64.0	7.2	1.1948	2	99	1	10	4	98	40		1.36	74	4			9
10		8.0			63.9	7.3	1.0036										151				10
11		8.2			63.7	7.3	1.0077										78				11
12					63.9		1.1963										103				12
13					63.1		1.1139										84				13
14		8.2			63.6	7.3	1.0160								208		74				14
15		8.1	285	217	63.5	7.3	0.9703	5	98	3	24	6	97	49		0.34	83	1			15
16		8.2	335	213	63.8	7.3	1.0704	6	98	3	27	9	96	80		0.52	115	19			16
17		8.1			63.2	7.3	1.4123										64				17
18		8.1			61.8	7.3	1.1047										68				18
19					62.8	7.4	1.1013										230				19
20					62.8	7.5	1.0876										420				20
21		7.8	332	197	62.6	7.4	1.0957	6	98	3	27	8	96	73	202	0.71	105	30			21
22		8.1	263	195	62.9	7.3	1.0279	6	98	3	26	6	97	51		0.92	84	3			22
23		8.0			62.2	7.4	1.0870										91				23
24					62.4	7.3	1.0932										84				24
25					62.3	7.4	0.9241										144				25
26					62.3	7.4	0.9492										214				26
27					62.0	7.4	1.0100										176				27
28		7.7			62.3	7.4	0.9861								202		157				28
29		8.1	332	261	62.4	7.4	0.9701	4	99	2	16	6	98	49		0.91	142	5			29
30		7.8	320	193	61.8	7.4	0.9447	4	99	2	16	6	97	47		1.29	109	1			30
31		8.3			60.6	7.4	0.9432										73				31
TOTAL																				TOTAL	
DAILY MINIMUM		7.7			60.6	7.2											51			DAILY MINIMUM	
DAILY MAXIMUM		8.5			64.5	7.5					27			80		1.51	420	30		DAILY MAXIMUM	
WKLY. AVG. MAX.										3	27	8		64						WEEKLY AVERAGE MAX.	
MONTHLY AVG.			312	227	63.1		1.0830	4	99	2	19	6	98	50	205	0.83	115	3		MONTHLY AVERAGE	
DAILY LIMITS						6.00-9.00					834			1000		33		406		DAILY LIMITS	
WEEKLY LIMITS										40	667	45		750						WEEKLY LIMITS	
MONTHLY LIMITS									85	25	417	30	85	500		18		126		MONTHLY LIMITS	
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W		MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	January, 2016
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X
Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Mark Gunter	Certification No. & Grade	#C-11871 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T - 9031 IV

Date		INFLUENT			EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30)															Date
			BOD	TSS				BOD		CBOD		TSS					Disinfection			
			Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria		
		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1					59.9		0.9458										305			1
2					58.9		0.9982										235			2
3					59.3		1.0152										178			3
4		8.0			60.1	7.3	1.0036								200		207			4
5		8.5	405	241	60.6	7.3	0.9294	8	98	4	31	9	96	70		2.49	92	7		5
6		8.4	465	315	60.9	7.3	0.9441	7	98	3	24	8	97	63		2.20	88	4		6
7		8.3			60.9	7.3	0.9432										85			7
8		8.2			61.0	7.3	0.9330										85			8
9					61.3		1.0009										173			9
10					61.4		1.0258										141			10
11		8.4			61.2	7.3	0.9758								192		70			11
12		8.3	358	218	61.0	7.3	1.0587	7	98	4	35	7	97	62		4.05	75	3		12
13		8.2	316	213	61.0	7.3	1.0390	7	98	4	35	7	97	61		3.23	81	3	Calibrated Honeywell slt 3000 Temperature Sensor	13
14		8.4			60.6	7.2	0.9991										100			14
15		8.4			60.7	7.5	1.0017										134			15
16					60.7	7.3	1.1073										206		Flow verification of Seimans LUT 400 Flow Meter	16
17					60.3	7.3	1.1765										205			17
18		8.3			61.0	7.3	1.1238								169		133			18
19		8.0	289	195	60.7	7.3	1.0743	7	98	3	27	7	96	63		1.94	92	5		19
20		8.4	326	244	60.8	7.3	1.0332	5	98	3	26	9	96	78		1.82	161	16		20
21		8.2			61.5	7.2	1.0646										116			21
22		8.5			61.8	7.3	1.0131										126			22
23					61.5	7.3	1.0724										118			23
24					61.8	7.3	1.1078										229			24
25		8.1			62.2	7.3	0.9942								183		77			25
26		7.8	265	239	62.3	7.3	0.9897	5	98	1	8	5	98	41		1.28	71	5		26
27		8.5	289	222	62.9	7.3	1.0039	5	98	2	17	6	97	50		1.52	234	138		27
28		8.4			62.8	7.3	1.0146										116			28
29		8.1			62.1	7.3	1.0553										111			29
30					61.4		1.0110										113			30
31					61.0		1.1412										91			31
TOTAL																			TOTAL	
DAILY MINIMUM		7.8			58.9	7.2											70		DAILY MINIMUM	
DAILY MAXIMUM		8.5			62.9	7.5					35			78		4.05	305	138	DAILY MAXIMUM	
WKLY. AVG. MAX.										4	35	9		70					WEEKLY AVERAGE MAX.	
MONTHLY AVG.			339	236	61.1		1.0257	6	98	3	25	7	97	61	186	2.32	137	8	MONTHLY AVERAGE	
DAILY LIMITS						6.00-9.00					834			1000		33		406	DAILY LIMITS	
WEEKLY LIMITS										40	667	45		750					WEEKLY LIMITS	
MONTHLY LIMITS									85	25	417	30	85	500		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	**Phone Number**	503-266-0648	**Month/Year**	February, 2016
DEQ Permit No.	101063	**DEQ File No./Facility ID**	13691	**EPA Reference No.**	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	**County**	CLACKAMAS	**Population Served**	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X _____ Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	**Principal Operator Name (print)**	Mark Gunter	**Certification No. & Grade**	#C-11871 III
Treatment Sys. Class	IV	**Principal Operator Name (print)**	David Conner	**Certification No. & Grade**	T - 9031 IV

Date	INFLUENT			EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30)															DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
		BOD Comp.	TSS Comp.		Grab		BOD Comp.	BOD Calc.	CBOD Comp.	CBOD Comp.	TSS Comp.	TSS Calc.	TSS Comp.	Grab		Disinfection UV	Disinfection Bacteria			
	pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli			
	S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2				
1	8.1			60.8	7.4	1.0714								203		87				1
2	8.4	260	251	60.9	7.2	1.0040	7	97	3	25	7	97	59		6.98	82	727			2
3	8.2	304	230	62.1	7.3	1.0609	4	99	2	18	6	97	53		4.77	136	33			3
4	8.3			61.7	7.3	1.0034										96	29			4
5	8.3			61.8	7.3	0.9720										109				5
6				62.2	7.4	1.0025										364				6
7				62.6	7.4	1.0461										749				7
8	8.3			62.5	7.4	1.0009								194		176				8
9	8.4	373	262	63.7	7.3	0.9596	5	99	2	16	6	98	48		1.32	145	1			9
10	7.6	370	174	62.3	7.3	1.1410	6	98	3	29	9	95	86		1.20	120	12			10
11	8.4			62.2	7.3	1.8560										109				11
12	8.3			61.9	7.3	1.1065										189				12
13				61.8	7.3	1.0475										126				13
14				62.5	7.4	1.0442										192				14
15				62.7	7.4	1.1934										105				15
16	8.2	279	220	62.7	7.2	1.0757	4	99	3	27	6	97	54	172	0.63	120	21			16
17	8.4	280	219	62.4	7.3	1.1299	5	98	3	28	6	97	57		0.47	103	3			17
18	8.3			61.9	7.2	1.1569										110				18
19	8.0			61.5	7.2	1.0725										155				19
20				61.2		1.0859										288				20
21				61.6		1.0718										352				21
22	8.4			62.0	7.4	0.9702								188		128				22
23	8.4			62.3	7.3	0.9797										102	1			23
24	8.4	370	261	62.7	7.3	1.2634	6	98	4	42	7	97	74		1.15	97	6			24
25	8.4	592	236	63.0	7.2	0.9413	6	99	4	31	7	97	55		0.93	162				25
26	8.2			63.1	7.3	0.9698										86				26
27				63.2		1.0128										230				27
28				62.9		1.0310										190				28
29	8.1			63.3	7.3	0.9830								129		135				29
TOTAL																		TOTAL		
DAILY MINIMUM	7.6			60.8	7.2											82		DAILY MINIMUM		
DAILY MAXIMUM	8.4			63.7	7.4					42			86		6.98	749	727	DAILY MAXIMUM		
WKLY. AVG. MAX.									4	37	8		67					WEEKLY AVERAGE MAX.		
MONTHLY AVG.		354	232	62.3		1.0777	5	98	3	27	7	97	61	177	2.18	175	11	MONTHLY AVERAGE		
DAILY LIMITS					6.00-9.00					834			1000		33		406	DAILY LIMITS		
WEEKLY LIMITS									40	667	45		750					WEEKLY LIMITS		
MONTHLY LIMITS								85	25	417	30	85	500		18		126	MONTHLY LIMITS		
MIN. MON. FREQ.	3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.		

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	March, 2016
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X
Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Mark Gunter	Certification No. & Grade	#C-11871 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T - 9031 IV

Date		INFLUENT			EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30)														DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
			BOD	TSS				BOD		CBOD		TSS					Disinfection			
			Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria		
		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli		
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1		8.4	300	328	63.3	7.2	0.9769	4	99	1	8	5	98	41		0.27	104	12		1
2		8.5	307	304	62.9	7.2	1.0420	4	99	2	17	6	98	52		0.60	104	40		2
3		8.4			63.4	7.3	0.9538										105			3
4		8.4			63.0	7.3	0.9227										106			4
5					63.4	7.4	1.0218										205			5
6					63.6	7.4	1.0626										199			6
7		8.3			62.9	7.5	0.9314								183		60			7
8		8.4		269	62.7	7.3	1.0491					11	96	96		0.51	52	37		8
9		8.3		256	63.1	7.3	1.0299					11	96	94		0.85	102	19		9
10		8.5			63.1	7.3	0.9675										73			10
11		8.3			63.7	7.3	0.9478										67			11
12					62.9		1.0293										77			12
13					62.6		1.1725										71			13
14		8.4			62.9	7.4	1.0158								172		67			14
15		8.3	291	290	62.7	7.4	1.0161	5	98	3	25	5	98	42		0.65	68	1		15
16		8.3	294	226	62.3	7.3	0.9740	6	98	4	32	7	97	57		0.62	112	4		16
17		8.1			62.6	7.4	0.9964										90			17
18		8.4			62.1	7.4	0.9574										115			18
19					63.2	7.4	1.0030										261			19
20					63.7	7.5	1.0008										230			20
21		8.2			63.5	7.4	0.9912								184		149			21
22		8.3	298	234	63.2	7.4	0.9653	5	98	3	24	6	97	48		0.33	120	11		22
23		8.1	310	230	63.2	7.4	0.9482	5	98	3	24	8	97	63		0.33	72	16		23
24		8.4			63.6	7.4	0.9140										96			24
25		8.0			63.3	7.4	0.9525										73			25
26					63.6		0.9752										133			26
27					64.2		1.0133										179			27
28		8.3			64.0	7.1	0.9749								149		72			28
29		8.4	331	283	64.1	7.4	0.9491	5	98	2	16	5	98	40		0.30	74	89		29
30		8.3	306	258	64.3	7.4	0.9763	9	97	4	33	9	97	73		0.55	87	23		30
31		8.5			65.4	7.3	0.9787										80			31
TOTAL																			TOTAL	
DAILY MINIMUM		8.0			62.1	7.1											52		DAILY MINIMUM	
DAILY MAXIMUM		8.5			65.4	7.5					33			96		0.85	261	89	DAILY MAXIMUM	
WKLY. AVG. MAX.										4	29	11		95					WEEKLY AVERAGE MAX.	
MONTHLY AVG.			305	268	63.3		0.9906	5	98	3	22	7	97	61	172	0.50	110	15	MONTHLY AVERAGE	
DAILY LIMITS						6.00-9.00					834			1000		33		406	DAILY LIMITS	
WEEKLY LIMITS										40	667	45		750					WEEKLY LIMITS	
MONTHLY LIMITS									85	25	417	30	85	500		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	**Phone Number**	503-266-0648	**Month/Year**	April, 2016
DEQ Permit No.	101063	**DEQ File No./Facility ID**	13691	**EPA Reference No.**	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	**County**	CLACKAMAS	**Population Served**	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X _____ Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	**Principal Operator Name (print)**	Mark Gunter	**Certification No. & Grade**	#C-11871 III
Treatment Sys. Class	IV	**Principal Operator Name (print)**	David Conner	**Certification No. & Grade**	T - 9031 IV

		INFLUENT			EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30)																
			BOD	TSS				BOD		CBOD		TSS					Disinfection				
			Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria			
Date		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.		Date
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2				
1		8.3			65.8	7.3	0.9598										149		On 3-9-16 all lab equipment was calibrated by Quality Control Services		1
2					65.6	7.4	0.9786										145				2
3					65.8	7.5	1.0901										198				3
4		8.0	296	242	65.7	7.4	0.9880	13	96	4	33	13	95	107	163	0.87	65				4
5		8.4	286	266	65.6	7.3	0.9704	7	98	3	24	9	97	73		0.66	67	4			5
6		8.4			66.0	7.4	1.0037										78	35	Flow meter calibration verified on Seimans LUT 400 flow meter		6
7		8.4			66.7	7.3	0.9891										76				7
8		8.1			68.1	7.3	0.9329										72				8
9					66.9		0.9351										123				9
10					66.6		1.0039										186				10
11		8.4			66.8	7.4	0.9685								173		83				11
12		8.3	242	299	66.4	7.4	0.9476	3	99	2	16	3	99	24		0.23	73	68			12
13		8.2	295	275	66.3	7.4	0.9674	4	99	3	24	6	98	48		0.35	74	48			13
14		8.2			65.9	7.5	0.9703										81				14
15		7.8			66.0	7.5	0.9287										208				15
16					66.7		1.0124										77				16
17					67.9		1.0565										278				17
18		8.3			68.1	7.2	0.9781										78				18
19		8.4	362	281	69.0	7.3	0.9568	4	99	2	16	7	98	56	172	0.16	74	20			19
20		7.8	331	166	69.6	7.3	0.9457	5	98	3	24	7	96	55		0.21	79	12			20
21		8.3			69.1	7.3	0.9742										92				21
22		8.1			68.7	7.3	0.9473										56				22
23					68.0		1.0272										165				23
24					67.8		1.0390										92				24
25		8.4	356	245	68.2	7.4	0.9531	3	99	2	14	5	98	40	180	0.18	81				25
26		8.3	316	235	68.1	7.4	0.9028	5	99	3	22	7	97	53		0.21	145	55			26
27		8.4			67.5	7.5	0.9757										83	21			27
28		8.2			67.6	7.4	0.9662										150				28
29		8.4			67.8	7.5	0.9477										75				29
30					68.1	7.4	1.0066										181				30
TOTAL																			TOTAL		
DAILY MINIMUM		7.8			65.6	7.2											56		DAILY MINIMUM		
DAILY MAXIMUM		8.4			69.6	7.5					33			107		0.87	278	88	DAILY MAXIMUM		
WKLY. AVG. MAX.										4	29	11		90					WEEKLY AVERAGE MAX.		
MONTHLY AVG.			311	251	67.2		0.9774	5	98	3	22	7	97	57	172	0.36	113	25	MONTHLY AVERAGE		
DAILY LIMITS						6.00-9.00					834			1000		33		406	DAILY LIMITS		
WEEKLY LIMITS										40	667	45		750					WEEKLY LIMITS		
MONTHLY LIMITS									85	25	417	30	85	500		18		126	MONTHLY LIMITS		
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.		

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	May, 2016	I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.	X
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4		Authorized Signature Date
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206		David Conner
							Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Mark Gunter	Certification No. & Grade	#C-11871 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T- 9031 IV

		INFLUENT			EFFLUENT (Outfall 001) - Summer Limits (May 1 - Oct. 31)																
			BOD	TSS				BOD		CBOD		TSS					Disinfection				
			Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria			
Date		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.		Date
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2				
1					68.7	7.5	1.0568										119				1
2		8.4			69.5	7.3	0.9624								187		58				2
3		8.5	334	264	69.7	7.3	0.9316	3	99	1	8	4	98	31		0.20	89	99			3
4		8.4	362	285	69.0	7.3	0.9635	3	99	2	16	5	98	40		0.16	87	55			4
5		8.3			69.6	7.4	0.9539										54				5
6		8.2			70.5	7.4	0.9252										115				6
7					71.1	7.4	0.9651										100				7
8					70.2	7.4	0.9858										118				8
9		8.3			70.3	7.4	0.9818								184		95				9
10		8.2	239	184	70.5	7.3	0.9368	2	99	1	8	4	98	31		0.09	82	32			10
11		8.3	317	193	71.0	7.4	0.9594	2	99	1	8	4	98	32		0.10	151	26			11
12		8.3			71.9	7.4	0.9273										97				12
13		8.3			71.9	7.5	0.8955										101				13
14					70.5		1.0065										455				14
15					70.1		1.1099										173				15
16		8.1			70.4	7.4	0.9616								191		132				16
17		8.0	327	255	71.2	7.4	0.9578	3	99	1	8	5	98	40		0.11	148	32			17
18		8.0	286	212	71.3	7.4	0.9711	5	98	2	16	6	97	49		0.12	169	71			18
19		8.4			70.6	7.4	0.9542										102				19
20		8.3			71.0	7.5	0.9133										203				20
21					70.1		1.0070										113				21
22					71.1		1.0680								186		144				22
23		8.2			71.3	7.4	0.9914										94				23
24		8.2	296	209	71.5	7.4	0.9652	4	99	2	18	6	97	48		0.15	146	125			24
25		8.2	276	164	70.6	7.4	0.9643	4	99	2	18	5	97	40		0.15	187	50			25
26		8.3			70.3	7.4	0.9700										96				26
27		8.3			71.2	7.5	0.8825										114				27
28					71.1	7.3	0.9431										163				28
29					71.4	7.5	0.8723										320				29
30					71.0	7.4	1.0233										213				30
31		8.1			72.4	7.4	0.9427								169		115				31
TOTAL																			TOTAL		
DAILY MINIMUM		8.0			68.7	7.3											54		DAILY MINIMUM		
DAILY MAXIMUM		8.5			72.4	7.5					18			49		0.20	455	125	DAILY MAXIMUM		
WKLY. AVG. MAX.										2	18	6		44					WEEKLY AVERAGE MAX.		
MONTHLY AVG.			305	221	70.7		0.9661	3	99	2	12	5	98	39	183	0.14	140	53	MONTHLY AVERAGE		
DAILY LIMITS						6.00-9.00					334			334		33		406	DAILY LIMITS		
WEEKLY LIMITS										15	250	15		250					WEEKLY LIMITS		
MONTHLY LIMITS									85	10	167	10	85	167		18		126	MONTHLY LIMITS		
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.		

Discharge Monitoring Report - Oregon Department of Environmental Quality

ıcility Name	City of Canby	Phone Number	503-266-0648	Month/Year	June, 2016
EQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
ant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X Authorized Signature Date

David Conner Name (Print)

Operator Certification

ollection Sys. Class	III	Principal Operator Name (print)	Mark Gunter	Certification No. & Grade	#C-11871 III
eatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T- 9031 IV

	INFLUENT			EFFLUENT (Outfall 001) - Summer Limits (May 1 - Oct. 31)															
		BOD	TSS				BOD		CBOD		TSS					Disinfection			
		Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria		
	pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
	S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1	8.1	283	252	72.9	7.4	0.9797	3	99	1	8	5	98	41		0.12	156	*579	Retest were 9, 461, 5, 9 and 4 for a geomean of 15 as recorded on the 2nd. The 579 exceedance and 15	1
2	7.6	329	182	72.3	7.4	0.9836	3	99	2	16	4	98	33		0.24	111	15	geomean are not used in the monthly calculation per DEQ instruction book but the individual resamples	2
3	8.1			73.4	7.5	0.9585										94	10	are included in the calculation for the monthly geometric mean.	3
4				74.1		0.9646										307			4
5				75.6		1.0283										137			5
6	8.1			75.2	7.5	0.9716								184		242			6
7	8.3	377	232	75.6	7.4	0.9521	3	99	2	16	5	98	40		0.16	116	44		7
8	8.3	323	249	74.6	7.4	0.9206	3	99	2	15	6	98	46		0.18	130	22		8
9	8.2			73.4	7.4	0.9156										149			9
0	7.9			72.9	7.6	0.9388										270			10
1				73.0		0.9537										191			11
2				73.7		0.9549										135			12
3	7.9			72.9	7.5	0.9407								186		143			13
4	8.0	327	261	72.4	7.5	0.9316	3	99	2	16	4	98	31		0.08	175	55		14
5	8.0	239	212	73.0	7.5	0.9390	3	99	2	16	4	98	31		0.11	143	68		15
6	8.1			72.9	7.5	0.9377										166			16
7	8.1			73.1	7.6	0.9424										155			17
8				72.5	7.5	0.9655										194			18
9				73.0	7.5	0.9630										285			19
0	8.2			74.0	7.6	0.9380								188		210			20
1	8.1	267	205	74.0	7.4	0.9511	3	99	1	8	3	99	24		0.12	122	68		21
2	8.0	289	215	74.5	7.4	0.9257	3	99	1	8	3	99	23		0.13	132	131		22
3	8.0			73.2	7.5	0.9029										126			23
4	7.8			72.9	7.6	0.9711										143			24
5				74.0		0.9766										373			25
6				74.9		0.9886										473			26
7	7.7			75.3	7.2	0.9611								156		140			27
8	7.9	265	271	75.6	7.4	0.9609	3	99	2	13	2	99	16		0.07	132	210		28
9	8.0	338	254	75.6	7.5	0.9324	2	99	1	10	2	99	16		0.11	180	23		29
0	7.8			75.4	7.5	0.9459										113			30
OTAL																		TOTAL	
AILY MINIMUM	7.6			72.3	7.2											94		DAILY MINIMUM	
AILY MAXIMUM	8.3			75.6	7.6					16			48		0.24	473	210	DAILY MAXIMUM	
'KLY. AVG. MAX.									2	16	5		43					WEEKLY AVERAGE MAX.	
ONTHLY AVG.		301	233	75.0		0.9538	3	99	2	13	4	98	30	172	0.10	131	32	MONTHLY AVERAGE	
AILY LIMITS					6.00-9.00					334			334		33		406	DAILY LIMITS	
EEKLY LIMITS									15	250	15		250					WEEKLY LIMITS	
ONTHLY LIMITS							85	10	167	10	85		167		15		126	MONTHLY LIMITS	
IN. MON. FREQ.	5/W	2/W	2/W	Daily	5/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	July, 2016
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X
Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Mark Gunter	Certification No. & Grade	#C-11871 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T- 9031 IV

	INFLUENT			EFFLUENT (Outfall 001) - Summer Limits (May 1 - Oct. 31)															
		BOD	TSS				BOD		CBOD		TSS					Disinfection			
		Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria		
Date	pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
	S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1	7.9			75.3	7.4	0.9136										190			1
2				76.4		0.9468										153			2
3				76.3		0.9131										464			3
4				74.8		0.9292										402			4
5	7.9	308	274	75.3	7.5	0.9721	3	99	2	16	4	99	32	173	0.17	227	6		5
6	7.8	292	196	76.1	7.4	0.9728	4	99	3	24	4	99	32		0.18	151	50		6
7	7.5			75.2	7.5	0.9360										201			7
8	8.0			75.0	7.6	0.9085										144			8
9				75.7	7.4	0.9848										170			9
10				75.1	7.5	1.0060										164			10
11	7.9			76.2	7.3	0.9383								169		206		Selmans LUT400 flowmeter calibration check	11
12	7.9	237	202	75.5	7.4	0.9421	3	99	2	16	3	99	24		0.15	279	22		12
13	7.7	326	247	76.3	7.4	0.9421	3	99	3	24	3	99	24		0.16	180	43		13
14	8.0			76.3	7.4	0.9260										123			14
15	7.9			75.9	7.8	0.9406										137			15
16				75.9	7.4	0.9277										260			16
17				75.4	7.5	0.9823										123			17
18	8.1			75.6	7.5	0.9485								175		123			18
19	7.8	322	278	76.0	7.4	0.9410	2	99	1	8	2	99	16		0.16	177	12		19
20	7.8	323	239	76.4	7.4	0.9458	1	100	1	8	3	99	24		0.16	195	11		20
21	8.0			78.0	7.4	0.9267										125			21
22	8.0			76.3	7.4	0.9188										156			22
23				76.8		0.9012										444			23
24				77.1		0.9660										412			24
25	8.1			77.8	7.8	0.9421								171		162			25
26	7.7	322	273	77.4	7.5	0.9092	2	99	1	8	2	99	15		0.13	103	9		26
27	7.6	342	206	78.1	7.5	0.9389	2	99	1	8	2	99	16		0.10	286	8		27
28	7.8			78.5	7.4	0.9717										124			28
29	7.8			79.1	7.6	0.9097										148			29
30				78.2		0.8964										322			30
31				77.6		0.9722										317			31
TOTAL																		TOTAL	
DAILY MINIMUM	7.5			74.8	7.3											103		DAILY MINIMUM	
DAILY MAXIMUM	8.1			79.1	7.6					24			32		0.18	464	50	DAILY MAXIMUM	
WKLY. AVG. MAX.									3	20	4		32					WEEKLY AVERAGE MAX.	
MONTHLY AVG.		309	239	76.4		0.9410	3	99	2	14	3	99	23	172	0.15	215	15	MONTHLY AVERAGE	
DAILY LIMITS					6.00-9.00					334			334		33		406	DAILY LIMITS	
WEEKLY LIMITS									15	250	15		250					WEEKLY LIMITS	
MONTHLY LIMITS								85	10	167	10	85	167		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.	3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	**Phone Number**	503-266-0648	**Month/Year**	August, 2016
DEQ Permit No.	101063	**DEQ File No./Facility ID**	13691	**EPA Reference No.**	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	**County**	CLACKAMAS	**Population Served**	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X

Authorized Signature **Date**

David Conner

Name (Print)

Operator Certification

Collection Sys. Class	III	**Principal Operator Name (print)**	Jerry Nelzen	**Certification No. & Grade**	C-12668 III
Treatment Sys. Class	IV	**Principal Operator Name (print)**	David Conner	**Certification No. & Grade**	T- 9031 IV

Date	INFLUENT pH	INFLUENT BOD Comp. Concentration	INFLUENT TSS Comp. Concentration	EFFLUENT Temperature (Daily Max.)	EFFLUENT pH	EFFLUENT Total Flow	BOD Comp. Concentration	BOD Calc. Removal	CBOD Comp. Concentration	CBOD Comp. Loading	TSS Comp. Concentration	TSS Calc. Removal	TSS Comp. Loading	Alkalinity	Ammonia Nitrogen	Disinfection UV Radiation Intensity (Dosage)	Disinfection Bacteria E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
					Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria		
	S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1	7.7			77.4	7.5	0.9539								160		197			1
2	7.4	271	312	77.3	7.4	0.9104	3	99	2	15	4	99	30		0.13	148	345		2
3	8.0	264	248	77.1	7.5	0.9566	3	99	1	8	5	99	40		0.20	123	365		3
4	7.9			78.0	7.5	0.9903										108			4
5	7.9			77.7	7.6	0.9132										116			5
6				77.2	7.5	0.9062										182			6
7				77.3	7.4	0.9736										163			7
8	7.9			76.4	7.6	0.9445								176		149			8
9	7.5	277	237	76.4	7.5	0.9473	2	99	2	16	3	99	24		0.09	185	19		9
10	8.0	288	240	77.0	7.5	0.9450	1	100	1	8	1	100	8		0.04	170	24		10
11	7.7			77.6	7.5	0.9673										147			11
12	8.0			78.5	7.6	0.9400										134			12
13				78.9	7.5	0.9185										305			13
14				79.0	7.6	0.9726										169			14
15	7.9			78.4	7.5	0.9830								188		140			15
16	8.1	273	215	78.4	7.5	0.9695	2	99	2	16	3	99	24		0.03	141	15		16
17	7.8	284	229	78.2	7.5	0.9710	2	99	1	8	3	99	24		0.11	176	10		17
18	7.7			78.5	7.5	0.9751										101			18
19	7.8			79.3	7.5	0.9634										176			19
20				79.4		0.9371										231			20
21				79.0		0.9892										238			21
22	7.8			78.5	7.4	0.9756								183		173			22
23	8.0	328	234	78.1	7.4	0.9653	2	99	2	16	3	99	24		0.07	127	31		23
24	7.9	290	223	78.1	7.4	0.9312	2	99	2	16	2	99	16		0.14	124	26		24
25	8.0			78.5	7.5	0.9419										209			25
26	8.0			79.0	7.5	0.9538										84			26
27				78.4		0.9472										196			27
28				79.2		1.1070										91			28
29	7.9	299	232	78.9	7.6	0.9848	3	99	2	16	5	98	41	181	0.19	87			29
30	7.9	306	226	78.0	7.5	0.9850	3	99	2	16	3	99	25		0.12	109	36		30
31	8.1			77.4	7.4	0.9880										105	23		31
TOTAL																		TOTAL	
DAILY MINIMUM	7.4			76.4	7.4											84		DAILY MINIMUM	
DAILY MAXIMUM	8.1			79.4	7.6					16			41		0.20	305	365	DAILY MAXIMUM	
WKLY. AVG. MAX.									2	16	5		35					WEEKLY AVERAGE MAX.	
MONTHLY AVG.		288	240	78.1		0.9615	2	99	2	14	3	99	26	178	0.11	155	38	MONTHLY AVERAGE	
DAILY LIMITS					6.00-9.00					334			334		33		406	DAILY LIMITS	
WEEKLY LIMITS									15	250	15		250					WEEKLY LIMITS	
MONTHLY LIMITS								85	10	167	10	85	167		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.	3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	September, 2016
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X _____ Authorized Signature Date

David Conner Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	C-12658 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T- 9031 IV

	INFLUENT			EFFLUENT (Outfall 001) - Summer Limits (May 1 - Oct. 31)															
		BOD	TSS				BOD		CBOD		TSS					Disinfection			
					Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria		
Date	pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
	S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1	8.0			77.0	7.4	0.9060										106			1
2	8.1			76.9	7.5	0.8757										91			2
3				76.5	7.4	0.9166										132			3
4				76.3	7.5	0.9060										177			4
5				77.2	7.5	1.0426										237			5
6	8.2	317	263	76.1	7.5	0.9178	2	99	1	8	1	100	8	165	0.15	94			6
7	8.1	323	282	76.7	7.4	0.9498	2	99	1	8	1	100	8		0.13	122	40		7
8	8.1			76.6	7.4	0.9861										109	61		8
9	8.0			76.9	7.4	0.9588										91			9
10				76.6		0.9715										83			10
11				76.7	7.4	1.0358										117			11
12	8.0			76.4	7.4	1.0093								160		114			12
13	8.3	315	258	75.5	7.3	0.9380	3	99	2	16	5	98	39		0.19	137	9		13
14	8.2	308	247	75.6	7.4	0.9619	4	99	3	24	3	99	24		0.18	150	5		14
15	8.0			75.9	7.4	0.9564										92			15
16	8.1			76.4	7.3	0.9381										95			16
17				75.5	7.3	1.0532										124			17
18				76.0	7.3	1.0892										256			18
19	8.2			75.6	7.5	0.9659								159		62			19
20	8.0	335	279	75.5	7.3	0.8790	5	99	3	22	4	99	29		0.15	96	727	Retests were 23,137, 64, 63, and 61 for a geomean of 60 as recorded on the 21st.	20
21	8.0	309	231	75.5	7.4	0.9081	5	98	3	23	5	98	38		0.12	199	60	The 727 exceedance and the 60 geomean are not used in the monthly calculation per DEQ	21
22	8.3			74.8	7.3	0.9600										166	28	instruction book but the individual resamples are included in the calculation for the monthly	22
23	8.3			74.5	7.4	0.9877										200		geometric mean.	23
24				74.6		1.1286										174			24
25				74.9		1.1196										158			25
26	7.2			76.4	7.3	0.8497								173		69			26
27	8.2	345	245	76.5	7.3	0.9740	5	99	3	24	5	95	41		0.19	70	6		27
28	8.1	308	209	76.2	7.3	0.9960	4	99	3	25	6	97	50		0.16	149	9		28
29	8.2			75.2	7.3	0.9711										77			29
30	8.3			73.6	7.4	0.8500										134			30
TOTAL																		TOTAL	
DAILY MINIMUM	7.2			73.6	7.3											62		DAILY MINIMUM	
DAILY MAXIMUM	8.3			77.2	7.5					25			50		0.19	256	727	DAILY MAXIMUM	
WKLY. AVG. MAX.									3	25	6		45					WEEKLY AVERAGE MAX.	
MONTHLY AVG.		320	249	75.9		0.9674	4	99	2	19	4	98	30	164	0.16	129	27	MONTHLY AVERAGE	
DAILY LIMITS					6.00-9.00					334			334		33		406	DAILY LIMITS	
WEEKLY LIMITS									15	250	15		250					WEEKLY LIMITS	
MONTHLY LIMITS								85	10	167	10	85	167		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.	3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	**Phone Number**	503-266-0648	**Month/Year**	October, 2016
DEQ Permit No.	101063	**DEQ File No./Facility ID**	13691	**EPA Reference No.**	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	**County**	CLACKAMAS	**Population Served**	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X _____ Authorized Signature Date

David Conner Name (Print)

Operator Certification

Collection Sys. Class	III	**Principal Operator Name (print)**	Jerry Nelzen	**Certification No. & Grade**	C-12668 III
Treatment Sys. Class	IV	**Principal Operator Name (print)**	David Conner	**Certification No. & Grade**	T- 9031 IV

Date	INFLUENT			EFFLUENT (Outfall 001) - Summer Limits (May 1 - Oct. 31)															DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
		BOD	TSS				BOD		CBOD		TSS					Disinfection			
		Comp.	Comp.		Grab		Comp.	Calc.	Comp	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria		
	pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli		
	S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1				74.3	7.4	0.9607										215			1
2				74.0	7.5	1.0292										227			2
3	8.2			73.6	7.3	1.0379								168		78		Verified flow meter calibration on the Siemens LUT400	3
4	8.3		261	73.5	7.4	0.9915					3	99	25		0.10	72	11	Parameter did not meet QA/QC for BOD/CBOD on the 4th and 5th	4
5	8.3		228	73.1	7.4	0.9725					4	98	32		0.13	127	9	Numbers are marked with an asterisk and are not used in the monthly calculation	5
6	8.3			73.3	7.4	0.9974										82			6
7	8.3			73.3	7.4	0.9734										80			7
8				73.8	7.3	1.0674										211			8
9				73.0	7.4	1.2342										196			9
10	7.9			72.4	7.4	0.9844								160		70			10
11	8.3	316	270	72.1	7.4	0.9426	3	99	2	16	3	99	24		0.02	140	2		11
12	8.3	319	263	72.2	7.4	0.9739	2	99	2	16	3	99	24		0.10	121	4		12
13	8.2			71.6	7.4	1.1801										79			13
14	7.9			71.3	7.4	1.0429										82			14
15				71.1		1.1235										204			15
16				70.7		1.1587										95			16
17	8.2			70.5	7.4	1.1049								171		60			17
18	8.4	333	281	70.6	7.3	0.9872	4	99	2	16	6	98	49		0.33	68			18
19	8.1	337	241	71.1	7.4	0.9827	3	99	2	16	4	98	33		0.14	137	6		19
20	8.3			71.1	7.4	1.0033										120	2		20
21	8.3			70.9	7.4	0.9755										205			21
22				71.0	7.4	0.9800										293			22
23				70.7	7.3	1.0289										162			23
24	8.3			70.4	7.3	0.9919								164		148			24
25	8.3	305	237	70.7	7.4	0.9818	2	99	2	16	3	99	25		0.14	207	11		25
26	8.0	303	242	70.5	7.4	1.0464	2	99	2	17	2	99	17		0.20	137	5		26
27	8.3			70.3	7.4	1.0246										160			27
28	8.3			69.7	7.4	0.9612										148			28
29				70.2	7.4	0.9961										300			29
30				70.3	7.4	1.0557										306			30
31	8.2			70.1	7.4	0.9544								186		127			31
TOTAL																		TOTAL	
DAILY MINIMUM	7.9			69.7	7.3											60		DAILY MINIMUM	
DAILY MAXIMUM	8.4			74.3	7.5					17			49		0.33	306	11	DAILY MAXIMUM	
WKLY. AVG. MAX.									2	17	5		41					WEEKLY AVERAGE MAX.	
MONTHLY AVG.		319	253	71.7		1.0240	3	99	2	16	4	99	29	170	0.14	150	5	MONTHLY AVERAGE	
DAILY LIMITS					6.00-9.00					334			334		33		406	DAILY LIMITS	
WEEKLY LIMITS									15	250	15		250					WEEKLY LIMITS	
MONTHLY LIMITS								85	10	167	10	85	167		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.	3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	November, 2016
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X
Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	C-12668 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T - 9031 IV

		INFLUENT			EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30)															
			BOD	TSS				BOD		CBOD		TSS					Disinfection			
			Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria		
Date		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1		8.2	328	318	69.8	7.4	0.9677	3	99	2	16	5	98	40		0.08	180	2		1
2		8.1	324	324	70.3	7.4	0.9739	3	99	2	16	4	99	32		0.02	203	1		2
3		8.2			70.1	7.3	0.9460										139			3
4		7.9			70.1	7.4	0.9897										163			4
5					69.5	7.4	1.1825										149			5
6					69.3	7.4	1.0752										248			6
7		8.3			69.6	7.4	0.9766								165		114			7
8		8.4	318	278	69.7	7.3	0.9436	5	98	3	24	7	97	55		1.25	122	22		8
9		8.1	331	282	69.9	7.3	0.9286	6	98	4	31	8	97	62		0.99	208	14		9
10		8.3			69.5	7.4	0.9331										139			10
11					69.4		1.0226										134			11
12					69.4		1.0238										182			12
13					69.1		1.0532										153			13
14		7.7			68.9	7.4	1.1389								171		110			14
15		8.2	315	249	68.1	7.3	0.9996	3	99	2	17	4	98	33		0.06	128	8		15
16		8.2	312	220	67.9	7.3	0.9685	5	98	4	32	7	97	57		0.21	210	20		16
17		8.4			67.7	7.3	0.9468										193			17
18		8.3			67.5	7.3	0.9451										108			18
19					67.6	7.4	0.9968										242			19
20					67.8	7.5	1.0188										193			20
21		8.3	302	242	68.1	7.6	0.9359	5	98	4	31	5	98	39	192	0.22	190	2		21
22		8.2	333	309	67.8	7.5	1.0492	5	98	4	35	4	99	35		0.07	208	4		22
23		8.0			66.9	7.4	1.0844										139			23
24					66.5	7.4	1.3069										221			24
25					66.4	7.3	1.0024										153			25
26					66.4	7.4	1.0556										290			26
27					66.2	7.4	1.0927										143			27
28		7.9			66.3	7.5	0.9748								172		107			28
29		7.8	364	263	66.7	7.3	0.9552	4	99	3	24	4	98	32		0.09	137	20		29
30		8.1	300	231	66.3	7.3	0.9607	5	98	4	32	6	97	48		0.19	184	9		30
TOTAL																			TOTAL	
DAILY MINIMUM		7.7			66.2	7.3											107		DAILY MINIMUM	
DAILY MAXIMUM		8.4			70.3	7.6					35			62		1.25	290	22	DAILY MAXIMUM	
WKLY. AVG. MAX.										4	33	8		59					WEEKLY AVERAGE MAX.	
MONTHLY AVG.			323	273	68.2		1.0150	4	99	3	26	5	98	43	175	0.32	170	7	MONTHLY AVERAGE	
DAILY LIMITS						6.00-9.00					834			1000		33		406	DAILY LIMITS	
WEEKLY LIMITS										40	667	45		750					WEEKLY LIMITS	
MONTHLY LIMITS									85	25	417	30	85	500		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	**Phone Number**	503-266-0648	**Month/Year**	December, 2016
DEQ Permit No.	101063	**DEQ File No./Facility ID**	13691	**EPA Reference No.**	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	**County**	CLACKAMAS	**Population Served**	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X _____ Authorized Signature Date

David Conner Name (Print)

Operator Certification

Collection Sys. Class	III	**Principal Operator Name (print)**	Jerry Nelzen	**Certification No. & Grade**	C-12668 III
Treatment Sys. Class	IV	**Principal Operator Name (print)**	David Conner	**Certification No. & Grade**	T - 9031 IV

Date		INFLUENT			EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30)															Date
			BOD	TSS				BOD		CBOD		TSS					Disinfection			
			Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	
		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli		
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1		8.2			66.3	7.3	0.9462										125			1
2		8.2			65.9	7.3	0.9597										109			2
3					65.8	7.4	1.0582										271			3
4					65.3	7.3	1.0535										128			4
5		8.3			64.8	7.5	1.0171								180		120			5
6		8.3	334	303	64.5	7.3	0.9325	6	98	5	39	7	98	54		0.13	124	26		6
7		8.1	338	238	63.9	7.3	0.9257	5	99	4	31	6	97	46		0.20	162	9		7
8		8.3			63.0	7.3	1.0280										129			8
9		8.2			62.9	7.3	1.0942										193			9
10					62.9		1.0322										162			10
11					63.3		1.1163										157			11
12		8.1			63.6	7.4	0.9903								164		77			12
13		8.4	298	245	62.8	7.2	0.9445	8	97	6	47	8	97	63		1.22	101	13		13
14		8.4	308	250	61.9	7.3	0.9339	9	97	7	55	10	96	78		1.62	165	25		14
15		8.1			61.5	7.3	1.0085										143			15
16		8.3			61.7	7.3	0.9526										122			16
17					61.6	7.3	1.0066										164			17
18					62.0	7.3	1.0020										192			18
19		8.2			62.2	7.4	1.1383								191		105			19
20		8.2	282	239	61.9	7.3	0.9735	5	98	3	24	5	98	41		0.07	110	6		20
21		8.2	302	216	61.7	7.3	0.9821	5	98	3	25	7	97	57		0.78	163	1		21
22		8.1			61.3	7.2	0.9858										154			22
23					61.6	7.2	1.1034										110			23
24					62.3	7.3	1.0275										186			24
25					62.4	7.4	0.8514										252			25
26					62.0	7.4	1.0205										117			26
27		8.0	300	238	61.8	7.4	0.9647	5	98	4	32	7	97	56	192	1.22	196	3		27
28		8.0	337	251	61.7	7.3	0.9418	6	98	5	39	9	96	71		1.28	174	21		28
29		8.1			61.6	7.3	0.9499										156			29
30		8.1			61.4	7.3	0.9314										146			30
31					61.2	7.3	1.0464										126			31
TOTAL																			TOTAL	
DAILY MINIMUM		8.0			61.2	7.2											77		DAILY MINIMUM	
DAILY MAXIMUM		8.4			66.3	7.5					55			78		1.62	271	26	DAILY MAXIMUM	
WKLY. AVG. MAX.										7	51	9		70					WEEKLY AVERAGE MAX.	
MONTHLY AVG.			312	248	62.8		0.9974	6	98	5	36	7	97	58	182	0.81	150	9	MONTHLY AVERAGE	
DAILY LIMITS						6.00-9.00					834			1000		33		406	DAILY LIMITS	
WEEKLY LIMITS										40	667	45		750					WEEKLY LIMITS	
MONTHLY LIMITS									85	25	417	30	85	500		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	January, 2017
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X

Authorized Signature Date

David Conner

Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	C-12668 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T - 9031 IV

Date	INFLUENT pH	INFLUENT BOD Comp. Concentration	INFLUENT TSS Comp. Concentration	EFFLUENT Temperature (Daily Max.)	EFFLUENT pH Grab	EFFLUENT Total Flow	BOD Comp. Concentration	BOD Calc. Removal	CBOD Comp. Concentration	CBOD Comp. Loading	TSS Comp. Concentration	TSS Calc. Removal	TSS Comp. Loading	Alkalinity Grab	Ammonia Nitrogen	Disinfection UV Radiation Intensity (Dosage)	Disinfection Bacteria E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
	S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1				60.7	7.3	0.9946										198			1
2				60.1	7.3	1.0878										294			2
3	8.3	284	244	58.9	7.4	0.9934	7	98	5	41	11	95	91	184	2.29	127	70		3
4	8.4	320	272	58.5	7.2	0.9506	7	98	5	40	8	97	63		2.41	117	58	Flow meter verification of LUT 400 Flow Meter	4
5	8.3			58.6	7.2	0.9429										75			5
6	8.2			58.8	7.2	0.9488										137			6
7				58.5		1.0371										221			7
8				58.6		1.1947										192			8
9	8.2			58.5	7.3	1.0555								173		117			9
10	8.4	315	232	58.6	7.3	0.9898	7	98	5	41	9	96	74		1.86	167	80		10
11	7.9	305	188	58.2	7.2	0.9688	5	98	4	32	5	97	40		2.32	304	5		11
12	8.3			58.1	7.1	0.9914										260			12
13	8.2			58.2	7.1	0.9792										188			13
14				58.0	7.1	1.0085										248			14
15				57.9	7.3	0.9871										211			15
16	8.2			58.5	7.3	0.9907								177		123			16
17	8.3	267	262	58.4	7.3	1.1817	5	98	4	39	4	98	39		2.95	242	84		17
18	8.2	303	214	57.8	7.3	1.1452	4	99	4	38	3	99	29		1.97	205	115		18
19	8.4			58.0	7.2	1.0286										92		Annual calibration of Honewell STT 3000 Temperature Sensure	19
20	8.0			58.9	7.2	0.9983										90			20
21				59.0	7.2	1.0719										194			21
22				59.3	7.3	1.0520										208			22
23	8.3			60.1	7.4	0.9427								176		88			23
24	8.4	252	228	60.5	7.3	0.9241	6	98	4	31	7	97	54		1.03	145	10		24
25	8.1	299	237	60.4	7.3	0.9467	6	98	4	32	7	97	55		1.25	148	33		25
26	8.5			60.2	7.2	0.9486										98			26
27	8.5			60.1	7.2	0.9245										94			27
28				59.8	7.4	0.9655										234			28
29				60.0	7.3	1.0053										259			29
30	8.3	308	248	60.7	7.4	0.9684	6	98	4	32	6	95	48	168	1.46	172	9		30
31	8.4	394	260	60.4	7.3	0.9189	7	98	4	31	6	98	46		1.38	149	18		31
TOTAL																		TOTAL	
DAILY MINIMUM	7.9			57.8	7.1					41			91		2.95	75		DAILY MINIMUM	
DAILY MAXIMUM	8.5			60.7	7.4											304	115	DAILY MAXIMUM	
WKLY. AVG. MAX.									5	41	10		77					WEEKLY AVERAGE MAX.	
MONTHLY AVG.		305	239	59.1		1.0046	6	98	4	36	7	97	54	176	1.89	174	31	MONTHLY AVERAGE	
DAILY LIMITS					6.00-9.00					834			1000		33		406	DAILY LIMITS	
WEEKLY LIMITS									40	667	45		750					WEEKLY LIMITS	
MONTHLY LIMITS								85	25	417	30	85	500		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.	3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	February, 2017
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

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Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	C-12668 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T - 9031 IV

		INFLUENT			EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30)																
			BOD	TSS				BOD		CBOD		TSS					Disinfection				
			Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria			
Date		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.		Date
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2				
1		8.3			58.9	7.4	0.9248										97				1
2		8.5			58.0	7.2	0.9448										103				2
3		8.4			59.0	7.2	1.0775										118				3
4					58.9	7.3	1.2383										94		UPS malfunction on U.V system reported to DEQ		4
5					58.1	7.2	1.4966										85		Replaced UPS		5
6		8.3			57.2	7.3	1.0844								153		108				6
7		8.4	317	254	58.0	7.3	1.0275	6	98	5	43	6	98	51		5.49	138	12			7
8		8.2	270	224	58.4	7.3	1.2608	6	98	5	53	7	97	74		6.93	109	22			8
9		8.2			58.6	7.3	1.1399										88				9
10		8.4			59.4	7.2	1.0239										124				10
11					59.2	7.3	1.0682										144				11
12					59.4	7.4	1.0495										127				12
13		8.4			59.8	7.5	0.9650								192		93				13
14		8.3	318	273	60.0	7.4	0.9817	6	98	5	41	6	98	49		6.01	136	30			14
15		8.3	353	365	60.0	7.4	1.2515	7	98	6	63	7	98	73		6.21	112	52			15
16		8.2			59.9	7.3	1.2245										84				16
17		8.3			59.9	7.3	1.0151										115				17
18					59.8		1.1123										137				18
19					60.2		1.1388										158				19
20					60.0		1.2307										92				20
21		8.4	283	201	59.1	7.4	1.2281	6	98	5	51	7	97	72	195	7.73	65	20			21
22		8.1	317	197	59.4	7.4	1.0482	7	98	6	52	7	96	61		10.70	136	11			22
23		8.2			59.4	7.4	1.0269										87				23
24		8.4			59.7	7.4	0.9887										109				24
25					59.9	7.4	1.0173										120				25
26					59.7	7.5	1.1331										223				26
27		8.4	346	210	60.0	7.4	1.0217	6	98	5	43	8	96	68	198	5.12	171	19			27
28		8.3	321	248	59.9	7.4	0.9994	6	98	5	42	6	98	50		4.46	131	16			28
TOTAL																			TOTAL		
DAILY MINIMUM		8.1			57.2	7.2											65		DAILY MINIMUM		
DAILY MAXIMUM		8.5			60.2	7.5					63			74		10.70	223	52	DAILY MAXIMUM		
WKLY. AVG. MAX.										6	52	7		66					WEEKLY AVERAGE MAX.		
MONTHLY AVG.			316	247	59.3		1.0971	6	98	5	48	7	97	62	185	6.58	118	20	MONTHLY AVERAGE		
DAILY LIMITS						6.00-9.00					834			1000		33		406	DAILY LIMITS		
WEEKLY LIMITS										40	667	45		750					WEEKLY LIMITS		
MONTHLY LIMITS									85	25	417	30	85	500		18		126	MONTHLY LIMITS		
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.		

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	March, 2017
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV.ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X
Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	C-12668 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T - 9031 IV

		INFLUENT			EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30)																
			BOD	TSS		Grab		BOD		CBOD		TSS			Grab		Disinfection				
			Comp.	Comp.				Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.			UV	Bacteria			
Date		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.		Date
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2				
1		8.2			60.1	7.3	0.9964										88				1
2		8.5			61.9	7.3	1.0921										136				2
3		8.0			60.6	7.4	1.0658										167				3
4					60.6	7.3	1.0367										81		Please see attached data for upset condition		4
5					60.2	7.3	1.0798										234				5
6		8.5			62.1	7.4	0.8671								187		76				6
7		8.2	243	193	60.5	7.3	1.1576	9	96	7	68	11	94	106		3.22	94				7
8		8.4	396	228	61.0	7.3	1.0938	9	98	7	64	9	96	82		3.52	118	12			8
9		8.4			60.4	7.3	1.1628										93	57			9
10		8.4			61.3	7.4	0.9695										201				10
11					61.1	7.4	1.0591										145				11
12					61.7	7.4	1.0833										309				12
13		8.3			61.9	7.4	1.1376								164		76				13
14		8.1	249	205	61.7	7.3	1.2650	9	96	6	63	7	97	74		3.21	113	54			14
15		8.1	252	200	61.6	7.3	1.2161	9	96	6	61	8	96	81		2.48	140	121			15
16		8.4			61.4	7.3	1.0388										108				16
17		8.4			62.0	7.3	1.0423										184				17
18					61.4		1.1436										431				18
19					61.4		1.1173										183		All lab equipment calibrated by Quality Control Services		19
20		8.3			61.6	7.3	1.0714								175		102				20
21		8.4	275	250	62.0	7.3	1.0712	7	97	5	45	7	97	63		1.79	106	43			21
22		8.4	310	206	61.4	7.3	1.0319	8	97	6	52	9	96	77		2.30	137	1			22
23		8.5			61.7	7.3	1.0542										135				23
24		8.4			61.7	7.3	1.1254										51				24
25					61.8	7.3	1.0895										74				25
26					61.5	7.3	1.1536										124				26
27		8.1			62.1	7.3	1.0251										104				27
28		8.3	247	220	61.8	7.3	1.0090	7	97	4	34	6	97	50	172	0.93	106	1			28
29		8.3	303	219	62.1	7.3	1.0076	6	98	5	42	5	98	42		0.98	96	1			29
30		8.3			62.3	7.3	0.9848										86				30
31		8.3			62.9	7.3	0.9808										65				31
TOTAL																				TOTAL	
DAILY MINIMUM		8.0			60.1	7.3											51			DAILY MINIMUM	
DAILY MAXIMUM		8.5			62.9	7.4					68			106		3.52	431	121		DAILY MAXIMUM	
WKLY. AVG. MAX.																				WEEKLY AVERAGE MAX.	
MONTHLY AVG.			284	215	61.5		1.0710	8	97	6	53	8	96	72	175	2.30	133	11		MONTHLY AVERAGE	
DAILY LIMITS						6.00-9.00					834			1000		33		406		DAILY LIMITS	
WEEKLY LIMITS										40	667	45		750						WEEKLY LIMITS	
MONTHLY LIMITS									85	25	417	30	85	500		18		126		MONTHLY LIMITS	
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W		MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	April, 2017
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	C-12668 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T - 9031 IV

	INFLUENT			EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30)															
		BOD	TSS				BOD		CBOD		TSS					Disinfection			
		Comp	Comp.		Grab		Comp.	Calc.	Comp	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria		
Date	pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
	S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1				62.2	7.3	1.0245										88			1
2				62.7	7.2	1.0778										62			2
3	8.4			62.8	7.3	0.9847								157		53			3
4	8.4	230	229	62.9	7.2	0.9820	4	98	3	25	4	98	33		0.95	166	2		4
5	8.4	287	274	63.3	7.1	0.9998	6	98	4	33	5	98	42		1.09	179	2		5
6	8.5			63.7	7.0	1.0692										90			6
7	8.4			63.1	7.2	0.9556										253			7
8				63.0	7.1	1.0041										78			8
9				63.4	7.1	1.0518										95			9
10	8.4			63.2	7.0	1.0011								125		46			10
11	8.5	249	247	63.4	7.1	0.9857	4	98	3	25	4	98	33		0.26	61	6	Standard did not meet QA/QC parameter for BOD on the 11th and 12th. Results of tests are	11
12	8.4	287	235	63.5	7.2	1.0097	6	98	5	42	5	98	42		0.31	97	29	included but not used in the weekly or monthly calculation	12
13	8.5			63.4	7.1	0.9987										65			13
14	8.5			63.7	7.1	0.9685										184			14
15				63.9		1.0702										448			15
16				64.3		1.1120										584			16
17	8.5			64.4	7.3	1.0220								156		113			17
18	8.5	268	238	64.8	7.2	0.9669	6	98	5	40	8	97	65		0.79	190	28		18
19	8.3	275	260	64.5	7.2	1.0095	6	98	4	34	6	98	51		0.73	150	20		19
20	8.5			64.6	7.2	0.9993										142			20
21	8.5			65.0	7.2	0.9770										232			21
22				65.2	7.1	1.0358										73			22
23				64.5	7.2	1.1436										170			23
24	8.4			64.7	7.3	1.0391								149		86			24
25	8.4	332	253	64.5	7.2	1.0654	4	99	2	18	4	98	36		0.80	122	3		25
26	8.2	343	231	64.2	7.2	1.0739	4	99	3	27	5	98	45		0.67	121	5		26
27	8.4			63.8	7.2	1.0317										83			27
28	8.4			64.3	7.2	0.9741										79			28
29				65.2	7.1	0.9864										117			29
30				65.1	7.1	1.0426										213			30
TOTAL																		TOTAL	
DAILY MINIMUM	8.2			62.2	7.0											46		DAILY MINIMUM	
DAILY MAXIMUM	8.5			65.2	7.3					40			65		1.09	584	29	DAILY	
MAXIMUM																			
WKLY. AVG. MAX.									5	37	7		58					WEEKLY AVERAGE	
MAX. MONTHLY AVG		284	246	63.9		1.0221	5	98	4	29	5	98	43	147	0.70	148	7	MONTHLY AVERAGE	
DAILY LIMITS					6.0-9.0					834			1000		33		406	DAILY LIMITS	
WEEKLY LIMITS									40	667	45		750					WEEKLY LIMITS	
MONTHLY LIMITS							85	25	417	30	85	500			18		126	MONTHLY LIMITS	
MIN. MON. FREQ.	3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	May, 2017
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X
Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	C-12668 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T- 9031 IV

Date		INFLUENT			EFFLUENT (Outfall 001) - Summer Limits (May 1 - Oct. 31)															DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
			BOD	TSS				BOD		CBOD		TSS						Disinfection			
			Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab			UV	Bacteria		
		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen		Radiation Intensity (Dosage)	E. coli		
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L		mW-s/cm2			
1		8.4			64.9	7.2	0.9921								121			81			1
2		8.4	265	235	66.1	7.1	0.9609	4	98	2	16	5	98	40		0.30		82	1		2
3		8.3	217	203	67.5	7.1	0.9998	3	99	3	25	5	98	42		0.12		129	20		3
4		8.4			68.1	7.0	0.9809											79			4
5		8.4			67.0	7.2	0.9719											124			5
6					66.6	7.1	1.0062											105			6
7					66.7	7.0	1.0555											161			7
8		8.4			67.2	7.2	0.9905								88			116			8
9		8.4	318	265	68.1	7.1	0.9499	5	98	4	32	8	97	63		0.35		79	30		9
10		7.7	295	397	68.2	7.1	0.9677	6	98	4	32	8	98	65		0.32		121	31		10
11		8.4			67.7	7.1	0.9798											85			11
12		8.4			66.9	7.1	0.9282											89			12
13					66.2		1.0658											150			13
14					66.7		1.0698											270			14
15		8.1			67.1	7.1	1.0432								133			93			15
16		8.4	262	246	67.0	7.1	0.9767	5	98	4	33	7	97	57		0.83		119	36		16
17		8.4	274	228	66.4	7.1	0.9772	5	98	3	24	7	97	57		0.41		115	33		17
18		8.4			68.3	7.0	1.0070											92			18
19		8.2			68.8	7.2	0.9518											88			19
20					68.9	7.1	0.9638											121			20
21					69.3	7.3	1.0390											212			21
22		8.3			70.0	7.3	0.9742								136			77			22
23		8.1	241	221	71.0	7.2	0.9216	4	98	3	23	5	98	38		0.05		133	345		23
24		7.7	269	261	69.1	7.2	0.9906	4	99	3	25	6	98	50		0.14		95			24
25		8.1			69.9	7.3	0.9677											84	7		25
26		8.0			70.3	7.2	0.9587											99			26
27					70.9	7.2	0.9521											142			27
28					71.4	7.2	0.8951											111			28
29					70.1	7.2	1.0552											87			29
30		8.4	289	251	69.3	7.3	0.9732	5	98	4	32	7	97	57	149	0.90		85	6		30
31		7.9	288	221	71.0	7.2	0.9873	7	98	5	41	9	96	74		1.49		100	44		31
TOTAL																				TOTAL	
DAILY MINIMUM		7.7			64.9	7.0												77		DAILY MINIMUM	
DAILY MAXIMUM		8.4			71.4	7.3					41			74		1.49		270	345	DAILY MAXIMUM	
WKLY. AVG. MAX.										5	37	8		65						WEEKLY AVERAGE MAX.	
MONTHLY AVG.			272	253	68.3		0.9856	5	98	4	28	7	97	54	125	0.49		114	21	MONTHLY AVERAGE	
DAILY LIMITS						6.00-9.00					334			334		33			406	DAILY LIMITS	
WEEKLY LIMITS										15	250	15		250						WEEKLY LIMITS	
MONTHLY LIMITS									85	10	167	10	85	167		18			126	MONTHLY LIMITS	
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W		Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	**Phone Number**	503-266-0648	**Month/Year**	June, 2017
DEQ Permit No.	101063	**DEQ File No./Facility ID**	13691	**EPA Reference No.**	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	**County**	CLACKAMAS	**Population Served**	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X
Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	**Principal Operator Name (print)**	Jerry Nelzen	**Certification No. & Grade**	C-12668 III
Treatment Sys. Class	IV	**Principal Operator Name (print)**	David Conner	**Certification No. & Grade**	T- 9031 IV

Date		INFLUENT			EFFLUENT (Outfall 001) - Summer Limits (May 1 - Oct. 31)														DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
			BOD	TSS				BOD		CBOD		TSS					Disinfection			
			Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria		
		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli		
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1		8.2			70.8	7.3	0.9591										111			1
2		8.2			71.8	7.4	0.9485										90			2
3					70.3	7.4	0.9748										218			3
4					70.6	7.5	1.0425										321			4
5		8.4			71.5	7.4	0.9792								180		111			5
6		8.2	254	252	72.0	7.3	0.9465	3	99	2	16	3	99	24		0.13	110	20		6
7		8.1	347	235	71.7	7.5	0.9873	3	99	2	16	3	99	25		0.15	159	1		7
8		8.4			71.2	7.4	0.9972										124			8
9		8.1			70.8	7.4	1.0115										105			9
10					70.4		1.0420										205			10
11					70.9		1.0569										531			11
12		8.2			70.5	7.4	0.9603								172		88			12
13		8.1	277	237	70.1	7.4	0.9424	5	98	3	24	8	97	63		0.12	134	7		13
14		8.3	315	254	70.5	7.3	0.9622	5	98	4	32	6	98	48		0.14	110	7		14
15		8.3			70.2	7.3	1.0171										108			15
16		8.4			70.6	7.3	0.9739										111			16
17					71.2	7.3	0.9996										138			17
18					72.2	7.4	1.0314										205			18
19		7.8			73.3	7.5	0.9819										100			19
20		8.1	262	255	73.7	7.3	0.9386	5		4		6	98	47	164	0.12	129	18	Bod dilution blank did not meet Q/A Q/C for Bod on the 20th and 21st	20
21		8.3	334	210	72.8	7.3	0.9207	5		4		6	97	46		0.07	130	26	Results are included but not used in the monthly calculation	21
22		8.2			73.1	7.3	0.8966										126			22
23		8.0			73.2	7.4	0.9304										87			23
24					73.9	7.3	0.9696										181			24
25					74.5	7.4	1.0179										165			25
26		8.1			74.9	7.5	1.0170								177		107			26
27		8.1	268	230	74.0	7.3	0.9548	3	99	2	16	3	99	24		0.11	114	9		27
28		7.9	265	256	73.9	7.3	0.9403	3	99	2	16	5	98	39		0.10	137	6		28
29		8.0			74.6	7.3	0.9666										147			29
30		8.1			75.2	7.3	0.9652										156			30
TOTAL																			TOTAL	
DAILY MINIMUM		7.8			70.1	7.3											87		DAILY MINIMUM	
DAILY MAXIMUM		8.4			75.2	7.5					32			63		0.15	531	26	DAILY MAXIMUM	
WKLY. AVG. MAX.										4	26	7		56					WEEKLY AVERAGE MAX.	
MONTHLY AVG.			290	241	72.1		0.9777	4	99	3	20	5	98	39	173	0.12	152	8	MONTHLY AVERAGE	
DAILY LIMITS						6.00-9.00					334			334		33		406	DAILY LIMITS	
WEEKLY LIMITS										15	250	15		250					WEEKLY LIMITS	
MONTHLY LIMITS									85	10	167	10	85	167		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	July, 2017
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X
Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	C-12668 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T- 9031 IV

Date	INFLUENT			EFFLUENT (Outfall 001) - Summer Limits (May 1 - Oct. 31)															DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
		BOD Comp.	TSS Comp.		Grab		BOD Comp.	BOD Calc.	CBOD Comp.	CBOD Comp.	TSS Comp.	TSS Calc.	TSS Comp.	Grab		Disinfection UV	Disinfection Bacteria		
	pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli		
	S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1				74.5		0.9471										235			1
2				75.0		0.9350										389			2
3	7.7			74.5	7.5	0.9380								144		249			3
4		260	182	74.9	7.3	0.9713	3	99	2	16	4	98	32		0.50	221	9		4
5	7.9	289	198	75.5	7.3	1.0003	3	99	3	25	5	97	42		0.18	200	7		5
6	8.1			76.1	7.2	0.9690										146			6
7	8.1			75.5	7.4	0.9835										183			7
8				75.6	7.3	0.9570										139			8
9				75.7	7.4	0.9957										128			9
10	7.8			76.1	7.4	0.9574								119		183			10
11	8.2	283	236	76.1	7.2	0.9525	4	99	2	16	5	98	40		0.15	182	22		11
12	8.1	300	255	76.5	7.2	0.9662	3	99	2	16	4	98	32		0.12	177	16		12
13	8.0			75.6	7.3	0.9782										169			13
14	8.2			76.7	7.4	0.9642										163			14
15				76.2	7.2	0.9418										200			15
16				76.4	7.3	1.0032										298			16
17	8.1			75.9	7.4	0.9822								127		152			17
18	8.0	287	280	76.7	7.2	0.9664	3	99	2	16	4	99	32		0.13	169	31		18
19	8.0	307	249	77.1	7.2	0.9546	3	99	2	16	4	98	32		0.12	199	36		19
20	8.1			76.0	7.2	0.9446										169			20
21	8.0			76.5	7.4	0.9682										138			21
22				77.6	7.2	0.9480										137			22
23				77.6	7.4	1.0106										188			23
24	8.0			77.6	7.3	1.0839								123		169			24
25	8.1	301	235	77.7	7.2	0.9814	5	98	4	33	6	97	49			103	7		25
26	7.9	326	214	78.2	7.2	0.9607	6	98	5	40	7	97	56		0.31	103	11		26
27	7.8			77.2	7.2	0.9760									0.25	107			27
28	8.0			77.2	7.3	0.9914										121			28
29				77.8	7.3	1.0104										108			29
30				77.7	7.2	1.0286										84			30
31	8.0			78.3	7.3	1.0039								116		112			31
TOTAL																		TOTAL	
DAILY MINIMUM	7.7			74.5	7.2											84		DAILY MINIMUM	
DAILY MAXIMUM	8.2			78.3	7.5					40			56		0.50	389	36	DAILY MAXIMUM	
WKLY. AVG. MAX.									5	36	7		53					WEEKLY AVERAGE MAX.	
MONTHLY AVG.		294	231	76.5		0.9758	4	99	3	22	5	98	39	126	0.22	171	14	MONTHLY AVERAGE	
DAILY LIMITS					6.00-9.00					334			334		33		406	DAILY LIMITS	
WEEKLY LIMITS									15	250	15		250					WEEKLY LIMITS	
MONTHLY LIMITS								85	10	167	10	85	167		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.	3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

acility Name	City of Canby	Phone Number	503-266-0648	Month/Year	August, 2017
EQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
lant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X Authorized Signature Date

David Conner Name (Print)

Operator Certification

ollection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	C-12668 III
reatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T- 9031 IV

	INFLUENT			EFFLUENT (Outfall 001) - Summer Limits (May 1 - Oct. 31)															
		BOD	TSS				BOD		CBOD		TSS					Disinfection			
		Comp.	Comp.		Grab		Comp.	Calc	Comp.	Comp.	Comp.	Calc	Comp.	Grab		UV	Bacteria		
Date	pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
	S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1	7.9	305	277	77.9	7.2	0.9747	6	98	4	33	9	97	73		0.94	101	304		1
2	7.9	324	308	78.6	7.3	0.9860	4	99	3	25	5	98	41		0.74	98	1		2
3	7.9			79.0	7.3	0.9321										137			3
4	7.8			79.3	7.3	0.9188										112			4
5				79.1		0.9645										252			5
6				78.8		1.0247										260			6
7	7.9			79.3	7.3	1.0075								88		117			7
8	8.0			79.1	7.2	0.9862										122	72		8
9	7.8	226	156	79.6	7.2	0.9851	3	99	2	16	5	97	41		0.14	133	50		9
10	7.7	275	226	79.9	7.3	0.9671	3	99	2	16	3	99	24		0.07	101			10
11	7.8			79.8	7.3	0.9816										203			11
12				78.9	7.2	0.9703										163			12
13				78.6	7.2	1.0124										104			13
14	7.9			77.9	7.4	0.9695								100		139			14
15	8.0	230	312	77.7	7.3	0.9785	5	98	3	24	5	98	41		0.28	119	62		15
16	8.0	238	260	78.0	7.2	1.0122	6	97	4	34	6	98	51		0.31	155	*2419	The E. coli retest was 13, 7, 1, 12, and 1 for a geomean of 4 as recorded on the 17th. The 2419 exceedance	16
17	8.0			78.5	7.2	1.0233										143	* 4	and 4 geomean are not used in the monthly calculation per DEQ instruction book but the individual	17
18	8.0			78.4	7.3	1.0026										148		resamples are included in the calculation for the monthly geometric mean.	18
19				78.3	7.3	1.0830										348			19
20				77.8	7.3	1.0437										142			20
21	7.8			77.8	7.3	0.9872								120		150			21
22	8.0	310	305	78.2	7.3	0.9891	3	99	3	25	3	99	25		0.27	185	22		22
23	7.9	243	164	78.0	7.3	1.0130	3	99	3	25	3	99	25		0.41	137	12		23
24	7.3			77.6	7.3	0.9478										208			24
25	8.0			77.8	7.4	0.9250										247			25
26				77.4	7.3	0.9703										208			26
27				77.8	7.3	1.0021										197			27
28	7.7			78.4	7.4	0.9555								117		235			28
29	7.9	248	401	78.5	7.3	0.9719	3	99	2	16	5	99	41		0.33	171	6		29
30	8.1	289	247	78.0	7.3	0.9638	3	99	2	16	4	98	32		0.20	207	3		30
31	7.9			78.2	7.2	0.9519										154			31
OTAL																		TOTAL	
AILY MINIMUM	7.3			77.4	7.2											98		DAILY MINIMUM	
AILY MAXIMUM	8.1			79.9	7.4					31			73		0.33	348	2419	DAILY MAXIMUM	
VKLY. AVG. MAX.									4	29	7		57					WEEKLY AVERAGE MAX.	
IONTHLY AVG.		269	266	78.5		0.9839	4	99	3	23	5	98	39	106	0.27	188	111	MONTHLY AVERAGE	
AILY LIMITS					6.00-9.00					334			334		33		406	DAILY LIMITS	
EEKLY LIMITS									15	250	15		250					WEEKLY LIMITS	
IONTHLY LIMITS								85	10	167	10	85	167		18		126	MONTHLY LIMITS	
IIN. MON. FREQ.	2/W	2/W	2/W	Daily	2/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	September, 2017
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X
Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	C-12668 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T- 9031 IV

		INFLUENT			EFFLUENT (Outfall 001) - Summer Limits (May 1 - Oct. 31)																
			BOD	TSS				BOD		CBOD		TSS					Disinfection				
			Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria			
Date		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.		Date
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2				
1		8.0			78.6	7.3	0.9697										174				1
2					78.6	7.3	0.9773										321				2
3					78.7	7.2	0.9848										125				3
4					78.9	7.3	1.0847										175				4
5		8.0	299	287	79.5	7.2	1.0024	4	99	2	17	4	99	33	120	0.54	197	3			5
6		8.1	292	280	78.7	7.3	1.0190	4	99	3	25	5	98	42		0.15	140	3			6
7		8.2			78.6	7.2	1.0562										128				7
8		7.7			78.6	7.2	0.9457										188				8
9					79.0	7.4	0.9780										276				9
10					78.7	7.3	1.0471										161				10
11		8.1			78.5	7.4	0.9951								131		111				11
12		8.2	278	278	78.4	7.3	0.9854	5	98	3	25	9	97	74		0.48	112	12			12
13		8.0	247	230	77.7	7.3	1.0075	5	98	3	25	9	96	76		0.21	158	18			13
14		8.3			77.8	7.2	0.9616										105				14
15		8.0			78.9	7.2	0.9476										118				15
16					76.6	7.3	0.9741										198				16
17					78.0	7.4	1.0702										193				17
18		8.2			75.8	7.4	1.0463								124		125				18
19		8.1	289	307	75.3	7.2	1.0697	5	98	4	36	10	97	89		0.13	118	20			19
20		8.1	250	215	74.7	7.2	1.0424	5	98	3	26	6	97	52		0.15	134	93			20
21		8.3			74.6	7.2	0.9785										135				21
22		8.2			74.8	7.3	0.9747										114				22
23					74.6		0.9954										404				23
24					74.8		1.0774										117				24
25		8.3			75.1	7.5	1.0621								123		117				25
26		8.2	274	283	75.3	7.2	1.0054	4	99	4	34	8	97	67		0.06	120	3			26
27		8.2	294	193	76.3	7.1	1.0132	4	99	4	34	5	97	42		0.03	121	1			27
28		8.3			76.1	7.0	0.9790										139				28
29		8.3			75.1	7.0	0.9421										150				29
30					74.6	7.1	1.0165										234				30
TOTAL																				TOTAL	
DAILY MINIMUM		7.7			74.6	7.0											105			DAILY MINIMUM	
DAILY MAXIMUM		8.3			79.5	7.5					36			89		0.54	404	93		DAILY MAXIMUM	
WKLY. AVG. MAX.										4	34	9		75						WEEKLY AVERAGE MAX.	
MONTHLY AVG.			278	259	76.9		1.0073	5	98	3	28	7	97	60	125	0.22	164	8		MONTHLY AVERAGE	
DAILY LIMITS						6.00-9.00					334			334		33		406		DAILY LIMITS	
WEEKLY LIMITS										15	250	15		250						WEEKLY LIMITS	
MONTHLY LIMITS									85	10	167	10	85	167		18		126		MONTHLY LIMITS	
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W		MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	**Phone Number**	503-266-0648	**Month/Year**	October, 2017
DEQ Permit No.	101063	**DEQ File No./Facility ID**	13691	**EPA Reference No.**	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	**County**	CLACKAMAS	**Population Served**	14206

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X
Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	**Principal Operator Name (print)**	Jerry Nelzen	**Certification No. & Grade**	C-12668 III
Treatment Sys. Class	IV	**Principal Operator Name (print)**	David Conner	**Certification No. & Grade**	T- 9031 IV

Date	INFLUENT pH	INFLUENT BOD Comp. Concentration	INFLUENT TSS Comp. Concentration	EFFLUENT Temperature (Daily Max.)	EFFLUENT pH Grab	EFFLUENT Total Flow	BOD Comp. Concentration	BOD Calc. Removal	CBOD Comp. Concentration	CBOD Comp. Loading	TSS Comp. Concentration	TSS Calc. Removal	TSS Comp. Loading	Alkalinity Grab	Ammonia Nitrogen Comp.	Disinfection UV Radiation Intensity (Dosage)	Disinfection Bacteria E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
	S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1				74.4	7.1	1.0814										310			1
2	8.2			74.2	7.0	1.0238								89		106			2
3	7.9	180	119	74.0	7.0	0.9782	5	97	4	33	5	96	41		0.07	153	1		3
4	8.1	324	266	73.8	7.1	1.0057	3	99	3	25	3	99	25		0.03	191	1		4
5	8.3			73.9	7.1	0.9984										126			5
6	8.4			73.5	7.0	0.9481										112			6
7				73.7	7.0	0.9832										141			7
8				73.5	7.1	1.0836										199			8
9	8.2			73.1	7.1	1.0067								85		120		Flow Meter verification of LUT 400 flow Meter	9
10	8.3	278	307	72.5	7.1	1.0105	9	97	6	51	9	97	76		0.41	117	16		10
11	8.3	287	276	72.3	7.1	1.0599	8	97	5	44	7	97	62		0.26	129	148		11
12	8.3			71.9	7.1	1.0488										92			12
13	8.2			71.2	7.1	0.9639										167			13
14				70.8		0.9829										175			14
15				71.7		1.0578										353			15
16	8.1			71.7	7.3	1.0129								100		109			16
17	8.4	303	309	71.1	7.1	0.9727	5	98	4	32	7	98	57		0.02	179	6		17
18	8.1	328	304	71.1	6.8	1.0268	6	98	5	43	9	97	77		0.03	147	7		18
19	8.4			71.1	7.0	1.1144										132			19
20	8.3			70.2	6.9	0.9639										141			20
21				70.4	7.1	1.3285										217			21
22				69.7	7.1	1.1220										223			22
23	8.2			70.5	7.1	1.0743								79		173			23
24	8.5	220	270	71.0	7.0	1.0161	6	97	5	42	10	96	85		0.02	150	3		24
25	8.3	332	297	71.0	7.2	1.0240	6	98	5	43	7	98	60		0.02	127	14		25
26	8.3			71.2	7.0	1.0224										126			26
27	8.2			71.1	7.0	1.0000										137			27
28				71.0	7.3	0.9853										166			28
29				70.5	7.4	1.0572										250			29
30	8.3			69.9	7.3	1.0268								96		111			30
31	8.4			68.9	7.1	0.9489										137			31
TOTAL																		TOTAL	
DAILY MINIMUM	7.9			68.9	6.8											92		DAILY MINIMUM	
DAILY MAXIMUM	8.5			74.4	7.4					51			85		0.41	353	148	DAILY MAXIMUM	
WKLY. AVG. MAX.									6	47	9		72					WEEKLY AVERAGE MAX.	
MONTHLY AVG.		282	269	71.8		1.0303	6	98	5	39	7	97	60	90	0.11	162	7	MONTHLY AVERAGE	
DAILY LIMITS					6.00-9.00					334			334		33		406	DAILY LIMITS	
WEEKLY LIMITS									15	250	15		250					WEEKLY LIMITS	
MONTHLY LIMITS								85	10	167	10	85	167		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.	3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	November, 2017
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

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X _____ Authorized Signature Date

David Conner Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	C-12668 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T - 9031 IV

		INFLUENT			EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30)																	
			BOD	TSS				BOD		CBOD		TSS					Disinfection					
			Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria				
Date		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.			Date
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2					
1		8.2	264	318	68.7	7.1	1.0336	5	98	4	34	4	99	34		0.08	141	16				1
2		8.3	358	320	68.8	7.0	1.0338	5	99	4	34	5	98	43		0.04	119	142				2
3		8.1			68.0	7.0	0.9403										105					3
4					68.0		1.0244										136					4
5					69.0		1.0634										220					5
6		8.4			68.0	7.1	0.9754								77		101					6
7		8.4	299	336	67.5	7.0	1.0230	4	99	3	26	3	99	28		0.07	112	15				7
8		8.2	317	247	66.4	7.0	1.0419	4	99	3	26	5	98	43		0.20	110	13				8
9		8.4			66.7	7.0	1.0148										140					9
10					67.3	6.9	0.9554										100					10
11					67.5	7.0	0.9766										152					11
12					67.8	7.0	1.0975										142					12
13		8.4			67.7	7.1	1.0423								83		88					13
14		8.2	262	332	66.4	7.0	1.0203	6	98	4	34	10	97	85		0.07	114	50				14
15		8.3	280	283	66.6	6.9	1.1735	7	98	5	49	10	96	98		0.45	112					15
16		8.4			66.1	6.9	1.0169										95	126				16
17		8.3			66.1	6.9	0.9555										98					17
18					66.0	7.0	0.9577										232					18
19					66.3	7.0	1.1071										231					19
20		8.2	309	287	66.4	7.0	1.0743	6	95	5	45	7	96	63	71	0.14	127	58				20
21		8.3	353	335	66.4	7.0	1.0661	6	99	5	44	8	96	71		1.76	271	52				21
22		8.1			66.7	7.0	1.0818										171					22
23					67.2	7.0	1.0811										181					23
24					67.5	7.0	0.9200										269					24
25					66.5	7.0	0.9827										295					25
26					66.4	6.9	1.0998										216					26
27		8.3			66.4	7.0	0.9869								65		128					27
28		8.2	349	301	66.4	7.3	1.0346	5	99	4	35	7	98	60		0.04	91	3				28
29		8.4	358	248	66.0	7.0	0.9893	6	98	4	33	8	97	66		0.14	148	4				29
30		8.2			65.4	6.9	0.9950										110					30
TOTAL																			TOTAL			
DAILY MINIMUM		8.1			65.4	6.9											88		DAILY MINIMUM			
DAILY MAXIMUM		8.4			68.8	7.3					49			98		1.76	295	142	DAILY MAXIMUM			
WKLY. AVG. MAX.										5	45	10		91					WEEKLY AVERAGE MAX.			
MONTHLY AVG.			315	301	67.0		1.0255	5	98	4	36	7	98	59	74	0.30	152	25	MONTHLY AVERAGE			
DAILY LIMITS						6.00-9.00					834			1000		33		406	DAILY LIMITS			
WEEKLY LIMITS										40	667	45		750					WEEKLY LIMITS			
MONTHLY LIMITS									85	25	417	30	85	500		18		126	MONTHLY LIMITS			
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.			

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	December, 2017
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X

Authorized Signature Date

David Conner

Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	C-12668 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T - 9031 IV

	INFLUENT			EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30)															
		BOD	TSS				BOD		CBOD		TSS					Disinfection			
		Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria		
Date	pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
	S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1	8.2			66.0	6.9	0.9478										142			1
2				65.9		1.0199										165			2
3				65.4		1.0296										159			3
4	7.6			65.3	6.9	1.0130								73		76			4
5	8.3	312	264	64.9	6.8	0.9710	7	98	6	49	9	97	73		0.02	111	4		5
6	8.4	364	295	64.3	6.9	0.9875	9	98	7	58	12	96	99		0.27	121	9		6
7	8.5			64.0	6.8	0.9720										122			7
8	8.3			63.8	6.7	0.8730										116			8
9				63.3	6.7	0.9374										191			9
10				62.7	6.9	0.9981										370			10
11	8.4			63.0	6.9	0.9661								51		115			11
12	8.1	338	281	62.2	6.7	0.9859	10	97	7	58	14	95	115		1.81	131	5		12
13	8.3	360	286	61.9	6.8	1.0074	10	97	8	67	13	95	109		1.89	125	66		13
14	8.5			62.3	6.9	0.9781								83		134			14
15	8.5			62.0	7.0	0.9074										118			15
16				62.8	7.2	0.9834										361			16
17				63.1	7.3	1.0152										192			17
18	8.4			63.5	7.3	1.0060								125		136			18
19	8.1			62.7	7.2	1.0564										130	6		19
20	8.2	296	245	62.3	7.2	1.0420	6	98	4	35	7	97	61		1.20	156	3		20
21	8.2	329	232	61.2	7.1	0.9442	6	98	4	31	7	97	55		0.72	137			21
22	8.1			62.0	7.2	0.9927										183			22
23				61.3		1.0014										135			23
24				61.6		1.0034										147			24
25				61.6		0.9186										109			25
26				61.5		0.9853										204			26
27	8.9	278	205	61.4	7.0	0.9739	7	97	5	41	9	96	73	127	1.48	159	28		27
28	8.1	338	282	62.2	7.1	1.0977	6	98	5	46	9	97	82		1.37	157	19		28
29	8.1			61.7	7.1	1.0902										193			29
30				61.9	7.1	0.9995										310			30
31				61.9	7.1	0.9371										185			31
TOTAL																		TOTAL	
DAILY MINIMUM	7.6			61.2	6.7											76		DAILY MINIMUM	
DAILY MAXIMUM	8.9			66.0	7.3					67			115		1.89	370	66	DAILY MAXIMUM	
WKLY. AVG. MAX.									8	62	14		112					WEEKLY AVERAGE MAX.	
MONTHLY AVG.		327	261	62.9		0.9901	8	98	6	48	10	96	83	92	1.09	164	10	MONTHLY AVERAGE	
DAILY LIMITS					6.00-9.00					834			1000		33		406	DAILY LIMITS	
WEEKLY LIMITS									40	667	45		750					WEEKLY LIMITS	
MONTHLY LIMITS								85	25	417	30	85	500		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.	3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	January, 2018
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X
Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	C-12668 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T - 9031 IV

Date	INFLUENT			EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30)															Date
		BOD Comp.	TSS Comp.		Grab		BOD Comp.	BOD Calc.	CBOD Comp.	CBOD Comp.	TSS Comp.	TSS Calc.	TSS Comp.	Grab		Disinfection UV	Disinfection Bacteria		
	pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	
	S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1				61.5	7.1	0.9982										334			1
2	8.4	343	281	61.3	7.3	0.9881	4	99	3	25	6	98	49	132	1.13	129	2	LUT 400 Flow Meter Accuracy Verified	2
3	8.2	421	257	61.3	7.1	0.9830	6	99	5	41	7	97	57		1.74	120	33		3
4	8.3			59.8	7.1	0.9866										102			4
5	8.5			61.4	7.1	0.9833										133			5
6				61.8	7.1	0.9670										223			6
7				62.4	6.9	1.0353										137			7
8	8.4			62.3	7.0	1.0415								84		116			8
9	8.4	327	286	62.1	7.0	1.0291	5	98	4	34	8	97	69		0.66	89	4		9
10	8.4	369	280	61.8	6.9	1.0685	6	98	4	36	8	97	71		0.77	121	3		10
11	8.4			62.0	7.0	1.1455										101			11
12	8.3			62.3	7.0	0.9173										106			12
13				62.4		0.9625										227			13
14				63.1		0.9589										225			14
15	8.3			63.0	7.3	1.0840								136		93			15
16	8.4	348	288	63.0	7.1	0.9827	7	98	5	41	8	97	66		0.88	125	21		16
17	8.5	326	248	62.9	7.1	1.0905	8	98	6	55	10	96	91		1.45	83	29		17
18	8.3			62.2	7.1	1.0210										114			18
19	8.4			61.9	7.0	0.9139										82			19
20				62.7	7.1	0.9848										197			20
21				62.0	7.2	1.0357										176			21
22	8.3			62.2	7.3	1.0366								140		113			22
23	8.4	269	316	62.1	7.0	1.1290	7	97	5	47	11	97	104		2.33	119	17		23
24	8.5	308	266	61.6	7.1	1.0596	7	98	5	44	9	97	80		2.54	285	9		24
25	8.5			61.3	7.1	1.0029										108			25
26	8.5			61.4	7.1	0.9368										107			26
27				62.3		0.9870										172			27
28				63.1		1.0346										265			28
29	8.4			62.6	7.1	1.0488								136		118			29
30	8.5	305	269	62.2	7.1	0.9781	6	98	4	33	7	97	57		2.39	111	49		30
31	8.4	330	275	62.5	7.1	0.9833	5	98	4	33	5	98	41		2.34	121	74		31
TOTAL																		TOTAL	
DAILY MINIMUM	8.2			59.8	6.9											82		DAILY MINIMUM	
DAILY MAXIMUM	8.5			63.1	7.3					55			104		2.54	334	74	DAILY MAXIMUM	
WKLY. AVG. MAX.									6	48	10		92					WEEKLY AVERAGE MAX.	
MONTHLY AVG.		335	277	62.1		1.0121	6	98	5	39	8	97	68	126	1.62	147	14	MONTHLY AVERAGE	
DAILY LIMITS					6.00-9.00					834			1000		33		406	DAILY LIMITS	
WEEKLY LIMITS									40	667	45		750					WEEKLY LIMITS	
MONTHLY LIMITS								85	25	417	30	85	500		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.	3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

acility Name	City of Canby	Phone Number	503-266-0648	Month/Year	February, 2018
EQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
lant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X Authorized Signature Date

David Conner Name (Print)

Operator Certification

ollection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	C-12668 III		
reatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T - 9031 IV		

	INFLUENT			EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30)															
		BOD	TSS				BOD		CBOD		TSS					Disinfection			
		Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc	Comp.	Grab		UV	Bacteria		
Date	pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
	S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1	8.5			62.5	7.1	0.9865										122			1
2	8.4			63.4	7.1	0.9345										126			2
3				63.6	7.2	0.9998										246			3
4				63.6	7.2	1.0432										111			4
5	8.3			63.8	7.3	0.9979								116		104			5
6	8.5	304	318	63.0	7.1	0.9708	8	97	5	40	10	97	81		1.01	112	53		6
7	8.4	313	259	63.0	7.0	0.9982	9	97	5	42	10	96	83		1.41	106	75		7
8	8.6			62.9	7.0	1.0009										104			8
9	8.5			63.0	7.0	0.9220										132			9
10				62.6	7.0	0.9579										92			10
11				62.3	7.2	1.0082										200			11
12	8.4			62.1	7.3	0.9521								125		89			12
13	8.4			61.7	7.0	0.9228										112	88		13
14	8.5	327	310	61.5	7.1	0.9449	6	98	4	32	6	98	47		1.41	115	57		14
15	8.6	350	281	62.0	7.2	0.9410	5	98	4	31	5	96	39		0.79	119			15
16	8.4			61.5	7.2	0.9405										175			16
17				61.6		1.0081										136			17
18				60.6		0.9901										73			18
19				60.6		1.0225										133			19
20	8.3	168	396	60.4	7.3	0.9579	5	97	4	32	7	99	56	133	3.86	165	1		20
21	8.5	352	299	60.1	7.1	0.9747	6	98	4	33	6	98	49		4.67	137	12		21
22	8.5			60.1	7.3	0.9746										213			22
23	8.4			59.8	7.3	0.9528										69			23
24				60.5	7.1	0.9628										139			24
25				60.3	7.3	1.0277										226			25
26	8.4			61.0	7.3	0.9588								133		106			26
27	8.5	309	330	61.5	7.1	0.9371	6	98	4	31	7	98	55		1.87	102	19	Standard did not meet QA/QC parameter for BOD on the 27th and 28th. Results are	27
28	8.5	323	311	60.7	7.1	0.9919	7	98	5	41	8	97	66		2.32	105	23	included but not used in the weekly or monthly calculations	28
OTAL																		TOTAL	
AILY MINIMUM	8.3			59.8	7.0											69		DAILY MINIMUM	
AILY MAXIMUM	8.6			63.8	7.3					42			83		4.67	246	88	DAILY MAXIMUM	
VKLY. AVG. MAX.									5	41	10		82					WEEKLY AVERAGE MAX.	
ONTHLY AVG.		306	313	61.8		0.9743	7	98	4	35	7	98	60	127	2.17	131	34	MONTHLY AVERAGE	
AILY LIMITS					6.00-9.00					834			1000		33		406	DAILY LIMITS	
VEEKLY LIMITS									10	667	45		750					WEEKLY LIMITS	
ONTHLY LIMITS								85	25	417	30	85	500		18		126	MONTHLY LIMITS	
IN. MON. FREQ.	3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	March, 2018
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	C-12668 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T - 9031 IV

		INFLUENT			EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30)																
			BOD	TSS				BOD		CBOD		TSS					Disinfection				
			Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria			
Date		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.		Date
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2				
1		8.5			60.8	7.1	0.9586										86				1
2		8.5			60.9	7.2	0.9615										75				2
3					61.1	7.1	0.9970										119				3
4					61.7	7.1	1.0366										89				4
5		8.4			62.0	7.3	0.9500								127		87		All lab equipment and Eff. Temp meter calibrated by Quality Control Services.		5
6		8.5	263	341	61.7	7.1	0.9224	7	97	5	36	9	97	69		2.02	85	*517	Results of the 5 retests were 25, 9, 3, 1 and 1 for GM of 3.68		6
7		8.5	325	364	62.0	7.0	0.9727	7	98	5	41	10	97	81		4.10	168	* 4	Original exceedance of 517 and the GM are not used in monthly average but the 5 retests are per guidance		7
8		8.6			61.3	7.0	1.0224										113	1			8
9		8.4			61.6	7.1	0.9575										168				9
10		7.8			61.9	7.1	0.9401										405				10
11		8.1			62.9	7.2	1.0069										467				11
12		8.4			63.3	7.2	0.9960								101		103				12
13		8.5	255	317	62.7	7.0	0.9991	7	97	4	33	9	97	75		1.64	127	10			13
14		8.5	284	309	63.2	7.1	0.9128	6	98	4	30	8	97	61		1.49	172	12			14
15		8.6			62.3	7.0	0.9354										145				15
16		8.5			62.3	7.1	0.9422										190				16
17					62.0	7.2	1.0121										248				17
18					62.6	7.3	1.0403										292				18
19		8.2			63.5	7.1	0.9978										128				19
20		8.5	240	414	63.0	7.2	0.9605	4	98	2	16	4	99	32	137	1.32	130	10			20
21		8.5	354	353	62.4	7.2	1.0731	4	99	2	18	4	99	36		1.33	128	1			21
22		8.4			61.9	7.2	1.0256										122				22
23		8.5			61.3	7.2	1.0427										163				23
24					61.0	7.2	1.0235										164				24
25					61.7	7.3	1.0003										360				25
26		8.2			61.9	7.4	0.9514								155		173				26
27		8.3	392	319	62.1	7.2	0.9662	5	99	4	32	5	99	40		0.51	231	2			27
28		8.5	342	272	62.6	7.3	0.9520	5	99	4	32	5	98	40		0.21	149	7			28
29		8.4			62.7	7.2	0.9648										131				29
30		8.4			63.2	7.2	0.9682										100				30
31					63.8		0.9801										157				31
TOTAL																				TOTAL	
DAILY MINIMUM		7.6			60.8	7.0											70			DAILY MINIMUM	
DAILY MAXIMUM		8.6			63.8	7.4					41			81		4.10	467	12		DAILY MAXIMUM	
WKLY. AVG. MAX.										5	40	10		75.5						WEEKLY AVERAGE MAX.	
MONTHLY AVG.			367	338	62.1		0.9629	6	99	4	30	7	98	54	130	1.58	171	4		MONTHLY AVERAGE	
DAILY LIMITS						6.0/9.0					834			1000		33		406		DAILY LIMITS	
WEEKLY LIMITS										30	667	45		750						WEEKLY LIMITS	
MONTHLY LIMITS									85	25	417	30	85	500		18		126		MONTHLY LIMITS	
MIN. MON. FREQ.		1/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W		MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	April, 2018
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	C-12668 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T - 9031 IV

		INFLUENT			EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30)																
			BOD	TSS				BOD		CBOD		TSS					Disinfection				
			Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp	Grab		UV	Bacteria			
Date		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.		Date
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2				
1					62.7		1.0458										171				1
2		8.5			63.4	7.4	0.9651								147		137				2
3		8.4	288	353	63.0	7.2	0.9445	5	98	4	32	6	98	47		0.08	134	25	LUT 400 flow meter accuracy verified.		3
4		8.5	459	284	64.1	7.1	0.9674	6	99	4	32	8	97	65		0.22	152	18			4
5		8.5			63.7	7.1	1.0086										87				5
6		8.4			64.6	7.1	0.9898										133				6
7					64.0	7.2	1.2007										245				7
8					63.1	7.2	1.1879										170				8
9		8.2			63.9	7.1	1.0091										89				9
10		8.5	345	370	64.4	7.2	0.9497	4	99	2	16	2	99	16	121	0.14	122				10
11		8.5	328	295	63.6	7.2	1.0211	3	99	2	17	3	99	26		0.13	129	23			11
12		8.4			62.8	7.1	1.0281										102	19			12
13		8.3			62.6	7.1	0.9947										176				13
14					63.2	7.1	1.0750										173				14
15					63.1	7.2	1.1767										131				15
16		8.2			63.0	7.2	1.0412								129		60				16
17		8.3	293	274	63.0	7.2	1.0074	4	99	3	25	7	97	59		0.09	117	24			17
18		8.5	387	284	63.4	7.2	1.0294	5	99	3	26	6	98	52		0.11	122	23			18
19		8.4			64.1	7.1	1.0158										114				19
20		8.3			64.7	7.2	0.9953										165				20
21					65.0		0.9747										219				21
22					65.0		1.0578										237				22
23		8.3			65.6	7.3	1.0086								140		120				23
24		8.4	245	361	65.6	7.2	0.9651	7	97	4	32	9	96	72		0.13	101	33			24
25		8.3	330	314	67.0	7.2	0.9762	6	98	5	41	7	98	57		0.19	130	161			25
26		8.3			67.5	7.1	0.9902										103				26
27		8.4			66.2	7.1	0.9596										184				27
28					66.3	7.2	1.0086										162				28
29					66.5	7.2	1.0516										160				29
30		8.4			66.4	7.3	0.9834								120		136				30
TOTAL																			TOTAL		
DAILY MINIMUM		8.2			62.6	7.1											60		DAILY MINIMUM		
DAILY MAXIMUM		8.5			67.5	7.4					41			72		0.22	245	161	DAILY MAXIMUM		
WKLY. AVG. MAX.										5	36	8		65					WEEKLY AVERAGE MAX.		
MONTHLY AVG.			334	317	64.3		1.0210	5	99	3	28	6	98	49	131	0.14	142	30	MONTHLY AVERAGE		
DAILY LIMITS						6.00-9.00					834			1000		33		406	DAILY LIMITS		
WEEKLY LIMITS										40	667	45		750					WEEKLY LIMITS		
MONTHLY LIMITS									85	25	417	30	85	500		18		126	MONTHLY LIMITS		
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.		

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	May, 2018
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X
Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	C-12668 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T- 9031 IV

		INFLUENT			EFFLUENT (Outfall 001) - Summer Limits (May 1 - Oct. 31)																	
			BOD	TSS				BOD		CBOD		TSS					Disinfection					
			Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria				
Date		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.			Date
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2					
1		8.3	242	227	66.1	7.1	0.9703	4	98	3	24	5	98	40		0.16	143	13				1
2		8.2	359	307	67.7	7.1	0.9801	5	99	3	25	5	98	41		0.14	153	29				2
3		8.4			67.8	7.1	0.9577										124					3
4		8.3			67.6	7.2	0.9359										264					4
5					68.1		1.0117										437					5
6					67.3	7.3	1.0677										261					6
7		8.3			69.3	7.3	0.9333								135		123					7
8		8.4	333	318	69.1	7.2	0.9673	4	99	2	16	5	98	40		0.14	161	7				8
9		8.4	334	273	69.0	7.2	0.9555	4	99	3	24	5	98	40		0.01	167	3				9
10		8.5			68.7	7.1	0.9980										132					10
11		8.3			67.9	7.1	0.9615										120					11
12					68.8	7.0	1.0253										89					12
13					69.9	7.2	1.0241										217					13
14		8.4			71.0	7.2	0.9566										154					14
15		8.4	257	420	70.2	7.1	0.9641	3	99	2	16	4	99	32	101	0.14	93	12				15
16		8.3	212	293	69.5	7.1	1.0186	4	98	3	25	6	98	51		0.20	95	17				16
17		8.3			69.7	7.1	0.9632										127					17
18		8.2			69.1	7.1	0.9475										210					18
19					69.3		1.0279										201					19
20					70.1		1.0507										322					20
21		8.1			70.4	7.3	0.9884								117		147					21
22		8.3	301	327	70.8	7.1	0.9767	4	99	3	24	5	98	41		0.14	125	19				22
23		8.4	391	357	71.0	7.1	0.9981	4	99	3	25	6	98	50		0.11	186	10				23
24		8.3			71.6	7.1	1.0082										95					24
25		8.1			70.7	7.2	0.9629										206					25
26					70.5	7.1	0.9404										180					26
27					71.2	7.3	0.8970										321					27
28					71.0	7.4	1.0623										335					28
29		8.4	305	255	71.5	7.4	0.9828	3	99	2	16	5	98	41	135	5.39	66	1				29
30		8.3	217	175	70.6	7.2	1.0249	3	99	2	17	4	99	34		7.22	163	20				30
31		8.2			70.0	7.2	1.0248										138					31
TOTAL																						TOTAL
DAILY MINIMUM		8.1			66.1	7.0											66					DAILY MINIMUM
DAILY MAXIMUM		8.5			71.6	7.4					25			51		7.22	437	29				DAILY MAXIMUM
WKLY. AVG. MAX.										3	25	6		45								WEEKLY AVERAGE MAX.
MONTHLY AVG.			295	295	69.5		0.9866	4	99	3	21	5	98	41	122	1.37	179	10				MONTHLY AVERAGE
DAILY LIMITS						6.00-9.00					334			334		33		406				DAILY LIMITS
WEEKLY LIMITS										15	250	15		250								WEEKLY LIMITS
MONTHLY LIMITS									85	10	167	10	85	167		18		126				MONTHLY LIMITS
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W				MIN. MONITORING FREQ.

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	**Phone Number**	503-266-0648	**Month/Year**	June, 2018
DEQ Permit No.	101063	**DEQ File No./Facility ID**	13691	**EPA Reference No.**	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	**County**	CLACKAMAS	**Population Served**	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X

Authorized Signature Date

David Conner

Name (Print)

Operator Certification

Collection Sys. Class	III	**Principal Operator Name (print)**	Jerry Nelzen	**Certification No. & Grade**	C-12668 III
Treatment Sys. Class	IV	**Principal Operator Name (print)**	David Conner	**Certification No. & Grade**	T- 9031 IV

	INFLUENT			EFFLUENT (Outfall 001) - Summer Limits (May 1 - Oct. 31)															
		BOD	TSS				BOD		CBOD		TSS					Disinfection			
		Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria		
Date	pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
	S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1	8.4			70.6	7.3	0.9599										202			1
2				71.5		1.0296										166			2
3				70.7		1.0608										202			3
4	7.8			71.4	7.2	0.9994								139		101			4
5	8.2	342	341	72.0	7.2	0.9680	3	99	2	16	3	99	24		0.02	193	18		5
6	8.3	270	375	72.2	7.3	1.0073	3	99	2	17	3	99	25		0.08	175	6		6
7	8.4			72.4	7.3	0.9759										173			7
8	8.3			71.4	7.4	1.0028										178			8
9				71.4	7.3	1.0325										283			9
10				70.5	7.2	1.0842										261			10
11	8.4			71.7	7.3	1.0120										141			11
12	8.4	289	328	72.2	7.2	0.9579	3	99	2	16	3	99	24	123	0.02	134	1		12
13	8.2	331	308	72.0	7.2	0.9774	3	99	2	16	4	99	33		0.03	171	2		13
14	8.3			71.6	7.2	1.0079										90			14
15	8.1			71.5	7.2	0.9786										117			15
16				72.3	7.2	0.9772										275			16
17				74.0	7.3	0.9813										174			17
18	7.9			73.5	7.4	0.9919								119		158			18
19	7.9	160	309	72.8	7.2	0.9882	2	99	2	16	5	98	41		0.02	154	13		19
20	8.2	188	356	74.8	7.2	0.9573	3	98	2	16	4	99	32		0.02	166	4		20
21	8.2			73.7	7.1	0.9719										126			21
22	8.2			73.9	7.4	0.9554										102			22
23				74.5	7.2	1.0085										187			23
24				74.9	7.3	1.0185										198			24
25				74.4	7.3	0.9657										118			25
26	8.2	289	282	74.2	7.2	0.9632	2	99	2	16	5	98	40	117	0.08	137	12		26
27	8.2	293	378	74.3	7.2	0.9790	3	99	2	16	4	99	33		0.10	124	13		27
28	8.2			74.6	7.2	0.9608										132			28
29	8.0			74.7	7.3	0.9697										97			29
30				75.1	7.2	0.9879										142			30
TOTAL																		TOTAL	
DAILY MINIMUM	7.8			70.5	7.1											90		DAILY MINIMUM	
DAILY MAXIMUM	8.4			75.1	7.4					17			41		0.10	283	18	DAILY MAXIMUM	
WKLY. AVG. MAX.									2	16	5		37					WEEKLY AVERAGE MAX.	
MONTHLY AVG.		270	335	72.8		0.9910	3	99	2	16	4	99	31	125	0.05	163	6	MONTHLY AVERAGE	
DAILY LIMITS					6.00-9.00					334			334		33		406	DAILY LIMITS	
WEEKLY LIMITS									15	250	15		250					WEEKLY LIMITS	
MONTHLY LIMITS								85	10	167	10	85	167		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.	3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	July, 2018
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

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Authorized Signature Date

David Conner

Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	C-12668 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T- 9031 IV

Date	INFLUENT			EFFLUENT (Outfall 001) - Summer Limits (May 1 - Oct. 31)															Date
		BOD Comp.	TSS Comp.		Grab		BOD Comp.	BOD Calc.	CBOD Comp.	CBOD Comp.	TSS Comp.	TSS Calc.	TSS Comp.	Grab		Disinfection UV	Disinfection Bacteria	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	
	pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli		
	S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1				75.0	7.4	0.9930										290			1
2	8.0			74.2	6.4	0.9688								116		133			2
3	8.1			74.4	7.3	0.9571										104	3		3
4		328	287	74.2		1.0008	3	99	2	17	5	98	42		0.19	135	2		4
5	8.1	357	276	75.1	7.2	0.9870	4	99	2	16	5	98	41		0.17	56		LUT 400 Flow meter Accuracy Verified	5
6	7.9			75.8	7.3	0.9711										75			6
7				75.9		0.9545										420			7
8				76.3		1.0097										264			8
9	8.2			74.9	7.4	1.0120								123		112			9
10	8.2	308	176	76.0	7.2	0.9823	3	99	2	16	6	97	49		0.02	128	40		10
11	8.1	300	156	76.1	7.2	0.9856	3	99	2	16	4	97	33		0.09	162	15		11
12	8.2			77.3	7.2	1.0173										121			12
13	8.0			77.3	7.4	0.9534										89			13
14				77.0	7.2	0.9517										134			14
15				78.0	7.3	0.9976										104			15
16	7.7			78.5	7.4	0.9983								116		108			16
17	8.0	310	320	78.5	7.2	0.9404	3	99	2	16	7	98	55		0.11	183	107		17
18	8.0	303	237	78.2	7.3	0.9132	3	99	2	15	5	98	38		0.13	233	64		18
19	8.0			76.5	7.3	0.9980										171			19
20	8.0			77.3	7.2	1.0017										147			20
21				76.9	7.3	0.9588										185			21
22				77.6	7.3	0.9875										236			22
23	7.9			78.3	7.4	0.9497								108		235			23
24	8.0	287	253	78.2	7.2	1.0218	3	99	2	17	6	98	51		0.02	185	9		24
25	8.0	321	272	79.0	7.3	0.9604	3	99	2	16	5	98	40	135	0.09	156	15		25
26	7.6			78.9	7.2	0.9470										171			26
27	7.9			78.9	7.4	0.9579										419			27
28				78.9	7.2	0.9519										220			28
29				79.0	7.3	1.0027										218			29
30	7.8			79.7	7.3	0.9528								119		192			30
31	7.9			79.2	7.2	0.9624										240	1		31
TOTAL																		TOTAL	
DAILY MINIMUM	7.6			74.2	6.4											56		DAILY MINIMUM	
DAILY MAXIMUM	8.2			79.7	7.4					17			55		0.19	420	107	DAILY MAXIMUM	
WKLY. AVG. MAX.									2	17	6		46					WEEKLY AVERAGE MAX.	
MONTHLY AVG.		314	247	77.1		0.9757	3	99	2	16	5	98	44	120	0.10	181	11	MONTHLY AVERAGE	
DAILY LIMITS					6.00-9.00					334			334		33		406	DAILY LIMITS	
WEEKLY LIMITS									15	250	15		250					WEEKLY LIMITS	
MONTHLY LIMITS								85	10	167	10	85	167		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.	3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	**Phone Number**	503-266-0648	**Month/Year**	August, 2018
DEQ Permit No.	101063	**DEQ File No./Facility ID**	13691	**EPA Reference No.**	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	**County**	CLACKAMAS	**Population Served**	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X
Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	**Principal Operator Name (print)**	Jerry Nelzen	**Certification No. & Grade**	C-12668 III
Treatment Sys. Class	IV	**Principal Operator Name (print)**	David Conner	**Certification No. & Grade**	T- 9031 IV

Date		INFLUENT			EFFLUENT (Outfall 001) - Summer Limits (May 1 - Oct. 31)																Date
			BOD	TSS				BOD		CBOD		TSS					Disinfection				
			Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria			
		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.		
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2				
1		8.2	287	247	79.2	7.3	0.9648	3	99	2	16	4	98	33		0.02	192	3			1
2		8.2	279	294	78.2	7.2	0.9887	3	99	2	16	5	98	41		0.14	152				2
3		8.0			77.9	7.4	0.9892										129				3
4					78.3	7.2	0.9787										192				4
5					78.8	7.4	1.0140										365				5
6		7.8			79.2	7.2	1.0054								119		176				6
7		8.1	319	306	79.5	7.3	0.9944	4	98	3	25	6	98	50		0.15	236	3			7
8		8.1	316	311	79.6	7.3	0.9984	5	98	3	25	6	98	50		0.12	190	4			8
9		8.0			80.1	7.2	1.0099										190				9
10		7.8			80.2	7.4	0.9651										515				10
11					79.0		0.9625										311				11
12					79.1		1.0098										425				12
13		8.1			79.2	7.5	1.0021										82				13
14		8.0	325	232	78.7	7.3	0.9845	5	98	4	33	4	98	33	100	0.17	254	173			14
15		7.8	340	373	78.9	7.3	1.0109	5	99	4	34	4	99	34		0.13	227	99			15
16		8.3			79.1	7.2	1.0119										226				16
17		8.3			78.5	7.3	1.0285										574				17
18					77.5	7.3	1.0295										310				18
19					78.5	7.2	1.0329										181				19
20		8.0			78.7	7.6	0.9750										205				20
21		7.8	399	331	78.6	7.4	0.9501	2	99	1	8	2	99	16	121	0.05	242	14			21
22		7.9	323	240	78.5	7.3	0.9795	3	99	2	16	2	99	16		0.11	263	4			22
23		8.1			77.5	7.3	0.9985										231				23
24		8.0			77.1	7.3	1.0366										195				24
25					76.7	7.2	1.0158										201				25
26					76.7	7.4	1.0367										411				26
27		7.7			77.3	7.3	1.0141								128		230				27
28		7.9	436	207	77.5	7.3	0.9796	4	99	2	16	3	99	25		0.10	220	120			28
29		8.0	564	263	77.7	7.3	0.9943	4	99	3	25	4	98	33		0.08	212	65			29
30		7.9			77.8	7.2	1.0048										181				30
31		7.8			77.7	7.3	0.9443										493				31
TOTAL																				TOTAL	
DAILY MINIMUM		7.7			76.7	7.2											82			DAILY MINIMUM	
DAILY MAXIMUM		8.3			80.2	7.6					34			50		0.17	574	173		DAILY MAXIMUM	
WKLY. AVG. MAX.										4	33	6		50						WEEKLY AVERAGE MAX.	
MONTHLY AVG.			359	280	78.4		0.9978	4	99	3	21	4	99	33	117	0.11	259	19		MONTHLY AVERAGE	
DAILY LIMITS						6.00-9.00					334			334		33		406		DAILY LIMITS	
WEEKLY LIMITS										15	250	15		250						WEEKLY LIMITS	
MONTHLY LIMITS									85	10	167	10	85	167		18		126		MONTHLY LIMITS	
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W		MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	September, 2018
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X
Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	C-12668 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T- 9031 IV

Date	INFLUENT pH	INFLUENT BOD Comp. Concentration	INFLUENT TSS Comp. Concentration	EFFLUENT (Outfall 001) - Summer Limits (May 1 - Oct. 31) Temperature (Daily Max.)	pH	Total Flow	BOD Comp. Concentration	BOD Calc. Removal	CBOD Comp. Concentration	CBOD Comp. Loading	TSS Comp. Concentration	TSS Calc. Removal	TSS Comp. Loading	Alkalinity	Ammonia Nitrogen	Disinfection UV Radiation Intensity (Dosage)	Disinfection Bacteria E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
	S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1				77.0		0.9446										259			1
2				77.4		0.9366										436			2
3				76.4		1.1042										555			3
4	8.4	356	270	77.4	7.4	0.9857	3	99	2	16	5	98	41	136	0.10	188			4
5	8.3	196	286	77.4	7.3	1.1128	3	98	2	19	4	99	37		0.08	197	7		5
6	8.0			77.9	7.2	0.9724										157	9		6
7	8.3			77.9	7.2	0.9194										124			7
8				77.1	7.2	1.0094										202			8
9				77.5	7.3	1.0282										221			9
10	7.6			77.2	7.6	0.9916								128		140			10
11	8.0	292	377	76.6	7.2	0.9934	4	99	2	17	7	98	58		0.16	164	17		11
12	7.9	356	311	76.4	7.2	1.0034	3	99	2	17	6	98	50		0.03	169			12
13	8.2			75.9	7.3	0.9859										256	14		13
14	7.5			76.2	7.3	0.9934										104			14
15				75.3	7.3	0.9689										268			15
16				75.4	7.5	1.0560										699			16
17	7.9			75.5	7.4	0.9972								127		136			17
18	8.0	263	278	75.6	7.3	0.9514	2	99	2	16	4	99	32		0.08	148	7		18
19	8.3	286	297	75.3	7.3	0.9734	3	99	2	16	5	98	41		0.09	129	11		19
20	8.3			75.3	7.3	0.9731										164			20
21	8.1			74.8	7.2	0.9919										167			21
22				75.2	7.3	1.0354										199			22
23				75.1	7.4	1.0714										389			23
24	8.2			74.5	7.2	0.9765								125		97			24
25	8.3	340	266	74.6	7.2	0.9714	3	99	2	16	4	98	32		0.14	124	31		25
26	8.4	552	314	74.8	7.2	0.9879	3	99	3	25	4	99	33		0.01	106	46		26
27	8.3			75.1	7.3	0.9783										104			27
28	8.3			75.0	7.3	0.9474										115			28
29				74.6		0.9600										172			29
30				74.9		1.0414										121			30
TOTAL																		TOTAL	
DAILY MINIMUM	7.5			74.5	7.2											97		DAILY MINIMUM	
DAILY MAXIMUM	8.4			77.9	7.6					25			58		0.16	699	46	DAILY MAXIMUM	
WKLY. AVG. MAX.									3	20	7		54					WEEKLY AVERAGE MAX.	
MONTHLY AVG.		330	300	76.0		0.9978	3	99	2	18	5	98	41	129	0.09	210	14	MONTHLY AVERAGE	
DAILY LIMITS					6.00-9.00					334			334		33		406	DAILY LIMITS	
WEEKLY LIMITS									15	250	15		250					WEEKLY LIMITS	
MONTHLY LIMITS								85	10	167	10	85	167		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.	3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	October, 2018
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X Authorized Signature Date

David Conner Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	C-12668 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T - 9031 IV

		INFLUENT			EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30)																
			BOD	TSS				BOD		CBOD		TSS					Disinfection			
			Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria		
Date		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1		8.0			75.1	7.3	0.9718								135		109			1
2		8.1	356	244	74.6	7.3	0.9426	4	99	3	24	5	98	39		0.08	98	69		2
3		8.3	339	322	74.0	7.3	0.9679	4	99	3	24	6	98	48		0.12	90	86		3
4		8.1			73.5	7.3	0.9921										88			4
5		8.2			72.9	7.2	0.9917										92			5
6					72.7	7.3	0.9723										197			6
7					73.1	7.2	1.0727										160			7
8		7.9			73.4	7.3	1.0035								124		97			8
9		8.1	383	300	73.4	7.2	0.9538	4	99	3	24	5	98	40		0.02	89	*649	E. coli retest was 16,31,10,20, and 12 for a geometric mean of 16 as recorded on the 10th.	9
10		8.1	335	281	72.8	7.2	0.9896	4	99	2	17	7	98	58		0.10	177	* 16	The 649 exceedance and 16 geometric mean are not used in the monthly calculation, however the	10
11		8.4			72.7	7.2	0.9821										216	17	5 resamples are included in the monthly calculation.	11
12		8.4			72.6	7.3	0.9911										322			12
13					72.0		0.9742										339			13
14					72.0		1.0451										210			14
15		8.1			72.1	7.2	0.9941								128		121			15
16		8.2	315	280	71.7	7.2	0.9673	4	99	3	24	6	98	48		0.02	183	7		16
17		8.3	312	280	71.7	7.2	0.9808	5	98	3	25	7	98	57		0.14	212	13		17
18		8.1			71.4	7.2	0.9798										203			18
19		8.4			71.3	7.2	0.9471										184			19
20					71.4	7.4	0.9467										403			20
21					71.9	7.4	1.0533										595			21
22		8.6			71.3	7.4	0.9833								133		147			22
23		8.5	325	343	71.0	7.3	0.9339	3	99	2	16	3	99	23		0.01	188	23		23
24		8.4	324	294	71.2	7.3	0.9651	3	99	2	16	3	99	24		0.02	143	28		24
25		8.2			71.0	7.3	0.9633										218			25
26		8.3			71.4	7.3	0.9491										216			26
27					71.9	7.4	1.1027										500			27
28					71.5	7.3	1.1424										215			28
29		8.3			71.1	7.3	0.9925								128		177			29
30		8.4	213	253	70.7	7.2	0.9528	5	98	3	24	6	98	48		0.16	173	60		30
31		8.3	415	312	70.8	7.3	0.9527	3	99	2	16	2	99	16		0.02	162	12		31
TOTAL																			TOTAL	
DAILY MINIMUM		7.9			70.7	7.2											88		DAILY MINIMUM	
DAILY MAXIMUM		8.6			75.1	7.4					25			58		0.16	595	96	DAILY MAXIMUM	
WKLY. AVG. MAX.										3	24	7		53					WEEKLY AVERAGE MAX.	
MONTHLY AVG.			312	291	72.8		0.9869	4	99	3	21	5	98	40	130	0.07	204	22	MONTHLY AVERAGE	
DAILY LIMITS						6.00-9.00					834			1000		33		406	DAILY LIMITS	
WEEKLY LIMITS										40	667	45		750					WEEKLY LIMITS	
MONTHLY LIMITS									85	25	417	30	85	500			126		MONTHLY LIMITS	
MIN. MON. FREQ.		2/W	2/W	2/W	Daily	5/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	November, 2018
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

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X Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	C-12668 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T - 9031 IV

		INFLUENT			EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30)															
			BOD	TSS				BOD		CBOD		TSS					Disinfection			
			Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp.	Comp.	Calc.	Comp.	Grab		UV	Bacteria		
Date		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	Date
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1		8.2			70.9	7.3	1.0092										162			1
2		8.3			71.2	7.3	0.9479										152			2
3					70.1	7.3	1.0286										316			3
4					70.8	7.2	1.0649										186			4
5		7.7			70.9	7.4	0.9720								137		176			5
6		8.2	243	190	70.6	7.3	0.9999	6	98	4	33	6	97	50		0.08	167	47		6
7		8.2	259	280	69.8	7.3	0.9407	6	98	4	31	6	98	47		0.10	264	19		7
8		8.6			69.7	7.2	0.9455										94			8
9		8.2			68.8	7.3	0.9011										125			9
10					68.4	7.2	1.0028										131			10
11					67.7	7.4	1.0098										152			11
12					67.7	7.1	1.0233										128			12
13		8.4	165	284	67.4	7.2	0.9133	4	98	3	23	4	99	30	93	0.02	99	4		13
14		8.2	413	264	67.4	7.2	0.9577	5	99	3	24	5	98	40		0.11	154	5		14
15		8.5			67.5	7.2	0.9773										164			15
16		8.5			67.9	7.2	0.9480										183			16
17					67.0	7.3	1.0172										141			17
18					66.5	7.2	1.0367										130			18
19		8.4	439	318	66.8	7.3	0.9486	4	99	3	24	6	98	47	136	0.08	129	15		19
20		8.4	395	288	66.6	7.2	0.9748	5	99	3	24	7	98	57		0.09	107	5		20
21		8.1			66.4	7.2	1.0218										167			21
22					66.6	7.3	1.0952										141			22
23					66.9	7.2	0.9581										272			23
24					66.1	7.3	0.9696										318			24
25					66.3	7.4	1.0579										427			25
26		8.1			66.6	7.2	1.1029								137		116			26
27		8.1	240	302	66.7	7.2	1.0212	4	98	3	26	7	98	60		0.13	131	3		27
28		8.3	409	301	65.9	7.1	1.0374	5	99	4	35	7	98	61		0.27	133	3		28
29		8.3			65.6	7.2	0.9750										137			29
30		8.5			65.9	7.3	1.0159										163			30
TOTAL																			TOTAL	
DAILY MINIMUM		7.7			65.6	7.1											94		DAILY MINIMUM	
DAILY MAXIMUM		8.6			71.2	7.4					35			51		0.27	427	47	DAILY MAXIMUM	
WKLY. AVG. MAX.										4	32	7		60					WEEKLY AVERAGE MAX.	
MONTHLY AVG.			320	278	67.9		0.9958	5	98	3	27	6	98	49	126	0.11	172	8	MONTHLY AVERAGE	
DAILY LIMITS						6.00-9.00					834			1000		33		406	DAILY LIMITS	
WEEKLY LIMITS										40	667	45		750					WEEKLY LIMITS	
MONTHLY LIMITS									85	25	417	30	85	500		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

Discharge Monitoring Report - Oregon Department of Environmental Quality

Facility Name	City of Canby	Phone Number	503-266-0648	Month/Year	December, 2018
DEQ Permit No.	101063	DEQ File No./Facility ID	13691	EPA Reference No.	OR-002021-4
Plant Type	CLASS IV ACTIVATED SLUDGE	County	CLACKAMAS	Population Served	14206

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

X
Authorized Signature Date

David Conner
Name (Print)

Operator Certification

Collection Sys. Class	III	Principal Operator Name (print)	Jerry Nelzen	Certification No. & Grade	C-12668 III
Treatment Sys. Class	IV	Principal Operator Name (print)	David Conner	Certification No. & Grade	T - 9031 IV

Date		INFLUENT			EFFLUENT (Outfall 001) - Winter Limits (Nov. 1 - Apr. 30)															Date
			BOD	TSS				BOD		CBOD		TSS					Disinfection			
			Comp.	Comp.		Grab		Comp.	Calc.	Comp.	Comp	Comp.	Calc.	Comp.	Grab		UV	Bacteria		
		pH	Concentration	Concentration	Temperature (Daily Max.)	pH	Total Flow	Concentration	Removal	Concentration	Loading	Concentration	Removal	Loading	Alkalinity	Ammonia Nitrogen	Radiation Intensity (Dosage)	E. coli	DAILY LOG Regarding breakdowns, bypassing, odors, complaints, etc.	
		S.U.	mg/L	mg/L	°F	S.U.	MGD	mg/L	%	mg/L	lbs.	mg/L	%	lbs.	mg/L	mg/L	mW-s/cm2			
1					65.4		1.0090										158			1
2					65.4		1.0904										110			2
3		8.4			65.2	7.2	0.9636								136		130			3
4		8.3	215	271	61.1	7.2	0.9503	4	98	3	24	3	99	24		1.14	133	2		4
5		8.5	267	277	63.3	7.2	0.9540	5	98	4	32	7	97	56		0.40	168	1		5
6		8.4			63.0	7.1	0.8816										149			6
7		8.5			63.0	7.1	0.9361										131			7
8					63.2	7.2	0.9833										287			8
9					63.4	7.3	1.1069										405			9
10		8.0			63.9	7.1	1.0136								124		116			10
11		8.3	194	415	63.9	7.2	1.0460	4	98	3	26	6	99	52		0.02	141	4		11
12		8.3	262	401	63.7	7.2	1.0112	4	98	3	25	7	98	59		0.06	154	2		12
13		7.9			63.8	7.2	0.9798										205			13
14		8.2			63.3	7.2	0.9899										120			14
15					63.3	7.1	1.0276										182			15
16					63.6	7.3	1.1110										152			16
17		8.2			63.8	7.2	1.1437								137		135			17
18		8.1			63.7	7.2	1.0294										78	3		18
19		8.4	212	258	64.0	7.1	1.0105	4	98	3	25	7	97	59		0.20	161	3		19
20		8.2	314	309	63.8	7.1	0.9674	5	98	3	24	8	97	65		0.31	122			20
21		8.3			63.1	7.2	0.9699										230			21
22					63.1	7.2	1.0877										171			22
23					63.7	7.3	1.1317										215			23
24					63.6	7.2	1.0500										122			24
25					63.6	7.3	0.9039										328			25
26		8.1	492	427	63.4	7.2	1.0100	5	99	3	25	6	99	51	144	0.52	195	1		26
27		8.2	337	236	63.4	7.3	0.9660	4	99	3	24	7	97	56		0.14	164	1		27
28		8.4			63.3	7.3	0.9715										176			28
29					63.3	7.2	1.0592										252			29
30					63.2	7.2	1.0253										124			30
31		8.2			63.1	7.2	0.9611								141		165			31
TOTAL																			TOTAL	
DAILY MINIMUM		7.9			61.1	7.1											78		DAILY MINIMUM	
DAILY MAXIMUM		8.5			65.4	7.3					32			65		1.14	405	4	DAILY MAXIMUM	
WKLY. AVG. MAX.										4	28	8		62					WEEKLY AVERAGE MAX.	
MONTHLY AVG.			267	324	63.6		1.0110	4	98	3	26	6	98	53	136	0.35	174	2	MONTHLY AVERAGE	
DAILY LIMITS						6.00-9.00					834			1000		33		406	DAILY LIMITS	
WEEKLY LIMITS										40	667	45		750					WEEKLY LIMITS	
MONTHLY LIMITS									85	25	417	30	85	500		18		126	MONTHLY LIMITS	
MIN. MON. FREQ.		3/W	2/W	2/W	Daily	3/W	Daily	2/W	Monthly	2/W	2/W	2/W	Monthly	2/W	Monthly	2/W	Daily	2/W	MIN. MONITORING FREQ.	

APPENDIX B

Rainfall Statistics

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service
Current Location: Elev: 167 ft. Lat: 45.3558° N Lon: -122.6047° W
Station: **OREGON CITY, OR US USC00356334**

Summary of Monthly Normals 1981-2010

Generated on 06/26/2019

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Precipitation (in.)								
	Totals	Mean Number of Days				Precipitation Probabilities Probability that precipitation will be equal to or less than the indicated amount		
	Means	Daily Precipitation				Monthly Precipitation vs. Probability Levels		
Month	Mean	>= 0.01	>= 0.10	>= 0.50	>= 1.00	0.25	0.50	0.75
01	6.78	17.6	13.0	4.5	1.0	4.89	7.51	9.15
02	4.62	13.2	10.0	3.2	0.8	2.80	4.35	5.99
03	4.67	16.6	12.0	3.1	0.6	3.43	4.75	5.60
04	3.47	14.4	9.1	1.9	0.2	2.40	3.11	4.63
05	2.46	11.4	7.1	1.4	0.1	1.54	2.00	3.41
06	1.74	7.9	4.6	0.8	0.2	1.03	1.59	2.15
07	0.65	3.8	1.5	0.3	0.1	0.22	0.40	0.65
08	0.72	3.1	2.1	0.4	0.1	0.08	0.41	1.05
09	1.61	5.4	3.6	0.9	0.2	0.67	1.42	2.27
10	3.61	10.3	7.4	2.5	0.6	2.17	3.57	4.96
11	6.56	17.1	12.8	5.0	1.3	4.47	6.35	8.74
12	7.32	16.4	13.0	5.4	1.9	4.35	6.57	9.74
Summary	44.21	137.2	96.2	29.4	7.1	28.05	42.03	58.34

-7777: a non-zero value that would round to zero

Empty or blank cells indicate data is missing or insufficient occurrences to compute value

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service

Summary of Monthly Normals
1981-2010

Generated on 06/26/2019

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Current Location: Elev: 167 ft. Lat: 45.3558° N Lon: -122.6047° W
Station: **OREGON CITY, OR US USC00356334**

Temperature (°F)

	Mean						Cooling Degree Days Base (above)						Heating Degree Days Base (above)				Mean Number of Days					
Month	Daily Max	Daily Min	Mean	Long Term Max Std Dev	Long Term Min Std Dev	Long Term Avg Std Dev	55	57	60	65	70	72	55	57	60	65	Max >= 100	Max >= 90	Max >= 50	Max <= 32	Min <= 32	Min <= 0
01	48.5	36.5	42.5	2.8	2.9	2.7	-7777	-7777	-7777	0	0	0	388	450	543	697	0.0	0.0	13.6	0.3	8.4	0.0
02	53.0	37.1	45.1	2.7	2.9	2.6	2	1	-7777	0	0	0	280	335	419	559	0.0	0.0	19.3	0.2	5.8	0.0
03	58.3	39.8	49.0	3.2	2.0	2.4	10	4	1	-7777	0	0	194	251	340	494	0.0	0.0	27.4	0.0	2.2	0.0
04	63.6	42.9	53.3	3.2	2.1	2.3	49	31	14	2	-7777	-7777	102	144	216	355	0.0	-7777	29.3	0.0	0.4	0.0
05	70.4	47.9	59.2	3.7	1.9	2.5	156	115	68	24	5	3	27	49	94	205	-7777	0.8	31.0	0.0	0.0	0.0
06	76.0	52.6	64.3	3.2	1.4	2.1	281	225	149	59	18	10	2	6	20	80	0.2	1.9	30.0	0.0	0.0	0.0
07	83.3	56.5	69.9	3.6	1.7	2.4	462	400	308	166	67	42	-7777	-7777	1	14	0.9	6.7	31.0	0.0	0.0	0.0
08	83.7	56.4	70.1	2.4	1.8	1.8	467	404	312	167	63	38	0	-7777	-7777	10	0.6	6.3	31.0	0.0	0.0	0.0
09	78.0	52.2	65.1	3.3	1.7	2.0	305	249	171	72	19	10	2	6	18	69	0.2	2.7	30.0	0.0	0.0	0.0
10	65.1	45.9	55.5	2.9	1.8	1.9	79	52	25	5	1	-7777	64	98	164	300	0.0	0.1	30.6	0.0	0.2	0.0
11	53.1	40.3	46.7	2.9	3.2	2.9	6	2	-7777	-7777	0	0	255	311	399	549	0.0	0.0	21.4	0.1	3.1	0.0
12	46.5	35.5	41.0	2.6	2.7	2.6	-7777	-7777	0	0	0	0	434	496	589	744	0.0	0.0	8.8	0.7	8.5	0.0
Summary	65.0	45.3	55.1	3.0	2.2	2.4	1817	1483	1048	495	173	103	1748	2146	2803	4076	1.9	18.5	303.4	1.3	28.6	0.0

-7777: a non-zero value that would round to zero

Empty or blank cells indicate data is missing or insufficient occurrences to compute value

I&I Annual Data Daily 1/1/2018 - 12/31/2018	City of Canby Effluent Flow Mgd MGD	City of Canby Plant Data Precip In/Day Inches/Day	
1/1/2018	0.9982	0	
1/2/2018	0.9881	0	
1/3/2018	0.983	0	
1/4/2018	0.9866	0.2	
1/5/2018	0.9833	0.28	
1/6/2018	0.967	0.02	
1/7/2018	1.0353	0.05	
1/8/2018	1.0415	0.63	
1/9/2018	1.0291	0.16	
1/10/2018	1.0685	0.42	
1/11/2018	1.1455	0.48	
1/12/2018	0.9173	0.02	
1/13/2018	0.9625	0	
1/14/2018	0.9589	0	
1/15/2018	1.084	0.14	
1/16/2018	0.9827	0.02	
1/17/2018	1.0905	0.7	
1/18/2018	1.021	0.4	
1/19/2018	0.9139	0.1	
1/20/2018	0.9848	0.05	
1/21/2018	1.0357	0.2	
1/22/2018	1.0366	0.18	
1/23/2018	1.129	0.9	
1/24/2018	1.0596	0.18	
1/25/2018	1.0029	0.22	
1/26/2018	0.9368	0.18	
1/27/2018	0.987	0.15	
1/28/2018	1.0346	0	
1/29/2018	1.0488	0.4	
1/30/2018	0.9781	0.02	January total
1/31/2018	0.9833	0	

2/1/2018	0.9865	0.16
2/2/2018	0.9345	0.05
2/3/2018	0.9998	0
2/4/2018	1.0432	0
2/5/2018	0.9979	0
2/6/2018	0.9708	0
2/7/2018	0.9982	0
2/8/2018	1.0009	0
2/9/2018	0.922	0
2/10/2018	0.9579	0
2/11/2018	1.0082	0
2/12/2018	0.9521	0
2/13/2018	0.9228	0.26
2/14/2018	0.9449	0.1
2/15/2018	0.941	0.1
2/16/2018	0.9405	0.02
2/17/2018	1.0081	0.17
2/18/2018	0.9901	0.14
2/19/2018	1.0225	0.2
2/20/2018	0.9579	0.32
2/21/2018	0.9747	0.1
2/22/2018	0.9746	0.1
2/23/2018	0.9528	0.18
2/24/2018	0.9628	0.06
2/25/2018	1.0277	0.2
2/26/2018	0.9588	0
2/27/2018	0.9371	0.12
2/28/2018	0.9919	0.28

February Total

2.56

3/1/2018	0.9586	0.03	
3/2/2018	0.9615	0.03	
3/3/2018	0.997	0	
3/4/2018	1.0366	0.01	
3/5/2018	0.95	0	
3/6/2018	0.9224	0	
3/7/2018	0.9727	0	
3/8/2018	1.0224	0.21	
3/9/2018	0.9575	0	
3/10/2018	0.9401	0	
3/11/2018	1.0069	0	
3/12/2018	0.996	0.04	
3/13/2018	0.9991	0.54	
3/14/2018	0.9128	0.14	
3/15/2018	0.9354	0.36	
3/16/2018	0.9422	0.04	
3/17/2018	1.0121	0.1	
3/18/2018	1.0403	0	
3/19/2018	0.9978	0	
3/20/2018	0.9605	0	
3/21/2018	1.0731	0.56	
3/22/2018	1.0256	0.6	
3/23/2018	1.0427	0.42	
3/24/2018	1.0235	0.15	
3/25/2018	1.0003	0.04	
3/26/2018	0.9514	0.03	
3/27/2018	0.9662	0.04	
3/28/2018	0.952	0	
3/29/2018	0.9648	0	
3/30/2018	0.9682	0	March Total
3/31/2018	0.9801	0	3.34

4/1/2018	1.0458	0.21	
4/2/2018	0.9651	0.02	
4/3/2018	0.9445	0.01	
4/4/2018	0.9674	0.02	
4/5/2018	1.0086	0.44	
4/6/2018	0.9898	0.4	
4/7/2018	1.2007	1.46	
4/8/2018	1.1879	0.26	
4/9/2018	1.0091	0.14	
4/10/2018	0.9497	0.19	
4/11/2018	1.0211	0.48	
4/12/2018	1.0281	0.28	
4/13/2018	0.9947	0.2	
4/14/2018	1.075	0.4	
4/15/2018	1.1767	0.52	
4/16/2018	1.0412	0.54	
4/17/2018	1.0074	0.15	
4/18/2018	1.0294	0.01	
4/19/2018	1.0158	0	
4/20/2018	0.9953	0	
4/21/2018	0.9747	0	
4/22/2018	1.0578	0	
4/23/2018	1.0086	0	
4/24/2018	0.9651	0	
4/25/2018	0.9762	0	
4/26/2018	0.9902	0	
4/27/2018	0.9596	0.1	
4/28/2018	1.0086	0.1	
4/29/2018	1.0516	0.05	April Total
4/30/2018	0.9834	0.01	5.99

5/1/2018	0.9703	0
5/2/2018	0.9801	0
5/3/2018	0.9577	0
5/4/2018	0.9359	0
5/5/2018	1.0117	0.01
5/6/2018	1.0677	0.01
5/7/2018	0.9333	0
5/8/2018	0.9673	0.19
5/9/2018	0.9555	0.03
5/10/2018	0.998	0.11
5/11/2018	0.9615	0
5/12/2018	1.0253	0
5/13/2018	1.0241	0
5/14/2018	0.9568	0
5/15/2018	0.9641	0
5/16/2018	1.0186	0
5/17/2018	0.9632	0
5/18/2018	0.9475	0
5/19/2018	1.0273	0
5/20/2018	1.0507	0
5/21/2018	0.9884	0
5/22/2018	0.9767	0
5/23/2018	0.9981	0
5/24/2018	1.0082	0
5/25/2018	0.9629	0
5/26/2018	0.9404	0
5/27/2018	0.897	0
5/28/2018	1.0623	0
5/29/2018	0.9828	0
5/30/2018	1.0249	0 May Total
5/31/2018	1.0248	0.08 0.43

6/1/2018	0.9599	0
6/2/2018	1.0296	0
6/3/2018	1.0608	0
6/4/2018	0.9994	0
6/5/2018	0.968	0
6/6/2018	1.0073	0
6/7/2018	0.9759	0
6/8/2018	1.0028	0.25
6/9/2018	1.0325	0.48
6/10/2018	1.0842	0.22
6/11/2018	1.012	0
6/12/2018	0.9579	0
6/13/2018	0.9774	0
6/14/2018	1.0079	0
6/15/2018	0.9786	0
6/16/2018	0.9772	0
6/17/2018	0.9813	0
6/18/2018	0.9919	0
6/19/2018	0.9882	0
6/20/2018	0.9573	0
6/21/2018	0.9719	0
6/22/2018	0.9554	0
6/23/2018	1.0085	0
6/24/2018	1.0185	0
6/25/2018	0.9657	0
6/26/2018	0.9632	0
6/27/2018	0.979	0
6/28/2018	0.9608	0
6/29/2018	0.9697	0
6/30/2018	0.9879	0

7/1/2018	0.993	0
7/2/2018	0.9688	0
7/3/2018	0.9571	0
7/4/2018	1.0008	0
7/5/2018	0.987	0
7/6/2018	0.9711	0
7/7/2018	0.9545	0
7/8/2018	1.0097	0
7/9/2018	1.012	0
7/10/2018	0.9823	0
7/11/2018	0.9856	0
7/12/2018	1.0173	0
7/13/2018	0.9534	0
7/14/2018	0.9517	0
7/15/2018	0.9976	0
7/16/2018	0.9983	0
7/17/2018	0.9404	0
7/18/2018	0.9132	0
7/19/2018	0.998	0
7/20/2018	1.0017	0
7/21/2018	0.9588	0
7/22/2018	0.9875	0
7/23/2018	0.9497	0
7/24/2018	1.0218	0
7/25/2018	0.9604	0
7/26/2018	0.947	0
7/27/2018	0.9579	0
7/28/2018	0.9519	0
7/29/2018	1.0027	0
7/30/2018	0.9528	0
7/31/2018	0.9624	0

8/1/2018	0.9848	0
8/2/2018	0.9887	0
8/3/2018	0.9892	0
8/4/2018	0.9787	0
8/5/2018	1.014	0
8/6/2018	1.0054	0
8/7/2018	0.9944	0
8/8/2018	0.9984	0
8/9/2018	1.0099	0
8/10/2018	0.9651	0
8/11/2018	0.9625	0
8/12/2018	1.0098	0
8/13/2018	1.0021	0
8/14/2018	0.9845	0
8/15/2018	1.0109	0
8/16/2018	1.0119	0
8/17/2018	1.0285	0
8/18/2018	1.0295	0
8/19/2018	1.0329	0
8/20/2018	0.975	0
8/21/2018	0.9501	0
8/22/2018	0.9795	0
8/23/2018	0.9985	0
8/24/2018	1.0366	0
8/25/2018	1.0158	0
8/26/2018	1.0367	0
8/27/2018	1.0141	0
8/28/2018	0.9796	0
8/29/2018	0.9943	0
8/30/2018	1.0048	0
8/31/2018	0.9443	0

9/1/2018	0.9446	0
9/2/2018	0.9366	0
9/3/2018	1.1042	0
9/4/2018	0.9857	0
9/5/2018	1.1128	0
9/6/2018	0.9724	0
9/7/2018	0.9194	0
9/8/2018	1.0094	0
9/9/2018	1.0982	0.05
9/10/2018	0.9916	0.04
9/11/2018	0.9934	0.21
9/12/2018	1.0034	0.14
9/13/2018	0.9859	0.02
9/14/2018	0.9934	0
9/15/2018	0.9689	0.17
9/16/2018	1.056	0.02
9/17/2018	0.9972	0.01
9/18/2018	0.9514	0
9/19/2018	0.9734	0
9/20/2018	0.9731	0
9/21/2018	0.9919	0.03
9/22/2018	1.0354	0.03
9/23/2018	1.0714	0
9/24/2018	0.9785	0
9/25/2018	0.9714	0
9/26/2018	0.9879	0
9/27/2018	0.9783	0
9/28/2018	0.9474	0
9/29/2018	0.96	0
9/30/2018	1.0414	0.01

10/1/2018	0.9718	0
10/2/2018	0.9426	0
10/3/2018	0.9679	0
10/4/2018	0.9921	0
10/5/2018	0.9917	0.74
10/6/2018	0.9723	0.01
10/7/2018	1.0727	0.29
10/8/2018	1.0035	0.04
10/9/2018	0.9538	0.01
10/10/2018	0.9896	0
10/11/2018	0.9821	0
10/12/2018	0.9911	0
10/13/2018	0.9742	0
10/14/2018	1.0451	0
10/15/2018	0.9941	0
10/16/2018	0.9673	0
10/17/2018	0.9808	0
10/18/2018	0.9798	0
10/19/2018	0.9471	0
10/20/2018	0.9467	0
10/21/2018	1.0533	0
10/22/2018	0.9833	0.01
10/23/2018	0.9339	0.01
10/24/2018	0.9651	0
10/25/2018	0.9633	0.4
10/26/2018	0.9491	0.27
10/27/2018	1.1027	1.12
10/28/2018	1.1424	0.37
10/29/2018	0.9925	0.09
10/30/2018	0.9528	0.15
10/31/2018	0.9527	0.03

11/1/2018	1.0092	0.12
11/2/2018	0.9479	0
11/3/2018	1.0286	0.12
11/4/2018	1.0649	0.125
11/5/2018	0.972	0.23
11/6/2018	0.9999	0
11/7/2018	0.9407	0
11/8/2018	0.9455	0
11/9/2018	0.9011	0
11/10/2018	1.0028	0
11/11/2018	1.0098	0
11/12/2018	1.0233	0
11/13/2018	0.9133	0
11/14/2018	0.9577	0.02
11/15/2018	0.9773	0
11/16/2018	0.948	0
11/17/2018	1.0172	0
11/18/2018	1.0367	0
11/19/2018	0.9488	0
11/20/2018	0.9748	0
11/21/2018	1.0218	0.18
11/22/2018	1.0952	0.6
11/23/2018	0.9581	0.4
11/24/2018	0.9696	0
11/25/2018	1.0579	0
11/26/2018	1.1029	1
11/27/2018	1.0212	0.29
11/28/2018	1.0374	0.18
11/29/2018	0.975	0.09
11/30/2018	1.0159	0.5

12/1/2018	1.009	0.05
12/2/2018	1.0904	0.01
12/3/2018	0.9636	0
12/4/2018	0.9503	0
12/5/2018	0.954	0
12/6/2018	0.8816	0
12/7/2018	0.9361	0.05
12/8/2018	0.9833	0
12/9/2018	1.1069	0.59
12/10/2018	1.0136	0.07
12/11/2018	1.046	0.6
12/12/2018	1.0112	0.02
12/13/2018	0.9798	0.05
12/14/2018	0.9899	0.07
12/15/2018	1.0276	0.15
12/16/2018	1.111	0.5
12/17/2018	1.1437	1.45
12/18/2018	1.0294	0.17
12/19/2018	1.0105	0.02
12/20/2018	0.9674	0.09
12/21/2018	0.9699	0
12/22/2018	1.0877	0.6
12/23/2018	1.1317	0.8
12/24/2018	1.05	0.02
12/25/2018	0.9039	0.07
12/26/2018	1.01	0.14
12/27/2018	0.966	0.06
12/28/2018	0.9715	0.17
12/29/2018	1.0592	0.49
12/30/2018	1.0253	0.05
12/31/2018	0.9611	0.02
Sum	363.0520	33.81
Avg	0.9947	0.09
Max	1.2007	1.46
Min	0.8816	0.00

APPENDIX C

Flood Plain Maps

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 10. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242,** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was derived from multiple sources. High resolution color orthophotos produced by Merrick & Co., Pixxures, Inc., and Clean Water Services covered portions of the county. USGS Digital Quadrangles at a scale of 1:12000 or less dated 6/20/94 covered the remainder of the county.

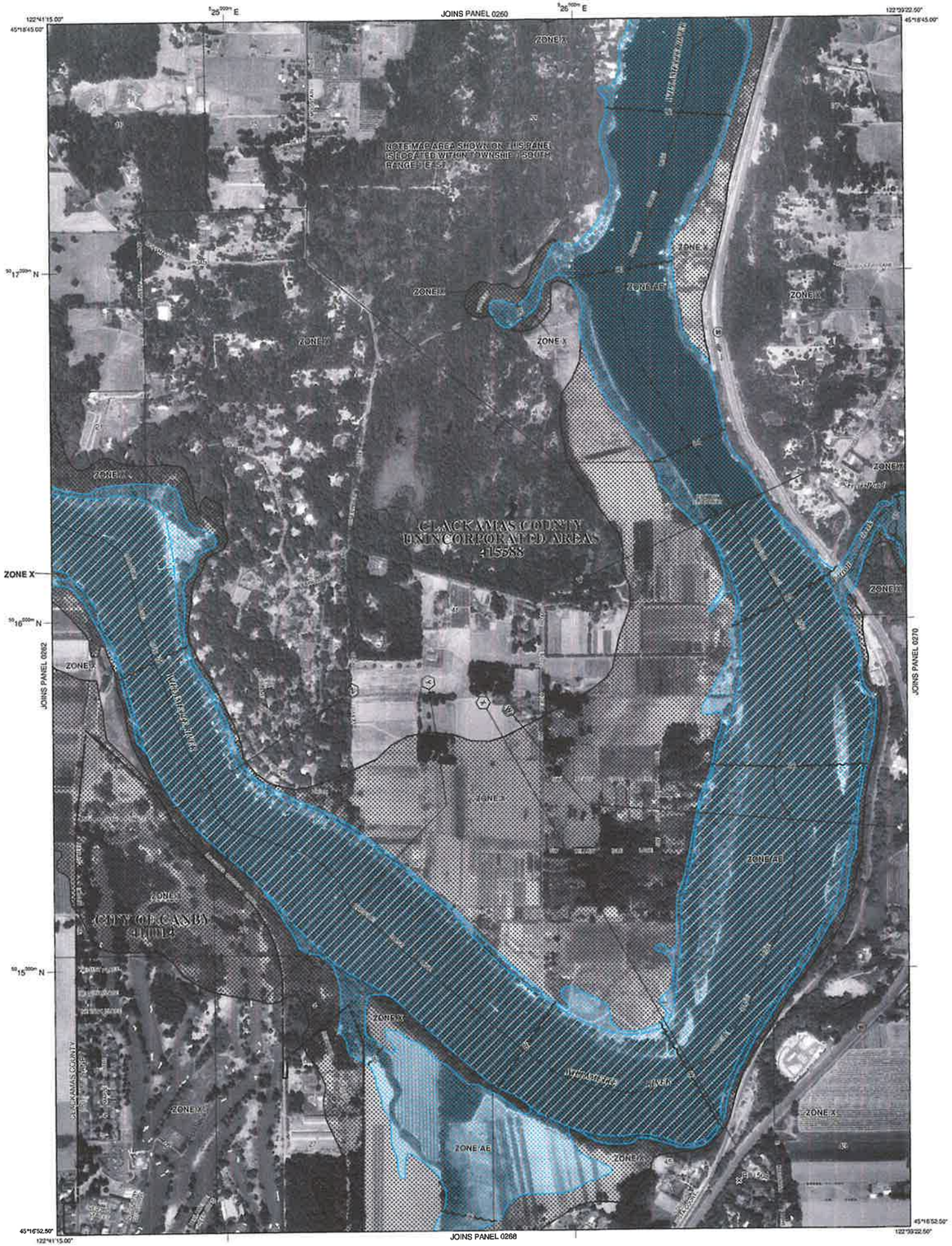
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The **1% annual chance flood** (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equalled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

- (A)—(A) — Cross section line
- (23)—(23) — Transect line
- 97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4275 000m N — 1000-meter Universal Transverse Mercator grid ticks, zone 10
- 6000000 M — 5000-foot grid ticks: Oregon State Plane coordinate system, north zone (FIPSZONE 3601), Lambert Conformal Conic
- DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
June 17, 2008
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0266D

FIRM

FLOOD INSURANCE RATE MAP

CLACKAMAS COUNTY, OREGON AND INCORPORATED AREAS

PANEL 266 OF 1175
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CLACKAMAS COUNTY	415588	0266	D
CANBY, CITY OF	410014	0266	D

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
41005C0266D

EFFECTIVE DATE
JUNE 17, 2008

Federal Emergency Management Agency

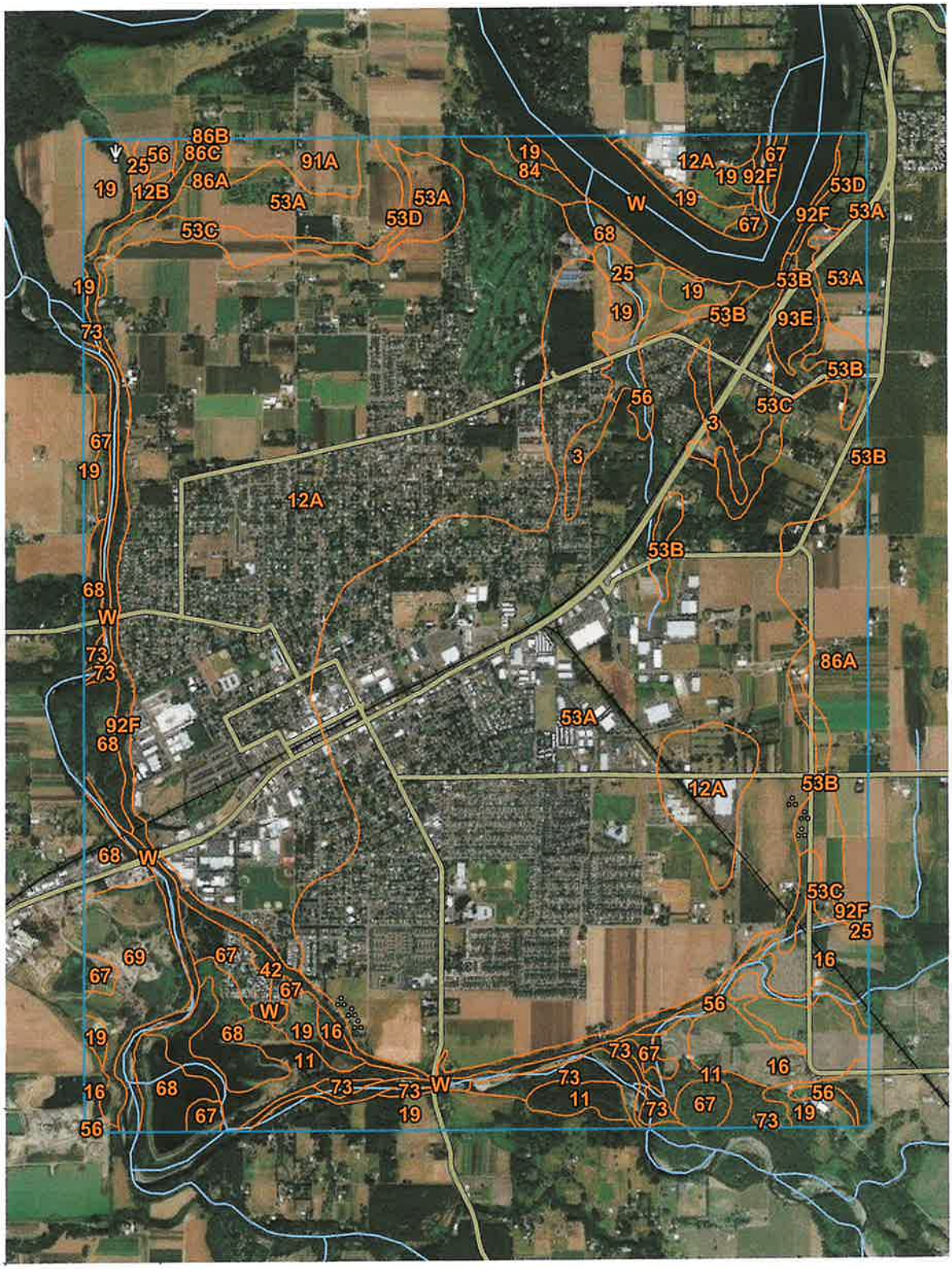
APPENDIX D

Soils Map and Description

122° 43' 2" W

122° 39' 6" W

45° 17' 49" N



45° 14' 8" N

122° 43' 2" W

122° 39' 6" W

Map Scale: 1:33,200 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 450 900 1800 2700

Feet: 0 1500 3000 6000 9000

Map projection: Web Mercator Corner coordinates: WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Clackamas County Area, Oregon
Survey Area Data: Version 14, Sep 18, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 19, 2015—Sep 13, 2016

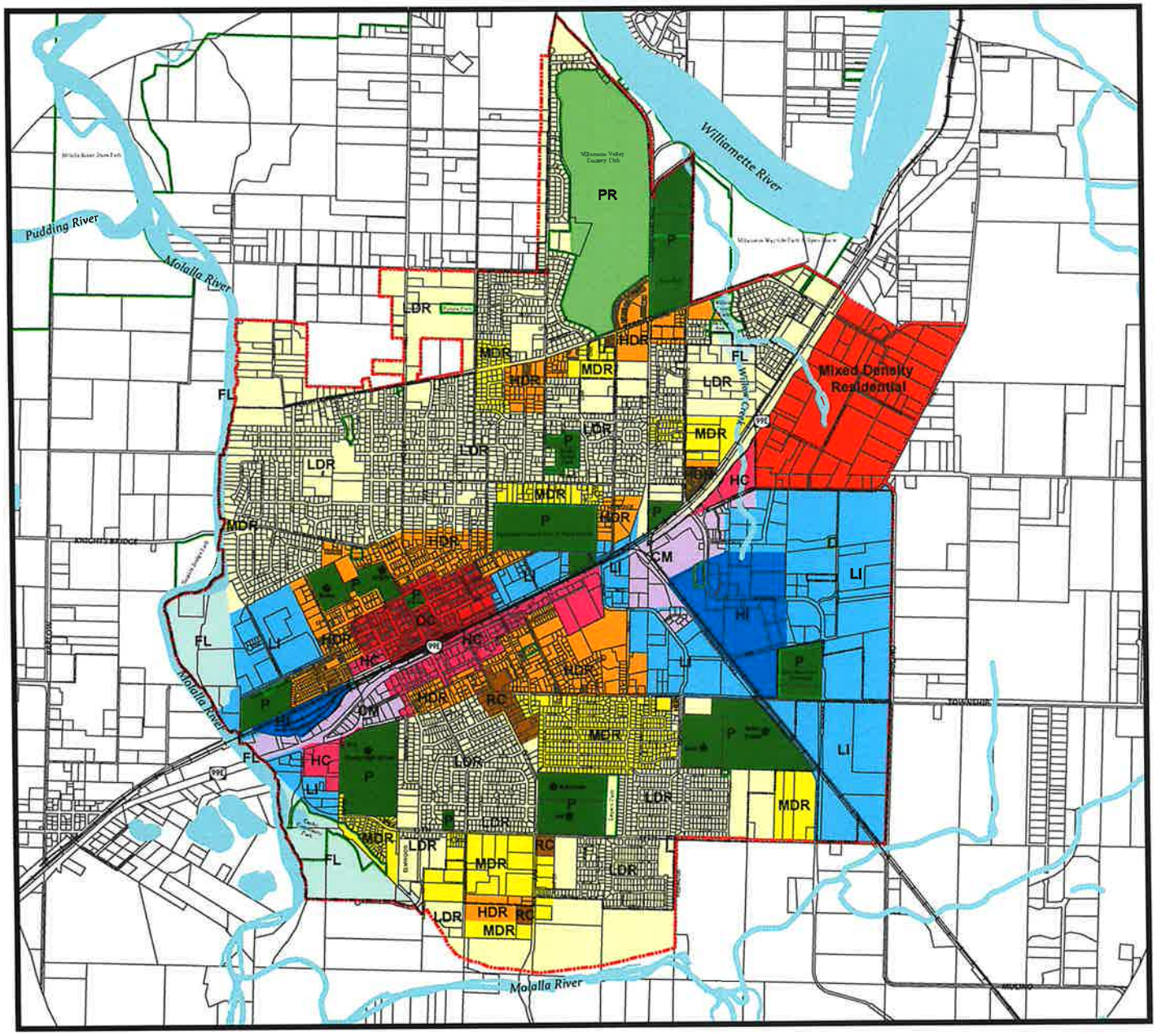
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
3	Amity silt loam	36.1	0.6%
11	Camas gravelly sandy loam	123.4	2.1%
12A	Canderly sandy loam, 0 to 3 percent slopes	1,651.0	28.7%
12B	Canderly sandy loam, 3 to 8 percent slopes	5.4	0.1%
16	Chehalis silt loam	157.4	2.7%
19	Cloquato silt loam	234.0	4.1%
25	Cove silty clay loam	19.8	0.3%
42	Humaquepts, ponded	7.5	0.1%
53A	Latourell loam, 0 to 3 percent slopes	2,162.0	37.6%
53B	Latourell loam, 3 to 8 percent slopes	95.1	1.7%
53C	Latourell loam, 8 to 15 percent slopes	88.9	1.5%
53D	Latourell loam, 15 to 30 percent slopes	43.6	0.8%
56	McBee silty clay loam	83.0	1.4%
67	Newberg fine sandy loam	103.0	1.8%
68	Newberg loam	173.8	3.0%
69	Pits	98.0	1.7%
73	Riverwash	56.0	1.0%
84	Wapato silty clay loam	22.3	0.4%
86A	Willamette silt loam, 0 to 3 percent slopes	166.1	2.9%
86B	Willamette silt loam, 3 to 8 percent slopes	2.7	0.0%
86C	Willamette silt loam, 8 to 15 percent slopes	2.6	0.0%
91A	Woodburn silt loam, 0 to 3 percent slopes	42.9	0.7%
92F	Xerochrepts and Haploxerolls, very steep	123.0	2.1%
93E	Xerochrepts-Rock outcrop complex, moderately steep	23.6	0.4%
W	Water	226.8	3.9%
Totals for Area of Interest		**5,748.1**	**100.0%**

APPENDIX E

Land Use Map



City of Canby
Comprehensive Plan Map

- City Limits
- Urban Gowth Boundary
- Parks
- LDR-Low Density Residential
- MDR-Medium Density Residential
- HDR-High Density Residential
- Mixed Density Residential
- RC-Residential Commercial
- DC-Downtown Commercial
- HC-Highway Commercial
- CM-Commercial/Manufacturing
- LI-Light Industrial
- HI-Heavy Industrial
- P-Public
- PR-Private Recreation
- FL-Flood Prone/Steep Slopes

0 0.25 0.5 1 Miles

N

May 2014

The information depicted on this map is for general reference only. The City of Canby cannot accept any responsibility for errors, omissions, or positional accuracy. However, notification of errors would be appreciated.

APPENDIX F

Biosolids Management Plan

City of Canby

2017

Biosolids Management Plan

Some changes have been made in our approved 2012 biosolids management plan. The changes basically deleted the name of the biosolids dryer since we no longer have that piece of equipment and are not able to produce class A biosolids. Some of the other changes are related to equipment we used when hauling and applying class B biosolids.

We currently have our solids hauled to Heard Farms where they make class B biosolids. Even though the city does not currently produce its own class B biosolids all the equipment is in place and we are still capable of producing class B biosolids if or when needed.

INTRODUCTION

The City of Canby owns and operates a municipal wastewater treatment facility and manages a biosolids land application program. Due to the lack of local farms and high in-house transportation costs the City currently contracts with Heard Farms (DEQ permit # 102449) or similar DEQ permitted facility to haul the sludge to their facility for the purpose of making class B biosolids. The City still maintains the capacity to produce its own Class B biosolids and will resume production of biosolids when it becomes economically feasible. The purpose of this Biosolids Management Plan is to document the means and methods the City will use to produce biosolids.

The biosolids program is regulated by DEQ in accordance with Federal regulations as outlined in 40 CFR, Part 503 and Oregon Administrative Rule 340-050. Provisions of this plan are part of the City of Canby NPDES permit No. 101063. The City BSMP outlines the liquids and solids processes at the facility, how the biosolids are managed to meet federal and state requirements, and how the biosolids land application program is operated. When information is conflicting or absent in the NPDES permit or the City Biosolids Management Plan, DEQ approval/clarification is required, or the most stringent requirements will always be followed.

Wastewater processed by the treatment facility is primarily of domestic origin with a small contribution from industrial and commercial users. The City is required under the NPDES permit to implement a formal Industrial Pretreatment program to ensure that biosolids produced from this facility meet all federal regulatory requirements for toxics and pollutants.

The City's biosolids management plan was originally approved by the Oregon DEQ in the early eighties with updates over the years. This updated plan reflects changes in regulatory requirements adopted by DEQ and incorporates upgrades to the biosolids process at the City of Canby facility.

I. Treatment Facility Wastewater Processing

The City of Canby operates an activated sludge BNR plant located at 1480 NE Territorial Road in Clackamas County, Oregon. Treated effluent is discharged year round to the Willamette River at river mile 33. The designed average dry weather flow is 2.8 million gallons per day (MGD). Actual flows during the 2016 dry season averaged 0.9695 MGD and the wet season averaged 1.0092 MGD. The peak wet weather flow for 2016 was 1.3069 MGD. The peak design flow is 5.6 MGD.
The following tables detail the wastewater sources and volume of biosolids produced annually:

Wastewater Sources & Volumes 2016

	Million Gallons/yr
Municipal 80%	289.650
Industrial 1.8%	6.517
Com. 13.66%	49.458
Misc. 4.54%	16.437
Septage	0.0
Total Million Gal.	**362.0623**

Biosolids Sources & Volumes 2016

	Dry Tons/yr
Primary (PS)	314.66
Secondary (WAS)	223.68
Other	
Total DT	**538.34**

A. Liquids Flow stream:

1. Screening: Canby uses 2 perforated spiral screens to remove debris and rags. The screens are automated with a maximum flow of 4 MGD apiece.

2. Grit Removal: Heavy and fine particles like sand, eggshells and grit are removed by a counter clockwise, vortex pista grit unit by Smith & Loveless. Maximum flow is 7 MGD. The grit is then pumped to a Smith & Loveless grit conveyer/separator, where the grit is washed and dewatered before discharge to an approved landfill.

3. Primary Settling: Settling is accomplished first in the primary clarifier, with a volume of 147,000 gal. The primary clarifier removes settleable solids, grease and floating debris. Suspended and colloidal particles in the Primary Effluent are then conveyed to the aeration basin. Settleable solids and floating scum are removed with skimmers and pumped to the waste activated sludge holding tank to await further solids processing.

4. Biological Treatment: The City of Canby is an activated sludge facility with nutrient removal. Nutrient removal is accomplished using a four-stage design that incorporates an anaerobic zone, anoxic selectors and a large aeration basin. The capacity of the biological treatment system is 871,500 gallons and the system peak design flow is 5.6 MGD.

5. Secondary Settling: There are two 256,000 gallon secondary clarifiers with a design flow of 5.0 MGD. Waste activated solids removed from the thickening sump of the secondary clarifiers are pumped to the waste activated sludge holding tank to await further solids processing.

6. Effluent Filtration: The Secondary effluent is further processed through an Aqua-Aerobics fabric membrane filter for effluent polishing. There are two filters in place with an average design hydraulic loading of 2.7 MGD apiece.

7. Disinfection: In October of 2010, the City of Canby treatment facility installed a new Ultraviolet Radiation system for effluent disinfection. The new Aquionics medium pressure high intensity system is an inline, perpendicular to flow system capable of a maximum design flow of 6.0 MGD.

8. Effluent Metering: The disinfected effluent then flows through a 60° V-Notch weir with a Siemens LUT 400 level sensor prior to discharge into the Willamette River.

B. Solids Flowstream:

1. Primary Sludge: The 147,000 gallon primary clarifier produces rapid settling primary sludge, which is pumped to the waste activated sludge holding tank.

2. Waste Activated Sludge: Two secondary clarifiers with a volume of 257,000 gallons each are used to settle out the activated sludge from the aeration basin. The waste activated sludge is removed from the bottom of the secondary clarifiers and pumped into the waste activated sludge holding tank (WASH), where it is mixed with the primary sludge.

3. Dewatering: Canby, as of October 2003, uses an Ashbrook Belt Press to dewater the combination of primary and waste activated sludge that is held in the WASH tank. The Belt Press is a vertical 2.0 meter belt that normally can produce a dewatered cake ranging from 18 % to 30 % solids.

C. Septage Receiving:

The City of Canby wastewater facility does not accept any type of hauled septage.

D. Pretreatment Program:

Canby has an approved and active pretreatment program. Authorization and enforcement of our pretreatment program are delegated according to the City of Canby's Sewer Use Ordinance No. 1413. Pollutant monitoring requirements as stated in the NPDES permit will ensure land application of biosolids occurs within federal and state limitations.

E. Inflow and Infiltration:

As reported in the 2015 Infiltration and Inflow report submitted to DEQ: The City of Canby never exceeded 71 gallons per day per capita of the 120 gpcd federal guideline for infiltration and 111 gpcd for excessive inflow, which is well below the 265 gpcd federal threshold value. In summary, the City of Canby sewer collection system has no reported deficiencies related to excessive infiltration or inflow. Therefore there are no solids process changes or problems that arise due to any minor fluctuations related to infiltration or inflow.

II. Solids Treatment Processes

A. Class B Biosolids Process:

1. Pathogen Reduction Class B:

The City of Canby has the capability to use a Process to Significantly Reduce

Pathogens (PSRP) Alternative (5) ' 503.32 (b)(3), Lime Stabilization.

2. Vector Attraction Reduction Class B:

The City has the capability to utilize the lime stabilization process which enables the City to comply with Alternative (6) 503.33(b) (6) Alkaline Treatment.

3. Sludge Stabilization Process:

In October of 2003 the City completed a major upgrade to our biosolids process and went on line with a new Belt Press and lime injection system producing a cake product. The new lime stabilization system allows our staff to process a maximum of 100,000 gallons of mixed Primary and Waste activated sludge daily.

A. Sludge Generation Process: Influent settleable solids are captured in the 50-foot diameter circular primary clarifier (147,000 gallons). This treatment unit has a center well gravity thickener section. The resulting primary sludge ranges between 4% and 6% total solids (TS). The waste activated sludge coming from the two new secondary clarifiers has a total solids concentration range between 0.4% and 1.2%. The activated sludge and primary sludge is then pumped into a 147,000 gallon waste activated sludge holding tank (WASH). In the WASH tank the primary and waste activated sludge can be held and dewatered or pumped directly to the Belt Press.

B. Sludge Preparation: The raw mixture of waste activated and primary solids are processed across a gravity belt section of the Belt Press. This area of the press increases the solids concentration from about 1% TS to somewhere in the range between four and 10% TS. After leaving the gravity belt section of the belt press, the dewatered sludge proceeds through the press where the additional water is squeezed out and a cake between 18 and 30 percent Total Solids is produced. The cake is then injected with hydrated lime and mixed thoroughly with a Bridge Breaker (Pug Mill). The cake is now ready to start the stabilization process.

C. Biosolids Monitoring: Throughout the dewatering process, samples are routinely taken and checked for pH to quantify that the correct amount of lime is being added for the stabilization process. During the lime stabilization process, four to six random cake samples are composited and taken to the main laboratory.

Once in the laboratory, a sample of approximately 100 grams of cake is

mixed with 200 to 300 milliliters of deionized water. Following calibration of the pH probe, the slurry is then checked to document the pH at time zero, and the pH at time zero must be between 12.0 and 12.5. After two hours, the pH is read again and recorded. The second pH must have remained at a pH of more than 12.0 for the previous two hours. Twenty two hours later a third and final pH is taken and recorded. If the pH of the third reading is still above a pH of 11.5, we may apply this batch to an approved site.

During all pH testing, the meter is being calibrated every two hours at a minimum, and always prior to the pH at time zero, the two hour pH, and the twenty four hour pH.

III. Biosolids Storage at Treatment Facility

A. Treatment Facility Storage:

The covered storage facility is concrete lined with a trench drain system to prevent any biosolids fluids from migrating outside of the concrete structure. The truck loading area is asphalt paved with all drainage surfaces returning to the headworks of the treatment facility.

The following table represents the storage capacity of different units at the City of Canby treatment facility:

Solids Storage

Structure	Number of Units	Total Volume	Storage
Asphalt Lagoon	2	450,000 gallons	.75 months
Stabilized Sludge Holding Cells	6	123,000 gallons	.25 months
Waste Activated Sludge Holding	1	146,000 gallons	.25 months
Covered Cake Storage Facility (Class B)	3,936 sq/ft	873 Cubic Yards	6 months

B. Staging of Biosolids:

The City of Canby does not practice the staging of Class B biosolids at any of the approved application sites.

C. Field Storage of Biosolids:

The City of Canby does not practice the storage of Class B biosolids at any of the approved application sites.

IV. Transportation of Biosolids

The City of Canby owned and operated equipment which transported biosolids from the wastewater treatment facility to the authorized land application sites. The city is not currently hauling any biosolids and currently has contracted out to Heard Farms for sludge removal to their facility to produce class B biosolids under their permit.

B. Transfer and Loading of Class B Biosolids:

Biosolids will be loaded with city equipment and possibly contract the hauling when the city returns to producing class B biosolids.

V. Remedial Procedures

A. Process Failure:

If a mechanical problem occurs with the biosolids treatment process and replacement parts are not in stock, an emergency parts order will be placed. In the case of an equipment failure during the lime stabilization process solids will be routed to an approved landfill site or stored in the City lagoons until the process equipment can be repaired.

"All biosolids not meeting the Pathogen or Vector reduction requirements for Class B biosolids as outlined in this BSMP, will be either recycled for further processing or hauled to the landfill for disposal".

B. Spill During Transport: (When city employees are transporting class B biosolids)

1. Drivers will secure the spill location from the public with flares and flags.

2. Notification of emergency personnel: Drivers will notify emergency personnel depending on the conditions at the spill location. The following is a list of emergency personnel and phone numbers:

a.	Dispatch (Traffic Control) 1. County Sheriffs 2. Canby Police Dept.	(503) 655-8211
b.	Treatment Plant Personnel (Cleanup)	(503) 266-1248
c.	Oregon Emergency Response System	(800) 452-0311
d.	Clackamas Environmental Health Dept.	(503) 655-8384
e.	DEQ Regional Biosolids Specialist (Pat Heins)	(503) 229-5347

3. Traffic Control: Dispatch will be notified if the spill location poses a threat to public safety, due to any congestion or traffic hazard.

4. Oregon Emergency Response System (OERS): If the biosolids spill is in excess of fifty gallons (or 1/4 of a cubic yard of solids) or is a threat to the environment, OERS will be notified within one (1) hour.

5. Clackamas Health Department: In a situation where a biosolids spill could threaten Public Health due to the contamination of surface water, groundwater, well water or any drinking water supply, notification of the County Health Department will be required.

6. DEQ Regional Biosolids Specialist: If the biosolids spill is in excess of 50 gallons (or 1/4 of a cubic yard of solids) or is a threat to the environment or public health, the DEQ Biosolids Specialist will be notified within 24 hours of the spill.

7. Treatment Plant Personnel: Once notified, treatment plant personnel will immediately begin gathering the necessary equipment and personal protective gear needed to clean up the biosolids spill.

   a. If the spill location is secure, and safety and emergency personnel have been notified, the driver will immediately try to contain the spill using a shovel and surrounding soil.

   b. The City of Canby Vactor truck will be used to vacuum up the biosolids at the spill location.

   c. Any residual biosolids will be limed judiciously, paying close attention to the threat of contamination due to the lime migrating off the site through air particulate, runoff, seepage or public contact.

   d. Once the spill is cleaned up and the residual biosolids limed, a thin layer of dirt will be applied over the lime to prevent public contact and migration. Asphalt and concrete surfaces will be sprayed with a light solution of hypochlorite or chlorine to further disinfect the surface area.

C. Treatment Facility:

Any spill located at the treatment facility outside of the contained biosolids storage facility or loading area, City staff will follow the outline as mentioned above, except for the notification of traffic control.

D. Complaint Procedures:

Complaints that come into City Hall are documented on a complaint form. The form is then sent to the appropriate Director and Supervisor of the department. It is the responsibility of the Wastewater Treatment Supervisor to handle all complaints and follow ups with the public concerning the biosolids program. Copies of the complaint form will be filed at the WWTP.

DEQ is consulted or notified of complaints that have the potential to endanger public health or the environment.

VI. Monitoring and Sampling

A. Sampling Program Class B:

Lime Stabilization Class B:

1. During the lime stabilization process, four to six random cake samples are composited and taken to the main laboratory.

2. Once in the laboratory, a sample of approximately 100 grams of cake is mixed with 200 to 300 milliliters of deionized water. Following calibration of the pH probe, the slurry is then checked to document the pH at time zero, and the pH at time zero must be between 12.0 and 12.5. After two hours, the pH is read again and recorded. The second pH must have remained at a pH of more than 12.0 for the previous two hours. Twenty two hours later a third and final pH is taken and recorded. If the pH of the third reading is still above a pH of 11.5, we may apply this batch to an approved site.

During all pH testing, the meter is being calibrated every two hours at a minimum, and always prior to the pH at time zero, the two hour pH, and the twenty four hour pH.

B. Metals and Nutrient Analysis:

Samples that are analyzed for metals and nutrients are taken randomly from the back of the Belt Press, prior to lime addition. The sample is a combination of eight to ten grab samples that have been composited in a zip lock bag. Samples are well mixed and representative of the batch being sampled. Each sample is labeled and given an identification number, preserved on ice to 4^0 C, and transported to the contract lab by treatment plant personnel or courier. Chain of Custody forms, Container and Preservation Log, Sample Request forms, and Lab Bench sheets are completed and recorded prior to shipping.

Dates, times, methods, type of sample, names, identification number, type of container, preservation, and analytical methods are recorded and documented on the above-mentioned documents.

All biosolids analysis shall be performed using sampling and analytical methods established under 40 CFR '503.8 and 40 CFR 136.

C. Soil Sampling:

Soil samples shall be taken directly from the application site and should be representative of the soils on which the biosolids will be applied. Because residual nitrates may be leached from the soil during the winter months, soil samples should be taken following the growing season and prior to high rainfall periods.

In order for a soil sample to be considered representative, an absolute minimum of ten (10) subsamples will be taken from varying locations throughout the site. In addition, a minimum of two samples at varying depths will be taken from each subsample location. The first depth is approximately 12 inches and the second depth should be close to 24 inches. The more subsamples you take, the better the representation of the area sampled.

A representative subsample will be taken from each soil series within the sampling unit. The sample locations should be random and distributed throughout the sampling unit, giving special consideration to varying topography such as steep slopes, wet bottom, flat areas and shallow soils.

Mix the individual subsamples together thoroughly and take the soil sample from the composite mixture. The composite sample should be at least 1-pint or 1-pound in size.

D. Monitoring Program:

All monitoring and reporting will be conducted in accordance with the City of Canby NPDES permit. The monitoring frequency is based on the amount of biosolids generated that is land applied, or marketed to be sold or given away. In years that the City of Canby land applies biosolids, the monitoring frequency requirements of 40 CFR §503.16, Table 1 will be followed. The following table lists the parameters for biosolids analysis:

Quarterly Biosolids Analysis

Nutrients		Bacteria		Metals		
TKN	P	Fecal Coliform or Salmonella sp.		As	Ni	Pb
NO^3-N	Total Solids (TS)			Cd	Se	Hg
NH^4-N	pH			Cr	Zn	Mo
K				Cu		

E. Pathogen/Vector Attraction Reduction Characteristics (Class B):

1. Pathogen Reduction: The City of Canby uses a Process to Significantly Reduce Pathogens (PSRP) Alternative (5) ' 503.32 (b)(3), Lime Stabilization. Sufficient lime is added to the sewage sludge to raise the pH of the sewage sludge to 12 after two hours of contact.
(Please refer to Section II, (A), for a more detailed description of the lime stabilization process).

2. Vector Attraction Reduction: The City of Canby uses a process that enables us to comply with Alternative (6) ' 503.33(b)(6) Alkaline Treatment. The pH of sewage sludge is raised to 12 or higher by alkali addition and, without the addition of more alkali, shall remain at 12 or higher for two hours and then at 11.5 or higher for an additional 22 hours.
(Please refer to Section II, (A), for a more detailed description of the alkali stabilization process).

"All biosolids not meeting the Pathogen or Vector reduction requirements for Class B biosolids as outlined in this BSMP, will be either recycled for further processing or hauled to the landfill for disposal".

VII. Reporting

A. Daily Reporting / Record keeping 40 CFR '503.17:

1. Class B Lime Stabilized Biosolids:

During the stabilization process, daily records are kept that reflect the amount of biosolids processed, pH of each batch processed, quantity of lime used per batch, dates, times, calibration of analytical equipment, and names of staff responsible for processing.

Applicators of biosolids are required to keep a daily log, which reflects the amount of biosolids applied, area maps of daily application, time and date of application, method of application, location and site identification, and the depth to ground water and location of monitoring wells if required. Daily monitoring of rain and wind conditions are required for each day of biosolids application.

Records and Site logs indicating the quantity, quality, and location of biosolids applied to Department approved sites are available for inspection on request. Site logs will be maintained as part of our permanent record and available for review during the life of the application site.

B. Biosolids Annual Report:

An annual report is required to be submitted every February 19, to the EPA and the Oregon DEQ Northwest Region. The Annual Biosolids Report summarizes the biosolids analysis for pH, bacteria analysis, total solids percentage, metals and nutrients as required by 40 CFR 503.16 table 1, yearly and quarterly production of biosolids, site locations, agronomic loading rates and the amount of biosolids applied to each specific site. The information submitted in the annual report shall be in compliance with 40 CFR '503.18.

During the production of the Biosolids Annual Report the City reviews the BSMP to determine if the plan requires updating. Revisions or updating of the BSMP are required when there is a renewal of the NPDES permit, or when there are major modifications to biosolids production, treatment process or land application activities.

C. Record Retention:

The City of Canby shall retain for a period of at least five years the written records of all pollutant monitoring and QA/QC documents required to produce Class B biosolids. These pollutants include the required metals, nutrients, bacteria, total

solids, pH, temperature, and any other analysis performed to comply with 40 CFR Part 503. Records will be kept on file by the City of Canby, and will be available upon request by the Department. It will be the responsibility of the Wastewater Treatment personnel to maintain these records.

D. Certification Statements:

The City of Canby is capable of meeting Class B pathogen reduction and vector attraction reduction requirements. As required under 40 CFR §503.17, the City must retain a certification statement indicating whether compliance with pathogen reduction, vector attraction reduction, and certain site restrictions have been met. The certification statement must be retained for a period of five years, and must be submitted with the annual report that is due February 19th or as required by the NPDES permit.
The City of Canby will retain the following certification statements and it will be signed by the person responsible for the Biosolids Program.

The following certification statements are included in the Biosolids Annual report:

1. Class B Biosolids:

I certify, under penalty of law, that the information that will be used to determine compliance with the Class B pathogen requirements in 40 CFR §503.32(b)(3), the vector attraction reduction requirements in 40 CFR § 503.33(b)(6), and the site restrictions in 40 CFR §503.32(b)(5) for each site on which Class B sewage sludge was applied, was prepared under my direction and supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate this information. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment.

Printed name here, Biosolids Coordinator

Signed: _____

Date:

"I certify, under penalty of law that the management practices in 40 CFR §503.14 have been met for each site on which bulk biosolids is applied. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the management practices have been met. I am aware that there are significant penalties for false certification, including the possibility of fine and imprisonment."

Printed name here, Biosolids Coordinator

Signed: _____

Date:

VIII. Biosolids Characteristics

No biosolids were hauled to approved application sites since 2010. The following chart presents analytical results from the previous years that is representative of the City's biosolids.

Pollutant Monitoring

Metals	1-27-15	2-10-16	8-2-16	40 CFR 503.13 (b)(3) Pollutant Concentration Limits (mg/kg)	Analytical Methodology
As	1.63	.801	1.02	41	EPA 6020
Cd	.632	.451	.6	39	EPA 6020
Cr	25.9	45.2	31.7	-	EPA 6020
Cu	130	107	135	1500	EPA 6020
Pb	7.26	8.33	7.09	300	EPA 6020
Hg	.242	.305	.709	17	EPA 6020
Mo	3.73	3.57	3.99	-	EPA 6020
Ni	14.8	23.4	18.5	420	EPA 6020
Se	3.25	3.14	3.36	100	EPA 6020
Zn	352	327	475	2800	EPA 6020

Note: Test data is expressed in mg/kg (ppm) based on dry weight.

Nutrient Monitoring

Item	1-27-15	2-10-16	8-2-16	Analytical Methodology
TKN	7.81	5.57	6.31	EPA 351.2
NO^3-N	<.0007	ND	ND	EPA 300.0
NH^4-N	.498	.239	.472	EPA 350.1
P	1.56	1.04	1.13	EPA 365.4
K	.566	.163	.175	EPA 6010
TS	14.33%	22.4	18.9	SM 2540G

Note: Test data is expressed in percent (%) based on dry weight.

IX. Class B Biosolids Land Application Plan

A. Agronomic Application Rate and Site Crops

Agronomic loading rates are based on the available nitrogen per dry ton of sludge, compared to the nitrogen requirements of the crop, minus any supplemental fertilizer, residual nitrogen in the soil including carryover nitrogen from previous biosolids applications.

Class B biosolids are required to be land applied to a site at a rate that is equal to or less than the agronomic rate for the site. An agronomic rate is the whole biosolids application rate (dry weight basis) designed to provide the annual total amount of nitrogen needed by a crop and to minimize the amount of nitrogen passing below the root zone of the crop and migrating to groundwater.

Biosolids application rates for the City of Canby sites were developed based on Oregon State University (OSU) Extension Service Fertilizer Guides. The land application sites authorized for use can assimilate the total plant available nitrogen the biosolids provide on an annual basis. Specific site agronomic loading rates are stated in the Department issued site authorization letters.

The methodologies and calculations used to determine the City of Canby application rates will be based on the DEQ Internal Management Directive December 2005, (Implementing Oregon's Biosolids Program).

(Please refer to Appendix B for a copy of the DEQ approved Worksheet for Calculating Biosolids Application Rates in Agriculture).

Site Inventory of Existing and Potential Sites:

Site maps are on file with the authorization letters at the City of Canby treatment facility, and are available on request.
The City of Canby currently has 467.8 acres that are authorized for land application. The following tables represent authorized sites.

The annual application rate for the specific crop per application site in pounds (lbs) available nitrogen (N) per acre is listed in the following table:

AUTHORIZED BIOSOLIDS APPLICATION SITES

The annual application rate for the specific crop per application site in pounds (lbs) available nitrogen (N) per acre is listed in the following table:

Site Active Sites	Legal Description	Total Acreage	Net Acreage	Crop	Method of Application	Irrigated Y / N	Harvest Season	Method of Harvest	Application Period	
Carrol Asbell	S30;T5S;R3E TL-700	25.51	23.0	Pasture	Manure Slinger	N	12 Months	Mechanical	Year-Round	
James Allen	S02;T6S;R1E TL-300, 500	160.14	76.5	Hay Wheat	Manure Slinger	N	July/Aug	Mechanical	Feb 15 to Nov 15 May 15 to Oct 15 June 15 to Oct 15 May 15 to Oct 15	
Bruce Fraser	S36;T4S;R1E TL-500	38.78	32	Pasture Hay	Manure Slinger	N	June/July	Mechanical	May 15 – Oct 15	
Keith Severson	S36;T3S;R1E TL-2600	19.82	16	Hay	Manure Slinger	N	July/Aug	Mechanical	June15-Oct 15	
William Ingels	S36;T3S;R1E TL-2500	18.84	15.0	Hay	Manure Slinger	N	July/Aug	Mechanical	Year-Round	
Jason Bristol	S13;T4S;R1E TL-1600	39.27	35.0	Hay	Manure Slinger	N	July/Aug	Mechanical	March 15 – Oct 15	
Robert Polack	S34;T4S;R1E TL-1200	70.75	63.1	Hay/Oats	Manure Slinger	N	June/July	Mechanical	March 15 – May 15	

AUTHORIZED BIOSOLIDS APPLICATION SITES

The annual application rate for the specific crop per application site in pounds (lbs) available nitrogen (N) per acre is listed in the following table:

Site Active Sites	Legal Description	Total Acreage	Net Acreage	Crop	Method of Application	Irrigated Y / N	Harvest Season	Method of Harvest	Application Period
Sister Site									W/Monitoring. May 15- Nov. 15
Robert Polack Grandson Site	S19;T5S;R2E TL-300	68.52	18.7	Hay Wheat Oats	Manure Slinger	N	June/July	Mechanical	March 15 – May 15 W/Monitoring. May 15- Nov. 15
Ken Wilson	S25;T3S;R1E TL-801, 1102, 1103	50.37	39	Pasture	Manure Slinger	Y	12 Months	N/A	Year - Round
Gary Ilhe	T4S, R1W, S14A: TL-900, 1000, 1100	20.64	14.5	Hay Pasture	Manure Slinger	N	May-Oct	Mechanical	May 15 – Oct 15
Odman	S18B;T4S;R2E TL-700	19.95	10.0	Pasture	Manure Slinger	N	12 Months	N/A	May 15 – Oct 15
Mary Kerr	S03 T5S: R1E TL 800, 890	25.01	20	Pasture	Manure Slinger	N	12 Months	N/A	(890) June 15 – Oct 15 (800) Year - Round
Dale McLouth	S30 T4S: R2E TL 1200, 1400	70	60	Pasture	Manure Slinger	N	12 Month	N/A	May 15 – Oct 15
Carpenter	S21;T4;R1E TL-1000, 901	45	45	Pasture & Hay	Manure Slinger	N/Y	12 Month	Mechanical	April 15 – Nov 1st

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C. Site Selection Criteria for a New Site:

1. Geographic area: The City of Canby will only consider sites that are within thirty nautical miles from the treatment facility. Approved application sites will only be considered for sites located in Marion County or Clackamas County, Oregon.

2. Landscape Position: To be considered for biosolids land application, sites should meet the following conditions:

   a. Sites should be on stable geologic formation not subject to flooding or excessive runoff from adjacent land. If periodic flooding cannot be avoided, the period of application will be restricted and seasonal groundwater monitoring will be required.

   b. At the time of biosolids application, the minimum depth to permanent groundwater should be four feet and the minimum depth to temporary groundwater should be one foot. Sites approved for year round application will be evaluated carefully to ensure that groundwater separation distances conform to this requirement.

   c. Topography of application sites should be suitable to allow for normal agricultural operations and appropriate management to prevent runoff. Well-vegetated sites with slopes up to thirty (30) percent may be used for dewatered or dried biosolids.

3. Soils: Application site soils should have a minimum rooting depth of twenty-four (24) inches. The underlying substratum to at least twenty-four (24) inches should not be rapidly draining, so that leachate will not be short circuited to groundwater. Sites with saline and/or alkaline soils should be avoided.

4. Soil Sampling: If application sites are proposed for a third consecutive year of biosolids application, then soil nitrate levels will be tested for each field in question. Agronomic loading rates will be adjusted based on the nitrate levels found in the soil of each specific location. Application sites left fallow in the third year, will not require soil analysis for nitrate.

   (Please refer to Section VI, (C) for soil sampling protocol)

5. Well Sampling: When requested, well samples will be taken free of charge for application site owners or abutting and adjacent land owners. Well samples are analyzed for nitrate nitrogen, fecal coliform and total coliform. Sampling and analysis of wells will be performed by Fisher=s Pump Supply in Canby Oregon or another qualified laboratory.

X. Public Notification

A. Notification of Property owners (' 40 CFR Part 501.15):

The City of Canby is required to notify the public of the proposed land application activity. Each year prior to land application of biosolids, the City should verify for those sites to be used for the year that the property owners who received prior notification have not changed. If a property owner has changed, notification of the land application activity should be made to the new property owner and documented.

Public notice and documentation are required for the authorization of new biosolids land application sites. The City of Canby notifies all land owners and occupants adjacent to or abutting the proposed land application site with a formal written letter. The notification letter will provide the following information:

1. Activity Proposed: Land application of biosolids
2. Exact Location: Map or Legal Description
3. Project Contact Person: Name and phone number

(Please refer to Appendix A for an example of the City's Notification Letter).

- Public notice does not require that the adjacent property owners/occupant approve of the biosolids land application;
- There is no required minimum waiting period between notification and the start of the biosolids application;
- The notification is not required prior to repeat biosolids land application at the site.

B. Public Notice:

Public notices of permit actions and a public comment period are provided by the (DEQ) for major revisions to the Biosolids Management Plan, typically completed during the NPDES Permit Renewal process.

C. Site Authorization:

Site Authorization Letters to apply biosolids to a specific site are given only after a new site request has been submitted, reviewed and approved by the Department of Environmental Quality (DEQ). New site requests must include the following:

- Vicinity Map (e.g., tax lot or assessors map) indicating biosolids site location;
- Site legal description (address, tax reference number, section, township, range, and county);

- Detailed map showing property boundaries and setbacks from roadways, surface waters, wells, residences, occupied structures, and public areas;
- Natural Resources Conservation Services (NRCS) soil survey map;
- Copy of a soil survey map description for each soil series at the site;
- Site owner name, address, and phone number;
- Site management agreement between the biosolids generating source and the site owners of record and/or authorized representative;
- Crop management data;
- Method of biosolids application and implements to be used;
- Biosolids characteristics from the most recent biosolids analysis;
- Forecast of biosolids application rates (gallons or dry tons/acre/year);
- Calculations used for forecasting annual biosolids application rates;
- Site life calculations (if applicable).

(Please refer to Appendix A for a sample of the Application Letters, and Site Management Agreements used by the City of Canby).

XI. Site Management Practices

Site access restrictions and setbacks will be followed as outlined in the Department's site authorization letters. The City of Canby will ensure that access is restricted by appropriate means as necessary, such as fencing or posting of signs at the land application site. Biosolids land application will not occur in those areas designated as buffer strips. Accurate measurements of the buffer strips and flagging will occur prior to commencing land application.

Management Practices: The following is a list of common management practices for the City of Canby Class B biosolids:

- Biosolids land application shall cease when precipitation exceeds (1/4 inch) per hour or when (one inch) or more of precipitation occurs in a 24-hour period. Land application shall be withheld from the site at least one day for every inch of rain that occurred during a 24-hour period;
- Biosolids shall be applied evenly and thinly in such a manner as to prevent ponding or runoff;
- Biosolids shall cease when ground surface is frozen or snow covered.
- Areas where biosolids are applied shall be clearly marked by flag pins or stakes which note the date biosolids were last applied;
- A 30-day interval shall follow the application of biosolids prior to grazing livestock on any field or prior to the harvesting of crops from biosolids areas that are to be fed to animals;

- Public access to the site shall be restricted for at least 12 months after biosolids land application;
- A minimum setback of 200 feet shall be maintained from all wells and other drinking water sources;
- Biosolids applier shall wash down (at the application site) areas of the equipment coated with biosolids to prevent biosolids from leaking onto public roads;
- A 50 foot minimum setback will be maintained from the bank of any surface water, springs, ditches, or waters of the state when truck spreading biosolids, and a 25 foot minimum setback when applying cake;
- The City=s truck operator shall clean up any spillage of biosolids. For spills that cannot be completely cleaned up, the City shall consult with the Department for the most appropriate additional measures to be taken;
- The Department shall be notified within one hour of any spills of more than 50 gallons for liquid biosolids and 1/4 cubic yard for cake biosolids, or other threats to the environment that may occur. Threats to the environment include spills of any amount to drainage ditches.

  Notification shall be made through the Oregon Emergency Response System (OERS) at 1-800-452-0311 (24 hour phone service). Failure to provide prompt notification may be considered cause for taking enforcement action against the City;
- The City shall maintain daily records for the biosolids land application site which indicate (on a field map grid system) where, when, and how much (volume) of biosolids was land applied to a particular site;
- Site records shall indicate the date, location and amount of biosolids applied, segments of each field that received biosolids, and amounts of available nitrogen applied to each area receiving biosolids and the type of crop grown. This data shall be maintained at the Wastewater Treatment Facility and be made available to the Department for review upon request.

XII. Crop Management Practices

As listed in the Biosolids Land Application Site Inventory tables in Section IX, biosolids are applied to mostly pasture, hay and some oats. Timing of application and the harvest cycle of the crop are also listed. Soil conditions must be favorable for application such that runoff, leaching, or soil compaction does not occur. The timing of land application takes into consideration tilling and irrigation practices that may occur on an authorized site.

The overall management of nutrients at the land application sites takes into account the amount of biosolids land applied, the amount of commercial fertilizers used and the amount of residual nitrogen in the soil. When additional sources of nitrogen (e.g., commercial fertilizer) are applied to a site, then the application of biosolids should be reduced to compensate for the additional nitrogen loading.

Prior to the initiation of biosolids application to a site, a representative soil sample is collected across the entire site, and analyzed by an independent commercial laboratory. Existing nitrogen levels in the soil profile are subtracted from the OSU Extension Service recommended nitrogen application rates for the crop and the biosolids application rate is adjusted. *(Please refer to Section VI, (C) for soil sampling protocol)*

In the event of annual biosolids application to the same field for 3 consecutive years, annual sampling and testing of application site soils for nitrate and ammonia nitrogen will be conducted prior to biosolids application. Application rates must be adjusted to account for available or residual nitrogen carried over from previous applications. If crop removal of nitrogen exceeds the calculated agronomic rate, additional nitrogen may be required to sustain crop production.

APPENDIX G

NPDES Permit

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
WASTE DISCHARGE PERMIT

Department of Environmental Quality
Northwest Region – Portland Office
2020 SW 4th Ave., Suite 400, Portland, OR 97201
Telephone: (503) 229-5263

Issued pursuant to ORS 468B.050 and The Federal Clean Water Act

ISSUED TO:
City of Canby
PO Box 930
Canby OR 97013

SOURCES COVERED BY THIS PERMIT:

Type of Waste	Outfall Number	Outfall Location
Treated Wastewater	001	R.M. 33

FACILITY TYPE AND LOCATION:
Activated Sludge
City of Canby Water Reclamation Facility
1480 NE Territorial Road
Canby OR 97013

RECEIVING STREAM INFORMATION:
Basin: Willamette
Sub-Basin: Molalla-Pudding
Receiving Stream: Willamette River
LLID: 1227618456580-33 D
County: Clackamas

Treatment System Class: Level IV
Collection System Class: Level III

EPA REFERENCE NO: OR-002021-4

Issued in response to Application No. 971501 received May 1, 2009.
This permit is issued based on the land use findings in the permit record.

Gregory L. Geist, Manager, WQ Source Control
Northwest Region

October 18, 2010
Date

PERMITTED ACTIVITIES

Until this permit expires or is modified or revoked, the permittee is authorized to construct, install, modify, or operate a wastewater collection, treatment, control and disposal system and discharge to public waters adequately treated wastewaters only from the authorized discharge point or points established in Schedule A and only in conformance with all the requirements, limitations, and conditions set forth in the attached schedules as follows:

Page
Schedule A - Waste Discharge Limitations not to be Exceeded..... 2
Schedule B - Minimum Monitoring and Reporting Requirements..... 4
Schedule D - Special Conditions..... 9
Schedule E – Pretreatment..... 13
Schedule F - General Conditions..... 17

Unless specifically authorized by this permit, by another NPDES or WPCF permit, or by Oregon Administrative Rule, any other direct or indirect discharge to waters of the state is prohibited, including discharge to an underground injection control system.

SCHEDULE A

Waste Discharge Limitations not to be exceeded after permit issuance.

1. Treated Effluent Outfall 001

a. May 1 - October 31:

Parameter	Average Effluent Concentrations Monthly	Weekly	Monthly* Average lb/day	Weekly* Average lb/day	Daily* Maximum lbs
$CBOD_5$ (See Note 1)	10 mg/l	15 mg/l	167	250	334
TSS	10 mg/l	15 mg/l	167	250	334

b. November 1 – April 30:

Parameter	Average Effluent Concentrations Monthly	Weekly	Monthly* Average lb/day	Weekly* Average lb/day	Daily* Maximum lbs
$CBOD_5$ (See Note 1)	25 mg/l	40 mg/l	417	667	834
TSS	30 mg/l	45 mg/l	500	750	1000

* Average dry weather design flow to the facility equals 2.0 mgd. Mass load limits based on dry weather design flow to the facility.

c.

Other parameters (year-round)	Limitations
E. coli Bacteria	Shall not exceed 126 organisms per 100 ml monthly geometric mean. No single sample shall exceed 406 organisms per 100 ml. (See Note 2)
pH	Shall be within the range of 6.0 - 9.0
BOD_5 and TSS Removal Efficiency	Shall not be less than 85% monthly average for BOD_5 and 85% monthly for TSS.
Ammonia (NH_3-N)	Shall not exceed 33.0 mg/l daily maximum and 18 mg/l monthly average

d. No wastes may be discharged or activities conducted that violate water quality standards adopted in OAR 340-041 for the Willamette basin except in the regulatory mixing zone and as provided for in OAR 340-45-0080. The regulatory mixing zone is defined as follows:

The regulatory mixing zone is that portion of the Willamette River from the point of discharge to 100 feet downstream of the point of discharge. The zone of initial dilution (ZID) shall not exceed 10 % of the defined mixing zone.

e. Chlorine and chlorine compounds shall not be used as a disinfecting agent of the treated effluent and no measurable chlorine residual shall be allowed in the discharged effluent due to chlorine used for maintenance purposes.

2. Groundwater

No activities shall be conducted that could cause an adverse impact on existing or potential beneficial uses of groundwater. All wastewater and process related residuals shall be managed and disposed in a manner that will prevent a violation of the Groundwater Protection Rules (OAR 340-040).

NOTES:

1. The $CBOD_5$ concentration limits are considered equivalent to the minimum design criteria for BOD_5 specified in Oregon Administrative Rules (OAR) 340-41. These limits and $CBOD_5$ mass limits may be adjusted (up or down) by permit action if more accurate information regarding $CBOD_5/BOD_5$ becomes available.

2. If a single sample exceeds 406 organisms per 100 ml, then five consecutive re-samples may be taken at four-hour intervals beginning within approximately 28 hours after the original sample was taken. If the log mean of the five re-samples is less than or equal to 126 organisms per 100 ml, a violation shall not be triggered.

SCHEDULE B

1. **Minimum Monitoring and Reporting Requirements**

The permittee shall monitor the parameters as specified below at the locations indicated. The laboratory used by the permittee to analyze samples shall have a quality assurance/quality control (QA/QC) program to verify the accuracy of sample analysis. If QA/QC requirements are not met for any analysis, the results shall be included in the report, but not used in calculations required by this permit. When possible, the permittee shall re-sample in a timely manner for parameters failing the QA/QC requirements, analyze the samples, and report the results.

a. Influent

Item or Parameter	Minimum Frequency	Type of Sample
BOD_5	2/Week	24-hour Composite
TSS	2/Week	24-hour Composite
pH	3/Week	Grab
Toxics: Metals (Ag, As, Cd, Cr, Cu, Hg, Mo, Ni, Pb, Se, Zn) , Cyanide and Total Phenols, measured as total in mg/l (See Note 1)	Semi-annually using 3 consecutive days between Monday and Friday, inclusive.	24-hour Composite

b. Treated Effluent Outfall 001

Item or Parameter	Minimum Frequency	Type of Sample
Total Flow (MGD)	Daily	Measurement (See Note 2)
Flow Meter Calibration	Semi-Annual	Verification
$CBOD_5$	2/Week	24-hour Composite
BOD_5	2/Week	24-hour Composite
TSS	2/Week	24-hour Composite
Pounds Discharged (TSS and $CBOD_5$)	2/Week	Calculation
Average Percent Removed (TSS and BOD_5)	Monthly	Calculation
pH	3/Week	Grab
E. coli	2/Week	Grab
UV Radiation Intensity	Daily	Reading (See Note 3)
Nutrients: TKN, NO_2+NO_3-N, Total Phosphorous	Annually	24-hour Composite
Ammonia (NH_3-N)	2/Week	24-hour Composite
Alkalinity	Monthly	Grab
Oil and Grease	Annually	Grab
Total Dissolved Solids (TDS)	Annually	24-hour Composite
Temperature, daily maximum	Daily	Continuous or via grab sample between 3 and 4 PM
Toxics:		
Priority Pollutant Scan		(See Note 4)
Metals (Ag, As, Cd, Cr, Cu, Hg, Mo, Ni, Pb, Se, Zn) , Cyanide and Total Phenols, measured as total in mg/l (See Note 1)	Semi-annually using 3 consecutive days between Monday and Friday, inclusive.	24-hour Composite
Bioassay (Whole Effluent Toxicity)	(See Note 5)	Acute & chronic

c. Biosolids Management (Class A and /or B)

Item or Parameter	Minimum Frequency	Type of Sample
Biosolids analysis including: Total Solids (% dry wt.) Biosolids nitrogen for: NH_3-N; NO_3-N; & TKN (% dry wt.) Phosphorus (% dry wt.) Potassium (% dry wt.) pH (standard units) Biosolids metals content for: Ag, As, Cd, Cr, Cu, Hg, Mo, Ni, Pb, Se & Zn, measured as total in mg/kg	Quarterly	Composite sample to be representative of the product to be land applied (See Note 6)
Quantity and type of alkaline product used to stabilize biosolids (when required to meet federal pathogen and vector attraction reduction requirements per OAR 340-050)	Each occurrence	Measurement
Initial time when solids that received alkaline agent ascended to pH >= 12	Each batch	Date, time, and actual pH measurement (corrected to standard at 25°C)
2 hours after initial alkaline addition and sustained at pH >= 12	Each batch	Date, time, and actual pH measurement (corrected to standard at 25°C)
24 hours after initial alkaline addition and pH >= 11.5 was sustained (See Note 7)	Each batch	Date, time, and actual pH measurement (corrected to standard at 25°C)

d. Biosolids Management (Class A-See Note 8)

Item or Parameter	Minimum Frequency	Type of Sample
Fecal coliform bacteria per gram total solids (dry weight basis) or Salmonella sp. bacteria per grams total solids (dry weight basis)	Monthly	At least seven (7) individual samples representative of the biosolids product (See Note 9)
Moisture content of biosolids	Each batch	Record date, time and % moisture
Temperature of biosolids leaving the dryer or the wet bulb temperature of the gas in contact with the biosolids leaving the dryer.	Each batch	Record date, time and temperature measurement leaving the dryer

e. Biosolids Management (Class B)

Item or Parameter	Minimum Frequency	Type of Sample
Record of locations where biosolids are applied on each DEQ approved site. (Site location maps to be maintained at treatment facility for review upon request by DEQ)	Each Occurrence	Date, volume & locations where biosolids were applied recorded on site location map.

2. **Reporting Procedures**

a. Monitoring results shall be reported on approved forms. Reports must be submitted to the Department's Northwest Region - Portland office by the 15th day of the following month. Biosolids monitoring shall be reported annually.

b. State monitoring reports shall identify the name, certificate classification and grade level of each principal operator designated by the permittee as responsible for supervising the wastewater collection and treatment systems during the reporting period. Monitoring reports shall also identify each system classification as found on page one of this permit.

c. Monitoring reports shall also include a record of the quantity and method of use of all biosolids removed from the treatment facility and a record of all applicable equipment breakdowns and bypassing.

3. **Report Submittals**

a. The permittee shall have in place a program to identify and reduce inflow and infiltration into the sewage collection system. An annual report shall be submitted to the Department by June 1 each year which details sewer collection maintenance activities that reduce inflow and infiltration. The report shall state those activities that have been done in the previous year and those activities planned for the following year.

b. For any year in which biosolids are land applied, a report shall be submitted to the Department by February 19 of the following year that describes solids handling activities for the previous year and includes, but is not limited to, the required information outlined in OAR 340-50-035(6)(a)-(e).

NOTES:

1. Daily 24-hour composite samples shall be analyzed and reported separately. Toxic monitoring results and toxic removal efficiency calculations shall be tabulated and submitted with the Pretreatment Program Annual Report as required in schedule E. Submittal of toxic monitoring results for the influent and effluent is not required with the monthly Discharge Monitoring Report (DMR).

Test methods used must have quantitation limits less than or equal to those listed in the table below unless otherwise approved by the Department in writing. The permittee must ensure that all monitoring analysis reports contain both the quantitation limit and detection level as defined below:

Detection Level – the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

Quantitation Limit – The lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration for the analyte. It is equivalent to the concentration of the lowest calibration standard, assuming that all method-specified sample weights, volumes, and cleanup procedures have been employed.

For sample results below the detection level, the result shall be reported as "<DL" (e.g. <1.0). For sample results above the detection limit and below the quantitation limit, the results shall be reported as "eDL" (e.g. e1.0).

For metals, the minimum quantitation level (MQL) shall be met for each metal as listed below using approved EPA methods. If there are no methods available to obtain the MQL's listed below, the test method that provides the lowest

MQL shall be used. The method detection limit (MDL), the MQL, and the test method used for each test shall be reported along with the results.

Parameter	MQL (µg/L)
Arsenic	0.05
Cadmium	0.1
Chromium	0.4
Copper	10
Cyanide	5
Lead	5
Mercury	0.01
Nickel	10
Selenium	2
Silver	1
Zinc	5

Unless requested otherwise by the Department in writing, influent and effluent metals shall be collected semi-annually (using three-day sampling events). This data will also be used to evaluate the reasonable potential to violate in-stream water quality standards. After evaluation of this data, the permit may be reopened to include permit limits resulting from the reasonable potential analysis.

2. List the date of any meter calibration on the discharge monitoring report (DMR)s and maintain records of the calibration at the plant site.

3. The intensity of UV radiation passing through the water column will affect the system's ability to kill organisms. To track the reduction in intensity, the UV disinfection system must include a UV intensity meter with a sensor located in the water column at a specified distance from the UV bulbs. This meter will measure the intensity of UV radiation in mWatts-seconds/cm^2. The daily UV radiation intensity shall be determined by reading the meter each day. If more than one meter is used, the daily recording will be an average of all meter readings each day.

4. The permittee shall perform all testing required in Part D of EPA Permit Application Form 2A. At least three scans are required. Two of the three scans must be performed no fewer than 4 months and no more than 8 months apart. The testing includes all metals (total recoverable), cyanide, phenols, hardness and the 85 organic pollutants included under volatile organic, acid extractable and base-neutral compounds. The metals monitoring needs to be conducted using a "clean" sampling method, an "ultra-clean" sampling method, EPA method 1669 or any other test method approved by the Department. Mercury monitoring shall be conducted in accordance with EPA Method 245.7 or 1631E with a detection limit of 10 ng/l or less. The organic monitoring needs to be conducted using EPA Methods 624 for volatile organic compounds, EPA Method 625 for semi-volatile organic compounds and Polycyclic Aromatic Hydrocarbons. The effluent samples shall be 24-hour daily composites, except where sampling volatile compounds. In this case, six discrete samples (not less than 40 ml) collected over the operating day are acceptable. The permittee shall take special precautions in compositing the individual grab samples for the volatile organics to insure sample integrity (i.e. no exposure to the outside air). Alternately, the discrete samples collected for volatiles may be analyzed separately and averaged.

5. Bioassay (WET) testing may be conducted quarterly for a period of one year or at least annually over the life of the permit. Either way, a minimum of four tests (both chronic and acute) shall be conducted in accordance with Schedule D, Condition 2, prior to submission of the next renewal application.

6. Composite samples from the dewatered biosolids shall be taken from reference areas in the dewatered biosolids pursuant to Test Methods for Evaluating Solid Waste, Volume 2; Field Manual, Physical/Chemical Methods, November 1986, Third Edition, Chapter 9.

   Inorganic pollutant monitoring must be conducted according to Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Second Edition (1982) with Updates I and II and Third Edition (1986) with Revision I.

7. To comply with vector attraction reduction requirements of OAR 340-050, all biosolids shall be stabilized for a full 24 –hours (after the addition of lime) before utilization as Class A or Class B biosolids. If the City chooses to conduct a research project into alternative methods of vector attraction reduction, the project must receive written approval from both EPA and DEQ and must be conducted in a manner that will not endanger public health or the environment.

8. If alternative methods of demonstrating compliance with federal pathogen reduction and/or vector attraction reduction requirements are used, the monitoring and sampling frequency shall be based on OAR 340-050 and shall conform to the approved Biosolids Management Plan.

9. Samples shall be taken over a 14-day period. Analyze and report bacteria results from each sample separately.

SCHEDULE D

Special Conditions

1. All biosolids shall be managed in accordance with the current, DEQ approved biosolids management plan, land application plan and the site authorization letters issued by the DEQ. Any changes in solids management activities that significantly differ from operations specified under the approved plan require the prior written approval of the DEQ.

   All new biosolids application sites shall meet the site selection criteria set forth in OAR 340-50-0070. All currently approved sites are located in Clackamas County. No new public notice is required for the continued use of these currently approved sites. Property owners adjacent to any newly approved application sites shall be notified, in writing or by any method approved by DEQ, of the proposed activity prior to the start of application. For proposed new application sites that are deemed by the DEQ to be sensitive with respect to residential housing, runoff potential or threat to groundwater, an opportunity for public comment shall be provided in accordance with OAR 340-50-0030.

2. This permit may be modified to incorporate any applicable standard for biosolids use or disposal promulgated under section 405(d) of the Clean Water Act, if the standard for biosolids use or disposal is more stringent than any requirements for biosolids use or disposal in the permit, or controls a pollutant or practice not limited in this permit.

3. **Whole Effluent Toxicity Testing**

   a. The permittee shall conduct whole effluent toxicity (WET) tests as specified in Schedule B of this permit.

   b. The facility is required to sample at least four times prior to the next renewal application. The sampling events and toxicity tests should be spaced to represent the different quarter s of the year, so that samples are taken in both the wet and dry seasons. The facility may choose to conduct all tests within a single year of the permit, in which case, the tests shall be conducted quarterly.

   c. Acute Toxicity Testing - Organisms and Protocols

      (1) The permittee shall conduct 48-hour static renewal tests with *Ceriodaphnia dubia* (water flea) and 96-hour static renewal tests with *Pimephales promelas* (fathead minnow).

      (2) All test methods and procedures shall be in accordance with **Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms**, Fifth Edition, EPA-821-R-02-012, October 2002. Any deviation of the bioassay procedures outlined in this method shall be submitted in writing to the Department for review and approval prior to use.

      (3) Tests shall be conducted on final effluent sample collected as a single grab sample or a 24-hour composite sample. No treatments to the final effluent (i.e. dechlorination, etc), except those included as part of the methodology, shall be performed by the laboratory unless approved by the Department prior to analysis.

      (4) Acute tests shall be conducted on a control and the following dilution series, unless otherwise approved by the Department in writing: 10%, 20%, 40%, 70% and 100%.

      (5) An acute WET test shall be considered to show toxicity if there is a statistically significant difference in survival between the control and 40 percent effluent.

d. Chronic Toxicity Testing - Organisms and Protocols

(1) The permittee shall conduct tests with: *Ceriodaphnia dubia* (water flea) for reproduction and survival test endpoint, *Pimephales promelas* (fathead minnow) for growth and survival test endpoint, and *Raphidocelis subcapitata* (green alga formerly known as *Selanastrum capricornutum*) for growth test endpoint.

(2) All test methods and procedures shall be in accordance with **Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms**, Fourth Edition, EPA-821-R-02-013, October 2002. Any deviation of the bioassay procedures outlined in this method shall be submitted in writing to the Department for review and approval prior to use.

(3) Tests shall be conducted on final effluent samples collected as 24-hour composite samples. No treatments to the final effluent (i.e. dechlorination, etc), except those included as part of the methodology, shall be performed by the laboratory unless approved by the Department prior to analysis.

(4) Chronic tests shall be conducted on a control and the following dilution series, unless otherwise approved by the Department in writing: 2%, 5.9%, 15%, 40%, and 100%.

(5) A chronic WET test shall be considered to show toxicity if the IC_{25} (25% inhibition concentration) occurs at dilutions equal to or less than the dilution that is known to occur at the edge of the mixing zone, i.e. $IC_{25} \leq 5.9\%$.

e. Dual End-Point Tests –

(1) WET tests may be dual end-point tests in which both acute and chronic end-points can be determined from the results of a single chronic test. The acute end-point shall be based on 48-hours for the *Ceriodaphnia dubia* (water flea) and 96-hours for the *Pimephales promelas* (fathead minnow).

(2) All test methods and procedures shall be in accordance with **Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms**, Fourth Edition, EPA-821-R-02-013, October 2002. Any deviation of the bioassay procedures outlined in this method shall be submitted in writing to the Department for review and approval prior to use.

(3) Tests shall be conducted on final effluent samples collected as described in item d.(3).

(4) Tests run as dual end-point tests shall be conducted on a control and the following dilution series, unless otherwise approved by the Department in writing: 2%, 5.9%, 15%, 40%, and 100%.

(5) Toxicity determinations for dual end-point tests shall correspond to the acute, c. (5), and chronic, d. (5), described above.

f. Additional Sampling Requirements

(1) At the time of WET sampling, effluent samples should also be collected and analyzed for Ammmonia (NH_3-N)

g. Evaluation of Causes and Exceedances

(1) If any test exhibits toxicity, as defined in sections c.(5) or d.(5) of this permit condition, another toxicity test using the same species and Department approved methodology shall be conducted within two weeks, unless otherwise approved by the Department.

(2) If two consecutive WET test results indicate acute and/or chronic toxicity, as defined in sections c.(5) or d.(5) of this permit condition, the permittee shall immediately notify the Department of the results. The Department will work with the permittee to determine the appropriate course of action to evaluate and address the toxicity.

h. Quality Assurance / Reporting

(1) Quality assurance criteria, statistical analyses, and data reporting for the WET tests shall be in accordance with the EPA documents stated in this condition.

(2) A bioassay laboratory report for each test shall be prepared according to the EPA method documents referenced in this Schedule. This shall include all QA/QC documentation, statistical analysis for each test performed, standard reference toxicant test (SRT) conducted on each species required for the toxicity tests, and completed Chain of Custody forms for the samples including time of sample collection and receipt. Reports shall be submitted to the Department within 45 days of test completion.

(3) The report should include all endpoints measured in the test, i.e. NOEC, LOEC, and IC_{25}.

(4) The permittee shall make available to the Department, on request, the written standard operating procedures they, or the laboratory performing the WET tests, are using for all toxicity tests required by the Department.

i. Reopener

(1) The Department may reopen and modify this permit to include new limitations, monitoring requirements, and/or conditions as determined by the Department to be appropriate, and in accordance with procedures outlined in Oregon Administrative Rules, Chapter 340, Division 45, if:
   a. WET testing data indicate acute and/or chronic toxicity.
   b. The facility undergoes any process changes.
   c. Discharge monitoring data indicate a change in the reasonable potential to exhibit toxicity.

4. The permittee shall comply with Oregon Administrative Rules (OAR), Chapter 340, Division 49, "Regulations Pertaining To Certification of Wastewater System Operator Personnel" and accordingly:

a. The permittee shall have its wastewater system supervised by one or more operators who are certified in a classification and grade level (equal to or greater) that corresponds with the classification (collection and/or treatment) of the system to be supervised as specified on page one of this permit.

Note: A "supervisor" is defined as the person exercising authority for establishing and executing the specific practice and procedures of operating the system in accordance with the policies of the permittee and requirements of the waste discharge permit. "Supervise" means responsible for the technical operation of a system, which may affect its performance or the quality of the effluent produced. Supervisors are not required to be on-site at all times.

b. The permittee's wastewater system may not be without supervision (as required by Special Condition 4.a. above) for more than thirty (30) days. During this period, and at any time that the supervisor is

not available to respond on-site (i.e. vacation, sick leave or off-call), the permittee must make available another person who is certified at no less than one grade lower then the system classification.

c. If the wastewater system has more than one daily shift, the permittee shall have the shift supervisor, if any, certified at no less than one grade lower than the system classification.

d. The permittee is responsible for ensuring the wastewater system has a properly certified supervisor available at all times to respond on-site at the request of the permittee and to any other operator.

e. The permittee shall notify the Department of Environmental Quality in writing within thirty (30) days of replacement or redesignation of certified operators responsible for supervising wastewater system operation. The notice shall be filed with the Water Quality Division, Operator Certification Program, 400 East Scenic Drive, Suite 307, The Dalles, OR 97058. This requirement is in addition to the reporting requirements contained under Schedule B of this permit.

f. Upon written request, the Department may grant the permittee reasonable time, not to exceed 120 days, to obtain the services of a qualified person to supervise the wastewater system. The written request must include justification for the time needed, a schedule for recruiting and hiring, the date the system supervisor availability ceased and the name of the alternate system supervisor(s) as required by 4.b. above.

5. The permittee shall notify the DEQ Northwest Region - Portland Office (phone: (503) 229-5263) in accordance with the response times noted in the General Conditions of this permit, of any malfunction so that corrective action can be coordinated between the permittee and the Department.

6. In accordance with Schedule F, Section B, Condition 8 of this permit, adequate contingency plan for prevention and handling of spills and unplanned discharges shall be in force at all times. A continuing program of employee orientation and education shall be maintained to ensure awareness of the necessity of good in-plant control and quick and proper action in the event of a spill or accident.

SCHEDULE E

Pretreatment Activities

The permittee shall implement the following pretreatment activities:

1. Program Administration

The permittee shall conduct and enforce its Pretreatment Program, as approved by the Department, and comply with the General Pretreatment Regulations (40 CFR Part 403). The permittee shall secure and maintain sufficient resources and qualified personnel to carry out the program implementation procedures described in this permit as required by 40 CFR § 403.8(f)(3).

2. Legal Authorities

The permittee shall adopt all legal authority necessary to fully implement its approved pretreatment program and to comply with all applicable State and Federal pretreatment regulations. The permittee must also establish, where necessary, contracts or agreements with contributing jurisdictions to ensure compliance with pretreatment requirements by industrial users within these jurisdictions. These contracts or agreements shall identify the agency responsible for all implementation and enforcement activities to be performed in the contributing jurisdictions. Regardless of jurisdictional situation, the permittee is responsible for ensuring that all aspects of the pretreatment program are fully implemented and enforced.

3. Industrial Waste Survey

The permittee shall update its inventory of industrial users at a frequency and diligence adequate to ensure proper identification of industrial users subject to pretreatment standards, but no less than once per year. The permittee shall notify these industrial users of applicable pretreatment standards in accordance with 40 CFR § 403.8(f)(2)(iii).

4. National Pretreatment Standards

The permittee shall enforce categorical pretreatment standards promulgated pursuant to Section 307(b) and (c) of the Act, prohibited discharge standards as set forth in 40 CFR § 403.5(a) and (b), or local limitations developed by the permittee in accordance with 40 CFR § 403.5(c), whichever are more stringent, or are applicable to any non-domestic source regulated under Section 307(b), (c), or (d) of the Act.

5. Local Limits

The permittee shall perform a technical evaluation of the need to revise local limits within 18 months after permit re-issuance unless the Department authorizes or requires, in writing, an alternate time frame. Locally derived discharge limitations shall be defined as pretreatment standards under Section 307(d) of the Act and must conform to 40 CFR §403.5(c), §403.8(f)(4). Technically based local limits shall be developed in accordance with the procedures established by the Department, and the USEPA's Local Limits Guidance.

6. Control Mechanisms

The permittee shall issue an individual control mechanism to all Significant Industrial Users except where the permittee may, at its discretion, issue a general control mechanism as defined by 40 CFR §403.8(f)(1)(iii); or certification in lieu of a control mechanism for Non-Significant Categorical Industrial Users (NSCIUs) as defined by § 403.3(v)(2), and Non-Discharging Categorical Industrial Users (NDCIUs). All individual and general control mechanisms must be enforceable and contain, at a minimum, the requirements identified in 40 CFR § 403.8(f)(1)(iii)(B); and, may contain equivalent concentration and mass based effluent limitations

where appropriate under § 403.6(c)(5) and (6). Unless a more stringent definition has been adopted by the permittee, the definition of Significant Industrial User shall be as stated in 40 CFR § 403.3(v).

7. Compliance Monitoring:

Industrial User Sampling and Inspection

The permittee shall randomly sample and analyze the effluent from Industrial Users at a frequency commensurate with the character, consistency, and volume of the discharge and conduct surveillance activities in order to identify, independent of information supplied by Industrial Users, occasional and continuing noncompliance with Pretreatment Standards. The permittee shall conduct a complete facility inspection; and, sample the effluent from each Significant Industrial User at least once a year at a minimum, unless otherwise specified below:

(a) Where the permittee has authorized the Industrial User subject to a categorical Pretreatment Standard to forego sampling of a pollutant regulated by a categorical Pretreatment Standard in accordance with §403.12(e)(2), the permittee must sample for the waived pollutant(s) at least once during the term of the Categorical Industrial User's control mechanism. In the event that the permittee subsequently determines that a waived pollutant is present or is expected to be present in the Industrial User's wastewater based on changes that occur in the User's operations, the permittee must immediately begin at least annual effluent monitoring of the User's Discharge and inspection.

(b) Where the permittee has determined that an Industrial User meets the criteria for classification as a Non-Significant Categorical Industrial User, the permittee must evaluate, at least once per year, whether an Industrial User continues to meet the criteria in §403.3(v)(2).

(c) In the case of Industrial Users subject to reduced reporting requirements under §403.12(e)(3), the permittee must randomly sample and analyze the effluent from Industrial Users and conduct inspections at least once every two years. If the Industrial User no longer meets the conditions for reduced reporting in §403.12(e)(3), the permittee must immediately begin sampling and inspecting the Industrial User at least once a year.

Industrial User Self Monitoring and Other Reports

The permittee shall receive and analyze self-monitoring and other reports submitted by industrial users as required by §403.8(f)(2)(iv) and §403.12(b),(d),(e),(g) and (h). Significant Industrial User reports must include Best Management Practice (BMP) compliance information per §403.12(b), (e), (h), where appropriate.

Industrial User Monitoring in Lieu of Self-Monitoring

Where the permittee elects to conduct monitoring of an industrial user in lieu of requiring self-monitoring, the permittee shall gather all information which would otherwise have been submitted by the user. The permittee shall also perform the sampling and analyses in accordance with the protocols established for the user; and, must follow the requirements in 40 CFR §403.12(g)(2) if repeat sampling is required as the result of any sampling violation(s).

Sample Collection and Analysis

Sample collection and analysis, and the gathering of other compliance data, shall be performed with sufficient care to produce evidence admissible in enforcement proceedings or in judicial actions. Unless specified otherwise by the Director in writing, all sampling and analyses shall be performed in accordance with 40 CFR §136, or 40 CFR §503 for biosolids analytes.

8. Slug Control Plans

The permittee is required to evaluate whether each Significant Industrial User needs a slug control plan or other action to control Slug Discharges. Industrial Users identified as significant after October 14, 2005, must be evaluated within 1 year of being designated a Significant Industrial User. A Slug Discharge is any Discharge of a non-routine, episodic nature, including but not limited to an accidental spill or a non-customary batch Discharge, which has a reasonable potential to cause Interference or Pass Through, or in any other way violate the permittee's regulations, local limits or conditions of this Permit. The results of such activities shall be available to the Approval Authority upon request. The permittee shall require Significant Industrial Users to immediately notify the permittee of any changes at its facility affecting potential for a Slug Discharge. If the permittee determines that a slug control plan is needed, the requirements to control Slug Discharges shall be incorporated into the significant industrial user's control mechanism, and the plan shall contain, at a minimum, the following elements:

(a) Description of discharge practices, including non-routine batch Discharges;
(b) Description of stored chemicals;
(c) Procedures for immediately notifying the permittee of Slug Discharges, including any Discharge that would violate a prohibition under §403.5(b) with procedures for follow-up written notification within five days; and,
(d) If necessary, procedures to prevent adverse impact from accidental spills, including inspection and maintenance of storage areas, handling and transfer of materials, loading and unloading operations, control of plant site run-off, worker training, building of containment structures or equipment, measures for containing toxic organic pollutants (including solvents), and/or measures and equipment for emergency response;

9. Enforcement

The permittee shall identify all violations of the industrial user's permit or local ordinance. The permittee shall investigate all such instances of industrial user noncompliance and shall take all necessary steps to return users to compliance. The permittee's enforcement actions shall follow its approved Legal Authorities (i.e. Ordinance, etc.) and Enforcement Response Plan developed in accordance with 40 CFR § 403.8(f)(5).

10. Public Participation (significant noncompliance)

The permittee shall publish annual notification in a newspaper(s) of general circulation that provides meaningful public notice within the jurisdiction(s) served by the permittee of industrial users which, at any time during the previous 12 months, were in significant noncompliance with applicable Pretreatment requirements. For the purposes of this requirement, an industrial user is in significant noncompliance if it meets one or more of the criteria listed in 40 CFR§ 403.8(f)(2)(viii).

11. Data and Information Management

The permittee must develop and maintain a data management system designed to track the status of the industrial user inventory, discharge characteristics, and compliance. In accordance with 40 CFR § 403.12(o), the delegated program shall retain all records relating to pretreatment program activities for a minimum of three years, and shall make such records available to the Department and USEPA upon request. The permittee shall also provide public access to information considered effluent data under 40 CFR Part 2.

12. Annual Pretreatment Program Report

The permittee shall submit a complete report to the Department on or before March 31 that describes the pretreatment program activities during the previous calendar year pursuant to 40 CFR §403.12(i). The content and format of this report shall be as established by the Department. Reports submitted to the DEQ by the permittee must be signed by a principal executive officer, ranking elected official or other duly authorized employee. The duly authorized employee must be an individual or position having responsibility for the

overall operation of the facility or the Pretreatment Program. This authorization must be made in writing by the principal executive officer or ranking elected official, and submitted to the Approval Authority prior to or together with the report being submitted.

13. Pretreatment Program Modifications

The permittee shall submit in writing to the Department a statement of the basis for any proposed modification of its approved program and a description of the proposed modification in accordance with 40 CFR § 403.18. No substantial program modifications may be implemented by the delegated program prior to receiving written authorization from the Department. This Schedule incorporates, by reference, all substantial and non-substantial pretreatment program modifications approved by the Department prior to NPDES permit re-issuance.

14. Implementation of 2005 EPA Streamlining Amendments to 40 CFR § 403

The permittee shall complete implementation of the required portions of the 2005 EPA streamlining amendments within twelve months after the permit reissuance unless the Department authorizes or requires in writing an alternate time frame.

SCHEDULE F

NPDES GENERAL CONDITIONS

SECTION A. STANDARD CONDITIONS

1. Duty to Comply with Permit
The permittee must comply with all conditions of this permit. Failure to comply with any permit condition is a violation of Oregon Revised Statutes (ORS) 468B.025 and the federal Clean Water Act and is grounds for an enforcement action. Failure to comply is also grounds for the Department to terminate, modify and reissue, revoke, or deny renewal of a permit.

2. Penalties for Water Pollution and Permit Condition Violations
The permit is enforceable by DEQ or EPA, and in some circumstances also by third-parties under the citizen suit provisions 33 USC §1365. DEQ enforcement is generally based on provisions of state statutes and EQC rules, and EPA enforcement is generally based on provisions of federal statutes and EPA regulations.

ORS 468.140 allows the Department to impose civil penalties up to $10,000 per day for violation of a term, condition, or requirement of a permit. The federal Clean Water Act provides for civil penalties not to exceed $32,500 and administrative penalties not to exceed $11,000 per day for each violation of any condition or limitation of this permit.

Under ORS 468.943, unlawful water pollution, if committed by a person with criminal negligence, is punishable by a fine of up to $25,000, imprisonment for not more than one year, or both. Each day on which a violation occurs or continues is a separately punishable offense. The federal Clean Water Act provides for criminal penalties of not more than $50,000 per day of violation, or imprisonment of not more than 2 years, or both for second or subsequent negligent violations of this permit.

Under ORS 468.946, a person who knowingly discharges, places, or causes to be placed any waste into the waters of the state or in a location where the waste is likely to escape into the waters of the state is subject to a Class B felony punishable by a fine not to exceed $200,000 and up to 10 years in prison. The federal Clean Water Act provides for criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment of not more than 3 years, or both for knowing violations of the permit. In the case of a second or subsequent conviction for knowing violation, a person shall be subject to criminal penalties of not more than $100,000 per day of violation, or imprisonment of not more than 6 years, or both.

3. Duty to Mitigate
The permittee must take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment. In addition, upon request of the Department, the permittee must correct any adverse impact on the environment or human health resulting from noncompliance with this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

4. Duty to Reapply
If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and have the permit renewed. The application must be submitted at least 180 days before the expiration date of this permit.

The Department may grant permission to submit an application less than 180 days in advance but no later than the permit expiration date.

5. Permit Actions
This permit may be modified, revoked and reissued, or terminated for cause including, but not limited to, the following:
a. Violation of any term, condition, or requirement of this permit, a rule, or a statute
b. Obtaining this permit by misrepresentation or failure to disclose fully all material facts
c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge

d. The permittee is identified as a Designated Management Agency or allocated a wasteload under a Total Maximum Daily Load (TMDL)
e. New information or regulations
f. Modification of compliance schedules
g. Requirements of permit reopener conditions
h. Correction of technical mistakes made in determining permit conditions
i. Determination that the permitted activity endangers human health or the environment
j. Other causes as specified in 40 CFR 122.62, 122.64, and 124.5
k. For communities with combined sewer overflows (CSOs):
   (1) To comply with any state or federal law regulation that addresses CSOs that is adopted or promulgated subsequent to the effective date of this permit
   (2) If new information, not available at the time of permit issuance, indicates that CSO controls imposed under this permit have failed to ensure attainment of water quality standards, including protection of designated uses
   (3) Resulting from implementation of the Permittee's Long-Term Control Plan and/or permit conditions related to CSOs.

The filing of a request by the permittee for a permit modification, revocation or reissuance, termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

6. Toxic Pollutants
The permittee must comply with any applicable effluent standards or prohibitions established under Oregon Administrative Rules (OAR) 340-041-0033 and 307(a) of the federal Clean Water Act for toxic pollutants, and with standards for sewage sludge use or disposal established under Section 405(d) of the Clean Water Act, within the time provided in the regulations that establish those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

7. Property Rights and Other Legal Requirements
The issuance of this permit does not convey any property rights of any sort, or any exclusive privilege, or authorize any injury to persons or property or invasion of any other private rights, or any infringement of federal, tribal, state, or local laws or regulations.

8. Permit References
Except for effluent standards or prohibitions established under Section 307(a) of the federal Clean Water Act and OAR 340-041-0033 for toxic pollutants, and standards for sewage sludge use or disposal established under Section 405(d) of the Clean Water Act, all rules and statutes referred to in this permit are those in effect on the date this permit is issued.

9. Permit Fees
The permittee must pay the fees required by Oregon Administrative Rules.

SECTION B. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

1. Proper Operation and Maintenance
The permittee must at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems that are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

2. Need to Halt or Reduce Activity Not a Defense
For industrial or commercial facilities, upon reduction, loss, or failure of the treatment facility, the permittee must, to the extent necessary to maintain compliance with its permit, control production or all discharges or both until the facility is restored or an alternative method of treatment is provided. This requirement applies, for example, when the primary source of power of the treatment facility fails or is reduced or lost. It is not a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

3. Bypass of Treatment Facilities
a. Definitions

(1) "Bypass" means intentional diversion of waste streams from any portion of the treatment facility. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, provided the diversion is to allow essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs b. and c. of this section.

(2) "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

b. Prohibition of bypass.

(1) Bypass is prohibited and the Department may take enforcement action against a permittee for bypass unless:

i. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

ii. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that occurred during normal periods of equipment downtime or preventative maintenance; and

iii. The permittee submitted notices and requests as required under General Condition B.3.c.

(2) The Department may approve an anticipated bypass, after considering its adverse effects and any alternatives to bypassing, when the Department determines that it will meet the three conditions listed above in General Condition B.3.b.(1).

c. Notice and request for bypass.

(1) Anticipated bypass. If the permittee knows in advance of the need for a bypass, a written notice must be submitted to the Department at least ten days before the date of the bypass.

(2). Unanticipated bypass. The permittee must submit notice of an unanticipated bypass as required in General Condition D.5.

4. Upset

a. Definition. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operation error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventative maintenance, or careless or improper operation.

b. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of General Condition B.4.c are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

c. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset must demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

(1) An upset occurred and that the permittee can identify the causes(s) of the upset;

(2) The permitted facility was at the time being properly operated;

(3) The permittee submitted notice of the upset as required in General Condition D.5, hereof (24-hour notice); and,

(4) The permittee complied with any remedial measures required under General Condition A.3 hereof.

d. Burden of proof. In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.

5. Treatment of Single Operational Upset

For purposes of this permit, A Single Operational Upset that leads to simultaneous violations of more than one pollutant parameter will be treated as a single violation. A single operational upset is an exceptional incident that causes simultaneous, unintentional, unknowing (not the result of a knowing act or omission), temporary noncompliance with more than one Clean Water Act effluent discharge pollutant parameter. A single operational upset does not include Clean Water Act violations involving discharge without a NPDES permit or noncompliance to the extent caused by improperly designed or inadequate treatment facilities. Each day of a single operational upset is a violation.

6. Overflows from Wastewater Conveyance Systems and Associated Pump Stations

a. Definitions

(1) "Overflow" means any spill, release or diversion of sewage including:

i. An overflow that results in a discharge to waters of the United States; and

ii. An overflow of wastewater, including a wastewater backup into a building (other than a backup caused solely by a blockage or other malfunction in a privately owned sewer or building lateral), even if that overflow does not reach waters of the United States.

b. Prohibition of overflows. Overflows are prohibited. The Department may exercise enforcement discretion regarding overflow events. In exercising its enforcement discretion, the Department may consider various factors, including the adequacy of the conveyance system's capacity and the magnitude, duration and return frequency of storm events.
c. Reporting required. All overflows must be reported orally to the Department within 24 hours from the time the permittee becomes aware of the overflow. Reporting procedures are described in more detail in General Condition D.5.

7. Public Notification of Effluent Violation or Overflow
If effluent limitations specified in this permit are exceeded or an overflow occurs that threatens public health, the permittee must take such steps as are necessary to alert the public, health agencies and other affected entities (e.g., public water systems) about the extent and nature of the discharge in accordance with the notification procedures developed under General Condition B.8. Such steps may include, but are not limited to, posting of the river at access points and other places, news releases, and paid announcements on radio and television.

8. Emergency Response and Public Notification Plan
The permittee must develop and implement an emergency response and public notification plan that identifies measures to protect public health from overflows, bypasses or upsets that may endanger public health. At a minimum the plan must include mechanisms to:
a. Ensure that the permittee is aware (to the greatest extent possible) of such events;
b. Ensure notification of appropriate personnel and ensure that they are immediately dispatched for investigation and response;
c. Ensure immediate notification to the public, health agencies, and other affected public entities (including public water systems). The overflow response plan must identify the public health and other officials who will receive immediate notification;
d. Ensure that appropriate personnel are aware of and follow the plan and are appropriately trained;
e. Provide emergency operations; and
f. Ensure that DEQ is notified of the public notification steps taken.

9. Removed Substances
Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters must be disposed of in such a manner as to prevent any pollutant from such materials from entering waters of the state, causing nuisance conditions, or creating a public health hazard.

SECTION C. MONITORING AND RECORDS

1. Representative Sampling
Sampling and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge. All samples must be taken at the monitoring points specified in this permit, and shall be taken, unless otherwise specified, before the effluent joins or is diluted by any other waste stream, body of water, or substance. Monitoring points may not be changed without notification to and the approval of the Department.

2. Flow Measurements
Appropriate flow measurement devices and methods consistent with accepted scientific practices must be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices must be installed, calibrated and maintained to insure that the accuracy of the measurements is consistent with the accepted capability of that type of device. Devices selected must be capable of measuring flows with a maximum deviation of less than ± 10 percent from true discharge rates throughout the range of expected discharge volumes.

3. Monitoring Procedures
Monitoring must be conducted according to test procedures approved under 40 CFR part 136, or in the case of sludge use and disposal, under 40 CFR part 503, unless other test procedures have been specified in this permit.

4. Penalties of Tampering
The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit may, upon conviction, be punished by a fine of not more than $10,000 per violation, imprisonment for not more than two years, or both. If a conviction of a person is for a violation committed after a first conviction of such person, punishment is a fine not more than $20,000 per day of violation, or by imprisonment of not more than four years, or both.

5. Reporting of Monitoring Results
Monitoring results must be summarized each month on a Discharge Monitoring Report form approved by the Department. The reports must be submitted monthly and are to be mailed, delivered or otherwise transmitted by the 15th day of the following month unless specifically approved otherwise in Schedule B of this permit.

6. Additional Monitoring by the Permittee
If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR part 136, or in the case of sludge use and disposal, under 40 CFR part 503, or as specified in this permit, the results of this monitoring must be included in the calculation and reporting of the data submitted in the Discharge Monitoring Report. Such increased frequency must also be indicated. For a pollutant parameter that may be sampled more than once per day (e.g., Total Chlorine Residual), only the average daily value must be recorded unless otherwise specified in this permit.

7. Averaging of Measurements
Calculations for all limitations that require averaging of measurements must utilize an arithmetic mean, except for bacteria which shall be averaged as specified in this permit.

8. Retention of Records
Records of monitoring information required by this permit related to the permittee's sewage sludge use and disposal activities shall be retained for a period of at least five years (or longer as required by 40 CFR part 503). Records of all monitoring information including all calibration and maintenance records, all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit and records of all data used to complete the application for this permit shall be retained for a period of at least 3 years from the date of the sample, measurement, report, or application. This period may be extended by request of the Department at any time.

9. Records Contents
Records of monitoring information must include:

a. The date, exact place, time, and methods of sampling or measurements;
b. The individual(s) who performed the sampling or measurements;
c. The date(s) analyses were performed;
d. The individual(s) who performed the analyses;
e. The analytical techniques or methods used; and
f. The results of such analyses.

10. Inspection and Entry
The permittee must allow the Department or EPA upon the presentation of credentials to:

a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit, and
d. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by state law, any substances or parameters at any location.

11. Confidentiality of Information
Any information relating to this permit that is submitted to or obtained by DEQ is available to the public unless classified as confidential by the Director of DEQ under ORS 468.095. The Permittee may request that information be classified as confidential if it is a trade secret as defined by that statute. The name and address of the permittee, permit applications, permits, effluent data, and information required by NPDES application forms under 40 CFR 122.21 will not be classified as confidential. 40 CFR 122.7(b).

SECTION D. REPORTING REQUIREMENTS

1. Planned Changes
The permittee must comply with OAR chapter 340, division 52, "Review of Plans and Specifications" and 40 CFR Section 122.41(l)(1). Except where exempted under OAR chapter 340, division 52, no construction, installation, or modification involving disposal systems, treatment works, sewerage systems, or common sewers may be commenced

until the plans and specifications are submitted to and approved by the Department. The permittee must give notice to the Department as soon as possible of any planned physical alternations or additions to the permitted facility.

2. Anticipated Noncompliance
The permittee must give advance notice to the Department of any planned changes in the permitted facility or activity that may result in noncompliance with permit requirements.

3. Transfers
This permit may be transferred to a new permittee provided the transferee acquires a property interest in the permitted activity and agrees in writing to fully comply with all the terms and conditions of the permit and the rules of the Commission. No permit may be transferred to a third party without prior written approval from the Department. The Department may require modification, revocation, and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under 40 CFR Section 122.61. The permittee must notify the Department when a transfer of property interest takes place.

4. Compliance Schedule
Reports of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any compliance schedule of this permit must be submitted no later than 14 days following each schedule date. Any reports of noncompliance must include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirements.

5. Twenty-Four Hour Reporting
The permittee must report any noncompliance that may endanger health or the environment. Any information must be provided orally (by telephone) to DEQ or to the Oregon Emergency Response System (1-800-452-0311) as specified below within 24 hours from the time the permittee becomes aware of the circumstances.

a. Overflows.

(1) Oral Reporting within 24 hours.
i. For overflows other than basement backups, the following information must be reported to the Oregon Emergency Response System (OERS) at 1-800-452-0311. For basement backups, this information should be reported directly to DEQ.
a) The location of the overflow;
b) The receiving water (if there is one);
c) An estimate of the volume of the overflow;
d) A description of the sewer system component from which the release occurred (e.g., manhole, constructed overflow pipe, crack in pipe); and
e) The estimated date and time when the overflow began and stopped or will be stopped.
ii. The following information must be reported to the Department's Regional office within 24 hours, or during normal business hours, whichever is first:
a) The OERS incident number (if applicable) along with a brief description of the event.

(2) Written reporting within 5 days.
i. The following information must be provided in writing to the Department's Regional office within 5 days of the time the permittee becomes aware of the overflow:
a) The OERS incident number (if applicable);
b) The cause or suspected cause of the overflow;
c) Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the overflow and a schedule of major milestones for those steps;
d) Steps taken or planned to mitigate the impact(s) of the overflow and a schedule of major milestones for those steps; and
e) (for storm-related overflows) The rainfall intensity (inches/hour) and duration of the storm associated with the overflow.

The Department may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

b. Other instances of noncompliance.
(1) The following instances of noncompliance must be reported:
i. Any unanticipated bypass that exceeds any effluent limitation in this permit;
ii. Any upset that exceeds any effluent limitation in this permit;

iii. Violation of maximum daily discharge limitation for any of the pollutants listed by the Department in this permit; and
iv. Any noncompliance that may endanger human health or the environment.

(2) During normal business hours, the Department's Regional office must be called. Outside of normal business hours, the Department must be contacted at 1-800-452-0311 (Oregon Emergency Response System).

(3) A written submission must be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission must contain:
i. A description of the noncompliance and its cause;
ii. The period of noncompliance, including exact dates and times;
iii. The estimated time noncompliance is expected to continue if it has not been corrected;
iv. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance; and
v. Public notification steps taken, pursuant to General Condition B.7

(4) The Department may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

6. Other Noncompliance

The permittee must report all instances of noncompliance not reported under General Condition D.4 or D.5, at the time monitoring reports are submitted. The reports must contain:
a. A description of the noncompliance and its cause;
b. The period of noncompliance, including exact dates and times;
c. The estimated time noncompliance is expected to continue if it has not been corrected; and
d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

7. Duty to Provide Information

The permittee must furnish to the Department within a reasonable time any information that the Department may request to determine compliance with the permit or to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit. The permittee must also furnish to the Department, upon request, copies of records required to be kept by this permit.

Other Information: When the permittee becomes aware that it has failed to submit any relevant facts or has submitted incorrect information in a permit application or any report to the Department, it must promptly submit such facts or information.

8. Signatory Requirements

All applications, reports or information submitted to the Department must be signed and certified in accordance with 40 CFR Section 122.22.

9. Falsification of Information

Under ORS 468.953, any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance, is subject to a Class C felony punishable by a fine not to exceed $100,000 per violation and up to 5 years in prison. Additionally, according to 40 CFR 122.41(k)(2), any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a federal civil penalty not to exceed $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

10. Changes to Indirect Dischargers

The permittee must provide adequate notice to the Department of the following:
a. Any new introduction of pollutants into the POTW from an indirect discharger which would be subject to section 301 or 306 of the Clean Water Act if it were directly discharging those pollutants and;
b. Any substantial change in the volume or character of pollutants being introduced into the POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.
c. For the purposes of this paragraph, adequate notice shall include information on (i) the quality and quantity of effluent introduced into the POTW, and (ii) any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

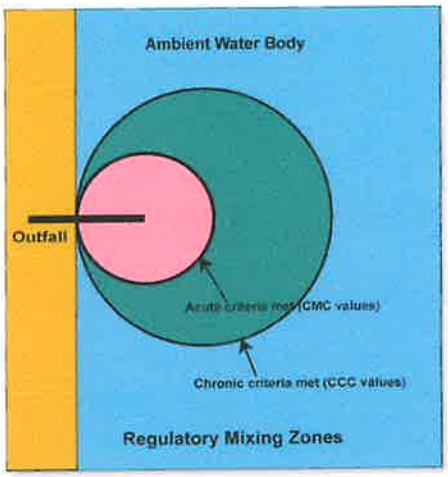
SECTION E. DEFINITIONS

1. *BOD* means five-day biochemical oxygen demand.
2. *CBOD* means five day carbonaceous biochemical oxygen demand
3. *TSS* means total suspended solids.
4. "*Bacteria*" includes but is not limited to fecal coliform bacteria, total coliform bacteria, and E. coli bacteria.
5. *FC* means fecal coliform bacteria.
6. *Total residual chlorine* means combined chlorine forms plus free residual chlorine
7. *Technology based permit effluent limitations* means technology-based treatment requirements as defined in 40 CFR Section 125.3, and concentration and mass load effluent limitations that are based on minimum design criteria specified in OAR Chapter 340, Division 41.
8. *mg/l* means milligrams per liter.
9. *kg* means kilograms.
10. m^3/d means cubic meters per day.
11. *MGD* means million gallons per day.
12. 24-hour *Composite sample* means a sample formed by collecting and mixing discrete samples taken periodically and based on time or flow. The sample must be collected and stored in accordance with 40 CFR part 136.
13. *Grab sample* means an individual discrete sample collected over a period of time not to exceed 15 minutes.
14. *Quarter* means January through March, April through June, July through September, or October through December.
15. *Month* means calendar month.
16. *Week* means a calendar week of Sunday through Saturday.
17. *POTW* means a publicly owned treatment works

APPENDIX H

Outfall Mixing Zone

ODEQ IMD Level 3
Mixing Zone Field Study & Modeling Analysis for the City of Canby, OR WRF



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Executive Summary

This report presents an Oregon Department of Environmental Quality (ODEQ) Internal Management Directive (IMD) Mixing Zone Level 3 study for the City of Canby (COC) Water Reclamation Facility (WRF) discharge in Canby, OR USA. The facility treats primarily domestic wastewater and discharges treated wastewater via a newly installed submerged, multiport diffuser into the Willamette River near River Mile 33, Outfall #001 (NPDES permit #101063). COC WRF is permitted to discharge treated wastewater year round in the Willamette River. The Average Dry Weather Design Flow (ADWDF) for the WRF is 2.0 MGD.[1]

A field study was conducted on September 19th, 2013 to observe and measure ambient and discharge flow conditions at the site. Rhodamine WT fluorescent dye was injected into the discharge in Outfall #001 to observe and measure mixing behavior of the discharged effluent plume. Measurements of ambient depth and velocity were taken with a boat mounted ADCP unit. Measurements of dye concentrations were taken using a boat mounted CTD unit fitted with a Rhodamine sensor. The Willamette River is relatively shallow near the outfall location and is not likely to be stratified. The discharge site is above Willamette Falls and is not tidally influenced.

Ambient flow statistics for the critical low flow period were computed using data from the USGS gage – USGS 14191000 WILLAMETTE RIVER AT SALEM, OR and in accordance with the guidance provided in the ODEQ IMD. Effluent discharge statistics for the critical periods were computed, using available discharge data for the COC WRF, in accordance with ODEQ IMD guidelines for a Level 3 mixing zone modeling and analysis. The effluent discharge data (January 2010 to July 2013) provided by COC WRF, indicates that the monthly average discharge flow rate of $Q_0 = 0.962$ MGD is below the current permitted design flow.[2]

Table 1 and Table 2 below summarize the results of the mixing zone dilution modeling study, completed using the CORMIX Mixing Zone Model, CORMIX v8.0, for the COC WRF discharges. The CORMIX v8.0 mixing zone model results were verified with field dye dilution measurements.

Modeling results and field dilution measurements indicate that the new multiport diffuser provides, on average, **6 times increase in centerline dilutions** at the ZID and **2 times increase in centerline dilutions** at the RMZ across all cases when compared to the previously operating single port discharge.[3]

Thermal analysis of the plume indicates compliance with regulatory criteria.

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[1] ODEQ NPDES PERMIT EVALUATION AND FACT SHEET, NPDES PERMIT # 101063

[2] Refer to Appendix E - Effluent Discharge Statistics & Data

[3] Refer to "Mixing Zone Field Monitoring and Modeling Study", February 2009 for single port discharge details.

Table 1 CORMIX v8.0 predicted dilution S & plume dimensions at the ZID and RMZ for COC WRF Multiport Diffuser								
Case	Discharge Flow	Ambient Flow	Zone of Initial Dilution ZID = 10 ft.			Regulatory Mixing Zone RMZ = 100 ft.		
	Q_0 (MGD)	Q_a (cfs)	Minimum Centerline Dilution $S_c = c_0/c$	Plume Vertical Thickness BV (m)	Plume Horizontal Half-Width BH (m)	Bulk Dilution S_f	Plume Vertical Thickness BV (m)	Plume Horizontal Half-Width BH (m)
1Q10	1.150	3,663	11	1.32	2.84	21	0.75	7.22
7Q10	0.981	3,732	13	1.35	2.73	28	1.28	4.88
30Q5	0.981	10,458	15	1.54	2.67	31	1.19	5.25
Q_{HM}	2.000	14,192	23	3.03	2.46	40	2.32	4.61

Table 2 COC WRF Multiport Diffuser Discharge - CORMIX Mixing Zone Modeling - Inputs & Results					
Model Input Parameter	**Case 1** **Field Study September 19th 2013**	**Case 2** **1Q10**	**Case 3** **7Q10**	**Case 4** **30Q5**	**Case 5** **Q_{HM}**
Effluent Discharge Flow Rate - Q_0 (MGD)	1.100	1.150	0.981	0.981	2.000
Effluent Discharge Temperature - T_0 (°C)	24.37	26.25	23.75	20.97	20.97
Ambient Discharge - Q_a (cfs)	10,458.30	3,663.36	3,732.48	10,458.30	14,192.64
Ambient Average Depth HA (m)	1.940	1.034	1.045	1.192	2.330
Ambient Depth At Discharge HD (m)	2.520	1.343	1.358	1.548	3.027
Ambient Velocity - U_a (m/s)	0.145	0.095	0.096	0.105	0.164
Ambient Temperature - T_a (°C)	17.25	22.99	22.99	19.27	19.27
CORMIX Modeling Results					
CORMIX Flow Class	MU2	MU2	MU2	MU2	MU2
Sc @ZID (10 ft. Downstream Trajectory) – Centerline	30	11	13	15	23
Sf @ZID (10 ft. Downstream Trajectory) – Bulk Sf = Sc *1.3 for line sources	39	14	17	20	30
Plume Half Width BH (m)	2.50	2.84	2.73	2.67	2.46
Plume Thickness BV (m)	2.52	1.32	1.35	1.54	3.03
Sc @RMZ (100 ft. Downstream Trajectory) – Centerline	40	16	21	24	31
Sf @RMZ (100 ft. Downstream Trajectory) – Bulk Sf = Sc *1.3 for line sources	52	21	28	31	40
Plume Half Width BH (m)	5.96	7.22	4.88	5.25	4.61
Plume Thickness BV (m)	1.46	0.75	1.28	1.19	2.32

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List of Abbreviations

ADCP	Acoustic Doppler Current Profiler
ADWDF	Average Dry Weather Design Flow
AWWDF	Average Wet Weather Design Flow
BH	Plume half width in horizontal plane, normal to trajectory (m)
BS	Ambient cross-section width
BV	Plume vertical thickness (m)
cfs	cubic feet per second
COC	City of Canby, OR
DC	Depth Cast (vertical profile measurement using CTD dipping sensor)
DGPS	Differential Global Positioning System
DMR	Discharge Monitoring Report
DWSA	Drinking Water Source Area
D_0	Port diameter
HA	average far-field depth (m)
HD	average depth near discharge (m)
HD0	local depth at surface discharge outlet (m)
HH	Human Health
IMD	Internal Management Directive
MGD	million gallons per day
MZIMD	Mixing Zone Internal Management Directive
-NA-	Not Applicable
NPDES	National Pollution Discharge Elimination System
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
OR	Oregon
OWRD	Oregon Water Resources Department

ppb	parts per billion
PDT	Pacific Daylight Time
Q_a	Ambient discharge flow
Q_0	Effluent discharge flow
Q1-10	1 day average, 10 year return period (1Q10) ambient flow – Acute Conditions
Q7-10	7 day average, 10 year return period (7Q10) ambient flow – Chronic Conditions
30Q5	30 day average, 5 year return period (30Q5) ambient flow – Human Health
Q_{HM}	Average daily flow (harmonic mean) ambient flow – Human Health
RHO_0	Effluent discharge density - ρ_0 (kg/m^3)
RHO_{AM}	Uniform ambient density - ρ_{AM} (kg/m^3)
R.M.	River Mile
RMS	Root Mean Square
RMZ	Regulatory Mixing Zone
S	Physical dilution
S_c	Minimum centerline dilution
S_f	Bulk dilution (flux averaged) $S_f = S_c * 1.7$ for point source/surface discharges; $S_f = S_c * 1.3$ for line source discharges;
U_a	Ambient velocity (m/s)
U_0	Port exit velocity of the effluent plume (m/s)
USA	United States of America
USGS	U.S. Geological Survey
WRF	Water Reclamation Facility
WWTF	Waste Water Treatment Facility
WWTP	Waste Water Treatment Plant
ZID	Zone of Initial Dilution

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1. Introduction

MixZon Inc. submitted a proposal to the COC in response to a RFQ for a mixing zone study for the COC WRF's newly installed multiport diffuser outfall.[4] MixZon was awarded the contract in September 2013. MixZon conducted the study with MixZon employees, equipment, and technology.

MixZon Inc. conducted a field study and data collection campaign on September 19th 2013 to collect mixing zone data representative of low ambient flow conditions. A modeling analysis of mixing zone dilution using the CORMIX v8.0 Mixing Zone Model was completed after analyzing the field data. The field data collection and modeling study were done in accordance with the guidelines presented in the ODEQ IMD on mixing zones for a Level 3 mixing zone study.

This wastewater treatment facility discharges treated wastewater via a newly installed submerged multiport diffuser outfall into the Willamette River at River Mile 33, Outfall #001 (NPDES permit #101063). The approximate coordinates of the multiport diffuser mid-point outfall, measured using a DGPS unit during the field study, are 45°17'19.22"N, 122°40'39.88"W.

MixZon obtained dye dilution data and ambient flow conditions based on field measurements, observations, discussions with COC WRF staff, ODEQ, and past experience. This mixing zone report addresses the following technical objectives and information:

- Environmental Mapping of critical resources with respect to the mixing zone.
- Outfall and RMZ characterization: A description of the existing outfall and Regulatory Mixing Zone (RMZ).
- Ambient receiving water conditions: Measurements, estimates and description of the ambient bathymetry, cross-section, velocity field, density structure, bottom roughness, etc.
- Discharge characteristics: Information on source conditions (density, temperature, pollutant constituent concentrations, etc.) to sufficiently document and characterize the effluent discharge.
- Mixing zone modeling analysis: This study presents a Level 3 modeling effort and data collection for mixing zone analysis.
- Thermal analysis: Analysis of temperature as a water quality parameter of concern, considering Reasonable Potential Analysis (RPA) requirements.

[4] "Proposal for Engineering Services for the City of Canby Mixing Zone Study", RFQ dated 08/13/2013

2. Environmental Mapping

The COC WRF diffuser is located on the right shoreline of the Willamette River near river mile 33.

Figure 1 presents an environmental map, which shows the location of the discharge in relationship to drinking water sources, confined animal feeds, and other mixing zones with NPDES permits.

Figure 2 presents a site scale environmental map, including fish habitat and human activities in the vicinity of the discharge location.

The Willamette River at the discharge location is often characterized as the "Newberg Pool", a generally slow moving section above Willamette Falls and below Newberg. This section of the river is characterized by urbanization with large lot sizes along both banks, with some relatively undeveloped sections.

There are no public access areas such as boat ramps or public beaches/swimming in the vicinity (within 200 feet) of the outfall. Based on the field study, direct onshore access to the outfall location is limited, though there is an active, nearby Frisbee golf course on the shore. There also appears to be a public walking/jogging trail on the shoreline in the vicinity of the outfall.

There is evidence of two historic log loading ramps on the west bank which were used from the mid-19th to 20th centuries to transport timber to market. Both ramps are within ½ mile upstream and downstream from the discharge location.

The Willamette River in the discharge location provides passage for several anadromous salmonid species (Fall Chinook, Spring Chinook, Coho, Summer Steelhead, and Winter Steelhead), but is not used as spawning habitat. There are no known commercial or recreational shellfish areas in the vicinity of the outfall. There are submerged logs in the vicinity of the outfall that might attract fish.

The area of the river in the vicinity of the discharge is popular for recreational use by boaters, water skiers, and bass anglers; however, since the outfall location is near shore it does not appear to conflict with these uses.

There are no other NPDES discharges upstream and downstream within ½ mile of the outfall. There are no drinking water intakes within the vicinity of the outfall and ½ mile downstream.

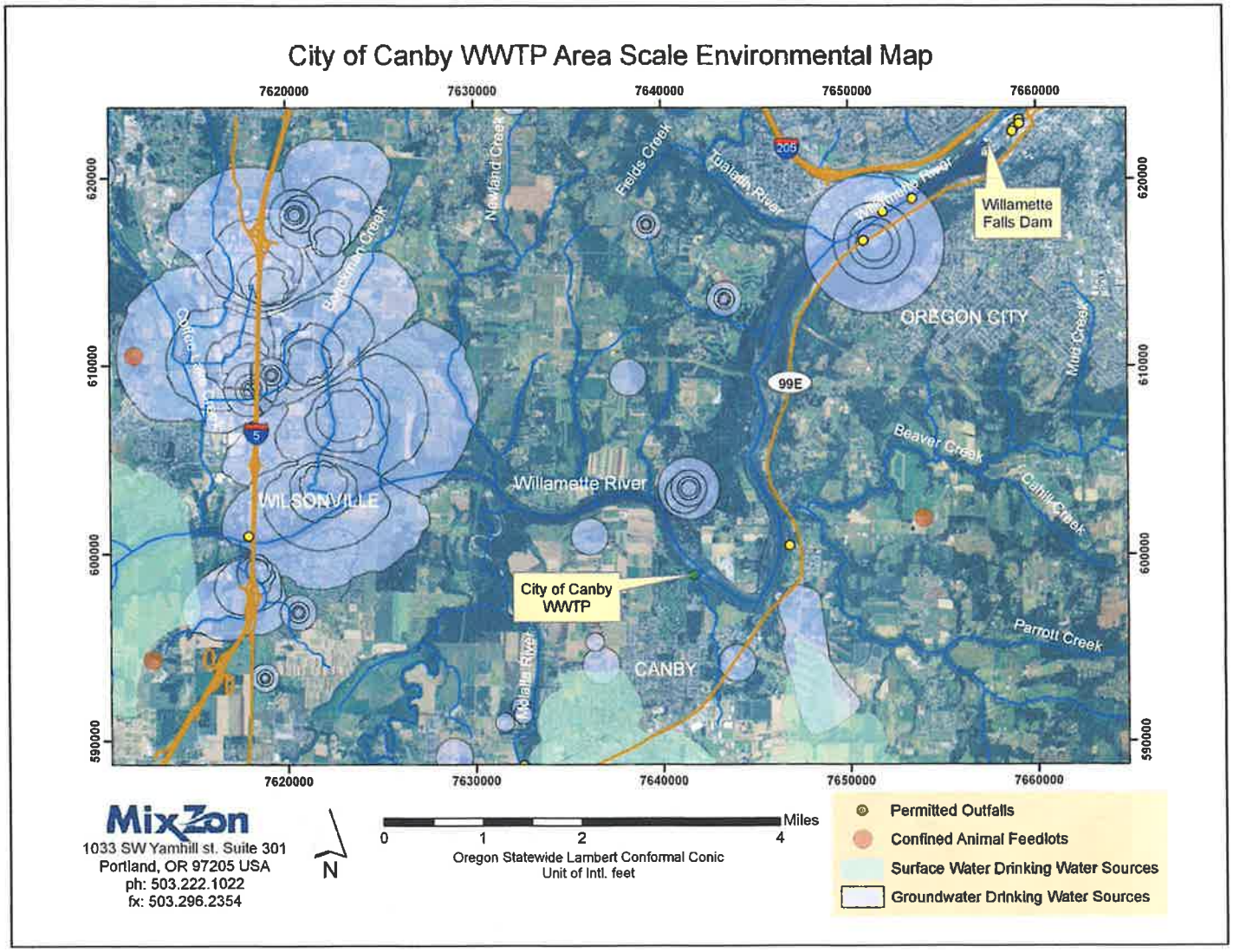

Figure 1 Environmental mapping of mixing zones and water supply near COC WRF outfall

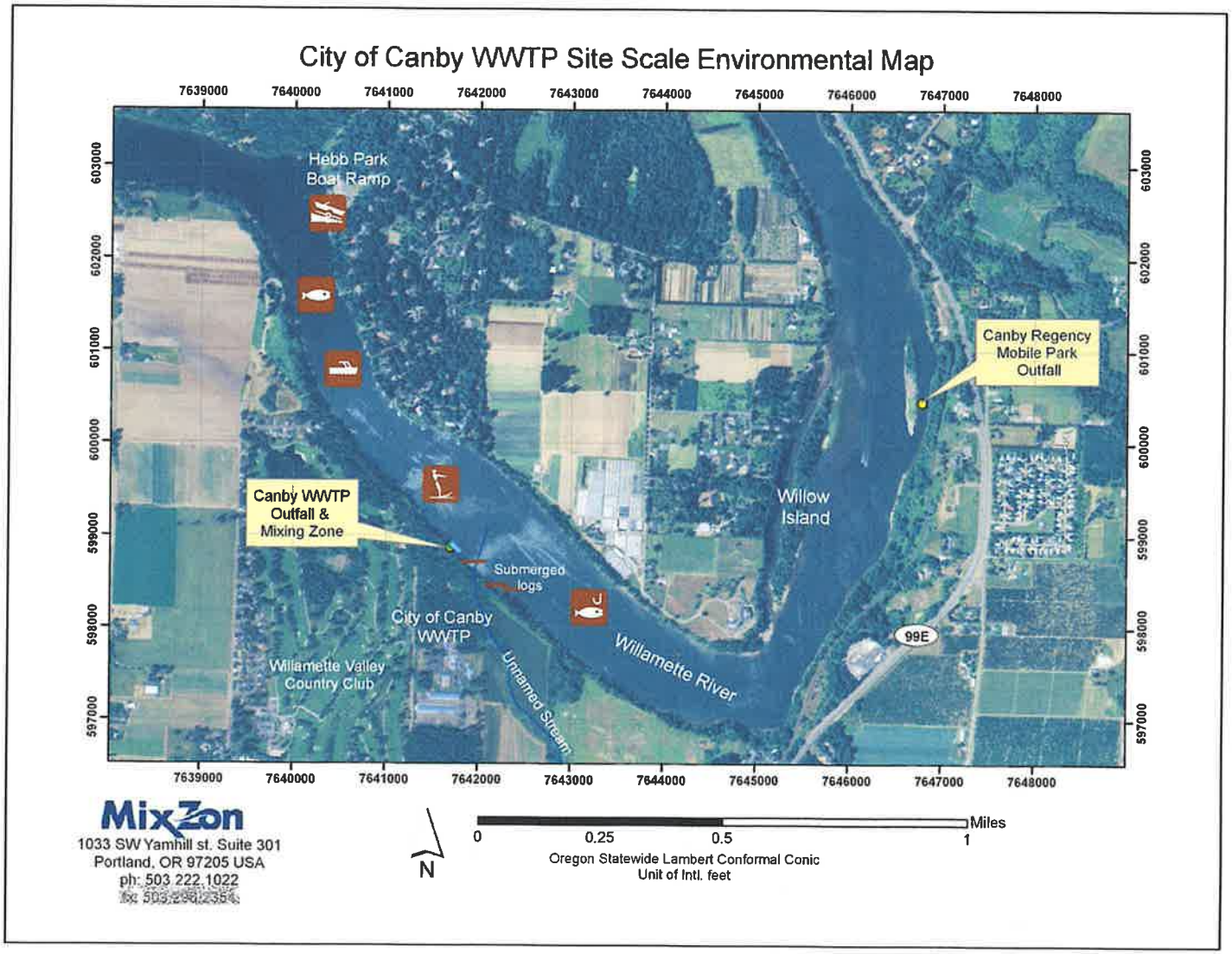

Figure 2 Site scale environmental mapping of COC WRF outfall and mixing zone

3. Ambient and Discharge Characterization

A field study was conducted on September 19th, 2013 to assess typical low summer flow ambient and discharge conditions. Appendix J - Discharge Site Photos shows photos taken during the field study.

3.1. Ambient Conditions

MixZon conducted an extensive site characterization survey using several sensors mounted on our 20' jet boat between 8AM and 4PM PDT on the day of the field study.

The survey crew was quite familiar with the site having conducted a prior mixing zone study in 2008 for the COC WRF. Site surveys were completed to map site bottom bathymetry, ambient currents, river discharge, and ambient temperature and density structure.

Figure 3 illustrates MixZon's survey boat and sensor configuration used in this study. The discharge location was easily identified by the onshore notice board indicating the presence of the COC WRF's mixing zone outfall, bubble plumes at the water surface and a buoy marker. Figure 4 shows a photograph taken of the outfall site from the boat and shows the discharge location and bubble plume.

Figure 3 Photo of survey boat and typical senor configuration used in the Canby field study

Figure 4 Photo of COC WRF discharge in the Willamette River

3.1.1. Ambient Bathymetry

Site bathymetry was collected using a Trimble AG-114 DGPS receiver and a RDI/Teledyne Workhorse Rio Grande 1200kHz ADCP sensor. The DGPS allows us to determine the latitude/longitude position of the ADCP sensor with sub-meter accuracy. Data from the current bathymetric survey completed on September 19th 2013 was found to be consistent with the bathymetric data that was collected and presented in the previous mixing zone study performed by MixZon for the COC WRF in the year 2008. Hence the bathymetric maps from the past study are presented in this study (Figure 5 and Figure 6).

The Willamette River bottom bathymetry near the COC WRF discharge location is characterized by a shallow ledge forming about 25 ft. upstream of the outfall location. The shallow ledge extends downstream along the right bank past the outfall location. The shallow ledge becomes much broader laterally from about 50 ft. downstream to about to approximately 250 ft. downstream of the outfall. The shallow ledge then narrows and disappears where Willow Creek enters the Willamette River.

The Willamette River at the discharge location is 990 ft. wide. For CORMIX mixing zone modeling purposes, the channel is schematized as an **unbounded section** (since the effluent dye plume never reached the far shore). The bottom roughness is characterized using a Manning's N value of n=0.03, the suggested value in literature for clean straight alluvial channels, for all model simulations.

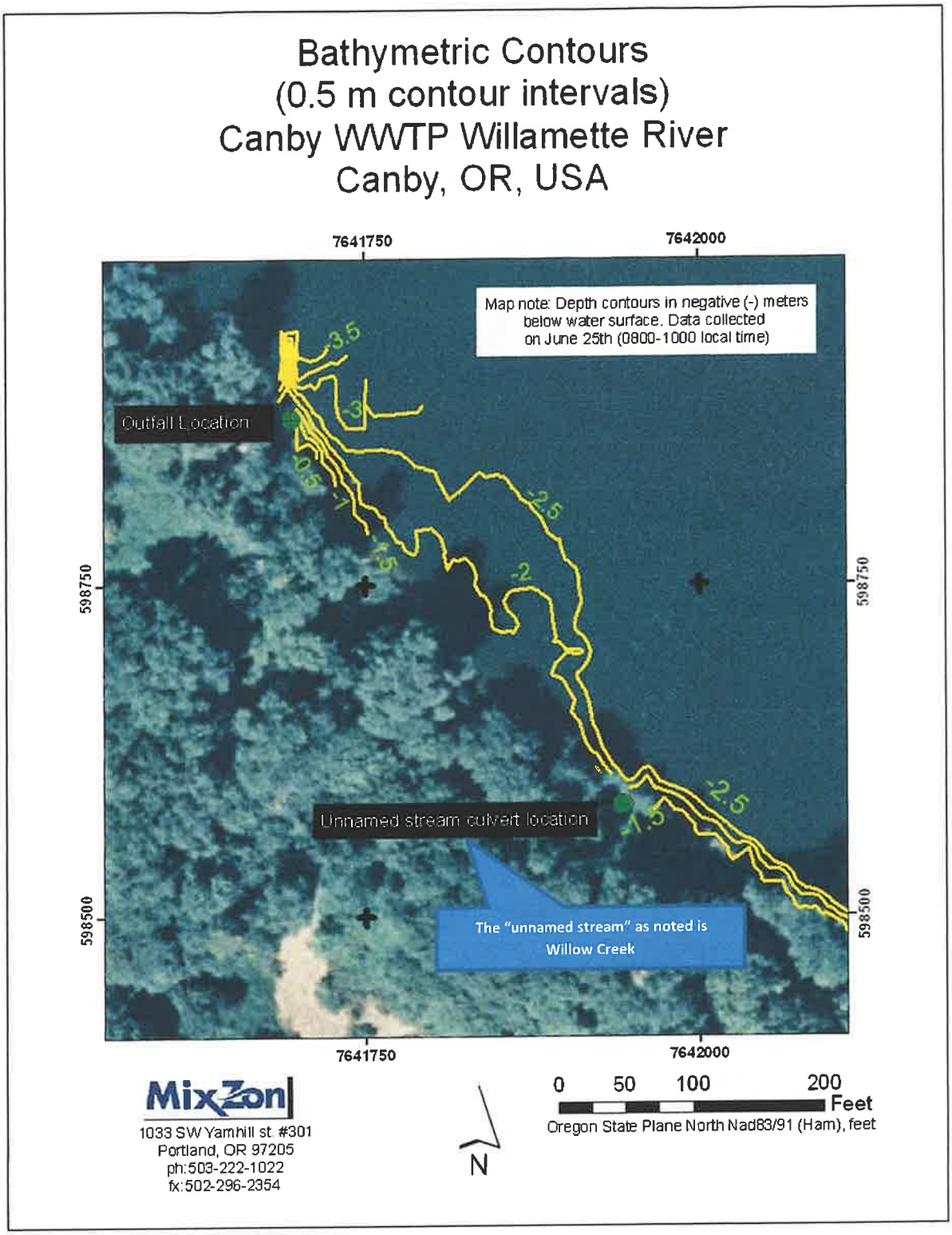

Figure 5 Site bathymetry survey results with 0.5 m contour

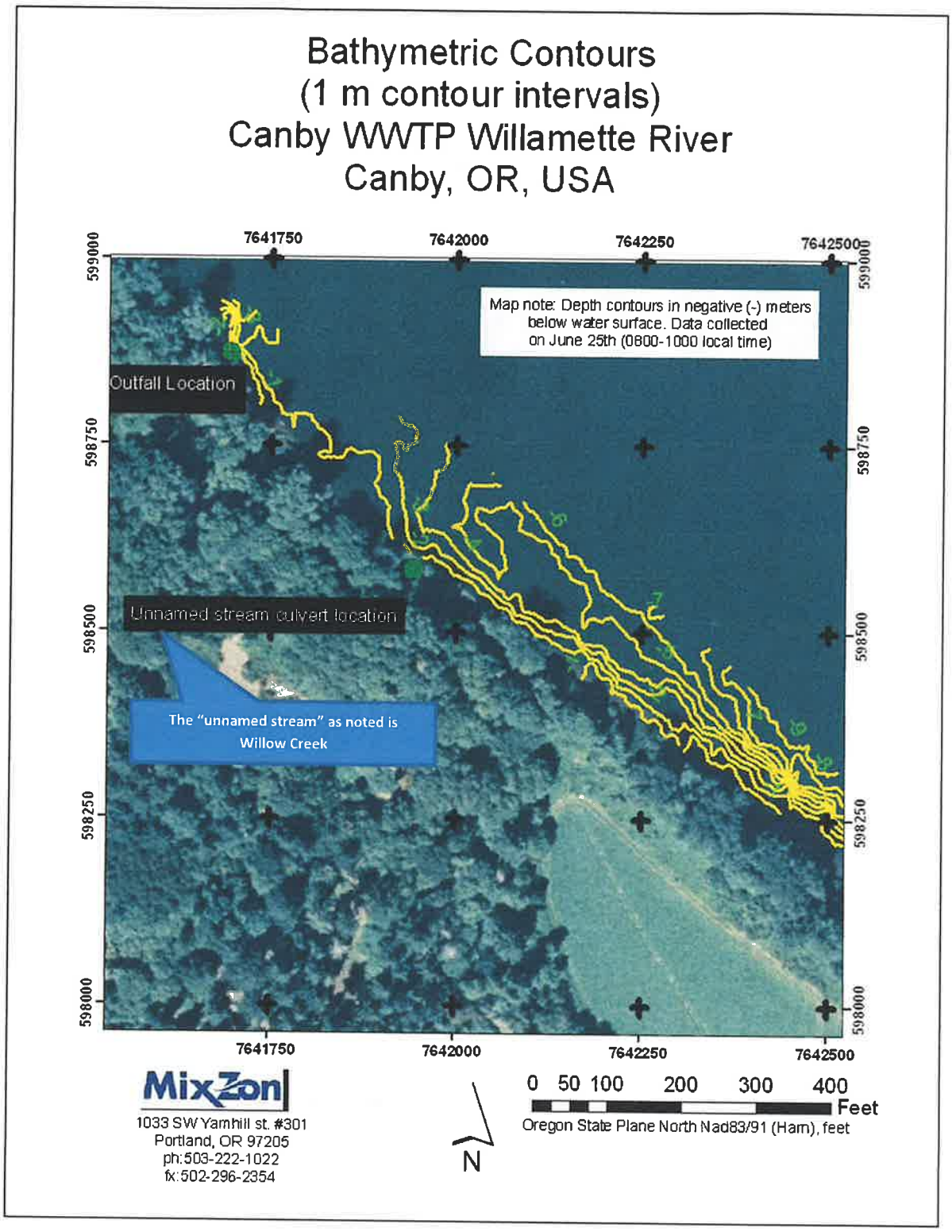

Figure 6 Site bathymetry survey results with 1-m contour

3.1.2. Ambient Velocity

The ADCP and DGPS sensors were used to gather the Willamette River ambient velocity data just upstream from the COC WRF multiport diffuser outfall, during the field study on September 19th 2013. Several boat passes were made in the vicinity and upstream of the diffuser to collect ambient velocity data.

Figure 7 shows the approximate boat track, just upstream of the current diffuser location, used for ambient velocity cross section data.

Figure 7 Approximate boat track for ambient velocity profile data collection

Figure 8 shows a graphical representation of the ambient velocity cross section profile and channel bottom bathymetry upstream of the diffuser.

The depth-averaged ambient Root-Mean-Square (RMS) velocity upstream of the outfall for the field study is $\mathbf{U_a = 0.145\ m/s}$. The RMS direction of the average velocity is about **168°** degrees from true North, placing the current vector approximately parallel to the shoreline at the discharge location. Because of the unsteady velocity field observed in the vicinity of the discharge, the resulting plume behavior in the mixing zone is likely to be somewhat unsteady too.

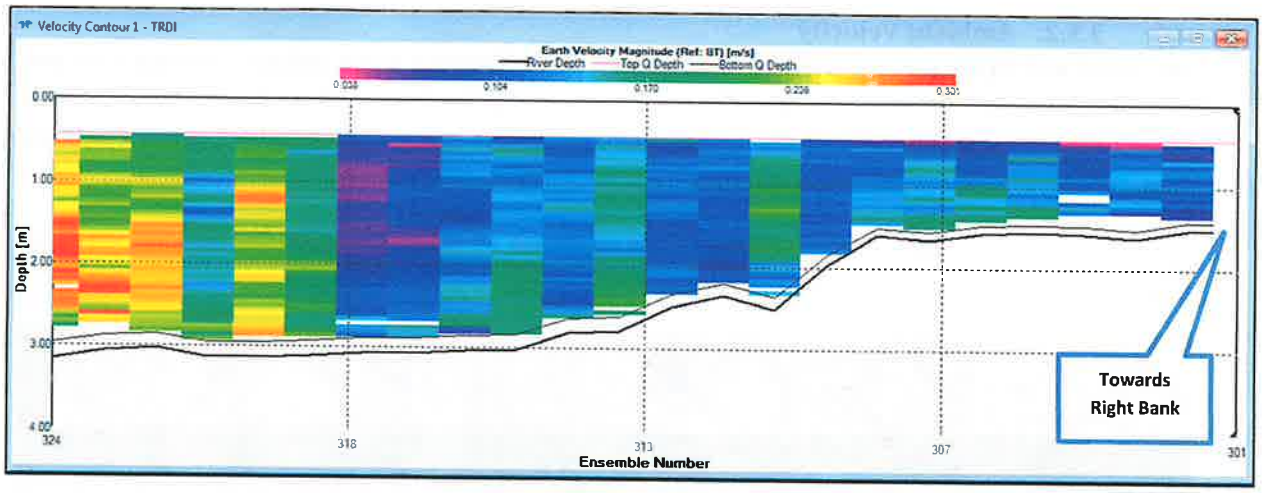

Figure 8 ADCP Ambient velocity cross section profile, measured upstream of the COC WRF diffuser

3.1.3. Ambient Density Profile

MixZon collected several vertical Conductivity Temperature Depth (CTD) profiles upstream of the multiport diffuser location. An Applied Microsystems, Micro CTD sensor (SN#7564) was used for the measurement. The location of these measurements relative to the outfall, and details of the vertical casts and data are presented in Appendix D - Ambient Density Profile Data. Results of the vertical temperature and conductivity profile indicate a **uniform ambient density field**.

3.1.4. Ambient Temperature

The average temperature from the vertical density profile CTD measurements upstream of the diffuser on September 19th 2013 is $\mathbf{T_a = 17.17°C}$. The average temperature from the near surface ADCP measurements upstream of the diffuser on September 19th 2013 is $\mathbf{T_a = 17.32°C}$.

Available Willamette River temperature statistics from the upstream USGS gauge at Newberg were used to characterize the ambient temperature at Canby during the critical low flow periods. First, the maximum of daily mean temperature values for each day from 2001 to 2013 was obtained from the gage. Next the monthly means of these temperature values during the critical summer low flow period (August, September and October) were computed. The maximum and average values of temperatures from the monthly means are then used. The ambient temperatures that is used for critical low flow conditions at 1Q10 and 7Q10 at Canby is $\mathbf{T_a = 22.99°C}$ and **Ta = 19.27 °C** for 30Q5 and QHM flows. Please refer to Appendix C - Ambient Depth and Temperature Data for details.

3.1.5. Hydrographic Analysis

In order to develop data sets for regulatory mixing zone modeling and analysis in accordance with ODEQ IMD recommendations, a stage-discharge relationship for the Willamette River at the COC WRF multiport diffuser outfall location is needed.

Historical ambient flow data (available from various upstream USGS gages on the Willamette River) provides the basis for calculating the ambient depth and velocity at the COC WRF discharge location for the various ambient low flow conditions. We use the measured values of ambient velocity (U_a), depth (HD), and total ambient discharge (Q_a) at the discharge location to adjust and compute the corresponding values of depth and velocity for the various statistical ambient low flows.

Table 3 below lists the USGS gages on the Willamette River, both upstream and downstream of the COC WRF outfall location, along with their statuses and respective drainage areas.

Table 3 USGS Gages on the Willamette River, upstream and downstream of the COC WRF outfall

USGS Gage ID	Location Description	Sufficient Historical Flow Data Available?	Drainage Area (sq. miles)
USGS 14174000	WILLAMETTE RIVER AT ALBANY, OR	Yes (1892 to 2013)	4,840[5]
USGS 14191000	WILLAMETTE RIVER AT SALEM, OR	Yes (1909 to 2013)	7,280[6]
USGS 14197900	WILLAMETTE RIVER AT NEWBERG, OR	No (2001 to 2013)	8,350[7]
-NA-	COC WRF Discharge Location	-NA- (Ungaged Site)	9,330[8]
USGS 14207700	WILLAMETTE RIVER AT OREGON CITY, OR	No (1978 to 1979)	10,000[9]

The closest upstream gage to the discharge location is the one at Newberg, OR. However, this gage does not have sufficient historical flow to be used in the statistical low flow computations. Hence the USGS gage at Salem is used for the ambient low flow computations. Data from the USGS gage at Newberg is used for QA/QC - to verify our field measurements of river flow and to check that our ADCP was calibrated correctly.

On September 19th 2013 between 9:00AM and 9:50AM PDT, MixZon completed 3 ADCP cross-section transects of the Willamette River upstream of the COC WRF discharge location in order to measure the average ambient flowrate. The results of the ambient flow survey are summarized in Table 4.

Table 4 Willamette River flow data – measured upstream of the COC WRF outfall

Transect	Measured Qa (m^3/s)	Measured Qa (cfs)	Avg. Water Temp. (°C)
0	297.76	10515.40	17.31
1	292.93	10344.79	17.32
2	297.74	10514.69	17.34
Average	**296.15**	**10,458.30**	**17.32**

[5] http://waterdata.usgs.gov/nwis/nwisman/?site_no=14174000&agency_cd=USGS

[6] http://waterdata.usgs.gov/nwis/nwisman/?site_no=14191000&agency_cd=USGS

[7] http://waterdata.usgs.gov/nwis/nwisman/?site_no=14197900&agency_cd=USGS

[8] Using the Watershed Delineation in the USGS StreamStats - Refer to Appendix G - StreamStats Ungaged Site Report

[9] http://waterdata.usgs.gov/nwis/nwisman/?site_no=14207700&agency_cd=USGS

The average river flow measured using the ADCP upstream of the COC WRF discharge location is $Q_{a\text{-}CANBY\text{-}ADCP}$ = 10,458 cfs.

The average ambient flow recorded at the closest upstream gage at Newberg, during the same time as the ADCP measurements is $Q_{a\text{-}NEWBERG}$ = 9,666.67 cfs (Refer to Appendix H - USGS Newberg AND Salem – Flow Data for 09/19/2013 for gage data).

The watershed drainage area ratio of the Willamette River at Canby to Newberg is 1.12 (9,330/8,350). Hence, the estimated flow at Canby during the ADCP field measurement based on the average USGS gage flow at Newberg is $Q_{a\text{-}CANBY} = Q_{a\text{-}NEWBERG} * 1.12 = 9,666.67 * 1.12 = 10,826.67$ cfs.

This estimated flow at Canby ($Q_{a\text{-}CANBY}$ = 10,827 cfs) is within 3.5% of the measured flow at Canby ($Q_{a\text{-}CANBY\text{-}ADCP}$ = 10,458 cfs).

This error is small enough to indicate a satisfactory measurement of the hydrographic data near the COC WRF discharge location and also an indication that the ADCP sensors were calibrated and working normally.

3.1.6. Calculation of Ambient Flow Statistics

The closest upstream gage to the discharge location is the one at Newberg, OR (USGS 14197900). However, this gage does not have sufficient historical flow data to be used in the statistical low flow computations. Long-term data is available at the upstream Albany (USGS 14174000) and Salem (USGS 14191000) gage stations.

Salem is the nearest gage station on the Willamette River with discharge measures long enough to compute flow statistics. To scale the flow for the COC WRF discharge location, a *"watershed drainage area ratio analysis"* is presented.

The watershed drainage area ratio of the Willamette River at COC WRF discharge location to USGS Salem gage is 1.28 (9,330/7,280).

The average ambient flow recorded at the upstream gage at Salem, during the same time as the ADCP measurements is $Q_{a\text{-}SALEM}$ = 9,650.00 cfs[10]

Hence, the estimated flow at Canby during the ADCP field measurement based on the average USGS gage flow at Salem is $Q_{a\text{-}CANBY} = Q_{a\text{-}SALEM} * 1.28 = 9,650.00 * 1.28 = 12,352.00$ cfs and is substantially higher than measured flow during the field study, $Q_{a\text{-}CANBY\text{-}ADCP}$ = 10,458 cfs

We hypothesize that due to the low summertime conditions, there is less contribution to the ambient flow between Salem and Canby from the contributing streams and groundwater inflows. Hence we

[10] Refer to Appendix H - USGS Newberg AND Salem – Flow Data for 09/19/2013 for gage data

"*scale*" the "*watershed drainage area ratio analysis*" computation at Canby based on the USGS Salem gage flows, with a 10% reduction to better reflect measured flow conditions at Canby.

Therefore, we have $Q_{a\text{-}CANBY} = Q_{a\text{-}SALEM}$*1.28*0.90 = 9,650.00 * 1.28 * 0.90 = 11,116.80 cfs at the time of the field dilution survey on Sept 19th, 2013. This "*scaled watershed drainage area ratio analysis*" of the flow at Canby based on the flow from the Salem USGS gage ($Q_{a\text{-}CANBY}$ = 11,117 cfs) is within 6.3% of the ADCP measured average flow ($Q_{a\text{-}CANBY\text{-}ADCP}$ = 10,458 cfs). This error is small enough to use the "*scaled watershed drainage area ratio analysis*".

To calculate ambient flow statistics, the USGS DFLOW program and USGS daily ambient flow data were employed.[11] We can use the same "*scaled watershed drainage area ratio analysis*" from above, to compute the statistical low flow conditions at Canby, based on the DFLOW computation results on the USGS flow data at Salem.

However, we first must test the "*dependability*" of the "*scaled watershed drainage area ratio analysis*". Since the USGS Albany and Salem gages have long term historical river flow, we compute the statistical low flows at Salem using the USGS gage data at Albany and the "*watershed drainage area ratio*" between Salem and Albany. These values are then compared against the statistical low flows computed using DFLOW directly from the USGS gage data at Salem.

DFLOW results for Albany gage data are presented in Table 5.[12] DFLOW results for the Salem gage data are presented in Table 6.[13]

Table 5 DFLOW Ambient Flow Statistics - USGS 14174000 WILLAMETTE RIVER AT ALBANY, OR	
Climatic year defined as Apr 1 - Mar 31 Full Climatic Year Begin Date=1909-10-01; End Date=2013-10-21	
1Q10 (cfs)	2,360.00
7Q10 (cfs)	2,390.00
30Q5 (cfs)	2,980.00
QHM (cfs)	7,510.00

[11] http://www.epa.gov/waterscience/models/dflow/

[12] http://waterdata.usgs.gov/nwis/dv?cb_00060=on&format=rdb&period=&begin_date=1909-10-01&end_date=2013-10-21&site_no=14174000&referred_module=sw

[13] http://waterdata.usgs.gov/nwis/dv?cb_00060=on&format=rdb&period=&begin_date=1909-10-01+&end_date=2013-10-21&site_no=14191000&referred_module=sw

Table 6 DFLOW Ambient Flow Statistics - USGS 14191000 WILLAMETTE RIVER AT SALEM, OR	
Climatic year defined as Apr 1 - Mar 31 Full Climatic Year Begin Date=1909-10-01; End Date=2013-10-21	
1Q10 (cfs)	3,180.00
7Q10 (cfs)	3,240.00
30Q5 (cfs)	4,030.00
QHM (cfs)	11,200.00

The watershed drainage area ratio between the USGS gage locations Salem/Albany = 7,280/4,840 = 1.50. Hence the ambient low flow discharge statistics for Salem can be obtained by multiplying the corresponding low flows (computed using DFLOW) from the Albany gage by 1.50 i.e. $Q_{a\text{-}SALEM} = Q_{a\text{-}ALBANY}*1.5$. The comparison of the computed flows at Salem, as indicated above, with the direct DLOW results using the USGS Salem gage data are presented in below in Table 7.

Table 7 Comparison of Willamette River Flow At Salem				
Statistical Flows	**$Q_{a\text{-}ALBANY}$ (cfs)** *Computed using DLOW & USGS 14174000 Albany Gage Data*	**$Q_{a\text{-}SALEM}$ (cfs)** $Q_{a\text{-}ALBANY}*1.5$ *(watershed drainage area ratio)*	**$Q_{a\text{-}SALEM}$ (cfs)** *Computed using DLOW & USGS 14191000 Salem Gage Data*	**Difference**
1Q10	2,360.00	3,540.00	3,180.00	≈10% high
7Q10	2,390.00	3,585.00	3,240.00	≈10% high
30Q5	2,980.00	4,470.00	4,030.00	≈10% high
QHM	7,510.00	11,265.00	11,200.00	≈1% high

Results of this *"dependability"* test indicate that the *"watershed drainage area ratio analysis"* results in an approximately 10% increase in flow statistics at Salem for the 1Q10, 7Q10 and 30Q5 flows, with an approximate 1% increase in the QHM flow.

Hence we can conclude that performing the *"watershed drainage area ratio analysis"* and comparing the results directly to statistical flow data shows that the ratio method may estimate statistical flows within a 10% margin. This also justifies the 10% reduction used in the *"scaled watershed drainage area ratio analysis"* when computing the flows at the COC WRF discharge location based on the flows reported in the Salem gage and comparing them with the measured ADCP values.

We will use the "scaled *watershed drainage area ratio analysis" to get* estimates of the statistical low flows at the COC WRF discharge location using the long term historical flow data at the USGS Salem gage. In determining the statistical low flows near the discharge location, an adjustment or scaling of about -10% will be used for the 1Q10, 7Q10 and 30Q5 flows (computed using the *"watershed drainage area ratio analysis"* and the Salem gage), while a scaling of -1% will be used for the QHM flows as tabulated in Table 8.

Table 8 Computed Willamette River Low Flow Statistics at the COC WRF Discharge Location				
Statistical Flows	**$Q_{a\text{-SALEM}}$ (cfs)** *Computed using DLOW & USGS 14191000 Salem Gage Data*	**$Q_{a\text{-CANBY}}$ (cfs)** $Q_{a\text{-SALEM}}$*1.28 *("watershed drainage area ratio analysis")*	**Adjustment/ Scaling**	**Final $Q_{a\text{-CANBY}}$ (cfs)**
1Q10	3,180.00	4,070.40	-10%	3,663
7Q10	3,240.00	4,147.20	-10%	3,732
30Q5	4,030.00	5,158.40	-10%	4,643
QHM	11,200.00	14,336.00	-1%	14,193

The low flow excursion statistics were calculated for available historical data record. Low flow excursion events occurred in the months of August, September and October, with September as the most frequent month for a low flow excursion.

3.1.7. Calculation of Discharge-Stage-Velocity-Depth Relationship at Canby

The discharge-stage-velocity-depth relationship is used to compute ambient velocity and depth values for the COC WRF discharge site under the statistical ambient low flows conditions. This relationship uses ratios between measured values from the field study and the statistical low flow values.

The average river flow, measured using the ADCP, during the field study was **Q_{a1} = 10,458.30 cfs**. The average depth measured at the discharge location was **HD_1= 2.52 m** (≈8.27').[14] This is consistent with the river bottom depth data dated 07/24/13, provided to us by the COC WRF.[15] The average far-field depth measured at Canby discharge location was **HA_1 = 1.94 m**.[16] Average ambient velocity measured just upstream of the outfall was **U_{a1} = 0.145 m/s**.

The following relationships were used to adjust ambient velocity and depths near the discharge for the low ambient flow modeling scenarios outlined in the NPDES permit. It is based on the Manning equation for open channel flow, and is stated as follows:

$$H_2 = H_1 (Q_{a2}/Q_{a1})^{3/5}$$

$$U_{a2} = U_{a1} (HD_2/HD_1)^{2/3}, \text{ where}$$

H_1 is the measured/observed ambient depth (either depth at discharge HD or far-field depth HA),
H_2 is the statistical ambient depth (either depth at discharge HD or far-field depth HA),
Q_{a1} is the ambient discharge observed during the field study,
Q_{a2} is the statistical ambient discharge flow to be modeled,

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[14] Measurement on 09-19-2013 - ADCP Transect #4,5; all measurements within 20' radius of diffuser midpoint.

[15] Refer to Appendix C - Ambient Depth and Temperature Data, Figure 13

[16] Measurement on 09-19-2013 - ADCP Transect #4, 5; All points within 50' of stated RMZ boundary

U_{a1} is the velocity observed during the field study, and
U_{a2} is the velocity for the statistical ambient flow.

Table 9 below presents the relevant ambient flow, depth and velocity parameters used in subsequent modeling analysis for the observed conditions during the dilution field study and for representative statistical flows.

Table 9 Ambient parameters for model input

Model Ambient Input Parameter	Case 1 Field Study 09/19/2013	Case 2 1Q10	Case 3 7Q10	Case 4 30Q5	Case 5 Q_{HM}
Ambient Flowrate - Q_a (cfs)	10,458	3,663	3,732	4,643	14,193
Ambient Velocity - U_a (m/s)	0.145	0.095	0.096	0.105	0.164
Ambient Depth Near Discharge - HD (m)	2.52	1.34	1.36	1.55	3.03
Ambient Average Far-Field Depth - HA (m)	1.94	1.03	1.05	1.19	2.33
Ambient Water Temperature - T_a (°C)	17.32	22.99	22.99	19.27	19.27

All these values are likely to be conservative and produce conservative estimates of dilution available at the site.

4. Effluent Discharge Characteristics

The COC WRF discharge is a typical municipal effluent. Pollutants of concerns include ammonia and temperature.

The critical low flow period in summer for the COC WRF discharge is between August 1st and October 31st, with September as the most likely month for a low flow excursion. The ADWDF for the COC WRF as reported in the NPDES permit is 2.0 MGD. The average monthly flow (based on data provided by the WRF) is computed to be 0.96 MGD (about 48% of the dry weather design flow). Hence the plant has been operating at < 85% of the ADWDF.

The average effluent flow rate, based on discharge data provided by the COC WRF, during the field dye dilution study was **Q_0 = 1.1 MGD**.[17] The average effluent discharge temperature during the study on was **T_0 = 24.37°C**.[18]

In accordance with ODEQ IMD guidelines effluent discharge characteristics (flow and temperature) were developed for the statistical low ambient flow conditions for the mixing zone modeling and analysis.

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[17] Refer to Figure 16 in Appendix E - Effluent Discharge Statistics & Data

[18] Refer to Table 18 in Appendix E - Effluent Discharge Statistics & Data

The effluent discharge values, Q_0, used for mixing zone modeling and dilution analysis are enumerated in Table 15, Appendix E - Effluent Discharge Statistics & Data. These values are likely to be conservative and produce conservative estimates of dilution available at the site.

5. Outfall and RMZ characterization

COC WRF installed a new multiport diffuser to replace their existing single port discharge in the first week of September 2013. The design and installation of this new multiport diffuser was done by a third party under contract with the City of Canby. It is assumed that the necessary hydraulic modeling and analysis of the new discharge was completed by the third party contractor and the COC.

The outfall did appear to be "venting" air entrained in the feeder pipe. The resulting "bubble plume" was readily apparent at the water surface (Figure 45).

Due to the shallow nature of the river near the discharge location, the boat crew was able to photograph the effluent discharge flowing from the multiport diffuser ports as shown below in Figure 9.

The multiport diffuser plan schematics (preliminary and final fabrications drawings) provided to us by the COC WRF are attached for reference in Appendix F - COC WRF Multiport Diffuser Plan & Drawings.

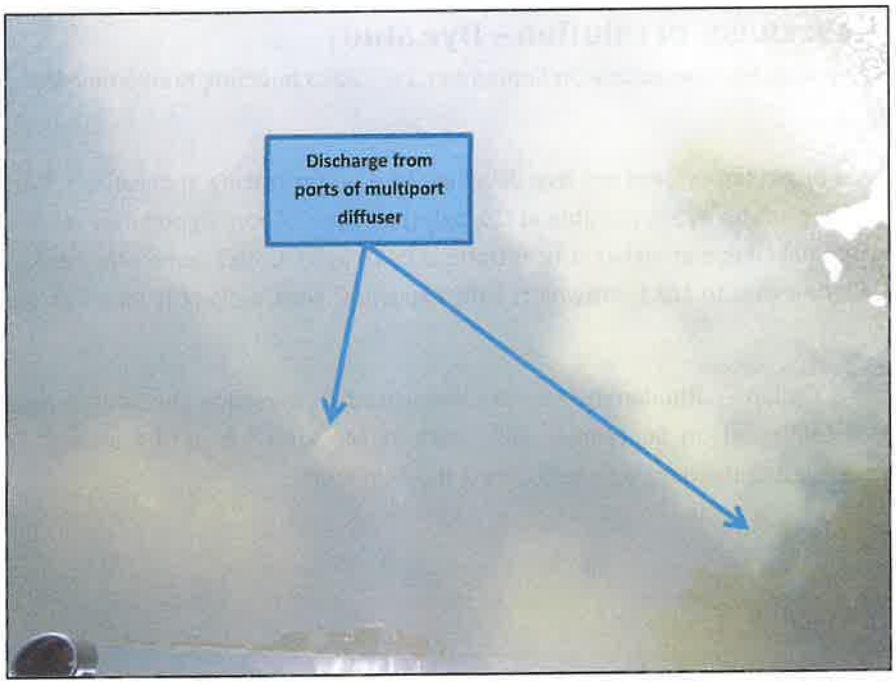

Figure 9 Discharge from 2 ports of the COC WRF multiport diffuser

The multiport diffuser is located near the **RIGHT bank/shoreline** of the Willamette River, when looking downstream. The diffuser line has an effective length **LD = 16.50'.** The distances of the multiport diffuser ends from the right shoreline are **YB1 = 17.00' and YB2 = 33.50'**. The diffuser consists **NOPEN = 4**

ports/openings, each of D_0 = **8"** in diameter. According to the diffuser plan drawings, each opening is installed with an insert type WASTOP inline check valve (Model # WS-193-55-304, manufactured by J & S Valve, Texas), to prevent backflow.[19] The port opening centers are about **H0 = 0.8'** above the channel bottom, with a vertical alignment angle θ = **45°**. For modeling purposes a contraction ratio CR_0 = **1** is assumed.

The diffuser alignment angle (angle between diffuser centerline line and ambient current direction, measured counterclockwise from the ambient current direction) is approximately γ = **90°**, since the average ambient currents flow parallel to the shoreline and the diffuser line is more or less perpendicular to the shoreline. All the 4 ports are pointing offshore with an approximate horizontal angle σ = **45°** relative to ambient current.

The NPDES permit states, "*The regulatory mixing zone is that portion of the Willamette River from the point of discharge to 100 feet downstream of the point of discharge. The zone of initial dilution (ZID) shall not exceed 10 % of the defined mixing zone*".

Effluent plume mixing dilutions and plume dimensions are reported at RMZ = 100 ft. and ZID = 10 ft. from the outfall location.

6. Field Measurement of Dilution – Dye Study

MixZon conducted a river dilution survey on September 19th, 2013 injecting Rhodamine WT dye into the effluent discharge.

Rhodamine WT is a bright fluorescent red dye developed for water tracing applications. With a modern fluorometer, detection of the dye is possible at 0.1 ppb (parts per billion) in polluted waters. It can also be detectable by the naked eye at higher concentrations (> 20 ppb). Unlike some other dyes, Rhodamine WT resists degradation due to UV (ultraviolet) light exposure, thus making it ideal for surface water quality studies.

The Turner Designs Cyclops-7 Rhodamine sensors were used to measure Rhodamine concentrations. The sensors were calibrated on September 16th, 2013 at MixZon's lab at the office.[20] Temperature corrections were applied to the data collected during the field study.

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[19] http://www.jandsvalve.com/public/pdf08/WaStop%20JS%20Valve%202012%20Final.pdf

[20] Refer to Appendix I - Dye Study Sensor Calibrations and Field Data for Rhodamine Sensor Calibration Sheets

6.1. Rhodamine WT Dye Injection

During the field study, dye was injected into the discharge chamber at the COC WRF headworks using an FMI QBP metered pump.[21] Dye injection started at about 10:45 AM PDT and continued until about 16:20 PDT. Figure 31, Figure 32 and Figure 33 in Appendix J - Discharge Site Photos show the dye injection setup at the headworks.

Measurements of dye concentration, temperature, and conductivity were collected at the outfall manhole approximately 100 meters from the headworks. Rhodamine concentrations were measured using a Turner Designs Cyclops-7 Rhodamine sensor (serial #2101513). Figure 38, Figure 39 and Figure 40 in Appendix J - Discharge Site Photos show the dye monitoring and sampling setup at the manhole.

Effluent dye concentrations are a function of the effluent discharge, the stock dye concentration, effluent temperature and the dye injection rate. The effluent discharge varied from about 0.8 to 1.2 MGD during the period of dye injection, with an average of about 1.1 MGD, and an average discharge temperature of 24.37°C. Figure 16, in Appendix E - Effluent Discharge Statistics & Data shows the effluent discharge over the injection period.

During the first hour of injection, small adjustments were made to the dye injection rate to try to get an effluent dye concentration of about 300 ppb at the manhole. Dye concentrations at the manhole varied from about 260 to 350 ppb during the injection period. Figure 24 and Figure 25 show the Rhodamine dye concentrations at the manhole over the injection period. The dye injections from about 14:15 to 16:00 averaged about 325 ppb. This later period was used for determining dye dilution using the dye measurements in the river.

For quality control, three grab samples were collected from the manhole during the injection period. These samples were analyzed later at the MixZon lab to validate the continuous monitoring data. Two of the three matched the continuous monitoring data very closely; the other was about 10% lower, but did match a downward spike in the continuous monitoring data. These data sufficiently validate the continuous monitoring data.

Travel time from the dye injection site to the discharge location in the river was approximately 12 minutes. Travel time from the sampling manhole to the diffuser was estimated about 8 minutes.

6.2. Rhodamine WT Measurements in the River

Between 11:00 and 16:00 MixZon measured Rhodamine concentrations from the boat using vertical casts and lateral transects. Rhodamine concentrations were measured continuously using a Turner Designs Cyclops-7 Rhodamine sensor (serial # 2100987) mounted on a CTD instrument. A DGPS unit was mounted near the CTD to collect position information.

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[21] Refer to Figure 20, Appendix I - Dye Study Sensor Calibrations and Field Data for FMI QBG Due Injection Pump Calibrations

For quality control, five grab samples were collected from the river during the monitoring period. These samples were analyzed later at the MixZon lab to validate the continuous monitoring data. One of the samples was collected in ambient water upstream of the diffuser before dye injection commenced – this sample essentially measured zero. The other grab samples were collected during dye monitoring. These samples were compared with the concurrent Rhodamine sensor measurements. The sample and sensor measurements were on the same order, though differences ranged from 1.5 to 5 ppb. These differences can be explained by the patchy nature of the dye in the river and the difficulty positioning the sampling device in the water near the CTD. These data sufficiently validate the continuous monitoring data.

The individual plumes from the four ports were visible from the boat. No dye was observed upstream of the diffuser. The individual plumes merged near the water surface several feet downstream from the diffuser. As the dye plume proceeded downstream from the diffuser, it became shore-hugging for several hundred feet downstream before widening out in the river. In the reach where we measured, the dye plume was patchy throughout, both near the ZID and further downstream past the RMZ extent.

Post-processing of the dye measurements verified that there was no upstream intrusion of the effluent. The patchy nature of the plume was confirmed by the Rhodamine dye concentrations, which varied spatially in the river during different boat transects. Figure 10 shows depth-average Rhodamine concentrations in the vicinity and downstream of the diffuser. Note the patchy nature of the plume.

6.3. Rhodamine WT Dilutions

In order to better understand the data, the Rhodamine concentrations were post-processed using a grid of 1-foot cells, with measurements averaged in each cell. Dilutions were calculated as C0/C, where C0 is the average dye concentration at the manhole and C is the dye concentration from the river. Figure 11 shows the dilution contours calculated from the Rhodamine measurements. Table 10 shows summary data for Rhodamine concentrations and Dilutions (S) for dye measurements near the plume centerline at the ZID and RMZ. Dilution near the plume centerline at the ZID was approximately S = 29, while at the RMZ S = 35.

Table 10 Rhodamine concentrations & Dilutions (S) for dye measurements near plume centerline

	ZID (10 feet)		RMZ (100 feet)	
	Rhodamine (ppb)	**Dilution (S)**	**Rhodamine (ppb)**	**Dilution (S)**
Median	**11.3**	**29**	**9.3**	**35**
Average	**11.1**	**30**	**7.8**	**48**
Std. dev.	1.8	6	2.7	20
Minimum	7.7	25	4.0	30
Maximum	13.0	42	11.1	81

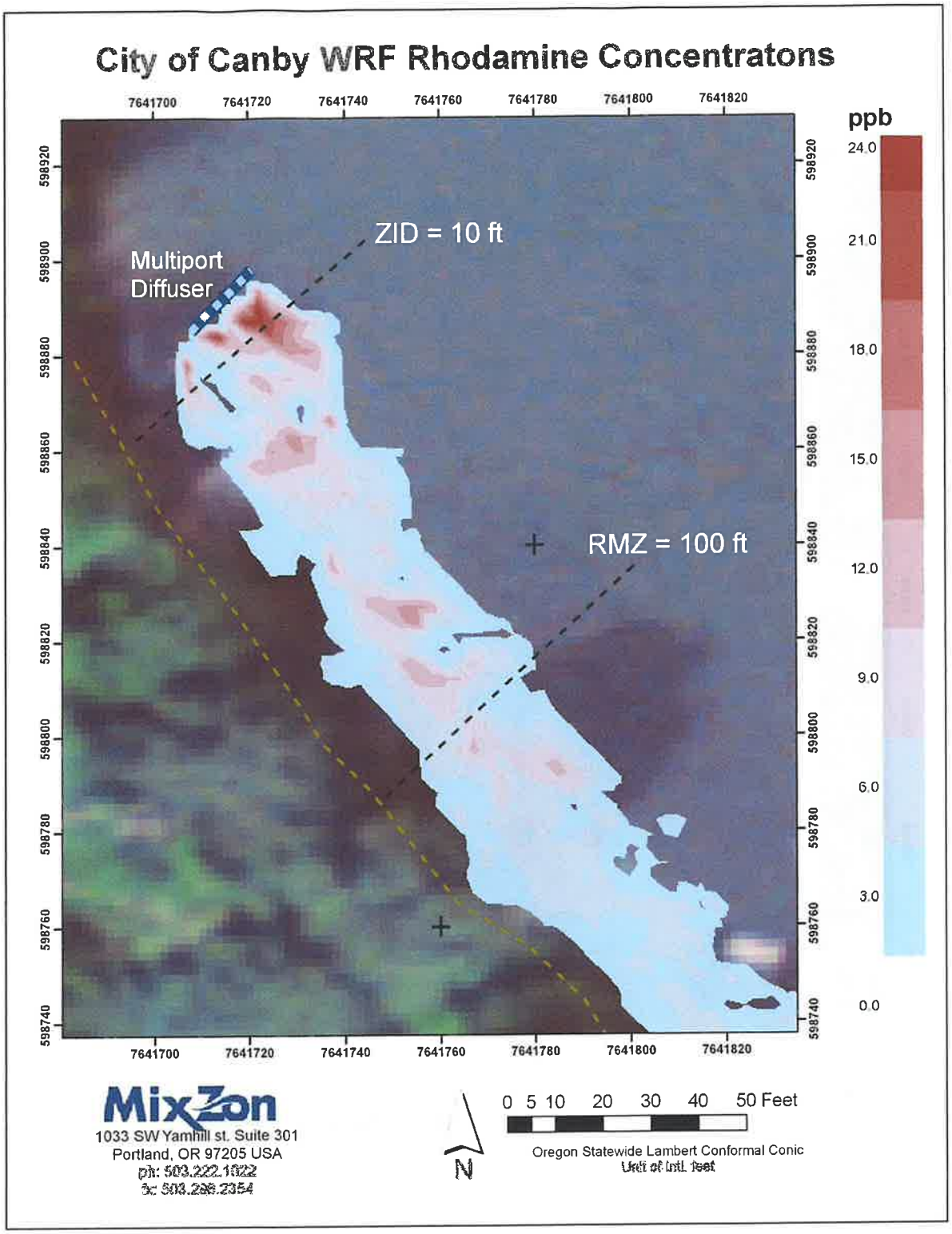

Figure 10 Depth-averaged dye concentrations measured in the vicinity and downstream of the diffuser

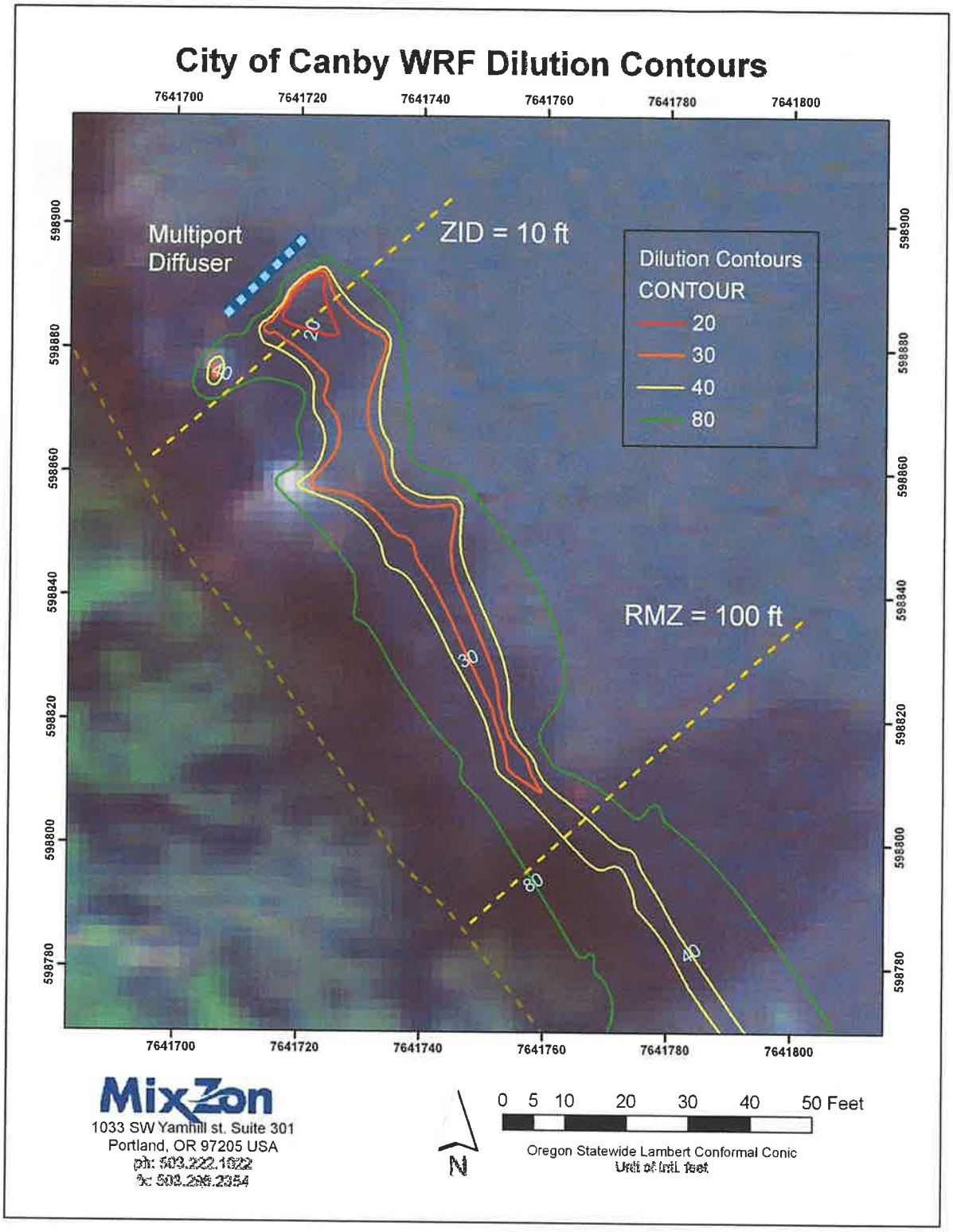

Figure 11 Effluent Dye dilution contours based on field measurements of dye concentration

7. Mixing Zone Modeling

The CORMIX v8.0 Mixing Zone Model was selected for mixing zone modeling and dilution analysis of the effluent discharge from the COC WRF. CORMIX was selected because it:

i. explicitly simulates boundary interactions,
ii. accounts for discharge stability,
iii. can predict near-field and far-field dilutions for various source configurations,
iv. gives 3-D plume trajectory and dilution, and
v. has been validated for a wide range of discharge and mixing zone conditions in accordance with the ODEQ IMD model selection requirements.
vi. CORMIX v8.0 is the same model version currently licensed to ODEQ.

CORMIX predicts a MU2 flow class in all cases.

The modeling results and flow classification indicates that the effluent plume has shoreline interaction in the far-field in all cases.

For all these cases CORMIX provides plume flux averaged (bulk) dilutions S_f. Predicted plume bulk dilutions, S_f, are converted to minimum centerline dilution values, S_c using the following equation:

$$S_c = S_f/1.3$$

Appendix A - Flow Classes and Description contains details on CORMIX flow classification results and corresponding flow class description.

Appendix B - CORMIX Prediction Files lists complete CORMIX prediction files for dilution prediction at the ZID and RMZ for discharge flows for the field study conditions and for the various critical low ambient flows.

Table 11 lists the CORMIX input data and modeling results for the mixing zone dilution modeling for the conditions at the ZID and RMZ.

Table 11 COC WRF Multiport Discharge – CORMIX Mixing Zone Modeling – Inputs and Results					
Model Input Parameter	**Case 1 Field Study September 19th 2013**	**Case 2 1Q10**	**Case 3 7Q10**	**Case 4 30Q5**	**Case 5 Q_{HM}**
Effluent Discharge Flow Rate - Q_0 (MGD)	1.100	1.150	0.981	0.981	2.000
Effluent Discharge Temperature - T_0 (°C)	24.37	26.25	23.75	20.97	20.97
Ambient Discharge - Q_a (cfs)	10,458.30	3,663.36	3,732.48	10,458.30	14,192.64
Ambient Average Depth HA (m)	1.940	1.034	1.045	1.192	2.330
Ambient Depth At Discharge HD (m)	2.520	1.343	1.358	1.548	3.027
Ambient Velocity - U_a (m/s)	0.145	0.095	0.096	0.105	0.164
Ambient Temperature - T_a (°C)	17.25	22.99	22.99	19.27	19.27
Ambient Section is Bounded/Unbounded?	Unbounded	Unbounded	Unbounded	Unbounded	Unbounded
Ambient Wind Speed - U_W (m/s)	2.00	2.00	2.00	2.00	2.00
Manning's – n	0.03	0.03	0.03	0.03	0.03
Nearest bank – Bank	Right	Right	Right	Right	Right
Multiport Diffuser Length - LD (ft.)	16.50	16.50	16.50	16.50	16.50
Distance from Near Shore to First Port - YB1 (ft.)	17.00	17.00	17.00	17.00	17.00
Distance from Near Shore to Last Port - YB2 (ft.)	33.50	33.50	33.50	33.50	33.50
Port Height Above the Bottom - H0 (ft.)	0.80	0.80	0.80	0.80	0.80
Port Opening Diameter - D0 (ft.)	0.67	0.67	0.67	0.67	0.67
Port Contraction Ratio - CR0	1	1	1	1	1
Total number of ports/openings – NOPEN	4	4	4	4	4
Diffuser Alignment Angle - GAMMA (deg.)	90	90	90	90	90
Diffuser Type	Unidirectional	Unidirectional	Unidirectional	Unidirectional	Unidirectional
Port Vertical Angle - THETA (deg.)	45.00	45.00	45.00	45.00	45.00
Port Horizontal Angle - SIGMA (deg.)	45	45	45	45	45
Relative Orientation Angle - BETA (deg.)	45	45	45	45	45
CORMIX Modeling Results					
Plume Exit Velocity - U_0 (m/s)	0.37	0.39	0.33	0.33	0.68

CORMIX Flow Class	MU2	MU2	MU2	MU2	MU2
Plume Contacts Near shore (Right Bank) in Near Field (Y/N)?	N	N	N	N	N
Sc @ZID (10 ft. Downstream Trajectory) – Centerline	30	11	13	15	23
Sf @ZID (10 ft. Downstream Trajectory) – Bulk Sf = Sc *1.3 for line sources	39	14	17	20	30
Plume Half Width BH (m)	2.50	2.84	2.73	2.67	2.46
Plume Thickness BV (m)	2.52	1.32	1.35	1.54	3.03
Sc @RMZ (100 ft. Downstream Trajectory) – Centerline	40	16	21	24	31
Sf @RMZ (100 ft. Downstream Trajectory) – Bulk Sf = Sc *1.3 for line sources	52	21	28	31	40
Plume Half Width BH (m)	5.96	7.22	4.88	5.25	4.61
Plume Thickness BV (m)	1.46	0.75	1.28	1.19	2.32

8. CORMIX Model Validation for Dilution Prediction

Table 12 shows a comparison of model predictions of dilution S based on field conditions against measured field values.

Table 12 CORMIX model comparison with field measurements of dilution

	CORMIX v8.0 Dilution Prediction		Measured Dye Dilutions (based on measured Rhodamine Dye Concentrations near plume centerline)				
	Minimum Centerline Dilution S_c	Bulk Dilution S_f (S_c * 1.3)	S Minimum	S Maximum	S Average	S Median	Std. Dev.
ZID (10 ft.)	30	39	25	42	30	29	6
RMZ (100 ft.)	40	52	30	81	48	35	20

In general, extensive comparison with field and laboratory data has shown that the CORMIX predictions on dilutions and concentrations (with associated plume geometries) are reliable for the majority of cases and are accurate to within +-50% of one standard deviation.

Overall, predicted plume dilutions at the ZID and RMZ based on CORMIX modeling of field conditions are in good agreement with field measurements of dilution. The field study validates the CORMIX model predictions for low summer flow conditions observed and measured on September 19th 2013; therefore we can conclude that the CORMIX model predications for statistical low flow ambient conditions are also valid.

9. Comparison of Mixing Performance

MixZon had completed a Level 3 Mixing Zone study for the COC WRF single port discharge into the Willamette River in 2008. The COC WRF upgraded their single port discharge to a new multiport diffuser, installed in September 2013, to increase mixing performance.

Table 13 below compares the mixing performance, based on CORMIX modeling results, of the old single port discharge and newly installed multiport diffuser for the respective field study conditions and the various statistical low flow ambient conditions at the ZID and RMZ.

Table 13 Comparison of Mixing Performance – Old Single port vs. New Multiport Discharges

		CORMIX Model Predicted Plume Centerline Dilution S_c Under Various Ambient Flow Conditions				
		Field Study	1Q10	7Q10	30Q5	QHM
Single Port Discharge - 2008	ZID 10 ft.	4 (Sept. 2008)	3	3	3	4
Multiport Diffuser - 2013	ZID 10 ft.	30 (Sept. 2013)	11	13	15	23
Improvement Ratio (2013/2008)		7.5	4.3	4.7	4.8	6.4
Single Port Discharge - 2008	RMZ 100 ft.	18 (Sept. 2008)	6	10	14	23
Multiport Diffuser - 2013	RMZ 100 ft.	40 (Sept. 2013)	16	21	24	31
Improvement Ratio (2013/2008)		2.28	2.44	2.16	1.74	1.32

On average, across all cases, the new multiport diffuser provides an approximate improvement of 5.5x times in plume centerline dilutions (Sc) at the ZID.

On average, across all cases, the new multiport diffuser provides an approximate improvement of 2.0x times (about 98%) in plume centerline dilutions at the RMZ.

10. Thermal Plume analysis of the Discharge

The effluent discharge temperatures used in the mixing zone modeling and in this report does **not** account for any heat loss or transfer in the pipe from the head works to the discharge point in the Willamette River. Discharge temperature values used for modeling are likely to be conservative and produce conservative estimates of temperature dilution available at the site.

The ODEQ IMD lists a thermal shock criterion that limits potential exposure of fish to temperatures of 25 °C or more to less than 5% of the cross-section at Chronic flows (7Q10 ambient flows).

So during critical summer discharge conditions, the following data is used for modeling the chronic summer 7Q10 flow conditions (Case 3 - Chronic Conditions - 7Q10 Flow):

Q_a = 3,732.48 cfs, Ta = 22.99°C;

Q_0 = 0.981 MGD, T_0 = 23.75°C.

For this case, CORMIX predicted a minimum centerline dilution of S_c = 13 at the ZID (10 ft.) with a plume half-width BH = 2.73 m

Thus the local temperature excess at the ZID is ΔT/S = (23.75°C - 22.99°C)/13 = 0.059°C

If the ambient temperature T_a = 22.99°C, then the plume maximum temperature at the ZID is 22.99°C + 0.059°C = 23.05 °C, well below the thermal criteria of 25°C.

Hence, thermal analysis of the effluent plume indicates compliance with regulatory criteria for the current multiport diffuser discharge conditions.

11. Conclusions/Recommendations

A mixing zone study was conducted for the COC WRF wastewater discharge into the Willamette River to comply with ODEQ NPDES mixing zone permit requirements. A Level 3 study was completed, with data obtained from a site visit measurements and estimated from available data sources.

Conservative values for ambient and discharge parameters were used in this analysis. Dilutions observed at the site are likely to be somewhat greater than predicted values due to conservative assumptions.

Environmental mapping was completed to identify nearby mixing zones and critical resources that may be affected by the mixing zone.

The study included field data collection on plume dilution and hydrodynamic modeling of the mixing zone. The field study consisted of an ambient bathymetry and velocity survey in the vicinity of the outfall using an ADCP and effluent dye dilution measurement using a Rhodamine sensor.

The field study was conducted on September 19th, 2013. Ambient flowrate at the discharge location was determined by ADCP measurement and verified with USGS gauging station at Newberg. Statistical flow analysis to determine 1Q10, 7Q10, 30Q5, and Q_{HM} critical ambient flows at Canby based on the flow records available from the USGS gages at Newberg, Salem and Albany is presented.

The CORMIX v8.0 mixing zone model predictions were verified with field dye dilution measurements. CORMIX predictions are in good overall agreement with measured dye dilution data.

Subsequent modeling was completed to determine dilutions at the ZID and RMZ from the newly installed multiport diffuser for the various critical low ambient flow conditions.

Overall the new multiport diffuser increased the effluent plume dilutions by about 6 times at the ZID (near-field) and by about 2 times at the RMZ (far-field) when compared to the previous single port discharge configuration.

Appendix A - Flow Classes and Description

A.1 Flow Class Diagrams

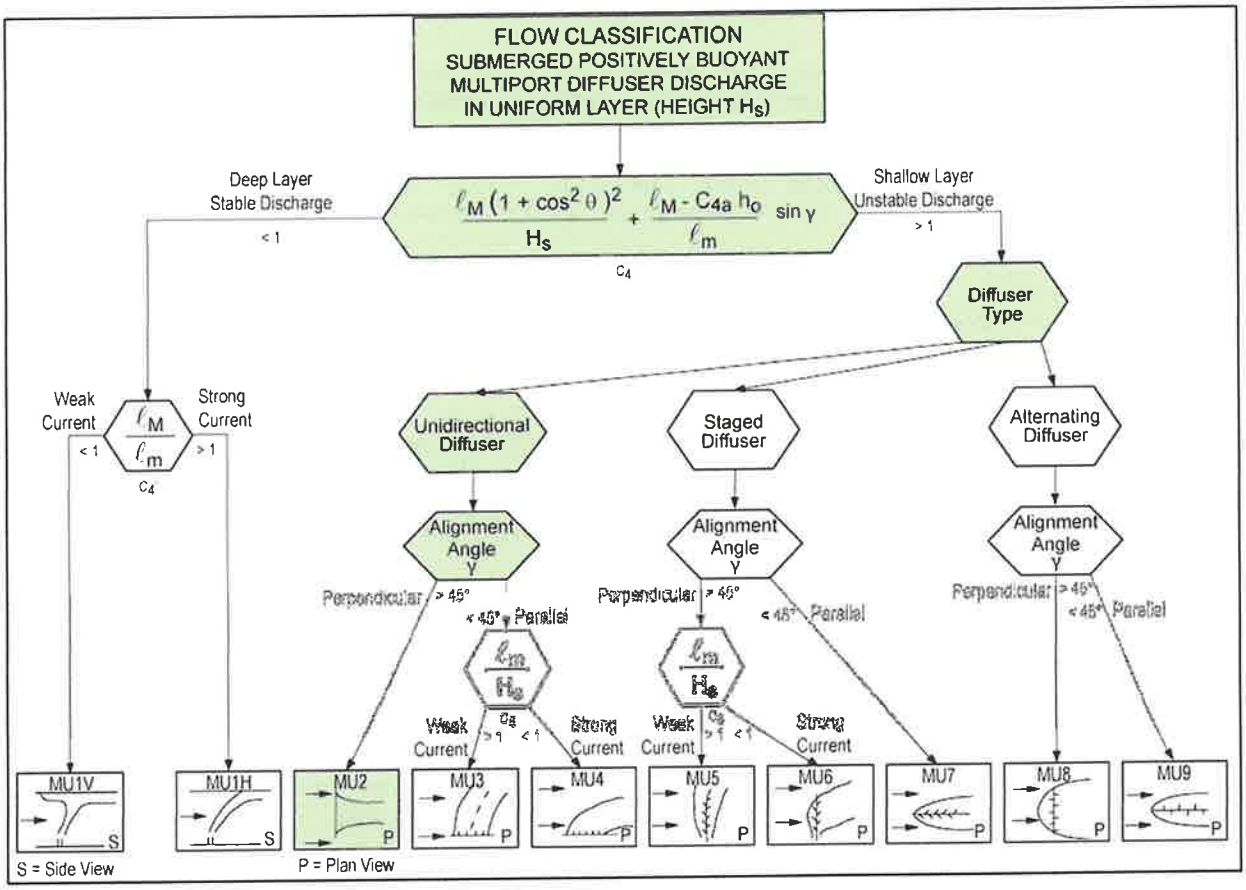

Figure 12 MU2 - CORMIX Flow Classification Diagram

A.2 Flow Class Description

FLOW_CLASS_MU2

A unidirectional multiport diffuser with perpendicular alignment is discharging into an ambient flow. Frequently, this is called a "co-flowing diffuser". The discharge configuration is hydrodynamically "unstable", that is the discharge strength (measured by its momentum flux) is very strong in relation to the layer depth and in relation to the stabilizing effect of the discharge buoyancy (measured by its buoyancy flux). Rapid vertical mixing takes place over the full layer depth.

The following flow zones exist:

1) Acceleration zone for unidirectional coflowing diffuser: The net horizontal momentum flux provided by the diffuser jets leads to a whole scale acceleration of the ambient water, which flows across the diffuser line leading to rapid entrainment and mixing in this zone. The diffuser plume is mixed over the full layer depth, and contracts laterally in the direction of the flow (acceleration process). The length of this zone is about one half the diffuser length.

2) Diffuser-induced plume in co-flow: The diffuser induced momentum flux is still controlling the flow. However, lateral entrainment and diffusion lead to a spreading of the diffuser plume and additional mixing. The plume moves predominantly in the direction of the ambient flow. At the beginning, the plume is vertically mixed over the full layer depth. At some distance, stratification may take place depending on the strength and direction of the plume buoyancy.

***
The zones listed above constitute the NEAR-FIELD REGION in which strong initial mixing takes place.
***

3) Buoyant spreading at layer boundary: The plume spreads laterally along the layer boundary (surface or pycnocline) while it is being advected by the ambient current. The plume thickness may decrease during this phase. The mixing rate is relatively small. The plume may interact with a nearby bank or shoreline.

4) Passive ambient mixing: After some distance the background turbulence in the ambient shear flow becomes the dominating mixing mechanism. The passive plume is growing in depth and in width. The plume may interact with the channel bottom and/or banks.

***
Predictions will be terminated in zone 3 or 4 depending on the definitions of the REGULATORY MIXING ZONE or the REGION OF INTEREST.
***

SPECIAL CASE: If the ambient is stagnant, then advection and diffusion by the ambient flow (zones 3 and 4) cannot be considered. The mixing is limited to the near-field region (zones 1 and 2) and the predictions will be terminated at this stage.

Such stagnant water predictions may be a useful initial mixing indicator for a given site and discharge design.

For practical final predictions, however, the advection and diffusion of the ambient flow - no matter how small in magnitude - should be considered.

Appendix B - CORMIX Prediction Files

Case 1 - Field Study September 19th 2013

```
CORMIX2 PREDICTION FILE:
2222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
                        CORMIX MIXING ZONE EXPERT SYSTEM
                Subsystem CORMIX2: Multiport Diffuser Discharges
                             CORMIX Version 8.0GTR
                        HYDRO2 Version 8.0.0.0 April 2012
------------------------------------------------------------------------------------------------------------
------------------------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Canby WRF; Willamette River
 Design case:       Sept . 19th 2013 Field Study Conditions
 FILE NAME:         \\G... Multiport Diffuser-Field Study Sept. 19 2013.prd
 Time stamp:        Wed Nov 20 17:02:11 2013

ENVIRONMENT PARAMETERS (metric units)
 Unbounded section
 HA    =      1.94  HD    =      2.52
 UA    =     0.145  F     =     0.057 USTAR =0.1220E-01
 UW    =     2.000 UWSTAR=0.2198E-02
 Uniform density environment
 STRCND=  U         RHOAM =  998.7323

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_perpendicular
 BANK  =  RIGHT     DISTB =      7.70  YB1   =      5.18  YB2   =     10.21
 LD    =      5.03  NOPEN =    4       SPAC  =      1.68
 D0    =     0.203 A0    =     0.032 H0    =      0.24  SUB0  =      2.28
 D0INP =     0.203 CR0   =     1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =     90.00  THETA =     45.00  SIGMA =     45.00  BETA  =     45.00
 U0    =     0.371  Q0    =     0.048       =0.4819E-01
 RHO0  =  997.2053  DRHO0 =0.1527E+01  GP0   =0.1499E-01
 C0    =0.1000E+03  CUNITS=
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.9583E-02  m0    =0.3560E-02  j0    =0.1437E-03  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =     0.026 lM    =      1.30  lm    =      0.17
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.4819E-01  M0    =0.1790E-01  J0    =0.7226E-03
 Associated 3-d length scales (meters)
 LQ    =     0.18  LM    =      1.82  Lm    =      0.92  Lb    =      0.24
                                      Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =     18.89  FRD0  =      6.73  R     =      2.56  PL    =     10.50
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =     0.371  D0    =     0.203 A0    =     0.032 THETA =     45.00
 FR0   =     18.89  FRD0  =      6.73  R     =      2.56
 (slot)             (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222222
 2  Flow class (CORMIX2)       =    MU2    2
 2  Applicable layer depth HS =     2.52  2
 22222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
```

```
 C0    =0.1000E+03  CUNITS=
 NTOX  =  0
 NSTD  =  0
 REGMZ =  1
 REGSPC=  4          XREG  =     30.48  WREG  =      0.00  AREG  =      0.00
 XINT  =   3000.00  XMAX  =   3000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
         7.70 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  10 display intervals per module
-------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

      X        Y        Z        S        C        BV       BH       Uc        TT
   0.00     0.00     0.24      1.0 0.100E+03    0.02     2.51     0.299   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------
BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =     2.52m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

      X        Y        Z        S        C        BV       BH        TT
   0.00     0.00     0.24      1.0 0.100E+03    0.02     2.51 .00000E+00
   0.18     0.18     0.26     13.0 0.768E+01    0.25     2.49 .14491E+01
   0.36     0.36     0.28     18.0 0.556E+01    0.50     2.48 .30363E+01
   0.53     0.53     0.30     21.8 0.458E+01    0.76     2.47 .46560E+01
   0.71     0.71     0.32     25.0 0.399E+01    1.01     2.46 .62930E+01
   0.89     0.89     0.35     27.9 0.359E+01    1.26     2.45 .79413E+01
   1.07     1.07     0.37     30.4 0.328E+01    1.51     2.45 .95976E+01
   1.24     1.24     0.39     32.8 0.305E+01    1.76     2.44 .11260E+02
   1.42     1.42     0.41     35.0 0.286E+01    2.02     2.44 .12927E+02
   1.60     1.60     0.43     37.1 0.270E+01    2.27     2.44 .14599E+02
   1.78     1.78     0.45     39.0 0.256E+01    2.52     2.44 .16273E+02
 Cumulative travel time =         16.2735 sec  (    0.00 hrs)
   Plume centerline may exhibit slight discontinuities in transition
     to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER
-------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------
BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

 Phase 1: Vertically mixed, Phase 2: Re-stratified

-------------------------------------------------------------------------------------------
```

```
 Phase 2: The flow has RESTRATIFIED at the beginning of this zone.

 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD251: DIFFUSER PLUME IN CO-FLOW
-------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  1.06 to conserve the mass flux in the far-field!
-------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Profile definitions:
   BV = top-hat thickness, measured vertically
   BH = top-hat half-width, measured horizontally in y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
      X        Y        Z        S        C        BV       BH       ZU       ZL       TT
    1.78     1.78     2.52     39.0 0.256E+01   2.52     2.57     2.52     0.00   .16273E+02
    8.65     1.78     2.52     42.7 0.234E+01   2.01     3.53     2.52     0.51   .63662E+02
   15.52     1.78     2.52     45.8 0.218E+01   1.74     4.37     2.52     0.78   .11105E+03
   22.39     1.78     2.52     48.8 0.205E+01   1.58     5.14     2.52     0.94   .15844E+03
   29.26     1.78     2.52     51.9 0.193E+01   1.47     5.85     2.52     1.05   .20583E+03
 ** REGULATORY MIXING ZONE BOUNDARY **
 In this prediction interval the plume TRAJECTORY distance meets or exceeds
 the regulatory value =    30.48 m.
 This is the extent of the REGULATORY MIXING ZONE.
   36.13     1.78     2.52     55.2 0.181E+01   1.41     6.52     2.52     1.11   .25321E+03
   43.01     1.78     2.52     58.8 0.170E+01   1.36     7.16     2.52     1.16   .30060E+03
   49.88     1.78     2.52     62.7 0.159E+01   1.34     7.77     2.52     1.18   .34799E+03
   56.75     1.78     2.52     67.1 0.149E+01   1.33     8.36     2.52     1.19   .39538E+03
   63.62     1.78     2.52     71.8 0.139E+01   1.34     8.93     2.52     1.18   .44277E+03
   70.49     1.78     2.52     77.0 0.130E+01   1.35     9.48     2.52     1.17   .49016E+03
 Cumulative travel time =         490.1554 sec  (    0.14 hrs)

-------------------------------------------------------------------------------
 Plume is ATTACHED to RIGHT bank/shore.
   Plume width is now determined from RIGHT bank/shore.

 Plume Stage 2 (bank attached):
      X        Y        Z        S        C        BV       BH       ZU       ZL       TT
   70.49    -7.70     2.52     77.0 0.130E+01   1.35    18.96     2.52     1.17   .49016E+03
   82.87    -7.70     2.52     86.2 0.116E+01   1.44    19.92     2.52     1.08   .57550E+03
   95.24    -7.70     2.52     96.2 0.104E+01   1.53    20.86     2.52     0.99   .66084E+03
  107.61    -7.70     2.52    107.2 0.933E+00   1.64    21.78     2.52     0.88   .74618E+03
  119.99    -7.70     2.52    119.0 0.840E+00   1.74    22.68     2.52     0.78   .83152E+03
  132.36    -7.70     2.52    131.8 0.759E+00   1.86    23.56     2.52     0.66   .91686E+03
  144.74    -7.70     2.52    145.6 0.687E+00   1.98    24.42     2.52     0.54   .10022E+04
  157.11    -7.70     2.52    160.3 0.624E+00   2.11    25.28     2.52     0.41   .10875E+04
  169.49    -7.70     2.52    175.9 0.568E+00   2.24    26.11     2.52     0.28   .11729E+04
  181.86    -7.70     2.52    192.6 0.519E+00   2.38    26.94     2.52     0.14   .12582E+04
  194.23    -7.70     2.52    210.3 0.475E+00   2.52    27.75     2.52     0.00   .13436E+04
 Cumulative travel time =        1343.5613 sec  (    0.37 hrs)

END OF MOD241: BUOYANT AMBIENT SPREADING
-------------------------------------------------------------------------------
 Due to the attachment or proximity of the plume to the bottom, the bottom
   coordinate for the FAR-FIELD differs from the ambient depth, ZFB = 0 m.
 In a subsequent analysis set "depth at discharge" equal to "ambient depth".
-------------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.616E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.126E+00 m^2/s
```

```
 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 2 (bank attached):
       X        Y        Z        S        C        BV       BH       ZU       ZL       TT
    194.23    -7.70     2.52    210.3 0.475E+00   2.52    27.75     2.52     0.00   .13436E+04
 Plume interacts with BOTTOM.
 The passive diffusion plume becomes VERTICALLY FULLY MIXED within this
   prediction interval.
    474.81    -7.70     2.52    323.3 0.309E+00   2.52    42.64     2.52     0.00   .32786E+04
    755.39    -7.70     2.52    451.3 0.222E+00   2.52    59.52     2.52     0.00   .52136E+04
   1035.96    -7.70     2.52    592.8 0.169E+00   2.52    78.18     2.52     0.00   .71486E+04
   1316.54    -7.70     2.52    746.6 0.134E+00   2.52    98.47     2.52     0.00   .90836E+04
   1597.12    -7.70     2.52    911.7 0.110E+00   2.52   120.25     2.52     0.00   .11019E+05
   1877.69    -7.70     2.52   1087.6 0.919E-01   2.52   143.44     2.52     0.00   .12954E+05
   2158.27    -7.70     2.52   1273.5 0.785E-01   2.52   167.96     2.52     0.00   .14889E+05
   2438.85    -7.70     2.52   1468.9 0.681E-01   2.52   193.73     2.52     0.00   .16824E+05
   2719.42    -7.70     2.52   1673.4 0.598E-01   2.52   220.71     2.52     0.00   .18759E+05
   3000.00    -7.70     2.52   1886.6 0.530E-01   2.52   248.82     2.52     0.00   .20694E+05
 Cumulative travel time =       20693.6660 sec  (    5.75 hrs)

 Simulation limit based on maximum specified distance =    3000.00 m.
   This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
-------------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------------
CORMIX2: Multiport Diffuser Discharges        End of Prediction File
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
```

Case 2 - Acute Conditions - 1Q10 Flow

```
CORMIX2 PREDICTION FILE:
2222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
                    CORMIX MIXING ZONE EXPERT SYSTEM
              Subsystem CORMIX2: Multiport Diffuser Discharges
                          CORMIX Version 8.0GTR
                    HYDRO2 Version 8.0.0.0 April 2012
------------------------------------------------------------------------------------------
------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Canby WRF; Willamette River
 Design case:       1Q10
 FILE NAME:         \\G... Multiport\Canby Multiport Diffuser-2013-1Q10.prd
 Time stamp:        Wed Nov 20 17:03:49 2013

ENVIRONMENT PARAMETERS (metric units)
 Unbounded section
 HA    =      1.03  HD    =      1.34
 UA    =     0.095  F     =     0.070 USTAR =0.8875E-02
 UW    =     2.000 UWSTAR=0.2198E-02
 Uniform density environment
 STRCND=  U         RHOAM =  997.5417

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_perpendicular
 BANK  =  RIGHT     DISTB =      7.70  YB1   =      5.18  YB2   =     10.21
 LD    =      5.03  NOPEN =     4      SPAC  =      1.68
 D0    =     0.203  A0    =     0.032  H0    =      0.24  SUB0  =      1.10
 D0INP =     0.203  CR0   =     1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =     90.00  THETA =     45.00  SIGMA =     45.00  BETA  =     45.00
 U0    =     0.388  Q0    =     0.050       =0.5038E-01
 RHO0  =  996.7175  DRHO0 =0.8242E+00  GP0   =0.8102E-02
 C0    =0.1000E+03  CUNITS=
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.1002E-01  m0    =0.3891E-02  j0    =0.8117E-04  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =     0.026  lM    =     2.07  lm    =     0.43
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.5038E-01  M0    =0.1957E-01  J0    =0.4082E-03
 Associated 3-d length scales (meters)
 LQ    =     0.18   LM    =     2.59  Lm    =     1.47  Lb    =     0.48
                                      Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =    26.86  FRD0  =     9.57  R     =     4.09  PL    =    8.30
 (slot)            (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =     0.388  D0    =     0.203  A0    =     0.032  THETA =     45.00
 FR0   =    26.86  FRD0  =     9.57  R     =     4.09
 (slot)            (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU2    2
 2  Applicable layer depth HS =     1.34  2
 22222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=
 NTOX  =  0
 NSTD  =  0
```

```
 REGMZ =  1
 REGSPC=  4          XREG  =     30.48  WREG  =      0.00  AREG  =      0.00
 XINT  =   3000.00   XMAX  =   3000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
         7.70 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  10 display intervals per module
-------------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

      X        Y        Z        S        C        BV       BH       Uc        TT
    0.00     0.00     0.24     1.0 0.100E+03    0.02     2.51     0.341   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-------------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------------
BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =    1.34m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

      X        Y        Z        S        C        BV       BH        TT
    0.00     0.00     0.24     1.0 0.100E+03    0.02     2.51  .00000E+00
    0.18     0.18     0.26     5.1 0.195E+02    0.13     2.44  .14725E+01
    0.36     0.36     0.28     6.8 0.146E+02    0.27     2.39  .33124E+01
    0.53     0.53     0.29     8.1 0.123E+02    0.40     2.34  .52872E+01
    0.71     0.71     0.31     9.3 0.108E+02    0.54     2.31  .73428E+01
    0.89     0.89     0.32    10.2 0.978E+01    0.67     2.28  .94545E+01
    1.07     1.07     0.34    11.1 0.900E+01    0.81     2.26  .11608E+02
    1.24     1.24     0.36    11.9 0.839E+01    0.94     2.25  .13795E+02
    1.42     1.42     0.37    12.7 0.789E+01    1.07     2.24  .16009E+02
    1.60     1.60     0.39    13.4 0.748E+01    1.21     2.23  .18246E+02
    1.78     1.78     0.40    14.0 0.712E+01    1.34     2.23  .20502E+02
 Cumulative travel time =          20.5020 sec  (    0.01 hrs)
   Plume centerline may exhibit slight discontinuities in transition
     to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER
-------------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------------
BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

 Phase 1: Vertically mixed, Phase 2: Re-stratified

-------------------------------------------------------------------------------------------------
 Phase 2: The flow has RESTRATIFIED at the beginning of this zone.

 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.
```

```
END OF MOD251: DIFFUSER PLUME IN CO-FLOW
-------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  1.24 to conserve the mass flux in the far-field!
-------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Profile definitions:
   BV = top-hat thickness, measured vertically
   BH = top-hat half-width, measured horizontally in y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
      X        Y        Z        S        C        BV       BH       ZU       ZL       TT
    1.78     1.78     1.34     14.0 0.712E+01    1.34     2.77     1.34     0.00    .20502E+02
    6.54     1.78     1.34     15.2 0.656E+01    1.10     3.69     1.34     0.25    .70603E+02
   11.30     1.78     1.34     16.3 0.615E+01    0.96     4.50     1.34     0.38    .12070E+03
   16.06     1.78     1.34     17.2 0.580E+01    0.87     5.24     1.34     0.47    .17081E+03
   20.82     1.78     1.34     18.2 0.548E+01    0.82     5.93     1.34     0.53    .22091E+03
   25.58     1.78     1.34     19.3 0.518E+01    0.78     6.59     1.34     0.57    .27101E+03
   30.34     1.78     1.34     20.4 0.489E+01    0.75     7.21     1.34     0.59    .32111E+03
 ** REGULATORY MIXING ZONE BOUNDARY **
 In this prediction interval the plume TRAJECTORY distance meets or exceeds
 the regulatory value =    30.48 m.
 This is the extent of the REGULATORY MIXING ZONE.
   35.10     1.78     1.34     21.7 0.461E+01    0.74     7.81     1.34     0.61    .37121E+03
   39.85     1.78     1.34     23.0 0.435E+01    0.73     8.38     1.34     0.62    .42131E+03
   44.61     1.78     1.34     24.5 0.409E+01    0.73     8.94     1.34     0.62    .47141E+03
   49.37     1.78     1.34     26.1 0.384E+01    0.73     9.48     1.34     0.61    .52151E+03
 Cumulative travel time =         521.5130 sec  (    0.14 hrs)

-------------------------------------------------------------------------------
 Plume is ATTACHED to RIGHT bank/shore.
   Plume width is now determined from RIGHT bank/shore.

 Plume Stage 2 (bank attached):
      X        Y        Z        S        C        BV       BH       ZU       ZL       TT
   49.37    -7.70     1.34     26.1 0.384E+01    0.73    18.96     1.34     0.61    .52151E+03
   58.89    -7.70     1.34     29.2 0.343E+01    0.77    20.00     1.34     0.57    .62173E+03
   68.42    -7.70     1.34     32.6 0.307E+01    0.82    21.02     1.34     0.52    .72195E+03
   77.94    -7.70     1.34     36.3 0.275E+01    0.87    22.01     1.34     0.47    .82216E+03
   87.46    -7.70     1.34     40.4 0.248E+01    0.93    22.98     1.34     0.41    .92238E+03
   96.98    -7.70     1.34     44.7 0.223E+01    0.99    23.93     1.34     0.35    .10226E+04
  106.50    -7.70     1.34     49.5 0.202E+01    1.06    24.87     1.34     0.29    .11228E+04
  116.02    -7.70     1.34     54.6 0.183E+01    1.12    25.78     1.34     0.22    .12230E+04
  125.54    -7.70     1.34     60.0 0.167E+01    1.19    26.68     1.34     0.15    .13232E+04
  135.06    -7.70     1.34     65.8 0.152E+01    1.27    27.57     1.34     0.08    .14235E+04
  144.58    -7.70     1.34     72.0 0.139E+01    1.34    28.44     1.34     0.00    .15237E+04
 Cumulative travel time =        1523.6810 sec  (    0.42 hrs)

END OF MOD241: BUOYANT AMBIENT SPREADING
-------------------------------------------------------------------------------
 Due to the attachment or proximity of the plume to the bottom, the bottom
   coordinate for the FAR-FIELD differs from the ambient depth, ZFB = 0 m.
 In a subsequent analysis set "depth at discharge" equal to "ambient depth".
-------------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.240E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.130E+00 m^2/s

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
```

```
     = or equal to layer depth, if fully mixed
  BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
       measured horizontally in Y-direction
  ZU = upper plume boundary (Z-coordinate)
  ZL = lower plume boundary (Z-coordinate)
  S  = hydrodynamic centerline dilution
  C  = centerline concentration (includes reaction effects, if any)
  TT = Cumulative travel time

 Plume Stage 2 (bank attached):
       X        Y       Z        S        C        BV       BH       ZU       ZL       TT
    144.58    -7.70    1.34     72.0 0.139E+01    1.34    28.44    1.34     0.00   .15237E+04
 Plume interacts with BOTTOM.
 The passive diffusion plume becomes VERTICALLY FULLY MIXED within this
   prediction interval.
    430.12    -7.70    1.34    133.2 0.751E+00    1.34    52.60    1.34     0.00   .45294E+04
    715.66    -7.70    1.34    205.8 0.486E+00    1.34    81.26    1.34     0.00   .75351E+04
   1001.21    -7.70    1.34    288.1 0.347E+00    1.34   113.79    1.34     0.00   .10541E+05
   1286.75    -7.70    1.34    379.3 0.264E+00    1.34   149.77    1.34     0.00   .13547E+05
   1572.29    -7.70    1.34    478.4 0.209E+00    1.34   188.92    1.34     0.00   .16552E+05
   1857.83    -7.70    1.34    584.9 0.171E+00    1.34   230.98    1.34     0.00   .19558E+05
   2143.37    -7.70    1.34    698.3 0.143E+00    1.34   275.76    1.34     0.00   .22564E+05
   2428.92    -7.70    1.34    818.2 0.122E+00    1.34   323.12    1.34     0.00   .25569E+05
   2714.46    -7.70    1.34    944.3 0.106E+00    1.34   372.92    1.34     0.00   .28575E+05
   3000.00    -7.70    1.34   1076.3 0.929E-01    1.34   425.04    1.34     0.00   .31581E+05
 Cumulative travel time =       31580.7324 sec  (    8.77 hrs)

 Simulation limit based on maximum specified distance =   3000.00 m.
   This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
-------------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------------
CORMIX2: Multiport Diffuser Discharges       End of Prediction File
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
```

Case 3 - Chronic Conditions - 7Q10 Flow

```
CORMIX2 PREDICTION FILE:
2222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
                    CORMIX MIXING ZONE EXPERT SYSTEM
              Subsystem CORMIX2: Multiport Diffuser Discharges
                          CORMIX Version 8.0GTR
                   HYDRO2 Version 8.0.0.0 April 2012
------------------------------------------------------------------------------------------------
------------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Canby WRF; Willamette River
 Design case:       7Q10
 FILE NAME:         \\G... Multiport\Canby Multiport Diffuser-2013-7Q10.prd
 Time stamp:        Wed Nov 20 17:05:14 2013

ENVIRONMENT PARAMETERS (metric units)
 Unbounded section
 HA    =      1.04  HD    =      1.36
 UA    =     0.096  F     =     0.070 USTAR =0.8953E-02
 UW    =     2.000 UWSTAR=0.2198E-02
 Uniform density environment
 STRCND=  U         RHOAM =  997.5417

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_perpendicular
 BANK  =  RIGHT     DISTB =      7.70  YB1   =      5.18  YB2   =     10.21
 LD    =      5.03  NOPEN =     4      SPAC  =      1.68
 D0    =     0.203  A0    =     0.032  H0    =      0.24  SUB0  =      1.11
 D0INP =     0.203  CR0   =     1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =     90.00  THETA =     45.00  SIGMA =     45.00  BETA  =     45.00
 U0    =     0.331  Q0    =     0.043       =0.4298E-01
 RHO0  =  997.3588  DRHO0 =0.1829E+00  GP0   =0.1798E-02
 C0    =0.1000E+03  CUNITS=
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.8546E-02  m0    =0.2831E-02  j0    =0.1537E-04  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =     0.026  lM    =     4.57  lm    =     0.31
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.4298E-01  M0    =0.1424E-01  J0    =0.7729E-04
 Associated 3-d length scales (meters)
 LQ    =     0.18   LM    =     4.69  Lm    =     1.24  Lb    =     0.09
                                      Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =    48.64  FRD0  =    17.33  R     =     3.45  PL    =    5.59
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =     0.331  D0    =     0.203  A0    =     0.032  THETA =     45.00
 FR0   =    48.64  FRD0  =    17.33  R     =     3.45
 (slot)             (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222222
 2  Flow class (CORMIX2)       =    MU2    2
 2  Applicable layer depth HS =     1.36   2
 22222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=
 NTOX  =  0
 NSTD  =  0
```

```
 REGMZ =  1
 REGSPC=  4          XREG  =     30.48  WREG  =      0.00  AREG  =      0.00
 XINT  =   3000.00   XMAX  =   3000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
         7.70 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  10 display intervals per module
-------------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

      X        Y        Z        S        C        BV       BH       Uc        TT
   0.00     0.00     0.24      1.0 0.100E+03   0.02     2.51     0.283   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-------------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------------
BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =    1.36m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

      X        Y        Z        S        C        BV       BH        TT
   0.00     0.00     0.24      1.0 0.100E+03   0.02     2.51  .00000E+00
   0.18     0.18     0.26      5.9 0.170E+02   0.14     2.46  .16492E+01
   0.36     0.36     0.28      7.9 0.127E+02   0.27     2.42  .36436E+01
   0.53     0.53     0.29      9.4 0.106E+02   0.41     2.38  .57527E+01
   0.71     0.71     0.31     10.7 0.932E+01   0.54     2.36  .79284E+01
   0.89     0.89     0.32     11.9 0.842E+01   0.68     2.34  .10149E+02
   1.07     1.07     0.34     12.9 0.774E+01   0.81     2.32  .12403E+02
   1.24     1.24     0.36     13.9 0.721E+01   0.95     2.31  .14684E+02
   1.42     1.42     0.37     14.8 0.677E+01   1.09     2.30  .16985E+02
   1.60     1.60     0.39     15.6 0.641E+01   1.22     2.30  .19304E+02
   1.78     1.78     0.40     16.4 0.610E+01   1.36     2.30  .21638E+02
 Cumulative travel time =          21.6378 sec  (    0.01 hrs)
   Plume centerline may exhibit slight discontinuities in transition
     to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER
-------------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------------
BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

 Phase 1: Vertically mixed, Phase 2: Re-stratified

 Phase 1: The diffuser plume is VERTICALLY FULLY MIXED over the
          entire layer depth.
 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.
-------------------------------------------------------------------------------------------------
```

```
 Phase 2: The flow has RESTRATIFIED at the beginning of this zone.

 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD251: DIFFUSER PLUME IN CO-FLOW
-------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  1.18 to conserve the mass flux in the far-field!
-------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Profile definitions:
   BV = top-hat thickness, measured vertically
   BH = top-hat half-width, measured horizontally in y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
       X        Y        Z        S        C         BV       BH       ZU       ZL       TT
    1.78     1.78     1.36     16.4 0.610E+01    1.36     2.70     1.36     0.00   .21638E+02
    5.16     1.78     1.36     17.4 0.576E+01    1.30     3.00     1.36     0.06   .56843E+02
    8.54     1.78     1.36     18.4 0.543E+01    1.26     3.28     1.36     0.10   .92049E+02
   11.92     1.78     1.36     19.5 0.512E+01    1.23     3.55     1.36     0.13   .12725E+03
   15.30     1.78     1.36     20.8 0.481E+01    1.22     3.81     1.36     0.14   .16246E+03
   18.68     1.78     1.36     22.2 0.451E+01    1.22     4.06     1.36     0.14   .19766E+03
   22.06     1.78     1.36     23.6 0.423E+01    1.23     4.30     1.36     0.13   .23287E+03
   25.44     1.78     1.36     25.2 0.396E+01    1.24     4.54     1.36     0.11   .26808E+03
   28.82     1.78     1.36     27.0 0.371E+01    1.27     4.77     1.36     0.09   .30328E+03
 ** REGULATORY MIXING ZONE BOUNDARY **
 In this prediction interval the plume TRAJECTORY distance meets or exceeds
 the regulatory value =    30.48 m.
 This is the extent of the REGULATORY MIXING ZONE.
   32.20     1.78     1.36     28.9 0.346E+01    1.29     5.00     1.36     0.06   .33849E+03
   35.58     1.78     1.36     30.9 0.323E+01    1.33     5.22     1.36     0.03   .37369E+03
 Cumulative travel time =         373.6922 sec  (    0.10 hrs)

END OF MOD241: BUOYANT AMBIENT SPREADING
-------------------------------------------------------------------------------
 Due to the attachment or proximity of the plume to the bottom, the bottom
   coordinate for the FAR-FIELD differs from the ambient depth, ZFB = 0 m.
 In a subsequent analysis set "depth at discharge" equal to "ambient depth".
-------------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.244E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.136E-01 m^2/s

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
       X        Y        Z        S        C         BV       BH       ZU       ZL       TT
    35.58     1.78     1.36     30.9 0.323E+01    1.33     5.22     1.36     0.03   .37369E+03
 Plume interacts with BOTTOM.
 The passive diffusion plume becomes VERTICALLY FULLY MIXED within this
   prediction interval.
    44.55     1.78     1.36     34.0 0.294E+01    1.36     5.61     1.36     0.00   .46718E+03
```

53.53	1.78	1.36	36.4	0.275E+01	1.36	6.00	1.36	0.00	.56067E+03
62.50	1.78	1.36	38.9	0.257E+01	1.36	6.41	1.36	0.00	.65416E+03
71.47	1.78	1.36	41.4	0.242E+01	1.36	6.82	1.36	0.00	.74765E+03
80.45	1.78	1.36	43.9	0.228E+01	1.36	7.24	1.36	0.00	.84114E+03
89.42	1.78	1.36	46.5	0.215E+01	1.36	7.67	1.36	0.00	.93462E+03
98.40	1.78	1.36	49.2	0.203E+01	1.36	8.11	1.36	0.00	.10281E+04
107.37	1.78	1.36	51.9	0.193E+01	1.36	8.56	1.36	0.00	.11216E+04
116.35	1.78	1.36	54.7	0.183E+01	1.36	9.01	1.36	0.00	.12151E+04
125.32	1.78	1.36	57.5	0.174E+01	1.36	9.47	1.36	0.00	.13086E+04

Cumulative travel time = 1308.5791 sec (0.36 hrs)

Plume Stage 2 (bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
125.32	-7.70	1.36	57.5	0.174E+01	1.36	18.95	1.36	0.00	.13086E+04
412.79	-7.70	1.36	123.1	0.812E+00	1.36	40.59	1.36	0.00	.43030E+04
700.26	-7.70	1.36	203.6	0.491E+00	1.36	67.11	1.36	0.00	.72975E+04
987.73	-7.70	1.36	296.5	0.337E+00	1.36	97.74	1.36	0.00	.10292E+05
1275.19	-7.70	1.36	400.3	0.250E+00	1.36	131.98	1.36	0.00	.13286E+05
1562.66	-7.70	1.36	514.1	0.195E+00	1.36	169.49	1.36	0.00	.16281E+05
1850.13	-7.70	1.36	637.0	0.157E+00	1.36	210.00	1.36	0.00	.19275E+05
2137.60	-7.70	1.36	768.3	0.130E+00	1.36	253.30	1.36	0.00	.22270E+05
2425.06	-7.70	1.36	907.6	0.110E+00	1.36	299.23	1.36	0.00	.25264E+05
2712.53	-7.70	1.36	1054.5	0.948E-01	1.36	347.64	1.36	0.00	.28259E+05
3000.00	-7.70	1.36	1208.5	0.827E-01	1.36	398.41	1.36	0.00	.31253E+05

Cumulative travel time = 31253.1152 sec (8.68 hrs)

Simulation limit based on maximum specified distance = 3000.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

CORMIX2: Multiport Diffuser Discharges End of Prediction File

22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222

Case 4 - HH Conditions - 30Q5 Flow

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CORMIX2 PREDICTION FILE:
2222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
                    CORMIX MIXING ZONE EXPERT SYSTEM
              Subsystem CORMIX2: Multiport Diffuser Discharges
                          CORMIX Version 8.0GTR
                    HYDRO2 Version 8.0.0.0 April 2012
------------------------------------------------------------------------------------------------
------------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Canby WRF; Willamette River
 Design case:       30Q5
 FILE NAME:         \\G... Multiport\Canby Multiport Diffuser-2013-30Q5.prd
 Time stamp:        Wed Nov 20 17:06:44 2013

ENVIRONMENT PARAMETERS (metric units)
 Unbounded section
 HA    =      1.19  HD    =      1.55
 UA    =     0.105  F     =     0.067 USTAR =0.9580E-02
 UW    =     2.000 UWSTAR=0.2198E-02
 Uniform density environment
 STRCND=  U         RHOAM =  998.3530

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_perpendicular
 BANK  =  RIGHT     DISTB =      7.70  YB1   =      5.18  YB2   =     10.21
 LD    =      5.03  NOPEN =     4      SPAC  =      1.68
 D0    =     0.203  A0    =     0.032  H0    =      0.24  SUB0  =      1.30
 D0INP =     0.203  CR0   =     1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =     90.00  THETA =     45.00  SIGMA =     45.00  BETA  =     45.00
 U0    =     0.331  Q0    =     0.043       =0.4298E-01
 RHO0  =  997.9999  DRHO0 =0.3531E+00  GP0   =0.3468E-02
 C0    =0.1000E+03  CUNITS=
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.8546E-02  m0    =0.2831E-02  j0    =0.2964E-04  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =     0.026 lM    =      2.95  lm    =      0.26
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.4298E-01  M0    =0.1424E-01  J0    =0.1491E-03
 Associated 3-d length scales (meters)
 LQ    =      0.18  LM    =      3.38  Lm    =      1.14  Lb    =      0.13
                                       Lmp   =  99999.00  Lbp   =  99999.00


NON-DIMENSIONAL PARAMETERS
 FR0   =     35.03  FRD0  =     12.48  R     =      3.16  PL    =     6.96
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =     0.331  D0    =     0.203  A0    =     0.032  THETA =     45.00
 FR0   =     35.03  FRD0  =     12.48  R     =      3.16
 (slot)             (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU2    2
 2  Applicable layer depth HS =     1.55  2
 22222222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=
 NTOX  =  0
 NSTD  =  0
```

```
 REGMZ =  1
 REGSPC=  4          XREG  =     30.48  WREG  =      0.00  AREG  =      0.00
 XINT  =   3000.00  XMAX  =   3000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
         7.70 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  10 display intervals per module
-------------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

      X        Y        Z        S        C        BV       BH       Uc        TT
   0.00     0.00     0.24      1.0 0.100E+03   0.02     2.51     0.279   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-------------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------------
BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =    1.55m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

      X        Y        Z        S        C        BV       BH        TT
   0.00     0.00     0.24      1.0 0.100E+03   0.02     2.51 .00000E+00
   0.18     0.18     0.26      7.0 0.142E+02   0.15     2.47 .16531E+01
   0.36     0.36     0.28      9.5 0.105E+02   0.31     2.44 .35984E+01
   0.53     0.53     0.30     11.4 0.873E+01   0.46     2.41 .56323E+01
   0.71     0.71     0.31     13.1 0.765E+01   0.62     2.39 .77159E+01
   0.89     0.89     0.33     14.5 0.690E+01   0.77     2.38 .98329E+01
   1.07     1.07     0.35     15.8 0.634E+01   0.93     2.36 .11974E+02
   1.24     1.24     0.36     17.0 0.590E+01   1.08     2.35 .14134E+02
   1.42     1.42     0.38     18.1 0.554E+01   1.24     2.35 .16310E+02
   1.60     1.60     0.40     19.1 0.524E+01   1.39     2.35 .18497E+02
   1.78     1.78     0.42     20.1 0.498E+01   1.55     2.34 .20696E+02
Cumulative travel time =         20.6959 sec  (    0.01 hrs)
  Plume centerline may exhibit slight discontinuities in transition
    to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER
-------------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------------
BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

 Phase 1: Vertically mixed, Phase 2: Re-stratified

-------------------------------------------------------------------------------------------------
 Phase 2: The flow has RESTRATIFIED at the beginning of this zone.

 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.
```

```
END OF MOD251: DIFFUSER PLUME IN CO-FLOW
-------------------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  1.13 to conserve the mass flux in the far-field!
-------------------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Profile definitions:
   BV = top-hat thickness, measured vertically
   BH = top-hat half-width, measured horizontally in y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
       X        Y        Z        S        C        BV       BH       ZU       ZL       TT
    1.78     1.78     1.55     20.1 0.498E+01   1.55     2.65     1.55     0.00   .20696E+02
    8.55     1.78     1.55     22.1 0.452E+01   1.35     3.36     1.55     0.20   .85204E+02
   15.32     1.78     1.55     24.4 0.410E+01   1.25     3.99     1.55     0.30   .14971E+03
   22.10     1.78     1.55     26.9 0.371E+01   1.20     4.58     1.55     0.34   .21422E+03
   28.87     1.78     1.55     29.9 0.335E+01   1.19     5.13     1.55     0.36   .27873E+03
 ** REGULATORY MIXING ZONE BOUNDARY **
 In this prediction interval the plume TRAJECTORY distance meets or exceeds
 the regulatory value =    30.48 m.
 This is the extent of the REGULATORY MIXING ZONE.
   35.64     1.78     1.55     33.3 0.300E+01   1.21     5.65     1.55     0.34   .34324E+03
   42.42     1.78     1.55     37.2 0.269E+01   1.24     6.15     1.55     0.31   .40774E+03
   49.19     1.78     1.55     41.7 0.240E+01   1.29     6.63     1.55     0.26   .47225E+03
   55.96     1.78     1.55     46.7 0.214E+01   1.35     7.09     1.55     0.20   .53676E+03
   62.74     1.78     1.55     52.3 0.191E+01   1.42     7.54     1.55     0.13   .60127E+03
   69.51     1.78     1.55     58.6 0.171E+01   1.50     7.98     1.55     0.04   .66578E+03
 Cumulative travel time =         665.7753 sec  (    0.18 hrs)

END OF MOD241: BUOYANT AMBIENT SPREADING
-------------------------------------------------------------------------------------------
 Due to the attachment or proximity of the plume to the bottom, the bottom
   coordinate for the FAR-FIELD differs from the ambient depth, ZFB = 0 m.
 In a subsequent analysis set "depth at discharge" equal to "ambient depth".
-------------------------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.298E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.239E-01 m^2/s

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
       X        Y        Z        S        C        BV       BH       ZU       ZL       TT
    69.51     1.78     1.55     58.6 0.171E+01   1.50     7.98     1.55     0.04   .66578E+03
 Plume interacts with BOTTOM.
 The passive diffusion plume becomes VERTICALLY FULLY MIXED within this
   prediction interval.
   72.76     1.78     1.55     61.4 0.163E+01   1.55     8.12     1.55     0.00   .69667E+03
   76.00     1.78     1.55     62.5 0.160E+01   1.55     8.27     1.55     0.00   .72757E+03
   79.24     1.78     1.55     63.7 0.157E+01   1.55     8.42     1.55     0.00   .75846E+03
   82.49     1.78     1.55     64.8 0.154E+01   1.55     8.57     1.55     0.00   .78936E+03
```

85.73	1.78	1.55	65.9	0.152E+01	1.55	8.71	1.55	0.00	.82025E+03
88.98	1.78	1.55	67.1	0.149E+01	1.55	8.86	1.55	0.00	.85115E+03
92.22	1.78	1.55	68.2	0.147E+01	1.55	9.02	1.55	0.00	.88204E+03
95.46	1.78	1.55	69.3	0.144E+01	1.55	9.17	1.55	0.00	.91294E+03
98.71	1.78	1.55	70.5	0.142E+01	1.55	9.32	1.55	0.00	.94383E+03
101.95	1.78	1.55	71.7	0.140E+01	1.55	9.47	1.55	0.00	.97473E+03

Cumulative travel time = 974.7256 sec (0.27 hrs)

Plume Stage 2 (bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
101.95	-7.70	1.55	71.7	0.140E+01	1.55	18.95	1.55	0.00	.97473E+03
391.76	-7.70	1.55	146.4	0.683E+00	1.55	38.71	1.55	0.00	.37348E+04
681.56	-7.70	1.55	237.0	0.422E+00	1.55	62.68	1.55	0.00	.64948E+04
971.37	-7.70	1.55	341.1	0.293E+00	1.55	90.21	1.55	0.00	.92549E+04
1261.17	-7.70	1.55	457.2	0.219E+00	1.55	120.89	1.55	0.00	.12015E+05
1550.98	-7.70	1.55	584.0	0.171E+00	1.55	154.44	1.55	0.00	.14775E+05
1840.78	-7.70	1.55	720.8	0.139E+00	1.55	190.61	1.55	0.00	.17535E+05
2130.59	-7.70	1.55	866.9	0.115E+00	1.55	229.23	1.55	0.00	.20295E+05
2420.39	-7.70	1.55	1021.7	0.979E-01	1.55	270.17	1.55	0.00	.23055E+05
2710.20	-7.70	1.55	1184.7	0.844E-01	1.55	313.28	1.55	0.00	.25815E+05
3000.00	-7.70	1.55	1355.6	0.738E-01	1.55	358.47	1.55	0.00	.28575E+05

Cumulative travel time = 28575.1914 sec (7.94 hrs)

Simulation limit based on maximum specified distance = 3000.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

CORMIX2: Multiport Diffuser Discharges End of Prediction File

2222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222

Case 5 - HH Conditions - QHM Flow

```
CORMIX2 PREDICTION FILE:
2222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
                        CORMIX MIXING ZONE EXPERT SYSTEM
                Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GTR
                         HYDRO2 Version 8.0.0.0 April 2012
------------------------------------------------------------------------------------------------
------------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Canby WRF; Willamette River
 Design case:       QHM
 FILE NAME:         \\G...w Multiport\Canby Multiport Diffuser-2013-QHM.prd
 Time stamp:        Wed Nov 20 17:08:29 2013

ENVIRONMENT PARAMETERS (metric units)
 Unbounded section
 HA    =      2.33  HD    =      3.03
 UA    =     0.164  F     =     0.053 USTAR =0.1338E-01
 UW    =     2.000 UWSTAR=0.2198E-02
 Uniform density environment
 STRCND=  U         RHOAM =  998.3530

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_perpendicular
 BANK  =  RIGHT     DISTB =      7.70  YB1   =      5.18  YB2   =     10.21
 LD    =      5.03  NOPEN =     4      SPAC  =      1.68
 D0    =     0.203  A0    =     0.032  H0    =      0.24  SUB0  =      2.78
 D0INP =     0.203  CR0   =     1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =     90.00  THETA =     45.00  SIGMA =     45.00  BETA  =     45.00
 U0    =     0.675  Q0    =     0.088        =0.8763E-01
 RHO0  =  997.9999  DRHO0 =0.3531E+00  GP0   =0.3468E-02
 C0    =0.1000E+03  CUNITS=
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.1742E-01  m0    =0.1177E-01  j0    =0.6043E-04  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =     0.026  lM    =      7.63  lm    =      0.44
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.8763E-01  M0    =0.5919E-01  J0    =0.3039E-03
 Associated 3-d length scales (meters)
 LQ    =      0.18  LM    =      6.88  Lm    =      1.48  Lb    =      0.07
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =     71.41  FRD0  =     25.44  R     =      4.12  PL    =     4.33
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =     0.675  D0    =     0.203  A0    =     0.032  THETA =     45.00
 FR0   =     71.41  FRD0  =     25.44  R     =      4.12
 (slot)             (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU2    2
 2  Applicable layer depth HS =     3.03  2
 22222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=
 NTOX  =  0
 NSTD  =  0
```

```
 REGMZ =  1
 REGSPC=  4          XREG  =     30.48  WREG  =      0.00  AREG  =      0.00
 XINT  =   3000.00  XMAX  =   3000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
         7.70 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  10 display intervals per module
-------------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

      X        Y        Z        S        C        BV       BH       Uc        TT
   0.00     0.00     0.24      1.0 0.100E+03   0.02     2.51     0.593   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-------------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------------
BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =    3.03m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

      X        Y        Z        S        C        BV       BH        TT
   0.00     0.00     0.24      1.0 0.100E+03   0.02     2.51 .00000E+00
   0.18     0.18     0.26     10.1 0.987E+01   0.30     2.48 .10902E+01
   0.36     0.36     0.29     13.9 0.719E+01   0.61     2.45 .23663E+01
   0.53     0.53     0.31     16.8 0.595E+01   0.91     2.42 .36950E+01
   0.71     0.71     0.33     19.3 0.519E+01   1.21     2.40 .50530E+01
   0.89     0.89     0.35     21.4 0.467E+01   1.51     2.39 .64302E+01
   1.07     1.07     0.37     23.4 0.428E+01   1.82     2.38 .78214E+01
   1.24     1.24     0.39     25.2 0.397E+01   2.12     2.37 .92234E+01
   1.42     1.42     0.41     26.8 0.373E+01   2.42     2.37 .10634E+02
   1.60     1.60     0.43     28.4 0.352E+01   2.72     2.36 .12052E+02
   1.78     1.78     0.45     29.9 0.335E+01   3.03     2.36 .13476E+02
 Cumulative travel time =          13.4755 sec  (    0.00 hrs)
   Plume centerline may exhibit slight discontinuities in transition
     to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER
-------------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------------
BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

 Phase 1: Vertically mixed, Phase 2: Re-stratified

-------------------------------------------------------------------------------------------------
 Phase 2: The flow has RESTRATIFIED at the beginning of this zone.

 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.
```

```
END OF MOD251: DIFFUSER PLUME IN CO-FLOW
-------------------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  1.12 to conserve the mass flux in the far-field!
-------------------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Profile definitions:
   BV = top-hat thickness, measured vertically
   BH = top-hat half-width, measured horizontally in y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
       X        Y        Z        S        C        BV       BH       ZU       ZL       TT
    1.78     1.78     3.03     29.9 0.335E+01   3.03     2.64     3.03     0.00   .13476E+02
    5.38     1.78     3.03     31.0 0.322E+01   2.84     2.92     3.03     0.19   .35429E+02
    8.98     1.78     3.03     32.2 0.311E+01   2.70     3.19     3.03     0.33   .57382E+02
   12.58     1.78     3.03     33.4 0.300E+01   2.58     3.45     3.03     0.44   .79336E+02
   16.18     1.78     3.03     34.6 0.289E+01   2.50     3.70     3.03     0.53   .10129E+03
   19.78     1.78     3.03     35.9 0.279E+01   2.43     3.94     3.03     0.60   .12324E+03
   23.38     1.78     3.03     37.2 0.269E+01   2.38     4.18     3.03     0.65   .14520E+03
   26.98     1.78     3.03     38.6 0.259E+01   2.34     4.40     3.03     0.68   .16715E+03
 ** REGULATORY MIXING ZONE BOUNDARY **
 In this prediction interval the plume TRAJECTORY distance meets or exceeds
 the regulatory value =    30.48 m.
 This is the extent of the REGULATORY MIXING ZONE.
   30.58     1.78     3.03     40.1 0.249E+01   2.32     4.63     3.03     0.71   .18910E+03
   34.18     1.78     3.03     41.7 0.240E+01   2.30     4.84     3.03     0.73   .21106E+03
   37.78     1.78     3.03     43.3 0.231E+01   2.29     5.06     3.03     0.74   .23301E+03
 Cumulative travel time =         233.0099 sec  (    0.06 hrs)

END OF MOD241: BUOYANT AMBIENT SPREADING
-------------------------------------------------------------------------------------------
 Bottom coordinate for FAR-FIELD is determined by average depth, ZFB =  0.70m
-------------------------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.812E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.130E-01 m^2/s

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
       X        Y        Z        S        C        BV       BH       ZU       ZL       TT
   37.78     1.78     3.03     43.3 0.231E+01   2.29     5.06     3.03     0.74   .23301E+03
 Plume interacts with BOTTOM.
 The passive diffusion plume becomes VERTICALLY FULLY MIXED within this
   prediction interval.
   53.78     1.78     3.03     47.6 0.210E+01   2.33     5.45     3.03     0.70   .33054E+03
   69.77     1.78     3.03     51.1 0.196E+01   2.33     5.86     3.03     0.70   .42807E+03
   85.77     1.78     3.03     54.8 0.182E+01   2.33     6.28     3.03     0.70   .52560E+03
  101.76     1.78     3.03     58.5 0.171E+01   2.33     6.71     3.03     0.70   .62312E+03
  117.76     1.78     3.03     62.4 0.160E+01   2.33     7.15     3.03     0.70   .72065E+03
  133.75     1.78     3.03     66.3 0.151E+01   2.33     7.60     3.03     0.70   .81818E+03
```

149.74	1.78	3.03	70.2	0.142E+01	2.33	8.05	3.03	0.70	.91571E+03
165.74	1.78	3.03	74.3	0.135E+01	2.33	8.52	3.03	0.70	.10132E+04
181.73	1.78	3.03	78.4	0.128E+01	2.33	8.99	3.03	0.70	.11108E+04
197.73	1.78	3.03	82.6	0.121E+01	2.33	9.47	3.03	0.70	.12083E+04

Cumulative travel time = 1208.2947 sec (0.34 hrs)

Plume Stage 2 (bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
197.73	-7.70	3.03	82.6	0.121E+01	2.33	18.95	3.03	0.70	.12083E+04
477.96	-7.70	3.03	133.6	0.748E+00	2.33	30.64	3.03	0.70	.29170E+04
758.18	-7.70	3.03	192.2	0.520E+00	2.33	44.07	3.03	0.70	.46257E+04
1038.41	-7.70	3.03	257.4	0.389E+00	2.33	59.03	3.03	0.70	.63344E+04
1318.64	-7.70	3.03	328.7	0.304E+00	2.33	75.38	3.03	0.70	.80431E+04
1598.86	-7.70	3.03	405.6	0.247E+00	2.33	93.01	3.03	0.70	.97518E+04
1879.09	-7.70	3.03	487.7	0.205E+00	2.33	111.83	3.03	0.70	.11461E+05
2159.32	-7.70	3.03	574.7	0.174E+00	2.33	131.78	3.03	0.70	.13169E+05
2439.55	-7.70	3.03	666.3	0.150E+00	2.33	152.79	3.03	0.70	.14878E+05
2719.77	-7.70	3.03	762.3	0.131E+00	2.33	174.81	3.03	0.70	.16587E+05
3000.00	-7.70	3.03	862.6	0.116E+00	2.33	197.80	3.03	0.70	.18295E+05

Cumulative travel time = 18295.3164 sec (5.08 hrs)

Simulation limit based on maximum specified distance = 3000.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

CORMIX2: Multiport Diffuser Discharges End of Prediction File

22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222

Appendix C - Ambient Depth and Temperature Data

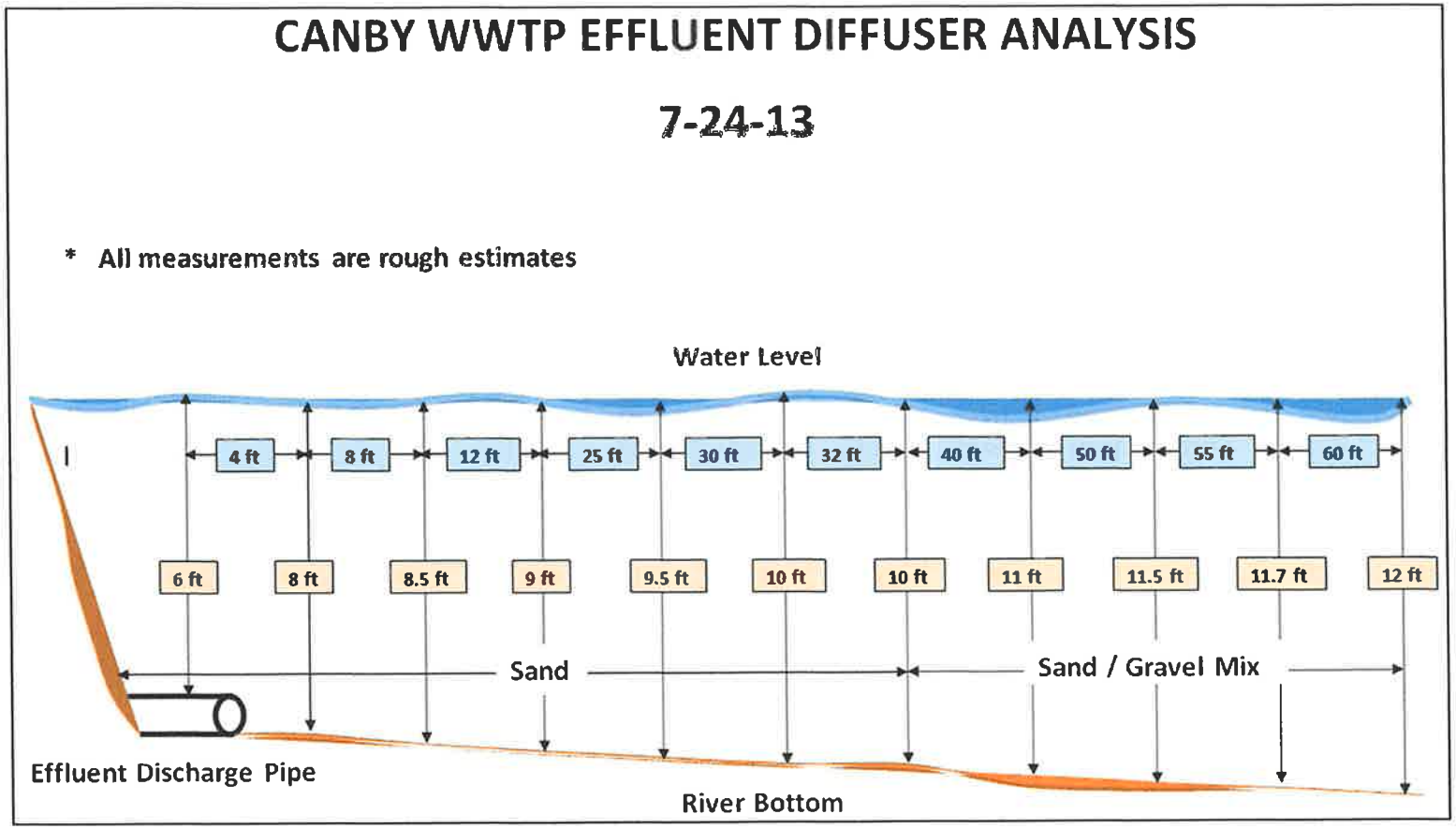

Figure 13 July 24 2013 River bottom depth data near COC WRF (provided by COC WRF)

Table 14 Ambient Temperature Data - WILLAMETTE RIVER AT NEWBERG, OR - USGS 14197900												
Day of month	Maximum of daily mean values for each day for 8 - 11 years of record in, deg C (Calculation Period 2001-10-01 -> 2013-09-30)[22] 00010, Temperature, water, degrees Celsius,											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	8.60	8.20	9.80	13.40	15.60	18.40	21.70	25.20	21.80	18.00	12.60	10.10
2	8.50	8.10	10.40	13.50	16.00	18.90	21.80	24.80	21.40	17.60	12.90	10.10
3	8.10	8.00	10.40	12.80	16.30	19.40	22.00	24.30	21.20	17.20	12.80	10.10
4	7.70	8.20	10.50	12.40	16.20	19.50	22.30	23.80	21.50	17.00	12.30	9.40
5	7.50	8.60	10.10	12.10	15.70	18.70	23.00	22.90	21.10	16.80	12.20	9.50
6	8.00	8.60	10.30	11.70	16.20	19.00	23.40	22.80	20.80	16.80	12.60	9.30
7	8.00	8.70	10.80	12.30	16.60	19.70	23.40	22.90	20.30	16.90	13.20	9.00
8	8.00	8.60	11.40	12.40	16.40	19.90	21.10	22.90	20.00	16.80	12.70	8.60
9	7.90	8.20	12.00	12.20	16.10	20.10	23.20	22.80	19.40	16.20	11.80	8.40
10	8.10	7.80	12.50	12.90	16.50	19.70	23.30	22.50	19.40	15.80	11.70	8.90
11	8.70	7.90	13.10	13.60	17.20	19.20	23.90	23.20	19.60	15.10	11.50	9.50
12	8.60	8.10	13.40	13.90	17.60	18.50	23.80	23.70	19.60	14.80	11.60	9.30
13	8.30	8.50	13.50	13.40	17.20	18.00	24.10	23.80	20.00	15.20	11.70	9.30
14	8.20	8.90	13.20	12.50	16.60	18.60	24.20	23.60	20.10	15.60	11.20	9.40
15	8.00	9.10	12.90	11.90	16.10	18.50	23.70	23.30	19.70	15.80	10.70	9.00
16	8.30	9.30	12.40	11.50	16.30	18.20	23.10	23.30	19.00	15.50	10.70	8.50
17	8.80	9.40	11.60	11.80	16.90	18.80	23.30	23.50	18.40	14.90	10.90	8.20
18	8.70	9.30	11.40	12.20	17.40	19.10	22.90	23.30	17.90	15.00	10.50	7.90
19	8.20	8.80	11.20	12.50	17.20	20.00	23.30	23.30	17.70	15.60	10.40	7.80
20	8.60	8.40	11.10	12.50	16.50	20.70	23.10	23.40	17.60	16.00	10.40	7.80
21	8.60	8.30	10.60	13.20	15.90	21.20	23.00	23.30	17.40	16.60	10.30	8.20
22	8.50	8.60	11.30	13.60	15.40	21.00	23.40	22.80	17.50	16.90	9.80	7.90
23	8.20	9.00	11.90	13.70	15.10	20.00	23.70	21.50	17.50	16.60	9.70	7.60
24	8.00	8.70	12.40	13.10	14.90	19.40	24.80	21.80	17.70	15.80	9.20	7.80
25	7.90	8.80	12.10	13.00	15.90	20.40	25.00	22.40	17.80	14.80	9.90	8.10

[22] http://waterdata.usgs.gov/nwis/dvstat?referred_module=sw&site_no=14197900&por_14197900_3=1971923,00010,3,2001-10-19,2013-06-30&format=html_table&stat_cds=max_va&date_format=YYYY-MM-DD&rdb_compression=file&submitted_form=parameter_selection_list

26	7.90	8.60	11.00	13.60	16.40	21.60	24.60	22.50	17.80	14.50	9.90	8.20
27	8.00	9.10	10.10	14.50	17.00	22.60	24.60	22.30	17.70	13.90	9.30	8.20
28	8.20	9.40	10.20	15.20	17.80	22.70	24.90	22.00	17.50	14.20	8.60	8.20
29	8.40	8.50	11.10	15.20	17.10	22.10	25.80	21.70	18.10	14.10	9.10	8.40
30	8.30		12.10	15.20	17.50	22.00	26.20	21.60	18.30	13.40	9.90	8.10
31	8.20		12.80		18.10		25.60	21.60		12.90		8.40

	Critical Summer Period		
Monthly Means During Critical Summer Low Flow Period	**22.99**	19.13	15.69
Average Monthly Means During Critical Summer Low Flow Period	**19.27**		

Appendix D - Ambient Density Profile Data

MixZon collected several vertical Conductivity Temperature Depth (CTD) profiles upstream of the COC WRF multiport diffuser location, in the Willamette River. An Applied Microsystems, Micro CDT sensor (SN#7564) was used for the measurement.

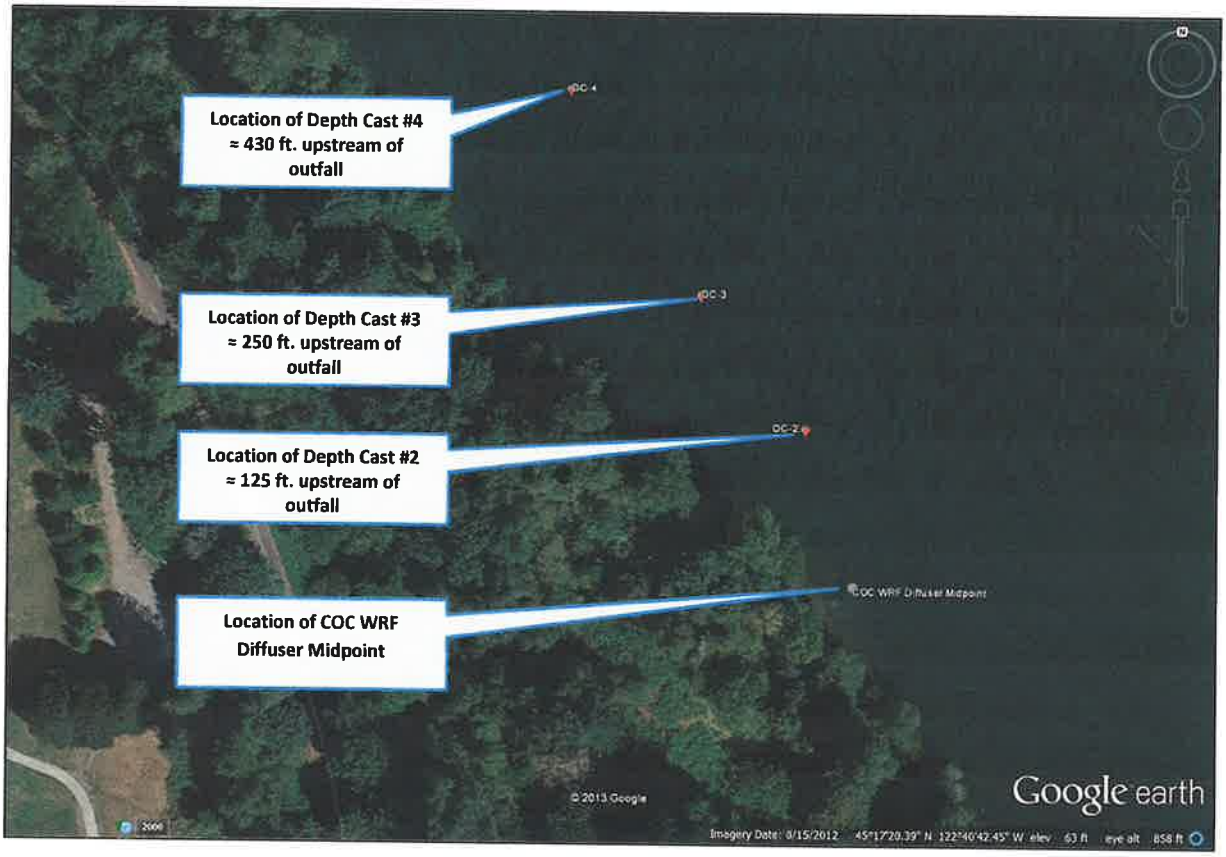

Figure 14 Locations of CTD depth casts for ambient density profile measurements

The locations of these measurements relative to the outfall location are presented in Figure 14. Only the up-cast data from each vertical depth cast of the CTD probe was used in the computations and plots. This is done to ensure that we use the stabilized sensor readings from each vertical depth cast (DC) which consists of a depth downcast, followed by an up-cast. Plots of temperature as a function of depth from these field measurements are presented in Figure 15.

Results of the vertical temperature, conductivity and salinity profile indicate a **uniform ambient density field** with a background conductivity value of 0.06 mS/cm, salinity of 0.03 psu and no detectable background Rhodamine WT dye concentration.

The average ambient temperature from these measurements was computed to be **Ta = 17.17 °C**.

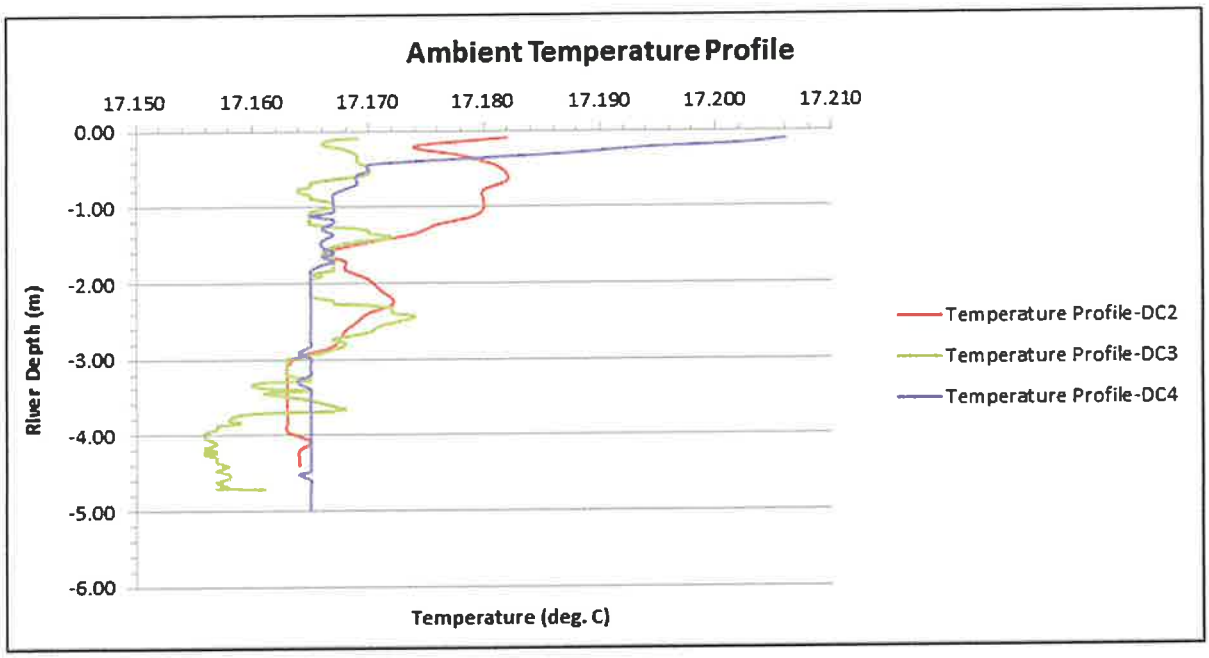

Figure 15 Ambient vertical density (temperature) profile measured upstream of the COC WRF outfall

Appendix E - Effluent Discharge Statistics & Data

The COC WRF provided MixZon with effluent discharge flow (Table 16) and temperature data (Table 17) from January 2010 to July 2013 for this mixing zone study and report.

The critical low flow period in summer for the COC WRF discharge is between August 1st and October 31st. The ADWDF for the COC WRF as reported in the NPDES permit is 2.0 MGD. The average monthly flow is computed to be 0.96 MGD (about 48% of the dry weather design flow). Hence the plant has been operating at < 85% of the ADWDF.

The ODEQ *"Regulatory Mixing Zone Internal Management Directive Part Two: Reviewing Mixing Zone Studies"* indicates that the following effluent flow statistics need to be computed for mixing zone modeling analysis for domestic discharges, when the plant is operating at < 85% of ADWDF:[23]

- **Acute:** Use maximum daily average flow for the past 3 years during the period when the critical receiving water flow is most likely to occur.
- **Chronic:** Use highest monthly average flow for the past 3 years during the period when the critical receiving water flow is most likely to occur.
- **Human Health – Non-Carcinogens:** Use highest monthly average flow for the past 3 years during the period when the critical receiving water flow is most likely to occur.
- **Human Health - Carcinogens:** Use the annual average flow based on the permit application.

Effluent temperature values for mixing zone modeling need to be computed as follows:[24]

- **Acute:** 90th % of daily maximums during critical period.
- **Chronic**: Average daily temperature during critical period.
- **Human Health:** Annual average

Discharge statistics were computed (Table 15) based on the discharge data provided and the ODEQ IMD guidelines.

Table 15 COC WRF Effluent Flow & Temperature Statistics for Critical Low Flow Period

Flow Statistic	Flowrate Q0 (MGD)	Temperature T0 (°C)
1Q10 - Acute (Aquatic Life)	1.150	26.25
7Q10 - Chronic (Aquatic Life)	0.981	23.75
30Q5 - Human Health (Non-Carcinogens)	0.981	20.97
QHM - Human Health (Carcinogens)	2.000	20.97

[23] Section 4.4 Discharge Flow Statistics, Page 31 of 50 of the IMD, Table 4.3 –"Effluent Flow Statistics to Use in Mixing Zone Analyses (for both riverine and marine/estuarine systems)"

[24] Section 4.4 Discharge Flow Statistics, Page 32 of 50 of the IMD, "Temperature and Density"

Table 16 COC WRF Effluent Discharge Flow Records - (Q_0) - Daily Total/Avg. (MGD)

Year	2010			2011			2012			2013		
Month	Min	Max	Monthly Avg.	Min	Max	Monthly Avg.	Min	Max	Monthly Avg.	Min	Max	Monthly Avg.
January	0.825	1.135	0.995	0.841	1.112	0.940	0.876	1.318	1.012	0.845	0.984	0.924
February	0.914	1.018	0.957	0.864	1.237	0.963	0.876	1.065	0.964	0.683	1.083	0.930
March	0.872	1.094	0.944	0.833	1.142	0.972	0.682	1.226	0.999	0.856	0.984	0.921
April	0.865	1.036	0.960	0.885	1.084	0.973	0.915	1.072	0.996	0.863	1.034	0.938
May	0.894	1.104	0.974	0.858	1.069	0.968	0.889	1.037	0.963	0.879	1.082	0.944
June	0.901	1.091	0.969	0.913	0.995	0.954	0.909	1.016	0.965	0.906	1.019	0.960
July	0.832	1.057	0.930	0.875	1.022	0.946	0.896	0.994	0.953	0.891	1.009	0.941
August	**0.816**	**1.068**	**0.938**	**0.884**	**1.039**	**0.952**	**0.906**	**1.011**	**0.960**			
September	**0.862**	**1.048**	**0.947**	**0.884**	**1.136**	**0.965**	**0.890**	**1.032**	**0.966**			
October	**0.894**	**1.105**	**0.958**	**0.890**	**1.128**	**0.981**	**0.898**	**1.150**	**0.969**			
November	0.851	1.099	0.963	0.892	1.153	0.989	0.877	1.377	0.989			
December	0.868	1.285	0.999	0.820	1.128	0.961	0.865	1.136	0.966			

Table 17 COC WRF Effluent Discharge - Hourly Temperature (T_0) - Daily Max (°C)

Year	2010			2011			2012			2013		
Month	Min	Max	Monthly Avg.	Min	Max	Monthly Avg.	Min	Max	Monthly Avg.	Min	Max	Monthly Avg.
January												
February												
March							14.97	17.26	15.72	16.06	18.44	16.85
April				17.22	18.76	17.84	15.99	19.17	17.52	17.65	19.63	18.46
May	18.40	21.10	19.77	17.87	20.34	19.16	17.87	21.17	19.64	19.37	21.63	20.64
June	19.90	22.40	20.96	20.00	23.15	21.93	20.18	22.62	21.60	21.36	24.50	22.64
July	22.10	25.20	23.97	22.49	24.62	23.53	22.25	24.63	23.84	24.07	25.75	24.89
August	**24.00**	**25.90**	**24.80**	**24.04**	**26.33**	**24.89**	**24.51**	**26.23**	**25.11**			
September	**23.60**	**25.10**	**24.23**	**23.63**	**25.32**	**24.45**	**23.51**	**24.98**	**24.23**			
October	**20.50**	**24.00**	**22.17**	**20.34**	**23.53**	**21.98**	**20.54**	**23.63**	**21.92**			
November	17.70	21.00	19.38	17.77	20.49	18.77	17.98	21.24	19.49			
December	15.70	18.00	17.23	15.66	17.63	16.43	16.13	18.33	17.11			

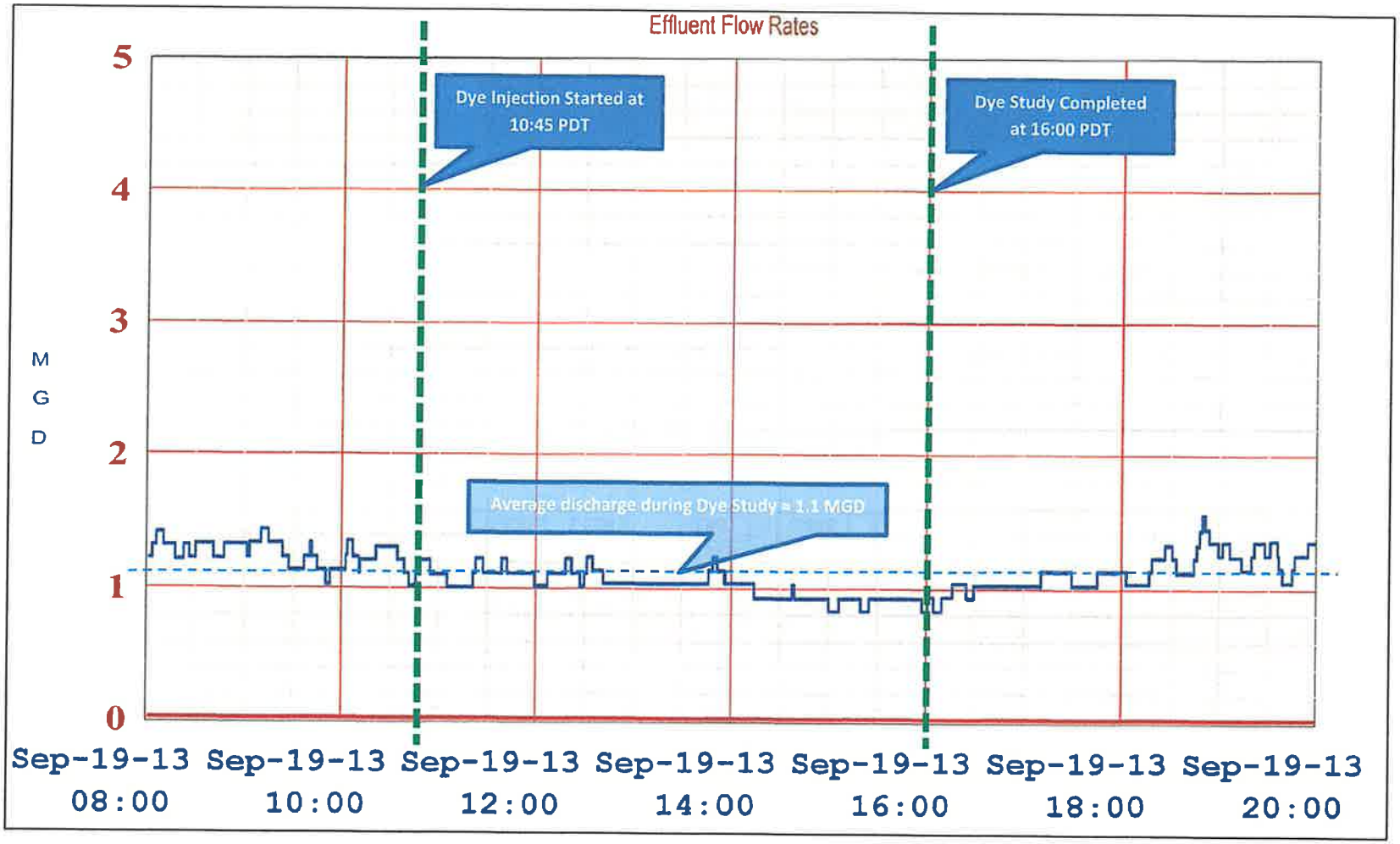

Figure 16 COC WRF Effluent Discharge Flow Rate during dye study on 09/19/2013

Table 18 COC WRF Effluent Discharge Temperature Data during dye study on 09/19/2013		
Date (yyyy-mm-dd)	**Time (hh:mm:ss)**	**Effluent Temperature (°C)**
9/19/2013	10:00:00	24.03
9/19/2013	11:00:00	24.14
9/19/2013	12:00:00	24.27
9/19/2013	13:00:00	24.43
9/19/2013	14:00:00	24.52
9/19/2013	15:00:00	24.61
9/19/2013	16:00:00	24.59
Avg. Effluent Temperature during Dye Study		**24.37**

Appendix F - COC WRF Multiport Diffuser Plan & Drawings

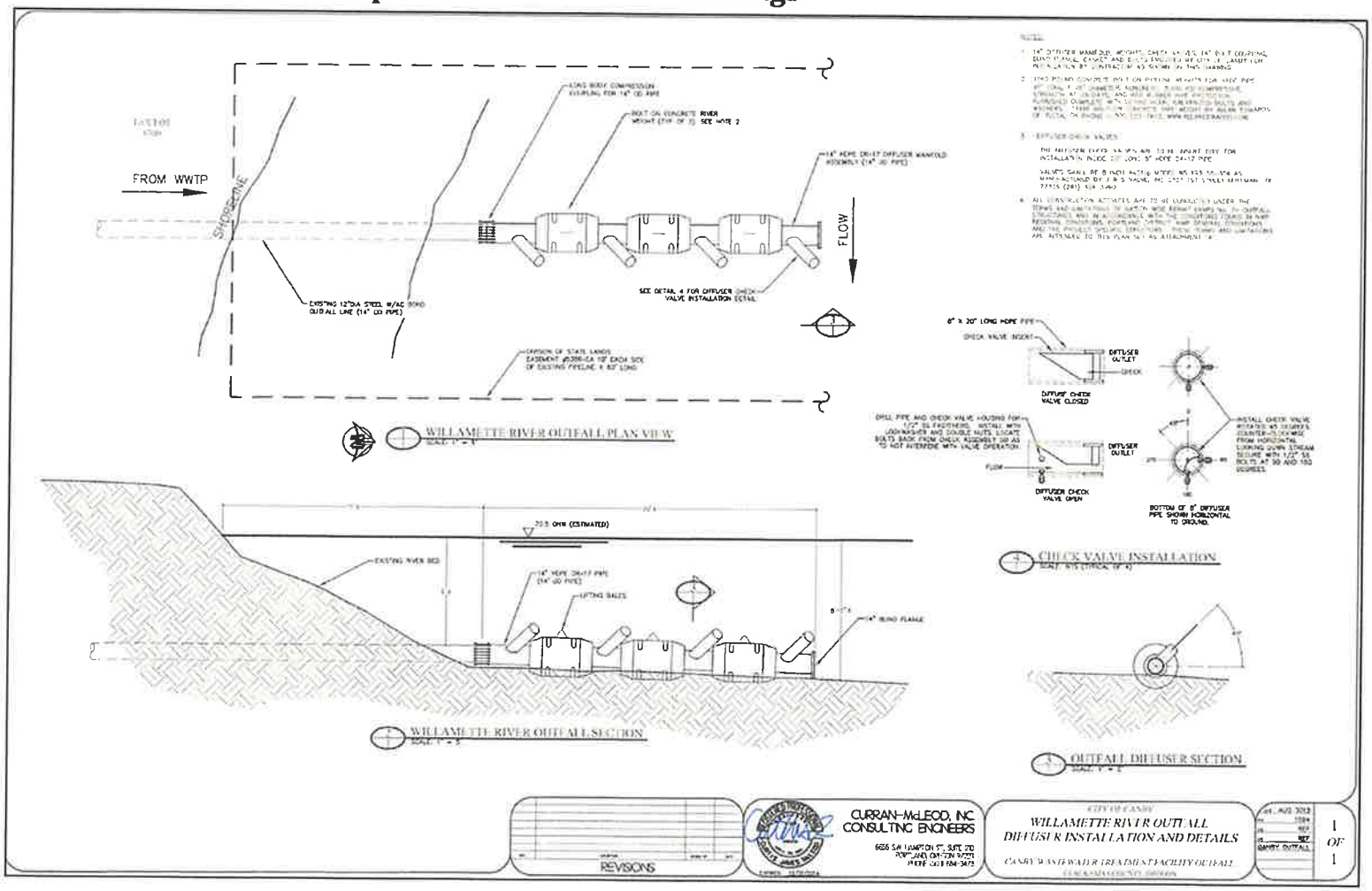

Figure 17 COC WRF Multiport Diffuser Plan (Preliminary)

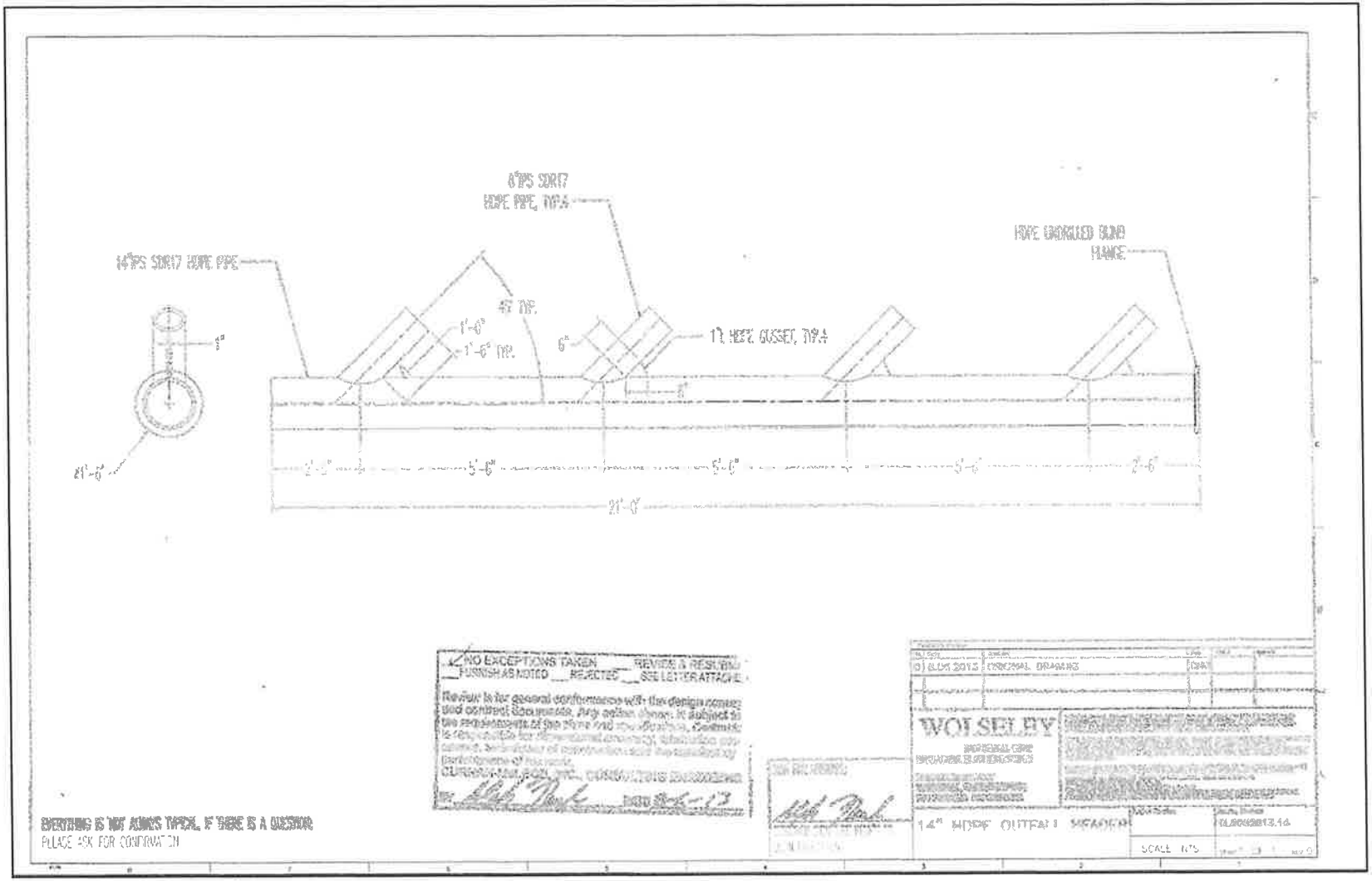

Figure 18 COC WRF Multiport Diffuser (Final fabrication drawings)

Appendix G - StreamStats Ungaged Site Report

The following report was generated by the USGS Oregon StreamStats tool after using the "Watershed Delineation from a Point" tool and selecting a point near the COC WRF discharge in the Willamette River.[25]

Date : Wed Nov 6 2013 17:17:14 Mountain Standard Time
Site Location : Oregon
NAD27 Latitude : 45.2895 (45 17 22); **NAD27 Longitude** : -122.6751 (-122 40 30)
NAD83 Latitude : 45.2894 (45 17 22); **NAD83 Longitude** : -122.6763 (-122 40 35)
Drainage Area : **9330 mi^2**
Percent Urban : 5.39 %
Percent Impervious : 1.7 %

Peak Flows Region Grid Basin Characteristics

Mean Basin Elevation in feet=1860

100% Reg 2B Western Interior LT 3000 ft. Cooper (9330 mi2)

Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	9330 (above max value 7270)	0.37	7270
Mean Basin Slope from 30m DEM (degrees)	12	5.62	28.3
24 Hour 2 Year Precipitation (inches)	2.64	1.53	4.48

Warning: Some parameters are outside the suggested range. Estimates will be extrapolations with unknown errors.

Peak Flows Region Grid Streamflow Statistics

Statistic	Flow (ft^3/s)	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
				Minimum	Maximum
PK2	251000		2		
PK5	374000		2.8		
PK10	461000		3.6		
PK25	572000		4.8		
PK50	657000		5.5		
PK100	742000		6.2		
PK500	946000		7.5		

[25] http://water.usgs.gov/osw/streamstats/oregon.html

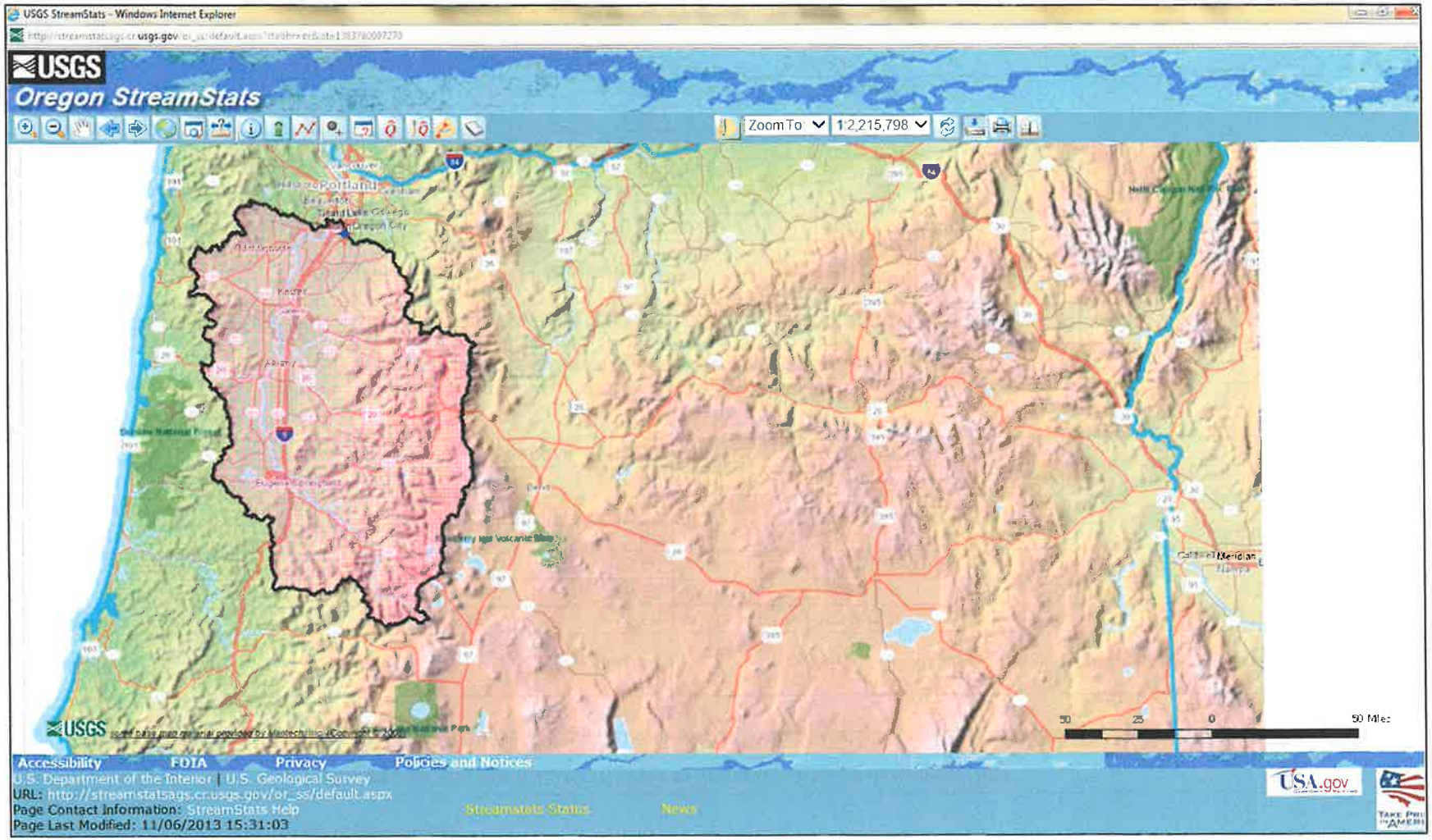

Figure 19 Watershed Delineation for Ungaged site at COC WRF Outfall using USGS StreamStats tool

Appendix H - USGS Newberg AND Salem – Flow Data for 09/19/2013

The ADCP measurement of river flow on the Willamette River just upstream of the COC WRF discharge location was conducted on September 19th 2013 between 9:00AM and 9:50AM PDT. Average flows recorded at the USGS Newberg and Salem gages that are upstream of the discharge location are presented in Table 19 and Table 20. These averages account for some flow travel time from the respective gage locations to the where the ADCP flow measurements were made.

Table 19 USGS 14197900 WILLAMETTE RIVER AT NEWBERG, OR Flow Data for 09/19/2013

Data Source: http://waterdata.usgs.gov/nwis/uv?cb_00065=on&cb_00060=on&cb_00010=on&cb_00055=on&format=rdb&period=&begin_date=2013-09-19&end_date=2013-09-19&site_no=14197900

Gage #		Date/Time			Gage Height (ft.)		Q_a (cfs)		Water Temp. (°C)		Stream velocity(ft./s)	
USGS	14197900	9/19/2013	8:45	PDT	56.66	P	10600	P	16.70	P	0.940	P
USGS	14197900	9/19/2013	9:00	PDT	56.67	P	11000	P	16.70	P	0.980	P
USGS	14197900	9/19/2013	9:15	PDT	56.66	P	9230	P	16.60	P	0.820	P
USGS	14197900	9/19/2013	9:30	PDT	56.66	P	9060	P	16.70	P	0.810	P
USGS	14197900	9/19/2013	9:45	PDT	56.64	P	9640	P	16.60	P	0.860	P
USGS	14197900	9/19/2013	10:00	PDT	56.66	P	8470	P	16.60	P	0.760	P
Average flow between 8:45AM and 10:00AM							**9,666.67**					

Table 20 USGS 14191000 WILLAMETTE RIVER AT SALEM, OR Flow Data for 09/19/2013

Data Source: http://waterdata.usgs.gov/nwis/uv?cb_00060=on&cb_00065=on&format=rdb&period=&begin_date=2013-09-19&end_date=2013-09-19&site_no=14191000

Gage #		Date/Time			Gage Height (ft.)		Q_a (cfs)	
USGS	14191000	9/19/2013	8:00	PDT	6.10	P	9660	P
USGS	14191000	9/19/2013	8:15	PDT	6.10	P	9660	P
USGS	14191000	9/19/2013	8:30	PDT	6.10	P	9660	P
USGS	14191000	9/19/2013	8:45	PDT	6.09	P	9630	P
USGS	14191000	9/19/2013	9:00	PDT	6.10	P	9660	P
USGS	14191000	9/19/2013	9:15	PDT	6.09	P	9630	P
Average flow between 8:00AM and 9:15AM							**9,650.00**	

Appendix I - Dye Study Sensor Calibrations and Field Data

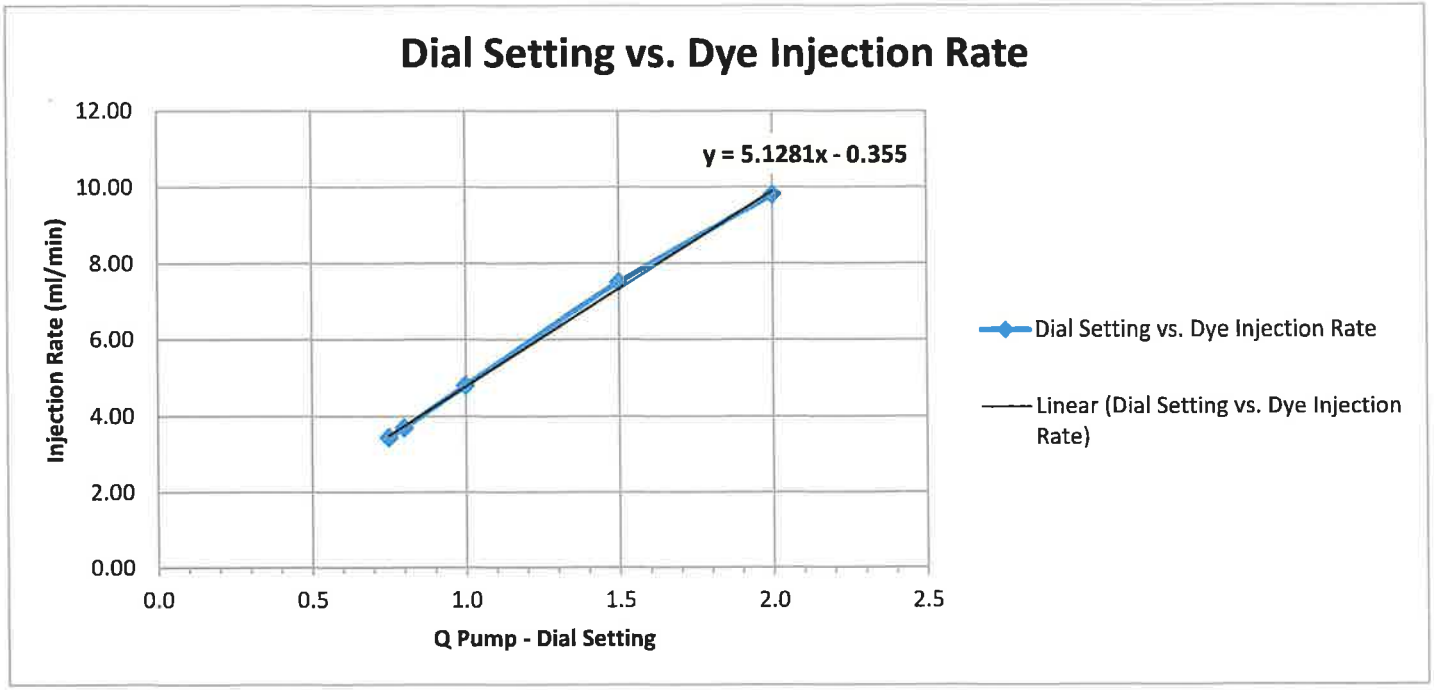

Figure 20 Calibration curve for FMI QBGMB-Q2CSY Metered Dye Injection Pump

The dye injection rate in ml/min was computed for a target effluent discharge flow rate of 1.1 to 1.2 MGD. The dial settings on the metered pump were then adjusted accordingly based on the desired injection rate and the hourly effluent discharge rates.

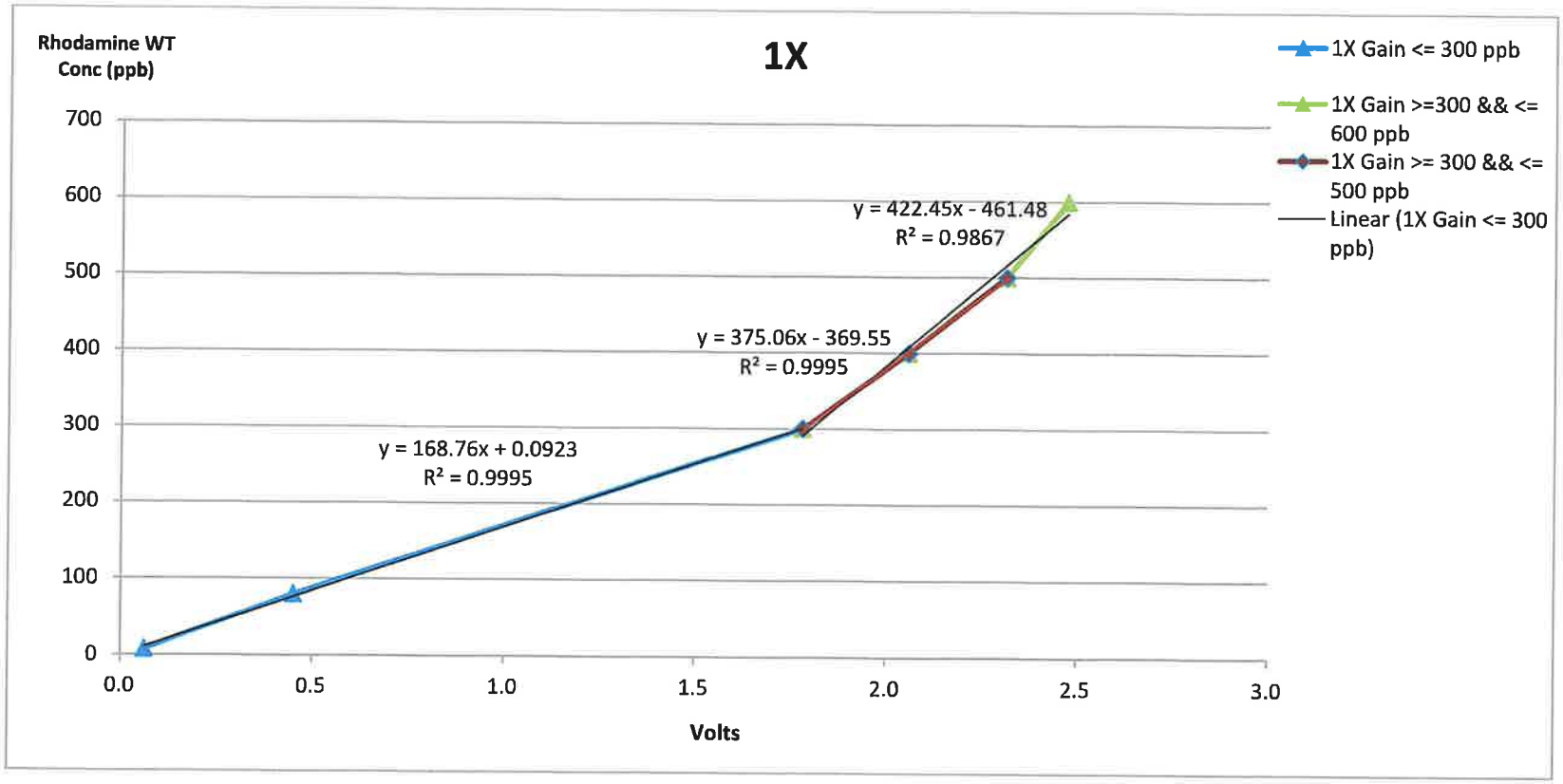

Figure 21 Calibration curve for dye sensor (serial # 2101513; Gain: 1X) used at manhole

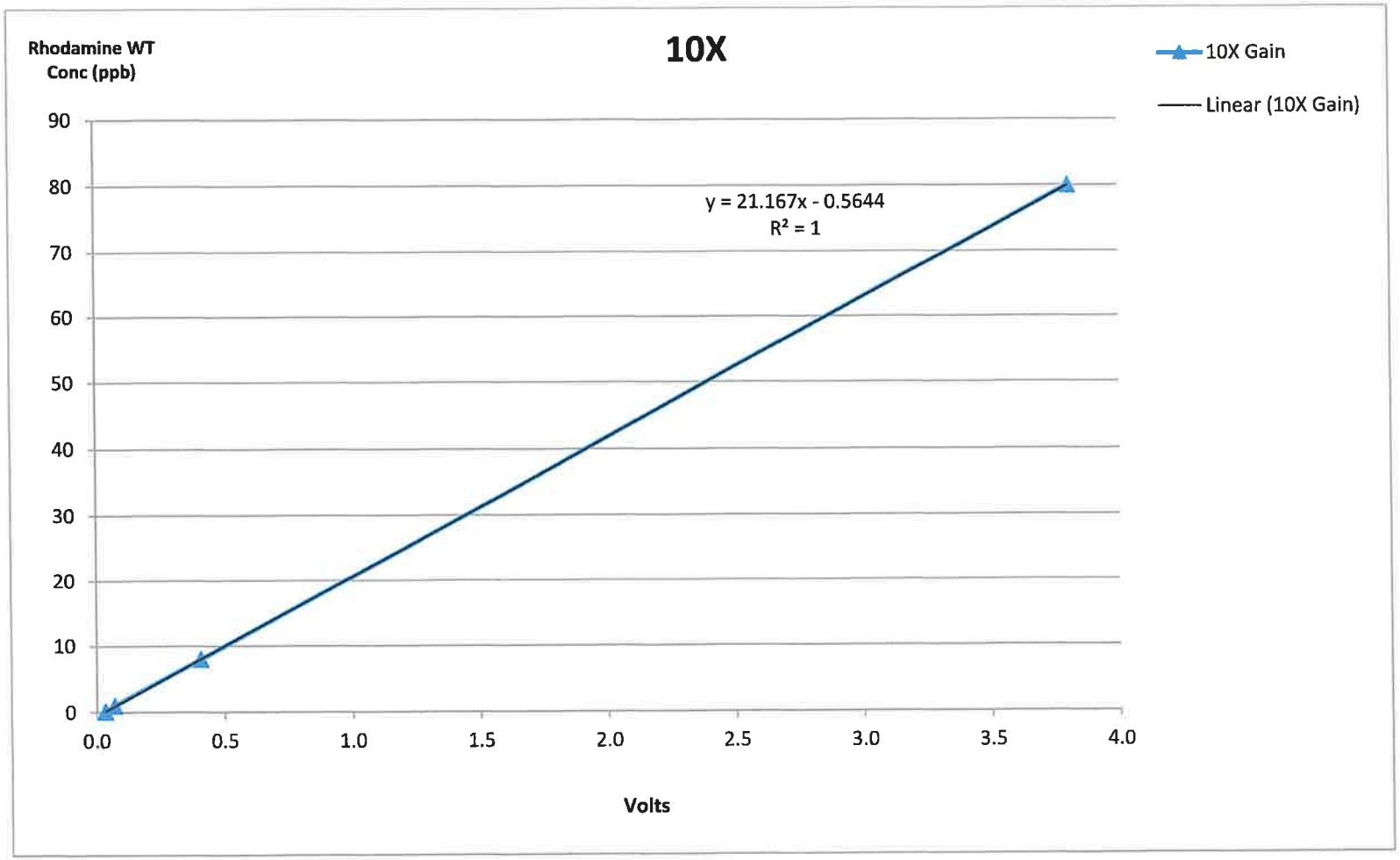

Figure 22 Calibration curve for dye sensor (serial # 2100987; Gain: 10X) used from boat

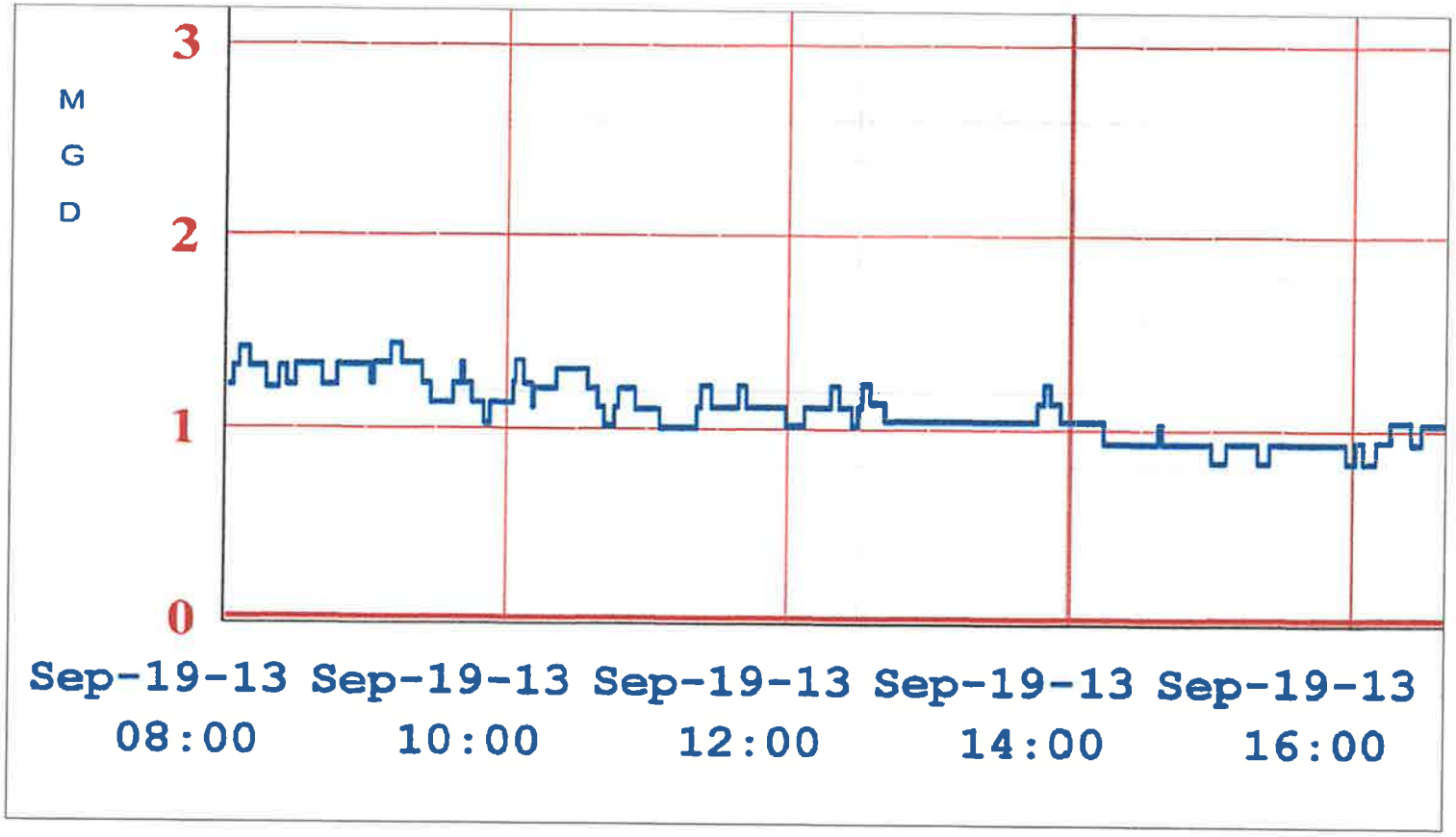

Figure 23 COC WRF Effluent Discharge Flow Rate during Dye Injection

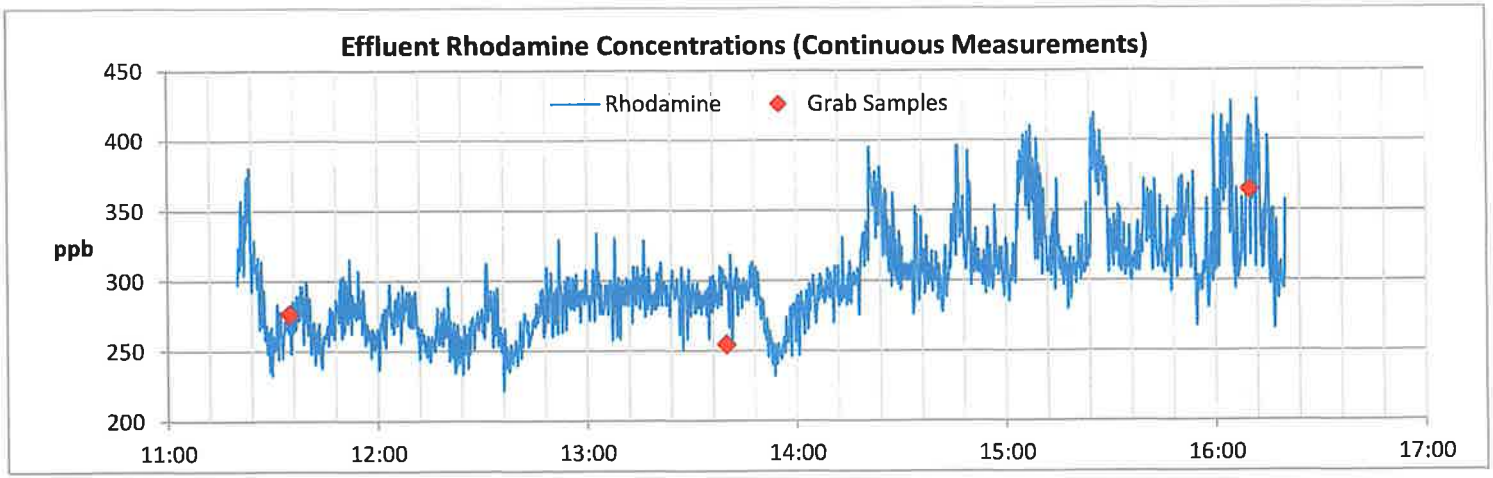

Figure 24 Dye concentrations measure at the COC WRF manhole (Continuous Measurements)

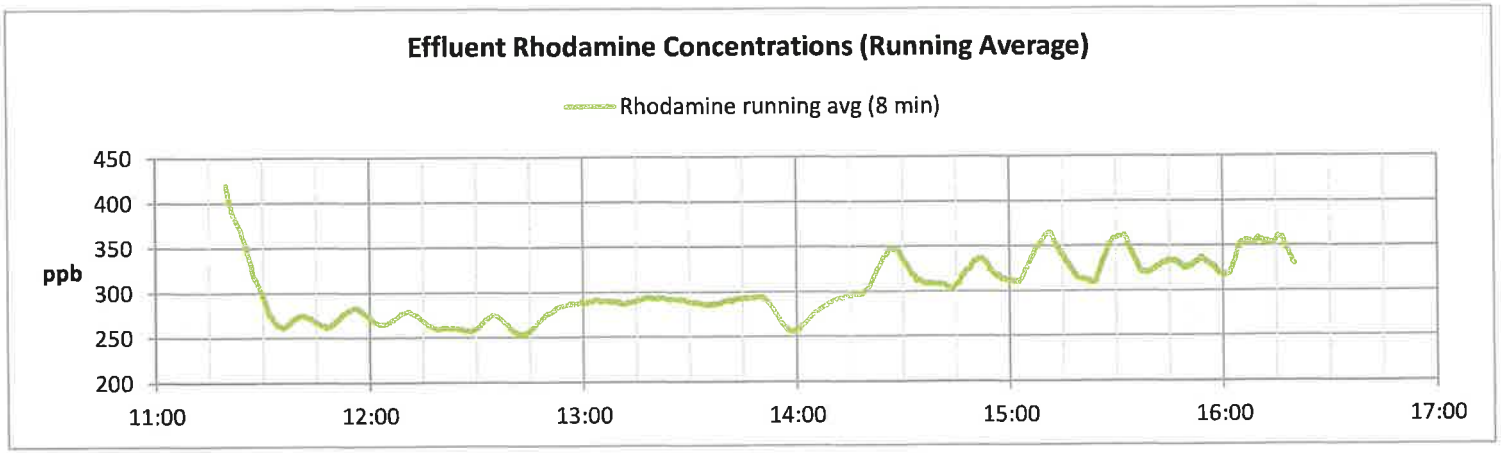

Figure 25 Dye concentrations measure at the COC WRF manhole (8 min. running avg.)

Appendix J - Discharge Site Photos

Figure 26 COC WRF discharge headworks

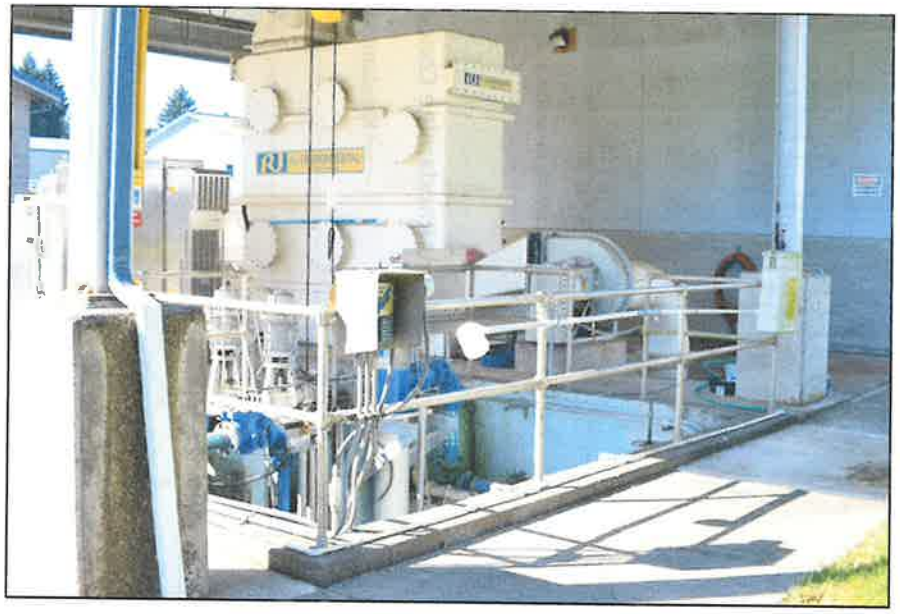

Figure 27 COC WRF discharge at headworks

Figure 28 Discharge sampling chamber looking towards the COC WRF entrance

Figure 29 Discharge sampling chamber looking towards the Willamette River

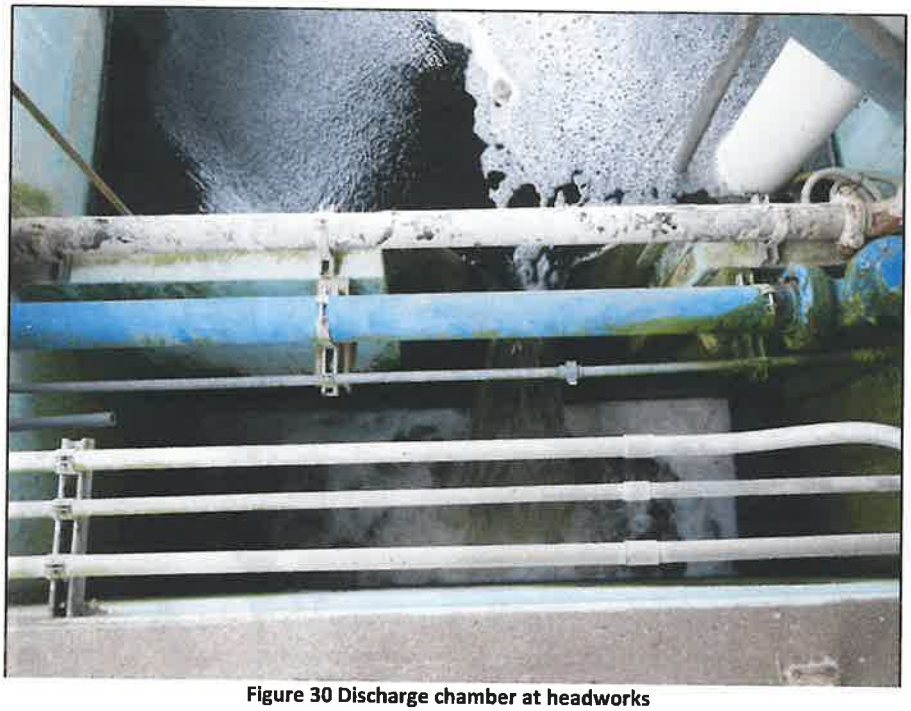

Figure 30 Discharge chamber at headworks

Figure 31 Dye injection setup at COC WRF discharge chamber

Figure 32 FMI QBG metered dye injection pump

Figure 33 Dye injection info discharge chamber

Figure 34 Rhodamine WT dye injection into COC WRF headworks

Figure 35 Dye injection in progress

Figure 36 Fluorescent dye injection

Figure 37 Deer near the COC WRF discharge manhole

Figure 38 Dye sampling and monitoring station and setup at the manhole

Figure 39 Dye monitoring and record keeping at the COC WRF discharge manhole

Figure 40 Dipping sensors and sampling pumps in the discharge manhole

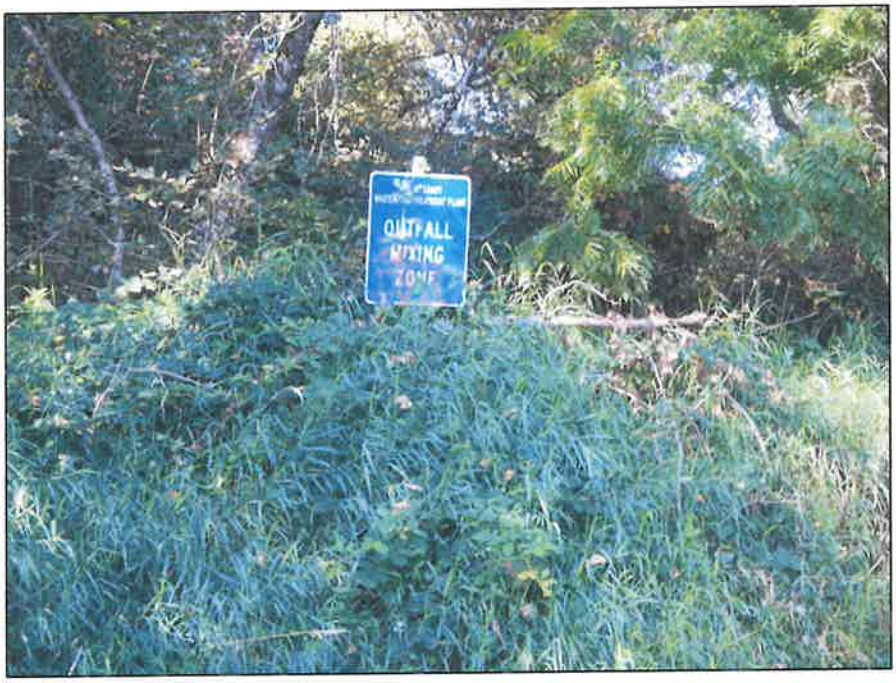

Figure 41 COC WRF Mixing Zone board on the right bank of Willamette River

Figure 42 Upstream view from COC WRF discharge (marked with buoy) in the Willamette River

Figure 43 COC WRF discharge (marked with buoy) in the Willamette River

Figure 44 COC WRF discharge (marked with buoy), looking upstream and toward right bank

Figure 45 COC WRF discharge location (marked with buoy), looking toward the right shoreline

Figure 46 COC WRF effluent discharge into the Willamette River via a multiport diffuser

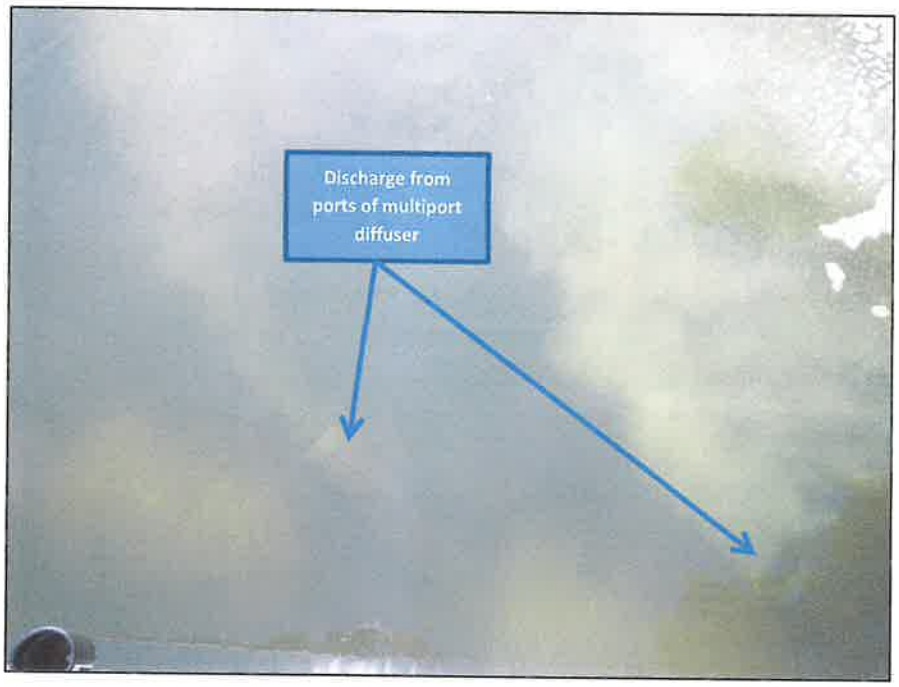

Figure 47 Discharge from 2 ports of the COC WRF multiport diffuser

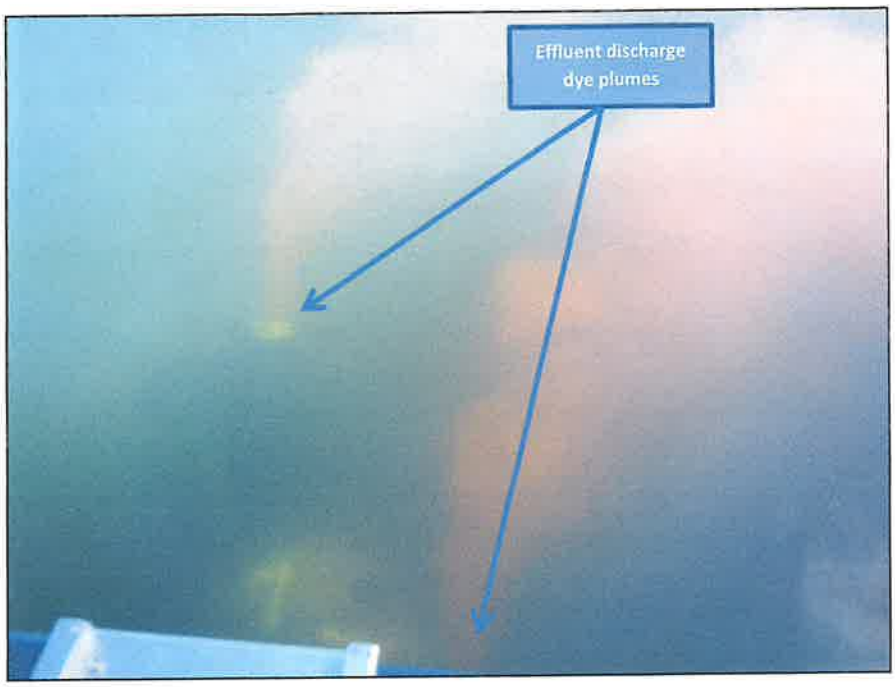

Figure 48 Dye plume emerging from two of the multiport diffuser ports

Figure 49 Four distinct dye plumes from the four ports of the COC WRF diffuser

Figure 50 Dye plumes from the four ports of the COC WRF diffuser, before and after merging

Figure 51 Effluent dye plume, looking upstream with the right bank of the river on the left side of the picture

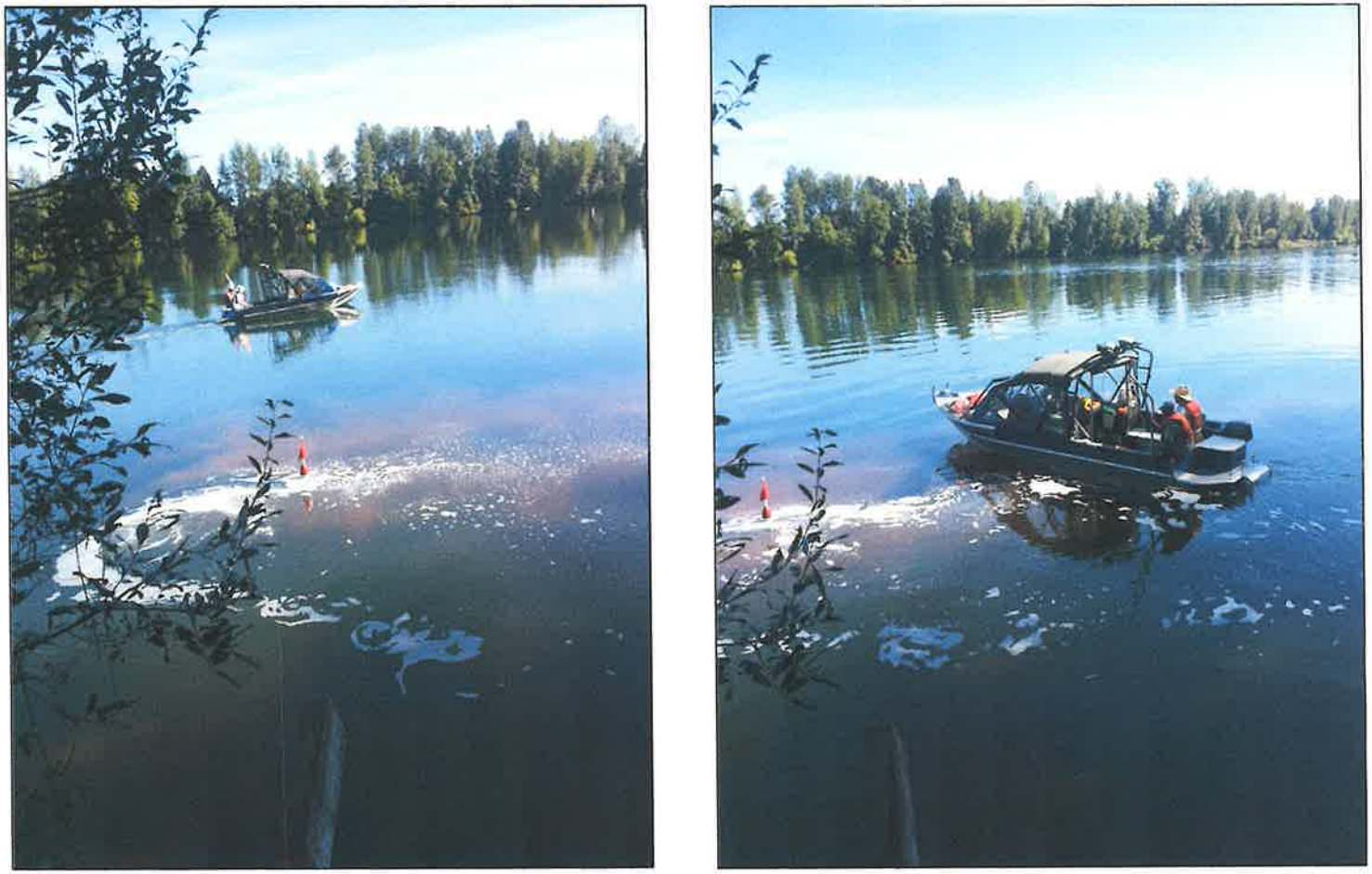

Figure 52 Boat monitoring of effluent dye – photo taken from the right shoreline

APPENDIX I

Sewer Use Rate Study

City of Canby, Oregon

SEWER & STORMWATER RATES ANALYSIS & FINANCIAL PLAN

Prepared by:

ECONOMIC & FINANCIAL ANALYSIS

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Vancouver, WA 98660

23 May 2011

ECONOMIC & FINANCIAL ANALYSIS

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SUMMARY

The City of Canby's sewer utility consists of both sewer and stormwater functions, and is financially self-sufficient. The City is planning improvements to each system, and retained Economic & Financial Analysis to develop a financial plan that provides the revenue necessary to cover the increased annual cost of operations and maintenance, as well as a plan for financing improvements to each system.

Financial Plan

Through fiscal year 2009-10, the sewer and stormwater systems were combined in the sewer utility's financial records. This fiscal year (2010-11) the City began tracking expenditures associated with each system separately in order to determine the proportion of annual costs that can be attributed to each. EFA used this data to develop a financial plan that breaks out the cost of operating and maintaining the stormwater system separately from the sewer system and more accurately projects the utility's revenue requirements from user rates. This provided the basis for updating the utility rates, which will include both a sewer fee and a stormwater fee to cover the costs of operating and maintaining both systems.

The financial plan presented here recommends an initial rate increase of 25% percent in FY 2011-12, followed by an annual rate increase of 4 percent for the next 5 years. After that, the City will have to re-evaluate its financial condition. These rate increases, along with an annual growth rate between .2 percent and .75 percent, will provide sufficient revenue from user charges and SDCs to cover the annual cost of operations and maintenance, complete the improvements identified in the sewer and stormwater capital improvements plans, pay off the utility's debts, and maintain a cash reserve sufficient to cover unexpected problems.

Table 1 shows the progression of monthly single-family sewer rates from 1999 through 2010, as well as proposed rates through 2016. The complete rate schedule by customer class can be found in Table 10.

Table 1 Residential Sewer Rates Summary (Past & Proposed)

	Year	% Increase	Single-family Combined Sewer/Stormwater Rates	$ Increase
History	1999	4.3%	$24.25	$1.00
	2005	4.0%	$25.22	$0.97
	2006	4.0%	$26.23	$1.01
	2007	4.0%	$27.28	$1.05
	2009	5.0%	$28.64	$1.36
Current	2010	6.1%	$30.39	$1.75
Proposed	2011	25.0%	$38.00	$7.61
	2012	4.0%	$39.60	$1.60
	2013	4.0%	$41.20	$1.60
	2014	4.0%	$42.90	$1.70
	2015	4.0%	$44.70	$1.80
	2016	4.0%	$46.50	$1.80

Capital Improvements

The City updated the capital improvement plans for the sewer and stormwater systems in February 2011. Improvements during the 5-year forecast period are estimated at $2.647 million in 2010 dollars. The financial plan uses cash from reserves, net income from operations, and systems development charge revenues. No additional borrowing will be required unless the proposed schedule of capital improvements changes.

INTRODUCTION

This analysis provides a review of the combined sewer and stormwater financial history, followed by a financial forecast and proposed rate increases. We evaluate the current combined rate and estimate the portions that are attributable to the sanitary sewer and stormwater systems for the current fiscal year. We also project the cost of scheduled capital improvements and provide a financing plan to complete the improvements.

FINANCIAL HISTORY

Table 2 shows the recent financial history of the combined sewer and stormwater fund. During the past 6 years the City has limited annual increases in operating costs to 0.5% per year, while revenues have increased 5.2% per year. The City had sufficient funds to make over $6 million of capital improvements to the system and pay off an outstanding bond. These capital expenditures resulted in cash reserves decreasing from $3.5 million to $1.3 million over the 6-year period.

Table 2 Cash Flow History—Combined Sewer & Stormwater Systems

	Audited History					Estimate	Avg
	2005 2006	2006 2007	2007 2008	2008 2009	2009 2010	2010 2011	Annual % Δ
CASH FLOWS FROM OPERATING ACTIVITIES							
Operating Revenues							
Customer Receipts	1,940,291	2,064,487	2,174,773	2,339,706	2,392,212	2,537,820	5.2%
Miscellaneous						3,587	
Total Revenues	1,940,291	2,064,487	2,174,773	2,339,706	2,392,212	2,541,407	5.2%
Operating Expenditures							
Personal Services	687,129	665,064	702,244	754,495	848,416	829,100	5.3%
Materials & Services	393,568	365,351	609,832	533,852	253,187	437,589	-11.0%
Total Expenditures	1,080,697	1,030,415	1,312,076	1,288,347	1,101,603	1,266,689	0.5%
Net Cash From Operating Activities	$859,594	$1,034,072	$862,697	$1,051,359	$1,290,609	$1,274,718	10.2%
CASH FLOWS FROM NONCAPITAL FINANCING ACTIVITIES							
Interfund Loan Payments	37,735	29,820	10,609			8,624	
Transfers In (Out)	(185,245)	(261,929)	(297,613)	(312,978)	(358,550)	(295,070)	
Net Cash From Noncapital Activities	($147,510)	($232,109)	($287,004)	($312,978)	($358,550)	($286,446)	

	Audited History					Estimate	Avg Annual
	2005 2006	2006 2007	2007 2008	2008 2009	2009 2010	2010 2011	% Δ
CASH FLOWS FROM CAPITAL & RELATED FINANCING ACTIVITIES							
System Development Charges	550,736	319,814	174,935	39,484	5,711	20,700	
Capital Expenditures	(433,925)	(534,579)	(161,963)	(782,579)	(1,261,234)	(1,799,642)	
Long-term Obligations							
Bond Proceeds	25,435		2,505,000				
Amortization of Bond Issue Costs	21,734		23,894	8,928			
Bond Premium			54,244				
Amortization of Bond Premium			(1,356)	(5,424)			
Principal	1,600	(250,000)	(3,695,000)	(240,000)	(210,000)	(225,000)	
Interest	(456,250)	(192,611)	(184,064)	(88,431)	(80,194)	(71,872)	
Costs			(86,301)				
Net Cash From Capital Activities	($290,670)	($657,376)	($1,370,611)	($1,068,022)	($1,545,717)	($2,075,814)	
CASH FLOWS FROM INVESTING ACTIVITIES							
Interest	$127,903	$191,754	$182,170	$61,369	$20,166	$8,000	
Net Change in Cash & Investments	$549,317	$336,341	($612,748)	($268,272)	($593,492)	($1,079,542)	
CASH BALANCE, Beginning	2,994,626	3,543,943	3,880,284	3,267,536	2,999,264	2,405,772	
CASH BALANCE, Ending	$3,543,943	$3,880,284	$3,267,536	$2,999,264	$2,405,772	$1,326,230	

Table 3 shows a breakdown of costs between the sanitary sewer and stormwater functions. This year, stormwater expenditures amounted to about 30% of the total operating expenditures, 23% of transfers, and 25% of capital and related financing activities.

Table 3 Cash Flow Forecast by System, FY 2011-12

	2011-12 Forecast		
	Sewer	Stormwater	Combined
CASH FLOWS FROM OPERATING ACTIVITIES			
Operating Revenues			
Customer Receipts	2,435,000	769,000	3,204,000
Miscellaneous	2,500	2,500	5,000
Total Revenues	2,437,500	771,500	3,209,000
Operating Expenditures			
Personal Services	858,844	222,710	1,081,554
Materials & Services	456,575	79,900	536,475
Total Expenditures	1,315,419	302,610	1,618,029
Net Cash From Operating Activities	$1,122,081	$468,890	$1,590,971
CASH FLOWS FROM NONCAPITAL FINANCING ACTIVITIES			
Interfund Loan Payments			0
Transfers In (Out)	(215,000)	(64,400)	(279,400)
Net Cash From Noncapital Activities	($215,000)	($64,400)	($279,400)

	2011-12 Forecast		
	Sewer	Stormwater	Combined
CASH FLOWS FROM CAPITAL AND RELATED FINANCING ACTIVITIES			
System Development Charges (SDC)^			0
Capital Expenditures	(83,500)	(124,500)	(208,000)
Long-term Obligations			
Principal	(235,000)		(235,000)
Interest	(63,265)		(63,265)
Net Cash From Capital Financing Activities	($381,765)	($124,500)	($506,265)
CASH FLOWS FROM INVESTING ACTIVITIES			
Interest	$6,000	$6,000	$12,000
Net Change in Cash & Investments	$531,316	$285,990	$817,306
CASH & INVESTMENTS, Beginning	1,602,402	197,309	1,799,711
CASH & INVESTMENTS, Ending	$2,133,718	$483,299	$2,617,017

^ SDC revenues have been omitted to calculate capital expenditure requirements

FINANCIAL FORECAST

Forecast Assumptions

Two forecasts are presented—one for the sewer system and one for the stormwater system. Both systems will be affected by the same rates of growth and inflation, as presented in Table 4.

Table 4 Forecast Assumptions & Rate Increases

	Estimated 2010 2011	2011 2012	2012 2013	2013 2014	2014 2015	2015 2016
Growth Rate		0.2%	0.3%	0.4%	0.5%	0.75%
Number of EDUs	6,959	6,973	6,994	7,022	7,057	7,110
New	8	14	21	28	35	53
SDCs						
Sewer	$2,489	$2,489	$2,489	$2,489	$2,489	$2,489
Stormwater	$100	$100	$104	$108	$112	$116
% Rate Increase (effective July 1)		25.0%	4.0%	4.0%	4.0%	4.0%
Residential Flat Fee (Sewer & Stormwater)	$38.00	$39.52	$41.10	$42.74	$44.45	$44.45
Capital	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Operating Expenditures						
Personal Services		7.5%	7.5%	7.5%	7.5%	7.5%
Materials & Services		4.5%	4.5%	4.5%	4.5%	4.5%
Return on Investments	0.4%	0.3%	0.3%	0.5%	0.5%	1.0%

The City also plans capital improvements during the forecast period to both the sewer system and the stormwater system. We assume that the 5-year capital improvements in Tables 5 and 6 will be constructed. Construction costs in 2011 $'s are estimated at $2.040 million for sewer and $670,000 for stormwater. However, we assume a 4% per year increase in costs, which will result in total capital costs of approximately $4.19 million—$2.71 million for sewer $1.48 million for stormwater. The City has enough in current cash plus net revenues and future SDC revenues to complete the improvements without financing. However, if projects have to be expedited, the City may consider borrowing to construct some or all of the projects. Financing would spread the cost over several years, but the added burden of interest would be incurred.

Table 5 Capital Improvements Plan—Sewer System

No.	Description	Capacity (mgd) ADWF	Years 1-5 (2012-2016) Cost Estimate	Years 1-5 (2012-2016) $/gal	Years 6-10 (2017-2021) Cost Estimate	Years 6-10 (2017-2021) $/gal	Years 11-20 (2022-2031) Cost Estimate	Years 11-20 (2022-2031) $/gal
1	Secondary Scum Pump Station	2.8	$60,000	$0.02				
2	Effluent Filtration	2.8	$350,000	$0.16				
3	Odor Control Improvements	2.8	$600,000	$0.21				
4	Sludge Conditioning Basin, 600,000g	2.8	$800,000	$0.29				
5	SCADA System Improvements	2.8	$150,000	$0.05				
6	RV Septic Receiving Station	2.8			$125,000	$0.04		
7	Headworks Screening	2.8			$750,000	$0.27		
8	Outfall Diffuser Improvements	2.8			$250,000	$0.09		
9	Dried Sludge Storage Building	2.8	$80,000	$0.03				
10	New Lab Building Construction	2.8			$600,000	$0.21		
11	Employee Support Building	2.8			$420,000	$0.15		
12	Additional Primary Clarifier	2.8					$800,000	$0.29
13	Effluent Irrigation System	2.8			$450,000	$0.16		
14	Power Distribution System Upgrades	2.8					$600,000	$0.21
15	Collection System Upsizing/Oversizing							
15(a)	South 2nd Trunk, MH R-26 to O-39	2.8					$160,000	$0.06
15(b)	NW Territorial Road Trunk Oversizing	2.8					$20,000	$0.01
15(c)	Mulino Pump Station & Force Main	2.8					$360,000	$0.13
15(d)	North 22nd Pump Station & Force Main	2.8					$280,000	$0.10
15(e)	North Birch Pump Station & Force Main	2.8					$280,000	$0.10
15(f)	System Oversizing	2.8					$50,000	$0.02
16	System Planning, SDC & Rates	2.8					$250,000	$0.09
	Subtotal by Improvement Year		$2,040,000	$0.73	$2,595,000	$0.92	$2,800,000	$1.01
TOTAL COST OF ALL IMPROVEMENTS (2011 $'s)							$7,435,000	
$ / gallon (combined)								$2.66

Source: City of Canby, Public Works Department, February 2011

Table 6 Capital Improvements Plan—Stormwater System

No.	Description	Years 1-5 (2012-2016)	Years 6-10 (2017-2021)
1	WPCF / NPDES Permitting	$50,000	
2(a)	Stormwater Master Planning	$40,000	
2(b)	UIC Decommissioning Plan	$40,000	
2(c)	Stormwater Management Plan	$40,000	
3	UIC Decommissioning/BMP Implementation	$500,000	
4	Regional Detention Facility - NW 3rd & Baker		$1,200,000
5	Regional Detention Facility - NE Territorial Rd		$1,200,000
6	System Oversizing		$100,000
	Subtotal by Improvement Year	$670,000	$2,500,000
	TOTAL COST OF ALL IMPROVEMENTS (2011 $'s)		$3,170,000

Source: City of Canby, Public Works Department, February 2011

Sewer System Forecast

In Table 7, we determine the revenue required in FY 2011-12 from sewer rates alone (excluding the stormwater system) in order for the sewer utility to meet all of its financial obligations. Using the sewer system's portion of operating costs in Table 3, we also assume the operating fund needs working capital equal to 25% of the operating costs. The existing combined sewer/stormwater utility has outstanding debt that has a claim on all sewer rate revenues. The bondholder, Mellon Bank, requires that sewer rate revenues be maintained at a level that pays all operating costs plus 125% of debt service. With these assumptions, the sewer utility has to maintain about 76% of the revenues from the current combined sewer/stormwater rate.

Table 7 Sewer Utility Revenue Requirements

	2011-12	% Forecast Revenue
Personnel	858,844	
Materials & Services	456,575	
Working Capital, 25%	329,000	
Total O&M	$1,644,419	51%
Debt Service	298,534	
Coverage, 25%	74,634	
Total Debt Service	$373,168	12%
Capital Expenditures	430,000	13%
Revenue Needed From Rates	$2,447,587	76%
Forecast Revenues	$3,204,000	100%
Balance Available for Stormwater	$756,413	24%

Table 8 shows the financial forecast for sewer only. Revenue from the rate increases is split 76% to the sewer system, and 24% to the stormwater system. Even though the combined sewer/stormwater rate increase is 25% next fiscal year (2011-12), the amount allocated to sewer is lower than total revenues from the previous year. Operating expenditures increase due to additional staff. The sewer utility makes all debt service payments. The *Net Change in Cash & Investments* varies from positive to negative depending upon the amount of capital expenditures each year. *Cash & Investments* is attributable to sewer rates and sewer SDCs.

Table 8 Cash Flow Forecast—Sewer System

	Combined	Forecast				
	2010	2011	2012	2013	2014	2015
	2011	2012	2013	2014	2015	2016
CASH FLOWS FROM OPERATING ACTIVITIES						
Operating Revenues						
Customer Receipts	2,537,820	2,416,000	2,520,000	2,631,000	2,750,000	2,881,000
Miscellaneous	3,587	2,500				
Total Revenues	2,541,407	2,418,500	2,520,000	2,631,000	2,750,000	2,881,000
Operating Expenditures						
Personal Services	829,100	858,844	923,300	992,500	1,066,900	1,146,900
Materials & Services	437,589	456,575	477,100	498,600	521,000	544,400
Total Expenditures	1,266,689	1,315,419	1,400,400	1,491,100	1,587,900	1,691,300
Net Cash From Operating Activities	$1,274,718	$1,103,081	$1,119,600	$1,139,900	$1,162,100	$1,189,700
CASH FLOWS FROM NONCAPITAL FINANCING ACTIVITIES						
Interfund Loan Payments	8,624					
Transfers In (Out)	(295,070)	(215,000)	(231,100)	(248,400)	(267,000)	(287,000)
Net Cash From Noncapital Activities	($286,446)	($215,000)	($231,100)	($248,400)	($267,000)	($287,000)
CASH FLOWS FROM CAPITAL AND RELATED FINANCING ACTIVITIES						
System Development Charges	20,700	35,000	52,300	69,700	87,100	131,900
Capital Expenditures	(1,523,470)	(135,750)	(233,400)	0	(1,146,500)	(1,192,300)
Long-term Obligations						
Principal	(225,000)	(235,000)	(240,000)	(250,000)	(255,000)	(275,000)
Interest	(71,872)	(63,265)	(54,925)	(46,044)	(36,891)	(27,284)
Costs						
Net Cash From Capital Activities	($1,799,642)	($399,015)	($476,025)	($226,344)	($1,351,291)	($1,362,684)
CASH FLOWS FROM INVESTING ACTIVITIES						
Interest	$8,000	$6,000	$15,000	$28,700	$30,100	$51,800
Net Change in Cash & Investments	($803,370)	$495,066	$427,475	$693,856	($426,091)	($408,184)
CASH & INVESTMENTS, Beginning	2,405,772	1,602,402	2,097,468	2,524,943	3,218,799	2,792,709
CASH & INVESTMENTS, Ending	$1,602,402	$2,097,468	$2,524,943	$3,218,799	$2,792,709	$2,384,524

APPENDIX J

Collection System Conceptual Plan

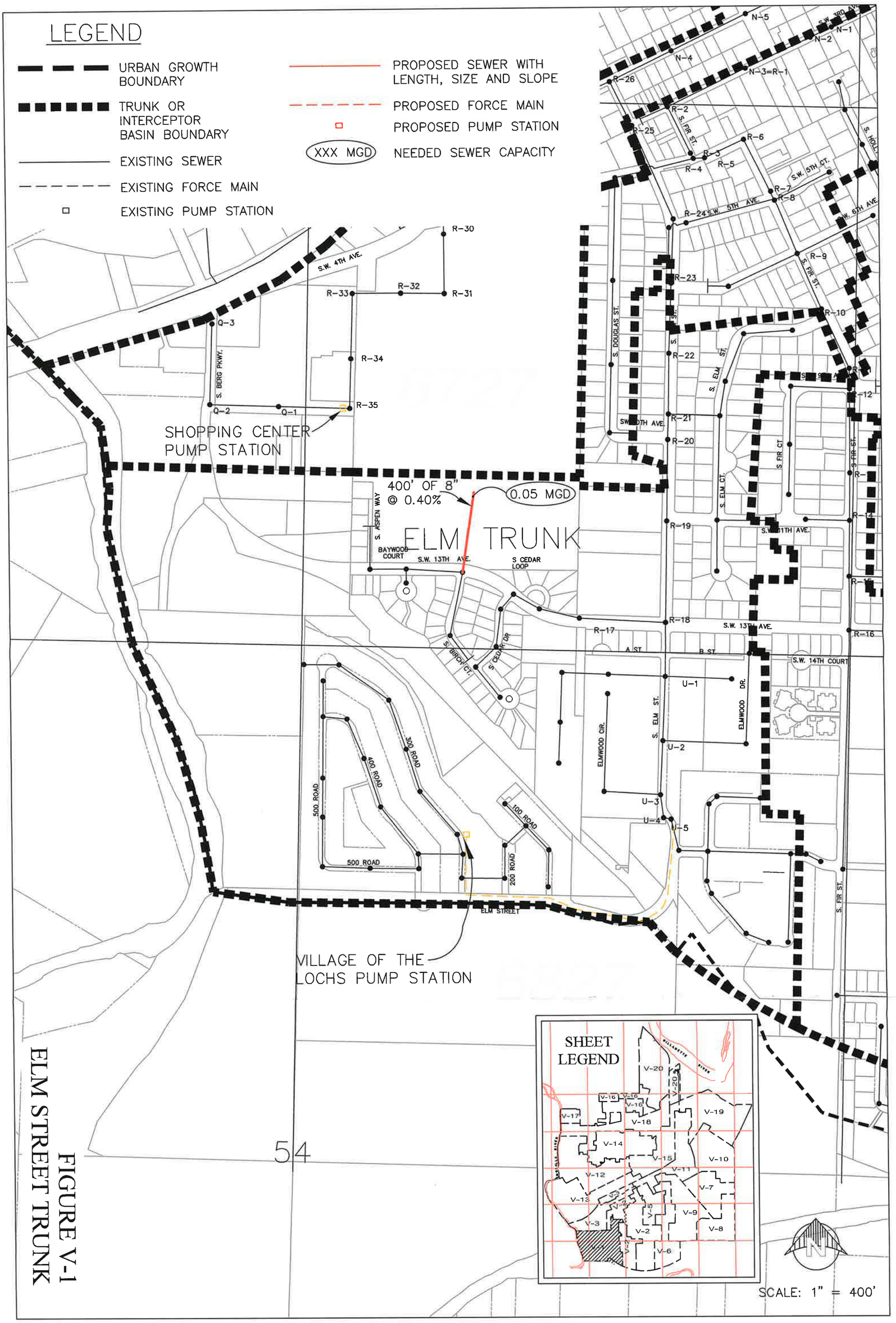
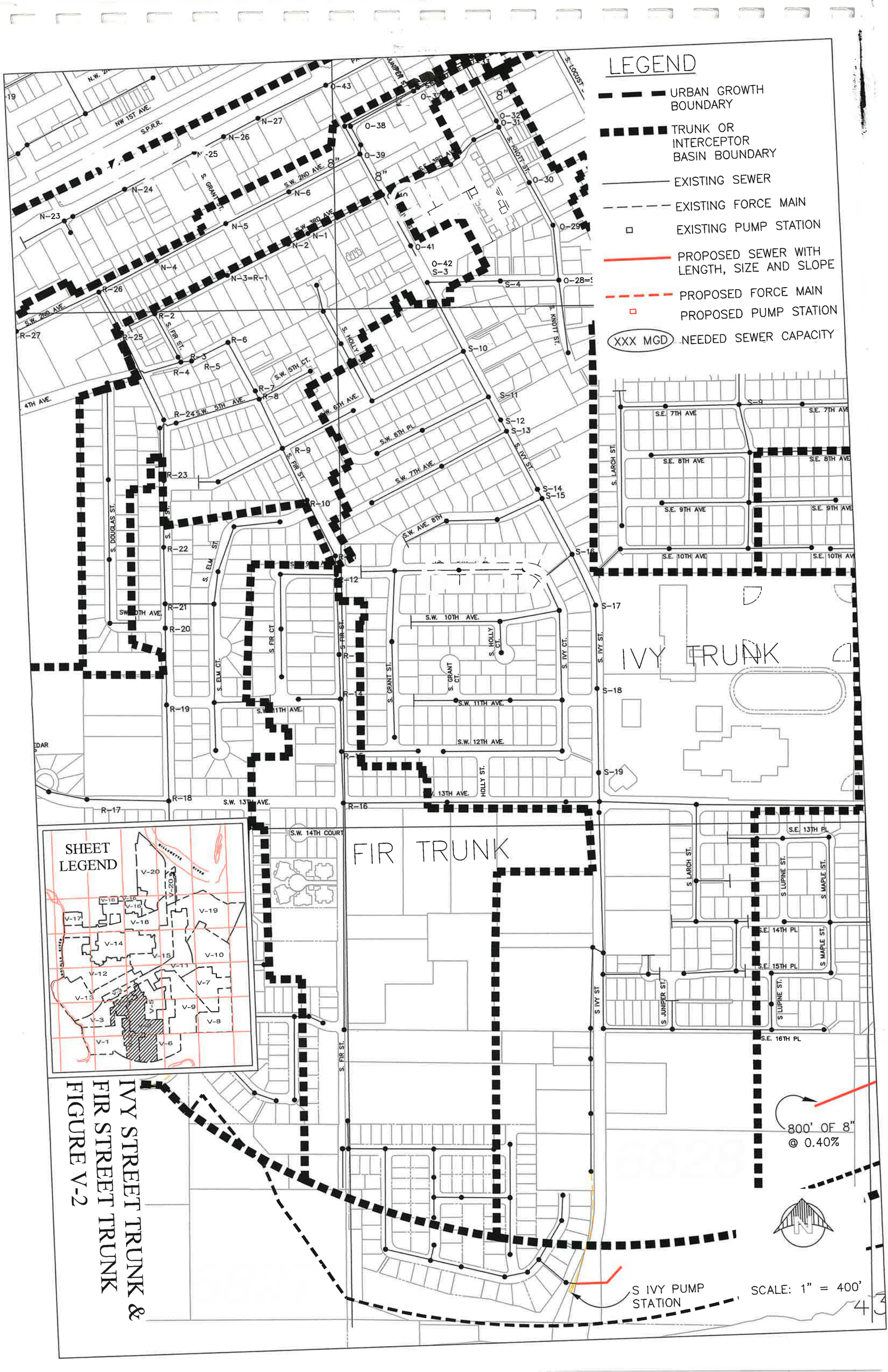


FIGURE V-1
ELM STREET TRUNK


LEGEND
URBAN GROWTH BOUNDARY
TRUNK OR INTERCEPTOR BASIN BOUNDARY
EXISTING SEWER
EXISTING FORCE MAIN
EXISTING PUMP STATION
PROPOSED SEWER WITH LENGTH, SIZE AND SLOPE
PROPOSED FORCE MAIN
PROPOSED PUMP STATION
XXX MGD NEEDED SEWER CAPACITY
IVY TRUNK
FIR TRUNK
SHEET LEGEND
800' OF 8" @ 0.40%
S IVY PUMP STATION
SCALE: 1" = 400'
IVY STREET TRUNK & FIR STREET TRUNK
FIGURE V-2

LEGEND

- URBAN GROWTH BOUNDARY
- TRUNK OR INTERCEPTOR BASIN BOUNDARY
- EXISTING SEWER
- EXISTING FORCE MAIN
- EXISTING PUMP STATION
- PROPOSED SEWER WITH LENGTH, SIZE AND SLOPE
- PROPOSED FORCE MAIN
- PROPOSED PUMP STATION
- XXX MGD — NEEDED SEWER CAPACITY

3RD & BAKER PUMP STATION

4" FM

400' OF 8" @ 0.40%

SOUTH 2nd TRUNK

SHOPPING CENTER PUMP STATION

400' OF 8" @ 0.40%

0.05 MGD

99E TRUNK

SHEET LEGEND

SCALE: 1" = 400'

FIGURE V-3
99E TRUNK &
SOUTH 2nd TRUNK

J:\Canby\1009-Canby SS Maps\2999e2nd.dwg, 5/19/2020 3:44:47 PM, DWG To PDF.pc3

PROPOSED ROUTE COMMON TO ALTERNATIVES ONE & TWO

ALTERNATIVE TWO PROPOSED ROUTE

ALTERNATIVE TWO PROPOSED ROUTE EXTENSION

ALTERNATIVE ONE PROPOSED ROUTE

SHOPPING CENTER PUMP STATION

I.E.=140.4

I.E.=140.

I.E.=138.8

I.E.=143.4

I.E.=144.8

I.E.=146.9

I.E.=144.5

I.E.=150.5

I.E.=147.4

I.E.=156.2

I.E.=157.7

I.E.=157.2

I.E.=151.1

I.E.=136.3

3233 54

3334 43

SHEET LEGEND

SCALE: 1" = 500'

FIGURE V-4
SOUTH 2nd TRUNK REPLACEMENT ALTERNATIVES

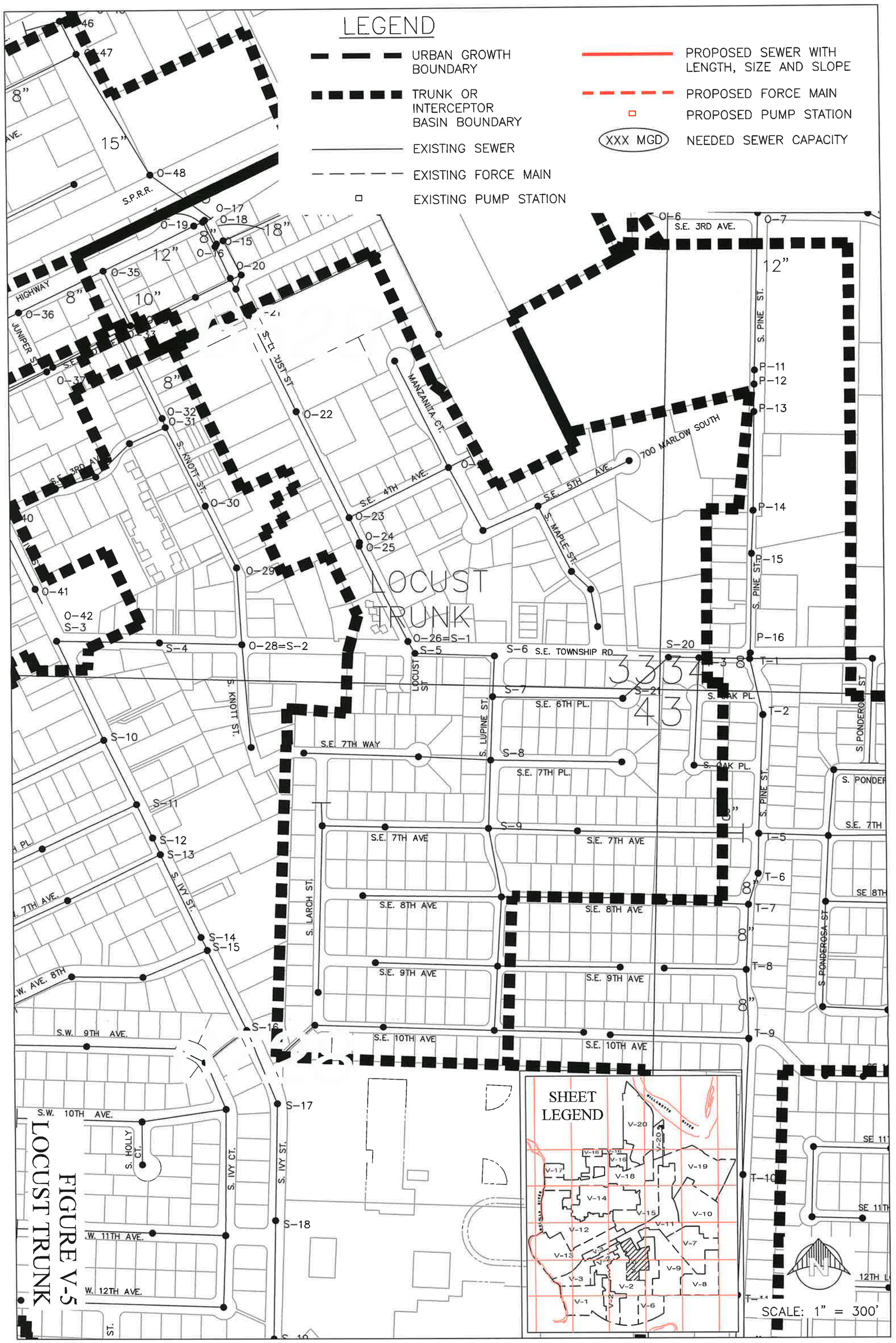
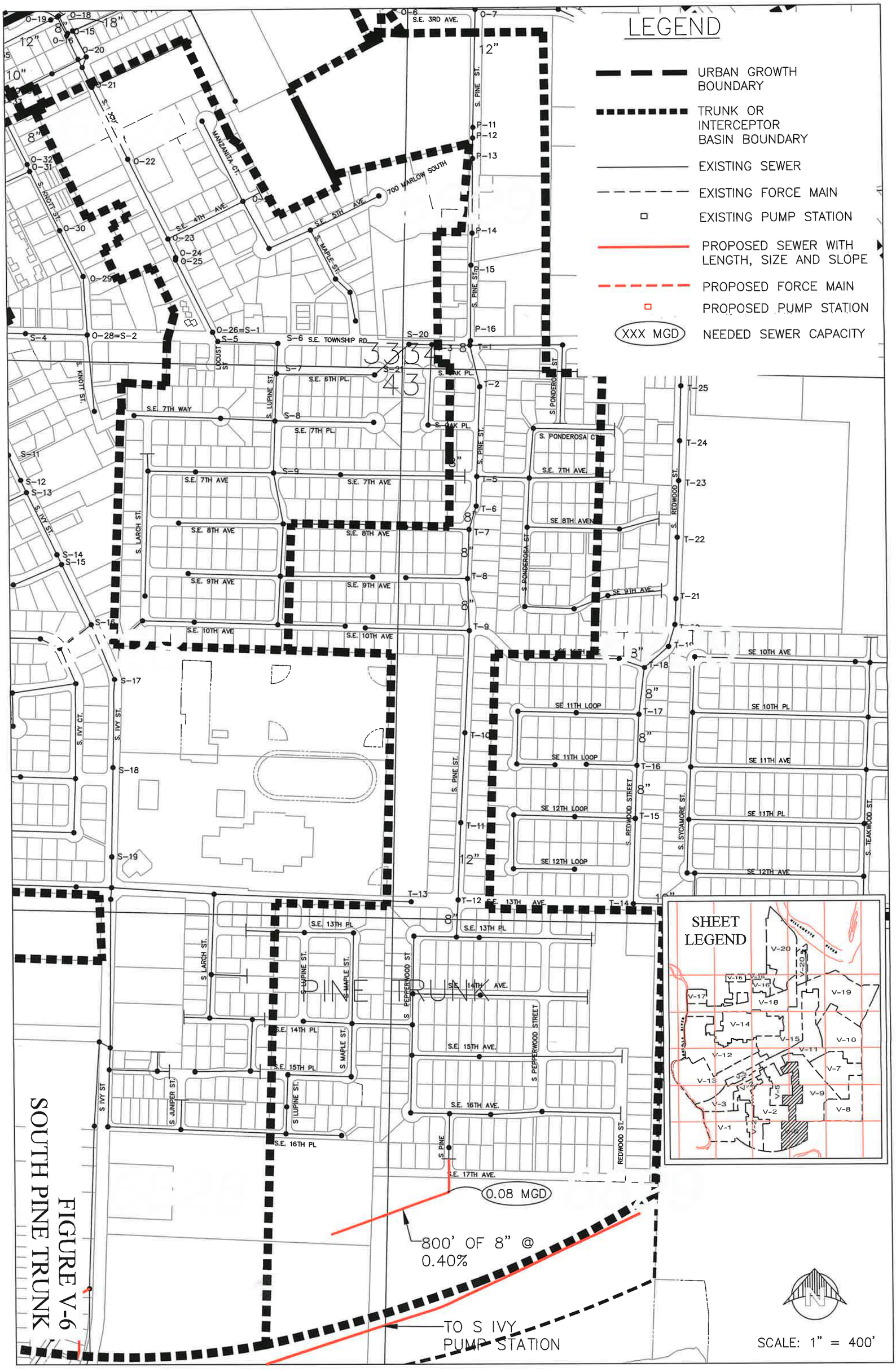


FIGURE V-5
LOCUST TRUNK


LEGEND
URBAN GROWTH BOUNDARY
TRUNK OR INTERCEPTOR BASIN BOUNDARY
EXISTING SEWER
EXISTING FORCE MAIN
EXISTING PUMP STATION
PROPOSED SEWER WITH LENGTH, SIZE AND SLOPE
PROPOSED FORCE MAIN
PROPOSED PUMP STATION
XXX MGD
NEEDED SEWER CAPACITY
SHEET LEGEND
PINE TRUNK
0.08 MGD
800' OF 8" @ 0.40%
TO S IVY PUMP STATION
SCALE: 1" = 400'
FIGURE V-6
SOUTH PINE TRUNK

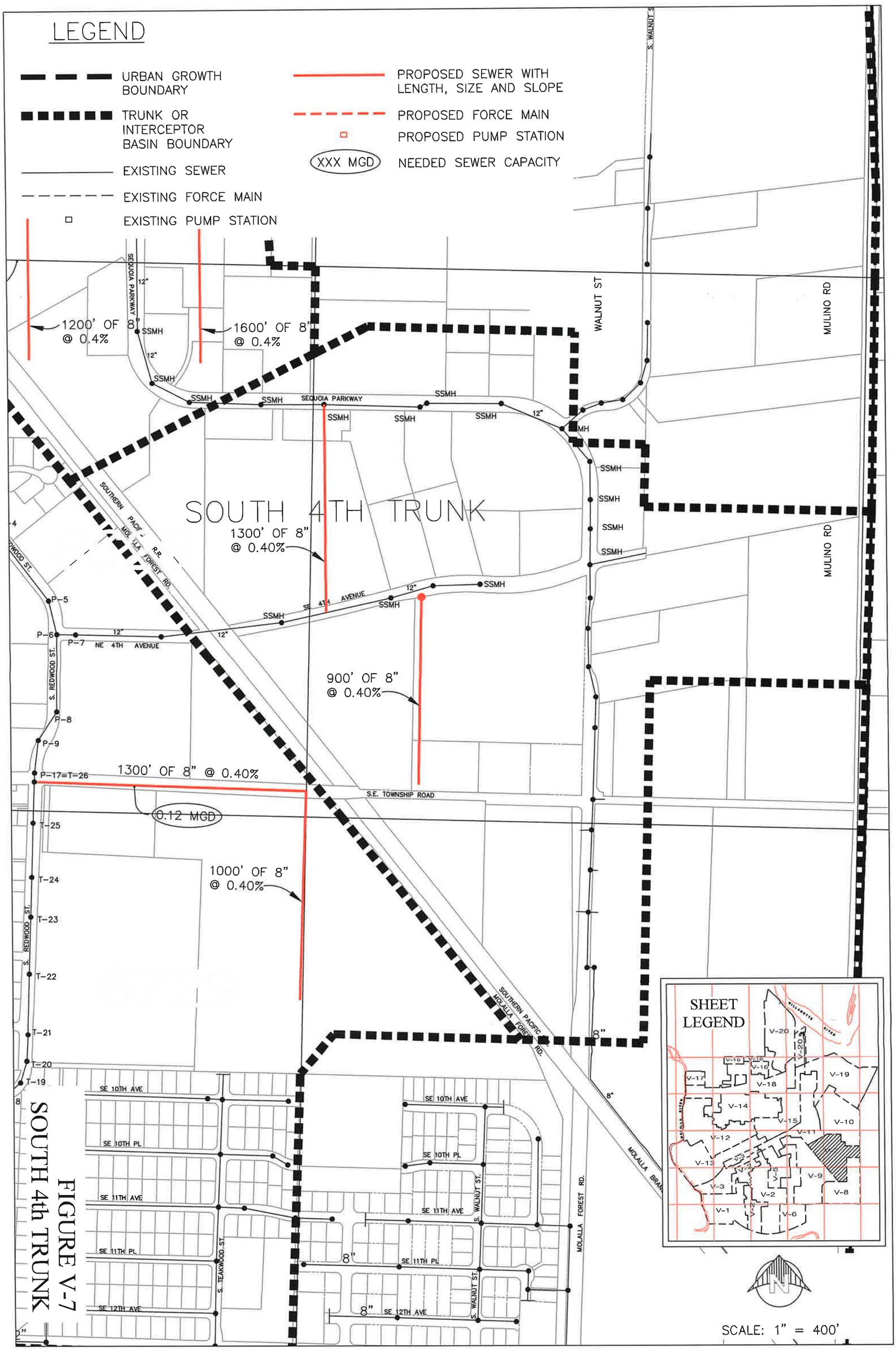


FIGURE V-7
SOUTH 4th TRUNK

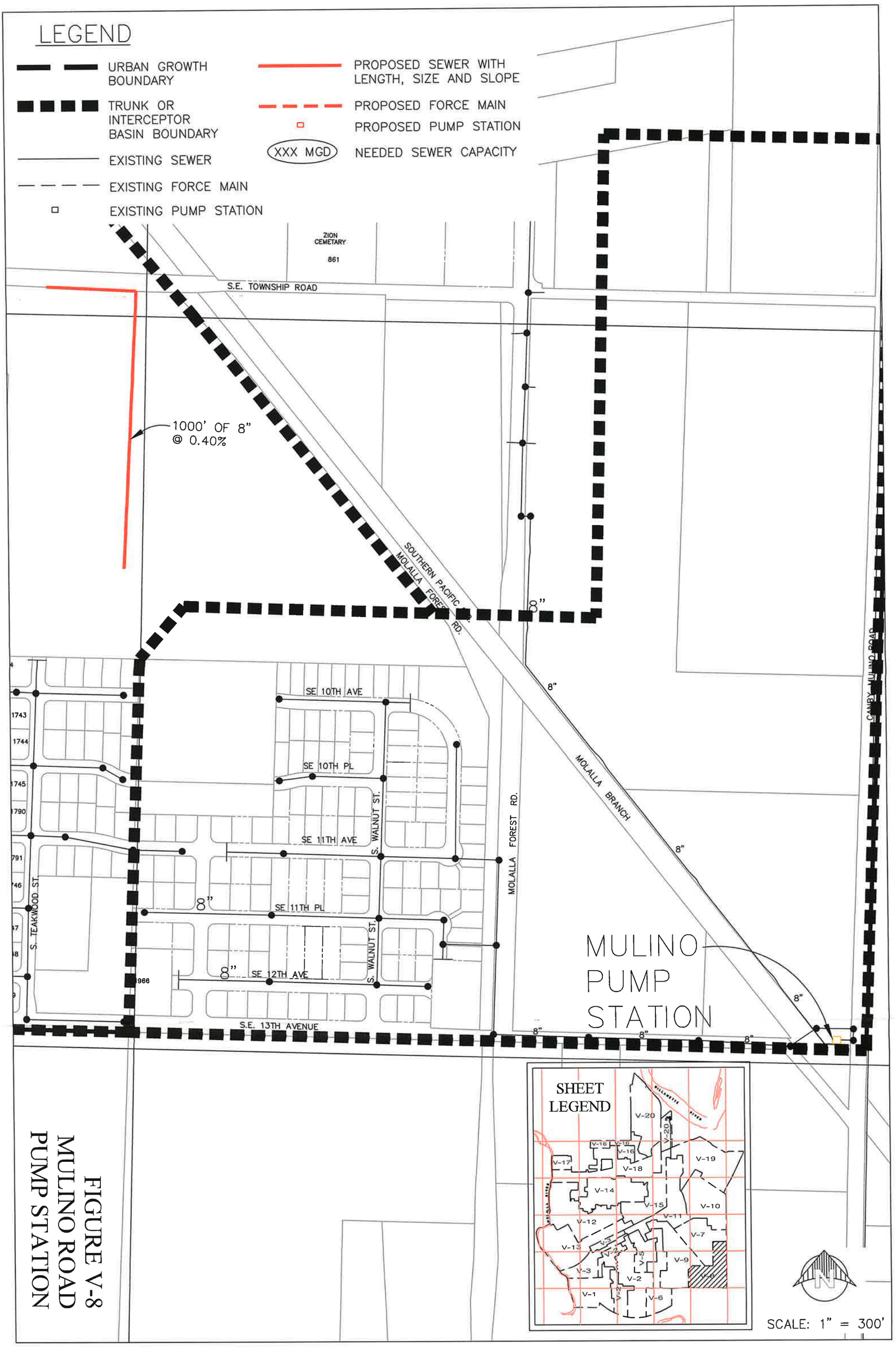


FIGURE V-8
MULINO ROAD
PUMP STATION

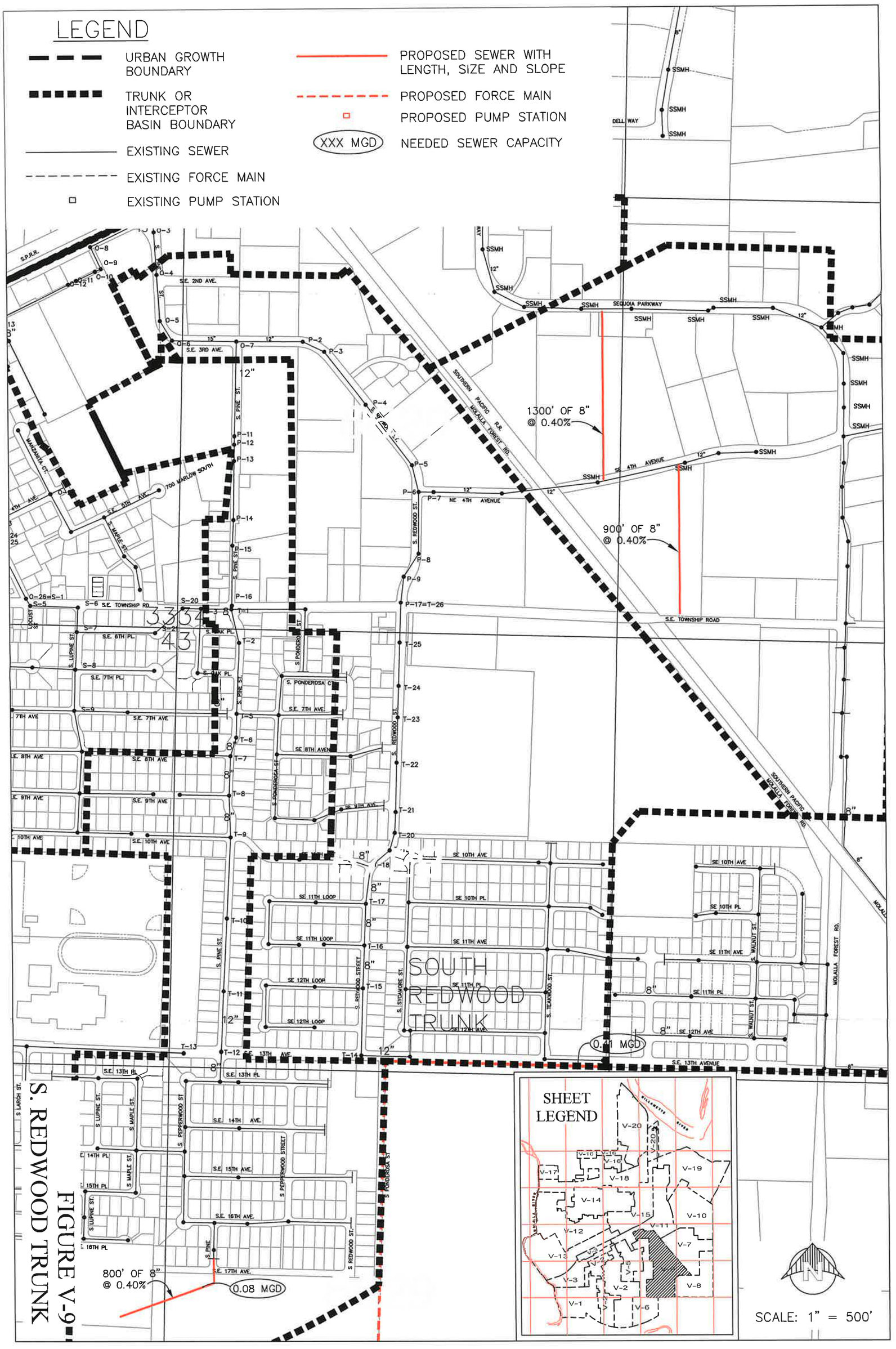


FIGURE V-9
S. REDWOOD TRUNK

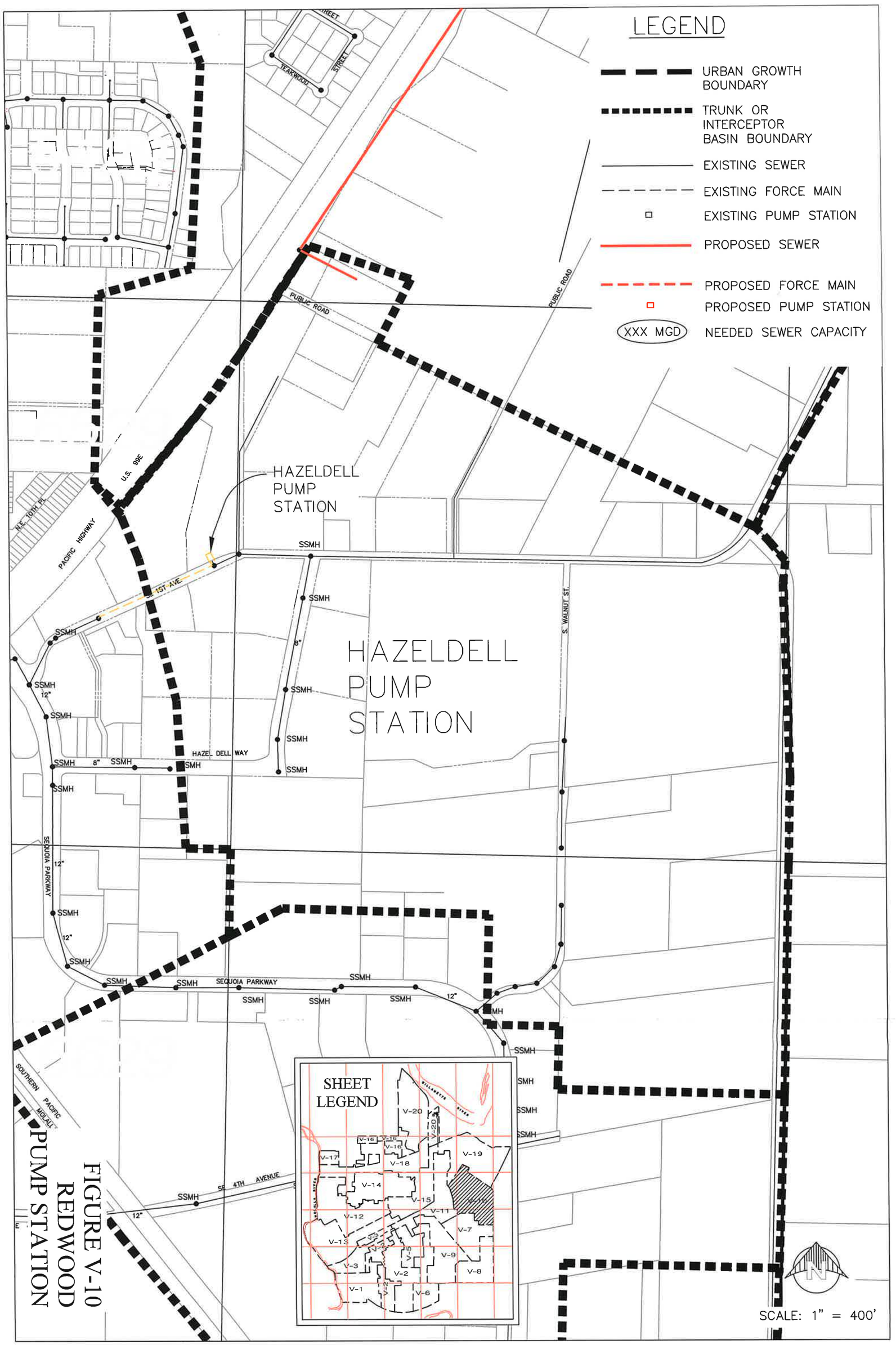
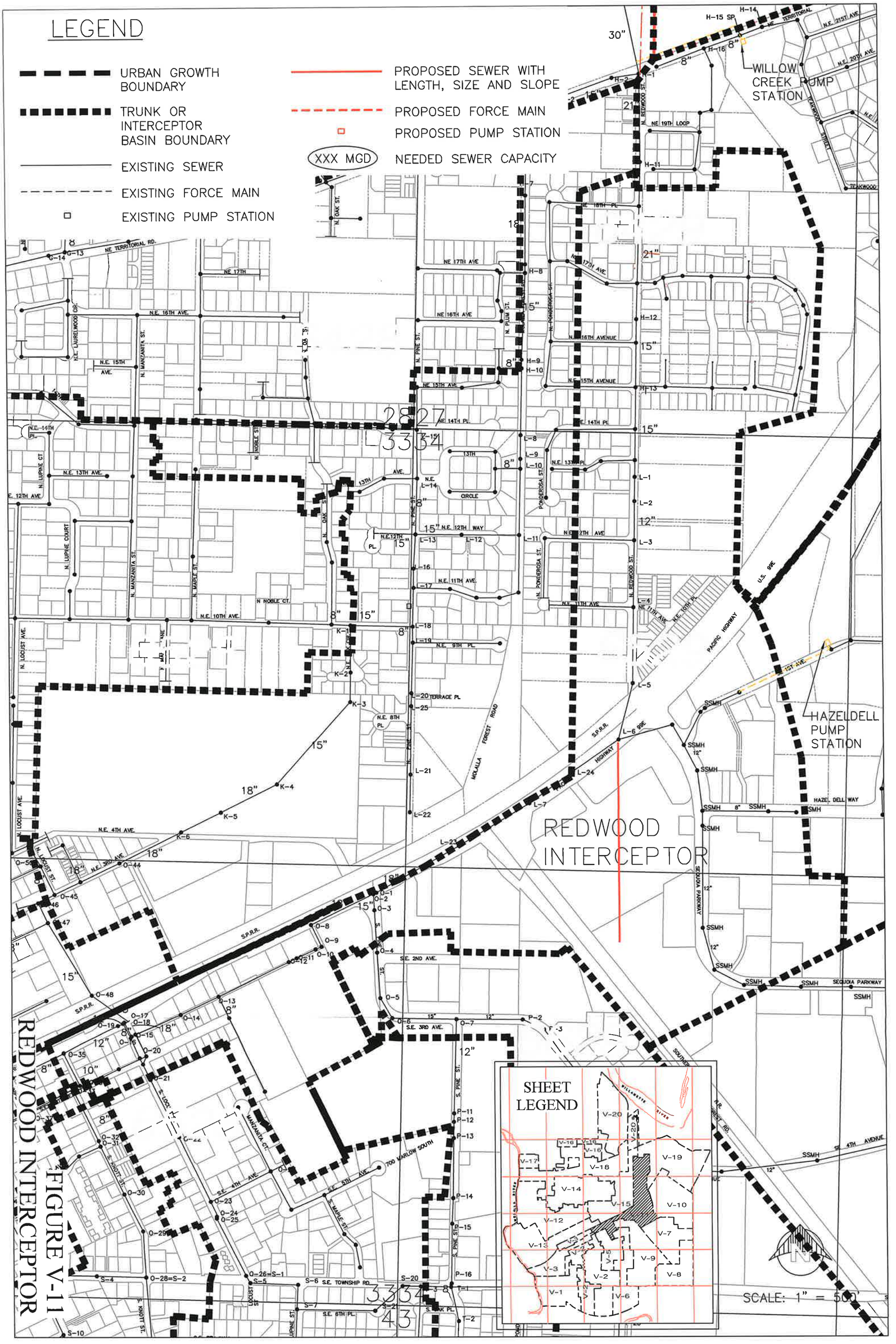


FIGURE V-10
REDWOOD
PUMP STATION


LEGEND
URBAN GROWTH BOUNDARY
TRUNK OR INTERCEPTOR BASIN BOUNDARY
EXISTING SEWER
EXISTING FORCE MAIN
EXISTING PUMP STATION
PROPOSED SEWER WITH LENGTH, SIZE AND SLOPE
PROPOSED FORCE MAIN
PROPOSED PUMP STATION
XXX MGD
NEEDED SEWER CAPACITY
WILLOW CREEK PUMP STATION
HAZELDELL PUMP STATION
REDWOOD INTERCEPTOR
SHEET LEGEND
SCALE: 1" = 500'
FIGURE V-11
REDWOOD INTERCEPTOR

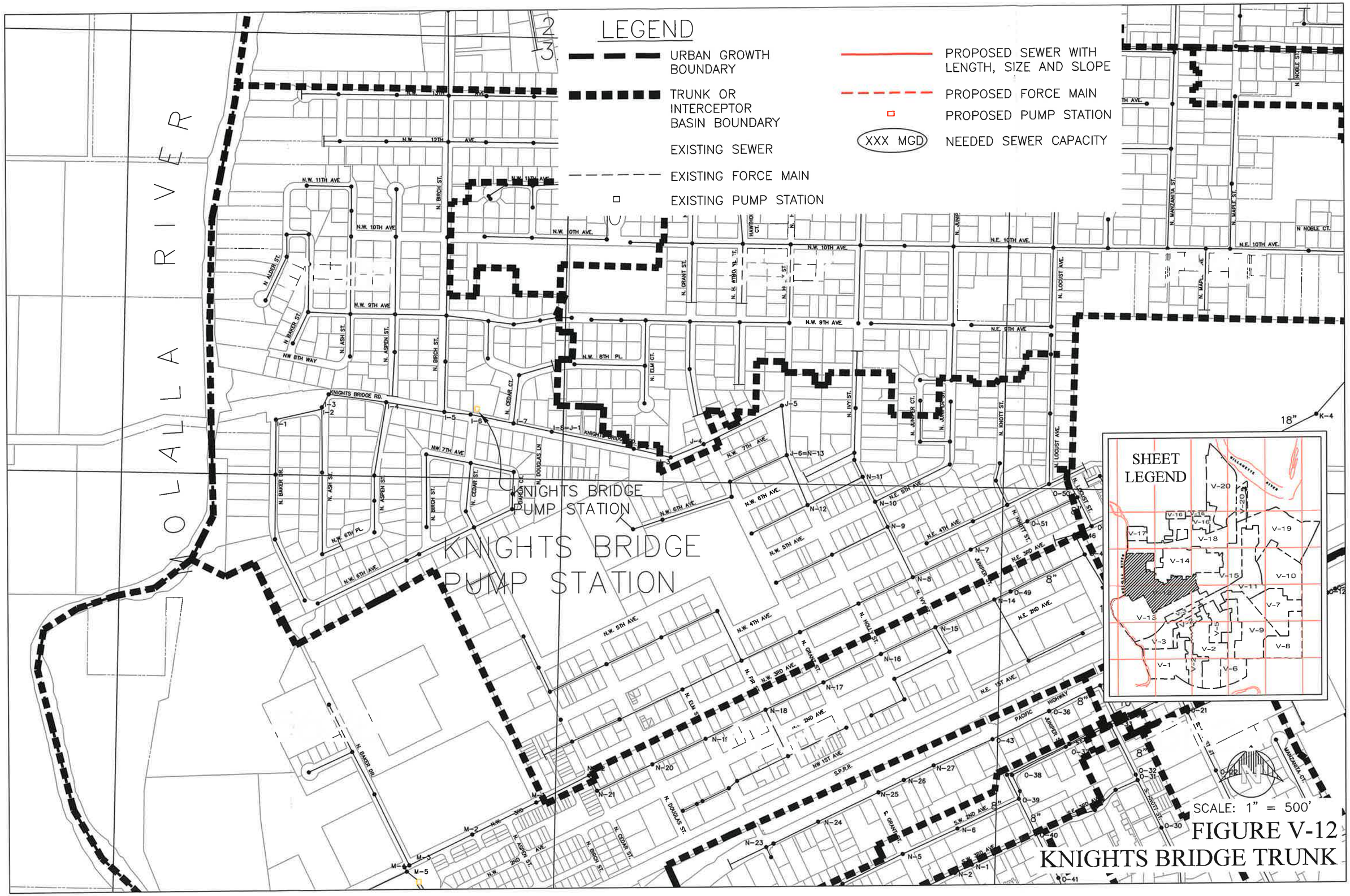


FIGURE V-12
KNIGHTS BRIDGE TRUNK

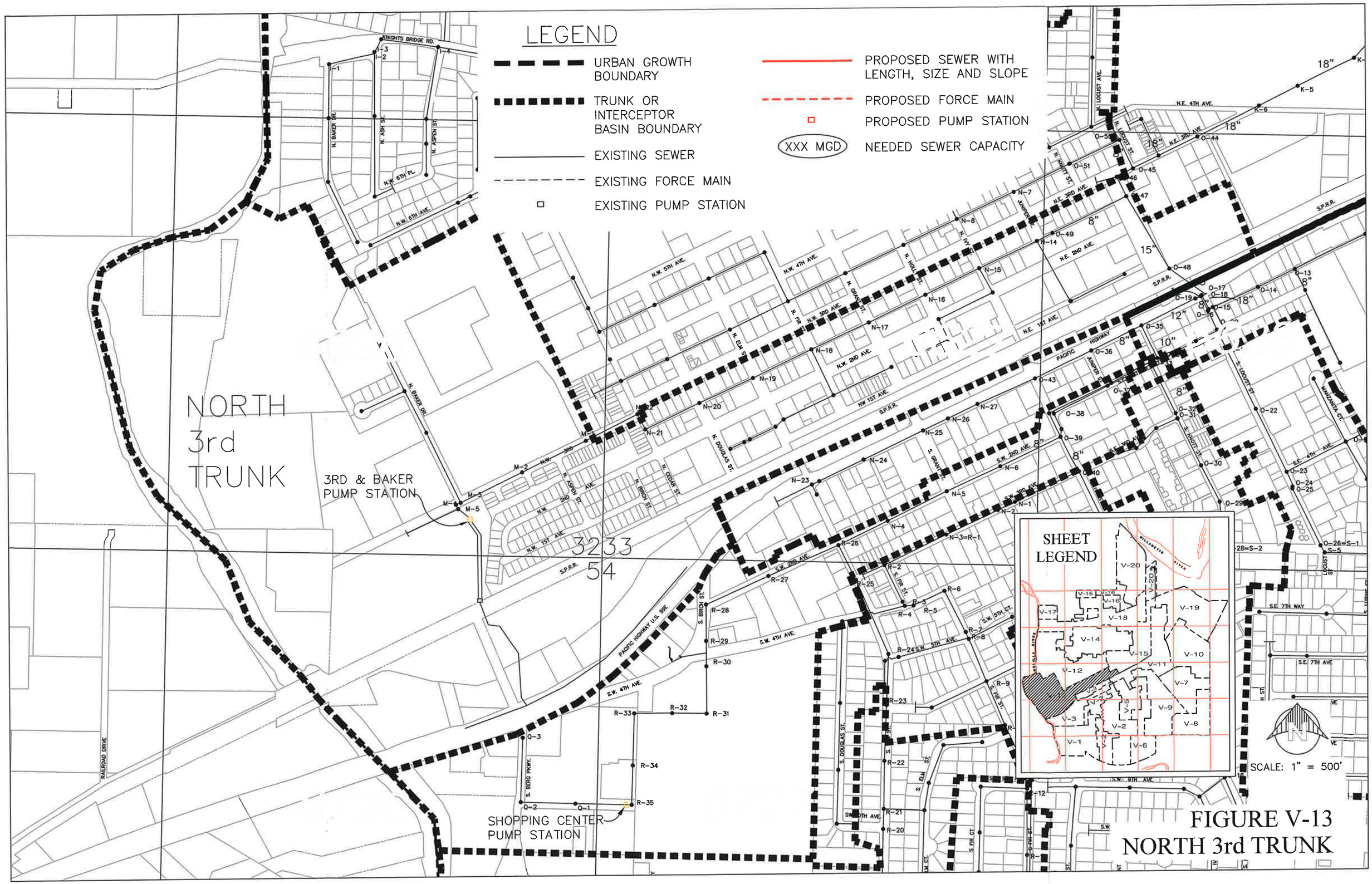


FIGURE V-13
NORTH 3rd TRUNK

NORTH 10th TRUNK

NW TERRITORIAL ROAD
NW. TERRITORIAL RD.
N.W. 15TH PL.
N.W. 14TH AVE.
N.W. 13TH AVE.
N.W. 12TH AVE.
N.W. 11TH AVE.
N.W. 11TH PL
N.W. 10TH AVE.
N.W. 9TH AVE.
N.W. 8TH PL.
N.W. 7TH AVE
N.W. 6TH AVE.
N.E. 16TH AVE.
NE 16TH AVE
N.E. 15TH AVE.
NE 15TH AVE
N.E. 14TH PL.
NE 14TH PL.
N.E. 13TH AVE.
N.E. 12TH AVE
N.E. 12TH WAY
N.E. 11TH AVE.
N.E. 10TH AVE.
N.E. 9TH PL.
N.E. 8TH PL
N NOBLE CT.
N.E. LAURELWOOD CIR.
N. ELM ST.
N. FR ST.
N. GRANT ST.
N. BIRCH ST.
N. HOLLY ST.
N. IVY ST.
N. JUNIPER PL.
N. JUNIPER ST.
HAWTHORNE ST
HAWTHORNE CT.
HAZELNUT CT
N. LOCUST ST.
N. LUPINE CT
N. LUPINE COURT
N. MANZANITA ST.
N. MAPLE ST.
N. NOBLE ST.
N. OAK ST.
N. PINE ST.
N. CEDAR CT.
N. CEDAR ST.
N. DOUGLAS LN
DAHLIA CT.
N. ELM CT.
N. IVY ST.
INVER CT.
JUNIPER ST.
OTT ST.
LOCUST AVE.
13TH AVE.
CIRCLE
PL
TERRACE PL
MCLALLA FOREST ROAD
2928
3233
2827
3354
KNIGHTS BRIDGE PUMP STATION
I-5
I-6
J-4
J-5
K-1
K-2
K-3
L-12
L-13
L-14
L-15
L-16
L-17
L-18
L-19
L-20
L-21
L-22
L-23
L-25
8"
15"
SCALE: 1" = 400'

LEGEND

- URBAN GROWTH BOUNDARY
- TRUNK OR INTERCEPTOR BASIN BOUNDARY
- EXISTING SEWER
- EXISTING FORCE MAIN
- EXISTING PUMP STATION
- PROPOSED SEWER WITH LENGTH, SIZE AND SLOPE
- PROPOSED FORCE MAIN
- PROPOSED PUMP STATION
- XXX MGD — NEEDED SEWER CAPACITY

SHEET LEGEND

V-1 V-2 V-3 V-4 V-5 V-6 V-7 V-8 V-9 V-10 V-11 V-12 V-13 V-14 V-15 V-16 V-17 V-18 V-19 V-20

WILLAMETTE RIVER

FIGURE V-14
NORTH 10th TRUNK

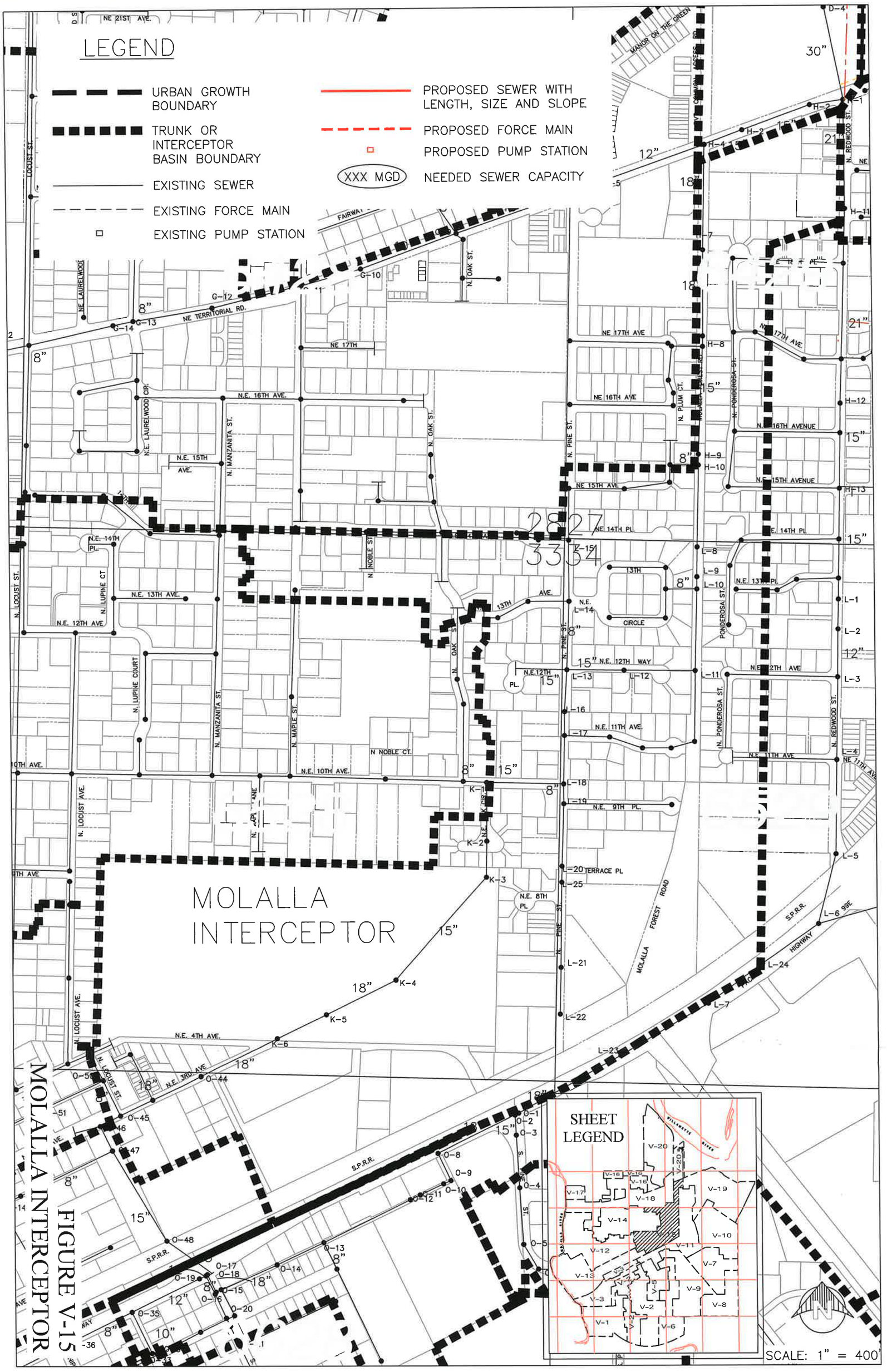


FIGURE V-15
MOLALLA INTERCEPTOR

LEGEND

- URBAN GROWTH BOUNDARY
- TRUNK OR INTERCEPTOR BASIN BOUNDARY
- EXISTING SEWER
- EXISTING FORCE MAIN
- EXISTING PUMP STATION
- PROPOSED SEWER WITH LENGTH, SIZE AND SLOPE
- PROPOSED FORCE MAIN
- PROPOSED PUMP STATION
- XXX MGD — NEEDED SEWER CAPACITY

PUMP STATION

3" F.M.

0.03 MGD

0.03 MGD

1300' OF 8" @ 0.4%

NORTH 22nd PUMP STATION

NORTH 22nd TRUNK

0.06 MGD

1300' OF 8" @ 0.40%

1500' OF 8" @ 0.40%

NORTH 20th TRUNK

0.06 MGD

8"

8"

8"

8"

C-7

G-1

G-2

G-3

G-4

G-5

G-6

G-7

G-8

G-10

G-11

G-12

G-13

G-14

G-15=F-2

G-16

G-17

G-18

N. LOCUST ST.

N. LAUREL WOOD STREET

N. LUPINE STREET

N. MAPLE ST.

N. OAK ST.

NE LAUREL WOOD

LOCUST ST.

N.E. 23RD AVE.

NE 21ST AVE.

N.E. 21ST PL.

NE 20TH AVE

N.E. 20TH AVE.

NE 19TH AVE

GREENVIEW CT.

FAIRWAY LANE

COUNTRY CLUB DR

NE TERRITORIAL RD.

NW TERRITORIAL ROAD

NE 17TH

N.E. 16TH AVE.

SHEET LEGEND

V-1 V-2 V-3 V-4 V-5 V-6 V-7 V-8 V-9 V-10 V-11 V-12 V-13 V-14 V-15 V-17 V-18 V-19 V-20

SCALE: 1" = 300'

FIGURE V-16
N. 22nd PUMP STATION
NORTH 22nd TRUNK
NORTH 20th TRUNK

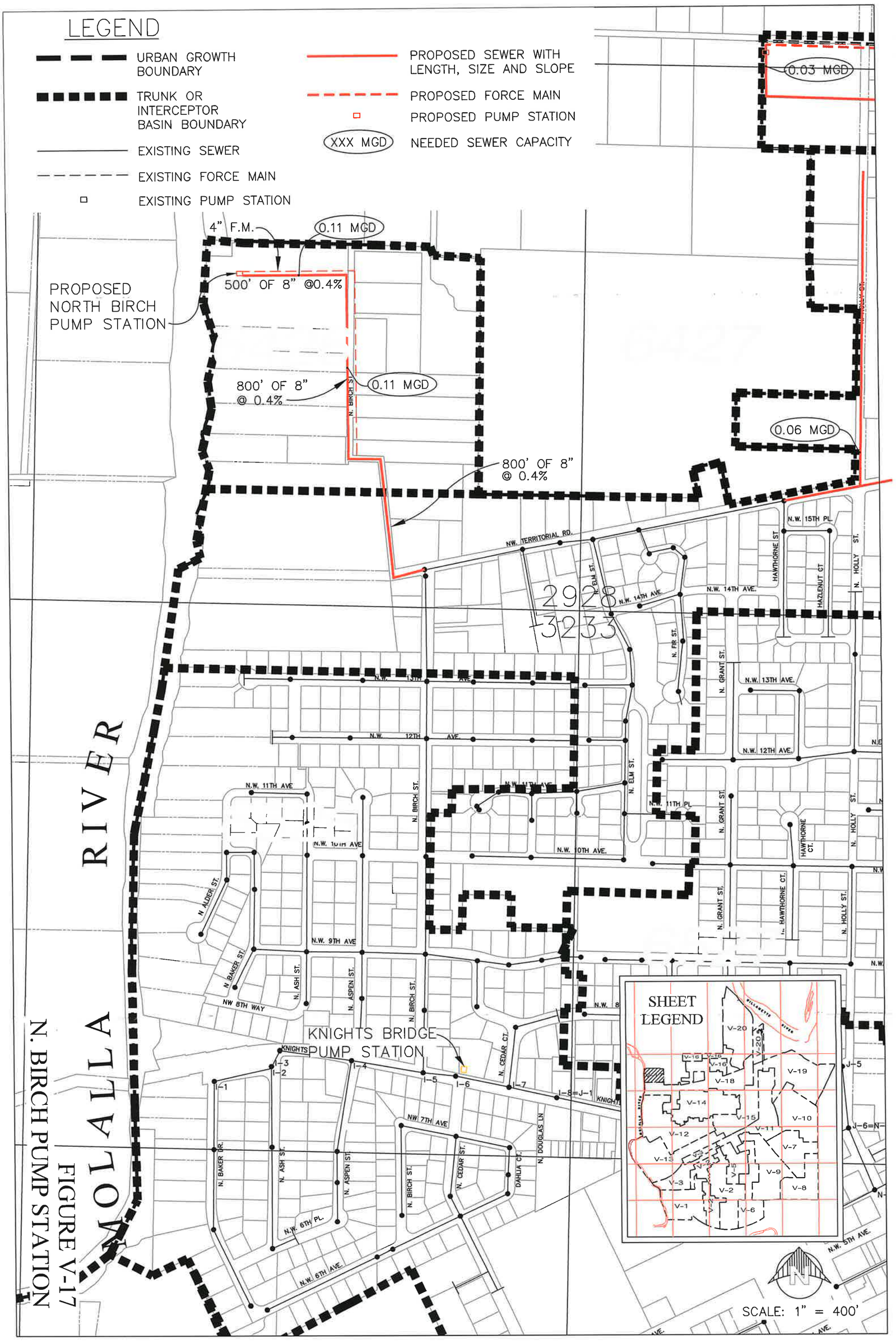


FIGURE V-17
N. BIRCH PUMP STATION

LEGEND

- URBAN GROWTH BOUNDARY
- TRUNK OR INTERCEPTOR BASIN BOUNDARY
- EXISTING SEWER
- EXISTING FORCE MAIN
- EXISTING PUMP STATION
- PROPOSED SEWER WITH LENGTH, SIZE AND SLOPE
- PROPOSED FORCE MAIN
- PROPOSED PUMP STATION
- XXX MGD — NEEDED SEWER CAPACITY

PROPOSED NORTH BIRCH PUMP STATION

4" F.M.

0.11 MGD

500' OF 8" @ 0.4%

800' OF 8" @ 0.4%

0.11 MGD

800' OF 8" @ 0.4%

1500' OF 8" @ 0.40%

0.06 MGD

1500' OF 8" @ 0.40%

0.05 MGD

1300' OF 8" @ 0.40%

0.06 MGD

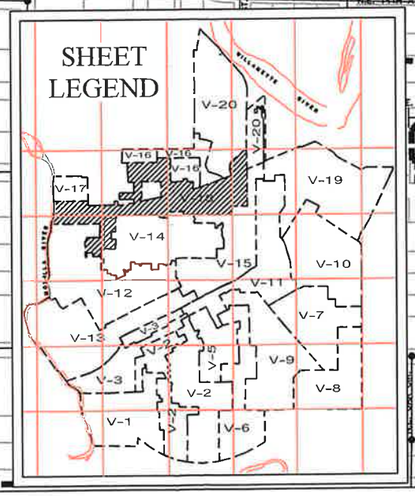
TERRITORIAL INTERCEPTOR

MOLALLA RIVER

2928-3233

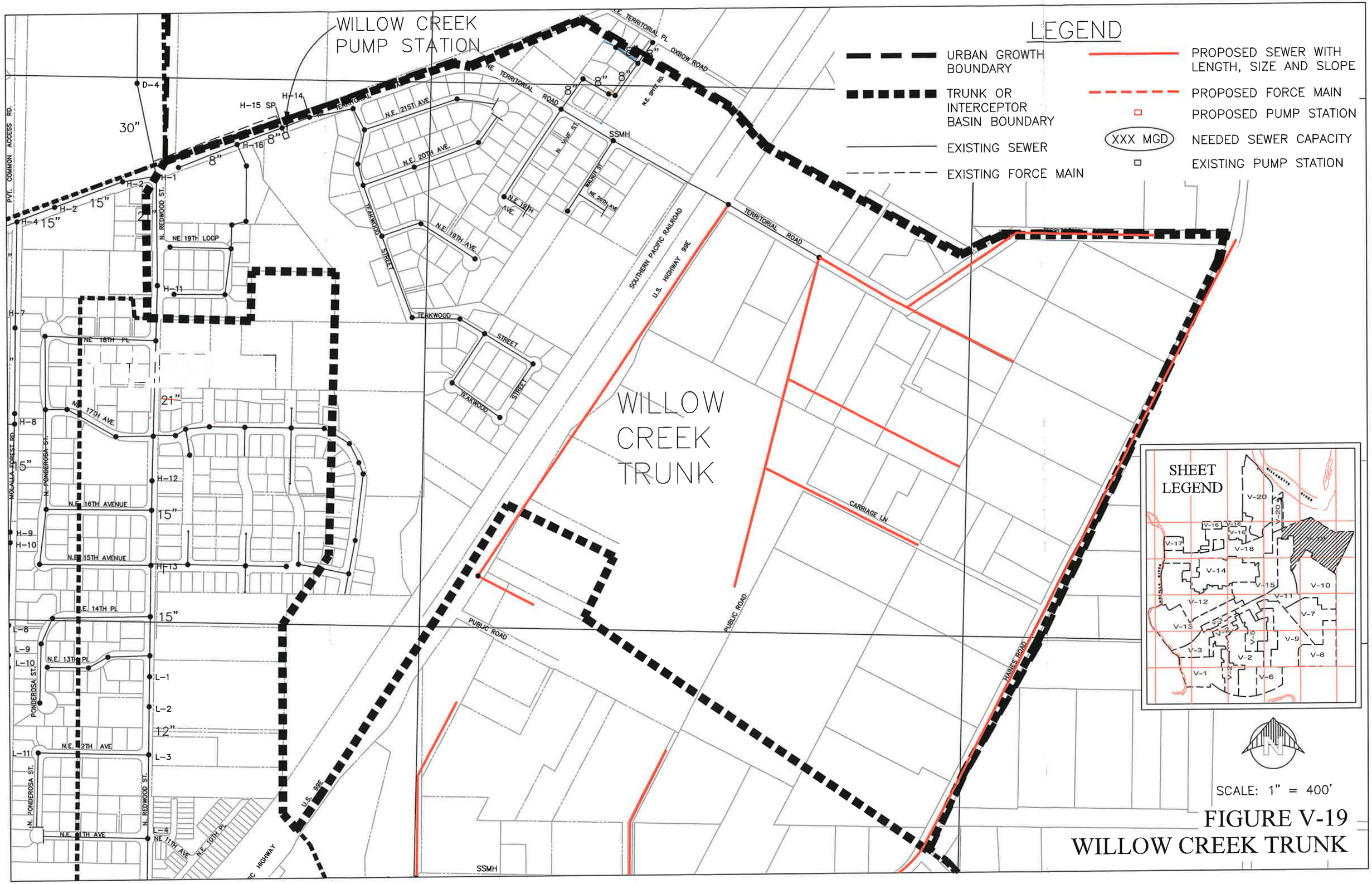
2827-3354

SHEET LEGEND



SCALE: 1" = 500'

FIGURE V-18 TERRITORIAL INTERCEPTOR


WILLOW CREEK PUMP STATION
LEGEND
URBAN GROWTH BOUNDARY
TRUNK OR INTERCEPTOR BASIN BOUNDARY
EXISTING SEWER
EXISTING FORCE MAIN
PROPOSED SEWER WITH LENGTH, SIZE AND SLOPE
PROPOSED FORCE MAIN
PROPOSED PUMP STATION
XXX MGD
NEEDED SEWER CAPACITY
EXISTING PUMP STATION
WILLOW CREEK TRUNK
SHEET LEGEND
SCALE: 1" = 400'
FIGURE V-19
WILLOW CREEK TRUNK
TERRITORIAL ROAD
N.E. TERRITORIAL PL
OXBOW ROAD
N.E. 21ST AVE.
N.E. 20TH AVE.
N.E. 19TH AVE.
N. VINE ST.
MADRIT ST.
NE 20TH AVE
SSMH
TEAKWOOD STREET
SOUTHERN PACIFIC RAILROAD
U.S. HIGHWAY 99E
NE 19TH LOOP
NE 18TH PL
NE 17TH AVE.
N. REDWOOD ST.
PVT. COMMON ACCESS RD.
N. PONDEROSA ST.
MOLALLA FOREST RD.
N.E. 16TH AVENUE
N.E. 15TH AVENUE
N.E. 14TH PL.
N.E. 13TH PL.
N.E. 12TH AVE
N.E. 11TH AVE
N.E. 10TH PL.
CARRIAGE LN
PUBLIC ROAD
HAINES ROAD
D-4
H-15 SP
H-14
H-16
H-1
H-2
H-4
H-11
H-7
H-8
H-12
H-13
H-9
H-10
L-8
L-9
L-10
L-11
L-1
L-2
L-3
L-4
30"
15"
21"
12"
8"
V-20
V-16
V-17
V-18
V-14
V-15
V-10
V-12
V-11
V-7
V-13
V-9
V-3
V-2
V-8
V-1
V-6

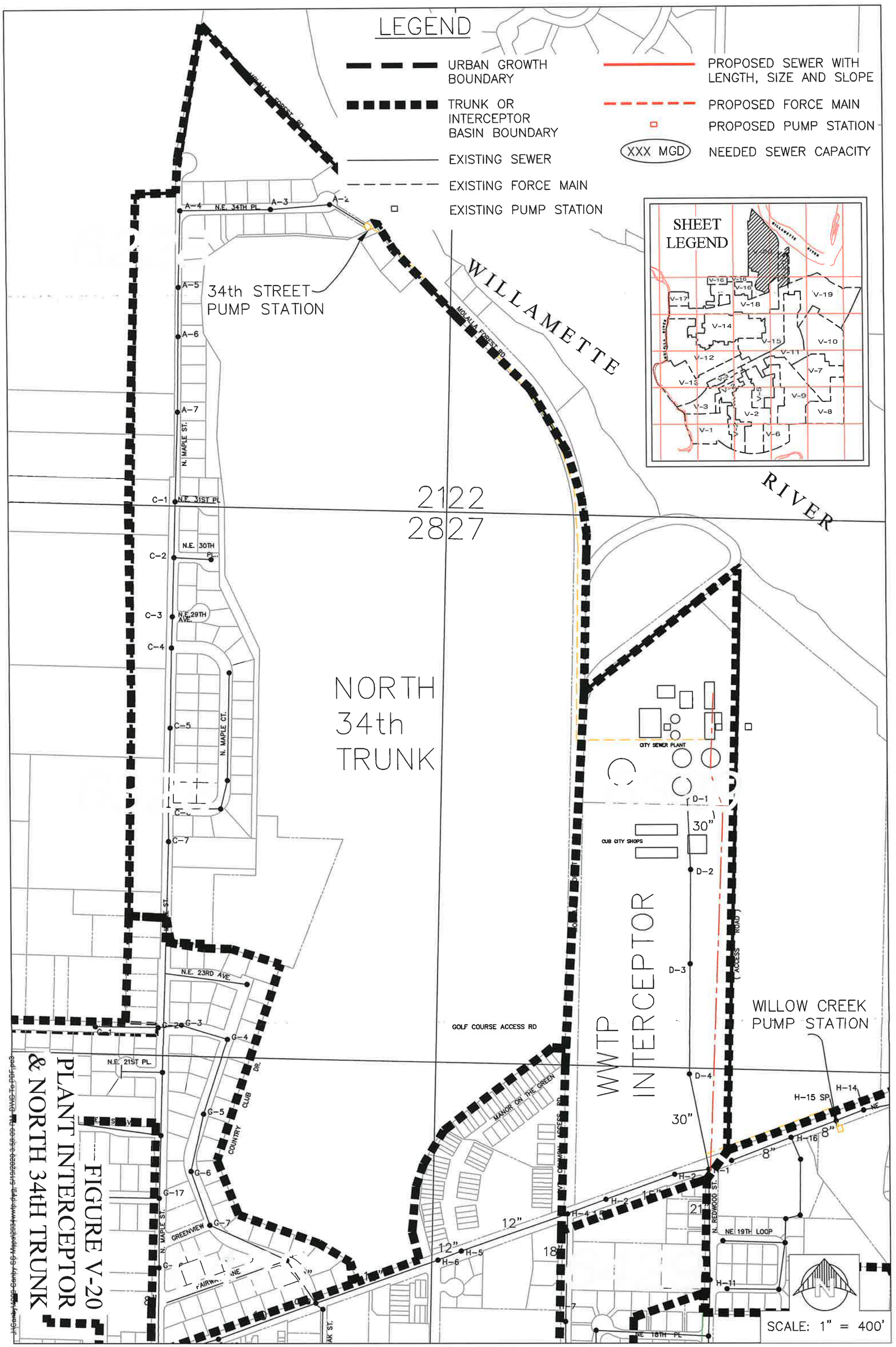


FIGURE V-20
PLANT INTERCEPTOR
& NORTH 34th TRUNK