CITY OF SNOQUALMIE

General Sewer Plan

G&O #11543

November 2012

Gray & Osborne, Inc

CONSULTING ENGINEERS

CITY OF SNOQUALMIE

KING COUNTY **WASHINGTON**

GENERAL SEWER PLAN

ERIC F. NUTTING
STATE OF WASHINGTON
33900
REGISTERED
PROFESSIONAL ENGINEER

GREGORY A. NICOLL
STATE OF WASHINGTON
PROFESSIONAL ENGINEER
7/17/15

HARVEY F. DOTY
STATE OF WASHINGTON
50398
REGISTERED
PROFESSIONAL ENGINEER
7-17-15

G&O #11543
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Gray & Osborne, Inc.
CONSULTING ENGINEERS

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ABBREVIATIONS

AC	asbestos cement
BOD	Biological Oxygen Demand
CBOD	Carbonaceous Biological Oxygen Demand
CFR	Code of Federal Regulations
cfs	cubic feet per second
CI	cast iron
CWA	Clean Water Act
d	day
DEA	Developer Extension Agreement
DI	ductile iron
EIS	Environmental Impact Statement
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
ft	feet
GMA	Growth Management Act
gpad	gallons per acre per day
gpm	gallons per minute
HDPE	high density polyethylene
HPA	Hydraulic Project Approval
in	inch
kW	kilowatt
hp	horsepower
KCPS	Kimball Creek Pump Station
lf	linear feet
L	liter
lbs	pounds
mg	milligrams
mgd	million gallons per day
MIU	Minor Industrial User
ml	milliliters
µg	microgram
N	nitrogen
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NTU	nephelometric turbidity unit
P	phosphorous
PCB	polychlorinated biphenyl
PSCAA	Puget Sound Clean Air Agency
PSIU	Potentially Significant Industrial User
PVC	polyvinyl chloride
QA/QC	quality assurance/quality control
RAS	return activated sludge

RCW	Revised Code of Washington
SEPA	State Environmental Policy Act
SIU	Significant Industrial User
SR I	Snoqualmie Ridge I
SR II	Snoqualmie Ridge II
SRF	State Revolving Fund
TCLP	Toxicity Characteristic Leaching Procedure
TMDL	total maximum daily load
TSS	total suspended solids
UGA	Urban Growth Area
USFWS	United States Fish and Wildlife Service
UV	ultraviolet
WAC	Washington Administrative Code
WAS	waste activated sludge
WRECO	Weyerhauser Real Estate Company
WRF	Water Reclamation Facility
WWTF	Wastewater Treatment Facility

EXECUTIVE SUMMARY

GENERAL

This *General Sewer Plan* (2012 Plan) for the City of Snoqualmie was prepared to address the City's planning needs for wastewater collection, transmission, treatment, and disposal for the 20-year planning period (2102 – 2032). The 2012 Plan provides proposed conceptual designs, cost estimates, schedule, and financing plan for recommended major facility improvements. The projects described in the 2012 Plan are consistent with Washington State regulations relating to the prevention and control of discharge of pollutants into waters of the state, anti-degradation of existing and future beneficial uses of ground waters, and anti-degradation of surface waters.

The City owns and operates a municipal sewage collection and treatment system that includes 14 pump stations with associated force mains, approximately 43 miles of gravity sewer pipes, and a water reclamation facility (WRF) that is capable of producing reuse quality effluent and Class A biosolids. The 2.15 mgd WRF has one outfall to the Snoqualmie River immediately upstream of Snoqualmie Falls. Effluent is also pumped to a pond at the Snoqualmie Ridge Golf Course for reuse as irrigation water.

This 2012 Plan evaluates both the wastewater collection system and the wastewater treatment system in detail. This evaluation includes collection and treatment system modeling and analysis and development of a recommended capital improvement plan with project cost estimates and implementation schedule.

SERVICE AREA POPULATION

The City of Snoqualmie's sewer service area boundaries are coincident with the City limits. The existing city limits encompass a total area of approximately 4,764 acres. The Urban Growth Area (UGA) encompasses a total area of approximately 5,498 acres. For the purposes of this report, the City of Snoqualmie sewer system is divided into eight collection areas, or drainage basins, as shown in Figure E-1. The basins, which predominantly follow the natural drainage patterns of the City's service area, are named to coincide with the primary pump station that collects all of the sewage from that basin.

With the exception of 34 homes that are served by on-site septic systems, all homes and businesses within the City are connected to the sewer system. The City is planning to require the homes on septic systems to connect to the sewer system in the near future and, therefore, for the purposes of this report, the total service area population includes all of the people living within the City limits. The projected sewer service area population is based on the existing population and the developable and re-developable land within the City and the Urban Growth Area. The land in the UGA will be annexed by the City as it is developed and served by the wastewater system.

The projected future City population is based on projected 2032 population data and variable annual growth rate projections for the 20-year planning period in the Snoqualmie Ridge (SR) I and II and Kimball Creek Developments, combined with constant annual growth rate projections in all other neighborhoods, as provided by the City's planning department. Table E-1 provides the population projections through the year 2032 for the City. It shall be noted that the population projections do not include any growth associated with the future master planned Mill Site.

TABLE E-1

City of Snoqualmie Projected Population 2011 to 2032

Year	Projected Population	Projected Annual Growth Rate
2011	11,039	3.46%
2012	11,418	3.43%
2013	11,850	3.78%
2014	12,284	3.66%
2015	12,997	5.80%
2016	13,430	3.33%
2017	13,863	3.22%
2022	14,627	0.60%
2027	15,065	0.59%
2032	15,508	0.58%

Table E-2 provides an estimate of the number of sewer service connections by customer class in 2011, based on billing records obtained from the City's Finance Department.

TABLE E-2

City of Snoqualmie Sewer Service Connections by Customer Class

	2011
Single-Family Residential	3,047
Multi-family Residential	502
Commercial	194
TOTAL	**3,743**

PROJECTED WASTEWATER ERUS, FLOWS AND LOADINGS

Current wastewater flows and loadings measured at the WRF were used in conjunction with projected population, water consumption records, and ERU (Equivalent Residential

City of Snoqualmie

General Sewer Plan
Figure E-1
Collection System Map

LEGEND:

- PS — PUMP STATION
- MANHOLES
- FORCEMAINS
- GRAVITY MAINS
- casino
- CITY LIMITS
- URBAN GROWTH AREA
- PARCELS

SEWER BASINS:

- #1
- #3
- #4
- BP
- E
- K3
- KC
- L

All users of the data shall be advised that the map features are approximate and are intended only to provide an indication of said feature. Additional areas that have not been mapped may be present. This is not a survey. The City of Snoqualmie assumes no liability for variations ascertained by actual survey. ALL DATA IS EXPRESSLY POVIDED 'AS IS' AND 'WITH ALL FAULTS'. The City makes no warranty of fitness for a particular purpose. This disclaimer shall be present on all paper map products and shall be included in the terms of use for this data in a web or software system.

0 2,000 4,000 Feet

N W E S

PS K2
PS F
PS N6
PS L
PS K3
PS E
SNOQUALMIE WATER RECLAMATION FACILITY
IPPS
KIMBAL CREEK PS
PS #1
PS #2
PS Z
PS BP
FROM ECHO GLEN CHILDREN'S CENTER
CASINO
PS #3
PS #4
PS #6

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Unit) data to estimate the projected wastewater flows and loadings for the 20-year planning period and buildout conditions.

The current and projected 10-year, 20-year and buildout wastewater ERUs and flows are shown in Table E-3. A summary of projected BOD_5, TSS and TKN loads to the WRF are presented in Table E-4. It should be noted that the projected flows and loadings in this plan do not include flows or loadings associated with development of the future Mill Site.

TABLE E-3

Current and Projected Wastewater ERUs and Flows

Wastewater Customer Types and Flows	**Wastewater ERUs**			
Customer Type	**2012**	**2018**	**2032**	**Buildout**
Residential	4,026	5,035	5,469	5,658
Commercial/Light Industrial	416	521	565	585
City	922	1,153	1,252	1,295
Total	**5,364**	**6,709**	**7,286**	7,539
Design Flow	**Projected Flows (mgd)**			
Total Base Flow	0.740	0.926	1.005	1.04
Average Annual Flow	1.023	1.209	1.288	1.323
Maximum Month	1.55	1.83	1.95	2.01
Permitted Maximum Month	2.15	2.15	2.15	2.15
Peak Day	3.62	4.28	4.56	4.69
Peak Hour	5.0	5.70	5.89	5.97

TABLE E-4

Current and Projected WRF Loadings

ERUs and Loadings	**NPDES Permit**	**2012**	**2018**	**2032**	**Buildout**
Total ERUs	NA	5,364	6,709	7,286	7,539
Population	NA	11,418	14,279	15,508	16,046
Annual Average BOD_5 (lb/d)	NA	2,291	2,865	3,112	3,220
Maximum Month BOD_5 (lb/d)	5,220	3,224	4,031	4,378	4,530
Annual Average TSS (lb/d)	NA	1,953	2,443	2,653	3,858
Maximum Month TSS (lb/d)	5,220	3,485	4,359	4,734	4,898
Annual Average TKN (lb/d)	NA	307	363	387	397
Maximum Month TKN (lb/d)	NA	553	653	696	715

NA – Not Applicable

As shown in Table E-4, the projected year 2032 maximum month BOD_5 loading of 4,378 lb/d is not in excess of the permitted capacity of 5,220 lb/d. The maximum month BOD_5 loading is projected to reach approximately 87 percent of the permitted capacity at buildout condition, which will occur after 2032. The projected 2032 maximum month loading of TSS is 4,734 lb TSS/d, also less than the permitted capacity of 5,220 lb/d.

EVALUATION OF EXISTING COLLECTION SYSTEM

The City of Snoqualmie's existing sewer system, including pump stations, was modeled using the InfoSewer sewer modeling program developed by Innovyze, Inc. to assess the ability of the major trunk sewers (all pipes 10 inches in diameter and larger) to convey the design peak hour flow. The system was evaluated for the existing conditions as well as the 6-year (2018) and 20-year (2032) forecasted development conditions to determine recommended capital improvements.

Recommended sewer system capital improvements are greatly dependent on the amount of existing I/I removed from the sewer system in the future. Infiltration and inflow into the City's sewers varies dramatically between Historic Snoqualmie and Snoqualmie Ridge. A vast majority of the sewers in Historic Snoqualmie are located within the flood plain and below the groundwater table for much of the year. Most of these sewers are concrete, upwards of 50 years old and allow substantial quantities of infiltration to enter the sewers. During flood events many of the manhole lids are submerged, and large amounts of inflow enter the system. Based on Pump Station No. 1 flow meter data, the peak hour infiltration and inflow into the sewers in Historic Snoqualmie is estimated to be 9,500 gallons per acre per day. Conversely, the sewers in the Snoqualmie Ridge development are PVC and have been installed in the past 20 years, were installed above the groundwater table and are not subject to flooding. As a result, the I/I into the Snoqualmie Ridge sewers is much lower. Based on flow meter data for the WRF and Pump Station No. 1 and Kimball Creek Pump Station runtime data, the peak hour I/I for the residential and commercial parcels in Snoqualmie Ridge is estimated to be 1,575 gallons per acre per day.

Based on the results of sewer modeling, if I/I is not reduced in Historic Snoqualmie, multiple gravity sewers in that area will be over capacity and will need to be replaced with larger diameter pipes capable of conveying the forecasted peak hour flow. In addition, Pump Station Nos. 1 and 3 will be over capacity and will need to be upgraded. The surcharged and over capacity sewers are listed in Table 6-8 in Chapter 6.

The 2003 General Sewer Plan estimated that the infiltration and inflow in Historic Snoqualmie may be reduced by as much as half to 4,500 gallons per acre per day by completing recommended I/I reduction projects, which included repairs of system leaks identified through smoke testing, sealing of leaking manholes, and sewer main and side sewer pipe rehabilitation/replacement. The recommended projects and their current completion status are summarized in E-5 below. The City completed a television inspection of the gravity sewers in Historic Snoqualmie in 2007 and identified many of

the sources of I/I. The results of the 2007 investigation should be used to prioritize the I/I removal projects to be completed.

TABLE E-5

Infiltration and Inflow Reduction Projects Recommended in the 2003 Sewer Plan

Project No.	Project Description[(1)]	Completion Status
1	Repair Sewer System Defects Identified During 1999 Smoke Testing	Completed 2007
2	Sewer Rehabilitation in Pump Station No. 3 Sewer Basin	Not Complete
3	Repair/Replace 30 percent of concrete sewer mains in Historic Snoqualmie	Not Complete
4	Grout 50 percent of manholes in Historic Snoqualmie	Not Complete
5	Repair/Replace 50 percent of side sewers in Historic Snoqualmie[(2)]	Not Complete
6	Investigate further I/I Removal in Historic Snoqualmie[(3)]	Investigation Completed 2007

(1) Projects are further described in Chapter 7 of the 2003 General Sewer Plan.
(2) The City cannot typically complete work on private property, and therefore, replacement of leaking side sewers beyond the edge of right-of-way may not be feasible.
(3) Investigation completed in 2007, however, the necessary repairs have not been completed.

Based on current flows, it appears that the system repairs completed to date have not significantly reduced the I/I entering the sewer system in Historic Snoqualmie. If the City undertakes the projects summarized in Table E-5 above that have not yet been completed and reduces the I/I in Historic Snoqualmie to 6,000 gallons per acre per day, both Pump Station Nos. 1 and 3 are anticipated to have sufficient capacity to convey the 2032 peak hour flow. If I/I is reduced to 4,500 gallons per acre per day, no sewer pipes will need to be replaced with larger pipes to convey the projected 2032 peak flows.

It is recommended that the City complete the recommended I/I reduction projects in phases over a 5-year period. Projects should be prioritized based on the results of the 2007 investigation. Following completion of each phase of work, the City should monitor wet weather flows from Pump Station No. 1 to evaluate the effectiveness of each phase of work.

Other capital improvement projects recommended for the City of Snoqualmie collection system are summarized in Table E-6. The table shows a summary of recommended projects if no I/I reduction projects are performed and I/I is not reduced in Historic Snoqualmie.

TABLE E-6

Capital Improvement Project Summary (No I/I Reduction)

Project No.	Capital Improvement Project	Estimated Year of Completion	Project Cost (2012 Dollars)
Gravity Sewers			
1	Gravity Sewer at SE Newton Street	2015	$960,000
2	Gravity Sewer at 384th Street	2015	$610,000
Pump Stations			
3	Pump Station No. 1 Upgrade(1)	2015	$690,000
4	Pump Station No. 3 Upgrade(1)	2018	$140,000
5	Pump Station No. 2 Upgrade	2018	$250,000
Other Deficiencies			
6	Pump Station BP FM Realignment(3)	2013	$100,000

(1) If I/I in Historic Snoqualmie is reduced to 6,000 gallons per acre per day, this project will not be required.

(2) If I/I in Historic Snoqualmie is reduced to 4,500 gallons per acre per day, this project will not be required.

(3) Per City staff, the City has not yet released the performance bond for the project that installed this force main to the developer and the developer is responsible for completing any work required to resolve this deficiency.

EVALUATION OF EXISTING WATER RECLAMATION FACILITY

Evaluation of the water reclamation facility addressed the condition of existing equipment, capacity to treat projected flow and loadings, compliance with expected future NPDES and water reclamation permit limits, solids handling to produce Class A and B biosolids, disinfection to meet water reuse standards, standby power to meet reliability requirements, facilities for operations staff and plant maintenance, and other needs to maintain reliability and redundancy.

It was determined that the projected 2032 flow and loading will not exceed the plant design criteria during the planning period and, consequently, the WRF is expected to have sufficient permitted treatment capacity through the planning period. However, evaluation of the capacities of major WRF components indicated that the existing secondary clarifiers and the UV disinfection system do not have the capacity to handle 2018 and 2032 flows. Other WRF deficiencies were identified and include the following:

- Deteriorated equipment.
- Measurement and sampling of combined influent and recycle flows.
- Sludge handling system limitations preventing production of Class B biosolids.
- Insufficient emergency generator capacity.

- Over-consumption of city water and inadequate non-potable water system capacity.
- Lack of scum pump station.
- Uncovered vactor decant station.
- Under-sized employee office space, parking, and maintenance facilities.
- Inadequate site security.

ESTIMATED REMAINING AVAILABLE WRF TREATMENT CAPACITY

The City has entered into developer extension agreements for sewer service with several entities, including Quadrant Homes (Snoqualmie Ridge 1 and 2), CamWest Homes (Kimball Creek Village), the Muckleshoot Tribe (Salish Expansion), the Snoqualmie Tribe (Hills Project), and Washington State DSHS (Echo Glen Children's Center). These agreements create commitments requiring the City to provide sewer service for various developers and other property owners. Based on the known commitments, and including the City-exempt allocation of 1,127 ERUs, it is estimated that the City has commitments to provide treatment capacity to approximately 5,980 ERUs at the WRF. Comparison of the committed number of ERUs to the permitted capacity of the WRF indicates that there is an estimated reserve capacity of 3,900 ERUs to serve growth in the City. Full use of this reserve capacity requires correction of WRF deficiencies noted in the previous section.

RECOMMENDED CAPITAL IMPROVEMENT PLAN AND FINANCING

The recommended sewer and WRF improvements will correct existing deficiencies within the City's collection system and at the WRF to increase capacity to handle future flows and to improve treatment performance and reliability to meet the City's effluent permit limits. The recommended capital improvements, including estimated project costs, proposed construction schedule, and estimated rate impact for a 30-year bond funding scenario, are listed in Table E-7. Collection system improvements are recommended if I/I is not reduced in Historic Snoqualmie. The City plans to pursue a revenue bond as a source of funding for these projects.

TABLE E-7

Recommended Capital Improvement Projects

Collection System Improvements	Project Cost[(1)(2)]	Construction Year	Rate Impact ($/mo/ERU)[(3)(4)]
Pump Station No. 1 (Railroad Place)	$690,000	2015	$0.56
Gravity Sewer at SE Newton Street	$950,200	2015	$0.78
Gravity Sewer at 384th Street	$610,000	2015	$0.50
Pump Station No. 2 Upgrade (Fir)	$250,000	2018	$0.20
Pump Station No. 3 Upgrade (Park)	$140,000	2018	$0.11
Total Estimated Rate Impact			**$2.16**
Water Reclamation Facility Improvements	**Project Cost[(1)(2)]**	**Construction Year**	**Rate Impact ($/mo/ERU)[(3)(4)]**
Raw Wastewater Pump Station	$420,000	2015	$0.34
Standby Generator System Upgrade	$1,344,000	2015	$1.09
Anoxic Mixer	$103,800	2015	$0.08
UV Disinfection System Upgrade	$1,712,000	2015	$1.40
Anaerobic Mixer	$44,600	2017	$0.04
Grit Removal System Improvements	$166,000	2017	$0.14
Scum Pump Station	$94,000	2017	$0.08
Vactor Decant Station	$59,000	2017	$0.05
Air Gap System/Non-Potable Water System Improvements	$243,000	2017	$0.20
Sludge Drying Facility Odor Control Upgrades	$244,400	2018	$0.20
Site Security Improvements	$122,000	2018	$0.10
Aerobic Digester	$1,250,000	2018	$1.02
Third Secondary Clarifier	$1,556,000	2020	$1.27
Additional Parking	$68,000	2020	$0.06
Solids Handling Nitrogen Padding System	$26,000	2020	$0.02
Operations Building and Shop Facility Remodel	$1,277,000	2020	$1.05
Total Estimated Rate Impact			**$7.13**

(1) 2012 dollars.

(2) Assumes all projects are funded by a 30-year bond at an interest rate of 3.25 percent. Estimated rate impacts do not include any related fees associated with purchase of the bond.

(3) Monthly rate impact is based on dividing the bond payment equally among the 2012 sewer equivalent residential units (ERUs), which total 5,364 ERUs.

(4) The rate increases are based on the current number of ERUs.

CHAPTER 1

INTRODUCTION

PURPOSE

This *General Sewer* (2012 Plan) for the City of Snoqualmie was prepared to address the City's planning needs for wastewater collection, transmission, treatment, and disposal for the 20-year planning period. This Plan was prepared in accordance with the provisions of the Revised Code of Washington (RCW), Section 90.48, *Water Pollution Control*, Washington Administrative Code (WAC) Section 173-240-050, *General Sewer Plan*, and Draft WAC Chapter 173-219, *Reclaimed Water Rule.* Development of the Plan has been coordinated with the City's 2006 update of the 1994 *Snoqualmie Valley Comprehensive Plan*, and with the City's draft 2011 *Water System Comprehensive Plan*.

The 2012 Plan provides proposed conceptual designs, cost estimates, schedule, and financing plan for recommended major facility improvements. This Plan is in compliance with the State Environmental Policy Act (SEPA), a signed SEPA checklist and determination is provided in Appendix A. The projects described in the 2012 Plan are consistent with Washington State regulations relating to the prevention and control of discharge of pollutants into waters of the state, anti-degradation of existing and future beneficial uses of ground waters, and anti-degradation of surface waters.

OVERVIEW

The City of Snoqualmie is situated in the western foothills of the Cascade Mountains in King County, approximately 25 miles east of Seattle. The location of Snoqualmie is shown on Figure 1-1. The City covers approximately 4,162 acres and has a population of approximately 11,039.

The City owns and operates a municipal sewage collection and treatment system that includes 14 pump stations with associated force mains, approximately 43 miles of gravity sewer pipes and a water reclamation facility that is capable of producing reuse quality effluent and Class A biosolids. The water reclamation facility has one outfall to the Snoqualmie River immediately upstream of Snoqualmie Falls. Effluent is also pumped to a pond at the Snoqualmie Ridge Golf Course for reuse as irrigation water.

The City is governed by a Mayor and City Council. The Public Works Director serves as the sewer system manager. The City's mailing address is:

City of Snoqualmie
38624 SE River Street
P.O. Box 987
Snoqualmie, WA 98065

The City's Water Reclamation Facility is located at:

Snoqualmie WRF
38190 SE Stearns Road
P.O. Box 987
Snoqualmie, WA 98065

HISTORY AND DEVELOPMENT OF THE SEWER SYSTEM

The City of Snoqualmie's wastewater collection and treatment system was originally constructed in the mid-1960s. The original system consisted of concrete sewer pipes that conveyed sewage to a wastewater treatment facility that consisted of two aerated lagoons and was located on the site of the City's current water reclamation facility. The collection system has been expanded since it was originally constructed as needed to accommodate growth of the City.

In the mid-1990s, the collection system was significantly expanded to serve the Snoqualmie Ridge development and a new water reclamation facility was constructed. The water reclamation facility, which includes two oxidation ditches and ultraviolet disinfection, has undergone two expansions since it was constructed to increase capacity and to produce Class A biosolids. The water reclamation facility currently has a permitted capacity to treat a maximum monthly flow of 2.15 million gallons per day.

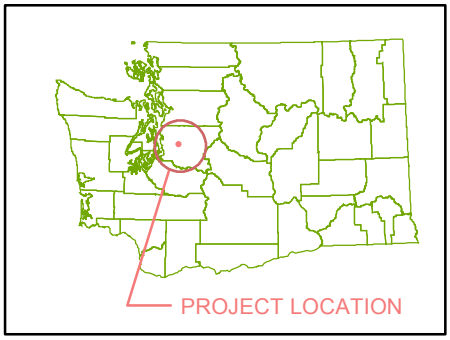
PLAN ELEMENTS

This Plan evaluates both the wastewater collection system and the wastewater treatment system in detail. This evaluation includes collection and treatment system modeling, analysis and a capital improvement plan with cost analysis and schedule. The 2012 Plan addresses the following elements:

- Background data
- Service area characteristics
- Population and land use
- Regulatory criteria
- Projected future flow and loadings to the water reclamation facility (WRF)
- Pertinent performance and design criteria for system facilities
- Evaluation of the WRF
- Computer model and evaluation of wastewater collection system
- Evaluation of water reuse alternatives
- Identification of system improvements with cost estimates
- Financing plan for capital improvement plan

City of Snoqualmie

General Sewer Plan
Figure 1-1
Vicinity Map



All users of the data shall be advised that the map features are approximate and are intended only to provide an indication of said feature. Additional areas that have not been mapped may be present. This is not a survey. The City of Snoqualmie assumes no liability for variations ascertained by actual survey. ALL DATA IS EXPRESSLY POVIDED 'AS IS' AND 'WITH ALL FAULTS'. The City makes no warranty of fitness for a particular purpose. This disclaimer shall be present on all paper map products and shall be included in the terms of use for this data in a web or software system.

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CITY OF SNOQUALMIE
CITY OF ISSAQUAH
CITY OF NORTH BEND
CITY OF MAPLE VALLEY
MOUNT SI
Cedar Lake
Chester Morse Lake
203
202
90
18
90

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RELATED PLANNING DOCUMENTS

The following documents were consulted in the preparation of this General Sewer/Wastewater Facilities Plan:

GROWTH MANAGEMENT ACT (GMA) RELATED PLANS, POLICIES AND DEVELOPMENT REGULATIONS

Snoqualmie Vicinity Comprehensive Plan, City of Snoqualmie, 1994 (updated 2006).

The City of Snoqualmie Comprehensive Plan, which was prepared by City of Snoqualmie staff and a consultant team, was originally adopted in 1994 and was updated in 2006. This document was developed to comply with the Growth Management Act (GMA), and is consistent with the planning policies of King County. The Comprehensive Plan addresses land use, transportation, community character, parks, recreation and open space, cultural and historic resources, environmental resources, economic development, capital facilities and utilities, and annexation. The Comprehensive Plan for the City of Snoqualmie provides:

- Policies and recommendations to direct public and private decisions affecting future growth and development;
- A framework of goals and policies adaptable to the changing attitudes and resources of the region;
- A long-range vision, based on community values and goals, of how citizens want Snoqualmie to look and function in the future as well as guidance for achieving that vision; and
- Guidelines for making decisions on growth, land use, transportation, public facilities, and services, parks, and open space.

The Comprehensive Plan used an annual growth rate of 2 percent to 4 percent for the City for 20-year growth projections. The actual growth rate has exceeded the projections according to the 2010 census.

Sensitive Areas Ordinance, Snoqualmie Municipal Code 19.12.

On August 12, 1991, the City adopted a Sensitive Areas Ordinance. The Ordinance was subsequently amended to add provisions for Fish and Wildlife Conservation Areas and Critical Recharge Areas on May 26, 1992.

WASTEWATER SYSTEM PLANNING

City of Snoqualmie General Sewer Plan, June 2003, Tetra Tech/KCM,Inc.

This Plan included descriptions of the various planning areas within the City. The Plan outlines the preliminary development plans and population projections for each of the planning areas. Since the plan was prepared prior to the development agreement for the Snoqualmie Ridge II development, the development projections included in this plan will need to be updated to include this development. Based on an Infiltration and Inflow (I/I) analysis that was conducted as part of this plan, I/I is estimated to be 1,100 gpad in the Snoqualmie Ridge I development and more than 5,000 gpad in old Snoqualmie sewers.

The plan describes the City's existing collection system and provides evaluation of existing collection system and recommends improvements.

Quadrant Corporation Snoqualmie Ridge II Wastewater Collection Facilities Project Report, August 2003, Earth Tech, Inc.

This report focused on the plan for construction of the collection system to serve the Snoqualmie Ridge II development. The plan used a peaking factor of 2.5 and an I/I allowance of 1,100 gpd per acre to estimate wastewater flow from the development.

Snoqualmie Ridge II Development Agreement, City of Snoqualmie Resolution No. 702, March 2004

This resolution is the development agreement for Snoqualmie Ridge II between Quadrant and the City. The agreement specifies that the plans and recommendations provided in the General Sewer Plan and the Snoqualmie Ridge II Wastewater Collection Facilities Project Report shall be used in the design and construction of the sewage collection system for this development.

Snoqualmie Ridge Division Sewer Capacity Analysis, Letter Report, January 4, 2007, Gray & Osborne, Inc.

This letter report focused on the capacity of the Kimball Creek Sewage Pump Station (KCPS) and associated force main. The letter report concluded that the KCPS is not able to handle the projected flow of wastewater from the Snoqualmie Ridge I, Snoqualmie Ridge II, other parkway development, and from Historic Snoqualmie (via Pump Station No. 1). The report recommended that the KCPS and discharge force main needed to be upgraded to convey the projected flows.

WATER SYSTEM COMPREHENSIVE PLANS

City of Snoqualmie Water System Comprehensive Plan, Gray & Osborne, Inc., December 2011

The *City of Snoqualmie Water System Comprehensive Plan* discusses the existing water system facilities, water usage and design criteria, conservation programs, system expansion, and water system improvements. The plan recommends numerous system improvements to improve fire flow, upgrade the 1040 Zone Booster Pump Station and increase the capacity of the North Wellfield.

WATERSHED PLANNING

Snoqualmie Watershed Forum, Interlocal Agreement, Amended 2010.

The City of Snoqualmie is a participating member in the Snoqualmie Watershed Forum which is located within the Snohomish Basin (WRIA 7). Table 1-1 includes a list of all members of the Snoqualmie Watershed Forum as given in the interlocal agreement amendment that is valid until December 31, 2016. The Snoqualmie Watershed Forum is a partnership to work on local watershed issues, and provides administration and oversight of watershed projects and efforts.

TABLE 1-1

Snoqualmie Watershed Forum

Participating Members	
City of Duvall	City of Snoqualmie
Snoqualmie Tribe	King County
City of North Bend	City of Carnation

COLLECTION SYSTEM STANDARD DESIGN CRITERIA

Sewer Regulation Ordinance, Snoqualmie Municipal Code 13.04.

The City has adopted an ordinance which gives collection system standard design criteria. The standard design criteria are included in Appendix P.

CHAPTER 2

REGULATORY REQUIREMENTS

INTRODUCTION

The purpose of this Chapter is to identify and summarize the pertinent federal and state regulations that affect the planning, design, and approval of recommended improvements discussed in this report.

This chapter does not describe each regulation in detail; rather, it addresses important facets of the regulations that affect the planning and design process. Subsequent sections of this report address technical requirements of the regulations at a level of detail appropriate for the evaluation provided by that section.

FEDERAL AND STATE STATUTES, REGULATIONS AND PERMITS

This section discusses some of the various federal and state laws that may affect wastewater system construction and operations, as well as other relevant permits, programs, and regulations.

FEDERAL CLEAN WATER ACT

The Federal Water Pollution Control Act is the principal law regulating the water quality of the nation's waterways. Originally enacted in 1948, it was significantly revised in 1972 and 1977, when it was given the common title of the "Clean Water Act" (CWA). The CWA has been amended several times since 1977. The 1987 amendments replaced the Construction Grants program with the Water Pollution Control State Revolving Fund (SRF) that provides low-cost financing for a range of water quality infrastructure projects. The Clean Water Act has not been reauthorized since 1987.

The National Pollutant Discharge Elimination System (NPDES) program was established by Section 402 of the CWA and its subsequent amendments. The Department of Ecology administers NPDES permits in the State of Washington for the U.S. Environmental Protection Agency (EPA). NPDES permits place limits on the quantity and quality of pollutants that may be discharged. The City's current NPDES permit, No. WA-002240-3 (Permit), is attached as Appendix B. The current Permit has an effective date of May 1, 2014 and an expiration date of May 1, 2019. The City's current permit effluent limits are shown in Tables 4-15, 4-16 and 4-17 in Chapter 4.

Condition S.1, Discharge Limitations, for Outfall #001 in the Snoqualmie River requires the reclamation facility effluent to meet limits for carbonaceous biochemical oxygen demand (CBOD), total suspended solids (TSS), fecal coliform bacteria, pH, and total ammonia. The Discharge Limitations include seasonal TMDL-based effluent limits from

August through October for CBOD, fecal coliform bacteria, pH, and Total Ammonia. The limitations include chlorine limits which are only applicable during emergency periods when UV disinfection is not available and the use of chlorine for disinfection is required. The chlorine limits were added by the permit modification. Condition S.1 also includes descriptions of the maximum boundaries of the chronic and acute mixing zones for the river outfall.

Condition S.2 lists monitoring requirements including influent and effluent flow, CBOD, BOD_5, TSS, pH, temperature, total ammonia, fecal coliform, soluble reactive phosphorous, and chlorine in the event that chlorine is used for disinfection. The City is required to conduct additional monitoring during the year prior to reapplication. The reapplication monitoring requirements include dissolved oxygen, total kjeldahl nitrogen, nitrate plus nitrite N, oil and grease, phosphorous (total), total dissolved solids, total hardness, EPA priority pollutants, and whole effluent toxicity testing.

Condition S.4.A specifies that the WRF design capacity for maximum month influent BOD_5 loading is 5,220 lbs/day and for maximum month influent TSS is 5,220 lbs/day. The maximum month average flow capacity for the WRF is 2.15 million gallons per day (mgd). Condition S.4.B requires the City to prepare a plan to maintain adequate capacity when flows and loadings to the WWTF exceed 85 percent of design capacity for 3-consecutive months or the projected increase would reach design capacity within 5 years (whichever occurs first).

Condition S.4.E requires the City to perform an Inflow and Infiltration (I/I) Evaluation. The I/I Evaluation consists of documenting the steps taken to identify sources of excess I/I, documenting projects completed to correct significant contributions to I/I, and develop plans for future I/I management. Also, the City must recharacterize the impact of I/I on the collection system and develop a report for submittal to Ecology by November 30, 2012.

Condition S.6 specifies that the City must work with Ecology to make sure that all commercial and industrial users comply with pretreatment regulations. The City must conduct an Industrial User Survey listing all significant industrial users (SIUs) and potentially significant industrial users (PSIUs) and submit the survey to Ecology by December 31, 2011.

The City's Permit contains special provisions for reclaimed water. The WRF discharges reclaimed water to Outfall #002 in Eagle Lake. Eagle Lake is the 9th hole pond at the TPC Snoqualmie Ridge Golf Course. Multiple end users and use locations are served from Eagle Lake which is a reclaimed water storage location.

Condition R.1, Reclaimed Water Limitations, for Outfall #002 in Eagle Lake requires the reclaimed water to meet limits for dissolved oxygen, turbidity, flow, carbonaceous biochemical oxygen demand (CBOD), total suspended solids (TSS), fecal coliform bacteria, pH, and chlorine residual.

Condition R.2 lists reclaimed water monitoring requirements including reclaimed water product water flow, dissolved oxygen, CBOD, TSS, pH, turbidity, coagulant usage, coagulant aid usage, total nitrogen, total coliform, and total chlorine residual.

Condition R.3 lists the reporting and record keeping requirements that are in conjunction with Special Condition S.3. The City is required to submit monthly discharge monitoring reports for Outfall #001 at the Snoqualmie River to the Department of Ecology. The City is also required to submit monthly discharge monitoring reports for Outfall #002 at Eagle Lake (9th Hole Pond) to the Department of Ecology and to the Washington State Department of Health.

FEDERAL ENDANGERED SPECIES ACT

On March 16, 1999, the National Marine Fisheries Service (NMFS) listed the Puget Sound Chinook as "threatened" under the Endangered Species Act (ESA). In 1999, the United States Fish and Wildlife Service (USFWS) listed the Bull Trout as "threatened." The National Marine Fisheries Service listed Puget Sound steelhead as "threatened" in 2007. ESA listings impact activities that affect salmon and trout habitat, such as water use, land use, construction activities, and wastewater disposal. Impacts to the greater Snoqualmie area may include longer timelines for permit applications, and more stringent regulation of construction impacts and activities in riparian corridors.

In response to existing and proposed ESA listings of salmon, steelhead, and trout species throughout Washington State, Governor Locke established the Office of Salmon Recovery in 1997 to direct the State's salmon recovery efforts. Rather than attempting to avert additional ESA listings, the Statewide Strategy provides local input into, and maintains some local control over, the salmon recovery regulatory processes that affects the majority of Washington State.

In order to minimize liability under the ESA, local governments need to demonstrate that their land use regulations will not result in a prohibited "take" of a listed species, including adverse modification of critical habitat.

RECLAIMED WATER STANDARDS

The standards for the use of reclaimed water are outlined in RCW 90.46 and in a separate document published by the Washington State Department of Health and Ecology entitled "Water Reclamation and Reuse Standards." Reclaimed water is the effluent derived from a wastewater treatment system that has been adequately and reliably treated, such that it is no longer considered sewage and is suitable for a beneficial use or a controlled use that would not otherwise occur. The legislature has declared that "the utilization of reclaimed water by local communities for domestic, agricultural, industrial, recreational, and fish and wildlife habitat creation and enhancement purposes (including wetland enhancement) will contribute to the peace, health, safety, and welfare of the people of the State of

Washington."

The *Water Reclamation and Reuse Standards* define the water quality standards for reclaimed water. The City of Snoqualmie is a Water Reclamation Facility (WRF) that generates reclaimed water. The generation of Class "A" reclaimed water has minimum requirements that are described below:

Continuously Oxidized – Wastewater that at all times has been stabilized such that the monthly average CBOD is less than 25 mg/L and weekly average CBOD is less than 40 mg/L and contains a measurable amount of dissolved oxygen.

Continuously Coagulated – Oxidized wastewater that at all times has been treated by a chemical or equally effective method to destabilize and agglomerate colloidal and finely suspended matter prior to filtration.

Continuously Filtered – Oxidized and coagulated wastewater that at all times has been passed through a filtering media so that the turbidity of the filtered effluent does not exceed an average of 2 nephelometric turbidity units (NTU), determined monthly, and does not exceed 5 NTU at any time.

Continuously Disinfected – Oxidized, coagulated and filtered wastewater that at all times has been disinfected to destroy or inactivate pathogenic organisms. A group of indicator microorganisms, coliform bacteria, are used to measure the effectiveness of the disinfection process. The Class "A" reclaimed water standard is a total coliform density of 2.2 per 100 milliliters (ml) for the median of the last 7 days of samples, with no sample having a density greater than 23 per 100 ml.

NATIONAL ENVIRONMENTAL POLICY ACT

The National Environmental Policy Act (NEPA) was established in 1969 and requires federal agencies to determine environmental impacts on all projects requiring federal permits or funding. Federally delegated activities such as NPDES permits or Section 401 Certification are considered state actions and do not require NEPA compliance. The federal agency responsible for funding or permitting the project performs an Environmental Assessment to determine whether an Environmental Impact Statement must be prepared. If project impacts are found to be insignificant, a Finding of No Significant Impact (FONSI) is issued by the responsible federal agency. NEPA is not applicable to projects that do not include a federal component. Currently, State Revolving Fund and Centennial Grant Projects are reviewed under the State Environmental Policy Act (SEPA) and the State Environmental Review Process (SERP) to satisfy the intent of NEPA, as the Clean Water Act has not been reauthorized.

STATE ENVIRONMENTAL REVIEW PROCESS

The Washington Department of Ecology has developed the State Environmental Review Process (SERP) to satisfy the intent of NEPA for projects funded by the State Revolving Fund and Centennial Clean Water Fund. SERP review is similar to NEPA in that it reviews the potential impacts of an action on a defined set of environmental resources; however, SERP relies on the alternatives analysis presented in the Facilities Plan, State Environmental Policy Act (SEPA) Checklist and a Federal Cross-Cutter Checklist for review of potential project impacts.

Facilities Plans require submittal of a SERP Coversheet, which documents completion of SEPA review, Project Cost-Effectiveness Analysis, and the Public Participation process. It also provides a federal cross cutter overview checklist to highlight any potential environmental issues for projects identified in the Facilities Plan for potential funding applications. Public entities submitting funding applications for construction projects must submit a federal "Cross Cutter Report" which documents potential project impacts to the list of NEPA environmental parameters and compliance with federal Executive Orders to protect the environment. Cross cutter reviews should be initiated prior to submittal of funding applications to Ecology, and must be approved before funding agreements can be signed and funds disbursed. Endangered Species Act consultation and National Historic Preservation Act, Section 106 review are among the cross cutters that can require considerable review time, so the environmental review process should be initiated early in the process of project development and funding applications. The Cross Cutter Report is reviewed and approved by Ecology staff, which issues an approval letter once all environmental review requirements are completed. Unlike the federal NEPA process, no FONSI is issued.

FEDERAL CLEAN AIR ACT

The Federal Clean Air Act requires all wastewater facilities to plan to meet the air quality limitations of the region. The City falls in the jurisdiction of the Puget Sound Clean Air Agency. The Puget Sound Clean Air Agency (PSCAA) is responsible for enforcing federal, state and local outdoor air quality standards and regulations in King, Kitsap, Pierce, and Snohomish counties of Washington State. The WRF operates under the authority of the PSCAA.

STATE STATUTES, REGULATIONS AND PERMITS

STATE WATER POLLUTION CONTROL ACT

The intent of the state Water Pollution Control Act is to "maintain the highest possible control standards to ensure the purity of all waters of the state consistent with public health and the enjoyment…the propagation and protection of wildlife, birds, game, fish and other aquatic life, and the industrial development of the state." Under the Revised Code of Washington (RCW) 90.48 and the Washington Administrative Code

(WAC) 173-220, Ecology issues permits for wastewater treatment facilities and State Waste Discharge permits under WAC 173-216.

Submission of Plans and Reports for Construction of Wastewater Facilities, WAC 173-240

Prior to construction or modification of domestic wastewater facilities, engineering reports and plans, and specifications must be submitted to and approved by Ecology. This regulation outlines procedures and requirements for the development of an engineering report that thoroughly examines the engineering and administrative aspects of a domestic wastewater facility project. This state regulation defines a facility plan as an engineering report under federal regulations, 40 CFR Part 35.

Key provisions of WAC 173-240 are provided below:

- An engineering report for a wastewater facility project must contain everything required for a general sewer plan unless an up-to-date general sewer plan is on file with Ecology.

- An engineering report shall be sufficiently complete so that plans and specifications can be developed from it without substantial changes.

- A wastewater facility engineering report must be prepared under the supervision of a professional engineer.

Criteria for Sewage Works Design, Washington State Department of Ecology

Ecology has published design criteria for collection systems and wastewater treatment plants. While these criteria are not legally binding, their use is strongly encouraged by Ecology since the criteria are used by the agency to review engineering reports for upgrading wastewater treatment systems. Commonly referred to as the "Orange Book," these design criteria primarily emphasize unit processes through secondary treatment, and also includes criteria for planning and design of wastewater collection systems. Any expansion or modification of the City of Snoqualmie collection system and/or WRF will require continued conformance with Ecology criteria.

Certification of Operators of Wastewater Treatment Plants, WAC 173-230

Wastewater treatment plant operators are certified by the state Water and Wastewater Operators Certification Board. The operator assigned overall responsibility for operation of a wastewater treatment plant is defined by WAC 173-230 as the "operator in responsible charge." This individual must have state certification at or above the classification rating of the plant. The City of Snoqualmie WRF is currently assigned a Class III rating. The operating staff assigned to the plant have the required certification. Table 2-1 presents the certification of the WRF operational staff.

TABLE 2-1

Operator Certification

Title	Class	Certification Number
Wastewater Superintendent	IV	6854
Senior Operator	II	3437
Senior Operator	IV	2761
Laboratory Analyst	II	7543
Operator II	III	7626
Senior Industrial Maintenance Tech.	----	W00104E(1)

(1) WABO Certification Number.

WATER QUALITY STANDARDS FOR SURFACE WATERS OF THE STATE OF WASHINGTON, CHAPTER 173-201A WAC

WAC 173-201A establishes water quality standards for the State of Washington. The standards are based on two objectives: protection of public health and enjoyment, and protection of fish, shellfish, and wildlife. For each surface water body in the state, the revised standards assign specific uses, such as aquatic life, recreation or water supply uses. Water quality standards have been developed for each use, for parameters such as fecal coliform, dissolved oxygen, temperature, pH, turbidity, and toxic, radioactive, deleterious substances.

It is the policy of the State of Washington to maintain existing beneficial uses of surface water by preventing degradation of existing water quality. However, certain allowances are made by Ecology for discharging treated wastewater into a surface water that enable a temporary or mitigated degradation to occur. These allowances are made by establishing mixing zones and determining the assimilative capacity of the receiving water.

STATE OF WASHINGTON BIOSOLIDS REGULATIONS, WAC 173-308

WAC 173-308 is the basis for the statewide biosolids management program. Rather than applying for a permit, facilities that are subject to the permit program apply for coverage under the existing statewide general permit. The City of Snoqualmie is covered under the general permit. The City of Snoqualmie produces Class "A" biosolids, which are permitted for unrestricted land application.

STATE ENVIRONMENTAL POLICY ACT

WAC 173-240-050 requires a statement in all wastewater comprehensive plans regarding proposed projects in compliance with the State Environmental Policy Act (SEPA), if applicable. The capital improvements proposed in this plan will fall under SEPA

regulations. A SEPA checklist is included in Appendix A of this report for use in the environmental review for the project. In most cases a determination of non-significance is issued (DNS); however, if a project will have a probable significant adverse environmental impact an environmental impact statement (EIS) will be required. In addition to SEPA, facilities planning documentation must include SERP, which serves as NEPA for Ecology's State Revolving Fund and Centennial Clean Water Act funded projects.

ACCREDITATION OF ENVIRONMENTAL LABORATORIES (WAC 173-050)

The State of Washington established a requirement that all laboratories reporting data to comply with NPDES permits must be generated by an accredited laboratory. This accreditation program establishes specific tasks for quality control and quality assurance (QA/QC) that are intended to ensure the integrity of laboratory procedures. Accreditation requirements must be met for any on-site laboratory or outside laboratory used to analyze samples. Only accredited laboratories may be used for analyses reported for compliance with NPDES permits. In planning for an on-site laboratory, staffing must be sufficient to allow for QA/QC procedures to be performed. The Snoqualmie WRF lab is currently accredited for determination of the following parameters: Ammonia as N, BOD_5, Orthophosphate as P, dissolved oxygen, pH, fecal coliform, total coli/E. coli, total solids, and total volatile solids.

MINIMAL STANDARDS FOR SOLID WASTE HANDLING (WAC 173-304)

Grit and screenings are not subject to the sludge regulations in WAC 173-308, but their disposal is regulated under the state solid waste regulations, WAC 173-304. Waste placed in a municipal solid waste landfill must not contain free liquids, nor exhibit any of the criteria of a hazardous waste as defined by WAC 173-303. To be placed in a municipal solid waste landfill, grit, screenings, and incinerator ash must pass the paint filter test. This test determines the amount of free liquids associated within the solids, and includes the toxicity characteristic leaching procedure (TCLP) test, which determines if the waste has hazardous characteristics.

WETLANDS

Dredging and Filling Activities in Natural Wetlands (Section 404 of the Federal Water Pollution Control Act)

A Corps permit is required when locating a structure, excavating, or discharging dredged or fill material in waters of the United States or transporting dredged material for the purpose of dumping it into ocean waters. Typical projects requiring these permits include the construction and maintenance of piers, wharves, dolphins, breakwaters, bulkheads, jetties, mooring buoys, and boat ramps.

If wetland fill activities cannot be avoided, the negative impacts can be mitigated by creating new wetland habitat in upland areas. If other federal agencies agree, the Corps would generally issue a permit.

Wetlands Executive Order 11990

This order directs federal agencies to minimize degradation of wetlands and enhance and protect the natural and beneficial values of wetlands. This order could affect siting of lift stations and sewer lines.

SHORELINE MANAGEMENT ACT

The Shoreline Management Act of 1971 (RCW 90.58) establishes a broad policy giving preference to shoreline uses that protect water quality and the natural environment, depend on proximity to the water, and preserve or enhance public access to the water. The Shoreline Management Act jurisdiction extends to lakes or reservoirs of 20 acres or greater, streams with a mean annual flow of 20 cubic feet per second (CFS) or greater, marine waters, and an area inland 200 feet from the ordinary high water mark. Projects are reviewed by local governments according to state guidelines and a local Shoreline Master Program. The City of Snoqualmie Shoreline Master Program was adopted in 1974 with subsequent revisions in 1986 and 1992. The City is currently updating its shoreline master program.

FLOODPLAIN DEVELOPMENT PERMIT

Local governments that participate in the National Flood Insurance Program are required to review projects in a mapped floodplain and impose conditions to reduce potential flood damage from flood water. A Floodplain Development Permit is required prior to construction, including projects involving wastewater collection facilities.

HYDRAULIC PROJECT APPROVAL

Under the Washington State Hydraulic Code (WAC 220-110), the WDFW requires a hydraulic project approval (HPA) for activities that will "use, divert, obstruct, or change the natural flow or bed" of any waters of the state. For City activities such as pipeline crossings of streams or WWTF outfall modifications, an HPA will be required. The HPA will include provisions necessary to minimize project specific and cumulative impacts to fish.

CITY SEWER ORDINANCES

The Snoqualmie Municipal Code, Title 13, addresses rules and regulations for the City's sewer system. Table 2-2 lists the chapters in Title 13. These chapters of the municipal code have been included in Appendix C. As shown in Table 2-2, the sewer ordinances address such issues as requirements for connections to sewer system, permits for sewer

installation by developers, rates for sewer service, development requirements for private sewer systems, conditions for sewer service extensions, and sewage pretreatment regulations.

TABLE 2-2

Snoqualmie Sewer System Municipal Code

Chapter	Title	Description
13.02.020	New Account Servicing Fee	Establishes the cost of creating a "new account".
13.04.040	Discharge of Pollutants into Natural Outlets	Establishes that it is unlawful to discharge sewage, industrial waste, or other polluted waters into any natural outlet unless treated in accordance with the Code.
13.04.060	Suitable Toilet Facilities	Requires all buildings to have suitable toilet facilities where sewers are available.
13.04.090	Private Disposal – Conditions for Use	Establishes that in locations where no public sewer is available, it is allowable for building drains to connect to a private sewage disposal system.
13.04.100	Permit - Requirement	Establishes the requirement for a permit to do any work on public and private side sewers.
Article 5	Side Sewers and Connections	Provides general information such as permit classes, locating wyes, tees, and stubs, allowable materials of construction, and acceptable installation practices.
Article 5	Standard Participation Contract	Describes the methods of connecting to public sewer service when property is not entitled to connection by Standard Participation Contract.
Article 6	Fees and Charges	Establishes the requirement to pay a connection and/or trunkage charge, service charge, and sets penalties for delinquency.
Article 7	Use of Public Sewer	Prohibits discharge of specified pollutants and establishes the requirement for pretreatment facilities if deemed necessary.
13.08	Sewer Rates and Charges	Establishes the sewer rates and charges per month.

CHAPTER 3

LAND USE, POPULATION PROJECTIONS, AND SERVICE AREA CHARACTERISTICS

The 2006 update of the 1994 *Snoqualmie Valley Comprehensive Plan,* 1995 *Snoqualmie Ridge Mixed Use Final Plan,* 2003 *General Sewer Plan*, and the 2011 *Water System Plan* were used as the basis for the descriptions of land use and the planning criteria included in this chapter. In addition, planning criteria and population projections provided by the City's Planning Department were used in the development of this chapter.

PLANNING PERIOD

In order to provide wastewater services for future growth, the wastewater system is in need of continuous evaluation and improvement. A planning period for the evaluation of the wastewater utility should be long enough to be useful for an extended period of time, but not so long as to be impractical. The planning period for this *General Sewer Plan* is from 2012 through 2032, coinciding with a 20-year planning interval.

SEWER STUDY AREA

The City of Snoqualmie is in the Snoqualmie River Valley in King County. Snoqualmie is approximately 25 miles east of Seattle along the I-90 corridor. As shown on Figure 3-1, the City is bordered by the City of North Bend to the southeast, by the unincorporated rural town of Fall City to the northwest and by unincorporated King County in all other directions.

The City is comprised of approximately 4,162 acres and has 11,039 residents. The City has a number of commercial, hospitality, and retail businesses within the sewer service area. Also, the sewer study area includes area schools, the Snoqualmie Valley Hospital, and several properties with on-site septic systems.

SEWER SERVICE AREAS

City of Snoqualmie

The City of Snoqualmie current sewer service area includes connections within city limits. The collection system consists of gravity sewers, pump stations and force mains, including over 43 miles of mains and laterals that serve eight drainage basins. The drainage basins are described in detail in Chapter 4. The wastewater collection system schematic is shown on Figure 3-2.

ADJACENT JURISDICTIONS

City of North Bend

The City of North Bend is east of Snoqualmie. North Bend operates and maintains its own wastewater collection system and treatment plant. The City of North Bend Wastewater Treatment Plant is located on the bank of the South Fork of the Snoqualmie River near State Route 202. The wastewater treatment facility receives flows that are primarily from domestic sources consisting of single and multi-family residential units, restaurants, light commercial and retail units, with no contribution from industrial operations. North Bend's collection system includes one pump station and two privately owned pump stations. North Bend's WWTP consists of an extended aeration activated sludge system with an oxidation ditch, secondary clarifier, ultraviolet disinfection, and an outfall in the South Fork of the Snoqualmie River.

Town of Fall City

The Fall City Business District and surrounding rural areas are served by on-site septic systems, community drain fields, or alternative sewage treatment technologies. No community wide wastewater collection or treatment system is currently in place. The King County Comprehensive Plan (Policy F-313) and King County Code (13.24.132 and 13.24.134) state that public sewers are allowable should privately owned on-site septic systems, community drain fields, or alternative sewage treatment technologies be proven to be technologically infeasible. Currently, there are no plans in place to discontinue use of on-site septic systems, community drain fields, and alternative sewage treatment technologies.

AGREEMENTS AND INTERTIES

The City has an agreement for mutual aid with local utilities and organizations. The City does not have any wastewater interties with the surrounding communities.

ZONING AND FUTURE LAND USE

Development of accurate and reasonable growth projections is essential in establishing capacity requirements for the wastewater collection system and water reclamation facility. Accurate projections allow the community to plan financially for needed infrastructure improvements and to establish appropriate facility capacities, locations, and implementation scheduling for wastewater system improvements.

The three major elements in predicting the amount and location of future growth and development in the City's wastewater collection system service area are land use, zoning, and population projections. Population forecasts, in conjunction with current water consumption data, provide a basis for estimating future wastewater collection system and

City of Snoqualmie

General Sewer Plan
Figure 3-1
City Limits, Urban Growth Area And Adjacent Communities

LEGEND:

- CITY LIMITS AND SEWER SERVICE AREA
- URBAN GROWTH AREA
- PARCELS
- CITY OF NORTH BEND
- FALL CITY (APPROXIMATE-UNINCORPORATED KING COUNTY)

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City of Snoqualmie

General Sewer Plan
Figure 3-2
Wastewater Collection System

LEGEND:

- PS — PUMP STATION
- MANHOLES
- FORCEMAINS
- GRAVITY MAINS
- casino
- CITY LIMITS
- URBAN GROWTH AREA
- PARCELS

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PS F
PS N6
PS L
PS K3
PS E
SNOQUALMIE WATER RECLAMATION FACILITY
IPPS
KIMBAL CREEK PS
PS #1
PS #2
PS Z
PS #3
PS #4
FROM ECHO GLEN CHILDREN'S CENTER
PS BP
CASINO
PS #6

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treatment facility demands. Land use, zoning, and development plans play an important role in determining growth patterns. Future land use, variations in use, and changing population densities, as determined by applicable zoning ordinances, can significantly impact a system's ability to provide adequate capacity in the City's wastewater collection and treatment system. Increased residential and commercial densities, as well as new large industrial users, can greatly impact the flows and loadings of wastewater conveyed by the collection system and treated at the water reclamation facility.

Current zoning within the City limits is shown on Figure 3-3. Per the Snoqualmie Municipal Code, the following are the main types of land uses within the City:

- Business General (BG) – Provides for a broad range of retail and commercial uses, including businesses and services that are of a larger scale or are inappropriate for the historic downtown area, such as automotive services and limited light-industrial uses.

- Business Office (BO) – Provides for space within the city for smaller-scale office uses, but also allows for some retail and service uses.

- Business Retail 1, 2 (BR-1, BR-2) – Serves as the core shopping area within Snoqualmie, with uses serving as shopping catalysts to other businesses within the district. The BR-1 subdistrict contains all properties located within the downtown historic district retail overlay zone, and is intended for shopping and dining in a pedestrian-oriented environment. The BR-2 subdistrict contains all properties within the BR district outside of those listed within the BR-1 subdistrict

- Constrained Residential (R-C) – Allows low density single-family detached residential development. This district is characterized by large parcels subject to significant environmental constraints and lack of adjacent sewer service.

- Historic District – Indicates areas which may be subject to further development constraints to fulfill City standards for historic areas.

- Mixed Use (MU) – Allows for residential, commercial, and light industrial uses in a manner which promotes environmental awareness by requiring open spaces and minimizing the need for automobiles. Refer to Municipal Code section 17.30 for additional information.

- Office Park (OP) – Provides areas appropriate for commercial and office uses, such as medical, dental, and other professional services.

- Open Space 1, 2, 3 (OS-1, OS-2, OS-3) – Provides areas appropriate for active and passive recreation, certain agricultural uses, peripheral open space greenbelts, sensitive areas, a viable system of wildlife corridors, floodplain protection, pedestrian and equestrian trails, certain institutional uses, open space for public health and welfare, and protection of lands unsuitable for development. The OS-1 district is intended for natural open space preservation, informal low-intensity recreation, and limited agricultural uses. The OS-2 district is intended for formal and active park uses, as well as other recreational uses such as golf courses and riding stables. The OS-3 district includes land owned by the City and the Northwest Railway Museum on which the Northwest Railway Museum runs its tourist train. This district is intended to accommodate the uses of the museum, while maintaining the overall open space character of the property.

- Planned Commercial/Industrial (PCI) – Provides areas in the city for planned commercial/industrial uses, which might include single or mixed use retail, office, light industrial and open space uses.

- Planned Residential (PR) – Provides for residential development that encourages a range of housing types, sizes and cost and allows for a limited amount of compatible neighborhood residential uses.

- Resource Extraction (RE) – Provides for continued extraction and processing of mineral and soil resources in an environmentally responsible manner.

- Utility Park (UP) – Allows for areas containing unique natural resources and is intended to provide areas appropriate for hydroelectric generation and associated facilities, public or private parks and open space with appropriate visitor-related commercial services, utility treatment plants and other municipal facilities.

As shown on Figure 3-1, the City's Urban Growth Area (UGA) extends beyond the City's corporate boundaries into unincorporated King County. The UGA outside of City limits is subject to zoning from King County. The classifications and land uses for King County within the UGA are as follows:

- Industrial Property-specific (I-P) – Provides for the location and grouping of industrial enterprises. Property-specific development standards indicate that conditions beyond the minimum requirements of the title have been applied to development on a property, such as increased development standards, limits on permitted uses or special conditions of approval.

City of Snoqualmie

General Sewer Plan
Figure 3-3
Land Use and Zoning

LEGEND:

- CITY LIMITS
- URBAN GROWTH AREA
- PARCELS

UGA LANDUSE:

- CONSTRAINED RESIDENTIAL
- OPEN SPACE
- PLANNED COM / RESIDENTIAL
- PLANNED RESIDENTIAL
- SINGLE FAMILY RESIDENTIAL
- UTILITY PARK

CITY ZONING:

- BUSINESS GENERAL
- BUSINESS OFFICE
- BUSINESS RETAIL 1
- BUSINESS RETAIL 2
- CONSTRAINED RESIDENTIAL
- PLANNED RESIDENTIAL
- MIXED USE
- OFFICE PARK
- OPEN SPACE 1
- OPEN SPACE 2
- OPEN SPACE 3
- PLANNED COMMERCIAL / INDUSTRIAL
- RESOURCE EXTRACTION
- UTILITY PARK

CITY OF SNOQUALMIE

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- Mineral Property-specific (M-P) – Property-specific development standards indicate that conditions beyond the minimum requirements of the title have been applied to development on a property, such as increased development standards, limits on permitted uses or special conditions of approval.

- Rural Area 2.5, 5, 10 (RA-2.5, RA-5, RA-10) – Provides for an area-wide long-term rural character to minimize land use conflicts with nearby agricultural or forest production districts or mineral extraction sites. Lots sizes of less than 5 acres (RA-2.5), 5 to 10 acres (RA-5, RA-5-P), 10 to 20 acres (RA-10).

- Urban Reserve (UR) – Purpose is to phase growth and demand for urban services, and reserve large tracts of land for possible future growth. Allows for rural, agricultural, low-density uses, and limited residential growth in a manner that will not impeded or prohibit later development at urban densities.

- Urban Reserve Property-specific (UR-P) – Property-specific development standards indicate that conditions beyond the minimum requirements of the title have been applied to development on a property, such as increased development standards, limits on permitted uses or special conditions of approval.

Zoning within the City is shown in Figure 3-3. The zoning designations are listed in Table 3-1, along with the amount of land per designation.

TABLE 3-1

Zoning Designations

Abbreviation	Zoning Designation	Acreage
City Zoning		
BG	Business General	11.14
BO	Business Office	7.85
BR-1	Business Retail 1	5.92
BR-2	Business Retail 2	22.01
R-C	Constrained Residential	483.23
None	Historic District	0
MU	Mixed Use	2,160.26
OP	Office Park	52.89
OS-1	Open Space 1	851.91
OS-2	Open Space 2	584.57
OS-3	Open Space 3	50.51

TABLE 3-1 – (continued)

Zoning Designations

Abbreviation	Zoning Designation	Acreage
PCI	Planned Commercial/Industrial	261.17
PR	Planned Residential	104.42
RE	Resource Extraction	18.78
UP	Utility Park	148.57
Total City Zoning		**4,517.70**

POPULATION

HISTORICAL RESIDENTIAL POPULATION

The City's population over the last 10 years is shown in Table 3-2.

TABLE 3-2

City of Snoqualmie Historical Population 2000 to 2010

Year	Population	Annual Growth Rate
2000	1,631(1)	NA
2001	3,416(2)	109.4%
2002	4,210	23.2%
2003	4,785	13.7%
2004	5,110	6.8%
2005	6,345	24.2%
2006	7,815(2)	23.2%
2007	9,100(3)	16.4%
2008	9,790(3)	7.6%
2009	10,100(3)	3.2%
2010	10,670(4)	5.6%

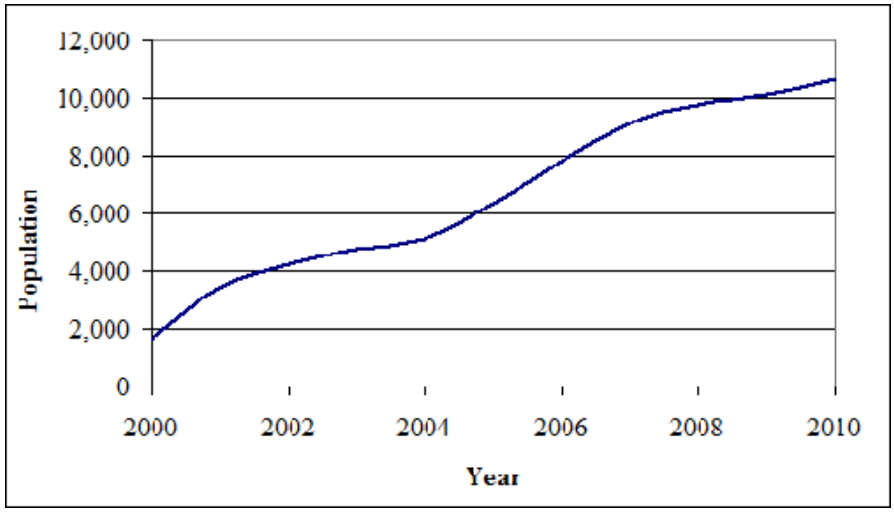
(1) Source: 2000 U.S. Census.
(2) Source: State Certified Special Census.
(3) Estimate based on 2000, 2006 and 2010 Census data and water connection growth.
(4) Source: 2010 U.S. Census.

As shown in Table 3-2, the City's population has drastically increased over the past decade, which is almost exclusively due to growth in Snoqualmie Ridge. Growth has slowed over the past 3 years since building has slowed in Snoqualmie Ridge I (SR I) and Snoqualmie Ridge II (SR II) in conjunction with an economic downturn and as the SR I

and SR II developments near completion. Figure 3-4 shows population growth from 2000 to 2010 graphically.

FIGURE 3-4

Historic Population 2000 to 2010



SERVICE AREA POPULATION

As shown on Figure 3-1, the City of Snoqualmie's sewer service area boundaries are coincident with the City limits. With the exception of 34 homes that are served by on-site septic systems, all homes and businesses within the City are connected to the sewer system. The City is planning to require the homes on septic systems to connect to the sewer system in the near future and, therefore, for the purposes of this report, the total service area population includes all of the people living within the City limits. The projected sewer service area population is based on the existing population and the developable and redevelopable land within the City and the Urban Growth Area (UGA). The land in the UGA will be annexed by the City as it is developed and served by the wastewater system.

PROJECTED FUTURE CITY POPULATION

The projected future City population is based on projected 2032 population data and variable annual growth rate projections for the 20-year planning period in the Snoqualmie Ridge (SR) 1 and 2 and Kimball Creek Developments, combined with constant annual growth rate projections in all other neighborhoods including the Snoqualmie Hills planning area, as provided by the City's Planning Department. Table 3-3 provides the population projections through the year 2032 for the City.

TABLE 3-3

City of Snoqualmie Projected Population 2011 to 2032

Year	Projected Population[(1)]	Projected Annual Growth Rate
2011	11,039	3.46%
2012	11,418	3.43%
2013	11,850	3.78%
2014	12,284	3.66%
2015	12,997	5.80%
2016	13,430	3.33%
2017	13,863	3.22%
2022	14,627	0.60%
2027	15,065	0.59%
2032	15,508	0.58%

(1) Growth projections based on data provided by the City.

Population projections by each planning area are included in Appendix D. The planning areas are shown on Figure 3-5.

SEWER CONNECTIONS

Table 3-4 provides an estimate of the number of sewer connections to the City of Snoqualmie's sewer system from 2011, based on billing records obtained from the City's Finance Department.

TABLE 3-4

City of Snoqualmie Sewer Service Connections by Customer Class[(1)]

	2011
Single-Family Residential	3,047
Multi-family Residential	502
Commercial	194
TOTAL	**3,743**

(1) The number of connections in the customer classes was estimated by sewer billing data provided by the City.

City of Snoqualmie

General Sewer Plan
Figure 3-5
Developable Lands Planning Areas

LEGEND:

- CITY LIMITS
- URBAN GROWTH AREA
- PARCELS

PLANNING AREA:

- HISTORIC SNOQUALMIE
- MEADOWBROOK
- MILL
- RATTLESNAKE RIDGE
- SNOQUALMIE FALLS
- SNOQUALMIE HILLS
- SNOQUALMIE RIDGE
- SNOQUALMIE RIDGE 2

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SNOQUALMIE RIDGE 2

SNOQUALMIE RIDGE

SNOQUALMIE FALLS

MILL

SNOQUALMIE HILLS

HISTORIC SNOQUALMIE

MEADOWBROOK

SNOQUALMIE RIDGE 2

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INDUSTRIES IN THE SEWER SERVICE AREA

Girard Resources, Inc. holds a temporary State Waste Discharge Permit (No. ST0045516) and Technical Glass Manufacturing holds a State Waste Discharge Permit (No. ST0045534).

Microconnex is an electronics design and manufacturing company located near the intersection of SE Douglas Street and Snoqualmie Parkway in the Snoqualmie Ridge Development. Sewage from this facility is discharged to Pump Station BP. The industrial process water from this facility is evaporated and does not discharge to the City collection system; therefore, they do not require a pretreatment permit.

AGREEMENTS FOR SERVICE IN THE SEWER SERVICE AREA

Snoqualmie Hills Project

The City and the Snoqualmie Tribe have an agreement for sewer service for the Snoqualmie Hills Project (Hills Project). The Snoqualmie Tribe's initial reservation is located within the City's designated Urban Growth Area and has constructed a casino as a part of the Hills Project. The agreement reserves 360 Equivalent Residential Units (ERU) of wastewater treatment capacity at the City's WRF. The agreement defines one ERU as 180 gallons of wastewater per ERU per day and 1/2 pound of BOD per ERU per day maximum. The wastewater discharged by the Hills Project is measured with a flow meter and sampled and tested for BOD. The flows and loadings of wastewater from the Hills Project are used to determine the monthly billing rate as set by City ordinance.

Echo Glen Children's Center

The City and the Washington State Department of Social and Health Services have an agreement for sewer service for the Echo Glen Children's Center (Echo Glen). Echo Glen is a medium/maximum security facility that provides rehabilitation services for young offenders. The agreement reserves 160 Equivalent Residential Units of wastewater treatment capacity at the City's WRF. The agreement defines one ERU as 180 gallons of wastewater per ERU per day and 1/2 pound of BOD per ERU per day maximum. The wastewater discharged by Echo Glen is measured with a flow meter and sampled and tested for BOD. The flows and loadings of wastewater from Echo Glen are used to determine the monthly billing rate as set by City ordinance.

Salish Expansion

The City and the developer Gateway Cascades, LLC entered into a development agreement in 2004 which included provisions for a reserve capacity of 361 ERUs of wastewater treatment at the City's WRF. Gateway Cascades, LLC has been succeeded by the Muckleshoot Tribe. The development has not yet been constructed due to negative economic factors. The original development agreement has been amended to extend the

term of the agreement until such time that a future development agreement establishes a revised development timeline. The 361 ERUs of reserve capacity will be considered when evaluating capacity of the WRF as the development may occur at any time.

NATURAL ENVIRONMENT

GEOGRAPHY AND CLIMATE

The City is located about 25 miles east of Seattle in the Snoqualmie River Valley. The upper valley branches to the east and southeast, gradually rising into the three narrow canyons of the North, Middle and South Forks of the Snoqualmie River. The upper valley is bounded on the west by middle plateaus that range in elevation from 500 to 1,000 feet. The east end of the valley is bounded by mountains that range in elevation from 3,000 to 5,000 feet. The upper valley is separated from the lower valley by an escarpment that creates 268-foot Snoqualmie Falls. The lower river valley slopes downwards to Everett, where the river flows into the Puget Sound. Figure 3-6 shows topography of the area.

The east side of the Snoqualmie Valley is formed by Mount Si, which rises vertically to approximately 4,000 feet, and the south is bounded by Rattlesnake Ridge. The Lake Alice Plateau to the west slopes gently to the upper valley floor, which makes this area more suitable for development. Coniferous and deciduous forests, along with farms, occupy much of the undeveloped portions of Snoqualmie.

The Snoqualmie area receives an average of 61.25 inches of precipitation per year. November is historically the wettest month, and July the driest. The average annual temperature is 50.4 degrees F. Precipitation data gathered from the Snoqualmie Falls weather station is presented in Table 3-5. The weather station is located at Latitude 47°32'N Longitude 121°50'W at 440 feet above sea level.

City of Snoqualmie

General Sewer Plan
Figure 3-6
Topography Map

LEGEND:

- 10 FOOT CONTOURS - USGS
- STREETS
- CITY LIMITS
- URBAN GROWTH AREA

ELEVATION:

- High : 2270
- Low : 85

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TABLE 3-5

Snoqualmie Falls Precipitation 2004-2010

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
2004	9.27	3.85	3.81	1.65	5.38	1.59	.38 M	5.58	3.79	4.17	7.52	8.79	55.78
2005	4.56	1.10	9.79	4.59	4.93	3.63 M	2.02	.64	3.59	5.27	8.25 M	8.92 M	57.29 M
2006	18.74	5.15	2.84	4.88	5.02	2.57	.31	.57	3.39	3.63	19.03	9.23 M	75.36 M
2007	6.87	5.17	8.61	2.43	2.71	2.61	1.41	1.20	3.04	6.92	4.67	11.62	57.26
2008	8.15	4.51	7.46	4.98	2.70	2.81	1.02	3.49	2.69	3.04	10.09	5.65	56.59
2009	9.81	1.45	7.00	6.06	3.70*	1.74*	0.0*	1.34	3.86	8.51	13.19	3.59	56.66 M
2010	8.31	3.31	6.89	6.89	7.30	5.25	4.61*	0.85*	1.98*	4.64*	6.19*	9.02*	56.22 M
Ave.	9.4	3.5	6.6	4.5	4.5	2.8	1.6	2.0	3.2	5.2	10.1	7.7	59.3
Min.	4.56	1.1	2.84	1.65	2.7	1.59	0	0.57	1.98	3.04	4.67	3.59	0
Max.	18.74	5.17	9.79	6.89	7.3	5.25	4.61	5.58	3.86	8.51	19.03	11.62	19.03

SOURCE: NOAA, Climatological Data, Snoqualmie Falls, * - indicates data was acquired from Snoqualmieweather.com to substitute for missing data in NOAA records
M – Insufficient or partial data. M is appended to average and/or total values computed with 1-9 daily values missing.

SOILS AND GEOLOGY

There are three main classifications of soils in the Snoqualmie area. These classifications are Bareston-Klaus-Skykomish, Tokul, and Edgewick-Seattle-Nooksack. The first two types, Bareston-Klaus-Skykomish and Tokul, are found on terraces, foothills, and till plains. The third soil type, Edgewick-Seattle-Nooksack, is found in flood plains, terraces, till plains, and river valleys. Brief descriptions of these soils from the USDA Soil Conservation Service are provided below.

Bareston-Klaus-Skykomish – The soils in this classification are moderately deep and very deep, somewhat excessively drained and well drained, nearly level to very steep soils on terraces and terrace escarpments.

Tokul – The soils in this classification are moderately deep, moderately well drained, nearly level to very steep soils on mountain foot slopes and in valleys.

Edgewick-Seattle-Nooksack – The soils in this classification are very deep, well drained, moderately well drained, and very poorly drained, nearly level soils on river terraces, on flood plains, in river valleys, and on glacial till plains.

Groundwater in the Snoqualmie area is contained in aquifers that consist of both river-deposited alluvium and glacially deposited outwash materials. The groundwater generally moves parallel to the bedrock in generally the same direction as the Snoqualmie River.

SURFACE WATERS

The Snoqualmie River is the main surface water body in the City. The river runs along the northern edge of the City. There are various tributary creeks flowing throughout the City's UGA that feed into the Snoqualmie River. Coal Creek and Kimball Creek flow from the southwest and south portions of the UGA, respectively.

SITE SENSITIVE AREAS

The following section summarizes information regarding site-sensitive/critical areas within the sewer service area of the City. Site sensitive areas within the sewer service area include those classified as wetlands, seismic hazard areas, slide hazard areas, flood hazard areas, and water bodies. The City of Snoqualmie municipal code Title 17, Zoning and Title 19, Environment provide protection to site sensitive areas. Municipal code 19.12.010, legislative purpose, provides the following summary of the code:

> *The purpose of this chapter is to provide for the designation and protection of sensitive areas, referred to as critical areas in the Washington Growth Management Act of 1990, Chapter 36.70A RCW, incorporating best available science, giving special consideration to conservation or protection measures necessary to preserve or enhance anadromous fisheries, as required by the Growth Management Act, to supplement the development requirements contained in the Snoqualmie Municipal Code, to alert tax assessors and appraisers to the presence of environmentally sensitive areas and the development limitations of such areas and to establish special standards for the use and development of lands based on the existence of natural conditions and features, including erosion, landslide, seismic hazard areas and steep slope areas, critical recharge areas, fish and wildlife conservation areas, streams, and wetlands.*

The following plans are being prepared by the City in addition to the municipal ordinances in place for the protection of the natural environment within the Snoqualmie sewer service area:

- Draft Shoreline Management Master Program
- Draft Snoqualmie Vicinity Comprehensive Plan

Erosion Hazard Areas

These areas are especially subject to erosion, if disturbed, and may not be well suited for high-density developments or intensive land uses. Municipal Ordinance 19.12.120 provides specific regulation of erosion hazard areas.

Seismic Hazard Areas

Seismic hazard areas are those with low-density soils that are more likely to experience greater damage due to seismic-induced subsidence, liquefaction, or landslides. Seismic hazard areas are regulated mainly with respect to public safety and with the exception of a severe earthquake, these hazard areas do not impact wastewater facilities. United States is divided into seismic hazard zones based upon historic documents. These zones range from category 1 to 4, with 4 representing the highest risk. Snoqualmie is Category 4, which means that the Snoqualmie building code must have the highest construction standards. Municipal Ordinance 19.12.150 provides specific regulation of seismic hazard areas.

Flood Hazard Areas

Flood hazard areas are areas adjacent to lakes, rivers, and streams that are prone to flooding during peak runoff periods. Flood hazard areas deserve special attention due to the sensitive nature of their ecosystems as well as the potential for damage to structures located in the floodplain. A significant portion of the Historic City is located in the floodplain of the Snoqualmie River. Figure 3-7 shows the flood hazard areas within the City's service area. The City's zoning regulations provide regulation of land use within the flood hazard areas.

Slide Hazard Areas

Slide hazards areas are those that are prone to unstable behavior due to steep slopes, lack of vegetation, or unconsolidated soils. Municipal Ordinances 19.12.130 and 19.12.140 provide specific regulation of landslide hazard areas and steep slope hazard areas, respectively.

Wetlands

Wetlands are defined by the EPA as areas that are inundated for at least part of the year. Wetlands support valuable and complex ecosystems and consequently development is severely restricted if not prohibited in most wetlands. Wetlands in the Snoqualmie sewer service area are shown on Figure 3-8. Municipal Ordinance 19.12.180 provides specific regulation of wetlands.

Water Bodies

Lakes and streams are classified as sensitive areas due to the variety of plants and animals that they support. Water bodies are shown on Figure 3-8.

Critical Aquifer Recharge Areas

The City of Snoqualmie uses groundwater as a significant portion of its water supply. The City has two well fields within the city limits and both are active. Since the wells are in the sewer service area, critical aquifer recharge areas are important areas to protect. Snoqualmie Municipal Code 19.12.200, Critical Aquifer Recharge Areas, requires a hydrogeologic assessment for all proposed hazardous activities in such areas or any case where the director determines that there is a potential to threaten the quality of groundwater in a critical aquifer recharge area.

Fish and Wildlife Habitat Conservation Areas

Sensitive fish and wildlife habitat is defined as areas which meet the definition of a "Fish and Wildlife Habitat Critical Area" pursuant to WAC 365-190-080(5) and is essential for maintaining specifically listed species in suitable habitats. Any proposed activity within 300 feet of these areas, including construction related to wastewater collection systems, requires that a habitat study be prepared. Snoqualmie Municipal Code 19.12.190, Fish and wildlife habitat conservation areas, lists the following areas within the City that are fish and wildlife habitat conservation areas:

- All wetlands and streams and their buffers
- All publicly owned spaces greater than 10 acres
- Meadowbrook Farm
- Two Sister Return Open Space
- Snoqualmie Point
- Three Forks Natural Area
- Snoqualmie River Open Space
- Kimball Creek Open Space

WATER SYSTEM

WATER SYSTEM HISTORY

The first source of water for the City was from springs and surface streams. Since the City was founded, the water system has expanded as needed to serve the growing population. In 1950, the City began to utilize Canyon Springs water source and a new 10-inch wooden transmission main was constructed from the springs to the existing distribution system. In 1968, service was extended about 3/4 of a mile north of the City to serve the Snoqualmie Falls Lodge (which is now the Salish Lodge). In 1973, Well No. 1 was constructed to provide supplemental supply on the Mount Si High School property near Park Street. The City's water system was extended to the Snoqualmie Valley Hospital at the southwest corner of the City in 1982.

City of Snoqualmie

General Sewer Plan
Figure 3-7
Flood Hazard Areas

LEGEND:

- CITY LIMITS
- URBAN GROWTH AREA
- PARCELS
- FLOODWAY
- 100 YEAR FLOODPLAIN
- 500 YEAR FLODPLAIN

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City of Snoqualmie

General Sewer Plan
Figure 3-8
Sensitive Areas

LEGEND:

- CITY LIMITS
- URBAN GROWTH AREA
- PARCELS

WETLANDS

- FRESHWATER EMERGENT WETLAND
- FRESHWATER FORESTED / SHRUB WETLAND
- FRESHWATER POND
- LAKE
- RIVER
- SLIDE AREAS / STEEP SLOPES
- 100 YEAR FLOODPLAIN

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The City's water system was substantially expanded in the mid-1990's to serve the Snoqualmie Ridge development. Two wells, Well Nos. 6 and 7, were drilled in 1995 and developed in 1996 at the North Well Field to serve the Snoqualmie Ridge Development. The 1040 Booster Station was constructed in 1996 and the 2.0 MG 1040 Reservoir No. 1 was constructed in 1997. A third well, Well No. 8, was drilled in 2001 and developed in 2002. In 2004, the 1040 Reservoir No. 2 was constructed adjacent to No. 1. In 2008 the 1180 and 1260 Booster Station was completed to serve Snoqualmie Ridge II (SR II).

EXISTING WATER SYSTEM

The City's water system is essentially separated into two areas. The Canyon Springs area includes the Historic City (599 Zone), the Johnson Heights pressure zone (709 Zone), and the Hospital/Winery pressure zones (799/1172 Zones). The Snoqualmie Ridge area currently includes the 1260, 1180, 1040, 890, 800, and 705 Zones. This area is served by the North Well Field and is augmented by the South Well Field and Canyon Springs. The two areas are connected by an intertie that consists of a PRV station and a booster station to allow flow between the 705 Zone and the 599 Zone. The two areas used to operate fairly independently of each other, but with continued growth and demand requirements in both areas, the system is operated more holistically.

SEWER FRANCHISE AGREEMENT

The City has a franchise agreement with King County for sewer outside of the city limits in the Snoqualmie Hills sewer service area. The franchise agreement is included in Appendix O. The sewer franchise area is shown on Figure 3-9. The franchise agreement allows the City to operate, maintain, repair, and construct sewer mains, service lines, and appurtenances in, over, along, and under King County roads and rights-of-way. The franchise area is within the City's UGA; the population projections and wastewater flow projections include this franchise area.

As a point of clarification the sewer service area includes an extended sewer line to the Echo Glen Children's Center in unincorporated King County and it should be noted that for this and other private lines there shall be no connections to the extended service lines in unincorporated King County.

Also, it should be noted that the Snoqualmie Hills planning area is included in the population growth projections for the sewer service area.

City of Snoqualmie

General Sewer Plan
Figure 3-9
South Snoqualmie Hills
Sewer Franchise Area

LEGEND:

- MANHOLES
- FORCEMAINS
- GRAVITY MAINS
- PS PUMP STATION
- CITY LIMITS
- CASINO
- FRANCHISE AREA
- URBAN GROWTH AREA
- PARCELS

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CASINO

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CHAPTER 4

EXISTING FACILITIES

INTRODUCTION

This Chapter describes existing facilities that comprise the City of Snoqualmie's wastewater collection and treatment systems. These facilities include force mains and gravity sewers, pump stations, water reclamation facilities, reclaimed water conveyance and river outfall.

WASTEWATER COLLECTION SYSTEM

Pump Stations

The City of Snoqualmie has fourteen major pump stations within its sanitary sewer system. The locations of these pump stations are shown in Figure 4-1. Basic information about the pump stations is included in Table 4-1. The common names for each pump station are listed in parentheses throughout this section. Descriptions of the various basins in which the pump stations are located appear in the next section.

TABLE 4-1

Pump Stations

Pump Station	Location	Basin No. Located In	Qty. of Pumps	Pump Motor Size (HP)	Pump Capacity (gpm, ea.)	Station Type	TDH (ft.)	Force Main Dia. (in.)
Pump Station No. 1 (Railroad Place)	Railroad Avenue SE south of Snoqualmie Parkway	1	2	40	1800	Submersible	66	10
Pump Station No. 2 (Pickering Court)	SE Fir Street west of Silva Avenue SE	1	2	7.5	400	Wet Pit/Dry Pit	25	8
Pump Station No. 3 (Park Street)	Park Avenue SE and SE Newton Street	3	2	7.5	700	Submersible	25	8
Pump Station No. 4 (Meadowbrook)	Meadowbrook Way SE north of SE Spruce Street	4	2	5	200	Submersible	25	6
Pump Station No. 5 (DECOMMISSIONED)	384th Avenue SE and Newton Street SE	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pump Station No. 6 (Honey Farm)	Southwest end of Kimball Creek Drive SE	1	2	3	100	Submersible	1.7	4
Kimball Creek Pump Station (Snoqualmie Parkway)	Snoqualmie Parkway and SE Fall City-Snoqualmie Road	KC	3	134	3,475	Immersible, Two Speed	100	14

TABLE 4-1 – (continued)

Pump Stations

Pump Station	Location	Basin No. Located In	Qty. of Pumps	Pump Motor Size (HP)	Pump Capacity (gpm, ea.)	Station Type	TDH (ft.)	Force Main Dia. (in.)
Pump Station E (Crestview)	Crestview Avenue SE northwest of SE Ridge Street	E	2	38	240	Submersible	141	6
Pump Station F (Fairview)	North end of Fairway Place SE	F	2	38	230	Submersible	123	6
Pump Station K2 (Burke)	SE Burke Street west of Douglas Avenue SE	K2	2	23	80	Submersible	140	4
Pump Station K3 (Muir)	SE Muir Street west of Augusta Place SE	K3	2	28	215	Submersible	95	6
Pump Station BP (Business Park)	SE Douglas Street and Bracken Place SE	BP	2	36	750	Submersible	110	6 and 8
Pump Station L (Carmichael)	SE Charmichael Street east of Elderberry Avenue SE	L	2	36	500	Submersible	110	8
Pump Station N6 (Whittaker)	Whittaker Lane SE north of SE Kendall Peak Street	E	2	10	98	Submersible	92	3(1)
Pump Station Z (Gala)	South end of SE Gala Court	KC	2	6	77	Submersible	71.5	3(1)

(1) Based on record drawings, the Gala (Z) Pump Station is connected to a 3-inch-diameter force main. Record drawings for the Whittaker (N6) Pump Station show that the force main consists of approximately 50 feet of 3-inch-diameter pipe to the street, where it transitions to a 4-inch force main. Based on the capacities listed in the table, the maximum velocities in the Gala (Z) Pump Station and the Whittaker (N6) Pump Station force mains are 3 and 4 feet per second, respectively. These maximum velocities fall within the acceptable design velocities of 2 to 8 feet per second, which justifies the use of 3-inch rather than 4-inch-diameter force main.

Pump Station No. 1 (Railroad Place)

Pump Station No. 1 was originally constructed in 1967 and was last upgraded in 2002. The upgrade converted the wet well and dry well into a single wet well equipped with two 40-hp KSB 150-401/326XG submersible pumps. Backup power is provided by an 80 kW natural gas generator that was installed in 2002. The station is connected to the City's telemetry system via a radio transmitter. The pump station building is a two story structure with a control room on the second floor above the 100-year flood plain elevation. The bottom floor houses a storage tank that contains Bioxide, which is used for odor control. Flow from the pump station is measured with a submersible 10-inch-diameter Danfoss MagFlow 5000 magnetic flow meter located in the valve vault.

City of Snoqualmie

General Sewer Plan
Figure 4-1
Collection System Map

LEGEND:

- PS PUMP STATION
- MANHOLES
- FORCEMAINS
- GRAVITY MAINS
- casino
- CITY LIMITS
- URBAN GROWTH AREA
- PARCELS

SEWER BASINS:

- #1
- #3
- #4
- BP
- E
- K3
- KC
- L

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N W E S

PS K2
PS F
PS N6
PS L
PS K3
PS E
SNOQUALMIE WATER RECLAMATION FACILITY
IPPS
KIMBAL CREEK PS
PS #1
PS #2
PS Z
PS #3
PS #4
PS BP
CASINO
PS #6
FROM ECHO GLEN CHILDREN'S CENTER

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Pump Station No. 2 (Pickering Court)

Pump Station No. 2 was originally constructed in 1967 and has not been substantially modified since it was constructed. A 7.5-hp Flygt Model 3127.090 submersible pump was installed in the dry pit to replace one of the original 7.5-hp Cornell Model 16F8 top mounted, shaft driven pumps in 2011. The second original pump remains in service. The pump station is equipped with a gas-powered engine to provide power to one of the pumps in the event of power loss to the station. This pump station was connected to the City's radio telemetry system in 2011.

Pump Station No. 3 (Park Street)

Pump Station No. 3 was originally constructed in 1967 and was last upgraded in 2010. The station was originally a wet pit/dry pit pump station with shaft driven pumps. The 2010 upgrade elevated the pump station above the floodplain, combined the wet pit and dry pit into a single wet well and installed two 7.5-hp Flygt Model NP 3127.090 submersible pumps on guide rails in a wet well. The 2010 modifications also included the addition of a 25 kW natural gas standby generator, radio telemetry and a valve vault with a pig launching port for pigging the force main.

Pump Station No. 4 (Meadowbrook)

Pump Station No. 4 was originally constructed in 1967 and was last upgraded in 2010. The station was originally a wet pit/dry pit pump station with shaft driven pumps. The 2010 upgrade elevated the pump station above the floodplain, combined the wet pit and dry pit into a single wet well and installed two 5-hp Flygt Model NP 3102 submersible pumps on guide rails in a wet well. The 2010 modifications also included the addition of a 25 kW natural gas standby generator, radio telemetry and a valve vault with a pig launching port for pigging the force main.

Pump Station No. 5 – DECOMMISSIONED

Pump Station No. 5 was originally constructed in 1982. As part of the project to install new sewers to serve the Snoqualmie Casino, this pump station was eliminated.

Pump Station No. 6 (Honey Farm)

Pump Station No. 6 was originally constructed in 1997 and has not been significantly upgraded since then. The station was constructed to serve the Old Honey Farm, the Country Inn, and a 15 house development. The pump station is located within a roundabout and consists of a wet well with two 10-hp Flygt Model 3127.090 submersible pumps with the controls in a small control building. The pump station control panel has pig tail connections for a portable generator to be connected and serve as temporary standby power. The discharge force main is configured to serve as a siphon in the event the pumps fail. The force main discharges to the same point in siphon mode as in normal

operation. When in siphon mode, the gravity sewer pipes that the pump station serves are surcharged. This pump station is connected to the City's radio telemetry system.

Kimball Creek Pump Station (Snoqualmie Parkway)

The Kimball Creek Pump Station (KCPS) was originally constructed in 1997. The pump station is equipped with three, 134-hp, two speed Wemco-Hidrostal Model 110K-M-LETT7 immersible prerotational pumps. With the exception of the former Weyerhauser Mill site and the Salish Lodge, all of the City's sewage is pumped by the Kimball Creek Pump Station to the WRF headworks via two 14-inch force mains. The current capacity of the pump station, which is equipped with three pumps and two 14-inch-diameter force mains, is 6,950 gallons per minute. The KCPS is equipped with a 450 kW diesel generator for standby power and radio telemetry. The pump station is also equipped with two 14-inch magnetic flow meters.

Pump Station No. E (Crestview)

Pump Station No. E was originally constructed in 1998. The pump station is equipped with two 28-hp KSB Model KRTK100-316/244x1G submersible pumps mounted on guide rails. A 60 kW natural gas generator located inside the pump station control building provides standby power to the lift station. The pump station is equipped with radio telemetry.

Pump Station No. F (Fairview)

Pump Station No. F was originally constructed in 1998. The pump station is equipped with two 28-hp KSB Model KRTK100-316/244x1G submersible pumps mounted on guide rails in a wet well. A 60 kW natural gas generator housed in a below grade vault provides standby power to the lift station. The pump station is equipped with radio telemetry.

Pump Station No. K2 (Burke)

Pump Station No. K2 was originally constructed in 2004. The pump station has two 23-hp Flygt CP3152.091 submersible pumps wet well guide rail. A 60 kW natural gas generator provides standby power to the lift station. The pump station is equipped with radio telemetry.

Pump Station No. K3 (Muir)

Pump Station No. K3 was originally constructed in 1998. The pump station is equipped with two 28-hp KSB Model KRTK100-316/244x1G submersible pumps mounted on guide rails in a wet well. A 60 kW natural gas generator located inside the pump station control building provides standby power to the lift station. The pump station is equipped with radio telemetry.

Pump Station No. BP (Business Park)

Pump Station No. BP was originally constructed in 1998 and upgraded in 2008. The pump station has two 36-hp KSB Model 100-316/294GX submersible pumps that were installed to replace the original 28-hp pumps as part of the 2008 upgrade project. A 100 kW natural gas generator provides standby power to the lift station. The pump station is equipped with radio telemetry. The 2008 upgrade project also included installation of an 8-inch force main parallel to the existing 6-inch-diameter force main, increasing the pump station capacity to 750 gpm.

Pump Station No. L (Carmichael)

Pump Station No. L was originally constructed in 2000. The pump station has two 36-hp KSB Model 100-316/294GX submersible pumps. A 60 kW natural gas generator housed in a small building provides standby power to the lift station. The pump station is equipped with radio telemetry.

Pump Station No. Z (Gala)

Pump Station No. Z was originally constructed in 2003. The pump station has two 6-hp Flygt Model CP3102.254 submersible pumps. A 30 kW natural gas generator housed in a small building provides standby power to the lift station. The pump station is equipped with radio telemetry.

Pump Station N6 (Whittaker)

Pump Station N6 was originally constructed in 2008 and has not been substantially modified since it was constructed. The duplex pump station consists of two 10-horsepower, Flygt NP3127 submersible pumps mounted in a 72-inch-diameter concrete wet well. The station has a capacity of 98 gallons per minute at a total dynamic head of 92 feet. Emergency power is provided by a 45 kW generator housed in a 185 square foot CMU building located on the pump station site. Sewage is pumped by Pump Station N6 via a 3-inch-diameter HDPE force main to the gravity collection system in Denny Park Drive, which conveys the sewage to Pump Station E. The station is equipped with radio telemetry.

Privately Owned Pump Stations

Two privately pump stations are located within the sewer service area: the former Weyerhauser Mill site and the Echo Glen Children's Center. The private collection systems are summarized below:

Former Weyerhauser Mill Site

The sewage from the privately-owned collection system at the former Weyerhauser Mill site is pumped by a pump station to the In-Plant Pump Station at the WRF through a 6-inch-diameter force main. Based on drawdown testing done by Gray & Osborne in 2009, the pump station has an approximate capacity of 290 gallons per minute. The Mill site is no longer used by Weyerhauser and is now being utilized by a rally car driving school that occupies one classroom and one office. The remainder of the collection system within the Mill site is no longer in use but has not been disconnected and continues to contribute I/I to the system. The site is owned by Snoqualmie Mill Ventures and the City plans to work with the Owner to address I/I contributions to the Water Reclamation Facility. The City has annexed the majority of the site, and the portion of the site that is not owned by the City is within the UGA. If the site is developed, the developer will be required to replace the existing collection system.

Echo Glen Children's Center

In accordance with the Developer Extension Agreement (DEA) dated July 25, 2005, the Echo Glen Children's Center (Echo Glen), operated by Washington Department of Social and Health Services (DSHS), decommissioned its wastewater treatment facility in 2006 and began conveying its untreated sewage to the City of Snoqualmie's collection system. Sewage from Echo Glen is conveyed to the City of Snoqualmie's collection system via a pump station owned by DSHS equipped with influent screening and two 35-hp Flygt NP3170.090 submersible pumps connected to a fused 6-inch-diameter force main that discharges to a manhole located at the intersection of Center Street and Snoqualmie Parkway. Per the DEA, Echo Glen is limited to a peak daily flow of 28,800 gallons per day based on agreement of 160 ERUs with a target daily average flow rate of 35,000 gpd. However, based on a review of flow data, this limit is exceeded regularly during winter months. The City suspects that the high flows are the result of significant infiltration and inflow into the Echo Glen collection system. Between 2010 and 2011, the average flow from Echo Glen was 37,125 gpd, which exceeds the 35,000 gpd target. The City is not currently working on additional I/I mitigation with DSHS. Under the DEA, DSHS is charged for flows in excess of 28,000 gpd, which provides a financial incentive for DSHS to initiate collection system upgrades.

History of Sewer Collection System

The City of Snoqualmie's original sewer system was installed in 1967. Numerous extensions to the original system have been made since it was originally constructed. The original system was constructed of 8-inch to 15-inch-diameter concrete pipe with rubber gasket joints. Sewers were laid at minimum grade, with most sewers averaging 6 to 8 feet below grade. Manholes were constructed of precast concrete sections with grouted joints and brick rider sections.

The City of Snoqualmie provides sanitary sewer service to approximately 1,791 acres within its existing corporate city limits. The existing city limits encompass a total area of approximately 4,161 acres. The urban growth area encompasses a total area of approximately 5,689 acres.

Description of Gravity Collection System

The existing sanitary sewer system is shown on Figure 4-1 and a summary of the existing gravity sewer pipes and force mains is provided in Table 4-2. The system consists of over 190,000 linear feet of 8-inch to 36-inch gravity sewers serving areas that are connected to the system by pump stations and force mains. All of the sewage from Historic Snoqualmie is conveyed to Pump Station No. 1, which pumps to the Kimball Creek Pump Station. Wastewater from the Snoqualmie Ridge flows by gravity via the 15-inch HPDE Parkway Interceptor to the Kimball Creek Pump Station. With the exception of flows from the Salish Lodge and the Weyerhauser Mill site, the Kimball Creek Pump Station pumps all of the City's sewage directly to the WRF headworks.

The City's sanitary sewer system also contains approximately 1,628 manholes. These manholes consist primarily of precast concrete manholes.

TABLE 4-2

Sewer Pipe Summary (All Lengths in Feet)

Pipe Diameter (in)	Pipe Length(ft.)
Gravity Sewers	
6	1,275
8	170,928
10	20,990
12	8,315
14	77
15	12,197
18	236
24	32
36	353
Total	**195,512 feet (37 miles)**
Force Mains	
2	1,109
3	5,249
4	5,077
6	6,802
8	4,288
10	2,542
14	6,874
Total	**31,941 feet (6.1 miles)**

Collection Areas

For the purposes of this report, the City of Snoqualmie collection system is divided into eight collection areas, or drainage basins. These collection areas predominantly follow the natural drainage patterns of the City's service area. The eight major basins are shown in Figure 4-1. The basins are named to coincide with the primary pump station that collects all of the sewage from that basin.

The sewers in the Historic Snoqualmie area, including Basins 1, 3 and 4, were constructed on alluvial deposits of silt and gravel. Sewers in a majority of this area are constructed within the seasonal groundwater table and become submerged in groundwater during the wet winter months. When the sewers are submerged, groundwater enters defects in the pipes and manholes, contributing to infiltration. Sewers in Snoqualmie Ridge, including Basins K3, L, E, BP and KC, were constructed outside of the floodplain and above the groundwater table, resulting in significantly less I/I into these sewers.

The following section describes the boundaries and land use designations of each basin, as well as information about the sewer lines within each basin.

Basin 1

Basin 1 consists of an area of about 354 acres in Historic Snoqualmie. The approximate boundaries of this basin are 384th Avenue SE on the west, the Snoqualmie River and Basin 3 on the east, Snoqualmie Parkway on the north, and Interstate 90 on the south. Basin 1 also includes an 8-inch gravity sewer line that serves two restrooms at the Rattlesnake Ridge parking lot and a 10-inch PVC gravity sewer line that serves the Snoqualmie Casino, which is located outside of the City limits. The designated land use in most of Basin 1 is single-family residential, office, and retail.

Sewage from the residential portions of Basin 1 is conveyed primarily by eight-inch concrete gravity sewer pipes to a 15-inch-diameter concrete and PVC trunk sewer that discharges to Pump Station No. 1 located in the north end of the drainage basin. Pump Station No. 2 collects sewage from a small subbasin in the northwest corner of the basin and Pump Station No. 6 pumps sewage from a small residential development on Kimball Creek Drive immediately east of 384th Avenue SE. Pump Station No. 3 conveys all of the sewage from Basins 3 and 4 to Basin 1. Pump Station No. 1 pumps the sewage from Basins 1, 3, and 4 to the Kimball Creek Pump Station.

Basin 3

Basin 3 consists of an area of about 190 acres located on the eastern edge of the City. The basin is bordered to the west by Basin 1, by Basin 4 to the east, the Snoqualmie River to the north, and an undeveloped, unsewered area to the south. Land use in this

basin includes single-family residential, Mt. Si High School and Snoqualmie Middle School.

Sewage from Snoqualmie Middle School, located in the southeast corner of the basin, and the Northwest Railway Museum, located to the south of the basin, is pumped into the Basin 3 gravity collection system by two small grinder pump stations. Sewage from Basin 4 is pumped by Pump Station No. 4 into the Basin 3 collection system. Sewage from Basin 3 is conveyed by 8-inch and 10-inch-diameter concrete gravity sewers to Pump Station No. 3, which is located in the northwest corner of the basin, and pumped to the Basin 1 gravity sewer system.

Basin 4

Basin 4 serves a residential area of approximately 88 acres located in the northeastern corner of the City. The basin is bordered by an undeveloped, unsewered area to the east and south, the Snoqualmie River to the north and Basin 3 to the west.

A majority of this basin is served by eight-inch concrete gravity sewer pipes. Sewage from the Centennial Fields Park is pumped into the basin by a small grinder pump station. Pump Station No. 4 pumps all of the sewage from Basin 4 to the Basin 3 gravity collection system.

Basin KC

Basin KC consists of an area of about 354 acres west of Historic Snoqualmie. The basin consists of mixed use development served primarily by 8-inch-diameter PVC sewers. The basin is bordered to the west by Basin BP, to the south by the City Limits, to the north by Basin E and to the east by Basin 1. With the exception of the sewage from the Salish Lodge and the former Weyerhauser mill site, Basin KC collects all of the sewage from the entire City.

Pump Station Z serves a small subbasin and pumps into the gravity sewer on the south side of Basin KC. The sewage from Snoqualmie Ridge, which includes Basins K1, K3, L, BP, E and F, is pumped by Pump Station Nos. BP, K3, and E into the gravity sewers on the western end of the basin. The sewage discharged from Pump Station Nos. BP, K3, and E and the sewage collected within the Basin KC are conveyed by gravity via a 15-inch PVC trunk sewer that runs along Snoqualmie Parkway to Kimball Creek Pump Station. Pump Station No. 1 pumps directly into the wet well of Kimball Creek Pump Station. The Kimball Creek Pump Station pumps all of the sewage from the City to the WRF headworks.

Basin L

Basin L consists of an area of approximately 170 acres in the northwest corner of the Snoqualmie Ridge I development. The basin is bounded on the north and west by the

City Limits, to the south by Basin BP and to the east by Basin K3. The basin consists of mixed use development, which is primarily single-family residential, served by 8-inch-diameter gravity sewers.

Sewage from the north end of the basin is pumped by Pump Station K2 to a manhole in Douglas Avenue, between SE Knowles Street and SE Charmichael Street, where it then flows by gravity to Pump Station L. All of the sewage in the basin is pumped by Pump Station L via an 8-inch force main to Basin KC.

Basin K3

Basin K3 consists of an area of approximately 103 acres in the north end of the Snoqualmie Ridge I development. The basin is bounded on the north by fairways for the Snoqualmie Ridge Golf Course and undeveloped land, to the east by Basin E, to the south by Basins BP and KC, and to the west by Basin L. The basin is zoned for mixed use development, and consists of primarily single-family residential, served by 8-inch-diameter gravity sewers.

Sewage from the north end of the basin is pumped by Pump Station F to a manhole immediately upstream of Pump Station K3. All of the sewage in the basin is pumped by Pump Station K3 via a 6-inch force main to Basin KC.

Basin E

Basin E includes approximately 100 acres of residential development located in the northeast corner of the Snoqualmie Ridge I development. The basin is bounded on the north by undeveloped, unsewered land, to the west by Basin K3, to the south by Basin KC and to the east by undeveloped, unsewered land. The basin is zoned for mixed use development, and consists of primarily single-family residential.

This basin is served by 8-inch PVC sewers that flow by gravity to Pump Station E. Pump Station E pumps all of the sewage from the basin to the gravity sewers on the north end of Basin KC.

Basin BP

Basin BP includes approximately 383 acres zoned for mixed land use, which includes a combination of commercial and residential development. This basin includes the southwestern corner of the Snoqualmie Ridge I development and a southern section of the Snoqualmie Ridge II development. The Snoqualmie Ridge II development is currently under construction and a significant portion of the development has not yet been connected to the sewer system. The basin is bounded on the north by Basins L and K3 and to the west, south and east by undeveloped, unsewered land.

This basin is served by 8-inch PVC sewers that flow by gravity to Pump Station BP. Pump Station BP pumps all of the sewage from the basin to the gravity sewers on the southwest corner of Basin KC.

Planned Collection System Expansions

Collection system expansions projects are planned to be completed by 2018 to serve the planned 1,009 homes that have not yet been constructed in the Snoqualmie Ridge II development. Roughly an additional 32,000 linear feet of 8-inch diameter gravity sewer pipe and a new pump station are currently planned to be constructed to serve the development (by developers). The developer has constructed a new pump station (the Vaughn Street Pump Station) which is not yet in service. Also, a pump station to serve the Snoqualmie Valley Hospital is currently under construction.

WATER RECLAMATION FACILITY

The City of Snoqualmie (City) constructed the original wastewater treatment plant in 1967. The facility consisted of a two-cell facultative lagoon with a total surface area of 6.7 acres and a total volume of 7.1 million gallons with floating surface aerators. Effluent from the lagoon system was disinfected with chlorine and discharged to the Snoqualmie River. The lagoon system remained in operation for more than 20 years with little significant change to the overall process.

In the early 1990s, the City began planning for a new facility that would accommodate anticipated rapid population growth while improving effluent quality in response to water quality problems in the Snoqualmie River. The City completed Phase I construction of the new water reclamation facility in 1997. The new facility consisted of a headworks facility with a mechanical bar screen and vortex grit removal, a single oxidation ditch, two secondary clarifiers, and a UV disinfection system. The existing lagoons were converted for use as sludge stabilization and storage ponds. The new facility also included rapid sand filtration, dedicated in-plant pumping systems for use in producing Class A reclaimed water, and a single-port diffuser in the Snoqualmie River.

The City completed the Phase II expansion of the water reclamation facility in 2003. The Phase II expansion included the construction of a second oxidation ditch, an additional rapid sand filter for effluent filtration, and additional low pressure UV light banks for effluent disinfection.

In 2008, the City removed the stored biosolids from the sludge storage lagoons. Following sludge removal, the lagoons were decommissioned. A new solids handling system was then constructed to process the WRF waste activated sludge. Construction of the solids handling system included a new sludge dewatering and drying building, an aerated waste sludge storage tank, a packaged mechanical fine screen for the waste sludge, a dewatering centrifuge with polymer feed system, a thermal sludge dryer, a dried

product surge bin, a dried product bagging system, and a biofilter. The system was designed to produce Class A biosolids via thermal sludge drying.

A new mechanical fine screen and washer/compactor were installed at the headworks in 2012. The City purchased and will install a new perforated plate mechanical fine screen with 6 millimeter openings at the headworks to replace the existing mechanical bar screen.

The Department of Ecology issued the current City of Snoqualmie NPDES operating permit effective May 1, 2014. The expiration date of the permit is May 1, 2019.

Figures 4-2 and 4-3 show a process schematic and a layout/process schematic for the WRF. The WRF liquid stream treatment processes include influent mechanical fine screening, grit removal, flow splitting, biological treatment in oxidation ditches, secondary settling in clarifiers, filtration, and UV disinfection. Waste activated sludge is transferred by pump to the sludge storage tank and then dewatered by a polymer-fed centrifuge. Sludge from the centrifuge is then conveyed to the sludge dryer, then to a product surge bin and finally a bagging system. A brief description of each unit process and facility component for the existing facility follows.

IN-PLANT PUMP STATION

The in-plant pump station pumps water up to the WRF headworks from a number of sources inside and outside of the WRF. The in-plant pump station was upgraded in July 2009. The two existing 22.5-hp submersible pumps were replaced with two 25-hp submersible non-clog pumps with increased hydraulic capacity. Table 4-3 presents the design criteria of the In-Plant Pump Station.

TABLE 4-3

In-Plant Pump Station Design Criteria

In-Plant Pump Station Design	
No. of Pumps	2
Capacity	1,085 gpm (1.56 mgd) @ 62 ft TDH
Motor	25 hp, 480V, 3 Phase
Type	Submersible Centrifugal

The in-plant pump station receives wastewater flow directly from a number of sources including the Salish Lodge, Weyerhaeuser Mill Site, Water Treatment Plant, Headworks drains, Oxidation Ditch drains, Filter Building drains, Operations Building drains, WAS Pump Room drain, WAS sump drain, Sludge Loading Station drain, Clarifier scum sump, Clarifier RAS sump, and the Solids Handling Building drains.

INFLUENT MAINS
MANUAL BAR SCREEN
MECHANICAL BAR SCREEN
GRIT CHAMBER
FLUME
SPLITTER BOX
RAS
OXIDATION DITCH NO. 1
OXIDATION DITCH NO. 2
FUTURE OXIDATION DITCH
MIXED LIQUOR CONTROL BOX
CLARIFIER NO. 1
CLARIFIER NO. 2
CLARIFIER NO. 3
CLARIFIER NO. 4
RAS PUMP
RAS
WAS
DRAIN
SCREENINGS COMPACTOR
GRIT WASHER
WASTE CONTAINER
DRAIN
SLUDGE FEED PUMP
AERATED WAS STORAGE TANK
MECHANICAL FINE SCREEN
OXIDATION DITCH DRAINS
WAS PUMPS
CENTRATE
CENTRIFUGE
SCRUBBER/ CONDENSER
THERMAL SLUDGE DRYER
BIOFILTER/ CARBON PACK
BAGGER
HEPA FILTER
VENT TO ATMOSPHERE
BAGGED CLASS "A" BIOSOLIDS
SCREENINGS WASHER/ COMPACTOR
WASTE CONTAINER
FILTRATE
SAND FILTER NO 1
SAND FILTER NO 2
SAND FILTER NO 3
SECONDARY EFFLUENT CONTROL
TURBIDITY SAMPLER
UV CHAMBER
CLASS "A" PUMPS
CHLORINE
OUTFALL TO SNOQUALMIE RIVER
TO EAGLE LAKE RECLAIMED WATER RESERVOIR
IN-PLANT PUMP STATION
RECYCLE FLOW

LEGEND

- PRIMARY PROCESS FLOW
- SECONDARY FLOW
- SLUDGE/SOLIDS FLOW
- FUTURE FLOW

CITY OF SNOQULMIE
GENERAL SEWER PLAN
FIGURE 4-2
WATER RECLAMATION FACILITY PROCESS SCHEMATIC

Gray & Osborne, Inc.
CONSULTING ENGINEERS

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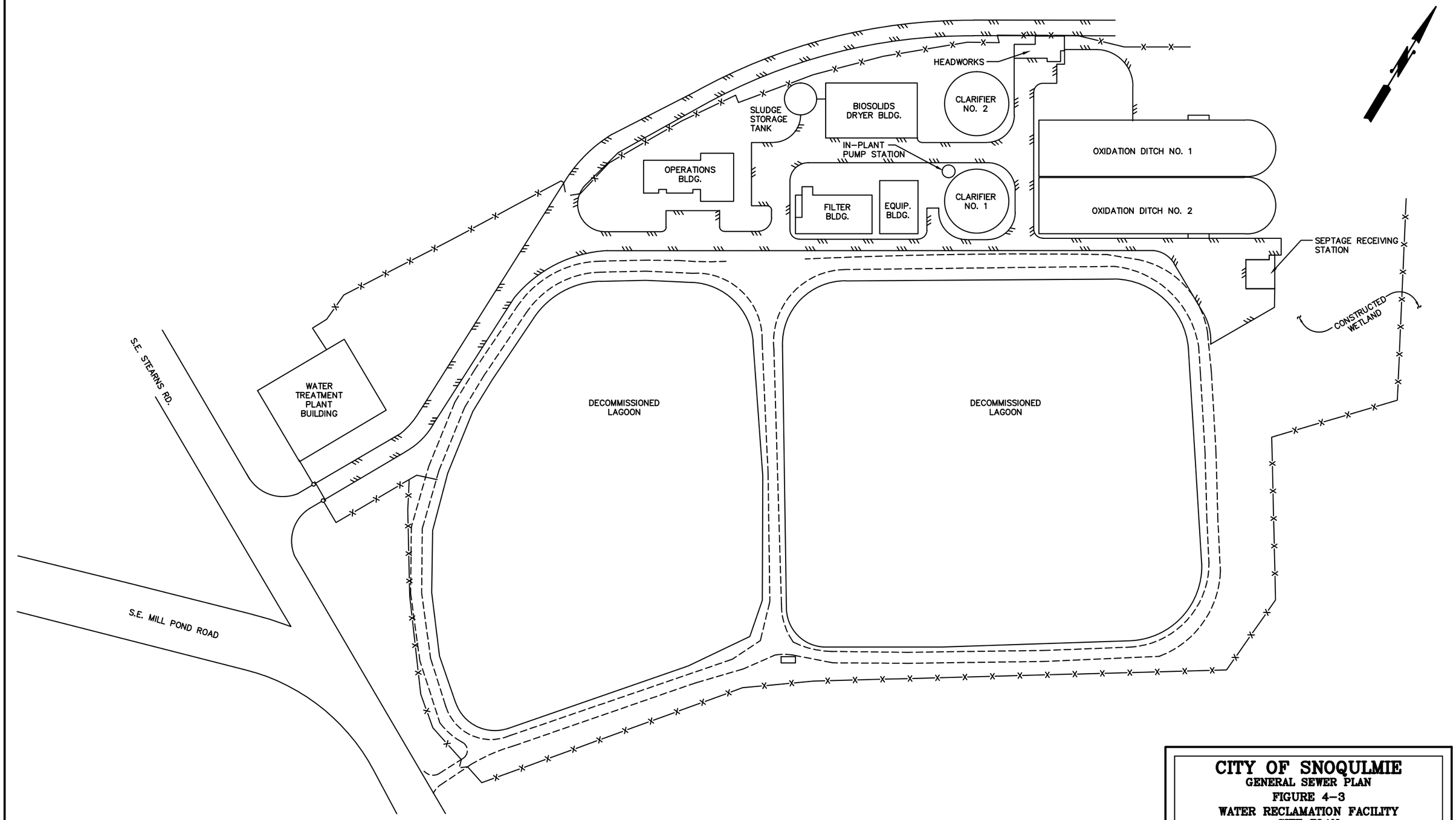

CITY OF SNOQULMIE

GENERAL SEWER PLAN

FIGURE 4-3

WATER RECLAMATION FACILITY SITE PLAN

Gray & Osborne, Inc.
CONSULTING ENGINEERS

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HEADWORKS

The headworks is designed for flow metering, screening and influent flow sampling. The original headworks structure was constructed in 1997. Influent first passes through the mechanical bar screen before entering the 18-inch Parshall flume for influent flow measurement. If the fine screen is out of service or if the influent flow exceeds the capacity of the screen, the excess wastewater is diverted to the manual bypass coarse bar screen. The manual bypass screen has a bar spacing of 1/2 inch. The screenings are transported by a screenings screw conveyor to a dumpster located adjacent to the headworks structure. Table 4-4 presents the design criteria for the headworks.

The headworks facility also has a 12-foot-diameter vortex grit chamber with a maximum flow capacity of 10 million gallons per day. The grit is airlifted to a grit classifier and the dewatered grit is dropped into a dumpster for disposal.

TABLE 4-4

Headworks Design Criteria

Flow Meter	
Quantity	1
Type	Parshall Flume
Throat Width	18"
Level Sensor	Ultrasonic
Flow Range	0 – 8,300 gpm (0-12.0 mgd)
Mechanical Bar Screen	
Quantity	1
Type	Perforated Plate
Opening	1/4"
Capacity	10.3 mgd
Motor	3/4 hp, 460 Vac, 3 Phase
Screenings Compactor	
Quantity	1
Type	Variable Pitch Screw
Diameter	7"
Motor	1.5 hp, 460 Vac, 3 Phase
Manual Bar Screen	
Quantity	1
Opening	1/2"
Influent Sampler	
Quantity	1
Type	24 Hour Composite Refrigerated

TABLE 4-4 – (continued)

Headworks Design Criteria

Grit Removal Chamber	
Quantity	1
Type	Vortex
Dimensions	12' Diameter
Capacity	10 mgd
Blowers	2 – 76 cfm each

OXIDATION DITCHES

The first oxidation ditch was constructed in 1997 and the second ditch was constructed in 2003. The second ditch was constructed with a flow splitter box incorporated into the footprint of the ditch. At the flow splitter box, primary influent flow is mixed with Return Activated Sludge (RAS) and then the combined flow is split between the two ditches.

The oxidation ditches are part of the activated sludge system and biological nutrient removal system. The oxidation ditches use the EIMCO Carrousel A^2C System process which includes denitrification. Flow from the splitter box enters the anaerobic zone which consists of two chambers with individual mixers. Following the anaerobic zone is the anoxic zone. The anoxic zone contains a large horizontal paddle mixer which mixes the flow from the anaerobic zone with regulated flow from the oxidation ditch. The oxidation ditch comprises the aerated zone. Each ditch has two vertical shaft aerators/mixers, one constant speed mixer and one variable frequency drive mixer at opposite ends of the basin.

Table 4-5 presents the design criteria for the oxidation ditches.

TABLE 4-5

Oxidation Ditch Design Criteria

Oxidation Ditches	
Quantity	2
Operation	Parallel
Side Water Depth	14 Feet
Volume	
Anaerobic Zone	0.20 MG
Anoxic Zone	0.52 MG
Aerated Zone	2.08 MG

TABLE 4-5 – (continued)

Oxidation Ditch Design Criteria

Hydraulic Detention Time	
Annual Average	41 hrs
Maximum Month	31 hrs
Sludge Yield	
lb TS/lb BOD Applied	0.75
Sludge Age	
Days	29 d
MLSS	
Concentration	4,000 mg/L
MLVSS	
Percent	70 %
Internal Recycle Ratio	
Internal Recycle Ratio	3.75
Internal Recycle Ratio at Max. Mo. Flow	8.1 mgd
F/M Ratio(1)	
Annual Average	0.062 ppd/BOD/lb MLVSS
Maximum Month	0.086 ppd/BOD/lb MLVSS
Organic Loading	
Annual Average	11 ppd BOD/1,000 CF
Maximum Month	15 ppd BOD/1,000 CF
Aerators	
Quantity	Two per ditch
Type	100 hp (1 – two speed, 1 – VFD) per ditch
Anaerobic Zone Mixers	
Quantity	Two per ditch
Type	6.3 hp directional
Anoxic Zone Mixers	
Quantity	One per ditch
Type	7.5 hp submerged turbine

(1) Includes MLVSS in Anoxic and Aerated Zones.

SECONDARY CLARIFIERS

Two 70-foot circular secondary clarifiers provide efficient and effective solids separation producing high quality effluent. The secondary clarifiers were constructed in 1997. The clarifiers have a 14-foot sidewater depth with conical bottoms. Each clarifier has two rake arms with sludge removal pipes. The rake arms have scraper blades that direct settled solids from the clarifier bottom to the sludge removal (uptake) pipes and the sludge hopper. The settled solids are comprised of return activated sludge (RAS) and

waste activated sludge (WAS). The RAS is collected by the sludge removal pipes. The WAS is collected in a hopper at the bottom of the clarifier and flows to the WAS collection sump and then pumped via progressing cavity pumps in the WAS Pump Room of the Equipment Building to the solids handling system for subsequent processing. RAS flows to the RAS Pump Station and is then pumped to the oxidation ditch splitter box. The scum and floatables are directed by a skimmer attached to the rake arms to a scum trough. The scum flows from the troughs into a sump located adjacent to the clarifiers. Scum is pumped to the solids handling system using the WAS pumps.

Table 4-6 presents the design criteria for the clarifiers.

TABLE 4-6

Secondary Clarifier Design Criteria

Secondary Clarifiers	
Quantity	2
Diameter	70 feet
Side Water Depth	14 feet
Volume, each clarifier	0.4 million gallons
Solids Loading Rate (2032 peak hour flow)	1.06 lb/sf-h
Surface Overflow Rate (2032 peak hour flow)	835 gpd/sf

RETURN ACTIVATED SLUDGE PUMP STATIONS

The return activated sludge (RAS) pump stations consist of two 25-hp variable speed submersible pumps, each with a pumping capacity of 1,740 gallons per minute at 26 feet of head at each clarifier. The RAS pump stations pump activated sludge collected in the secondary clarifiers to the oxidation ditch splitter box. The pump stations are located in a sump structure on the outer wall of each clarifier and were constructed in 1997.

Table 4-7 presents the design criteria for the RAS Pump Stations. The pump stations are identical at Clarifier No. 1 and Clarifier No. 2.

TABLE 4-7

RAS Pump Station Design Criteria

RAS Pump Station Design	
No. of Pumps	2
Type	Submersible
Capacity	1,740 gpm @ 26 ft TDH
Motor	25 hp, 480V, 3 Phase, VFD

WASTE ACTIVATED SLUDGE PUMP ROOM

The waste activated sludge (WAS) pump room is located in the Equipment Building and was originally constructed in 1997. The pump station consists of two 20-hp constant speed progressing cavity pumps with a pumping capacity of 200 gallons per minute at 50 feet of head. The WAS Pump Room was modified in 2009 in conjunction with the work to construct the solids handling system. The scum sumps were connected to the inlet side of the WAS pumps. New valves and valve actuators were installed to provide interlocked flow control of the scum and WAS flow to the progressing cavity pumps.

Table 4-8 presents the design criteria for the WAS Pump Station.

TABLE 4-8

WAS Pump Station Design Criteria

RAS Pump Station Design	
No. of Pumps	2
Type	Progressing Cavity
Capacity	200 gpm @ 50 ft TDH
Motor	25 hp, 480V, 3 Phase

SECONDARY EFFLUENT CONTROL STRUCTURE

The secondary effluent control structure is located downstream of the secondary clarifiers and upstream of the ultraviolet disinfection system and reclaimed water filters. The control structure was constructed in the Phase 1 upgrade. The control structure provides the operators with a means to measure and control the flow of clarifier effluent. The control structure has a v-notched weir with an ultrasonic level sensor for flow measurement. The flow measurement is used for process monitoring and flow-pacing the RAS pumping rate. The flow can be diverted to the ultraviolet disinfection system or to the reclaimed water filters by operating slide gates. In addition, the secondary effluent control structure contains an injection point with a diffuser for effluent conditioning by polymer or alum.

Table 4-9 presents the design criteria for the secondary effluent control structure.

TABLE 4-9

Secondary Effluent Control Structure Design Criteria

Effluent Control Structure	
Quantity	1
Type	V-notch Weir
Level Sensor	Ultrasonic

ALUM SYSTEM

The alum system is designed to provide enhancement of suspended solids removal in the clarifiers and reclaimed water filters. The alum system consists of a 7,600-gallon storage tank and two 1/4-hp positive displacement variable speed diaphragm pumps and piping. The alum system can inject liquid alum solution at the mixed liquor control structure or at the secondary effluent control structure. The alum system was constructed during the Phase 1 upgrades.

Table 4-10 presents the design criteria for the alum system.

TABLE 4-10

Alum System Design Criteria

Alum System	
Storage	1 – 7,600 gallon tank
No. of Pumps	2
Type of Pumps	1/4-hp positive displacement, variable speed

POLYMER SYSTEM

The polymer system is designed to provide enhancement of suspended solids removal in the clarifiers and reclaimed water filters. Liquid polymer is stored in 55-gallon drums and totes in the Equipment Building. The polymer feed system uses a 1/3 hp variable speed, variable stroke, positive displacement diaphragm pump to blend water with raw polymer and pump it to the injection points. The polymer system was designed to inject polymer at the mixed liquor control structure or at the secondary effluent control structure.

Table 4-11 presents the design criteria for the Polymer System.

TABLE 4-11

Polymer System Design Criteria

Alum System	
Storage	55 gallon drums
No. of Pumps	1
Type of Pumps	1/3-hp positive displacement, variable speed

RECLAIMED WATER FILTERS

The secondary clarifier effluent flows by gravity from the secondary effluent control structure to the reclaimed water filters. The reclaimed water filters are rapid sand filters that provide additional removal of suspended solids and colloidal matter from the secondary effluent. The filters consist of three concrete basins filled with fine sand used as filtration media. The first two filters were constructed in 1997 and the third filter was constructed in 2003. The sand is suspended by the filter floor over an air plenum with an effluent drain system below. Scour air is supplied by low pressure blowers to fluidize the filter media to facilitate the flow of effluent through the media. Clarifier effluent flows by gravity from the secondary effluent control structure to the reclaimed water filters. Water flows by gravity through the filters and subsequently to the ultraviolet disinfection system. Periodically, each filter undergoes a backwash process in which a traveling backwash hood and suction pump pumps filtered water from the plenum up through the media, fluidizing it and washing accumulated solids to a launder trough for removal to the drain system. The filters can be used to help the WRF meet the percent removal requirement of total suspended solids (85 percent removal) when influent flows are diluted by infiltration and inflow and are required to operate when the WRF is producing reclaimed water.

RECLAIMED WATER PUMPS AND PIPELINE

The reclaimed water pumps pump treated reclaimed water produced by the WRF and well water to the reclaimed water outfall at Eagle Lake. The pumps are located in the reclaimed water sump adjacent to the UV disinfection channel. There are two 100 hp constant speed vertical turbine pumps capable of pumping 500 gpm each at 587 feet of total dynamic head. The reclaimed water is pumped through approximately 21,000 feet of 8-inch pipe to the reclaimed water storage location, which is the Hole 9 Pond at TPC Snoqualmie Ridge Golf Course (also known as Eagle Lake). The reclaimed water pumps and pipeline were installed during the Phase 1 upgrade project. The pipeline is equipped with a continuous total chlorine residual analyzer at the hydrant sampling port for compliance monitoring. Presently, water from City Well #7 is used to supplement the reclaimed water flow to meet irrigation needs at the golf course. However, due to limited

water supply, it is expected that use of potable water to supplement the reuse water will be discontinued in the near future.

Table 4-12 presents the design criteria for the reclaimed water system.

TABLE 4-12

Reclaimed Water System Design Criteria

Filters	
Quantity	3
Type	Rapid Sand
Filter Area, per filter	290 square feet
Filter Area, total	870 square feet
Peak Capacity	3.13 mgd
Surface Loading Rate, average	1.25 gpm/sf
Surface Loading Rate, peak	2.50 gpm/sf
Backwash Rate	20 gpm/sf
Filter Backwash Pumps	
Quantity	3
Capacity	355 gpm
Reclaimed Water Pumps	
Quantity	2
Type	100 hp Vertical Turbine
Capacity, each pump	500 gpm @ 587 feet TDH
Capacity, station	1.44 mgd

ULTRAVIOLET DISINFECTION

The ultraviolet (UV) disinfection system disinfects effluent prior to discharge to the river outfall or to the reclaimed water pumps. The UV disinfection system consists of two horizontal open concrete channels with six banks of UV lights contained in 48 modules for a total of 480 UV lamps in the channels. The system was initially installed in the Phase 1 upgrade and additional capacity was added in the Phase 2 upgrades.

Table 4-13 presents the design criteria for the UV disinfection system.

TABLE 4-13

UV Disinfection System Design Criteria

UV System	
No. of Channels	2
No. of Module Banks	6
No. of Modules	48
No. of Bulbs per Module	10
Total number of Lights	480
Capacity	10 mgd
Design Transmittance	60%
UV Dose	39,700 μW-S/cm^2 @ 253.7 nanometers
Retention Time	3.48 S

CHLORINE DISINFECTION

Reclaimed Water Outfall

The WRF adds chlorine to the reclaimed water main distribution line to provide a chlorine residual of minimum 0.7 mg/L in accordance with the reclaimed water discharge limitations for the reclaimed water outfall. The chlorine residual is monitored at the hydrant sample port located at the BPA easement road near the end of the reclaimed water main distribution line at the Eagle Lake storage reservoir.

River Outfall

The WRF has the ability to add chlorine to the effluent prior to discharge to the river during emergency periods when UV disinfection is not available or if the plant experiences an upset that interferes with the UV disinfection system. A temporary delivery system is set up at the secondary effluent control structure for use as a disinfectant. The piping and structures to the UV disinfection channels and the channels themselves provide sufficient contact time for chlorine disinfection. To minimize the concentration of chlorine discharge to the river, dechlorination tablets are placed in the effluent flow at the V-notch weir. The permitted maximum daily total chlorine residual is 52μg/L.

OUTFALL

The effluent from the UV disinfection system flows by gravity to the outfall pipe. The outfall consists of a 1,500-foot-long 36-inch-diameter pipe with a single port diffuser

submerged in the Snoqualmie River. The pipe is constructed of concrete until it enters the Snoqualmie River where the material of construction of the pipe is ductile iron.

SLUDGE STORAGE TANK

Waste activated sludge is pumped to the 34-foot-diameter painted steel sludge storage tank located adjacent to the Solids Handling Building. The tank has a capacity of approximately 114,000 gallons. The sludge passes through a mechanical fine screen with 1/4-inch bar spacings and then into the tank. The screenings captured by the screen are discharged to a washer/compactor and then to a disposal container. A progressing cavity sludge feed pump equipped with a variable frequency drive pumps the waste activated sludge to the dewatering centrifuge. The tank is equipped with an aerated blower and 24 coarse bubble air diffusers. The storage tank was constructed in 2009 as a part of the solids handling system construction.

SLUDGE DEWATERING CENTRIFUGE

The waste activated sludge is combined with polymer for conditioning prior to entering the dewatering centrifuge in the Solids Handling Building. The centrifuge dewaters the waste activated sludge to approximately 18 percent solids. The centrifuge is a solid bowl scroll type with a nominal throughput capacity of 35 to 55 gallons per minute. The dewatered sludge cake is transferred by a screw conveyor to the cake hopper. The centrate drains to the in-plant pump station. The centrifuge was installed in 2009 as a part of the solids handling system and is located in the Solids Handling Building.

THERMAL SLUDGE DRYER

Dewatered sludge cake is transferred from the hopper to the thermal sludge dryer via screw conveyor. The thermal sludge dryer dries the sludge cake from about 18 percent solids to at least 90 percent solids. The dryer passes heated thermal fluid through hollow flights of an internal auger to heat the sludge cake. Hot gasses are exhausted to a scrubber/condenser and then treated in a biofilter. Once the sludge has achieved the desired dryness and temperature, it is discharged from the thermal sludge drier to a surge bin. The dryer produces dried biosolids that meet the regulatory requirements for Class A biosolids. The biosolids are conveyed to a surge bin and subsequently to a product bagger for temporary storage. The thermal sludge dryer is located in the Solids Handling Building and was installed in 2009.

Table 4-14 presents the design criteria for the solids handling facilities.

TABLE 4-14

Solids Handling Design Criteria

Sludge Storage Tank	
Quantity	1
Volume	114,000 gallons
Solids Detention Time	14 days
Sludge Dewatering Centrifuge	
Quantity	1
Capacity	55 gpm
Thermal Sludge Dryer	
Quantity	1
Capacity	3.3 wet cy/batch
Output Solids Concentration	90 percent

VACTOR/EDUCTOR RECEIVING STATION

A vactor/educator receiving station is provided to receive material from vactor/eductor trucks. Material is collected in a drainage basin at grade and conveyed to the in plant pump station where it is combined with the plant recycle flows and pumped to the headworks.

ELECTRICAL SYSTEMS

The electrical system at the WRF has a 480 volt 3 phase electrical service serving a 200-amp main distribution switchboard. This switchboard serves existing panelboards and motor control centers. The Electrical Room in the Equipment building houses the main distribution switchboard and most of the motor control centers. The WRF has a 250 kW standby power engine generator which only serves a fraction of the equipment at the WRF.

SCADA SYSTEM

Supervisory Control and Data Acquisition (SCADA) systems are sophisticated technologies which allow for the centralized viewing, modification, storage, and organization of the vast amount of data measured and collected by equipment throughout a treatment plant. Typically, SCADA systems include software programs and computers located at a central location within the plant. These computers are often called human machine interfaces (HMI) and allow operators to access current or historical data from any piece of equipment or process throughout the plant.

Using these software packages, the operators are able to print historical reports, view maximum/minimum water quality values, monitor flows, view alarm status, and also to change/modify settings on the process equipment – among additional functions.

The WRF SCADA system consists of WonderWare V10.5 on a central PC located in the operations building at the WRF as well as in the electrical room.

WRF DESIGN CRITERIA

The design loading criteria for the City of Snoqualmie Water Reclamation Facility, as presented in the 1995 Wastewater Facilities Engineering Report and the City's current NPDES permit, are shown in Table 4-15.

TABLE 4-15

Water Reclamation Facility Existing NPDES Permit Limits: Influent Design Criteria

Parameter	Value
NPDES Influent Design Criteria	
Maximum Month Flow (MGD)	2.15
Maximum Monthly Loading, BOD_5 (lb/d)	5,220
Maximum Monthly Loading, TSS (lb/d)	5,220

The City discharges treated effluent to two separate outfalls (Outfall Nos. 001 and 002). Outfall No. 001 discharges to the Snoqualmie River immediately upstream of Snoqualmie Falls. Effluent from Outfall No. 001 is subject to total maximum daily load (TMDL) limits from August to October. These limits are based on the *1994 Snoqualmie River Total Maximum Daily Load Study* (Publication Number 94-71). TMDL limits have been established for carbonaceous biochemical oxygen demand, pH, total ammonia as NH_3-N, and total residual chlorine. The technology-based and TMDL-based permit limits for Outfall 001 are summarized in Table 4-16 below.

TABLE 4-16

Water Reclamation Facility Existing NPDES Permit Limits:
Outfall No. 001 – Snoqualmie River Outfall

Parameter	Technology-Based Limits		TMDL-Based Limits (Aug-Oct)
	Average Monthly	Average Weekly	Maximum Daily[2]
Effluent Limitations: Outfall No. 001[1]			
Carbonaceous Biochemical Oxygen Demand	25 mg/L, 448 lbs/day[5], 85% removal of influent CBOD	40 mg/L, 717 lbs/day	206 lbs/day
Total Suspended Solids	30 mg/L, 538 lbs/day, 85% removal of TSS	45 mg/L, 807 lbs/day	N/A
Fecal Coliform Bacteria	200/100 mL	400/100 mL	Technology Limits
pH[3]	$6 \leq pH \leq 9$		
Total Ammonia (as NH_3-N)	N/A	N/A	68.7 lbs/day
Total Residual Chlorine[4]	N/A	N/A	52 mg/L
Temperature Maximum 7 Day Planning Average (Effective June-September only)	N/A	N/A	24.7°C

(1) The average monthly and weekly effluent limitations are based on the arithmetic mean of the samples taken with the exception of fecal coliform, which is based on the geometric mean.

(2) The maximum daily effluent limitation is defined as the highest allowable daily discharge. The daily discharge means the discharge of a pollutant measured during a calendar day. For pollutants with limitations expressed in units of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the day. For other units of measurement, the daily discharge is the average measurement of the pollutant over the day. This does not apply to pH.

(3) Indicates the range of permitted values. The instantaneous maximum and minimum pH must be reported monthly. Not an average value.

(4) Chlorine limits apply only during emergency periods when UV disinfection is not available and the use of chlorine for disinfection is required. During normal operations with UV disinfection, chlorine limits are not applicable.

(5) Effective November-July.

Outfall No. 002 discharges reuse quality effluent to Eagle Lake at the TPC Snoqualmie Ridge Golf Course that is reused for irrigation of the golf course. The permit limits for Outfall No. 002 are summarized in Table 4-17 below. Effluent from Outfall No. 002 is not subject to TMDL limits.

TABLE 4-17

Water Reclamation Facility Existing NPDES Permit
Reclaimed Water Limits: Outfall No. 002 – Eagle Lake Outfall

Reclaimed Water Limitations: Outfall No. 002			
Oxidized Wastewater – Secondary Effluent			
Dissolved Oxygen	Must be measurably present in secondary effluent at all times.		
Coagulated/Filtered Wastewater – Prior to Disinfection			
Parameter	**Average Monthly(1)**	**Average Weekly(2)**	**Sample Maximum(3)**
Turbidity	2 NTU	N/A	5 NTU
Disinfected – Reclaimed Water			
Parameter	**Average Monthly(1)**	**Average Weekly(2)**	**Sample Maximum(3)**
Carbonaceous Biochemical Oxygen Demand	25 mg/L	40 mg/L	N/A
Total Suspended Solids	30 mg/L	45 mg/L	N/A
Total Nitrogen as N	10 mg/L	N/A	15 mg/L
Parameter	**Maximum 7-day Median(4)**	**Sample Maximum**	
Total Coliform	2.2 MPN/100 mL	23 MPN/100 mL	
pH	$6 \leq pH \leq 9$		
Parameter	**Daily Minimum Concentration**		
Chlorine Residual	0.7 mg/L		

(1) The average monthly effluent limitation is defined as the highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

(2) The average weekly effluent limitation is defined as the highest allowable average of daily discharges measured during that week.

(3) The sample maximum is defined as the value not to be exceeded by any single sample.

(4) The median number of total coliform organisms in the reclaimed water after disinfection may not exceed 2.2 per 100 milliliters, as determined from the bacteriological results over 7 consecutive days for which analysis have been completed. This value is not an arithmetic average or geometric average. Median is defined as the middle number of a group of numbers; that is, half the numbers have values that are greater than the median, and half the numbers have values that are less than the median. The number of total coliform organisms must not exceed 23 per 100 milliliters in any single sample.

CHAPTER 5

WASTEWATER FLOW AND LOADING PROJECTIONS AND DESIGN CRITERIA

INTRODUCTION

This chapter provides information on existing hydraulic, organic, and solids loadings to the City's existing WRF and presents projections of future flows and loadings through the 20-year planning period (2032). Quantifying the existing loadings to the WRF is necessary to determine the level at which the existing wastewater treatment processes are operating, relative to their current capacities, and to project performance under future flows and loadings.

Adequate design of wastewater treatment and conveyance facilities requires the determination of the quantity and quality of wastewater generated from each of the contributing sources. Typically, wastewater is predominantly domestic in origin with lesser amounts contributed by commercial and light industrial businesses and by public use facilities such as schools, parks, hospitals, and municipal functions. The flows to the City of Snoqualmie WRF are predominantly from domestic sources. Additionally, significant infiltration and inflow (I/I) contributions result from groundwater and surface water entering the sewer system during periods of high groundwater levels and rainfall, respectively, as occurs in many other communities in western Washington.

DEFINITIONS OF TERMS

The terms and abbreviations used in the analysis are described below, listed in alphabetical order.

AVERAGE ANNUAL FLOW

Average annual flow is the average daily flow over a calendar year. This flow parameter is used to estimate annual operation and maintenance costs for treatment and lift station facilities.

AVERAGE DRY WEATHER FLOW

Average dry weather flow is wastewater flows during periods when the groundwater table is low and precipitation is at its lowest of the year. The dry weather flow period in western Washington normally occurs during June through September. During this time, the wastewater strength is highest, due to the lack of dilution with the ground and surface water components of infiltration and inflow. The higher strength coupled with higher temperatures and longer detention times in the sewer system create the greatest potential

for system odors during this time. The average dry weather flow is the average daily flow during the three lowest consecutive flow months of the year. For this study, average flows for July, August, and September are used.

BIOCHEMICAL OXYGEN DEMAND (BOD)

Biochemical oxygen demand (BOD) is a measure of the oxygen required by microorganisms in the biochemical oxidation (digestion) of organic matter. BOD is an indicator of the organic strength of the wastewater. If BOD is discharged untreated to the environment, biodegradable organics will deplete natural oxygen resources and result in the development of septic (anaerobic) conditions. BOD data together with other parameters are used in the sizing of the treatment facilities and provide a measurement for determining the effectiveness of the treatment process. BOD is expressed as a concentration in terms of milligrams per liter (mg/L) and as a load in terms of pounds per day (lb/d). The term BOD typically refers to a 5-day BOD, often written BOD_5, since the BOD test protocol requires five days for completion. BOD_5 of a wastewater is composed of two components – a carbonaceous oxygen demand ($CBOD_5$) and a nitrogenous oxygen demand ($NBOD_5$). The use of $CBOD_5$ as a parameter for evaluating wastewater strength removes the influence of nitrogenous components, including ammonia and organic nitrogen.

CHLORINE

Chlorine is a chemical element that acts as a strong oxidant when exposed to certain components of organic matter. Chlorine is widely used as a disinfectant in wastewater treatment, and is available both in gaseous (elemental chlorine) and solution forms (hypochlorite). Chlorine is a toxic chemical and is lethal to aquatic biota if present in too high a concentration. Additionally, some organic constituents may react with the chlorine to interfere with chlorination or form toxic compounds, such as chloroform, that can have long-term adverse effect on the beneficial uses of the waters to which they are discharged. To minimize the effects of potentially toxic chlorine residuals on the environment, it has sometimes been found necessary to dechlorinate wastewater treated with chlorine or substitute alternative disinfection systems such as ultraviolet disinfection, as the City of Snoqualmie uses. The City occasionally uses hypochlorite for other purposes at the WRF such as cleaning the clarifier weirs.

CONTAMINANTS OF CONCERN

Contaminants of concern in wastewater, in addition to chlorine, BOD and TSS discussed elsewhere in this section, include nutrients, priority pollutants, heavy metals, and dissolved organics. The City's NPDES permit requires the removal of biodegradable organics ($CBOD_5$), suspended solids, pathogens (indicated by fecal coliform bacteria), and total ammonia (as NH_3-N seasonally). The reclaimed water discharge permit also limits total coliform, total nitrogen as N, and turbidity in the discharge. Many of the

more stringent standards that have been developed and applied recently to other facilities deal with the removal of nutrients and priority pollutants.

Nutrients such as nitrogen and phosphorus, along with carbon, are essential requirements for growth. When discharged to the aquatic environment, these nutrients can lead to the growth of undesirable aquatic life. When discharged in excessive amounts on land, they can also lead to the pollution of groundwater. Additionally, in too high a concentration, nutrients, particularly ammonia, can be toxic to aquatic life.

Priority pollutants are organic and inorganic compounds selected on the basis of their known or suspected carcinogenicity, mutagenicity, teratogenicity, or high acute toxicity. Many of these compounds are found in wastewater. Inorganic constituents, including heavy metals, are often present in wastewater due to commercial and industrial activities and may have to be removed if the presence of the metals will adversely affect the receiving water, or, if the wastewater is to be reused. Some heavy metals (most notably copper) can be present in wastewater due to leaching from drinking water pipes. Per the terms of its NPDES permit, Snoqualmie is required to monitor for heavy metals in WRF influent and effluent quarterly and sludge once during the permit cycle.

DOMESTIC WASTEWATER

Domestic wastewater is wastewater generated from single- and multifamily residences, permanent mobile home courts, and group housing facilities such as nursing homes. Domestic wastewater flow is generally expressed as a unit flow based on the average contribution from each person per day. The unit quantity is expressed in terms of gallons per capita per day (gpcd).

EQUIVALENT RESIDENTIAL UNIT (ERU)

An equivalent residential unit (ERU) is a baseline wastewater generator that represents the average single-family residential household. An ERU can also express the average annual flow contributed by a single-family household, in units of gallons per day, or an annual average loading (of 5-day biochemical oxygen demand or total suspended solids) contributed by a single-family household, in units of pounds per day.

INFILTRATION

Infiltration is groundwater entering a sewer system by means of defective pipes, pipe joints, or manhole walls. Infiltration quantities exhibit seasonal variation in response to groundwater levels. Storm events or irrigation trigger a rise in the groundwater levels and increase infiltration. The greatest infiltration is observed following significant storm events prolonged periods of precipitation. Since infiltration is related to the total amount of piping and appurtenances in the ground and not to any specific water use component, it is generally expressed in terms of the total land area being served. The unit quantity generally used is gallons per acre per day.

INFLOW

Inflow is surface water entering the sewer system from yard, roof, and footing drains from cross connections with storm drains and through holes in manhole covers. Peak inflow occurs during heavy storm events when storm sewer systems are taxed beyond their capacity, resulting in hydraulic backups and local ponding. Inflow, like infiltration, can be expressed in terms of gallons per capita day or gallons per acre per day.

WRF flow records are utilized to characterize combined infiltration and inflow (I/I) in the Snoqualmie system in terms of peak hour, peak day, maximum month, and average annual I/I.

MAXIMUM MONTH FLOW (TREATMENT DESIGN FLOW)

Maximum month flow is the highest average monthly flow during a calendar year. In western Washington, the maximum month flow normally occurs in the winter due to the presence of more I/I. This wintertime flow is composed of the normal domestic, commercial, and public use facilities flows with significant contributions from inflow and infiltration. The predicted maximum month flow at the end of the design period is used as the design flow for sizing treatment processes and selecting treatment equipment.

NON-RESIDENTIAL WASTEWATER

Non-residential wastewater is wastewater generated from commercial activities, such as restaurants, retail and wholesale stores, service stations, and office buildings, and industrial flow (process wastewater, rinse water, and other industrial activities). Non-residential wastewater quantities for commercial and industrial wastewater are expressed in this Plan in terms of equivalent residential units (ERUs).

PEAK HOUR FLOW

Peak hour flow is the highest average hourly flow during a calendar year. The peak hour flow in western Washington usually occurs in response to a significant storm event preceded by prolonged periods of rainfall which have previously developed a high groundwater table in the service area. Peak hour flows are used in sizing the hydraulic capacity of wastewater collection, treatment, and pumping components. Peak hour flow is typically determined from treatment facility flow records and projected future flows.

SUSPENDED SOLIDS

Suspended solids are the solid matter carried in the waste stream. The total suspended solids (TSS) in a wastewater sample are determined by filtering a known volume of the sample, drying the filter paper, and measuring the increase in weight of the filter paper. TSS is expressed in the same terms as BOD; milligrams per liter for concentration and

pounds per day for mass load. The amount of TSS in the wastewater is used in the sizing of treatment facilities and provides another measure of the treatment effectiveness. The concentration of TSS in wastewater affects the treatment facility biosolids production rate, treatment and storage requirements, and ultimate disposal requirements.

WASTEWATER

Wastewater is water-carried waste from residential, business, industry, and public use facilities, together with quantities of groundwater and surface water which enter the sewer system through defective piping and direct surface water inlets. The total wastewater flow is quantitatively expressed in millions of gallons per day (mgd).

EXISTING WASTEWATER FLOWS AND LOADING

WRF records for the 6-year period from 2006 through 2011 were reviewed and analyzed to determine current wastewater flow, characteristics, and influent loadings. Current wastewater flows and loadings were then used in conjunction with projected population data and water use data to determine projected future wastewater flows and loadings.

WASTEWATER FLOWS AT CITY OF SNOQUALMIE WRF

The WRF monitors influent flow entering the WRF upstream of the mechanical fine screen. The measured influent flow includes recycle streams as they are returned to the headworks upstream of the Parshall flume. During the period of record, the only significant recycle stream was the effluent filter backwash, which was a small percentage of the total flow and only existed during the summer when reclaimed water was being produced. Therefore, this recycle flow is considered negligible and is included in the raw wastewater influent flow data as measured by the Parshall flume. Table 5-1 shows historical influent flows of raw wastewater at the WRF.

TABLE 5-1

Historical WRF Influent Flows (2006-2011)

Flow Type	2006	2007	2008	2009	2010	2011
Average Dry Weather Flow(1)	0.61	0.71	0.64	0.65	0.83	0.85
Annual Average Flow(2)	0.87	0.82	0.80	0.96	0.99	1.04
Maximum Month Flow(3)	1.65	1.20	1.15	1.87	1.37	1.48
Peak Day Flow(4)	4.46	2.85	2.00	4.83	3.17	2.43
Peak Hour Flow(5)	N/A	N/A	N/A	5.0(6)	4.49	3.52

(1) Dry weather period August 1 to October 31.
(2) Average Annual Flow, the average flow for the year.
(3) Maximum Month Flow, the flow for the month with the highest average flow in a calendar year.
(4) Peak Day Flow, the flow for the day with the highest flow in a calendar year.
(5) Peak Hour Flow, the flow for the hour with the highest flow in a calendar year. Data not available for 2006 to 2008.
(6) Peak Hour Flow for 2009 based on totalized daily pump run time data at Kimball Creek Pump Station and daily flow data at the WRF. Hourly flow recordings by the Parshall flume not available for this period. Additional discussion is provided in Chapter 6.

As shown in Tables 5-1, the data indicate that the permitted maximum month average flow of 2.15 mgd for the existing facility has not been exceeded over the period of 2006 to 2011. The WRF annual average dry weather influent flows agree reasonably well with winter water use data.

Graphical representations of average monthly WRF flows and influent BOD_5/TSS loadings for the period from 2006 through 2011 are shown on Figures 5-1, 5-2, and 5-3, respectively.

FIGURE 5-1

Historical WRF Monthly Average Influent Flows

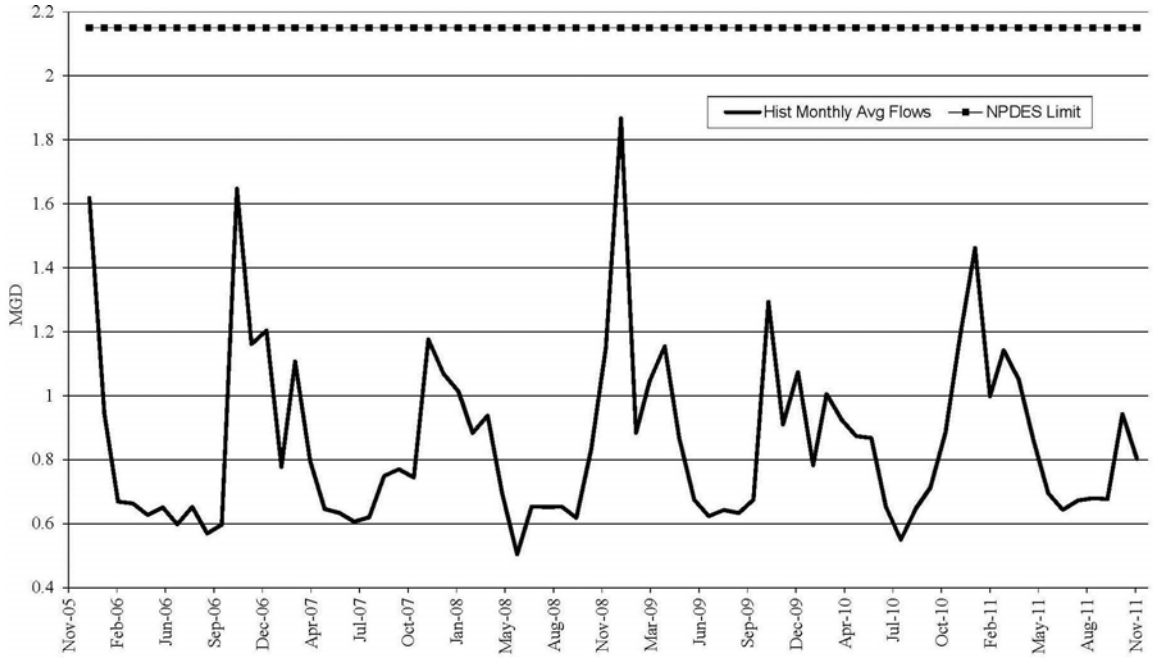


FIGURE 5-2

Average Influent TSS Loading

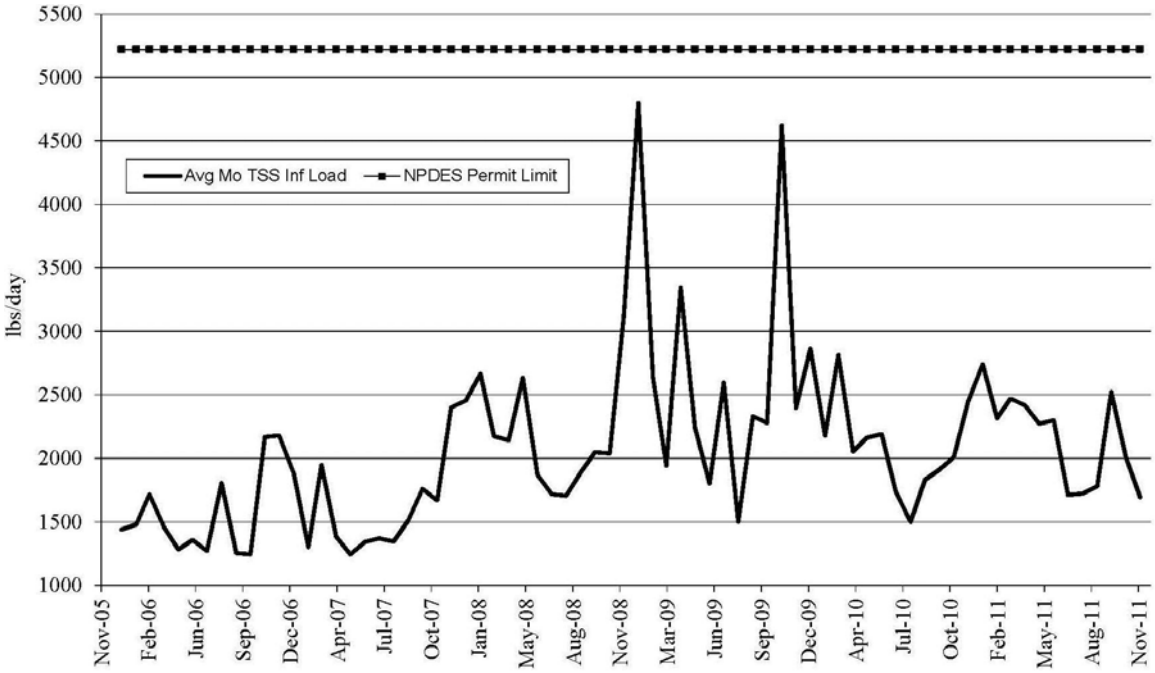
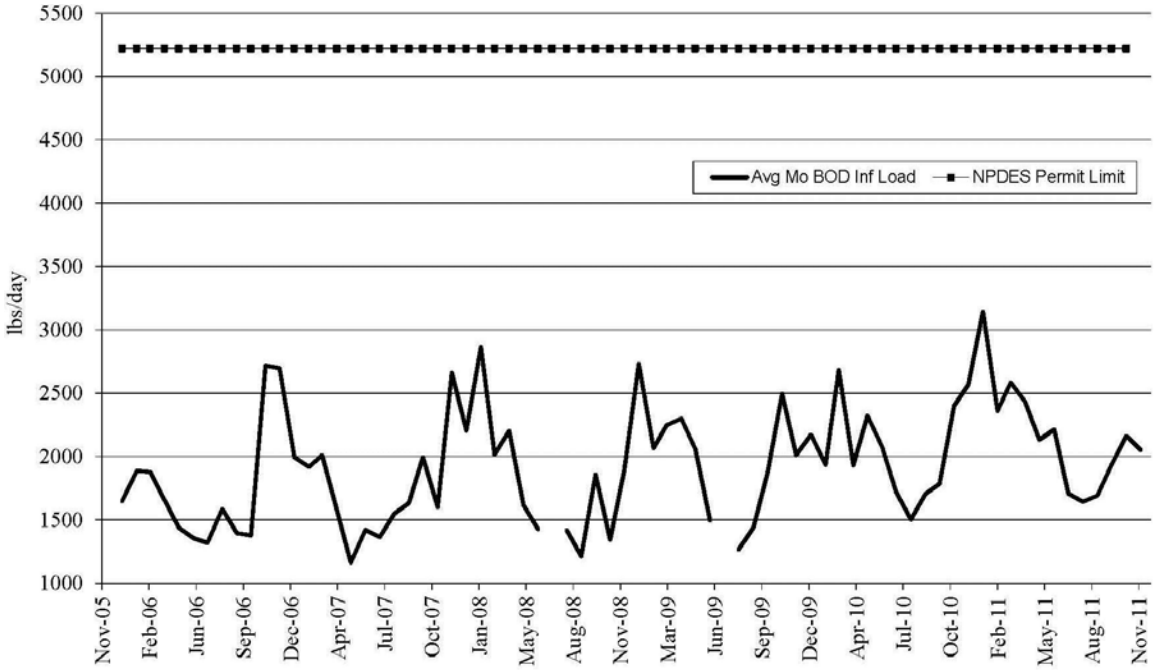


FIGURE 5-3

Average Influent BOD Loading



HISTORICAL INFLUENT LOADING AT WRF

The measured influent BOD_5 loading includes recycle streams as they are returned to the headworks upstream of the Parshall flume. During the period of record, the only significant recycle stream was the effluent filter backwash, which only existed during the summer when reclaimed water was produced. The recycle loading is considered to be insignificant (less than approximately 5 BOD_5 lb/d) and therefore is included in the raw wastewater influent BOD_5 loading data. The annual average and maximum month BOD_5 and maximum monthly loading of BOD_5 per capita for 2006 through 2011 are listed in Table 5-2.

TABLE 5-2

Historical WRF Influent BOD_5 Loading (2006-2011)

Year	Population	Average Annual BOD_5 (mg/L)	Average Annual BOD_5 (lb/d)	Maximum Monthly BOD_5 (lb/d)	Average Annual BOD_5 (ppcd)	Maximum Monthly BOD_5 (ppcd)
2006	7,815	268	1,748	2,720	0.22	0.35
2007	9,100	273	1,739	2,660	0.19	0.29
2008	9,790	270	1,822	2,865	0.19	0.29
2009	10,100	269	1,997	2,730	0.20	0.27
2010	10,670	306	2,065	2,683	0.19	0.25
2011	11,039	302	2,166	3,142	0.20	0.28
Average	—	**281**	**1,923**	**2,800**	**0.20**	—
Maximum	—	**306**	—	**3,142**	**0.22**	**0.29**

The measured influent TSS loading includes recycle streams as they are returned to the headworks upstream of the Parshall flume. During the period of record, the only significant recycle stream was the effluent filter backwash, which only existed during the summer when reclaimed water was produced. The recycle loading and WTP backwash loading is considered to be insignificant (less than approximately 10 lb TSS/d) and therefore is included in the raw wastewater influent TSS loading data. The annual average and maximum month TSS and maximum monthly loading of TSS per capita for 2006 through 2011 are listed in Table 5-3.

TABLE 5-3

Historical WRF Influent TSS Loading (2006-2011)

Year	Population	Average Annual TSS (mg/L)	Average Annual TSS (lb/d)	Maximum Monthly Average TSS (lb/d)	Average Annual TSS (ppcd)	Maximum Monthly Average TSS (ppcd)
2006	7,815	245	1,553	2,180	0.20	0.28
2007	9,100	249	1,595	2,399	0.18	0.26
2008	9,790	335	2,203	3,105	0.23	0.32
2009	10,100	368	2,707	4,801	0.27	0.48
2010	10,670	316	2,140	2,862	0.20	0.27
2011	11,039	306	2,162	2,740	0.20	0.25
Average	—	**303**	**2,060**	**2,638**	**0.19**	**0.27(1)**
Maximum	—	**368**	—	**3,105(1)**	**0.25**	**0.32(1)**

(1) Maximum monthly average TSS does not include TSS from 2009. An outlier in the data occurred during that period.

The maximum allowable loadings, per the NPDES permit, of 5,220 lb/d BOD_5 and 5,220 lb/d TSS have not been exceeded as a monthly average during this period.

EXISTING EQUIVALENT RESIDENTIAL UNITS (ERUS)

To determine the number of residential units with sewer service, water consumption, sewer, and water billing records were reviewed.

SERVICE CONNECTIONS

Table 5-4 shows the average number of water service connections by year and customer class for the years 2004 through 2010. The water service area is larger than the sewer service area, and there are approximately 416 water service connections outside of the sewer service area. For the purposes of this evaluation, only water connections within the sewer service area are included in calculations of wastewater flow presented later in this chapter. As seen in the Table 5-4, the majority of the water service connections are in the single-family residential customer class.

TABLE 5-4

Water Service Connections by Customer Class (2004-2010)(1)

Customer Class	Average Number of Service Connections						
	2004	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
City of Snoqualmie(2)	19	21	18	31	34	35	36
Commercial	92	97	103	168	185	186	189
Multifamily	54	53	53	54	54	54	54
Residential	2,343	2,661	2,943	3,378	3,579	3,636	3,771
Salish Lodge	3	3	3	6	5	5	5
Schools	9	12	13	15	15	15	16
Snoqualmie Hospital	2	2	2	2	2	2	2
Annual Total	**2,522**	**2,849**	**3,135**	**3,657**	**3,874**	**3,933**	**4,073**

(1) Water service connections include approximately 416 connections outside of sewer service area.
(2) The majority of the service connections in this category are used for irrigation.

WINTER WATER CONSUMPTION

Winter water use is used to estimate wastewater volumes entering the collection system because the amount of winter water consumption typically is equal to wastewater flow except for a minor amount of water that does not enter the sewer system (such as winter irrigation flows, hydrant use, spills, and evaporation).

Winter water consumption records for the period of 2007 through 2010 were reviewed from the City's computer billing database. Table 5-5 presents the winter water consumption in gallons per day (gpd) by customer class obtained from the database (excluding irrigation and hydrant connections). The winter usage period is considered to be from January 1 to March 31.

TABLE 5-5

Winter Water Use by Year and Customer Class (2007-2010)[1]

Customer Type	Winter Water Use by Water Customers (gpd)			
	2007	**2008**	**2009**	**2010**
City of Snoqualmie	20,000[2]	23,870	31,379	59,266
Commercial	66,181	58,816	66,399	67,654
Multifamily	30,560	30,699	30,507	27,824
Residential	514,848	535,409	537,472	521,424
Salish Lodge	32,206	24,304	20,895	20,109
Schools	13,364	12,538	16,889	11,368
Casino[3]	ND	ND	ND	75,243
Snoqualmie Hospital	4,638	5,015	2,701	2,720
Total	**681,797**	**690,651**	**706,242**	**785,608**

(1) For the period January 1 to March 31. Includes water usage from approximately 416 connections outside of sewer service area.
(2) Water usage estimated this period.
(3) Casino has private water source but is connected to City sewer; water use estimate based on metered sewage flows. The casino began operations in 2010.

EQUIVALENT RESIDENTIAL UNITS

Use of ERUs is a way to express the amount of sewage generated by all customer classifications as an equivalent number of residential customers. Table 5-6 summarizes the City's residential winter water consumption, quantity of water service connections, and calculated water and wastewater ERU values for 2007 to 2010.

Water consumption data can often be used as a surrogate to base sanitary wastewater flow production and can be used to develop wastewater ERUs. The wastewater ERU value is calculated based on residential winter water use since irrigation does not occur in the winter and the majority of the water consumed during the winter will enter the sewer and will ultimately end up at the treatment plant. During drier months, a large fraction of the water consumed will be for irrigation purposes and will not enter the wastewater collection system.

Based on previous experience at similar sized wastewater treatment plants, typically 80 to 100 percent of the winter water consumed will enter the wastewater collection system. For the City of Snoqualmie, a conservative estimate of 95 percent of the

residential winter water consumption is assumed to end up as influent to the WWTF. It is estimated that 5 percent of the winter water consumption does not enter the wastewater collection system due to winter irrigation flows, hydrant use, spills, and evaporation.

The wastewater ERU value is calculated by dividing the winter water use for single-family residential units (single-family residential accounts for approximately 92 percent of all connections) by the number of SFR service connections and multiplying by 0.95. For 2008 through 2010, average winter water use of 531,435 gallons per day ÷ 3,662 water service connections (average 2008 through 2010) yields 145 gpd per water ERU. Multiplying this value by 0.95 results in 138 gpd per wastewater ERU. This analysis is summarized in Table 5-6.

TABLE 5-6

Winter Water Use and Equivalent Residential Units (2008-2010)

Parameter	2008	2009	2010	Average
Residential Winter Water Use (gpd)(1)	535,409	537,472	521,424	531,435
Residential Service Connections	3,579	3,636	3,771	3,662
Water ERU Value (gpd/ERU)	150	148	138	145
Wastewater ERU Value (gpd/ERU)(2)	142	140	131	138

(1) Single-Family Residential. Includes water service connections outside of the sewer service area.
(2) Wastewater ERU Value = 0.95 * Water ERU Value

It should be noted that the single-family residential (SFR) water use classification includes several multifamily units. Most multifamily units have water accounts that are billed as single-family units and as such are treated as single-family residential. Each service connection is defined as one ERU.

As shown in Table 5-6, the average daily residential winter water use for the City from 2008 through 2010 steadily declined from a high of 150 gpd/ERU in 2008 to a low of 138 gpd/ERU in 2010. The reduction in water use over time is attributed to high-efficiency water fixtures being installed in new construction.

Table 5-7 summarizes current wastewater ERUs based on an analysis of winter water use by sewer customers during 2008 through 2010. Only water use by customers within the sewer service area is shown.

TABLE 5-7

2008-2010 Average Wastewater ERUs

Customer Type	2008 to 2010 Average Winter Water Use (gpd)	95% of Average Winter Water Use (gpd)	Sewer ERUs[4]	% of Total ERUs
Residential[1]	500,653	475,620	3,447	75.1%
Commercial[2]	51,770	49,182	356	7.8%
City[3]	114,619	108,888	789	17.2%
Total	**667,042**	**633,690**	**4,592**	**100%**

(1) Residential customer type includes single-family residential and multifamily residential. Most multifamily residential units are billed as single-family residential and are treated as such here. Water use for 416 connections outside of the sewer service area removed from water use.
(2) Commercial includes Salish Lodge and hospital flows.
(3) City includes schools.
(4) Sewer ERU = Avg. winter water use per customer type x 0.95/138 gpd/WW ERU.

The 2008 through 2010 average residential wastewater ERU calculation of 3,447 ERUs corresponds reasonably well with the number of sewer accounts billed in winter 2010. According to billing records, the number of residential wastewater connections billed in winter 2010 was 3,357 which is within approximately 2.6 percent of the calculated number of ERUs. The relative percent of total ERUs as calculated in Table 5-7 is assumed to remain constant in the future and is the basis for the relative number of ERUs in each customer type in future ERU projections.

Table 5-8 presents the number of wastewater ERUs in 2010. The total number of wastewater ERUs in 2010 (5,013) is used as the base line for future ERU projections.

TABLE 5-8

2010 Wastewater ERUs

Customer Type	Winter Water Use (gpd)	95% of Winter Water Use (gpd)	Sewer ERUs[4]
Residential[1]	491,840	467,248	3,386
Commercial[2]	70,634	67,102	486
City[3]	165,726	157,440	1,141
Total	**728,200**	**691,790**	**5,013**

(1) Residential customer type includes single-family residential and multifamily residential. Most multifamily residential units are billed as single-family residential and are treated as such here. Water use for 416 connections outside of the sewer service area removed from water use.
(2) Commercial includes Salish Lodge and hospital flows.
(3) City includes schools.
(4) Sewer ERU = Avg. winter water use per customer type x 0.95/138 gpd/WW ERU.

INFILTRATION AND INFLOW

The amount of I/I can be estimated on an annual average, maximum month, and maximum day basis by subtracting the base wastewater flow to the WRF, which is calculated based on water use, from the annual average, maximum month, and maximum day flows at the WRF. I/I data is also used to estimate future total design flows to the WRF. To quantify annual average and maximum month I/I, DMRs were reviewed for the period 2007 to 2010. Using this DMR information, the number of ERUs per year, and the base flow determined on a per ERU basis (138 gpd/ERU) enables the calculation of I/I quantity on an annual average, maximum monthly, maximum day, and peak hour basis. For example, the 2008 to 2010 annual average flow to the WRF was 0.92 mgd. Subtracting the average base flow of 0.63 mgd during that period results in an annual average I/I flow of 0.23 mgd. Similar calculations were performed for maximum monthly and maximum daily I/I, and the results are presented in Table 5-9.

To estimate the diurnal peaking factor, the available hourly flow data was reviewed for the WRF (January 2010 through March 2012). The driest day with the lowest sewage flow at the WRF during this period occurred on August 20, 2011. The flow on this day was assumed to be approximately equal to the base sewage flow. The diurnal peaking factor was calculated by dividing the average flow by the peak hour flow for August 20. The resultant diurnal peaking factor is 2.38. Therefore, the peak hour base flow in this evaluation is 1.51 mgd (2.38*0.63 mgd).

To calculate the infiltration and inflow at the peak hour flow, instantaneous flow data for the period from January 2010 through December 2011 from the flow meters at Pump Station No. 1, WRF headworks and the In-Plant Pump Station was reviewed. Because recycle flows are combined with the raw influent upstream of the influent flow meter, the peak hour flow for the entire collection system was calculated by subtracting the flow pumped by the IPPS from the flow at the WRF. As shown in Table 5-1, the peak hour flow in 2010 was 4.49 mgd and in 2011 was 3.52 mgd. Since peak hour flow data is not available prior to 2010, the average peak hour flow of 4.0 mgd during 2010 and 2011 is used in the I/I estimate. The average base flow of 0.63 mgd discussed above was then subtracted from this average peak hour flow to calculate the peak hour infiltration and inflow shown in Table 5-9 below.

TABLE 5-9

Estimated Average Infiltration and Inflow (2008-2010)

Flow Type	Average Influent Flow at WRF (mgd)[1]	Average Base Flow[2] (mgd)	Average Total I/I (mgd)
Annual Average	0.92	0.63	0.29
Maximum Month	1.46	0.63	0.83
Peak Day	3.33	0.63	2.70
Peak Hour[3]	4.33	1.51	2.82

(1) From Table 5-1.
(2) Base flow determined by estimated number of ERUs (4,592) multiplied by 138 gpd/ERU.
(3) Average of peak hour flow for 2009 to 2011 used. Peak hour I/I = influent peak hour flow – peaking factor of 2.38 times base flow of 0.63 mgd.

The I/I reported in Table 5-9 is system-wide I/I. However, the Snoqualmie wastewater collection system can be characterized as two major collection basins consisting of Historic Snoqualmie and Snoqualmie Ridge basins each with different I/I rates. The historic Snoqualmie basin collection system is older and in high groundwater areas resulting in higher I/I rates than for the Snoqualmie Ridge basin. The entire flow from Historic Snoqualmie is pumped by Pump Station No. 1 to the WRF, while the remaining flow to the WRF is from Snoqualmie Ridge.

Table 5-10 presents a summary of the inflow and infiltration contributed by Historic Snoqualmie and Snoqualmie Ridge. The flow meter data from Pump Station No. 1 was used to determine the peak day flow for Historic Snoqualmie. The peak day flow from Snoqualmie Ridge was calculated by subtracting the Pump Station No. 1 flow from the WRF influent flow.

TABLE 5-10

Estimated Peak Day Infiltration and Inflow per Basin

Basin	Peak Day Flow (2010 to 2011) (mgd)	Base Flow (mgd)	Total I/I (mgd)	Area (acres)	Total I/I (gpad)
Historic Snoqualmie[1]	2.26	0.13	2.14	255.8	8,353
Water Reclamation Facility[2]	3.17	0.63	2.54	957.3	2,653
Snoqualmie Ridge[3]	0.91	0.50	0.41	701.5	579

(1) Historic Snoqualmie flows based on Pump Station No. 1 flow meter data from January 2010 through March 2012.
(2) Influent flows to the Water Reclamation Facility are based on flow meter data at the WRF minus the flows from the In-Plant Pump Station from January 2010 through March 2012.
(3) Flows from Snoqualmie Ridge were calculated by subtracting the Pump Station No. 1 flows from the flows into the Water Reclamation Facility.

Infiltration

Table 5-11 shows estimated infiltration for the City. Infiltration is estimated by examining the flows during a period of days with no rain during the wet season when the water table is at its highest. The sewage flow on these days is presumed to be comprised of base sewage flow and flow entering the system via infiltration. Therefore, the base flow was subtracted from the total flow to calculate the infiltration flow.

TABLE 5-11

Estimated Infiltration

Time Period	Population	WRF Influent Flow Volume (MG)	Base Wastewater Flow Volume[(1)] (MG)	Infiltration (MG)	Infiltration (gal/cap day)
1/24/07 to 2/3/07	9,100	7.61	6.4	1.18	11.8
1/21/08 to 1/26/08	9,790	5.54	3.5	2.03	34.5
2/17/08 to 2/22/08	9,790	5.14	3.5	1.63	27.7
2/15/09 to 2/19/09	10,100	3.98	2.9	1.05	20.8
1/15/10 to 1/18/10	10,670	5.44	2.4	3.08	72.1
2/14/10 to 2/19/10	10,670	4.73	3.5	1.19	18.6
Average					30.9

(1) Base Wastewater Flow Volume determined using the following formula: days in period x average daily winter water use (Table 5-5) x 0.95/1,000,000 – 416 x water ERU value (Table 5-6).

Inflow

Table 5-12 shows estimated inflow for the City. Inflow is estimated by examining the wastewater flows during a period of days with significant rainfall during the wet season. The water table is at its highest in the winter and as the days observed are significant rain days, the flow is estimated to be comprised of base flow plus flow due to infiltration and inflow. The inflow is determined by subtracting the base flow and the infiltration from the measured flow at the headworks (Inflow = Total Flow – Base Flow – Infiltration). The infiltration used for each time period was calculated from days with no precipitation immediately preceding or following inflow event, as shown in Table 5-11 above.

TABLE 5-12

Estimated Inflow

Time Period	Population	WRF Influent Flow Volume (MG)	Base WW Flow Volume[(1)] (MG)	Est. Infiltration (MG)	Avg. Daily Rainfall (in)	Inflow (MG)	Inflow (gal/cap day)
1/2/07 to 1/11/07	9,100	17.3	5.8	2.2	1.55	9.2	101.4
3/20/07 to 3/28/07	9,100	12.05	5.3	2.0	1.28	4.8	58.5
1/2/08 to 1/15/08	9,790	16.3	8.2	5.5	1.06	2.6	19.1
3/22/10 to 3/31/10	10,670	10.8	5.9	3.0	1.14	1.9	17.8
Average							49.2

(1) Base Wastewater Flow Volume determined using the following formula: days in period x average daily winter water use (Table 5-5) x 0.95/1,000,000 – 416 water ERU value (Table 5-6).

Infiltration and Inflow Analysis Using EPA Criteria

The U.S. EPA manual entitled *I/I Analysis and Project Certification* provides the following recommended guidelines for determining if infiltration and/or inflow is excessive:

1. To determine if excessive *infiltration* is occurring, a threshold value of 120 gallons per capita per day (gpcd) is used. This infiltration value is based on an average daily flow over a 7- to 14-day non-rainfall period during seasonal high groundwater conditions.

2. To determine if excessive *inflow* is present in a collection system, the U.S. EPA uses a threshold value of 275 gpcd. If the average daily flow (excluding major commercial and industrial flows greater than 50,000 gpd each) during periods of significant rainfall exceeds 275 gpcd, the amount of inflow is considered excessive.

A comparison of the EPA criteria and the City of Snoqualmie flows are summarized in Table 5-13.

TABLE 5-13

Per Capita Infiltration and Inflow Based on EPA Criteria

Parameter	EPA Criteria for Excessive I/I (gpcd)	Estimated Value (gpcd)
EPA Excessive Infiltration Criteria	120	90(1)
EPA Excessive Inflow Criteria	275	140(2)

(1) 90 gpcd is the average total wastewater flow during non-rain days in the wet season from 2008 to 2010.

(2) 140 gpcd is the average total wastewater flow during periods of significant rainfall events from 2008 to 2010.

The "EPA I/I Infiltration Value" for Snoqualmie is estimated at 90 gpcd. Because this value is less than the EPA guideline of 120 gpcd, Snoqualmie is not considered to have excessive infiltration by EPA criteria. The "EPA I/I Inflow Value" is estimated at 140 gpcd. Because this value is less than the EPA guideline of 275 gpcd, Snoqualmie is not considered to have excessive inflow by the EPA criteria.

It should be noted that the amount of infiltration and inflow in the City is significantly different between the sewer system in Snoqualmie Ridge and in Historic Snoqualmie. The sewers in Snoqualmie Ridge are less than 20 years old and located above the groundwater table and the floodplain. As a result and as shown in Table 5-10 above, the I/I in this area are quite low. Conversely, the majority of the sewers in Historic Snoqualmie was constructed in the mid-1960s with concrete pipe, are below the groundwater table during the wet season and are subject to flooding. As shown in Table 5-10 above, the infiltration and inflow entering the collection system in Historic Snoqualmie (Peak Day I/I = 8,353 gallons per acre per day) is high.

PROJECTED WASTEWATER FLOWS AND LOADING

The planning period for this *General Sewer/Wastewater Facility Plan* is from 2012 through 2032, coinciding with a 20-year planning interval. Current wastewater flows and loadings were used in conjunction with projected population and ERU data to estimate the projected wastewater flows and loadings.

The wastewater flow and loadings projected in this report consist of raw wastewater without recycle flows and loadings. The qualifier is made because the design flows and loadings in the existing NPDES permit include recycle flows and loadings due to the existing configuration of the headworks. The WRF recycle flow discharges upstream of the influent flow meter and the sampling location; therefore, as such the recycle flow is combined with the raw wastewater flows, and the permitted maximum month wastewater flow, BOD_5 loading, and TSS loading consists of both raw wastewater and plant recycle flows. However, during the period of record for plant data used in this analysis, the plant recycle flows and loads were negligible relative to the raw wastewater flow.

PROJECTED FLOWS AT CITY OF SNOQUALMIE WRF

The following is the basic formula used to estimate the future design flows at the WRF:

Projected Flow = (Projected ERUs x Flow Per ERU) + I/I Flow

The flow of water treatment plant (WTP) backwash water to the WRF is included in the estimated wastewater flow per ERU. Future backwash flows due to increased production at the WTP is assumed to correlate with population increase and are included in the future flow projections.

PROJECTED SEWER SERVICE AREA POPULATION, ERUS AND FLOWS

The current and projected 10-year, 20-year, and buildout ERUs and flows are shown in Table 5-14. The projected flows and ERUs are based on population growth projections from Chapter 3. I/I is assumed to be constant throughout the period (i.e., increases in I/I due to the addition of new pipes and deterioration of old pipes are assumed equal to decreases in I/I due to ongoing I/I reduction efforts).

Future WRF flows are projected using a base wastewater flow of 138 gpd/ERU. To estimate future annual average flows, the I/I flow rate from Table 5-8 was added to the base level wastewater flows derived from the ERU projections to obtain the future average annual flow rates. To obtain the future maximum month flow rate, the base flow was multiplied by the ratio of average maximum month to average annual flow (Table 5-1, 2006-2011 average annual flow to average maximum monthly flow is 1.59). To obtain the peak hour flow, the base wastewater flow was multiplied by the diurnal peaking factor (2.38) and the peak hour I/I (2.82 mgd) was added.

TABLE 5-14

Current and Projected Wastewater ERUs and Flows

Wastewater Customer Types and Flows	Wastewater ERUs[1]			
Customer Type	**2012**	**2018**	**2032**	**Buildout**
Residential	4,026	5,035	5,469	5,658
Commercial/Light Industrial	416	521	565	585
City	922	1,153	1,252	1,295
Total	**5,364**	**6,709**	**7,286**	7,539
Design Flow	**Projected Flows (mgd)[2]**			
Total Base Flow[3]	0.740	0.926	1.005	1.04
Average Annual Flow[4]	1.023	1.209	1.288	1.323
Maximum Month[5]	1.55	1.83	1.95	2.01
Permitted Maximum Month[4]	2.15	2.15	2.15	2.15
Peak Day[6]	3.62	4.28	4.56	4.69
Peak Hour[7]	5.0[8]	5.70	5.89	5.97

(1) Projected ERUs and flows based on assumption that all ERUs increase at the same rate as the overall population. The distribution of ERUs between residential, commercial, and City is per Table 5-7. Total number of ERUs in 2012 based on total number of ERUs in Table 5-7 with annual growth per population projections in Table 3-3.

(2) I/I assumed to remain constant during planning period.

(3) Total base flow = total ERUs x 138 gpd/ERU.

(4) Average annual flow = total base flow + average annual I/I from Table 5-9.

(5) Maximum month flow projections use a peaking factor of 1.52 based on the average peaking factor of maximum month to annual average from 5 years of historical flow data (2006-2008, 2010 and 2011).

(6) Peak day flow projections use a peaking factor of 3.5 based on the average peaking factor of peak day to annual average from 5 years of historical flow data.

(7) Peak hour flow projections beyond 2012 calculated by multiplying the base wastewater flow by the diurnal peaking factor (2.38) and adding the current peak hour I/I. It is assumed that I/I reductions from ongoing I/I removal projects will offset additional infiltration and inflow from new development projects.

(8) 2012 peak hour flow estimated as hourly flow data not available for peak hour flow event. Peak hour flow estimated using totalized pump run time data at KCPS and WRF DMRs.

EXISTING AND PROJECTED INFLUENT BOD_5 AND TSS LOADING

The existing influent monitoring data for BOD_5 and TSS loadings are presented in Tables 5-2 and Table 5-3, respectively, for the years 2006 to 2011 and discussed below. Projected BOD_5 and TSS loadings are presented below.

EXISTING BOD_5 LOADING

Annual average influent BOD_5 loadings ranged from 1,646 lb/d to 1,827 lb/d and the maximum monthly average influent BOD_5 loadings ranged from 2,720 lb/d to 3,142 lb/d for the 6-year period of analysis as shown in Table 5-2. For 2006 to 2011, the ratio of the average maximum month BOD_5 loading to the annual average BOD_5 loading is 1.46:1. The average historical concentration of BOD_5 was 281 mg/L. The maximum permitted monthly average influent BOD_5 loading of 5,220 lb/d was never exceeded during the 6-year period of analysis. To project future loads, the historical average loading per ERU is examined. The historical number of average wastewater ERUs for 2008 through 2010 was developed in Table 5-7. The average of the average annual BOD_5 for 2008 through 2010 per the average number of wastewater ERUs for 2008-2010 was 0.43 lbs BOD_5/ERU/d. The average of the maximum month BOD_5 for 2008 through 2010 per the average number of wastewater ERUs for 2008-2010 was 0.60 lbs BOD_5/ERU/d. The average annual and maximum month loading per ERU is used to project future annual average and maximum month BOD_5 loadings to the WRF.

EXISTING TOTAL SUSPENDED SOLIDS LOADING

For 2006 to 2011 not including 2009 (an outlier), the ratio of the average maximum month TSS loading to the annual average TSS loading is 1.38:1. To project future loads, the historical average loading per ERU is examined. The historical number of average wastewater ERUs for 2008 through 2010 was developed in Table 5-7. The average of the average annual TSS for 2008 through 2010 per the average number of wastewater ERUs for 2008-2010 was 0.51 lbs TSS/ERU/d. The average of the maximum month TSS for 2008 through 2010 per the average number of wastewater ERUs for 2008-2010 was 0.65 lbs BOD_5/ERU/d. The average annual and maximum month loading per ERU is used to project future annual average and maximum month TSS loadings to the WRF.

EXISTING AMMONIA LOADING

Influent ammonia and TKN are not measured at the WRF. Consequently, typical values for domestic wastewater are used in the analysis. Typical concentrations of ammonia as NH_3-N in raw wastewater range from 12 to 45 mg/L. For this report the assumed NH_3-N concentration is 36 mg/L.

PROJECTED FUTURE WASTEWATER LOADINGS

Future WRF annual average BOD_5 and TSS loadings are estimated by multiplying the projected number of future ERUs by the historical average loading per ERU. Future WRF maximum month BOD_5 and TSS loadings are estimated by multiplying the (2008-2010) maximum month average loading by the projected number of future ERUs.

Table 5-15 provides a summary of projected future WRF influent loadings.

TABLE 5-15

Current and Projected WRF Loadings

ERUs and Loadings	NPDES Permit	2012	2018	2032	Buildout
Total ERUs	NA	5,364	6,709	7,286	7,539
Population	NA	11,418	14,279	15,508	16,046
Annual Average BOD_5 (lb/d)	NA	2,291	2,865	3,112	3,220
Maximum Month BOD_5 (lb/d)	5,220	3,224	4,031	4,378	4,530
Annual Average TSS (lb/d)	NA	1,953	2,443	2,653	3,858
Maximum Month TSS (lb/d)	5,220	3,485	4,359	4,734	4,898
Annual Average TKN (lb/d)	NA	307	363	387	397
Maximum Month TKN (lb/d)	NA	553	653	696	715

NA – Not Applicable

As shown in Table 5-15, the projected year 2032 maximum month BOD_5 loading of 4,378 lb/d is not in excess of the permitted capacity of 5,220 lb/d. The maximum month BOD_5 loading is projected to reach approximately 87 percent of the permitted capacity at buildout condition, which will occur after 2032. The projected 2032 maximum month loading of TSS is to be 4,734 lb TSS/d, also less than the permitted capacity of 5,220 lb/d.

The 20-year planning projections for flows and loadings are within current design flows and loadings; therefore, a Tier II analysis is not performed in this Plan.

CHAPTER 6

COLLECTION SYSTEM EVALUATION

INTRODUCTION

The City of Snoqualmie's existing sewer collection system was modeled using the InfoSewer sewer modeling program developed by Innovyze, Inc. to assess the ability of the major trunk sewers (all pipes 10 inches in diameter and larger) to convey the design peak hour flow. The system was evaluated for the existing conditions as well as the 6-year (2018) and 20-year (2032) forecasted development conditions. Input flows to the model were based on flow records from January 2010 through March 2012 for the Snoqualmie WRF and Pump Station No. 1, current and future land use information provided by the City, water use records, and available commercial flow meter data, as summarized in Chapter 5 of this Plan.

For planning purposes, the Planning Department has separated the City and the UGA into eight planning areas as shown on Figure 3-5. The planning areas include Historic Snoqualmie, Mill District, Meadowbrook, Rattlesnake Ridge, Snoqualmie Falls, Snoqualmie Hills, Snoqualmie Ridge I, and Snoqualmie Ridge II. Future development has been forecasted by the City for each of these planning areas.

For the purposes of the sewer model, the City has been divided into a total of eight sewer basins (catchments) based on the natural drainage patterns of the City's service area and locations of pump stations (see Figure 4-1). The basins were further subdivided into 57 smaller subbasins, as shown in Figure 6-1.

MODEL CONSTRUCTION

The InfoSewer model consists of a network of gravity sewer pipes, manholes, pump stations, and force mains. For economy, only a portion of the total collection system is modeled. All pipelines 10-inch diameter and larger are included. A schematic of the skeletonized system is shown in Figure 6-2 along with the sub-basin overlay. Necessary data for the model is shown in Table 6-1.

TABLE 6-1

Collection System Information

Category	Gravity Sewers	Manholes	Pump Stations
Dimensions	Length (Based on available record drawings)	Location (X and Y coordinates from District's GIS system)	Location (X and Y coordinates from District's GIS system)
Identification No.(1)	Name (of Upstream Manhole)	Name	Name (e.g. LS K3)
Base Elevation	—	Rim Elevation	Ground Elevation
Depth	Upstream and Downstream Invert Elevations	Sump Elevation	Level Setting
Size	Pipe Diameter	Manhole Diameter	Wet Well Diameter
Flow Criteria	Pipe Material	—	Pump Curve
Vertical Datum	NAVD 88	NAVD 88	NAVD 88

(1) Where the manhole ID is not given by the City, sequential numbering system was assigned for the purposes of this model.

Flows for each subbasin are input into the furthest upstream manhole within that subbasin. This modeling approach is considered to be conservative in terms of predicting sewer capacity.

Information required to construct the sewer network was obtained from record drawings, linear interpolation between known pipe inverts and physical survey of the system.

Much of the pipeline and manhole information for the model was obtained by the City from record drawings on file and included in the City's GIS information. The GIS information provided by the City includes the location of the manholes, the manhole identification for some manholes, pipe invert elevations, and the size and lengths of pipelines.

For the portions of the sewer system included in the sewer model for which record drawings were not available, Gray & Osborne surveyed the location and rim elevations of the manholes and the invert elevations of the pipelines entering the manholes. The GIS base map was updated with this survey information. A total of four manholes could not be surveyed because the manhole lids have been paved over. The invert elevations for the pipes entering these manholes were estimated based on the invert elevations upstream and downstream of these manholes.

INPUT FLOWS

Flows for each subbasin are based on the number, acreage and current land use of the parcels within the subbasin, as described below. Parcel information was provided in the

City of Snoqualmie

General Sewer Plan
Figure 6-1
Sewer System and Sub Basins

LEGEND:

- GRINDER PUMP STATIONS
- MANHOLES
- FORCEMAINS
- GRAVITY MAINS
- PUMP STATION
- CITY LIMITS
- casino
- PARCELS
- SEWER BASINS

All users of the data shall be advised that the map features are approximate and are intended only to provide an indication of said feature. Additional areas that have not been mapped may be present. This is not a survey. The City of Snoqualmie assumes no liability for variations ascertained by actual survey. ALL DATA IS EXPRESSLY POVIDED 'AS IS' AND 'WITH ALL FAULTS'. The City makes no warranty of fitness for a particular purpose. This disclaimer shall be present on all paper map products and shall be included in the terms of use for this data in a web or software system.

N W E S

0 1,400 2,800 Feet

FROM ECHO GLEN CHILDREN'S CENTER

CASINO

M:\Snoqualmie\11543 Gen Sewer WW Fac Plan\GIS\EXISTING SEWER SYSTEM.mxd

City of Snoqualmie

General Sewer Plan
Figure 6-2
Modeled Sewers

LEGEND:

- G GRINDER PUMP STATIONS
- MANHOLES
- FORCEMAINS
- GRAVITY MAINS
- MODELED SEWER
- PS PUMP STATION
- CITY LIMITS
- casino
- PARCELS
- SEWER BASINS

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N
W E
S

0 1,400 2,800 Feet

FROM ECHO GLEN CHILDREN'S CENTER

CASINO

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parcels shape file supplied by the City and supplemented by King County Assessor's records.

SINGLE-FAMILY RESIDENTIAL

All parcels identified as single-family residential within the basin were considered to be a single ERU and ascribed a base sewer flow of 138 gallons per day, the average daily flow per ERU as developed in Chapter 5. A diurnal peaking factor of 2.38 was determined by comparing the peak hour flow to the average day flow for August 20, 2011, which is the driest day that hourly flow data is available. It is assumed that the flow on this day most closely approximates the base sewage flow since the infiltration and inflow entering the system on this day are assumed to be near zero.

Flows from infiltration and inflow, as described below, were added to the peak diurnal flow based on total residential acreage to develop the peak hourly residential flow for each subbasin.

MULTI-FAMILY RESIDENTIAL

Units on parcels identified as multi-family residential were considered equal to one residential ERU and were ascribed a base sewer flow equal the single family residential base flow. The total flow from a multi-family parcel was determined by multiplying the flow per unit by the total number of units on the parcel as reported by the King County Assessor and adding residential I/I as discussed below.

COMMERCIAL

The Snoqualmie Casino and the Echo Glen Children's Center are charged for sewer service based on actual flow and loading and both facilities are equipped with flow metering equipment. Flows from the Casino and Echo Glen were estimated based on flow meter data from 2011 and 2012 (2010 data was available but may be unreliable due to flume clogging). The maximum daily flow from the reviewed data set was used along with a peaking factor to calculate the peak hour flow from these two sites. The calculated peaking factor of 2.38 (discussed above) was used to estimate the peak hour flow from both Echo Glen and the Casino.

For all parcels identified as commercial (excluding the Snoqualmie Casino and Echo Glen Children's Center), the total commercial water use was used to estimate the base sewage flow. The water consumption from Canyon Springs water service area was used to determine the base flow from Historic Snoqualmie and the water consumption for the Snoqualmie Ridge water service area was used to estimate the base flow from Snoqualmie Ridge. The peak hour base flow was estimated by multiplying the base flow by the diurnal peaking factor of 2.38 discussed above. The infiltration and inflow rate was added to the base flow to determine the peak hour flow from the commercial properties.

SCHOOLS

For the hydraulic model, a unit flow rate of 16 gpd per student for high schools and middle schools and 10 gpd per student for elementary schools has been used. This is assumed to be a peak hour flow not including infiltration and inflow (I/I).

INFILTRATION AND INFLOW

As discussed in Chapter 5, infiltration and inflow into the City's sewers varies dramatically between Historic Snoqualmie and Snoqualmie Ridge. A vast majority of the sewers in Historic Snoqualmie (which includes the Meadowbrook and Historic Snoqualmie planning areas and some of the basins in the Snoqualmie Hills and Snoqualmie Falls planning areas) are located within the flood plain and below the groundwater table for much of the year. Most of these sewers are concrete, upwards of 50 years old and allow substantial quantities of infiltration to enter the sewers. During flood events many of the manhole lids are submerged, and large amounts of inflow enter the system. Based on Pump Station No. 1 flow meter data, the peak hour infiltration and inflow into the sewers in Historic Snoqualmie is estimated to be 9,446 gallons per acre per day. Conversely, the sewers in the Snoqualmie Ridge development have been installed in the past 20 years, were installed above the groundwater table and are not subject to flooding. As a result, the I/I into the Snoqualmie Ridge sewers is much lower. Based on flow meter data for the WRF and Pump Station No. 1 and Kimball Creek Pump Station runtime data, the peak hour I/I for the residential and commercial parcels in Snoqualmie Ridge (which includes Snoqualmie Ridge I and II planning areas and some of the basins in the Snoqualmie Hills planning area) is estimated to be 1,575 gallons per acre per day.

The I/I per acre for school parcels is generally lower than commercial and residential parcels because the lots are generally very large relative to the amount of sewer piping. The I/I flow from schools is estimated to be approximately 25 percent of the residential and commercial I/I flow for each area. The I/I flow for schools in Historic Snoqualmie is estimated to be 2,345 gallons per acre per day. The flow from the school in Snoqualmie Ridge was estimated to be 394 gallons per acre per day.

PUMP STATIONS

Using data from record drawings and pump station draw-down testing completed by the City, the model includes 10 of the 14 pump stations in the City, including pump capacity, wet well dimensions and pump operating points. To simplify the model and because they serve small sewer basins with low flows, Pump Station Nos. 6, N6, Z, and K2 were not modeled. The flows from the sewer basins draining to the pump stations not included in the model were added to the gravity sewer collection system at the discharge manhole for the force main associated with the pump station.

All model runs completed for this Plan were at steady state and were based on all pump stations were running at constant speed. The model contains sufficient pump station information to dynamically model the system with all of the modeled pump stations operating as fill and draw pump stations. The modeling completed for this plan did not include dynamic modeling.

EXISTING CONDITIONS

Existing land use data provided by the City (see Figure 3-1) supplemented by information from the King County Assessor was used to determine the number and acreage of single family residential parcels, multi-family residential units, commercial properties and schools in each sub-basin. This information was used along with the flow information summarized above to calculate the flow from each sub-basin. The input data for the existing condition is included in Appendix F.

FUTURE CONDITIONS

The collection system was modeled using estimated flows from the projected future development. The system was evaluated for the 6-year and 20-year development conditions. These development conditions were estimated based on the projected buildout conditions as described below.

BUILDOUT CONDITIONS

The 2009 Snoqualmie Vicinity Comprehensive Plan evaluated the developable lands within the City of Snoqualmie and the Urban Growth Area (UGA) and provided a forecast of future single-family and multi-family residential and commercial development. The City periodically updates these forecasts. The most recent update was used to estimate the development at buildout.

The development data prepared by the City is provided by planning area. To allocate this development to each sewer subbasin, the available and developable land data provided by the City and King County was overlaid onto the basin map to assess the location that development might occur. For planning areas in which there was insufficient information available to determine where development would occur, the development was spread over the subbasins in the planning area based on the acreage of each subbasin.

2018 AND 2032 CONDITIONS

The City has projected the future population annually for the next 20 years for each of the eight planning areas. These projections were used to estimate the future ERUs in each planning area for 2018 (6-year forecast) and 2032 (20-year forecast). Those projected ERUs were then further distributed to each model subbasin based on the fraction of the buildout ERUs projected for that subbasin as described above. The input data for the 2018 and 2032 models are included in Appendix F.

For the purposes of this model, the flow per ERU and commercial flow rates are assumed to remain constant over the planning period. It is assumed that the City's on-going I/I removal efforts in Historic Snoqualmie will reduce the I/I per acre in Historic Snoqualmie, offsetting any additional I/I contributed by new sewers installed to serve new development. Therefore, the total peak hour I/I into the collection system, as listed in Table 5-8, is assumed to remain constant over the 20-year planning period and the I/I in Historic Snoqualmie is assumed to decrease over time.

GRAVITY SEWER CAPACITY ANALYSIS

Results of modeling were used to identify sewer lines that are surcharged or over-capacity. Sewers in the City of Snoqualmie are determined to be over capacity when the upstream manhole is surcharged more than 1 foot.

EXISTING CONDITIONS

Hydraulic modeling of the existing collection system indicates that approximately 3,710 linear feet of sewer pipe are surcharged at current peak hour flows. All of the surcharged sewers are located within Historic Snoqualmie, listed in Table 6-2 below and shown on Figure 6-3.

TABLE 6-2

Surcharged Pipes – Existing (Year 2012) Conditions

Upstream MH	Downstream MH	Dia.	Length	Slope (ft/ft)	Capacity (gpm)	Flow(2) (gpm)	Surcharge in Upstream MH (ft)	Location
MH 2	PS 1	15	29	0.001	1,074	1,791	0.07	Railroad Avenue
MH 4(1)	**MH 3**	**15**	**302**	**0.002**	**1,182**	**1,791**	**1.28**	**Railroad Avenue**
MH 3	MH 2	15	294	0.001	1,072	1,791	0.72	Railroad Avenue
MH 5(1)	**MH 4**	**15**	**303**	**0.002**	**1,346**	**1,791**	**1.79**	**Railroad Avenue**
MH 8	DMH 7	12	173	0.002	741	778	0.04	Fir Street
MH 9	MH 8	12	384	0.002	694	778	0.28	Railroad Avenue
DMH 7(1)	**MH 6**	**15**	**332**	**0.002**	**1,183**	**1,791**	**1.59**	**Railroad Avenue**
MH 6	MH 5	15	332	0.002	1,391	1,791	0.97	Railroad Avenue
MH 2	MH 1	10	74	0.003	526	778	0.25	Railroad Avenue
MH 12	MH 11	12	394	0.002	758	778	0.05	Falls Avenue
MH13	MH 12	12	404	0.002	748	778	0.08	Falls Avenue
MH 14	MH 13	12	421	0.002	741	778	0.10	Falls Avenue
15H	MH 12	10	235	0.001	328	473	0.28	384th Avenue
16H	15H	10	32	0.001	326	440	0.32	384th Avenue

(1) Surcharging exceeds 1 foot in the upstream manhole. Upgrade of the capacity of this sewer pipe is recommended if I/I is not sufficiently reduced.

(2) Estimated 2012 Peak Hour Flow.

City of Snoqualmie

General Sewer Plan
Figure 6-3
Model Results - Existing

LEGEND:

- MANHOLES
- FORCEMAINS
- PUMP STATION
- CITY LIMITS
- PARCELS

PERCENT OF PIPE CAPACITY:

- 0 - 49.9%
- 50% - 74.9%
- 75% - 99.9%
- FULL PIPE
- OVER CAPACITY
- GRINDER PUMP STATIONS

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N W E S

0 1,100 2,200 Feet

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City of Snoqualmie

General Sewer Plan
Figure 6-4
Model Results - 2018

LEGEND:

- MANHOLES
- FORCEMAINS
- PUMP STATION
- CITY LIMITS
- PARCELS

PERCENT OF PIPE CAPACITY:

- 0 - 49.9%
- 50 - 74.9%
- 75% - 99.9%
- FULL PIPE
- GRINDER PUMP STATIONS

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N W E S

0 1,100 2,200 Feet

NOTE:

NONE OF THE GRAVITY SEWERS IN THE CITY'S SEWER COLLECTION SYSTEM ARE EXPECTED TO BE OVER CAPACITY AT PROJECTED 2018 FLOWS. IT IS ASSUMED THAT THE I/I IN HISTORIC SNOQUALMIE WILL BE REDUCED TO 6,500 GPAD BY 2018.

PSFLMH PSEDM PS4LMH

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City of Snoqualmie

General Sewer Plan
Figure 6-5
Model Results - 2032

LEGEND:

- MANHOLES
- PS PUMP STATION
- FORCEMAINS
- CITY LIMITS
- PARCELS

PERCENT OF PIPE CAPACITY:

- 0 - 49.9%
- 50 - 74.9%
- 75% - 99.9%
- FULL PIPE
- G GRINDER PUMP STATIONS

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N W E S

0 1,100 2,200 Feet

NOTE:

NONE OF THE GRAVITY SEWERS IN THE CITY'S SEWER COLLECTION SYSTEM ARE EXPECTED TO BE OVER CAPACITY AT PROJECTED 2032 FLOWS. IT IS ASSUMED THAT THE I/I IN HISTORIC SNOQUALMIE WILL BE REDUCED TO 4,500 GPAD BY 2032.

PSFLMH

PSELM

PS4LMH

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City of Snoqualmie

General Sewer Plan
Figure 6-6
Gravity Sewer Capital Improvement Projects

LEGEND:

- MANHOLES
- PUMP STATION
- FORCEMAINS
- CITY LIMITS
- PARCELS
- GRAVITY SEWERS
- GRINDER PUMP STATIONS

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N W E S

0 1,100 2,200 Feet

CIP PROJECT NO.3

CIP PROJECT NO.4

PSFLMH

PS4LMH

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With the exception of two sections of pipe with a total length of 938 linear feet from manhole MH 3 to manhole MH 5 and from manhole DMH 7 to manhole MH 6, the pipes listed in Table 6-2 are not considered to be over capacity. Although the upstream manholes are surcharged at the current peak hour flows, surcharging is less than 1 foot in the manhole upstream of the surcharged pipe and the risk of overflow is minimal. Therefore, it is not recommended to upgrade these pipes at this time.

Surcharging of manholes MH 4, MH 5 and DMH 7 currently exceeds 1 foot and the downstream pipes are considered to be over capacity. All three manholes are located along Railroad Avenue (near Northern Street and Fir Street) and are connected to 15-inch-diameter gravity sewer pipes. If I/I is reduced as anticipated between 2012 and 2018, the flow in these pipes will be reduced and will no longer be over capacity. However, if I/I in Historic Snoqualmie is not reduced, it is recommended that these two sections of pipe upgraded to convey the 2032 flow.

6-YEAR (2018) FORECAST

As shown in Table 5-14, by 2018, it is anticipated that the peak hour flow to the WRF will increase from 5.0 mgd to 5.70 mgd. As discussed previously, it is assumed that the City will complete improvements to reduce I/I in Historic Snoqualmie to offset the additional I/I contributed by new sewers installed to serve new development. It is assumed that the I/I in Historic Snoqualmie will be reduced to 6,500 gallons per acre per day by 2018 and the I/I per acre in Snoqualmie Ridge will remain constant. The additional flow from new development was distributed throughout the collection system based on forecasted development. Results of this modeling are summarized in Table 6-3.

TABLE 6-3

Surcharged Pipes – 6-year (Year 2018) Forecast

Upstream MH	Downstream MH	Dia.	Length	Slope (ft/ft)	Capacity (gpm)	Flow(1) (gpm)	Surcharge in Upstream MH (ft)	Location
MH 37	MH 5A	10	295	0.002	490	497	0.03	Fairway Avenue
MH 21	MH 8	10	183	0.003	525	798	0.69	Business Park
MH 2	PS 1	15	29	0.001	1,074	1,502	0.04	Railroad Avenue
MH 4	MH 3	15	302	0.002	1,182	1,502	0.60	Railroad Avenue
MH 3	MH 2	15	294	0.001	1,072	1,502	0.39	Railroad Avenue
MH 5	MH 4	15	303	0.002	1,346	1,502	0.77	Railroad Avenue
DMH 7	MH 6	15	332	0.002	1,183	1,502	0.37	Railroad Avenue
MH 6	MH 5	15	332	0.002	1,391	1,502	0.13	Railroad Avenue
MH 2	MH 1	10	74	0.003	526	633	0.10	Railroad Avenue
15H	MH 12	10	235	0.001	328	462	0.26	384th Avenue
16H	15H	10	32	0.001	326	437	0.29	384th Avenue

(1) Estimated 2018 Peak Hour Flow.

As a result of the I/I reduction that is anticipated to be achieved by 2018, none of the manholes in the collection system are anticipated to be surcharged more than 1 foot at the estimated 2018 peak hour flow. If the I/I in Historic Snoqualmie is not reduced as expected, some sections of pipe listed in Table 6-3 above could be over capacity in 2018.

20-YEAR FORECAST

The peak hour flow in 2032 is forecast to increase to 5.89 mgd. Similar to the 6-year forecast, it is assumed that the City will complete improvements to reduce I/I in Historic Snoqualmie to offset the additional I/I contributed by new sewers installed to serve new development. It is assumed that the I/I in Historic Snoqualmie will be reduced to 4,500 gallons per acre per day by 2032. The additional flow from new development was distributed throughout the collection system based on forecasted development.

TABLE 6-4

Surcharged Pipes – 20-year (Year 2032) Forecast

Upstream MH	Downstream MH	Dia.	Length	Slope (ft/ft)	Capacity (gpm)	Flow(2) (gpm)	Surcharge in Upstream MH (ft)	Location
MH 37	MH 5A	10	295	0.002	490	497	0.03	Fairway Ave.
MH 21	MH 8	10	183	0.003	525	798	0.69	Business Park
MH 2	PS 1	15	29	0.001	1,074	1,425	0.03	Railroad Avenue
MH 4	MH 3	15	302	0.002	1,182	1,425	0.44	Railroad Avenue
MH 3	MH 2	15	294	0.001	1,072	1,425	0.31	Railroad Avenue
MH 5	MH 4	15	303	0.002	1,346	1,425	0.52	Railroad Avenue
DMH 7	MH 6	15	332	0.002	1,183	1,425	0.25	Railroad Avenue
MH 6	MH 5	15	332	0.002	1,391	1,425	0.04	Railroad Avenue
MH 2	MH 1	10	74	0.003	526	548	0.02	Railroad Avenue
15H	MH 12	10	235	0.001	328	558	0.49	384th Avenue
16H	15H	10	32	0.001	326	540	0.56	384th Avenue
11H(1)	12H	10	400	0.002	427	470	0.17	384th Avenue

(1) Pipe not surcharged at the 2018 peak hour flow.
(2) Estimated 2032 Peak Hour Flow.

Similar to the 6-year forecast, the collection system will have sufficient capacity to convey the 2032 peak hour flow if the anticipated I/I reduction is achieved in Historic Snoqualmie. If this reduction is not achieved, it may be necessary to replace portions of the collection system in Historic Snoqualmie with larger diameter pipes to convey the peak hour flow.

PUMP STATION CAPACITY ANALYSIS

EXISTING CONDITIONS

The City of Snoqualmie currently operates and maintains 14 pump stations. Pump Station No. 1 pumps all of the sewage from Historic Snoqualmie to the Kimball Creek Pump Station. With the exception of the flows from the Weyerhauser Mill, Salish Lodge and the Snoqualmie Falls Visitor Center, which discharge to the WRF In-Plant Pump Station, all of the sewage from the City is pumped by the Kimball Creek Pump Station to the WRF headworks.

As shown in Table 6-5, with the exception of Pump Station No. 3, model results indicate that all of the pump stations have sufficient capacity to convey the current peak hour flow from their respective collection basins.

TABLE 6-5

Pump Station Capacity – Existing Conditions

Pump Station	Capacity (gpm)	Estimated Peak Influent Flow (gpm)	Over Capacity?
Kimball Creek	6,950	3,528	No
No. 1	1,800	1,791	No
No. 2	400	282	No
No. 3(1)	700	778	Over Capacity
No. 4	200	169	No
No. 6	100	97	No
BP	744	359	No
E	240	112	No
F	230	47	No
K2	80	71	No
K3	215	122	No
L	500	253	No
N6	98	14	No
Z	77	28	No

(1) Based on a review of the runtime data for 2011, this pump station was only over capacity during river flooding events in 2011. Model results indicate that this pump station is over capacity at the non-flood peak hour flow to the WRF of 5.0 mgd.

Modeling indicates that the peak hour flow to Pump Station No. 3 is 778 gallons per minute, which is slightly higher than the rated capacity of the pump station of 700 gallons per minute. Pump Station No. 3 was upgraded in 2009 and the new pumps were sized based on the recommendations in the 2003 General Sewer Plan, which estimated a buildout flow of 694 gallons per day to the pump station. The design flow listed in the 2003 General Sewer Plan was based on an assumption that the infiltration and inflow in

this basin would be reduced to 4,500 gallons per acre per day by completing a number of I/I removal projects identified in the 2003 Plan. Although some of the recommended improvements have been completed, the I/I in Historic Snoqualmie has not been reduced to the anticipated levels. As discussed previously, the current I/I in Historic Snoqualmie has been estimated to be 9,446 gallons per acre per day.

Although modeling indicates that the influent flow to Pump Station No. 1 is slightly below the pump station capacity of 1,800 gallons per minute, flow meter data indicates that one pump has run continuously for over 2 hours on multiple occasions. The incidents primarily occur when the Snoqualmie River is well above flood stage and portions of the sewer system are submerged by flood waters. However, there have been occasions that one pump has run continuously when there was no flooding. Per City staff, the lag pump in Pump Station No. 1 is programmed to operate when the water level in the wet well reaches the high level alarm. Based on the available flow meter data and pump station logs, the lag pump has never turned on during these high flow events, indicating that the single pump capacity is roughly equivalent to the incoming flow at the peak hour flow.

The City should verify that the Pump Station No. 1 is operating correctly to ensure that the second pump will be called in the event that the influent flow exceeds the capacity of the lead pump.

Although modeling indicates that Pump Stations 6 and K2 are operating near capacity, both stations are operating as designed. Both stations serve isolated neighborhoods with no growth projected; therefore, upgrading these stations will not be necessary.

6-YEAR (2018) FORECAST

Model results for the 6-year (year 2018) forecasted flow are summarized in Table 6-6. In anticipation of completion of the upgrade project (discussed above) that is currently under construction, the capacity of the Kimball Creek Pump Station was increased to the new design flow of 6,950 gallons per minute for this model and the 20-year model.

TABLE 6-6

Pump Station Capacity – 6-Year (2018) Forecast

Pump Station	Capacity (gpm)	Estimated Peak Influent Flow (gpm)	Over Capacity?
Kimball Creek	6,950	3,831	No
No. 1	1,800	1,502	No
No. 2	400	217	No
No. 3	700	633	No
No. 4	200	137	No
No. 6	100	69	No

TABLE 6-6 – (continued)

Pump Station Capacity – 6-Year (2018) Forecast

Pump Station	Capacity (gpm)	Estimated Peak Influent Flow (gpm)	Over Capacity?
BP	744	743	No
E	240	119	No
F	230	49	No
K2	80	72	No
K3	215	127	No
L	500	356	No
N6	98	14	No
Z	77	28	No

As discussed previously, it is anticipated that the City will complete improvement projects to reduce the I/I entering the portion of the collection system in Historic Snoqualmie to 6,500 gallons per acre per day by 2018. As a result of these improvements, the peak hour flows to Pump Station Nos. 1 and 3 will be reduced and these pump stations will be sufficiently sized to convey the 2018 peak hour flows. If the I/I is not reduced to the anticipated levels, it may be necessary to upgrade one or both of these pump stations.

20-YEAR (2032) FORECAST

Model results for the 20-year (year 2032) forecasted flow are summarized in Table 6-7.

TABLE 6-7

Pump Station Capacity – 20-Year (2032) Forecast

Pump Station	Capacity (gpm)	Estimated Peak Influent Flow (gpm)	Over Capacity?
Kimball Creek	6,950	3,777	No
No. 1	1,800	1,425	No
No. 2	400	176	No
No. 3	700	548	No
No. 4	200	117	No
No. 6	100	50	No
BP	744	743	No
E	240	119	No
F	230	49	No
K2	80	72	No
K3	215	127	No

TABLE 6-7 – (continued)

Pump Station Capacity – 20-Year (2032) Forecast

Pump Station	Capacity (gpm)	Estimated Peak Influent Flow (gpm)	Over Capacity?
L	500	356	No
N6	98	14	No
Z	77	28	No

At the forecasted 2032 flows, which are based on the assumption that the I/I in Historic Snoqualmie will be reduced to 4,500 gallons per acre per day, model results indicate that none of the pump stations will be over capacity.

It should be noted that I/I for this Plan was not evaluated in sufficient detail to identify separate I/I rates for each individual sewer basin. Sufficient flow data does not exist to estimate I/I at this scale with sufficient accuracy. I/I reductions were applied to the model system-wide and actually may vary by neighborhood. It should also be noted that there is no growth projected for the basin that is served by Pump Station No. 6. Also, the WRF analysis does not include I/I reduction; therefore, the analysis of the WRF hydraulic capacity is not affected by any assumptions about I/I reduction.

COLLECTION SYSTEM EVALUATION WITHOUT I/I REDUCTION

As summarized in Chapter 5, the peak hour flows for 2018 and 2032 were estimated using an assumption that the I/I in Historic Snoqualmie will be reduced over the next 20 years through sewer system repair and improvement projects. The forecasted reductions in flow will offset the additional I/I contributed by new sewers installed to serve new development. It is estimated that the I/I reduction projects will reduce the I/I in Historic Snoqualmie from 9,446 gallons per acre per day to 4,500 gallons per acre per day by the end of the 20-year planning period.

If, however, I/I reductions are not completed or are not successful in reducing the flow, the peak hour flow in Historic Snoqualmie will be substantially higher than the flows included in the models. To account for this possibility, the collection system was modeled using the current I/I flow of 9,446 gallons per acre per day in Historic Snoqualmie for the 2032 development condition.

Based on the results of this model, multiple gravity sewers will be over capacity and will need to be replaced with larger diameter pipes capable of conveying the forecasted peak hour flow. In addition, Pump Station Nos. 1 and 3 will be over capacity and will need to be upgraded. The surcharged and over capacity sewers are listed in Table 6-8. Pump station flows and capacities are summarized in Table 6-9.

TABLE 6-8

Surcharged Pipes – 20-year (Year 2032) Forecast w/o I/I Reduction

Upstream MH	Downstream MH	Dia.	Length	Slope (ft/ft)	Capacity (gpm)	Flow[(1)] (gpm)	Surcharge in Upstream MH (ft)	Location
MH 37	MH 5A	10	295	0.002	490	497	0.02	Fairway Avenue
MH 21	MH 8	10	183	0.003	525	798	0.69	Business Park
MH 2	PS 1	15	29	0.001	1,074	2,133	0.12	Railroad Avenue
MH 4	MH 3	15	302	0.002	1,182	2,133	2.23	Railroad Avenue
MH 3	MH 2	15	294	0.001	1,072	2,133	1.19	Railroad Avenue
MH 5	MH 4	15	303	0.002	1,346	2,133	3.22	Railroad Avenue
MH 8	DMH 7	12	173	0.002	741	898	3.25	Railroad Avenue
MH 9	MH 8	12	384	0.002	694	898	3.18	Railroad Avenue
MH 10	MH 9	12	264	0.003	866	898	3.18	Riverview Park
DMH 7	MH 6	15	332	0.002	1,183	2,133	4.09	384th Avenue
MH 6	MH 5	15	332	0.002	1,391	2,133	2.94	384th Avenue
11H	12H	10	236	0.003	560	604	0.33	384th Avenue
MH 2	MH 1	10	74	0.003	526	898	0.40	Riverview Park
MH 12	MH 11	12	394	0.002	758	898	3.516	Falls Avenue
MH 13	MH 12	12	404	0.002	748	898	3.81	Falls Avenue
MH 14	MH 13	12	421	0.002	741	898	4.139	Falls Avenue
15H	MH 12	10	235	0.001	328	696	0.914	384th Avenue
16H	15H	10	32	0.001	326	661	1.028	384th Avenue
14H	16H	10	244	0.003	547	661	1.279	384th Avenue
13H	14H	10	248	0.003	546	661	1.638	384th Avenue
11H	12H	10	400	0.002	427	520	1.912	384th Avenue
9H	10H	10	272	0.003	508	520	1.396	384th Avenue
8H	9H	10	38	0.001	359	520	1.402	384th Avenue
MH 6-1	MH 6	8	403	0.003	285	323	0.32	Gamma Alley
MH 6-2	MH 6-1	8	187	0.003	290	323	0.342	Gamma Alley

(1) Estimated 2032 Peak Hour Flow without I/I reductions.

TABLE 6-9

Pump Station Capacity – 20-Year Forecast w/o I/I Reduction

Pump Station	Capacity (gpm)	Estimated Peak Influent Flow (gpm)	Over Capacity?
Kimball Creek	6,950	4,492	No
No. 1	1,800	2,133	Over Capacity
No. 2	400	306	No
No. 3	700	898	Over Capacity
No. 4	200	181	No
No. 6	100	99	No
BP	744	743	No
E	240	119	No
F	230	49	No
K2	80	72	No

TABLE 6-9 – (continued)

Pump Station Capacity – 20-Year Forecast w/o I/I Reduction

Pump Station	Capacity (gpm)	Estimated Peak Influent Flow (gpm)	Over Capacity?
K3	215	127	No
L	500	356	No
N6	98	14	No
Z	77	28	No

OTHER SYSTEM DEFICIENCIES

2007 SEWER INSPECTION

In 2007, the City completed a television inspection of the portion of the sewer collection system located in Historic Snoqualmie. The inspection identified numerous deficiencies and problems with the gravity sewer pipes, some of which allow significant amounts of infiltration and inflow to enter the collection system. The results of this investigation should be used to prioritize the portions of the system that should be repaired or replaced as part of the I/I reduction project recommended in the Capital Improvement Plan.

PUMP STATION BP

Per City staff, the manhole into which the Pump Station BP force main discharges occasionally surcharges two to three feet when the pumps are running. The manhole, MH-14, is an outside drop manhole that discharges to a 10-inch-diameter gravity sewer pipe. Based on modeling and hydraulic calculations, this gravity sewer pipe downstream of the force main discharge has a capacity of 1,674 gpm, which is more than sufficient capacity to convey the pump station capacity of 744 gallons per minute.

Based on a visual inspection of the manhole, the force main enters the manhole at an approximate 45 degree angle relative to the direction of the discharge piping. Because the sewage discharged from the manhole has to make an abrupt turn in the manhole, there is a substantial amount of turbulence in the manhole, which results in substantial headloss. To reduce the headloss, the alignment of the force main should be revised to align better with the discharge piping.

Per City staff, the force main and manhole were constructed by a developer, the City still has the performance bond for this project and the developer is responsible for any repairs required for proper operation of the system. To resolve this problem, the force main alignment should be revised to enter the manhole in line with the discharge pipe to reduce the turbulence and head loss in the manhole.

PUMP STATION NO. 2 (PICKERING COURT)

Pump Station No. 2 was originally constructed in 1965 and, with the exception of replacing one of the existing dry-pit pumps with a new 7.5-horsepower submersible Flygt pump, this station has not been significantly upgraded since it was constructed. The existing piping, valves, electrical equipment, roof and remaining original pump are beyond their useful lives and are in need of replacement.

CAPITAL IMPROVEMENT PROJECTS

INFILTRATION AND INFLOW REDUCTIONS

The 2003 General Sewer Plan estimated that the infiltration and inflow may be reduced by as much as half to 4,500 gallons per acre per day by completing I/I reduction projects, which include repairs of system leaks identified through smoke testing, sealing of leaking manholes, and sewer main and side sewer pipe rehabilitation/replacement. The recommended projects and their current completion status are summarized in Table 6-10 below. As discussed above, the City completed a television inspection of the gravity sewers in Historic Snoqualmie and identified many of the sources of I/I. The results of the 2007 investigation should be used to prioritize the I/I removal projects to be completed.

TABLE 6-10

Infiltration and Inflow Reduction Projects Recommended in the 2003 Sewer Plan

Project No.	Project Description[(1)]	Completion Status
1	Repair Sewer System Defects Identified During 1999 Smoke Testing	Completed 2007
2	Sewer Rehabilitation in Pump Station No. 3 Sewer Basin	Not Complete
3	Repair/Replace 30 percent of concrete sewer mains in Historic Snoqualmie	Not Complete
4	Grout 50 percent of manholes in Historic Snoqualmie	Not Complete
5	Repair/Replace 50 percent of side sewers in Historic Snoqualmie	Not Complete
6	Investigate further I/I Removal in Historic Snoqualmie[(2)]	Investigation Completed 2007

(1) Projects are further described in Chapter 7 of the 2003 General Sewer Plan.
(2) Investigation completed in 2007, however, the necessary repairs have not been completed.

Based on current flows, it appears that the system repairs completed to date have not significantly reduced the I/I entering the sewer system in Historic Snoqualmie.

If the City undertakes the projects summarized in Table 6-10 above that have not yet been completed and reduces the I/I in Historic Snoqualmie to 6,000 gallons per acre per day, both Pump Station Nos. 1 and 3 are anticipated to have sufficient capacity to convey the 2032 peak hour flow. If I/I is reduced to 4,500 gallons per acre per day, no sewer pipes will need to be replaced with larger pipes.

It is recommended that the City complete the recommended I/I reduction projects in phases over a 5-year period. Projects should be prioritized based on the results of the 2007 investigation. Following completion of each phase of work, the City should monitor wet weather flows from Pump Station No. 1 to evaluate the effectiveness of each phase of work.

Pump Station and Sewer Pipe Upgrades

Two pump stations (Pump Station Nos. 1 and 3) are over capacity at current flows based on flow meter data and sewer system modeling. If the I/I in Historic Snoqualmie is not reduced to below 6,000 gallons per acre per day, these two pump stations will need to be upgraded. In addition, if I/I is not reduced numerous gravity sewers will be over capacity. The capital improvement projects recommended for the 20-year planning period are summarized in Table 6-11 and further discussed below. Modeling indicates that, with the exception of the I/I removal projects and revision of the Pump Station BP force main discharge manhole, none of the projects listed in Table 6-11 are required if the I/I in Historic Snoqualmie is reduced to 4,500 gallons per acre per day by 2032.

GRAVITY SEWERS

As summarized earlier in this chapter, based on modeling, if I/I is reduced to 4,500 gallons per acre per day by 2032, none of the gravity sewers in the collection system will be over capacity. If, however, I/I is not reduced, it is anticipated that approximately 4,840 linear feet of gravity sewer pipe will be over capacity by the end of the 20-year planning period. In 2010, prior to modeling of the sewer system, approximately 971 linear feet of 12-inch pipe between King Street and River Street, which modeling indicates will be over capacity by 2032, was replaced with new 12-inch pipe. Although this new pipe is forecast to be over capacity within the 20-year planning period, the pipe and the roadway are new and in good condition. This section of pipe is not included in the capital improvement plan, but the City will monitor flows and surcharging in this section and will add it to the capital improvement plan at a later date if determined to be necessary. In addition, based on the results of sewer modeling, design is currently underway to replace approximately 770 linear feet of existing 12-inch pipe with 15-inch pipe in Falls Avenue between Fir Street and King Street. The new 15-inch pipe will have the capacity to convey the 2032 peak hour flow. This section is not included in this capital improvement plan.

Projects to repair the identified deficiencies and the estimated costs are included in Table 6-11 below and shown on Figure 6-6. Detailed cost estimates are provided in Appendix H.

PUMP STATIONS

Pump Station No. 3

Pump Station No. 3 was upgraded in 2009 to a capacity of 700 gallons per minute. The design flow was based on the buildout peak hour flow calculated for the sewer basin that drains to Pump Station No. 3 in the 2003 General Sewer Plan. In the 2003 General Sewer Plan, it was assumed that I/I reduction projects would be completed to reduce the I/I in Historic Snoqualmie to 4,500 gallons per acre per day. To date, some of these I/I reduction projects have been completed, yet the current I/I in Historic Snoqualmie is estimated to be 9,446 gallons per acre per day, indicating that I/I has not been reduced. As a result, Pump Station No. 3 is currently slightly over capacity and will be well over capacity by 2032 without a substantial reduction in I/I. As discussed above, if I/I is reduced to 6,000 gallons per acre per day, Pump Station No. 3 will have sufficient to convey the 2032 peak hour flow. If I/I is not reduced, it will be necessary to upgrade this pump station to convey a peak hour flow of 900 gallons per minute. Upgrades would include expanding the existing wet well by removing the concrete wall and fill material installed in 2009 and replacing the two existing 7.5-horsepower pumps with two 10-horsepower submersible pumps. The existing force main has sufficient capacity to convey the design flow.

Pump Station No. 1

Pump Station No. 1 was upgraded in 2002-2003 from 800 gallons per minute to 1,800 gallons per minute. Pump station runtime and flow meter data indicate that the pump station runs continuously for multiple hours during peak non-flood flows. Since the second pump in the pump station is never called, it is assumed that the peak influent flow is equal to the capacity of the pump station. Based on results of modeling, it is estimated that the flow to Pump Station No. 1 will be approximate 2,150 gallons per minute by 2032 if the I/I is not reduced.

Two alternatives were evaluated for upgrading Pump Station No. 1 to convey the forecasted flow. Alternative No. 1 would replace the existing 2,100-foot-long, 10-inch-diameter steel force main with a new 14-inch-diameter HDPE force main. The larger force main would reduce the total dynamic head on the pumps, allowing the existing pumps to convey the design flows. The pump curves for the existing pumps, which were not available at the time of this report, should be carefully reviewed during design to ensure that the pumps have sufficient capacity and will not be operating outside of their recommended range. The estimated cost to install a new force main is $690,000.

Alternative No. 2 would retain the existing 10-inch-diameter steel force main and replace the existing 40-horsepower pumps with two 85-horsepower pumps capable of conveying the forecasted future flows. The existing electrical equipment would be upgraded as needed to operate the larger pumps. At the design flow, the velocity through the existing force main will be almost 9 feet per second, which slightly exceeds the maximum recommended velocity of 8 feet per second. The estimated cost to install the new pumps is $420,000.

Although the pressure within the pipe would not be excessive, the operating cost of the Alternative No. 2 would be higher than Alternative No. 1 and velocity in the force main in Alternative No. 2 would be above of the recommended design velocities. For these reasons, Alternative No. 1is the recommended alternative and is included in Table 6-9.

Pump Station No. 2

Pump Station No. 2 has not been substantially upgraded since it was originally constructed and the existing equipment and portions of the structure are beyond their useful lives. Upgrades to Pump Station No. 2 would include replacement of the one remaining original long-coupled dry pit pump with a new 7.5-horsepower submersible pump installed in the existing dry pit. The existing roof and roof framing would be removed and replaced with a pitched roof with metal roofing. All of the existing electrical and control equipment would be replaced and telemetry would be added to the station. A trolley hoist would be installed to facilitate removal of the pumps from the building and a davit crane would be installed in the dry pit to move the pumps within the dry pit. All of the existing valves and piping would be replaced. The estimated cost to upgrade Pump Station No. 2 is $250,000.

RECOMMENDED COLLECTION SYSTEM CAPITAL IMPROVEMENTS

The capital improvement projects recommended for the City of Snoqualmie collection system are summarized in Table 6-11. The table shows a summary of projects required if no I/I reductions are performed.

TABLE 6-11

Capital Improvement Project Summary (No I/I Reduction Projects)

Project No.	Capital Improvement Project	Estimated Year of Completion	Project Cost (2012 Dollars)
Gravity Sewers			
1	Gravity Sewer at SE Newton Street	2015	$960,000
2	Gravity Sewer at 384th Street	2015	$610,000
Pump Stations			
3	Pump Station No. 1 Upgrade(1)	2015	$690,000
4	Pump Station No. 3 Upgrade(1)	2018	$140,000
5	Pump Station No. 2 Upgrade	2018	$250,000
Other Deficiencies			
6	Pump Station BP FM Realignment(3)	2013	$100,000

(1) If I/I in Historic Snoqualmie is reduced to 6,000 gallons per acre per day, this project will not be required.

(2) If I/I in Historic Snoqualmie is reduced to 4,500 gallons per acre per day, this project will not be required.

(3) Per City staff, the City has not yet released the performance bond for the project that installed this force main to the developer and the developer is responsible for completing any work required to resolve this deficiency.

FUTURE DEVELOPMENT

Salish Lodge Expansion and Residential Development

Per the Salish Expansion Developer Agreement, a new hotel with up to 250 rooms and a residential development with up to 175 single-family homes will be constructed on 52.8 acres in the Snoqualmie Falls planning area in the near future. The City has agreed to reserve 361 ERUs for these developments. It is not currently known when these developments may occur and the City has amended the Developer Agreement to extend the deadline to start construction of these developments indefinitely. It is assumed that these ERUs will produce a base sewage flow of 138 gallons per minute as calculated in Chapter 5. Using the diurnal peaking factor of 2.38 calculated in Chapter 5 and the peak hour I/I that was calculated for Snoqualmie Ridge of 1,575 gallons per acre per day, the peak hour flow from this new development is estimated to be 141 gallons per minute. It is assumed that sewage from the 361 additional ERUs associated with the Salish Expansion would be conveyed to the WRF by the existing eight-inch diameter gravity sewers that currently serve the Salish Lodge. The existing sewers have sufficient remaining capacity to convey the sewage from the planned expansion.

Mill Site Development

The Mill Site property was annexed to the City in 2011. 197 acres of the property are zoned Planned Commercial Industrial (PC/I), 40 acres are zoned Planned Residential (PR) and approximately 300 acres are zoned Open Space. The annexed property is subject to a preannexation agreement, which requires further subarea planning prior to acceptance of any development applications. Both the PC/I and PR zoning require that a master development plan be approved by the City prior to any new construction.

This planning document only accounts for flows from the Mill Site that are pumped by the existing Weyerhaeuser Mill Pump Station. The flow is based on approximately 10 ERUs and the historical I/I conveyed to that pump station with a total peak hour flow of approximately 317 gpm. Any use or development beyond current use would need to be analyzed and appropriately planned for in a new planning document or an amendment to this Plan.

CHAPTER 7

WATER RECLAMATION FACILITY ANALYSIS

The purpose of this chapter is to evaluate the water reclamation facility (WRF) for its ability to meet its treatment objectives based on performance, capacity, reliability, and redundancy, and provide recommendations for improvements to meet the treatment objectives. The treatment objectives are seasonal and depend which discharge is used, either the river outfall or the reclaimed water outfall at the Hole 9 Pond. The treatment plant effluent quality must meet maximum monthly average limits of 30 mg/L for TSS and 25 mg/L for CBOD, as well as limits for ammonia, fecal coliform, pH, turbidity, and total coliform when producing reclaimed water. These limits were discussed in Chapter 4.

This evaluation focuses on the following treatment issues, at current and future design loadings:

- Capacity to treat projected WRF flow and loadings;
- Compliance with expected future NPDES permit limits;
- TSS, BOD, ammonia and total nitrogen removal, including biological treatment performance and solids/liquid separation in the secondary clarifiers and sand filters;
- Solids handling to produce Class A and B biosolids;
- Disinfection to meet water reuse standards;
- Standby power considerations;
- Reclaimed water quality;
- Other WRF requirements to maintain reliability and redundancy.

RECENT WRF IMPROVEMENTS

The City completed the Phase II expansion of the water reclamation facility in 2003. The Phase II expansion included the construction of a second oxidation ditch with a flow splitter box, a new rapid sand filter for effluent filtration, and additional low pressure UV light banks for effluent disinfection.

In 2008, the stored biosolids were removed from the sludge storage lagoons. Following sludge removal, the lagoons were decommissioned. Concurrently, a new solids handling system was constructed to process the WRF waste activated sludge. The system was designed to produce Class A biosolids using centrifuge dewatering and thermal sludge drying.

In 2012, the City purchased and installed a new perforated plate mechanical fine screen with 6 millimeter openings at the headworks to replace the existing mechanical rake bar screen.

NPDES PERMIT

The Department of Ecology issued the current City of Snoqualmie NPDES discharge permit with an effective date of May 1, 2014. The expiration date of the permit is May 1, 2019. The revised permit included the following modifications:

- Added a new limit on maximum temperature for discharge to the Snoqualmie River.
- Added a more restrictive minimum pH limit of 6.3 standard units.
- Added additional nitrogen and phosphorous monitoring.

HISTORICAL PLANT PERFORMANCE

Historical WRF performance with regard to removal of $CBOD_5$, TSS, Fecal Coliform, Total Coliform, and Ammonia is discussed below. NPDES permit limits are shown in Table 4-16.

$CBOD_5$ AND TSS REMOVAL

Monthly average effluent $CBOD_5$ (and BOD_5) and TSS concentrations for the period of 2006-2011 are shown in Figures 7-1 and 7-2, respectively. Note that prior to July 2008 the data shown in Figure 7-1 is measured effluent BOD_5. The WRF has exhibited good performance and has generally met its permit effluent limits for $CBOD_5$ and TSS. Average monthly effluent concentrations for the period of 2006 to 2011 were 4.6 mg/L for TSS and 27 mg/L for $CBOD_5$ (BOD_5 prior to July 2008). The maximum month effluent limits for $CBOD_5$ and TSS concentration in the City's NPDES permit were exceeded during a plant upset during a major flood event in late 2008. Following the upset, the effluent concentrations have remained within limits.

FECAL COLIFORM AND TOTAL COLIFORM REMOVAL

Monthly average effluent fecal coliform (discharge to river) and total coliform (reclaimed water discharge) concentrations for the period of 2006 to 2011 are shown in Figure 7-3. The WRF has exhibited good performance and has generally met its permit effluent limits for fecal coliform. The average monthly and average weekly fecal coliform limits were exceeded during a plant upset condition during a major flood event in late 2008. If the period of the plant upset is omitted from the data considered, the average effluent fecal coliform for the period of 2006 to 2011 was 6.1 MPN/100 mL. The total coliform reclaimed water discharge limits of 23 MPN/100 mL for sample maximum and 2.2 MPN/100 mL for maximum 7-day median have generally been met. There have been only a few times the total coliform limits were exceeded since 2006.

FIGURE 7-1

Average Monthly Effluent $CBOD_5$ Concentration

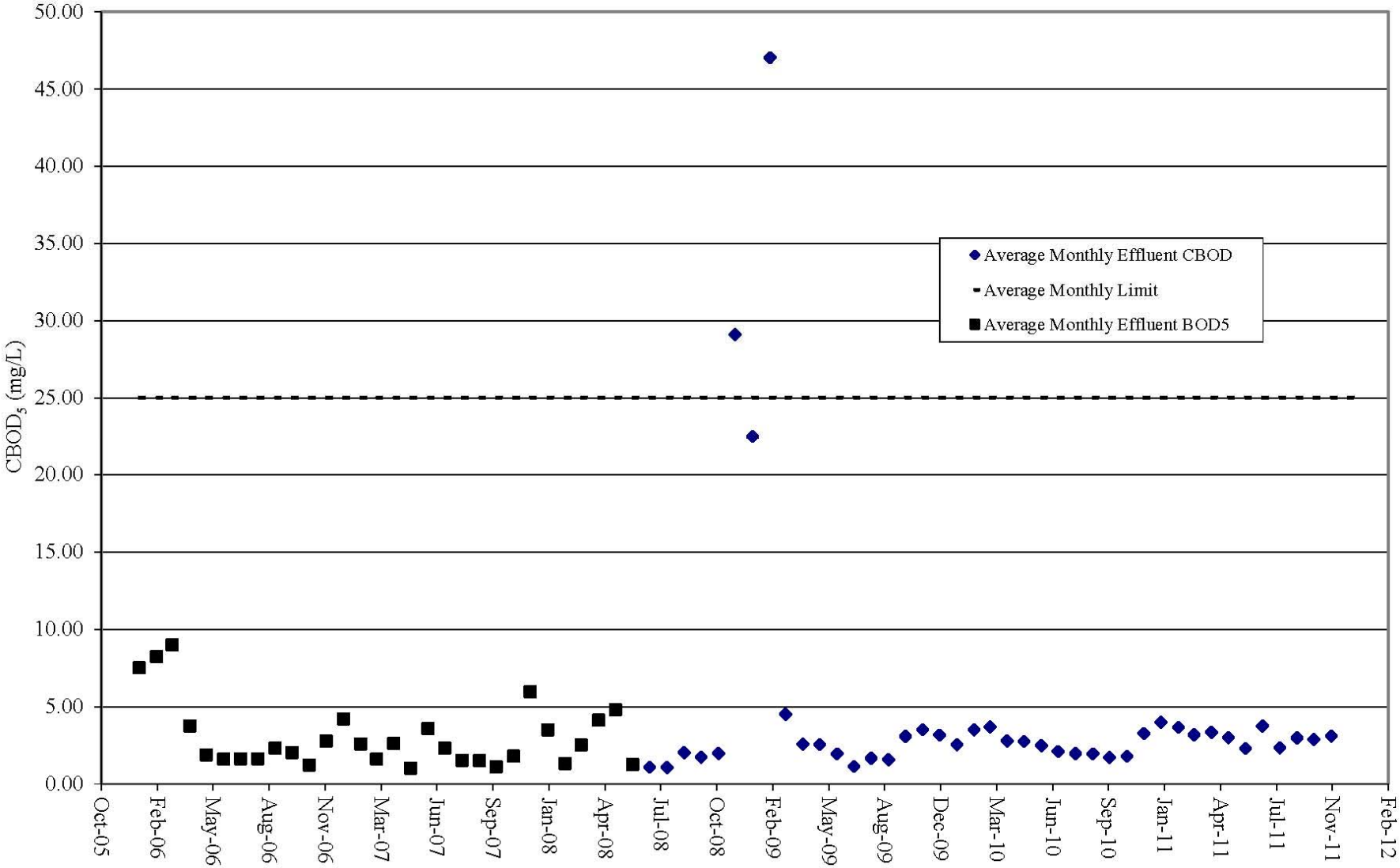


FIGURE 7-2

Monthly Average Effluent TSS Concentration

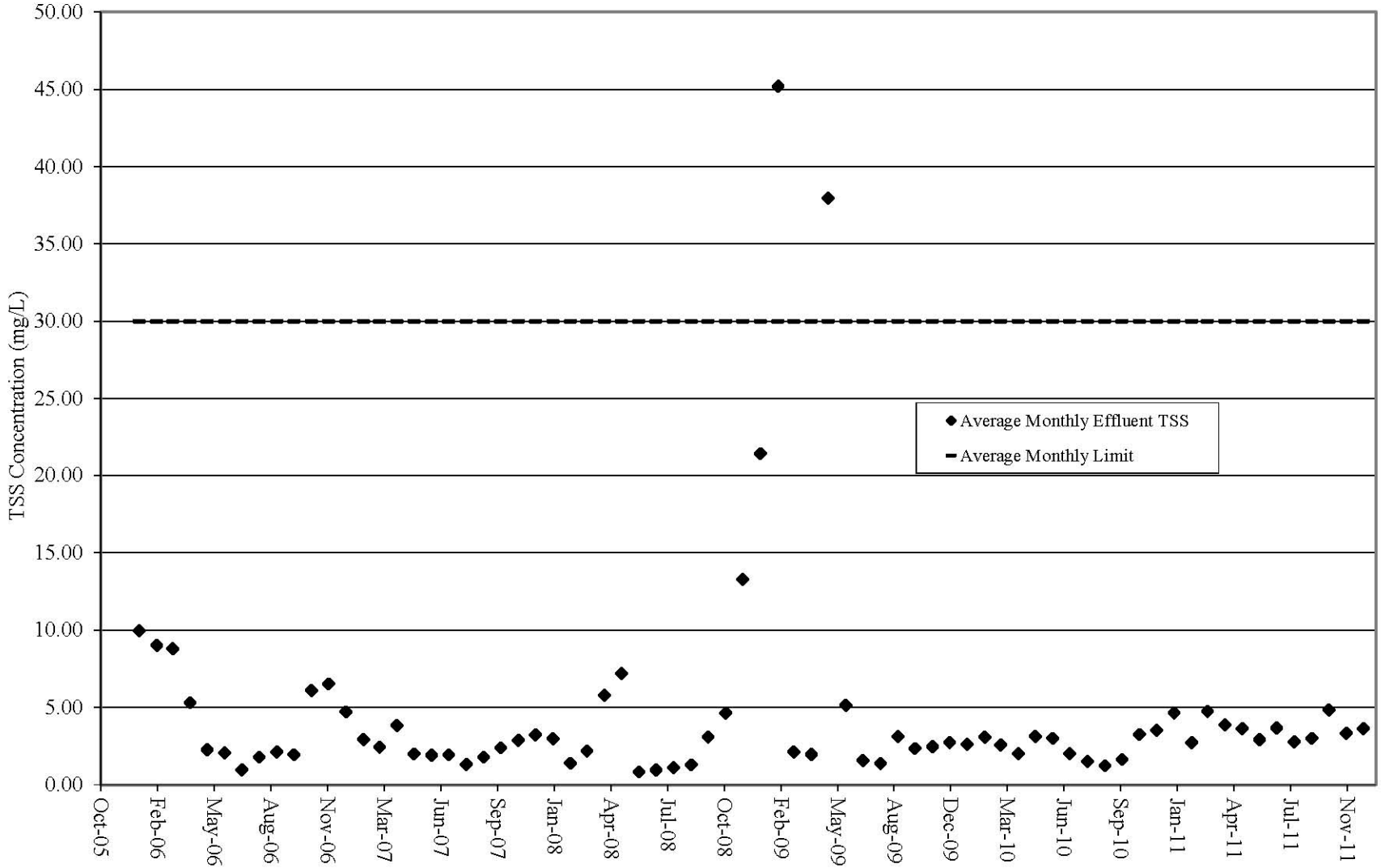
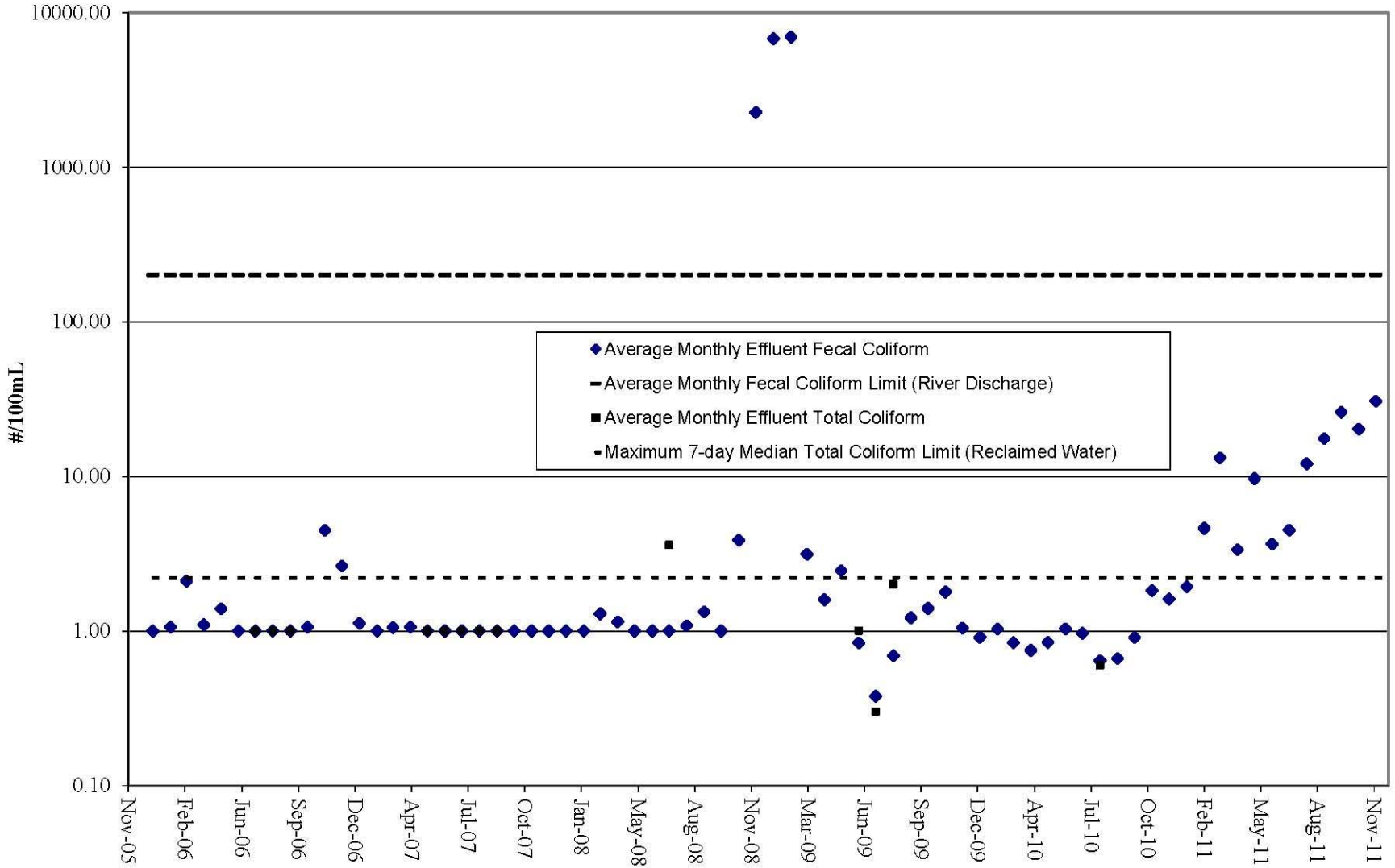


FIGURE 7-3

Average Monthly Fecal Coliform Effluent



TOTAL AMMONIA REMOVAL

Effluent ammonia (as NH_3-N) daily loadings for the period 2006 to 2011 are summarized in Figure 7-4. The WRF has exhibited good nitrification performance and has consistently met the seasonal TMDL permit effluent limits for ammonia. As shown, WRF effluent ammonia loadings have been seasonally variable. During seasonal winter-time high flows, the ammonia mass (lb/day) discharge has been high. However, the TMDL-based ammonia limit is only in force August through October and has not been in effect during historical seasonal high flows.

ANALYSIS OF WRF FLOW AND LOADING PROJECTIONS

Figures 5-1 through 5-3 show monthly average influent flow and loadings to the City of Snoqualmie WRF for the period of 2006 through 2011. A summary of current and projected flows and loadings, as developed in Chapter 5, is provided in Table 7-1. The flow and loadings shown are based on influent wastewater, recycle flows are considered negligible.

FLOW

As shown in Table 7-1, the projected maximum month influent flows to the WRF approach, but do not exceed, the rated capacity of the WRF (2.15 mgd) for the 20-year planning period. However, it is projected that 85 percent of the permitted maximum month flow will be reached by 2018.

LOADING

As shown in Table 7-1, the projected maximum month BOD_5 and TSS influent loadings to the WRF are both estimated to remain within the permitted capacity of the WRF (5,220 lb/d each) during the 20-year planning period. However, it is projected that 85 percent of the permitted maximum month TSS loading will be reached by 2018.

TABLE 7-1

Comparison of Design Criteria and Current and Projected Future Flow and Loadings

Parameter	Design Criteria	85% of NPDES Permitted Design Criteria(2)	Current 2012 Value	Projected 2018 Value	Projected 2032 Value
Average Annual Flow (mgd)	1.58	NR	1.023	1.209	1.288
Maximum Month Flow(1) (mgd)	2.15	1.83	1.55	1.83	1.95
Peak Hour Flow (mgd)	7.30	NR	5.0	5.70	5.89
Average Annual BOD_5 Loading (lb/day)	3,750	NR	2,291	2,865	3,112
Maximum Month BOD_5 Loading(1) (lb/day)	5,220	4,437	3,224	4,031	4,378
Average Annual TSS Loading (lb/day)	3,750	NR	2,745	3,433	3,729
Maximum Month TSS Loading(1) (lb/day)	5,220	4,437	3,485	4,359	4,734
Average Annual NH_3-N Loading (lb/day)	NR	NR	307	363	387
Maximum Month NH_3-N Loading (lb/day)	NR	NR	553	653	751

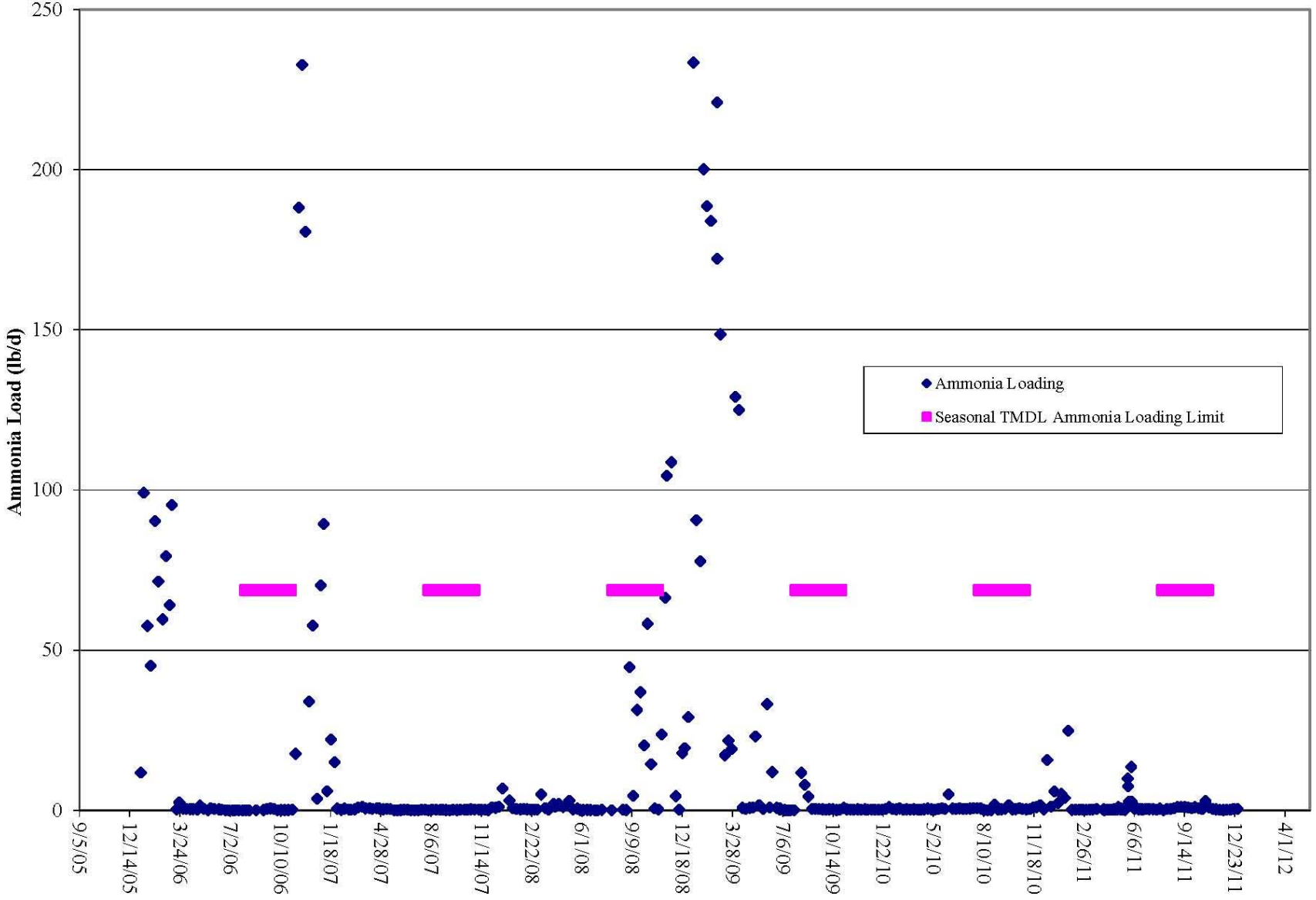
(1) Condition S.4.A of City's NPDES permit
(2) Condition S.4.B of City's NPDES permit
NR = Not Rated

Planning and development of capital improvement projects for maintenance of WRF capacity will be needed at the WRF. This need is due to the requirement in the City's NPDES permit that when actual monthly influent flow or loading to the WRF exceed 85 percent of design criteria for 3 consecutive months, or if the City has *projected* increases in wastewater flow or loading that would cause exceedance of design capacity within 5 years, the City must submit a plan and schedule to the Department of Ecology to maintain adequate capacity. The 85 percent and 5-year requirements are established to provide sufficient time for municipalities to plan, design and construct sufficient capacity. Based on projections, the City may exceed the 85 percent criteria prior to 2032 for Maximum Month Flow which is projected to be exceeded by 2018. However, the projected maximum month flow is not projected to exceed the design criteria during the planning period and the WRF is expected to have sufficient treatment capacity through 2032.

The ability of the WRF to accommodate the projected increases in flow and loading is addressed below.

FIGURE 7-4

Average Monthly Ammonia Effluent Loading



PLANT EVALUATION AT PROJECTED DESIGN CRITERIA

In the following sections, the capacities of major WRF components at 2018 and 2032 projected flow and loadings are evaluated, and, where applicable, compared to accepted design criteria, such as published in the Ecology's *Criteria for Sewage Works Design* (1998), WEF Manual of Practice #8, and *Wastewater Engineering* (Metcalf and Eddy 4th Edition, 2004). This evaluation is also summarized in Table 7-2.

TABLE 7-2

Comparison of Component Design Criteria and Projected Flow and Loadings

Component (Parameter)	Capacity/Criteria	Reference[1]	2018 Operating Condition (meets criteria?)	2032 Operating Condition (meets criteria?)
Mechanical Fine Screen (at PHF)	7.3 mgd	Manufacturer	5.99 mgd (yes)	6.42 mgd (yes)
Vortex Grit Chamber (at PHF)	10 mgd	Manufacturer	5.99 (yes)	6.42 (yes)
Oxidation Ditch Solids Retention Time (SRT)	10-20 days, MMF	M&E, 2003	15 days (yes)	15.9 days (yes)
Secondary Clarifiers[2] (Surface Overflow Rate at MMF)	400-700 gpd/sf 300-1,000 gpd/sf	Ecology, 2008 WEF, 2006	244 gpd/sf (yes)	256 gpd/sf (yes)
(Surface Overflow Rate at PHF)	1,000-1,200 gpd/sf	WEF, 2006	779 gpd/sf (yes)	835 gpd/sf (yes)
Secondary Clarifiers[2] (Solids Loading Rate at MMF)	0.8 – 1.2 lb/sf/hr 0.833-1.25 lb/sf/hr	M&E, 2004 WEF, 2006	0.33 lb/sf/hr (yes)[2]	0.35 lb/sf/hr (yes)[2]
(Solids Loading Rate at PHF)	1.6 lb/sf/h	M&E, 2004	1.03 lb/sf/hr (yes)	1.06 lb/sf/hr (yes)
Secondary Clarifiers[3] (Solids Loading Rate at PDF)	0.75 lb/sf/hr	Daigger Clarifier Analysis[4]	0.78 lb/sf/hr **(NO)**	0.83 lb/sf/hr **(NO)**

TABLE 7-2 – (continued)

Comparison of Component Design Criteria and Projected Flow and Loadings

Component (Parameter)	Capacity/Criteria	Reference[1]	2018 Operating Condition (meets criteria?)	2032 Operating Condition (meets criteria?)
Filtration System (at MMF)	3.13 mgd	Manufacturer	0.93 (yes)	1.0 (yes)
UV Disinfection System (at PHF)	10.0 mgd	Manufacturer	5.7 mgd (yes)	5.89 mgd (yes)
UV Disinfection System (Delivered Dose)	100 mJ/cm^2 at 55% transmittance[5]	NWRI, Purple Book	39.7 mJ/cm^2 at 60% transmittance **(NO)**	39.7 mJ/cm^2 at 60% transmittance **(NO)**
Reclaimed Water Pumps[5]	1.44 mgd	Manufacturer	0.93 mgd (yes)	1.0 mgd (yes)

(1) Sources include Water Environment Federation (WEF), the Washington State Department of Ecology (Ecology) and Metcalf and Eddy (M&E).
(2) At SVI<150 mL/g.
(3) At SVI = 250 mL/g, using Daigger Approach to Clarifier Analysis
(4) Daigger Clarifier Analysis presented in following sections.
(5) The UV disinfection system criteria listed is the minimum delivered dose for Class A reclaimed water production. Systems that will only discharge effluent to surface water in compliance with secondary treatment standards and permit requirements may use lower UV dosages to provide energy savings.
(6) Based on estimated annual average dry weather flow.

HEADWORKS

Influent Pump Station

Wastewater from the majority of the City of Snoqualmie sewer collection system is pumped by the Kimball Creek Pump Station and enters the Water Reclamation Facility at the headworks. A small portion of the City's collection system, including the Salish Lodge, the Snoqualmie Falls Visitor's Center, and the Weyerhaeuser Mill site, flow to the In-Plant Pump Station (IPPS), where the flow from these areas combines with WRF in-plant recycle flows. The IPPS pumps both the recycle flows and the raw sewage to the headworks upstream of the screening, sampling and flow metering equipment, where it combines with the influent flows from the Kimball Creek Pump Station. All of the sewage, including all plant recycle flows, is screened and sampled and the flow is measured in the headworks.

In the current configuration, because in-plant recycle flows are combined with the influent flows upstream of the sampling and flow measuring equipment, it is not possible to accurately measure the actual quantity and strength of the incoming sewage. In an effort to reconcile this issue, the City currently measures the strength and quantity of the flow being pumped to the headworks by the IPPS and deducts it from the total influent flow. However, because some raw sewage is combined with the recycle flows conveyed by the IPPS, this calculation deducts a small amount of the raw sewage from the influent flow. To more accurately measure influent flow and to collect more representative samples, it is recommended that in-plant recycle flows be separated from the influent and discharged downstream of the headworks sampling and flow metering equipment.

To fully separate the recycle flows from the raw influent, it would be necessary to revise the In-Plant Pump Station force main alignment to discharge downstream of the sampler and flow meter. The force main would be relocated to discharge into the headworks discharge box. The gravity sewers from the Salish Lodge and Snoqualmie Falls Visitor Center and the force main from the Weyerhaeuser Pump Station would be rerouted to flow directly to the headworks. The new conveyance facilities would be sized to convey the future flows from the anticipated expansion of the Salish Lodge and the Snoqualmie Falls development, which are discussed in Chapter 3.

Four alternatives were evaluated for revising the conveyance of the influent wastewater flows that currently flow to the In-Plant Pump Station. These alternatives are summarized below. For all alternatives, the existing IPPS force main would be rerouted to discharge to the headworks discharge box.

Alternative No. 1 – Construct New Pump Station to Pump Gravity Flows; Extend Weyerhaeuser Mill Pump Station Force Main

The gravity sewers that currently flow to the In-Plant Pump Station would be routed to a new pump station that would be constructed in the planting strip located adjacent to the southeast corner of the Operations Building as shown on Figure 7-5. A new manhole and approximately 20 feet of new 12-inch-diameter gravity sewer pipe would be installed to intercept the gravity sewer flows in the existing 12-inch-diameter gravity sewer pipe that runs along the northern edge of the former sludge storage lagoons.

The new pump station would consist of a 6-foot-diameter concrete wet well equipped with two, 5-horsepower submersible pumps. A new 6-inch-diameter force main would be installed to convey the flows from the new pump station to the WRF headworks.

The force main from the Weyerhaeuser Mill Pump Station currently discharges to Manhole MH-1 located near the City's Water Treatment Plant. This 6-inch-diameter force main would be rerouted and extended to pump directly to the WRF headworks. Extending the force main would add approximately 29 feet of additional head to the pump station, which will slightly reduce the capacity of the pump station. Pump curves for the existing pumps in the Weyerhaeuser pump station were not available at the time

of this report and; therefore, the reduction in capacity of the pump station due to this additional head is unknown. If this alternative is selected, additional investigation will be needed to determine the impact that extending the force main would have on the existing pumps. Since the capacity of this pump station is substantially greater than the current flow, it is unlikely that the pump station capacity will be reduced to less than the peak hour flow from the mill area.

The estimated cost for Alternative No. 1 is $510,000, including contingency, tax, engineering, and construction administration.

Alternative No. 2 – Construct New Pump Station to Convey All Influent Wastewater Flows

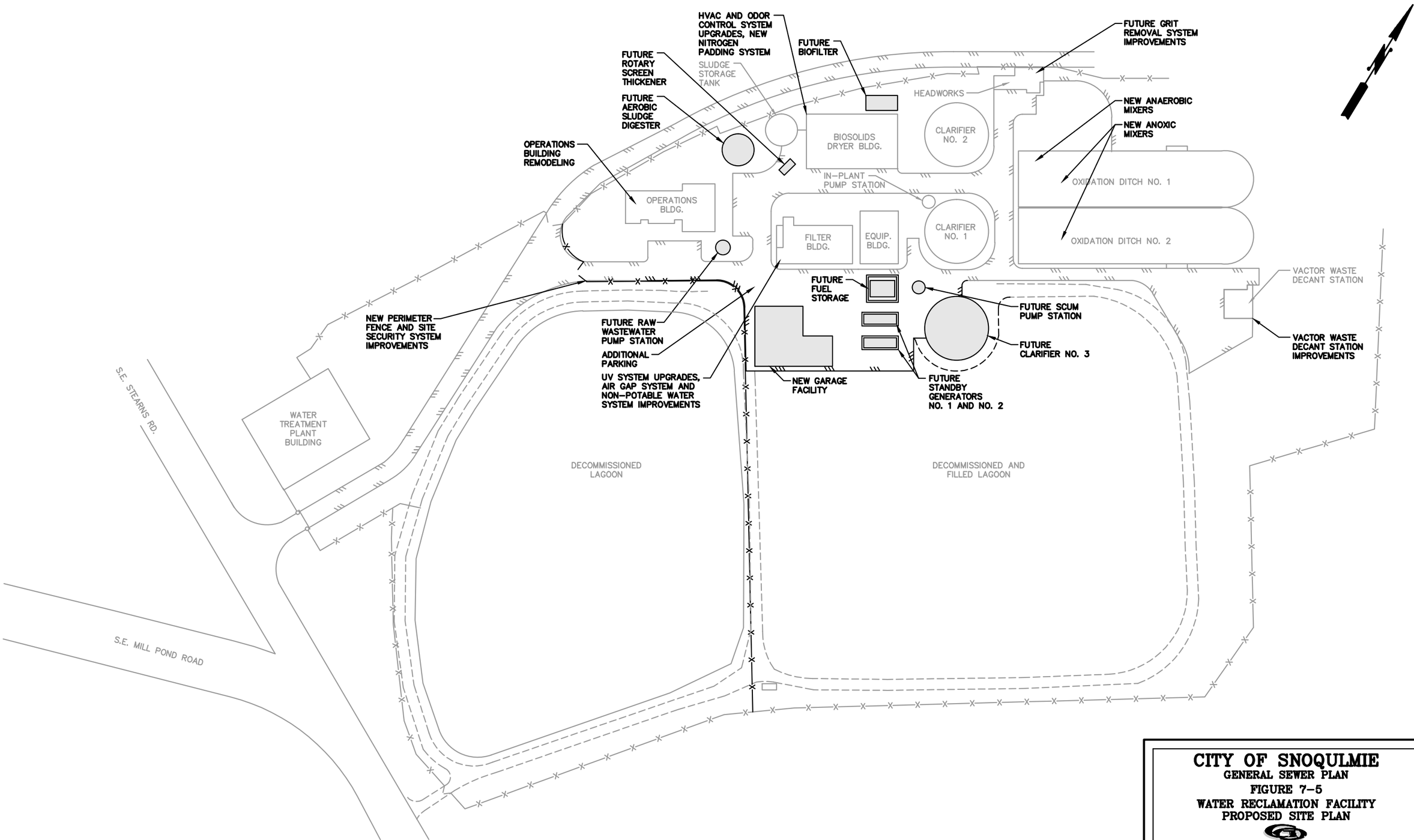
Similar to Alternative No. 1, the sewage that currently flows through an existing 12-inch gravity sewer to the In-Plant Pump Station would be rerouted to a new pump station located near the southeast corner of the Operations Building. The force main from the Weyerhaeuser Mill Pump Station would continue to discharge to Manhole MH-1, and a new gravity sewer would be installed from this manhole to the new pump station. The new gravity sewer would be a twelve-inch diameter pipe to convey the raw sewage flows.

The new pump station would consist of a 6' diameter concrete wet well. To accommodate the additional flow from the Weyerhaeuser Mill Pump Station, the pump station would be equipped with two 7.5 horsepower submersible pumps and an 8-inch-diameter force main would be installed from the pump station to the headworks.

The estimated cost for Alternative No. 2 is $420,000, including contingency, tax, engineering, and construction administration.

Alternative No. 3 – Upgrade the Lagoon Pump Station to Convey All Influent Wastewater Flows

The existing Lagoon Pump Station, which is a 6-foot-diameter submersible pump station located near the southwest corner of the former South Sludge Lagoon, was taken out of service in 2008 when the sludge holding lagoons were decommissioned. The pump station, valve vault and force main remain in place and could be upgraded to convey the raw sewage flows from the Weyerhaeuser Mill and the Salish Lodge to the headworks. A new 8-inch-diameter gravity sewer pipe would be constructed from Manhole MH-1 to the Lagoon Pump Station wet well to convey the flows from the Salish Lodge, Snoqualmie Falls Visitor Center, and the Weyerhaeuser Mill Pump Station force main to the Lagoon Pump Station wet well. The existing one-horsepower pumps would be replaced with two 15-horsepower submersible pumps. All of the existing piping, valves and controls would be replaced. The existing 8-inch force main would be extended from its existing discharge at Manhole MH-1 to the headworks. The existing power to the Lagoon Pump Station is provided by a separate service connection from the WRF, and a new 20 kW generator would be needed to provide standby power.



CITY OF SNOQULMIE
GENERAL SEWER PLAN
FIGURE 7-5
WATER RECLAMATION FACILITY
PROPOSED SITE PLAN

Gray & Osborne, Inc.
CONSULTING ENGINEERS

M:\Snoqualmie\11543 Gen Sewer WW Fac Plan\Figures\7-5.dwg, 5/7/2015 1:27:15 PM, mnagel

The estimated cost for Alternative No. 3 is $475,000, including contingency, tax, engineering, and construction administration.

Alternative No. 4 – Upgrade the Lagoon Pump Station to Pump Gravity Flows; Extend Weyerhaeuser Mill Pump Station Force Main

Under this alternative, the Lagoon Pump Station would pump only the gravity flows from the Salish Lodge and the Snoqualmie Falls Visitor's Center. The flows from the Weyerhaeuser Mill site would be pumped directly to the headworks via a separate force main, similar to Alternative No. 1. Similar to Alternative No. 3, a new 8-inch-diameter gravity sewer pipe would be installed from Manhole MH-1 to the Lagoon Pump Station to convey the gravity sewer flows. The existing force main for the Weyerhaeuser Mill Pump Station would be extended to the headworks as discussed in Alternative No. 1. The Lagoon Pump Station would be upgraded with two five-horsepower submersible pumps and new valves, piping and controls. Similar to Alternative No. 3, a new 20 kW generator would be installed.

The estimated cost for Alternative No. 4 is $520,000, including contingency, tax, engineering, and construction administration.

Because of the lower capital costs and risk associated with modifying an existing structure, Alternative No. 2, which includes a new pump station located near the Operations Building that will pump all of the raw sewage currently pumped by the In Plant Pump Station, is the recommended alternative.

Grit Removal

Grit removal is currently performed by the 12-foot diameter vortex grit chamber and grit chamber system. The design parameters meet industry standards, as indicated in Table 7-2. However, significant amounts of grit have been observed to accumulate in the oxidation ditches at the WRF. Pass through of grit may be attributed to the highly variable characteristics of grit (moisture content, specific gravity, and size) reducing capture rate of the existing vortex chamber system. Also, at peak flows, the detention times in the vortex unit decreases significantly, resulting in some pass through.

The existing grit washing and dewatering equipment is showing significant signs of wear and will likely need to be replaced within the next 10 years. It is recommended that the existing configuration consisting of an airlift pump and classifier be replaced with a new centrifugal pump, hydrocyclone, and grit classifier to improve grit recovery. The estimated project cost to replace the grit classifier equipment is $166,000, including contingency, tax, engineering, and construction administration.

OXIDATION DITCHES

The existing two oxidation ditches are Eimco A2C Carrousel Bardenpho type oxidation ditches. The oxidation ditches consist of three zones: one anaerobic zone for phosphorous removal, one anoxic zone for nitrogen removal, and one aerated zone for $CBOD_5$ removal and conversion of ammonia to nitrates. The capacity of the existing oxidation ditches to treat the projected 2032 maximum loading is verified below and is presented in a spreadsheet model in Appendix K.

Oxidation Ditch Capacity

Nitrification of ammonia to nitrates is required at the City of Snoqualmie WRF because of the low seasonal (August through October) ammonia effluent limits as set forth in the TMDL-based permit limits. Denitrification (removal of nitrates) is required to meet the reclaimed water limits on total nitrogen.

Oxidation ditch capacity requirements for removal of BOD_5 and ammonia are dependent on three major design criteria. These criteria are solids retention time (SRT), net heterotrophic and autotrophic yields, and design mixed liquor suspended solids (MLSS) concentration. SRT is the criteria of greatest importance for nitrification. The net specific growth rate of the nitrifying biomass is an order of magnitude lower than that of carbon oxidizing bacteria and is therefore used as the basis for determining the SRT of the oxidation ditch system. Also, the SRT used to calculate the required value for nitrification must be the aerobic SRT since nitrification only occurs under aerobic conditions.

SRT Calculation

The first step is to calculate the maximum specific nitrifier growth rate ($\mu_{n,m}$), decay rate (k_{dn}), and ammonia half saturation coefficient (K_N) at the late summer/early fall design temperature of 15 degrees C using the following equations.

$$\mu_{n,m,15} = (\mu_{n,m}) \times (\theta^{t-20}) = (0.75/d) \times (1.072^{15-20}) = 0.530/d$$

$$k_{dn,15} = (k_{dn}) \times (\theta^{t-20}) = (0.17/d) \times (1.029^{15-20}) = 0.147/d$$

$$K_{N,15} = (K_N) \times (\theta^{t-20}) = (0.74\ mg/L) \times (1.053^{15-20}) = 0.572\ mg/L$$

The numerical values for the various parameters above are typical for domestic wastewater.

Assuming typical values for effluent ammonia concentration of 1 mg/L, which is needed to ensure adequate total nitrogen removal, a dissolved oxygen concentration (DO) of 2.0 mg/L, and an oxygen half saturation coefficient (K_O) of 0.5 mg/L, the actual nitrifier growth rate is calculated as follows:

$$\mu_n = (\mu_{n,m,15})\left(\frac{N}{K_N + N}\right)\left(\frac{DO}{K_O + DO}\right) - k_{dn,15} = (0.530/d)\left(\frac{1.0}{0.572 + 1.0}\right)\left(\frac{2.0}{0.5 + 2.0}\right) - 0.147\ /d$$

This yields a net specific nitrifier growth rate of 0.12/d, which is then used to calculate the required SRT using the following equation:

SRT = $1/\mu_n$ = 8.2 days

Applying a safety/peaking factor of 1.5 to this value, to account for daily fluctuations in ammonia loading, produces a required oxidation ditch SRT of 12.3 days. Since the effluent ammonia limit is a maximum daily limit, this safety factor is recommended.

Design SRT = 1.5 x 8.2 days = 12.3 days

In order to calculate the aerobic mass required for the design SRT, the net sludge production for the treatment system must first be estimated. Assuming a typical cell yield of 0.4 lb VSS/lb biodegradable COD (bCOD), a typical influent wastewater and biomass VSS/TSS ratio of 0.85, and a design temperature of 15 degrees C, the total sludge production can be determined using the following equation:

$$P_X = \left[\frac{(Y)(S - S_0)}{(1 + (k_{d,t})(SRT))0.85}\right] + \left[\frac{(f_d)(k_{d,t})(Y)(S - S_0)(SRT)}{(1 + (k_{d,t})(SRT))0.85}\right] + \left[\frac{(Y_n)(NO_x)}{(1 + (k_{dn,t})(SRT))0.85}\right] + X_{iVSS} + X_{iTSS}$$

Where:

- P_X = mass of waste activated sludge per day, lb/d (to be determined)
- Y = heterotrophic cell yield = 0.40 lb/lb bCOD (typical for domestic wastewater)
- Y_n = autotrophic cell yield = 0.12 lb/lb TKN (typical for domestic wastewater)
- S = mass of influent bCOD, taken as 1.6 x influent BOD_5 = 8,352 lb day (5,220 lb/day x 1.6)
- S_o = mass of effluent bCOD, taken as 8.34 x influent flow x effluent $sbCOD_5$ = 143 lb/day (8 mg/L x 8.34 x 2.15 mgd)
- f_d = fraction of cell mass remaining as cell debris = 0.15 lb/lb (typical for domestic wastewater)
- $k_{d,t}$ = endogenous heterotrophic decay coefficient, d^{-1} (see below)
- $k_{dn,t}$ = endogenous nitrogenous decay coefficient = 0.147 d^{-1} (see above)
- SRT = solids retention time of the SRT = 12.3 days (see above)
- X_{iVSS} = volatile nonbiodegradable solids, = 0.4 x 0.85 influent TSS = 1,775 lb/d, where influent VSS is 85 percent of influent TSS, and volatile nonbiodegradable solids are assumed to be 40 percent of VSS

X_{iTSS} = influent nonvolatile suspended solids, taken as influent TSS – Influent VSS = 783 lb/day (5,220 lb/day TSS – 4,437 lb/d VSS)
t = oxidation ditch temperature = 15 degrees C
NO_x = amount of influent TKN oxidized to nitrate, assumed as 80 percent of influent TKN, 0.8 x 696 = 560 lb/d (assumes 20 percent ammonia uptake through cell growth)

The value for k_d can be determined as follows:

$$k_{d,15^0} = \left(k_{n,\max}\right)\left(\theta^{t-20}\right) = \left(0.1/d\right)\left(1.04^{15-20}\right) = 0.082/d \quad \text{(typical for domestic wastewater)}$$

The sludge production can then be calculated as follows:

$$P_X = \left[\frac{(0.4)(8{,}352-143)}{(1+(0.082)(12.3))0.85}\right] + \left[\frac{(0.15)(0.082)(0.4)(8{,}352-143)(12.3)}{(1+(0.082)(12.3))0.85}\right] + \left[\frac{(0.12)(560)}{(1+(0.147)(12.3))0.85}\right] + 1{,}775 + 783$$

$$P_X = 4{,}800 \text{ lb/day}$$

This equation yields a total estimated sludge production of 4,800 lb/day. At the design SRT of 12.3 days, this waste sludge production results in a required total aerobic mass of 56,800 lbs. With a known oxidation ditch volume of 2,080,000 gallons, the required MLSS concentration is calculated at 3,275 mg/L. Since this MLSS concentration is less than the original oxidation ditch design concentration of 4,000 mg/L, and since the secondary clarifiers are capable of handling this MLSS concentration without solids overload, it is verified that the existing oxidation ditch system has the capacity to treat the 20-year projected flow.

Nitrate Removal Analysis

The biological reduction of nitrates to nitrogen gas will take place in the anoxic zones before the carrousel sections of the oxidation ditches. In addition to removing nitrogen from the wastewater, the anoxic zone adds several other advantages to the treatment process. These zones improve overall process stability, recover a portion of the alkalinity that is consumed during nitrification in the oxidation ditch (to be discussed later), reduce aeration requirements (i.e., save power) by using nitrate in lieu of oxygen as an electron acceptor, and, provide some additional selection against filamentous bacteria.

The mixed liquor enters the anoxic zone together with recycled effluent from the oxidation ditch. This effluent contains a high concentration of nitrates as a result of biological nitrification in the aerobic zone.

The first step in verifying the sizing of the anoxic zone is to calculate the active biomass in the MLSS in the anoxic zone, which will be the same as in the oxidation ditch. The equation describing the active biomass is as follows:

$X_b=[Q(SRT)/V] \times [Y(S-S_0)/(1+k_{d,t}(SRT))]$

Where:

- X_b = active biomass in aeration basin, mg/L
- Q = design flow = 2.15 mgd
- SRT = solids retention time in aerobic zones = 12.3 days (see above)
- V = volume of aerobic zone = 2.08 mgal
- Y = heterotrophic cell yield = 0.40 lb/lb bCOD (typical for domestic wastewater)
- S = influent biodegradable COD (bCOD), taken as 1.6 x influent BOD_5 = 466 mg/l (1.6 x 8,352 lbs/day / (2.15 mgd x 8.345)
- S_0 = effluent bCOD, taken as 1.6 x effluent BOD_5 = 8 mg/l (1.6 x 5 mg/L discharge)
- $k_{d,t}$ = endogenous heterotrophic decay coefficient at temperature "t" = $k_{d,20} \times 1.04^{(t-20)}$
- $k_{d,20}$ = 0.1/day (typical for domestic wastewater)
- t = 15 degrees C
- $k_{d,15}$ = $0.1 \times 1.04^{(15-20)} = 0.082$/day

Thus, the active biomass concentration in the mixed liquor would be as follows:

$X_b = (2.15x12.3/2.08) \times [0.4(466-8)/(1+0.082x12.3)] = 1160$ mg/L

The next step is to determine the internal recycle (IR) ratio. The internal recycle returns nitrified effluent to the anoxic zone so that the nitrates can be reduced to nitrogen gas and released to the atmosphere.

The amount of nitrates that will be returned from the oxidation ditch to the anoxic zone depends on the amount of nitrates that will be discharged in the effluent. As will be shown in the next section, the oxidation ditch should be designed for an effluent ammonia concentration of 1 mg/l. Also, the effluent suspended solids will contribute a small amount of organic nitrogen. The plant effluent should have a suspended solids concentration of less than 10 mg/l. Usually, 12 percent of the suspended solids consist of organic nitrogen. Thus, 1.2 mg/l of organic nitrogen would be present in the plant effluent, resulting in an estimated effluent TKN concentration of 2.2 mg/L (1.2 mg/L organic nitrogen + 1 mg/L ammonia).

The total effluent nitrogen target design value is 10 mg/L as required per the reclaimed water discharge permit limit. Since the WWTF effluent nitrogen will consist of ammonia, organic nitrogen, and nitrates, the allowable effluent nitrate concentration should be limited to 6.0 mg/L. The IR ratio is defined as the IR flow divided by the influent flow and is determined by the following equation:

$IR = (NO_x/NO_{3eff}) – 1.0 – R$

Where:

NO_x = 560 lbs/d / 2.15 mgd / 8.34 = 31 mg/L
NO_{3eff} = effluent nitrate concentration = 6.0 mg/L (target value)
MLSS = $(SRT(P_x-(Eff_{TSS} \times 2.15 \times 8.34)))/(2.08 \times 8.34)$ = 3,276 mg/L
R = RAS ratio = MLSS/(WAS Conc. – MLSS) = 0.42

The internal recycle ratio would, thus, be as follows:

$IR = (31/6) – 1.0 – 0.42 = 3.75$

An IR ratio of 3.75 will result in an IR flow of 3.75 x 2.15 mgd = 8.1 mgd

The oxidation ditch is equipped with an internal recycle process that uses flow-diverting gates that are capable of recycling up to 15 times the influent flow via operation of the gates within the oxidation ditch, therefore the system is capable of producing the required internal recycle ratio. The gates divert flow from the oxidation ditch to the anoxic basin. The recycle ratio is adjusted by opening or closing the gates.

The next step in verifying the sizing of the anoxic zone is to determine the mass of nitrates that are fed to the anoxic tank. The mass of nitrates is equal to the mass of TKN that is oxidized to nitrate in the oxidation ditch, minus the nitrates that leave the system in the plant effluent.

$NO_{3recycle} = (NO_{ox} – NO_{3eff}) \times Q \times 8.34$
$= (31 \text{ mg/L} – 6 \text{ mg/L}) \times 2.15 \text{ mgd} \times 8.34 = 450 \text{ lbs/d}$

The last step in verifying the sizing of the anoxic zone is to determine the appropriate volume based on the specific denitrification rate (SDNR) in the anoxic basins.

It has been determined that the rate of denitrification at 20 degrees C ($SDNR_{20}$) is a function of the ratio of influent BOD to the mass of the active biomass in the anoxic basin (F/M_b). The relationship is given on Figure 8-23 in *Wastewater Engineering, Treatment and Reuse, Fourth Edition* (Metcalf and Eddy, 2003). The SDNR is adjusted to account for temperature as follows:

$SNDR_T = SNDR_{20}*(1.026^{(T-20)})$ (Metcalf and Eddy, 2003, Eq. 8-44)

At an active biomass concentration of 1160 mg/l, and an influent BOD_5 of 5,220 lbs/day, for anoxic basins:

$F/M_b = QS'/ (V_{nox})(X_b)$

F/M_b = Food to mass ratio
Q = Design Flow = 2.15 mgd
S' = Influent BOD mg/L = 5,220 lbs/d BOD_5 / 2.15 mgd / 8.34 = 291 mg/L
V_{nox} = Volume of Anoxic Basins = 0.52 mgal
X_b = Anoxic zone biomass concentration = 1,160 mg/L

F/M_b = (2.15 mgd) x 291 mg/L / (0.52 mgal) (1,160)
= 1.03 lbs BOD/lb MLVSS/day

Figure 8-23 in Metcalf and Eddy, (2003) and Equation 8-44 give an adjusted $SDNR_{15}$ of 0.184 lb NO_3/lb active biomass per day.

The active biomass in the anoxic zone is M_b = (0.52 mgd) x 1,160 mg/L x 8.34 = 5,030 lbs. Thus, the anoxic zone is capable of removing M_b x $SDNR_{15}$ = 5,030 x 0.184 = 926 lbs of nitrates per day.

The nitrate removal capacity is 926 lbs/day, which is greater than the estimated requirement of 450 lbs/day of nitrates recycled to meet the total nitrogen effluent reclaimed water discharge limit of 10 mg/L. Therefore, the WRF nitrate removal system is projected to have sufficient capacity to treat the 20-year projected loading.

Aeration Requirements

To biologically oxidize the BOD_5 in the wastewater into bacteria and harmless end products, oxygen must be continuously added to the oxidation ditch. The required quantity of oxygen consists of a carbonaceous oxygen demand and a nitrogenous oxygen demand minus the oxygen credit due to denitrification.

The carbonaceous oxygen demand is calculated as follows:

Carbonaceous O_2 Demand = $S - S_o - 1.42(P_{xbio})$

Where:

S = mass influent bCOD, 8,352 lb/d (from above)
S_o = mass effluent bCOD, 143 lb/d (from above)
P_{xbio} = $0.85(P_x - X_{iVSS} - X_{iTSS})$ = 0.85 x (4,800 – 1,775 – 783) = 1,905 lb/d

Therefore, the carbonaceous oxygen demand is 5,500 lb O_2/d. The nitrogenous oxygen demand is calculated by the amount of nitrogen oxidized to nitrate:

Nitrogenous O_2 Demand = $4.33(TKN_{in} - TKN_{out} - 0.12(P_{xbio}))$

Where:

TKN_{in} = Influent TKN = 696 lb/d
TKN_{out} = effluent TKN, 18 lb/d (assume 1 mg/L at 2.15 mgd)
P_{xbio} = 1,905 lb/d (from above)

Therefore, the nitrogenous oxygen demand is 1,945 lb/d. The oxygen credit due to denitrification is calculated by the amount of oxygen equivalent of the NO_3-N used in oxidation of bCOD:

O_2 Denitrification Credit = 2.86(Effluent NO_3), where design effluent NO_3 concentration is 6 mg/L, and;

Effluent NO_3 = 0.80 x TKN_{in} – Design Eff Nitrate
= 0.80 x TKN_{in} - 6 mg/L NO_3
TKN_{in} = Influent TKN = 696 lb/d
Design Eff Nitrate = 108 lb /d (at 2.15 mgd)

Therefore, the oxygen credit due to denitrification is 1,285 lb/d. The total oxygen demand is the sum of carbonaceous and nitrogenous oxygen demand minus the oxygen credit due to denitrification, or 6,160 lb/d. Applying a safety factor of 1.3 to account for fluctuations in diurnal loads results in a design oxygen demand of 8,010 lb/d, which is the required oxygen transfer rate under field conditions.

The surface low speed aerator oxygen transfer rate standard performance data must be adjusted to reflect field conditions. The field performance of the existing low speed surface aerators is calculated as follows:

$$N = N_O\left(\frac{\beta C_{walt} - C_L}{9.17}\right)\left(1.024^{T-20}\right)\alpha$$

Where:

N = lb O_2/hp-h transferred under field conditions
N_O = lb O_2/hp-h transferred in water at 20 C, and zero dissolved oxygen, Metcalf and Eddy states the range is from 2.5 to 3.5 lb 0_2/hp-h. A rate of 2.5 lb O2/hp-hr is used in this analysis.
α = oxygen transfer correction factor, 0.85 (typical for oxidation ditches)
β = salinity surface tension factor, 0.95
C_{walt} = oxygen saturation concentration for tap water at operating temperature and elevation, 10.0 mg/L
C_L = operating dissolved oxygen concentration, 2 mg/L
T = 20 degrees C

The resulting estimated aerator performance is 1.7 lb O_2/hp-hr. The existing aeration system consists of four 100 hp low speed surface aerators, providing a maximum of 400 hp of aeration. Therefore, the existing aeration system can supply a maximum rate 680 lb O_2/h, or 16,320 lb O_2/d, which is adequate to meet the calculated design requirement of 8,010 lb O_2/d.

The WRF must meet Class II reliability which requires each oxidation ditch to be equipped with redundant aeration that is capable of supplying 100 percent of the oxygen transfer requirement. Each oxidation ditch has two 100 hp low speed surface aerators, each capable of supplying the required oxygen demand. Therefore, the system is considered to provide adequate redundancy for the 20-year maximum month flow and load.

Alkalinity Requirements

The stoichiometric reaction for the oxidation of ammonia nitrogen to nitrate shows that two moles of hydrogen are produced for every mole of ammonia nitrogen oxidized. In a wastewater treatment system, these hydrogen ions are neutralized by the wastewater's natural alkalinity (buffering capacity), preventing this acidic condition from significantly reducing the pH within the treatment system. However, if the alkalinity present in the influent wastewater (reported value of 200 mg/L as $CaCO_3$) is not sufficient to neutralize the hydrogen ions released during nitrification, the pH within the system will begin to drop. This, in turn, can lead to a significant reduction in nitrification efficiency. pH readings outside the range from 7.2 to 8.0 can have an inhibitory effect on the nitrifying organisms.

The amount of alkalinity remaining following the biological process is calculated as follows:

Effluent Alkalinity = (Influent alkalinity) – (alkalinity consumed in nitrification) + (alkalinity recovery from denitrification)
= (200 mg/L) - (560 lb/d * 7.14 mg $CaCO_3$)/(2.15 mgd * 8.34) + (450 lb/d * 3.57 mg $CaCO_3$) /(2.15 mgd * 8.34)
= 68 mg/L

The total effluent alkalinity is estimated at 68 mg/L. A minimum alkalinity of about 75 mg/L is required in the oxidation ditch to maintain a pH of 7.2. It appears that the oxidation ditch process may be slightly deficient in alkalinity, but low effluent pH has not historically been an operating problem.

Anaerobic Mixers

In Oxidation Ditch No. 1, the anaerobic zone mixers do not sufficiently mix the basin contents. The anaerobic zone of Oxidation Ditch No. 2 uses turboprop mixers that show

good mixing performance. However, the turboprop mixer blades have exhibited signs of accelerated wear, likely due to abrasion from grit.

It is recommended that the existing anaerobic zone mixers in Oxidation Ditch No. 1 be replaced with turboprop mixers. The estimated project cost including contingency, tax, engineering, and construction administration, to replace the existing mixers with turboprop mixers is $44,600.

Anoxic Mixers

In Oxidation Ditch No. 1, the anoxic zone mixer is showing signs of wear. The gearbox has been producing a grinding noise, which is an early indication that the equipment is approaching the end of its useful life. It is recommended that the existing mixer be replaced with a new mixer as there is no significant cost savings provided by rebuilding the gearbox compared to purchasing a new unit. The estimated project cost including contingency and tax to replace the anoxic mixer in Oxidation Ditch No. 1 is $103,000. Note that engineering and administration is not included as the project would not require engineering services.

SECONDARY CLARIFIERS

The WRF has two 70-foot-diameter secondary clarifiers. The most significant factors that influence the performance of secondary clarifiers include the clarifier design, overflow rate, solids loading rate, and sludge settleability.

Clarifier Surface Overflow Rate

As shown in Table 7-2, the 2008 Ecology Design Criteria lists 400 to 700 gallons per day per square foot (gpd/sf) as a recommended limit for secondary clarifiers settling waste activated sludge at average design flow (max. month flow) based on SVIs of 150 mL/g and lower. WEF Manual of Practice #FD-8 (Clarifier Design) recommends maximum month design ranges of 300 to 1,000 gpd/sf and peak hour flow design ranges of 1,000 to 1,200 gpd/sf (the Ecology Design Criteria does not address peak hour flow). At projected year 2018 and 2032 flows, the clarifier overflow rate is within recommended criteria at SVIs of 150 mL/g and lower.

As noted above, the recommended design surface overflow rates are based on SVIs of 150 mL/g and lower. The Snoqualmie WRF historical SVIs are on average 53 percent higher than this typical design SVI.

Solids Loading Rate

As shown in Table 7-2, the maximum design solids loading rate recommended by Metcalf and Eddy is 0.8 to 1.2 lb/sf-h (19.2 to 28.8 lb/sf-d), and WEF recommends 0.833 to 1.25 lb/sf-h (20 to 30 lb/sf-d). At the design maximum month flow and loadings, the

solids loading rates are 0.33 lb/sf-h (8 lb/sf-d) for year 2018 and 0.35 lb/sf-h (8.4 lb/sf-d) for year 2032. Therefore, at projected year 2018 and 2032 flows, the clarifier solids loading rate is within recommended criteria (at SVIs of 150 mL/g and lower).

The *peak* solids loading rate recommended by Metcalf and Eddy is 1.4 lb/sq ft-h (33.6 lb/sf-d), and WEF recommends 2.08 lb/sq. ft.-h (50 lb/sf-d). The WEF guidelines state that the peak recommended solids loading rate is based on low SVI numbers. At projected year 2018 and year 2032 peak hour flow and loadings, the peak solids loading rates are 1.03 lb/sf-h (25 lb/sf-d) for year 2018, and 1.06 lb/sf-h (25.4 lb/sf-d) for year 2032. Therefore, at projected year 2018 and 2032 peak flows, the clarifier solids loading rate is within recommended criteria (at SVIs of 150 mL/g and lower).

As noted, the recommended design solids loading rates are based on SVIs of 150 mL/g and lower. The Snoqualmie WRF historical SVIs are on average 50 percent higher than the typical design SVI. Since SVIs at the WRF are typically higher than 150 mL/g a clarifier analysis has been performed using the Daigger Approach to determine if the clarifiers are overloaded at future design flows.

Clarifier Analysis

The Daigger Approch described in WEF Manual of Practice No. FD-8 (Clarifer Design) follows the work developed by Daigger (1995) and Daigger and Roper (1985) in which a clarifier operating diagram is used to determine the clarifier operating point, under steady-state conditions. The clarifier operating diagram correlates the maximum solids loading rate, the underflow (RAS) solids concentration, the RAS pumping rate, and SVI.

In order to use the Diagger Approach for clarifier analysis, the design SVI and operating RAS underflow rate must be known. The operating RAS underflow concentration and maximum allowable solids loading rate (flux) are then determined from these two known values.

The settling characteristics of the mixed liquor solids are measured using the sludge volume index (SVI) empirical test. The typical design value of SVI for a good settling sludge is considered to be 150 mg/L or less. Historical sludge volume index (SVI) values for the Snoqualmie WRF are provided in Table 7-3. The average SVI for the period of January 2010 to January 2012 was 230 mg/L. To be conservative, a design SVI value of 250 mg/L is used in the analysis. It is expected that SVI values this high may be experienced in the future.

TABLE 7-3

Historical SVI Data

Date	SVI (mg/L)[1]
January 2010	265
February 2010	233
March 2010	247
April 2010	267
May 2010	253
June 2010	209
July 2010	224
August 2010	244
September 2010	233
October 2010	213
November 2010	251
December 2010	252
January 2011	265
February 2011	241
March 2011	214
April 2011	306
May 2011	289
June 2011	241
July 2011	241
August 2011	201
September 2011	170
October 2011	214
November 2011	211
December 2011	184
January 2012	216

(1) SVI data is the average of the recorded SVI for the entire month.

To determine if the existing clarifiers are overloaded at design future flows, the operating values at year 2018 and 2032 design flows were examined. At the 2018 maximum month design flow of 1.83 mgd (from Table 5-13), a clarifier underflow rate of 2.5 mgd (equal to the maximum pumping capacity of the RAS pumps, and equal to 325 gpd/sf for the two 70-foot-diameter clarifiers), and a design SVI of 250 mg/L, the Daigger curves indicate a maximum allowable solids loading rate of 18 lb/sf-d (0.75 lb/sf-h). Since the solids loading rate at these steady-state 2018 design flows and the design MLSS concentration of 4,000 mg/L is 8 lb/sf-d, the clarifier size is adequate. However, at the 2018 peak day flow of 4.28 mgd, the solids loading rate increases to 18.6 lb/sf-d (0.78 lb/sf-h), and the maximum allowable solids loading rate is exceeded. Consequently, under these conditions, the clarifier will likely fail and solids will overflow

into the effluent. At greater 2032 design peak day flows, clarifier failure will also occur. The Daigger curves used in the clarifier analysis are presented in Appendix L.

If a third 70-foot-diameter clarifier is constructed, including a new RAS pump, the maximum allowable solids loading rate remains the same at 18 lb/sf-d, but due to the additional clarifier surface area, the 2018 peak day solids loading rate decreases to 12.4 lb/sf-d. At the 2032 peak day flow of 4.56 mgd, and an MLSS concentration of 4,000 mg/L, the resulting solids loading rate is 13.2 lb/sf-d. The solids loading rates at the 2018 and 2032 design flows are within the apparent maximum allowable rate with a third clarifier in operation. Therefore, it is recommended that a third clarifier be constructed and the performance of the facility be monitored as flows increase to assess the adequacy of the clarifier capacity.

As the Daigger Approach to clarifier analysis predicts that two clarifiers will be insufficient by 2018, it is recommended that a third clarifier be constructed to maintain adequate performance, operational reliability, and redundancy in the future.

The third clarifier would be constructed in the decommissioned Lagoon No. 2 east of Clarifier No. 1. Figure 7-4 presents the proposed site layout. The estimated project cost including contingency, tax, engineering, and construction administration, to construct the third clarifier is $1,556,000.

The design criteria for the existing and proposed secondary clarifiers is provided below.

Secondary Clarifier Design Criteria

Secondary Clarifiers (Existing)	2
Size – Diameter	70 feet
Sidewater Depth	14 feet
Volume, each	0.4 million gallons
Proposed Third Clarifier	1
Size – Diameter	70 feet
Sidewater Depth	14 feet
Volume	0.4 million gallons

Scum Pumping Facilities

Scum is collected from the secondary clarifiers and flows by gravity from the scum collection hoppers to the scum box which is on the outer wall of each clarifier. Originally, the scum box drained by gravity to the sludge storage lagoons. When the solids handling facilities were constructed and the lagoons were decommissioned, the piping was modified such that the scum is currently connected to the WAS piping near the inlet of the WAS pumps with additional piping and valves. The WAS pumps will not pump if the magnetic flow meters do not detect flow in order to protect the progressing

cavity pumps from running dry, which can damage the pumps. The magnetic flow meters have difficulty detecting the flow of scum due to the low density of the scum, and the WAS pumps sometimes do not operate due to the interlock. As the WAS pumps do not reliably pump the scum, it tends to back up into the scum box and then into the clarifiers.

It is recommended that a new scum pump station be constructed to provide reliable scum pumping. The scum pump station would accept gravity flows of scum out of the clarifier scum pits. The scum pump station would consist of a submersible progressing cavity pump located in a circular, below grade wet well with pump guide rails for serviceability. The scum pump station would be located between Clarifier No. 1 and future Clarifier No. 3 as indicated on Figure 7-4. To provide a redundant pumping system in case the new scum pump station is out of service, the existing piping and valves that convey scum to the WAS pumps will be connected to the new scum pump station wet well. A high level float switch will call the backup scum pumping system to pump the scum. The estimated project cost including contingency, tax, engineering, and construction administration, to construct the scum pumping facility is $94,000.

The design criteria for the existing and proposed scum pumping facilities and associated equipment are provided below.

Scum Pumping Facilities Design Criteria

Scum (and WAS) Pumping Facilities (Existing)	
Pump Quantity	2
Pump Type	Submersible Centrifugal
Pump Capacity	200 gpm
Pump Head	50 feet TDH
Motor Size	25 hp
Configuration	Dry Pit, Direct Suction Feed
Proposed Scum Pump Station	
Pump Quantity	1
Pump Type	Progressing Cavity
Pump Capacity	10 gpm
Pump Head	50 feet TDH
Motor Size	3 hp
Configuration	Wet Well, Removable Submersible

Air Gap System/Non-Potable Water System

The existing air gap system in the Equipment Building is intended to provide a physical separation between the City's potable water system and the water reclamation facility's plant water system, in accordance with Department of Health cross connection regulations. The existing air gap system has been cited by the local cross connection

control officer as not meeting the requirements of the Department of Health regulations. The potable water inlet is below the rim of the tank, presenting a possible cross-connection hazard. In addition, the tank is undersized and experiences significant level fluctuations that cause frequent alarms that shut off the pumps.

It is recommended that the existing air gap tank be abandoned and the existing, unused polymer storage tank be used as a non-potable water air gap system tank. To use the existing polymer storage tank as the air gap system tank, the tank piping would need to be modified and a new level control system installed.

The existing non-potable water system, which is supplied with potable water, includes all yard hydrants and treatment process water connections downstream of the air gap system. The facility consumes a significant amount of potable water in the non-potable water system. In 2010, the WRF was the No. 1 consumer of potable water in the City. The average daily potable water consumption by the City was 58,600 gallons per day with the majority of the potable water consumed at the WRF and the remaining used for irrigation. The estimated annual cost of potable water consumption at the WRF is $55,000 per year.

To reduce this cost, it is recommended that improvements be constructed to the non-potable water system to enable treated effluent to be used in the non-potable water system. Treated effluent can be used to supplement or replace potable water use in the non-potable water system in the WRF. Connections and processes that require potable water would not be connected to the proposed non-potable water system, including the polymer make down system, alum make down system, emergency eye wash stations, and emergency shower stations. A new smaller air gap system would be installed to provide water to the polymer make down system and alum make down system.

The existing reclaimed water sump can be modified to be used as a non-potable water withdrawal point. The sump will continue to serve as a reclaimed water sump during periods of reclaimed water production. When reclaimed water is not being produced the sump will be used as a treated effluent sump. The sump will need to undergo a thorough cleaning regiment prior to switching from use as a treated effluent/non-potable sump to a reclaimed water sump. Any treated effluent not withdrawn for use in the non-potable water system will be pumped to the reclaimed water discharge (during periods of reclaimed water production) or flow over the existing weir to the river outfall. The volume of the sump is approximately 25,000 gallons. New pumps, piping and controls will have to be provided for the non-potable water system upgrade to pump treated effluent to the existing polymer tank repurposed for use as an air gap system tank. The new equipment would be located in the filter building. The new pumps will convey water to the existing polymer storage tank that will serve as a break tank through an air gap to protect the reclaimed water. The existing non-potable water pumps will be configured to pump non-potable water from the break tank into the non-potable water system. In addition, in case reclaimed water or treated effluent is not available for any period of time, the new system will be able to utilize potable water through the new air gap for redundancy via additional pipe and valves.

The polymer make down system and the alum system require potable water to function properly. These systems will be served by a new skid mounted air gap system sized to supply water to these systems. The skid mounted air gap system will be located in the chemical storage area of the Equipment Building.

The equipment within the chemical storage area of Equipment Building, including the air gap system, shows signs of accelerated corrosion. The excessive corrosion is likely due to elevated levels of chlorine in the air that is stripped from the water as it passes through the existing air gap. It is recommended that the air handling system be improved to provide more air changes per hour to remove chlorine gas and mitigate the excessive corrosion to the equipment.

The design criteria for the existing and proposed air gap system facilities and associated equipment are provided below.

Air Gap System Design Criteria

Air Gap System (Existing)	
Pump Quantity	3
Pump Type	Multi-Stage Centrifugal
Pump Capacity	300 gpm
Pump Head	200 psi
Motor Size	10 hp
Break Tank	200 gal
Proposed Non-Potable Water Air Gap System	
Non-Potable Pump Quantity (reuse existing)	3
Non-Potable Pump Type (reuse existing)	Multi-Stage Centrifugal
Non-Potable Pump Capacity (reuse existing)	300 gpm
Non-Potable Pump Head (reuse existing)	200 psi
Non-Potable Motor Size (reuse existing)	10 hp
Break Tank (remodel existing)	7,000 gal
Treated Effluent Water Transfer Pump Quantity (new)	2
Treated Effluent Water Transfer Pump Type (new)	Submersible, Centrifugal
Treated Effluent Water Transfer Pump Capacity (new)	300 gpm
Treated Effluent Water Transfer Pump Head (new)	35 feet
Treated Effluent Water Transfer Pump Motor Size (new)	3 hp
Proposed Polymer Make Down System and Alum System Air Gap System	
Pump Quantity	2
Pump Type	Close Coupled Centrifugal
Pump Capacity	15 gpm
Pump Head	90 feet

Motor Size	1.5 hp
Break Tank	32 gal

The estimated project cost to construct the non-potable water system and air handling system upgrades, including contingency, tax, engineering, and construction administration, is $243,000.

Ultraviolet Disinfection System

The oldest part of the existing UV system will be 20-years old in 2018. The existing ultraviolet (UV) disinfection system is not equipped with an automatic cleaning system and is not provided with a means for removing modules of lamps. Also, the delivered dose of UV disinfection does not meet the levels stated in the National Water Research Institute (NWRI) guidelines and the Washington State Draft Reclaimed Water Facilities Manual (Purple Book) for reclaimed water disinfection. The existing design dosage is 39.7 millijoules per square centimeter at 60 percent transmittance, whereas the required minimum dose for reuse systems is 100 millijoules per square centimeter at 55 percent transmittance. The system is deficient in delivered dose and is based on a higher than standard transmittance.

It is recommended that the existing system be replaced with a new UV system. The new UV disinfection system will be designed to have a delivered dosage of 100 millijoules per square centimeter at 55 percent transmittance, in accordance with the NWRI guidelines and the Purple Book for reclaimed water production. The delivered dosage will be minimum 30,000 mJ/cm^2 at 55 percent transmittance during periods that reclaimed water is not being produced and the UV disinfection system is treating secondary effluent for discharge to the outfall. The new UV disinfection system will be equipped with an automatic lamp sleeve cleaning system to remove fouling and provide the highest level of transmittance through the lamp sleeve. Also, it is recommended that a hoist system is installed for removal of the lamp modules to facilitate operator safety during routine maintenance. The estimated project cost including contingency, tax, engineering, and construction administration, to construct the UV system upgrades is $1,712,000.

It should be noted that the standard design NWRI transmittance of 55 percent can be increased by sufficient operating data. If the WRF has recorded transmittance data from the effluent three times per day for six months, the 90^{th} percentile transmittance can be used for UV disinfection design. A higher transmittance value can substantially lower the capital cost of a new UV system. At a design value of 65 percent transmittance, a smaller UV disinfection system is required, and the estimated project cost is $1,274,000.

The design criteria for the existing and proposed UV disinfection facilities and associated equipment are provided below.

UV Disinfection System Design Criteria

UV Disinfection System (Existing)	
Peak Design Flow	10 mgd
Percent UV Transmission	60
UV Dose	39.7 mJ/cm^2
Number of Channels	2
Number of Banks	6
Number of Modules	48
Number of Lights per Module	10
Total Number of Lights	480
UV Disinfection System (Proposed at 55 percent Transmittance)	
Peak Hour Design Flow (During Reclaimed Water Production Season)	2.36 mgd
Peak Hour Design Flow (Secondary Effluent Discharge)	5.97 mgd
Percent UV Transmission	55
Delivered Design UV Dose (Reclaimed Water Production)	100 mJ/cm^2
Delivered Design UV Dose (Secondary Effluent Production)	30 mJ/cm^2
Number of Channels	2
Number of Banks	4
Number of Modules	32
Number of Lights per Module	8
Total Number of Lights	256
UV Disinfection System (Proposed at 65 percent Transmittance)	
Peak Hour Design Flow (During Reclaimed Water Production Season)	2.36 mgd
Peak Hour Design Flow (Secondary Effluent Discharge)	5.97 mgd
Percent UV Transmission	65
UV Dose (Reclaimed Water Production)	100 mJ/cm^2
UV Dose (Secondary Effluent Production)	30 mJ/cm^2
Number of Channels	2
Number of Banks	4
Number of Modules	16
Number of Lights per Module	8
Total Number of Lights	128

Note that a system with a design dose of 100 mJ/cm^2 at 2.36 mgd will be capable of a larger dose than the required 30 mJ/cm^2 at the design peak day flow. The control system for the UV disinfection system should be programmed to provide the design dose of 30 mJ/cm^2 when reclaimed water production us not required, in order to save energy and O&M costs.

RECLAIMED WATER PUMPS

The reclaimed water pumps have performed well historically. It is expected that they will continue to perform adequately at design capacity for at least the next 10 years. The design criteria for the existing reclaimed water pumps are provided below.

Reclaimed Water Pumps Design Criteria

Reclaimed Water Pumps (Existing)	
Number of Pumps	2
Type of Pumps	Vertical Turbine
Pump Capacity, Each Pump	500 gpm
Design Capacity, Pump Station	1.44 mgd
Total Dynamic Head	587 feet
Pump Horsepower	100 hp
Average Monthly Reclaimed Water Discharge Limit	1.56 mgd

SITE PARKING

The amount of parking for staff and visitors is limited. There is one parking spot reserved for disabled parking permit holders and five additional parking spots. The current level of staffing at the WRF is six full-time employees with plans for two more. It is recommended that five additional parking spots be provided to account for future employees and site visitors. The proposed location of additional parking is shown on Figure 7-4. The estimated project cost to provide additional parking is $68,000. The design criteria for the existing and proposed parking are provided below.

Water Reclamation Facility Parking Design Criteria

Parking Design Criteria	
Number of Disabled Permit Parking Spaces (Existing)	1
Number of Parking Spaces (Existing)	5
Number of Additional Parking Spaces (Proposed)	5

OPERATIONS BUILDING

The existing Operations Building, which provides facilities for six full time employees with two additional full-time employees in the future, is undersized for the current level of staffing at the WRF. The office area does not provide sufficient work space. The break room does not have enough space to seat all of the operators. The locker room has lockers for only half the number of employees. Also, there is no meeting space provided in the building. The work shop does not have enough space for both work layout and equipment and spare parts storage. To provide space for work layout and to provide

space to perform maintenance tasks additional shop space is needed. Currently, these tasks are performed outside and are weather dependant.

To provide additional office and shop work space, it is recommended that the Operations Building be remodeled and a new Garage Facility constructed. The Operations Building remodel should include additional space for the office, break room, shower and locker facilities, and meeting space. The new Garage Facility will have additional spare parts storage and more floor space for the work shop. The estimated project cost to remodel the Operations Building and construct a new Garage Facility is $1,277,000.

SLUDGE TREATMENT

Waste solids produced at the WRF are pumped to the aerated sludge holding tank, dewatered in the dewatering centrifuge, and then thermally dried to produce Class A biosolids. If the dryer equipment used in the process to produce Class A biosolids is out of service for any extended period of time, the existing WRF solids handling system has no provision for producing Class B biosolids, which would require the facility to haul secondary waste sludge off-site for further treatment and disposal or reuse. The City's options are limited and costly when disposing of waste sludge that does not meet Class A or Class B regulatory criteria. To provide redundancy and increased flexibility in long-term biosolids management, and to avoid the costs of off-site treatment if the Class A system fails, it is recommended that aerobic digestion upstream of the existing dryer process be performed to produce Class B biosolids.

Aerobic Digestion to Produce Class B Biosolids

Aerobic digestion is similar to the activated sludge process. Waste solids from the secondary clarifiers are conveyed to the aerobic digesters for stabilization and solids reduction. The sludge is aerated and mixed in the digesters to provide oxygen to microorganisms which break down available food to carbon dioxide, water, and cell tissue. As the supply of available food is depleted, the microorganisms begin to consume their own cell mass to obtain energy for cell maintenance. When this occurs, cell mass is oxidized aerobically to form carbon dioxide, water, and ammonia. A major objective of aerobic digestion is to reduce the mass of the solids for disposal. This reduction takes place predominantly with the biodegradable (organic) content of the sludge, although there may be some removal of inorganics through biological processes as well.

Production of Class B biosolids using aerobic digestion provides greater flexibility for the long-term management of waste solids at the WRF. Also, odor may be reduced by stabilizing the sludge in the aerobic digestion process. Wastewater treatment facilities with design flows of 5 mgd and less typically use aerobic digestion for sludge stabilization primarily due to lower capital costs and ease and reliability of operation.

Presently, the WRF provides limited aerobic digestion of the waste sludge in the existing aerated sludge holding tank. However, this tank does not have enough volume and

aeration capacity to produce Class B biosolids. It is recommended that additional aerobic digester volume be constructed at the WRF to produce Class B biosolids. The recommended upgrades include the installation of a sludge thickener, constructing a new aerobic sludge digester with coarse bubble diffusers for aeration and mixing, and use of the existing sludge holding tank as part of the aerobic sludge digester process.

Aerobic Digester Tank Sizing

The required volume for an aerobic digestion system is based on the required detention time to achieve pathogen reduction requirements to produce Class B biosolids. The State of Washington Administrative Code (WAC) provides the requirements for biosolids to be classified as Class B with respect to pathogens. WAC 173-308-170 states that to achieve Class B biosolids using aerobic digestion, the biosolids must be agitated with air or oxygen to maintain aerobic conditions for a specific solids retention time (SRT) at a specific temperature. Values for the SRT and temperature must be between forty days at 20 degrees C (68 degrees F) and sixty days at 15 degrees C (59 degrees F) when accommodating the projected maximum month sludge loadings. To be conservative, the design temperature used to size the aerobic digestion system is 15 degrees C with an SRT of 60 days.

Thickening the waste activated sludge minimizes the variability of the waste solids concentration and reduces the volume of the aerobic digester. It is recommended that the thickening be performed with a rotary screen thickener (RST), which provides reliable thickening up to 5 percent solids. It is recommended that the sludge be thickened to approximately 4 percent for optimum digestion performance. Solids concentrations higher than 3.5 percent to 4 percent in the digester typically become difficult to mix and aerate.

The aeration basin configuration for aerobic sludge digestion will be staged in series. The existing Sludge Holding Tank will be used as the second basin in the aerobic digestion process. A new basin will be constructed for the first stage in the series. The series configuration improves the digester performance and efficiency. Placement of the existing sludge holding tank as the second stage retains the existing layout for connections to the centrifuge facility. The size of the new digester tank is calculated as follows:

WEF MOP-8 provides the following aerobic digester volume sizing equation:

$$V = \frac{Qi \cdot (Xi + Y \cdot Si)}{X \cdot (Kd \cdot Pv + {}^{1}\!/_{SRT})}$$

Where,

Qi (ft^3/d) = Sludge feed flow rate to new aerobic digester from RST
Xi (mg/L) = Feed solids concentration from RST

Y	=	Fraction of feed consisting of raw primary solids
Si (mg/L)	=	Digester feed BOD_5
X (mg/L)	=	Suspended solids in new aerobic digester
Kd (1/d)	=	Reaction rate constant, from Fig. 22.39 in WEF MOP-8
Pv	=	Volatile fraction of digester SS
SRT (d)	=	Solids retention time

The terms Qi and SRT, used in the new aerobic digester sizing equation are determined as follows:

The influent to the new aerobic digester consists of waste solids from the rotary screen thickener. The pounds per day waste solids production, or Px, is calculated above in the Oxidation Ditch Capacity analysis. The waste solids are thickened to 4 percent. The influent flow to the new aerobic digester is calculated as follows:

AD Influent Flow, Qi = (Waste solids production, Px) / [(suspended solids concentration output from RST)*8.34] * 1,000,000
= (4,800 lb/d)/[(40,000 mg/L)*8.34*1,000,000]
= 14,460 gal/d
= 1,940 ft^3/d

The total required volume provided by the new Aerobic Digester in series with the existing Sludge Holding Tanks is presented as follows and in Appendix M:

Total AD Volume = Qi*(Xi +YSi)/X*(KdPv + 1/SRT)
= (1,933 ft3/d)*[(40,000 mg/L) + 0*Si)]/{(26,000 mg/L)*[(0.082 1/d)*(0.85%) + (1/60 d)]}
= 34,400 ft^3
= 257,600 gal

New AD Volume = (Total AD Volume) – (Existing SHT Volume)
= (257,600 gal) – (114,000 gal)
= 143,600 gal

The total required volume of the New Aerobic Digester is 143,600 gallons. It is recommended that the New Aerobic Digester have a diameter of 34 feet and a height of approximately 22 feet.

Aerobic Digester Aeration System

The total aerobic digestion oxygen demand is calculated below assuming 40 percent VSS destruction and a VSS fraction of 85 percent.

Carbonaceous O_2 Demand = 1.42 lb O_2/lb(feed sludge P_{xbio} lb/d)(% VSS destruction)
= 1.42 lb O_2/lb(1,905 lb/d)(0.4)
= 1,082 lb O_2/d

Nitrogenous O_2 Demand = 4.57 lb/lb(N/VSS destroyed)(feed sludge P_{xbio})
*(%VSS destruction)
= 4.57 lb O_2/lb(0.12 lb/lb)(1,905 lb/d)(0.4)
= 418 lb O_2/d

Total O_2 Demand = Carbonaceous O_2 Demand + Nitrogenous O_2 Demand
= 1,500 lb O_2/d

Applying a safety factor of 1.3 to account for fluctuations in diurnal loads, results in a design oxygen demand of 1,950 lb/d.

Oxygenation equipment is specified based upon standard oxygen transfer rate (SOTR), the oxygen transfer rate in clean 20 percent C water with no suspended solids. The SOTR is calculated as follows:

$$AOTR = SOTR\left(\frac{\beta C_{STH} - C_O}{C_{S20}}\right)\left(1.024^{T-20}\right)\alpha$$

Where:

- a = oxygen transfer correction factor, 0.6 (typical for this diffused aeration equipment)
- b = salinity surface tension factor, 0.95
- C_{STH} = dissolved oxygen concentration at operating temperature and elevation,
  = 10.0 mg/L
- C_{S20} = dissolved oxygen concentration at 20 degrees C and 1 atm, 9.08 mg/L
- C_O = operating dissolved oxygen concentration, 2 mg/L
- T = 15 degrees C

Thus the total oxygen demand is 4,430 lb/day.

Assuming an aeration diffuser efficiency of 30 percent, the required airflow is then:

Air flow = 4,430 lb O_2/d/(1440 min/d)(0.0173 lb O_2/scfm)(0.30)
= 593 scfm

The air required for mixing the aerobic digester is calculated with the mixing requirement of 0.02 scfm/ft^3:

Mixing Requirement = (21,750 ft^3)(0.02 scfm/ft^3)
= 435 scfm

Aeration required by oxygen demand is greater than the aeration required by mixing therefore, the aeration requirement due to oxygen demand is used. Typical aeration requirements for aerobic digestion range from 25 to 30 scfm per 1,000 cf of aerobic digester volume which is 544 scfm to 650 scfm for the aerobic digester volume of 21,750 cf. To be conservative, the air flow provided to the aerobic digester will be capable of providing 650 scfm.

The design criteria for the aerobic digesters, sludge thickener, and associated equipment are provided below.

Aerobic Digesters Design Criteria

Sludge Holding Tank/Digester (Existing)	
Quantity	1
Volume	114,000 gallons
Diameter	34 feet
Side Water Depth	17.75 feet
Solids Retention Time	5 days
Aerobic Digester (New)	
Quantity	1
Volume	143,600 gallons
Diameter	34 feet
Side Water Depth	22 feet
Solids Retention Time	55 days
Total Solids Retention Time	60 days
Influent Sludge Solids Concentration	4.0 percent
Total Solids Loading	4,800 lb/day
Biodegradable Volatile Solids Loading	1,905 lb/day
Digester Operating Temperature	15 degrees C to 20 degrees C
Estimated Volatile Solids Reduction	40 percent
Digester Mixing/Aeration	
Type of Mixing	Coarse Bubble Aeration
Mixing Air per Digester	25-30 ft^3/min/1,000 ft^3
SHT/Aerobic Digester Aeration	400 ft^3/min
Motor Size	30 hp
New Aerobic Digester Aeration	650 ft^3/min
Motor Size	45 hp

WAS Thickener	
Quantity	1
Type	Rotary Screen Thickener
Flow Capacity	75 gpm
Flocculation Tank Capacity	150 gallons
Feed Solids	1%
Thickened Solids	4%
Flocculator Motor Size	1 hp
Drum Main Drive Motor Size	3 hp
Thickening Polymer Feed System	
Quantity	1
Type	Hydro-Mechanical Mixing Chamber
Polymer Type	Liquid
Solution Feed Pump Capacity	1 gph
Thickened WAS Pumps	
Quantity	1
Type	Progressing Cavity
Capacity	144 gpm
Pump Head	65 psi
Motor Size	7.5 hp

The existing sludge holding tank has a mechanical fine screen mounted on a platform at the top of the tank. The mechanical fine screen is manufactured by Enviroquip, Inc. (Model FS-600) and has a rated hydraulic capacity of 250 gallons per minute. The mechanical fine screen at the Sludge Holding Tank is undersized and no longer required as the new mechanical fine screen at the headworks meets the regulatory requirements to significantly remove manufactured inerts with a 3/8-inch minimum screen. To avoid potential spills of WAS overloading the screen; it is recommended that the sludge holding tank screen be removed when the new aerobic digestion system is constructed. The estimated cost including contingency, tax, engineering, and construction administration, to construct a new aerobic digester with rotary screen thickener and associated aeration system is $1,250,000.

SLUDGE DEWATERING AND DRYING FACILITES

The sludge dewatering and drying facilities process waste activated sludge into Class A biosolids. The manufacturer states that the sludge dryer has the capacity to dry 5 dry tons per day of sludge. The projected sludge production is approximately 2.3 dry tons per day. The existing equipment is expected to have sufficient capacity for the projected 20-year flow and load. However, it should be noted that the operation and maintenance of the sludge dryer has been extremely difficult. Due to high temperatures in the dryer and poorly digested feed sludge, solids are baked on the interior surfaces of the thermal sludge dryer, fouling the heat transfer surfaces of the dryer and reducing the overall

efficiency of the system. The interior of the dryer is severely fouled with each batch of sludge processed, and operational staff has to chip and scrape out the baked-on sludge from the dryer on a daily basis. This maintenance task is a significant labor burden on the WRF.

The dried sludge is discharged to a surge bin and is then conveyed to the bagging system. The surge bin has had a fire when organic fine particles ignited, greatly increasing the volume and pressure of hot combustion products. To increase operator safety, it is recommended that a nitrogen padding system is installed on the surge bin. The nitrogen padding system will deliver nitrogen gas to provide an inert atmosphere with oxygen levels below five percent (by volume) to reduce potential for the dried product to experience self-heating and possible ignition. The estimated cost including contingency, tax, engineering, and construction administration, to install a nitrogen padding system is $26,000.

The atmosphere within the Sludge Dewatering and Drying Building is significantly odorous. There are several point sources of odor that are not currently served by the existing odor control system. To increase operator safety, reduce corrosion and dust, and provide a reasonable work environment, the odor control system should be upgraded. It is recommended that new biofilter facilities be constructed adjacent to the solids handling building, as shown on Figure 7-4. The estimated project cost including contingency, tax, engineering, and construction administration is $244,400.

The design criteria for the sludge dewatering and drying facilities and associated equipment are provided below:

Sludge Dewatering and Drying Facilities Design Criteria

Sludge Dewatering Centrifuge (existing)	
Quantity	1
Manufacturer	Centrisys
Feed Capacity	20 to 60 gpm
Feed Capacity	750 dry lbs/hr
Dewatered sludge output concentration	18% to 22%
G-force	3,150 G
Maximum Polymer Consumption	20 to 25 lbs active/dry tn sludge
Drive Motor Size	30 hp
Polymer Make Down System	
Quantity	1
Manufacturer	Velodyne
Mixing Chamber	Hydro-Mechanical
Polymer Pump Capacity	4.5 gph
Dilution Water Flow Capacity	10 gpm

Dewatered Sludge Cake Hopper (existing)

Quantity	1
Size	15 CY
Type	Live Bottom
Drive Motor Size	5 hp

Sludge Dryer (existing)

Quantity	1
Type	Indirect Contact Thermal Fluid Heated Auger Flights
Manufacturer	Fenton Environmental Technologies
Capacity	3.3 wet CY/batch
Throughput	18 to 24 wet tons sludge/d
Dryer Drive Motor Size	20 hp
Operating Temperature	212 degrees F
Thermal Fluid Firing Rate	4.5 Mbtu/hr
Thermal Fluid Circulation Pump Motor Size	15 hp
Combustion Fan Motor Size	7.5 hp

Dried Product Surge Bin (existing)

Quantity	1
Size	45 CUFT
Type	Live Bottom
Drive Motor Size	5 hp

Hot Gas Handling System (existing)

Quantity	1
Type	Venturi Scrubber/Condenser
Water Feed Rate	80 gpm
Size	45 CUFT

Biofilter (existing)

Quantity	1
Type	Venturi Scrubber/Condenser
Water Feed Rate	80 gpm
Dimensions	6'D x 8'-3"H
Capacity	300 CFM
Media Volume	170 CUFT
Carbon Pack Volume	15.7 CUFT

OUTFALL

The existing 36-inch Snoqualmie WRF outfall is 1,500-feet long and has an estimated capacity of 10.7 mgd at the 25-year flood elevation. The outfall is a single-port diffuser located approximately 1,700 feet upstream of the Snoqualmie Falls. The outfall opening is approximately 15 feet offshore in the main stem of the Snoqualmie River. The pipe is

secured to the river bottom with chains and H-piling. The outfall was last inspected in 2005 by divers. The inspection noted that the outfall is in good condition with no damage or leaks observed. Section S9 of the City's NPDES Permit requires the City to perform an inspection of the outfall during the river's typical low flow period and submit the inspection report by October 1, 2018. The City is required to include and follow a correction plan if there are signs of sediment accumulations near the diffuser ports.

The flow through the outfall is not projected to exceed the existing permitted capacity. No modifications to improve outfall dilution are necessary. No mixing zone study is required as the permitted discharge flow rate of treated effluent to the river does not need to be increased in the 20-year planning period.

VACTOR DECANT STATION

The vactor decant station is used to receive loads of waste material from vactor/eductor trucks. The trucks dump waste material onto a concrete pad to dewater the material. The waste material has to be dewatered to the extent that it will pass the paint filter test in order to be accepted at a landfill. The existing decant station is exposed to the weather and as such the operational staff has difficulty dewatering the waste material to an acceptable level of dryness that is suitable for hauling to a landfill in the wet season.

It is recommended that the vactor decant station be covered to enable year-round operation of the decant station. A canopy with a metal roof and structural steel supports can be erected over the decant station to provide 1,100 square feet of coverage. Figure 7-4 shows the project location at the WRF. The estimated project cost including contingency, tax, engineering, and construction administration, for the decant station canopy is $59,000.

SITE SECURITY IMPROVEMENTS

The WRF is does not have sufficient fencing. It is recommended that additional fencing and gates be added to improve site security. Figure 7-5 shows the locations of the recommended new fencing and gates.

The WRF is not currently equipped with video surveillance cameras. It is recommended that approximately six video surveillance cameras be installed at the WRF. An associated recording and monitoring system would be installed in the Operations Building.

The WRF is not currently equipped with intrusion alarms on the building doors. It is recommended that intrusion detectors be installed on building doors. The intrusion detectors will be integrated with the WRF SCADA system for remote monitoring.

The estimated project cost including contingency, tax, engineering, and construction administration, for the site security improvements is $122,000.

ELECTRICAL SYSTEMS

The electrical system at the WRF has a 480 volt 3 phase electrical service serving a 200-amp main distribution switchboard. This switchboard serves existing panelboards and motor control centers. The Electrical Room in the Equipment building houses the main distribution switchboard and most of the motor control centers. The electrical equipment, motor control centers and power distribution are functioning and free of signs of corrosion and physical wear.

The existing generator at the WRF is undersized for continuous Reliability Class 1 operation of the water reclamation facility, as required by its NPDES permit. Consequently, the WRF would potentially discharge partially treated wastewater to the river outfall during periods of electrical power failure, as all of the vital components required to support the secondary processes may not be powered by the existing generator. Since the City desires to maintain the capability of producing Class A reclaimed water at all times, the generator should be capable of serving all Class A treatment equipment.

It is recommended that the stand-by power system be upgraded to Reliability Class 1 levels for the expected electrical loading for the 20-year planning period. Based on an electrical load study (see Appendix J), the size of the stand-by generator needed to provide sufficient electricity to operate the WRF at full capacity and full functionality, at least 1.5 MW of electrical power is required. Two alternatives for constructing the upgrades to the stand-by power system are discussed below.

Alternative 1 for providing upgraded standby power to the WRF is to install one 1.5 MW diesel powered standby generator. The total power delivered by the generator would be capable of providing standby electrical power to the entire WRF. The generator would be installed outside and have an outdoor rated weather enclosure. The weather enclosures would not be equipped with special acoustical attenuation. The standby generator would be provided with two external fuel storage tanks with a fuel capacity for 14 days of operation at full load. The estimated project costs including contingency, tax, engineering, and construction administration, for constructing the Alternative 1 standby power system upgrades is $1,095,500.

Alternative 2 for providing upgraded standby power is to install two 750 kW diesel powered generators in parallel. The total power delivered by the generators would be capable of providing standby electrical power to the entire Facility. The advantage of installing two generators in parallel is the added reliability of a second generator that can power over half of the entire Facility electrical load if one of the generators fails. The disadvantage of this option is the additional cost for the paralleling switchgear required to operate the generators in parallel. The generators would be installed outside and each would have an outdoor rated weather enclosure. The weather enclosures would not be equipped with special acoustical attenuation. The standby generators would be provided

with two external fuel storage tanks with a fuel capacity for 14 days of operation at full load. The estimated project costs including contingency, tax, engineering, and construction administration, for constructing the Alternative 2 standby power system upgrades is $1,344,000.

It is recommended that Alternative 2 is constructed to provide the greatest amount of redundancy and reliability.

SCADA SYSTEM

The WRF Supervisory Control and Data Acquisition (SCADA) system consists of WonderWare V10.5 on a central PC located in the operations building at the WRF as well as in the Electrical Room in the Equipment Building. The SCADA is accesed via the human machine interface (HMI) to view, troubleshoot, and manipulate treatment equipment status and process data throughout the WRF. In order to maintain compliance with its NPDES Permit, the WRF staff must be able to maintain continuous data monitoring for select processes and equipment throughout the facility. Historically, the WRF has maintained a good record of continuously monitored data. On select occasions, however, the SCADA system has temporarily lost its ability to collect and store data.

To maximize the effectiveness and accuracy of continuously collected data, Permit requirement S2.C addresses the need for additional safeguards and consistency checks on data collected and logged at the facility. The recommendations below address specific requirements stated in the Permit and will allow the WRF to maintain constant communication with its process equipment and minimize data losses and inconsistencies. In addition, we recommend that WonderWare Historian is added to the SCADA system to provide additional functionality.

PLC/HMI Communication

Currently, the WRF monitors communication status between the HMI and the central PLC associated with the SCADA system. If communication between the HMI and PLC is lost, process data for this time period will not be logged. While a loss of communication is obvious to WRF staff and can be resolved quickly during normal business hours, a loss of communication can go unnoticed for long periods of time when the facility is unoccupied, typically on the weekends.

Even though the WRF SCADA system monitors communication between devices, there are periods of time where no data is logged. To help alleviate this loss, the alarm system is linked to an auto-dialer in the SCADA system that will contact WRF personnel if communication is lost. This allows operators to take steps to address the loss in communication as quickly as possible. Additionally, the pH, turbidity, dissolved oxygen, and temperature sensing equipment has localized on-board logging that is set to log data on 15 minute intervals independent from the SCADA logging. This data is available for

download directly from the instrument in the event of a loss of communication elsewhere in the SCADA system by operations staff.

Reported Value Consistency

On a regular (daily) basis, values are logged by the SCADA system and a summary data sheet is compiled and printed by the WRF staff. This summary sheet includes information such as current daily, weekly, and monthly flows, maximum pH and temperature values, and other process information. WRF staff uses this information to complete the discharge monitoring reports (DMRs) required by Ecology. The data sheets outputted by the SCADA do not provide sufficient units or descriptions to relay information on how the value is collected.

It is recommended that the WRF consult with their integrator, Technical Systems, Inc. to confirm that the method for data collection (instantaneous, maximum/minimum, average per time period, etc.) matches that required by Ecology. Once confirmed to be correct, the summary data sheet should be modified to show the required parameters in units that are consistent with the permit.

Equipment Reliability

Existing equipment is managed by the City's technical staff and is linked to the City's central communications network through a virtual local area network. As a result, the WRF electronics system is logically separated from the City's overall network. However, the WRF utilizes network communication equipment (routers and switches) that are not designed for the type of environments and conditions found at a WRF. Specifically, the communications room in the maintenance garage is not a temperature controlled room, which can lead to sub-par performance of the electronic equipment.

The City should replace the existing communication equipment (routers and switches) with industrial or heavy duty grade equipment that is better suited to handle the types of conditions found at the WRF. Alternatively, WRF staff may also install a protective box around the switch. If this does not improve data logging consistency, then connectivity issues occasionally experienced at the WRF may be improved by re-assessing the SCADA system master plan and investigating ways to improve connectivity, reliability, and communication.

Transient Data Logging

During normal operations, it is possible for the HMI to record certain probes/analyzers to instantaneously and erroneously record a value of zero for certain parameters such as pH or temperature during transient loss of communication. If logged by the SCADA system, these kinds of transient data points negatively affect the maximum and minimum daily values reported by the WRF. Furthermore they are indicative of a systemic problem with the WRF's communication and SCADA system.

To limit the frequency of transient data loss, it is recommended that the City replace the existing routers/switches with industrial models. One cost effective solution would be to replace the units after failure. The City should also investigate whether or not the data loss is occurring between the instrument and the PLC, or the PLC and the SCADA system software. Determining the exact source of data loss would help the City take steps to permanently alleviate the issue. The City could limit the impact of these losses by altering the programming algorithm so that values registered for less than a set period of time (i.e., 5 seconds) are not logged.
The recommended changes and equipment modifications to the SCADA system are considered to be routine operation and maintenance type of work and upgrades and are not included in the capital improvement plan.

BIOSOLIDS MANAGEMENT

The current biosolids management program includes removal of biosolids by contract, which is in effect until December 2015. If the contract for biosolids removal is not renewed, the City will implement a use and marketing plan for utilization of the Class A biosolids, which are projected to total approximately 2,000 dry pounds of solids per day in the year 2032. The City has started a marketing program that provides information to the public regarding beneficial use of the Class A biosolids produced at the WRF. The City projects that all of the biosolids produced at the WRF will be used by private citizens or businesses and/or utilized by the City for landscaping use after 2015.

SUMMARY OF RECOMMENDED CAPITAL IMPROVEMENT PROJECTS

The recommended capital improvement projects described earlier in the chapter are summarized in Table 7-4. The costs shown are the estimated total project costs including engineering, construction management, sales tax, and contingency. Detailed cost estimates are included in Appendix H. Chapter 8, Finance, provides the recommended schedule for the capital improvements projects and alternatives for funding the projects.

TABLE 7-4

Summary of Recommended Capital Improvement Projects

No.	Description	Estimated Project Cost
1	Raw Wastewater Pump Station	$420,000
2	UV Disinfection System Upgrades	$1,712,000
3	Aerobic Digester	$1,250,000
4	Standby Generator System Upgrades	$1,344,000
5	Anoxic Mixers	$103,800
6	Anaerobic Mixers	$44,600
7	Grit Removal System Improvements	$166,000

TABLE 7-4 – (continued)

Summary of Recommended Capital Improvement Projects

No.	Description	Estimated Project Cost
8	Scum Pump Station	$94,000
9	Vactor Decant Station Improvements	$59,000
10	Operations Building Remodel and Garage Facility	$1,277,000
11	Site Security Improvements	$122,000
12	Third Secondary Clarifier	$1,566,000
13	Sludge Drying Facility Odor Control Upgrades	$244,400
14	Solids Handling Nitrogen Padding System	$26,000
15	Additional Parking	$68,000
16	Air Gap System and Non-Potable Water System Improvements	$243,000

ESTIMATED REMAINING AVAILABLE WRF TREATMENT CAPACITY

The City has entered into developer extension agreements for sewer service with several entities. The following sections discuss the commitments the City has to provide sewer service for various developers and other property owners. The agreements for sewer service are based on ERUs, with one ERU defined in the agreements as equal to 2.5 persons and 0.5 lbs BOD_5/day. It is noted that the actual load per ERU, based on historical records, is 0.60 lbs BOD_5/day on a maximum month average basis. The effect of this difference in ERU load between actual values and agreement values on committed and remaining WRF capacity is discussed below.

Committed WRF Treatment Capacity

Quadrant Homes

The primary developer on Snoqualmie Ridge, Quadrant Homes (formerly Weyerhaeuser Real Estate Company) paid for the construction of the first two phases of the WRF to provide sewer service for Quadrant's developments, Snoqualmie Ridge I and Snoqualmie Ridge II. The WRF was constructed and the ownership of the WRF was assigned to the City. By the August 1996 agreement between the City and Quadrant, Snoqualmie Ridge I was allocated 2,483 ERUs and the City was assigned 1,127 ERUs of treatment capacity following Phase 1 construction of the WRF. Following Phase 2 construction of the WRF, an additional 1,850 ERUs of treatment capacity were reserved for Quadrant for Snoqualmie Ridge II. Therefore, the total reserved treatment capacity for Quadrant is 4,333 ERUs or 2,166.5 lbs BOD_5/day, based on the rate of 0.5 lbs BOD_5/day per ERU in the developer agreement.

Quadrant has transferred some of its reserved treatment capacity to other developers in separate agreements. Quadrant transferred 127 ERUs (118.5 lbs BOD_5/day) to CamWest Homes for development at Kimball Creek Village. Also, Quadrant transferred 361 ERUs (180.5 lbs BOD_5/day) to the Muckleshoot Tribe for development known as the Salish Expansion.

City

In accordance with the August 1996 WWTF developer extension agreement between the City and Quadrant, the City's share of WRF capacity was based on the number of properties served by the City's old wastewater treatment facility (prior to development of Snoqualmie Ridge). Since the old wastewater treatment facility had the capacity to treat 980 ERUs, the capacity allocated to the City "Exempt" properties was based on the old treatment facility treatment capacity plus a 15 percent growth allocation for a total of 1,127 ERUs. Homes and businesses including the Salish Lodge are included in the City Exempt allocation.

Casino

The Snoqualmie Tribe secured 360 ERUs (180 lbs BOD_5/day) of wastewater treatment capacity at the WRF by agreement with the City for development of a casino. The Snoqualmie Tribe paid latecomers fees to the City which reimbursed Quadrant for the pro rata share of treatment capacity at the WRF.

Echo Glen

The Washington State Department of Social and Health Services (DSHS) secured 160 ERUs (80 lbs BOD_5/day) of wastewater treatment capacity at the WRF by agreement with the City for treatment of wastewater produced at the Echo Glen Children's Center. The DSHS paid latecomers fees to the City which reimbursed Quadrant for the pro rata share of treatment capacity at the WRF.

Table 7-5 presents the known commitments for treatment capacity in terms of ERUs, and lbs of BOD_5/day, using 0.5 lbs BOD_5/day per ERU.

TABLE 7-5

Estimated Committed Treatment Capacity in terms of ERUs

Item	Description	Owner/Developer	ERUs	BOD_5/d
City Exempt[(1)]				
1	City Exempt	City	887	443.5
2	Salish Lodge	Salish Lodge, LLC	240	120
Total City Exempt			**1,127**	**563.5**
Snoqualmie Ridge 1				
1	Business Park	Quadrant	136	68
2	Golf Course	Bright Star Golf Group, LLC	30	15
3	Kimball Creek Village	Camwest Development, LLC	127	63.5
4	Snoqualmie Ridge 1 Housing	Quadrant Corp., others	2,190	1,095
Total Snoqualmie Ridge 1			**2,483**	**1,241.5**
Snoqualmie Ridge 2				
1	Salish Expansion	Muckleshoot Tribe	361	180.5
2	Snoqualmie Ridge 2 Housing	Quadrant Corp., others	1,489	744.5
Total Snoqualmie Ridge 2			**1,850**	**925**
Other				
1	Casino	Snoqualmie Tribe	360	180
2	Echo Glen Children's Center	DSHS	160	80
Total Other			520	260
Total			**5,980**	**2,990**

(1) City ERUs include Salish Lodge as it was originally served by the wastewater facility prior to the construction of the WRF.

Based on the known commitments presented in Table 7-5, it is estimated that the City has approximately 5,980 committed ERUs or 2,990 lbs BOD_5/day, of treatment capacity at the WRF. Since the permitted capacity of the WRF is 5,220 lbs BOD_5/day, the estimated uncommitted treatment capacity at the WRF is 2,230 lbs BOD_5/day (5,220-2,990), equal to 4,460 ERUs at the developer agreement rate of 0.5 lbs BOD_5/day per ERU, and equal to 3,717 ERUs at the actual historical rate of 0.60 lbs BOD_5/day per ERU. The uncommitted WRF capacity of 2,230 lbs BOD_5/day, based on existing developer agreements, is equal to the estimated actual remaining capacity of 2,330 lbs BOD_5/day, which is calculated by subtracting the current maximum month average load of 2,890 lbs BOD_5/day, from the permitted load of 5,220 lbs BOD_5/day. It is estimated that there are close to 3,900 ERUs of reserve WRF capacity, when using the actual rate of 0.60 lbs BOD_5/day per ERU (2,330/0.6 = 3,883 ERUs). It should be noted that the estimated uncommitted capacity should be verified with the City's staff and legal council.

Latecomer Agreement

The City has entered into a Latecomer Agreement with Quadrant for partial reimbursement of the original cost of the new WRF. Developers and new customers that utilize any of the estimated remaining non-exempt treatment capacity by connecting to

the WRF are required to pay latecomers fees of $3,529.00 per ERU for construction of Phase 1 and Phase 2 treatment facilities and $395.56 per ERU for the construction of the solids handling facilities for a total latecomer payment of $3,924.56 per ERU. The latecomer agreement for construction of Phase 1 and Phase 2 treatment facilities is in effect until 2019 and the latecomer agreement for construction of the solids handling facilities is in effect until 2026.

REFERENCES

1. *Manual of Practice #FD-8,* WEF, 2006

2. *Manual of Practice #8,* WEF, 2010

3. *Criteria for Sewage Works Design,* Dept. of Ecology, 2008

4. *Wastewater Engineering,* Metcalf and Eddy, 4th edition, 2003

CHAPTER 8

CAPITAL IMPROVEMENT AND FINANCE PLAN

This chapter presents a Capital Improvement Plan to implement the collection system improvements and WRF improvements recommended in Chapters 6 and 7 and an analysis of funding strategies for the City of Snoqualmie to finance the recommended capital improvements.

The required capacity and timing of each recommended improvement are given for budgeting and financial projection purposes only. The actual design parameters should be evaluated at the design phase of the project. Updated population, flow and loading data should be used when available to ensure that the proposed facilities are adequately sized to transport and treat design flows.

Future projects that are not identified as part of the City's CIP presented in this chapter may become necessary to remedy an emergency situation, to address unforeseen problems, or to accommodate improvements proposed or required by other agencies. Due to emergency needs and budgetary constraints, the completion of such projects may require alterations to the recommended CIP. The City retains the flexibility to reschedule, expand, or reduce the projects included in the CIP and to add new projects to the CIP, as best determined by the City Council, when new information on system needs becomes available for review and analysis.

CURRENT SEWER RATES

The sewer rates are presented in Chapter 13.08.010 of the City's municipal code, which is included in Appendix C. Ordinance No. 1074 establishes a sewer rate for 2010 and subsequent years. Residential customers are charged a flat rate monthly service charge. Nonresidential customers pay a monthly service charge and a volume charge. Customers outside the city have individual contracts with the City for sewer service. Multifamily residential customers are billed as residential customers. In addition to the sewer service charges, there is a $1.20 monthly capital facilities surcharge added to the monthly billing. New sewer accounts are charged a $50.00 connection fee for administrative costs and latecomer charge as described in the following section. The monthly sewer rates for each customer class are summarized in Table 8-1.

TABLE 8-1

Current Monthly Sewer Rates[(1)]

Customer Class	2009	2010	2011	2012
Residential				
Per Dwelling Unit	$35.60	$37.30	$37.30	$37.30
Low Income Residential Dwelling Unit	$30.77	$31.96	$31.96	$31.96
Non-Residential				
Per unit/bldg up to 600 cu. ft./mo.	$35.60	$37.30	$37.30	$37.30
Plus volume charge for flow in excess of 600 cu. ft./mo. per 100 cu. ft.	$2.78	$2.78	$2.78	$2.78

(1) Source: Chapter 13.08.010 City of Snoqualmie Municipal Code.

LATECOMER CHARGES

New connections to the sewer system that are not part of Historic Snoqualmie or development by Quadrant (formerly WRECO) are subject to latecomer charges. The collection system serving Snoqualmie Ridge and expansion of the water reclamation facility were paid for by Quadrant and then conveyed to the City. Latecomer charges are applicable to new development by parties other than Quadrant or those parties that do not have agreements with Quadrant. The latecomer charges are assigned per ERU. The charge is $3,926.56 for construction of the collection system, WRF upgrades, and subsequent sludge handling system improvements. The latecomer agreement for construction of Phase 1 and Phase 2 treatment facilities is in effect until 2019 and the latecomer agreement for construction of the solids handling facilities is in effect until 2026.

CAPITAL IMPROVEMENT FINANCING AND SCHEDULE

The recommended sewer and WRF improvements will correct existing deficiencies within the City's collection and treatment systems to increase sewer capacity to handle future flows and to improve WRF performance and reliability to meet the City's effluent permit limits. Table 8-2 outlines the capital improvements recommended in Chapters 6 and 7 including estimated project costs and construction schedule. The City plans to pursue a revenue bond as a source of funding for these projects.

TABLE 8-2

Recommended Capital Improvements

Collection System Improvements	Project Cost[(1)(2)]	Construction Year	Rate Impact ($/mo/ERU)[(3)(4)]
Pump Station No. 1 (Railroad Place)	$690,000	2015	$0.56
Gravity Sewer at SE Newton Street	$950,200	2015	$0.78
Gravity Sewer at 384th Street	$610,000	2015	$0.50
Pump Station No. 2 Upgrade (Fir)	$250,000	2018	$0.20
Pump Station No. 3 Upgrade (Park)	$140,000	2018	$0.11
Total Estimated Rate Impact			**$2.16**
Water Reclamation Facility Improvements	**Project Cost[(1)(2)]**	**Construction Year**	**Rate Impact ($/mo/ERU)[(3)(4)]**
Raw Wastewater Pump Station	$420,000	2015	$0.34
Standby Generator System Upgrade	$1,344,000	2015	$1.09
Anoxic Mixer	$103,800	2015	$0.08
UV Disinfection System Upgrade	$1,712,000	2015	$1.40
Anaerobic Mixer	$44,600	2017	$0.04
Grit Removal System Improvements	$166,000	2017	$0.14
Scum Pump Station	$94,000	2017	$0.08
Vactor Decant Station	$59,000	2017	$0.05
Air Gap System/Non-Potable Water System Improvements	$243,000	2017	$0.20
Sludge Drying Facility Odor Control Upgrades	$244,400	2018	$0.20
Site Security Improvements	$122,000	2018	$0.10
Aerobic Digester	$1,250,000	2018	$1.02
Third Secondary Clarifier	$1,556,000	2020	$1.27
Additional Parking	$68,000	2020	$0.06
Solids Handling Nitrogen Padding System	$26,000	2020	$0.02
Operations Building and Shop Facility Remodel	$1,277,000	2020	$1.05
Total Estimated Rate Impact			**$7.13**

(1) 2012 dollars.
(2) Assumes all projects are funded by a 30-year bond at an interest rate of 3.25 percent. Estimated rate impacts do not include any related fees associated with purchase of the bond.
(3) Monthly rate impact is based on dividing the bond payment equally among the 2012 sewer equivalent residential units (ERUs), which total 5,364 ERUs.
(4) The rate increases are based on the current number of ERUs.

Table 8-3 provides an estimate of the rate impact of the collection system improvements for a 30-year bond funding scenario.

TABLE 8-3

Estimated Rate Impact for Recommended Collection System Improvements[(1)]

Project	Construction Year	Project Cost	Rate Impact ($/month/ERU)[(2)(3)]
Collection System Improvements			
Pump Station No. 1 (Railroad Place)	2015	$690,000	$0.56
Gravity Sewer at SE Newton Street	2015	$950,200	$0.78
Gravity Sewer at 384th Street	2015	$609,900	$0.50
Pump Station No. 2 (Fir)	2018	$250,000	$0.20
Pump Station No. 3 (Park)	2018	$140,000	$0.11
Total Estimated Rate Impact			**$2.16**

(1) Assumes all projects are funded by a 30-year bond at an interest rate of 3.25 percent. Estimated rate impacts do not include any related fees associated with purchase of the bond.
(2) Monthly rate impact is based on dividing the bond payment equally among the 2012 sewer equivalent residential units (ERUs), which total 5,364 ERUs.
(3) The rate increases are based on the current number of ERUs.

Table 8-4 provides an estimate of the rate impact of the recommended Water Reclamation Facility improvements for a 30-year bond funding scenario.

TABLE 8-4

Estimated Rate Impact for Recommended Water Reclamation Facility Improvements[(1)]

Project	Construction Year	Project Cost	Rate Impact ($/month/ERU)[(2)(3)]
Collection System Improvements			
Raw Wastewater Pump Station	$420,000	2015	$0.34
Standby Generator System Upgrade	$1,344,000	2015	$1.09
Anoxic Mixer	$103,800	2015	$0.08
UV Disinfection System Upgrade	$1,712,000	2015	$1.40
Anaerobic Mixer	$44,600	2017	$0.04
Grit Removal System Improvements	$166,000	2017	$0.14
Scum Pump Station	$94,000	2017	$0.08
Vactor Decant Station	$59,000	2017	$0.05
Air Gap System/Non-Potable Water System Improvements	$243,000	2017	$0.20
Sludge Drying Facility Odor Control Upgrades	$244,400	2018	$0.20
Site Security Improvements	$122,000	2018	$0.10
Aerobic Digester	$1,250,000	2018	$1.02
Third Secondary Clarifier	$1,556,000	2020	$1.27
Additional Parking	$68,000	2020	$0.06
Solids Handling Nitrogen Padding System	$26,000	2020	$0.02

TABLE 8-4 – (continued)

Estimated Rate Impact for Recommended Water Reclamation Facility Improvements[1]

Project	Construction Year	Project Cost	Rate Impact ($/month/ERU)[2][3]
Operations Building and Shop Facility Remodel	$1,277,000	2020	$1.05
Total Estimated Rate Impact			**$7.13**

(1) Assumes all projects are funded by a 30-year bond at an interest rate of 3.25 percent, estimated rate impacts do not include fees associated with purchase of the bond.
(2) Monthly rate impact is based on dividing the bond payment equally among the 2012 sewer equivalent residential units (ERUs), which total 5,364 ERUs.
(3) The rate increases are based on the current number of ERUs.

The following section describes several funding sources available to the City without reference to any specific project. It should be noted that the City intends to fund the projects described in this Plan with a revenue bond. However, this section is provided for informational purposes.

AVAILABLE FUNDING SOURCES

Grants: Centennial Clean Water Fund (CCWF)
Community Development Block Grant (CDBG)
Community Investment Fund (CIF)
US Economic Development Administration (US EDA)
US EPA State and Tribal Assistance Grant (STAG)
USDA Forest Service, Rural Assistance Program (USFS)
USDA Rural Development (RD)

Loans: Water Pollution Control State Revolving Fund (SRF)
Public Works Trust Fund (PWTF)
Community Economic Revitalization Board (CERB)
USDA Rural Development (RD)

Bonds: Revenue Bonds
General Obligation Bonds

Other: Utility Local Improvement Districts

CENTENNIAL CLEAN WATER FUND (CCWF)

The Department of Ecology administers the State Revolving Fund (SRF) and Centennial Clean Water Fund (CCWF) programs that provide low interest loans for water pollution control projects. Ecology bases interest rates for non-hardship projects on the average

market interest rate for tax exempt municipal bonds as published in the Bond Buyer's Index. Interest rates are based on the average daily market interest rate for the period 60 to 30 days before the start of the application cycle. Interest is compounded monthly.

For a repayment period of up to 5 years, the rate is 30 percent of market rate for tax-exempt municipal bonds. For a repayment period of more than 5 years, but no more than 20 years, the rate is 60 percent of market rate for tax-exempt municipal bonds. Interest rates for hardship loans and on-site local loan funds may vary. The primary program requirements are to have an approved facilities plan for treatment works and to demonstrate the ability to repay the loan through a dedicated funding source. The loans can be used to finance sewer system replacement for the elimination of excessive infiltration and inflow and for the construction of facilities with reserve capacities to accommodate flows corresponding to the 20-year projected growth in the service area. Land acquisition is not eligible for SRF funding.

Grant money is available only to those who can document hardship. A project may be phased and receive funds from several cycles to complete the project. Grants require a 50 percent matching fund, which is provided by a mandatory SRF loan. If the project is enrolled in Ecology's Small Town Environmental Program, an in-kind match may be used. To demonstrate hardship for the Centennial Clean Water Fund, a community's annual residential sewer rates after accounting for project debt service must exceed 2 percent of the annual median household income per WAC 173-95A-400. The Centennial Clean Water Fund does not require matching funds for grants made to finance facility construction projects. Funding match requirements only apply to non-point source activities projects. Table 8-5 presents the Grant Hardship-Funding Continuum.

TABLE 8-5

Grant Hardship Funding Continuum

Sewer User Fee Divided by MHI	Below 2 percent	2 percent and above, but below 3 percent	3 percent and above, but below 5 percent	5 percent and above
Hardship Designation	Nonhardship (not funded with grant dollars)	Moderate Hardship	Elevated Hardship	Severe Hardship
Grant Hardship-Funding Continuum	Zero percent Grant	50 percent Grant (up to 5 million dollars)	75 percent Grant (up to 5 million dollars)	100 percent (up to 5 million dollars)

COMMUNITY DEVELOPMENT BLOCK GRANT (CDBG)

The Community Development Block Grant program is a competitive source of federal funding for a broad range of community development projects. A primary requirement of the CDBG program is that the project must principally benefit at least 51 percent of the low-to-moderate income residents of the project area. The State typically receives about

$7.5 million in federal funds per funding cycle. CDBG has two programs including General Purpose and Planning Only. The General Purpose program provides grant funds for the design, construction, or reconstruction of water and sewer systems up to the amount of $1,000,000. The Planning Only program includes projects such as comprehensive plans, community development plans, capital improvement plans, and other plans such as land use and urban environmental design, economic development, floodplain and wetlands management, transportation, and utilities. Planning Only grants are limited to $24,000 for a single applicant or $40,000 for a joint applicant.

Eligible applicants for the CDBG programs include cities and towns with less than 50,000 people or counties with populations less than 200,000. Though port districts and economic development districts are not eligible to apply directly, a city or county can submit a joint application and include these entities as partners.

US ECONOMIC DEVELOPMENT ADMINISTRATION (US EDA)

US EDA offers competitive grants up to $1 million for projects within Region 10. Projects are selected locally by an economic development district and submitted to Congress for competitive selection among other regions in the US. Similar to CERB, applicants must have an industrial partner ready to proceed or a feasibility study that establishes realistic job creation.

US EPA STATE AND TRIBAL ASSISTANCE GRANT (STAG)

Local jurisdictions within the state of Washington can apply to the State and Tribal Assistance Grant program through the office of their local Congressional representative. The Congressional representative will work to add the project as a line item to the VA/HUD Appropriations Bill. Applicants can obtain grant funds up to approximately $2 million.

US FOREST SERVICE (USFS)

Forest Service grants are available through the Rural Community Assistance Program to assist rural communities that are dependent on natural resources. Project proposals must show a broad community benefit that results in greater ability to improve economically, socially, or environmentally. The project must have the potential for economic development and/or job creation/retention. An application must be located within 100 miles of a Forest Service office and be able to document a history of at least 15 percent dependency on forest products. Grant funds are available for components of planning and design and are limited to $50,000.

USDA RURAL DEVELOPMENT (RD)

The RD Rural Utility Service administers a water and wastewater loan and grant program to improve the quality of life and promote economic development in rural areas.

Rural Development has a loan program that, under certain conditions, includes a limited grant program. Grants may be awarded when the annual debt service portion of the utility rate exceeds 1.0 percent to 1.5 percent of the municipality's median household income.

In addition, RD has a loan program for needy communities that cannot obtain funding by commercial means through the sale of revenue bonds. The loan program provides 30- to 40-year loans at an interest rate that is based on federal rates and varies with the commercial market. RD loans are revenue bonds with a 1.1 debt coverage factor.

Eligible projects include the construction, expansion, extension or improvement of rural water, sanitary sewers, solid waste disposal, storm, and wastewater disposal facilities.

Basic criteria for RD funding follows:

- Dependent on inability to obtain funds from other sources at reasonable terms.
- A 45 percent grant is available if the median household income of the service area exceeds 80 percent of the statewide non-metropolitan median household income.
- A 75 percent grant is eligible if the service area is below the higher of the poverty line or 80 percent of the state non-metropolitan median household income, and the project is necessary to alleviate a health and safety issue.

Eligible applicants include municipalities; counties; non-profit corporations, associations, or cooperatives; and federally recognized Indian tribes in rural areas with populations less than 10,000.

PUBLIC WORKS TRUST FUND (PWTF)

The Public Works Trust Fund is a revolving loan fund designed to help local governments finance public works projects through low-interest loans and technical assistance. The PWTF, established in 1985 by legislative action, offers loans substantially below market rates, payable over periods ranging up to 20 years. To be eligible for the PWTF programs, an applicant must be a local government such as a city, county, or a special purpose utility district.

PWTF has four loan programs including Construction, Preconstruction, Planning, and Emergency. At the time this was written, the PWTF loan fund has not been made available by the legislature.

The Construction Program accepts applications once per year in the spring, and the money becomes available approximately 1 year later. The Preconstruction and Planning programs are open on a year-round basis and must be submitted to the Public Works Board prior to the 15th of the month to be reviewed at the next Board meeting. These funds become available shortly after the Public Works Board makes their final decision as to the award. Emergency projects must have a locally declared emergency and are applied for on an open cycle depending on the availability of funds. Project expenditures are reimbursable from the date of the declared emergency.

An applicant must have a long-term plan for financing its public works needs. If the applicant is a county or city, it must adopt the 1/4 percent real estate excise tax that is dedicated to public works construction projects. Eligible public works projects include streets and roads, bridges, storm sewers, sanitary sewer collection and treatment systems, and domestic water. Loans are presently offered only for purposes of repair, replacement, rehabilitation, reconstruction, or improvement of existing eligible public works systems. Eligible project costs can include expenses related to serving 20-year forecasted growth as identified in growth management comprehensive plans.

Since substantially more trust fund dollars are requested than are available, local jurisdictions must compete for the available funds. The applications are carefully evaluated, and the Public Works Board submits a prioritized list of those projects to the Legislature that are recommended to receive low-interest financing. The Legislature reviews the list and indicates its approval through the passage of an appropriation from the Public Works Assistance Account to cover the cost of the proposed loans. Once the Governor has signed the appropriation bill into law (an action that usually occurs by the following April), those local governments recommended to receive loans are offered a formal loan agreement with appropriate interest rates and terms as determined by the Public Works Board.

COMMUNITY ECONOMIC REVITALIZATION BOARD (CERB)

The Community Economic Revitalization Board's prime mission is to partner with business and private industry and local governments to maintain and create jobs. Established by the Legislature in 1982, CERB provides low-interest loans, and in unique circumstances grants, to help finance local public infrastructure necessary to develop or retain stable business and industrial activities. Projects eligible for funding include roads, domestic and industrial water systems, sanitary and storm sewers, port facilities, and general-purpose industrial buildings.

CERB provides loans up to $1 million and, and where applicable, grants in the amount of $300,000. The interest rate is tied to the current cost of a 10-year bond and a local match of 10 percent is required.

Eligible applicants include Washington State subdivisions in partnership with private enterprise. If there is no economic partner, a local government can produce a feasibility

study that documents realistic job retention or creation. Applications must be submitted 45 days prior to a regularly scheduled CERB Meeting, which typically meets in January, March, July, and November

REVENUE BONDS

The most common source of funds for construction of major utility improvements is the sale of revenue bonds. These are tax-free bonds issued by a city. The major source of funds for debt service on revenue bonds is from monthly sewer service charges. In order to sell revenue bonds and make them marketable to investors, the bonds typically have contractual provisions for the city to meet debt coverage requirements. The City must show that its annual net operating income (gross income less operation and maintenance expenses) must be equal to or greater than a factor, typically 1.2 to 1.4 times the annual debt service on all par debt. If a coverage factor has not been specified it will be determined at the time of any future bond issues.

GENERAL OBLIGATION BONDS

A city may by council action or special election issue general obligation bonds to finance almost any projects of general benefit to the City. The bonds are repaid by tax assessments levied against all privately owned properties within the City. This includes vacant property that would not otherwise contribute to the cost of the specific improvements. This type of bond issue is usually reserved for municipal improvements that are of general benefit to the public, such as arterial streets, bridges, lighting, municipal buildings, firefighting equipment, parks, and water and wastewater facilities. General obligation bonds are the most attractive bonds to investors because they are backed by the municipality's full taxing authority and carry the lowest rate of interest of any type of bond that a city may issue.

Disadvantages of general obligation bonds include the following:

- Voter approval is often required. The City will incur the legal costs of drafting a ballot measure and pay for the cost of holding a special election. There is also the additional cost of investing staff time in public education of the need for the project, yet there is always uncertainty to the outcome of elections.

- There are legal, as well as practical limits on the amount of general obligation debt a city can issue. Financing capital improvements through general obligation debt reduces the ability of the city to issue additional general obligation debt, which is often the only source of outside financing for many general government facilities.

UTILITY LOCAL IMPROVEMENT DISTRICTS

Another potential source of funds for improvements can be obtained through the formation of Utility Local Improvement Districts (ULIDs) involving a special assessment made against properties benefiting by the improvements. ULID bonds are further backed by a legal claim to the revenues generated by the utility, similar to revenue bonds.

Sewer system expansion is a frequent application of ULID financing. Typically, ULIDs are formed by the city at the written request (by petition) of the property owners within a specific section of the city's service area. Upon receipt of a sufficient number of signatures or petitions, and acceptance by the city council, the local improvement area is formed. Therefore, a sewer system is designed for that particular area in accordance with the city's sewer comprehensive plan. Each separate property in the ULID is assessed in accordance with the special benefits the property receives from the water or wastewater system improvements. A citywide ULID could form part of a financing package for large-scale capital projects such as sewer line extensions or replacements that benefit all residents in the service area. The assessment places a lien on the property that must be paid in full upon sale of the property. ULID participants have the option of paying their assessment immediately upon receipt, thereby reducing the portion of the costs financed by the ULID bonds.

The advantages of ULID financing, as opposed to rate financing, to the property owner include:

- The ability to avoid interest costs by early payment of assessments.
- If the ULID assessment is paid in installments, it may be eligible to be deducted from federal income taxes.
- Low-income senior citizens may be able to defer assessment payments until the property is sold.
- Some Community Block Grant funds are available to property owners with incomes near or below poverty level. Funds are available only to reduce assessments.

The major disadvantage to the ULID process is that it may be politically difficult to approve formation. The ULID process may be stopped if 40 percent of the property owners protest its formation. Also, there are significant legal and administrative costs associated with the ULID process, which increases total project costs by approximately 30 percent over other financing options.

APPENDIX A

SEPA CHECKLIST

Planning Department (425) 888-5337

City of Snoqualmie
P.O. Box 987, Snoqualmie, WA 98065
www.ci.snoqualmie.wa.us

NOTICE OF DETERMINATION OF NONSIGNIFICANCE (DNS)

Issuance Date:	February 11, 2013
Publication Date:	February 19, 2013
Applicant:	City of Snoqualmie
Location:	City of Snoqualmie
Description of Proposal:	Adoption of City of Snoqualmie General Sewer/Wastewater Facility Plan.

The proposed update of the General Sewer/Wastewater Facility Plan ("Plan") provides a long term planning strategy for sewer/wastewater system operation, addressing the City's needs for wastewater collection, transmission, treatment and disposal for the 20-year planning period (2012 – 2032). The current Plan is a General Sewer Plan in conformance with WAC 173-240-050. The updated Plan serves both as a General Sewer Plan in conformance with WAC 173-240-050 and an Engineering Report in conformance with WAC 173-240-060. The Plan provides updated population and flow projections based on updated population and flow data, evaluates both sewer system and wastewater treatment and reuse facility needs in detail, and proposes capital improvements to provide and maintain a high level of service through 2032. The new Plan contains design data and sizing calculations for the various proposed projects as well as other critical design data. Projects scheduled for construction will have a project level SEPA review by the City prior to construction unless it is determined that they are exempt.

Threshold Determination: The City of Snoqualmie (lead agency for this proposal) has determined that the above referenced proposal does not have a probable significant adverse impact on the environment. An environmental impact statement is not required under RCW 42.21.030(2)(c). This decision was made after review of a complete environmental checklist and other information on file with the lead agency. This information is available to the public on request. This DNS is issued under WAC 192-11-340(2); the lead agency will not act on this proposal for 15 days from the date of publication.

Responsible Official: Nancy Tucker, Planning Director

Comments on the Threshold Determination: The General Sewer/Wastewater Facility Plan is available for review at Snoqualmie City Hall at 38624 SE River Street, Snoqualmie, WA 98065. If you would like to comment on this Threshold Determination, your written comments should be sent to PO Box 987, Snoqualmie WA, 98065, Attn: Nancy Tucker, Planning Director, by March 4, 2014 at 5:00 p.m. The City will not take final action on this proposal until the end of the comment period.

The issuance of this Determination of Nonsignificance should not be interpreted as acceptance or approval of this proposal as presented. The City of Snoqualmie reserves the right to deny or approve said proposal subject to conditions if it is determined to be in the best interest of the City and/or necessary for the general health, safety, and welfare of the public to do so.

TO BE COMPLETED BY APPLICANT

EVALUATION
FOR AGENCY USE ONLY

WAC 197-11-960 Environmental Checklist.

ENVIRONMENTAL CHECKLIST

Purpose of checklist:

The State Environmental Policy Act (SEPA), chapter 43.21C RCW, requires all governmental agencies to consider the environmental impacts of a proposal before making decisions. An environmental impact statement (EIS) must be prepared for all proposals with probable significant adverse impacts on the quality of the environment. The purpose of this checklist is to provide information to help you and the agency identify impacts from your proposal (and to reduce or avoid impacts from the proposal, if it can be done) and to help the agency decide whether an EIS is required.

Instructions for applicants:

This environmental checklist asks you to describe some basic information about your proposal. Governmental agencies use this checklist to determine whether the environmental impacts of your proposal are significant, requiring preparation of an EIS. Answer the questions briefly, with the most precise information known, or give the best description you can.

You must answer each question accurately and carefully, to the best of your knowledge. In most cases, you should be able to answer the questions from your own observations or project plans without the need to hire experts. If you really do not know the answer, or if a question does not apply to your proposal, write "do not know" or "does not apply." Complete answers to the questions now may avoid unnecessary delays later.

Some questions ask about governmental regulations, such as zoning, shoreline, and landmark designations. Answer these questions if you can. If you have problems, the governmental agencies can assist you.

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

Use of checklist for nonproject proposals:

Complete this checklist for nonproject proposals, even though questions may be answered "does not apply." IN ADDITION, complete the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (part D).

For nonproject actions, the references in the checklist to the words "project," "applicant," and "property or site" should be read as "proposal," "proposer," and "affected geographic area," respectively.

A. Background

1. Name of proposed project, if applicable.

   General Sewer/Wastewater Facility Plan

2. Name of Applicant:

   City of Snoqualmie

3. Address and Phone Number of Applicant and Contact Person:

   Attn: Dan Marcinko, Director of Public Works
   City of Snoqualmie
   38624 SE River Street

PO Box 987
Snoqualmie, WA 98065
425-888-1555 ext. 1135

4. Date Checklist Prepared:

   November 25, 2013

5. Agency Requesting Checklist

   Washington State Department of Ecology

6. Proposed Timing or Schedule (including phasing, if applicable)

   The plan provides a schedule of improvements identified for construction for the six-year and 20-year planning periods.

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

   No – This proposal is the result of a General Sewer/Wastewater Facility Plan. Recommendations for capital improvement projects are included in the Plan. The Plan outlines wastewater treatment and conveyance infrastructure improvements proposed by the City of Snoqualmie to meet future needs and to maintain the existing wastewater conveyance and treatment systems. Future plan updates or developments unknown to the City at this time may identify sewer system needs that are not identified in the present plan.

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

   Projects scheduled for construction will have a SEPA review by the City of Snoqualmie at the time of construction unless it is determined that they are exempt.

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

   No.

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

    The Plan requires approval of the Department of Health and Department of Ecology.

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

    The Plan is a planning document describing and evaluating the City's sewer system and providing a list of capital projects necessary to provide sewer service through 2036. It is

used as a resource by the City staff, council members, and state regulatory agencies. The Plan describes management, standards, policies, service area, geography, quality, infrastructure, operations, and finance of the City's sewer system.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including the street address, if any, and section, township, and range, if known. If a proposal would occur over a range of areas, provide the range or boundaries of the site(s). While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

The project area includes the City's sewer service area as shown on Figure 4-1 in the Plan.

B. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site (check one): ☐ flat, ☐ rolling, ☐ hilly, ☐ steep slope, ☒ other. . . .

Terrain varies from flat to hilly. Refer to Figure 3-6, Topography Map.

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

Slopes vary throughout the various project areas, slopes will be considered on a project specific basis.

c. What general types of soils are found at on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.

There are three main classifications of soils on the Snoqualmie area. These classifications are Bareston-Klaus-Skykomish, Tokul, and Edgewick-Seattle-Nooksack. Soils will be considered on a project specific basis.

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

Steep slopes and floodplain areas may be subject to landslides and washouts during flooding. Slope stability and flood hazards will be determined on a project specific basis.

e. Describe the purpose, type, and approximate quantities of any grading proposed. Indicate source of fill.

No filling or grading will occur at this time. Grading and fill quantities will be developed along with permits and approvals for specific projects.

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

Erosion during construction associated with construction projects developed in this plan is anticipated. Construction plans and specifications and subsequent environmental documentation will address erosion control measures to minimize potential impacts to surface waters.

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

This will be determined on a project specific basis.

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

Stormwater best management practices will be employed for each project. An erosion control plan will be developed for each project.

2. Air

a. What types of emissions to the air would result from the proposal (i.e., dust, automobile, odors, industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities if known.

Exhaust from equipment and dust will be the primary sources of emissions during the construction of the proposed projects. Construction impacts will be localized and temporary and addressed in project specific SEPA Checklists and other permit documents. Any emissions to air resulting from the completed projects will be evaluated on a project specific basis.

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

None known.

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

Dust suppression measures and minimization of vehicle idling will be implemented during construction projects identified in the Plan.

3. Water

TO BE COMPLETED BY APPLICANT

EVALUATION
FOR AGENCY USE ONLY

a. Surface:

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

The Snoqualmie River, and tributaries Kimball Creek, and East Fork Kimball Creek flow through the City. Meadowbrook Slough is in the vicinity as well..

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

This will be determined on a project specific basis.

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

This will be determined on a project specific basis.

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

This will be determined on a project specific basis.

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

This will be determined on a project specific basis. Figure 3-7 shows the flood hazard areas in the City and UGA.

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

No discharge of waste materials into surface waters will occur as a result of the Plan.

b. Ground:

1) Will ground water be withdrawn, or will water be discharged to ground water? Give general description, purpose, and approximate quantities if known.

This will be determined on a project specific basis.

2) Describe the waste material that will be discharged into the ground from septic tanks or other sources if any (for example: domestic sewage; industrial, containing the following chemicals….; agricultural; etc.).

This will be determined on a project specific basis.

3) Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

Not applicable.

c. Water runoff (including stormwater):

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

This will be determined on a project specific basis.

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

This will be determined on a project specific basis.

3) Proposed measures to reduce or control surface, ground, and runoff water impacts, if any:

This will be determined on a project specific basis.

4. Plants

a. Check types of vegetation found on the site:

- ☐ Not applicable.
- ☒ Deciduous tree: alder, maple, aspen, other
- ☒ Evergreen tree: fir, cedar, pine, other
- ☒ Shrubs
- ☒ Grass
- ☒ Pasture
- ☐ Crop or grain
- ☒ Wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
- ☒ Water plants: water lily, eelgrass, milfoil, other
- ☒ Other types of vegetation

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

This will be determined on a project specific basis.

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

This will be determined on a project specific basis.

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

Revegetation will be required for each project proposed in the Plan.

5. Animals

a. Check any birds and animals which have been observed on or near the site or are known to be on or near the site:

☐ Not applicable.
☒ Birds: hawk, heron, eagle, songbirds, other:
☒ Mammals: dear, bear, elk, beaver, other:
☒ Fish: bass, salmon, trout, herring, shellfish, other;

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

This will be determined on a project specific basis. Listed salmon populations are not know to be present above the Snoqualmie Falls.

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

The entire Puget Sound basin is a part of the Pacific Flyway. Resident fish species migrate up and down the Snoqualmie River.

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

This will be determined on a project specific basis. Individual SEPA review will be performed on each project, as required.

6. Energy and Natural Resources

a. What kind of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

Electricity, fuel, and lubricant will be consumed by machinery during construction of projects identified in the Facilities Plan.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

No.

c. What kind of energy conservation features are included in the plans of this proposal? List other proposed measures to control energy impacts, if any.

Not applicable.

7. Environmental Health

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

This will be determined on a project specific basis.

1) Describe special emergency services that might be required.

None required.

2) Proposed measures to reduce or control environmental health hazards, if any.

Compliance with industrial safety standards in design, construction, and operation of facilities.

8. Noise

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

None.

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

During construction of projects identified in the Plan, noise from equipment will be generated at the project site. Hours of noise generation will be determined on a project specific basis.

3) Proposed measures to reduce or control noise impacts, if any.

This will be determined on a project specific basis. Construction equipment working times will be limited to daylight hours and in compliance with City Noise Ordinances.

9. Land and Shoreline Use

a. What is the current use of the site and adjacent properties?

Land use in the Snoqualmie Sewer Service Area is a mixture of residential, commercial, industrial, and public facilities.

b. Has the site been used for agriculture? If so, describe.

This will be determined on a project specific basis.

c. Describe any structures on the site.

Not applicable.

d. Will any structures be demolished? If so, what?

This will be determined on a project specific basis.

e. What is the current zoning classifications of the site?

Zoning classifications are established by the City of Snoqualmie and King County; classifications are a mixture of residential, tourist-commercial, marine-industrial, recreational, conservancy, and government.

f. What is the current comprehensive plan designation of the site?

The current comprehensive plan designations are consistent with the zoning classifications in the area.

g. If applicable, what is the current shoreline master program designation of the site?

The shoreline master program designations will be determined on a project specific basis.

h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.

This will be determined on a project specific basis.

i. Approximately how many people would reside or work in the completed project?

Not applicable.

j. Approximately how many people would the completed project displace?

Not applicable.

k. Proposed measures to avoid or reduce displacement impacts, if any:

Not applicable.

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any.

This will be determined on a project specific basis.

10. Housing

a. Approximately how many units would be provided, if any? Indicated whether high, middle, or low-income housing.

Not applicable.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

Not applicable.

c. Proposed measures to reduced or control housing impacts, if any:

Not applicable.

11. Aesthetics

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

This will be determined on a project specific basis.

b. What views in the immediate vicinity would be altered or obstructed:

None.

c. Proposed measures to reduce or control aesthetic impacts, if any.

This will be determined on a project specific basis.

12. Light and Glare

a. What type of light or glare will be proposal produce? What time of day would it mainly occur?

Not applicable.

b. Could light and glare from the finished project be a safety hazard or interfere with views?

Not applicable.

c. What existing off-site sources of light or glare may affect your proposal?

Not applicable.

d. Proposed measures to reduce or control light and glare impacts, if any:

Not applicable.

13. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?

There are fishing, hunting, hiking, and boating recreational opportunities in the Snoqualmie Valley.

b. Would the proposed project displace any existing recreational uses? If so, describe.

This will be determined on a project specific basis.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any.

This will be determined on a project specific basis.

14. Historic and Cultural Preservation

a. Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe.

This will be determined on a project specific basis.

b. Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site.

This will be determined on a project specific basis.

c. Proposed measures to reduce or control impacts, if any.

This will be determined on a project specific basis.

15. Transportation

a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.

Interstate 90, Highway 202, and Highway 18 are the major highways serving the site. Public streets serving projects identified in the Plan will be determined on a project specific basis. If applicable, proposed access to the existing street system will be determined on a project specific basis.

b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?

Yes, the vicinity is currently served by King County Metro Bus.

c. How many parking spaces would the completed project have? How many would the project eliminate?

Not applicable.

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveway? If so, generally describe (indicated whether public or private).

Not applicable.

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe?

Not applicable.

f. How many vehicle trips per day would be generated by the completed project? If known, indicated when peak volumes would occur.

Not applicable.

g. Proposed measures to reduce or control transportation impacts, if any.

Not applicable.

16. Public Services

a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.

Not applicable.

b. Proposed measures to reduce or control direct impacts on public services, if any.

Not applicable.

17. Utilities

a. Check utilities currently available at the site:

- ☒ electricity
- ☒ natural gas
- ☒ water
- ☒ refuse service
- ☒ sanitary service
- ☒ septic system
- ☒ other: phone, cable television, internet

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction on the site or in the immediate vicinity which might be needed.

This will be determined on a project specific basis.

C. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: _____

Date Submitted: 12/3/2013

TO BE COMPLETED BY APPLICANT

EVALUATION
FOR AGENCY USE ONLY

D. SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS

(Do not use this sheet for project actions.)

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent of the proposal, or the types of activities likely to result from the proposal, would affect the item in a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

   This will be determined on a project specific basis.

   Proposed measures to avoid or reduce such increases are:

   This will be determined on a project specific basis.

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

   This will be determined on a project specific basis.

   Proposed measures to protect or conserve plants, animals, fish, or marine life are:

   This will be determined on a project specific basis.

3. How would the proposal be likely to deplete energy or natural resources?

   Not applicable.

   Proposed measures to protect or conserve energy and natural resources area:

   Not applicable.

4. How would the proposal be likely to use or affect environmentally sensitive areas or area designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?

   This will be determined on a project specific basis.

Proposed measures to protect such resources or to avoid or reduce impacts are:

Not applicable.

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses compatible with existing plans?

Not applicable.

Proposed measures to avoid or reduce shoreline and land use impacts are:

Construction BMPs during construction of projects identified in the Plan will be implemented. Hydraulic permitting is required for any in-water work.

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

Projects identified in the Plan will provide wastewater treatment and conveyance in the Planning area to meet the projected demands.

Proposed measures to reduce or respond to such demand(s) are:

Not applicable.

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

No, the Plan will implement projects developed to protect water quality in the Snoqualmie River.

APPENDIX B

NPDES PERMIT

Issuance Date: April 29, 2014
Effective Date: May 1, 2014
Expiration Date: May 1, 2019

National Pollutant Discharge Elimination System
Waste Discharge Permit No. WA0022403

State of Washington
DEPARTMENT OF ECOLOGY
Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA 98008-5452

In compliance with the provisions of
The State of Washington Water Pollution Control Law
Chapter 90.48 Revised Code of Washington
and
The State of Washington Reclaimed Water Act
Chapter 90.46, Revised Code of Washington
and
The Federal Water Pollution Control Act
(The Clean Water Act)
Title 33 United States Code, Section 1342 et seq.

City of Snoqualmie Wastewater Treatment and Water Reclamation Facility
PO Box 987
Snoqualmie, WA 98065

is authorized to discharge in accordance with the Special Conditions,
Reclaimed Water Conditions, and General Conditions that follow.

Plant Location: 38190 SE Stearns Road Snoqualmie, WA 98065	Facility Location: Latitude: 47.54091 Longitude: -121.83140
Receiving Water: Snoqualmie River	Wastewater Discharge Location, outfall 001: Latitude: 47.53916 Longitude: -121.83222
Treatment Type: Oxidation ditch with sand filtration for reclaimed water production	Reclaimed Water Storage Location, outfall 002 Eagle Lake at Snoqualmie Ridge Golf Course: Latitude: 47.53722 Longitude: -121.86250

Kevin C. Fitzpatrick
Water Quality Section Manager
Northwest Regional Office
Washington State Department of Ecology

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Summary of Permit Report Submittals

Refer to the Special, Reclaimed and General Conditions of this permit for complete submittal requirements.

Permit Section	Submittal	Frequency	First Submittal Date
S2.C.3	Continuous Monitoring Equipment Plan	1/permit cycle	August 1, 2014
S3.A	Monthly Discharge Monitoring Report	Monthly	June 15, 2014
S3.A	Quarterly DMR for Permit Renewal Testing	Quarterly, during 2017	April 15, 2017
S3.A	DMR QA/QC Review Letter	Monthly	June 15, 2014
S3.C.6	Analytical Bench Sheets	Monthly, through 2014	June 15, 2014
S3.E	Reporting Permit Violations	As necessary	
S5.F	Bypass Notification	As necessary	
S5.G	Operations and Maintenance Manual Update	1/permit cycle	December 31, 2014
S6.E	Industrial User Survey Submittal	1/permit cycle	April 1, 2018
S8	Spill Control Plan Submittal	1/permit cycle	December 31, 2014 (with O&M Manual Update)
S9	Outfall Inspection Report	1/permit cycle	October 1, 2018
S10.A	Acute Toxicity Effluent Test Results	2/permit cycle	March 30, 2017 (for testing during January 2017) and September 30, 2017 (for testing during July 2017)
S11.A	Chronic Toxicity Effluent Test Results	2/permit cycle	June 30, 2017 (for testing during April 2017) and December 31, 2017 (for testing during October 2017)
S12	Application for Permit Renewal	1/permit cycle	October 1, 2018
R3.A	Reclaimed Water Monitoring Report	Monthly	May 15, 2014
R3.C	Reporting Violations of Reclaimed Water Production and Distribution Conditions	As necessary	
R4.C	Reclaimed Water Use Plan Update	1/permit cycle	June 1, 2015
R4.D.5	Service and Use Area Agreement Revisions	As necessary	
R6	Application for Reclaimed Water Permit Renewal	1/permit cycle	October 1, 2018
G1	Notice of Change in Authorization	As necessary	
G4	Reporting Planned Changes	As necessary	
G5	Engineering Report for Construction or Modification Activities	As necessary	

Special Conditions

S1. Discharge limits

S1.A. Effluent limits

All discharges and activities authorized by this permit must comply with the terms and conditions of this permit. The discharge of any of the following pollutants more frequently than, or at a level in excess of, that identified and authorized by this permit violates the terms and conditions of this permit.

Beginning on the effective date of this permit, the Permittee may discharge treated municipal wastewater to the Snoqualmie River at the permitted location subject to compliance with the following limits:

Effluent Limits: Outfall # 001 Latitude: 47.53916 Longitude: -121.83222		
Parameter	**Average Monthly [a]**	**Average Weekly [b]**
5-day Carbonaceous Biochemical Oxygen Demand ($CBOD_5$) Concentration	25 milligrams/liter (mg/L) 85% removal of influent $CBOD_5$	40 mg/L
$CBOD_5$ Mass *Effective November – July Only*	448 pounds/day (lbs/day)	717 lbs/day
Total Suspended Solids (TSS)	30 mg/L 538 lbs/day 85% removal of influent TSS	45 mg/L 807 lbs/day
Parameter	**Minimum**	**Maximum**
pH [c]	6.3 standard units	9.0 standard units
Parameter	**Monthly Geometric Mean**	**Weekly Geometric Mean**
Fecal Coliform Bacteria [d]	200/100 milliliter (mL)	400/100 mL
Parameter	**Average Monthly**	**Maximum Daily [e]**
$CBOD_5$ Mass *Effective August – October Only*	51.6 lbs/day	206 lbs/day
Total Ammonia mass (as NH3-N) *Effective August – October Only*	21.9 lbs/day	68.7 lbs/day
Temperature, Maximum 7-Day Running Average (7DADMax) *Effective June – September Only*	N/A	24.7° C
Total Residual Chlorine [f]	N/A	52 µg/L

Footnotes for Effluent Limits Table	
a	Average monthly effluent limit means the highest allowable average of daily discharges over a calendar month. To calculate the discharge value to compare to the limit, you add the value of each daily discharge measured during a calendar month and divide this sum by the total number of daily discharges measured. See footnote d for fecal coliform calculations.
b	Average weekly discharge limit means the highest allowable average of "daily discharges" over a calendar week, calculated as the sum of all "daily discharges" measured during a calendar week divided by the number of "daily discharges" measured during that week. See footnote d for fecal coliform calculations.
c	The pH of the discharge must be within the range bound by the listed minimum and maximum limits. The Permittee must report the instantaneous maximum and minimum pH recorded daily. Do not average pH values.
d	Ecology provides directions to calculate the monthly and the weekly geometric mean in publication No. 04-10-020, Information Manual for Treatment Plant Operators available at: http://www.ecy.wa.gov/pubs/0410020.pdf

e	Maximum daily effluent limit is the highest allowable daily discharge. The daily discharge is the average discharge of a pollutant measured during a calendar day. For pollutants with limits expressed in units of mass, calculate the daily discharge as the total mass of the pollutant discharged over the day. This does not apply to pH or temperature.
f	Chlorine limits apply only during emergency periods when UV disinfection is not available and the Permittee uses chlorine to disinfect effluent discharged to the Snoqualmie River. During normal operations with UV disinfection, chlorine limits do not apply. When not using chlorine during the monitoring period, enter qualifier code "M" into the WQWebDMR form to indicate that for chlorine was conditional and not required for the monitoring period.

S1.B. Mixing zone authorization

Mixing zone for outfall no. 001

Mixing Zone Size and Approximate Location

Available Dilution (dilution factor)	
Acute Aquatic Life Criteria	3
Chronic Aquatic Life Criteria	42
Human Health Criteria - Carcinogen	179
Human Health Criteria - Non-carcinogen	58

The paragraphs below define the maximum boundaries of the mixing zones.

Chronic mixing zone

The width of the chronic mixing zone is limited to a distance of 42.5 feet. The length of the chronic mixing zone extends 310.5 feet downstream and 100 feet upstream of the outfall. The mixing zone extends from the discharge port to the top of the water surface. The concentration of pollutants at the edge of the chronic zone must meet chronic aquatic life criteria and human health criteria.

Acute mixing zone

The width of the acute mixing zone is limited to a distance of 42.5 feet in any horizontal direction from the outfall. The length of the acute mixing zone extends 31.0 feet downstream and 10 feet upstream of the outfall. The mixing zone extends from the discharge port to the top of the water surface. The concentration of pollutants at the edge of the acute zone must meet acute aquatic life criteria.

S2. Monitoring requirements

S2.A. Monitoring schedule

The Permittee must monitor in accordance with the following schedule and the requirements specified in Appendix A.

Parameter	Units & Speciation	Minimum Sampling Frequency	Sample Type
(1) Wastewater influent			
Wastewater Influent means the raw sewage flow from the collection system into the treatment facility. Sample the wastewater entering the headworks of the treatment plant excluding any side-stream returns from inside the plant. If side stream flows return to the headworks ahead of the influent sampling point, the Permittee must account for the quantity and quality of the side stream flow sampled by the influent flow meter and sampler.			
Flow	MGD	Continuous [1]	Recording
Biochemical Oxygen Demand (BOD_5)	mg/L	2/month	24-hr Composite [2]
BOD_5	lbs/day	2/month	Calculated [3]
$CBOD_5$	mg/L	3/week	24-hr Composite
TSS	mg/L	3/week	24-hr Composite
TSS	lbs/day	3/week	Calculated [3]
(2) Final wastewater effluent			
Final Wastewater Effluent means wastewater exiting the last treatment process or operation. Typically, this is after or at the exit from the chlorine contact chamber or other disinfection process. The Permittee may take effluent samples for the BOD_5 analysis before or after the disinfection process. If taken after, the Permittee must dechlorinate and reseed the sample.			
Flow	MGD	Continuous	Recording
$CBOD_5$	mg/L	3/week	24-hr Composite
$CBOD_5$	lbs/day	3/week	Calculated [3]
$CBOD_5$	% removal	1/month	Calculated [4]
TSS	mg/L	3/week	24-hr Composite
TSS	lbs/day	3/week	Calculated [3]
TSS	% removal	1/month	Calculated [4]
pH [5]	Standard Units	Continuous	Recording
Fecal Coliform [6]	# /100 ml	3/week	Grab [7]
Total Ammonia	mg/L as N	1/week	24-hr Composite
Total Ammonia	lbs/day as N	1/week	Calculated
Nitrate plus Nitrite Nitrogen	mg/L as N	1/month	24-hr Composite
Total Kjeldahl Nitrogen (TKN)	mg/L as N	1/month	24-hr Composite
Soluble Reactive Phosphorus	mg/L as P	1/week	24-hr Composite
Soluble Reactive Phosphorus	lbs/day as P	1/week	Calculated
Total Phosphorus	mg/L as P	1/month	24-hr Composite

Parameter	Units & Speciation	Minimum Sampling Frequency	Sample Type
Temperature [8]	Degrees centigrade (°C)	Continuous	Recording
7-DADMax Temperature [9]	°C	1/day	Calculated
Chlorine, Total Residual	µg/L	1/day, as needed[10]	Grab
(3) Whole effluent toxicity testing – final wastewater effluent			
Acute Toxicity Testing	See condition S11 for testing requirements	2/permit cycle, dates specified in condition S11	24-hr composite
Chronic Toxicity Testing	See condition S12 for testing requirements	2/permit cycle, dates specified in condition S12	24-hr composite
(4) Permit renewal application requirements – final wastewater effluent			
In addition to the routine parameters listed above, the Permittee must report the following parameters in the next permit application. **The following testing must occur during the calendar year 2017**. The Permittee must record and report wastewater treatment plant flow discharged on the day it collects the sample for priority pollutant testing with the discharge monitoring report.			
Total Residual Chlorine	mg/L	Quarterly[11], 2017 only	Grab
Dissolved Oxygen	mg/L	Quarterly, 2017 only	Grab
Oil and Grease	mg/L	Quarterly, 2017 only	Grab
Total Dissolved Solids	mg/L	Quarterly, 2017 only	24-hr composite
Total Hardness	mg/L	Quarterly, 2017 only	Grab
Cyanide	micrograms/liter(µg/L)	Quarterly, 2017 only	Grab
Total Phenolic Compounds	µg/L	Quarterly, 2017 only	Grab
Priority Pollutants (PP) – Total Metals	µg/L; nanograms (ng/L) for mercury	Quarterly, 2017 only	24-hr composite Grab for mercury
PP – Volatile Organic Compounds	µg/L	Quarterly, 2017 only	Grab
PP – Acid-extractable Compounds	µg/L	Quarterly, 2017 only	24-hr composite
PP – Base-neutral Compounds	µg/L	Quarterly, 2017 only	24-hr composite

Monitoring Schedule Footnotes	
1	Continuous means uninterrupted except for brief lengths of time for calibration, for power failure, or for unanticipated equipment repair or maintenance.
2	24-hour composite means a series of individual samples collected over a 24-hour period into a single container, and analyzed as one sample.
3	Calculate mass discharge concurrently with the respective concentration measurement using the following formula: Concentration (mg/L) X Flow (MGD) X Conversion Factor (8.34) = lbs/day
4	% removal = $\frac{\text{Influent concentration (mg/L)} - \text{Effluent concentration (mg/L)}}{\text{Influent concentration (mg/L)}} \times 100$ Calculate the percent (%) removal of $CBOD_5$ and TSS using the above equation.
5	The Permittee must report the instantaneous maximum and minimum pH daily. Do not average pH values.
6	Do not report fecal coliform as too numerous to count (TNTC). Report a numeric value consistent with Ecology's *Information Manual for Wastewater Treatment Plant Operators*, Publication Number 04-10-020 available at: http://www.ecy.wa.gov/programs/wq/permits/guidance.html .
7	Grab means an individual sample collected over a fifteen (15) minute, or less, period.
8	Determine and report a daily maximum from continuous measurements integrated over a maximum half-hour interval. Continuous monitoring instruments must achieve an accuracy of 0.2 degrees C and the Permittee must verify accuracy annually.

[9]	Calculate a 7-DADMax for each day by averaging each days' maximum temperature value with the values from the six (6) preceding days.
[10]	The Permittee must monitor total chlorine residual concentrations only when using chlorine for disinfection purposes.
[11]	Quarterly sampling periods are January through March, April through June, July through September, and October through December.

S2.B. Sampling and analytical procedures

Samples and measurements taken to meet the requirements of this permit must represent the volume and nature of the monitored parameters. The Permittee must conduct representative sampling of any unusual discharge or discharge condition, including bypasses, upsets, and maintenance-related conditions that may affect effluent quality.

Sampling and analytical methods used to meet the monitoring requirements specified in this permit must conform to the latest revision of the *Guidelines Establishing Test Procedures for the Analysis of Pollutants* contained in 40 CFR Part 136 (or as applicable in 40 CFR subchapters N [Parts 400–471] or O [Parts 501-503]) unless otherwise specified in this permit . Ecology may only specify alternative methods for parameters without permit limits and for those parameters without an EPA approved test method in 40 CFR Part 136.

The Permittee must record and report all monitoring data using an appropriate number of significant digits. For parameters with numeric limits listed in S1.A and S4.A, the Permittee must, at a minimum, record and report values using the number of significant digits used in the limit. For all other parameters, report and record values using at least the number of significant digits used in that parameter's detection level listed in Appendix A.

S2.C. Flow measurement and continuous monitoring devices

The Permittee must:

1. Select and use appropriate flow measurement and continuous monitoring devices and methods consistent with accepted scientific practices.
2. Install, calibrate, and maintain these devices to ensure the accuracy of the measurements is consistent with the accepted industry standard and the manufacturer's recommendation for that type of device.
3. Develop a continuous monitoring equipment plan and submit it to Ecology by August 1, 2014. This plan must:
    a. Provide a list of all continuous monitoring devices (including manufacturer, model no., monitoring location) used for compliance monitoring at the facility. The list must identify the parameter(s) monitored by the device, the operating range for the device (including units), the accuracy of the device and the precision level for readings generated by the device.

b. Identify the manufacturer and local equipment representative for each device.

c. Explain the protocols the Permittee will use to perform periodic calibrations, including description of operator positions that may be assigned to perform calibration testing.

d. Include a data network diagram that identifies the location of each device and illustrates how each device is connected to the plant's SCADA system.

e. Describe SCADA system programming strategies the Permittee will use to manage data acquisition from the devices. The strategies must identify how the system produces values that the Permittee reports on DMRs, and how the system preserves reported values. The Permittee must address methods for handling data errors caused by transient loss of communication between the SCADA system and the monitoring devices and identify the length of data averaging periods used when communication errors occur.

4. Calibrate flow-monitoring devices at a minimum frequency of at least one calibration per year.

5. Calibrate continuous monitoring instruments weekly unless it can demonstrate a longer period is sufficient based on monitoring records. The Permittee:

   a. May calibrate apparatus for continuous monitoring of dissolved oxygen by air calibration.

   b. Must calibrate continuous pH measurement instruments using a grab sample analyzed in the lab with a pH meter calibrated with standard buffers and analyzed within 15 minutes of sampling.

   c. Must calibrate continuous chlorine measurement instruments using a grab sample analyzed in the laboratory within 15 minutes of sampling.

   d. Calibrate temperature probes using methods listed in manufacturer operation and maintenance manuals. Although calibration is not required if the Permittee uses recording devices certified by the manufacturer, the Permittee must verify accuracy of the temperature readings monthly by comparing the probe's temperature reading to an alcohol-based thermometer.

6. Verify monthly the accuracy of pH and temperature data captured by the plant's SCADA system by comparing values displayed on instrument control units located in the plant with values recorded in the SCADA system. Permittee must submit this verification with the monthly discharge monitoring report.

7. Maintain calibration and sensor verification records for at least three years.

S2.D. Laboratory accreditation

The Permittee must ensure that all monitoring data required by Ecology for permit specified parameters is prepared by a laboratory registered or accredited under the provisions of chapter 173-50 WAC, *Accreditation of Environmental Laboratories*.

Flow, temperature, settleable solids, conductivity, pH, and internal process control parameters are exempt from this requirement. The Permittee must obtain accreditation for conductivity and pH if it must receive accreditation or registration for other parameters.

S2.E. Request for reduction in monitoring

The Permittee may request a reduction of the sampling frequency after twelve (12) months of monitoring. Ecology will review each request and at its discretion grant the request when it reissues the permit or by a permit modification.

The Permittee must:

1. Provide a written request.
2. Clearly state the parameters for which it is requesting reduced monitoring.
3. Clearly state the justification for the reduction.

S3. Reporting and recording requirements

The Permittee must monitor and report in accordance with the following conditions. Falsification of information submitted to Ecology is a violation of the terms and conditions of this permit. The Permittee must verify the accuracy of all discharge monitoring report (DMR) data by requiring at least two operators to review each DMR prior to submitting DMRs to Ecology.

S3.A. Reporting

The first monitoring period begins on the effective date of the permit. The Permittee must:

1. Summarize, report, and submit monitoring data obtained during each monitoring period on the electronic Discharge Monitoring Report (DMR) form provided by Ecology within WQWebDMR. Include data for each of the parameters tabulated in Special Condition S2 and as required by the form. Report a value for each day sampling occurred (unless specifically exempted in the permit) and for the summary values (when applicable) included on the electronic form.

   To find out more information and to sign up for WQWebDMR go to:
   http://www.ecy.wa.gov/programs/wq/permits/paris/webdmr.html

   If unable to submit electronically during a given monitoring period (for example, if you do not have an internet connection available), the Permittee must contact Ecology to request a temporary waiver and obtain instructions on how to obtain a paper copy DMR. Ecology will evaluate requests for a temporary waiver on a case-by-case basis.

2. Enter the "no discharge" reporting code for an entire DMR, for a specific monitoring point, or for a specific parameter as appropriate, if the Permittee did not discharge wastewater or a specific pollutant during a given monitoring period.

3. Report single analytical values below detection as "less than the detection level (DL)" by entering < followed by the numeric value of the detection level (e.g. < 2.0) on the DMR. If the method used did not meet the minimum DL and quantitation level

(QL) identified in the permit, report the actual QL and DL in the comments or in the location provided.

4. Report the test method used for analysis in the comments if the laboratory used an alternative method not specified in the permit and as allowed in Appendix A.
5. Calculate average values (unless otherwise specified in the permit) using:
   a. The reported numeric value for all parameters measured between the agency-required detection value and the agency-required quantitation value.
   b. One-half the detection value (for values reported below detection) if the lab detected the parameter in another sample for the reporting period.
   c. Zero (for values reported below detection) if the lab did not detect the parameter in another sample for the reporting period.
6. Report single-sample grouped parameters (for example priority pollutants, PAHs, etc.) on the WQWebDMR form and include: sample date, concentration detected, detection limit (DL) (as necessary), and laboratory quantitation level (QL) (as necessary). The Permittee must also submit an electronic PDF copy of the laboratory report using WQWebDMR.

   The contract laboratory reports must also include information on the chain of custody, QA/QC results, and documentation of accreditation for the parameter.
7. Ensure that DMRs are electronically submitted no later than the dates specified below, unless otherwise specified in this permit.
8. Electronically attach a letter to each DMR submitted through the WQWebDMR system that identifies the name of the operator who prepared the DMR for submittal and the name of the operator who verified the accuracy of the data entered into the system.
9. Submit DMRs for parameters with the monitoring frequencies specified in S2 (monthly, quarterly, annual, etc.) at the reporting schedule identified below. The Permittee must:
   a. Submit **monthly** DMRs by the 15th day of the following month.
   b. Submit **quarterly DMRs**, unless otherwise specified in the permit, by the 15th day of the month following the monitoring period. Quarterly sampling periods are January through March, April through June, July through September, and October through December.
10. Submit reports to Ecology online using Ecology's electronic WQWebDMR submittal forms (electronic DMRs) as required above. Send paper reports to Ecology at:

    Water Quality Permit Coordinator
    Department of Ecology
    Northwest Regional Office
    3190 160th Avenue SE
    Bellevue, WA 98008-5452

S3.B. Records retention

The Permittee must retain records of all monitoring information for a minimum of three (3) years. Such information must include all calibration and maintenance records and all original 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. The Permittee must extend this period of retention during the course of any unresolved litigation regarding the discharge of pollutants by the Permittee or when requested by Ecology.

S3.C. Recording of results

For each measurement or sample taken, the Permittee must record the following information:

1. The date, exact place, method, and time of sampling or measurement.
2. The individual who performed the sampling or measurement.
3. The dates the analyses were performed.
4. The individual who performed the analyses.
5. The analytical techniques or methods used.
6. The results of all analyses.

The Permittee must electronically submit copies of all bench sheets containing the above information with monthly DMRs for all compliance sampling done up to December 31, 2014. Upload documents in the WQWebDMR system by attaching scanned electronic copies of the bench sheets (in PDF) as part of each DMR submittal.

S3.D. Additional monitoring by the Permittee

If the Permittee monitors any pollutant more frequently than required by Special Condition S2 of this permit, then the Permittee must include the results of such monitoring in the calculation and reporting of the data submitted in the Permittee's DMR unless otherwise specified by Special Condition S2.

S3.E. Reporting permit violations

The Permittee must take the following actions when it violates or is unable to comply with any permit condition:

1. Immediately take action to stop, contain, and cleanup unauthorized discharges or otherwise stop the noncompliance and correct the problem.
2. If applicable, immediately repeat sampling and analysis. Submit the results of any repeat sampling to Ecology within thirty (30) days of sampling.|

a. Immediate reporting

The Permittee must <u>immediately</u> report to Ecology and the Local Health Jurisdiction at the numbers listed below, all:

- Failures of the disinfection system when discharging to the Snoqualmie River via outfall #001.
- All collection system overflows that discharge to surface waters, stormwater conveyance systems or into areas open to public access.
- Plant bypasses resulting in a discharge to surface waters or into areas of public access.
- Any other failures of the sewage system that may impact surface water or public health.

Northwest Regional Office	**425-649-7000**
Public Health of Seattle-King County	**206-296-4932**

Refer to Condition R3.C for additional notification requirements that apply when the facility is producing and distributing reclaimed water.

b. Twenty-four-hour reporting

The Permittee must report the following occurrences of noncompliance by telephone, to Ecology at the telephone number listed above, within 24 hours from the time the Permittee becomes aware of any of the following circumstances:

1. Any noncompliance that may endanger health or the environment, unless previously reported under immediate reporting requirements.
2. Any unanticipated bypass that causes an exceedance of an effluent limit in the permit (See Part S5.F, "Bypass Procedures").
3. Any upset that causes an exceedance of an effluent limit in the permit (See G.15, "Upset").
4. Any violation of a maximum daily or instantaneous maximum discharge limit for any of the pollutants in Section S1.A of this permit.
5. Any overflow prior to the treatment works, whether or not such overflow endangers health or the environment or exceeds any effluent limit in the permit.

c. Report within five days

The Permittee must also submit a written report within five days of the time that the Permittee becomes aware of any reportable event under subparts a or b, above. The report must contain:

1. A description of the noncompliance and its cause.
2. The period of noncompliance, including exact dates and times.
3. The estimated time the Permittee expects the noncompliance to continue if not yet corrected.
4. Steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

5. If the noncompliance involves an overflow prior to the treatment works, an estimate of the quantity (in gallons) of untreated overflow.

d. Waiver of written reports

Ecology may waive the written report required in subpart c, above, on a case-by-case basis upon request if the Permittee has submitted a timely oral report.

e. All other permit violation reporting

The Permittee must report all permit violations, which do not require immediate or within 24 hours reporting, when it submits monitoring reports for S3.A ("Reporting"). The reports must contain the information listed in subpart c, above. Compliance with these requirements does not relieve the Permittee from responsibility to maintain continuous compliance with the terms and conditions of this permit or the resulting liability for failure to comply.

f. Report submittal

The Permittee must submit reports to the address listed in S3.A.

S3.F. Other reporting

a. Spills of Oil or Hazardous Materials

The Permittee must report a spill of oil or hazardous materials in accordance with the requirements of RCW 90.56.280 and chapter 173-303-145. You can obtain further instructions at the following website: http://www.ecy.wa.gov/programs/spills/other/reportaspill.htm .

b. Failure to submit relevant or correct facts

Where the Permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application, or in any report to Ecology, it must submit such facts or information promptly.

S3.G. Maintaining a copy of this permit

The Permittee must keep a copy of this permit at the facility and make it available upon request to Ecology inspectors.

S4. Facility loading

S4.A. Design criteria

The flows or waste loads for the permitted facility must not exceed the following design criteria:

Maximum Month Design Flow (MMDF)	2.15 MGD
BOD_5 Influent Loading for Maximum Month	5,220 lb/day
TSS Influent Loading for Maximum Month	5,220 lb/day

S4.B. Plans for maintaining adequate capacity

a. Conditions triggering plan submittal

The Permittee must submit a plan and a schedule for continuing to maintain capacity to Ecology when:

1. The actual flow or waste load reaches 85 percent of any one of the design criteria in S4.A for three consecutive months; or
2. The projected plant flow or loading would reach design capacity within five years.

b. Plan and schedule content

The plan and schedule must identify the actions necessary to maintain adequate capacity for the expected population growth and to meet the limits and requirements of the permit. The Permittee must consider the following topics and actions in its plan.

1. Analysis of the present design and proposed process modifications.
2. Reduction or elimination of excessive infiltration and inflow of uncontaminated ground and surface water into the sewer system.
3. Limits on future sewer extensions or connections or additional waste loads.
4. Modification or expansion of facilities.
5. Reduction of industrial or commercial flows or waste loads.

Engineering documents associated with the plan must meet the requirements of WAC 173-240-060, "Engineering Report," and be approved by Ecology prior to any construction.

S4.C. 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.

S4.D. Notification of new or altered sources

1. The Permittee must submit written notice to Ecology whenever any new discharge or a substantial change in volume or character of an existing discharge into the wastewater treatment plant is proposed which:
   a. Would interfere with the operation of, or exceed the design capacity of, any portion of the wastewater treatment plant.
   b. Is not part of an approved general sewer plan or approved plans and specifications.
   c. Is subject to pretreatment standards under 40 CFR Part 403 and Section 307(b) of the Clean Water Act.

2. This notice must include an evaluation of the wastewater treatment plant's ability to adequately transport and treat the added flow and/or waste load, the quality and volume of effluent to be discharged to the treatment plant, and the anticipated impact on the Permittee's effluent [40 CFR 122.42(b)].

S5. Operation and maintenance

The Permittee must at all times properly operate and maintain all facilities and systems of conveyance, treatment and control (and related appurtenances), which are installed to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance (O&M) includes, but is not limited to, performing periodic preventive maintenance and cleaning on all equipment and systems at intervals recommended by equipment manufacturers or as documented in an Ecology-approved (O&M); conducting routine inspections of the collection system to identify pipe defects or blockages that can cause sanitary sewer overflows; completing timely repairs or replacement of damaged equipment (including conveyance system components); keeping a daily operation logbook (paper or electronic); and using adequate laboratory controls and appropriate quality assurance procedures. This provision of the permit requires the Permittee to operate backup or auxiliary facilities or similar systems only when the operation is necessary to achieve compliance with the conditions of this permit.

S5.A. Certified operator

This permitted facility must be operated by an operator certified by the state of Washington for at least a Class III plant. This operator must be in responsible charge of the day-to-day operation of the wastewater treatment plant. An operator certified for at least a Class II plant must be in charge during all regularly scheduled shifts. In addition, an operator certified for at least a Class II plant must be at the facility to supervise all work done on any plant process equipment (including the plant SCADA system) that is done by non-certified workers or outside contractors.

S5.B. Operation and maintenance program

The Permittee must:

1. Institute an adequate operation and maintenance program for the entire sewage system.
2. Keep maintenance records on all major electrical and mechanical components of the treatment plant, as well as the sewage system and pumping stations. Such records must clearly specify the frequency and type of maintenance recommended by the manufacturer and must show the frequency and type of maintenance performed.
3. Ensure all operations and maintenance tasks done on WWTP process equipment or systems, including process management and SCADA computer systems, are performed or supervised by an operator certified by the State of Washington. The Permittee may allow qualified mechanics, electricians or other trained tradespersons appropriate for specific tasks to perform work on equipment as long as a certified operator is on site to verify that the work

performed does not adversely impact facility operations, effluent quality, or process monitoring and alarm reliability.

4. Make maintenance records available for inspection at all times.

S5.C. Short-term reduction

The Permittee must schedule any facility maintenance, which might require interruption of wastewater treatment and degrade effluent quality, during non-critical water quality periods and carry this maintenance out in a manner approved by Ecology.

If a Permittee contemplates a reduction in the level of treatment that would cause a violation of permit discharge limits on a short-term basis for any reason, and such reduction cannot be avoided, the Permittee must:

1. Give written notification to Ecology, if possible, thirty (30) days prior to such activities.
2. Detail the reasons for, length of time of, and the potential effects of the reduced level of treatment.

This notification does not relieve the Permittee of its obligations under this permit.

S5.D. Electrical power failure

The Permittee must ensure that adequate safeguards prevent the discharge of untreated wastes or wastes not treated in accordance with the requirements of this permit during electrical power failure at the treatment plant and/or sewage lift stations. Adequate safeguards include, but are not limited to, alternate power sources, standby generator(s), or retention of inadequately treated wastes.

The Permittee must maintain Reliability Class II (EPA 430/9-74-001) at the wastewater treatment plant. Reliability Class II requires a backup power source sufficient to operate all vital components and critical lighting and ventilation during peak wastewater flow conditions. Vital components used to support the secondary processes (i.e., mechanical aerators or aeration basin air compressors) need not be operable to full levels of treatment, but must be sufficient to maintain the biota.

S5.E. Prevent connection of inflow

The Permittee must strictly enforce its sewer ordinances and not allow the connection of inflow (roof drains, foundation drains, etc.) to the sanitary sewer system.

S5.F. Bypass procedures

This permit prohibits a bypass, which is the intentional diversion of waste streams from any portion of a treatment facility. Ecology may take enforcement action against a Permittee for a bypass unless one of the following circumstances (1, 2, or 3) applies.

1. Bypass for essential maintenance without the potential to cause violation of permit limits or conditions.

   This permit authorizes a bypass if it allows for essential maintenance and does not have the potential to cause violations of limits or other conditions of this permit, or adversely impact public health as determined by Ecology prior to the bypass. The Permittee must submit prior notice, if possible, at least ten (10) days before the date of the bypass.

2. Bypass which is unavoidable, unanticipated, and results in noncompliance of this permit.

   This permit authorizes such a bypass only if:

   a. Bypass is unavoidable to prevent loss of life, personal injury, or severe property damage. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which would cause them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass.

   b. No feasible alternatives to the bypass exist, such as:

      - The use of auxiliary treatment facilities.
      - Retention of untreated wastes.
      - Maintenance during normal periods of equipment downtime, but not if the Permittee should have installed adequate backup equipment in the exercise of reasonable engineering judgment to prevent a bypass.
      - Transport of untreated wastes to another treatment facility or preventative maintenance

   c. Ecology is properly notified of the bypass as required in Special Condition S3.E of this permit.

3. If bypass is anticipated and has the potential to result in noncompliance of this permit.

   a. The Permittee must notify Ecology at least thirty (30) days before the planned date of bypass. The notice must contain:

      - A description of the bypass and its cause.
      - An analysis of all known alternatives which would eliminate, reduce, or mitigate the need for bypassing.
      - A cost-effectiveness analysis of alternatives including comparative resource damage assessment.
      - The minimum and maximum duration of bypass under each alternative.
      - A recommendation as to the preferred alternative for conducting the bypass.

- The projected date of bypass initiation.
- A statement of compliance with SEPA.
- A request for modification of water quality standards as provided for in WAC 173-201A-410, if an exceedance of any water quality standard is anticipated.
- Details of the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the bypass.

b. For probable construction bypasses, the Permittee must notify Ecology of the need to bypass as early in the planning process as possible. The Permittee must consider the analysis required above during preparation of the engineering report or facilities plan and plans and specifications and must include these to the extent practical. In cases where the Permittee determines the probable need to bypass early, the Permittee must continue to analyze conditions up to and including the construction period in an effort to minimize or eliminate the bypass.

c. Ecology will consider the following prior to issuing an administrative order for this type of bypass:

- If the bypass is necessary to perform construction or maintenance-related activities essential to meet the requirements of this permit.
- If feasible alternatives to bypass exist, such as the use of auxiliary treatment facilities, retention of untreated wastes, stopping production, maintenance during normal periods of equipment down time, or transport of untreated wastes to another treatment facility.
- If the Permittee planned and scheduled the bypass to minimize adverse effects on the public and the environment.

After consideration of the above and the adverse effects of the proposed bypass and any other relevant factors, Ecology will approve or deny the request. Ecology will give the public an opportunity to comment on bypass incidents of significant duration, to the extent feasible. Ecology will approve a request to bypass by issuing an administrative order under RCW 90.48.120.

S5.G. Operations and maintenance (O&M) manual

a. O&M manual submittal and requirements

The Permittee must:

1. Complete an Operations and Maintenance (O&M) Manual that meets the requirements of 173-240-080 WAC and submit it to Ecology for review and approval by December 31, 2014. The Permittee must incorporate into the manual all current information from the unapproved draft O&M manual for the facility, developed by KCM/Tetra Tech in 1997, and from process manuals prepared by the original Oxidation Ditch system vendor. The manual must also include operations and maintenance details for all

new components and systems added to the facility since 1997 and include revised procedures and instructions developed through operator experience or through recommendations from consultants.

2. In addition to meeting the requirements of 173-240-080 WAC and including the detail noted in above, develop an O&M manual that conforms to the general guidance presented in Ecology's *Criteria for Sewage Works Design* (Orange Book, Section G1-4.4) and include the following general topics:

   a. Emergency procedures for cleanup in the event of wastewater system upset or failure.

   b. A Spill Control Plan, as required under Special Condition S8, for the management of oils or other dangerous wastes on the site.

   c. A review of system components which, if they fail, could result in a release of pollutants to surface water or could impact human health. Provide a procedure for a routine schedule of checking the function of these components.

   d. Identification of wastewater treatment system maintenance procedures that contribute to the generation of process wastewater.

   e. Detailed reporting protocols, including QA/QC process, for submitting reports to Ecology to comply with the reporting requirements in the discharge permit.

   f. Directions maintenance staff will use when cleaning or maintaining equipment or performing other tasks which are necessary to protect the operation of the wastewater system (for example, defining maximum allowable discharge rate for draining a tank, blocking all floor drains before beginning the overhaul of a stationary engine). Manual must clearly describe how operators will clean the UV disinfection system channels without flushing solids into the plant outfall.

   g. The treatment plant process control monitoring schedule.

   h. An alarm schedule that identifies all process components and equipment connected to alarm conditions in the facility's SCADA system. Describe the operator response actions required for all critical alarms and identify all alarms that connect to the facility's autodialer notification system.

   i. Minimum staffing adequate to operate and maintain the treatment processes and carry out compliance monitoring required by the permit.

3. Submit an electronic copy of the review draft (preferable as a PDF) by the due date listed above. Submit a paper copy and an electronic copy of the final manual after addressing Ecology's review comments.

4. Keep the 1997 draft O&M manual and all relevant vendor/equipment manuals at the permitted facility until Ecology has approved the revised

manual. All operators must follow the instructions and procedures in the 1997 draft O&M manual until final approval is granted for the new O&M manual. Once the Ecology approves the new O&M Manual the Permittee must maintain the approved manual on site and ensure operators follow the approved manual.

5. After Ecology approves the final manual, submit all substantial changes or updates to manual to Ecology for review and approval. The Permittee must submit a paper copy and an electronic copy (preferably as a PDF) of all updates.

S6. Pretreatment

S6.A. General requirements

The Permittee must work with Ecology to ensure that all commercial and industrial users of the publicly owned treatment works (POTW) comply with the pretreatment regulations in 40 CFR Part 403 and any additional regulations that the Environmental Protection Agency (U.S. EPA) may promulgate under Section 307(b) (pretreatment) and 308 (reporting) of the Federal Clean Water Act.

S6.B. Duty to enforce discharge prohibitions

1. Under federal regulations (40 CFR 403.5(a) and (b)), the Permittee must not authorize or knowingly allow the discharge of any pollutants into its POTW which may be reasonably expected to cause pass through or interference, or which otherwise violate general or specific discharge prohibitions contained in 40 CFR Part 403.5 or WAC-173-216-060.
2. The Permittee must not authorize or knowingly allow the introduction of any of the following into their treatment works:
   a. Pollutants which create a fire or explosion hazard in the POTW (including, but not limited to waste streams with a closed cup flashpoint of less than 140 degrees Fahrenheit or 60 degrees Centigrade using the test methods specified in 40 CFR 261.21).
   b. Pollutants which will cause corrosive structural damage to the POTW, but in no case discharges with pH lower than 5.0, or greater than 11.0 standard units, unless the works are specifically designed to accommodate such discharges.
   c. Solid or viscous pollutants in amounts that could cause obstruction to the flow in sewers or otherwise interfere with the operation of the POTW.
   d. Any pollutant, including oxygen-demanding pollutants, (BOD_5, etc.) released in a discharge at a flow rate and/or pollutant concentration which will cause interference with the POTW.
   e. Petroleum oil, non-biodegradable cutting oil, or products of mineral origin in amounts that will cause interference or pass through.

f. Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity which may cause acute worker health and safety problems.

g. Heat in amounts that will inhibit biological activity in the POTW resulting in interference but in no case heat in such quantities such that the temperature at the POTW headworks exceeds 40 degrees Centigrade (104 degrees Fahrenheit) unless Ecology, upon request of the Permittee, approves, in writing, alternate temperature limits.

h. Any trucked or hauled pollutants, except at discharge points designated by the Permittee.

i. Wastewaters prohibited to be discharged to the POTW by the Dangerous Waste Regulations (chapter 173-303 WAC), unless authorized under the Domestic Sewage Exclusion (WAC 173-303-071).

3. The Permittee must also not allow the following discharges to the POTW unless approved in writing by Ecology:

   a. Noncontact cooling water in significant volumes.

   b. Stormwater and other direct inflow sources.

   c. Wastewaters significantly affecting system hydraulic loading, which do not require treatment, or would not be afforded a significant degree of treatment by the system.

4. The Permittee must notify Ecology if any industrial user violates the prohibitions listed in this section (S6.B), and initiate enforcement action to promptly curtail any such discharge.

S6.C. Wastewater discharge permit required

The Permittee must

1. Establish a process for authorizing non-domestic wastewater discharges that ensures all SIUs in all tributary areas meet the applicable state waste discharge permit (SWDP) requirements in accordance with chapter 90.48 RCW and chapter 173-216 WAC.

2. Immediately notify Ecology of any proposed discharge of wastewater from a source, which may be a significant industrial user (SIU) [see fact sheet definitions or refer to 40 CFR 403.3(v)(i)(ii)].

3. Require all SIUs to obtain a SWDP from Ecology prior to accepting their non-domestic wastewater, or require proof that Ecology has determined they do not require a permit.

4. Require the documentation as described in S6.C.3 at the earliest practicable date as a condition of continuing to accept non-domestic wastewater discharges from a previously undiscovered, currently discharging and unpermitted SIU.

5. Require sources of non-domestic wastewater, which do not qualify as SIUs but merit a degree of oversight, to apply for a SWDP and provide it a copy of the application and any Ecology responses.
6. Keep all records documenting that its users have met the requirements of S6.C.

S6.D. Identification and reporting of existing, new, and proposed industrial users

1. The Permittee must take continuous, routine measures to identify all existing, new, and proposed SIUs and potential significant industrial users (PSIUs) discharging or proposing to discharge to the Permittee's sewer system (see Appendix C of the fact sheet for definitions).
2. Within 30 days of becoming aware of an unpermitted existing, new, or proposed industrial user who may be a significant industrial user (SIU), the Permittee must notify such user by registered mail that, if classified as an SIU, they must apply to Ecology and obtain a State Waste Discharge Permit. The Permittee must send a copy of this notification letter to Ecology within this same 30-day period.
3. The Permittee must also notify all Potential SIUs (PSIUs), as they are identified, that if their classification should change to an SIU, they must apply to Ecology for a State Waste Discharge Permit within 30 days of such change.

S6.E. Industrial user survey

The Permittee must complete an industrial user survey listing all SIUs and potential significant industrial users (PSIUs) discharging to the POTW. The Permittee must submit the survey to Ecology by April 1, 2018. At a minimum, the Permittee must develop the list of SIUs and PSIUs by means of a telephone book search, a water utility billing records search, and a physical reconnaissance of the service area. Information on PSIUs must include, at a minimum, the business name, telephone number, address, description of the industrial process(s), and the known wastewater volumes and characteristics.

S7. Solid wastes

S7.A. Solid waste handling

The Permittee must handle and dispose of all solid waste material in such a manner as to prevent its entry into state ground or surface water.

S7.B. Leachate

The Permittee must not allow leachate from its solid waste material to enter state waters without providing all known, available, and reasonable methods of treatment, nor allow such leachate to cause violations of the State Surface Water Quality Standards, Chapter 173-201A WAC, or the State Ground Water Quality Standards, Chapter 173-200 WAC. The Permittee must apply for a permit or permit modification as may be required for such discharges to state ground or surface waters.

S8. Spill control plan

S8.A. Spill control plan submittals and requirements

The Permittee must:

1. Develop a spill control plan for the prevention, containment, and control of spills or unplanned releases of pollutants by December 31, 2014. The Permittee must include the plan as a component of the O&M Manual required under S5.G.
2. Review the plan at least annually and update the spill plan as needed.
3. Send changes to the plan to Ecology.
4. Follow the plan and any supplements throughout the term of the permit.

S8.B. Spill control plan components

The spill control plan must include the following:

1. A list of all oil and petroleum products and other materials used and/or stored on-site, which when spilled, or otherwise released into the environment, designate as dangerous waste (DW) or extremely hazardous waste (EHW) by the procedures set forth in WAC 173-303-070. Include other materials used and/or stored on-site which may become pollutants or cause pollution upon reaching state's waters.
2. A description of preventive measures and facilities (including an overall facility plot showing drainage patterns) which prevent, contain, or treat spills of these materials.
3. A description of the reporting system the Permittee will use to alert responsible managers and legal authorities in the event of a spill.
4. A description of operator training to implement the plan.

The Permittee may submit plans and manuals required by 40 CFR Part 112, contingency plans required by Chapter 173-303 WAC, or other plans required by other agencies, which meet the intent of this section.

S9. Outfall evaluation

The Permittee must inspect the submerged portion of the outfall line and diffuser for outfall #001 to the Snoqualmie River. The inspection must document the integrity and continued function of the outfall. If conditions allow for a photographic or video verification, the Permittee must include such verification with the report as separate digital files. The Permittee must submit the inspection report to Ecology by October 1, 2018. The inspector must, at a minimum:

- Perform inspection during the river's typical low flow period, generally in late summer.
- Assess the physical condition of the outfall pipe, open-ended port, and associated couplings.
- Determine the extent of sediment accumulation in the vicinity of the diffuser.

- Ensure diffuser ports are free of obstructions and are allowing uniform flow.
- Confirm physical location (latitude/longitude) and depth of the diffuser section of the outfall.
- Assess physical condition of anchors (H pilings and chains) used to secure the outfall pipe.

The inspection report must describe the above findings and include a correction plan if the inspection reveals physical damage to the outfall structure or if there are signs of sediment accumulation near the diffuser ports.

S10. Acute toxicity

S10.A. Testing when there is no permit limit for acute toxicity

The Permittee must:

1. Conduct acute toxicity testing on final effluent during the following months: January 2017 and July 2017.
2. Submit the results to Ecology within 60 days of each sampling event, no later than March 30, 2017 and September 30, 2017. In addition, summarize and report results in the next permit renewal application.
3. Conduct acute toxicity testing on a series of at least five concentrations of effluent, including 100% effluent and a control.
4. Use each of the following species and protocols for each acute toxicity test:

Acute Toxicity Tests	Species	Method
Fathead minnow 96-hour static-renewal test	*Pimephales promelas*	EPA-821-R-02-012
Daphnid 48-hour static test	*Ceriodaphnia dubia, Daphnia pulex,* or *Daphnia magna*	EPA-821-R-02-012

S10.B. Sampling and reporting requirements

1. The Permittee must submit all reports for toxicity testing in accordance with the most recent version of Ecology Publication No. WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*. Reports must contain bench sheets and reference toxicant results for test methods. If the lab provides the toxicity test data in electronic format for entry into Ecology's database, then the Permittee must send the data to Ecology along with the test report, bench sheets, and reference toxicant results.
2. The Permittee must collect 24-hour composite effluent samples for toxicity testing. The Permittee must cool the samples to 0 - 6 degrees Celsius during collection and send them to the lab immediately upon completion. The lab must begin the toxicity testing as soon as possible but no later than 36 hours after sampling was completed.
3. The laboratory must conduct water quality measurements on all samples and test solutions for toxicity testing, as specified in the most recent version of Ecology Publication No. WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*.

4. All toxicity tests must meet quality assurance criteria and test conditions specified in the most recent versions of the EPA methods listed in Subsection C and the Ecology Publication No. WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*. If Ecology determines any test results to be invalid or anomalous, the Permittee must repeat the testing with freshly collected effluent.
5. The laboratory must use control water and dilution water meeting the requirements of the EPA methods listed in Section A or pristine natural water of sufficient quality for good control performance.
6. The Permittee must conduct whole effluent toxicity tests on an unmodified sample of final effluent.
7. The Permittee may choose to conduct a full dilution series test during compliance testing in order to determine dose response. In this case, the series must have a minimum of five effluent concentrations and a control. The series of concentrations must include the acute critical effluent concentration (ACEC). The ACEC equals 33.3% effluent.
8. All whole effluent toxicity tests, effluent screening tests, and rapid screening tests that involve hypothesis testing must comply with the acute statistical power standard of 29% as defined in WAC 173-205-020. If the test does not meet the power standard, the Permittee must repeat the test on a fresh sample with an increased number of replicates to increase the power.

S11. Chronic toxicity

S11.A. Testing when there is no permit limit for chronic toxicity

The Permittee must:

1. Conduct chronic toxicity testing on final effluent during the following months: April 2017 and October 2017.
2. Submit the results to Ecology within 60 days of each sampling event, no later than June 30, 2017 and December 31, 2017. In addition, summarize and report results in the next permit renewal application.
3. Conduct chronic toxicity testing on a series of at least five concentrations of effluent and a control. This series of dilutions must include the acute critical effluent concentration (ACEC). The ACEC equals 33.3% effluent. The series of dilutions should also contain the CCEC of 2.4% effluent.
4. Compare the ACEC to the control using hypothesis testing at the 0.05 level of significance as described in Appendix H, EPA/600/4-89/001.
5. Perform chronic toxicity tests with all of the following species and the most recent version of the following protocols:

Freshwater Chronic Test	Species	Method
Fathead minnow survival and growth	*Pimephales promelas*	EPA-821-R-02-013
Water flea survival and reproduction	*Ceriodaphnia dubia*	EPA-821-R-02-013

S11.B. Sampling and reporting requirements

1. The Permittee must submit all reports for toxicity testing in accordance with the most recent version of Ecology Publication No. WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*. Reports must contain bench sheets and reference toxicant results for test methods. If the lab provides the toxicity test data in electronic format for entry into Ecology's database, then the Permittee must send the data to Ecology along with the test report, bench sheets, and reference toxicant results.
2. The Permittee must collect 24-hour composite effluent for toxicity testing. The Permittee must cool the samples to 0 - 6 degrees Celsius during collection and send them to the lab immediately upon completion. The lab must begin the toxicity testing as soon as possible but no later than 36 hours after sampling was completed.
3. The laboratory must conduct water quality measurements on all samples and test solutions for toxicity testing, as specified in the most recent version of Ecology Publication No. WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*.
4. All toxicity tests must meet quality assurance criteria and test conditions specified in the most recent versions of the EPA methods listed in Section C and the Ecology Publication no. WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*. If Ecology determines any test results to be invalid or anomalous, the Permittee must repeat the testing with freshly collected effluent.
5. The laboratory must use control water and dilution water meeting the requirements of the EPA methods listed in Subsection C. or pristine natural water of sufficient quality for good control performance.
6. The Permittee must conduct whole effluent toxicity tests on an unmodified sample of final effluent.
7. The Permittee may choose to conduct a full dilution series test during compliance testing in order to determine dose response. In this case, the series must have a minimum of five effluent concentrations and a control. The series of concentrations must include the CCEC and the ACEC. The CCEC and the ACEC may either substitute for the effluent concentrations that are closest to them in the dilution series or be extra effluent concentrations. The CCEC equals 2.4% effluent. The ACEC equals 33.3% effluent.
8. All whole effluent toxicity tests that involve hypothesis testing must comply with the chronic statistical power standard of 39% as defined in WAC 173-205-020. If the test does not meet the power standard, the Permittee must repeat the test on a fresh sample with an increased number of replicates to increase the power.

S12. Application for permit renewal or modification for facility changes

The Permittee must submit an application for renewal of this permit October 1, 2018. The Permittee must submit a paper copy and an electronic copy (preferably as a PDF).

The Permittee must also submit a new application or supplement at least one hundred eighty (180) days prior to commencement of discharges, resulting from the activities listed below, which may result in permit violations. These activities include any facility expansions, production increases, or other planned changes, such as process modifications, in the permitted facility.

Reclaimed Water Conditions

Beginning on the effective date of this permit and lasting through its expiration date, all reclaimed water produced by the Permittee must comply with the Special Conditions (S.) and General Conditions (G.) as well as the Reclaimed Water Conditions (R.) of this permit.

R1. Reclaimed Water Limits

R1.A. Discharge Limits

All reclaimed water production and distribution activities authorized by this permit must be consistent with the terms and conditions of this permit. The distribution of reclaimed water containing any of the following constituents more frequently than, or at a concentration in excess of, that authorized by this permit constitute a violation of the terms and conditions of this permit.

Beginning on the effective date and lasting through the expiration date of this permit, the Permittee is authorized to produce and distribute Class A reclaimed water to various public and private locations in the vicinity of the TPC Snoqualmie Ridge Golf Course. The production, distribution, and use of reclaimed water must comply with all specific conditions and requirements of the Washington State Water Reclamation and Reuse Standards, 1997, and is subject to the limits listed the following table. The Permittee must operate the system in accordance with the permit conditions to ensure statutory requirements are met including protecting the existing and future beneficial uses of waters of the State. The Permittee may only distribute Class A Reclaimed Water to entities that have signed end user agreements with the Permittee and only for the purposes described in the end user agreements.

Reclaimed Water Limits (Outfall #002) Latitude 47.53722 Longitude -121.86250			
Oxidized Wastewater – Secondary Effluent [a]			
Dissolved Oxygen	Must be measurably present in secondary effluent at all times.		
Coagulant	Must add polymer, coagulant or other treatment aids that enhance the filterability of the reclaimed water.		
Coagulated/ Filtered Wastewater – Prior to Disinfection			
Parameter	**Average Monthly [b]**	**Average Weekly [c]**	**Sample Maximum [d]**
Turbidity	2 NTU	N/A	5 NTU
Reclaimed Water Prior to Distribution			
Flow	1.56 MGD	N/A	N/A
CBOD [e]	25 mg/L	40 mg/L	N/A
TSS [e]	30 mg/L	45 mg/L	N/A
Total Nitrogen as N	10 mg/L	N/A	15 mg/L
pH	Must be between 6.3 and 9.0 standard units at all times.		
Distribution System Point of compliance [g]			
Chlorine Residual	**Daily Minimum Concentration:** 0.7 mg/L		
Total Coliform	**Maximum 7-day Median [f]** 2.2 MPN/ 100 ml	**Sample Maximum [d]** 23 MPN/100 ml	

Footnotes for Reclaimed Water Limits Table	
a	The compliance point for Dissolved Oxygen is "Secondary Effluent," to be monitored at a point after the secondary clarifiers and prior to coagulant addition.
b	The average monthly effluent limit is defined as the highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.
c	The average weekly effluent limit is defined as the highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week.
d	The sample maximum is defined as the value not to be exceeded by any single sample.
e	The compliance point for CBOD and TSS will be the final reclaimed water monitored immediately following UV disinfection. This compliance point also serves as the compliance point for discharges from outfall #001.
f	The median number of total coliform organisms in the reclaimed water after disinfection may not exceed 2.2 per 100 milliliters, as determined from the bacteriological results over 7 consecutive days for which analyses have been completed. This value is **NOT** an arithmetic average or geometric average. Median is defined as the middle number of a group of numbers; that is, half the numbers have values that are greater than the median, and half the numbers have values that are less than the median. The number of total coliform organisms must not exceed 23 per 100 milliliters in any single sample.
g	A chlorine residual of at least 0.7 mg/L must be maintained in the reclaimed water during conveyance to the use area, or the storage pond if reclaimed water is not directly piped to the use area.

All Class A reclaimed water must at all times be oxidized, filter via sand filtration, and disinfected.

R2. Reclaimed Water Monitoring Requirements

R2.A. Class A Reclaimed Water Monitoring

The Permittee must monitor reclaimed water production according to the following schedule.

Parameter	Units	Sampling Frequency	Sample Type
(1) Secondary Control Structure			
Dissolved Oxygen	mg/L	Continuous	Meter
Turbidity	NTU	Continuous	Meter
Coagulant [1]	lbs/day	daily	Metered usage
(2) Filter effluent prior to disinfection [2]			
Turbidity	NTU	Continuous	Meter
(3) Reclaimed Water Prior to Distribution [3]			
Flow	MGD	Continuous	Meter
$CBOD_5$	mg/L	3/week	24-hr Composite
TSS	mg/L	3/week	24-hr Composite
Total Nitrogen	mg/L as N	1/week	24-hr Composite
pH [4]	Std. Units	Continuous	Meter
(4) Distribution Line to Eagle Lake [5]			
Total Residual Chlorine [6]	mg/L	Continuous	Meter
Total Coliform	MPN/100 ml	1/day	Grab

Monitoring Schedule Footnotes	
1	Coagulant refers to any polymer, coagulant or any other chemical added to the reclaimed water to enhance filterability. Permittee must record and report the total amount of all chemicals added each day reclaimed water is produced.
2	Permittee must monitor reclaimed water at a point between the filters and the UV disinfection system. The reclaimed water must comply with the turbidity limit at this monitoring point.
3	Permittee must monitor reclaimed water leaving the UV disinfection system as it enters the Reclaimed Water Wet Well. Monitoring must not include any raw well water added to the reclaimed water prior to distribution.
4	The Permittee must report the instantaneous maximum and minimum pH daily. Do not average pH values.
5	Sampling occurs at the "Hydrant Sampling Port" located along Snoqualmie Parkway near the Bonneville Power Administration's access road at the following coordinates: Latitude: 47.5304, Longitude: -121.8633. Permittee must comply with the minimum total residual chlorine and the total coliform limits at this point.
6	The Permittee must report the minimum total residual chlorine recorded for each day reclaimed water is distributed to Eagle Lake. The continuous recording device may average instantaneous values to minimize the risk of false reporting of low concentrations. The maximum averaging period may be no more than five (5) minutes.

The Permittee must meet the minimum sampling frequency in the above table whenever it produces and distributes reclaimed water. If the Permittee produces and distributes reclaimed water intermittently over the course of a month, it must ensure it complies with the minimum monitoring frequency during the periods it produces and distributes reclaimed water. Permittee may use $CBOD_5$ and TSS monitoring conducted on days when it does not distribute reclaimed water to outfall #002 to achieve the minimum frequency in this schedule only if the water was coagulated and filtered prior to discharge through outfall #001.

All reclaimed water monitoring practices and procedures must conform to the requirements of Special Conditions S2.B through S2.D.

R3. Reporting and Recording Requirements

The Permittee must monitor and report all reclaimed water production and distribution in accordance with Special Condition S3, and the following conditions.

R3.A. Reporting

The first monitoring period begins on the effective date of the permit. The Permittee must:

1. Submit results for monitoring required in R2 each month reclaimed water is produced. Summarize, report and submit monitoring data according to the instructions listed in Special Condition S3.A.
2. Submit reclaimed water monitoring through a separate WQWebDMR form for outfall #002. This form must report only data associated with the production and distribution of reclaimed water.
3. Submit a DMR for all months, regardless of whether the facility produces reclaimed water in a given month. For months in which the facility does not produce reclaimed water for the entire month, enter "No Discharge" on the form for that month. If the facility does not produce reclaimed water during part of a monitoring period, enter "no discharge" in the place of monitoring results for the days in which did not produce reclaimed water.

4. Electronically submit reclaimed water DMR no later than the 15th day of the month following the completed monitoring period. If temporarily submitting a paper DMR (as allowed by S3.A.1.), submit that DMR by the 15th day of the month following the completed monitoring period to the address listed in S3.A.10.

R3.B. Records Retention

The Permittee must retain records of all monitoring information associated with reclaimed water production and distribution for a minimum of five (5) years, corresponding to the life cycle of this permit. Such information must include all calibration and maintenance records and all original 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. During the course of any unresolved litigation regarding the discharge of pollutants by the Permittee or when requested by Ecology, the Permittee must extend this period of retention.

R3.C. Recording of results

For each measurement or sample taken, the Permittee must record the following information:

1. The date, exact place, method, and time of sampling or measurement.
2. The individual who performed the sampling or measurement.
3. The dates the analyses were performed.
4. The individual who performed the analyses.
5. The analytical techniques or methods used.
6. The results of all analyses.

The Permittee must electronically submit copies of all bench sheets containing the above information with monthly DMRs for all compliance sampling done up to December 31, 2014. Upload documents in the WQWebDMR system by attaching scanned electronic copies of the bench sheets (in PDF) as part of each DMR submittal.

R3.D. Additional monitoring by the Permittee

If the Permittee monitors any parameter more frequently than required by Reclaimed Water Condition R2 of this permit, then the Permittee must include the results of such monitoring in the calculation and reporting of the data submitted in the Permittee's DMR unless otherwise specified by Reclaimed Water Condition R2.

R3.E. Reporting Permit Violations

The Permittee must take the following actions upon violation of any condition of the reclaimed water permit conditions:

1. Immediately take action to stop, contain, and cleanup unauthorized discharges or otherwise stop the noncompliance and correct the problem and, if applicable, immediately repeat sampling and analysis. The results of any repeat sampling must be submitted to Ecology and Health within thirty (30) days of sampling.

2. Any failure of the disinfection system or failure of any other treatment system components that result in distribution of reclaimed water that does not meet Class A standards, must be reported immediately to:
   - Ecology using the ERTS (Environmental Reporting Tracking System) by calling 425-649-7000.
   - The Department of Health by calling 509-329-2146.
3. Any discharges of reclaimed water that violates end user agreements or at locations other than at permitted locations or due to operational issues such as a break in the distribution line or an illicit connection must be reported to the Departments of Ecology and Health within 24 hours of discovery.
4. Submit a detailed, written report to Ecology and the Department of Health with that month's DMR submittal, unless requested earlier by Ecology, describing the nature of the violation, corrective action taken and/or planned, steps to be taken to prevent a recurrence, results of the resampling, and any other pertinent information. Work with Ecology to prepare an operating protocol for conditions with frequent recurrence.

Compliance with these requirements does not relieve the Permittee from responsibility to maintain continuous compliance with the terms and conditions of this permit or the resulting liability for failure to comply.

R3.F. Reclaimed Water Operational Records

The Permittee must:

1. Keep maintenance records for five (5) years, corresponding to the life cycle of this permit, on all major electrical and mechanical components of the reclamation facility, distribution, and use areas. Records must clearly specify the frequency and type of maintenance recommended by the manufacturer and must show the frequency and type of maintenance performed. These maintenance records must be available for inspection at all times.
2. Maintain operating records at the reclamation treatment plant or within a central depository within the Permittee's operating agency for five (5) years. These records must include records of all analyses performed, records of operational problems, unit process and equipment breakdowns, and diversions to emergency storage or disposal; and all corrective or preventative action taken.
3. Record and maintain separate record files of process or equipment failures triggering an alarm that is key to maintaining reliability of reclaimed water quality. The recorded information must include the time and cause of failure and corrective action taken.
4. Cross Connection Control Coordination: The Permittee must provide to the Departments of Health and Ecology an annual letter confirming that they have contacted all the public water supplier(s) where reclaimed water is being used in their service area. The letter must indicate where reclaimed water is used and for what purpose, and remind the water supplier(s) of their duty to comply with the cross connection control report requirements from the Department of Health.

R4. Reclaimed Water Distribution and Use

R4.A. Design Criteria and Plan to Maintain Adequate Capacity

The production rate of reclaimed water must not exceed the reclaimed water system's maximum monthly average design flow rate of 1.56 MGD. This average does not include the flow volume of any raw well water that the Permittee blends with Class A product water for delivery to the Eagle Lake storage reservoir.

When the actual reclaimed water system flow reaches 85 percent of the above design criteria for three consecutive months, or when the projected increases would reach design capacity within five years, whichever occurs first, the Permittee must submit to the Departments of Ecology and Health, a plan and a schedule for continuing to maintain capacity at the facility sufficient to achieve the reclaimed water limits and other conditions of this permit.

Engineering documents associated with the plan must meet the requirements of the Water Reclamation and Reuse Standards and WAC 173-240-060, "Engineering Report," and be approved by the Departments of Ecology and Health prior to any construction. The plan must specify any contracts, ordinances, methods for financing, or other arrangements necessary to achieve this objective.

R4.B. Authorized Uses and Locations

The Permittee is authorized to distribute water reclaimed in accordance with the terms and conditions of this permit for authorized uses.

The distribution of reclaimed water by the Permittee that does not meet the treatment, water quality and monitoring requirements established in this permit, or the use of reclaimed water other than for authorized uses and locations listed in a Department of Health- and Ecology-approved reclaimed water engineering report will constitute a violation of the terms and conditions of this permit.

The Permittee may produce and distribute Class A reclaimed water to the Eagle Lake storage reservoir at the Snoqualmie Ridge Golf Course. The Permittee may enter into end user agreements that allow withdrawal of water from the storage reservoir for use as landscape and turf irrigation. The Permittee must maintain at the treatment facility a record of authorized end users, as required by R4.D, below. End user records must identify the allowed rate of use and the approved location of use for each end user, including water used by city departments.

R4.C. Reclaimed Water Use Plan Update

The Permittee must prepare an update to the Reclaimed Water Use Plan and submit to the Departments of Health and Ecology by June 1, 2015. The plan update must, at a minimum, contain the following:

1. Complete summary description of the reclaimed water distribution system.
2. Identification of uses, users, and location of reuse sites.
3. Evaluation of reuse sites, estimated volume of reclaimed water used at each site annually, means of application, the application rates, water balance, expected agronomic uptake, potential to impact ground water or surface water at the site,

background water quality and hydrogeological information necessary to evaluate potential water quality impacts.

R4.D. Service and Use Area Agreements

Where the reclaimed water use area is not under direct control of the Permittee:

1. The entity that owns or otherwise maintains control over the reclaimed water use area is responsible for on-site reclaimed water facilities, infrastructure, and activities inherent to the use of the reclaimed water to ensure that the system operates as approved by the Departments of Health and Ecology in accordance with this permit.
2. Reclaimed water uses, including runoff and spray, must be confined to the designated and approved use areas.
3. A binding Service and Use Area Agreement among the parties involved is required to ensure that construction, operation, maintenance, and monitoring meet all requirements of the Departments of Health and Ecology. This agreement must be consistent with the requirements of the *Water Reclamation and Reuse Standards*, 1997. Health and Ecology have approved a master end user agreement for use by the Permittee. The Permittee must sign agreements with all existing and new end users. Copies of the signed agreements must be available for inspection at the wastewater treatment plant. Any changes made to the master end user agreement must be submitted to and approved by Ecology and Health prior to implementation.
4. The Service and Use Area Agreement must provide the Permittee with authority to terminate service of reclaimed water to a customer violating the state *Water Reclamation and Reuse Standards* and restrictions outlined in the Service and Use Area Agreement. The Permittee may not distribute reclaimed water to a location that is not covered under an end user agreement.
5. The Permittee must maintain all Service and Use Area Agreements for the duration of the permit. The Permittee must inform the Departments of Health and Ecology in writing of any proposed changes to the approved, standard Service and Use Area Agreement.

R4.E. Use Area Responsibilities

The Permittee must ensure that the use of Reclaimed Water produced at their facility complies with the following Use Area Responsibilities. The Permittee must include the following in all end user agreements when Reclaimed Water is used in areas not under the direct control of the Permittee.

1. The Permittee must develop general language, symbols, and colors to be used for notification signs and have it approved by Ecology. The signs must be used in all reclaimed water use areas, consistent with the *Water Reclamation and Reuse Standards*.
2. All reclaimed water valves, storage facilities, and outlets must be tagged or labeled to warn the public or employees that the water is not intended for

drinking. The signage or advisory notification must be colored purple with white or black lettering.

3. Reclaimed water use, including runoff and spray, must be confined to the designated and approved use area.
4. Precautions must be taken to assure that reclaimed water will not be sprayed on people or any facility or area not designated for reuse, including but not limited to buildings, passing vehicles, and drinking water fountains.
5. There must be no hose bibs on reclaimed irrigation lines unless approved by Ecology.
6. Where the reclaimed water production, distribution, and use areas are under direct control of the Permittee, the Permittee must maintain control and be responsible for all facilities and activities inherent to the production, distribution, and use of the reclaimed water. The Permittee must ensure that the reuse system operates as approved by the Departments of Health and Ecology.
7. The Permittee must assure that all customers or authorized personnel using reclaimed water have completed training in the requirements for appropriate use of the water, including signage, cross connection control requirements, public health, and environmental protection.

R4.F. Irrigation Uses

1. For any irrigation use of reclaimed water, the hydraulic loading rate of reclaimed water must be determined based on a detailed water balance analysis. The calculated loading rate(s) and the parameters and methods used to determine the loading rate(s) must be submitted to Ecology and Health for approval.
2. There must be no runoff of reclaimed water applied to land by spray irrigation to any surface waters of the state or to any land not authorized by approved use agreement.
3. There must be no application of reclaimed water for irrigation purposes when the ground is saturated or frozen.
4. The reclaimed water must not be applied to the irrigation lands in quantities that:
    a. Significantly reduce or destroy the long-term infiltration rate of the soil.
    b. Cause long-term anaerobic conditions in the soil.
    c. Cause ponding of reclaimed water and produce objectionable odors or support insects or vectors.
    d. Cause leaching losses of constituents of concern beyond the treatment zone or in excess of the approved design. Constituents of concern are constituents in the reclaimed water, partial decomposition products, or soil constituents that would alter ground water quality in amounts that would affect current and future beneficial uses.

5. The Permittee must maintain all irrigation agreements for lands not owned for the duration of the permit. The Permittee must inform the Departments of Health and Ecology in writing of any proposed changes to existing agreements.

R4.G. Bypass Prohibited

The Permittee must not bypass untreated or partially treated wastewater from the treatment facility or any intermediate unit processes to the distribution system or point of use at any time. All reclaimed water distributed for beneficial use must meet Class A requirements at all times. The Permittee must divert water not meeting Class A Reclaimed Water Standards to the river outfall, or retain or discharge the wastewater back to the sewer system or headworks for additional treatment.

The Permittee must notify the Departments of Ecology by telephone within 24 hours of any discharge not meeting Class A entering the distribution system.

R4.H. Reclaimed Water Ordinance

The Permittee must complete and maintain an up-to-date local ordinance that includes policies and procedures for the distribution and delivery of reclaimed water. The ordinance must provide the Permittee with the authority to terminate service of reclaimed water from any customer violating the state *Water Reclamation and Reuse Standards* and restrictions outlined in the service and use agreement.

R4.I. Revocation of Authorization

Ecology may revoke authorization to provide Reclaimed Water service if the Permittee fails to comply with any requirement in this permit. Ecology will base its determination to revoke authorization on the risk to public health and safety or threat to waters of the state. Ecology may revoke the authorization for any or all reclamation facilities and use areas located within a specific geographic area if, due to a geologic or hydrologic condition, the cumulative effect of the water reclamation facilities and use areas causes the violation of state water quality standards. Before revoking the authorization, Ecology will notify the Permittee in writing and provide a reasonable opportunity and time frame to correct the noncompliance.

R5. Operation and Maintenance

The Permittee must operate and maintain the treatment and reclamation facility according to the requirements in Special Condition S5 and the following conditions.

R5.A. Short Term Reduction

The Permittee may not distribute reclaimed water produced during a period of "short-term reduction", as described in Special Condition S5.C.

R5.B. Reclaimed Water System Maintenance

The Permittee must:

1. Institute an adequate operation and maintenance (O&M) program for the entire reclamation system, including all portions of the distribution system under the Permittee's direct control.

2. Keep maintenance records on all major electrical and mechanical components of the treatment plant, distribution system and use areas. Such records must clearly specify the frequency and type of maintenance recommended by the manufacturer and must show the frequency and type of maintenance performed.
3. Make maintenance records must be available for inspection at all times.
4. Maintain, at all times, the reclamation facility, distribution and use areas and keep all equipment in a reliable operating condition.
5. Maintain a chlorine residual of at least 0.7 mg/l in the reclaimed water during conveyance from the reclamation plant to the Eagle Lake Storage Reservoir.
6. Notify end users whenever reclaimed water not meeting the requirements listed in condition R1.A has been distributed to use areas.

R5.C. Reliability

The Permittee must maintain the highest reliability class as described in the Water Reclamation and Reuse Standards which require one of the following features for each of the critical reclamation treatment unit processes of oxidation, coagulation, filtration and disinfection:

1. Alarms and standby power source. Standby power must meet Reliability Class I (EPA 430/9-74-001) at all times when producing Class A reclaimed water. Reliability Class I requires a backup power source sufficient to operate all vital components and critical lighting and ventilation during peak wastewater flow conditions. Class I reliability requires all vital components used to support the secondary processes (i.e., mechanical aerators, in-plant pumps, and disinfection system) be operable to full levels of treatment at all times. Standby power capacity must also be sufficient to operate all reclaimed water production systems, including coagulation feed system, filters and chlorination system. If there is insufficient standby power available to operate all secondary and reclaimed water treatment units, the partially treated reclaimed water must be diverted automatically upon loss of power to Outfall #001 for disposal or stored on site for treatment at a later time.
2. Alarms and automatically actuated short-term (24-hour) storage or disposal provisions. If standby power is not sufficient to meet Class I reliability, the Permittee must divert effluent to short term storage or disposal through outfall #001 during a power outage.
3. Automatically actuated long-term storage or disposal provisions for treated wastewater. If standby power is not sufficient to meet Class I reliability, the Permittee must divert effluent to short term storage or disposal via outfall #001 during a power outage.

R5.D. Operation and Maintenance Manual

The O&M Manual required under Special Condition S5.G must include the following details about the operation and maintenance of the reclaimed water system:

1. Emergency procedures for plant shutdown and cleanup in event of reclaimed water system upset or failure. Procedures must include instructions for draining and flushing water from the distribution main to Eagle Lake whenever a reclaimed system upset or failure results in discharge of water that does not meet Class A requirements.
2. The alarm schedule required in S5.G.2.h must include all alarms associated with the reclaimed water production and distribution system. The schedule must demonstrate that any alarm registering a failure within the reclaimed water treatment and disinfection system results in automatic shutdown of the reclaimed distribution pumps.
3. Reclaimed water system maintenance procedures and the proper handling of any associated wastewater as a result of these procedures (i.e. pipeline flushing, disinfection of conveyance lines, etc.).
4. A discussion of the cross-connection control and inspection program, including who will be responsible for compliance and testing of cross connection control devices.
5. Operational strategies for the reclaimed water use areas under the Permittee's control.

The Permittee must evaluate the reclaimed water system information in the existing operations and maintenance manual on an annual basis. Refer to Condition S5.G for notification and submission requirements for revisions made to the approved O&M Manual.

R6. Application for Reclaimed Water Use Permit renewal or modification for facility changes

The Permittee must submit a separate Permit Application for Reclaimed Water Use by October 1, 2018, to request renewal of the reclaimed water conditions of this permit. The Permittee must submit a paper copy and an electronic copy (preferably as a PDF).

The Permittee must also submit a new application or supplement at least one hundred eighty (180) days prior to commencement of discharges, resulting from the activities listed below, which may result in permit violations. These activities include any facility expansions, production increases, or other planned changes, such as process modifications, in the permitted facility.

General Conditions

G1. Signatory requirements

1. All applications, reports, or information submitted to Ecology must be signed and certified.

   a. In the case of corporations, by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

      - A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions for the corporation, or
      - The manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
      - In the case of a partnership, by a general partner.
      - In the case of sole proprietorship, by the proprietor.
      - In the case of a municipal, state, or other public facility, by either a principal executive officer or ranking elected official.

   Applications for permits for domestic wastewater facilities that are either owned or operated by, or under contract to, a public entity shall be submitted by the public entity.

2. All reports required by this permit and other information requested by Ecology must be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

   a. The authorization is made in writing by a person described above and submitted to Ecology.

   b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)

3. Changes to authorization. If an authorization under paragraph G1.2, above, is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph G1.2, above, must be submitted to Ecology prior to or together with any reports, information, or applications to be signed by an authorized representative.
4. Certification. Any person signing a document under this section must make the following certification:

   "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 gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering 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 fine and imprisonment for knowing violations."

G2. Right of inspection and entry

The Permittee must allow an authorized representative of Ecology, upon the presentation of credentials and such other documents as may be required by law:

1. To enter upon the premises where a discharge is located or where any records must be kept under the terms and conditions of this permit.
2. To have access to and copy, at reasonable times and at reasonable cost, any records required to be kept under the terms and conditions of this permit.
3. To inspect, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, methods, or operations regulated or required under this permit.
4. To sample or monitor, at reasonable times, any substances or parameters at any location for purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act.

G3. Permit actions

This permit may be modified, revoked and reissued, or terminated either at the request of any interested person (including the Permittee) or upon Ecology's initiative. However, the permit may only be modified, revoked and reissued, or terminated for the reasons specified in 40 CFR 122.62, 40 CFR 122.64 or WAC 173-220-150 according to the procedures of 40 CFR 124.5.

1. The following are causes for terminating this permit during its term, or for denying a permit renewal application:
   a. Violation of any permit term or condition.
   b. Obtaining a permit by misrepresentation or failure to disclose all relevant facts.
   c. A material change in quantity or type of waste disposal.

d. A determination that the permitted activity endangers human health or the environment, or contributes to water quality standards violations and can only be regulated to acceptable levels by permit modification or termination.

e. A change in any condition that requires either a temporary or permanent reduction, or elimination of any discharge or sludge use or disposal practice controlled by the permit.

f. Nonpayment of fees assessed pursuant to RCW 90.48.465.

g. Failure or refusal of the Permittee to allow entry as required in RCW 90.48.090.

2. The following are causes for modification but not revocation and reissuance except when the Permittee requests or agrees:

a. A material change in the condition of the waters of the state.

b. New information not available at the time of permit issuance that would have justified the application of different permit conditions.

c. Material and substantial alterations or additions to the permitted facility or activities which occurred after this permit issuance.

d. Promulgation of new or amended standards or regulations having a direct bearing upon permit conditions, or requiring permit revision.

e. The Permittee has requested a modification based on other rationale meeting the criteria of 40 CFR Part 122.62.

f. Ecology has determined that good cause exists for modification of a compliance schedule, and the modification will not violate statutory deadlines.

g. Incorporation of an approved local pretreatment program into a municipality's permit.

3. The following are causes for modification or alternatively revocation and reissuance:

a. When cause exists for termination for reasons listed in 1.a through 1.g of this section, and Ecology determines that modification or revocation and reissuance is appropriate.

b. When Ecology has received notification of a proposed transfer of the permit. A permit may also be modified to reflect a transfer after the effective date of an automatic transfer (General Condition G7) but will not be revoked and reissued after the effective date of the transfer except upon the request of the new Permittee.

G4. Reporting planned changes

The Permittee must, as soon as possible, but no later than one hundred eighty (180) days prior to the proposed changes, give notice to Ecology of planned physical alterations or additions to the permitted facility, production increases, or process modification which will result in:

1. The permitted facility being determined to be a new source pursuant to 40 CFR 122.29(b).

2. A significant change in the nature or an increase in quantity of pollutants discharged.

3. A significant change in the Permittee's sludge use or disposal practices. Following such notice, and the submittal of a new application or supplement to the existing application, along with required engineering plans and reports, this permit may be modified, or revoked and reissued pursuant to 40 CFR 122.62(a) to specify and limit any pollutants not previously limited. Until such modification is effective, any new or increased discharge in excess of permit limits or not specifically authorized by this permit constitutes a violation.

G5. Plan review required

Prior to constructing or modifying any wastewater control facilities, an engineering report and detailed plans and specifications must be submitted to Ecology for approval in accordance with chapter 173-240 WAC. Engineering reports, plans, and specifications must be submitted at least one hundred eighty (180) days prior to the planned start of construction unless a shorter time is approved by Ecology. Facilities must be constructed and operated in accordance with the approved plans.

G6. Compliance with other laws and statutes

Nothing in this permit excuses the Permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

G7. Transfer of this permit

In the event of any change in control or ownership of facilities from which the authorized discharge emanate, the Permittee must notify the succeeding owner or controller of the existence of this permit by letter, a copy of which must be forwarded to Ecology.

1. Transfers by Modification

   Except as provided in paragraph (2) below, this permit may be transferred by the Permittee to a new owner or operator only if this permit has been modified or revoked and reissued under 40 CFR 122.62(b)(2), or a minor modification made under 40 CFR 122.63(d), to identify the new Permittee and incorporate such other requirements as may be necessary under the Clean Water Act.

2. Automatic Transfers

   This permit may be automatically transferred to a new Permittee if:

   a. The Permittee notifies Ecology at least thirty (30) days in advance of the proposed transfer date.

   b. The notice includes a written agreement between the existing and new Permittees containing a specific date transfer of permit responsibility, coverage, and liability between them.

   c. Ecology does not notify the existing Permittee and the proposed new Permittee of its intent to modify or revoke and reissue this permit. A modification under this subparagraph may also be minor modification under 40 CFR 122.63. If this notice is not received, the transfer is effective on the date specified in the written agreement.

G8. Reduced production for compliance

The Permittee, in order to maintain compliance with its permit, must control production and/or all discharges upon reduction, loss, failure, or bypass of the treatment facility until the facility is restored or an alternative method of treatment is provided. This requirement applies in the situation where, among other things, the primary source of power of the treatment facility is reduced, lost, or fails.

G9. Removed substances

Collected screenings, grit, solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters must not be resuspended or reintroduced to the final effluent stream for discharge to state waters.

G10. Duty to provide information

The Permittee must submit to Ecology, within a reasonable time, all information which Ecology may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The Permittee must also submit to Ecology upon request, copies of records required to be kept by this permit.

G11. Other requirements of 40 CFR

All other requirements of 40 CFR 122.41 and 122.42 are incorporated in this permit by reference.

G12. Additional monitoring

Ecology may establish specific monitoring requirements in addition to those contained in this permit by administrative order or permit modification.

G13. Payment of fees

The Permittee must submit payment of fees associated with this permit as assessed by Ecology.

G14. Penalties for violating permit conditions

Any person who is found guilty of willfully violating the terms and conditions of this permit is deemed guilty of a crime, and upon conviction thereof shall be punished by a fine of up to ten thousand dollars ($10,000) and costs of prosecution, or by imprisonment in the discretion of the court. Each day upon which a willful violation occurs may be deemed a separate and additional violation.

Any person who violates the terms and conditions of a waste discharge permit may incur, in addition to any other penalty as provided by law, a civil penalty in the amount of up to ten thousand dollars ($10,000) for every such violation. Each and every such violation is a separate and distinct offense, and in case of a continuing violation, every day's continuance is deemed to be a separate and distinct violation.

G15. Upset

Definition – "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limits if the requirements of the following paragraph are met.

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 cause(s) of the upset.
2. The permitted facility was being properly operated at the time of the upset.
3. The Permittee submitted notice of the upset as required in Special Condition S3.E.
4. The Permittee complied with any remedial measures required under S3.E of this permit.

In any enforcement action the Permittee seeking to establish the occurrence of an upset has the burden of proof.

G16. Property rights

This permit does not convey any property rights of any sort, or any exclusive privilege.

G17. Duty to comply

The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

G18. Toxic pollutants

The Permittee must comply with effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if this permit has not yet been modified to incorporate the requirement.

G19. Penalties for 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 shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than two (2) years per violation, or by both. If a conviction of a person is for a violation committed after a first conviction of such person under this condition, punishment shall be a fine of not more than $20,000 per day of violation, or by imprisonment of not more than four (4) years, or by both.

G20. Compliance schedules

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 fourteen (14) days following each schedule date.

G21. Service agreement review

The Permittee must submit to Ecology any proposed service agreements and proposed revisions or updates to existing agreements for the operation of any wastewater treatment facility covered by this permit. The review is to ensure consistency with chapters 90.46 and 90.48 RCW as required by RCW 70.150.040(9). In the event that Ecology does not comment within a thirty-day (30) period, the Permittee may assume consistency and proceed with the service agreement or the revised/updated service agreement.

Appendix A

LIST OF POLLUTANTS WITH ANALYTICAL METHODS, DETECTION LIMITS AND QUANTITATION LEVELS

The Permittee must use the specified analytical methods, detection limits (DLs) and quantitation levels (QLs) in the following table for permit and application required monitoring unless:

- Another permit condition specifies other methods, detection levels, or quantitation levels.
- The method used produces measurable results in the sample and EPA has listed it as an EPA-approved method in 40 CFR Part 136.

If the Permittee uses an alternative method, not specified in the permit and as allowed above, it must report the test method, DL, and QL on the discharge monitoring report or in the required report.

If the Permittee is unable to obtain the required DL and QL in its effluent due to matrix effects, the Permittee must submit a matrix-specific detection limit (MDL) and a quantitation limit (QL) to Ecology with appropriate laboratory documentation.

Ecology added this appendix to the permit in order to reduce the number of analytical "non-detects" in permit-required monitoring and to measure effluent concentrations near or below criteria values where possible at a reasonable cost.

CONVENTIONAL PARAMETERS

Pollutant & CAS No. ***(if available)***	**Recommended Analytical Protocol**	**Detection (DL)[1]** ***µg/L unless specified***	**Quantitation Level (QL)[2]** ***µg/L unless specified***
Biochemical Oxygen Demand	SM5210-B		2 mg/L
Chemical Oxygen Demand	SM5220-D		10 mg/L
Total Organic Carbon	SM5310-B/C/D		1 mg/L
Total Suspended Solids	SM2540-D		5 mg/L
Total Ammonia (as N)	SM4500-NH3-B/C/D/E		20
Flow	Calibrated device		
Dissolved oxygen	SM4500-OC/OG		0.2 mg/L
Temperature (max. 7-day avg.)	Analog recorder or use micro-recording devices known as thermistors		0.2º C
pH	SM4500-H^+ B	N/A	N/A

NONCONVENTIONAL PARAMETERS

Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL)[1] µg/L unless specified	Quantitation Level (QL)[2] µg/L unless specified
Total Alkalinity	SM2320-B		5 mg/L as CaCO3
Chlorine, Total Residual	SM4500 Cl G		50.0
Color	SM2120 B/C/E		10 color units
Fecal Coliform	SM 9221E,9222	N/A	1 MF 1.1 MPN
Fluoride (16984-48-8)	SM4500-F E	25	100
Nitrate + Nitrite Nitrogen (as N)	SM4500-NO3- E/F/H		100
Nitrogen, Total Kjeldahl (as N)	SM4500-N_{org} B/C and SM4500NH_3-B/C/D/E		300
Soluble Reactive Phosphorus (as P)	SM4500- PE/PF	3	10
Phosphorus, Total (as P)	SM 4500 PB followed by SM4500-PE/PF	3	10
Oil and Grease (HEM)	1664 A or B	1,400	5,000
Salinity	SM2520-B		3 practical salinity units or scale (PSU or PSS)
Settleable Solids	SM2540 -F		100
Sulfate (as mg/L SO_4)	SM4110-B		200
Sulfide (as mg/L S)	SM4500-S^2F/D/E/G		200
Sulfite (as mg/L SO_3)	SM4500-SO3B		2000
Total Coliform	SM 9221B, 9222B, 9223B	N/A	1
Total dissolved solids	SM2540 C		20 mg/L
Total Hardness	SM2340B		200 as CaCO3
Aluminum, Total (7429-90-5)	200.8	2.0	10
Barium Total (7440-39-3)	200.8	0.5	2.0
BTEX (benzene +toluene + ethylbenzene + m,o,p xylenes)	EPA SW 846 8021/8260	1	2
Boron Total (7440-42-8)	200.8	2.0	10.0
Cobalt, Total (7440-48-4)	200.8	0.05	0.25
Iron, Total (7439-89-6)	200.7	12.5	50
Magnesium, Total (7439-95-4)	200.7	10	50
Molybdenum, Total (7439-98-7)	200.8	0.1	0.5
Manganese, Total (7439-96-5)	200.8	0.1	0.5
NWTPH Dx	Ecology NWTPH Dx	250	250
NWTPH Gx	Ecology NWTPH Gx	250	250
Tin, Total (7440-31-5)	200.8	0.3	1.5
Titanium, Total (7440-32-6)	200.8	0.5	2.5

PRIORITY POLLUTANTS

Pollutant & CAS No. *(if available)*	Recommended Analytical Protocol	Detection (DL)[1] *µg/L unless specified*	Quantitation Level (QL)[2] *µg/L unless specified*
METALS, CYANIDE & TOTAL PHENOLS			
Antimony, Total (7440-36-0)	200.8	0.3	1.0
Arsenic, Total (7440-38-2)	200.8	0.1	0.5
Beryllium, Total (7440-41-7)	200.8	0.1	0.5
Cadmium, Total (7440-43-9)	200.8	0.05	0.25
Chromium (hex) dissolved (18540-29-9)	SM3500-Cr EC	0.3	1.2
Chromium, Total (7440-47-3)	200.8	0.2	1.0
Copper, Total (7440-50-8)	200.8	0.4	2.0
Lead, Total (7439-92-1)	200.8	0.1	0.5
Mercury, Total (7439-97-6)	1631E	0.0002	0.0005
Nickel, Total (7440-02-0)	200.8	0.1	0.5
Selenium, Total (7782-49-2)	200.8	1.0	1.0
Silver, Total (7440-22-4)	200.8	0.04	0.2
Thallium, Total (7440-28-0)	200.8	0.09	0.36
Zinc, Total (7440-66-6)	200.8	0.5	2.5
Cyanide, Total (57-12-5)	335.4	5	10
Cyanide, Weak Acid Dissociable	SM4500-CN I	5	10
Cyanide, Free Amenable to Chlorination (Available Cyanide)	SM4500-CN G	5	10
Phenols, Total	EPA 420.1		50

Pollutant & CAS No. *(if available)*	Recommended Analytical Protocol	Detection (DL)[1] *µg/L unless specified*	Quantitation Level (QL)[2] *µg/L unless specified*
ACID COMPOUNDS			
2-Chlorophenol (95-57-8)	625	1.0	2.0
2,4-Dichlorophenol (120-83-2)	625	0.5	1.0
2,4-Dimethylphenol (105-67-9)	625	0.5	1.0
4,6-dinitro-o-cresol (534-52-1) (2-methyl-4,6,-dinitrophenol)	625/1625B	1.0	2.0
2,4 dinitrophenol (51-28-5)	625	1.0	2.0
2-Nitrophenol (88-75-5)	625	0.5	1.0
4-nitrophenol (100-02-7)	625	0.5	1.0
Parachlorometa cresol (59-50-7) (4-chloro-3-methylphenol)	625	1.0	2.0
Pentachlorophenol (87-86-5)	625	0.5	1.0
Phenol (108-95-2)	625	2.0	4.0
2,4,6-Trichlorophenol (88-06-2)	625	2.0	4.0

PRIORITY POLLUTANTS (continued)

Pollutant & CAS No. *(if available)*	Recommended Analytical Protocol	Detection (DL)[1] *µg/L unless specified*	Quantitation Level (QL)[2] *µg/L unless specified*
VOLATILE COMPOUNDS			
Acrolein (107-02-8)	624	5	10
Acrylonitrile (107-13-1)	624	1.0	2.0
Benzene (71-43-2)	624	1.0	2.0
Bromoform (75-25-2)	624	1.0	2.0
Carbon tetrachloride (56-23-5)	624/601 or SM6230B	1.0	2.0
Chlorobenzene (108-90-7)	624	1.0	2.0
Chloroethane (75-00-3)	624/601	1.0	2.0
2-Chloroethylvinyl Ether (110-75-8)	624	1.0	2.0
Chloroform (67-66-3)	624 or SM6210B	1.0	2.0
Dibromochloromethane (124-48-1)	624	1.0	2.0
1,2-Dichlorobenzene (95-50-1)	624	1.9	7.6
1,3-Dichlorobenzene (541-73-1)	624	1.9	7.6
1,4-Dichlorobenzene (106-46-7)	624	4.4	17.6
Dichlorobromomethane (75-27-4)	624	1.0	2.0
1,1-Dichloroethane (75-34-3)	624	1.0	2.0
1,2-Dichloroethane (107-06-2)	624	1.0	2.0
1,1-Dichloroethylene (75-35-4)	624	1.0	2.0
1,2-Dichloropropane (78-87-5)	624	1.0	2.0
1,3-dichloropropene (mixed isomers) (1,2-dichloropropylene) (542-75-6)[3]	624	1.0	2.0
Ethylbenzene (100-41-4)	624	1.0	2.0
Methyl bromide (74-83-9) (Bromomethane)	624/601	5.0	10.0
Methyl chloride (74-87-3) (Chloromethane)	624	1.0	2.0
Methylene chloride (75-09-2)	624	5.0	10.0
1,1,2,2-Tetrachloroethane (79-34-5)	624	1.9	2.0
Tetrachloroethylene (127-18-4)	624	1.0	2.0
Toluene (108-88-3)	624	1.0	2.0
1,2-Trans-Dichloroethylene (156-60-5) (Ethylene dichloride)	624	1.0	2.0
1,1,1-Trichloroethane (71-55-6)	624	1.0	2.0
1,1,2-Trichloroethane (79-00-5)	624	1.0	2.0
Trichloroethylene (79-01-6)	624	1.0	2.0
Vinyl chloride (75-01-4)	624/SM6200B	1.0	2.0

PRIORITY POLLUTANTS (continued)

Pollutant & CAS No. ***(if available)***	**Recommended Analytical Protocol**	**Detection (DL)[1]** ***µg/L unless specified***	**Quantitation Level (QL)[2]** ***µg/L unless specified***
BASE/NEUTRAL COMPOUNDS (compounds in bold are Ecology PBTs)			
Acenaphthene (83-32-9)	625	0.2	0.4
Acenaphthylene (208-96-8)	625	0.3	0.6
Anthracene (120-12-7)	625	0.3	0.6
Benzidine (92-87-5)	625	12	24
Benzyl butyl phthalate (85-68-7)	625	0.3	0.6
Benzo(*a*)anthracene (56-55-3)	625	0.3	0.6
Benzo(b)fluoranthene (3,4-benzofluoranthene) (205-99-2) [4]	610/625	0.8	1.6
Benzo(j)fluoranthene (205-82-3) [4]	625	0.5	1.0
Benzo(k)fluoranthene (11,12-benzofluoranthene) (207-08-9) [4]	610/625	0.8	1.6
Benzo(r,s,t)pentaphene (189-55-9)	625	0.5	1.0
Benzo(*a*)pyrene (50-32-8)	610/625	0.5	1.0
Benzo(*ghi*)Perylene (191-24-2)	610/625	0.5	1.0
Bis(*2-chloroethoxy)*methane (111-91-1)	625	5.3	21.2
Bis(*2-chloroethyl*)ether (111-44-4)	611/625	0.3	1.0
Bis(*2-chloroisopropyl*)ether (39638-32-9)	625	0.3	0.6
Bis(*2-ethylhexyl*)phthalate (117-81-7)	625	0.1	0.5
4-Bromophenyl phenyl ether (101-55-3)	625	0.2	0.4
2-Chloronaphthalene (91-58-7)	625	0.3	0.6
4-Chlorophenyl phenyl ether (7005-72-3)	625	0.3	0.5
Chrysene (218-01-9)	610/625	0.3	0.6
Dibenzo (a,h)acridine (226-36-8)	610M/625M	2.5	10.0
Dibenzo (a,j)acridine (224-42-0)	610M/625M	2.5	10.0
Dibenzo(a-*h*)anthracene (53-70-3)(1,2,5,6-dibenzanthracene)	625	0.8	1.6
Dibenzo(a,e)pyrene (192-65-4)	610M/625M	2.5	10.0
Dibenzo(a,h)pyrene (189-64-0)	625M	2.5	10.0
3,3-Dichlorobenzidine (91-94-1)	605/625	0.5	1.0
Diethyl phthalate (84-66-2)	625	1.9	7.6
Dimethyl phthalate (131-11-3)	625	1.6	6.4
Di-n-butyl phthalate (84-74-2)	625	0.5	1.0
2,4-dinitrotoluene (121-14-2)	609/625	0.2	0.4
2,6-dinitrotoluene (606-20-2)	609/625	0.2	0.4

PRIORITY POLLUTANTS (continued)

Pollutant & CAS No. *(if available)*	Recommended Analytical Protocol	Detection (DL)[1] *µg/L unless specified*	Quantitation Level (QL)[2] *µg/L unless specified*
BASE/NEUTRAL COMPOUNDS (compounds in bold are Ecology PBTs)			
Di-n-octyl phthalate (117-84-0)	625	0.3	0.6
1,2-Diphenylhydrazine (*as Azobenzene*) (122-66-7)	1625B	5.0	20
Fluoranthene (206-44-0)	625	0.3	0.6
Fluorene (86-73-7)	625	0.3	0.6
Hexachlorobenzene (118-74-1)	612/625	0.3	0.6
Hexachlorobutadiene (87-68-3)	625	0.5	1.0
Hexachlorocyclopentadiene (77-47-4)	1625B/625	0.5	1.0
Hexachloroethane (67-72-1)	625	0.5	1.0
Indeno(*1,2,3-cd*)Pyrene (193-39-5)	610/625	0.5	1.0
Isophorone (78-59-1)	625	0.5	1.0
3-Methyl cholanthrene (56-49-5)	625	2.0	8.0
Naphthalene (91-20-3)	625	0.3	0.6
Nitrobenzene (98-95-3)	625	0.5	1.0
N-Nitrosodimethylamine (62-75-9)	607/625	2.0	4.0
N-Nitrosodi-n-propylamine (621-64-7)	607/625	0.5	1.0
N-Nitrosodiphenylamine (86-30-6)	625	0.5	1.0
Perylene (198-55-0)	625	1.9	7.6
Phenanthrene (85-01-8)	625	0.3	0.6
Pyrene (129-00-0)	625	0.3	0.6
1,2,4-Trichlorobenzene (120-82-1)	625	0.3	0.6

Pollutant & CAS No. *(if available)*	Recommended Analytical Protocol	Detection (DL)[1] *µg/L unless specified*	Quantitation Level (QL)[2] *µg/L unless specified*
DIOXIN			
2,3,7,8-Tetra-Chlorodibenzo-P-Dioxin (176-40-16) (2,3,7,8 TCDD)	1613B	1.3 pg/L	5 pg/L

PRIORITY POLLUTANTS (continued)

Pollutant & CAS No. *(if available)*	Recommended Analytical Protocol	Detection (DL)[1] *µg/L unless specified*	Quantitation Level (QL)[2] *µg/L unless specified*
PESTICIDES/PCBs			
Aldrin (309-00-2)	608	0.025	0.05
alpha-BHC (319-84-6)	608	0.025	0.05
beta-BHC (319-85-7)	608	0.025	0.05
gamma-BHC (58-89-9)	608	0.025	0.05
delta-BHC (319-86-8)	608	0.025	0.05
Chlordane (57-74-9) [5]	608	0.025	0.05
4,4'-DDT (50-29-3)	608	0.025	0.05
4,4'-DDE (72-55-9)	608	0.025	0.05[10]
4,4' DDD (72-54-8)	608	0.025	0.05
Dieldrin (60-57-1)	608	0.025	0.05
alpha-Endosulfan (959-98-8)	608	0.025	0.05
beta-Endosulfan (33213-65-9)	608	0.025	0.05
Endosulfan Sulfate (1031-07-8)	608	0.025	0.05
Endrin (72-20-8)	608	0.025	0.05
Endrin Aldehyde (7421-93-4)	608	0.025	0.05
Heptachlor (76-44-8)	608	0.025	0.05
Heptachlor Epoxide (1024-57-3)	608	0.025	0.05
PCB-1242 (53469-21-9) [6]	608	0.25	0.5
PCB-1254 (11097-69-1)	608	0.25	0.5
PCB-1221 (11104-28-2)	608	0.25	0.5
PCB-1232 (11141-16-5)	608	0.25	0.5
PCB-1248 (12672-29-6)	608	0.25	0.5
PCB-1260 (11096-82-5)	608	0.13	0.5
PCB-1016 (12674-11-2) [6]	608	0.13	0.5
Toxaphene (8001-35-2)	608	0.24	0.5

1. Detection level (DL) or detection limit means the minimum concentration of an analyte (substance) that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero as determined by the procedure given in 40 CFR part 136, Appendix B.

2. Quantitation Level (QL) also known as Minimum Level of Quantitation (ML) – The lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration point for the analyte. It is equivalent to the concentration of the lowest calibration standard, assuming that the lab has used all method-specified sample weights, volumes, and cleanup procedures. The QL is calculated by multiplying the MDL by 3.18 and rounding the result to the number nearest to (1, 2, or 5) x 10^n, where n is an integer (64 FR 30417).
   ALSO GIVEN AS:
   The smallest detectable concentration of analyte greater than the Detection Limit (DL) where the accuracy (precision & bias) achieves the objectives of the intended purpose. (Report of the Federal Advisory Committee on Detection and Quantitation Approaches and Uses in Clean Water Act Programs Submitted to the US Environmental Protection Agency, December 2007).

3. NWTPH Dx⁻ Northwest Total Petroleum Hydrocarbons Diesel Extended Range – see http://www.ecy.wa.gov/biblio/97602.html

4. NWTPH Gx – Northwest Total Petroleum Hydrocarbons Gasoline Extended Range – see http://www.ecy.wa.gov/biblio/97602.html

5. 1, 3-dichloroproylene (mixed isomers) – You may report this parameter as two separate parameters: cis-1, 3-dichlorpropropene (10061-01-5) and trans-1, 3-dichloropropene (10061-02-6).

6. Total Benzofluoranthenes – Because Benzo(b)fluoranthene, Benzo(j)fluoranthene and Benzo(k)fluoranthene co-elute you may report these three isomers as total benzofluoranthenes.

7. Chlordane – You may report alpha-chlordane (5103-71-9) and gamma-chlordane (5103-74-2) in place of chlordane (57-74-9). If you report alpha and gamma-chlordane, the DL/PQLs that apply are 0.025/0.050.

8. PCB 1016 & PCB 1242 – You may report these two PCB compounds as one parameter called PCB 1016/1242.

Fact Sheet for NPDES Permit WA0022403

City of Snoqualmie Wastewater Treatment and Water Reclamation Facility

March 19, 2014

Purpose of this fact sheet

This fact sheet explains and documents the decisions the Department of Ecology (Ecology) made in drafting the proposed National Pollutant Discharge Elimination System (NPDES) permit for City of Snoqualmie Wastewater Treatment and Water Reclamation Facility. This fact sheet complies with Section 173-220-060 of the Washington Administrative Code (WAC), which requires Ecology to prepare a draft permit and accompanying fact sheet for public evaluation before issuing an NPDES permit.

Ecology makes the draft permit and fact sheet available for public review and comment at least thirty (30) days before issuing the final permit. Copies of the fact sheet and draft permit for City of Snoqualmie Wastewater Treatment and Water Reclamation Facility, NPDES permit WA0022403, are available for public review and comment from March 19, 2014, until April 19, 2014. For more details on preparing and filing comments about these documents, please see *Appendix A – Public Involvement Information.*

The City of Snoqualmie reviewed the draft permit and fact sheet for factual accuracy. Ecology corrected any errors or omissions regarding the facility's location, history, wastewater discharges, or receiving water prior to publishing this draft fact sheet for public notice.

After the public comment period closes, Ecology will summarize substantive comments and provide responses to them. Ecology will include the summary and responses to comments in this fact sheet as *Appendix F – Response to Comments*, and publish it when issuing the final NPDES permit. Ecology will not revise the rest of the fact sheet, but the full document will become part of the legal history contained in the facility's permit file.

Summary

The City of Snoqualmie owns and operates an oxidation ditch wastewater treatment facility to treat domestic sewage for discharge to the Snoqualmie River. The facility provides enhanced biological nitrogen and phosphorus removal in addition to conventional secondary wastewater treatment. The facility also uses sand filtration and redundant disinfection to produce Class A Reclaimed Water that the City distributes for irrigation uses on and around the TPC Snoqualmie Ridge Golf Course.

Ecology issued the previous on June 18, 2008, and modified it on July 1, 2011. The modified permit imposed technology-based and seasonal TMDL-based limits on carbonaceous biochemical oxygen demand, total suspended solids, fecal coliform bacteria, and pH. The permit also authorized emergency use of chlorine for disinfection of effluent discharged to the Snoqualmie River, included seasonal TMDL-based limits on ammonia-nitrogen, set a target benchmark for soluble reactive phosphorus and specific requirements related to reclaimed water production. The proposed permit contains similar limits along with a new limit on maximum temperature for discharges to the Snoqualmie River and a more restrictive minimum pH limit of 6.3 standard units.

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I. Introduction

The Federal Clean Water Act (FCWA, 1972, and later amendments in 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One mechanism for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System (NPDES), administered by the federal Environmental Protection Agency (EPA). The EPA authorized the state of Washington to manage the NPDES permit program in our state. Our state legislature accepted the delegation and assigned the power and duty for conducting NPDES permitting and enforcement to Ecology. The Legislature defined Ecology's authority and obligations for the wastewater discharge permit program in 90.48 RCW (Revised Code of Washington).

The following regulations apply to domestic wastewater NPDES permits:

- Procedures Ecology follows for issuing NPDES permits (chapter 173-220 WAC).
- Technical criteria for discharges from municipal wastewater treatment facilities (chapter 173-221 WAC).
- Water quality criteria for surface waters (chapter 173-201A WAC).
- Water quality criteria for groundwaters (chapter 173-200 WAC).
- Whole effluent toxicity testing and limits (chapter 173-205 WAC).
- Sediment management standards (chapter 173-204 WAC).
- Submission of plans and reports for construction of wastewater facilities (chapter 173-240 WAC).

These rules require any treatment facility owner/operator to obtain an NPDES permit before discharging wastewater to state waters. They also help define the basis for limits on each discharge and for requirements imposed by the permit.

Reclaimed Water

The Reclaimed Water Act, Chapter 90.46 RCW, authorized the development of Water Reclamation and Reuse Standards for the beneficial use of reclaimed water. These standards were completed in 1997. All reclaimed water permits issued by Ecology must specify conditions demonstrating that the wastewater has been adequately and reliably treated to meet the requirements in the Water Reclamation and Reuse Standards appropriate for the use. In addition to meeting the reclaimed water limits, the standards require specific treatment and disinfection requirements beyond those of most conventional wastewater treatment facilities. The standards also require automated alarms, redundancy of treatment units, emergency storage, stringent operator training requirements and public notification of reclaimed water use. RCW 90.46.220 states that generators of reclaimed water must obtain a permit prior to distributing reclaimed water for beneficial use.

Public Involvement

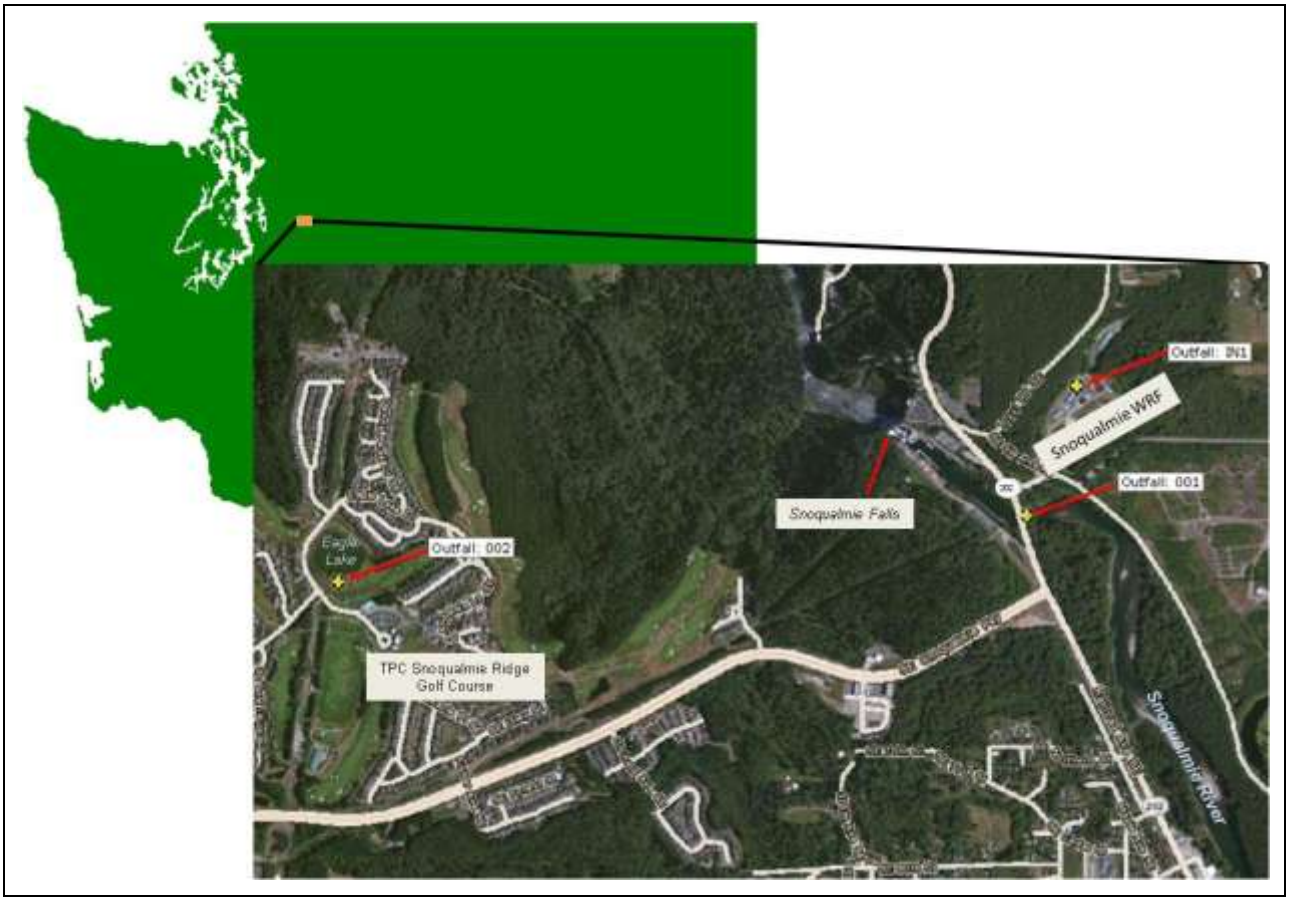
Under the NPDES permit program and in response to a complete and accepted permit application, Ecology must prepare a draft permit and accompanying fact sheet, and make them available for public review before final issuance. Ecology must also publish an announcement (public notice) telling people where they can read the draft permit, and where to send their comments, during a period of thirty days (WAC 173-220-050). (See *Appendix A – Public Involvement Information* for more detail about the public notice and comment procedures). After the public comment period ends, Ecology may make changes to the draft NPDES permit in response to comment(s). Ecology will summarize the responses to comments and any changes to the permit in Appendix F.

II. Background Information

Table 1. General Facility Information

Facility Information	
Applicant	City of Snoqualmie
Facility Name and Address	City of Snoqualmie Wastewater & Water Reclamation Facility 38190 SE Sterns Road Snoqualmie, WA 98065
Contact at Facility	Thomas Holmes, Wastewater Superintendent
Responsible Official	Matthew Larson, Mayor 38624 SE River Street, Snoqualmie, WA 98065
Type of Treatment	Advanced oxidation ditch with sand filtration
Facility Location (NAD83/WGS84 reference datum)	Latitude: 47.54091, Longitude: -121.83140
Discharge Waterbody Name and Location (Outfall #001)	Snoqualmie River, approximately ¼ mile above Snoqualmie Falls Latitude: 47.53916 Longitude: -121.83222
Reclaimed Water Storage Location (Outfall 002)	Eagle Lake (9th Hole Pond) at TPC Snoqualmie Ridge Golf Course Latitude: 47.53722 Longitude: -121.86250

Figure 1. Facility Location Map



A. Facility description

History

The City of Snoqualmie (City) constructed their first wastewater treatment plant, a 6.7-acre facultative lagoon system, in 1967. The treatment system remained unchanged for more than 20 years until anticipated growth required a substantial facility upgrade. In the early 1990s the City started planning for a new facility to accommodate projected population increases that would result with planned development of the Snoqualmie Ridge area. In addition to expanding treatment capacity for increasing population, the City's planning effort examined strategies to reduce pollutant loadings to the Snoqualmie River that Ecology identified as contributors to water quality impairments in the river.

The City completed construction of a new advanced treatment facility in 1997. The new facility consisted of a single oxidation ditch, two secondary clarifiers, and a UV disinfection system. The new facility also included sand filtration, chlorination and pumping systems necessary to produce and distribute Class A reclaimed water. The plant expansion project converted the old treatment lagoons into sludge stabilization and storage. The City completed a second phase of expansion in 2002 with the addition of a second oxidation ditch and more UV light banks.

Ecology issued a Notice of Violation to the City in 2006 based on groundwater monitoring results showing probable groundwater impacts from the sludge lagoons. At approximately the same time, Ecology's Solid Waste Program (now Waste2Resources Program) informed the City that they considered the sludge lagoons to be "storage", and federal regulations only allowed facilities to store biosolids onsite for two years. The City responded to these issues by reevaluating their long-term biosolids management strategy and developing plans to construct systems to produce Class A biosolids. The City completed construction of a new biosolids drying system in 2008 and started decommissioning the lagoons later the same year.

The Snoqualmie Wastewater Treatment and Water Reclamation Facility (WWTWRF) primarily serves residential customers and light commercial establishments within the City's incorporated limits. Customers contributing significant flows to the facility include the Snoqualmie Casino, Snoqualmie Valley Hospital, and the Department of Social and Health Service's (DSHS) Echo Glen Children's Center. The WWTWRF also receives flows from two industrial discharges that require pretreatment permits from Ecology.

Collection System Status

The City owns, operates, and maintains 15 lift stations within the collection system. Planned relocation of the Snoqualmie Valley Hospital to a location on Snoqualmie Ridge will necessitate the addition of a 16th lift station. The collection system also includes two lift stations that the City does not own and operate. One is owned by DSHS and serves the Echo Glenn Children's Center and the second is a small pump station owned by Puget Sound Energy that serves restroom facilities at Snoqualmie Falls. Most of the City's collection system conveys sewage to the Kimball Creek lift station, which pumps the sewage across the river to the WWTWRF. A small portion of the city's collection system on the north side of the river flows by gravity directly to the treatment plant. Flows from the Salish Lodge, the old Weyerhaeuser Mill Site, the Snoqualmie Falls Visitor Center and from the City's Water Treatment Plant discharge to the In-Plant lift station at the WWTWRF.

The City renovated Lift Station #3 (Riverview Park) and #4 (Meadowbrook) between 2009 and 2010. Renovations included raising the lift station structures above the 100-yr flood elevation. City staff also completed a series of repair projects at the Kimball Creek lift station, which included replacing a damaged volute and impeller on one of the pumps and installing third pump to increase the station's pumping capacity and to improve redundancy.

The WWTWRF's Supervisory Control and Data Acquisition (SCADA) system uses remote telemetry to monitor operations at all lift stations except Lift Station #5 (Honey Farm). The SCADA system logs all alarms and uses an auto-dialer system to alert an on-call operator to problems. All but two lift stations have dedicated generators for emergency back-up power. The two stations without dedicated generators are "Honey Farm" and Lift Station #2 (Pickering Court). Both stations have the ability to connect to a portable generator. The City maintains an inventory of spare lift station pumps at the treatment plant and the plant's mechanic repairs/refurbishes pumps and motors on site when needed.

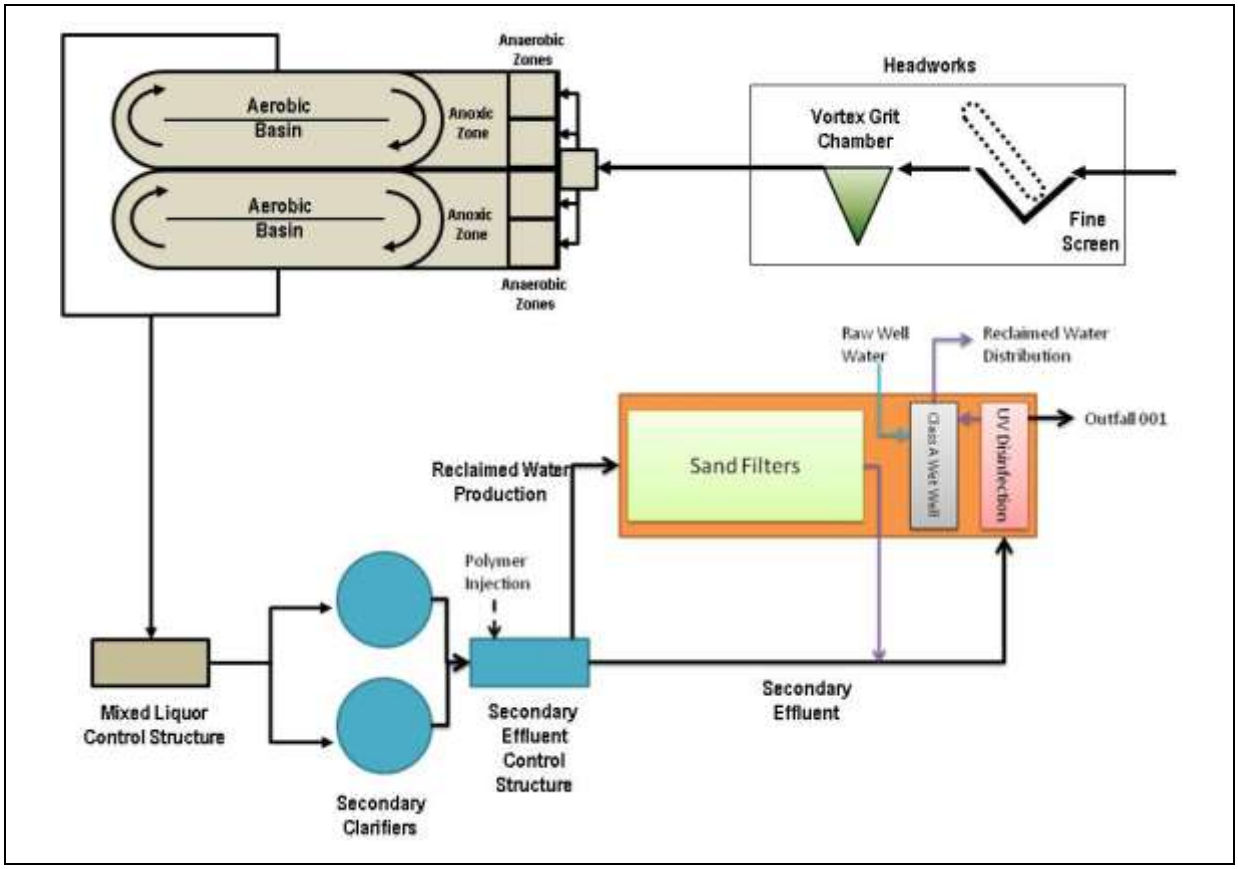
The City submitted an evaluation of inflow and infiltration (I&I) in November 2012. The study used plant flow, water usage, and rainfall data from 2007 to 2010 to estimate I&I in the system. While the study identified that the older portions of the collection system in the historic Snoqualmie City core has I&I rates approximately 14 times higher than newer section in the Snoqualmie Ridge area, the overall rates of I&I are not above the level EPA considers "excessive". The Snoqualmie WWTWRF presently has sufficient treatment capacity to treat excess flow caused by I&I and the City has not reported any sanitary sewer overflows that can be attributed to I&I.

Wastewater Treatment Process

Sewage flows from the Kimball Creek and In-Plant lift stations discharge at the headworks structure for preliminary treatment with a 6-mm, mechanically cleaned plate screen and a vortex grit chamber. A bypass channel with manually-cleaned 1.5-inch and 3/8th-inch screens allows staff to divert influent around the mechanical screen for maintenance. An ultrasonic flow meter at the headworks monitors the flow volume entering the facility. A flow-paced composite sampler located after the screen collects raw influent samples for BOD5 and TSS monitoring. Since the In-Plant lift station includes significant internal recycle flows along with sewage flow from the north side of the river, plant staff must monitor the volume and quality of the recycle streams in order to calculate the daily loading sent to the plant. Staff manually subtracted the recycle flow volume and typical pollutant strength from influent readings to arrive at an accurate influent flows and loading.

Screened and degritted wastewater flows from the grit chamber in the headworks structure to the oxidation ditch flow diversion structure where the sewage mixes with activated sludge returned from the secondary clarifiers. The diversion structure allows staff to route flow to one or both of the oxidation ditches for biological treatment. Both ditches include two anaerobic cells followed by an anoxic cell ahead of the aerobic oxidation ditch carrousel. The carrousel basins have two aerators, one at each end, to provide oxygen and to keep the mixed liquor moving through the basin in one direction. Gates located between the carrousel basin and the anoxic basin allow operators to regulate the amount of aerated mixed liquor recycled back to the anoxic basin. The oxidation ditch design and operation facilitates advanced biological phosphorus and nitrogen removal.

Figure 2. Process Flow Diagram



Weirs along the outer edge of the carrousel section of each ditch regulates outflow of mixed liquor from the ditches. Mixed liquor from the oxidation ditches collect in the mixed liquor control structure, where it is routed to one or both secondary clarifiers. Staff can add chlorine and polymer to the mixed liquor at the control structure as needed to assist with filament control or to improve sludge settling.

Overflow from the clarifiers routes to the secondary effluent control structure while underflow activated sludge is either returned to the oxidation ditch diversion structure or sent to the sludge storage tank for biosolids processing. Staff use the secondary effluent control structure to direct flow to final disinfection and disposal or to tertiary treatment for Class A reclaimed water production. During the wet weather season, typically November through May, the Snoqualmie facility discharges treated and disinfected effluent to the Snoqualmie River via outfall 001. In this mode, the secondary effluent control structure sends effluent flow directly to the UV system for disinfection. After disinfection, the treated effluent spills over a V-notch weir to outfall 001.

If the plant experiences an upset that interferes with the UV system or if UV system fails, staff can set up a temporary delivery system that injects hypochlorite at the secondary effluent control structure for use as a disinfectant. The transmission lines to the UV channels and the channels themselves provide sufficient contact time for chlorine disinfection. To minimize the concentration of chlorine discharge to the river, staff place dechlorination tablets in the effluent flow at the V-notch weir.

Reclaimed Water Production Process

The Snoqualmie WWTWRF produces Class A reclaimed water for irrigation uses during the dry weather season, typically between June and October. During reclaimed water production, overflow from the secondary clarifiers is collected at the secondary diversion structure and routed through a flash mixer for polymer addition then through rapid sand filtration beds. Filtered underflow is then routed to the UV disinfection system for initial disinfection before flowing to the effluent wet well. From the wet well, Class A product water is blended with well water then pumped approximately one mile to the Eagle Lake storage reservoir at the TPC Snoqualmie Ridge Golf Course.

The UV system at the Snoqualmie WWTWRF does not provide enough light intensity to meet the State's current design standards for complete disinfection of reclaimed water with UV light. To compensate, the facility adds chlorine to the reclaimed water main distribution line to provide additional disinfection in transit to the storage reservoir. This strategy also helps prevent regrowth within the distribution line.

Production of Class A reclaimed water at the Snoqualmie WWTWRF is limited by the capacity of the rapid sand filtration system. Based on the *Wastewater Treatment Plant Phase 2 Contract Drawings*, which were approved by Ecology in 2002, the design flow for the sand filters is 1.56 million gallons per day (MGD) for the maximum monthly average.

Operator Certification

Washington State law requires operators of municipal wastewater treatment plants to be certified at a level appropriate for the type and size of the facility. Guidance in Ecology's *Permit Writer's Manual* and WAC 173-230 classify activated sludge facilities treating between 1 and 10 million gallons of wastewater per day as a Group III facility. In addition, facilities providing tertiary treatment of flows less than 5 million gallons per day are classified as Group III facilities; reclaimed water production qualifies as tertiary treatment. Based on these guidelines, Ecology considers the Snoqualmie WWTWRF to be a Group III facility. As such, the operator in responsible charge must, at a minimum, be rated as a Group III operator. An operator certified for at least a Group II facility must be in charge of each scheduled shift at the facility.

Discharge Outfall

The Snoqualmie WWTWRF discharges secondary treated and disinfected effluent through a 36" outfall into the Snoqualmie River at a location approximately 1,700 feet upstream of the Snoqualmie Falls. The line is buried to a location approximately 15 feet offshore, then extends uncovered another 15 feet to its terminus. The pipe is anchored to the river bottom with "H" piling and chains.

The outfall was last inspected November 10, 2005, by Global Diving and Salvage. The inspection included dye testing to test for leaking joints or other damage to the pipeline. The inspection report revealed that the pipe is dent free, straight, round, and the joints did not leak. The outfall line is intact, undamaged, and has not shifted since installation. The inspection also revealed that there was no indication of sediment buildup near the vicinity of the outfall either as a result of the flow disturbance caused by the pipe or from deposition of particulates present in the effluent.

Reclaimed Water Distribution and Use Area

The City's WWTWRF delivers Class A reclaimed water blended with raw well water to the Eagle Lake storage reservoir at the TPC Snoqualmie Ridge Golf Course. Individual end users withdraw water from this storage reservoir for seasonal landscape irrigation. Water delivered to the storage reservoir has two distinct allotted withdrawals. The City's agreement with the Snoqualmie Ridge golf course allocates a daily average use of 730,000 gallons per day (gpd) of water (maximum of 857,000 gpd on dry days). The City retains an allotment of 570,000 gpd. The golf course uses its allotment exclusively for irrigation of up to 180 acres of land at the golf course (125 acres during extreme hot periods). The City divides its allocation among various users in an 85 acre area. City uses include irrigation of athletic fields at Snoqualmie Community Park, plants in the Snoqualmie Parkway median strip and landscape planters around businesses along Snoqualmie Parkway. Flow meters track the amount of water the city withdraws from Eagle Lake, however the City does not meter the individual end-users of that allotment. The golf course allotment is not metered.

According to the reclaimed water permit application, advisory signs are posted near the storage reservoir and at irrigation locations to alert the public of the use of reclaimed water. All distribution systems components (pipes, valves and outlets) are color-coded with purple paint and city employees receive training on the appropriate use of reclaimed water.

Residual Solids

The treatment facility removes solids during the treatment of the wastewater at the headworks (grit and screenings), and at the secondary clarifiers, in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. Grit, rags, and screenings are drained and disposed of as solid waste at the local landfill. Seattle & King County Public Health regulates the disposal of solid waste from this facility.

Waste activated sludge from the two clarifiers flows to the biosolids treatment system for production of Class A biosolids. The waste sludge first discharges to an aerated storage tank for up to 14 days until there is sufficient volume for batch processing. Each batch first passes through a gravity thickener to reduce the water content of the sludge. Water removed by the thickener flows to the in-plant lift station for retreatment. The thickened sludge cake is fed to a solids dryer for thermal treatment and drying to Class A standards. Staff discharge the final dried solids product into large bags for transportation to beneficial use locations.

B. Description of the receiving water

The Snoqualmie WWTWRF discharges treated effluent to the main stem of the Snoqualmie River approximately one-quarter mile above the Snoqualmie Falls. Other nearby point source outfalls include the City of North Bend WWTP, which discharges into the South Fork of the Snoqualmie River approximately five miles above the Snoqualmie WWTWRF outfall. Ecology has also issued a General Upland Fish Hatchery permit to authorize the discharge of water form hatchery operations at the Washington Department of Fish and Wildlife's Tokul Creek Hatchery, located approximately one mile downriver from the Snoqualmie WWTWRF. In addition to the point sources noted above, the Snoqualmie River receives urban runoff from the cities of Snoqualmie and North Bend, as well runoff from agricultural, sand & gravel mining, and construction activities throughout the Snoqualmie Valley area.

Ecology used its long-term water quality monitoring station #07D130, located approximately 1.5 miles above the WWTWRF outfall at the Meadowbrook bridge, as the primary source for ambient background conditions for this discharge. Table 2 summarizes data for conventional parameters collected between January 2003 and March 2013. Metals data are derived from a limited set of six sampling events that occurred between October 2008 and August 2009 and temperature data are taken from continuous monitoring conducted by Ecology in 2006 in connection with the Snoqualmie River Temperature TMDL.

Table 2. Ambient Background Data

Parameter	Average Value	90th Percentile Value	Geometric Mean Value [1]
Annual Temperature (7-DADMax)	—	20.7° C	—
pH Range (minimum-maximum)	6.59-8.08 standard units	7.37 standard units	—
Dissolved Oxygen	11.53 mg/L	9.60 mg/L (10th Percentile)	—
Total Ammonia-N	0.01 mg/L	0.01 mg/L	—
Fecal Coliform	—	71.4/100 mL	10.2/100 mL
Suspended Solids	14.1 mg/L	29.6 mg/L	—
Turbidity	6.3 NTU	14 NTU	—
Hardness	15.6 mg/L as CaCO3	22.3 mg/L as CaCO3	—
Alkalinity (estimated)	50 mg/L as CaCO3	—	—
Arsenic (dissolved)	1.02 µg/L	1.49 µg/L	—
Chromium (total)	0.99 µg/L	1.90 µg/L	—
Copper (dissolved)	0.81 µg/L	1.45 µg/L	0.70 µg/L
Lead (dissolved)	0.03 µg/L	0.043 µg/L	—
Mercury	0.0025 µg/L	0.0036 µg/L	0.0024 µg/L
Nickel (dissolved)	0.21 µg/L	0.27 µg/L	0.21 µg/L
Zinc (dissolved)	2.4 µg/L	4.0 µg/L	—

[1] Geometric mean calculated for parameters with human-health based standards. Ecology uses the geometric mean concentration of these parameters in evaluating the reasonable potential for a discharge to exceed human health-based water quality standards.

C. Treatment plant loading summary

The Snoqualmie WWTWRF monitors influent flow and waste loading to verify actual loading does not exceed approved design capacity. Table 3 summarizes loading to the facility from the period of July 2008 to March 2013. Appendix D contains complete data for all influent monitoring reported by the facility.

Table 3. Wastewater Influent Characterization

Parameter	Average Value	Maximum Value
Typical Daily Flow	0.9 MGD	1.9 MGD
Highest Average Daily Flow for a 30-day Reporting Period	1.4 MGD	5.7 MGD
Monthly Average 5-day Biochemical Oxygen Demand (BOD_5)	295 mg/L 1693 lbs/day	641 mg/L 3095 lbs/day
Monthly Average 5-day Carbonaceous Biochemical Oxygen Demand ($CBOD_5$)	272 mg/L	348 mg/L
Monthly Average Total Suspended Solids (TSS)	321 mg/L 1881 lbs/day	510 mg/L 4801 lbs/day

D. Wastewater effluent characterization

The Snoqualmie WWTWRF reported in the permit application and discharge monitoring reports (DMRs) concentrations of pollutants discharge to the Snoqualmie River. Table 4 summarizes effluent data for routinely monitored parameters, as reported in DMRs between July 2008 and March 2013. Appendix D contains complete data for all routine effluent monitoring reported by the facility.

Table 4. Wastewater Effluent Characterization

Parameter	Average Value	95^{tn} Percentile Value
Monthly Average $CBOD_5$	4.2 mg/L 36 lbs/day	8.1 mg/L 91 lbs/day
Monthly Average TSS	5.0 mg/L 43 lbs/day	14.9 mg/L 161 lbs/day
Monthly Geometric Mean of Fecal Coliform Bacteria *(excludes high values from plant upset in Dec 2008 to Feb. 2009)*	4 cfu/100 mL	15 cfu/ 100 mL
Average pH Range	6.94-7.62	—
Monthly Average Ammonia	3.0 mg/L-N 21.9 lbs/day-N	17.1 mg/L-N 132.9 lbs/day-N
Monthly Average Ortho-phosphate	1.44 mg/L-P 10.3 lbs/day-P	1.45 mg/L-P 41.3 lbs/day-P
Temperature, Daily Maximum [1]	17.9 °C	20.8 °C
Temperature, 7-day Average of Daily Maximums [1]	17.5 °C	21.7 °C

[1] The facility did not report credible effluent temperature data after October 2010. Summarized temperature data limited to the period of July 2008 to October 2010.

Table 5 summarizes expanded testing for conventional, non-conventional, and priority pollutants, as reported by the Snoqualmie WWTWRF in the permit application.

Table 5. Expanded Effluent Characterization

Parameter	Average Value	Maximum Value
Dissolved Oxygen	6.5 mg/L	—
Nitrate+Nitrite – Nitrogen	1.7 mg/L	2.9 mg/L
Total Kjeldahl Nitrogen	1.3 mg/L	6.0 mg/L
Total Phosphorus	0.78 mg/L	1.3 mg/L
Oil and Grease	1.45 mg/L	1.9 mg/L
Alkalinity (as $CaCO_3$)	104 mg/L	130 mg/L
Hardness (as $CaCO_3$)	95.3 mg/L	110 mg/L
Aluminum	8.0 μg/L	12.4 μg/L
Antimony	0.4 μg/L	0.95 μg/L
Arsenic	4.5 μg/L	6.43 μg/L
Barium	5.7 μg/L	6.76 μg/L
Cadmium	—	0.04 μg/L
Chromium	0.20 μg/L	0.25 μg/L
Copper	2.1 μg/L	3.54 μg/L

Parameter	Average Value	Maximum Value
Lead	0.1 μg/L	0.225 mg/L
Manganese	16.5 μg/L	32.2 μg/L
Molybdenum	1.1 μg/L	1.38 μg/L
Mercury	0.0025 μg/L	0.00312 μg/L
Nickel	0.7 mg/L	0.89 mg/L
Selenium	—	0.32 μg/L
Thallium	0.022μg/L	0.033 μg/L
Zinc	25.7 μg/L	37.3 μg/L
Total Phenolic Compounds	0.023 μg/L	0.037 μg/L
Toluene	—	10.5 μg/L
Bis(2-ethylhexyl)phthalate	—	0.8 μg/L

E. Permit status and compliance summary

Ecology issued the previous permit on June 18, 2008, and modified it on July 1, 2011. The City submitted an NPDES Permit application and a Reclaimed Water Permit application to Ecology on February 8, 2013. On February 20, 2013, Ecology deemed the applications incomplete and requested additional information from the City. The City supplied the additional information on February 26, 2013, and Ecology accepted the applications as complete on February 28, 2013. Ecology extended the permit on June 4, 2013.

The previous permit placed effluent limits on $CBOD_5$, TSS, fecal coliform, pH, ammonia, and on chlorine when used as back-up disinfectant for discharges to the river. The permit also included limits on Class A Reclaimed Water produced by the Snoqualmie WWTWRF. The Reclaimed Water Conditions placed additional limits on flow, turbidity, dissolved oxygen, total nitrogen, total coliform, and residual chlorine.

The Snoqualmie WWTWRF has not consistently complied with the limits and other conditions governing discharges to the Snoqualmie River throughout the duration of the permit. Ecology assessed compliance based on its review of the facility's discharge monitoring reports (DMRs) and on inspections. Table 6 summarizes violations of monthly and weekly average discharge limits reported by the facility during the past permit term. Table 7 summarizes violations of daily permit limits. In response to violations in December 2008 through February 2009, Ecology issued a $24,500 penalty to the City of Snoqualmie for exceeding permit limits and for failing to properly notify Ecology of a plant upset.

Table 6. Monthly and Weekly Limit Violations

Monitoring Month	Parameter	Units	Reported Value	Min. Limit	Max. Limit
December-08	Weekly Average $CBOD_5$	mg/L	45	-	40
December-08	Monthly Average $CBOD_5$	mg/L	29.1	-	25
December-08	Monthly Average $CBOD_5$	Lbs/Day	283	-	259
December-08	Fecal Coliform Weekly Geometric Mean	#/100ml	4407	-	400
December-08	Fecal Coliform Monthly Geometric Mean	#/100ml	2271	-	200
January-09	Weekly Average $CBOD_5$	mg/L	51	-	40
January-09	Weekly Average $CBOD_5$	Lbs/Day	442	-	414

Monitoring Month	Parameter	Units	Reported Value	Min. Limit	Max. Limit
January-09	Monthly Average $CBOD_5$	Lbs/Day	284.8	-	259
January-09	Weekly Average TSS	Lbs/Day	512	-	465
January-09	Fecal Coliform Weekly Geometric Mean	#/100ml	15886	-	400
January-09	Fecal Coliform Monthly Geometric Mean	#/100ml	6806	-	200
February-09	Weekly Average $CBOD_5$	mg/L	70.3	-	40
February-09	Monthly Average $CBOD_5$	mg/L	47	-	25
February-09	Weekly Average $CBOD_5$	Lbs/Day	439.3	-	414
February-09	Monthly Average $CBOD_5$	Lbs/Day	328.9	-	259
February-09	Monthly Average CBOD5 Percent Removal	Percent	81.8	85	-
February-09	Weekly Average TSS	mg/L	60.1	-	45
February-09	Monthly Average TSS	mg/L	45.2	-	30
February-09	Monthly Average TSS	Lbs/Day	315.32	-	310
February-09	Fecal Coliform Weekly Geometric Mean	#/100ml	327316	-	400
February-09	Fecal Coliform Monthly Geometric Mean	#/100ml	6973	-	200
May-09	Weekly Average TSS	mg/L	162	-	45
May-09	Monthly Average TSS	mg/L	38	-	30
May-09	Weekly Average TSS	Lbs/Day	1160	-	465

Table 7. Daily Limit Violations

Monitoring Month	Parameter	# of Days Violated	Lowest/ Highest Reported Value	Minimum Limit	Maximum Limit
July-08	Daily Maximum pH, standard units	28	**9.96**	-	9.0
September-08	Daily Maximum pH, standard units	6	**9.6**	-	9.0
October-08	Daily Maximum pH, standard units	6	**9.6**	-	9.0
November-10	Daily Minimum pH, standard units	1	**4.0**	6.0	-

The Snoqualmie WWTWRF also did not consistently comply with permit limits associated with reclaimed water production. Table 8 summarizes reclaimed water production limit violations reported during the permit term.

Table 8. Reclaimed Water Limit Violations

Monitoring Month	Parameter	# of Days Violated	Lowest/ Highest Reported Value	Minimum Limit	Maximum Limit
July-08	Minimum Chlorine Residual Concentration, mg/L	11	**0.08**	0.5	-
July-08	Daily Maximum pH, standard units	25	**9.96**	-	9.0
July-08	Single Sample Maximum of Total Coliforms, #/100 mL	1	**83.1**	-	23
September-08	Minimum Chlorine Residual Concentration, mg/L	1	**0.4**	0.5	-
August-09	Single Sample Maximum of Total Coliforms, #/100 mL	1	**36.4**	-	23
August-12	Single Sample Maximum of Total Coliforms, #/100 mL	1	**25**	-	23
September-12	Maximum 7-day Median of Total Coliforms, #/100 mL	N/A	**21**	-	2.2

Along with the limit violations noted above, the Snoqualmie WWTWRF did not consistently comply with requirements for timely submittal of reports and data. Throughout the permit term the facility submitted several monthly DMRs either late or with significant errors that required them to resubmit corrected reports. The facility also did not submit required Cross Connection Control Reports for the Reclaimed Water System in 2012 and 2013 and failed to submit their permit renewal applications on time.

Ecology last inspected the Snoqualmie WWTWRF in January and February of 2013. The inspection was a Class 2 inspection that thoroughly evaluated plant records and collected samples to compare the facility's lab performance with that of Ecology's Manchester Lab. Ecology completed the inspection report in April 2013 and issued a warning letter to the City that identified several areas of non-compliance. The inspection report identified violations related to proper calibration of flow meters, failure to follow written O&M procedures, failure to immediately notify Ecology of reclaimed water disinfection problems, and failure to properly record and report discharge monitoring data.

Ecology chose to initially exercise enforcement discretion for violations discovered during the inspection and instead planned to address the problems by placing additional conditions in the next permit that correct practices that led to the violations. However DMRs submitted during the summer of 2013 continued to exhibit errors. As a result, Ecology issued a Notice of Violation (NOV) on December 10, 2013, to address violations associated with failing to meet required monitoring frequencies for reclaimed water production, failing to submit accurate DMRs, and failing to ensure proper reporting of temperature data. Ecology will evaluate the City's response to the NOV and, if necessary, may pursue additional corrective actions.

F. Water rights impairment analysis

As the generator of reclaimed water, RCW 90.46.120 gives the Snoqualmie WWTWRF exclusive right to any water produced through the facility's reclamation process. However the diversion of reclaimed water from a surface water discharge must not adversely impact other water users downstream. RCW 90.46.130 prohibits facilities that reclaim water from impairing existing downstream water rights without compensation or mitigation. Based on information supplied in the Reclaimed Water Permit Application, the diversion of reclaimed water produced at the Snoqualmie WWTWRF does not impair downstream water rights.

G. State environmental policy act (SEPA) compliance

State law exempts the issuance, reissuance or modification of any wastewater discharge permit from the SEPA process as long as the permit contains conditions are no less stringent than federal and state rules and regulations (RCW 43.21C.0383). The exemption applies only to existing discharges, not to new discharges.

III. Proposed Permit Limits

Federal and state regulations require that effluent limits in an NPDES permit must be either technology- or water quality-based.

- Technology-based limits are based upon the treatment methods available to treat specific pollutants. Technology-based limits are set by the EPA and published as a regulation, or Ecology develops the limit on a case-by-case basis (40 CFR 125.3, and chapter 173-220 WAC).
- Water quality-based limits are calculated so that the effluent will comply with the Surface Water Quality Standards (chapter 173-201A WAC), Ground Water Standards (chapter 173-200 WAC), Sediment Quality Standards (chapter 173-204 WAC), or the National Toxics Rule (40 CFR 131.36).
- Ecology must apply the most stringent of these limits to each parameter of concern. These limits are described below.

The limits in this permit reflect information received in the application and from supporting reports (engineering, hydrogeology, etc.). Ecology evaluated the permit application and determined the limits needed to comply with the rules adopted by the state of Washington. Ecology does not develop effluent limits for all reported pollutants. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation.

Ecology does not usually develop limits for pollutants not reported in the permit application but may be present in the discharge. The permit does not authorize discharge of the non-reported pollutants. During the five-year permit term, the facility's effluent discharge conditions may change from those conditions reported in the permit application. The facility must notify Ecology if significant changes occur in any constituent [40 CFR 122.42(a)]. Until Ecology modifies the permit to reflect additional discharge of pollutants, a permitted facility could be violating its permit.

A. Design criteria

Under WAC 173-220-150 (1)(g), flows and waste loadings must not exceed approved design criteria. Ecology approved design criteria listed in Table 9 in the *2002 Wastewater Treatment Plant Phase 2 Contract Drawings* prepared by Tetra Tech/KCM.

Table 9. Design Criteria for the Snoqualmie WWTWRF

Parameter	Design Quantity
Maximum Month Design Flow (MMDF)	2.15 MGD
BOD_5 Loading for Maximum Month	5,220 lb/day
TSS Loading for Maximum Month	5,220 lb/day
Reclaimed Water Production MMDF	1.56 MGD

B. Technology-based effluent limits

Federal and state regulations define technology-based effluent limits for municipal wastewater treatment plants. These effluent limits are given in 40 CFR Part 133 (federal) and in chapter 173-221 WAC (state). These regulations are performance standards that constitute all known, available, and reasonable methods of prevention, control, and treatment (AKART) for municipal wastewater.

Table 10 identifies technology-based limits for pH, fecal coliform, $CBOD_5$, and TSS, as listed in chapter 173-221 WAC. Section III.F this fact sheet describes the potential for water quality-based limits.

Table 10. Technology-based Limits

Parameter	Average Monthly Limit	Average Weekly Limit
$CBOD_5$ (concentration)	25 mg/L	40 mg/L
	In addition, the $CBOD_5$ effluent concentration must not exceed fifteen percent (15%) of the average influent concentration.	
TSS (concentration)	30 mg/L	45 mg/L
	In addition, the TSS effluent concentration must not exceed fifteen percent (15%) of the average influent concentration.	
Parameter	**Monthly Geometric Mean Limit**	**Weekly Geometric Mean Limit**
Fecal Coliform Bacteria	200 organisms/100 mL	400 organisms/100 mL
Parameter	**Daily Minimum**	**Daily Maximum**
pH	6.0 standard units	9.0 standard units
Parameter	**Average Monthly Limit**	**Daily Maximum Limit**
Residual Chlorine (for back-up disinfection only)	37 μg/L	70 μg/L

Residual Chlorine

Although the Snoqualmie WWTWRF routinely uses UV light to disinfect wastewater before discharging to the Snoqualmie River, the system cannot operate properly during plant upsets that increase suspended solids concentrations. Ecology issued an administrative order to the City in February 2009 requiring the use of chlorine for disinfection during a plant upset. The 2011 permit modification added permanent authority to use chlorine for disinfection back-up.

Facilities using chlorine for disinfection must use enough chlorine to ensure adequate effluent disinfection while ensuring that the final residual amount does not present a toxicity risk to aquatic life. Ecology derived general technology-based monthly average limit for chlorine from standard operating practices. The Water Pollution Control Federation's *Chlorination of Wastewater* (1976) states that a properly designed and maintained wastewater treatment plant can achieve adequate disinfection if a 0.5 mg/L chlorine residual is maintained after fifteen minutes of contact time. See also Metcalf and Eddy, *Wastewater Engineering, Treatment, Disposal and Reuse*, Third Edition, 1991. A treatment plant that provides adequate chlorination contact time can meet the 0.5 mg/L chlorine limit on a monthly average basis. According to WAC 173-221-030(11)(b), the corresponding weekly average is 0.75 mg/L.

In developing the 2011 permit modification, Ecology determined that the general technology-based chlorine limit had a reasonable potential to exceed water quality standards. Chlorine limits listed in Table 10 above are water quality-based limits in the previous permit. Through the use of a dechlorination step the facility has demonstrated a capability of meeting the water quality-based limit. By policy Ecology will retain the previous limit in the proposed permit as a baseline technology-based limit. Section III.C of this fact sheet will reevaluate whether the limits listed above remain sufficient to protect aquatic life.

Mass Limits

Technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b). Ecology calculated the monthly and weekly average mass limits for $CBOD_5$ and Total Suspended Solids as follows:

Mass Limit = CL x DF x CF
where:
CL = Technology-based concentration limits listed in the above table
DF = Maximum Monthly Average Design flow (MGD)
CF = Conversion factor of 8.34

Table 11. Technology-based Mass Limits

Parameter	Concentration Limit (mg/L)	Mass Limit (lbs/day)
$CBOD_5$ Monthly Average	25	448
$CBOD_5$ Weekly Average	40	717
TSS Monthly Average	30	538
TSS Weekly Average	45	807

C. Surface water quality-based effluent limits

The Washington State surface water quality standards (chapter 173-201A WAC) are designed to protect existing water quality and preserve the beneficial uses of Washington's surface waters. Waste discharge permits must include conditions that ensure the discharge will meet the surface water quality standards (WAC 173-201A-510). Water quality-based effluent limits may be based on an individual waste load allocation or on a waste load allocation developed during a basin wide total maximum daily load study (TMDL).

Numerical criteria for the protection of aquatic life and recreation

Numerical water quality criteria are listed in the water quality standards for surface waters (chapter 173-201A WAC). They specify the maximum levels of pollutants allowed in receiving water to protect aquatic life and recreation in and on the water. Ecology uses numerical criteria along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limits, the discharge must meet the water quality-based limits.

Numerical criteria for the protection of human health

The U.S. EPA has published 91 numeric water quality criteria for the protection of human health that are applicable to dischargers in Washington State (EPA, 1992). These criteria are designed to protect humans from exposure to pollutants linked to cancer and other diseases, based on consuming fish and shellfish and drinking contaminated surface waters. The water quality standards also include radionuclide criteria to protect humans from the effects of radioactive substances.

Narrative criteria

Narrative water quality criteria (e.g., WAC 173-201A-240(1); 2006) limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge to levels below those which have the potential to:

- Adversely affect designated water uses.
- Cause acute or chronic toxicity to biota.
- Impair aesthetic values.
- Adversely affect human health.

Narrative criteria protect the specific designated uses of all fresh waters (WAC 173-201A-200, 2006) and of all marine waters (WAC 173-201A-210, 2006) in the state of Washington.

Antidegradation

Description--The purpose of Washington's Antidegradation Policy (WAC 173-201A-300-330; 2006) is to:

- Restore and maintain the highest possible quality of the surface waters of Washington.
- Describe situations under which water quality may be lowered from its current condition.
- Apply to human activities that are likely to have an impact on the water quality of surface water.
- Ensure that all human activities likely to contribute to a lowering of water quality, at a minimum, apply all known, available, and reasonable methods of prevention, control, and treatment (AKART).
- Apply three tiers of protection (described below) for surface waters of the state.

Tier I ensures existing and designated uses are maintained and protected and applies to all waters and all sources of pollutions. Tier II ensures that waters of a higher quality than the criteria assigned are not degraded unless such lowering of water quality is necessary and in the overriding public interest. Tier II applies only to a specific list of polluting activities. Tier III prevents the degradation of waters formally listed as "outstanding resource waters," and applies to all sources of pollution.

A facility must prepare a Tier II analysis when all three of the following conditions are met:

- The facility is planning a new or expanded action.
- Ecology regulates or authorizes the action.

- The action has the potential to cause measurable degradation to existing water quality at the edge of a chronic mixing zone.

Facility Specific Requirements--This facility must meet Tier I requirements.

- Dischargers must maintain and protect existing and designated uses. Ecology must not allow any degradation that will interfere with, or become injurious to, existing or designated uses, except as provided for in chapter 173-201A WAC.
- For waters that do not meet assigned criteria, or protect existing or designated uses, Ecology will take appropriate and definitive steps to bring the water quality back into compliance with the water quality standards. Ecology has developed and EPA has approved plans to correct impairments for the following parameters: Ammonia-Nitrogen (as a nutrient), BOD, fecal coliform, and temperature. Tier I requires the Snoqualmie WWTWRF to comply with waste load allocations in the approved plan.

Ecology's analysis described in this section of the fact sheet demonstrates that the proposed permit conditions will protect existing and designated uses of the receiving water.

Mixing zones

A mixing zone is the defined area in the receiving water surrounding the discharge port(s), where wastewater mixes with receiving water. Within mixing zones the pollutant concentrations may exceed water quality numeric standards, so long as the discharge doesn't interfere with designated uses of the receiving water body (for example, recreation, water supply, and aquatic life and wildlife habitat, etc.) The pollutant concentrations outside of the mixing zones must meet water quality numeric standards.

State and federal rules allow mixing zones because the concentrations and effects of most pollutants diminish rapidly after discharge, due to dilution. Ecology defines mixing zone sizes to limit the amount of time any exposure to the end-of-pipe discharge could harm water quality, plants, or fish.

The state's water quality standards allow Ecology to authorize mixing zones for the facility's permitted wastewater discharges only if those discharges already receive all known, available, and reasonable methods of prevention, control, and treatment (AKART). Mixing zones typically require compliance with water quality criteria within a specified distance from the point of discharge and must not use more than 25% of the available width of the water body for dilution [WAC 173-201A-400 (7)(a)(ii-iii)].

Ecology uses modeling to estimate the amount of mixing within the mixing zone. Through modeling Ecology determines the potential for violating the water quality standards at the edge of the mixing zone and derives any necessary effluent limits. Steady-state models are the most frequently used tools for conducting mixing zone analyses. Ecology chooses values for each effluent and for receiving water variables that correspond to the time period when the most critical condition is likely to occur (see Ecology's *Permit Writer's Manual*). Each critical condition parameter, by itself, has a low probability of occurrence and the resulting dilution factor is conservative. The term "reasonable worst-case" applies to these values.

The mixing zone analysis produces a numerical value called a dilution factor (DF). A dilution factor represents the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. For example, a dilution factor of 10 means the effluent is 10% and the

receiving water is 90% of the total volume of water at the boundary of the mixing zone. Ecology uses dilution factors with the water quality criteria to calculate reasonable potentials and effluent limits. Water quality standards include both aquatic life-based criteria and human health-based criteria. The former are applied at both the acute and chronic mixing zone boundaries; the latter are applied only at the chronic boundary. The concentration of pollutants at the boundaries of any of these mixing zones may not exceed the numerical criteria for that zone.

Each aquatic life *acute* criterion is based on the assumption that organisms are not exposed to that concentration for more than one hour and more often than one exposure in three years. Each aquatic life *chronic* criterion is based on the assumption that organisms are not exposed to that concentration for more than four consecutive days and more often than once in three years.

The two types of human health-based water quality criteria distinguish between those pollutants linked to non-cancer effects (non-carcinogenic) and those linked to cancer effects (carcinogenic). The human health-based water quality criteria incorporate several exposure and risk assumptions. These assumptions include:

- A 70-year lifetime of daily exposures.
- An ingestion rate for fish or shellfish measured in kg/day.
- An ingestion rate of two liters/day for drinking water.
- A one-in-one-million cancer risk for carcinogenic chemicals.

This permit authorizes a small acute mixing zone, surrounded by a chronic mixing zone around the point of discharge (WAC 173-201A-400). The water quality standards impose certain conditions before allowing the discharger a mixing zone:

1. **Ecology must specify both the allowed size and location in a permit.**

   The proposed permit specifies the size and location of the allowed mixing zone (as specified below).

2. **The facility must fully apply "all known, available, and reasonable methods of prevention, control and treatment" (AKART) to its discharge.**

   Ecology has determined that the treatment provided at the Snoqualmie WWTWRF meets the requirements of AKART (see "Technology-based Limits").

3. **Ecology must consider critical discharge conditions.**

   Surface water quality-based limits are derived for the water body's critical condition (the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or designated waterbody uses). The critical discharge condition is often pollutant-specific or waterbody-specific.

   Critical discharge conditions are those conditions that result in reduced dilution or increased effect of the pollutant. Factors affecting dilution include the depth of water, the density stratification in the water column, the currents, and the rate of discharge. Density stratification is determined by the salinity and temperature of the receiving water. Temperatures are warmer in the surface waters in summer. Therefore, density stratification is generally greatest during the summer months. Density stratification affects how far up in the water column a freshwater plume may rise. The rate of mixing is greatest when an effluent is rising. The effluent stops rising when the mixed effluent is the same density as the surrounding water. After the effluent

stops rising, the rate of mixing is much more gradual. Water depth can affect dilution when a plume might rise to the surface when there is little or no stratification. Ecology's *Permit Writer's Manual* describes additional guidance on criteria/design conditions for determining dilution factors. The manual can be obtained from Ecology's website at: https://fortress.wa.gov/ecy/publications/SummaryPages/92109.html.

Table 12. Critical Conditions Used to Model the Discharge

Critical Condition	Value
The seven-day-average low river flow with a recurrence interval of ten years (7Q10)	346 cfs
The thirty-day low river flow with a recurrence interval of five years (30Q5) [1]	484 cfs
Harmonic Mean Flow [2]	1038 cfs
River depth at the 7Q10 period	10.5 feet
Estimated river width at the 7Q10 period [3]	170 feet
Estimated river slope[3]	.000129
Maximum average monthly effluent flow for chronic and human health non-carcinogen	1.37 MGD
Maximum daily flow for acute mixing zone	3.18 MGD
Annual average flow for human health carcinogen	0.94 MGD

[1] *30Q5 flow estimated as 1.4 times the 7Q10 flow.*
[2] *Harmonic mean flow estimated as three times the 7Q10 flow.*
[3] *River width and slope estimated based on aerial photo interpretation and topographic map measurements.*

4. **Supporting information must clearly indicate the mixing zone would not:**
   - Have a reasonable potential to cause the loss of sensitive or important habitat.
   - Substantially interfere with the existing or characteristic uses.
   - Result in damage to the ecosystem.
   - Adversely affect public health.

   Ecology established Washington State water quality criteria for toxic chemicals using EPA criteria. EPA developed the criteria using toxicity tests with numerous organisms and set the criteria to generally protect the species tested and to fully protect all commercially and recreationally important species.

   EPA sets acute criteria for toxic chemicals assuming organisms are exposed to the pollutant at the criteria concentration for one hour. They set chronic standards assuming organisms are exposed to the pollutant at the criteria concentration for four days. Dilution modeling under critical conditions generally shows that both acute and chronic criteria concentrations are reached within minutes of discharge.

   The discharge plume does not impact drifting and non-strong swimming organisms because they cannot stay in the plume close to the outfall long enough to be affected. Strong swimming fish could maintain a position within the plume, but they can also avoid the discharge by swimming away. Mixing zones generally do not affect benthic organisms (bottom dwellers) because the buoyant plume rises in the water column. Ecology has additionally determined that the effluent will not exceed 33 degrees C for more than two seconds after discharge; and that the temperature of the water will not create lethal conditions or blockages to fish migration.

Ecology evaluates the cumulative toxicity of an effluent by testing the discharge with whole effluent toxicity (WET) testing.

Because this is a domestic wastewater discharge, the effluent contains fecal coliform bacteria. Ecology developed the water quality criteria for fecal coliforms (discussed below) to assure that people swimming (primary contact recreation) in water meeting the criteria would not develop gastro enteric illnesses. Ecology has authorized a mixing zone for this discharge and expects fecal coliform concentrations to be near background levels at the edge of the chronic mixing zone. Ecology does not believe this mixing zone substantially interferes with the primary recreation designated use.

Ecology reviewed the above information, the specific information on the characteristics of the discharge, the receiving water characteristics, and the discharge location. Based on this review, Ecology concluded that the discharge does not have a reasonable potential to cause the loss of sensitive or important habitat, substantially interfere with existing or characteristics uses, result in damage to the ecosystem, or adversely affect public health if the permit limits are met.

5. The discharge/receiving water mixture must not exceed water quality criteria outside the boundary of a mixing zone.

Ecology conducted a reasonable potential analysis, using procedures established by the EPA and by Ecology, for each pollutant and concluded the discharge/receiving water mixture will not violate water quality criteria outside the boundary of the mixing zone if permit limits are met.

6. The size of the mixing zone and the concentrations of the pollutants must be minimized.

At any given time, the effluent plume uses only a portion of the acute and chronic mixing zone, which minimizes the volume of water involved in mixing. The plume mixes as it rises through the water column therefore much of the receiving water volume at lower depths in the mixing zone is not mixed with discharge. Similarly, because the discharge may stop rising at some depth due to density stratification, waters above that depth will not mix with the discharge. Ecology determined it is impractical to specify in the permit the actual, much more limited volume in which the dilution occurs as the plume rises and moves with the current.

Ecology minimizes the size of mixing zones by requiring dischargers to install diffusers when they are appropriate to the discharge and the specific receiving waterbody. When a diffuser is installed, the discharge is more completely mixed with the receiving water in a shorter time. Ecology also minimizes the size of the mixing zone (in the form of the dilution factor) using design criteria with a low probability of occurrence. For example, Ecology uses the expected 95th percentile pollutant concentration, the 90th percentile background concentration, the centerline dilution factor, and the lowest flow occurring once in every ten years to perform the reasonable potential analysis.

Because of the above reasons, Ecology has effectively minimized the size of the mixing zone authorized in the proposed permit.

7. Maximum size of mixing zone.

The authorized mixing zone does not exceed the maximum size restriction.

8. **Acute mixing zone.**

   - **The discharge/receiving water mixture must comply with acute criteria as near to the point of discharge as practicably attainable.**

     Ecology determined the acute criteria will be met at 10% of the volume fraction of the chronic mixing zone at the ten year low flow.

   - **The pollutant concentration, duration, and frequency of exposure to the discharge will not create a barrier to migration or translocation of indigenous organisms to a degree that has the potential to cause damage to the ecosystem.**

     As described above, the toxicity of any pollutant depends upon the exposure, the pollutant concentration, and the time the organism is exposed to that concentration. Authorizing a limited acute mixing zone for this discharge assures that it will not create a barrier to migration. The effluent from this discharge will rise as it enters the receiving water, assuring that the rising effluent will not cause translocation of indigenous organisms near the point of discharge (below the rising effluent).

   - **Comply with size restrictions.**

     The mixing zone authorized for this discharge complies with the size restrictions published in chapter 173-201A WAC.

9. **Overlap of mixing zones.**

   This mixing zone does not overlap another mixing zone.

D. Designated uses and surface water quality criteria

Applicable designated uses and surface water quality criteria are defined in chapter 173-201A WAC. In addition, the U.S. EPA set human health criteria for toxic pollutants (EPA 1992). The tables included below summarize the criteria applicable to the receiving water's designated uses.

- Aquatic Life Uses are designated based on the presence of, or the intent to provide protection for the key uses. All indigenous fish and non-fish aquatic species must be protected in waters of the state in addition to the key species. The Aquatic Life Uses for this receiving water are identified below.

Table 13. Freshwater Aquatic Life Uses and Associated Criteria

Core Summer Salmonid Habitat	
Temperature Criteria – Highest 7-DAD MAX	16°C (60.8°F)
Dissolved Oxygen Criteria	9.5 mg/L
Turbidity Criteria	• 5 NTU over background when the background is 50 NTU or less; or • A 10 percent increase in turbidity when the background turbidity is more than 50 NTU.
Total Dissolved Gas Criteria	Total dissolved gas must not exceed 110 percent of saturation at any point of sample collection.
pH Criteria	The pH must measure within the range of 6.5 to 8.5, with a human-caused variation within the above range of less than 0.2 units.

- The *recreational uses* for this receiving water are identified below.

Table 14. Recreational Uses and Associated Criteria

Recreational Use	Criteria
Primary Contact Recreation	Fecal coliform organism levels must not exceed a geometric mean value of 100 colonies /100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 200 colonies /100 mL.

- The *water supply uses* are domestic, agricultural, industrial, and stock watering.
- The *miscellaneous freshwater uses* are wildlife habitat, harvesting, commerce and navigation, boating, and aesthetics.

E. Water quality impairments

Ecology conducted water quality assessments of the Snoqualmie River in 1989-91 that identified impairments existed within the basin. The *Snoqualmie River Total Maximum Daily Load Study* (#94-71) published in May 1994 recommended waste load allocations necessary to correct impairments due to nutrient loading and high fecal coliform bacteria levels. Ecology also published the *Snoqualmie River Basin Temperature Total Maximum Daily Load: Water Quality Improvement Report and Implementation Plan* (#11-10-041) in 2011 to address temperature impairments in the system. The studies included waste load allocations for certain parameters for each wastewater treatment plant in the basin. Table 15 summarizes waste load allocations applicable to the Snoqualmie WWTWRF.

Table 15. TMDL-Based Waste Load Allocations

Parameter	Waste Load Allocation	Critical Period for WLA
Temperature	24.7 °C	June 1st – September 30th
CBOD	206 lbs/day	August 1st – October 31st
Ammonia-N	68.7 lbs/day (as N)	August 1st – October 31st
Soluble Reactive Phosphorus[1]	14 lbs/day (as P)	August 1st – October 31st
Fecal Coliform	Meet technology-based limits	August 1st – October 31st

[1] *The TMDL does not include required WLAs for Soluble Reactive Phosphorus (Orthophosphate), but it does include "recommended goals" for dischargers. The value listed above reflects this recommended goal for the Snoqualmie WWTWRF. Ecology does not enforce recommended WLA goals as permit limits and only includes it in this fact sheet for informational purposes.*

F. Evaluation of surface water quality-based effluent limits for numeric criteria

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near-field) or at a considerable distance from the point of discharge (far-field). Toxic pollutants, for example, are near-field pollutants; their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as biochemical oxygen demand (BOD_5) is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating surface water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

With technology-based controls (AKART), predicted pollutant concentrations in the discharge exceed water quality criteria. Ecology therefore authorizes a mixing zone in accordance with the geometric configuration, flow restriction, and other restrictions imposed on mixing zones by chapter 173-201A WAC.

Outfall 001 consists of a 36-inch diameter open-ended pipe that discharges immediately upstream of the Railroad Avenue (Hwy 202) Bridge at a location approximately 30 feet from the north bank of the Snoqualmie River. The outfall pipe terminates at a depth of 10.5 feet at 7Q10 flow. Ecology carried out a preliminary dilution modeling effort of the outfall using river channel dimensions estimated from maps and aerial photos. This effort determined that dilution obtained through modeling would be less restrictive than using percent of river flow based calculations listed in regulations. Therefore, this permit limits the authorized mixing zones to the size and dilution ratios listed in WAC 173-201A-400, as discussed below. Figure 3 illustrates the approximate size and location of the authorized mixing zone.

Figure 3. Approximate Mixing Zones

Chronic Mixing Zone -- WAC 173-201A-400(7)(a) specifies that mixing zones must not extend in a downstream direction from the discharge ports for a distance greater than 300 feet plus the depth of water over the discharge ports or extend upstream for a distance of over 100 feet, not utilize greater than **25%** of the flow, and not occupy greater than **25%** of the width of the water body. Given these constraints, the proposed permit authorizes a chronic mixing zone with a maximum width of 42.5 feet, and that extends a maximum of 310.5 feet downstream and 100 feet upstream from the end of the pipe. The discharge must comply with water quality standards for chronic aquatic life criteria along with carcinogen and non-carcinogen human health criteria at the edge of this mixing zone. Ecology will restrict maximum chronic dilution based on mixing the effluent with 25% of the 7Q10 flow.

Acute Mixing Zone -- WAC 173-201A-400(8)(a) specifies that in rivers and streams a zone where acute toxics criteria may be exceeded must not extend beyond 10% of the distance towards the upstream and downstream boundaries of the chronic zone, not use greater than **2.5%** of the flow and not occupy greater than **25%** of the width of the water body Given these constraints, the proposed permit authorizes an acute mixing zone with a maximum width of 42.5 feet, and that extends a maximum of 31.0 feet downstream and 10.0 feet upstream from the end of the pipe. The discharge must comply with water quality standards for acute aquatic life criteria at the edge of this mixing zone. Ecology will restrict maximum acute dilution based on mixing the effluent with 2.5% of the 7Q10 flow.

Dilution Factors -- Ecology determined the dilution factors associated with the authorized mixing zones based on simple mixing of the effluent with the percentage of the river flow at the critical conditions noted above. Ecology uses the maximum dilution listed in table 16 below to evaluate the impacts the discharge may have on downstream water quality and to determine whether the proposed permit requires water quality-based limits for dissolved oxygen deficiency, nutrients, pH, fecal coliform, chlorine, ammonia, metals, other toxics, and temperature. The derivation of surface water quality-based limits also takes into account the variability of pollutant concentrations in both the effluent and the receiving water.

Table 16. Dilution Factors (DF)

Criteria	Acute	Chronic
Aquatic Life	3	42
Human Health, Carcinogen		179
Human Health, Non-carcinogen		58

Dissolved Oxygen -- BOD_5 and Ammonia Effects -- Natural decomposition of organic material in wastewater effluent impacts dissolved oxygen in the receiving water at distances far outside of the regulated mixing zone. The 5-day Biochemical Oxygen Demand of an effluent sample indicates the amount of biodegradable material in the wastewater and estimates the magnitude of oxygen consumption the wastewater will generate in the receiving water. The amount of ammonia-based nitrogen in the wastewater also provides an indication of oxygen demand potential in the receiving water.

The *1994 Snoqualmie River Total Maximum Daily Load Study* established waste load allocations (WLAs) for $CBOD_5$ and ammonia for discharges occurring during the August – October critical season. Waste load allocations for the Snoqualmie WWTWRF are:

- 206 lbs/day $CBOD_5$
- 68.7 lbs/day Ammonia (as N)

The WLA listed above are the maximum daily limits (MDL) for those parameters. According to federal NPDES regulations, all permit limits must be expressed as both average monthly and maximum daily limits. The average monthly limit (AML) is calculated according to the method in EPA's Technical Support Document for Water Quality-based Toxics Control (1991). See Appendix E for detailed calculations. The AML calculation is affected by effluent variability and number of samples per month. Ecology calculated the

average monthly limit based on 12 sampling events per month (3 per week) for CBOD5 and 4 sampling events per month (1 per week) for ammonia. The calculated coefficients of variation (CV) used are 1.77 and 2.29 for CBOD5 and ammonia, respectively. Average monthly limits (AML) for the proposed permit are:

- 51.6 lbs/day $CBOD_5$
- 21.9 lbs/day Ammonia (as N)

The proposed permit will include water quality-based mass limits for $CBOD_5$ and total ammonia during the critical season and technology-based mass limits for $CBOD_5$ only during the non-critical season. $CBOD_5$ concentration limits apply throughout the year.

pH -- Ecology modeled the impact of the effluent pH on the receiving water using the calculations from EPA, 1988, and the chronic dilution factor of 42. Ecology used ambient values in Table 2 for this analysis along with the extremes of the technology-based limits (pH of 6.0 and 9.0). Ecology also assumed discharge temperature and alkalinity in Tables 4 and 5 remain constant throughout the pH range.

As shown in model outputs in Appendix E, Ecology predicts no violation of the pH criteria under critical conditions at the upper boundary of pH 9.0. However, the incremental pH change at the lower end of the range (pH 6.0) exceeds the allowable change of 0.2 standard units. The discharge will not exceed the incremental change restriction when pH is above 6.3. Therefore, the proposed permit will limit pH to the range of 6.3 to 9.0.

Fecal Coliform -- The 1994 *Snoqualmie River Total Maximum Daily Load Study* examined the need for waste load allocations for fecal coliform bacteria. The report concluded that wastewater treatment plants within the system represented a minor contribution to the overall loading when the plants comply with technology-based limits for fecal coliform. Although the study included a numeric waste load allocation of 2.5×10^{10} CFU/day for the Snoqualmie facility, Ecology has routinely enforced the technology-based limits described in Part III.B of this fact sheet as the required controls necessary to comply with the TMDL.

To confirm that technology-based limits remain sufficient to protect water quality downstream of the discharge, Ecology modeled the numbers of fecal coliform by simple mixing analysis using the technology-based limit of 400 organisms per 100 ml, an ambient concentration of 71.4 organisms per100 ml and a dilution factor of 42. As shown in Appendix E, the calculation predicts that the discharge will increase fecal coliform levels by 8 organisms per 100 ml at the edge of the chronic mixing zone to a level of 79 organisms per 100 ml. Since this remains less than the water quality standard of 100 organisms per 100 ml, the proposed permit includes the technology-based effluent limit for fecal coliform bacteria.

Turbidity -- Ambient data from Ecology's long-term monitoring station 07D130 indicates that a linear correlation exists between TSS concentrations and turbidity measurements in the Snoqualmie River. Data shows that each mg/L of TSS concentration equates to a turbidity reading of approximately 0.408 NTU. Using this correlation and simple mixing within the chronic mixing zone, Ecology evaluated the reasonable potential for technology-based TSS limits to violate turbidity standards. The simple mixing analysis predicts that an effluent TSS concentration of 45 mg/L will cause TSS concentration to increase by 0.4 mg/L at the edge of the chronic mixing zone. This increase equates to an increase of 0.15 NTU in turbidity. Since this increase is lower than the 5 NTU increase allowance in the water quality standards, the

technology-based limits for TSS are sufficient to protect water quality in the vicinity of the discharge.

Toxic Pollutants -- Federal regulations (40 CFR 122.44) require Ecology to place limits in NPDES permits on toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. Ecology does not exempt facilities with technology-based effluent limits from meeting the surface water quality standards.

The City's permit application identified that the discharge contains pollutants with water quality standards for the protection of aquatic life. Those pollutants include chlorine (when used as a backup disinfectant), ammonia, aluminum, dissolved arsenic, cadmium, hexavalent chromium, copper, lead, mercury, nickel, selenium, and zinc. Ecology conducted a reasonable potential analysis (See Appendix E) on these parameters to determine whether it would require effluent limits in this permit. The analysis used effluent concentrations based on monitoring done by the City of Snoqualmie and ambient background concentrations listed in Table 2. Ecology did not have ambient data for aluminum, cadmium, selenium, and chlorine and, therefore, used zero for background concentrations of these pollutants. Ambient data was also not available for hexavalent chromium, however data was available for total chromium. Since total chromium includes hexavalent chromium, Ecology used the ambient concentration of total chromium as a "worst case" concentration of hexavalent chromium in the reasonable potential analysis.

The results presented in Appendix E show that the previous water-quality based limits on chlorine no longer remain sufficient to protect aquatic life. This is likely due to decreases in the authorized mixing zone dilution factors compared to the previous permit. The proposed permit will include the following limits on chlorine discharged through outfall #001 to the Snoqualmie River: Average Monthly Limit of 20.0 μg/L and Maximum Daily Limit of 52 μg/L. As with the previous permit, these limits apply only when the Snoqualmie WWTWRF must use chlorine as a disinfectant whenever their primary UV disinfection system becomes ineffective due to equipment failure or plant upset. The permit does not allow the discharge of chlorine when UV system is used for disinfection.

For the remaining toxic pollutants noted above, the analysis in Appendix E shows that the discharge poses no reasonable potential to exceed the water quality criteria for those constituents at the critical condition. Therefore, the permit does not require effluent limits for ammonia, aluminum, dissolved arsenic, cadmium, hexavalent chromium, copper, lead, mercury, nickel, selenium, and zinc. Ecology's determination assumes that this facility meets the other effluent limits of this permit.

Temperature--The state temperature standards [WAC 173-201A-200-210 and 600-612] include multiple elements:

- Annual summer maximum threshold criteria (June 15 to September 15).
- Supplemental spawning and rearing season criteria (September 15 to June 15).
- Incremental warming restrictions.
- Protections against acute effects.

Appendix E contains detailed explanations of each element. Ecology independently evaluates each criterion noted above to determine whether a reasonable potential exists for the discharge to exceed water quality standards and to derive appropriate permit limits, if necessary. Since the water quality standards do not identify supplemental spawning criteria for the Snoqualmie River in the vicinity of the outfall, Ecology did not evaluate the facility's impact on this element.

Annual summer maximum and incremental warming criteria: Due to documented temperature impairments in the Snoqualmie River basin, Ecology completed The *Snoqualmie River Basin Temperature Total Maximum Daily Load: Water Quality Improvement Report and Implementation Plan* in 2011. This plan established strategies and waste load allocations necessary to restore river temperatures to levels consistent with approved standards for summer maximum, supplemental spawning (in areas with supplemental temperature criteria), and incremental warming. The plan includes a temperature waste load allocation of 24.7° C for discharges from the Snoqualmie WWTWRF to the Snoqualmie River during the period of June 1st through September 30th. Ecology will incorporate this allocation into the proposed permit as a seasonal daily temperature limit.

Protection against acute effects: A discharge does not pose a reasonable potential to risk acute effects when it meets the following conditions:

- Effluent temperature must not exceed 33°C or cause ambient temperature to exceed 33°C two seconds after discharge.
- Does not increase ambient temperature more than 0.3°C when receiving water temperature exceeds either a 1DMax of 23°C or a 7DADMax of 22°C.
- Does not cause temperature to warm more than 0.3°C above 17.5°C at locations where eggs are incubating.

The wastewater effluent characterization in Table 4 of this fact sheet shows that discharges from the Snoqualmie WWTWRF do not approach 33°C. In addition, ambient data in Table 2 shows that the river temperature does not approach a 7DADMax temperature of 22°C and the facility does not discharge into an area in which eggs are incubating. Therefore, the proposed permit does not require a limit to protect against acute effects since the discharge complies with the acute criteria listed above.

G. Human health

Washington's water quality standards include 91 numeric human health-based criteria that Ecology must consider when writing NPDES permits. These criteria were established in 1992 by the U.S. EPA in its National Toxics Rule (40 CFR 131.36). The National Toxics Rule allows states to use mixing zones to evaluate whether discharges comply with human health criteria.

The permit application identified that the effluent contained detectable concentrations of the following chemicals of concern for human health: antimony, bis(2-ethylhexyl)phthalate, copper, manganese, mercury, nickel, selenium, thallium, and toluene. Ecology evaluated the discharge's potential to violate the water quality standards as required by 40 CFR 122.44(d) by following the procedures published in the *Technical Support Document for Water Quality-Based Toxics Control* (EPA/505/2-90-001) and Ecology's *Permit Writer's Manual* to

make a reasonable potential determination. The evaluation showed that the discharge has no reasonable potential to cause a violation of water quality standards, and effluent limits are not needed for the chemicals listed above.

H. Sediment quality

The aquatic sediment standards (chapter 173-204 WAC) protect aquatic biota and human health. Under these standards Ecology may require a facility to evaluate the potential for its discharge to cause a violation of sediment standards (WAC 173-204-400). You can obtain additional information about sediments at the Aquatic Lands Cleanup Unit website. http://www.ecy.wa.gov/programs/tcp/smu/sediment.html

The City of Snoqualmie conducted an inspection of the submerged portions of outfall #001 in the Snoqualmie River in November 2005. The diver's report from that inspection noted that the river bed in the vicinity of the outfall was predominantly cobble and gravel with no visible signs of sediment accumulation. Based on this observation and the City's practice of discharging minimal effluent to the river during the summer season when river velocity is low, Ecology has determined that this discharge has no reasonable potential to violate the sediment management standards. Therefore the proposed permit does not contain sediment monitoring requirements.

I. Whole effluent toxicity

The water quality standards for surface waters forbid discharge of effluent that has the potential to cause toxic effects in the receiving waters. Many toxic pollutants cannot be measured by commonly available detection methods. However, laboratory tests can measure toxicity directly by exposing living organisms to the wastewater and measuring their responses. These tests measure the aggregate toxicity of the whole effluent, so this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

> *Acute toxicity tests measure mortality as the significant response* to the toxicity of the effluent. Dischargers who monitor their wastewater with acute toxicity tests find early indications of any potential lethal effect of the effluent on organisms in the receiving water.
>
> *Chronic toxicity tests measure various sublethal toxic responses*, such as reduced growth or reproduction. Chronic toxicity tests often involve either a complete life cycle test on an organism with an extremely short life cycle, or a partial life cycle test during a critical stage of a test organism's life. Some chronic toxicity tests also measure organism survival.

Laboratories accredited by Ecology for WET testing know how to use the proper WET testing protocols, fulfill the data requirements, and submit results in the correct reporting format. Accredited laboratory staff know about WET testing and how to calculate an NOEC, LC50, EC50, IC25, etc. Ecology gives all accredited labs the most recent version of Ecology Publication No. WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria* (http://www.ecy.wa.gov/biblio/9580.html), which is referenced in the permit. Ecology recommends that City of Snohomish send a copy of the acute or chronic toxicity sections(s) of its NPDES permit to the laboratory.

WET testing conducted during effluent characterization showed no reasonable potential for effluent discharges to cause receiving water acute or chronic toxicity. The proposed permit will not include an acute or chronic WET limit. The Snoqualmie WWTWRF must retest the effluent before submitting an application for permit renewal.

If this facility makes process or material changes which, in Ecology's opinion, increase the potential for effluent toxicity, then Ecology may (in a regulatory order, by permit modification, or in the permit renewal) require the facility to conduct additional effluent characterization. The City of Snoqualmie may demonstrate to Ecology that effluent toxicity has not increased by performing additional WET testing and/or chemical analyses after the process or material changes have been made. Ecology recommends that the Permittee check with it first to make sure that Ecology will consider the demonstration adequate to support a decision to not require an additional effluent characterization.

If WET testing conducted for submittal with a permit application fails to meet the performance standards in WAC 173-205-020, Ecology will assume that effluent toxicity has increased.

J. Groundwater quality limits

The groundwater quality standards (chapter 173-200 WAC) protect beneficial uses of groundwater. Permits issued by Ecology must not allow violations of those standards (WAC 173-200-100). The Snoqualmie WWTWRF does not discharge wastewater to the ground. Although the facility produces and distributes Class A reclaimed water for irrigation purposes, the reclaimed water conditions in the proposed permit do not allow for the use of the water in any way that will impact groundwater. Therefore the proposed permit does not require numeric limits to protect groundwater.

K. Comparison of effluent limits with the last permit, modified on July 1, 2011

Table 17. Comparison of Previous and Proposed Effluent Limits, Outfall 001

	Previous Effluent Limits:		**Proposed Effluent Limits:**	
Parameter	**Average Monthly**	**Average Weekly**	**Average Monthly**	**Average Weekly**
$CBOD_5$ Concentration Limits	25 mg/L 85% Removal	40 mg/L	25 mg/L 85% Removal	40 mg/L
$CBOD_5$ Mass Limits *Effective Nov.-July Only*	448 lbs/day	717 lbs/day	448 lbs/day	717 lbs/day
Total Suspended Solids	30 mg/L 538 lbs/day 85% Removal	45 mg/L 807 lbs/day	30 mg/L 538 lbs/day 85% Removal	45 mg/L 807 lbs/day
Parameter	**Monthly Geometric Mean Limit**	**Weekly Geometric Mean Limit**	**Monthly Geometric Mean Limit**	**Weekly Geometric Mean Limit**
Fecal Coliform Bacteria	200/100 ml	400/100 ml	200/100 ml	400/100 ml
Parameter	**Limit**		**Limit**	
pH	Within the range of 6.0 to 9.0		Within the range of 6.3 to 9.0	
Parameter	**Average Monthly**	**Maximum Daily**	**Average Monthly**	**Maximum Daily**
Total Residual Chlorine	37 μg/L	70 μg/L	20 μg/L	52 μg/L

	Previous Effluent Limits:		Proposed Effluent Limits:	
Parameter	**Average Monthly**	**Average Weekly**	**Average Monthly**	**Average Weekly**
$CBOD_5$, Seasonal mass limit *Effective Aug-Oct. Only*	N/A	206 lbs/day	51.6 lbs/day	206 lbs/day
Total Ammonia (as N), Seasonal mass limit *Effective July-Oct. Only*	N/A	68.7 lbs/day	21.9 lbs/day	68.7 lbs/day
Temperature, 7DADMAX *Effective June – Sept. Only*	N/A	N/A	N/A	24.7° C

L. Reclaimed Water limits

The Reclaimed Water Act, Chapter 90.46 RCW requires that reclaimed water generators adequately and reliably treat wastewater to meet reclaimed water standards prior to distribution and beneficial use. State regulations require that Ecology base reclaimed water limits on the:

- Technology and treatment methods available to treat specific pollutants (technology based). The source of reclaimed water must be treated using all known, available, reasonable methods of prevention, control, and treatment (AKART). In addition, reclaimed water must receive adequate and reliable treatment (ART) as specified by the 1997 *Washington State Water Reclamation and Reuse Standards*. Due to the design capacity limitations of the sand filters, reclaimed water production must not exceed 1.56 MGD to ensure that the reclaimed water receives adequate and reliable treatment.
- For land application uses, including irrigation, the quantity and quality of the reclaimed water must be at levels that protect the quality of the groundwater. The proposed permit limits irrigation use to agronomic rates to minimize the potential for reclaimed water to percolate into groundwater.
- Applicable requirements of other local, state and federal laws.

Ecology and Department of Health (DOH) adopted criteria to demonstrate compliance with these requirements in the *Washington State Water Reclamation and Reuse Standards (1997)* and Chapter 173-221 WAC. Ecology applies the most stringent of technology and water quality based limits to each parameter of concern for reclaimed water production and further describes the proposed limits below.

The 1997 *Water Reclamation and Reuse Standards*, outline the requirements for the additional level of treatment technology as well as water quality limits necessary for public health protection during the use of reclaimed water. The technology and water quality requirements for the production of Class A reclaimed water are as follows:

"Class A Reclaimed Water" is reclaimed water that had been adequately and reliably treated and, at a minimum is, at all times, an oxidized, coagulated, filtered and disinfected wastewater.

- Oxidized is defined as wastewater in which the organic matter has been stabilized such that the biochemical oxygen demand (BOD_5) does not exceed 30 mg/L and total suspended solids (TSS) does not exceed 30 mg/L, is nonputrescible and contains

dissolved oxygen. The proposed permit requires the facility to demonstrate compliance with the technology-based limits for CBOD and TSS listed in Table 10 when producing reclaimed water and to demonstrate that the product water contains measureable concentrations of dissolved oxygen. The proposed permit also includes a pH limit range of 6.3 to 9.0 for all reclaimed water produced at the facility.

- Coagulated wastewater is defined as an oxidized wastewater in which colloidal and finely divided suspended matter have been destabilized and agglomerated prior to filtration by the addition of chemicals or by an equally effective method. The proposed permit does not include a numeric limit on the amount of coagulant used in reclaimed water production. However the proposed permit contains a narrative limit that requires the Snoqualmie WWTWRF to use coagulant and to report the quantity used each day.
- Filtered wastewater is defined as an oxidized, coagulated wastewater which has been passed through natural undisturbed soils or filter media, such as sand or anthracite, so that the turbidity as determined by an approved laboratory method does not exceed an average operating turbidity of 2 nephelometric turbidity units (NTU), determined monthly, and does not exceed 5 NTU at any time. The proposed permit includes these values as limit values that must be met prior to UV disinfection.
- Adequate disinfection is defined as the median number of total coliform organisms in the wastewater after disinfection does not exceed 2.2 per 100 milliliters, as determined from the bacteriological results of the last seven (7) days for which analyses have been completed, and the number of total coliform organisms does not exceed 23 per 100 milliliters in any sample.
- The reclaimed water standards require facilities that rely on chlorine for disinfection to maintain residual chlorine at a level that achieves a "Ct" value (contact time multiplied by concentration) of 30. This equates to a chorine residual of 1 mg/L after 30 minutes of contact time. The Snoqualmie WWTWRF was designed to provide dual disinfection of reclaimed water using both UV light at the treatment plant and chlorine in the transmission line to provide complete disinfection to Class A standards. Since the facility relies on chlorine for complete disinfection, it must maintain a residual at the end of the distribution pipe that provides a Ct value of 30. At full reclaimed water design flows of 1.56 MGD, the detention time in the distribution pipe between the facility and the sample port located near Eagle Lake is approximately 45 minutes. Given this detention time, the minimum concentration necessary to maintain a Ct value of 30 at the sample point is determined by dividing the design Ct value by the detention time (30 ÷ 45), which equals 0.7 mg/L. Therefore, the proposed permit includes the minimum daily chlorine limit of 0.7 mg/L. The point of compliance for this parameter is at the "Hydrant Sample Port," located at the BPA easement road.
- The reclaimed water standards do not require nutrient (nitrogen and/or phosphorus) limits on Class A reclaimed water produced for irrigation uses. However the standards recommend including nutrient limits when the reclaimed water is used in a nonrestricted recreational impoundment as a measure to control algae growths and maintain acceptable aesthetics. The Eagle Lake storage reservoir at the TPC Snoqualmie Ridge Golf Course provides aesthetic landscape benefit at the golf course. Past reclaimed water permits for the Snoqualmie WWTWRF have included a total nitrogen limit of 10 mg/L (monthly average) and 15 mg/L (daily maximum). Ecology will retain these limits in the proposed permit to protect the aesthetic quality of the storage reservoir.

Although the limits in the proposed permit have not changed since the last modification on July 1, 2011, the limit table in condition R1 has changed with the addition of the narrative limit for the addition of coagulants.

IV. Monitoring Requirements

Ecology requires monitoring, recording, and reporting (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and that the discharge complies with the permit's effluent limits.

If a facility uses a contract laboratory to monitor wastewater, it must ensure that the laboratory uses the methods and meets or exceeds the method detection levels required by the permit. The permit describes when facilities may use alternative methods. It also describes what to do in certain situations when the laboratory encounters matrix effects. When a facility uses an alternative method as allowed by the permit, it must report the test method, DL, and QL on the discharge monitoring report or in the required report.

A. Wastewater monitoring

The wastewater monitoring schedule is detailed in the proposed permit under Special Condition S.2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of Ecology's *Permit Writer's Manual* (Publication Number 92-109) for an advanced activated sludge, oxidation ditch treatment plant rated for flows greater than 2.0 MGD.

Ecology currently requires all domestic wastewater facilities to conduct additional monitoring of nutrients. Data from this monitoring may support future work in evaluating treatment technology standards or in assessing the need for revised water quality-based limits. Nutrient monitoring in the proposed permit is in addition to monitoring associated with TMDL compliance, which requires weekly monitoring of ammonia and soluble reactive phosphorous (orthophosphorus). The enhanced nutrient monitoring requires monthly monitoring of nitrate+nitrite-nitrogen, total kjeldahl nitrogen, and total phosphorus.

Monitoring of sludge quantity and quality is necessary to determine the appropriate uses of the sludge. Biosolids monitoring is required by the current state and local solid waste management program and also by EPA under 40 CFR 503.

B. Reclaimed water monitoring

The proposed permit includes Condition R2, which details the monitoring requirements for reclaimed water production. Ecology developed the monitoring schedule to verify that reclaimed water production complies with the quality restrictions in the 1997 *Water Reclamation and Reuse Standards* and to demonstrate that the water receives adequate and reliable treatment. Specified monitoring frequencies and locations take into account the quantity and variability of the reclaimed water, the treatment method, past compliance, significance of monitored parameters, and cost of monitoring.

Condition R2 contains monitoring for some parameters that also appear in the wastewater monitoring schedule (S2), namely CBOD, TSS and pH. Although the Snoqualmie WWTWRF staff may collect samples for reclaimed water monitoring of these parameters at the same point as samples collected to monitor effluent being discharged to the river, they must report results on each DMR since both DMRs track compliance with different sets of permit conditions and standards. In addition, plant staff may not use monitoring done on days in which the facility did not produce reclaimed water to fulfill monitoring requirements for reclaimed water production monitoring. If the facility produces reclaimed water for only part of a week, the plant staff must ensure they meet the minimum monitoring frequency requirements for all reclaimed water parameters regardless of whether they may have already met the minimum requirements for wastewater disposal monitoring.

C. Lab accreditation

Ecology requires that facilities must use a laboratory registered or accredited under the provisions of chapter 173-50 WAC, Accreditation of Environmental Laboratories, to prepare all monitoring data (with the exception of certain parameters). The laboratory at the Snoqualmie WWTWRF holds an accreditation (#M745-13) for the following parameters:

Table 18. Accredited Parameters

General Chemistry		
Analyte Name	**Method**	**Matrix Description**
Ammonia	EPA 350.1_2_1993	Non-Potable Water
Orthophosphate	EPA 365.1_2_1993	Non-Potable Water
Dissolved Oxygen	Hach 10360 Rev 1.1	Non-Potable Water
Solids, Total Suspended	SM 2540 D-97	Non-Potable Water
pH	SM 4500-H+ B-00	Non-Potable Water
Carbonaceous BOD (CBOD)	SM 5210 B-01	Non-Potable Water
Solids, Total, Fixed and Volatile	SM 2540 G-97	Solid and Chemical Materials
Microbiology		
Analyte Name	**Method**	**Matrix Description**
Fecal coliform-count	SM 9222 D (m-FC)-97	Non-Potable Water
Total Coli/Ecoli - count	SM 9223 B Colilert	Non-Potable Water

V. Other Permit Conditions

A. Reporting and record keeping

Ecology based Special Condition S3 on its authority to specify any appropriate reporting and record keeping requirements to prevent and control waste discharges (WAC 173-220-210). As documented in past inspection reports and enforcement documents, The Snoqualmie WWTWRF has not consistently complied with reporting and record keeping requirements in the past permit. Documented problems include submission of inaccurate or incomplete data along with failing to validate data from the facility's SCADA system with field data. To correct ongoing problems with reporting and record keeping, Ecology plans to include provisions in the proposed permit requiring multiple staff to verify DMR data prior to

submitting data to Ecology. The permit condition will require submittal of a cover letter with each DMR that identifies which operators validate the data; each operator must sign the cover letter. The proposed permit also includes a requirement for the facility to submit copies of laboratory bench sheets for the first year of the permit.

B. Prevention of facility overloading

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Snoqualmie WWTWRF to:

- Take the actions detailed in proposed permit Special Condition S.4.
- Design and construct expansions or modifications before the treatment plant reaches existing capacity.
- Report and correct conditions that could result in new or increased discharges of pollutants.

Special Condition S.4 restricts the amount of flow. Reclaimed Water Condition R4 contains similar requirements for maintaining capacity of the reclaimed water system.

C. Operation and maintenance

The proposed permit contains Special Conditions S.5 as authorized under RCW 90.48.110, WAC 173-220-150, chapter 173-230 WAC, and WAC 173-240-080. Ecology included it to ensure proper operation and regular maintenance of equipment, and to ensure that the Snoqualmie WWTWRF takes adequate safeguards so that it uses constructed facilities to their optimum potential in terms of pollutant capture and treatment. The proposed permit also includes Reclaimed Water Condition R.5, which requires additional operation and maintenance actions that apply to the production and distribution of reclaimed water. Ecology included the requirements of R.5 to ensure the City operates and maintains the entire reclaimed water production and distribution system in a manner consistent with the 1997 *Water Reclamation and Reuse Standards.*

Operations and Maintenance Manual – Although the City prepared a draft Operations and Maintenance (O&M) manual for the treatment facility in 1997, Ecology has no record of approving the manual. The facility also did not have an approved O&M manual at the site during Ecology's most recent inspection. State law requires owners of wastewater treatment facilities to operate the facility according to directions contained in an approved O&M manual and to submit updates to that manual for review and approval whenever significant changes are made in plant equipment and processes. Ecology's April 2013 inspection report noted that the City has made significant changes in equipment and processes since the 1997 draft O&M manual was compiled. Changes include construction of a second oxidation ditch, addition of a biosolids dryer and processing facility, and replacement of screening equipment at the headworks.

Due to the lack of an approved O&M manual and the process modifications made since 1997, the proposed permit will require the City to submit a complete updated O&M manual to Ecology for review and approval. The updated manual must conform to the requirements of WAC 173-240-080 and follow the general guidance for O&M manuals in section G1-4.4

of the *Criteria for Sewage Works Design* (Orange Book). The permit condition will require the City to produce an O&M manual that provides detailed instructions for all aspects of facility operations, including processes devoted to reclaimed water production and distribution.

Inflow and Infiltration - Past I/I studies completed by the City of Snoqualmie have documented localized instances of high inflow and infiltration in the collection system serving the historic area of the City. However the City has not documented that I/I contributes to sanitary sewer overflows and the treatment plant currently has sufficient capacity to treat the excess flow. The proposed permit will not require the City to complete additional I/I studies, however it will require the City to take appropriate steps to minimize I/I as part of an overall collection system operations and maintenance strategy.

D. Pretreatment

Duty to enforce discharge prohibitions

This provision prohibits the publicly owned treatment works (POTW) from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer.

- The first section of the pretreatment requirements prohibits the POTW from accepting pollutants which causes "pass-through" or "interference". This general prohibition is from 40 CFR §403.5(a). Appendix C of this fact sheet defines these terms.
- The second section reinforces a number of specific state and federal pretreatment prohibitions found in WAC 173-216-060 and 40 CFR §403.5(b). These reinforce that the POTW may not accept certain wastes, which:
    a. Are prohibited due to dangerous waste rules.
    b. Are explosive or flammable.
    c. Have too high or low of a pH (too corrosive, acidic or basic).
    d. May cause a blockage such as grease, sand, rocks, or viscous materials.
    e. Are hot enough to cause a problem.
    f. Are of sufficient strength or volume to interfere with treatment.
    g. Contain too much petroleum-based oils, mineral oil, or cutting fluid.
    h. Create noxious or toxic gases at any point.

40 CFR Part 403 contains the regulatory basis for these prohibitions, with the exception of the pH provisions which are based on WAC 173-216-060.

- The third section of pretreatment conditions reflects state prohibitions on the POTW accepting certain types of discharges unless the discharge has received prior written authorization from Ecology. These discharges include:
    a. Cooling water in significant volumes.
    b. Stormwater and other direct inflow sources.
    c. Wastewaters significantly affecting system hydraulic loading, which do not require treatment.

Federal and state pretreatment program requirements

Ecology administers the Pretreatment Program under the terms of the addendum to the "Memorandum of Understanding between Washington Department of Ecology and the United States Environmental Protection Agency, Region 10" (1986) and 40 CFR, part 403. Under this delegation of authority, Ecology issues wastewater discharge permits for significant industrial users (SIUs) discharging to POTWs which have not been delegated authority to issue wastewater discharge permits. Ecology must approve, condition, or deny new discharges or a significant increase in the discharge for existing significant industrial users (SIUs) [40 CFR 403.8 (f)(1)(i) and(iii)].

Industrial dischargers must obtain a permit from Ecology before discharging waste to the Snoqualmie WWTWRF [WAC 173-216-110(5)]. Industries discharging wastewater that is similar in character to domestic wastewater do not require a permit.

Routine identification and reporting of industrial users

The permit requires non-delegated POTWs to take "continuous, routine measures to identify all existing, new, and proposed significant industrial users (SIUs) and potential significant industrial users (PSIUs)" discharging to their sewer system. Examples of such routine measures include regular review of water and sewer billing records, business license and building permit applications, advertisements, and personal reconnaissance. System maintenance personnel should be trained on what to look for so they can identify and report new industrial dischargers in the course of performing their jobs. The POTW may not allow SIUs to discharge prior to receiving a permit, and must notify all industrial dischargers (significant or not) in writing of their responsibility to apply for a State Waste Discharge Permit. The POTW must send a copy of this notification to Ecology.

Requirements for performing an industrial user survey

This POTW has the potential to serve significant industrial or commercial users and must conduct an industrial user (IU) survey. The purpose of the IU Survey is to identify all facilities that may be subject to pretreatment standards or requirements so that Ecology can take appropriate measures to control these discharges. The POTW should identify each such user, and require them to apply for a permit before allowing their discharge to the POTW to commence. For SIUs, the POTW must require they actually are issued a permit prior to accepting their discharge. The steps the POTW must document in their IU Survey submittal include:

1. The POTW must develop a master list of businesses that may be subject to pretreatment standards and requirements and show their disposition. This list must be based on several sources of information including business licenses, and water and sewer billing records.
2. The POTW must canvas all the potential sources, having them either complete a survey form or ruling them out by confirming they only generate domestic wastewater.
3. The POTW must develop a list of the SIUs and potential SIUs in all areas served by the POTW. The list must contain sufficient information on each to allow Ecology to decide which discharges merit further controls such as a state waste discharge permit.

Ecology describes the information needed in IU Survey submittals to allow Ecology to make permitting decision in the manual "Performing an Industrial User Survey". Properly completing an Industrial User Survey helps Ecology control discharges that may otherwise harm the POTW including its collection system, processes, and receiving waters. Where surveys are incomplete, Ecology may take such enforcement as appropriate and/or require the POTW to develop a fully delegated pretreatment program.

The proposed permit requires the City of Snoqualmie to conduct an industrial user survey to determine the extent of compliance of all industrial users of the sanitary sewer and wastewater treatment facility with federal pretreatment regulations [40 CFR Part 403 and Sections 307(b) and 308 of the Clean Water Act)], with state regulations (chapter 90.48 RCW and chapter 173-216 WAC), and with local ordinances.

E. Solid wastes

To prevent water quality problems the facility is required in permit Special Condition S7 to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and state water quality standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503, and by Ecology under chapter 70.95J RCW, chapter 173-308 WAC "Biosolids Management," and chapter 173-350 WAC "Solid Waste Handling Standards." The disposal of other solid waste is under the jurisdiction of Seattle-King County Public Health.

Requirements for monitoring sewage sludge and record keeping are included in this permit. Ecology will use this information, required under 40 CFR 503, to develop or update local limits.

F. Spill plan

This facility stores a quantity of chemicals on-site that have the potential to cause water pollution if accidentally released. Ecology can require a facility to develop best management plans to prevent this accidental release [Section 402(a)(1) of the Federal Water Pollution Control Act (FWPCA) and RCW 90.48.080]. The proposed permit requires this facility to ensure that the updated O&M manual contains plans for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs.

G. Outfall evaluation

The proposed permit requires the City to conduct an outfall inspection and submit a report detailing the findings of that inspection (Special Condition S.10). The inspection must evaluate the physical condition of the discharge pipe and open-ended port, evaluate the extent of sediment accumulations in the vicinity of the outfall,, confirm the location (latitude and longitude) of the end of the outfall, and assess the physical condition of the anchors used to secure the outfall pipe. The report must also include a correction plan if the inspection reveals physical damage to the outfall structure or if there are signs of sediment accumulation near the diffuser ports.

H. Reclaimed water distribution and use

Reclaimed Water Condition R4 establishes restrictions on the distribution and use of reclaimed water produced by the Snoqualmie WWTWRF. The restrictions are based on the requirements of RCW 90.46 and the 1997 *Water Reclamation and Reuse Standards*. The standards contain requirements to assure that distribution and use of reclaimed water are protective of public health and the environment at all times. These include prohibitions on bypass, alarms and storage or alternative disposal of substandard water, maintenance of operational records, cross connection control, use area restrictions and enforceable contracts and a local reclaimed water use ordinance.

This permit will require the City have certain records relating to distribution and use available for inspection at the wastewater treatment plant. Records to maintain at the facility include a map of the reclaimed water distribution system, a list of end users with signed agreements, an inventory of cross connection control devices installed at locations served by both potable and reclaimed water and any records relating to improper use of reclaimed water (including spills resulting from broken lines).

I. General conditions

Ecology bases the standardized General Conditions on state and federal law and regulations. They are included in all individual domestic wastewater NPDES permits issued by Ecology.

VI. Permit Issuance Procedures

A. Permit modifications

Ecology may modify this permit to impose numerical limits, if necessary to comply with water quality standards for surface waters, with sediment quality standards, or with water quality standards for groundwaters, based on new information from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

Ecology may also modify this permit to comply with new or amended state or federal regulations.

B. Proposed permit issuance

This proposed permit meets all statutory requirements for Ecology to authorize a wastewater discharge. The permit includes limits and conditions to protect human health and aquatic life, and the beneficial uses of waters of the state of Washington. Ecology proposes to issue this permit for a term of 5 years.

VII. References for Text and Appendices

Earth Tech.

1996 *Snoqualmie Ridge Class "A" Water System and Irrigation Plan*

1998 *Amendment No. 1 to Snoqualmie Ridge Class "A" Water System and Irrigation Plan*

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. *Technical Support Document for Water Quality-based Toxics Control*. EPA/505/2-90-001.

1988. *Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling*. USEPA Office of Water, Washington, D.C.

1985. *Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water*. EPA/600/6-85/002a.

1983. *Water Quality Standards Handbook.* USEPA Office of Water, Washington, D.C.

Tsivoglou, E.C., and J.R. Wallace.

1972. *Characterization of Stream Reaeration Capacity*. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Washington State Department of Ecology.

1994 *Snoqualmie River Total Maximum Daily Load Study* Publication Number 94-71

2008 *Snoqualmie River Basin Fecal Coliform Bacteria, Dissolved Oxygen, Ammonia-Nitrogen, and pH Total Maximum Daily Load: Water Quality Effectiveness Monitoring Report* Publication Number 08-03-005

2011 *Snoqualmie River Basin Temperature Total Maximum Daily Load - Water Quality Improvement Report and Implementation Plan* Publication Number 11-10-041

December 2011. *Permit Writer's Manual*. Publication Number 92-109 (https://fortress.wa.gov/ecy/publications/SummaryPages/92109.html)

Laws and Regulations (http://www.ecy.wa.gov/laws-rules/index.html)

Permit and Wastewater Related Information (http://www.ecy.wa.gov/programs/wq/permits/guidance.html)

Washington State Department of Ecology and Department of Health

1997 *Water Reclamation and Reuse Standards* Publication Number 97-23

Water Pollution Control Federation.

1976. *Chlorination of Wastewater*.

Wright, R.M., and A.J. McDonnell.

1979. *In-stream Deoxygenation Rate Prediction*. Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

Tetra Tech/KCM, Inc.

1994 *City of Snoqualmie Draft Wastewater Facilities Engineering Report*

2002. *Wastewater Treatment Plant Phase 2 Contract Drawings*

2003 *City of Snoqualmie General Sewer Plan*

Appendix A -- Public Involvement Information

Ecology proposes to reissue a permit to City of Snoqualmie Wastewater Treatment and Water Reclamation Facility. The permit includes wastewater discharge limits and other conditions. This fact sheet describes the facility and Ecology's reasons for requiring permit conditions.

Ecology placed a Public Notice of Draft on March 19, 2014, in the *Snoqualmie Valley Record* to inform the public and to invite comment on the proposed draft National Pollutant Discharge Elimination System permit and fact sheet.

The notice:

- Told where copies of the draft permit and fact sheet were available for public evaluation (a local public library, the closest regional or field office, posted on our website).
- Offered to provide the documents in an alternate format to accommodate special needs.
- Asked people to tell us how well the proposed permit would protect the receiving water.
- Invited people to suggest fairer conditions, limits, and requirements for the permit.
- Invited comments on Ecology's determination of compliance with antidegradation rules.
- Urged people to submit their comments, in writing, before the end of the comment period.
- Told how to request a public hearing about the proposed NPDES permit.
- Explained the next step(s) in the permitting process.

Ecology has published a document entitled *Frequently Asked Questions about Effective Public Commenting*, which is available on our website at https://fortress.wa.gov/ecy/publications/SummaryPages/0307023.html.

You may obtain further information from Ecology by telephone, (425) 649-7037 or by writing to the address listed below.

Water Quality Permit Coordinator
Department of Ecology
Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA 98008-5452

The primary author of this permit and fact sheet is Shawn McKone, PE.

Appendix B -- Your Right to Appeal

You have a right to appeal this permit to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of the final permit. The appeal process is governed by chapter 43.21B RCW and chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2) (see glossary).

To appeal you must do the following within 30 days of the date of receipt of this permit:

- File your appeal and a copy of this permit with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of your appeal and this permit on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in chapter 43.21B RCW and chapter 371-08 WAC.

ADDRESS AND LOCATION INFORMATION

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503	**Department of Ecology** Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608
Pollution Control Hearings Board 1111 Israel RD SW STE 301 Tumwater, WA 98501	**Pollution Control Hearings Board** PO Box 40903 Olympia, WA 98504-0903

Appendix C -- Glossary

1-DMax or 1-day maximum temperature -- The highest water temperature reached on any given day. This measure can be obtained using calibrated maximum/minimum thermometers or continuous monitoring probes having sampling intervals of thirty minutes or less.

7-DADMax or 7-day average of the daily maximum temperatures -- The arithmetic average of seven consecutive measures of daily maximum temperatures. The 7-DADMax for any individual day is calculated by averaging that day's daily maximum temperature with the daily maximum temperatures of the three days prior and the three days after that date.

Acute toxicity -- The lethal effect of a compound on an organism that occurs in a short time period, usually 48 to 96 hours.

AKART -- The acronym for "all known, available, and reasonable methods of prevention, control and treatment." AKART is a technology-based approach to limiting pollutants from wastewater discharges, which requires an engineering judgment and an economic judgment. AKART must be applied to all wastes and contaminants prior to entry into waters of the state in accordance with RCW 90.48.010 and 520, WAC 173-200-030(2)(c)(ii), and WAC 173-216-110(1)(a).

Alternate point of compliance -- An alternative location in the groundwater from the point of compliance where compliance with the groundwater standards is measured. It may be established in the groundwater at locations some distance from the discharge source, up to, but not exceeding the property boundary and is determined on a site specific basis following an AKART analysis. An "early warning value" must be used when an alternate point is established. An alternate point of compliance must be determined and approved in accordance with WAC 173-200-060(2).

Ambient water quality -- The existing environmental condition of the water in a receiving water body.

Ammonia -- Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Annual average design flow (AADF) -- The average of the daily flow volumes anticipated to occur over a calendar year.

Average monthly (intermittent) discharge limit -- The average of the measured values obtained over a calendar months time taking into account zero discharge days.

Average monthly discharge limit -- The average of the measured values obtained over a calendar month's time.

Background water quality -- The concentrations of chemical, physical, biological or radiological constituents or other characteristics in or of groundwater at a particular point in time upgradient of an activity that has not been affected by that activity [WAC 173-200-020(3)]. Background water quality for any parameter is statistically defined as the 95% upper tolerance interval with a 95% confidence based on at least eight hydraulically upgradient water quality samples. The eight samples are collected over a period of at least one year, with no more than one sample collected during any month in a single calendar year.

Best management practices (BMPs) -- Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the state. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD5 -- Determining the five-day Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD5 is used in modeling to measure the reduction of dissolved oxygen in receiving waters after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD_5 is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass -- The intentional diversion of waste streams from any portion of a treatment facility.

Categorical pretreatment standards -- National pretreatment standards specifying quantities or concentrations of pollutants or pollutant properties, which may be discharged to a POTW by existing or new industrial users in specific industrial subcategories.

Chlorine -- A chemical used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic toxicity -- The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean water act (CWA) -- The federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Compliance inspection-without sampling -- A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance inspection-with sampling -- A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations. In addition it includes as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Ecology may conduct additional sampling.

Composite sample -- A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

Construction activity -- Clearing, grading, excavation, and any other activity, which disturbs the surface of the land. Such activities may include road building; construction of residential houses, office buildings, or industrial buildings; and demolition activity.

Continuous monitoring -- Uninterrupted, unless otherwise noted in the permit.

Critical condition -- The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Date of receipt -- This is defined in RCW 43.21B.001(2) as five business days after the date of mailing; or the date of actual receipt, when the actual receipt date can be proven by a preponderance of the evidence. The recipient's sworn affidavit or declaration indicating the date of receipt, which is unchallenged by the agency, constitutes sufficient evidence of actual receipt. The date of actual receipt, however, may not exceed forty-five days from the date of mailing.

Detection limit -- The minimum concentration of a substance that can be measured and reported with 99 percent confidence that the pollutant concentration is above zero and is determined from analysis of a sample in a given matrix containing the pollutant.

Dilution factor (DF) -- A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent fraction, for example, a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Distribution uniformity -- The uniformity of infiltration (or application in the case of sprinkle or trickle irrigation) throughout the field expressed as a percent relating to the average depth infiltrated in the lowest one-quarter of the area to the average depth of water infiltrated.

Early warning value -- The concentration of a pollutant set in accordance with WAC 173-200-070 that is a percentage of an enforcement limit. It may be established in the effluent, groundwater, surface water, the vadose zone or within the treatment process. This value acts as a trigger to detect and respond to increasing contaminant concentrations prior to the degradation of a beneficial use.

Enforcement limit -- The concentration assigned to a contaminant in the groundwater at the point of compliance for the purpose of regulation, [WAC 173-200-020(11)]. This limit assures that a groundwater criterion will not be exceeded and that background water quality will be protected.

Engineering report -- A document that thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report must contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal coliform bacteria -- Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab sample -- A single sample or measurement taken at a specific time or over as short a period of time as is feasible.

Groundwater -- Water in a saturated zone or stratum beneath the surface of land or below a surface water body.

Industrial user -- A discharger of wastewater to the sanitary sewer that is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

Industrial wastewater -- Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business; from the development of any natural resource; or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Interference -- A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

- Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and

- Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Local limits -- Specific prohibitions or limits on pollutants or pollutant parameters developed by a POTW.

Major facility -- A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum daily discharge limit -- The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Maximum day design flow (MDDF) -- The largest volume of flow anticipated to occur during a one-day period, expressed as a daily average.

Maximum month design flow (MMDF) -- The largest volume of flow anticipated to occur during a continuous 30-day period, expressed as a daily average.

Maximum week design flow (MWDF) -- The largest volume of flow anticipated to occur during a continuous 7-day period, expressed as a daily average.

Method detection level (MDL) -- See Method Detection Level.

Minor facility -- A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing zone -- An area that surrounds an effluent discharge within which water quality criteria may be exceeded. The permit specifies the area of the authorized mixing zone that Ecology defines following procedures outlined in state regulations (chapter 173-201A WAC).

National pollutant discharge elimination system (NPDES) -- The NPDES (Section 402 of the Clean Water Act) is the federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the state of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both state and federal laws.

pH -- The pH of a liquid measures its acidity or alkalinity. It is the negative logarithm of the hydrogen ion concentration. A pH of 7 is defined as neutral and large variations above or below this value are considered harmful to most aquatic life.

Pass-through -- A discharge which exits the POTW into waters of the State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

Peak hour design flow (PHDF) -- The largest volume of flow anticipated to occur during a one-hour period, expressed as a daily or hourly average.

Peak instantaneous design flow (PIDF) -- The maximum anticipated instantaneous flow.

Point of compliance -- The location in the groundwater where the enforcement limit must not be exceeded and a facility must comply with the Ground Water Quality Standards. Ecology determines this limit on a site-specific basis. Ecology locates the point of compliance in the groundwater as near and directly downgradient from the pollutant source as technically, hydrogeologically, and geographically feasible, unless it approves an alternative point of compliance.

Potential significant industrial user (PSIU) -- A potential significant industrial user is defined as an Industrial User that does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day; or

b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

Ecology may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation level (QL) -- Also known as Minimum Level of Quantitation (ML) -- The lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration point for the analyte. It is equivalent to the concentration of the lowest calibration standard, assuming that the lab has used all method-specified sample weights, volumes, and cleanup procedures. The QL is calculated by multiplying the MDL by 3.18 and rounding the result to the number nearest to (1, 2, or 5) x 10^n, where n is an integer (64 FR 30417).

ALSO GIVEN AS:
The smallest detectable concentration of analyte greater than the Detection Limit (DL) where the accuracy (precision & bias) achieves the objectives of the intended purpose. (Report of the Federal Advisory Committee on Detection and Quantitation Approaches and Uses in Clean Water Act Programs Submitted to the US Environmental Protection Agency December 2007).

Reasonable potential -- A reasonable potential to cause a water quality violation, or loss of sensitive and/or important habitat.

Responsible corporate officer -- A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or have gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

Significant industrial user (SIU) --

1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N; and

2) Any other industrial user that discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement [in accordance with 40 CFR 403.8(f)(6)].

   Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

   *The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

Slug discharge -- Any discharge of a non-routine, episodic nature, including but not limited to an accidental spill or a non-customary batch discharge to the POTW. This may include any pollutant released at a flow rate that may cause interference or pass through with the POTW or in any way violate the permit conditions or the POTW's regulations and local limits.

Soil scientist -- An individual who is registered as a Certified or Registered Professional Soil Scientist or as a Certified Professional Soil Specialist by the American Registry of Certified Professionals in Agronomy, Crops, and Soils or by the National Society of Consulting Scientists or who has the credentials for membership. Minimum requirements for eligibility are: possession of a baccalaureate, masters, or doctorate degree from a U.S. or Canadian institution with a minimum of 30 semester hours or 45 quarter hours professional core courses in agronomy, crops or soils, and have 5, 3, or 1 year(s), respectively, of professional experience working in the area of agronomy, crops, or soils.

Solid waste -- All putrescible and non-putrescible solid and semisolid wastes including, but not limited to, garbage, rubbish, ashes, industrial wastes, swill, sewage sludge, demolition and construction wastes, abandoned vehicles or parts thereof, contaminated soils and contaminated dredged material, and recyclable materials.

Soluble BOD_5 -- Determining the soluble fraction of Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of soluble organic material present in an effluent that is utilized by bacteria. Although the soluble BOD_5 test is not specifically described in Standard Methods, filtering the raw sample through at least a 1.2 um filter prior to running the standard BOD_5 test is sufficient to remove the particulate organic fraction.

State waters -- Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater -- That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based effluent limit -- A permit limit based on the ability of a treatment method to reduce the pollutant.

Total coliform bacteria -- A microbiological test, which detects and enumerates the total coliform group of bacteria in water samples.

Total dissolved solids -- That portion of total solids in water or wastewater that passes through a specific filter.

Total maximum daily load (TMDL) -- A determination of the amount of pollutant that a water body can receive and still meet water quality standards.

Total suspended solids (TSS) -- Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset -- An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water quality-based effluent limit -- A limit imposed on the concentration of an effluent parameter to prevent the concentration of that parameter from exceeding its water quality criterion after discharge into receiving waters.

Appendix D -- Monitoring Data Summary

The following tables and graphs summarize monitoring data reported by the Snoqualmie WWTWRF to Ecology in monthly Discharge Monitoring Reports and other periodic monitoring reports from July 2008 to March 2013.

Discharge Monitoring Data, 2008-2013

Facility: Snoqualmie WRF
Permit No: WA0022403

	Influent											
Date	Flow, MGD	Flow, MGD	CBOD, mg/L	CBOD, mg/L	BOD, mg/L	BOD, mg/L	BOD, ppd	BOD, ppd	TSS, mg/L	TSS, mg/L	TSS, ppd	TSS, ppd
	Monthly Ave	Monthly Max	Monthly Ave	Monthly Max	Monthly Ave	Monthly Max	Monthly Ave	Monthly Max	Monthly Ave	Monthly Max	Monthly Ave	Monthly Max
July-08	0.7	0.8	267.0	365.4 E	E		1,438.0	1,983	318	566	1,683	3,052
August-08	0.8	0.9	243.0	343.5	266	369	1,744.0	2,519	309	478	1,917	3,263
September-08	0.6	0.8	208.0	307.0	204	327	938.9	1,663	344	740	1,646	3,764
October-08	1.0	5.7	241.0	342.0	274	432.6	1,856.0	6,294	292	465	2,046	6,680
November-08	0.8	2.0	187.0	288.0	195	284	1,342.0	1,906	296	457	2,038	3,266
December-08	1.2	1.9	196.0	308.0	215	298	1,888.0	2,669	343	770	**3,105**	7,069
January-09	**1.9**	4.8	209.0	441.0	217	545	2,730.0	6,887	305	528	**4,801**	17,234
February-09	0.9	1.6	258.0	335.0	296	364	2,066.0	2,513	378	823	2,635	6,013
March-09	1.0	1.3	252.0	328.0	274	327.6	2,246.0	2,773	231	373	1,941	2,782
April-09	1.1	1.8	252.0	461.0	254	454.2	2,300.0	4,056	405	2,070	**3,342**	13,500
May-09	0.9	1.1	267.0	389.0	283	450	2,055.0	3,358	312	395	2,245	3,128
June-09	0.7	0.9	253.0	357.0	274	443.4	330.0	2,322	455	330	1,800	2,591
July-09	0.6	0.7	201.0	314.0	221	334.2	1,030.0	1,660	510	1,964	2,504	9,639
August-09	0.6	0.7	171.0	224.0	243	366.6	1,266.0	1,860	287	347	1,500	1,887
September-09	0.6	0.8	206.0	297.0	285	450	1,437.0	2,255	462	739	2,331	3,702
October-09	0.7	1.1	301.0	412.0	641	560	1,871.0	2,998	430	585	2,277	2,971
November-09	**1.3**	1.9	219.0	380.0	245	360	1,958.0	3,252	453	498	**3,735**	7,526
December-09	0.9	1.2	272.0	473.0	263	470	1,357.0	3,306	314	484	1,263	2,889
January-10	1.1	1.5	245.0	380.0	251	367.5	1,697.0	2,415	322	579	2,042	4,979
February-10	0.8	0.9	283.0	330.0	311	382.5	1,306.0	1,734	351	486	1,098	2,131
March-10	1.0	1.5	278.0	363.0	322	435	2,683.0	3,309	338	477	2,811	3,867
April-10	0.9	1.2	245.0	271.0	263	292.5	1,932.0	2,364	280	456	2,053	3,182
May-10	0.9	1.3	275.0	500.0	338	525	1,841.0	2,899	312	417	1,333	2,440
June-10	0.9	1.1	281.0	363.0	292	375	1,265.0	2,150	300	399	788	1,530
July-10	0.7	0.8	313.0	372.0	323	375	1,142.0	1,663	326	398	739	1,729
August-10	0.5	0.7	290.0	356.0	331	480	994.1	1,766	326	401	621	1,996
September-10	0.6	0.8	298.0	420.0	319	517	1,250.0	2,312	343	453	1,288	1,743
October-10	0.7	1.0	288.0	286.0	310	420	1,449.0	2,273	336	774	1,507	3,360
November-10	0.9	1.1	288.0	386.0	328	525	2,041.0	3,634	278	360	1,652	2,370
December-10	1.2	2.8	278.0	375.0	288	382	2,155.0	2,832	274	400	2,033	2,845
January-11	**1.5**	2.4	282.0	380.0	275	375	**3,095.0**	4,316	241	297	2,693	3,414
February-11	1.0	1.5	291.0	400.0	297	405	2,317.0	2,818	292	369	2,271	2,606
March-11	1.1	1.7	258.0	387.0	277	405	2,254.0	3,253	266	399	2,131	2,630
April-11	1.1	1.9	303.0	405.0	303	427.5	2,025.0	2,744	303	425	2,013	2,736
May-11	0.9	1.3	315.0	423.0	319	465	1,630.0	2,533	341	702	1,771	4,066
June-11	0.7	0.8	258.0	363.0	267	375	1,656.0	2,342	272	335	1,758	3,360
July-11	0.7	0.7	303.0	353.0	320	570	1,112.0	1,902	322	352	1,093	1,516
August-11	0.7	0.7	275.0	330.0	297	390	1,226.0	1,866	312	426	1,307	1,969
September-11	0.7	0.8	311.0	413.0	307	383	1,295.0	1,827	322	382	1,384	1,901
October-11	0.7	0.9	347.7	435.0	342.5	382.5	1,609.8	2,159	449.3	1,414	2,197	7,643
November-11	0.9	1.9	288.6	360.0	285.4	367.5	1,738.0	4,200	273	352	1,581	2,763
December-11	0.8	1.3	323.0	418.0	328.4	405	1,763.7	2,347	279.9	407	1,450	2,859
January-12	1.1	1.8	269.0	555.0	276	435	1,895.0	2,454	230	316	1,516	2,424
February-12	1.1	1.6	288.0	443.0	284	405	2,073.0	3,183	224	294	1,541	2,424
March-12	1.1	1.6	267.5	337.5	278.54	352.5	1,921.5	2,772	241.08	351	1,551	2,277
April-12	0.9	1.2	337.1	470.0	346.88	502.5	1,983.9	2,702	292.67	339	1,618	1,822
May-12	0.8	1.0	318.0	398.0	315	383	1,674.0	2,109	283	328	1,466	1,803
June-12	0.8	1.0	313.0	485.0	321.8	450	1,633.0	3,049	279	377	1,342	2,145
July-12	0.7	0.8	285.0	355.0	311.5	443	14.1	2,306	336	432	1,524	2,096
August-12	0.8	0.9	286.0	355.0	297	338	1,401.0	1,745	375	527	1,885	2,773
September-12	0.8	0.8	298.0	400.0	327	450	1,540.0	2,266	450.8	845	2,303	4,775
October-12	0.8	1.1	290.0	518.0	341	510	1,467.0	3,033	347	448	1,555	2,394
November-12	1.0	1.6	295.0	435.0	310	428	2,192.0	4,312	272	332	1,778	2,699
December-12	1.2	1.9	209.0	318.0	253	420	2,097.0	3,368	236	326	1,954	2,810
January-13	0.9	1.3	290.0	583.0	310	533	1,850.0	3,445	282	359	1,643	2,731
February-13	0.9	1.0	328.0	375.0	329	360	1,751.0	2,171	267	346	1,315	2,009
March-13	0.9	1.1	286.0	330.0	286	379	1,681.0	2,358	301	493	1,782	3,417
AVE:	0.9	1.4	271.6	382.3	295.2	415.2	1,693	2,758	321.4	530	1,881	3,670
MIN:	0.5	0.7	171.0	224.0	195.0	284.0	14	1,660	224.0	294	621	1,516
MAX:	1.9	5.7	347.7	583.0	641.0	570.0	3,095	6,887	510.0	2,070	4,801	17,234
Median	0.9	1.1	281.0	375.0	294.0	405.0	1,738	2,513	312.0	425	1,771	2,782
95th Percentile	1.2	2.5	324.0	503.6	341.4	536.0	2,390	4,313	453.4	959	3,152	8,042
Standard Deviation	0.24	0.89	38.97	68.48	59.38	68.17	528.41	1006.28	64.20	341.92	712.28	2818.25
CV	0.3	0.6	0.1	0.2	0.2	0.2	0.3	0.4	0.2	0.6	0.4	0.8
DESIGN (up to 7/2011):	1.2						2,860				2,860	
85% DESIGN:	1.1						2,431				2,431	
DESIGN (after 7/2011):	2.2						5,220				5,220	
85% DESIGN:	1.8						4,437				4,437	

approaching design limits (85%)
exceeds design limits

Discharge Monitoring Data, 2008-2013

Facility: Snoqualmie WRF
Permit No: WA0022403

Effluent

Date	Flow, MGD	Flow, MGD	CBOD, mg/L	CBOD, mg/L	CBOD, ppd	CBOD, ppd	CBOD, ppd	CBOD, % Removal	TSS, mg/L	TSS, mg/L	TSS, ppd	TSS, ppd	TSS, % Removal	PH	PH
	Monthly Ave	Monthly Max	Monthly Ave	Wkly Ave	Monthly Ave	Wkly Ave	Daily Max	Ave	Monthly Ave	Wkly Ave	Monthly Ave	Wkly Ave	Ave	Min	Max
July-08	0.11	0.00	1.2	1.5	6	6	16.2	99.7	1.0	1.5	5	5	99.6	8.66	**9.96**
August-08	0.29	1.78	1.2	3.4	8	43	68.5	98.2	1.1	2.5	5	16	98.9	6.90	8.70
September-08	0.76	2.72	2.0	1.2	13	22	42.7	99.0	1.3	1.3	10	12	99.6	6.30	**9.60**
October-08	0.73	1.37	1.7	2.3	11	17	21.1	99.3	3.1	4.1	20	27	98.9	6.80	**9.60**
November-08	1.27	3.18	2.0	3.1	22	29	37.7	98.9	4.6	5.9	53	71	98.4	7.00	7.60
December-08	1.36	2.97	**29.1**	**45.0**	**283**	413	432.2	85.2	13.3	21.0	133	170	96.1	6.90	7.40
January-09	1.91	4.74	22.5	**51.0**	**285**	**442**	668.8	89.3	21.4	37.0	299	**512**	93.0	6.36	7.28
February-09	0.84	1.04	**47.0**	**70.3**	**329**	**439**	711.9	**81.8**	**45.2**	**60.1**	**315**	415	88.0	7.20	7.40
March-09	0.99	1.35	4.5	10.2	34	71	97.6	98.2	2.1	4.3	20	40	99.1	6.50	7.50
April-09	1.08	1.77	2.6	5.6	22	51	67.5	99.0	2.0	3.7	16	25	99.5	6.90	7.20
May-09	0.85	1.11	2.3	3.9	17	29	66.1	99.1	**38.0**	**162.0**	271	**1,160**	87.8	7.00	7.40
June-09	0.82	1.07	2.0	2.4	12	13	32.7	99.2	5.1	8.3	30	33	98.4	6.80	7.40
July-09	0.09	0.29	1.1	1.6	1	5	1.7	99.4	1.6	3.3	1	4	99.7	7.30	7.60
August-09	0.33	0.78	1.7	2.3	5	10	13.6	99.0	1.4	3.1	3	5	99.5	7.00	7.60
September-09	0.67	0.89	1.6	2.2	9	13	16.4	99.2	3.1	4.7	17	24	99.3	7.60	7.80
October-09	0.82	1.01	3.1	3.5	21	29	56.6	99.0	2.3	16.2	16	19	99.5	6.90	7.70
November-09	1.37	1.97	3.5	4.5	43	69	56.9	98.4	2.5	2.6	29	38	99.5	6.90	8.80
December-09	1.14	1.53	3.2	4.2	30	44	58.1	98.8	2.7	3.9	26	34	99.1	7.20	7.50
January-10	1.16	1.54	2.5	3.3	24	28	41.0	99.0	2.6	3.4	24	28	99.2	7.00	7.40
February-10	0.91	1.07	3.5	4.7	25	34	43.5	98.8	3.1	3.5	22	26	99.1	7.10	7.30
March-10	0.95	1.45	3.7	4.2	30	42	50.6	98.7	2.6	3.4	21	26	99.2	7.20	7.60
April-10	1.02	1.26	2.8	3.3	24	28	34.3	98.9	2.0	2.5	17	22	99.3	7.20	7.50
May-10	1.02	1.35	2.8	3.0	23	23	28.4	99.0	3.1	4.8	25	36	99.0	7.40	7.60
June-10	1.12	1.90	2.5	4.3	22	30	34.6	99.1	3.0	3.9	28	40	99.0	7.20	7.60
July-10	0.78	0.95	2.1	2.8	14	21	21.4	99.3	2.0	2.2	13	14	99.4	7.60	8.00
August-10	0.40	0.96	2.0	2.7	7	13	19.1	99.3	1.5	2.2	5	12	99.5	8.00	8.50
September-10	0.75	0.87	1.9	2.7	12	17	20.0	99.3	1.2	2.4	8	15	99.6	8.00	8.30
October-10	0.79	1.20	1.7	2.2	11	14	24.3	99.4	1.6	2.3	11	19	99.5	6.80	8.30
November-10	1.02	1.34	2.0	2.0	15	18	30.1	99.0	3.0	5.0	27	40	99.0	**4.00**	8.10
December-10	1.33	3.18	3.3	4.1	35	51	62.1	98.8	3.5	5.1	39	63	98.7	6.30	7.10
January-11	1.37	2.31	4.0	4.8	42	61	76.8	98.6	4.6	5.3	49	63	98.1	6.00	7.20
February-11	1.05	1.56	3.7	4.3	32	41	49.7	98.7	2.7	3.5	23	28	99.1	6.70	7.00
March-11	1.28	1.82	3.2	4.2	34	34	55.7	98.8	4.8	5.9	52	64	98.2	6.60	7.00
April-11	1.18	2.04	3.3	4.9	31	40	56.6	98.9	3.9	4.1	38	35	98.7	6.90	7.20
May-11	0.98	1.36	3.0	4.0	24	31	41.9	99.1	3.6	5.1	31	53	98.9	6.80	7.10
June-11	0.88	1.47	2.0	2.0	19	29	32.0	99.0	3.0	3.0	23	31	99.0	7.00	7.70
July-11	0.79	1.12	4.0	10.0	27	73	175.3	99.0	4.0	4.0	26	36	99.0	6.60	7.40
August-11	0.67	0.93	2.3	3.1	13	17	18.1	99.0	2.8	4.4	16	31	99.0	7.00	7.50
September-11	0.76	0.95	3.0	3.4	20	22	27.0	90.0	3.0	3.7	20	24	99.0	7.00	7.50
October-11	0.80	1.00	2.9	4.3	20	27	36.9	99.2	4.8	5.7	33	36	98.9	6.80	7.50
November-11	1.14	2.97	3.0	4.0	30	52	59.0	98.9	3.2	3.7	32	60	99.0	6.70	7.20
December-11	1.03	1.50	2.8	3.7	25	29	49.6	99.1	4.0	5.6	35	57	98.6	6.50	7.20
January-12	1.34	2.03	3.6	4.6	40	63	56.7	99.0	8.0	20.0	97	271	96.5	6.70	7.00
February-12	1.21	1.74	3.0	4.6	32	60	97.9	99.0	6.8	19.5	82	266	97.0	6.70	7.30
March-12	1.29	1.88	3.1	3.9	34	54	84.3	98.8	3.4	3.9	37	45	98.6	6.60	6.98
April-12	1.02	1.36	2.5	3.3	21	28	41.3	99.3	2.7	2.9	22	25	99.1	6.75	6.97
May-12	0.98	1.23	2.7	3.2	22	25	31.1	99.2	4.3	5.1	35	40	98.5	6.70	7.30
June-12	0.96	1.11	3.5	5.1	29	40	54.1	99.0	4.3	6.1	35	49	98.0	7.10	7.40
July-12	0.42	0.93	1.4	1.6	3	8	16.6	99.5	2.3	3.4	7	9	99.0	7.30	7.90
August-12	0.24	0.75	1.6	2.2	1	2	3.5	99.5	1.7	1.9	2	2	99.6	7.30	7.66
September-12	0.56	0.85	2.2	2.6	7	13	12.0	99.0	2.0	2.8	6	17	100.0	7.30	7.70
October-12	0.81	1.24	1.7	2.0	12	20	23.0	99.0	2.0	2.0	16	23	99.0	7.10	7.60
November-12	1.11	1.88	3.0	4.0	27	29	38.0	99.0	3.0	4.0	28	43	99.0	7.00	7.30
December-12	1.33	1.82	2.0	2.0	28	34	49.6	**1.0**	3.0	3.0	33	43	99.0	7.00	7.30
January-13	1.02	1.47	3.1	3.9	26	30	33.3	98.9	4.5	5.9	39	52	98.4	7.00	7.30
February-13	1.02	1.26	3.4	4.2	30	**e**	41.2	99.0	5.5	6.7	49	63	98.0	7.00	7.00
March-13	1.06	1.26	3.3	3.6	29	33	42.0	99.0	5.6	9.2	50	78	98.0	7.20	7.00
AVE:	0.93	1.52	4.2	6.3	36	53	73.3	96.4	5.0	9	43	78.8	98.4	6.94	7.62
MIN:	0.09	0.00	1.1	1.2	1	2	1.7	1.0	1.0	1	1	2.3	87.8	4.00	6.97
MAX:	1.91	4.74	47.0	70.3	329	442	711.9	99.7	45.2	162	315	####	100.0	8.66	9.96
Median	0.98	1.35	2.8	3.6	23	29	41.3	99.0	3.0	4	26	34.5	99.0	7.00	7.50
95th Percentile	1.36	3.01	8.1	17.2	91	158	226.7	99.4	14.9	24	161	299.7	99.6	7.68	8.96
Standard Deviation	0.34	0.78	7.27	12.05	63.57	92.53	####	13.29	7.72	22.60	64.33	####	2.28	0.59	0.65
CV	0.4	0.5	1.7	1.9	1.8	1.8	1.8	0.1	1.5	2.4	1.5	2.2	0.0	0.08	0.08
Aug-Oct LIMIT (up to 7/2011):			25	40			206	85	30	45	310	465	85.0	6.0	9
Nov-July LIMIT (up to 7/2011):			25	40	259	414		85	30	45	310	465	85.0	6	9
Aug-Oct LIMIT (after 7/2011):			25	40			206	85	30	45	538	807	85.0	6.0	9
Nov-July LIMIT (after 7/2011):			25	40	448	717		85	30	45	538	807	85.0	6	9

exceeds permit limits

Discharge Monitoring Data, 2008-2013

Facility: Snoqualmie WRF
Permit No: WA0022403

	Effluent														
Date	Fecal Coliform, #/100 ml	Fecal Coliform, #/100 ml	Ammonia, mg/l (as N)	Ammonia, mg/l (as N)	Ammonia, ppd (as N)	Ammonia, ppd (as N)	Ortho-phosphate, mg/l (as P)	Ortho-phosphate, mg/l (as P)	Ortho-phosphate, ppd (as P)	Ortho-phosphate, ppd (as P)	Temperature °C	Temperature °C	Temp - 7DADMax oC	Temp - 7DADMax oC
			Monthly		Monthly	Daily	Monthly		Monthly	Daily	Monthly	Daily	Monthly	Daily
	GEM	GM7	Ave	Max	Ave	Max	Ave	Max	Ave	Max	Averag	Max	Averag	Max
July-08	1	1	0.01	0.0	0.1	0.1	6.97	9.9	38.4	51.88	19.00	20.00	19.00	20
August-08	1	1	0.02	0.1	0.1	0.2	7.72	9.3	46.3	59.45	19.70	21.00	19.90	20.6
September-08	2	7	5.65	9.4	29.3	44.6	5.94	17.3	34.5	#####	19.10	20.00	19.10	19.6
October-08	1	1	3.12	9.5	18.7	58.2	11.50	22.8	77.2	#####	18.20	25.00	18.40	22.1
November-08	4	189	9.67	15.0	75.8	108.7	1.44	2.6	15.5	38.22	14.60	17.00	14.80	17
December-08	**2,271**	**4,407**	1.34	2.3	14.2	29.1	4.09	5.5	48.2	75.50	12.60	15.00	12.90	15
January-09	**6,806**	**15,886**	12.30	25.9	150.0	233.5	2.58	3.5	40.0	87.00	10.30	12.00	10.40	11.7
February-09	**6,973**	**327,316**	27.13	30.3	191.5	221.1	1.66	2.0	11.6	14.32	12.30	13.00	12.10	12.9
March-09	3	34	7.30	22.5	51.6	148.6	0.61	1.0	4.6	6.80	12.40	13.00	12.40	13
April-09	2	10	5.02	15.7	51.2	129.0	0.54	1.0	4.4	9.82	13.00	15.00	12.70	14.4
May-09	2	4	0.80	3.4	5.3	23.0	1.83	3.4	11.9	23.70	15.90	18.00	15.60	17.3
June-09	1	2	2.37	5.8	9.5	33.1	2.41	3.2	11.8	18.46	18.60	19.00	18.50	19
July-09	0	1	0.08	0.3	0.1	0.2	0.98	2.2	0.7	1.74	20.40	22.00	20.10	21.7
August-09	1	2	1.53	1.9	6.1	11.7	0.05	0.1	0.2	0.38	21.20	22.00	21.20	21.7
September-09	1	5	0.06	0.1	0.3	0.5	3.55	4.7	19.3	23.58	20.50	21.00	20.70	21
October-09	1	4	0.03	0.1	0.2	0.4	2.41	3.0	16.8	20.56	17.90	20.00	18.20	19.3
November-09	2	2	0.04	0.1	0.4	0.7	1.68	2.5	18.1	22.61	14.80	17.00	15.00	16.5
December-09	1	3	0.03	0.0	0.3	0.3	1.04	1.9	9.6	16.74	13.00	13.00	13.00	13
January-10	1	2	0.03	0.0	0.2	0.4	1.18	2.7	11.1	22.45	12.60	13.00	12.60	13
February-10	1	4	0.07	0.1	0.5	1.0	1.91	2.7	13.8	16.89	13.90	15.00	13.80	14.1
March-10	1	2	0.04	0.0	0.3	0.3	1.11	1.5	8.7	11.25	14.10	15.00	14.10	14.6
April-10	1	2	0.03	0.1	0.3	0.6	0.53	0.7	4.4	7.06	14.10	16.00	14.00	15.1
May-10	1	1	0.06	0.1	0.5	0.7	1.69	2.2	12.7	19.26	15.60	17.00	15.50	16.6
June-10	1	2	0.16	0.6	1.4	5.0	1.15	3.0	11.2	26.01	17.20	19.00	16.90	19
July-10	1	2	0.09	0.1	0.6	0.7	0.83	1.6	5.4	10.89	19.80	22.00	19.50	21.1
August-10	1	1	0.04	0.1	0.2	0.5	0.56	0.8	2.1	4.21	20.90	21.00	21.00	21
September-10	1	1	0.14	0.3	0.9	1.7	0.99	1.4	6.3	7.84	20.20	21.00	20.30	20.9
October-10	3	1	0.06	0.1	0.4	0.7	0.23	0.3	1.5	2.18	18.20	20.00	18.40	20
November-10	2	4	0.08	0.1	0.6	1.0	0.18	0.2	1.5	1.63	15.60	17.00	15.90	17
December-10	2	2	0.41	1.0	4.9	15.7	0.12	0.3	1.2	2.87	14.10	15.00	14.10	14.4
January-11	2	4	0.80	2.2	9.0	24.8	0.09	0.2	0.9	2.02	14.00	15.00	15.00	14.1
February-11	5	9	0.02	0.0	0.1	0.2	0.09	0.2	0.8	1.32	14.90	15.00	14.90	15
March-11	13	28	0.02	0.0	0.2	0.4	0.14	0.2	1.5	2.10	14.50	15.00	14.40	15
April-11	3	11	0.02	0.1	0.2	0.5	0.38	0.9	3.3	7.25	14.40	15.00	14.30	14.9
May-11	11	18	0.35	1.7	2.8	13.6	2.91	6.0	21.5	46.89	14.90	15.00	14.90	15
June-11	4	6	0.10	0.2	0.4	1.4	0.10	0.1	0.4	0.70	15.00	15.00	15.00	15
July-11	5	17	0.00	0.1	0.3	0.4	0.10	0.1	0.5	0.70	15.00	15.00	15.00	15
August-11	12	76	0.50	6.0	2.8	33.1	0.20	0.3	1.1	1.60	15.00	15.00	15.00	15
September-11	18	44	0.13	0.2	0.7	0.9	0.88	1.3	4.8	6.90	15.00	15.00	15.00	15
October-11	11	31	0.19	0.5	1.1	2.6	0.47	0.5	2.6	2.97	15.00	15.00	15.00	15
November-11	8	13	0.05	0.2	0.3	0.7	0.11	0.2	0.6	1.16	14.00	15.00	15.00	15
December-11	19	49	0.03	0.1	0.2	0.4	0.07	0.1	0.5	0.78	15.00	16.00	15.00	16
January-12	26	42	0.02	0.0	0.2	0.4	0.06	0.1	0.6	1.45	15.00	15.00	15.00	15
February-12	4	37	0.03	0.1	0.0	0.3	0.05	0.1	0.5	1.45	15.00	15.00	15.00	15
March-12	2	4	0.01	0.0	0.1	0.1	0.05	0.1	0.4	0.66	15.00	15.00	15.00	15
April-12	2	2	0.03	0.1	0.2	0.4	0.10	0.1	0.7	0.96	15.00	15.00	15.00	15
May-12	2	7	0.06	0.1	0.4	0.5	0.34	0.7	2.2	4.31	15.00	15.00	15.00	15
June-12	13	64	0.44	0.7	2.9	4.7	1.08	2.1	7.0	13.16	15.00	15.00	15.00	15
July-12	2	5	0.08	0.1	0.5	0.8	0.65	0.9	3.9	5.50	16.00	16.00	16.00	16
August-12	1	2	0.06	0.1	0.4	0.6	0.90	1.3	5.7	7.77	15.80	16.00	15.80	16
September-12	1	2	0.03	0.1	0.2	0.3	0.79	1.0	4.8	5.77	15.00	16.00	15.00	16
October-12	3	7	0.05	0.1	0.4	0.7	0.38	0.7	2.6	6.29	15.00	15.00	15.00	15
November-12	8	24	0.06	0.1	0.5	0.7	0.41	0.7	3.2	6.29	15.00	15.00	15.00	15
December-12	2	4	0.02	0.0	0.2	0.4	0.18	0.2	1.7	2.00	15.00	16.00	15.00	15
January-13	2	8	0.05	0.1	0.4	0.8	1.10	2.6	8.2	21.38	15.00	15.00	15.00	15
February-13	3	5	0.86	3.0	8.2	21.7	1.80	2.4	12.6	18.10	15.00	15.00	15.00	15
March-13	5	13	6.80	9.2	51.3	67.6	0.90	1.4	6.5	10.90	15.00	15.00	15.00	15
AVE:	4	6113	1.55	3.0	12.3	21.9	1.44	2.4	10.3	18.6	16.4	17.9	16.4	17.5
MIN:	0	1	0.00	0.0	0.0	0.1	0.05	0.1	0.2	0.4	10.3	12.0	10.4	11.7
MAX:	6973	327316	27.13	30.3	191.5	233.5	11.50	22.8	77.2	173.5	21.2	25.0	21.2	22.1
Median	2	5	0.06	0.1	0.4	0.7	0.83	1.3	4.8	7.2	16.6	18.5	16.3	18.2
95th Percentile	15	1033	7.77	17.1	56.4	132.9	6.14	9.4	41.3	77.8	20.8	22.0	20.9	21.7
Standard Deviation	1306	43359	4.27	6.59	34.33	50.32	2.12	3.99	14.70	30.11	3.26	3.50	3.27	3.33
CV	313.5	7.1	2.75	2.2	2.8	2.3	1.47	1.7	1.4	1.6	0.2	0.2	0.2	0.2
Aug-Oct LIMIT (up to 7/2011):	200	400				68.7								
Nov-July LIMIT (up to 7/2011):	200	400												
Aug-Oct LIMIT (after 7/2011):	200	400				68.7								
Nov-July LIMIT (after 7/2011):	200	400												

exceeds permit limits

Discharge Monitoring Data, 2008-2013

Facility: Snoqualmie WRF
Permit No: WA0022403

	Production Monitoring											
Date	Dissolved Oxygen, mg/L	Dissolved Oxygen, mg/L	Pre-filtered Turbidity, NTU	Pre-filtered Turbidity, NTU	Post-filtered Turbidity, NTU	Post-filtered Turbidity, NTU	Coagulant, ppd	Coagulant, ppd	Coagulant Aid, ppd	Coagulant Aid, ppd
	Monthly Ave	Monthly Min	Monthly Ave	Monthly Max	Monthly Ave	Monthly Max	Monthly Ave	Monthly Max	Monthly Ave	Monthly Max
July-08	M	M	M	M	S	S	M	M	136.9	177
August-08	1.9	**0.0**	0.6	1.2	0.2	0.3	M|	M|	81.6	135
September-08	1.5	0.8	1.3	1.5	1.9	5	137.9	145	M|	M|	
October-08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
November-08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
December-08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
January-09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
February-09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
March-09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
April-09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
May-09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
June-09	1.8	1.8	3.0	3.0	1.5	1.5	12.9	13	M|	M|		
July-09	3.2	1.6	3.1	6.4	0.9	2	11.8	15	M|	M|		
August-09	2.3	**0.1**	0.6	1.4	0.8	4.1	7.4	10	M|	M|		
September-09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
October-09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
November-09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
December-09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
January-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
February-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
March-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
April-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
May-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
June-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
July-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
August-10	1.7	1.1	0.6	1.9	0.6	2	2.7	3	1.1	1		
September-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
October-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
November-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
December-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
January-11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
February-11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
March-11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
April-11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
May-11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
June-11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
July-11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
August-11	0.4	0.2	2.8	7.7	1.1	1.3	20.6	22	1	1		
September-11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
October-11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
November-11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
December-11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
January-12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
February-12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
March-12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
April-12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
May-12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
June-12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
July-12	3.1	2.7	1.2	1.8	0.6	1.1	0.5	1	0.02	0		
August-12	2.9	2.4	1.2	2.6	0.7	1.39	3.0	3	1	1		
September-12	2.9	2.8	1.6	2.0	0.98	1.32	3.0	3	1	1		
October-12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
November-12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
December-12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
January-13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
February-13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
March-13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
AVE:	2.2	1.3	1.6	3.0	0.9	2.0	22	24	31.8	45		
MIN:	0.4	0.0	0.6	1.2	0.2	0.3	1	1	0.0	-		
MAX:	3.2	2.8	3.1	7.7	1.9	5.0	138	145	136.9	177		
Median	2.1	1.3	1.3	1.9	0.9	1.4	7	10	1.0	1		
95th Percentile	3.2	2.8	3.1	7.1	1.7	4.6	91	96	120.3	164		
LIMIT (up to 7/2011):		0.1			2	5						
LIMIT (after 7/2011):		0.1			2	5						

exceeds permit limits

Discharge Monitoring Data, 2008-2013

Facility: Snoqualmie WRF
Permit No: WA0022403

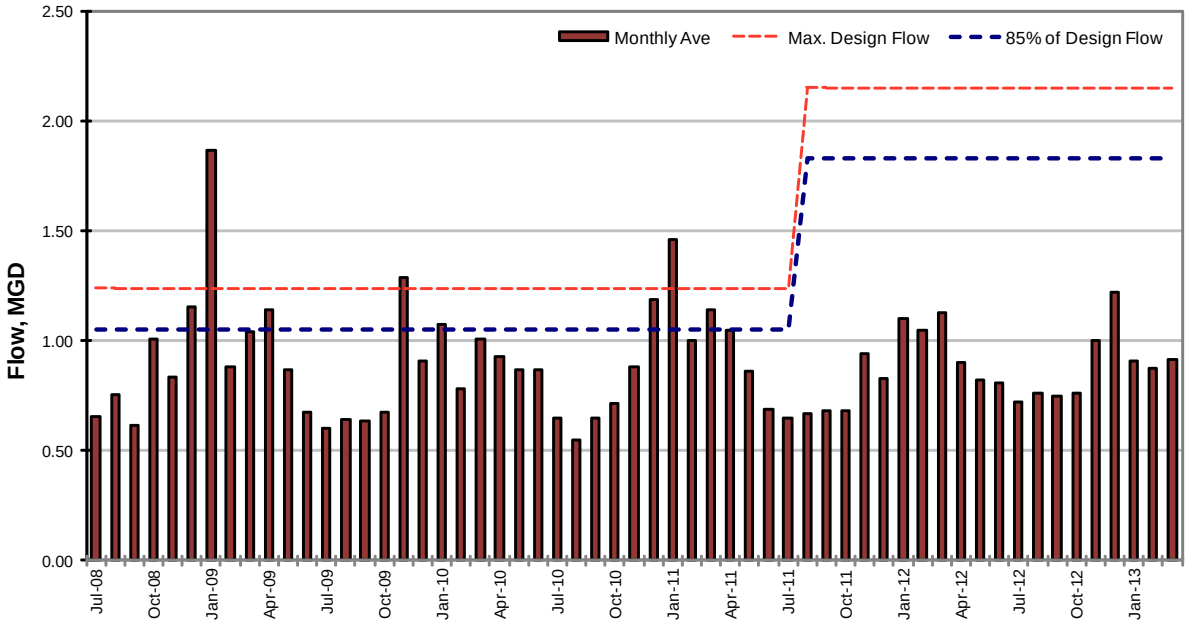
Product Water Distribution

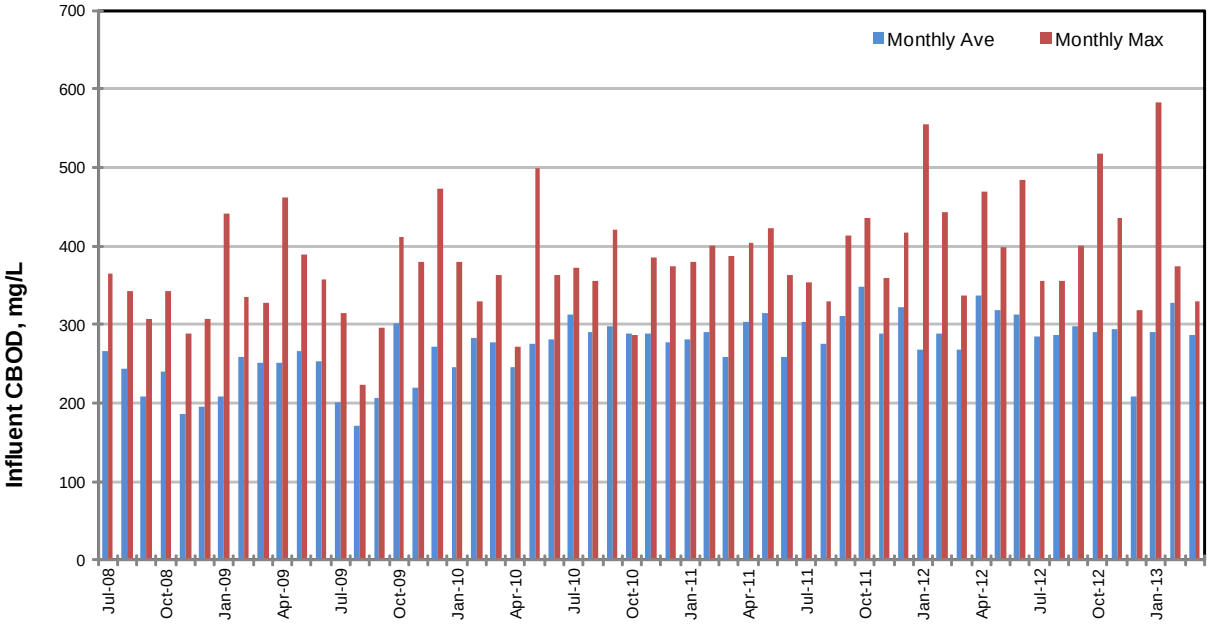
Date	Flow, MGD	Flow, MGD	CBOD, mg/L	CBOD, mg/L	Dissolved Oxygen, mg/L	Dissolved Oxygen, mg/L	Total Nitrogen, mg/l (as N)	Total Nitrogen, mg/l (as N)	TSS, mg/L	TSS, mg/L	PH	PH	Total Coliform, MPN/100 ml	Total Coliform, MPN/100 ml	Chlorine Residual, mg/L	Chlorine Residual, mg/L
	Monthly Ave	Monthly Max	Monthly Ave	Wkly Ave	Monthly Ave	Monthly Min	Ave	Daily Max	Monthly Ave	Wkly Ave	Min	Max	7-day Median	Max	Min	Avg
July-08	0.8	1.3	1.1	1.5	8.1	7.4	0.0	0.0	1.0	1.5	8.7	**10.0**	0.0	**83.1**	**0.1**	1
August-08	0.4	0.9	1.1	3.4	4.8		0.0	0.1	1.1	2.5	6.9	8.7	0.0	1.0	2.1	2
September-08	0.6	1.2	1.4	1.0	6.9	4.8	0.0	0.0	0.5	1.3	8.0	8.4	0.0	0.0	**0.4**	1
October-08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
November-08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
December-08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
January-09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
February-09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
March-09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
April-09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
May-09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
June-09	0.7	0.7	1.3	1.3	4.9	4.9	**E**	**E**	9.6	9.6	7.1	7.1	1.0	1.0	0.9	1
July-09	0.7	0.8	1.1	1.6	5.8	3.0	4.9	6.9	1.6	4.6	7.3	7.6	0.0	5.3	0.7	5
August-09	0.6	0.8	1.7	2.3	5.5	4.7	1.9	6.7	1.9	3.1	7.3	7.5	2.0	**36.4**	1.8	5
September-09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
October-09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
November-09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
December-09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
January-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
February-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
March-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
April-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
May-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
June-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
July-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
August-10	1.0	1.2	1.8	2.7	6.2	6.2	3.6	4.5	1.6	2.0	8.1	8.3	2.0	0.6	0.6	4
September-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
October-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
November-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
December-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
January-11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
February-11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
March-11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
April-11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
May-11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
June-11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
July-11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
August-11	0.9	1.1	1.8	1.8	4.6	8.0	1.7	1.7	1.7	1.7	7.1	7.4	1.0	1.0	1.5	3
September-11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
October-11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
November-11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
December-11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
January-12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
February-12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
March-12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
April-12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
May-12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
June-12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
July-12	0.6	0.9	1.3	1.5	6.0	6.0	5.0	7.0	2.5	3.4	7.3	7.9	2.0	1.0	1.0	8
August-12	0.7	0.9	1.6	2.2	6.5	5.5	3.6	4.4	1.7	1.9	7.3	7.6	0.1	**25.0**	**0.6**	10
September-12	0.8	0.9	2.5	3.2	6.7	5.8	5.8	6.1	2.6	2.9	7.3	7.7	**21.0**	22.0	0.8	2
October-12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
November-12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
December-12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
January-13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
February-13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
March-13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AVE:	0.7	1.0	1.5	2.0	6.00	5.63	2.6	3.7	2.3	3	7	8.0	2.6	16.04	1	4
MIN:	0.4	0.7	1.1	1.0	4.60	3.00	0.0	0.0	0.5	1	7	7.1	0.0	0.00	0	1
MAX:	1.0	1.3	2.5	3.4	8.10	8.00	5.8	7.0	9.6	10	9	10.0	21.0	83.10	2	10
Median	0.7	0.9	1.4	1.8	6.00	5.65	2.7	4.4	1.7	3	7	7.7	1.0	1.00	1	3
95th Percentile	0.9	1.3	2.2	3.3	7.50	3.77	5.5	7.0	6.1	7	8	9.3	11.5	59.75	2	9
DESIGN LIMIT:	1.56															
85% DESIGN:	1.33															
LIMIT (up to 7/2011):			25	40			10	15	30	45	6.0	9.0	2.2	23.0	0.5	
LIMIT (after 7/2011):			25	40			10	15	30	45	6.0	9.0	2.2	23.0	0.7	

exceeds permit limits

Discharge Monitoring Data, Influent Flow and CBOD, 2008-2013

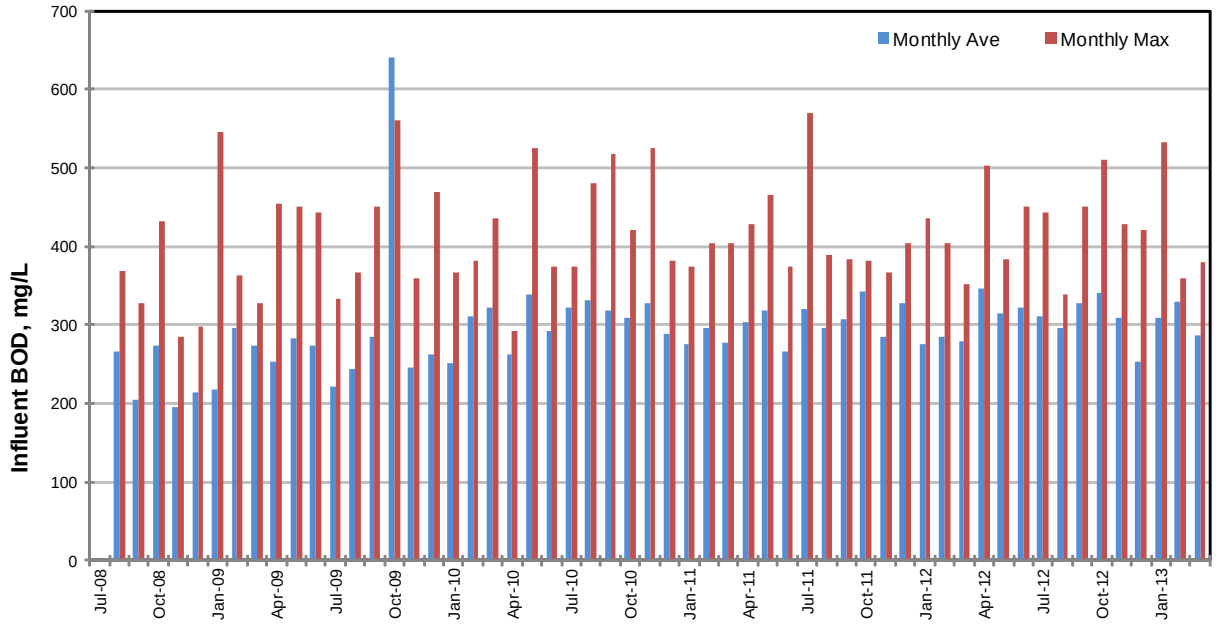
Snoqualmie WRF
Permit #WA0022403

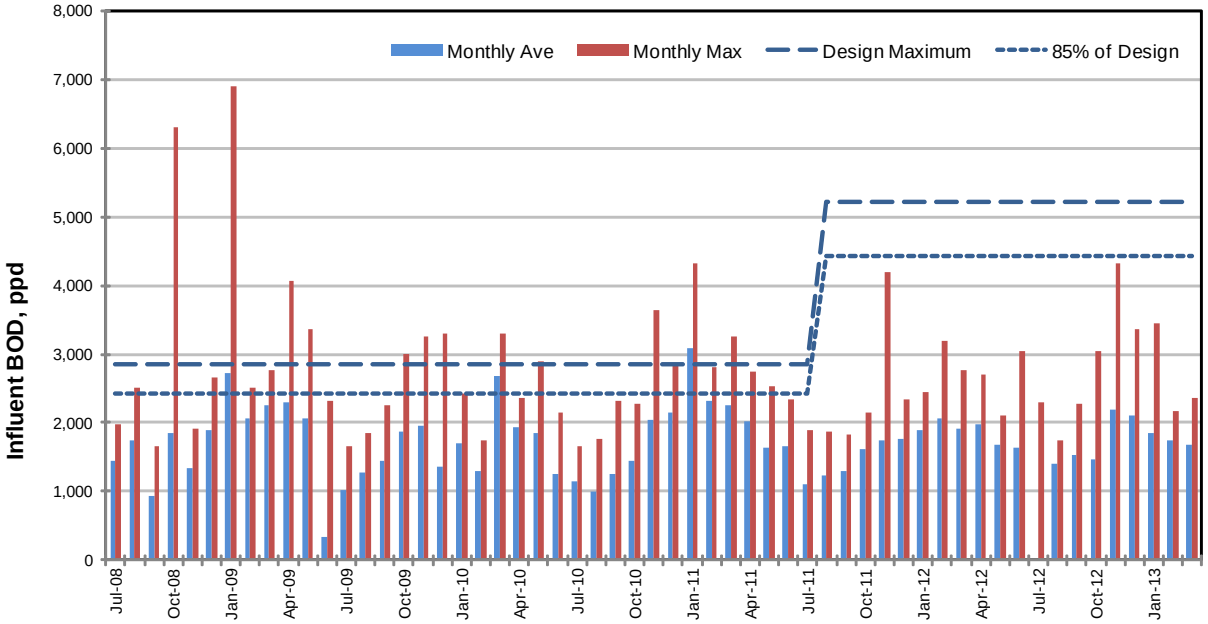




Discharge Monitoring Data, Influent BOD, 2008-2013

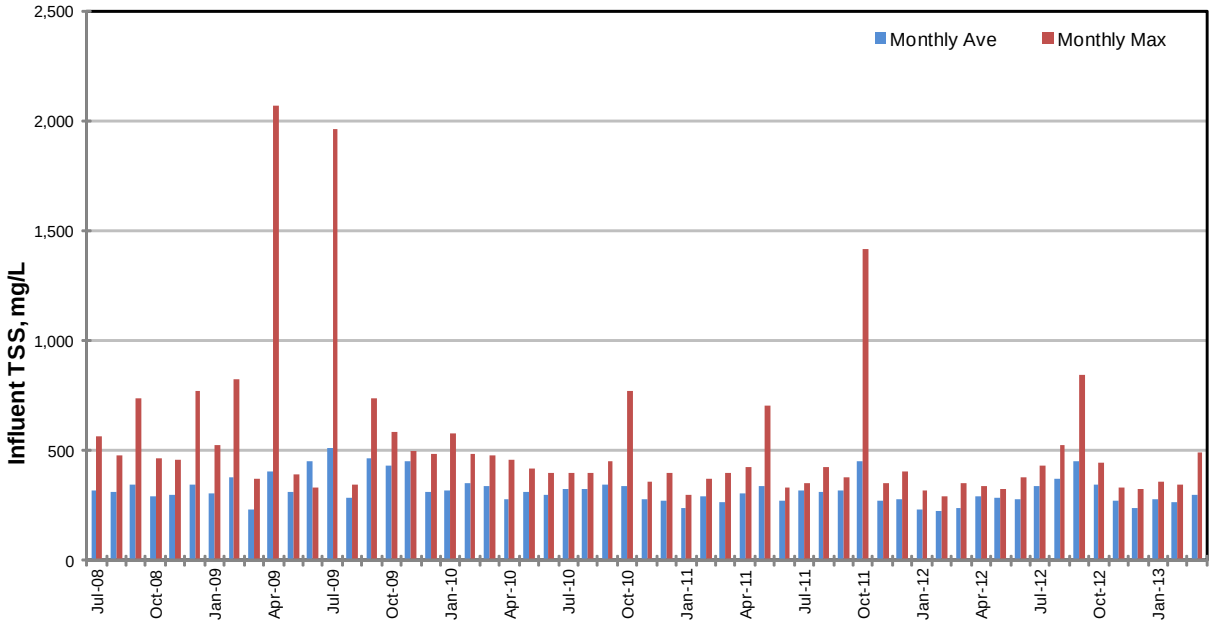
Snoqualmie WRF
Permit #WA0022403

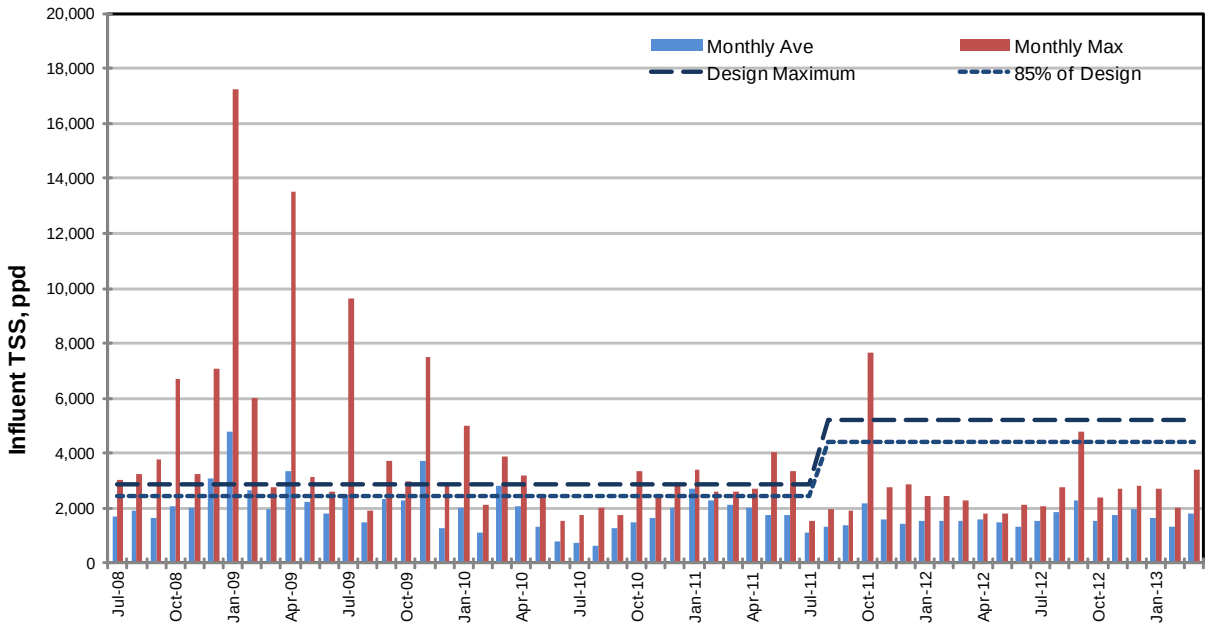




Discharge Monitoring Data, Influent TSS, 2008-2013

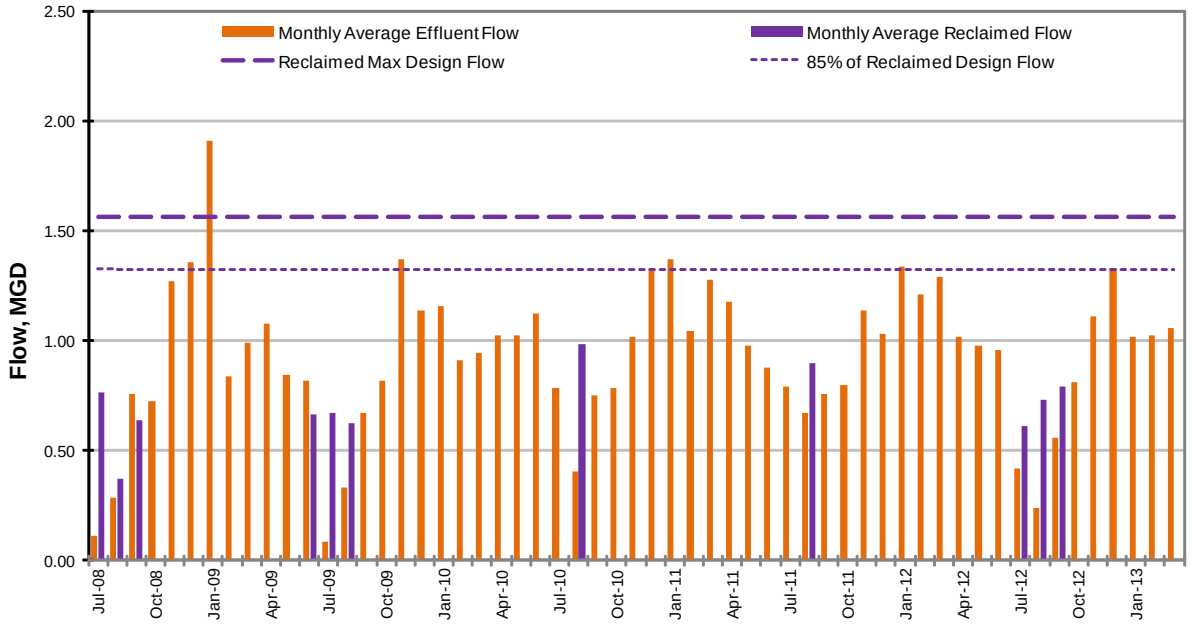
Snoqualmie WRF
Permit #WA0022403

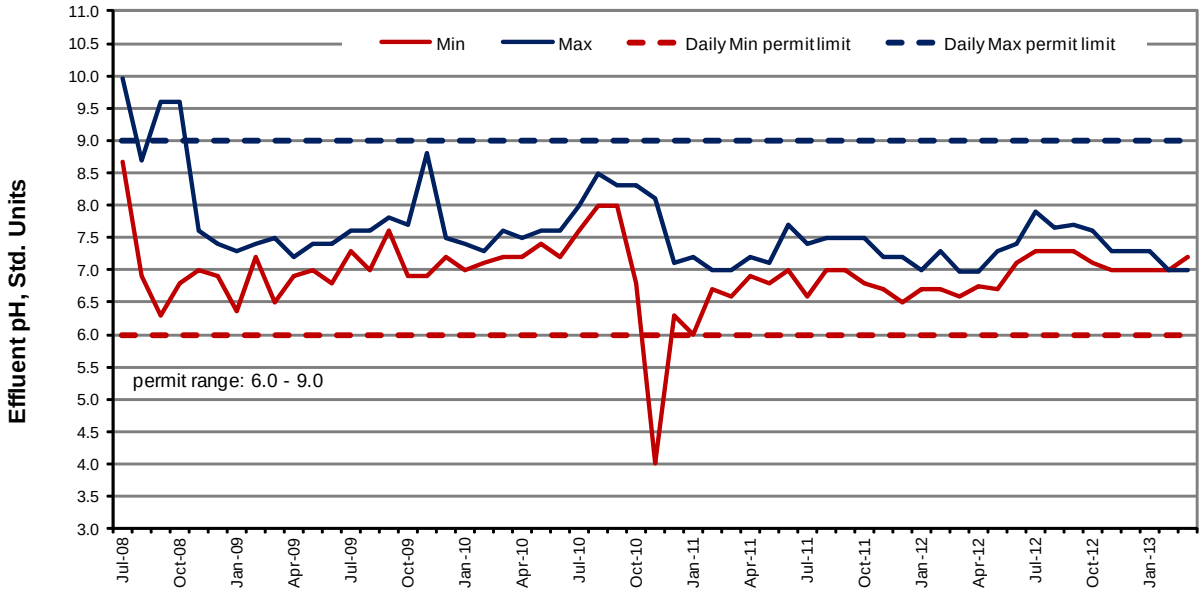




Discharge Monitoring Data, Effluent/Reclaimed Flow and Effluent pH, 2008-2013

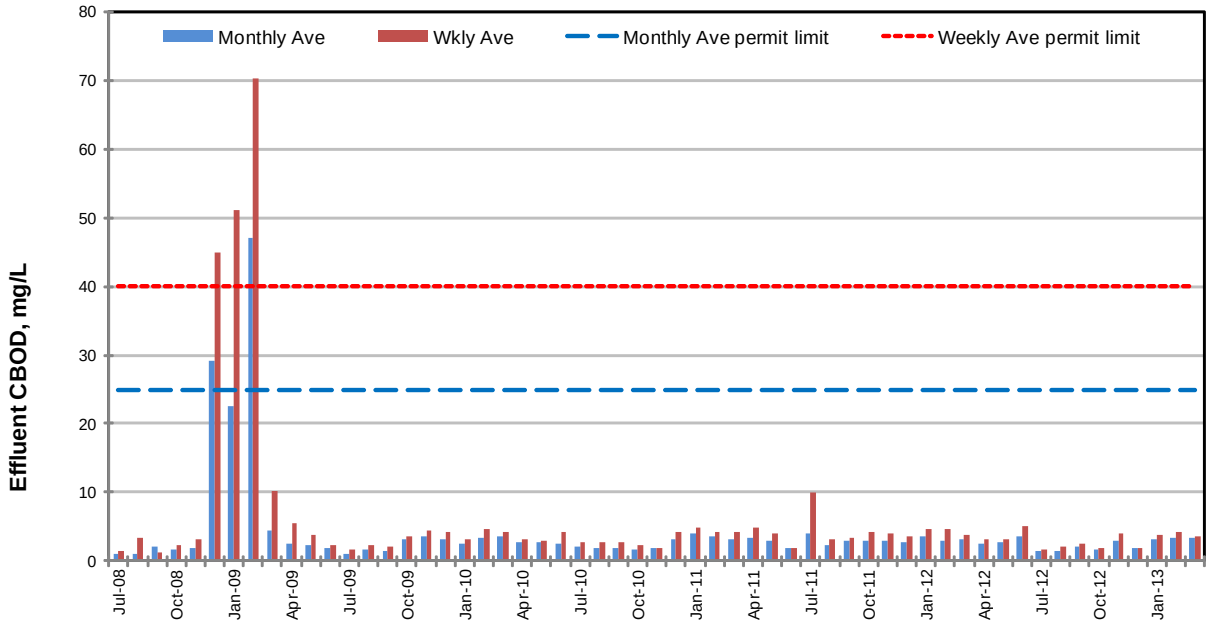
Snoqualmie WRF
Permit #WA0022403

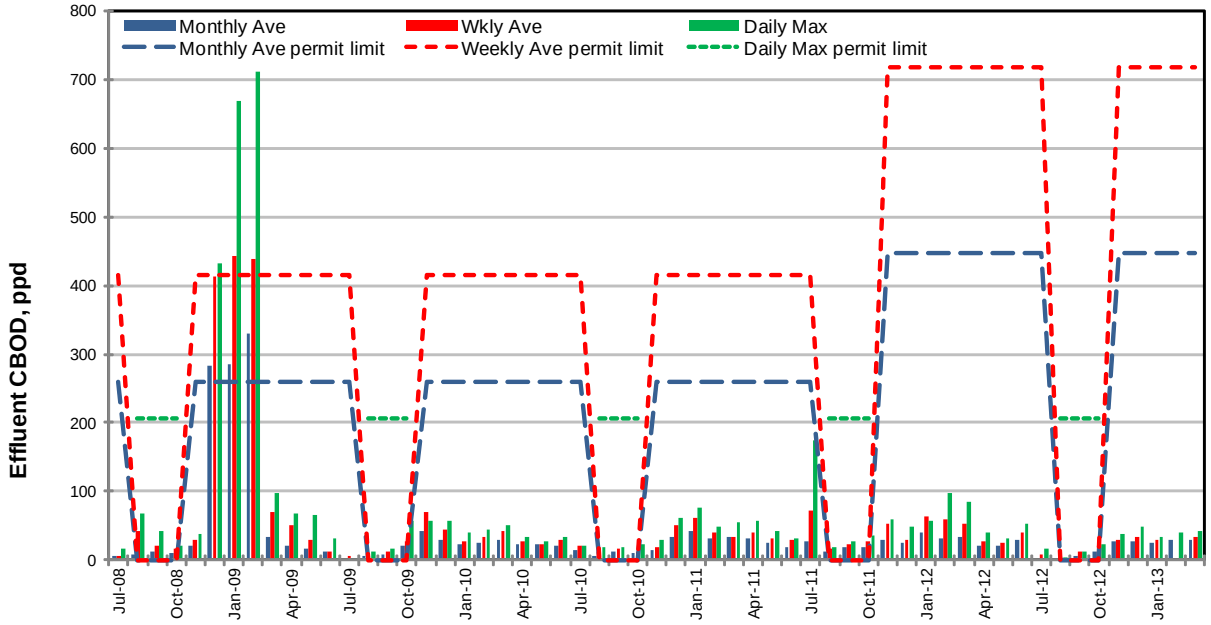




Discharge Monitoring Data, Effluent CBOD, 2008-2013

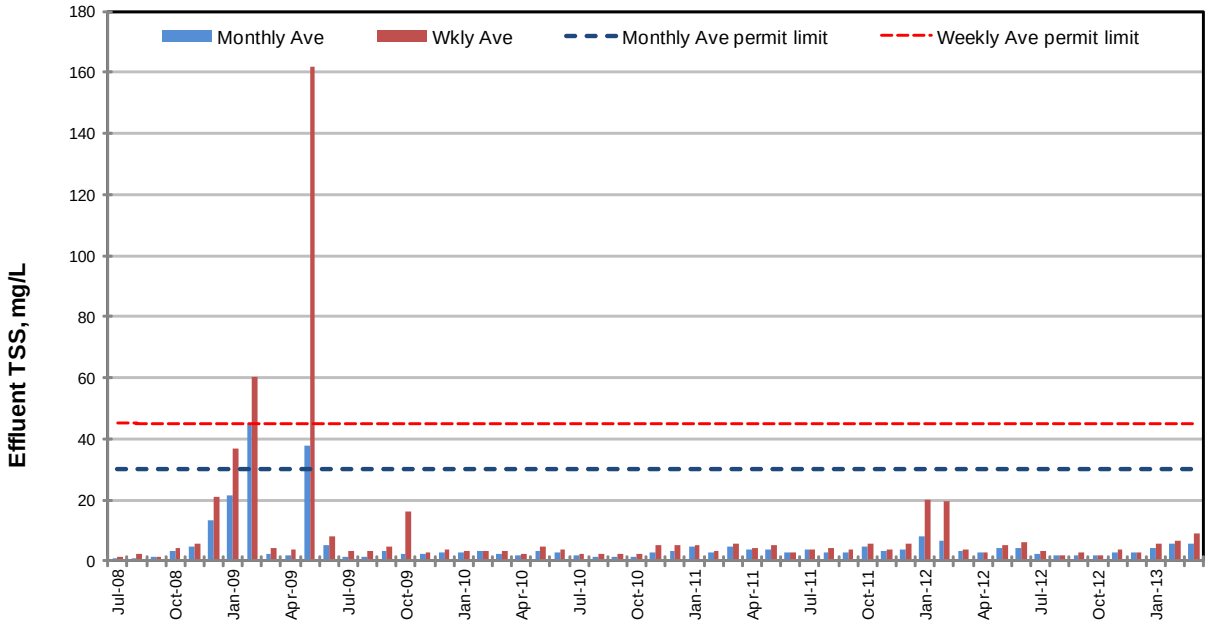
Snoqualmie WRF
Permit #WA0022403

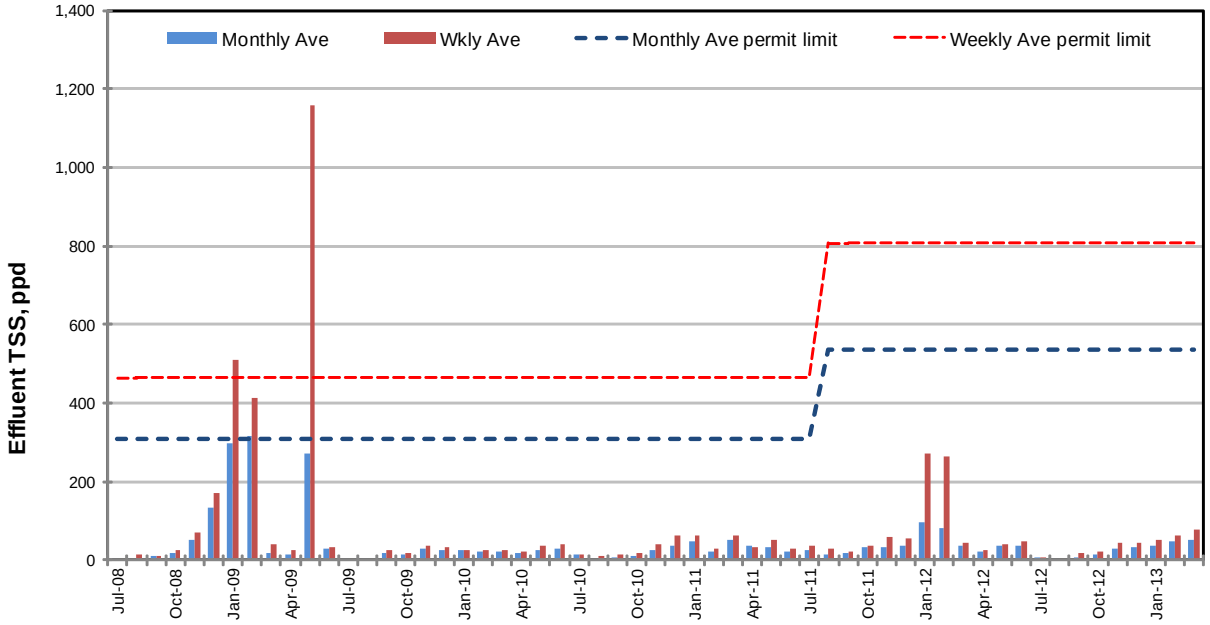




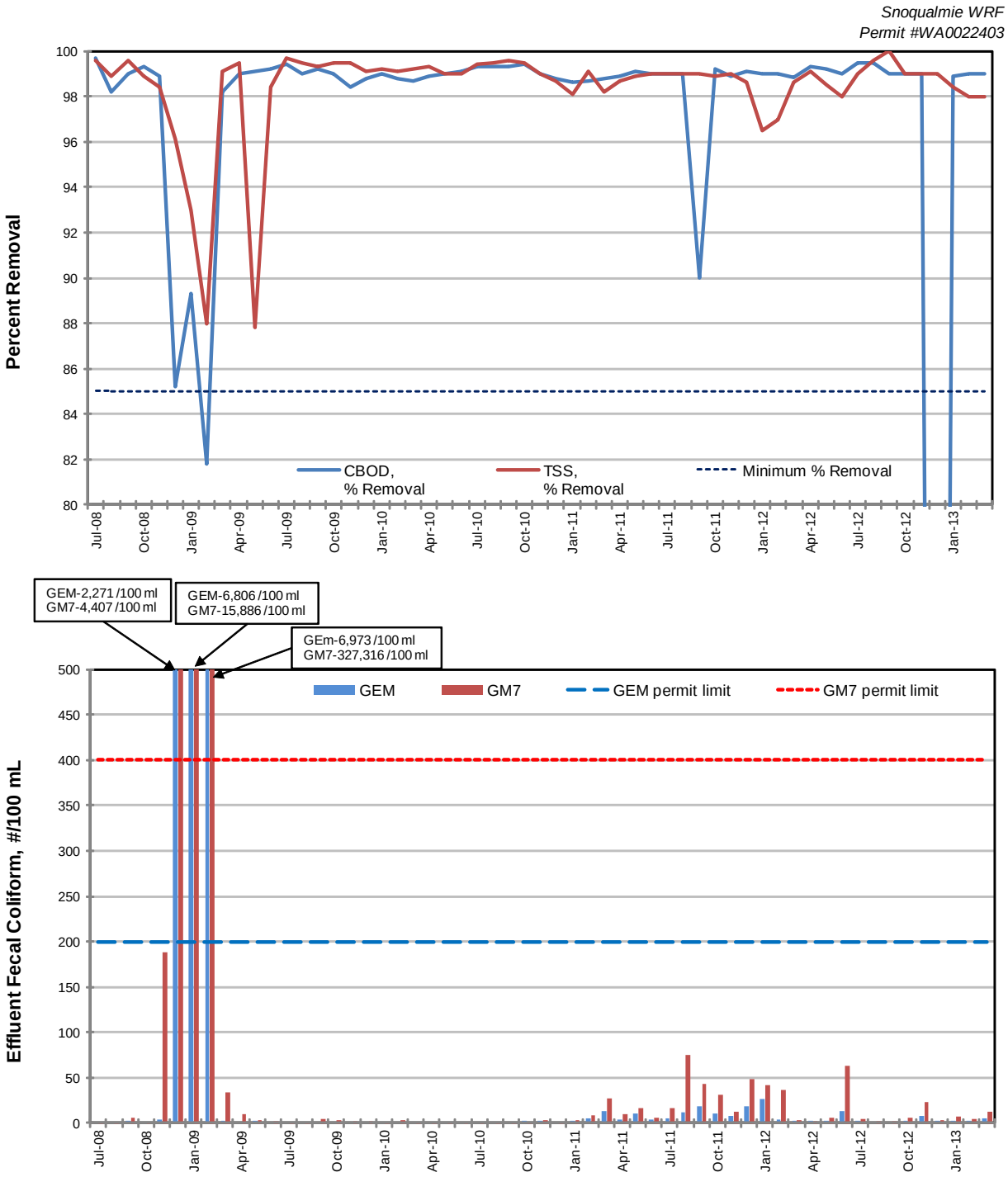
Discharge Monitoring Data, Effluent TSS, 2008-2013

Snoqualmie WRF
Permit #WA0022403



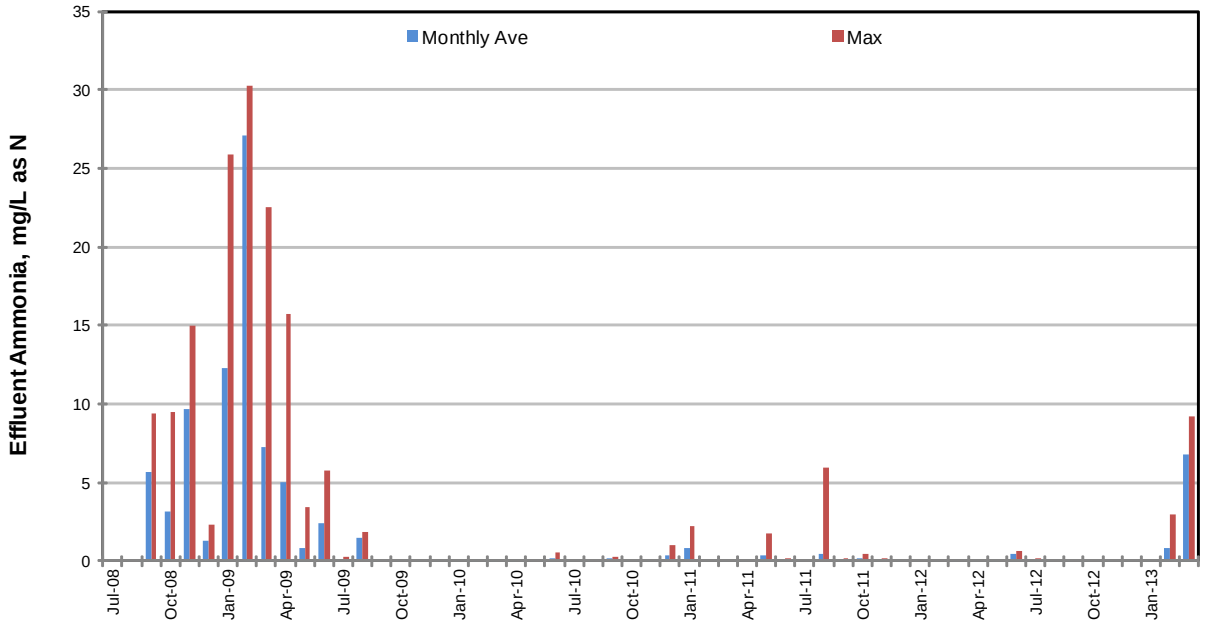


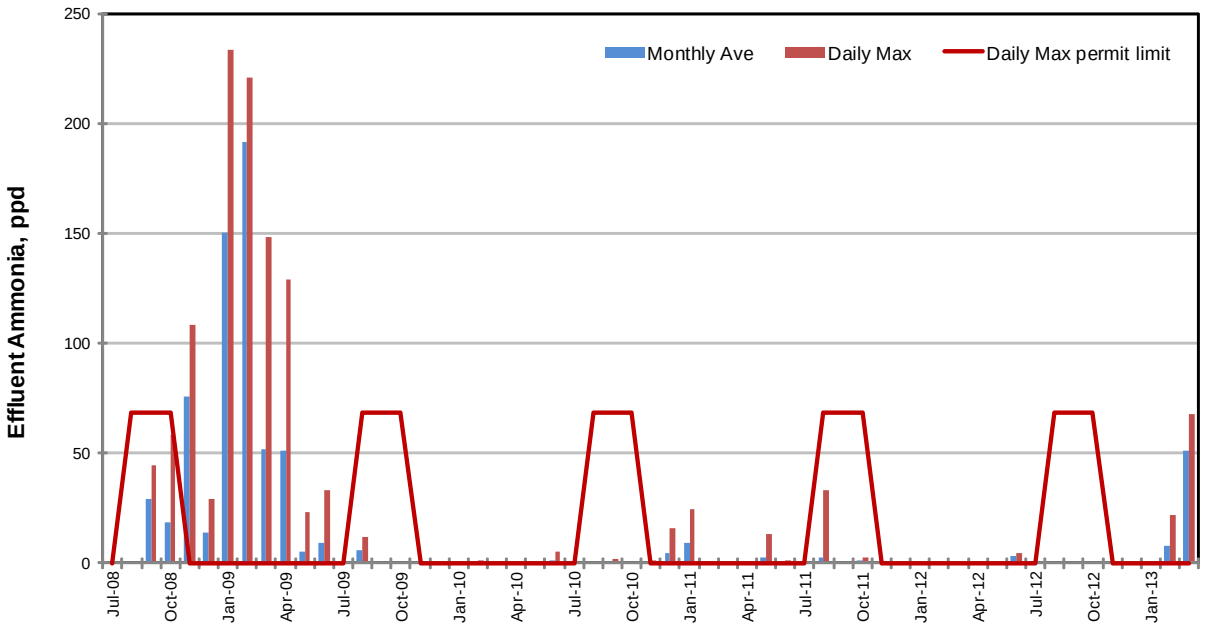
Discharge Monitoring Data, CBOD/TSS % Removal and Effluent Fecal Coliform, 2008-2013



Discharge Monitoring Data, Effluent Ammonia, 2008-2013

Snoqualmie WRF
Permit #WA0022403





Discharge Monitoring Data, Effluent Phosphorus, 2008-2013

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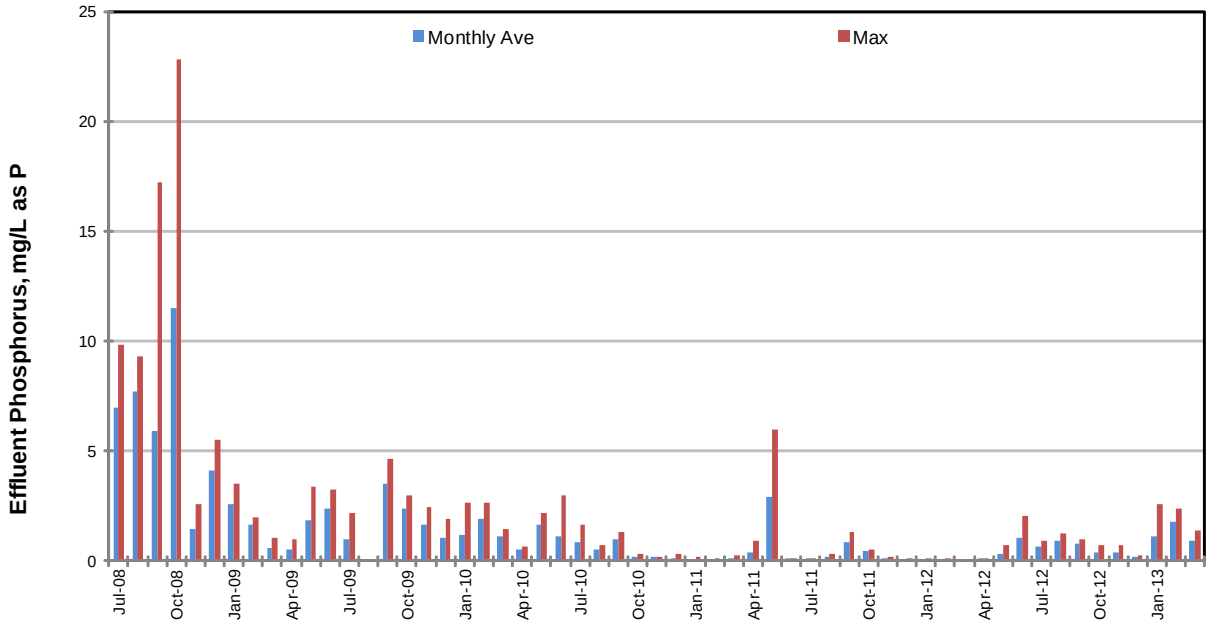
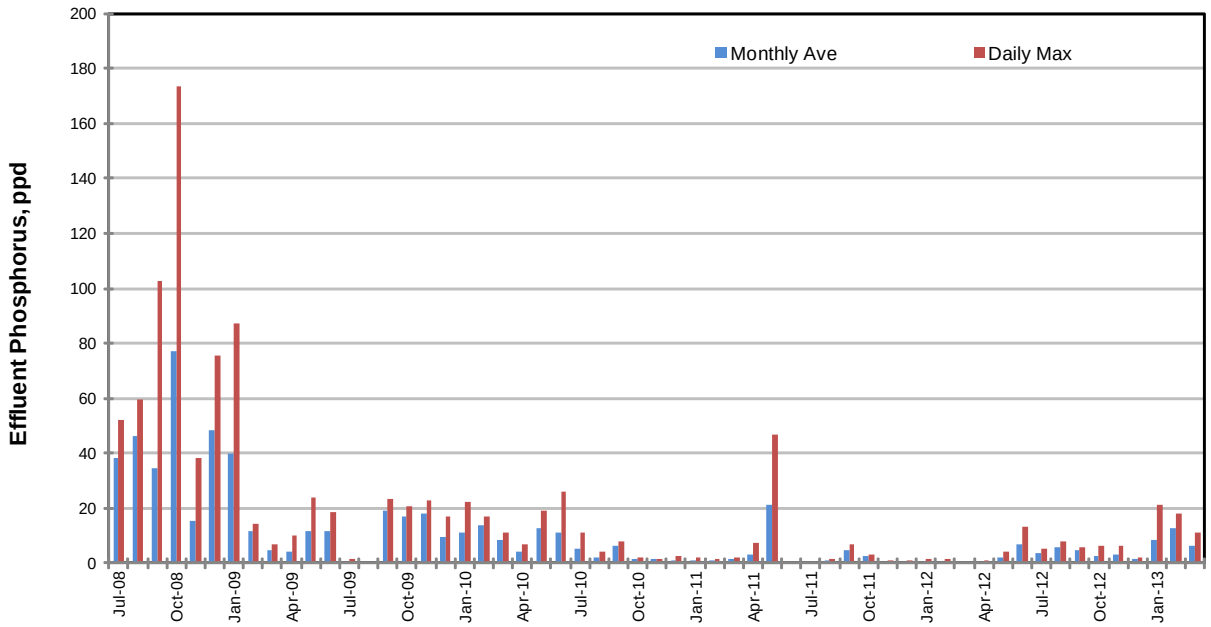
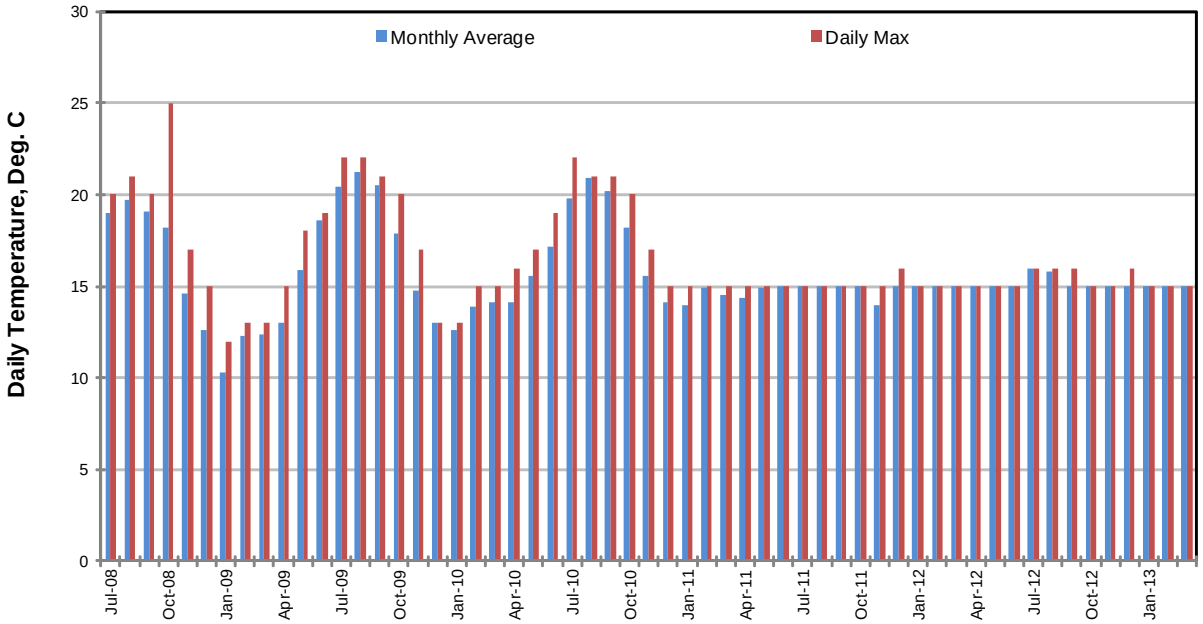
Permit #WA0022403

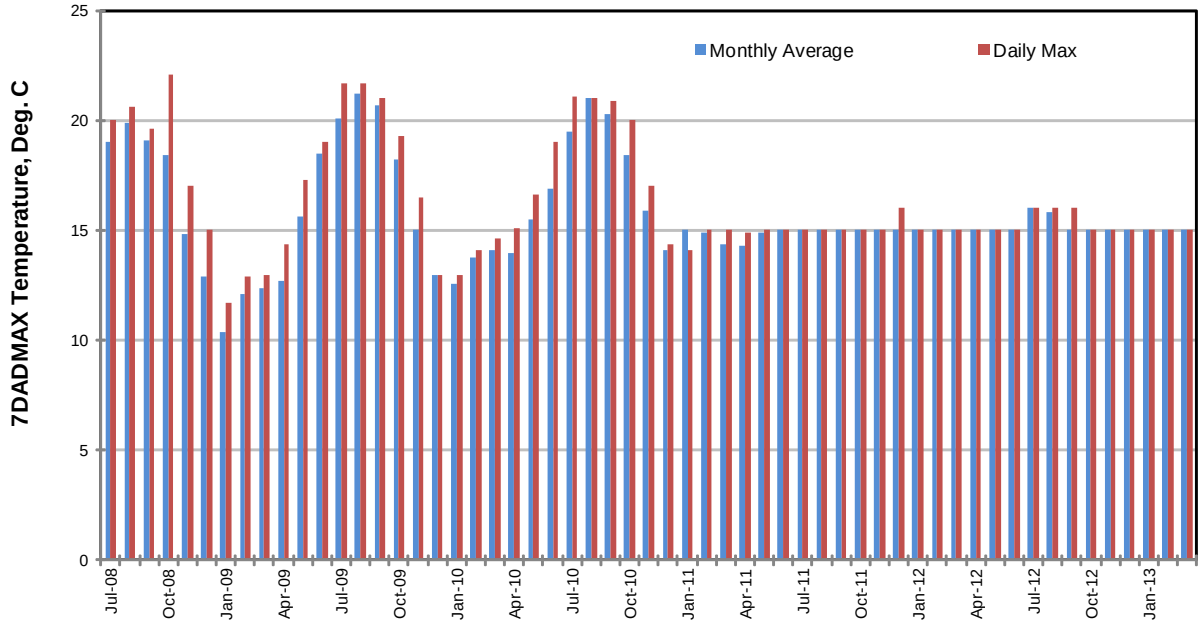




Discharge Monitoring Data, Effluent Temperature, 2008-2013

Snoqualmie WRF
Permit #WA0022403





Effluent Priority Pollutant Testing						
		Results for Given Monitoring Period			Results Summary	
Parameter	Units	Apr-2012	Jun-2012	Sep-2012	Maximum	Average
Alkalinity	mg/L as CaCO3	100	130	82	130	104.0
Hardness	mg/L as CaCO3	82	94	110	110	95.3
Aluminum	µg/L	5.02	6.44	12.4	12.4	8.0
Antimony	µg/L	0.12	0.12	0.95	0.95	0.4
Arsenic	µg/L	2.63	4.36	6.43	6.43	4.5
Barium	µg/L	4.17	6.76	6.24	6.76	5.7
Cadmium	µg/L	nd	0.04	nd	0.04	0.0
Chromium	µg/L	0.19	0.07	0.25	0.25	0.2
Copper	µg/L	3.54	1.09	1.75	3.54	2.1
Lead	µg/L	0.06	nd	0.225	0.225	0.1
Manganese	µg/L	15	32.2	2.16	32.2	16.5
Molybdenum	µg/L	0.96	1.07	1.38	1.38	1.1
Nickel	µg/L	0.46	0.68	0.89	0.89	0.7
Selenium	µg/L	nd	0.32	nd	0.32	0.3
Thallium	µg/L	nd	0.033	0.011	0.033	0.022
Zinc	µg/L	18.7	21.2	37.3	37.3	25.7
Mercury	µg/L	0.00312	0.00152	0.00277	0.00312	0.0025
Toluene	µg/L	10.5	nd	nd	10.5	10.5
Bis(2-ethylhexyl)phthalate	µg/L	nd	nd	0.8	0.8	0.8

"nd" not detected in the effluent sample.

Snoqualmie WWTP Acute WET Test Results as % Survival in 100% Effluent

Test Code	Collected	Start Date	Organism	Endpoint	% Survival
RMAR1148	3/14/2003	3/14/2003	*Daphnia pulex*	48-hour Survival	100%
RMAR1149	3/17/2003	3/17/2003	fathead minnow	96-hour Survival	95%
RMAR0989	6/11/2003	6/11/2003	*Daphnia pulex*	48-hour Survival	100%
RMAR0988	6/11/2003	6/11/2003	fathead minnow	96-hour Survival	98%
RMAR0329	12/17/2003	12/17/2003	*Daphnia pulex*	48-hour Survival	100%
RMAR0330	1/14/2004	1/14/2004	fathead minnow	96-hour Survival	100%
RMAR0692	6/14/2006	6/15/2006	*Ceriodaphnia dubia*	48-hour Survival	100%
RMAR0693	6/14/2006	6/15/2006	fathead minnow	96-hour Survival	100%
RMAR0885	12/11/2006	12/12/2006	*Ceriodaphnia dubia*	48-hour Survival	100%
RMAR0886	12/11/2006	12/12/2006	fathead minnow	96-hour Survival	95%
RMAR2478	2/14/2012	2/15/2012	*Ceriodaphnia dubia*	48-hour Survival	100%
RMAR2477	2/14/2012	2/15/2012	fathead minnow	96-hour Survival	100%
RMAR2673	8/21/2012	8/22/2012	*Ceriodaphnia dubia*	48-hour Survival	100%
RMAR2672	8/21/2012	8/22/2012	fathead minnow	96-hour Survival	100%
				Median	**100%**

The effluent demonstrates reasonable potential for Acute Toxicity when median survival in 100% effluent is less than 80% for a series of tests or if any single test results in less than 65% survival. (WAC 173-205-050)

Snoqualmie WWTP Acute WET Test Results as NOEC/LOEC in % Effluent

Test Code	Collected	Start Date	Organism	Endpoint	NOEC	LOEC	PMSD
RMAR1148	3/14/2003	3/14/2003	*Daphnia pulex*	48-hour Survival	100	> 100	5.0%
RMAR1149	3/17/2003	3/17/2003	fathead minnow	96-hour Survival	100	> 100	8.3%
RMAR0989	6/11/2003	6/11/2003	*Daphnia pulex*	48-hour Survival	100	> 100	5.0%
RMAR0988	6/11/2003	6/11/2003	fathead minnow	96-hour Survival	100	> 100	4.6%
RMAR0329	12/17/2003	12/17/2003	*Daphnia pulex*	48-hour Survival	100	> 100	5.0%
RMAR0330	1/14/2004	1/14/2004	fathead minnow	96-hour Survival	100	> 100	2.5%
RMAR0692	6/14/2006	6/15/2006	*Ceriodaphnia dubia*	48-hour Survival	100	> 100	5.0%
RMAR0693	6/14/2006	6/15/2006	fathead minnow	96-hour Survival	100	> 100	4.0%
RMAR0885	12/11/2006	12/12/2006	*Ceriodaphnia dubia*	48-hour Survival	100	> 100	5.0%
RMAR0886	12/11/2006	12/12/2006	fathead minnow	96-hour Survival	100	> 100	7.8%
RMAR2478	2/14/2012	2/15/2012	*Ceriodaphnia dubia*	48-hour Survival	100	> 100	13.3%
RMAR2477	2/14/2012	2/15/2012	fathead minnow	96-hour Survival	100	> 100	6.5%
RMAR2673	8/21/2012	8/22/2012	*Ceriodaphnia dubia*	48-hour Survival	100	> 100	5.0%
RMAR2672	8/21/2012	8/22/2012	fathead minnow	96-hour Survival	100	> 100	2.5%

NOEC = Concentration at which testing showed no observable effects

LOEC = Lowest concentration at which test showed an observable effect

PMSD = Percent minimum significant difference calculated for all tests in sampling event

Snoqualmie WWTP Chronic WET Test Results as NOEC/LOEC in % Effluent

Test Code	Collected	Start Date	Organism	Endpoint	NOEC	LOEC	PMSD
RMAR1150	3/12/2003	3/12/2003	*Ceriodaphnia dubia*	7-day Survival	100	> 100	
				Reproduction	100	> 100	25.5%
RMAR1151	3/12/2003	3/12/2003	fathead minnow	7-day Survival	100	> 100	5.2%
				Biomass	100	> 100	12.9%
				Weight	100	> 100	12.5%
RMAR0695	6/14/2006	6/15/2006	*Ceriodaphnia dubia*	7-day Survival	100	> 100	
				Reproduction	100	> 100	32.7%
RMAR0694	6/14/2006	6/15/2006	fathead minnow	7-day Survival	100	> 100	4.0%
				Biomass	100	> 100	17.5%
				Weight	100	> 100	16.4%
RMAR0883	12/11/2006	12/12/2006	*Ceriodaphnia dubia*	7-day Survival	100	> 100	
				Reproduction	100	> 100	30.1%
RMAR0884	12/11/2006	12/12/2006	fathead minnow	7-day Survival	100	> 100	10.1%
				Biomass	100	> 100	17.0%
				Weight	100	> 100	16.8%
RMAR2808	11/16/2011	11/17/2011	*Ceriodaphnia dubia*	7-day Survival	100	> 100	
				Reproduction	100	> 100	29.3%
RMAR2807	11/16/2011	11/17/2011	fathead minnow	7-day Survival	100	> 100	9.8%
				Biomass	100	> 100	10.4%
				Weight	100	> 100	14.0%
RMAR2806	11/16/2011	11/17/2011	green alga	Cell Density	100	> 100	11.4%
RMAR2649	6/25/2012	6/26/2012	*Ceriodaphnia dubia*	7-day Survival	100	> 100	
				Reproduction	50	100	33.1%
RMAR2647	6/25/2012	6/26/2012	fathead minnow	7-day Survival	100	> 100	9.7%
				Biomass	100	> 100	10.8%
				Weight	100	> 100	11.7%
RMAR2648	6/25/2012	6/26/2012	green alga	Cell Density	100	> 100	11.9%

NOEC = Concentration at which testing showed no observable effects
LOEC = Lowest concentration at which test showed an observable effect
PMSD = Percent minimum significant difference calculated for all tests in sampling event

Appendix E -- Technical Calculations

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on Ecology's homepage at http://www.ecy.wa.gov/programs/eap/pwspread/pwspread.html.

Basic Mixing In Rivers

State regulations (WAC 173-201A-400) limits the amount of mixing in an authorized mixing zone for discharges to rivers based on the most stringent dilution determined through two methods. The first method uses computer models to predict the amount of dilution obtained at the maximum edges of the authorized zones. The second method uses a simple mass balance approach to determine the amount of mixing obtained by mixing the effluent with a fraction of the total flow in the river at critical low flow periods (7Q10 flow). Ecology uses the following formula for the second method.

$$DF = \frac{Q_{WWTP} + \%\text{ of } 7Q10}{Q_{WWTP}}$$

where:

Q_{WWTP} = Wastewater Treatment Plant Flow
% of 7Q10 = Allowable fraction of critical 7Q10 flow for river

Ecology uses the following treatment plant and river flows in calculating the appropriate dilution factors.

Criteria	Plant Flow	River Flow
Aquatic Life, Acute	Maximum Daily Dry Weather	2.5% of 7Q10
Aquatic Life, Chronic	Maximum Monthly Dry Weather	25% of 7Q10
Human Health, Carcinogen	Maximum Monthly Dry Weather	25% of 30Q5
Human Health, Non-carcinogen	Annual Average	25% of Harmonic Mean

Simple Mixing:

Ecology uses simple mixing calculations to assess the impacts of certain conservative pollutants, such as the expected increase in fecal coliform bacteria at the edge of the chronic mixing zone boundary. Simple mixing uses a mass balance approach to proportionally distribute a pollutant load from a discharge into the authorized mixing zone. The approach assumes no decay or generation of the pollutant of concern within the mixing zone. The predicted concentration at the edge of a mixing zone (MC) is based on the following calculation:

$$MC = \frac{EC + (AC \times DF)}{1 + DF}$$

where:

EC = Effluent Concentration
AC = Ambient Concentration
DF = Dilution Factor

The following tables present results of evaluating changes in fecal coliform bacteria and turbidity using simple mixing.

Calculation of Fecal Coliform at Chronic Mixing Zone

INPUT	
Chronic Dilution Factor	42
Receiving Water Fecal Coliform, #/100 ml	71
Effluent Fecal Coliform - worst case, #/100 ml	400
Surface Water Criteria, #/100 ml	*100*
OUTPUT	
Fecal Coliform at Mixing Zone Boundary, #/100 ml	**79**
Difference between mixed and ambient, #/100 ml	8

Conclusion: At design flow, the discharge has no reasonable potential to violate water quality standards for fecal coliform.

Estimation of Turbidity at Chronic Mixing Zone

INPUT	
Chronic Dilution Factor	42
Ambient TSS Concentration, mg/L	29.6
Effluent TSS Concentration - worst case, mg/L	45
Surface Water Criteria, Maximum NTU increase	*5*
OUTPUT	
TSS at Mixing Zone Boundary, mg/L	30.0
TSS Increase at Mixing Zone Boundary, mg/L	0.4
TSS to Turbidity Conversion Factor[1]	0.408
Tubidity Increase at Mixing Zone Boundary, NTU	**0.15**

Conclusion: At design flow, the discharge has no reasonable potential to violate water quality standards for turbidity.

[1]*Factor for converting each mg/L of TSS concentration to an approximate NTU value for turbidity. Factor assumes a linear relationship between TSS and Turbidity and is derived from site-specific data.*

pH Analysis

Ecology uses a spreadsheet tool to calculate the pH of a mixture of two flows using the procedure in EPA's DESCON program (EPA, 1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. EPA Office of Water, Washington DC). The major form of alkalinity is assumed to be carbonate alkalinity. Also, alkalinity and total inorganic carbon are assumed to be conservative. The following tables present the calculated pH at the edge of the chronic mixing zone for each outfall. Ecology evaluated resultant pH when effluent is at the extremes of the technology standards of 6.0 and 9.0. If the analysis showed a potential to exceed water quality criteria, additional pH values were evaluated to determine appropriate limits.

Calculation of pH of a Mixture of Two Flows

Based on the procedure in EPA's DESCON program (EPA, 1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington D.C.)

INPUT			
	pH 9.0	**pH 6.0**	**pH 6.3**
1. Dilution Factor at Mixing Zone Boundary	42	42	42
2. Ambient/Upstream/Background Conditions			
Temperature (deg C):	20.70	20.70	20.70
pH:	7.37	7.37	7.37
Alkalinity (mg CaCO3/L):	50.00	50.00	50.00
3. Effluent Characteristics			
Temperature (deg C):	21.70	21.70	21.70
pH:	9.00	6.00	6.30
Alkalinity (mg CaCO3/L):	130.00	130.00	130.00
OUTPUT			
1. Ionization Constants			
Upstream/Background pKa:	6.38	6.38	6.38
Effluent pKa:	6.37	6.37	6.37
2. Ionization Fractions			
Upstream/Background Ionization Fraction:	0.91	0.91	0.91
Effluent Ionization Fraction:	1.00	0.30	0.46
3. Total Inorganic Carbon			
Upstream/Background Total Inorganic Carbon (mg CaCO3/L):	55	55	55
Effluent Total Inorganic Carbon (mg CaCO3/L):	130	435	283
4. Condtions at Mixing Zone Boundary			
Temperature (deg C):	20.72	20.72	20.72
Alkalinity (mg CaCO3/L):	51.91	51.91	51.91
Total Inorganic Carbon (mg CaCO3/L):	56.88	64.17	60.53
pKa:	6.38	6.38	6.38
RESULTS			
pH at Mixing Zone Boundary:	**7.40**	**7.00**	**7.16**
pH Change at Mixing Zone Boundary:	**0.0**	**0.4**	**0.2**

Reasonable Potential Analysis:

Ecology's PermitCalc Workbook uses Excel spreadsheets to determine whether a discharge has a reasonable potential to violate the aquatic life and human health-based water quality standards. The tool also calculates appropriate effluent limits, if needed. The process and formulas for determining reasonable potential and effluent limits in these spreadsheets are taken directly from the *Technical Support Document for Water Quality-based Toxics Control*, (EPA 505/2-90-001). The adjustment for autocorrelation is from EPA (1996a), and EPA (1996b). The tool uses water quality criteria published in WAC 173-201A-240. Criteria for toxic pollutants not listed in the state water quality standards are taken from the National Toxic Rule (40 CFR 131.36) or from EPA's National Recommended WQ Criteria.

Ammonia Criteria Calculation

The reasonable potential analysis for Ammonia depends on site-specific criteria for this parameter since ammonia's toxicity depends on that portion which is available in the unionized form. The amount of unionized ammonia depends on the temperature and pH in the receiving freshwater. To evaluate ammonia toxicity, Ecology used the available receiving water information for its long-term monitoring station #07D130, located approximately 1.5 miles above the WWTWRF outfall at the Meadowbrook Bridge, and equations presented in 173-201A-240 WAC. The following table summarizes the calculation.

Freshwater Un-ionized Ammonia Criteria Calculation

Based on Chapter 173-201A WAC, amended November 20, 2006

INPUT	
1. Receiving Water Temperature (deg C):	20.7
2. Receiving Water pH:	7.4
3. Is salmonid habitat an existing or designated use?	Yes
4. Are non-salmonid early life stages present or absent?	Present
OUTPUT	
Ratio	20.900
FT	1.400
FPH	1.657
pKa	9.380
Unionized Fraction	0.010
Unionized ammonia NH3 criteria (mg/L as NH_3)	
Acute:	0.188
Chronic:	0.016
RESULTS	
Total ammonia nitrogen criteria (mg/L as N):	
Acute:	15.981
Chronic:	1.403

Reasonable Potential Calculation

Facility	Snoqualmie WRF
Water Body Type	Freshwater
Rec. Water Hardness	Acute=54.1, Chronic=24.4 mg/L

Dilution Factors:	Acute	Chronic
Aquatic Life	3	42
Human Health Carcinogenic		179
Human Health Non-Carcinogenic		58

Pollutant, CAS No. & NPDES Application Ref. No.		AMMONIA, Criteria as Total NH3	ALUMINUM, total recoverable, pH 6.5-9.0 7429905	ANTIMONY (INORGANIC) 744036 1M	ARSENIC (dissolved) 7440382 2M	BIS(2-ETHYLHEXYL) PHTHALATE 117817 13B	CADMIUM - 7440439 4M Hardness dependent	CHROMIUM(HEX) 18540299	COPPER - 744058 6M Hardness dependent	LEAD - 7439921 7M Dependent on hardness	MANGANESE 7439965	MERCURY 7439976 8M
Effluent Data	# of Samples (n)	57	3	3	3	3	3	3	3	3	3	3
	Coeff of Variation (Cv)	2.2	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)	17,100	12.4	0.95	6.43	0.8	0.04	0.25	3.54	0.225	32.2	0.0031
	Calculated 50th percentile Effluent Conc. (when n>10)											
Receiving Water Data	90th Percentile Conc., ug/L	10	0		1.49		0	1.9	1.45	0.043		0.0036
	Geo Mean, ug/L			0		0			1.28		0	0.0024
Water Quality Criteria	Aquatic Life Criteria, ug/L — Acute	15,981	750	-	360	-	1.9018	15	9.5377	32.884	-	2.1
	Aquatic Life Criteria, ug/L — Chronic	1,403	-	-	190	-	0.3627	10	3.4003	0.5263	-	0.012
	WQ Criteria for Protection of Human Health, ug/L	-	-	14	-	1.8	-	-	1300	-	50	0.14
	Metal Criteria Translator, decimal — Acute	-	-	-	1	-	0.943	0.982	0.7213	0.466	-	0.85
	Metal Criteria Translator, decimal — Chronic	-	-	-	1	-	0.943	0.962	0.7213	0.466	-	-
	Carcinogen?	N	N	N	Y	Y	N	N	N	N	N	N

Aquatic Life Reasonable Potential

Effluent percentile value		0.950	0.950		0.950		0.950	0.950	0.950	0.950		0.950
s	$s^2=\ln(CV^2+1)$	1.328	0.555		0.555		0.555	0.555	0.555	0.555		0.555
Pn	$Pn=(1\text{-confidence level})^{1/n}$	0.949	0.368		0.368		0.368	0.368	0.368	0.368		0.368
Multiplier		1.00	3.00		3.00		3.00	3.00	3.00	3.00		3.00
Max concentration (ug/L) at edge of…	Acute	6,206	13.484		7.942		0.041	1.478	3.701	0.141		0.005
	Chronic	419	0.890		1.916		0.003	1.872	1.598	0.049		0.004
Reasonable Potential? Limit Required?		**NO**	**NO**		**NO**		**NO**	**NO**	**NO**	**NO**		**NO**

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$		0.5545	0.5545		0.5545	0.5545	0.5545
Pn	$Pn=(1\text{-confidence level})1/n$		0.368	0.368		0.368	0.368	0.368
Multiplier			1.2049	1.2049		1.2049	1.2049	1.2049
Dilution Factor			58.139	179.45		58.139	58.139	58.139
Max Conc. at edge of Chronic Zone, ug/L			0.0197	0.0054		1.3313	0.6673	0.0024
Reasonable Potential? Limit Required?			**NO**	**NO**		**NO**	**NO**	**NO**

Reasonable Potential Calculation - Page 2

Facility	Snoqualmie WRF
Water Body Type	Freshwater
Rec. Water Hardness	Acute=54.1, Chronic=24.4 mg/L

Dilution Factors:	Acute	Chronic
Aquatic Life	3	42
Human Health Carcinogenic		179
Human Health Non-Carcinogenic		58

Pollutant, CAS No. & NPDES Application Ref. No.		NICKEL - 7440020 9M - Dependent on hardness	SELENIUM 7782492 10M	THALLIUM 7440280 12M	TOLUENE 108883 25V	ZINC- 7440666 13M hardness dependent	CHLORINE (Total Residual) 7782505					
Effluent Data	# of Samples (n)	3	3	3	3	3	3					
	Coeff of Variation (Cv)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)	0.89	0.32	0.033	10.5	37.3	70					
	Calculated 50th percentile Effluent Conc. (when n>10)											
Receiving Water Data	90th Percentile Conc., ug/L	0.27	0			4	0					
	Geo Mean, ug/L	0.21	0	0	0							
Water Quality Criteria	Aquatic Life Criteria, ug/L Acute	841.65	20	-	-	68	19					
	Chronic	47.657	5	-	-	31.626	11					
	WQ Criteria for Protection of Human Health, ug/L	610	170	1.7	6800	-	-					
	Metal Criteria Translator, decimal Acute	0.998	-	-	-	0.8184	-					
	Chronic	0.997	-	-	-	0.8184	-					
	Carcinogen?	N	N	N	N	N	N					

Aquatic Life Reasonable Potential

Effluent percentile value		0.950	0.950			0.950	0.950
s	$s^2=\ln(CV^2+1)$	0.555	0.555			0.555	0.555
Pn	$Pn=(1\text{-confidence level})^{1/n}$	0.368	0.368			0.368	0.368
Multiplier		3.00	3.00			3.00	3.00
Max concentration (ug/L) at edge of…	Acute	1.138	0.348			35.747	76.121
	Chronic	0.327	0.023			6.094	5.022
Reasonable Potential? Limit Required?		**NO**	**NO**			**NO**	**YES**

Aquatic Life Limit Calculation

# of Compliance Samples Expected per month		30
LTA Coeff. Var. (CV), decimal		0.6
Permit Limit Coeff. Var. (CV), decimal		0.6
Waste Load Allocations, ug/L	Acute	52.408
	Chronic	459.95
Long Term Averages, ug/L	Acute	16.827
	Chronic	242.59
Limiting LTA, ug/L		16.827
Metal Translator or 1?		1.00
Average Monthly Limit (AML), ug/L		**20.0**
Maximum Daily Limit (MDL), ug/L		**52.4**

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$	0.5545	0.5545	0.5545	0.5545
Pn	$Pn=(1\text{-confidence level})1/n$	0.368	0.368	0.368	0.368
Multiplier		1.2049	1.2049	1.2049	1.2049
Dilution Factor		58.139	58.139	58.139	58.139
Max Conc. at edge of Chronic Zone, ug/L		0.2248	0.0066	0.0007	0.2176
Reasonable Potential? Limit Required?		**NO**	**NO**	**NO**	**NO**

Comments/Notes:

References: WAC 173-201A,

Technical Support Document for Water Quality-based Toxics Control, US EPA, March 1991, EPA/505/2-90-001, pages 56/99

Calculation of Water Quality-Based Effluent Limits:

Water quality-based effluent limits are calculated by the two-value wasteload allocation process as described on page 100 of the TSD (EPA, 1991) and shown below.

1. Calculate the acute wasteload allocation WLA_a by multiplying the acute criteria by the acute dilution factor and subtracting the background factor. Calculate the chronic wasteload allocation (WLA_c) by multiplying the chronic criteria by the chronic dilution factor and subtracting the background factor.

   WLA_a = (acute criteria x DF_a) – [(background conc.x (DF_a - 1)]

   WLA_c = (chronic criteria x DF_c) – [(background conc. x (DF_c -1)]

   where: DF_a = Acute Dilution Factor

   DF_c = Chronic Dilution Factor

2. Calculate the long term averages (LTA_a and LTA_c) which will comply with the wasteload allocations WLA_a and WLA_c.

   $LTA_a = WLA_a \times e^{[0.5\sigma^2 - z\sigma]}$ where: $\sigma^2 = \ln[CV^2 + 1]$; $z = 2.326$; CV = coefficient of variation = std. dev./mean

   $LTA_c = WLA_c \times e^{[0.5\sigma^2 - z\sigma]}$ where: $\sigma^2 = \ln[(CV^2 \div 4) + 1]$; $z = 2.326$

3. Use the smallest LTA of the LTA_a or LTA_c to calculate the maximum daily effluent limit and the monthly average effluent limit.

   Maximum Daily Limit = MDL

   $$MDL = LTA x e^{(Z\sigma - 0.5\sigma^2)}$$ where: $\sigma^2 = \ln[CV^2 + 1]$; $z = 2.326$ (99th percentile occurrence); LTA = Limiting long term average

   Average Monthly Limit = AML

   $$AML = LTA x e^{(Z\sigma_n - 0.5\sigma_n^2)}$$ where: $\sigma^2 = \ln[(CV^2 \div n) + 1]$; n = number of samples/month; $z = 1.645$ (95^{th} % occurrence probability); LTA = Limiting long term average

Temperature Reasonable Potential Analysis

Ecology calculates the reasonable potential for a discharge to exceed fresh water temperature standards based on the requirements of WAC 173-201A-200(1)(c)(i)--(ii) and The Water Quality temperature guidance document found at: http://www.ecy.wa.gov/biblio/0610100.html. Ecology evaluates temperature based on the elements described below and uses the following calculations to determine if a discharge has a reasonable potential to exceed water quality standards.

Criteria elements for the Washington State Fresh Water Temperature Standards:

- Annual summer maximum and supplementary spawning/rearing criteria

  Each water body has an annual maximum temperature criterion [WAC 173-201A-200(1)(c), 210(1)(c), and Table 602]. These threshold criteria (e.g., 12, 16, 17.5, 20°C) protect specific categories of aquatic life by controlling the effect of human actions on summer temperatures.

  Some waters have an additional threshold criterion to protect the spawning and incubation of salmonids (9°C for char and 13°C for salmon and trout) [WAC 173-201A-602, Table 602]. These criteria apply during specific date-windows.

  The threshold criteria apply at the edge of the chronic mixing zone. Criteria for most fresh waters are expressed as the highest 7-Day average of daily maximum temperature (7-DADMax). The 7-DADMax temperature is the arithmetic average of seven consecutive measures of daily maximum temperatures. Criteria for marine waters and some fresh waters are expressed as the highest 1-Day annual maximum temperature (1-DMax).

- Incremental warming criteria

  The water quality standards limit the amount of warming human sources can cause under specific situations [WAC 173-201A-200(1)(c)(i)-(ii), 210(1)(c)(i)-(ii)]. The incremental warming criteria apply at the edge of the chronic mixing zone.

  At locations and times when background temperatures are cooler than the assigned threshold criterion, point sources are permitted to warm the water by only a defined increment. These increments are permitted only to the extent doing so does not cause temperatures to exceed either the annual maximum or supplemental spawning criteria.

  At locations and times when a threshold criterion is being exceeded due to natural conditions, all human sources, considered cumulatively, must not warm the water more than 0.3°C above the naturally warm condition.

  When Ecology has not yet completed a TMDL, our policy allows each point source to warm water at the edge of the chronic mixing zone by 0.3°C. This is true regardless of the background temperature and even if doing so would cause the temperature at the edge of a standard mixing zone to exceed the numeric threshold criteria. Allowing a 0.3°C warming for each point source is reasonable and protective where the dilution factor is based on 25% or less of the critical flow. This is because the fully mixed effect on temperature will only be a fraction of the 0.3°C cumulative allowance (0.075°C or less) for all human sources combined.

- Protections for temperature acute effects

  Instantaneous lethality to passing fish: The upper 99th percentile daily maximum effluent temperature must not exceed 33°C, unless a dilution analysis indicates ambient temperatures will not exceed 33°C two seconds after discharge.

  General lethality and migration blockage: Measurable (0.3°C) increases in temperature at the edge of a chronic mixing zone are not allowed when the receiving water temperature exceeds either a 1DMax of 23°C or a 7DADMax of 22°C.

  Lethality to incubating fish: Human actions must not cause a measurable (0.3°C) warming above 17.5°C at locations where eggs are incubating.

Temperature at Chronic Mixing Zone Boundary:

$$T_{chronic} = T_{amb} + [(T_{effluent} - T_{amb}) \div DF]$$

where,

$T_{chronic}$ = Estimated temperature at the edge of the chronic mixing zone.

T_{amb} = Ambient 7DADMax temperature of the receiving water.

$T_{effluent}$ = Effluent 7DADMax temperature.

DF = Chronic Dilution Factor

Maximum Allowable Incremental Temperature Increase:

The water quality standards limit the maximum allowable incremental temperature increase in freshwater systems based on how close the ambient temperature is to the criteria. When ambient temperature is warmer than the criteria or within 0.3 C of the criteria, and no TMDL exists for temperature impairments, no single discharger may increase the temperature at the chronic mixing zone boundary by more than 0.3 C. When ambient temperature is cooler than the criteria, incremental warming (T_i) is limited to the lesser of:

$$T_i = T_{criteria} - T_{amb} \quad \text{or,} \quad T_i = \frac{28}{(T_{amb} + 7)}$$

Appendix F -- Response to Comments

Ecology did not receive any comments during the public comment period.

APPENDIX C

MUNICIPAL CODE SELECTIONS

Chapter 13.02
FEES FOR NEW WATER AND SEWER ACCOUNTS

Sections:

13.02.010 Findings.
13.02.020 New account servicing fee.

13.02.010 Findings.

The city council finds that certain one-time administrative costs are incurred in setting up new water and sewer accounts which are not recovered through connection charges or monthly rates, and should be charged as a service fee to the customer at the time a new water or sewer account is set up. (Ord. 864 § 1, 2000).

13.02.020 New account servicing fee.

Prior to any connection to the municipal water and/or sewer system there shall be paid a nonrefundable new account servicing fee in the sum of $50.00. For the purpose of this chapter, a “new account” is any account sought by any person not previously serviced with municipal water or sewer service at the street address of requested service, either individually, as a member of a marital community, under another name or as owner or principal of a business entity of any nature. (Ord. 864 § 1, 2000).

This page of the Snoqualmie Municipal Code is current through Ordinance 1076, passed January 24, 2011.
Disclaimer: The City Clerk's Office has the official version of the Snoqualmie Municipal Code. Users should contact the City Clerk's Office for ordinances passed subsequent to the ordinance cited above.

City Website: http://www.ci.snoqualmie.wa.us/ (http://www.ci.snoqualmie.wa.us/)
City Telephone: (425) 453-6525
Code Publishing Company (http://www.codepublishing.com/)

Chapter 13.04
SEWER REGULATION[1]

Sections:

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13.04.010 Definitions.
13.04.020 Grammatical interpretation.

Article II. General Provisions

13.04.030 Deposit of excrement, garbage, wastes.
13.04.040 Discharge of pollutants into natural outlets.
13.04.050 Privy, septic tank, cesspool.
13.04.060 Suitable toilet facilities – Connection – Repairs.
13.04.070 Connection, repairs – Authorization by city.
13.04.080 Property determined serviceable by city sewer lines.

Article III. Private Sewers

13.04.090 Private disposal – Conditions for use.

Article IV. Side Sewers and Connections

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13.04.130 Side sewer contract – Conditions.
13.04.140 Wyes, tees, stubs.
13.04.150 Installation – Costs borne by property owner.
13.04.160 Single sewer for each building – Exceptions.
13.04.170 Use of old facilities.
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13.04.200 Placement.
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13.04.220 Excavation – Pipe laying and backfill.
13.04.230 Joints and connections – Material, method.
13.04.240 Joints and connections – Location.
13.04.250 Inspections – Procedure.
13.04.260 Barricades, lights – Restoration.
13.04.270 Permit – Failure to secure.
13.04.280 Conveyance of private sewer to city.
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Article V. Standard Participation Contract

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Article VII. Use of Public Sewer

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Article VIII. Side Sewer Contractors

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Article IX. Administration and Enforcement

13.04.570 Agent or owner of serviced premises.
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Article I. Definitions

13.04.010 Definitions.

Unless the context specifically indicates otherwise, the meaning of terms used in this chapter shall be as set forth in this section:

1. “BOD” (denoting biochemical oxygen demand) means the quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedure in five days at 20 degrees centigrade, expressed in parts per million by weight.

2. “Building drain” means that part of the lowest horizontal piping of a drainage system which receives the discharge from soil, waste, and other drainage pipes inside the walls of the building and conveys it to the side sewer.

3. “Clerk” means the city administrator or his designee.

4. “Commercial structure” means business and industrial structures, and all structures other than residential.

5. “Downspout” means the leader or pipe above the ground which is installed to conduct storm water from the roof gutter of any structure.

6. “Duplex” means a residential structure containing two individual dwelling units, designed or used to house not more than two families living independently of each other.

7. “Garbage” means solid waste from the preparation, processing, cooking and dispensing of food, and from the handling, storing and sale of produce.

8. “Industrial waste” means any liquid, solid or gaseous substance, or combination thereof, resulting from any process of industry, manufacturing, business, trade or research, including development, recovering or processing of natural resources.

9. “Inspector” means the utilities director or his designee.

10. “Lateral” means a sewer which will receive the flow from one or more side sewers and discharge into a trunk or interceptor.

11. “Licensed side sewer contractor” means any contractor who is duly licensed under this chapter to construct, install, repair, reconstruct, excavate, or connect any side sewer to the public sewers of the city.

12. “Multiple dwelling” means a residential structure containing more than two dwelling units designed or used to house more than two families living independently of each other, and also includes mobile home parks, in which each space or stall shall be deemed a dwelling unit.

13. “Natural outlet” means any outlet into a watercourse, pond, ditch, lake or other body of surface or groundwater.

14. “Occupant” means any person or owner in physical possession of a structure to which sewer service is available.

15. “Person or owner” means any individual or firm, company, association, society, corporation or group, and the singular shall include the plural.

16. “Private sewer” means a sewer, exclusive of side sewers, which is neither owned nor operated by the city or other public authority.

17. “pH” means the logarithm of the reciprocal of the weight of hydrogen ions in grams per liter of solution.

18. “Properly shredded garbage” means garbage which has been shredded to such a degree that all particles will be carried freely under the flow conditions normally prevailing in public sewers, with no particle greater than one-half inch in diameter.

19. “Public sewer” means a sewer which is owned or operated by the city or other public authority.

20. “Residential structure” means a single-family, duplex or multiple-family dwelling structure, and includes mobile homes, motels and hotels.

21. “Sanitary sewer” means a sewer which carries sewage into which storm water, surface water and ground water are not intentionally admitted.

22. “Sewage” means water-carried wastes discharged from the sanitary facilities of structures occupied or used by human beings.

23. “Sewage treatment plant” means any arrangement of devices, lagoons, or structures used for treating sewage.

24. “Sewage works” means all facilities for collecting, pumping, treating and disposing of sewage.

25. “Sewer” means a pipe or conduit for sewage.

26. “Sewer superintendent” means the sewer department crew chief.

27. “Side sewer” (or building sewer) means the extension from the building drain to the public sewer or other place of disposal, beginning two and one-half feet outside the foundation wall.

28. “Standard participation contract” means a form of contract required by this chapter to be entered into before properties which have not been assessed for sewers, or otherwise qualified, may use the public sewers of the city.

29. “Storm drain” means a conduit designed to or used to transport storm water.

30. “Storm water” means waters on the surface of the ground or underground resulting from rainfall or other natural precipitation.

31. “Structure” means anything constructed or erected, the use of which requires location or attachment to something having location on the ground, including mobile homes and trailers, but not including fences.

32. “Suspended solids” means solids that either float on the surface of or are in suspension in water, sewage, or other liquids, and which are removable by laboratory filtering.

33. “Utilities director” means the director of public utilities, or his designee.

34. “Waste water” means water containing either or both of sewage or industrial wastes.

35. “Watercourse” means a channel in which a flow of water occurs, whether continuous or intermittent. (Ord. 627 § 1, 1989).

13.04.020 Grammatical interpretation.
“Shall” is mandatory. “May” is permissive. (Ord. 627 § 1, 1989).

Article II. General Provisions

13.04.030 Deposit of excrement, garbage, wastes.
It is unlawful for any person to place, deposit or permit to be deposited in an unsanitary manner upon public or private property within the city any human or animal excrement, garbage or other objectionable waste. (Ord. 627 § 1, 1989).

13.04.040 Discharge of pollutants into natural outlets.
It is unlawful to discharge into any natural outlet within the city any sewage, industrial waste, or other polluted waters, except where suitable treatment has been provided in accordance with the provisions of this chapter. (Ord. 627 § 1, 1989).

13.04.050 Privy, septic tank, cesspool.
Except as provided in this chapter, it is unlawful to construct, maintain or use privy, privy vault, septic tank, cesspool or other facility intended or used for the disposal of sewage in the city. (Ord. 627 § 1, 1989).

13.04.060 Suitable toilet facilities – Connection – Repairs.
A. The owner of each lot or parcel of real property within the city upon which there is situated any structure for human occupancy, employment, recreation or other purpose or use, which lot or parcel abuts on any street, alley, easement or right-of-way in which there is now located or may in the future be located a public sewer, and where the public sewer is within 150 feet of that lot or parcel and service by such public sewer is available, is required, at his expense, to install suitable toilet facilities therein and to connect the facilities to the public sewer, including the making of any repairs to the public sewer required by damage occurring during the making of such connection, regardless of the cause of such damage, in accordance with the provisions of this chapter. Such installation and connection must be made within 30 days after the date of mailing or personal delivery of notice by the clerk to the owner of property to be served, notifying such owner to make such connection. All connections to the public sewers of the city shall be made in a permanent and sanitary manner, and shall be sufficient to carry all the sewage and waste and waste fluids of every kind from the house, building or structure to the public sewer, and each toilet, sink, lavatory, washing machine, dishwasher and other piece of equipment of whatever type producing waste water shall be connected to the public sewer.

B. Any structure hereafter constructed or made available for human occupancy or use for any purpose shall, when required by this section, be connected to the public sewer before the completion of construction of such building or structure or before any occupancy or use thereof, or in the event that the public sewer capable of serving the structure has not been completed prior to the construction or occupancy of such structure, within 30 days after written notice from the clerk as provided in the preceding paragraph, whichever occurs first.

C. The limit of responsibility of the city shall be maintenance of the public sewer. Any needed repair to a side sewer or connection to a public sewer shall be the responsibility of the owner of the property served, and shall be made within 30 days after the date of mailing or personal delivery of a notice by the clerk or the utility director or his designee to the owner of the property served, notifying such owner to make such repair or connection. In the event of an emergency, a shorter period of time may be established for the repair to be made, or, if the owner cannot be located or does not promptly make such repair, the city may make repairs under the procedure of SMC 13.04.070. (Ord. 627 § 1, 1989).

13.04.070 Connection, repairs – Authorization by city.

A. If any connection to a public sewer or needed repair to a side sewer is not made within the time and in the manner provided in SMC 13.04.060, the utilities director may forthwith cause the same to be made.

B. In all cases in which the utilities director causes required connections or repairs to be made, he shall file a statement of the cost thereof with the clerk. The clerk shall notify the owner or reputed owner of the property of the cost of making such connection or repair, and if the same is not paid within four months, such cost, together with interest at the rate of 12 percent per year, shall be a lien against the property, and the clerk shall direct the city attorney to file a notice of claim of lien with the auditor of King County. Such lien may be foreclosed in the manner provided for mechanics liens. (Ord. 627 § 1, 1989).

13.04.080 Property determined serviceable by city sewer lines.
All property is capable of being served by a public sewer of the city, and service by such public sewer is available if the first floor plumbing of any building or structure located thereon can be served by gravity into the city sewer lines, as provided in SMC 13.04.060, even though the basement drains of such building or structure cannot be served into the city sewers. (Ord. 627 § 1, 1989).

Article III. Private Sewers

13.04.090 Private disposal – Conditions for use.
Where a public sanitary sewer is not available for use as provided by SMC 13.04.060, 13.04.070 and 13.04.080, and that is so certified by the utilities director, the building drain may be connected to a private sewage disposal system or replacement thereof, any of which must comply with applicable city ordinances, and in the absence of such applicable ordinances, with King County regulations for septic systems. (Ord. 627 § 1, 1989).

Article IV. Side Sewers and Connections

13.04.100 Permit – Requirement.
No person other than representatives of the city shall uncover, make connections with or opening into, use, alter, or disturb any public sewer or appurtenance thereof without first obtaining a written permit from the clerk. (Ord. 627 § 1, 1989).

13.04.110 Permit – Classes – Application.
A. There shall be three classes of side sewer permits:

1. For residential service;

2. For commercial service; and

3. For service to any establishment producing industrial wastes.

B. In each case, the owner or his agent shall make an application on a special form furnished by the clerk. The permit application shall be supplemented by any plans, specifications, or other information considered pertinent in the judgment of the clerk or water and sewer superintendent, including, in case of a new building, a plan or diagram of plumbing and drainage facilities. (Ord. 627 § 1, 1989).

13.04.120 Permits – Acquisition procedure.
Side sewer permits shall be obtained in the following manner:

A. Side sewer permits shall be issued only upon proper application at the office of the city engineer.

B. A permit which includes side sewer work in a public area may be issued only to a licensed side sewer contractor.

C. A permit which includes side sewer work on private property only may be issued to the owner of the property or to a licensed side sewer contractor.

D. No licensed side sewer contractor shall lay any pipe pursuant to any other person's permit, nor shall any unauthorized person lay any pipe pursuant to a licensed side sewer contractor's permit.

E. The applicant for a side sewer permit shall supply the city engineer with the following information:

1. Owner's name;

2. Address to be served;

3. Owner's mailing address;

4. Name and address to which bill shall be mailed;

5. Licensed side sewer contractor's name;

6. Legal description of property to be served;

7. All outside dimensions of building to be served;

8. Location of buildings on property to be served;

9. Purpose of building;

10. Full course of the proposed side sewer.

F. A permit shall be obtained and the fees thereafter paid before any side sewer is started.

G. No permit shall be issued for side sewer connection before the main sewer is accepted.

H. The permit must be posted on the job and must be readily accessible for inspection by the utilities director or sewer superintendent.

I. A licensed side sewer contractor shall meet with the utilities director or sewer superintendent on the job whenever so directed. (Ord. 769 § 4, 1996; Ord. 627 § 1, 1989).

13.04.130 Side sewer contract – Conditions.
A side sewer contract between owners and a licensed side sewer contractor shall be subject to the following requirements:

A. The contract between the owner and the licensed side sewer contractor shall provide that the side sewer contractor shall connect all outlets from the plumbing fixtures existing at the time the work is done unless specifically noted otherwise.

B. The contractor shall, when requested by the owner, furnish the owner with a release of lien or

claims of both labor and material or with an affidavit stating the same have been paid before payment is accepted for the side sewer work. (Ord. 627 § 1, 1989).

13.04.140 Wyes, tees, stubs.
Wyes, tees and stubs shall be located in the following manner:

A. Connection will be made at the point designated by the sewer superintendent.

B. If a side sewer tee or stub is not found at the measurement given by the sewer superintendent, the contractor shall prospect two feet in all directions from the measurement given and if not found, then notify the sewer superintendent.

C. Wyes may be used only if the sewer superintendent permits and at a location provided by the sewer superintendent.

D. An inspection tee with a riser to not less than one foot from the surface of the ground shall be placed on every side sewer at or near the connection to a common sewer, the location to be approved by the water and sewer superintendent. The tee shall be capped with a cast iron cover. If the inspection tee is located on private property, the city shall have the right to enter onto that private property and excavate to the inspection tee at any time when there is a reasonable doubt on the legal use of the building sewer, but the city shall restore the surface after such excavation. (Ord. 627 § 1, 1989).

13.04.150 Installation – Costs borne by property owner.
All costs and expense incident to the installation and connection of the side sewer shall be borne by the owner. The owner shall indemnify the city from any loss or damage that may directly or indirectly be occasioned by the installation of the side sewer. (Ord. 627 § 1, 1989).

13.04.160 Single sewer for each building – Exceptions.
A. A single side sewer shall be provided for every building unless the connection of more than one building to a single side sewer is approved by the utilities director prior to the construction of such side sewer. Nor more than one multiple dwelling, industrial, or commercial building shall be connected to a side sewer, unless otherwise approved by the utilities director.

B. If the side sewer is to be installed across or exist upon the property of another person, approved easement documents assuring that all property involved shall have perpetual use of the side sewer, and having provisions for maintenance and access for repair purposes, shall be signed by the recorded owners. These documents shall be acknowledged and recorded with the county auditor, and a copy provided to the city. (Ord. 627 § 1, 1989).

13.04.170 Use of old facilities.
Old side sewers, including septic tank lines, may be used only when they are found on examination and test by the sewer superintendent to meet all requirements of this chapter. The owner or his agent shall demonstrate to the sewer superintendent that no connection to such side sewer or septic tank line exists which conveys any material prohibited by SMC 13.04.420 through 13.04.500. (Ord. 627 § 1, 1989).

13.04.180 Materials – Construction.
The side sewer shall be cast iron soil pipe, ASTM specification A-74, with leaded joints, vitrified clay with “Brant” or approved equal rubber joint gaskets cement-asbestos with standard couplings and fittings, or other suitable material approved by the sewer superintendent. Joints shall be tight and waterproof. Any part of the side sewer that is located within less than 10 feet of

the water service pipe shall be constructed of cast iron oil pipe with leaded joints unless such part is at least three feet lower than such water pipe. If installed and filled on unstable ground, the side sewer shall be of cast iron soil pipe, except that nonmetallic materials may be accepted if laid on a suitable concrete bed or cradle as approved by the sewer superintendent. (Ord. 627 § 1, 1989).

13.04.190 Size and slope.
The size and slope of the building sewer shall be subject to the approval of the water and sewer superintendent, but in no event shall the diameter be less than four inches for single connections and six inches for multiple connections. The slope of such building sewer

shall be not less than three-sixteenths inch per foot for four-inch pipe or one-eighth inch per foot for six-inch pipe unless the depth of the public sewer requires a lesser slope, and such a lesser slope is approved by the water and sewer superintendent. (Ord. 627 § 1, 1989).

13.04.200 Placement.
Whenever possible, the side sewer shall be brought to the building at an elevation below the basement floor. No side sewer shall be laid under any building or within two and one-half feet of any foundation wall unless the side sewer is constructed of cast iron pipe. The minimum depth of trench shall be two feet. The side sewer shall be laid at uniform grade and in straight alignment insofar as possible. Changes in direction shall be made only with properly curved pipe fittings, as approved by the water and sewer superintendent. Fittings shall be used at all major changes of direction and a clean-out shall be provided at such fittings. Whenever any new building drain is constructed too low to permit gravity flow to the public sewer, sewage carried by such drain shall be lifted by approved artificial means and discharged to the public sewer at the owner's expense. (Ord. 627 § 1, 1989).

13.04.210 Grade and elevation – Sewer tee and stub.
The owner of any building shall be responsible for obtaining from the sewer superintendent the location and elevation of the sewer tee or sewer stub at the point of connection and, in the case of new construction, for planning the building and plumbing to provide adequate slope for the side sewer. The applicant for permit shall be responsible for determining the available grade between the building drain and the sewer tee or stub. (Ord. 627 § 1, 1989).

13.04.220 Excavation – Pipe laying and backfill.
All excavations required for the installation of the side sewers shall be open trench work unless otherwise approved by the sewer superintendent. Pipe laying and backfill shall be performed in accordance with the following specifications:

A. Pipe shall be carefully bedded, either by forming the trench bottom to support the bottom one-quarter of the pipe or by over excavating and bedding the granular material thoroughly tamped or trod under and along side of the pipe.

B. No large rocks shall be left in the trench bottom which may damage the pipe, and no large rocks shall be placed in the backfill.

C. Pipe shall be laid with spigot ends downstream and all changes of directions shall be made by suitable fittings. The trench shall be free of water during laying of pipe.

D. No backfill shall be placed over the pipe until the work has been inspected and approved.

E. Backfill shall be placed by hand and be thoroughly tamped or trod to six inches above the top

of the pipe.

F. Only the owner or a licensed side sewer contractor may excavate in the vicinity of a public sewer and stubs.

G. No downspouts or outside drains shall be connected to a side sewer. (Ord. 627 § 1, 1989).

13.04.230 Joints and connections – Material, method.
All joints and connections shall be made gastight and watertight. Cast iron pipe joints shall be firmly packed with oakum or hemp and filled with molten lead, federal specifications QQ-L-156, not less than one inch deep. Lead shall be run in one pouring and caulked tight. No paint, varnish or other coating shall be permitted on the joining material until after the joint has been tested and approved by the sewer superintendent. All joints between metallic and nonmetallic pipe, or between two pipes of nonmetallic pipe shall be made with hot poured joining material or cement mortar approved by the sewer superintendent. Material for hot poured joints shall not soften sufficiently to destroy the effectiveness of the joint when subjected to a temperature of 160 degrees Fahrenheit, nor be soluble in any of the waste carried by the drainage system. The joint shall first be caulked tight with jute, hemp or similar material approved by the water and sewer superintendent. Other joining materials and methods may be used only by approval of the sewer superintendent. (Ord. 627 § 1, 1989).

13.04.240 Joints and connections – Location.
The connection of the side sewer into the public sewer shall be made at the stub, if such stub is available at the suitable location. If no properly located stub is available, a neat hole may be cut into the public sewer to receive the side sewer, with entry at right angles or in the downstream direction at an angle of about 45 degrees, which hole may be cut only by licensed side sewer contractor. A 45-degree L may be used to make such connection, with the spigot end cut so as not to extend past the interservice of the public sewer. The invert of the side sewer at the point of connection shall be at the same or a higher elevation than the invert of the public sewer. A smooth neat joint shall be made, and the connection made secure and watertight by encasement in concrete. Special fittings may be used for the connection only when approved by the sewer superintendent. (Ord. 627 § 1, 1989).

13.04.250 Inspections – Procedures.
A. The applicant for the side sewer permit shall notify the sewer superintendent when the side sewer is ready for inspection. After pipe has been inspected, the bottom of the trench shall be puddled and the line will be checked for infiltration by the sewer superintendent by observing the flow through the inspection tee. An infiltration rate of more than four gallons per hour per 100 feet of pipe shall be sufficient reason for rejection.

B. As an alternate to the infiltration as specified, the pipe may be tightly sealed above the inspection tee by a plumber's ball or similar apparatus, the pipe filled with water to the level of the lowest fixture, and the loss through exfiltration observed. Any joints observed to leak shall be repaired, and the test repeated until exfiltration is reduced to specified amount.

C. Proof that downspouts are not connected to the side sewer may be established by watering roof gutters and again observing flow through inspection tee or by any other acceptable test. (Ord. 627 § 1, 1989).

13.04.260 Barricades, lights – Restoration.
All excavations for side sewer installations shall be adequately guarded with barricades and lights so as to protect the public from hazard. Streets, sidewalks, parkways and other public

property disturbed in the course of the work shall be restored in a manner satisfactory to the utilities director, when applicable. (Ord. 627 § 1, 1989).

13.04.270 Permit – Failure to secure.
Any person who makes or causes to be made any connection to public sewers of the city without receiving a permit therefor or executing the standard participation contract, provided by the city before such connection, shall be subject to the penalties set forth in SMC 13.04.510, and $200.00 in addition to charges payable to the city. (Ord. 627 § 1, 1989).

13.04.280 Conveyance of private sewer to city.
A private sewer constructed in a public right-of-way or in an easement conveyed to the city may be conveyed to the city subject to acceptance by the city. If the city accepts that conveyance, the sewer thereafter shall be a public sewer under the jurisdiction of the city. Prior to acceptance of the conveyance, the city may require that the grantor of the private sewer satisfy certain construction and other reasonable standards, including, but not limited to, the payment of a connection charge and an inspection fee and the execution of a standard participation contract. (Ord. 627 § 1, 1989).

13.04.290 Property outside city limits – Contract for service.
The owners of property outside the boundaries of the city or of property within the city which has not been assessed for sewers by the district may, if the city council consents, connect to the public sewer of the city and obtain sewage disposal service by entering into a standard participation contract, provided for by SMC 13.04.320 through 13.04.360. (Ord. 627 § 1, 1989).

13.04.300 Connection charges, assessments.
If the property to be connected has been assessed for sewers, the cost of constructing that portion of the side sewer between the main sewer and the property line of the public right-of-way or easement shall be borne by the city, and the owner shall pay to the city a connection charge as established by this chapter. If the property to be connected to the sewer has not been assessed for sewers, the owner shall pay to the city, in addition to the connection charge, the cost of constructing the side sewer between the main sewer and the property line as provided in SMC 13.04.380. (Ord. 627 § 1, 1989).

13.04.310 Disconnection – Procedure.
No structure may be disconnected from a side sewer and no side sewer may be disconnected from the public sewer for any reason without prior notification to and approval of the city (acting through its sewer superintendent). No approval shall be given unless the disconnection is lawful under this chapter and other applicable ordinances of the city, and satisfactory protection is given by the owner or his contractor to the city, including, but not limited to, the satisfactory capping of the side sewer or public sewer. Sewer service charge for any structure disconnected or to be disconnected shall continue until such disconnection is approved by the city council and the building and public sewer capped and otherwise protected to the satisfaction of the sewer superintendent. (Ord. 627 § 1, 1989).

Article V. Standard Participation Contract

13.04.320 Required when.
Properties, either inside or outside of the city, which are not entitled to sewer service by reason of not having been subject to a sewer assessment of the city or otherwise qualifying for sewer service, may be connected to the public sewers of the city and served thereby when the owner thereof executes a standards participation contract and the city council concurs therewith. (Ord.

627 § 1, 1989).

13.04.330 Terms.
The standard participation contract shall provide the following:

A. That the property owner warrants that he is the owner of that property with full authority to bind the property with the covenants and conditions contained in the contract;

B. The property owner shall subject his property to the terms of the contract and shall use the public sewer of the city in accordance with the rules and regulations of the city as they may be amended from time to time, and that the property shall be subject to the regular schedule of sewer service charges of the city as may be from time to time fixed by the city for its use classification, including, if the city so provides, a reasonable split rate for property served in particular areas;

C. That the property described in the contract shall be the only property served with sewer service pursuant to that contract;

D. That the property subject to the contract shall be subject to liens, penalties and interest for nonpayment of sewer service charges to the same extent as any other property served by the city;

E. That the property owner and his successors in interest shall not object to any annexation to the city or the formation of any utility local improvement district, the area of which may include the property subject to the contract. Credit shall be given on assessment for any reasonable cost incurred by the property owner in installing his own sewer lines which have been deeded to the city.

F. The contract shall be filed for record at the office of the King County auditor and shall constitute a charge against the property and a covenant running with the land and shall bind the property and all of the future owners thereof. (Ord. 627 § 1, 1989).

13.04.340 Charges.
A standard participation contract shall provide that before the property shall receive sewer service, the property owner must pay to the city, in addition to any trunkage, connection and permit fee or charge which may be due, an amount of money which shall constitute a charge in lieu of assessment and which may be determined as near as may be by the use of the assessment formula used in the city whose sewer lines will be tapped to serve the property subject to the contract, or by any fair means at the discretion of the city council. The charge in lieu of assessment must be paid in full before connection to the public sewers of the city as permitted, but if the city council approves, and if the property owner prepays at least 10 percent thereof, the balance of the charge in lieu of assessment may be paid in equal annual installments, plus interest at six percent annually on the unpaid balance, payable in not more than five years, or sooner. Unpaid balance plus interest shall become and remain a lien against the property prior to any other charges whatsoever, except taxes. (Ord. 627 § 1, 1989).

13.04.350 Council right to impose additional conditions.
To protect the interest of the city, the city council may require other conditions and provisions to be inserted in the standard participation contract as the individual case may warrant. (Ord. 627 § 1, 1989).

13.04.360 Real estate owners.

The city may also enter into contracts with owners of real estate as provided in the Municipal Water and Sewer Facilities Act. (Ord. 627 § 1, 1989).

Article VI. Fees and Charges

13.04.370 Connection and/or trunkage charge – Requirement.
At the time when a side sewer permit is applied for, or prior to the issuance of a "letter of availability" of the subject property to the building department of the county, if any, whichever event occurs first, the applicant shall pay to the city, as set forth in SMC 13.04.380, the connection and/or trunkage charge, if any required by code SMC 13.04.380 and Ordinance 357, Sections 6.03 and 6.04. There shall be no charge for the application and issuance of the permit by the city; however, if the city does not issue a permit, the trunkage or connection charge, or any part thereof which has been paid, shall be refunded. (Ord. 627 § 1, 1989).

13.04.380 Connection and/or trunkage charge – Established.
A. Charges for Side. There shall be a charge for each side sewer connection in such amount as city council shall from time to time establish by ordinance. The connection charge so established shall only apply to sewer lines on which sewer stub has already been provided for service to the property and does not apply to property for which a sewer stub has not been installed at the time of the installation of the city's sewer line. Such connection may be paid immediately or shall be paid as follows:

1. One-fourth at the issuance of the permit;

2. The balance in three equal annual installments on the anniversary date of the issuance of the permit;

3. The balance of the connection charge shall bear interest at 12 percent per year, and shall be a lien against the property;

4. In the event the owners fail to pay any installment when due, the entire balance shall become immediately due and payable. A penalty of 10 percent of the remaining balance shall be imposed as an administrative fee and the balance and penalty shall thereafter bear interest at 12 percent per year, and the city attorney may immediately file a lien with the King County auditor and shall, after the lien has been delinquent for four months, file a lien with the King County auditor.

B. Such connection charge shall become payable for all properties capable of being served by the city sewage system and for which the city has already installed a side sewer stub from the city sewer line to the property line 30 days after mailing of notices provided in SMC 13.04.060. For all future connections for which the city must provide a stub, such charge shall become due upon application being made for such connection or may be paid in four annual installments as set forth in this section. The connection charge for all such property shall be $2,500 plus $250.00 for each additional living unit in excess of one, plus the actual cost of labor and materials to install such stub, plus 15 percent for administrative costs.

C. Charges collectible pursuant to latecomer agreements shall be paid in full prior to the time the connection is made.

D. The connection charges collectible pursuant to this section shall be waived for side sewer connections with the Snoqualmie Ridge Planning Area as defined in the Snoqualmie Vicinity Comprehensive Plan 1994. (Ord. 880 § 2, 2001; Ord. 810 § 1, 1998; Ord. 639 § 2, 1990; Ord.

627 § 1, 1989).

13.04.390 Service charge – When due.
A. All charges for sewer service shall be due and payable on receipt of the city's billing for the services rendered.

B. As for buildings or residences in existence at the time sewage services become available to the building or residence, the first billing shall be made during the month next following the month in which written notice was given by the city, pursuant to SMC 13.04.060.

C. As for buildings or residences constructed after the time sewage disposal facilities have been constructed capable of serving such buildings or residences, the first service charge shall be billed during the month next following connection to the sewage system of the city. (Ord. 627 § 1, 1989).

13.04.400 Delinquency – Determination, penalty.
All connection charges against property owners receiving or capable or receiving such service are deemed charges against the property served, and if such charges as established in this title are not paid by the fifteenth day of the month, or if the fifteenth day of the month is a legal holiday, then on the next business day, such charges shall be delinquent. Upon any such sewage connection charge becoming delinquent, there shall be added a penalty of 10 percent of the amount of such charge then due, and from the date of delinquency of any connection charge or sewer service charge there shall be charged interest at 12 percent on the delinquent charges and penalty added thereto. Delinquent charges, penalties added thereto, and interest on such charges and penalties shall be a lien against the property to which service was provided or which was capable of being served, subject only to the lien for general taxes. The clerk shall direct the city attorney to prepare and file a lien with the King County auditor whenever such charges have been delinquent for a period of four months, but may be so certified whenever such charges have been delinquent for a period of three months. The city may at any time thereafter bring suit and foreclose such lien by civil action in the superior court of the state for King County, pursuant to RCW 35.67.220 et seq. (Ord. 627 § 1, 1989).

13.04.410 Delinquency – Notice.
Delinquent notices may be mailed either to the occupant or to the owner of the property on which the structure so served is located so far as the city may reasonably ascertain the same. Failure to receive such bills shall not relieve any person liable therefor from the obligation to pay the same, nor the property receiving such service, or capable of receiving such service, from such lien therefor as may thereafter attach to the property in the manner provided by law. (Ord. 627 § 1, 1989).

Article VII. Use of Public Sewer

13.04.420 Discharge of specified unpolluted waters – Prohibited.
No person shall discharge or cause to be discharged any storm waters, surface waters, roof runoff, subsurface drainage, cooling water, or unpolluted industrial process water to any sanitary sewer. (Ord. 627 § 1, 1989).

13.04.430 Discharge of specified pollutants – Prohibited.
Except as provided in this chapter, no person shall discharge or cause to be discharged any of the following described waters or wastes to any public sewer:

A. Any liquid or vapor having temperature higher than 100 degrees Fahrenheit;

B. Any water, or wastes which may contain more than 100 parts per million, by weight, of fat, oil, or grease;

C. Any gasoline, benzene, naphtha, fuel oil, lube oil, or other flammable or explosive liquid, solid or gas;

D. Any garbage that has not been properly shredded;

E. Any ashes, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, paunch manure, or any other solid or viscous substance capable of causing obstruction to the flow in sewers or other interference with the proper operation of the sewage works;

F. Any waters or wastes having a pH lower than 5.5 or higher than 9.0 or having any other corrosive property capable of causing damage or hazard to structures, equipment, and personnel of the city;

G. Any waters or wastes containing toxins or poisonous substances in sufficient quantity to injure or interfere with any sewage treatment process, constitute a hazard to humans or animals, or create any hazard in the receiving waters of the sewage treatment plant;

H. Any waters or wastes containing suspended solids of such character and quantity that unusual attention or expense is required to handle such materials at the sewage treatment plant;

I. Any noxious or malodorous gas or substance capable of creating a public nuisance. (Ord. 627 § 1, 1989).

13.04.440 Grease, oil, sand interceptors – Required when.
Grease, oil and sand interceptors shall be provided when, in the opinion of the utilities director they are necessary for the proper handling of liquid wastes containing grease in excessive amounts, or any flammable wastes, sand and other harmful ingredients. Such interceptors shall be of a type and capacity approved by the utilities director and shall be so located as to be readily and easily acceptable for cleaning and inspection. Grease and oil interceptors shall be constructed of impervious materials capable of withstanding abrupt and extreme changes in temperature. They shall be of substantial construction, watertight and equipped with easily removed covers, which when bolted in place shall be gastight and watertight. (Ord. 627 § 1, 1989).

13.04.450 Grease, oil, sand interceptors – Maintenance.
Where installed, all grease, oil and sand interceptors shall be maintained by the owner, at his expense, for continuously efficient operation at all times. (Ord. 627 § 1, 1989).

13.04.460 Discharge of specified wastes – Approval required.
A. The admission into the public sewer of any waters or wastes having the qualities set forth in this subsection shall be subject to review and approval by utilities director:

1. A five-day BOD greater than 300 parts per million weight; or

2. Containing more than 350 parts per gallon by weight of suspended solids; or

3. Containing any quantity of substances having the characteristics described in SMC 13.04.430; or

4. Having an average daily flow greater than two percent of the average daily sewage flow

of the district.

B. Where necessary, in the opinion of the utilities director, the owner shall provide, at his expense, such preliminary treatment as may be necessary to:

1. Reduce BOD to 300 parts per million by weight, and the suspended solids to 350 parts per million by weight; or

2. Reduce objectionable characteristics or constituents to within the maximum limits provided for in SMC 13.04.430; or

3. Control the quantities and rates of discharge of such waters or wastes.

C. Plans, specifications and other pertinent information relating to proposed preliminary treatment facilities shall be submitted to the approval of the utilities director and of the Pollution Control Commission of the state when required by law, and no construction of such facilities shall be commenced until such approvals are obtained in writing. Any expenses incurred by the city in reviewing such plans, specifications and information shall be paid by the property owner or his representative before the utilities director's approval shall be issued. (Ord. 627 § 1, 1989).

13.04.470 Preliminary treatment facilities.
Where preliminary treatment facilities are provided for any waters or wastes, they shall be maintained continuously in satisfactory and effective operation and by the owner at his expense. (Ord. 627 § 1, 1989).

13.04.480 Manholes.
When required by the utilities director, the owner of any property served by a side sewer carrying industrial wastes shall install a suitable control manhole in the side sewer to facilitate observation, sampling and measurement for the wastes. Such manhole, when required, shall be accessibly and safely located, and shall be constructed in accordance with plans approved by the utilities director. The manhole shall be installed by the owner, at his expense, and shall be maintained by him so as to be safe and accessible at all times. (Ord. 627 § 1, 1989).

13.04.490 Measurements, test samples.
All measurements, tests and analysis of the characteristics of waters and wastes to which reference is made in SMC 13.04.430 and 13.04.460 shall be determined in accordance with standard methods for the examination of water sewage, and shall be determined at the control manhole provided for in SMC 13.04.480, or upon suitable samples taken at such control manhole. In the event that no special manhole has been required, the control manhole shall be considered to be the nearest downstream in the public sewer to the point at which the side sewer is connected. (Ord. 627 § 1, 1989).

13.04.500 Admission of wastes by special agreement.
Nothing in this chapter shall be construed as preventing any special agreement or arrangement between the city and the manufacturing of any industrial wastes whereby industrial wastes of unusual strength or character may be accepted by the city for treatment, subject to payment therefor by that manufacturer. (Ord. 627 § 1, 1989).

Article VIII. Side Sewer Contractors

13.04.510 Requirement – Exemption.
For the purpose of assuring safe and quality construction of side sewers, safe and quality

connection of side sewers of the city, and affording satisfactory protection of the sewer users of the city, no person other than the owner of the property involved or his agent may construct, install, repair, reconstruct, excavate, or connect to the public sewers of the city any side sewer unless he is a side sewer contractor holding a valid license of the city, pursuant to this chapter, and also holding a valid Washington Contractor License. (Ord. 627 § 1, 1989).

13.04.520 License – Application procedure.
Side sewer contractor licenses shall be issued annually by the city, based upon information contained on the application and obtained from other reliable sources relating to the experience, ability to perform the necessary work, and reputation of the applicant and his satisfying the requirements of this chapter. All applicants for the license shall complete an application furnished by the clerk which shall require the applicant to furnish information relating to the experience, ability to perform side sewer work, and personal, financial, and previous work references. The application shall contain a statement that the side sewer contractor agrees to abide by the requirements of this chapter. (Ord. 627 § 1, 1989).

13.04.530 License – Bond insurance requirement.
A. Every applicant for a license must, prior to the issuance of the license to him, deposit with the clerk:

1. A surety bond in favor of the city in the amount of $50,000, with a surety or sureties thereon approved by the clerk and conditioned that he will perform the obligations imposed by this chapter and the resolutions and requirements of the city relating to side sewers and side sewer contractors; and

2. Satisfactory proof that the applicant currently carries the following insurance coverage:

a. Public liability insurance in an amount not less than $300,000 for injuries and accidental death, and

b. Property damage and fire insurance in an amount not less than $50,000.

B. As long as a side sewer contractor has a license, he shall maintain such bond and insurance, and such additional limits as may be required from time to time, and shall furnish proof thereof to the city whenever required by the utilities director or clerk. (Ord. 627 § 1, 1989).

13.04.540 Liabilities and responsibilities.
Every licensed side sewer contractor shall:

A. Post a valid side sewer permit at the site of the work prior to commencing the work relating thereto;

B. Contract for work using only a form of side sewer contract as may be provided by the clerk or utilities director, executed in triplicate, which provides:

1. A clear description, including sketch, of the work to be performed and the materials to be used, and

2. That the workmanship and materials shall be guaranteed for a period of one year after installation and acceptance thereof;

C. Adhere at all times to the then current requirements of the city for side sewers and side sewer contractors, including such reasonable requirements of the utilities director or sewer

superintendent relating to construction, installation, reconstruction and repair; and

D. Be liable for and indemnify the city against all damages to the sewage system of the city occasioned by his work. (Ord. 627 § 1, 1989).

13.04.550 License – Revocation.

A. The license of a side sewer contractor may be revoked by the city council or temporarily suspended by the utilities director until the next meeting of the city council, for any of the following causes:

1. Fraud or misrepresentation in applying for a license;

2. Failure to observe the rules and regulations of the city relating to side sewers and side sewer contractors;

3. Failure to pay for labor or materials used in the construction of side sewers;

4. Fraud or misrepresentation to the owner, occupant, or agent or representative thereof for the purpose of obtaining a contract for the construction of a side sewer, or during the course of work done pursuant to such a contract, and including the failure to adhere to the standard side sewer contract;

5. Failure to correct work or pay any default covered by the guaranty in the standard side sewer contract;

6. Failure to pay for work performed by the sewer superintendent or city, or caused to be performed thereby, for which the contractor may be liable; or

7. Failure to maintain, or, when requested, prove the maintenance of, the surety bond and insurance required to be maintained by SMC 13.04.530.

B. Prior to the meeting of the city council at which action or revocation of a license will be taken, the contractor shall be notified and shall be afforded an opportunity to be heard by the city council at that meeting. If the license is revoked, or suspended, the contractor must forthwith cease any side sewer construction work being performed by him within the city. (Ord. 627 § 1, 1989).

13.04.560 License – Renewal.

The side sewer contractor's license may be renewed annually by application as aforesaid and satisfaction of the requirements of this chapter. (Ord. 627 § 1, 1989).

Article IX. Administration and Enforcement

13.04.570 Agent or owner of serviced premises.

Any person who has the care, custody, control or management of any premises or building, or who has control of the operation thereof or the collection of rentals therefrom, shall, for the purpose of this chapter, be deemed the agent of the owner of such premises or building, and the giving of all notices provided in this chapter to that agent shall be deemed notice to the owner. The mailing or delivery of bills for sewer service charges, permit fees, connection or trunkage charges, or other charges to that agent shall be deemed mailing or delivery to the owner. (Ord. 627 § 1, 1989).

13.04.580 Right of entry to inspect.

The utilities director and other duly authorized employees or representatives of the city bearing proper credentials and identification shall be permitted to enter upon all properties for the purpose of inspection, observation, measurement, sampling, and testing in accordance with the provisions of this chapter. (Ord. 627 § 1, 1989).

13.04.590 Sewer superintendent – Authority.
The utilities director shall be the administrator of the city's sewerage system, and all instructions and decisions made by him shall be final, but appeals from such instructions or decisions may be made to the city council in writing at any regular meeting of the council. Where this chapter requires approval by permission or decision of, or instruction from the utilities director, the utilities director shall be guided solely by generally recognized engineering standards and practices, the operational demands and requirements of the sewerage system, and the peculiarities of construction, topographies, soil condition, and other relevant special factors affecting specific decisions to be made by the utilities director. (Ord. 627 § 1, 1989).

13.04.600 Vandalism.
No unauthorized person shall maliciously, willfully or negligently break, damage, destroy, uncover, deface or tamper with any structure, appurtenance or piece of equipment which is a part of the city sewer works. (Ord. 627 § 1, 1989).

13.04.610 Violator – Subject to expenses.
Any person who violates any provision of this chapter, shall be liable to the city for any expense, loss, damage, cost of inspection or cost of correction incurred by the city by reason of such violation, including any expenses incurred by the city in collecting from such person of such loss, damage, expense, cost of inspection or cost of correction. (Ord. 627 § 1, 1989).

13.04.620 Violator – Notice.
Any person found to be violating any provision of this chapter shall be served by the city with or mailed written notice stating the nature of the violation and providing a reasonable time limit for the satisfactory correction thereof. The offender shall, within the period of time stated in such notice, permanently cease all violations and make all necessary corrections. (Ord. 627 § 1, 1989).

13.04.630 Violator – Continued offense.
Any person who continues any violation beyond the time limit provided for in SMC 13.04.620, shall in addition to the items of expense provided in SMC 13.04.610, become liable to the city for a penalty in the amount of $500.00 for each day that the violation continues, together with interest thereon at 12 percent per year, from the expiration of the time limit provided in SMC 13.04.610. (Ord. 627 § 1, 1989).

13.04.640 Violations – Abatement.
Any violation of the provisions of this chapter which in the opinion of the utilities director constitutes a hazard to the public health, safety or welfare, is hereby declared to be a public nuisance, and may be abated by action in the superior court. (Ord. 627 § 1, 1989).

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[1] Prior legislation: Ords. 357, 364 and 541.

This page of the Snoqualmie Municipal Code is current through Ordinance 1076, passed January 24, 2011.
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City Website: http://www.ci.snoqualmie.wa.us/ (http://www.ci.snoqualmie.wa.us/)
City Telephone: (425) 453-6525
Code Publishing Company (http://www.codepublishing.com/)

Chapter 13.08
SEWER SERVICE RATES AND CHARGES

Sections:

13.08.005 *Repealed.*
13.08.010 Designated.
13.08.030 Building housing more than one business.
13.08.040 Determination – Appeal.
13.08.050 Payment – Due date.

13.08.005 Old System and New System defined.
Repealed by Ord. 988. (Ord. 810 § 2, 1998).

13.08.010 Designated.
Sewer rates and charges per month are imposed as follows:

A. Residential.

Rate Type	
Each single-family residence; each dwelling unit in an apartment, condominium or multiplex; and each trailer or mobile home in a trailer court or mobile home park	$37.30
Low income residential	$31.96

B. Nonresidential of whatever nature or description, including without limitation hotel, school, hospital, church, lodge, intermittently used building, commercial or industrial.

Rate Type	
Base rate per unit or building based on water consumption up to 600 cubic feet	$37.30 per unit
Plus volume rate per 100 cubic feet or portion thereof on water consumption above 600 cubic feet	$2.78 per 100 cf

C. Rates for sewer service outside the corporate limits established by contract shall be as set forth in the applicable contract.

D. In addition to the sewer rates and charges set forth in this section, there shall be added a $1.20 per month capital facilities surcharge, which shall be expended solely for the construction of sewer capital facilities identified in the capital facilities plans adopted by the city council. (Ord. 1074 § 1, 2011; Ord. 1040 § 1, 2008; Ord. 994 § 1, 2006; Ord. 880 § 1, 2001; Ord. 871 § 1,

2000; Ord. 847 § 1, 1999; Ord. 810 § 3, 1998; Ord. 804 § 1, 1997; Ord. 734 § 1, 1994; Ord. 704 § 1, 1992; Ord. 701 § 1, 1992; Ord. 639 § 1, 1990; Ord. 582 § 2, 1986).

13.08.030 Building housing more than one business.

Any building which is used for more than one purpose or business shall pay the combined rate for each purpose or business. (Ord. 734 § 1, 1994; Ord. 398 § 3, 1973; Ord. 361 § 3, 1967).

13.08.040 Determination – Appeal.

Rates to be applied to each building shall be determined by the city administrator, and his decision shall be final, except that appeals from such decisions may be made to the city council in writing within 60 days from the date due. (Ord. 734 § 1, 1994; Ord. 398 § 4, 1973; Ord. 361 § 4, 1967).

13.08.050 Payment – Due date.

The charges for any monthly billing remaining unpaid 15 days after the current billing due date shall be deemed delinquent. For any monthly billing that is delinquent, a finance charge of one and one-half percent per month shall be assessed on the delinquent amount. (Ord. 734 § 1, 1994; Ord. 522 § 1, 1983; Ord. 398 § 5, 1973; Ord. 361 § 5, 1967).

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Code Publishing Company (http://www.codepublishing.com/)

APPENDIX D

POPULATION PROJECTIONS

																75.1%	7.8%	17.2%
Year	**Total Projected Residential Population**	**% Growth**	**Add'd Pop.**	**Total ERUs (Res, City, Comm.)**	**Base Flow, 131 gal/ERU (gpd)**	**I/I (gpd)**	**Total AAF (mgd)**	**MMF**	**% of Permitted Flow**	**PDF**	**PHF**	**AAF Dry Weather**	**PHF DRY Weather**	**Year**	**Residential ERUs**	**Commercial ERUs**	**City ERUs**
2010	**10,670**		**0**	**5013**	691,790	283,000	0.975	1.479	69%	3.452	5.205	0.731	2.047	**2010**	**3763**	**389**	**861**
2011	11,039	3.46%	369	5186	715,727	283,000	0.999	1.515	70%	3.537	5.333	0.749	2.097	2011	**3893**	**403**	**891**
2012	**11,418**	**3.43%**	**379**	**5364**	**740,300**	**283,000**	**1.023**	**1.552**	**72%**	**3.624**	5.464	0.767	2.149	**2012**	**4026**	**416**	**922**
2013	11,850	3.78%	432	5567	768,308	283,000	1.051	1.595	74%	3.723	5.614	0.788	2.208	2013	**4179**	**432**	**957**
2014	12,284	3.66%	434	5771	796,447	283,000	1.079	1.638	76%	3.823	5.764	0.810	2.267	2014	**4332**	**448**	**992**
2015	12,997	5.80%	713	6106	842,674	283,000	1.126	1.708	79%	3.987	6.011	0.844	2.364	2015	**4583**	**474**	**1049**
2016	13,430	3.33%	433	6310	870,748	283,000	1.154	1.750	81%	4.086	6.161	0.865	2.423	2016	**4736**	**490**	**1084**
2017	13,863	3.22%	433	6513	898,821	283,000	1.182	1.793	83%	4.185	6.311	0.886	2.482	2017	4889	505	1119
2018	**14,279**	**3.00%**	**416**	**6709**	**925,806**	**283,000**	**1.209**	**1.834**	**85%**	**4.281**	**6.455**	**0.907**	**2.538**	**2018**	**5035**	**521**	**1153**
2019	14,366	0.61%	87	6750	931,446	283,000	1.214	1.842	86%	4.301	6.485	0.911	2.550	2019	**5066**	**524**	**1160**
2020	14,453	0.61%	87	6790	937,087	283,000	1.220	1.851	86%	4.321	6.515	0.915	2.562	2020	**5097**	**527**	**1167**
2021	14,540	0.60%	87	6831	942,728	283,000	1.226	1.859	86%	4.341	6.545	0.919	2.574	2021	**5127**	**530**	**1174**
2022	14,627	0.60%	87	6872	948,368	283,000	1.231	1.868	87%	4.361	6.576	0.924	2.586	2022	5158	533	1181
2023	14,714	0.59%	87	6913	954,009	283,000	1.237	1.877	87%	4.381	6.606	0.928	2.598	2023	**5189**	**537**	**1188**
2024	14,801	0.59%	87	6954	959,650	283,000	1.243	1.885	88%	4.401	6.636	0.932	2.610	2024	**5219**	**540**	**1195**
2025	14,889	0.59%	88	6995	965,355	283,000	1.248	1.894	88%	4.421	6.666	0.936	2.622	2025	**5250**	**543**	**1202**
2026	14,977	0.59%	88	7037	971,061	283,000	1.254	1.902	88%	4.441	6.697	0.941	2.634	2026	**5281**	**546**	**1209**
2027	15,065	0.59%	88	7078	976,766	283,000	1.260	1.911	89%	4.461	6.727	0.945	2.646	2027	**5312**	**549**	**1216**
2028	15,153	0.58%	88	7119	982,471	283,000	1.265	1.920	89%	4.482	6.758	0.949	2.657	2028	**5343**	**553**	**1223**
2029	15,241	0.58%	88	7161	988,177	283,000	1.271	1.928	90%	4.502	6.788	0.953	2.669	2029	**5375**	**556**	**1230**
2030	15,329	0.58%	88	7202	993,882	283,000	1.277	1.937	90%	4.522	6.819	0.958	2.681	2030	**5406**	**559**	**1238**
2031	15,418	0.58%	89	7244	999,653	283,000	1.283	1.946	91%	4.543	6.849	0.962	2.694	2031	**5437**	**562**	**1245**
2032	**15,508**	**0.58%**	**90**	**7286**	**1,005,488**	**283,000**	**1.288**	**1.955**	**91%**	4.563	6.881	0.966	2.706	**2032**	**5469**	**565**	**1252**
Total	**15,508**								0%								
Buildout	**16,046**	**3.47%**	**538**	**7,539**	**987,572**	**283,000**	**1.271**							**Buildout**	**5,658.24**	**585.09**	**1,295.39**

Kimball Creek, SR1, and SR2 growth numbers and rate provided by City
Initial Population provided by 2010 census.
2010 Census did not provide population numbers by planning area. 2010 population planning area population derived from water connections
Growth in Historic Snoqualmie, Snoqualmie Falls, Snoqualmie Hills East, and Snoqualmie Hills West are assumed to be linear by year.
Buildout population projections based on City provided projection Called "High (Build Out)"

APPENDIX E

2012 PRIORITY POLLUTANT SCAN LAB TEST RESULTS

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

Professional Analytical Services

May 17 2012
City of Snoqualmie
PO Box 987
Snoqualmie, WA 98065
Attention: Lyle Beach

Dear Lyle Beach:

Enclosed please find the analytical data for your Priority Pollutants project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
SQ1	Water	12-A004731	Micro, CONV, MIN, DEM, NUT, MET, Hg-CV, BTEX, PEST, PCB, chlorometh, Semi-Vol, N-nidimeta, b(2Clis)et, Nit-di-pro, Fluorene, N-nidiphmn, Benzidine, Azobenzene, Benz(J)flo, diben(ah)a, diben(aj)a, 7hdiben-cj, Dibenz(ae), Dibenz(ai), Dibenz(ah), MET
Trip Blank	Water	12-A004732	BTEX, chlorometh

Your samples were received on Wednesday, April 4, 2012. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Method Detection Limits (MDL's), as opposed to Practical Quantitation Limits (PQL's).

If you should have any questions pertaining to the data package, please feel free to conact me.

Sincerely,

Aaron W. Young
Laboratory Manager

BACT = Bacteriological
CONV = Conventionals
MET = Metals
ORG = Organics
NUT=Nutrients
DEM=Demand
MIN=Minerals

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664
www.amtestlab.com

Professional Analytical Services

ANALYSIS REPORT

City of Snoqualmie
PO Box 987
Snoqualmie, WA 98065
Attention: Lyle Beach
Project Name: Priority Pollutants
All results reported on an as received basis.

Date Received: 04/04/12
Date Reported: 5/17/12

AMTEST Identification Number **12-A004731**
Client Identification **SQ1**
Sampling Date **04/04/12, 12:15**

Microbiological

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE / TIME
Fecal Coliforms	< 2	CFU/100 ml		1	SM 9222D	DC	04/04/12 15:15

Conventionals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
pH	6.95	unit	*	0.1	EPA 150.2	KF	04/04/12
Chlorine Residual	< 0.1	mg/l		0.1	EPA 330.5	ED	04/04/12
Color	10.	unit		5	EPA 110.2	KF	04/04/12
Total Cyanide	< 0.005	mg/l		0.005	EPA 335.4	SS	04/05/12
Cyanide(Weak&Dissociable)	< 0.005	mg/l		0.005	SM 4500 CN	SS	04/11/12
Dissolved Oxygen	7.8	mg/l		1	EPA 360.2	ED	04/04/12
Total Oil and Grease	< 1	mg/l		1	EPA 1664	MO	04/27/12
Total Phenol	0.037	mg/L		0.005	EPA 420.4	SS	04/10/12
Salinity	0.16	g/kg		0.05	SM 2520	KF	04/05/12
Total Dissolved Solids	220	mg/l		1	SM 2540C	ED	04/10/12
Total Suspended Solids	< 1	mg/l		1	SM 2540D	ED	04/10/12
Settleable Solids	< 0.2	ml/l		0.2	EPA 160.5	ED	04/09/12
Total Sulfide	< 0.1	mg/l		0.1	EPA 376.2	ED	04/12/12
Sulfite	< 1	mg/l		1	EPA 377.1	ED	04/12/12

Demand

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
BOD	< 2	mg/l		2	SM 5210B	NG	04/05/12
Total Organic Carbon	4.3	mg/l		0.5	SM 5310B	ED	04/12/12
Chemical Oxygen Demand	< 10	mg/l		10	EPA 410.4	ED	04/17/12

Minerals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Alkalinity (as CaCO3)	100	mg/l		1	SM 2320B	ED	04/16/12
Fluoride	0.02	mg/l		0.02	SM 4500-F	SS	04/24/12
Hardness (CaCO3)	82.	mg/l		1	EPA 200.7 calc	CG	04/09/12
Sulfate	15.	mg/l		0.1	EPA 300.0	MO	04/04/12
Calcium	25.	mg/l		0.05	EPA 200.7	CG	04/09/12
Magnesium	4.7	mg/l		0.05	EPA 200.7	CG	04/09/12

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Ammonia Nitrogen	0.038	mg/l		0.005	EPA 350.1	SS	04/10/12
Total Nitrogen (TKN)	0.709	mg/l		0.1	EPA 351.2	SS	04/10/12
Nitrate Nitrogen	3.0	mg/l		0.01	Calculated		
Nitrite Nitrogen	0.019	mg/l		0.001	SM 4500NO2B	ED	04/04/12
Nitrate + Nitrite	3.0	mg/l		0.01	EPA 353.2	SS	04/19/12
Ortho-Phosphate	0.030	mg/l		0.005	SM 4500-PE	ED	04/04/12
Total Phosphorus	0.083	mg/l		0.005	SM 4500-PE	SS	04/09/12

ICP/MS Metals 200.8

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Aluminum	5.02	ug/L		0.5	EPA 200.8	CG	04/06/12
Antimony	0.12	ug/L		0.05	EPA 200.8	CG	04/06/12
Arsenic	2.63	ug/L		0.1	EPA 200.8	CG	04/06/12
Barium	4.17	ug/L		0.05	EPA 200.8	CG	04/06/12
Beryllium	< 0.05	ug/L		0.05	EPA 200.8	CG	04/06/12
Cadmium	< 0.05	ug/L		0.05	EPA 200.8	CG	04/06/12
Chromium	0.19	ug/L		0.05	EPA 200.8	CG	04/06/12
Cobalt	< 0.5	ug/L		0.5	EPA 200.8	CG	04/06/12
Copper	3.54	ug/L		0.1	EPA 200.8	CG	04/06/12
Lead	0.06	ug/L		0.05	EPA 200.8	CG	04/06/12
Manganese	15.0	ug/L		0.05	EPA 200.8	CG	04/06/12
Molybdenum	0.96	ug/L		0.05	EPA 200.8	CG	04/06/12
Nickel	0.46	ug/L		0.05	EPA 200.8	CG	04/06/12
Selenium	< 0.5	ug/L		0.5	EPA 200.8	CG	04/06/12
Silver	< 0.05	ug/L		0.05	EPA 200.8	CG	04/06/12
Thallium	< 0.05	ug/L		0.05	EPA 200.8	CG	04/06/12
Zinc	18.7	ug/L		0.5	EPA 200.8	CG	04/06/12

Total Metals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Boron	0.18	mg/l		0.05	EPA 200.7	CG	04/09/12
Dissolved Hex. Chromium	< 0.003	mg/l		0.003	EPA 7196	ED	04/05/12
Iron	0.044	mg/l		0.005	EPA 200.7	CG	04/09/12
Mercury	< 0.0001	mg/l		0.0001	EPA 245.1	SS	04/18/12
Tin	0.007	mg/l		0.005	EPA 200.7	CG	04/09/12
Titanium	< 0.001	mg/l		0.001	EPA 200.7	CG	04/09/12

NWTPH-Dx (Water)

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Diesel	110	ug/l	z	50.	NWTPH-Dx	MO	04/06/12
Heavy Oil	< 100	ug/l	z	100	NWTPH-Dx	MO	04/06/12

Surrogates

ANALYTE	% RECOVERY	LIMITS
Bromofluorobenzene	66.6 %	50.0 - 150.
2-Fluorobiphenyl	81.0 %	50.0 - 150.

NWTPH-Gx and BTEX

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Gasoline in Water	< 100	ug/l		100	EPA NWTPH-Gx	NLN	04/17/12
Benzene	< 1	ug/l		1	EPA 624	NLN	04/17/12
Toluene	< 1	ug/l		1	EPA 624	NLN	04/17/12
Ethyl Benzene	< 1	ug/l		1	EPA 624	NLN	04/17/12
Total Xylene	< 1	ug/l		1	EPA 624	NLN	04/17/12

Surrogate

ANALYTE	% RECOVERY	LIMITS
Bromofluorobenzene	108. %	50.0 - 150.

Volatile Organic Analysis (VOA's)

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
1,1,1,2-Tetrachloroethane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
1,1,1-Trichloroethane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
1,1,2,2-Tetrachloroethane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
1,1,2-Trichloroethane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
1,1-Dichloroethane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
1,1-Dichloroethylene	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
1,2,3-Trichloropropane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
1,2-Dibromo-3-chloropropane	< 5	ug/l		5.0	EPA 624	NLN	04/19/12
1,2-Dibromoethane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
1,2-Dichlorobenzene	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
1,2-Dichloroethane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
1,2-Dichloropropane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
1,4-Dichlorobenzene	< 4	ug/l		4.0	EPA 624	NLN	04/19/12
2-Butanone (MEK)	< 5	ug/l		5.0	EPA 624	NLN	04/19/12
2-Chloroethylvinylether	< 1	ug/l		1.0	EPA 624	NLN	04/23/12
2-Hexanone	< 5	ug/l		5.0	EPA 624	NLN	04/19/12
4-Methyl-2-Pentanone	< 5	ug/l		5.0	EPA 624	NLN	04/19/12
Acetone	< 5	ug/l		5.0	EPA 624	NLN	04/19/12
Acrylonitrile	< 5	ug/l		5.0	EPA 624	NLN	04/19/12
Benzene	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Bromochloromethane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Bromodichloromethane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Bromoform	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Bromomethane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Carbon Disulfide	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Carbon Tetrachloride	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Chlorobenzene	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Chlorodibromomethane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Chloroethane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Chloroform	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Chloromethane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
cis-1,2-Dichloroethylene	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
cis-1,3-Dichloropropene	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Dibromomethane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Ethyl Benzene	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Total Xylenes	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Methyl Iodide	< 1	ug/l		1.0	EPA 624	NLN	04/19/12

Volatile Organic Analysis (VOA's) continued...

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Methylene Chloride	< 2	ug/l		2.0	EPA 624	NLN	04/19/12
o-Xylene	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Styrene	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Tetrachloroethylene	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Toluene	10.5	ug/l		1.0	EPA 624	NLN	04/19/12
trans-1,2-Dichloroethylene	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Trans-1,3-Dichloropropene	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
trans-1,4-Dichloro-2-butene	< 5	ug/l		5.0	EPA 624	NLN	04/19/12
Trichloroethylene	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Trichlorofluoromethane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Vinyl Acetate	< 5	ug/l		5.0	EPA 624	NLN	04/19/12
Vinyl Chloride	< 0.2	ug/l		0.20	EPA 624	NLN	04/19/12

VOA Surrogates

ANALYTE	% RECOVERY	LIMITS
D4-1,2,-Dichloroethane	118. %	86.3 - 123.
D8-Toluene	120. %	73.1 - 137.
4-Bromofluorobenzene	112. %	83.8 - 111.

Semi-Volatiles

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
1,2,4-Trichlorobenzene	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
1,2-Dichlorobenzene	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
1,3-Dichlorobenzene	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
1,4-Dichlorobenzene	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
2,4,6-Trichlorophenol	< 0.1	ug/l		0.10	EPA 625-SIM	AY	05/15/12
2,4-Dichlorophenol	< 1	ug/l		0.99	EPA 625-SIM	AY	05/15/12
2,4-Dimethylphenol	< 1	ug/l		0.99	EPA 625-SIM	AY	05/15/12
2,4-Dinitrophenol	< 1	ug/l		0.99	EPA 625-SIM	AY	05/15/12
2,4-Dinitrotoluene	< 1	ug/l		0.99	EPA 625-SIM	AY	05/12/12
2,6-Dinitrotoluene	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
2-Chloronaphthalene	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
2-Chlorophenol	< 1	ug/l		0.99	EPA 625-SIM	AY	05/15/12
2-Nitrophenol	< 1	ug/l		0.99	EPA 625-SIM	AY	05/15/12
3,3-Dichlorobenzidine	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
3-Methylcholanthrene	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
4,6-Dinitro-2-methylphenol	< 1	ug/l		0.99	EPA 625-SIM	AY	05/15/12
4-Bromophenylphenylether	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
4-Chloro-3-methylphenol	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/15/12
4-Chlorophenylphenylether	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
4-Nitrophenol	< 1	ug/l		0.99	EPA 625-SIM	AY	05/15/12
7h-Dibenzo(c,j)carbazole	< 0.2	ug/l		0.20	EPA 625-SIM	AY	05/12/12
Acenaphthene	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
Acenaphthylene	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
Anthracene	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
Azobenzene	< 0.2	ug/l		0.20	EPA 625-SIM	AY	05/12/12
Benzidine	< 0.5	ug/l		0.50	EPA 625-SIM	AY	05/12/12
Benzo(a)anthracene	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
Benzo(a)pyrene	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
Benzo(b)fluoranthene	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
Benzo(g,h,i)perylene	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
Benzo(j)fluoranthene	< 0.2	ug/l		0.20	EPA 625-SIM	AY	05/12/12
Benzo(k)fluoranthene	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
Bis(2-chloroethoxy)methane	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
Bis(2-Chloroethyl)ether	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
bis(2-Chloroisopropyl)ether	< 0.5	ug/l		0.50	EPA 625-SIM	AY	05/12/12
Bis(2-ethylhexyl)phthalate	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
Butylbenzylphthalate	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
Chrysene	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
Dibenzo(a,h)acridine	< 0.2	ug/l		0.20	EPA 625-SIM	AY	05/12/12
Dibenzo(a,e)pyrene	< 1	ug/l		0.99	EPA 625-SIM	AY	05/12/12
Dibenzo(a,j)acridine	< 0.2	ug/l		0.20	EPA 625-SIM	AY	05/12/12
Dibenzo(a,h)anthracene	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12

Semi-Volatiles continued...

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Dibenzo(a,h)pyrene	< 1	ug/l		0.99	EPA 625-SIM	AY	05/12/12
Dibenzo(a,i)pyrene	< 1	ug/l		0.99	EPA 625-SIM	AY	05/12/12
Diethylphthalate	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
Dimethylphthalate	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
Di-n-butylphthalate	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
Di-n-octylphthalate	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
Fluoranthene	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
Fluorene	< 0.5	ug/l		0.50	EPA 625-SIM	AY	05/12/12
Hexachlorobenzene	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
Hexachlorobutadiene	< 1	ug/l		0.99	EPA 625-SIM	AY	05/12/12
Hexachlorocyclopentadiene	< 1	ug/l		0.99	EPA 625-SIM	AY	05/12/12
Hexachloroethane	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
Ideno(1,2,3-cd)pyrene	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
Isophorone	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
Naphthalene	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
Nitrobenzene	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
N-Nitrosodimethylamine	< 0.5	ug/l		0.50	EPA 625-SIM	AY	05/12/12
N-Nitrosodiphenylamine	< 0.5	ug/l		0.50	EPA 625-SIM	AY	05/12/12
N-Nitroso-di-n-propylamine	< 0.5	ug/l		0.50	EPA 625-SIM	AY	05/12/12
Pentachlorophenol	< 1	ug/l		0.99	EPA 625-SIM	AY	05/15/12
Phenanthrene	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12
Pyrene	< 0.6	ug/l		0.59	EPA 625-SIM	AY	05/12/12

Semi-Volatile Surrogates

ANALYTE	% RECOVERY	LIMITS
2-Fluorophenol	52.7 %	10.0 - 138.
D6-Phenol	52.8 %	0.0 - 156.
D5-Nitrobenzene	56.8 %	16.3 - 114.
2-Fluorobiphenyl	77.9 %	17.4 - 113.
2,4,6-Tribromophenol	72.2 %	20.0 - 134.
D14-Terphenyl	87.2 %	29.6 - 142.

Organo-chlorine Pesticides

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Alpha BHC	< 0.03	ug/l		0.030	EPA 608	MO	05/05/12
Lindane	< 0.03	ug/l		0.030	EPA 608	MO	05/05/12
Heptachlor	< 0.03	ug/l		0.030	EPA 608	MO	05/05/12
Aldrin	< 0.03	ug/l		0.030	EPA 608	MO	05/05/12
Beta-BHC	< 0.03	ug/l		0.030	EPA 608	MO	05/05/12
Delta-BHC	< 0.03	ug/l		0.030	EPA 608	MO	05/05/12
Heptachlor Epoxide	< 0.03	ug/l		0.030	EPA 608	MO	05/05/12
Endosulfan I	< 0.03	ug/l		0.030	EPA 608	MO	05/05/12
pp-DDE	< 0.03	ug/l		0.030	EPA 608	MO	05/05/12
Dieldrin	< 0.03	ug/l		0.030	EPA 608	MO	05/05/12
Endrin	< 0.03	ug/l		0.030	EPA 608	MO	05/05/12
pp-DDD	< 0.03	ug/l		0.030	EPA 608	MO	05/05/12
Endosulfan II	< 0.03	ug/l		0.030	EPA 608	MO	05/05/12
pp-DDT	< 0.03	ug/l		0.030	EPA 608	MO	05/05/12
Endrin Aldehyde	< 0.03	ug/l		0.030	EPA 608	MO	05/05/12
Endosulfan Sulfate	< 0.03	ug/l		0.030	EPA 608	MO	05/05/12
Methoxychlor	< 0.03	ug/l		0.030	EPA 608	MO	05/05/12
Toxaphene	< 0.248	ug/l		0.248	EPA 608	MO	05/05/12
Chlordane	< 0.099	ug/l		0.099	EPA 608	MO	05/05/12

PCB's

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
PCB-1016	< 0.5	ug/L		0.495	EPA 608	MO	05/05/12
PCB-1221	< 0.5	ug/L		0.495	EPA 608	MO	05/05/12
PCB-1232	< 0.5	ug/L		0.495	EPA 608	MO	05/05/12
PCB-1242	< 0.5	ug/L		0.495	EPA 608	MO	05/05/12
PCB-1248	< 0.5	ug/L		0.495	EPA 608	MO	05/05/12
PCB-1254	< 0.5	ug/L		0.495	EPA 608	MO	05/05/12
PCB-1260	< 0.5	ug/L		0.495	EPA 608	MO	05/05/12

Surrogates

ANALYTE	% RECOVERY	LIMITS
Tetrachloro-m-xylene	79.9 % Rec	40.1 - 150.
Decachlorobiphenyl	99.8 % Rec	45.3 - 155.

AMTEST Identification Number **12-A004732**
Client Identification **Trip Blank**
Sampling Date **04/04/12, 12:15**

NWTPH-Gx and BTEX

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Gasoline in Water	< 100	ug/l		100	EPA NWTPH-Gx	NLN	04/17/12
Benzene	< 1	ug/l		1	EPA 624	NLN	04/17/12
Toluene	< 1	ug/l		1	EPA 624	NLN	04/17/12
Ethyl Benzene	< 1	ug/l		1	EPA 624	NLN	04/17/12
Total Xylene	< 1	ug/l		1	EPA 624	NLN	04/17/12

Surrogate

ANALYTE	% RECOVERY	LIMITS
Bromofluorobenzene	102. %	50.0 - 150.

Volatile Organic Analysis (VOA's)

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
1,1,1,2-Tetrachloroethane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
1,1,1-Trichloroethane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
1,1,2,2-Tetrachloroethane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
1,1,2-Trichloroethane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
1,1-Dichloroethane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
1,1-Dichloroethylene	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
1,2,3-Trichloropropane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
1,2-Dibromo-3-chloropropane	< 5	ug/l		5.0	EPA 624	NLN	04/19/12
1,2-Dibromoethane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
1,2-Dichlorobenzene	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
1,2-Dichloroethane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
1,2-Dichloropropane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
1,4-Dichlorobenzene	< 4	ug/l		4.0	EPA 624	NLN	04/19/12
2-Butanone (MEK)	< 5	ug/l		5.0	EPA 624	NLN	04/19/12
2-Hexanone	< 5	ug/l		5.0	EPA 624	NLN	04/19/12
4-Methyl-2-Pentanone	< 5	ug/l		5.0	EPA 624	NLN	04/19/12
Acetone	6.3	ug/l		5.0	EPA 624	NLN	04/19/12
Acrylonitrile	< 5	ug/l		5.0	EPA 624	NLN	04/19/12
Benzene	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Bromochloromethane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12

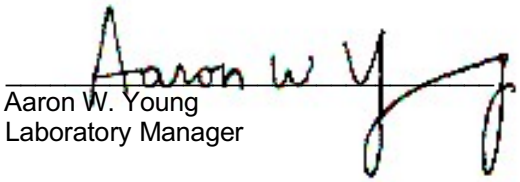
Volatile Organic Analysis (VOA's) continued...

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Bromodichloromethane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Bromoform	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Bromomethane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Carbon Disulfide	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Carbon Tetrachloride	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Chlorobenzene	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Chlorodibromomethane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Chloroethane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Chloroform	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Chloromethane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
cis-1,2-Dichloroethylene	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
cis-1,3-Dichloropropene	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Dibromomethane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Ethyl Benzene	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Total Xylenes	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Methyl Iodide	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Methylene Chloride	< 2	ug/l		2.0	EPA 624	NLN	04/19/12
o-Xylene	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Styrene	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Tetrachloroethylene	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Toluene	8.1	ug/l		1.0	EPA 624	NLN	04/19/12
trans-1,2-Dichloroethylene	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Trans-1,3-Dichloropropene	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
trans-1,4-Dichloro-2-butene	< 5	ug/l		5.0	EPA 624	NLN	04/19/12
Trichloroethylene	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Trichlorofluoromethane	< 1	ug/l		1.0	EPA 624	NLN	04/19/12
Vinyl Acetate	< 5	ug/l		5.0	EPA 624	NLN	04/19/12
Vinyl Chloride	< 0.2	ug/l		0.20	EPA 624	NLN	04/19/12

VOA Surrogates

ANALYTE	% RECOVERY	LIMITS
D4-1,2,-Dichloroethane	124. %	86.3 - 123.
D8-Toluene	122. %	73.1 - 137.
4-Bromofluorobenzene	116. %	83.8 - 111.

* = The method specifies the test is to be performed in the field; therefore the result is an estimate.
Z = The chromatographic fingerprint does not resemble a petroleum product.



Aaron W. Young
Laboratory Manager

Am Test Inc.
14603 N.E. 87th St.
Redmond, WA 98052
(425) 885-1664
www.amtestlab.com

AMTEST LABORATORIES

Professional Analytical Services

QC Summary for sample numbers: 12-A004731 to 12-A004732

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SMPL VAL	DUP VAL	RPD	MAX RPD
12-A004723	Fecal Coliforms	CFU/100 ml	2.	< 2		50.
12-A004668	pH	unit	7.17	7.15	0.28	5.
12-A004818	pH	unit	6.22	6.17	0.81	5.
12-A004691	pH	unit	6.60	6.63	0.45	5.
12-A004682	Alkalinity (as CaCO3)	mg/l	480	470	2.1	20.
12-A004847	Alkalinity (as CaCO3)	mg/l	< 1	< 1		20.
12-A004945	Alkalinity (as CaCO3)	mg/l	100	100	0.00	20.
12-A004830	BOD	mg/l	400	390	2.5	47.
12-A004847	Total Organic Carbon	mg/l	11.	11.	0.00	54.
12-A005402	Total Organic Carbon	mg/l	31.	32.	3.2	54.
12-A004684	Chemical Oxygen Demand	mg/l	< 10	< 10		36.
12-A004847	Chemical Oxygen Demand	mg/l	< 10	< 10		36.
12-A004851	Chemical Oxygen Demand	mg/l	< 10	< 10		36.
12-A004731	Chlorine Residual	mg/l	< 0.1	< 0.1		20.
12-A004636	Total Cyanide	mg/l	< 0.005	< 0.005		37.
12-A004729	Total Cyanide	mg/l	0.27	0.23	16.	37.
12-A004731	Cyanide(Weak&Dissociable)	mg/l	< 0.005	< 0.005		110
12-A004731	Dissolved Oxygen	mg/l	7.8	8.3	6.2	17.
12-A005304	Fluoride	mg/l	0.12	0.11	8.7	37.
12-A005796	Fluoride	mg/l	1.1	1.1	0.00	37.
12-A004446	Ammonia Nitrogen	mg/l	< 0.005	< 0.005		32.
12-A004514	Ammonia Nitrogen	mg/l	0.195	0.189	3.1	32.
12-A004542	Ammonia Nitrogen	mg/l	0.471	0.430	9.1	32.
12-A004552	Ammonia Nitrogen	mg/l	0.680	0.690	1.5	32.
12-A004979	Total Nitrogen (TKN)	mg/l	36.1	36.2	0.28	25.
12-A004682	Nitrite Nitrogen	mg/l	< 0.001	< 0.001		31.
12-A004686	Nitrite Nitrogen	mg/l	< 0.001	< 0.001		31.
12-A004731	Total Phenol	mg/L	0.037	0.044	17.	37.
12-A004691	Ortho-Phosphate	mg/l	< 0.005	< 0.005		29.
12-A004691	Total Phosphorus	mg/l	0.046	0.051	10.	56.
12-A004818	Total Phosphorus	mg/l	0.101	0.099	2.0	56.
12-A004684	Total Dissolved Solids	mg/l	1100	1000	9.5	20.
12-A004849	Total Dissolved Solids	mg/l	100	98.	2.0	20.
12-A005241	Total Dissolved Solids	mg/l	200	210	4.9	20.
12-A004714	Total Suspended Solids	mg/l	< 1	< 1		35.
12-A004817	Total Suspended Solids	mg/l	4.0	4.0	0.00	35.
12-A004818	Total Suspended Solids	mg/l	25.	25.	0.00	35.

DUPLICATES continued....

SAMPLE #	ANALYTE	UNITS	SMPL VAL	DUP VAL	RPD	MAX RPD
12-A004966	Total Suspended Solids	mg/l	300	340	12.	35.
12-A004976	Total Suspended Solids	mg/l	< 1	1.0		35.
12-A005018	Total Suspended Solids	mg/l	11.	10.	9.5	35.
12-A004731	Total Sulfide	mg/l	< 0.1	< 0.1		24.
12-A004548	Sulfate	mg/l	2.0	2.3	14.	29.
12-A004589	Sulfate	mg/l	17.	16.	6.1	29.
12-A004731	Sulfite	mg/l	< 1	< 1		27.
12-A004929	Sulfite	mg/l	15.	16.	6.5	27.
12-A005227	Mercury	mg/l	< 0.0001	< 0.0001		30.
12-A005631	Mercury	mg/l	< 0.0001	< 0.0001		30.
12-A005636	Mercury	mg/l	< 0.0001	< 0.0001		30.

MATRIX SPIKES

SAMPLE #	ANALYTE	UNITS	SMPL VAL	SMPL+SPK	SPK AMT	% REC	LIMITS
12-A004847	Total Organic Carbon	mg/l	11.	59.	50.	96.0 %	52.3 - 146.
12-A005402	Total Organic Carbon	mg/l	31.	67.	50.	72.0 %	52.3 - 146.
12-A004636	Total Cyanide	mg/l	< 0.005	0.11	0.10	110. %	52.5 - 123.
12-A004729	Total Cyanide	mg/l	0.27	0.75	0.50	96.0 %	52.5 - 123.
12-A004731	Cyanide(Weak&Dissociable)	mg/l	< 0.005	0.092	0.10	92.0 %	20.6 - 147.
12-A005304	Fluoride	mg/l	0.12	2.2	2.0	104. %	82.7 - 125.
12-A005796	Fluoride	mg/l	1.1	12.	10.	109. %	82.7 - 125.
12-A004446	Ammonia Nitrogen	mg/l	< 0.005	0.450	0.500	90.0 %	61.5 - 130.
12-A004514	Ammonia Nitrogen	mg/l	0.195	0.647	0.500	90.4 %	61.5 - 130.
12-A004542	Ammonia Nitrogen	mg/l	0.471	0.992	0.500	104. %	61.5 - 130.
12-A004552	Ammonia Nitrogen	mg/l	0.680	1.28	0.500	120. %	61.5 - 130.
12-A004979	Total Nitrogen (TKN)	mg/l	36.1	85.0	50.0	97.8 %	60.0 - 140.
12-A004682	Nitrite Nitrogen	mg/l	< 0.001	0.030	0.032	93.8 %	68.6 - 126.
12-A004686	Nitrite Nitrogen	mg/l	< 0.001	0.031	0.032	96.9 %	68.6 - 126.
12-A004731	Total Phenol	mg/L	0.037	0.57	0.50	107. %	79.2 - 136.
12-A004691	Ortho-Phosphate	mg/l	< 0.005	0.074	0.079	93.7 %	75.0 - 130.
12-A004691	Total Phosphorus	mg/l	0.046	0.152	0.100	106. %	82.3 - 132.
12-A004818	Total Phosphorus	mg/l	0.101	0.228	0.100	127. %	82.3 - 132.
12-A004548	Sulfate	mg/l	2.0	6.2	5.0	84.0 %	46.9 - 145.
12-A004589	Sulfate	mg/l	17.	22.	5.0	100. %	46.9 - 145.
12-A004691	Calcium	mg/l	9.6	42.	31.	105. %	70.0 - 130.
12-A004691	Calcium	mg/l	9.6	42.	31.	105. %	70.0 - 130.
12-A004731	Calcium	mg/l	25.	59.	31.	110. %	70.0 - 130.
12-A004731	Calcium	mg/l	25.	57.	31.	103. %	70.0 - 130.
12-A004731	Iron	mg/l	0.044	0.219	0.200	87.5 %	70.0 - 130.
12-A004731	Iron	mg/l	0.044	0.221	0.200	88.5 %	70.0 - 130.
12-A005227	Mercury	mg/l	< 0.0001	0.0026	0.0025	104. %	64.3 - 138.
12-A005631	Mercury	mg/l	< 0.0001	0.0024	0.0025	96.0 %	64.3 - 138.
12-A005636	Mercury	mg/l	< 0.0001	0.0025	0.0025	100. %	64.3 - 138.
12-A004691	Magnesium	mg/l	2.8	33.	31.	97.4 %	70.0 - 130.
12-A004691	Magnesium	mg/l	2.8	32.	31.	94.2 %	70.0 - 130.
12-A004731	Magnesium	mg/l	4.7	36.	31.	101. %	70.0 - 130.
12-A004731	Magnesium	mg/l	4.7	35.	31.	97.7 %	70.0 - 130.
Blank	Alpha BHC	ug/l	< 0.03	0.040	0.040	100. %	53.3 - 127.
Blank	Alpha BHC	ug/l	< 0.03	0.041	0.040	102. %	53.3 - 127.
Blank	Lindane	ug/l	< 0.03	0.043	0.040	108. %	68.5 - 123.
Blank	Lindane	ug/l	< 0.03	0.043	0.040	108. %	68.5 - 123.
Blank	Heptachlor	ug/l	< 0.03	0.042	0.040	105. %	72.6 - 108.

MATRIX SPIKES continued....

SAMPLE #	ANALYTE	UNITS	SMPL VAL	SMPL+SPK	SPK AMT	% REC	LIMITS
Blank	Heptachlor	ug/l	< 0.03	0.043	0.040	108. %	72.6 - 108.
Blank	Aldrin	ug/l	< 0.03	0.041	0.040	102. %	43.7 - 118.
Blank	Aldrin	ug/l	< 0.03	0.042	0.040	105. %	43.7 - 118.
Blank	Beta-BHC	ug/l	< 0.03	0.025	0.040	62.5 %	59.7 - 126.
Blank	Beta-BHC	ug/l	< 0.03	0.024	0.040	60.0 %	59.7 - 126.
Blank	Delta-BHC	ug/l	< 0.03	0.037	0.040	92.5 %	48.1 - 138.
Blank	Delta-BHC	ug/l	< 0.03	0.038	0.040	95.0 %	48.1 - 138.
Blank	Heptachlor Epoxide	ug/l	< 0.03	0.043	0.040	108. %	50.0 - 122.
Blank	Heptachlor Epoxide	ug/l	< 0.03	0.043	0.040	108. %	50.0 - 122.
Blank	Endosulfan I	ug/l	< 0.03	0.040	0.040	100. %	57.4 - 126.
Blank	Endosulfan I	ug/l	< 0.03	0.041	0.040	102. %	57.4 - 126.
Blank	pp-DDE	ug/l	< 0.03	0.042	0.040	105. %	39.5 - 132.
Blank	pp-DDE	ug/l	< 0.03	0.042	0.040	105. %	39.5 - 132.
Blank	Dieldrin	ug/l	< 0.03	0.044	0.040	110. %	47.9 - 118.
Blank	Dieldrin	ug/l	< 0.03	0.043	0.040	108. %	47.9 - 118.
Blank	Endrin	ug/l	< 0.03	0.041	0.040	102. %	51.0 - 139.
Blank	Endrin	ug/l	< 0.03	0.042	0.040	105. %	51.0 - 139.
Blank	pp-DDD	ug/l	< 0.03	0.043	0.040	108. %	65.1 - 136.
Blank	pp-DDD	ug/l	< 0.03	0.044	0.040	110. %	65.1 - 136.
Blank	Endosulfan II	ug/l	< 0.03	0.041	0.040	102. %	51.5 - 129.
Blank	Endosulfan II	ug/l	< 0.03	0.040	0.040	100. %	51.5 - 129.
Blank	pp-DDT	ug/l	< 0.03	0.043	0.040	108. %	66.3 - 136.
Blank	pp-DDT	ug/l	< 0.03	0.042	0.040	105. %	66.3 - 136.
Blank	Endrin Aldehyde	ug/l	< 0.03	0.041	0.040	102. %	37.2 - 141.
Blank	Endrin Aldehyde	ug/l	< 0.03	0.040	0.040	100. %	37.2 - 141.
Blank	Endosulfan Sulfate	ug/l	< 0.03	0.036	0.040	90.0 %	51.0 - 124.
Blank	Endosulfan Sulfate	ug/l	< 0.03	0.035	0.040	87.5 %	51.0 - 124.
Blank	Methoxychlor	ug/l	< 0.03	0.039	0.040	97.5 %	70.0 - 181.
Blank	Methoxychlor	ug/l	< 0.03	0.040	0.040	100. %	70.0 - 181.
Blank	PCB-1260	ug/L	< 0.5	0.18	0.25	72.0 %	49.1 - 122.
Blank	PCB-1260	ug/L	< 0.5	0.19	0.25	76.0 %	49.1 - 122.
12-A004731	Chloromethane	ug/l	< 1	11.3	11.9	95.0 %	49.7 - 131.
12-A004731	Chloromethane	ug/l	< 1	9.3	11.9	78.2 %	49.7 - 131.
12-A004731	Vinyl Chloride	ug/l	< 0.2	9.5	12.	79.2 %	46.0 - 145.
12-A004731	Vinyl Chloride	ug/l	< 0.2	7.9	12.	65.8 %	46.0 - 145.
12-A004731	Bromomethane	ug/l	< 1	11.5	11.9	96.6 %	66.1 - 164.
12-A004731	Bromomethane	ug/l	< 1	10.5	11.9	88.2 %	66.1 - 164.
12-A004731	Chloroethane	ug/l	< 1	11.6	11.9	97.5 %	48.9 - 128.
12-A004731	Chloroethane	ug/l	< 1	10.3	11.9	86.6 %	48.9 - 128.
12-A004731	Trichlorofluoromethane	ug/l	< 1	11.8	11.9	99.2 %	17.0 - 181.
12-A004731	Trichlorofluoromethane	ug/l	< 1	10.1	11.9	84.9 %	17.0 - 181.
12-A004731	1,1-Dichloroethylene	ug/l	< 1	13.3	11.9	112. %	65.0 - 142.
12-A004731	1,1-Dichloroethylene	ug/l	< 1	11.4	11.9	95.8 %	65.0 - 142.
12-A004731	Carbon Disulfide	ug/l	< 1	12.0	11.9	101. %	61.2 - 156.
12-A004731	Carbon Disulfide	ug/l	< 1	9.4	11.9	79.0 %	61.2 - 156.
12-A004731	Methyl Iodide	ug/l	< 1	7.7	11.9	64.7 %	44.9 - 153.
12-A004731	Methyl Iodide	ug/l	< 1	5.7	11.9	47.9 %	44.9 - 153.
12-A004731	Methylene Chloride	ug/l	< 2	18.6	11.9	156. %	52.0 - 156.
12-A004731	Methylene Chloride	ug/l	< 2	16.0	11.9	134. %	52.0 - 156.

MATRIX SPIKES continued....

SAMPLE #	ANALYTE	UNITS	SMPL VAL	SMPL+SPK	SPK AMT	% REC	LIMITS
12-A004731	Trans-1,2-Dichloroethene	ug/l	< 1	18.	12.	150. %	62.0 - 150.
12-A004731	Trans-1,2-Dichloroethene	ug/l	< 1	15.	12.	125. %	62.0 - 150.
12-A004731	Cis-1,2-Dichloroethene	ug/l	< 1	14.	12.	117. %	59.4 - 147.
12-A004731	Cis-1,2-Dichloroethene	ug/l	< 1	12.	12.	100. %	59.4 - 147.
12-A004731	1,1-Dichloroethane	ug/l	< 1	15.1	11.9	127. %	82.0 - 138.
12-A004731	1,1-Dichloroethane	ug/l	< 1	12.4	11.9	104. %	82.0 - 138.
12-A004731	Vinyl Acetate	ug/l	< 5	12.6	11.9	106. %	30.0 - 167.
12-A004731	Vinyl Acetate	ug/l	< 5	12.8	11.9	108. %	30.0 - 167.
12-A004731	Acrylonitrile	ug/l	< 5	15.2	11.9	128. %	39.3 - 165.
12-A004731	Acrylonitrile	ug/l	< 5	13.4	11.9	113. %	39.3 - 165.
12-A004731	2-Butanone (MEK)	ug/l	< 5	15.0	11.9	126. %	36.2 - 170.
12-A004731	2-Butanone (MEK)	ug/l	< 5	14.0	11.9	118. %	36.2 - 170.
12-A004731	Chloroform	ug/l	< 1	13.2	11.9	111. %	51.0 - 138.
12-A004731	Chloroform	ug/l	< 1	11.9	11.9	100. %	51.0 - 138.
12-A004731	1,1,1-Trichloroethane	ug/l	< 1	15.0	11.9	126. %	77.0 - 148.
12-A004731	1,1,1-Trichloroethane	ug/l	< 1	11.8	11.9	99.2 %	77.0 - 148.
12-A004731	Carbon Tetrachloride	ug/l	< 1	13.0	11.9	109. %	70.0 - 140.
12-A004731	Carbon Tetrachloride	ug/l	< 1	11.5	11.9	96.6 %	70.0 - 140.
12-A004731	Benzene	ug/l	< 1	12.0	11.9	101. %	37.0 - 151.
12-A004731	Benzene	ug/l	< 1	10.9	11.9	91.6 %	37.0 - 151.
12-A004731	1,2-Dichloroethane	ug/l	< 1	12.3	11.9	103. %	57.0 - 143.
12-A004731	1,2-Dichloroethane	ug/l	< 1	11.2	11.9	94.1 %	57.0 - 143.
12-A004731	Trichloroethylene	ug/l	< 1	15.0	11.9	126. %	54.1 - 147.
12-A004731	Trichloroethylene	ug/l	< 1	13.3	11.9	112. %	54.1 - 147.
12-A004731	Bromodichloromethane	ug/l	< 1	13.1	11.9	110. %	68.0 - 135.
12-A004731	Bromodichloromethane	ug/l	< 1	11.4	11.9	95.8 %	68.0 - 135.
12-A004731	Bromochloromethane	ug/l	< 1	15.	12.	125. %	75.8 - 136.
12-A004731	Bromochloromethane	ug/l	< 1	12.	12.	100. %	75.8 - 136.
12-A004731	1,2-Dibromoethane (EDB)	ug/l	< 1	13.	12.	108. %	76.0 - 121.
12-A004731	1,2-Dibromoethane (EDB)	ug/l	< 1	12.	12.	100. %	76.0 - 121.
12-A004731	Dibromomethane	ug/l	< 1	14.	12.	117. %	75.0 - 125.
12-A004731	Dibromomethane	ug/l	< 1	12.	12.	100. %	75.0 - 125.
12-A004731	1,2-Dichloropropane	ug/l	< 1	13.4	11.9	113. %	74.0 - 128.
12-A004731	1,2-Dichloropropane	ug/l	< 1	12.3	11.9	103. %	74.0 - 128.
12-A004731	4-Methyl-2-Pentanone MIBK	ug/l	< 5	14.3	11.9	120. %	43.7 - 147.
12-A004731	4-Methyl-2-Pentanone MIBK	ug/l	< 5	13.4	11.9	113. %	43.7 - 147.
12-A004731	Toluene	ug/l	10.5	24.6	11.9	118. %	76.0 - 128.
12-A004731	Toluene	ug/l	10.5	22.1	11.9	97.5 %	76.0 - 128.
12-A004731	Cis-1,3-Dichloropropene	ug/l	< 1	13.0	11.9	109. %	0.0 - 227.
12-A004731	Cis-1,3-Dichloropropene	ug/l	< 1	11.6	11.9	97.5 %	0.0 - 227.
12-A004731	1,1,2-Trichloroethane	ug/l	< 1	12.7	11.9	107. %	78.0 - 121.
12-A004731	1,1,2-Trichloroethane	ug/l	< 1	11.8	11.9	99.2 %	78.0 - 121.
12-A004731	Tetrachloroethylene	ug/l	< 1	15.8	11.9	133. %	50.4 - 167.
12-A004731	Tetrachloroethylene	ug/l	< 1	14.7	11.9	124. %	50.4 - 167.
12-A004731	2-Hexanone	ug/l	< 5	16.3	11.9	137. %	44.8 - 139.
12-A004731	2-Hexanone	ug/l	< 5	15.8	11.9	133. %	44.8 - 139.
12-A004731	Chlorodibromomethane	ug/l	< 1	13.1	11.9	110. %	53.0 - 149.
12-A004731	Chlorodibromomethane	ug/l	< 1	12.0	11.9	101. %	53.0 - 149.
12-A004731	Chlorobenzene	ug/l	< 1	12.6	11.9	106. %	37.0 - 160.

MATRIX SPIKES continued....

SAMPLE #	ANALYTE	UNITS	SMPL VAL	SMPL+SPK	SPK AMT	% REC	LIMITS
12-A004731	Chlorobenzene	ug/l	< 1	11.4	11.9	95.8 %	37.0 - 160.
12-A004731	Ethyl Benzene	ug/l	< 1	14.4	11.9	121. %	79.0 - 125.
12-A004731	Ethyl Benzene	ug/l	< 1	12.8	11.9	108. %	79.0 - 125.
12-A004731	m,p Xylene	ug/l	< 1	14.9	11.9	125. %	55.8 - 130.
12-A004731	m,p Xylene	ug/l	< 1	12.5	11.9	105. %	55.8 - 130.
12-A004731	o-Xylene	ug/l	< 1	14.4	11.9	121. %	75.0 - 125.
12-A004731	o-Xylene	ug/l	< 1	13.4	11.9	113. %	75.0 - 125.
12-A004731	Styrene	ug/l	< 1	13.9	11.9	117. %	52.9 - 120.
12-A004731	Styrene	ug/l	< 1	12.0	11.9	101. %	52.9 - 120.
12-A004731	Bromoform	ug/l	< 1	12.	12.	100. %	63.0 - 139.
12-A004731	Bromoform	ug/l	< 1	11.	12.	91.7 %	63.0 - 139.
12-A004731	1,1,2,2-Tetrachloroethane	ug/l	< 1	13.	12.	108. %	63.0 - 121.
12-A004731	1,1,2,2-Tetrachloroethane	ug/l	< 1	13.	12.	108. %	63.0 - 121.
12-A004731	1,1,1,2-Tetrachloroethane	ug/l	< 1	13.	12.	108. %	75.8 - 122.
12-A004731	1,1,1,2-Tetrachloroethane	ug/l	< 1	12.	12.	100. %	75.8 - 122.
12-A004731	Trans-1,3-Dichloropropene	ug/l	< 1	13.	12.	108. %	17.0 - 183.
12-A004731	Trans-1,3-Dichloropropene	ug/l	< 1	12.	12.	100. %	17.0 - 183.
12-A004731	1,4-Dichlorobenzene	ug/l	< 4	13.1	11.9	110. %	77.5 - 127.
12-A004731	1,4-Dichlorobenzene	ug/l	< 4	12.2	11.9	103. %	77.5 - 127.
12-A004731	1,2-Dichlorobenzene	ug/l	< 1	13.2	11.9	111. %	18.0 - 190.
12-A004731	1,2-Dichlorobenzene	ug/l	< 1	12.2	11.9	103. %	18.0 - 190.
12-A004731	1,2-Dibromo3Chloropropane	ug/l	< 5	14.	12.	117. %	39.3 - 162.
12-A004731	1,2-Dibromo3Chloropropane	ug/l	< 5	13.	12.	108. %	39.3 - 162.
12-A004731	trans-1,4-Dichloro2butene	ug/l	< 5	13.	12.	108. %	47.5 - 141.
12-A004731	trans-1,4-Dichloro2butene	ug/l	< 5	12.	12.	100. %	47.5 - 141.
12-A004731	1,2,3-Trichloropropane	ug/l	< 1	14.	12.	117. %	38.3 - 163.
12-A004731	1,2,3-Trichloropropane	ug/l	< 1	13.	12.	108. %	38.3 - 163.
12-A004731	2,3,7,8-TCDD	pg/L	< 1	9.15	10.0	91.5 %	20.0 - 175.
Blank	N-Nitrosodimethylamine	ug/l	< 0.5	2.1	2.5	84.0 %	30.0 - 140.
Blank	bis(2-Chloroisopropyl)eth	ug/l	< 0.5	2.4	2.5	96.0 %	36.0 - 166.
Blank	N-Nitroso-di-n-propylamin	ug/l	< 0.5	2.0	2.5	80.0 %	0.0 - 230.
Blank	Fluorene	ug/l	< 0.5	1.8	2.5	72.0 %	59.0 - 121.
Blank	N-nitrosodiphenylamine	ug/l	< 0.5	2.2	2.5	88.0 %	30.0 - 140.
Blank	Azobenzene	ug/l	< 0.2	2.7	2.5	108. %	30.0 - 140.
12-A004635	Silver	ug/L	< 0.05	47.9	50.0	95.8 %	70.0 - 130.
12-A004635	Silver	ug/L	< 0.05	48.1	50.0	96.2 %	70.0 - 130.
12-A004635	Arsenic	ug/L	0.404	51.7	50.0	103. %	70.0 - 130.
12-A004635	Arsenic	ug/L	0.404	51.6	50.0	102. %	70.0 - 130.
12-A004808	Arsenic	ug/L	10.4	61.2	50.0	102. %	70.0 - 130.
12-A004808	Arsenic	ug/L	10.4	62.2	50.0	104. %	70.0 - 130.
12-A004635	Barium	ug/L	1.51	51.7	50.0	100. %	70.0 - 130.
12-A004635	Barium	ug/L	1.51	51.7	50.0	100. %	70.0 - 130.
12-A004635	Beryllium	ug/L	< 0.05	50.9	50.0	102. %	70.0 - 130.
12-A004635	Beryllium	ug/L	< 0.05	51.0	50.0	102. %	70.0 - 130.
12-A004635	Cadmium	ug/L	< 0.05	50.8	50.0	102. %	70.0 - 130.
12-A004635	Cadmium	ug/L	< 0.05	51.0	50.0	102. %	70.0 - 130.
12-A004635	Chromium	ug/L	0.11	46.8	50.0	93.4 %	70.0 - 130.
12-A004635	Chromium	ug/L	0.11	46.9	50.0	93.6 %	70.0 - 130.
12-A004635	Copper	ug/L	1.17	47.9	50.0	93.5 %	69.6 - 127.

MATRIX SPIKES continued....

SAMPLE #	ANALYTE	UNITS	SMPL VAL	SMPL+SPK	SPK AMT	% REC	LIMITS
12-A004635	Copper	ug/L	1.17	48.0	50.0	93.7 %	69.6 - 127.
12-A004818	Copper	ug/L	3.88	182.	200.	89.1 %	69.6 - 127.
12-A004818	Copper	ug/L	3.88	177.	200.	86.6 %	69.6 - 127.
12-A004691	Copper	ug/L	4.98	183.	200.	89.0 %	69.6 - 127.
12-A004691	Copper	ug/L	4.98	180.	200.	87.5 %	69.6 - 127.
12-A004635	Manganese	ug/L	11.3	60.7	50.0	98.8 %	70.0 - 130.
12-A004635	Manganese	ug/L	11.3	60.7	50.0	98.8 %	70.0 - 130.
12-A004635	Nickel	ug/L	0.05	46.3	50.0	92.5 %	70.0 - 130.
12-A004635	Nickel	ug/L	0.05	46.4	50.0	92.7 %	70.0 - 130.
12-A004635	Lead	ug/L	0.10	50.3	50.0	100. %	70.0 - 130.
12-A004635	Lead	ug/L	0.10	50.4	50.0	101. %	70.0 - 130.
12-A004635	Antimony	ug/L	< 0.05	53.0	50.0	106. %	70.0 - 130.
12-A004635	Antimony	ug/L	< 0.05	53.8	50.0	108. %	70.0 - 130.
12-A004635	Selenium	ug/L	< 0.5	59.4	50.0	119. %	70.0 - 130.
12-A004635	Selenium	ug/L	< 0.5	59.4	50.0	119. %	70.0 - 130.
12-A004635	Thallium	ug/L	< 0.05	49.9	50.0	99.8 %	70.0 - 130.
12-A004635	Thallium	ug/L	< 0.05	49.9	50.0	99.8 %	70.0 - 130.
12-A004635	Zinc	ug/L	4.24	57.5	50.0	107. %	63.3 - 142.
12-A004635	Zinc	ug/L	4.24	57.6	50.0	107. %	63.3 - 142.
12-A004818	Zinc	ug/L	31.3	212.	200.	90.4 %	63.3 - 142.
12-A004818	Zinc	ug/L	31.3	207.	200.	87.8 %	63.3 - 142.
12-A004691	Zinc	ug/L	11.6	193.	200.	90.7 %	63.3 - 142.
12-A004691	Zinc	ug/L	11.6	190.	200.	89.2 %	63.3 - 142.

MATRIX SPIKE DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAM + SPK	MSD VALUE	RPD	LIMITS
Spike	Calcium	mg/l	42.	42.	0.00	16.
Spike	Calcium	mg/l	59.	57.	3.4	16.
Spike	Iron	mg/l	0.219	0.221	0.91	50.
Spike	Magnesium	mg/l	33.	32.	3.1	15.
Spike	Magnesium	mg/l	36.	35.	2.8	15.
Spike	Alpha BHC	ug/l	0.040	0.041	2.5	23.
Spike	Lindane	ug/l	0.043	0.043	0.00	28.
Spike	Heptachlor	ug/l	0.042	0.043	2.4	27.
Spike	Aldrin	ug/l	0.041	0.042	2.4	32.
Spike	Beta-BHC	ug/l	0.025	0.024	4.1	21.
Spike	Delta-BHC	ug/l	0.037	0.038	2.7	28.
Spike	Heptachlor Epoxide	ug/l	0.043	0.043	0.00	20.
Spike	Endosulfan I	ug/l	0.040	0.041	2.5	18.
Spike	pp-DDE	ug/l	0.042	0.042	0.00	24.
Spike	Dieldrin	ug/l	0.044	0.043	2.3	14.
Spike	Endrin	ug/l	0.041	0.042	2.4	25.
Spike	pp-DDD	ug/l	0.043	0.044	2.3	35.
Spike	Endosulfan II	ug/l	0.041	0.040	2.5	18.
Spike	pp-DDT	ug/l	0.043	0.042	2.4	48.
Spike	Endrin Aldehyde	ug/l	0.041	0.040	2.5	25.
Spike	Endosulfan Sulfate	ug/l	0.036	0.035	2.8	19.
Spike	Methoxychlor	ug/l	0.039	0.040	2.5	54.
Spike	PCB-1260	ug/L	0.18	0.19	5.4	46.
Spike	Chloromethane	ug/l	11.3	9.3	19.	34.
Spike	Vinyl Chloride	ug/l	9.5	7.9	18.	25.
Spike	Bromomethane	ug/l	11.5	10.5	9.1	27.

MATRIX SPIKE DUPLICATES continued....

SAMPLE #	ANALYTE	UNITS	SAM + SPK	MSD VALUE	RPD	LIMITS
Spike	Chloroethane	ug/l	11.6	10.3	12.	25.
Spike	Trichlorofluoromethane	ug/l	11.8	10.1	16.	34.
Spike	1,1-Dichloroethylene	ug/l	13.3	11.4	15.	24.
Spike	Carbon Disulfide	ug/l	12.0	9.4	24.	35.
Spike	Methyl Iodide	ug/l	7.7	5.7	30.	35.
Spike	Methylene Chloride	ug/l	18.6	16.0	15.	38.
Spike	Trans-1,2-Dichloroethene	ug/l	18.	15.	18.	23.
Spike	Cis-1,2-Dichloroethene	ug/l	14.	12.	15.	25.
Spike	1,1-Dichloroethane	ug/l	15.1	12.4	20.	31.
Spike	Vinyl Acetate	ug/l	12.6	12.8	1.6	45.
Spike	Acrylonitrile	ug/l	15.2	13.4	13.	20.
Spike	2-Butanone (MEK)	ug/l	15.0	14.0	6.9	25.
Spike	Chloroform	ug/l	13.2	11.9	10.	23.
Spike	1,1,1-Trichloroethane	ug/l	15.0	11.8	24.	36.
Spike	Carbon Tetrachloride	ug/l	13.0	11.5	12.	37.
Spike	Benzene	ug/l	12.0	10.9	9.6	29.
Spike	1,2-Dichloroethane	ug/l	12.3	11.2	9.4	24.
Spike	Trichloroethylene	ug/l	15.0	13.3	12.	40.
Spike	Bromodichloromethane	ug/l	13.1	11.4	14.	22.
Spike	Bromochloromethane	ug/l	15.	12.	22.	36.
Spike	1,2-Dibromoethane (EDB)	ug/l	13.	12.	8.0	28.
Spike	Dibromomethane	ug/l	14.	12.	15.	20.
Spike	1,2-Dichloropropane	ug/l	13.4	12.3	8.6	24.
Spike	4-Methyl-2-Pentanone MIBK	ug/l	14.3	13.4	6.5	39.
Spike	Toluene	ug/l	24.6	22.1	11.	22.
Spike	Cis-1,3-Dichloropropene	ug/l	13.0	11.6	11.	39.
Spike	1,1,2-Trichloroethane	ug/l	12.7	11.8	7.3	22.
Spike	Tetrachloroethylene	ug/l	15.8	14.7	7.2	21.
Spike	2-Hexanone	ug/l	16.3	15.8	3.1	40.
Spike	Chlorodibromomethane	ug/l	13.1	12.0	8.8	30.
Spike	Chlorobenzene	ug/l	12.6	11.4	10.	33.
Spike	Ethyl Benzene	ug/l	14.4	12.8	12.	18.
Spike	m,p Xylene	ug/l	14.9	12.5	18.	38.
Spike	o-Xylene	ug/l	14.4	13.4	7.2	20.
Spike	Styrene	ug/l	13.9	12.0	15.	29.
Spike	Bromoform	ug/l	12.	11.	8.7	26.
Spike	1,1,2,2-Tetrachloroethane	ug/l	13.	13.	0.00	28.
Spike	1,1,1,2-Tetrachloroethane	ug/l	13.	12.	8.0	37.
Spike	Trans-1,3-Dichloropropene	ug/l	13.	12.	8.0	29.
Spike	1,4-Dichlorobenzene	ug/l	13.1	12.2	7.1	27.
Spike	1,2-Dichlorobenzene	ug/l	13.2	12.2	7.9	25.
Spike	1,2-Dibromo3Chloropropane	ug/l	14.	13.	7.4	39.
Spike	trans-1,4-Dichloro2butene	ug/l	13.	12.	8.0	35.
Spike	1,2,3-Trichloropropane	ug/l	14.	13.	7.4	45.
Spike	Silver	ug/L	47.9	48.1	0.42	19.
Spike	Arsenic	ug/L	51.7	51.6	0.19	16.
Spike	Arsenic	ug/L	61.2	62.2	1.6	16.
Spike	Barium	ug/L	51.7	51.7	0.00	19.
Spike	Beryllium	ug/L	50.9	51.0	0.20	21.

MATRIX SPIKE DUPLICATES continued....

SAMPLE #	ANALYTE	UNITS	SAM + SPK	MSD VALUE	RPD	LIMITS
Spike	Cadmium	ug/L	50.8	51.0	0.39	25.
Spike	Chromium	ug/L	46.8	46.9	0.21	15.
Spike	Copper	ug/L	47.9	48.0	0.21	25.
Spike	Copper	ug/L	182.	177.	2.8	25.
Spike	Copper	ug/L	183.	180.	1.7	25.
Spike	Manganese	ug/L	60.7	60.7	0.00	35.
Spike	Nickel	ug/L	46.3	46.4	0.22	35.
Spike	Lead	ug/L	50.3	50.4	0.20	25.
Spike	Antimony	ug/L	53.0	53.8	1.5	15.
Spike	Selenium	ug/L	59.4	59.4	0.00	25.
Spike	Thallium	ug/L	49.9	49.9	0.00	20.
Spike	Zinc	ug/L	57.5	57.6	0.17	25.
Spike	Zinc	ug/L	212.	207.	2.4	25.
Spike	Zinc	ug/L	193.	190.	1.6	25.

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VAL	% REC	LIMITS
pH	unit	7.00	7.02	100. %	95.0 - 105.
pH	unit	7.00	7.00	100. %	95.0 - 105.
Alkalinity (as CaCO3)	mg/l	240	260	108. %	82.5 - 108.
Alkalinity (as CaCO3)	mg/l	240	250	104. %	82.5 - 108.
Alkalinity (as CaCO3)	mg/l	240	250	104. %	82.5 - 108.
BOD	mg/l	200	170	85.0 %	70.0 - 130.
Total Organic Carbon	mg/l	50.	48.	96.0 %	71.9 - 121.
Total Organic Carbon	mg/l	50.	52.	104. %	71.9 - 121.
Total Organic Carbon	mg/l	50.	49.	98.0 %	71.9 - 121.
Chemical Oxygen Demand	mg/l	150	150	100. %	79.5 - 119.
Chemical Oxygen Demand	mg/l	150	160	107. %	79.5 - 119.
Chlorine Residual	mg/l	0.50	0.53	106. %	73.1 - 122.
Total Cyanide	mg/l	0.10	0.10	100. %	68.7 - 121.
Total Cyanide	mg/l	0.10	0.10	100. %	68.7 - 121.
Cyanide(Weak&Dissociable)	mg/l	0.10	0.093	93.0 %	69.2 - 129.
Fluoride	mg/l	2.0	2.1	105. %	90.0 - 112.
Fluoride	mg/l	2.0	2.1	105. %	90.0 - 112.
Ammonia Nitrogen	mg/l	0.500	0.510	102. %	89.0 - 113.
Ammonia Nitrogen	mg/l	0.500	0.503	101. %	89.0 - 113.
Ammonia Nitrogen	mg/l	0.500	0.499	99.8 %	89.0 - 113.
Ammonia Nitrogen	mg/l	0.500	0.502	100. %	89.0 - 113.
Total Nitrogen (TKN)	mg/l	29.3	22.9	78.2 %	73.7 - 123.
Nitrate + Nitrite	mg/l	0.50	0.51	102. %	89.4 - 115.
Nitrite Nitrogen	mg/l	0.032	0.033	103. %	73.8 - 127.
Nitrite Nitrogen	mg/l	0.032	0.032	100. %	73.8 - 127.
Total Phenol	mg/L	0.50	0.51	102. %	88.4 - 116.
Ortho-Phosphate	mg/l	0.079	0.081	103. %	80.8 - 115.
Total Phosphorus	mg/l	0.100	0.097	97.0 %	88.3 - 119.
Total Phosphorus	mg/l	0.100	0.094	94.0 %	88.3 - 119.
Salinity	g/kg	2.00	1.99	99.5 %	80.0 - 120.

STANDARD REFERENCE MATERIALS continued....

ANALYTE	UNITS	TRUE VALUE	MEASURED VAL	% REC	LIMITS
Total Dissolved Solids	mg/l	350	360	103. %	75.0 - 116.
Total Dissolved Solids	mg/l	350	350	100. %	75.0 - 116.
Total Suspended Solids	mg/l	100	94.	94.0 %	74.9 - 123.
Total Suspended Solids	mg/l	100	100	100. %	74.9 - 123.
Total Suspended Solids	mg/l	100	92.	92.0 %	74.9 - 123.
Total Suspended Solids	mg/l	100	95.	95.0 %	74.9 - 123.
Total Suspended Solids	mg/l	100	93.	93.0 %	74.9 - 123.
Total Suspended Solids	mg/l	100	100	100. %	74.9 - 123.
Total Sulfide	mg/l	1.0	0.98	98.0 %	72.2 - 122.
Sulfate	mg/l	1.0	0.95	95.0 %	75.8 - 121.
Sulfate	mg/l	1.0	1.0	100. %	75.8 - 121.
Sulfate	mg/l	1.0	1.0	100. %	75.8 - 121.
Sulfite	mg/l	110	98.	89.1 %	80.0 - 120.
Sulfite	mg/l	110	100	90.9 %	80.0 - 120.
Boron	mg/l	0.80	0.81	101. %	90.0 - 110.
Calcium	mg/l	4.0	3.8	95.0 %	90.0 - 110.
Dissolved Hex. Chromium	mg/l	0.025	0.023	92.0 %	75.0 - 125.
Iron	mg/l	4.00	3.94	98.5 %	90.0 - 110.
Mercury	mg/l	0.0020	0.0021	105. %	90.0 - 110.
Mercury	mg/l	0.0020	0.0021	105. %	90.0 - 110.
Mercury	mg/l	0.0020	0.0021	105. %	90.0 - 110.
Magnesium	mg/l	4.0	4.0	100. %	90.0 - 110.
Tin	mg/l	0.800	0.783	97.9 %	90.0 - 110.
Titanium	mg/l	4.00	4.20	105. %	90.0 - 110.
2-Chloro Vinyl Ether	ug/l	10.0	10.0	100. %	75.0 - 125.
Gasoline in Water	ug/l	236.	212.	89.8 %	53.9 - 144.
Diesel	ug/l	400	420	105. %	85.0 - 115.
Diesel	ug/l	400	420	105. %	85.0 - 115.
Heavy Oil	ug/l	400	420	105. %	85.0 - 115.
Heavy Oil	ug/l	400	420	105. %	85.0 - 115.
2,3,7,8-TCDD	pg/L	100.	92.5	92.5 %	78.0 - 129.
N-Nitrosodimethylamine	ug/l	5.0	5.3	106. %	50.0 - 150.
bis(2-Chloroisopropyl)eth	ug/l	5.0	5.2	104. %	50.0 - 150.
N-Nitroso-di-n-propylamin	ug/l	5.0	4.1	82.0 %	50.0 - 150.
Fluorene	ug/l	5.0	4.6	92.0 %	50.0 - 150.
N-nitrosodiphenylamine	ug/l	5.0	5.0	100. %	50.0 - 150.
Azobenzene	ug/l	5.0	4.8	96.0 %	503. - 150.
Benzo(j)fluoranthene	ug/l	5.0	5.4	108. %	50.0 - 150.
Dibenzo(a,h)acridine	ug/l	5.0	5.0	100. %	50.0 - 150.
Dibenzo(a,j)acridine	ug/l	5.0	5.6	112. %	50.0 - 150.
7h-Dibenzo(c,j)carbazole	ug/l	5.0	4.7	94.0 %	50.0 - 150.
Dibenzo(a,e)pyrene	ug/l	5.0	4.3	86.0 %	50.0 - 150.
Dibenzo(a,i)pyrene	ug/l	5.0	4.3	86.0 %	50.0 - 150.
Dibenzo(a,h)pyrene	ug/l	5.0	4.0	80.0 %	50.0 - 150.

STANDARD REFERENCE MATERIALS continued....

ANALYTE	UNITS	TRUE VALUE	MEASURED VAL	% REC	LIMITS
Silver	ug/L	25.0	24.2	96.8 %	90.0 - 110.
Silver	ug/L	25.0	24.2	96.8 %	90.0 - 110.
Silver	ug/L	25.0	24.2	96.8 %	90.0 - 110.
Silver	ug/L	25.0	24.2	96.8 %	90.0 - 110.
Aluminum	ug/L	25.0	24.2	96.8 %	90.0 - 110.
Arsenic	ug/L	25.0	24.7	98.8 %	90.0 - 110.
Arsenic	ug/L	25.0	24.7	98.8 %	90.0 - 110.
Arsenic	ug/L	25.0	24.7	98.8 %	90.0 - 110.
Barium	ug/L	25.0	25.3	101. %	90.0 - 110.
Barium	ug/L	25.0	25.3	101. %	90.0 - 110.
Beryllium	ug/L	25.0	24.3	97.2 %	90.0 - 110.
Beryllium	ug/L	25.0	24.3	97.2 %	90.0 - 110.
Cadmium	ug/L	25.0	24.2	96.8 %	90.0 - 110.
Cadmium	ug/L	25.0	24.2	96.8 %	90.0 - 110.
Cadmium	ug/L	25.0	24.2	96.8 %	90.0 - 110.
Cobalt	ug/L	25.0	24.0	96.0 %	90.0 - 110.
Chromium	ug/L	25.0	24.5	98.0 %	90.0 - 110.
Chromium	ug/L	25.0	24.5	98.0 %	90.0 - 110.
Chromium	ug/L	25.0	24.5	98.0 %	90.0 - 110.
Copper	ug/L	25.0	24.5	98.0 %	90.0 - 110.
Copper	ug/L	25.0	24.4	97.6 %	90.0 - 110.
Copper	ug/L	25.0	24.5	98.0 %	90.0 - 110.
Copper	ug/L	25.0	24.5	98.0 %	90.0 - 110.
Manganese	ug/L	25.0	24.5	98.0 %	90.0 - 110.
Manganese	ug/L	25.0	24.5	98.0 %	90.0 - 110.
Molybdenum	ug/L	25.0	24.0	96.0 %	90.0 - 110.
Nickel	ug/L	25.0	24.2	96.8 %	90.0 - 110.
Nickel	ug/L	25.0	24.2	96.8 %	90.0 - 110.
Nickel	ug/L	25.0	24.2	96.8 %	90.0 - 110.
Lead	ug/L	25.0	23.4	93.6 %	90.0 - 110.
Lead	ug/L	25.0	23.4	93.6 %	90.0 - 110.
Lead	ug/L	25.0	23.4	93.6 %	90.0 - 110.
Antimony	ug/L	25.0	23.5	94.0 %	90.0 - 110.
Antimony	ug/L	25.0	23.5	94.0 %	90.0 - 110.
Selenium	ug/L	125.	125.	100. %	90.0 - 110.
Selenium	ug/L	125.	125.	100. %	90.0 - 110.
Thallium	ug/L	25.0	23.6	94.4 %	90.0 - 110.
Thallium	ug/L	25.0	23.6	94.4 %	90.0 - 110.
Zinc	ug/L	25.0	23.7	94.8 %	90.0 - 110.
Zinc	ug/L	25.0	23.6	94.4 %	90.0 - 110.
Zinc	ug/L	25.0	23.8	95.2 %	90.0 - 110.
Zinc	ug/L	25.0	23.8	95.2 %	90.0 - 110.

BLANKS

ANALYTE	UNITS	RESULT
Fecal Coliforms	CFU/100 ml	< 1
Alkalinity (as CaCO3)	mg/l	< 1
Alkalinity (as CaCO3)	mg/l	< 1
Alkalinity (as CaCO3)	mg/l	< 1
BOD	mg/l	< 2
Total Organic Carbon	mg/l	< 0.5
Total Organic Carbon	mg/l	< 0.5
Total Organic Carbon	mg/l	< 0.5
Chemical Oxygen Demand	mg/l	< 10
Chemical Oxygen Demand	mg/l	< 10
Chlorine Residual	mg/l	< 0.1
Total Cyanide	mg/l	< 0.005
Total Cyanide	mg/l	< 0.005
Cyanide(Weak&Dissociable)	mg/l	< 0.005
Fluoride	mg/l	< 0.02
Fluoride	mg/l	0.03
Ammonia Nitrogen	mg/l	< 0.005
Ammonia Nitrogen	mg/l	< 0.005
Ammonia Nitrogen	mg/l	< 0.005
Ammonia Nitrogen	mg/l	< 0.005
Total Nitrogen (TKN)	mg/l	< 0.1
Nitrate + Nitrite	mg/l	< 0.01
Nitrite Nitrogen	mg/l	< 0.001
Nitrite Nitrogen	mg/l	< 0.001
Total Phenol	mg/L	< 0.005
Ortho-Phosphate	mg/l	< 0.005
Total Phosphorus	mg/l	< 0.005
Total Phosphorus	mg/l	< 0.005
Salinity	g/kg	< 0.05
Total Dissolved Solids	mg/l	< 1
Total Dissolved Solids	mg/l	< 1
Total Suspended Solids	mg/l	< 1
Total Suspended Solids	mg/l	< 1
Total Suspended Solids	mg/l	< 1
Total Suspended Solids	mg/l	< 1
Total Suspended Solids	mg/l	< 1
Total Suspended Solids	mg/l	< 1
Total Sulfide	mg/l	< 0.1
Sulfate	mg/l	< 0.1
Sulfate	mg/l	< 0.1
Sulfate	mg/l	< 0.1

BLANKS continued....

ANALYTE	UNITS	RESULT
Sulfite	mg/l	< 1
Sulfite	mg/l	< 1
Boron	mg/l	< 0.05
Calcium	mg/l	< 0.05
Dissolved Hex. Chromium	mg/l	< 0.003
Iron	mg/l	< 0.005
Mercury	mg/l	< 0.0001
Mercury	mg/l	< 0.0001
Mercury	mg/l	< 0.0001
Magnesium	mg/l	< 0.05
Tin	mg/l	< 0.005
Titanium	mg/l	< 0.001
Benzene	ug/l	< 1
Toluene	ug/l	< 1
Ethyl Benzene	ug/l	< 1
Total Xylene	ug/l	< 1
Alpha BHC	ug/l	< 0.03
Lindane	ug/l	< 0.03
Heptachlor	ug/l	< 0.03
Aldrin	ug/l	< 0.03
Beta-BHC	ug/l	< 0.03
Delta-BHC	ug/l	< 0.03
Heptachlor Epoxide	ug/l	< 0.03
Endosulfan I	ug/l	< 0.03
pp-DDE	ug/l	< 0.03
Dieldrin	ug/l	< 0.03
Endrin	ug/l	< 0.03
pp-DDD	ug/l	< 0.03
Endosulfan II	ug/l	< 0.03
pp-DDT	ug/l	< 0.03
Endrin Aldehyde	ug/l	< 0.03
Endosulfan Sulfate	ug/l	< 0.03
Methoxychlor	ug/l	< 0.03
Toxaphene	ug/l	< 0.25
Chlordane	ug/l	< 0.1
PCB-1016	ug/L	< 0.5
PCB-1221	ug/L	< 0.5
PCB-1232	ug/L	< 0.5
PCB-1242	ug/L	< 0.5
PCB-1248	ug/L	< 0.5
PCB-1254	ug/L	< 0.5

BLANKS continued....

ANALYTE	UNITS	RESULT
PCB-1260	ug/L	< 0.5
Tetrachloro-m-xylene	% Rec	80.0
Decachlorobiphenyl	% Rec	93.4
Chloromethane	ug/l	< 1
Vinyl Chloride	ug/l	< 0.2
Bromomethane	ug/l	< 1
Chloroethane	ug/l	< 1
Trichlorofluoromethane	ug/l	< 1
1,1-Dichloroethylene	ug/l	< 1
Acetone	ug/l	< 5
Carbon Disulfide	ug/l	< 1
Methyl Iodide	ug/l	< 1
Methylene Chloride	ug/l	< 2
Trans-1,2-Dichloroethene	ug/l	< 1
Cis-1,2-Dichloroethene	ug/l	< 1
1,1-Dichloroethane	ug/l	< 1
Vinyl Acetate	ug/l	< 5
Acrylonitrile	ug/l	< 5
2-Butanone (MEK)	ug/l	< 5
Chloroform	ug/l	< 1
1,1,1-Trichloroethane	ug/l	< 1
Carbon Tetrachloride	ug/l	< 1
Benzene	ug/l	< 1
1,2-Dichloroethane	ug/l	< 1
Trichloroethylene	ug/l	< 1
Bromodichloromethane	ug/l	< 1
Bromochloromethane	ug/l	< 1
1,2-Dibromoethane (EDB)	ug/l	< 1
Dibromomethane	ug/l	< 1
1,2-Dichloropropane	ug/l	< 1
4-Methyl-2-Pentanone MIBK	ug/l	< 5
Toluene	ug/l	5.4
Cis-1,3-Dichloropropene	ug/l	< 1
1,1,2-Trichloroethane	ug/l	< 1
Tetrachloroethylene	ug/l	< 1
2-Hexanone	ug/l	< 5
Chlorodibromomethane	ug/l	< 1
Chlorobenzene	ug/l	< 1
Ethyl Benzene	ug/l	< 1
m,p Xylene	ug/l	< 1
o-Xylene	ug/l	< 1

BLANKS continued....

ANALYTE	UNITS	RESULT
Styrene	ug/l	< 1
Bromoform	ug/l	< 1
1,1,2,2-Tetrachloroethane	ug/l	< 1
1,1,1,2-Tetrachloroethane	ug/l	< 1
Trans-1,3-Dichloropropene	ug/l	< 1
2-Chloro Vinyl Ether	ug/l	< 1
1,4-Dichlorobenzene	ug/l	< 4
1,2-Dichlorobenzene	ug/l	< 1
1,2-Dibromo3Chloropropane	ug/l	< 5
trans-1,4-Dichloro2butene	ug/l	< 5
1,2,3-Trichloropropane	ug/l	< 1
D4-1,2,-Dichloroethane	%	116.
D8-Toluene	%	113.
4-Bromofluorobenzene	%	116.
Gasoline in Water	ug/l	< 100
Bromofluorobenzene	%	99.0
Diesel	ug/l	< 50
Diesel	ug/l	< 50
Heavy Oil	ug/l	< 100
Heavy Oil	ug/l	< 100
Bromofluorobenzene	%	64.2
Bromofluorobenzene	%	59.7
2-Fluorobiphenyl	%	74.5
2-Fluorobiphenyl	%	71.8
2,3,7,8-TCDD	pg/L	< 1
D5-Nitrobenzene	%	71.3
2-Fluorobiphenyl	%	48.7
D14-Terphenyl	%	105.
N-Nitrosodimethylamine	ug/l	< 0.5
bis(2-Chloroisopropyl)eth	ug/l	< 0.5
N-Nitroso-di-n-propylamin	ug/l	< 0.5
Fluorene	ug/l	< 0.5
N-nitrosodiphenylamine	ug/l	< 0.5
Benzidine	ug/l	< 0.5
Azobenzene	ug/l	< 0.2
Benzo(j)fluoranthene	ug/l	< 0.2
Dibenzo(a,h)acridine	ug/l	< 0.2
Dibenzo(a,j)acridine	ug/l	< 0.2
7h-Dibenzo(c,j)carbazole	ug/l	< 0.2
Dibenzo(a,e)pyrene	ug/l	< 1
Dibenzo(a,i)pyrene	ug/l	< 1

BLANKS continued....

ANALYTE	UNITS	RESULT
Dibenzo(a,h)pyrene	ug/l	< 1
Silver	ug/L	< 0.05
Silver	ug/L	< 0.05
Silver	ug/L	< 0.05
Silver	ug/L	< 0.05
Aluminum	ug/L	< 0.5
Aluminum	ug/L	< 0.5
Arsenic	ug/L	< 0.1
Arsenic	ug/L	< 0.1
Arsenic	ug/L	< 0.1
Barium	ug/L	< 0.05
Barium	ug/L	< 0.05
Barium	ug/L	< 0.05
Beryllium	ug/L	< 0.05
Beryllium	ug/L	< 0.05
Cadmium	ug/L	< 0.05
Cadmium	ug/L	< 0.05
Cadmium	ug/L	< 0.05
Cobalt	ug/L	< 0.5
Cobalt	ug/L	< 0.5
Chromium	ug/L	< 0.05
Chromium	ug/L	< 0.05
Chromium	ug/L	< 0.05
Copper	ug/L	< 0.1
Copper	ug/L	< 0.1
Copper	ug/L	< 0.1
Copper	ug/L	< 0.1
Manganese	ug/L	< 0.05
Manganese	ug/L	< 0.05
Molybdenum	ug/L	< 0.05
Molybdenum	ug/L	< 0.05
Molybdenum	ug/L	< 0.05
Nickel	ug/L	< 0.05
Nickel	ug/L	< 0.05
Nickel	ug/L	< 0.05
Lead	ug/L	< 0.05
Lead	ug/L	< 0.05
Lead	ug/L	< 0.05
Antimony	ug/L	< 0.05
Antimony	ug/L	< 0.05
Antimony	ug/L	< 0.05

BLANKS continued....

ANALYTE	UNITS	RESULT
Selenium	ug/L	< 0.5
Selenium	ug/L	< 0.5
Selenium	ug/L	< 0.5
Thallium	ug/L	< 0.05
Thallium	ug/L	< 0.05
Thallium	ug/L	< 0.05
Zinc	ug/L	< 0.5
Zinc	ug/L	< 0.5
Zinc	ug/L	< 0.5
Zinc	ug/L	< 0.5

AMTEST LABORATORIES

AmTest Chain of Custody Record

13600 NE 126th PL, Suite C, Kirkland, WA 98034
Ph (425) 885-1664 Fx (425) 820-0245
www.amtestlab.com

Chain of Custody No. 16048

Client Name & Address:	Invoice To:
City of Snoqualmie P.O. Box 987 Snoqualmie, WA 98065	
Contact Person: Lyle Beach	Invoice Contact:
Phone No: 425-888-4153	PO Number:
Fax No: 425-888-4379	Invoice Ph/Fax:
E-mail: lbeach@ci.snoqualmie.wa.us	Invoice E-mail:
Report Delivery: (Choose all that apply) Mail / Fax / Email / Posted Online	Data posted to online account: YES / NO Web Login ID:
Special Instructions:	
Requested ~~TAT~~: **(Rush must be pre-approved by lab)** Standard RUSH (5 Day / 3 Day / 48 HR / 24 HR)	Temperature upon Receipt:
~~Project Name~~: Priority Pollutants Project Number:	

AmTest ID	Client ID (35 characters max)	Date Sampled	Time Sampled	~~Effluent~~ Matrix	No. of containers	Analysis Requested: Conventional Parameters	Non-conventional Parameters	Priority pollutants	Dioxin	Acid Compounds	Volatile Compounds	Base/Neutral Compounds	Pesticides/PCB's		QA/QC
4731	SQ1	4-3-12	12:15	WW	13	✓	✓	✓	✓	✓	✓	✓	✓		
32	SQ2	4-4-12	12:15	WW	19	✓	✓	✓	✓	✓	✓	✓	✓		
32	TRIP Blank														

Collected/Relinquished By:	Date	~~Time~~	Received By:	Date	~~Time~~
L. Beach	4-4-12	12:15		4-4-12	12:15
Relinquished By:	Date	Time	Received By:	Date	Time
Relinquished By:	Date	Time	Received By:	Date	Time

COMMENTS:

APPENDIX F

SEWER MODEL LOADING DATA

EXISTING BASIN FLOW CALCULATIONS

EQUATION

2047.21477

10974.1559

Flow per ERU			0.096	gpm		Res. Peaking Factor	2.38	School Flow per Student	0.033	gpm
SR I/I flow per Acre	1574.6164	gpad	1.093	gpam		SR Commercial Flow per Acre	1.42	Elem. Sch. Flow per St.	0.021	gpm
Hist. Sno. I/I	9382.4501	gpad	6.516	gpam		Historic Comm. Flow per Acre	7.62			

					SINGLE FAMILY RESIDENTIAL FLOW							COMMERCIAL FLOW			MULTI-FAMILY RESIDENTIAL FLOW							SCHOOL FLOW				
Sewer Basin	Historic or Snoq. Ridge	Planning Area	Loading Manhole	City ID	# of Units	ERUs	Base Flow	Peak Base Flow	Acres	I/I flow	Total Peak Hour Flow	# of Parcels	Acres	Flow	# of Units	ERUs	Base Flow	Peak Base Flow	Acres	I/I flow	Total Peak Hour Flow	School Name	# of Students	# of Parcels	Acres	Flow
1	Snoq. Ridge	SRI	PS F		84	84	8.05	19.16	25	27.64	46.80	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
2	Snoq. Ridge	SRI	PS E		232	232	22.23	52.92	42	45.86	98.78	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
2A	Snoq. Ridge	SRI	PS E		32	32	3.07	7.30	6	6.13	13.43	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
3	Snoq. Ridge	SRI	48		58	58	5.56	13.23	17	18.32	31.54	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
4	Snoq. Ridge	SRI	129		74	74	7.09	16.88	14	15.31	32.19	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
5	Snoq. Ridge	SRI	48		70	70	6.71	15.97	12	13.34	29.31	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
6	Snoq. Ridge	SRI	128	MH 10	93	93	8.91	21.21	11	11.66	32.87	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
7	Snoq. Ridge	SRI	128	MH 10	128	128	12.27	29.19	16	18.03	47.23	0	0	0.00	50	50	4.79	11.40	8.17	8.93	20.34			0	0	0.00
8	Snoq. Ridge	SRI	128	MH 10	74	74	7.09	16.88	10	10.44	27.32	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
9	Snoq. Ridge	SRI	154	MH 1	26	26	2.49	5.93	3	3.41	9.34	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
10	Snoq. Ridge	SF	81	MH 32	30	30	2.88	6.84	4	4.11	10.95	3	1.6	2.27	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
11	Snoq. Ridge	SF	82	MH 31	0	0	0.00	0.00	0	0.00	0.00	1	15.44	21.95	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
12	Snoq. Ridge	SRI	39	MH 9-10	87	87	8.34	19.84	11	11.73	31.58	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
13	Snoq. Ridge	SRI	3	MH 7	0	0	0.00	0.00	0	0.00	0.00	1	7.48	10.63	48	48	4.60	10.95	3.55	3.88	14.83			0	0	0.00
14	Snoq. Ridge	SRI	233	MH 37	0	0	0.00	0.00	0	0.00	0.00	0	0	0.00	119	119	11.40	27.14	9.01	9.85	36.99			0	0	0.00
15	Snoq. Ridge	SRI	203	MH 24	22	22	2.11	5.02	2	2.70	7.72	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
16	Snoq. Ridge	SRI	276	MH 9	63	63	6.04	14.37	8	8.56	22.93	1	0.01	0.01	62	62	5.94	14.14	5.11	5.59	19.73			0	0	0.00
17	Snoq. Ridge	SRI	185	MH 2	21	21	2.01	4.79	2	2.07	6.86	1	1.54	2.19	0	0	0.00	0.00	0.00	0.00	0.00	Cascade View Elementary	717	1	9.99	26.63
18	Snoq. Ridge	SRI	201	MH 23	41	41	3.93	9.35	4	4.07	13.42	7	126	179.13	101	101	9.68	23.04	6.32	6.91	29.95			0	0	0.00
19	Snoq. Ridge	SRI	69	MH 11	64	64	6.13	14.60	9	10.27	24.87	0	0	0.00	38	38	3.64	8.67	2.76	3.02	11.69			0	0	0.00
20	Snoq. Ridge	SRII	198	MH 21A	233	233	22.33	53.14	36	39.02	92.16	3	3.86	5.49	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
21	Snoq. Ridge	SRII	198	MH 21A	213	213	20.41	48.58	21	22.73	71.32	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
22	Snoq. Ridge	SHE	16		0	0	0.00	0.00	0	0.00	0.00	1	70.59	203.54	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
23	Snoq. Ridge	SRI	71	MH 2	0	0	0.00	0.00	0	0.00	0.00	3	1.79	2.54	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
24	Snoq. Ridge	SRI	123	MH 3	0	0	0.00	0.00	0	0.00	0.00	2	6.78	9.64	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
25	Snoq. Ridge	SRI	52		0	0	0.00	0.00	0	0.00	0.00	7	36.76	52.26	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
26	Snoq. Ridge	SRI	53	MH 5	0	0	0.00	0.00	0	0.00	0.00	4	14.96	162.28	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
27	Snoq. Ridge	SRI	58	MH 16	0	0	0.00	0.00	0	0.00	0.00	2	6.63	9.43	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
28	Snoq. Ridge	SRI	198	MH 21A	0	0	0.00	0.00	0	0.00	0.00	4	10.87	15.45	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
29	Snoq. Ridge	SRI	69	MH 11	225	225	21.56	51.32	27	29.09	80.41	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
30	Snoq. Ridge	SRI	147	MH 1	138	138	13.23	31.48	19	20.96	52.44	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
31	Snoq. Ridge	SRI	18		179	179	17.15	40.83	27	29.38	70.21	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
32	Snoq. Ridge	SRII	147	MH 1	301	301	28.85	68.65	47	51.20	119.85	0	0	0.00	50	38	3.59	8.55	2.05	2.24	10.79			0	0	0.00
33	Snoq. Ridge	SRI	141		34	34	3.26	7.75	8	8.72	16.47	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
34	Snoq. Ridge	SRI	42		141	141	13.51	32.16	24	26.17	58.33	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
35	Snoq. Ridge	SRI	39	MH 9-10	46	46	4.41	10.49	6	6.86	17.35	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
36	Snoq. Ridge	SRI	43	MH 2	29	29	2.78	6.61	5	5.53	12.15	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
37	Snoq. Ridge	SRI	47		21	21	2.01	4.79	4	4.61	9.40	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
38	Snoq. Ridge	SRI	47		12	12	1.15	2.74	2	2.69	5.43	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
39	Historic	SF	73		0	0	0.00	0.00	0	0.00	0.00	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
40	Historic	HS	1	7-E	19	19	1.82	4.33	9	56.36	60.69	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
41	Historic	HS	97	7-K	17	17	1.63	3.88	3	16.48	20.36	19	2.94	22.41	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
42	Historic	HS	245	MH 5	96	96	9.20	21.90	29	185.95	207.85	3	6.21	47.33	38	29	2.73	6.50	3.07	20.00	26.50	Snoqualmie SD Bus Yard		0	0	0.00
43	Historic	HS	140	DMH 7	33	33	3.16	7.53	12	78.38	85.91	33	5.56	42.37	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
44	Historic	HS	277	MH 9	20	20	1.92	4.56	2	12.51	17.07	4	1.2	9.15	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
45	Historic	HS	139	DMH 6 RR	75	75	7.19	17.11	16	102.69	119.79	7	1.14	8.69	40	30	2.88	6.84	5.51	35.90	42.74			0	0	0.00
46	Historic	HS	30	16H	12	12	1.15	2.74	5	31.14	33.88	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
47	Historic	HS	24	13H	11	11	1.05	2.51	21	136.57	139.08	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
48	Historic	HS	110		17	17	1.63	3.88	14	93.04	96.92	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
49	Historic	HS	193	MH 2	24	24	2.30	5.47	5	33.82	39.29	28	4.23	32.24	2	2	0.14	0.34	0.16	1.04	1.38			0	0	0.00
50	Historic	HS	139	DMH 6 RR	0	0	0.00	0.00	0	0.00	0.00	6	1.21	9.22	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
51	Historic	HS	135	DMH 3	21	21	2.01	4.79	4	28.15	32.94	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
52	Historic	HS	137	DMH 5	21	21	2.01	4.79	4	24.11	28.90	7	1.42	10.82	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
53	Historic	HS	260	MH 5	31	31	2.97	7.07	10	64.11	71.18	5	0.98	7.47	6	5	0.43	1.03	0.34	2.22	3.24	Mt. Si High School	1378	1	26.74	89.49
54	Historic	HS	266	MH 7	31	31	2.97	7.07	3	18.18	25.25	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00			0	0	0.00
55	Historic	HS	PS4		61	61	5.85	13.91	11	73.10	87.02	17	2	15.24	35	26	2.52	5.99	0.93	6.06	12.05	Mt. Si High, Snoq. Elem.	886	5	15.38	54.58
56	Historic	HS	260	MH 6-5	0	0	0.00	0.00	0	0.00	0.00	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	Snoq. Middle School	416.00	1	44.55	86.43
					3260	3260	312.417	743.5516667	567.74	1415.21	2158.758919		331.2	881.76		546.25	52.349	124.5905208	46.98	105.65	230.24				96.66	257.141
					SR	2771	265.554	SR	421.23	460.61		SR	233.72	SR	468.00	455.5		SR	36.97	40.43				Total Peak Hour Flow	
					Historic	489		Historic	146.51	954.60		Historic	97.48	Historic	121.00	90.75		Historic	10.01	65.22				Total Acreage	

Total Flow
46.80
98.78
13.43
31.54
32.19
29.31
32.87
67.56
27.32
9.34
13.23
21.95
31.58
25.46
36.99
7.72
42.67
35.68
222.50
36.55
97.65
71.32
203.54
2.54
9.64
52.26
162.28
9.43
15.45
80.41
52.44
70.21
130.64
16.47
58.33
17.35
12.15
9.40
5.43
0.00
60.69
42.77
281.68
128.28
26.22
171.22
33.88
139.08
96.92
72.91
9.22
32.94
39.72
171.39
25.25
168.89
86.43
3527.89
5.08
957.03

2018 BASIN FLOW CALCULATIONS

EQUATION

Flow per ERU			0.096	gpm	Res. Peaking Factor	2.38	School Flow per Student	0.033	gpm
SR I/I flow per Acre	1574.616448	gpad	1.093	gpam	SR Commercial Flow per Acre	1.42	Elem. Sch. Flow per St.	0.021	gpm
Hist. Sno. I/I	6500	gpad	4.514	gpam	Historic Comm. Flow per Acre	5.62			

					2018 SINGLE FAMILY RESIDENTIAL FLOW							MULTI-FAMILY RESIDENTIAL FLOW							2018 COMMERCIAL FLOW		SCHOOL FLOW					Total Flow
Sewer Basin	Historic or Snoq. Ridge	Planning Area	Loading Manhole	City ID	2018 Acres	2018 ERUs	Base Flow	Peak Base Flow	Acres	I/I flow	Total Peak Hour Flow	# of Units	ERUs	Base Flow	Peak Base Flow	Acres	I/I flow	Total Peak Hour Flow	2018 Acres	Flow	School Name	# of Students	# of Parcels	Acres	Flow	
1	Snoq. Ridge	SRI	PS F		25	84	8.05	19.16	25.28	27.64	46.80	0	0	0	0	0	0	0	1	2.07			0	0	0.00	48.87
2	Snoq. Ridge	SRI	PS E	MH 1	42	232	22.23	52.92	41.94	45.86	98.78	0	0	0	0	0	0	0	5	6.86			0	0	0.00	105.63
2A	Snoq. Ridge	SRI	PS E	MH1	6	32	3.07	7.30	5.61	6.13	13.43	0	0	0	0	0	0	0	0	0.37			0	0	0.00	13.80
3	Snoq. Ridge	SRI	48		17	58	5.56	13.23	16.75	18.32	31.54	0	0	0	0	0	0	0	1	1.50			0	0	0.00	33.05
4	Snoq. Ridge	SRI	129		14	74	7.09	16.88	14.00	15.31	32.19	0	0	0	0	0	0	0	1	1.19			0	0	0.00	33.38
5	Snoq. Ridge	SRI	48		12	70	6.71	15.97	12.20	13.34	29.31	0	0	0	0	0	0	0	1	0.97			0	0	0.00	30.28
6	Snoq. Ridge	SRI	128	MH 10	11	93	8.91	21.21	10.66	11.66	32.87	0	0	0	0	0	0	0	1	0.94			0	0	0.00	33.81
7	Snoq. Ridge	SRI	128	MH 10	33	158	15.14	36.04	33.16	36.26	72.30	50	50	5	11	8	9	20	1	0.95			0	0	0.00	93.59
8	Snoq. Ridge	SRI	128	MH 10	10	74	7.09	16.88	9.55	10.44	27.32	0	0	0	0	0	0	0	1	0.89			0	0	0.00	28.21
9	Snoq. Ridge	SRI	154	MH 1	3	26	2.49	5.93	3.12	3.41	9.34	0	0	0	0	0	0	0	0	0.29			0	0	0.00	9.63
10	Snoq. Ridge	SF	81	MH 32	5	36	3.40	8.10	5.13	5.61	13.71	0	0	0	0	0	0	0	2	2.61			0	0	0.00	16.32
11	Snoq. Ridge	SF	82	MH 31	3	12	1.11	2.65	2.90	3.17	5.82	0	0	0	0	0	0	0	16	22.65			0	0	0.00	28.47
12	Snoq. Ridge	SRI	39	MH 9-10	11	87	8.34	19.84	10.73	11.73	31.58	0	0	0	0	0	0	0	2	2.74			0	0	0.00	34.32
13	Snoq. Ridge	SRI	3	MH 7	4	0	0.00	0.00	3.55	3.88	3.88	48	48	5	11	4	4	15	8	11.48			0	0	0.00	30.20
14	Snoq. Ridge	SRI	233	MH 37	9	0	0.00	0.00	9.01	9.85	9.85	119	119	11	27	9	10	37	1	0.72			0	0	0.00	47.57
15	Snoq. Ridge	SRI	203	MH 24	2	22	2.11	5.02	2.47	2.70	7.72	0	0	0	0	0	0	0	0	0.32			0	0	0.00	8.04
16	Snoq. Ridge	SRI	276	MH 9	13	63	6.04	14.37	12.94	14.15	28.52	62	62	6	14	5	6	20	1	1.26			0	0	0.00	49.51
17	Snoq. Ridge	SRI	185	MH 2	2	21	2.01	4.79	1.89	2.07	6.86	0	0	0	0	0	0	0	2	3.19	Cascade View Elementary	717.00	1	9.99	26.63	36.68
18	Snoq. Ridge	SRI	201	MH 23	10	41	3.93	9.35	10.04	10.98	20.33	101	101	10	23	6	7	30	127	180.56			0	0	0.00	230.84
19	Snoq. Ridge	SRI	69	MH 11	12	64	6.13	14.60	12.15	13.29	27.88	38	38	4	9	3	3	12	1	1.50			0	0	0.00	41.07
20	Snoq. Ridge	SRII	198		110	656	62.88	149.64	110.11	120.40	270.05	0	0	0	0	0	0	0	20	28.26			0	0	0.00	298.31
21	Snoq. Ridge	SRII	198		88	596	57.08	135.86	88.10	96.34	232.19	0	0	0	0	0	0	0	14	20.60			0	0	0.00	252.79
22	Snoq. Ridge	SHE	16		8	23	2.20	5.25	7.60	8.31	13.55	0	0	0	0	0	0	0	71	204.46			0	0	0.00	218.02
23	Snoq. Ridge	SRI	71	MH 2	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	2	2.80			0	0	0.00	2.80
24	Snoq. Ridge	SRI	123	MH 3	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	7	10.15			0	0	0.00	10.15
25	Snoq. Ridge	SRI	52		0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	39	54.81			0	0	0.00	54.81
26	Snoq. Ridge	SRI	53	MH 5	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	16	163.26			0	0	0.00	163.26
27	Snoq. Ridge	SRI	58	MH 16	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	7	9.93			0	0	0.00	9.93
28	Snoq. Ridge	SRI	198	MH 21A	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	11	16.26			0	0	0.00	16.26
29	Snoq. Ridge	SRI	69	MH 11	27	225	21.56	51.32	26.60	29.09	80.41	0	0	0	0	0	0	0	2	3.07			0	0	0.00	83.48
30	Snoq. Ridge	SRI	147	MH 1	19	138	13.23	31.48	19.17	20.96	52.44	0	0	0	0	0	0	0	1	1.73			0	0	0.00	54.17
31	Snoq. Ridge	SRI	18		27	179	17.15	40.83	26.87	29.38	70.21	0	0	0	0	0	0	0	2	2.29			0	0	0.00	72.50
32	Snoq. Ridge	SRII	147	MH 1	85	504	48.33	115.01	84.63	92.54	207.55	50	38	4	9	2	2	11	8	10.94			0	0	0.00	229.29
33	Snoq. Ridge	SRI	141		8	34	3.26	7.75	7.97	8.72	16.47	0	0	0	0	0	0	0	1	0.71			0	0	0.00	17.18
34	Snoq. Ridge	SRI	42		24	141	13.51	32.16	23.93	26.17	58.33	0	0	0	0	0	0	0	2	2.25			0	0	0.00	60.58
35	Snoq. Ridge	SRI	39	MH 9-10	6	46	4.41	10.49	6.27	6.86	17.35	0	0	0	0	0	0	0	1	0.77			0	0	0.00	18.11
36	Snoq. Ridge	SRI	43	MH 2	5	29	2.78	6.61	5.06	5.53	12.15	0	0	0	0	0	0	0	0	0.53			0	0	0.00	12.68
37	Snoq. Ridge	SRI	47		4	21	2.01	4.79	4.22	4.61	9.40	0	0	0	0	0	0	0	0	0.34			0	0	0.00	9.75
38	Snoq. Ridge	SRI	47		2	12	1.15	2.74	2.46	2.69	5.43	0	0	0	0	0	0	0	0	0.21			0	0	0.00	5.64
39	Historic	SF	73		1	2	0.22	0.53	0.58	2.62	3.15	0	0	0	0	0	0	0	0	0.55			0	0	0.00	3.71
40	Historic	HS	1	7-E	9	19	1.83	4.37	8.68	39.20	43.57	0	0	0	0	0	0	0	0	0.05			0	0	0.00	43.62
41	Historic	HS	97	7-K	3	17	1.64	3.91	2.56	11.56	15.47	0	0	0	0	0	0	0	3	16.56			0	0	0.00	32.03
42	Historic	HS	245	MH 5	30	97	9.26	22.05	29.61	133.66	155.71	38	29	3	7	3	20	27	6	35.13	Snoqualmie SD Bus Yard		0	0	0.00	217.35
43	Historic	HS	140	DMH 7	12	34	3.21	7.64	12.16	54.88	62.52	0	0	0	0	0	0	0	6	31.42			0	0	0.00	93.94
44	Historic	HS	277	MH 9	2	20	1.92	4.57	1.93	8.73	13.30	0	0	0	0	0	0	0	1	6.76			0	0	0.00	20.06
45	Historic	HS	139	DMH 6 RR	17	75	7.23	17.20	17.48	78.92	96.12	40	30	3	7	6	36	43	1	6.55			0	0	0.00	145.41
46	Historic	HS	30	16H	5	12	1.16	2.75	4.80	21.65	24.41	0	0	0	0	0	0	0	0	0.02			0	0	0.00	24.43
47	Historic	HS	24	13H	21	11	1.08	2.58	21.04	94.96	97.54	0	0	0	0	0	0	0	0	0.11			0	0	0.00	97.65
48	Historic	HS	110		14	17	1.66	3.94	14.35	64.79	68.73	0	0	0	0	0	0	0	0	0.10			0	0	0.00	68.83
49	Historic	HS	193	MH 2	5	24	2.34	5.56	5.34	24.09	29.65	2	2	0	0	0	1	1	4	23.91			0	0	0.00	54.95
50	Historic	HS	139	DMH 6 RR	0	0	0.00	0.01	0.01	0.03	0.03	0	0	0	0	0	0	0	1	6.81			0	0	0.00	6.84
51	Historic	HS	135	DMH 3	4	21	2.02	4.81	4.34	19.59	24.40	0	0	0	0	0	0	0	0	0.03			0	0	0.00	24.43
52	Historic	HS	137	DMH 5	4	21	2.02	4.82	3.73	16.85	21.67	0	0	0	0	0	0	0	1	8.02			0	0	0.00	29.69
53	Historic	HS	260	MH 6-5	10	32	3.03	7.21	10.09	45.56	52.77	6	5	0	1	0	2	3	1	5.72	Mt. Si High School	1378.03	1	26.74	76.11	137.84
54	Historic	HS	266	MH 7	3	31	2.98	7.09	2.81	12.67	19.75	0	0	0	0	0	0	0	0	0.02			0	0	0.00	19.77
55	Historic	HS	PS4		12	62	5.92	14.10	11.70	52.80	66.90	35	26	3	6	1	6	12	2	11.53	Mt. Si High, Snoq. Elem.	885.97	5	15.38	46.89	137.36
0.058824	Historic	HS	260	MH 6-5	2	0	0.03	0.07	2.06	9.29	9.36	0	0	0	0	0	0	0	1	3.60	Snoq. Middle School	416.00	1	44.55	64.14	77.10
	Snoq. Ridge	SHW	57	MH 7	24	116	11.12	26.46	24.06	26.31	52.77	0	0	0	0	0	0	0		0					0.00	52.77
	Historic	SF	213	MH 3	17	69	6.57	15.63	17.08	18.67	34.30	0	0	0	0	0	0	0		0					0.00	34.30
						4531.0	434.2	1033.4	850.5	1454.2	2487.7		546.25	52.34895833	124.59052	46.98	105.65	230.24	402.31	933.36					96.66	213.77	3865.04
								SR	656.07	717.40	3.582249949	468.00	455.5		SR	36.97	40.43		374.39	SR					Total Peak Hour Flow		5.57
								Historic	153.27	691.85	2487.67	121.00	90.75		Historic	10.01	65.22		27.92	Historic					Total Acreage		1349.44

2032 BASIN FLOW CALCULATIONS

EQUATION

Flow per ERU			0.096	gpm	Res. Peaking Factor	2.38	School Flow per Student	0.033	gpm
SR I/I flow per Acre	1574.616448	gpad	1.093	gpam	SR Commercial Flow per Acre	1.42	Elem. Sch. Flow per St.	0.021	gpm
Hist. Sno. I/I	4500	gpad	3.125	gpam	Historic Comm. Flow per Acre	4.23			

					2032 SINGLE FAMILY RESIDENTIAL FLOW							MULTI-FAMILY RESIDENTIAL FLOW							2032 COMMERCIAL FLOW		SCHOOL FLOW					Total Flow
Sewer Basin	Historic or Snoq. Ridge	Planning Area	Loading Manhole	City ID	2032 Acres	2032 ERUs	Base Flow	Peak Base Flow	Acres	I/I flow	Total Peak Hour Flow	# of Units	ERUs	Base Flow	Peak Base Flow	Acres	I/I flow	Total Peak Hour Flow	2032 Acres	Flow	School Name	# of Students	# of Parcels	Acres	Flow	
1	Snoq. Ridge	SRI	PS F		25	84	8.05	19.16	25.28	27.64	46.80	0	0	0	0	0	0	0	1	2.07			0	0	0.00	48.87
2	Snoq. Ridge	SRI	PS E	MH 1	42	232	22.23	52.92	41.94	45.86	98.78	0	0	0	0	0	0	0	5	6.86			0	0	0.00	105.63
2A	Snoq. Ridge	SRI	PS E	MH 1	6	32	3.07	7.30	5.61	6.13	13.43	0	0	0	0	0	0	0	0	0.37			0	0	0.00	13.80
3	Snoq. Ridge	SRI	48		17	58	5.56	13.23	16.75	18.32	31.54	0	0	0	0	0	0	0	1	1.50			0	0	0.00	33.05
4	Snoq. Ridge	SRI	129		14	74	7.09	16.88	14.00	15.31	32.19	0	0	0	0	0	0	0	1	1.19			0	0	0.00	33.38
5	Snoq. Ridge	SRI	48		12	70	6.71	15.97	12.20	13.34	29.31	0	0	0	0	0	0	0	1	0.97			0	0	0.00	30.28
6	Snoq. Ridge	SRI	128	MH 10	11	93	8.91	21.21	10.66	11.66	32.87	0	0	0	0	0	0	0	1	0.94			0	0	0.00	33.81
7	Snoq. Ridge	SRI	128	MH 10	33	158	15.14	36.04	33.16	36.26	72.30	50	50	5	11	8	9	20	1	0.95			0	0	0.00	93.59
8	Snoq. Ridge	SRI	128	MH 10	10	74	7.09	16.88	9.55	10.44	27.32	0	0	0	0	0	0	0	1	0.89			0	0	0.00	28.21
9	Snoq. Ridge	SRI	154	MH 1	3	26	2.49	5.93	3.12	3.41	9.34	0	0	0	0	0	0	0	0	0.29			0	0	0.00	9.63
10	Snoq. Ridge	SF	81	MH 32	8	46	4.43	10.54	7.80	8.53	19.08	0	0	0	0	0	0	0	2	3.25			0	0	0.00	22.33
11	Snoq. Ridge	SF	82	MH 31	9	34	3.28	7.81	8.53	9.33	17.13	0	0	0	0	0	0	0	17	24.01			0	0	0.00	41.14
12	Snoq. Ridge	SRI	39	MH 9-10	11	87	8.34	19.84	10.73	11.73	31.58	0	0	0	0	0	0	0	2	2.74			0	0	0.00	34.32
13	Snoq. Ridge	SRI	3	MH 7	4	0	0.00	0.00	3.55	3.88	3.88	48	48	5	11	4	4	15	8	11.48			0	0	0.00	30.20
14	Snoq. Ridge	SRI	233	MH 37	9	0	0.00	0.00	9.01	9.85	9.85	119	119	11	27	9	10	37	1	0.72			0	0	0.00	47.57
15	Snoq. Ridge	SRI	203	MH 24	2	22	2.11	5.02	2.47	2.70	7.72	0	0	0	0	0	0	0	0	0.32			0	0	0.00	8.04
16	Snoq. Ridge	SRI	276	MH 9	13	63	6.04	14.37	12.94	14.15	28.52	62	62	6	14	5	6	20	1	1.26			0	0	0.00	49.51
17	Snoq. Ridge	SRI	185	MH 2	2	21	2.01	4.79	1.89	2.07	6.86	0	0	0	0	0	0	0	2	3.19	Cascade View Elementary	717.00	1	9.99	26.63	36.68
18	Snoq. Ridge	SRI	201	MH 23	10	41	3.93	9.35	10.04	10.98	20.33	101	101	10	23	6	7	30	127	180.56			0	0	0.00	230.84
19	Snoq. Ridge	SRI	69	MH 11	12	64	6.13	14.60	12.15	13.29	27.88	38	38	4	9	3	3	12	1	1.50			0	0	0.00	41.07
20	Snoq. Ridge	SRII	198		110	656	62.88	149.64	110.11	120.40	270.05	0	0	0	0	0	0	0	20	28.26			0	0	0.00	298.31
21	Snoq. Ridge	SRII	198		88	596	57.08	135.86	88.10	96.34	232.19	0	0	0	0	0	0	0	14	20.60			0	0	0.00	252.79
22	Snoq. Ridge	SHE	16		26	79	7.57	18.02	26.10	28.54	46.56	0	0	0	0	0	0	0	73	206.72			0	0	0.00	253.27
23	Snoq. Ridge	SRI	71	MH 2	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	2	2.80			0	0	0.00	2.80
24	Snoq. Ridge	SRI	123	MH 3	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	7	10.15			0	0	0.00	10.15
25	Snoq. Ridge	SRI	52		0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	39	54.81			0	0	0.00	54.81
26	Snoq. Ridge	SRI	53	MH 5	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	16	163.26			0	0	0.00	163.26
27	Snoq. Ridge	SRI	58	MH 7	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	7	9.93			0	0	0.00	9.93
28	Snoq. Ridge	SRI	198	MH 21A	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	11	16.26			0	0	0.00	16.26
29	Snoq. Ridge	SRI	69	MH 11	27	225	21.56	51.32	26.60	29.09	80.41	0	0	0	0	0	0	0	2	3.07			0	0	0.00	83.48
30	Snoq. Ridge	SRI	147	MH 1	19	138	13.23	31.48	19.17	20.96	52.44	0	0	0	0	0	0	0	1	1.73			0	0	0.00	54.17
31	Snoq. Ridge	SRI	18		27	179	17.15	40.83	26.87	29.38	70.21	0	0	0	0	0	0	0	2	2.29			0	0	0.00	72.50
32	Snoq. Ridge	SRII	147	MH 1	85	504	48.33	115.01	84.63	92.54	207.55	50	38	4	9	2	2	11	8	10.94			0	0	0.00	229.29
33	Snoq. Ridge	SRI	141		8	34	3.26	7.75	7.97	8.72	16.47	0	0	0	0	0	0	0	1	0.71			0	0	0.00	17.18
34	Snoq. Ridge	SRI	42		24	141	13.51	32.16	23.93	26.17	58.33	0	0	0	0	0	0	0	2	2.25			0	0	0.00	60.58
35	Snoq. Ridge	SRI	39	MH 9-10	6	46	4.41	10.49	6.27	6.86	17.35	0	0	0	0	0	0	0	1	0.77			0	0	0.00	18.11
36	Snoq. Ridge	SRI	43	MH 2	5	29	2.78	6.61	5.06	5.53	12.15	0	0	0	0	0	0	0	0	0.53			0	0	0.00	12.68
37	Snoq. Ridge	SRI	47		4	21	2.01	4.79	4.22	4.61	9.40	0	0	0	0	0	0	0	0	0.34			0	0	0.00	9.75
38	Snoq. Ridge	SRI	47		2	12	1.15	2.74	2.46	2.69	5.43	0	0	0	0	0	0	0	0	0.21			0	0	0.00	5.64
39	Historic	SF	73		2	7	0.66	1.57	1.71	5.34	6.91	0	0	0	0	0	0	0	0	1.23			0	0	0.00	8.14
40	Historic	HS	1	7-E	9	19	1.86	4.44	8.76	27.38	31.82	0	0	0	0	0	0	0	0	0.12			0	0	0.00	31.93
41	Historic	HS	97	7-K	3	17	1.67	3.97	2.63	8.22	12.19	0	0	0	0	0	0	0	3	12.54			0	0	0.00	24.73
42	Historic	HS	245	MH 5	32	98	9.41	22.39	31.97	99.90	122.29	38	29	3	7	3	20	27	6	26.84	Snoqualmie SD Bus Yard		0	0	0.00	175.63
43	Historic	HS	140	DMH 7	12	35	3.32	7.90	12.44	38.86	46.76	0	0	0	0	0	0	0	6	23.95			0	0	0.00	70.71
44	Historic	HS	277	MH 9	2	20	1.93	4.60	1.96	6.13	10.73	0	0	0	0	0	0	0	1	5.12			0	0	0.00	15.85
45	Historic	HS	139	DMH 6 RR	21	76	7.31	17.41	21.27	66.48	83.89	40	30	3	7	6	36	43	1	5.17			0	0	0.00	131.80
46	Historic	HS	30	16H	5	12	1.17	2.79	4.84	15.11	17.90	0	0	0	0	0	0	0	0	0.06			0	0	0.00	17.96
47	Historic	HS	24	13H	21	12	1.15	2.74	21.21	66.28	69.02	0	0	0	0	0	0	0	0	0.26			0	0	0.00	69.28
48	Historic	HS	110		15	18	1.72	4.09	14.51	45.35	49.44	0	0	0	0	0	0	0	0	0.25			0	0	0.00	49.69
49	Historic	HS	193	MH 2	6	25	2.42	5.77	5.66	17.69	23.45	2	2	0	0	0	1	1	4	18.23			0	0	0.00	43.07
50	Historic	HS	139	DMH 6 RR	0	0	0.01	0.02	0.02	0.06	0.07	0	0	0	0	0	0	0	1	5.14			0	0	0.00	5.21
51	Historic	HS	135	DMH 3	4	21	2.04	4.85	4.39	13.71	18.56	0	0	0	0	0	0	0	0	0.07			0	0	0.00	18.63
52	Historic	HS	137	DMH 5	4	21	2.05	4.88	3.80	11.89	16.77	0	0	0	0	0	0	0	1	6.12			0	0	0.00	22.89
53	Historic	HS	260	MH 6-5	11	33	3.16	7.52	10.65	33.28	40.79	6	5	0	1	0	2	3	1	4.66	Mt. Si High School	1378.03	1	26.74	66.83	115.52
54	Historic	HS	266	MH 7	3	31	2.99	7.12	2.84	8.88	16.00	0	0	0	0	0	0	0	0	0.05			0	0	0.00	16.05
0.058824	Historic	HS	PS4		13	64	6.10	14.51	12.75	39.84	54.35	35	26	3	6	1	6	12	2	9.15	Mt. Si High, Snoq. Elem.	885.97	5	15.38	41.55	117.09
56	Historic	HS	260	MH 6-5	7	1	0.09	0.21	6.59	20.59	20.80	0	0	0	0	0	0	0	2	8.66	Snoq. Middle School	416.00	1	44.55	48.67	78.14
57	Snoq. Ridge	SHW	57	MH 7	76	368	35.27	83.93	76.33	83.46	167.40	0	0	0	0	0	0	0		0					0.00	167.40
58	Historic	SF	213	MH 3	50	202	19.33	46.00	50.26	157.06	203.06	0	0	0	0	0	0	0		0					0.00	203.06
						5021	481.179	1145.2064	850.86	1512.21	2657.412053		546.25	52.34895833	124.59052	46.98	105.65	230.24	407.55	908.34				96.66		3979.67
								SR	682.87	746.71	3.826673356	468.00	455.5		SR	36.97	40.43		377.38	SR				Total Peak Hour Flow		5.73

2032 BASIN FLOW CALCULATIONS

EQUATION

Flow per ERU			0.096	gpm	Res. Peaking Factor	2.38	School Flow per Student	0.033	gpm
SR I/I flow per Acre	1574.616448	gpad	1.093	gpam	SR Commercial Flow per Acre	1.42	Elem. Sch. Flow per St.	0.021	gpm
Hist. Sno. I/I	9382.450052	gpad	6.516	gpam	Historic Comm. Flow per Acre	7.62			

					2032 SINGLE FAMILY RESIDENTIAL FLOW							MULTI-FAMILY RESIDENTIAL FLOW							2032 COMMERCIAL FLOW		SCHOOL FLOW					Total Flow
Sewer Basin	Historic or Snoq. Ridge	Planning Area	Loading Manhole	City ID	2032 Acres	2032 ERUs	Base Flow	Peak Base Flow	Acres	I/I flow	Total Peak Hour Flow	# of Units	ERUs	Base Flow	Peak Base Flow	Acres	I/I flow	Total Peak Hour Flow	2032 Acres	Flow	School Name	# of Students	# of Parcels	Acres	Flow	
1	Snoq. Ridge	SRI	PS F		25	84	8.05	19.16	25.28	27.64	46.80	0	0	0	0	0	0	0	1	2.07			0	0	0.00	48.87
2	Snoq. Ridge	SRI	PS E	MH 1	42	232	22.23	52.92	41.94	45.86	98.78	0	0	0	0	0	0	0	5	6.86			0	0	0.00	105.63
2A	Snoq. Ridge	SRI	PS E	MH 1	6	32	3.07	7.30	5.61	6.13	13.43	0	0	0	0	0	0	0	0	0.37			0	0	0.00	13.80
3	Snoq. Ridge	SRI	48		17	58	5.56	13.23	16.75	18.32	31.54	0	0	0	0	0	0	0	1	1.50			0	0	0.00	33.05
4	Snoq. Ridge	SRI	129		14	74	7.09	16.88	14.00	15.31	32.19	0	0	0	0	0	0	0	1	1.19			0	0	0.00	33.38
5	Snoq. Ridge	SRI	48		12	70	6.71	15.97	12.20	13.34	29.31	0	0	0	0	0	0	0	1	0.97			0	0	0.00	30.28
6	Snoq. Ridge	SRI	128	MH 10	11	93	8.91	21.21	10.66	11.66	32.87	0	0	0	0	0	0	0	1	0.94			0	0	0.00	33.81
7	Snoq. Ridge	SRI	128	MH 10	33	158	15.14	36.04	33.16	36.26	72.30	50	50	5	11	8	9	20	1	0.95			0	0	0.00	93.59
8	Snoq. Ridge	SRI	128	MH 10	10	74	7.09	16.88	9.55	10.44	27.32	0	0	0	0	0	0	0	1	0.89			0	0	0.00	28.21
9	Snoq. Ridge	SRI	154	MH 1	3	26	2.49	5.93	3.12	3.41	9.34	0	0	0	0	0	0	0	0	0.29			0	0	0.00	9.63
10	Snoq. Ridge	SF	81	MH 32	8	46	4.43	10.54	7.80	8.53	19.08	0	0	0	0	0	0	0	2	3.25			0	0	0.00	22.33
11	Snoq. Ridge	SF	82	MH 31	9	34	3.28	7.81	8.53	9.33	17.13	0	0	0	0	0	0	0	17	24.01			0	0	0.00	41.14
12	Snoq. Ridge	SRI	39	MH 9-10	11	87	8.34	19.84	10.73	11.73	31.58	0	0	0	0	0	0	0	2	2.74			0	0	0.00	34.32
13	Snoq. Ridge	SRI	3	MH 7	4	0	0.00	0.00	3.55	3.88	3.88	48	48	5	11	4	4	15	8	11.48			0	0	0.00	30.20
14	Snoq. Ridge	SRI	233	MH 37	9	0	0.00	0.00	9.01	9.85	9.85	119	119	11	27	9	10	37	1	0.72			0	0	0.00	47.57
15	Snoq. Ridge	SRI	203	MH 24	2	22	2.11	5.02	2.47	2.70	7.72	0	0	0	0	0	0	0	0	0.32			0	0	0.00	8.04
16	Snoq. Ridge	SRI	276	MH 9	13	63	6.04	14.37	12.94	14.15	28.52	62	62	6	14	5	6	20	1	1.26			0	0	0.00	49.51
17	Snoq. Ridge	SRI	185	MH 2	2	21	2.01	4.79	1.89	2.07	6.86	0	0	0	0	0	0	0	2	3.19	Cascade View Elementary	717.00	1	9.99	26.63	36.68
18	Snoq. Ridge	SRI	201	MH 23	10	41	3.93	9.35	10.04	10.98	20.33	101	101	10	23	6	7	30	127	180.56			0	0	0.00	230.84
19	Snoq. Ridge	SRI	69	MH 11	12	64	6.13	14.60	12.15	13.29	27.88	38	38	4	9	3	3	12	1	1.50			0	0	0.00	41.07
20	Snoq. Ridge	SRII	198		110	656	62.88	149.64	110.11	120.40	270.05	0	0	0	0	0	0	0	20	28.26			0	0	0.00	298.31
21	Snoq. Ridge	SRII	198		88	596	57.08	135.86	88.10	96.34	232.19	0	0	0	0	0	0	0	14	20.60			0	0	0.00	252.79
22	Snoq. Ridge	SHE	16		26	79	7.57	18.02	26.10	28.54	46.56	0	0	0	0	0	0	0	73	206.72			0	0	0.00	253.27
23	Snoq. Ridge	SRI	71	MH 2	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	2	2.80			0	0	0.00	2.80
24	Snoq. Ridge	SRI	123	MH 3	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	7	10.15			0	0	0.00	10.15
25	Snoq. Ridge	SRI	52		0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	39	54.81			0	0	0.00	54.81
26	Snoq. Ridge	SRI	53	MH 5	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	16	163.26			0	0	0.00	163.26
27	Snoq. Ridge	SRI	58	MH 7	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	7	9.93			0	0	0.00	9.93
28	Snoq. Ridge	SRI	198	MH 21A	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	11	16.26			0	0	0.00	16.26
29	Snoq. Ridge	SRI	69	MH 11	27	225	21.56	51.32	26.60	29.09	80.41	0	0	0	0	0	0	0	2	3.07			0	0	0.00	83.48
30	Snoq. Ridge	SRI	147	MH 1	19	138	13.23	31.48	19.17	20.96	52.44	0	0	0	0	0	0	0	1	1.73			0	0	0.00	54.17
31	Snoq. Ridge	SRI	18		27	179	17.15	40.83	26.87	29.38	70.21	0	0	0	0	0	0	0	2	2.29			0	0	0.00	72.50
32	Snoq. Ridge	SRII	147	MH 1	85	504	48.33	115.01	84.63	92.54	207.55	50	38	4	9	2	2	11	8	10.94			0	0	0.00	229.29
33	Snoq. Ridge	SRI	141		8	34	3.26	7.75	7.97	8.72	16.47	0	0	0	0	0	0	0	1	0.71			0	0	0.00	17.18
34	Snoq. Ridge	SRI	42		24	141	13.51	32.16	23.93	26.17	58.33	0	0	0	0	0	0	0	2	2.25			0	0	0.00	60.58
35	Snoq. Ridge	SRI	39	MH 9-10	6	46	4.41	10.49	6.27	6.86	17.35	0	0	0	0	0	0	0	1	0.77			0	0	0.00	18.11
36	Snoq. Ridge	SRI	43	MH 2	5	29	2.78	6.61	5.06	5.53	12.15	0	0	0	0	0	0	0	0	0.53			0	0	0.00	12.68
37	Snoq. Ridge	SRI	47		4	21	2.01	4.79	4.22	4.61	9.40	0	0	0	0	0	0	0	0	0.34			0	0	0.00	9.75
38	Snoq. Ridge	SRI	47		2	12	1.15	2.74	2.46	2.69	5.43	0	0	0	0	0	0	0	0	0.21			0	0	0.00	5.64
39	Historic	SF	73		2	7	0.66	1.57	1.71	11.14	12.71	0	0	0	0	0	0	0	0	2.21			0	0	0.00	14.92
40	Historic	HS	1	7-E	9	19	1.86	4.44	8.76	57.09	61.52	0	0	0	0	0	0	0	0	0.21			0	0	0.00	61.74
41	Historic	HS	97	7-K	3	17	1.67	3.97	2.63	17.14	21.10	0	0	0	0	0	0	0	3	22.60			0	0	0.00	43.70
42	Historic	HS	245	MH 5	32	98	9.41	22.39	31.97	208.29	230.68	38	29	3	7	3	20	27	6	48.35	Snoqualmie SD Bus Yard		0	0	0.00	305.53
43	Historic	HS	140	DMH 7	12	35	3.32	7.90	12.44	81.03	88.93	0	0	0	0	0	0	0	6	43.15			0	0	0.00	132.08
44	Historic	HS	277	MH 9	2	20	1.93	4.60	1.96	12.78	17.38	0	0	0	0	0	0	0	1	9.22			0	0	0.00	26.61
45	Historic	HS	139	DMH 6 RR	21	76	7.31	17.41	21.27	138.61	156.02	40	30	3	7	6	36	43	1	9.31			0	0	0.00	208.07
46	Historic	HS	30	16H	5	12	1.17	2.79	4.84	31.51	34.29	0	0	0	0	0	0	0	0	0.11			0	0	0.00	34.40
47	Historic	HS	24	13H	21	12	1.15	2.74	21.21	138.19	140.93	0	0	0	0	0	0	0	0	0.48			0	0	0.00	141.41
48	Historic	HS	110		15	18	1.72	4.09	14.51	94.56	98.65	0	0	0	0	0	0	0	0	0.44			0	0	0.00	99.09
49	Historic	HS	193	MH 2	6	25	2.42	5.77	5.66	36.88	42.64	2	2	0	0	0	1	1	4	32.84			0	0	0.00	76.87
50	Historic	HS	139	DMH 6 RR	0	0	0.01	0.02	0.02	0.12	0.14	0	0	0	0	0	0	0	1	9.26			0	0	0.00	9.39
51	Historic	HS	135	DMH 3	4	21	2.04	4.85	4.39	28.58	33.44	0	0	0	0	0	0	0	0	0.13			0	0	0.00	33.56
52	Historic	HS	137	DMH 5	4	21	2.05	4.88	3.80	24.78	29.66	0	0	0	0	0	0	0	1	11.02			0	0	0.00	40.68
53	Historic	HS	260	MH 6-5	11	33	3.16	7.52	10.65	69.38	76.90	6	5	0	1	0	2	3	1	8.40	Mt. Si High School	1378.03	1	26.74	89.49	178.03
54	Historic	HS	266	MH 7	3	31	2.99	7.12	2.84	18.51	25.63	0	0	0	0	0	0	0	0	0.10			0	0	0.00	25.73
0.058824	Historic	HS	PS4		13	64	6.10	14.51	12.75	83.06	97.57	35	26	3	6	1	6	12	2	16.49	Mt. Si High, Snoq. Elem.	885.97	5	15.38	54.58	180.69
56	Historic	HS	260	MH 6-5	7	1	0.09	0.21	6.59	42.93	43.14	0	0	0	0	0	0	0	2	15.61	Snoq. Middle School	416.00	1	44.55	86.43	145.18
57	Snoq. Ridge	SHW	57	MH 7	76	368	35.27	83.93	76.33	83.46	167.40	0	0	0	0	0	0	0		0					0.00	167.40
58	Historic	SF	213	MH 3	50	202	19.33	46.00	50.26	327.46	373.46	0	0	0	0	0	0	0		0					0.00	373.46
						5021	481.179	1145.2064	850.86	2252.21	3397.415908		546.25	52.34895833	124.59052	46.98	105.65	230.24	407.55	1010.64				96.66		4895.43
								SR	682.87	746.71	4.892278908	468.00	455.5		SR	36.97	40.43		377.38	SR				Total Peak Hour Flow		7.05

APPENDIX G

SEWER SYSTEM MAP

City of Snoqualmie

General Sewer / Wastewater Facility Plan
Figure E-1
Collection System Map

LEGEND:

- PS PUMP STATION
- MANHOLES
- FORCEMAINS
- GRAVITY MAINS
- CITY LIMITS
- URBAN GROWTH AREA
- PARCELS

SEWER BASINS:

- #1
- #3
- #4
- BP
- E
- K3
- KC
- L

CITY OF SNOQUALMIE

All users of the data shall be advised that the map features are approximate and are intended only to provide an indication of said feature. Additional areas that have not been mapped may be present. This is not a survey. The City of Snoqualmie assumes no liability for variations ascertained by actual survey. ALL DATA IS EXPRESSLY POVIDED 'AS IS' AND 'WITH ALL FAULTS'. The City makes no warranty of fitness for a particular purpose. This disclaimer shall be present on all paper map products and shall be included in the terms of use for this data in a web or software system.

N W E S

0 1,000 2,000 Feet

PS K2
PS F
PS N6
PS L
PS K3
PS E
SNOQUALMIE WATER RECLAMATION FACILITY
IPPS
KIMBAL CREEK PS
PS #1
PS #2
PS Z
PS #3
PS #4
PS BP
PS #6

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APPENDIX H

CAPITAL IMPROVEMENTS COST ESTIMATES

City of Snoqualmie
Pump Station Capital Improvement Projects
Upgrade Pump Station No. 1 Alt. #1 - Replace Force Main

NO.	ITEM	QUANTITY		UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	1	LS	$ 41,000.00	$ 41,000
2	Traffic Control	1	LS	$ 20,000.00	$ 20,000.00
3	Trench Excavation Safety Systems	1	LS	$ 10,000	$ 10,000
4	14" SDR 17 HDPE FM	2,100	LF	$ 80.00	$ 168,000
5	Foundation Gravel	200	TN	$ 35.00	$ 7,000.00
6	Bank Run Gravel	1550	TN	$ 30.00	$ 46,500.00
7	Crushed Surfacing Top Course	170	TN	$ 30.00	$ 5,100.00
8	Asphalt Concrete Pavement	300	TN	$ 200.00	$ 60,000.00
9	Electrical	1	LS	$ 25,000.00	$ 25,000
10	Minor Changes	1	CALC	$ 20,000.00	$ 20,000

Subtotal:	$	402,600
Sales Tax (8.6%):	$	34,624
Subtotal:	$	437,224
Contingency (20%):	$	87,445
TOTAL ESTIMATED CONSTRUCTION COST:	$	524,668
Engineering and Construction Management (25%):	$	131,167
TOTAL ESTIMATED PROJECT COST (ROUNDED):	**$**	**655,900**

ENR CCI: 9323.58

City of Snoqualmie
Pump Station Capital Improvement Projects
Upgrade Pump Station No. 1 Alt. #2 - Replace Pumps

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	1 LS	$ 26,000.00	$ 26,000
2	Bypass Pumping	1 LS	$ 10,000.00	$ 10,000
3	Flygt NP3301HT, 350 mm Impeller, 85 hp	2 EA	$ 55,000.00	$ 110,000
7	Pump and Piping Installation	1 LS	$ 10,000.00	$ 10,000
4	Electrical	1 LS	$ 100,000.00	$ 100,000

Subtotal:	$ 256,000
Sales Tax (8.6%):	$ 22,016
Subtotal:	$ 278,016
Contingency (20%):	$ 55,603
TOTAL ESTIMATED CONSTRUCTION COST:	$ 333,619
Engineering and Construction Management (25%):	$ 83,405
TOTAL ESTIMATED PROJECT COST (ROUNDED):	**$ 417,100**

ENR CCI: 9323.58

City of Snoqualmie
Pump Station Capital Improvement Projects
Pump Station No. 2

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	1 LS	$ 15,500	$ 15,500
2	Flygt NP 3127, 7.5 hp	1 EA	$ 12,000	$ 12,000
3	Bypass Pumping	1 LS	$ 10,000	$ 10,000
4	Demolition, Removal and Disposal	1 LS	$ 10,000	$ 10,000
5	New Roof	1 LS	$ 5,000	$ 5,000
6	Trolley Hoist	1 LS	$ 10,000	$ 10,000
7	6" DI Spool (15 LF)	2 EA	$ 1,200	$ 2,400
8	6" FL El	2 EA	$ 250	$ 500
9	6" FL 45	1 EA	$ 250	$ 250
10	6" FL Tee	1 EA	$ 500	$ 500
11	6" Plug Valve	2 EA	$ 1,000	$ 2,000
12	6" Check Valve	2 EA	$ 2,500	$ 5,000
13	Pump and Piping Installation	1 LS	$ 10,000	$ 10,000
14	Electrical	1 LS	$ 60,000	$ 60,000
15	Minor Changes	1 CALC	$ 10,000	$ 10,000

Subtotal:	$ 153,150
Sales Tax (8.6%):	$ 13,171
Subtotal:	$ 166,321
Contingency (20%):	$ 33,264
TOTAL ESTIMATED CONSTRUCTION COST:	$ 199,585
Engineering and Construction Management (25%):	$ 49,896
TOTAL ESTIMATED PROJECT COST (ROUNDED):	**$ 249,500**

ENR CCI: 9323.58

City of Snoqualmie
New WRF Pump Station
Alternative No. 1 - New PS to Convey Gravity Flows, Extend WMPS FM

NO.	ITEM	QUANTITY		UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	1	LS	$ 31,000	$ 31,000
2	Trench Excavation Safety Systems	1	LS	$ 7,000	$ 7,000
3	Flygt N3102, 162 mm Impeller, 5 hp	2	EA	$ 11,000	$ 22,000
4	6' Dia. Wet Well	1	LS	$ 10,000	$ 10,000
5	Valve Vault	1	LS	$ 6,000	$ 6,000
6	Mechanical Pipe and Fittings	1	LS	$ 1,000	$ 1,000
7	4" DI Spool (10 LF)	2	EA	$ 800	$ 1,600
8	4" Check Valve	2	EA	$ 2,100	$ 4,200
9	4" Plug Valve	2	EA	$ 1,900	$ 3,800
10	Pump and Piping Installation	1	LS	$ 20,000	$ 20,000
11	4" HDPE Force Main	420	LF	$ 35	$ 14,700
12	6" HDPE Force Main	880	LF	$ 40	$ 35,200
13	48" Manhole	1	EA	$ 4,000	$ 4,000
14	8" PVC	20	LF	$ 60	$ 1,200
15	Foundation Gravel	110	TN	$ 35	$ 3,850
16	Bank Run Gravel	960	TN	$ 30	$ 28,800
17	Crushed Surfacing Top Course	215	TN	$ 30	$ 6,450
18	Electrical	1	LS	$ 100,000	$ 100,000
19	Minor Changes	1	CALC	$ 10,000	$ 10,000

Subtotal:	$ 310,800
Sales Tax (8.6%):	$ 26,729
Subtotal:	$ 337,529
Contingency (20%):	$ 67,506
TOTAL ESTIMATED CONSTRUCTION COST:	$ 405,035
Engineering and Construction Management (25%):	$ 101,259
TOTAL ESTIMATED PROJECT COST (ROUNDED):	**$ 506,300**

ENR CCI: 9323.58

City of Snoqualmie
New WRF Pump Station
Alternative No. 2 - New PS to Convey All Sewage

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	1 LS	$ 26,000	$ 26,000
2	Trench Excavation Safety Systems	1 LS	$ 5,000	$ 5,000
2	Flygt N3127, 188 mm Impeller, 7.5 hp	2 EA	$ 13,000	$ 26,000
3	6' Dia. Wet Well	1 LS	$ 11,000	$ 11,000
4	Valve Vault	1 LS	$ 6,000	$ 6,000
5	Mechanical Pipe and Fittings	1 LS	$ 1,000	$ 1,000
6	4" DI Spool (10 LF)	2 EA	$ 800	$ 1,600
7	4" Check Valve	2 EA	$ 2,100	$ 4,200
8	4" Plug Valve	2 EA	$ 1,900	$ 3,800
9	Pump and Piping Installation	1 LS	$ 20,000	$ 20,000
10	8" HDPE Force Main	420 LF	$ 50	$ 21,000
11	48" Manhole	1 EA	$ 4,000	$ 4,000
12	8" PVC	20 LF	$ 60	$ 1,200
13	Foundation Gravel	40 TN	$ 35	$ 1,400.00
14	Bank Run Gravel	320 TN	$ 30	$ 9,600.00
15	Crushed Surfacing Top Course	75 TN	$ 30	$ 2,250.00
16	Electrical	1 LS	$ 100,000	$ 100,000
19	Minor Changes	1 CALC	$ 10,000	$ 10,000

Subtotal:	$	254,050
Sales Tax (8.6%):	$	21,848
Subtotal:	$	275,898
Contingency (20%):	$	55,180
TOTAL ESTIMATED CONSTRUCTION COST:	$	331,078
Engineering and Construction Management (25%):	$	82,769
TOTAL ESTIMATED PROJECT COST (ROUNDED):	**$**	**413,900**

ENR CCI: 9323.58

City of Snoqualmie
New WRF Pump Station
Alternative No. 3 - Upgrade LPS to Convey All Sewage

NO.	ITEM	QUANTITY		UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	1	LS	$ 29,000	$ 29,000
2	Trench Excavation Safety Systems	1	LS	$ 6,000	$ 6,000
3	Flygt NP 31, 239 mm Impeller, 12 hp	2	EA	$ 15,000	$ 30,000
4	Demolition, Removal and Disposal	1	LS	$ 1,000	$ 1,000
5	4" DI Spool (10 LF)	2	EA	$ 800	$ 1,600
6	4" Check Valve	2	EA	$ 2,100	$ 4,200
7	4" Plug Valve	2	EA	$ 1,900	$ 3,800
8	Pump and Piping Installation	1	LS	$ 20,000	$ 20,000
9	8" HDPE Force Main	880	LF	$ 50	$ 44,000
10	48" Manhole	3	EA	$ 4,000	$ 12,000
11	8" PVC	350	LF	$ 60	$ 21,000
12	Reroute Weyerhauser Mill Pump Sta. FM	1	LS	$ 2,000	$ 2,000
13	Foundation Gravel	100	TN	$ 35	$ 3,500.00
14	Bank Run Gravel	900	TN	$ 30	$ 27,000.00
15	Crushed Surfacing Top Course	650	TN	$ 30	$ 19,500.00
16	Electrical	1	LS	$ 10,000	$ 10,000
17	20 kW Generator	1	LS	$ 45,000	$ 45,000
18	Minor Changes	1	CALC	$ 10,000	$ 10,000

Subtotal:	$	289,600
Sales Tax (8.6%):	$	24,906
Subtotal:	$	314,506
Contingency (20%):	$	62,901
TOTAL ESTIMATED CONSTRUCTION COST:	$	377,407
Engineering and Construction Management (25%):	$	94,352
TOTAL ESTIMATED PROJECT COST (ROUNDED):	**$**	**471,800**

ENR CCI: 9323.58

City of Snoqualmie
New WRF Pump Station
Alternative No. 4 - Upgrade LPS to Convey Gravity, Extend WMPS FM

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	1 LS	$ 32,000	$ 32,000
2	Trench Excavation Safety Systems	1 LS	$ 7,000	$ 7,000
3	Flygt NP 3102, 172 mm Impeller, 5 hp	2 EA	$ 11,000	$ 22,000
4	Demolition, Removal and Disposal	1 LS	$ 1,000	$ 1,000
5	4" DI Spool (10 LF)	2 EA	$ 800	$ 1,600
6	4" Check Valve	2 EA	$ 2,100	$ 4,200
7	4" Plug Valve	2 EA	$ 1,900	$ 3,800
8	Pump and Piping Installation	1 LS	$ 20,000	$ 20,000
9	6" HDPE Force Main	1,760 LF	$ 40	$ 70,400
10	48" Manhole	3 EA	$ 4,000	$ 12,000
11	8" PVC	350 LF	$ 60	$ 21,000
12	Foundation Gravel	170 TN	$ 35	$ 5,950.00
13	Bank Run Gravel	1550 TN	$ 30	$ 46,500.00
14	Crushed Surfacing Top Course	170 TN	$ 30	$ 5,100.00
15	Electrical	1 LS	$ 10,000	$ 10,000
16	20 kW Generator	1 LS	$ 45,000	$ 45,000
17	Minor Changes	1 CALC	$ 10,000	$ 10,000

Subtotal:	$	317,550
Sales Tax (8.6%):	$	27,309
Subtotal:	$	344,859
Contingency (20%):	$	68,972
TOTAL ESTIMATED CONSTRUCTION COST:	$	413,831
Engineering and Construction Management (25%):	$	103,458
TOTAL ESTIMATED PROJECT COST (ROUNDED):	**$**	**517,300**

ENR CCI: 9323.58

City of Snoqualmie
Gravity Sewer Capital Improvement Projects
384th Street S.E.

NO.	ITEM	QUANTITY		UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	1	LS	$ 37,000.00	$ 37,000.00
2	Temporary Erosion Control	1	EA	$ 4,000.00	$ 4,000.00
3	Traffic Control	1	LS	$ 7,500.00	$ 7,500.00
4	Trench Excavation Safety Systems	1	LS	$ 10,000.00	$ 10,000.00
5	Bypass Pumping	1	LS	$ 40,000.00	$ 40,000.00
6	Dewatering	1	LS	$10,000	$ 10,000.00
7	15"PVC Sanitary Sewer Pipe	1,360	LF	$ 100.00	$ 136,000.00
8	48" Manhole	4	EA	$ 4,000.00	$ 16,000.00
9	Foundation Gravel	105	CY	$ 40.00	$ 4,200.00
10	Bank Run Gravel	1,050	CY	$ 25.00	$ 26,250.00
11	Connect to Existing Sewer System	6	LS	$ 2,500.00	$ 15,000.00
12	Crushed Surfacing Top Course	135	CY	$ 35.00	$ 4,725.00
13	Asphalt Concrete Pavement	200	TN	$ 200.00	$ 40,000.00
14	Minor Changes	1	LS	$ 20,000.00	$ 20,000.00

Subtotal:	$ 370,675
Sales Tax (8.6%):	$ 31,878
Subtotal:	$ 402,553
Contingency (20%):	$ 80,511
TOTAL ESTIMATED CONSTRUCTION COST:	$ 483,064
Engineering and Construction Management (25%):	$ 120,766
TOTAL ESTIMATED PROJECT COST (ROUNDED):	**$ 603,900**

ENR CCI: 9323.58

City of Snoqualmie
Gravity Sewer Capital Improvement Projects
Railroad Avenue and Falls Avenue

NO.	ITEM	QUANTITY		UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	1	LS	$ 61,000.00	$ 61,000.00
2	Temporary Erosion Control	1	EA	$ 6,100.00	$ 6,100.00
3	Traffic Control	1	LS	$ 12,000.00	$ 12,000.00
4	Trench Excavation Safety Systems	1	LS	$ 20,000.00	$ 20,000.00
5	Bypass Pumping	1	LS	$ 50,000.00	$ 50,000.00
6	Dewatering	1	LS	$50,000	$ 50,000.00
7	20"PVC Sanitary Sewer Pipe	1,565	LF	$ 120.00	$ 187,800.00
8	15"PVC Sanitary Sewer Pipe	302	LF	$ 100.00	$ 30,200.00
9	60" Manhole	6	EA	$ 6,000.00	$ 36,000.00
10	48" Manhole	1	EA	$ 4,000.00	$ 4,000.00
11	Foundation Gravel	130	CY	$ 40.00	$ 5,200.00
12	Bank Run Gravel	1,500	CY	$ 25.00	$ 37,500.00
13	Connect to Existing Sewer System	2	LS	$ 2,500.00	$ 5,000.00
14	Crushed Surfacing Top Course	185	CY	$ 35.00	$ 6,475.00
15	Asphalt Concrete Pavement	260	TN	$ 200.00	$ 52,000.00
16	Minor Changes	1	LS	$ 20,000.00	$ 20,000.00

Subtotal:	$ 583,275
Sales Tax (8.6%):	$ 50,162
Subtotal:	$ 633,437
Contingency (20%):	$ 126,687
TOTAL ESTIMATED CONSTRUCTION COST:	$ 760,124
Engineering and Construction Management (25%):	$ 190,031
TOTAL ESTIMATED PROJECT COST (ROUNDED):	**$ 950,200**

ENR CCI: 9323.58

City of Snoqualmie
Gravity Sewer Capital Improvement Projects
I-I Removal - 30% Pipe Replacement

NO.	ITEM	QUANTITY		UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	1	LS	$ 220,000.00	$ 220,000.00
2	Temporary Erosion Control	1	EA	$ 20,000.00	$ 20,000.00
3	Traffic Control	1	LS	$ 60,000.00	$ 60,000.00
4	Trench Excavation Safety Systems	1	LS	$ 10,000.00	$ 10,000.00
5	Bypass Pumping	1	LS	$ 40,000.00	$ 40,000.00
6	8" HDPE for Pipe Bursting	7,300	LF	$ 150.00	$ 1,095,000.00
7	10" HDPE for Pipe Bursting	1,800	LF	$ 175.00	$ 315,000.00
8	12" HDPE for Pipe Bursting	650	LF	$ 200.00	$ 130,000.00
9	16" HDPE for Pipe Bursting	500	LF	$ 250.00	$ 125,000.00
10	Manhole Grouting	119	EA	$ 1,200.00	$ 142,800.00
11	Minor Changes	1	LS	$ 50,000.00	$ 50,000.00

Subtotal:	$	2,207,800
Sales Tax (8.6%):	$	189,871
Subtotal:	$	2,397,671
Contingency (20%):	$	479,534
TOTAL ESTIMATED CONSTRUCTION COST:	$	2,877,205
Engineering and Construction Management (25%):	$	719,301
TOTAL ESTIMATED PROJECT COST (ROUNDED):	**$**	**3,596,600**

ENR CCI: 9323.58

ROUNDED ESTIMATED CONSTRUCTION COST	$	3,600,000

City of Snoqualmie
Gravity Sewer Capital Improvement Projects
I-I Removal - 30% Pipe Lining by CIPP

NO.	ITEM	QUANTITY		UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	1	LS	$ 100,000.00	$ 100,000.00
2	Temporary Erosion Control	1	EA	$ 10,000.00	$ 10,000.00
3	Traffic Control	1	LS	$ 20,000.00	$ 20,000.00
4	Trench Excavation Safety Systems	1	LS	$ 5,000.00	$ 5,000.00
5	Bypass Pumping	1	LS	$ 40,000.00	$ 40,000.00
6	8" CIP	7,300	LF	$ 50.00	$ 365,000.00
7	10" CIP	1,800	LF	$ 75.00	$ 135,000.00
8	12" CIP	650	LF	$ 100.00	$ 65,000.00
9	15" CIP	500	LF	$ 150.00	$ 75,000.00
10	Manhole Grouting	119	EA	$ 1,200.00	$ 142,800.00
11	Minor Changes	1	LS	$ 30,000.00	$ 30,000.00

Subtotal:	$	987,800
Sales Tax (8.6%):	$	84,951
Subtotal:	$	1,072,751
Contingency (20%):	$	214,550
TOTAL ESTIMATED CONSTRUCTION COST:	$	1,287,301
Engineering and Construction Management (25%):	$	321,825
TOTAL ESTIMATED PROJECT COST (ROUNDED):	**$**	**1,609,200**

ENR CCI: 9323.58

ROUNDED ESTIMATED CONSTRUCTION COST	$	1,610,000

City of Snoqualmie
Gravity Sewer Capital Improvement Projects
I-I Removal - 50% Side Sewer Replacement

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	1 LS	$ 129,000.00	$ 129,000.00
2	Temporary Erosion Control	1 EA	$ 10,000.00	$ 10,000.00
3	Traffic Control	1 LS	$ 25,000.00	$ 25,000.00
4	Trench Excavation Safety Systems	1 LS	$ 10,000.00	$ 10,000.00
5	Bypass Pumping	1 LS	$ 20,000.00	$ 20,000.00
6	Television Inspection	1 LS	$ 50,000.00	$ 50,000.00
7	6" Side Sewer	290 EA	$ 3,500.00	$ 1,015,000.00
8	Minor Changes	1 LS	$ 30,000.00	$ 30,000.00

Subtotal:	$	1,289,000
Sales Tax (8.6%):	$	110,854
Subtotal:	$	1,399,854
Contingency (20%):	$	279,971
TOTAL ESTIMATED CONSTRUCTION COST:	$	1,679,825
Engineering and Construction Management (25%):	$	419,956
TOTAL ESTIMATED PROJECT COST (ROUNDED):	**$**	**2,099,800**

ENR CCI: 9323.58

ROUNDED ESTIMATED CONSTRUCTION COST	$	2,100,000

City of Snoqualmie
Preliminary Project Cost Estimate
Oxidation Ditch Anaerobic Mixer Replacement

NO.	ITEM	QUANTITY		UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1	LS	$ 3,000	$ 3,000
2	Anoxic Mixer, Motor, and Gearbox	1	EA	$ 18,500	$ 18,500
3	Labor	1	LS	$ 5,000	$ 5,000
4	Minor Changes	1	LS	$ 2,000	$ 2,000
	Subtotal:				$ 28,500
	Sales Tax (8.6%):				$ 2,451
	Subtotal:				$ 31,000
	Contingency (20%):				$ 6,200
	TOTAL ESTIMATED CONSTRUCTION COST:				$ 37,200
	Engineering and Administrative Costs (20%):				$ 7,400
	TOTAL ESTIMATED PROJECT COST (ROUNDED):				**$ 44,600**

ENR CCI=9323.58

City of Snoqualmie
Water Reclamation Facility Standby Generator
One (1) 1.5 MW Standby Generator Option

NO.	ITEM	QUANTITY		UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1	LS	$ 56,600	$ 56,600
2	Diesel Powered Genset 1.5 MW w/ Enclosure and Fuel Tank	1	EA	$ 482,000	$ 482,000
3	Automatic Transfer Switch	1	EA	$ 25,000	$ 25,000
4	Site Preparation	1	LS	$ 3,000	$ 3,000
5	Minor Changes	1	LS	$ 5,000	$ 5,000
	Subtotal:				$ 566,600
	Sales Tax (8.6%):				48,728
	Subtotal:				$ 615,300
	Contingency (15%):				92,295
	TOTAL ESTIMATED CONSTRUCTION COST:				$ 707,600
	Engineering and Administrative Costs (15%):				$ 106,100
	TOTAL ESTIMATED PROJECT COST (ROUNDED):				**$ 814,000**

ENR CCI=9323.58

City of Snoqualmie
Water Reclamation Facility Standby Generator
Two (2) 750 kW Standby Generators in Parallel

NO.	ITEM	QUANTITY		UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1	LS	$ 88,000	$ 88,000
2	Diesel Powered Genset 750 kW w/ Enclosure and Fuel Tanks	2	EA	$ 292,500	$ 728,000
3	Automatic Transfer Switch	1	EA	$ 25,000	$ 25,000
4	Paralleling Switchgear	1	LS	$ 100,000	$ 100,000
5	Site Work	1	LS	$ 14,500	$ 14,500
6	Minor Changes	1	LS	$ 5,000	$ 5,000

Subtotal:	$ 960,500
Sales Tax (8.6%):	82,603
Subtotal:	$ 1,043,100
Contingency (12%):	125,172
TOTAL ESTIMATED CONSTRUCTION COST:	$ 1,168,300
Engineering and Administrative Costs (15%):	$ 175,200
TOTAL ESTIMATED PROJECT COST (ROUNDED):	**$ 1,344,000**

ENR CCI=9323.58

City of Snoqualmie
Preliminary Project Cost Estimate
Site Security Improvements

NO.	ITEM	QUANTITY		UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1	LS	$ 6,800	$ 6,800
2	Fencing	1100	LF	$ 36	$ 39,600
3	Gates	1	LS	$ 5,000	$ 5,000
4	Intrusion Alarms	1	LS	$ 1,500	$ 1,500
5	Surveillance Recorder and Monitors	1	LS	$ 5,000	$ 5,000
6	Video Cameras	6	EA	$ 300	$ 1,800
7	Integration	1	LS	$ 12,000	$ 12,000
8	Minor Changes	1	LS	$ 3,000	$ 3,000

Subtotal:	$74,700
Sales Tax (8.6%):	$6,424
Subtotal:	$81,100
Contingency (20%):	$16,200
TOTAL ESTIMATED CONSTRUCTION COST:	$97,300
Engineering and Administrative Costs (25%):	$24,300
TOTAL ESTIMATED PROJECT COST (ROUNDED):	**$122,000**

ENR CCI=9323.58

City of Snoqualmie
Preliminary Project Cost Estimate
Ultraviolet Disinfection System Upgrades

NO.	ITEM	QUANTITY		UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1	LS	$ 99,000	$ 99,000
2	Demolition	1	LS	$ 5,000	$ 5,000
3	Temporary Disinfection Facilities	1	LS	$ 35,000	$ 35,000
4	UV Equipment	1	LS	$ 750,000	$ 750,000
5	Trolley Hoist	1	LS	$ 45,000	$ 45,000
6	System Integration	1	LS	$ 20,000	$ 20,000
7	Transmittance Meter	1	LS	$ 2,500	$ 2,500
8	Regulatory Validation	1	LS	$ 65,000	$ 65,000
9	Electrical	1	LS	$ 68,000	$ 68,000
10	Minor Changes	1	LS	$ 5,000	$ 5,000
	Subtotal:				$ 1,094,500
	Sales Tax (8.6%):				$ 94,127
	Subtotal:				$ 1,188,600
	Contingency (20%):				$ 237,700
	TOTAL ESTIMATED CONSTRUCTION COST:				$ 1,426,300
	Engineering and Administrative Costs (20%):				$ 285,300
	TOTAL ESTIMATED PROJECT COST (ROUNDED):				**$ 1,712,000**

ENR CCI=9323.58

City of Snoqualmie
Preliminary Project Cost Estimate
Third Secondary Clarifier

NO.	ITEM	QUANTITY		UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1	LS	$ 86,800	$ 86,800
2	Secondary Clarifier Mechanism	1	LS	$ 190,000	$ 190,000
3	Handrail	1	LS	$ 8,000	$ 8,000
4	Concrete	1	LS	$ 226,000	$ 226,000
5	Grout	1	LS	$ 26,000	$ 26,000
6	Foundation Gravel	1	LS	$ 12,000	$ 12,000
7	Weir Gates	1	LS	$ 18,000	$ 18,000
8	Dewatering	1	LS	$ 50,000	$ 50,000
9	Pipe Connections	1	LS	$ 3,000	$ 3,000
10	Shoring/Bracing	540	SQFT	$ 65	$ 36,000
11	Relocate Electrical Cable and Conduit	1	LS	$ 50,000	$ 50,000
12	Relocate Electrical Transformer	1	LS	$ 25,000	$ 25,000
13	Relocate Piping Conflicts	1	LS	$ 25,000	$ 25,000
14	Electrical/Integration	1	LS	$ 65,000	$ 65,000
15	Painting	1	LS	$ 29,000	$ 29,000
16	Piping	1	LS	$ 95,000	$ 95,000
17	Minor Changes	1	LS	$ 10,000	$ 10,000
	Subtotal:				$ 954,800
	Sales Tax (8.6%):				82,113
	Subtotal:				$ 1,036,900
	Contingency (20%):				207,380
	TOTAL ESTIMATED CONSTRUCTION COST:				$ 1,244,280
	Engineering and Administrative Costs (25%):				$ 311,100
	TOTAL ESTIMATED PROJECT COST (ROUNDED):				**$ 1,556,000**

ENR CCI=9323.58

City of Snoqualmie
Preliminary Project Cost Estimate
Vactor Decant Station Canopy

NO.	ITEM	QUANTITY		UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1	LS	$ 3,300	$ 3,300
2	Concrete Foundation Piers	4	EA	$ 300	$ 1,200
3	Structural Steel	1	EA	$ 12,000	$ 12,000
4	Metal Roof and Frame	1090	SQFT	$ 8	$ 8,720
5	Metal Gutter and Downspouts	1	LS	$ 1,600	$ 1,600
6	Painting	1	LS	$ 1,700	$ 1,700
7	Metal Trim	1	EA	$ 2,300	$ 2,300
8	Minor Changes	1	LS	$ 5,000	$ 5,000

Subtotal:	$35,820
Sales Tax (8.6%):	$3,081
Subtotal:	$38,900
Contingency (20%):	$7,800
TOTAL ESTIMATED CONSTRUCTION COST:	$46,700
Engineering and Administrative Costs (25%):	$11,700
TOTAL ESTIMATED PROJECT COST (ROUNDED):	**$59,000**

ENR CCI=9323.58

City of Snoqualmie
Preliminary Project Cost Estimate
Oxidation Ditch Anoxic Mixer Replacement

NO.	ITEM	QUANTITY		UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1	LS	$ 7,000	$ 7,000
2	Anoxic Mixer, Motor, and Gearbox	1	EA	$ 68,000	$ 68,000
3	Labor	1	LS	$ 2,600	$ 2,600
4	Minor Changes	1	LS	$ 2,000	$ 2,000
	Subtotal:				$ 79,600
	Sales Tax (8.6%):				$ 6,846
	Subtotal:				$ 86,400
	Contingency (20%):				$ 17,400
	TOTAL ESTIMATED CONSTRUCTION COST:				$ 103,800
	Engineering and Administrative Costs (0%):				$ -
	TOTAL ESTIMATED PROJECT COST (ROUNDED):				**$ 103,800**

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City of Snoqualmie
Preliminary Project Cost Estimate
Air Gap System/Non-Potable Water System Upgrade

NO.	ITEM	QUANTITY		UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1	LS	$ 13,600	$ 13,600
2	Non-potable Water Pumps	2	EA	$ 10,000	$ 20,000
3	Site Work	1	LS	$ 25,000	$ 25,000
4	Air Gap for Chemical System	1	LS	$ 7,500	$ 7,500
5	Piping and Valves	1	LS	$ 8,000	$ 8,000
6	HVAC Upgrades	1	LS	$ 20,000	$ 20,000
7	Electrical/Integration	1	LS	$ 50,000	$ 50,000
8	Minor Changes	1	LS	$ 5,000	$ 5,000

Subtotal:	$149,100
Sales Tax (8.6%):	$12,823
Subtotal:	$161,900
Contingency (20%):	$32,400
TOTAL ESTIMATED CONSTRUCTION COST:	$194,300
Engineering and Administrative Costs (25%):	$48,600
TOTAL ESTIMATED PROJECT COST (ROUNDED):	**$243,000**

ENR CCI=9323.58

City of Snoqualmie
Preliminary Project Cost Estimate
Parking Improvements

NO.	ITEM	QUANTITY		UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1	LS	$ 3,900	$ 3,900
2	Gravel	140	CY	$ 15	$ 2,100
3	Hot Mix Asphalt	65	TN	$ 130	$ 8,450
4	Striping	1	LS	$ 1,500	$ 1,500
5	Curb	60	LF	$ 20	$ 1,200
6	Sawcutting	1	LS	$ 1,500	$ 1,500
7	Stormwater Piping & Catch Basins	1	LS	$ 22,000	$ 22,000
8	Sawcutting	1	LS	$ 1,500	$ 1,500
9	Minor Changes	1	LS	$ 1,000	$ 1,000
	Subtotal:				$43,150
	Sales Tax (8.6%):				$3,711
	Subtotal:				$46,900
	Contingency (20%):				$9,400
	TOTAL ESTIMATED CONSTRUCTION COST:				$56,300
	Engineering and Administrative Costs (20%):				$11,300
	TOTAL ESTIMATED PROJECT COST (ROUNDED):				**$68,000**

ENR CCI=9323.58

City of Snoqualmie
Preliminary Project Cost Estimate
Scum Pump Station

NO.	ITEM	QUANTITY		UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1	LS	$ 5,200	$ 5,200
2	Trench Excavation Safety Systems	1	LS	$ 1,500	$ 1,500
3	Erosion Control	1	LS	$ 500	$ 500
4	Site Work	1	LS	$ 2,500	$ 2,500
5	48-inch Manhole	1	EA	$ 4,500	$ 4,500
6	GLDI Piping and Fittings	200	LF	$ 85	$ 17,000
7	Submersible Pump	1	EA	$ 15,000	$ 15,000
8	Bank Run Gravel for Trench Backfill	100	TN	$ 15	$ 1,500
9	Electrical	1	LS	$ 4,500	$ 4,500
10	Minor Changes	1	LS	$ 5,000	$ 5,000

Subtotal:	$57,200
Sales Tax (8.6%):	$4,919
Subtotal:	$62,100
Contingency (20%):	$12,400
TOTAL ESTIMATED CONSTRUCTION COST:	$74,500
Engineering and Administrative Costs (25%):	$18,600
TOTAL ESTIMATED PROJECT COST (ROUNDED):	**$94,000**

ENR CCI=9323.58

City of Snoqualmie
Preliminary Project Cost Estimate
Solids Handling Building HVAC and Odor Control Upgrades

NO.	ITEM	QUANTITY		UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1	LS	$ 13,000	$ 13,000
2	Sitework	1	LS	$ 3,000	$ 3,000
3	HVAC Modifications	1	LS	$ 22,000	$ 22,000
4	Biofilter Air Plenum and Media	1	LS	$ 65,000	$ 65,000
5	Biofilter Concrete Structure	1	LS	$ 15,000	$ 15,000
6	Foundation Gravel	50	TN	$ 15	$ 1,000
7	Odor Contol Duct	75	LF	$ 135	$ 11,000
8	Electrical	1	LS	$ 15,000	$ 15,000
9	Minor Changes	1	LS	$ 5,000	$ 5,000
	Subtotal:				$ 150,000
	Sales Tax (8.6%):				$ 12,900
	Subtotal:				$ 162,900
	Contingency (20%):				$ 32,600
	TOTAL ESTIMATED CONSTRUCTION COST:				$ 195,500
	Engineering and Administrative Costs (25%):				$ 48,900
	TOTAL ESTIMATED PROJECT COST (ROUNDED):				**$ 244,400**

ENR CCI=9323.58

City of Snoqualmie
Preliminary Project Cost Estimate
Operations Building and New Garage Construction

NO.	ITEM	QUANTITY		UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1	LS	$ 71,000	$ 71,000
2	Sitework	1	LS	$ 3,000	$ 3,000
3	New Maintenance Building	4,000	SQFT	$ 118	$ 472,000
4	Special Equipment	1	LS	$ 50,000	$ 50,000
5	Utility Connections	1	LS	$ 2,500	$ 2,500
6	Remodel Existing Operations Building	1,800	SQFT	$ 100	$ 180,000
7	Minor Changes	1	LS	$ 5,000	$ 5,000
	Subtotal:				$ 783,500
	Sales Tax (8.6%):				$ 67,381
	Subtotal:				$ 850,900
	Contingency (20%):				$ 170,200
	TOTAL ESTIMATED CONSTRUCTION COST:				$ 1,021,100
	Engineering and Administrative Costs (25%):				$ 255,300
	TOTAL ESTIMATED PROJECT COST (ROUNDED):				**$ 1,277,000**

ENR CCI=9323.58

City of Snoqualmie
Preliminary Project Cost Estimate
Aerobic Sludge Digestion Upgrades

NO.	ITEM	QUANTITY		UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1	LS	$ 82,000	$ 82,000
2	Earthwork	1	LS	$ 15,000	$ 15,000
3	Concrete for Digester	200	CY	$ 800	$ 160,000
4	Foundation Gravel	225	TN	$ 25	$ 6,000
5	Aeration Equipment	1	LS	$ 145,000	$ 145,000
6	Rotary Screen Thickener	1	LS	$ 83,025	$ 84,000
7	Piping and Valves	1	LS	$ 20,000	$ 20,000
8	Equipment Canopy	150	TN	$ 25	$ 4,000
9	Stairs and Platform	1	LS	$ 55,000	$ 55,000
10	Thickened WAS Pumps	2	EA	$ 18,000	$ 36,000
11	Instrumentation	1	LS	$ 25,000	$ 25,000
12	Integration	1	LS	$ 40,000	$ 40,000
13	Electrical	1	LS	$ 90,000	$ 90,000
14	Minor Changes	1	LS	$ 5,000	$ 5,000
	Subtotal:				$ 767,000
	Sales Tax (8.6%):				$ 65,962
	Subtotal:				$ 833,000
	Contingency (20%):				$ 166,600
	TOTAL ESTIMATED CONSTRUCTION COST:				$ 999,600
	Engineering and Administrative Costs (25%):				$ 249,900
	TOTAL ESTIMATED PROJECT COST (ROUNDED):				**$ 1,250,000**

ENR CCI=9323.58

City of Snoqualmie
Preliminary Project Cost Estimate
Grit Washing and Dewatering System Replacement

NO.	ITEM	QUANTITY		UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1	LS	$ 9,000	$ 9,000
2	Demolition and Wastehaul	1	LS	$ 1,500	$ 1,500
3	Grit Washing and Dewatering Equipment	1	LS	$ 60,000	$ 60,000
4	Piping and Fittings	1	LS	$ 8,000	$ 8,000
5	System Integration	1	LS	$ 3,500	$ 3,500
6	Painting	1	LS	$ 2,500	$ 2,500
7	Electrical	1	LS	$ 12,000	$ 12,000
8	Minor Changes	1	LS	$ 5,000	$ 5,000
	Subtotal:				$ 101,500
	Sales Tax (8.6%):				$ 8,729
	Subtotal:				$ 110,200
	Contingency (20%):				$ 22,000
	TOTAL ESTIMATED CONSTRUCTION COST:				$ 132,200
	Engineering and Administrative Costs (25%):				$ 33,100
	TOTAL ESTIMATED PROJECT COST (ROUNDED):				**$ 166,000**

ENR CCI=9323.58

APPENDIX I

2007 SEWER INSPECTION NOTES

= Heavy Infiltration/Other Problem = Moderate or Light Infiltration/Other Problem = Pipe Sag

City of Snoqualmie Sewer Lift station # 1 Sewer Main Inspection
Inspection Date 04/04/2007

Site ID #	Sewer Type	Problem	Distance From MH	MH #	Street Name
5	Service Conn.	Infiltration	107.1	7-E to 10-2	384th Ave SE & SE River
6	Manhole	Infiltration	167.2	7-E to 7-D	384th Ave SE & SE River
8	Manhole	Infiltration	256.6	7-C1 to 7D	Silva & King St.
16	Pipe Problem	Grease, Hvy	2.0	11 to 10	King St & Falls Ave.
16	Pipe Problem	Possible Sag	5.0	11 to 10	King St & Falls Ave.
16	Pipe Problem	End of Sag	172.8	11 to 1	King St & Falls Ave.
17	Joint Problem	Separated	13.9	8-2 to 8-1	SE Northern &Railroad Ave.
17	Joint Problem	Infiltration	13.9	8-2 to 8-1	SE Northern &Railroad Ave
17	Pipe Problem	Circular Crack	289.8	8-2 to 8-1	SE Northern &Railroad Ave
17	Pipe Problem	Infiltration	289.8	8-2 to 8-1	SE Northern &Railroad Ave
31	Pipe Problem	Debris	10.3	7 to 6	Fir & Railroad Pl.
32	Pipe Problem	Mineral Deposits	57.6	6 to 5	Fir & Railroad Pl.
32	Pipe Problem	Infiltration	275.5	6 to 5	Fir & Railroad Pl.
34	Pipe Problem	Debris	328.0	6 to 7	Fir & Railroad Pl.
36	Pipe Problem	Possible Sag	29.6	10 to 9	King St. & Railroad Ave.
36	Pipe Problem	End Sag	43.4	10 to 9	King St. & Railroad Ave.
36	Pipe Problem	Possible Sag	51.4	10 to 9	King St. & Railroad Ave.

City of Snoqualmie Sewer Lift station # 1 Sewer Main Inspection

Inspection Date 04/04/2007

Site ID #	Sewer Type	Problem	Distance from MH	MH #	Street Name
36	Pipe Problem	Possible Sag	142.9	10 to 9	King St. & Railroad Ave.
37	Pipe Problem	Possible Sag	13.4	9 to 8	King St. & Railroad Ave.
37	Pipe Problem	End Sag	187.6	9 to 8	King St. & Railroad Ave.
37	Pipe Problem	Infiltration	200.7	9 to 8	King St. & Railroad Ave.
37	Pipe Problem	Possible Sag	293.4	9 to 8	King St. & Railroad Ave.
39	Pipe Problem	Circular Crack	3.0	7 to 7	Fir St & Railroad Pl.
39	Pipe Problem	Infiltration	3.0	7 to 7-1	Fir St & Railroad Pl.
39	Joint Problem	Infiltration	112.3	7 to 7-1	Fir St & Railroad Pl.
40	Pipe Problem	Circular Crack	2.1	7-1 to 7-2	Fir St & Railroad Pl.
40	Pipe Problem	Infiltration	2.1	7-1 to 7-2	Fir St & Railroad Pl.
40	Joint Problem	Infiltration	19.8	7-1 to 7-2	Fir St & Railroad Pl.
41	Other	Lower Bend/LH	128.4	7-2 to 7-3	Fir St & Railroad Pl.
42	Joint Problem	Infiltration	3.0	7 king to 7-1king	King St. & Maple Ave.
43	Other	Lower Bend/LH	177.5	7-1king to 7-1king	Fir St & Railroad Pl.
46	Other	Outside Drop	53.4	7-1-1 to 7-1 Maple	Fir St & Railroad Pl.

Liftstation #2 Sewer Inspection Project

3/20/2007

Site ID #	Sewer Type	Problem	Distance from MH	MH #	Street Name
1	Service Conn	Infiltration	194.1	9 to 9-1	Olmstead& Silva Rd. at River St.
1	Service Conn	Infiltration	250.6	9 to 9-1	Olmstead& Silva Rd. at River St.
1	Service Conn	Infiltration	283.8	9 to 9-1	Olmstead& Silva Rd. at River St.
1	Pipe Problem	Circular Crack	300.3	9 to 9-1	Olmstead& Silva Rd. at River St.
1	Pipe Problem	Infiltration	300.3	9 to 9-1	Olmstead& Silva Rd. at River St.
2	Pipe Problem	Circular Crack	245.6	9-1 to 9-2	Olmstead& Silva Rd. at River St.
2	Pipe Problem	Infiltration	245.6	9-1 to 9-2	Olmstead& Silva Rd. at River St.
2	Service Conn	Debris 2x4	329.2	9-1 to 9-2	Olmstead& Silva Rd. at River St.
2	Other	LowerBend/LH	367.3	9-1 to 9-2	Olmstead& Silva Rd. at River St.
3	Service Conn	Infiltration	188.5	7-1 to 7-3	King St. & Maple Ave
12	Manhole	Infiltration	0	6W to 7W	Winery Ext.
18	Manhole	Infiltration	396.3	12W to 13W	Winery Ext.
23	Manhole	Infiltration	2.0	1WN to 1WC	Winery Ext.
24	Pipe Problem	Pos. Pipe Sag	9.8	2WN to 3WN	Winery Ext.
24	Pipe Problem	End Sag	23.3	2WN to 3WN	Winery Ext.
24	Manhole	Infiltration	312.3	2WN to 3WN	Winery Ext.
26	Manhole	Infiltration	224.0	4WN to 5WN	Winery Ext.
34	Manhole	Infiltration	190.2	12WN to 13WN	Winery Ext.
36	Manhole	Infiltration	9.8	14WN to 1H	Winery Ext.
37	Manhole	Infiltration	0	2H to 1H1	Winery Ext.

Lift station #2 Sewer Inspection Project

03/20/2007

Site ID #	*Sewer Type*	*Problem*	*Distance from* MH	MH #	Street Name
37	Manhole	Infiltration	299.2	2H to 1H	9416 384th Ave SE
38	Manhole	Infiltration	358.3	2H to 3H	9416 384th Ave SE
39	Manhole	Infiltration	0	3H to 4H	9416 384th Ave SE
47	Manhole	Possible Sag	8.0	11 to 12H	SE Roberts Ct. & 384th Ave SE
47	Manhole	End Sag	152.9	11H to 12H	SE Roberts Ct. & 384th Ave SE
48	Service Conn	L- Unknown	45.9	15H to 14H	SE 85th Ct. & 384th Ave. SE
48	Service Conn	R-Unknown	224.2	15H to 14H	SE Roberts Ct. & 384th Ave SE
48	Pipe Problem	Possible Sag	229.9	15H to 14H	SE Roberts Ct. & 384th Ave SE
48	Pipe Problem	End Sag	246.8	15H to 14	SE Roberts Ct. & 384th Ave SE
49	Service Conn	L Unknown	13.5	14H to 13H	SE Roberts Ct. & 384th Ave SE
51	Manhole	Infiltration	33.6	15H to 16H	SE 85th Ct. & 384th Ave. SE
55	Joint Problem	Infiltration	5.0	5 to 4	Silva & Cedar
55	Pipe Problem	Possible Sag	133.8	5 to 4	Silva & Cedar
55	Pipe Problem	End Sag	160.7	5 to 4	Silva & Cedar
55	Service Conn	Infiltration	263.6	5 to 4	Silva & Cedar
55	Pipe Problem	Possible Sag	324.1	5 to 4	Silva & Cedar
55	Joint Problem	Offset	327.5	5 to 4	Silva & Cedar
55	Joint Problem	Separated	327.5	5 to 4	Silva & Cedar
55	Joint Problem	Infiltration	327.5	5 to 4	Silva & Cedar
59	Pipe Problem	Circular Crack	2.2	1 to 0-A	Fir & Cedar
59	Pipe Problem	Deposits	2.2	1 to 0-A	Fir & Cedar
59	Pipe Problem	Infiltration	2.2	1 to 0-A	Fir & Cedar

Lift station #2 Sewer Inspection Project

3/20/2007

Site ID #	*Sewer Type*	*Problem*	*Distance from* MH	MH #
59	Pipe Problem	Possible Sag	2.5	1 to 0-A Fir & Cedar
59	Pipe Problem	End Sag	34.1	1 to 0-A Fir & Cedar
59	Service Conn	Min Deposits	69.5	1 to 0-A Fir & Cedar
59	Service Conn	Infiltration	69.5	1 to 0-A Fir & Cedar
59	Manhole	Infiltration	72.9	1 to 0-A Fir & Cedar
65	Pipe Problem	Circular Crack	99.5	2 to 1 Fir & Cedar
65	Pipe Problem	Infiltration	99.5	2 to 1 Fir & Cedar
67	Pipe Problem	Possible Sag	116.5	5 to 5-2 Railroad & Northern
67	Pipe Problem	½"	122.0	5 to 5-2 Railroad & Northern
67	Pipe Problem	Cam Underwater	125.8	5 to 5-2 Railroad & Northern
67	Pipe Problem	¼ Pipe	140.7	5 to 5-2 Railroad & Northern
67	Pipe Problem	End Sag	233.0	5 to 5-2 Railroad & Northern
67	Pipe Problem	Pipe Sag	250.0	5 to 5-2 Railroad & Northern
67	Pipe Problem	½ Pipe	263.5	5 to 5-2 Railroad & Northern
67	Pipe Problem	¼ Pipe	271.3	5 to 5-2 Railroad & Northern
67	Pipe Problem	½ Pipe	275.5	5 to 5-2 Railroad & Northern
67	Pipe Problem	¼ Pipe	283.9	5 to 5-2 Railroad & Northern
67	Pipe Problem	End Sag	97.6	5 to 5-2 Railroad & Northern
67	Pipe Problem	Pipe Sag	307.4	5 to 5-2 Railroad & Northern

Lift station #2 Sewer Inspection Project

3/20/2007

Site ID #	*Sewer Type*	*Problem*	*Distance from* MH	MH #	Street Name
67	Pipe Problem	End Sag	317.8	5 to 5-2	Railroad Pl & Northern
67	Pipe Problem	Pipe Sag	395.2	5 to 5-2	Railroad & Northern
67	Pipe Problem	End Sag	403.6	5 to 5-2	Railroad & Northern
67	Pipe Problem	Circular Crack	451.7	5 to 5-2	Railroad & Northern
67	Manhole	Infiltration	453.1	5 to 5-2	Railroad & Northern
68	Pipe Problem	Circular Crack	3.0	5 to 5-1	Railroad & Northern
68	Pipe Problem	Infiltration	3.0	5 to 5-1	Railroad & Northern
70	Joint Problem	Separated	45.4	3 to 3-1	Railroad & Northern
70	Joint Problem	Infiltration	45.4	3 to 3-1	Railroad & Northern

Lift station #3 Sewer Inspection Project

3/06/2007

Site ID #	*Sewer Type*	*Problem*	*Distance from* MH	MH #	Street Address
8	Pipe Problem	Debris/Heavy	90.7	2-5 to 2-6	Schusman Ave. & Park St.
9	Service Conn.	Infiltration/ Light	126.8	2-5 to 2-4	Schusman Ave. & Park St.
10	Service Conn	Roots/Light	147.4	2-4 to 2-3	Schusman Ave. & Park St.
10	Service Conn	Debris/Heavy	231.2	2-4 to 2-3	Schusman Ave. & Park St.
12	Service Conn	Infiltration/Medium	251.8	2-2 to 2-1	Schusman Ave. & Park St.
12	Service Conn	Infiltration/Medium	295.9	2-2 to 2-1	Schusman Ave. & Park St.
13	Pipe Problem	Crack/ Infilt/Light	2.5	2-1 to 2	Schusman Ave. & Park St.
13	Pipe Problem	Pipe Sag	39.1	2-1 to 2	Schusman Ave. & Park St.
13	Pipe Problem	Debris	48.1	2-1 to 2	Schusman Ave. & Park St.
14	Pipe Problem	Pipe Sag	102.9	7 to 7-1	Falls Ave. & Delta St.
14	Pipe Problem	¼ Pipe	109.2	7 to 7-1	Falls Ave. & Delta St.
14	Pipe Problem	End Sag	122.7	7 to 7-1	Falls Ave. & Delta St.
15	Service Conn	Infiltration	12.5	7 to 8	Falls Ave. & Delta St.
15	Service Conn	Rocks	98.3	7 to 8	Falls Ave. & Delta St.
15	Service Conn	Infiltration	98.3	7 to 8	Falls Ave. & Delta St.
15	Service Conn	Break in Conn	98.3	7 to 8	Falls Ave. & Delta St.
17	Pipe Problem	Circular Crack	91.4	3-1 to 3	Alpha & Beta St.(Alley)
19	Pipe Problem	Possible Sag	270.0	1-2 to 1-1	Park St. & Schusman
19	Pipe Problem	½ Pipe	300.0	1-2 to 1-1	Park St. & Schusman
19	Pipe Problem	End Sag	328.0	1-2 to 1-1	Park St. & Schusman
20	Pipe Problem	Possible Sag	6.0	BT Park&Falls Ave@River St.	

Lift Station #3 Sewer Inspection Project (Continued)

Site ID #	*Sewer Type*	*Problem*	*Distance from* MH	MH #	Street Address
20	Pipe Problem	½ Pipe	26.0	4-2 to 4-1	BT Park&Falls Ave@River St.
20	Pipe Problem	End Sag	49.2	4-2 to 4-1	BT Park&Falls Ave@River St.
20	Pipe Problem	Possible Sag	270.2	4-2 to 4-1	BT Park&Falls Ave@River St.
20	Pipe Problem	¼ Pipe	274.5	4-2 to 4-1	BT Park&Falls Ave@River St.
20	Pipe Problem	End Sag	282.3	4-2 to 4-1	BT Park&Falls Ave@River St.
21	Pipe Problem	Possible Sag	25.0	4-1 to 4	BT Park&Falls Ave@River St.
21	Pipe Problem	1/3 Pipe	34.0	4-1 to 4	BT Park&Falls Ave@River St.
21	Pipe Problem	Infiltration	55.2	4-1 to 4	BT Park&Falls Ave@River St.
21	Pipe Problem	End Sag	163.8	4-1 to 4	BT Park&Falls Ave@River St.
21	Joint Problem	Offset	169.8	4-1 to 4	BT Park&Falls Ave@River St.
21	Joint Problem	Seperated	169.8	4-1 to 4	BT Park&Falls Ave@River St.
21	Joint Problem	Soil Visible	169.8	4-1 to 4	BT Park&Falls Ave@River St.
21	Joint Problem	Seperated	186.0	4-1 to 4	BT Park&Falls Ave@River St.
21	Joint Problem	Possible Sag	192.0	4-1 to 4	BT Park&Falls Ave@River St.
21	Pipe Problem	End Sag	226.0	4-1 to 4	BT Park&Falls Ave@River St.
21	Joint Problem	Mineral Deposit	279.0	4-1 to 4	BT Park&Falls Ave@River St.
21	Joint Problem	Infiltration	279.0	4-1 to 4	BT Park&Falls Ave@River St.
21	Pipe Problem	Possible Sag	289.4	4-1 to 4	BT Park&Falls Ave@River St.
21	Joint Problem	Mineral Deposit	311.1	4-1 to 4	BT Park&Falls Ave@River St.
21	Pipe Problem	End Sag	327.7	4-1 to 4	BT Park&Falls Ave@River St.

Lift Station #3 Sewer Inspection Project (Continued)

Site ID #	*Sewer Type*	*Problem*	*Distance from* MH	MH #	Street Address
23	Pipe Problem	Possible Sag	165.0	6-4 to 6-5	Mt Si HS & Meadowbrook Ave.
23	Pipe Problem	¼ Pipe	183.6	6-4 to 6-5	Mt Si HS & Meadowbrook Ave.
23	Pipe Problem	End Sag	198.6	6-4 to 6-5	Mt Si HS & Meadowbrook Ave.
21	Joint Problem	Cracked	280.2	6-4 to 6-5	Mt Si HS & Meadowbrook Ave.
21	Joint Problem	Cracked	296.9	6-4 to 6-5	Mt Si HS & Meadowbrook Ave.
23	Pipe Problem	Possible Sag	328.2	6-4 to 6-5	Mt Si HS & Meadowbrook Ave.
23	Pipe Problem	End Sag	348.3	6-4 to 6-5	Mt Si HS & Meadowbrook Ave.
24	Joint Problem	Offset	7.3	6-4 to 6-3	Mt Si HS & Meadowbrook Ave.
24	Joint Problem	Seperated	7.3	6-4 to 6-3	Mt Si HS & Meadowbrook Ave.
24	Joint Problem	Offset	40.7	6-4 to 6-3	Mt Si HS & Meadowbrook Ave.
25	Service Conn.	Infiltration	129.1	6-2 to 6-3	Gamma St. & Schusman Ave.
25	Pipe Problem	Possible Sag	159.6	6-2 to 6-3	Gamma St. & Schusman Ave.
25	Joint Problem	Offset	166.7	6-2 to 6-3	Gamma St. & Schusman Ave.
26	Service Conn	Infiltration	80.6	6-2 to 6-1	Gamma St. & Schusman Ave.
27	Pipe Problem	Crack	94.8	6 to 6-1	Gamma St. & Falls Ave.
27	Pipe Problem	Infiltration	94.8	6 to 6-1	Gamma St. & Falls Ave.
27	Pipe Problem	End Crack	95.7	6 to 6-1	Gamma St. & Falls Ave.
27	Service Conn	Infiltration	172.9	6 to 6-1	Gamma St. & Falls Ave.
27	Service Conn	Infiltration	310.9	6 to 6-1	Gamma St. & Falls Ave.
27	Manhole	Infiltration	410.4	6 to 6-1	Gamma St. & Falls Ave.
29	Service Conn	Infiltration	21.1	6 to 7	Gamma St. & Falls Ave.
29	Service Conn	Cracked	21.1	6 to 7	Gamma St. & Falls Ave.

Lift Station #3 Sewer Inspection Project (Continued)

Site ID #	*Sewer Type*	*Problem*	*Distance from* MH	MH #	Street Address
31	Pipe Problem	Possible Sag	2.0	12 to 13	Alley Doone & Olmstead @ River St.
31	Joint Problem	Offset	4.0	12 to 13	Alley Doone & Olmstead @ River St.
31	Pipe Problem	End Sag	11.5	12 to 13	Alley Doone & Olmstead @ River St.
31	Pipe Problem	Possible Sag	13.2	12 to 13	Alley Doone & Olmstead @ River St.
31	Pipe Problem	End Sag	41.0	12 to 13	Alley Doone & Olmstead @ River St.
31	Pipe Problem	Possible Sag	154.0	12 to 13	Alley Doone & Olmstead @ River St.
31	Pipe Problem	½ Pipe	164.8	12 to 13	Alley Doone & Olmstead @ River St.
31	Service Conn	Roots	188.8	12 to 11-1	Alley Doone & Olmstead @ River St.
32	Pipe Problem	Circular Crack	34.1	12 to 11-1	Alley Doone & Olmstead @ River St.
32	Service Conn	Infiltration	34.1	12 to 11-1	Alley Doone & Olmstead @ River St.
32	Pipe Problem	Possible Sag	45.4	12 to 11-1	Alley Doone & Olmstead @ River St.
32	Pipe Problem	End Sag	89.1	12 to 11-1	Alley Doone & Olmstead @ River St.
32	Pipe Problem	Possible Sag	99.0	12 to 11-1	Alley Doone & Olmstead @ River St.
32	Pipe Problem	1/3 Pipe	114.3	12 to 11-1	Alley Doone & Olmstead @ River St.
32	Pipe Problem	End Sag	132.8	12 to 11-1	Alley Doone & Olmstead @ River St.
32	Pipe Problem	Possible Sag	134.2	12 to 11-1	Alley Doone & Olmstead @ River St.
32	Pipe Problem	End Sag	150.1	12 to 11-1	Alley Doone & Olmstead @ River St.
32	Pipe Problem	Circular Crack	158.3	12 to 11-1	Alley Doone & Olmstead @ River St.
32	Pipe Problem	Infiltration	158.3	12 to 11-1	Alley Doone & Olmstead @ River St.
32	Service Conn.	Roots	190.9	12 to 11-1	Alley Doone & Olmstead @ River St.
32	Pipe Problem	Possible Sag	197.3	12 to 11-1	Alley Doone & Olmstead @ River St.

Lift Station #3 Sewer Inspection Project (Continued)

Site ID #	*Sewer Type*	*Problem*	*Distance from* MH	MH #	Street Address
32	Pipe	Problem	End Sag	224.4	12 to 11-1	Alley Doone & Olmstead @ River St.
32	Pipe	Problem	Circular Crack	256.2	12 to 11-1	Alley Doone & Olmstead @ River St.
32	Pipe	Problem	Infiltration	256.2	12 to 11-1	Alley Doone & Olmstead @ River St.
32	Pipe	Problem	Possible Sag	289.8	12 to 11-1	Alley Doone & Olmstead @ River St.
32	Pipe	Problem	End Sag	328.7	12 to 11-1	Alley Doone & Olmstead @ River St.
32	Pipe	Problem	Possible Sag	333.3	12 to 11-1	Alley Doone & Olmstead @ River St.
32	Manhole	Infiltration	342.0	12 to 11-1	Alley Doone & Olmstead @ River St.
33	Pipe	Problem	Possible Sag	35.5	11-1 to 11	Alley Doone & Olmstead @ River St.
38	Pipe	Problem	Possible Sag	5.7	6-1RR to 6RR	Railroad Pl & Newton St.
38	Pipe	Problem	Grout in Line	26.8	6-1RR to 6RR	Railroad Pl & Newton St.
38	Joint	Problem	Seperated	35.5	6-1RR to 6RR	Railroad Pl & Newton St.
38	Joint	Problem	Infiltration	91.6	6-1RR to 6RR	Railroad Pl & Newton St.
38	Pipe	Problem	Circular Crack	168.4	6-1RR to 6RR	Railroad Pl & Newton St.
38	Pipe	Problem	Infiltration	168.4	6-1RR to 6RR	Railroad Pl & Newton St.
40	Service	Conn.	Infiltration	23.8	6-5RR to 6RR	Railroad Pl & Newton St.
41	Service	Conn.	Infiltration	123.0	2-7 to 2-8	Alley Park&Falls & Newton
42	Service	Conn.	Infiltration	7.2	2-7 to 2	Alley Park&Falls & Newton
42	Pipe	Problem	Possible Sag	7.4	2-7 to 2	Alley Park&Falls & Newton
42	Pipe	Problem	¼ Pipe	12.8	2-7 to 2	Alley Park&Falls & Newton
42	Pipe	Problem	End Sag	41.8	2-7 to 2	Alley Park&Falls & Newton
43	Manhole	Infiltration	2.0	11 to 11-A	Doone Ave. & Newton St.
43	Pipe	Problem	Possible Sag	2.0	11 to 11-A	Doone Ave. & Newton St.

Lift Station #3 Sewer Inspection Project (Continued)

Site ID #	*Sewer Type*	*Problem*	*Distance from* MH	MH #	Street Address
43	Pipe Problem	1/3 Pipe	22.6	11 to 11-A	Doone Ave. & Newton St.
44	Pipe Problem	Possible Sag	28.4	11 to 10	Doone Ave. & Newton St.
44	Pipe Problem	End Sag	37.2	11 to 10	Doone Ave. & Newton St.
44	Pipe Problem	Possible Sag	45.0	11 to 10	Doone Ave. & Newton St.
44	Pipe Problem	¼ Pipe	48.9	11 to 10	Doone Ave. & Newton St.
44	Service Conn.	Infiltration	54.0	11 to 10	Doone Ave. & Newton St.
44	Pipe Problem	1/3 Pipe	75.3	11 to 10	Doone Ave. & Newton St.
44	Pipe Problem	End Sag	93.1	11 to 10	Doone Ave. & Newton St.
44	Pipe Problem	Possible Sag	125.0	11 to 10	Doone Ave. & Newton St.
44	Pipe Problem	1/3 Pipe	141.8	11 to 10	Doone Ave. & Newton St.
44	Pipe Problem	End Sag	160.6	11 to 10	Doone Ave. & Newton St.
44	Pipe Problem	Possible Sag	167.2	11 to 10	Doone Ave. & Newton St.
44	Pipe Problem	End Sag	173.4	11 to 10	Doone Ave. & Newton St.
45	Pipe Problem	Possible Sag	21.5	10 to 8	Doone Ave. & Newton St.
45	Pipe Problem	½ Pipe	30.6	10 to 8	Doone Ave. & Newton St.
45	Joint Problem	Infiltration	38.4	10 to 8	Doone Ave. & Newton St.
45	Joint Problem	Separated	38.4	10 to 8	Doone Ave. & Newton St.
45	Pipe Problem	End Sag	66.7	10 to 8	Doone Ave. & Newton St.
45	Pipe Problem	Possible Sag	99.0	10 to 8	Doone Ave. & Newton St.
45	Pipe Problem	½ Pipe	103.9	10 to 8	Doone Ave. & Newton St.

Lift Station #3 Sewer Inspection Project (Continued)

Site ID #	*Sewer Type*	*Problem*	*Distance from* MH	MH #	Street Address
45	Pipe Problem	End Sag	107.9	10 to 8	Doone Ave. & Newton St.
45	Pipe Problem	Possible Sag	111.2	10 to 8	Doone Ave. & Newton St.
45	Pipe Problem	½ Pipe	118.2	10 to 8	Doone Ave. & Newton St.
45	Joint Problem	Separated	119.3	10 to 8	Doone Ave. & Newton St.
45	Pipe Problem	Circular Crack	123.8	10 to 8	Doone Ave. & Newton St.
46	Pipe Problem	Possible Sag	61.0	11A to 11B	Doone Ave. & Newton St.
46	Pipe Problem	¼ Pipe	65.7	11A to 11B	Doone Ave. & Newton St.
46	Pipe Problem	End Sag	76.4	11A to 11B	Doone Ave. & Newton St.
46	Service Conn.	Infiltration	105.2	11A to 11B	Doone Ave. & Newton St.
47	Pipe Problem	Grease	6.4	11-B to 11-C	Doone Ave. & Newton St.
47	Pipe Problem	End Grease	15.7	11-B to 11-C	Doone Ave. & Newton St.
47	Pipe Problem	Grease	90.0	11-B to 11-C	Doone Ave. & Newton St.
48	Pipe Problem	Broken	73.8	10-1 to 10	Doone Ave. & Maple St.
48	Pipe Problem	Soil Visible	73.8	10-1 to 10	Doone Ave. & Maple St.
53	Service Conn.	Infiltration	103.0	11-2 to 11-1	8325 Olmstead Pl. SE
54	Pipe Problem	Possible Sag	3.0	7 to 8	Maple Ave. & Newton St.
54	Pipe Problem	½ Pipe	23.5	7 to 8	Maple Ave. & Newton St.
54	Pipe Problem	¼ Pipe	38.2	7 to 8	Maple Ave. & Newton St.
54	Pipe Problem	½ Pipe	48.2	7 to 8	Maple Ave. & Newton St.
54	Pipe Problem	¼ Pipe	65.9	7 to 8	Maple Ave. & Newton St.
54	Pipe Problem	½ Pipe	90.6	7 to 8	Maple Ave. & Newton St.
54	Pipe Problem	¼ Pipe	109.4	7 to 8	Maple Ave. & Newton St.

Lift Station #3 Sewer Inspection Project (Continued)

Site ID #	*Sewer Type*	*Problem*	*Distance from* MH	MH #	Street Address
54	Pipe Problem	½ Pipe	127.7	7 to 8	Maple Ave. & Newton St.
54	Pipe Problem	¼ Pipe	139.5	7 to 8	Maple Ave. & Newton St.
54	Pipe Problem	½ Pipe	151.4	7 to 8	Maple Ave. & Newton St.
54	Pipe Problem	End Sag	162.3	7 to 8	Maple Ave. & Newton St.
56	Pipe Problem	Debris	3.0	5 to 5-1	Falls Ave. & Newton St.
56	Joint Problem	Min Deposit	27.5	5 to 5-1	Falls Ave. & Newton St.
56	Pipe Problem	Crack	129.2	5 to 5-1	Falls Ave. & Newton St.
56	Pipe Problem	Infiltration	129.2	5 to 5-1	Falls Ave. & Newton St.
56	Pipe Problem	End Crack	130.6	5 to 5-1	Falls Ave. & Newton St.
56	Service Conn.	Infiltration	199.5	5 to 5-1	Falls Ave. & Newton St.
58	Pipe Problem	Circular Crack	179.1	5-1to 5-2	Alley Betta/Gamma St. Falls Ave.
59	Pipe Problem	Pipe Sag	10.0	6Newt to 5 Newt	Maple Ave. & Newton St.
59	Pipe Problem	½ Pipe	54.3	6Newt to 5 Newt	Maple Ave. & Newton St.
59	Pipe Problem	¼ Pipe	96.0	6Newt to 5 Newt	Maple Ave. & Newton St.
59	Joint Problem	Min Deposit	102.5	6Newt to 5 Newt	Maple Ave. & Newton St.
59	Joint Problem	Infiltration	102.5	6Newt to 5 Newt	Maple Ave. & Newton St.
59	Pipe Problem	½ Pipe	134.6	6Newt to 5 Newt	Maple Ave. & Newton St.
59	Pipe Problem	¼ Pipe	156.7	6Newt to 5 Newt	Maple Ave. & Newton St.
59	Pipe Problem	End Sag	215.4	6Newt to 5 Newt	Maple Ave. & Newton St.
60	Pipe Problem	Possible Sag	3.0	5Newt to 4 Newt	Maple Ave. & Newton St.
60	Pipe Problem	½ Pipe	16.5	5Newt to 4 Newt	Maple Ave. & Newton St.
60	Pipe Problem	¼ Pipe	35.8	5Newt to 4 Newt	Maple Ave. & Newton St.

Lift Station #3 Sewer Inspection Project (Continued)

Site ID #	*Sewer Type*	*Problem*	*Distance from* MH	MH #	Street Address
60	Pipe Problem	End Sag	119.0	5Newt to 4 Newt	Maple Ave. & Newton St.
61	Pipe Problem	Possible Sag	35.3	4Newt to 3Newt	Maple Ave. & Newton St.
61	Pipe Problem	¼ Pipe	40.3	4Newt to 3Newt	Maple Ave. & Newton St.
61	Pipe Problem	End Sag	67.0	4Newt to 3Newt	Maple Ave. & Newton St.
61	Pipe Problem	Possible Sag	76.9	4Newt to 3Newt	Maple Ave. & Newton St.
61	Pipe Problem	¼ Pipe	84.7	4Newt to 3Newt	Maple Ave. & Newton St.
62	Pipe Problem	Possible Sag	60.0	3 Newt to 2 Park	Park Ave. & Newton St.
62	Pipe Problem	End Sag	104.3	3 Newt to 2 Park	Park Ave. & Newton St.
62	Joint Problem	Infiltration	128.0	3 Newt to 2 Park	Park Ave. & Newton St.
62	Joint Problem	Min Deposit	128.0	3 Newt to 2 Park	Park Ave. & Newton St.
62	Pipe Problem	Possible Sag	129.9	3 Newt to 2 Park	Park Ave. & Newton St.
62	Pipe Problem	End Sag	140.3	3 Newt to 2 Park	Park Ave. & Newton St.
63	Pipe Problem	Possible Sag	225.9	4Falls to 5 Falls	Falls Ave. & Beta St.
63	Pipe/Coupler	Infiltration	234.8	4Falls to 5 Falls	Falls Ave. & Beta St.
63	Joint Problem	Offset	291.1	4Falls to 5 Falls	Falls Ave. & Beta St.
65	Pipe Problem	Infiltration	245.3	3Euclid to 2 Euclid	Euclid Ave. & Alpha St.
65	Pipe Problem	Circular Crack	316.1	3Euclid to 2 Euclid	Euclid Ave. & Alpha St.
66	Service Conn	Infiltration	74.3	2Euclid to 2 Park	Euclid Ave. & Alpha St.
68	Pipe Problem	Possible Sag	110.3	6-3 to 6-4	Mount Si Highschool
68	Joint Problem	Offset	268.3	6-3 to 6-4	Mount Si Highschool
68	Pipe Problem	1/3 Pipe	272.5	6-3 to 6-4	Mount Si Highschool
68	Pipe Problem	½ Pipe	278.8	6-3 to 6-4	Mount Si Highschool

Lift Station #3 Sewer Inspection Project (Continued)

Site ID #	*Sewer Type*	*Problem*	*Distance from* MH	MH #	Street Address
68	Joint Problem	Offset	295.0	6-3 to 6-4	Mount Si Highschool
68	Pipe Problem	End Sag	300.3	6-3 to 6-4	Mount Si Highschool
68	Pipe Problem	Possible Sag	320.3	6-3 to 6-4	Mount Si Highschool
68	Pipe Problem	½ Pipe	329.1	6-3 to 6-4	Mount Si Highschool
68	Joint Problem	Offset Pipe	329.1	6-3 to 6-4	Mount Si Highschool
68	Pipe Problem	End Sag	332.2	6-3 to 6-4	Mount Si Highschool
69	Pipe Problem	Possible Sag	52.2	6-3 to 6-2	Mount SI Highschool
69	Pipe Problem	Broken Pipe	64.6	6-3 to 6-2	Mount SI Highschool
69	Pipe Problem	Soil Visible	64.6	6-3 to 6-2	Mount SI Highschool
69	Pipe Problem	End Sag	68.1	6-3 to 6-2	Mount SI Highschool
69	Pipe Problem	Possible Sag	124.0	6-3 to 6-2	Mount SI Highschool
69	Pipe Problem	End Sag	141.3	6-3 to 6-2	Mount SI Highschool
69	Pipe Problem	Possible Sag	245.0	6-3 to 6-2	Mount SI Highschool
69	Pipe Problem	¼ Pipe	271.6	6-3 to 6-2	Mount SI Highschool
69	Joint Problem	Offset	279.0	6-3 to 6-2	Mount SI Highschool
69	Pipe Problem	End Sag	302.1	6-3 to 6-2	Mount SI Highschool

Lift Station #4 Sewer Inspection Project (Continued)

Site ID #	*Sewer Type*	*Problem*	*Distance from* MH	MH #	Street Address
1	Pipe Problem	Possible Sag	62.0	1-5-1 to 1-5-2	Park St. & Mountain Ave
1	Pipe Problem	¼ Pipe	82.8	1-5-1 to 1-5-2	Park St. & Mountain Ave
1	Pipe Problem	¼ Pipe	108.3	1-5-1 to 1-5-2	Park St. & Mountain Ave
1	Pipe Problem	End Sag	141.8	1-5-1 to 1-5-2	Park St. & Mountain Ave
2	Pipe Problem	Possible Sag	282.5	1-5-1 to 1-5-2	Park St. & Mountain Ave
2	Pipe Problem	1/3 Pipe	288.1	1-5-1 to 1-5-2	Park St. & Mountain Ave
2	Joint Problem	Infiltration	294.9	1-5-1 to 1-5-2	Park St. & Mountain Ave
2	Joint Problem	Separated	294.9	1-5-1 to 1-5-2	Park St. & Mountain Ave
2	Pipe Problem	End Sag	295.9	1-5-1 to 1-5-2	Park St. & Mountain Ave
3	Pipe Problem	Possible Sag	4.7	1-5-1 to 1-5-2	Park St. & Mountain Ave
3	Pipe Problem	¼ Pipe	8.2	1-5-1 to 1-5-2	Park St. & Mountain Ave
3	Pipe Problem	End Sag	36.3	1-5-1 to 1-5-2	Park St. & Mountain Ave
3	Pipe Problem	Possible Sag	46.8	1-5-1 to 1-5-2	Park St. & Mountain Ave
3	Pipe Problem	End Sag	61.5	1-5-1 to 1-5-2	Park St. & Mountain Ave
3	Pipe Problem	Possible Sag	80.3	1-5-1 to 1-5-2	Park St. & Mountain Ave
3	Pipe Problem	1/4 Pipe	109.8	1-5-1 to 1-5-2	Park St. & Mountain Ave
3	Pipe Problem	End Sag	117.7	1-5-1 to 1-5-2	Park St. & Mountain Ave
3	Pipe Problem	Possible Sag	122.1	1-5-1 to 1-5-2	Park St. & Mountain Ave
3	Pipe Problem	End Sag	141.4	1-5-1 to 1-5-2	Park St. & Mountain Ave
3	Pipe Problem	Possible Sag	159.8	1-5-1 to 1-5-2	Park St. & Mountain Ave
3	Pipe Problem	End Sag	189.4	1-5-1 to 1-5-2	Park St. & Mountain Ave
4	Pipe Problem	Possible Sag	88.0	1-4-2 to 1-4	Spruce St. & Mountain Ave

Lift Station #4 Sewer Inspection Project (Continued)

Site ID #	*Sewer Type*	*Problem*	*Distance from* MH	MH #	Street Address
4	Pipe Problem	End Sag	98.3	1-4-2 to 1-4	Spruce St. & Mountain Ave
4	Pipe Problem	Possible Sag	115.9	1-4-2 to 1-4	Spruce St. & Mountain Ave
4	Pipe Problem	¼ Pipe	121.4	1-4-2 to 1-4	Spruce St. & Mountain Ave
4	Pipe Problem	End Sag	148.7	1-4-2 to 1-4	Spruce St. & Mountain Ave
6	Service Conn	Infiltration	189.0	1-6 to 1-5	Spruce St. & Meadowbrook
6	Service Conn	Infiltration	255.7	1-6 to 1-5	Spruce St. & Meadowbrook
12	Pipe Problem	Possible Sag	17.2	1-4 to 1-3	Walnut St. & mountain Ave.
12	Pipe Problem	End Sag	31.4	1-4 to 1-3	Walnut St. & mountain Ave.
12	Service Conn	Infiltration	135.5	1-4 to 1-3	Walnut St. & mountain Ave.
15	Service Conn	Rocks/Dirt	101.8	9-1 to 9-2	Park St. & Mountain Ave.
15	Service Conn	Infiltration	101.8	9-1 to 9-2	Park St. & Mountain Ave.
15	Pipe Problem	Debris	102.0	9-1 to 9-2	Park St. &Mountain Ave.
16	Pipe Problem	Infiltration	22.1	9-1 to 9-0	Park St. &Mountain Ave.
17	Service Conn	Infiltration	171.4	9 to 8	Park St. Meadowbrook Way
18	Pipe Problem	Possible Sag	3.0	11 to 12	Park St. Meadowbrook Way
18	Pipe Problem	End Sag	41.4	11 to 12	Park St. Meadowbrook Way
21	Pipe Problem	Spiral Crack	36.2	10 to 9	Park St. and Meadowbrook Way
21	Pipe Problem	End Crack	37.0	10 to 9	Park St. and Meadowbrook Way
21	Other	Repair Coupler	279.3	10 to 9	Park St. and Meadowbrook Way
21	Other	Repair Coupler	281.8	10 to 9	Park St. and Meadowbrook Way
25	Service Conn	Infiltration	39.9	4 to 5	Spruce St. & Meadowbrook Ave.
25	Pipe Problem	Possible Sag	76.5	4 to 5	Spruce St. & Meadowbrook Ave.

Lift Station #4 Sewer Inspection Project (Continued)

Site ID #	*Sewer Type*	*Problem*	*Distance from* MH	MH #	Street Address
25	Pipe Problem	End Sag	94.1	4 to 5	Spruce St. & Meadowbrook Ave.
25	Pipe Problem	Possible Sag	109.9	4 to 5	Spruce St. & Meadowbrook Ave.
25	Pipe Problem	End Sag	139.3	4 to 5	Spruce St. & Meadowbrook Ave.

Lift Station (K3 Liftstation) Sewer Inspection Project (Continued)

Site ID #	*Sewer Type*	*Problem*	*Distance from* MH	MH #	Street Address
1	Other	Repair Coupler	34.3	D/S MH to U/S MH	K3 Liftstation
1	Pipe Problem	Possible Sag	34.3	D/S MH to U/S MH	K3 Liftstation
1	Pipe Problem	¼ Pipe	37.3	D/S MH to U/S MH	K3 Liftstation
1	Pipe Problem	End Sag	44.9	D/S MH to U/S MH	K3 Liftstation
1	Pipe Problem	Debris	83.2	D/S MH to U/S MH	K3 Liftstation

APPENDIX J

ELECTRICAL LOAD STUDY

ELECTRICAL LOAD STUDY REPORT

Client: City Of Snoqualmie
Job Title: General Sewer / Ww Facility Plan
Load Study Title: Total Facility (All MCCs And Panel A)

Job Number: 11543

For this Load Study, Calculations for Ampacity are Based on a Bus Configuration of 460 Volts, 3 Phase

Base Loading Calculations					
Total Connected Load:	1546.1 kVA	1940.6 Amps			
Peak Demand Loading:	1534.9 kVA	1926.5 Amps	25% of Largest Motor:	0.0 kVA	0.0 Amps
Anticipated Average Loading:	1316.4 kVA	1652.3 Amps			

Min. Feeder Ampacity: 1,926 Amps *(Peak Demand + 25% of Largest Motor)*

System Sized Selected at: **2,000.0 Amps** 1,593.4 Equivalent kVA at 460 Volts, 3 Phase

Bus-Connected Loads

		Load Calculations					
		Connected		Anticipated Average		Peak Demand	
Description	HP	kVA	Usage	kVA	Usage	kVA	Notes:
0 Motors, Load Total:							
Panel A (Dewatering/Drying Building)	Z	184.0	100%	184.0	100%	184.0	
MCC D	Z	75.9	100%	75.9	100%	75.9	
MCC C	Z	197.6	100%	197.6	100%	197.6	
MCC E	Z	346.7	84%	291.5	97%	335.4	
MCC B	Z	135.1	84%	113.6	100%	135.1	
MCC A	Z	606.9	75%	453.9	100%	606.9	
6 Non-Motor Loads, Load Total:		1,546.1		1,316.4		1,534.9	

* Value Includes Spare Design Capacity Adjustment.

System Load Summary

(Calculations based on 460 V) *D.F. = % Demand Factor*

Load Description	Connected Loads STARTER	HP	kVA	Utility Load Demand D.F.	kVA	Generator Loads D.F.	kVA
MCC A			606.9	100	606.9	0	0.0
MCC B			135.1	100	135.1	0	0.0
MCC C			197.6	100	197.6	0	0.0
MCC D			75.9	100	75.9	0	0.0
MCC E			346.7	97	335.4	0	0.0
Panel A (Dewatering/Drying Building)			184.0	100	184.0	0	0.0
Total kVA:			1,546.1		1,534.9		0.0
Resulting Ampacity At 460 VAC, 3 PH:			1,940.6		1,926.5		0.0

Feeder Design Minimum Sizing: 25% of Largest Motor (in Amps): 0.0
Resulting Minimum Feeder Ampacities 1,926.5 0.0

System Sized At: 2000 A Spare Capacity Over Peak Demand: 73.5 A, 3.7%

Notes:

Job Site Address:
WA,

Utility of Jurisdiction:

$$kW = \frac{I * V * \phi Mx * PF}{1000} = kVA * PF \qquad kVA = \frac{I * V * \phi Mx}{1000} = kW / PF$$

$$HP = \frac{I * V * \phi Mx * \%E * PF}{746} \qquad HP = \frac{kVA * \%E * PF}{0.746} = \frac{kW * \%E}{0.746}$$

Where:
ϕMx = 1 for 1 Phase
ϕMx = 2 for 2 Phase
ϕMx = SQRT(3) for 3 Phase

Calculations Made By	Calculations Approved By	Date
	, P.E.	August 10, 2012

* Value Includes Spare Design Capacity Adjustment.

ELECTRICAL LOAD STUDY REPORT

Client: City Of Snoqualmie
Job Title: General Sewer / Ww Facility Plan
Load Study Title: MCC A

Job Number: 11543

For this Load Study, Calculations for Ampacity are Based on a Bus Configuration of 460 Volts, 3 Phase

	Base Loading Calculations				
Total Connected Load:	606.9 kVA	761.7 Amps			
Peak Demand Loading:	606.9 kVA	761.7 Amps	25% of Largest Motor:	24.7 kVA	31.0 Amps
Anticipated Average Loading:	453.9 kVA	569.7 Amps			
Min. Feeder Ampacity:	793 Amps	*(Peak Demand + 25% of Largest Motor)*			
System Sized Selected at:	**2,000.0 Amps**	1,593.4 Equivalent kVA at 460 Volts, 3 Phase			

Bus-Connected Loads

		Load Calculations					
		Connected		Anticipated Average		Peak Demand	
Description	HP	kVA	Usage	kVA	Usage	kVA	Notes:
[01 MTR 12], Motor, Ditch #1, Aerator #1	100	98.8	100%	98.8	100%	98.8	RVSS
[01 MTR 13], Motor, Ditch #2, Aerator #1	100	98.8	100%	98.8	100%	98.8	RVSS
[01 MTR 14], Motor, Reclaimed Water Pump #1	100	98.8	100%	98.8	100%	98.8	RVSS
[01 MTR 15], Motor, Reclaimed Water Pump #2	100	98.8	0%	0.0	100%	98.8	RVSS
[01 MTR 16], Motor, Clarifier Drive #1	1	1.7	100%	1.7	100%	1.7	FVNR
[01 MTR 17], Motor, Clarifier Drive #2	1	1.7	100%	1.7	100%	1.7	FVNR
[01 MTR 18], Motor, RAS Pump Station #1, Pump #1	25	27.1	100%	27.1	100%	27.1	VFD 6PLS
[01 MTR 19], Motor, RAS Pump Station #1, Pump #2	25	27.1	0%	0.0	100%	27.1	VFD 6PLS
[01 MTR 20], Motor, RAS Pump Station #2, Pump #1	25	27.1	100%	27.1	100%	27.1	VFD 6PLS
[01 MTR 21], Motor, RAS Pump Station #2, Pump #2	25	27.1	0%	0.0	100%	27.1	VFD 6PLS
10 Motors, Load Total:	502	506.9		353.9		506.9	
[01 CV 01], Control Valve, Clarifier #1	Z	5.0	100%	5.0	100%	5.0	
[01 CV 02], Control Valve, Clarifier #2	Z	5.0	100%	5.0	100%	5.0	
[01 CV 03], Control Valve, WAS Recirculation	Z	5.0	100%	5.0	100%	5.0	
[01 HT 01], Heater, 20 kW	H	20.0	100%	20.0	100%	20.0	
[01 HT 02], Heater, 20 kW	H	20.0	100%	20.0	100%	20.0	
[01 HT 03], Heater, 15 kW	H	15.0	100%	15.0	100%	15.0	
[01 HT 04], Heater, 15 kW	H	15.0	100%	15.0	100%	15.0	
[01 HT 05], Heater, 5 kW	H	5.0	100%	5.0	100%	5.0	
[01 HT 06], Heater, 5 kW	H	5.0	100%	5.0	100%	5.0	
[01 HT 07], Heater, 5 kW	H	5.0	100%	5.0	100%	5.0	
10 Non-Motor Loads, Load Total:		100.0		100.0		100.0	

* Value Includes Spare Design Capacity Adjustment.

System Load Summary

(Calculations based on 460 V) *D.F. = % Demand Factor*

Load Description	STARTER	Connected Loads HP	Connected Loads kVA	Utility Load Demand D.F.	Utility Load Demand kVA	Generator Loads D.F.	Generator Loads kVA
[01 MTR 12], Motor, Ditch #1, Aerator #1	RVSS	100.0	98.8	100	98.8	0	0.0
[01 MTR 13], Motor, Ditch #2, Aerator #1	RVSS	100.0	98.8	100	98.8	0	0.0
[01 MTR 14], Motor, Reclaimed Water Pump #1	RVSS	100.0	98.8	100	98.8	0	0.0
[01 MTR 15], Motor, Reclaimed Water Pump #2	RVSS	100.0	98.8	100	98.8	0	0.0
[01 MTR 16], Motor, Clarifier Drive #1	FVNR	1.0	1.7	100	1.7	0	0.0
[01 MTR 17], Motor, Clarifier Drive #2	FVNR	1.0	1.7	100	1.7	0	0.0
[01 MTR 18], Motor, RAS Pump Station #1, Pump #1	VFD 6PLS	25.0	27.1	100	27.1	0	0.0
[01 MTR 19], Motor, RAS Pump Station #1, Pump #2	VFD 6PLS	25.0	27.1	100	27.1	0	0.0
[01 MTR 20], Motor, RAS Pump Station #2, Pump #1	VFD 6PLS	25.0	27.1	100	27.1	0	0.0
[01 MTR 21], Motor, RAS Pump Station #2, Pump #2	VFD 6PLS	25.0	27.1	100	27.1	0	0.0
[01 CV 01], Control Valve, Clarifier #1			5.0	100	5.0	0	0.0
[01 CV 02], Control Valve, Clarifier #2			5.0	100	5.0	0	0.0
[01 CV 03], Control Valve, WAS Recirculation			5.0	100	5.0	0	0.0
[01 HT 01], Heater, 20 kW			20.0	100	20.0	0	0.0
[01 HT 02], Heater, 20 kW			20.0	100	20.0	0	0.0
[01 HT 03], Heater, 15 kW			15.0	100	15.0	0	0.0
[01 HT 04], Heater, 15 kW			15.0	100	15.0	0	0.0
[01 HT 05], Heater, 5 kW			5.0	100	5.0	0	0.0
[01 HT 06], Heater, 5 kW			5.0	100	5.0	0	0.0
[01 HT 07], Heater, 5 kW			5.0	100	5.0	0	0.0
Total kVA:			606.9		606.9		0.0
Resulting Ampacity At 460 VAC, 3 PH:			761.7		761.7		0.0

Feeder Design Minimum Sizing: 25% of Largest Motor (in Amps): 31.0
Resulting Minimum Feeder Ampacities 792.7 31.0

System Sized At: 2000 A Spare Capacity Over Peak Demand: 1,238.3 A, 61.9%

Notes:

Job Site Address:
WA,

Utility of Jurisdiction:

$$kW = \frac{I * V * \phi Mx * PF}{1000} = kVA * PF \qquad kVA = \frac{I * V * \phi Mx}{1000} = kW / PF$$

$$HP = \frac{I * V * \phi Mx * \%E * PF}{746} \qquad HP = \frac{kVA * \%E * PF}{0.746} = \frac{kW * \%E}{0.746}$$

Where:
ϕMx = 1 for 1 Phase
ϕMx = 2 for 2 Phase
ϕMx = SQRT(3) for 3 Phase

* Value Includes Spare Design Capacity Adjustment.

ELECTRICAL LOAD STUDY REPORT

Client: City Of Snoqualmie
Job Title: General Sewer / Ww Facility Plan
Load Study Title: MCC B

Job Number: 11543

For this Load Study, Calculations for Ampacity are Based on a Bus Configuration of 460 Volts, 3 Phase

	Base Loading Calculations					
Total Connected Load:	135.1 kVA	169.6 Amps				
Peak Demand Loading:	135.1 kVA	169.6 Amps	25% of Largest Motor:	6.8 kVA	8.5 Amps	
Anticipated Average Loading:	113.6 kVA	142.6 Amps				
Min. Feeder Ampacity:	178 Amps	*(Peak Demand + 25% of Largest Motor)*				
System Sized Selected at:	**2,000.0 Amps**	1,593.4 Equivalent kVA at 460 Volts, 3 Phase				

Bus-Connected Loads

		Connected		Load Calculations: Anticipated Average		Peak Demand		
Description	HP	kVA	Usage	kVA	Usage	kVA	Notes:
[01 MTR 01], Motor, Ditch #1, Anerobic Mixer #1	3	3.8	100%	3.8	100%	3.8	FVNR
[01 MTR 02], Motor, Ditch #1, Anerobic Mixer #2	3	3.8	100%	3.8	100%	3.8	FVNR
[01 MTR 03], Motor, Ditch #1, Anoxic Mixer #1	7.5	8.8	100%	8.8	100%	8.8	FVNR
[01 MTR 04], Motor, WAS Pump #1	20	21.5	100%	21.5	100%	21.5	FVNR
[01 MTR 05], Motor, WAS Pump #2	20	21.5	0%	0.0	100%	21.5	FVNR
[01 MTR 06], Motor, WAS Room Sump Pump	7.5	8.8	100%	8.8	100%	8.8	FVNR
[01 MTR 07], Motor, Air Compressor #1	10	11.2	100%	11.2	100%	11.2	FVNR
[01 MTR 08], Motor, Air Comprssor #2	10	11.2	100%	11.2	100%	11.2	FVNR
[01 MTR 09], Motor, Filter Air Blower	25	27.1	100%	27.1	100%	27.1	FVNR
[01 MTR 10], Motor, Filter BackWash #1	7.5	8.8	100%	8.8	100%	8.8	FVNR
[01 MTR 11], Motor, Filter BackWash #2	7.5	8.8	100%	8.8	100%	8.8	FVNR
11 Motors, Load Total:	**121**	**135.1**		**113.6**		**135.1**	

0 Non-Motor Loads, Load Total:

* Value Includes Spare Design Capacity Adjustment.

System Load Summary

(Calculations based on 460 V) *D.F. = % Demand Factor*

Load Description	Connected Loads STARTER	HP	kVA	Utility Load Demand D.F.	kVA	Generator Loads D.F.	kVA
[01 MTR 01], Motor, Ditch #1, Anerobic Mixer #1	FVNR	3.0	3.8	100	3.8	0	0.0
[01 MTR 02], Motor, Ditch #1, Anerobic Mixer #2	FVNR	3.0	3.8	100	3.8	0	0.0
[01 MTR 03], Motor, Ditch #1, Anoxic Mixer #1	FVNR	7.5	8.8	100	8.8	0	0.0
[01 MTR 04], Motor, WAS Pump #1	FVNR	20.0	21.5	100	21.5	0	0.0
[01 MTR 05], Motor, WAS Pump #2	FVNR	20.0	21.5	100	21.5	0	0.0
[01 MTR 06], Motor, WAS Room Sump Pump	FVNR	7.5	8.8	100	8.8	0	0.0
[01 MTR 07], Motor, Air Compressor #1	FVNR	10.0	11.2	100	11.2	0	0.0
[01 MTR 08], Motor, Air Comprssor #2	FVNR	10.0	11.2	100	11.2	0	0.0
[01 MTR 09], Motor, Filter Air Blower	FVNR	25.0	27.1	100	27.1	0	0.0
[01 MTR 10], Motor, Filter BackWash #1	FVNR	7.5	8.8	100	8.8	0	0.0
[01 MTR 11], Motor, Filter BackWash #2	FVNR	7.5	8.8	100	8.8	0	0.0
Total kVA:			135.1		135.1		0.0
Resulting Ampacity At 460 VAC, 3 PH:			169.6		169.6		0.0

Feeder Design Minimum Sizing: 25% of Largest Motor (in Amps): 8.5
Resulting Minimum Feeder Ampacities 178.1 8.5

System Sized At: 2000 A Spare Capacity Over Peak Demand: 1,830.4 A, 91.5%

Notes:

Job Site Address:
WA,

Utility of Jurisdiction:

$$kW = \frac{I * V * \phi Mx * PF}{1000} = kVA * PF \qquad kVA = \frac{I * V * \phi Mx}{1000} = kW / PF$$

$$HP = \frac{I * V * \phi Mx * \%E * PF}{746} \qquad HP = \frac{kVA * \%E * PF}{0.746} = \frac{kW * \%E}{0.746}$$

Where:
ϕMx = 1 for 1 Phase
ϕMx = 2 for 2 Phase
ϕMx = SQRT(3) for 3 Phase

Calculations Made By

Calculations Approved By
, P.E.

August 10, 2012
Date

* Value Includes Spare Design Capacity Adjustment.

ELECTRICAL LOAD STUDY REPORT

Client: City Of Snoqualmie
Job Title: General Sewer / Ww Facility Plan
Load Study Title: MCC C

Job Number: 11543

For this Load Study, Calculations for Ampacity are Based on a Bus Configuration of 460 Volts, 3 Phase

Base Loading Calculations						
Total Connected Load:	197.6 kVA	248.0 Amps				
Peak Demand Loading:	197.6 kVA	248.0 Amps	25% of Largest Motor:	24.7 kVA	31.0 Amps	
Anticipated Average Loading:	197.6 kVA	248.0 Amps				

Min. Feeder Ampacity: 279 Amps *(Peak Demand + 25% of Largest Motor)*

System Sized Selected at: **2,000.0 Amps** 1,593.4 Equivalent kVA at 460 Volts, 3 Phase

Bus-Connected Loads

	Load Calculations						
	Connected		Anticipated Average		Peak Demand		
Description	HP	kVA	Usage	kVA	Usage	kVA	Notes:
[01 MTR 24], Motor, Ditch #1, Aerator #2	100	98.8	100%	98.8	100%	98.8	VFD 6PwBP
[01 MTR 25], Motor, Ditch #2, Aerator #2	100	98.8	100%	98.8	100%	98.8	VFD 6PwBP
2 Motors, Load Total:	200	197.6		197.6		197.6	

0 Non-Motor Loads, Load Total:

* Value Includes Spare Design Capacity Adjustment.

System Load Summary

(Calculations based on 460 V) *D.F. = % Demand Factor*

Load Description	STARTER	HP	Connected Loads kVA	Utility Load Demand D.F.	Utility Load Demand kVA	Generator Loads D.F.	Generator Loads kVA
[01 MTR 24], Motor, Ditch #1, Aerator #2	VFD/BP	100.0	98.8	100	98.8	0	0.0
[01 MTR 25], Motor, Ditch #2, Aerator #2	VFD/BP	100.0	98.8	100	98.8	0	0.0
Total kVA:			197.6		197.6		0.0
Resulting Ampacity At 460 VAC, 3 PH:			248.0		248.0		0.0
Feeder Design Minimum Sizing: 25% of Largest Motor (in Amps):			31.0				
Resulting Minimum Feeder Ampacities			279.0		31.0		

System Sized At: 2000 A Spare Capacity Over Peak Demand: 1,752.0 A, 87.6%

Notes:

Job Site Address:
WA,

Utility of Jurisdiction:

$$kW = \frac{I * V * \phi Mx * PF}{1000} = kVA * PF \qquad kVA = \frac{I * V * \phi Mx}{1000} = kW / PF$$

$$HP = \frac{I * V * \phi Mx * \%E * PF}{746} \qquad HP = \frac{kVA * \%E * PF}{0.746} = \frac{kW * \%E}{0.746}$$

Where:
- ϕMx = 1 for 1 Phase
- ϕMx = 2 for 2 Phase
- ϕMx = SQRT(3) for 3 Phase

Calculations Made By	Calculations Approved By	Date
	, P.E.	August 10, 2012

* Value Includes Spare Design Capacity Adjustment.

ELECTRICAL LOAD STUDY REPORT

Client: City Of Snoqualmie
Job Title: General Sewer / Ww Facility Plan
Load Study Title: MCC D

Job Number: 11543

For this Load Study, Calculations for Ampacity are Based on a Bus Configuration of 460 Volts, 3 Phase

	Base Loading Calculations				
Total Connected Load:	75.9 kVA	95.2 Amps			
Peak Demand Loading:	75.9 kVA	95.2 Amps	25% of Largest Motor:	6.8 kVA	8.5 Amps
Anticipated Average Loading:	75.9 kVA	95.2 Amps			

Min. Feeder Ampacity: 104 Amps *(Peak Demand + 25% of Largest Motor)*

System Sized Selected at: **600.0 Amps** 478.0 Equivalent kVA at 460 Volts, 3 Phase

Bus-Connected Loads

	Load Calculations						
	Connected		Anticipated Average		Peak Demand		
Description	HP	kVA	Usage	kVA	Usage	kVA	**Notes:**
[01 MTR 27], Motor, Ditch #2, Anerobic Mixer #1	6.3	6.5	100%	6.5	100%	6.5	FVNR
[01 MTR 27], Motor, Ditch #2, Anerobic Mixer #2	6.3	6.5	100%	6.5	100%	6.5	FVNR
[01 MTR 28], Motor, Ditch #2, Anoxic Mixer #1	7.5	8.8	100%	8.8	100%	8.8	FVNR
[01 MTR 29], Motor, Filter #3 BackWash And Misc Controls	3	3.8	100%	3.8	100%	3.8	FVNR
[01 MTR 30], Motor, Future RAS	25	27.1	100%	27.1	100%	27.1	RVSS
[01 MTR 31], Motor, Future WAS	20	21.5	100%	21.5	100%	21.5	RVSS
[01 MTR 32], Motor, Future Clarifier Drive	1	1.7	100%	1.7	100%	1.7	FVNR
7 Motors, Load Total:	69	75.9		75.9		75.9	

0 Non-Motor Loads, Load Total:

* Value Includes Spare Design Capacity Adjustment.

System Load Summary

(Calculations based on 460 V) *D.F. = % Demand Factor*

Load Description	Connected Loads STARTER	HP	kVA	Utility Load Demand D.F.	kVA	Generator Loads D.F.	kVA
[01 MTR 27], Motor, Ditch #2, Anerobic Mixer #1	FVNR	6.3	6.5	100	6.5	0	0.0
[01 MTR 27], Motor, Ditch #2, Anerobic Mixer #2	FVNR	6.3	6.5	100	6.5	0	0.0
[01 MTR 28], Motor, Ditch #2, Anoxic Mixer #1	FVNR	7.5	8.8	100	8.8	0	0.0
[01 MTR 29], Motor, Filter #3 BackWash And Misc Control	FVNR	3.0	3.8	100	3.8	0	0.0
[01 MTR 30], Motor, Future RAS	RVSS	25.0	27.1	100	27.1	0	0.0
[01 MTR 31], Motor, Future WAS	RVSS	20.0	21.5	100	21.5	0	0.0
[01 MTR 32], Motor, Future Clarifier Drive	FVNR	1.0	1.7	100	1.7	0	0.0
Total kVA:			75.9		75.9		0.0
Resulting Ampacity At 460 VAC, 3 PH:			95.2		95.2		0.0

Feeder Design Minimum Sizing: 25% of Largest Motor (in Amps): 8.5
Resulting Minimum Feeder Ampacities 103.7 8.5

System Sized At: 600 A Spare Capacity Over Peak Demand: 504.8 A, 84.1%

Notes:

Job Site Address:
WA,

Utility of Jurisdiction:

$$kW = \frac{I * V * \phi Mx * PF}{1000} = kVA * PF \qquad kVA = \frac{I * V * \phi Mx}{1000} = kW / PF$$

$$HP = \frac{I * V * \phi Mx * \%E * PF}{746} \qquad HP = \frac{kVA * \%E * PF}{0.746} = \frac{kW * \%E}{0.746}$$

Where:
ϕMx = 1 for 1 Phase
ϕMx = 2 for 2 Phase
ϕMx = SQRT(3) for 3 Phase

Calculations Made By	Calculations Approved By , P.E.	August 10, 2012 Date

* Value Includes Spare Design Capacity Adjustment.

ELECTRICAL LOAD STUDY REPORT

Client: City Of Snoqualmie
Job Title: General Sewer / Ww Facility Plan
Load Study Title: MCC E

Job Number: **11543**

For this Load Study, Calculations for Ampacity are Based on a Bus Configuration of 460 Volts, 3 Phase

Base Loading Calculations						
Total Connected Load:	346.7 kVA	435.1 Amps				
Peak Demand Loading:	335.4 kVA	421.0 Amps	25% of Largest Motor:	6.8 kVA	8.5 Amps	
Anticipated Average Loading:	291.5 kVA	365.8 Amps				
Min. Feeder Ampacity:	429 Amps	*(Peak Demand + 25% of Largest Motor)*				
System Sized Selected at:	**300.0 Amps**	239.0 Equivalent kVA at 460 Volts, 3 Phase				

Bus-Connected Loads

		Load Calculations					
	Connected		Anticipated Average		Peak Demand		
Description	HP	kVA	Usage	kVA	Usage	kVA	Notes:
[01 MTR 22], Motor, In Plant Pump Station, Pump #1	25	27.1	100%	27.1	100%	27.1	FVNR
[01 MTR 23], Motor, In Plant Pump Station, Pump #2	25	27.1	0%	0.0	100%	27.1	FVNR
2 Motors, Load Total:	**50**	**54.2**		**27.1**		**54.2**	
[01 BKR 01], Breaker, Headworks	Z	30.0	100%	30.0	100%	30.0	estimate
[01 BKR 02], Breaker, Transformer Primary, Equipment Building, 112.5 k	Z	112.5	75%	84.4	90%	101.3	estimate
[01 BKR 03], Breaker, Panelboard OB	Z	100.0	100%	100.0	100%	100.0	estimate
[01 BKR 04], Breaker, Non-Pot Water Pump	Z	35.0	100%	35.0	100%	35.0	estimate
[01 BKR 05], Breaker, Water Plant Emergency Power	Z	15.0	100%	15.0	100%	15.0	estimate
5 Non-Motor Loads, Load Total:		**292.5**		**264.4**		**281.3**	

* Value Includes Spare Design Capacity Adjustment.

System Load Summary

(Calculations based on 460 V) *D.F. = % Demand Factor*

Load Description	Connected Loads STARTER	HP	kVA	Utility Load Demand D.F.	kVA	Generator Loads D.F.	kVA
[01 MTR 22], Motor, In Plant Pump Station, Pump #1	FVNR	25.0	27.1	100	27.1	0	0.0
[01 MTR 23], Motor, In Plant Pump Station, Pump #2	FVNR	25.0	27.1	100	27.1	0	0.0
[01 BKR 01], Breaker, Headworks			30.0	100	30.0	0	0.0
[01 BKR 02], Breaker, Transformer Primary, Equipment Bu			112.5	90	101.3	0	0.0
[01 BKR 03], Breaker, Panelboard OB			100.0	100	100.0	0	0.0
[01 BKR 04], Breaker, Non-Pot Water Pump			35.0	100	35.0	0	0.0
[01 BKR 05], Breaker, Water Plant Emergency Power			15.0	100	15.0	0	0.0
Total kVA:			346.7		335.4		0.0
Resulting Ampacity At 460 VAC, 3 PH:			435.1		421.0		0.0

Feeder Design Minimum Sizing: 25% of Largest Motor (in Amps): 8.5
Resulting Minimum Feeder Ampacities 429.5 8.5

System Sized At: 300 A Spare Capacity Over Peak Demand: -121.0 A, -40.3%

Notes:

Job Site Address:
WA,

Utility of Jurisdiction:

$$kW = \frac{I * V * \phi Mx * PF}{1000} = kVA * PF \qquad kVA = \frac{I * V * \phi Mx}{1000} = kW / PF$$

$$HP = \frac{I * V * \phi Mx * \%E * PF}{746} \qquad HP = \frac{kVA * \%E * PF}{0.746} = \frac{kW * \%E}{0.746}$$

Where:
ϕMx = 1 for 1 Phase
ϕMx = 2 for 2 Phase
ϕMx = SQRT(3) for 3 Phase

August 10, 2012

Calculations Made By | Calculations Approved By , P.E. | Date

* Value Includes Spare Design Capacity Adjustment.

ELECTRICAL LOAD STUDY REPORT

Client: City Of Snoqualmie
Job Title: General Sewer / Ww Facility Plan
Load Study Title: Panel A (Dewatering/Drying Building)

Job Number: 11543

For this Load Study, Calculations for Ampacity are Based on a Bus Configuration of 460 Volts, 3 Phase

	Base Loading Calculations				
Total Connected Load:	184.0 kVA	230.9 Amps			
Peak Demand Loading:	184.0 kVA	230.9 Amps	25% of Largest Motor:	0.0 kVA	0.0 Amps
Anticipated Average Loading:	184.0 kVA	230.9 Amps			

Min. Feeder Ampacity: 231 Amps *(Peak Demand + 25% of Largest Motor)*

System Sized Selected at: 400.0 Amps 318.7 Equivalent kVA at 460 Volts, 3 Phase

Bus-Connected Loads

		Load Calculations					
		Connected		Anticipated Average		Peak Demand	
Description	HP	kVA	Usage	kVA	Usage	kVA	Notes:
0 Motors, Load Total:							
[01 BKR 06], Transformer Primary, 45 kVA, Sludge PB B	Z	24.0	100%	24.0	100%	24.0	
[01 BKR 07], Breaker, Heat Strip Control Panel	Z	6.0	100%	6.0	100%	6.0	
[01 BKR 08], Breaker, Centrifuge Control Panel	Z	52.0	100%	52.0	100%	52.0	
[01 BKR 09], Breaker, Dryer Control Panel And Biofilter Motor 10HP	Z	64.0	100%	64.0	100%	64.0	
[01 BKR 10], Breaker, Blower Tank Motors And Bar Screen Panel	Z	38.0	100%	38.0	100%	38.0	
5 Non-Motor Loads, Load Total:		184.0		184.0		184.0	

* Value Includes Spare Design Capacity Adjustment.

System Load Summary

(Calculations based on 460 V) *D.F. = % Demand Factor*

Load Description	Connected Loads STARTER	HP	kVA	Utility Load Demand D.F.	kVA	Generator Loads D.F.	kVA
[01 BKR 06], Transformer Primary, 45 kVA, Sludge PB B			24.0	100	24.0	0	0.0
[01 BKR 07], Breaker, Heat Strip Control Panel			6.0	100	6.0	0	0.0
[01 BKR 08], Breaker, Centrifuge Control Panel			52.0	100	52.0	0	0.0
[01 BKR 09], Breaker, Dryer Control Panel And Biofilter Mo			64.0	100	64.0	0	0.0
[01 BKR 10], Breaker, Blower Tank Motors And Bar Scree			38.0	100	38.0	0	0.0
Total kVA:			184.0		184.0		0.0
Resulting Ampacity At 460 VAC, 3 PH:			230.9		230.9		0.0

Feeder Design Minimum Sizing: 25% of Largest Motor (in Amps): 0.0
Resulting Minimum Feeder Ampacities 230.9 0.0

System Sized At: 400 A Spare Capacity Over Peak Demand: 169.1 A, 42.3%

Notes:

Job Site Address:
WA,

Utility of Jurisdiction:

$$kW = \frac{I * V * \phi Mx * PF}{1000} = kVA * PF \qquad kVA = \frac{I * V * \phi Mx}{1000} = kW / PF$$

$$HP = \frac{I * V * \phi Mx * \%E * PF}{746} \qquad HP = \frac{kVA * \%E * PF}{0.746} = \frac{kW * \%E}{0.746}$$

Where:
ϕMx = 1 for 1 Phase
ϕMx = 2 for 2 Phase
ϕMx = SQRT(3) for 3 Phase

Calculations Made By	Calculations Approved By	Date
	, P.E.	August 10, 2012

* Value Includes Spare Design Capacity Adjustment.

APPENDIX K

AERATION AND SLUDGE PRODUCTION CALCULATIONS

City of Snoqualmie
General Sewer/Wastewater Facility Plan

Activated Sludge Spreadsheet Model

Parameter	Design Conditions		Equation/Source	
	2018	Current Design, Permit Limit		
Influent Characteristics				
Flowrate - Max Month (mgd)	1.83	2.15	Includes IPPS flow	
BOD5 (lb/day)	1765	5220	Includes IPPS Load	
COD (lb/day)	3883	11484		
bCOD (lb/day)	2824	8352	[Infl CBOD5] * [Infl bCOD/CBOD5 ratio]	466
sCOD (lb/day)	854	2526	[Infl COD] * [Infl sCOD/COD ratio]	
sBOD5 (lb/day)	388	1148	[Infl CBOD] * [Infl sCBOD/CBOD ratio]	
TSS (lb/day)	1730	5220	Include 5% plant drainage recycle allowance (supernatant and drying bed drainage loading)	
VSS (lb/day)	1471	4437	[Infl TSS] * [Infl VSS/TSS ratio]	
NH4-N (lb/day)	371	466	[Infl TKN] * [Infl NH4/TKN ratio]	
TKN (lb/day)	553	696	Load Projections, Chapter 5	
nbVSS (lb/day)	588	1775	[Infl TSS] * [Infl VSS/TSS ratio] * [Infl nbVSS/VSS ratio]	
iTSS (lb/day)	260	783	[Infl TSS] - [Infl VSS]	
Kinetic and Stoichiometric Values				
Influent VSS/TSS ratio	0.85	0.85	Textbook	
Influent nbVSS/VSS ratio	0.4	0.4	Assumed	
Influent COD/BOD5 ratio	2.20	2.20	Textbook	
Influent bCOD/BOD5 ratio	1.60	1.60		
Influent sBOD5/BOD5 ratio	0.22	0.22		
Influent sCOD/COD ratio	0.22	0.22		
Influent rbCOD/COD ratio	0.155	0.155		
Influent NH4/TKN ratio	0.67	0.67		
MLSS temperature T (°C)	15	15	Winter minimum	
MLVSS/MLSS ratio	0.85	0.85	Design	
Y (lb VSS/lb bCOD)	0.4	0.4	M&E	
kd(20) (1/d)	0.1	0.1	M&E	
kd(T) (1/d)	0.082	0.082	[kd(20)] * (1.04 ^ ([T]-20))	
f-d	0.15	0.15	M&E	
Yn (lb VSS/lb TKN)	0.12	0.12	M&E	
Umax(20)	**0.75**	**0.75**	M&E	
Umax(T) (1/d)	0.530	0.530	[Umax(20)] * (1.072 ^ ([T]-20))	
kdn(20) (mg/L)	**0.17**	**0.17**	M&E	
kdn(T) (mg/L)	0.147	0.147	[kdn(20)] * (1.029 ^ ([T]-20))	
MLSS NH4 (mg/L)	1	1		
MLSS DO (mg/L)	2	2		
KsNH4(20) (mg/L)	**0.74**	**0.74**	M&E	
KsNH4(T) (mg/L)	0.572	0.572	[KsNH4(20)] * (1.053 ^ ([T]-20))	
KsDO (mg/L)	0.5	0.5	M&E	
Unet(T)	0.12	0.12	{Umax(T)*([NH4]/([NH4]+KsNH4(T)))*([DO]/([DO]+KsDO))}-kdn(T)	

City of Snoqualmie
General Sewer/Wastewater Facility Plan

Activated Sludge Spreadsheet Model

Parameter	Design Conditions		Equation/Source	
	2018	Current Design, Permit Limit		
Physical Dimensions				
Selector Sx-1 Volume (MG)	0.200	0.200	Input	
Anoxic Basin Volume (MG)	0.52	0.52		
Aeration Basin Volume (MG)	**2.08**	**2.08**	Input	
Total Volume (MG)	2.80	2.80	Input	
Active volume ratio	1.0	1.0	Input (proportion of volume consumed by settled grit)	
Total active volume (MG)	2.80	2.80	[Total volume] * [active volume ratio]	
Total active aerated Volume (MG)	2.08	2.08	[Total active volume] * [aerated phase ratio]	
Total Aerated Volume Ratio	0.74	0.74		
Total HRT (hr)	37	31		
Oxic Phase Design				
NOx (lb/d)	442	557	80% of Infl TKN	
Min Aerobic SRT (calc) (d)	**8.18**	**8.18**	1 / [Unet(T)], Theoretical SRT	
Min Aerobic SRT (safety) (d)	12.3	12.3	[SRT (calc)] , Design SRT SF=1.5 (typ.)	
Aerobic SRT (design) (d)	**12.3**	**12.3**		
Tot. Solids Retention Time (d)	15.0	15.9	[Vol]*[MLSS]/[Qwas]*[Xwas]	
Effl TSS (mg/L)	10	10		
Effl TKN (mg/L)	2.2	2.2		
Effl sbCOD (mg/L)	8	8		
Effl sbCOD S-o (lb/day)	122	143	[Effl sbCOD] * [Q] * 8.34)	
WAS Org-N (lb/day)	77	228		
TKN-ox (lb/day) (calc'd)	443	428		
TKN-ox (lb/day) (iter.)	443	428	[Infl TKN] - ([Effl TKN] * [Q] * 8.34)	
Grit removal ratio for iTSS	1	1		
Px - TSS (lb/day)	1598	4798		
Px-VSS (lb VSS/day)	1226	3679	$\frac{[Y]*([\text{Infl bCOD}]-[\text{Effl sbCOD}])}{(1+([k_{d(T)}]*[SRT]))*v}+\frac{[f_d]*[k_{d()}]*[Y]*([\text{Infl bCOD}]-[\text{Effl sbCOD}])*[\text{SRT}]}{(1+([k_{d(T)}]*[SRT]))*v}+\frac{[Y_n]*[TKN_{ox}]}{(1+([k_{dN(T)}]*[SRT]))*v}+[nbVSS]+[iTSS]$	
Px-bio (lb VSS/day)	638	1,904		
WAS Conc (mg/L)	11,000	11,000		Conservative
Px (gal/day)	**17,420**	**52,299**		
Total SRT (design)	16.6	16.6		
Aerobic Mass M (lb)	17,779	56,809		
Total Mass M (lb)	23,934	76,474		
MLSS (mg/L)	**1,025**	**3,275**		
Recycle ratio RAS	0.10	0.42	RAS pumps capable of performing up to 1.0	
MLVSS bio (mg/l)	452	1350		
Hetero biomass Xb (mg/l)	381	1158	MLVSS	
Px {A}	537	1633	((E$36*(E$14-E$75))/((1+(E$38*E$85))))	
Px {B}	81	248	((E$39*E$38*E$36*(E$14-E$75)*E$85)/((1+(E$38*E$85))))	
Px-N {C}	19	24	((E$40*E$78)/((1+(E$44*E$85))))	
Px {nbVSS}	588	1775	(E$79*E$21	
Px {iTSS}	260	783	(E$79*E$22)	

City of Snoqualmie
General Sewer/Wastewater Facility Plan

Activated Sludge Spreadsheet Model

Parameter	Design Conditions		Equation/Source		
	2018	Current Design, Permit Limit			
Anoxic System Design					
Target Effluent Nitrate (mg/L)	6.0	6.0	Reclaimed Permit limit is 10 mg/L Tot NH3-N		
Target Effluent Nitrate (lb/day)	91.6	107.6			
TKN-ox concentration (mg/L)	442.9	428.1			
Internal Recycle (IR) Ratio	3.73	3.75			
IR Max. Flow Rate (gpm)	4738	5601	MFR states IR capability is 3-15 x Qin		
Nitrates recycled (lb/day)	351	449			
Anoxic Selector Design					
Selector No. 1 F/M	1.0	1.0			
Selector No. 1 & 2 F/M	1.0	1.0			
Total Selector F/M	1.0	1.0			
Total Selector HRT (min)	157	134			
Anoxic Phase Design					
Total Anoxic Volume (MG)	0.520	0.520		HRT (hr)>>	5.8
Anoxic Cell No. 1 Volume (MG)	0.520	0.520			
Anoxic Cell No. 2 Volume (MG)	0.000	0.000			
Anoxic Cell No. 3 Volume (MG)	0.000	0.000			
Method 1: Pre-anoxic Model results per M&E figure					
Anoxic Cell					
F/Mbio (lb BOD5/lb MLVSS bio/d)	1.07	1.04			
SDNRt (lb NO3-DEN/lb MLVSS b/d)	0.184	0.184	Per M&E Fig. 8-23; assumes rbCOD/bCOD = 0.15, Theta = 1.026, M&E eqn. (8-44), t=15		
NO3-DEN (lb NO3/day)	304	924		5514.299567	
Total Anoxic Cell NO3-DEN (lb NO3/day)	304	924			
Target NO3-DEN (lb NO3/day)	351	449			
Influent Alkalinity (mg/L)	200	200	Estimated		
Net alk. Consumed (lb CaCO3/d)	1908	2372	Alkalinity consumed in nitrification with alkalinity recovery in denit		
Net alk. Consumed (mg CaCO3/L)	125	132			
Effluent Alkalinity (mg/L)	75	68			

City of Snoqualmie

Oxygen Requirements

	Inf. Characteristics		Conditions
			2032 Design Conditions (Max. Month Flow & Load)
1	Flow	mgd	***2.15***
2	BOD	lb/day	***5220***
3	TSS	lb/day	***5220***
4	VSS	lb/day	***4437***
5	NH4-N	lb/day	***466***
6	TKN	lb/day	***696***
	O2 Requirement Balance		
7	bCODin	lb/day	***8352***
8	bCODo	lb/day	***143***
9			
10			
11	TKN ox	lb/day	***428***
12	Px-bio	lb VSS/day	1904
13	NO3-DEN	lb/day	449
	NO3-DEN O2 Credit	lb/day	1285
14	Carbon AOR	lb/day	***5505***
15	Nitrogenous AOR	lb/day	***1853***
16	**AOR (O2 required)**	**lb/day**	***6073***
17	Peak AOR	lb/day	7895

Peak AOR	lb/hr	329.0
	lb/d	7895.5

Low Speed Surface Aerator Efficiency AOR		
Transfer Rate Low	lb 02/hp h	1.2
Transfer Rate High	lb 02/hp h	2.4
Tot. Required horsepower Low	hp	274
Tot. Required horsepower hi	hp	137
Reqd Hp per Ditch Lo Eff	hp	137
Reqd Hp per Ditch Hi Eff	hp	69

APPENDIX L

CLARIFIER ANALYSIS CURVES

City of Snoqualmie
Clarifier Solids Loading Rate (SLR)

Flow	Capacity/Criteria	Reference
AAF	0.8-1.2 (lb/sqft/hr)	Metcalf & Eddy
PHF	1.6 (lb/sqft/hr)	Metcalf & Eddy
PHF	20-30 (lb/d/sqft)	MOP FD-8
PHF	.833-1.25 (lb/hr/sqft)	MOP FD-8

RAS Flow (mgd)	Up to 2.5 MGD	
MLSS Conc (mg/L)	4,000	
2 Clarifiers Cross Sectional Area (sqft)	7693	
3 Clarifiers Cross Sectional Area (sqft)	11540	
Conversion Factor	8.34	(mg/L x MGD x 8.34 = lb/d)

	Influent Flow (mgd)	**RAS Flow 2 Clar**	**RAS Flow 3 Clar**	**SLR 2 Clarifiers in Operation (lb/sqft/d)**	**2 Clarifier in Oper. Clarifier Underflow (gpd/sqft)**	**3 Clar. In Oper. Underflow**	**SLR 3 Clarifiers in Operation (lb/sqft/d)**
2018 AAF	1.209	0.60	2.15	5	79	52	3.5
2018 MMF	1.830	2.50	3.22	7.9	325	279	5.3
2018 PDF	4.280	2.50	3.22	18.6	325	279	12.4
2018 PHF	5.700			24.7			
2032 MMF	1.950	2.50	3.22	8.5	325	279	5.6
2032 PDF	4.560	2.50	3.22	20	325	279	13.2
2032 PHF	5.890			25.541			17.0

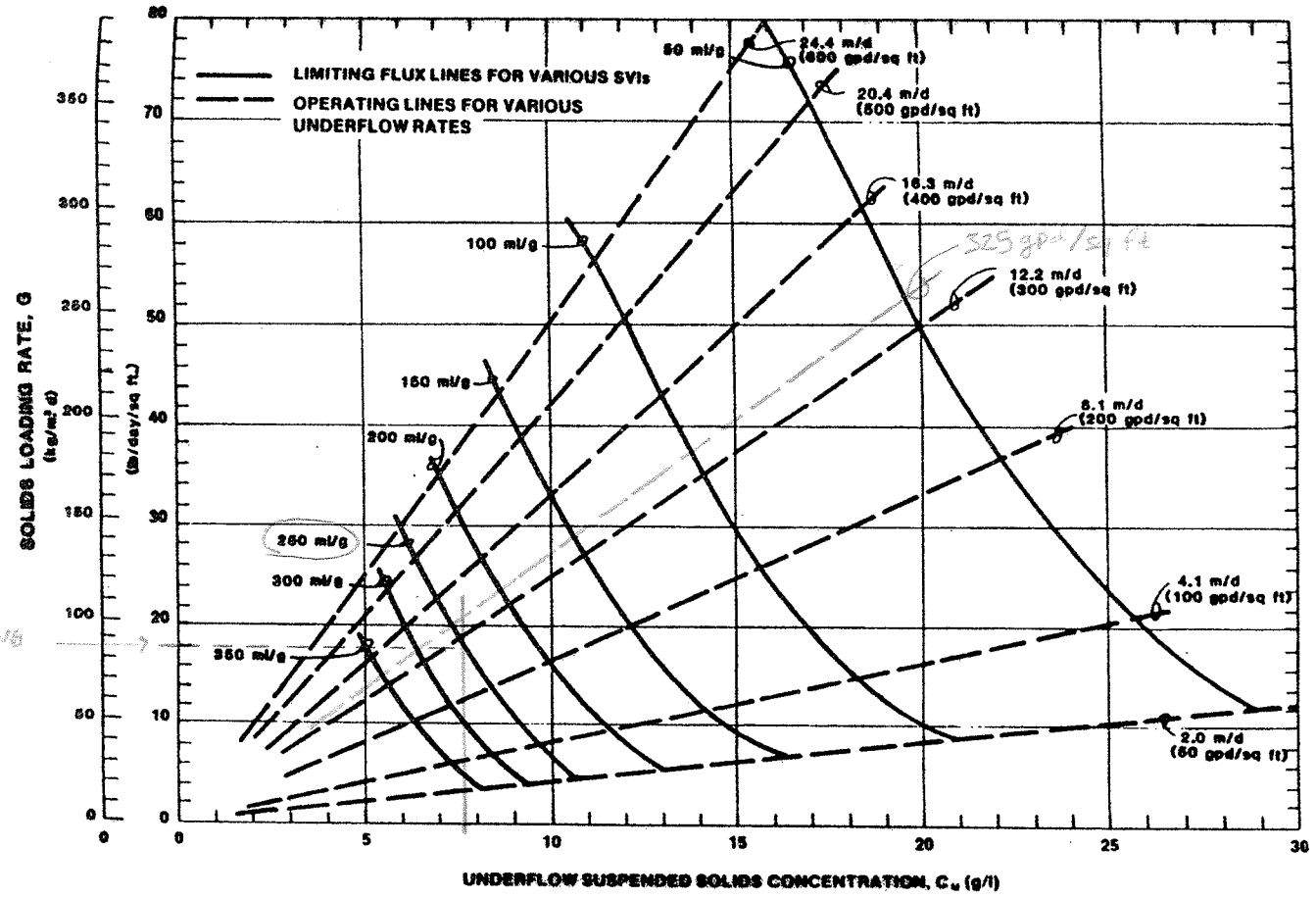

FIGURE 4.20 Daigger operating chart (Daigger, 1995).

RAS FLOW 2.5 MGD
RAS CONC. 7700 mg/L
UNDERFLOW 325 gpd/sq ft

2 CLARIFIERS IN OPERATION
MAX SLR = 18 lb/d sq ft

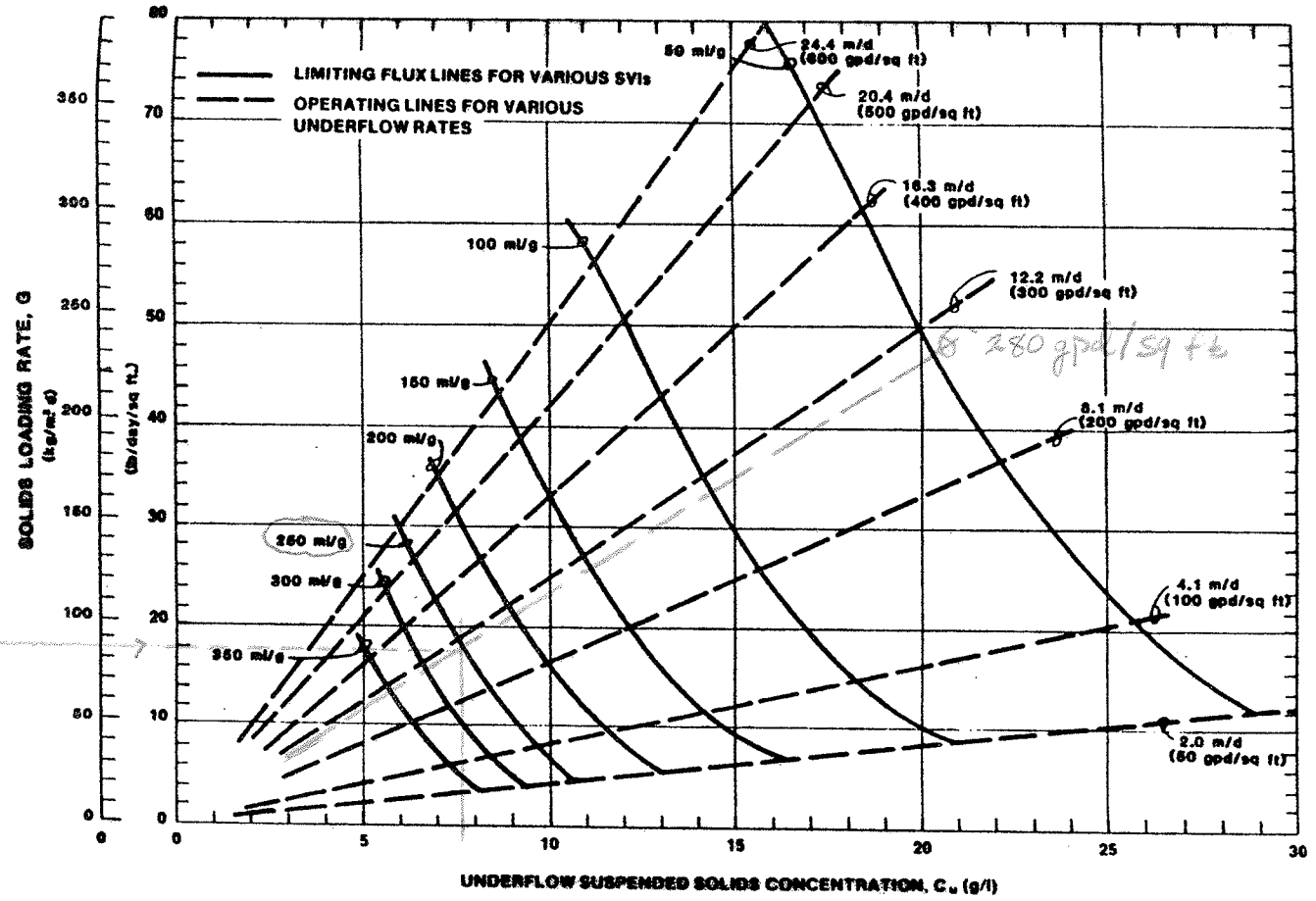

FIGURE 4.20 Daigger operating chart (Daigger, 1995).

RAS FLOW 3.22 MGD
RAS CONC. 7,700 mg/L
UNDERFLOW 280 gpd/sq ft

3 CLARIFIERS IN OPERATION
MAX SLR = 18 lb/d-sqft

APPENDIX M

AEROBIC DIGESTER SIZING CALCULATIONS

Snoqualmie
11543

Oxidation Ditch

SRT (d)	12.3	Approx. Historical is 29 d, use 12.3 per Design Data
V (gal)	1,060,000	Volume of each oxidation Ditch
X (mg/L)	4,000	Design Criteria
Xr (mg/L)	11000	Hist avg 13,000 use 11,000 for conservative est.
Pv (%)	85	% Volatile Suspendid Solids
Px (lb/d)	4,800	Lbs TSS/d, Based on sludge prod. calc

Aerobic Digester Sizing

Use thickener to go from ~1% solids to ~3.0% solids

$$V = \frac{Qi \cdot (Xi + Y \cdot Si)}{X \cdot (Kd \cdot Pv + 1/SRT)}$$

Equation 22.36 from WEF MOP-8

Qi (ft^3/d)	1,933	Inf avg flow rate	14,460	gpd
Xi (mg/L)	40,000	Inf Suspendid Solids (thickened)		
Y (% of inf with Primary solids %)	0	Portion of influent BOD consisting of raw primary solids		
X (mg/L)	26,000	Digester SS, assumed		
Kd (1/d)	0.082	Reaction rate constant		
Pv (%)	0.85	volatile fraction of digester suspendid solids %		
SRT (d)	60.00	solids retention time		
V (CUFT)	34,436			
V(gal)	**257,578**			
New AD Vol. (gal)	143,600	(total AD vol. - exist. AD vol.)		

APPENDIX N

DEVELOPER EXTENSION AGREEMENTS

SNOQUALMIE WASTEWATER TREATMENT FACILITIES DEVELOPER EXTENSION AGREEMENT

THIS AGREEMENT, made this 16th day of August, 1996, between the CITY OF SNOQUALMIE, a municipal corporation of the State of Washington (the "City") and Weyerhaeuser Real Estate Company, a Washington corporation ("WRECO"),

WITNESSETH:

I
RECITALS

1.1 The City is a municipal corporation of the State of Washington, organized under the Optional Municipal Code, title 35A RCW, located in King County, Washington.

1.2 WRECO owns certain real property located in the City on the Lake Alice Plateau, commonly known as Snoqualmie Ridge, and legally described on Exhibit A hereto.

1.3 The City owns certain real property located in the City (the "City Property"), legally described in Exhibit B hereto, upon which it operates the City's existing wastewater treatment facility.

1.4 On September 15, 1996, the City approved the Snoqualmie Ridge Mixed Use Final Plan (the "Final Plan"), a master plan for a mixed use development. All conditions referred to in these recitals are conditions of the Final Plan.

1.5 Condition 92 requires WRECO to demonstrate the availability of approved wastewater treatment prior to approval of each residential preliminary plat or development approval or the approval of each non-residential development project generating wastewater. The City's existing wastewater treatment facilities do not have capacity to serve Snoqualmie Ridge.

1.6 Condition 133 requires WRECO to pay all costs to design, permit and construct a new wastewater treatment facility, and necessary collection system improvements and associated infrastructure, as identified in the City of Snoqualmie Wastewater Facilities Engineering Report, 1995, ("the Engineering Report"). Condition 133 also requires WRECO to enter into a developer extension agreement with terms acceptable to the City that addresses the transfer of the facilities to the City, and provides that expenditures made by WRECO may be eligible for latecomer contributions under chapter 35.91 RCW to the extent that other new development uses a share of the capacity

FILED for Record at Request of
NAME BEN BAKKENTA
ADDRESS HILLIS CLARK MARTIN & PETERSON
CITY 1221 2nd Ave, Ste. 500
Seattle, WA 98101

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of the wastewater treatment facilities constructed by WRECO, or through other lawful financing mechanisms to recapture capital expenditures from users of the new wastewater treatment facility who are not users of the existing wastewater treatment facilities.

1.7 On February 21, 1995, the City published a *Final Environmental Impact Statement for the City of Snoqualmie Wastewater Treatment Plant Expansion* (the *"FEIS"*), addressing environmental impacts and mitigation measures associated with the preferred system design and with each of several alternatives.

1.8 The Engineering Report sets forth the basic design elements for the wastewater treatment facilities improvements. On August 14, 1995, the Washington State Department of Ecology ("Ecology") approved the Engineering Report.

1.9 The Engineering Report identifies as required improvements a new wastewater treatment plant, a new outfall, a reclaimed water force main, a new pump station, a new river crossing and new collection systems (the "Wastewater System Improvements"). The improvements identified in Exhibit C-1 ("the Phase 1 Facilities") are covered by this Agreement. The balance of the Wastewater System Improvements will be covered by separate subsequent agreements.

1.10 Construction of the Wastewater System Improvements is intended to be completed in phases. The Phase 1 Facilities are intended to be constructed immediately upon execution of this Agreement. The components identified in Exhibit C-2 (the "Phase 2 Facilities" and the "Later Phase Facilities") will be constructed at such time as the additional treatment capacity or other identified facilities are required for the development of Snoqualmie Ridge or other development. The extent and timing of construction of the Phase 2 Facilities and the Later Phase Facilities is dependent on the rate of growth and assessment of the performance of the Phase 1 Facilities. The sludge stabilization facilities identified in the Later Phase Facilities in Exhibit C-2 may never be required, depending upon the performance of the existing lagoons for sludge stabilization. Whether any sludge stabilization facilities will be required, and if so when, cannot be ascertained at this time, but the parties wish to recognize and provide for the contingency that such improvements may be required in order to provide adequate wastewater treatment for Snoqualmie Ridge.

1.11 Plans and specifications for construction of the Wastewater System Improvements have been approved (collectively "the Approved Plans and Specifications") as follows:

1.11.1 Plans and specifications entitled City of Snoqualmie, Washington, Wastewater Facility Improvements, Wastewater Treatment Plant, June, 1996, prepared by KCM, Inc.

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1.11.2 Plans and specifications entitled City of Snoqualmie, Washington, Wastewater Facility Improvements, Pipelines and Outfalls, June 1996, prepared by KCM, Inc.

1.11.3 Sheets 37 through 39 and 66 through 77 of 86 of a plan set entitled Phase 3 Construction Plans for Snoqualmie Ridge Parkway and Related Improvements, prepared by ESM, Inc.

1.11.4 Plans and specifications entitled Class A Transmission Pipeline, June 1996, prepared by Earth Tech.

1.12 The City and WRECO have entered into an Easement and Agreement dated August 16, 1996 (the "Easement"), pursuant to which the City has granted WRECO certain easement rights on the City Property, including construction, operating and access rights relating to the construction of the Wastewater System Improvements, subject to issuance by the City and other governmental entities of all requisite permits, approvals and authorizations.

1.13 The Phase 1 Facilities will serve the existing municipal Service Area, including Snoqualmie Ridge, which is depicted on Exhibit D. The City anticipates that the Service Area may be expanded to include other properties within the City's designated Urban Growth Area, and may possibly at some time be expanded to include the Joint Planning Area, an area outside the Urban Growth Area subject to an Interlocal Agreement among the City, WRECO and King County.

1.14 Condition 130 excludes from the definition of "new development" which may be subject to a requirement to reimburse a fair pro rata share of the cost of new Wastewater System Improvements all new construction, new utility connections, and expansion of existing utility connections on any existing platted residential lot within the existing city limits as of the date of Mixed Use approval, but includes as "new development" new connections for new subdivisions or expansion of commercial or institutional uses within the existing City limits after construction of the new facilities. Existing unbuilt platted residential lots and other lots or uses that do not constitute "new development" within the corporate limits are referred to herein as the "Exempt Properties." The Final Plan recognizes that the Exempt Properties are already served by the existing municipal wastewater treatment system which will be replaced by the Wastewater System Improvements, the construction of which would not have been necessary but for the requirements of Snoqualmie Ridge. All other real property within the Service Area, as it exists and may hereafter be expanded, excluding Snoqualmie Ridge and the Exempt Properties, which connect to or expand their usage of the City's wastewater facilities after construction of the Phase 1 facilities, directly or indirectly, may be subject to a requirement to reimburse a fair pro rata share of the cost of Wastewater System Improvements.

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1.15 The capacity of the completed Phase 1 Facilities will be limited by Biological Oxygen Demand ("BOD") at the oxidation ditch. For purposes of this Agreement, treatment capacity is expressed in Equivalent Residential Units ("ERUs") based upon the following assumptions:

1.15.1 One person equals 0.20 pounds per day BOD.

1.15.2 One residential unit equals 2.5 persons.

1.15.3 One ERU equals 0.5 pounds per day BOD

1.15.4 The basis for calculating ERUs for multi-family, commercial and other uses based on BOD will be developed by the City in consultation with WRECO and the design engineer.

1.16 The total design capacity of the wastewater treatment plant after construction of the Phase 2 Facilities is 3,610 pounds per day BOD (7,220 ERUs). The treatment capacity of the wastewater treatment plant to be constructed as part of the Phase 1 Facilities is 1,805 pounds per day BOD (3,610 ERUs). Total design capacity of Phase 2 will be based on both flow and BOD. The calculation of ERU capacity created by Phase 2 will be revisited on the basis of flow and BOD criteria when Phase 2 is implemented.

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1.17 All of the treatment capacity of the Phase 1 Facilities is allocated between Snoqualmie Ridge and the Exempt Properties. The allocation for the Exempt Properties is based upon the treatment capacity of the City's existing wastewater treatment facilities of 490 pounds per day BOD (980 ERUs) increased by a factor of 15% (563.5 pounds per day BOD, or 1,127 ERUs). All remaining treatment capacity for Phase 1 (1,241.5 pounds per day BOD, or 2,483 ERUs) is reserved to WRECO for use on Snoqualmie Ridge or to be made available by WRECO to third parties by private agreement.

1.18 Chapter 35.91 RCW and Snoqualmie Municipal Code 13.04.360 authorize the City to contract with owners and developers of real property to construct wastewater facilities and improvements for future conveyance to the City and to provide by contract for partial reimbursement of a fair pro rata share to the parties who construct wastewater facilities and improvements by owners of properties who did not contribute to the original cost and who will benefit from such facilities and improvements, at such time as such other properties tap into, use or otherwise connect, directly or indirectly or though laterals or branches, to the improved wastewater system.

1.19 Chapter 35.91 RCW requires an Engineer's Estimate and a public hearing thereon prior to entering a reimbursement contract (a "Latecomer Agreement"). Because all treatment capacity of the Phase 1 Facilities is allocated between Snoqualmie Ridge and the Exempt Properties, no reimbursement under chapter 35.91 RCW will be authorized until after construction of the Phase 2 Facilities and such Later Phase Facilities

as may be required, or WRECO relinquishes a portion of its reserved capacity. The parties acknowledge and agree that significant portions of the Phase 1 Facilities are sized for the full design capacity of the wastewater treatment plant, are a necessary precondition to the ability to construct the Phase 2 Facilities, and should be subject to partial reimbursement after construction of the Phase 2 Facilities. The cost of the Phase 1 Facilities should also be subject to partial reimbursement by Latecomer Agreement in the event WRECO relinquishes any reserved capacity, and such relinquished capacity is used by properties other than the Exempt Properties.

1.20 The following Agreement is made upon the basis of the foregoing recitals, and in consideration of the mutual promises and covenants herein, and the mutual benefits to be derived by the parties therefrom.

II
AGREEMENT

2.1 DEVELOPER EXTENSION PROVISIONS

2.1.1 Construction of Phase 1 Facilities. Subject to all other terms and conditions of this Agreement, WRECO shall construct the Phase 1 Facilities identified in Exhibit C-1, in conformity with the Approved Plans and Specifications, at its sole expense, commencing immediately upon execution of this Agreement or as soon thereafter as is practicable. In addition, the Phase 1 Facilities shall include provision of fixtures, furnishings and equipment as set forth on Exhibit C-1. WRECO's obligation for the Phase 1 Facilities shall be limited to the Approved Plans, and any modifications thereto approved by WRECO, the City and the Department of Ecology. WRECO shall have no obligation for subsequent improvements or modifications to the Phase 1 Facilities, unless otherwise expressly agreed, which may be required due to changed regulatory standards or different interpretation of existing standards.

2.1.2 Construction of Phase 2 and Later Phase Facilities. Subject to all other terms and conditions of this Agreement, WRECO shall construct the Phase 2 Facilities and Later Phase Facilities, including the sludge stabilization facilities if required to meet the requirements of the Department of Ecology, in accordance with plans and specifications to be approved by the City and Department of Ecology, based upon regulatory standards then in effect. WRECO's obligation to construct the Phase 2 Facilities and/or Later Phase Facilities shall be released if (a) the City in its sole discretion elects to construct such facilities through a ULID or other municipal financing arrangement, or (b) the City contracts with a third party to construct such facilities, provided, WRECO shall have the right of first refusal to construct such facilities upon such terms as would be acceptable to the City for construction by such third party. The extent of the improvements to be constructed shall be determined by assessment of the performance of the Phase 1 Facilities by the City, and by the City and WRECO if

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WRECO will construct the Phase 2 and/or Later Phase Facilities. The timing of construction shall be determined by the rate of growth in Snoqualmie, including Snoqualmie Ridge, and the City's Urban Growth Area. WRECO shall have no obligation to construct the Phase 2 or Later Phase Facilities to serve development in any area other than Snoqualmie Ridge, but the availability of approved wastewater treatment for any proposed development project on Snoqualmie Ridge must be demonstrated before such development project generating wastewater may be approved. In consideration of WRECO's undertaking the Phase 1 improvements, if WRECO constructs Phase 2 and/or Later Phase Facilities or if the City constructs Phase 2 and/or Later Phase Facilities under a ULID, WRECO shall be allowed to reserve a sufficient amount of total plant capacity to serve Snoqualmie Ridge and any other properties that have contributed to the cost of Phase 1 and/or Phase 2 and Later Phase Facilities.

2.1.3 Permits and Approvals. City permitting officials shall review plans, issue permits, and inspect construction for the Phase 1 Facilities, as provided in the Snoqualmie Municipal Code. In instances where a permit is issued to the City for activities associated with construction of the Phase 1 Facilities, the City hereby appoints and constitutes WRECO as the City's authorized agent, to proceed in accordance with those permit authorizations. The City agrees to apply for, at WRECO's sole expense, any required modifications or approvals of the City's NPDES permit.

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2.1.4 Construction Costs. WRECO shall pay all costs of designing, permitting, engineering and constructing the Phase 1 Facilities, subject to possible Latecomer Provisions of Section 2.2 of this Agreement, and further subject to any private cost sharing agreements between WRECO and third parties. If the City or a third party constructs the Phase 2 and/or Later Phase Facilities, WRECO shall have no further obligation to finance or construct such improvements.

2.1.5 Extension of Service. The City shall provide sewer service to Snoqualmie Ridge, subject to the terms and conditions set forth herein and to be set forth in any other Wastewater System Agreements. Such extension of sewer service shall commence immediately upon construction of required facilities and regulatory approvals.

2.1.6 Assurance of Completion of Phase 1 Facilities. Subject to issuance by the City of necessary permits, and upon mutual approval and execution of this Agreement, WRECO shall proceed with construction of the Phase 1 Facilities. Within twenty (20) days after WRECO issues a written notice to its contractor to proceed with the construction of physical improvements upon the City Property, WRECO shall supply to the City a bond or other security acceptable to the City assuring that, upon demand by the City, construction of the Phase 1 Facilities (as the same are presently defined or may hereafter be modified by mutual agreement) will be completed; provided, the schedule of construction of such Facilities may be revised as reasonably necessary so long as the construction area is adequately secured for public safety and is stabilized against erosion

and other environmental damage. For these purposes, "construction" shall mean and include underground shoring or foundation work, actual installation of casings, vaults, tanks, collection or distribution lines, or other permanent facilities, but shall not include pre-construction activities such as design and engineering, acquisition and stockpiling of equipment, supplies and materials, surveying, testing and sampling, logging, clearing, debris removal, soils compaction, grading, excavation and other site-preparation work.

2.1.7 Allocation of Treatment Capacity.

2.1.7.1 There is allocated and reserved to the Exempt Properties 1,127 ERUs of the treatment capacity created by the Phase 1 Facilities.

2.1.7.2 There is allocated and reserved to WRECO the remaining treatment capacity of the Phase 1 Facilities, which is assumed to be 2,483 ERUs on the basis of the Engineering Report, up to a maximum of 3,420 ERUs. The basis for calculation of the actual number of ERUs allocated and reserved to WRECO shall be the treatment capacity of the Phase 1 Facilities as determined by Ecology for purposes of the City's National Pollution Discharge Elimination System ("NPDES") permit, less the treatment capacity allocated and reserved to the Exempt Properties, up to the maximum of 3,420 ERUs. Phase 1 capacity that exceeds the sum of the Exempt Properties allocation plus the WRECO maximum reservation shall be made available within the City's service area, subject to latecomers contribution.

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2.1.7.3 The City will issue a Certificate of Wastewater Treatment Availability in ERUs equal to such allocated and reserved capacity, provided, there may be adjustments to the remaining available capacity from time to time based upon the actual performance of the facilities, the conditions of future NPDES permits and the actual ERUs used by Snoqualmie Ridge and WRECO's assignees as determined through the building permit process with the issuance of Sewer Use Certificates pursuant to chapter 13.04 of the Snoqualmie Municipal Code.

2.1.7.4 WRECO shall have the right to assign, under terms and conditions set by WRECO in its sole discretion, any portion of its reserved capacity to other properties within the corporate limits of the City, and the City shall not allow connections to the wastewater system which would reduce the unused treatment capacity below the amount reserved to WRECO, without written notice of such assignment, or written relinquishment by WRECO of reserved treatment capacity. For assignment of capacity outside of the City limits, City consent will be required.

2.1.7.5 If WRECO or the City construct the Phase 2 improvements, in consideration of WRECO's construction of the Phase 1 improvements, WRECO shall have the right to reserve an amount of total treatment facility capacity, as calculated based on flow and BOD, in an amount sufficient to serve Snoqualmie Ridge

and any other properties that have contributed to the cost of construction of Phase 1 and Phase 2.

2.1.8 Wastewater Reuse. The City shall supply, or allow WRECO to supply, Snoqualmie Ridge with wastewater treated to a level in compliance with applicable state standards for the reuse of wastewater ("Reclaimed Water") for the Snoqualmie Parkway landscape irrigation and the Snoqualmie Ridge golf course, subject to the functional capacity of the wastewater treatment system, and any applicable provisions of law. The basis for rates and charges for delivery of Class A Reclaimed Water shall be reserved to future agreement.

2.1.9 Construction.

2.1.9.1 WRECO shall fully comply with all terms and conditions of the Construction Easement, including but not limited to the requirement that at all times during construction of the Phase 1 Facilities, the existing wastewater treatment lagoons and associated plant shall remain fully operational.

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2.1.9.2 Prior to commencement of construction, WRECO shall request a pre-construction conference, to be attended by the City Engineer, the City's consultant inspectors, WRECO's designated representative, WRECO's contractors and subcontractors, the project engineer, the design engineer and representatives of affected utilities. WRECO shall be responsible for notifying the required attendees, and shall submit a proposed agenda for the meeting sufficiently in advance of the meeting date for inclusion into the City's agenda.

2.1.9.3 At a location approved by the City, and as the first order of business, WRECO shall furnish for the duration of the project a field office of not less than 120 square feet for exclusive use by the City. The field office shall be provided with lights, heat, ventilation, drafting stool, layout table (3' x 5' minimum) desk, chair and desk. Shelves and a wall space or bulletin board shall be provided. Sanitary facilities shall be provided nearby. A touch-tone telephone with local service for the City's exclusive use shall be provided. WRECO shall furnish and maintain a facsimile machine at the site that is available for the City's use during normal business hours.

2.1.9.4 The work shall be subject to full-time inspection by the City, and the City and its consultants shall have full access to the site at all times. Tests shall be performed by WRECO's consultant technicians and laboratories as required by the City. The City may perform required testing at its option. WRECO shall provide adequate notice for inspection and/or testing as required and prior to work. Work may not be covered without the approval of the City, and if covered without such approval, must be uncovered for inspection if requested by the City.

2.1.9.5 Error or omissions discovered in the plans or specifications during the course of construction shall be corrected in writing to the satisfaction of the City Engineer immediately upon discovery.

2.1.9.6 WRECO shall provide the City for its review and approval all submittals required by the Plans and Specifications. No materials or equipment shall be incorporated into the construction unless first approved by the City Engineer or the City Engineer's designee.

2.1.9.7 WRECO shall submit all shop drawing to the City Engineer for review and approval. No construction requiring shop drawings shall commence until such drawings have been approved. The City shall approve all substitutions of materials or equipment submitted as "equal" by the Engineer of Record.

2.1.9.8 The City shall make potable water available at the site on a trial basis, with costs shared. WRECO and the City shall cooperate so that adequate water is available at all times to operate the existing wastewater treatment facilities.

2.1.9.9 WRECO shall be responsible for obtaining all permits for the use of public thoroughfares, and shall conform to the requirements of all applicable ordinances, codes and regulations thereof. WRECO shall be responsible for maintenance of such thoroughfares, and shall repair or cause to be repaired, at its sole expense, all damage to the same resulting from construction operations.

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2.1.9.10 WRECO shall provide its own waste sites. No soil removed from the site may be wasted in the floodplain of the Snoqualmie River. Wasting of construction, demolition and landclearing materials shall comply with all applicable regulations.

2.1.9.11 No work shall be done between the hours of 7:00 p.m. and 7:00 a.m., nor on weekends or holidays observed by the City of Snoqualmie, unless requested 48 hours in advance and approved by the City. Noise shall be limited to that allowed under Snoqualmie Municipal Code 8.16.050, and public disturbance noises are prohibited between the hours of 10:00 p.m. and 7:00 a.m., as provided in Snoqualmie Municipal Code 9.36.020.

2.1.9.12 WRECO is responsible for obtaining easements from third parties for construction of facilities across any real property not owned by WRECO or the City.

2.1.10 Startup. Prior to conveyance but upon completion of the raw sewage force main, headworks, oxidation ditch, including nutrient removal section, one clarifier, inplant pump station, ultraviolet disinfection, outfall, necessary piping, pumps, valves, vaults, controls and testing ("Phase 1 Base Facilities"), the City shall have the right to divert all or a portion of its sewage flows from the existing lagoons to the Phase 1

Base Facilities and operate said completed facilities and WRECO shall have the right to initiate flows. The remainder of the facilities shall be put into service as soon as they are completed and tested. WRECO's contractor, equipment suppliers and construction manager shall cooperate with the City and its consultants to make timely corrections and provide advice and instruction as required to effect an efficient startup of the new facilities.

2.1.11 Conveyance of Facilities. Prior to conveyance, WRECO shall obtain, record and convey or assign any and all required franchises and easements for ingress, egress and utilities, provided, the City shall assist in the acquisition of any such easements or other property interests. Upon completion of the Phase 1 Facilities, or any portion thereof, and upon the City's acceptance thereof pursuant to paragraph 2.1.12: (i) WRECO shall convey such facilities to the City by Bill of Sale; and (ii) shall grant to the City or obtain for the City's use and benefit any and all required easements for ingress, egress, conveyance pipelines, and utilities, and convey or assign the same to the City, and shall convey by statutory warranty deed any other real property not already owned by the City upon which facilities are located, provided the City shall assist in the acquisition of any such easements or other property interests. The conveyance may be subject to a service contract or other agreement for private operation, as provided in Mixed Use Condition 133(b). The Phase 1 Facilities may but are not required to be deemed complete for purposes of this paragraph, although certain minor work not affecting the functioning thereof remains to be done, upon the approval of the City.

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2.1.12 Conditions of Acceptance. Acceptance of the Facilities shall be upon motion of the City Council to approve the same, provided, before the City shall give final approval to acceptance, WRECO shall demonstrate the following:

(a) WRECO has furnished the City with an affidavit, in a form acceptable to the City, stating that all charges for materials and labor have been paid, and there are no liens against the Facilities; or to the extent that some work remains to be completed, and the bond or other security supplied by WRECO is inadequate, WRECO will provide a bond to the City assuring completion and payment for any such remaining work;

(b) WRECO has furnished the City with documents of conveyance of the Facilities, in a form acceptable to the City, providing a warranty that WRECO has the right to convey such improvements, the improvements are free from encumbrances and WRECO will indemnify and defend the City against all claims that WRECO does not have the right to convey such improvements free from encumbrances;

(c) WRECO has provided the City with a written warranty, warranting the Facilities to be free of defects in material and workmanship for a period ending one (1) year after conveyance, and further assigning to the City any and all

contractual warranties in favor of WRECO given by any third party in connection with the construction or equipping of the Facility;

(d) WRECO has submitted to the City, in a form acceptable to the City Engineer, the complete as-built record drawings of the Facility;

(e) WRECO has paid all permit fees and all other fees and charges for City costs required under this Agreement, the conditions of Mixed Use approval or any applicable City ordinance; and

(f) WRECO has submitted a written statement to the City of total Actual Cost incurred up to the time of conveyance, and the City has approved the same.

2.1.13 Ownership. All supplies, materials, equipment, fixtures, and other property of whatsoever kind or nature used in the construction of the Phase 1 Facilities, whether or not incorporated therein, and all facilities and improvements constituting the Phase 1 Facilities, shall be owned and controlled by WRECO, subject to the rights and interests of third parties as may exist under applicable law, and the City shall not own or control or have any liability therefor, until such time and to the extent that the same are conveyed or otherwise transferred to the City, provided, the plans and specifications for all the improvements covered by this Agreement shall belong to the City.

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2.2 LATECOMER PROVISIONS

2.2.1 Engineer's Estimate and Public Hearing. Pursuant to chapter 35.91 RCW, at WRECO's request and at WRECO's sole expense, an Engineer's Estimate may be prepared and a public hearing held upon the Phase 1 Facilities for use by the parties in entering a Latecomer Agreement to provide for partial reimbursement to WRECO of the costs of the Phase 1 Facilities, to the extent such costs are lawfully subject to reimbursement.

2.2.2 Latecomer Agreement. The parties may on the basis of the Engineer's Estimate and after the public hearing, enter into a contract which provides terms and conditions for a partial reimbursement after construction of the Phase 2 facilities of a portion of the costs of the Phase 1 Facilities which are sized for the full design capacity of the facilities and upon which the Phase 2 Facilities depend, and additionally for the assessment and collection of latecomer charges in the event WRECO relinquishes its reserved treatment capacity for the Phase 1 Facilities. At such time as the Phase 2 Facilities are proposed to be constructed, the provisions of such contract may be incorporated into any developer extension agreement or Latecomer Agreement which may be entered into for the Phase 2 Facilities.

2.3 GENERAL PROVISIONS

2.3.1 Recitals and Exhibits. All of the recitals set forth above and all exhibits attached hereto are adopted by the parties as material elements and/or findings related to this Agreement, and are incorporated into this Agreement as integral terms hereof.

2.3.2 Assignment. WRECO shall have the right to assign its rights and interest under this Agreement, in whole or part, to another entity, so long as the assignee assumes WRECO's corresponding obligations hereunder in writing, and the City consents to such assignment, which consent shall not be unreasonably withheld. As a condition of granting such consent, it shall not be deemed unreasonable for the City to require adequate assurances of the financial strength, experience and capability of the proposed assignee. No such assignment shall release WRECO from any of its obligations to the City under this Agreement, or any other agreement between WRECO and the City, except as any subsequent agreement expressly so provides.

2.3.3 Indemnification. Except as otherwise provided herein, WRECO releases and agrees to defend, indemnify and hold harmless the City and all of its elected and appointed officials and its employees from all liability, claims and costs arising in connection with the construction of the Phase 1 Facilities, and the enforcement of the provisions of Section 2.2, except to the extent resulting from any negligence or intentional act or omission of the City or its officers, agents or employees in performance of the Agreement.

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2.3.4 Notices. All notices under this Agreement shall be writing, and shall be delivered or mailed by certified mail, return receipt requested, and shall be effective as of the date of delivery, on the date of receipt as shown by the return receipt, or three days after the postmark date if there is no return receipt. Notices shall be addressed to the following addresses or to such other address as the a party may specific in writing:

City:

City of Snoqualmie
P.O. Box 987
Snoqualmie, WA 98065

With a copy to:

Pat Anderson
City Attorney
P.O. Box 924
Snoqualmie, WA 98065

WRECO:

James Nyberg
Weyerhaeuser Real Estate Company
Land Management Division
WRE 1-1
Tacoma, WA 98477

With a copy to:

Hillis, Clark Martin & Peterson
Attn: Richard M. Peterson
500 Galland Building
1221 Second Ave.
Seattle, WA 98101-2925

2.3.5 Enforcement. Venue and jurisdiction to enforce all obligations under this Agreement shall lie exclusively in the King County Superior Court. Some of the obligations of the parties hereunder do not have an adequate remedy by way of an action for damages, and may be enforced by specific performance.

2.3.6 Governing Law. This Agreement is entered into under the laws of the State of Washington, and the parties intend that Washington law shall apply to the interpretation hereof.

2.3.7 Severability. In the event a court of competent jurisdiction declares any material portion of this Agreement invalid, unconstitutional or otherwise unenforceable, any party may elect to terminate this Agreement, provided, there shall be no action for recovery of any amounts previously expended in reliance upon this Agreement, nor shall the bond or other security to assure completion be exonerated as a result thereof. In the event of a non-material provision of this Agreement is declared invalid, unconstitutional or otherwise unenforceable, the provisions hereof not affected by such declaration shall remain in full force and effect.

2.3.8 Amendment. This Agreement may not be modified, supplemented or otherwise amended, except by written instrument duly executed by all parties and approved by the City Council.

2.3.9 Binding Effect. This Agreement shall be binding upon, and shall inure to the benefit of, the parties and their respective heirs, successors and assigns.

2.3.10 Recording. WRECO shall cause this Agreement to be recorded with the King County Department of Records and Elections at its sole expense. No assessment hereunder shall be enforceable against any property until this Agreement has been so recorded.

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CITY OF SNOQUALMIE

Jeanne Hansen, Mayor

WEYERHAEUSER REAL ESTATE COMPANY

James Nyberg, Assistant Vice President

Attest:

Jill C. Long, City Clerk

STATE OF WASHINGTON } ss.

COUNTY OF KING

On this 16 day of August, 1996, before me, the undersigned, a Notary Public duly commissioned and sworn, personally appeared JEANNE HANSEN, to me known to be the Mayor of the City of Snoqualmie, and acknowledged the said instrument to be the free and voluntary act of said municipal corporation, for the uses and purposes therein stated, and on oath stated that she is authorized to execute the said instrument.

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

Printed Name Patrick B. Anderson
NOTARY PUBLIC in and for the State of Washington,
residing at Fall City WA
My Commission Expires 11-25-99

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Unofficial Document

STATE OF WASHINGTON }
ss.
COUNTY OF KING }

On this 13 day of August, 1996, before me, the undersigned, a Notary Public duly commissioned and sworn, personally appeared JAMES A. NYBERG, to me known to be the Assistant Vice President of Weyerhaeuser Real Estate Company, and acknowledged the said instrument to be the free and voluntary act of said corporation, for the uses and purposes therein stated, and on oath stated that he is authorized to execute the said instrument.

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

ARLET M BAHR
NOTARY PUBLIC
STATE OF WASHINGTON

Arlet M. Bahr
Printed Name Arlet M Bahr
NOTARY PUBLIC in and for the State of Washington,
residing at Pierce County
My Commission Expires 4/15/98

#42703 11102-88 WY7011.DOC 8/13/96

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Official Document

EXHIBIT A

ESM inc.

A CIVIL ENGINEERING, LAND SURVEY, AND PROJECT MANAGEMENT CONSULTING FIRM

Job No. 129-05-941-002
Snoqualmie Ridge
Revision of May 18, 1995

LEGAL DESCRIPTION

That portion of Sections 23, 25, 26, and 35, Township 24 North, Range 7 East, W.M., King County, Washington, more particularly described as follows:

BEGINNING at the southwest corner of said Section 25;

THENCE along the south line of said Section 25, S 87°28'37" E, 2616.08 feet to the south quarter corner thereof;

THENCE continuing along said south line, S 87°02'58" E, 2612.81 feet to the southeast corner of said Section 25;

THENCE along the east line of said Section 25, N 01°21'01" E, 2646.57 feet to the east quarter corner;

THENCE continuing along said east line, N 02°05'12" E, 1160.41 to the south line of the north 1580 feet of the northeast quarter of said Section 25;

THENCE along said south line, N 88°53'29" W, 1580.23 feet to the west line of the east 1580 feet of said northeast quarter;

THENCE along said west line, N 02°05'12" E, 1580.23 feet to the north line of said Section 25;

THENCE along said north line, N 88°53'29" W, 1084.04 feet to the north quarter corner thereof;

THENCE continuing along said north line, N 87°03'05" W, 2629.31 feet to the northwest corner of said Section 25, also being the southeast corner of said Section 23;

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34004 9th Ave. So., Bldg. A - Federal Way, Washington 98003
Federal Way (206) 838-6113 - Tacoma (206) 927-0619 - Seattle (206) 623-3911 - Fax: (206) 838-7104

THENCE along the east line of said Section 23, N 00°56'29" E, 1261.14 feet to the northeast corner of the south half of the southeast quarter of said Section 23;

THENCE along the north line of said south half, N 88°27'10" W, 2697.93 to the northwest corner thereof;

THENCE along the north line of the southeast quarter of the southwest quarter of said Section 23, N 88°27'48" W, 1355.24 feet to the northwest corner thereof;

THENCE along the west line of said subdivision, S 00°31'25" W, 1290.84 feet to the north line of Section 26;

THENCE along the west line of the east half of northwest quarter of said Section 26, S 01°12'03" W, 2676.86 feet to the north line of the southwest quarter of said Section 26;

THENCE along the west line of the east half of said southwest quarter, S 00°32'56" W, 2678.54 feet to the north line of said Section 35;

THENCE along the west line of the east half of the northwest quarter of said Section 35, S 00°37'46" W, 727.14 feet;

THENCE S 65°14'51" E, 442.93 feet;

THENCE S 82°11'34" E, 351.03 feet;

THENCE S 50°30'19" E, 384.76 feet;

THENCE S 59°06'32" E, 200.21 feet;

THENCE S 63°38'37" E, 110.06 feet;

THENCE N 85°08'59" E, 542.89 feet;

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THENCE S 31°28'35" E, 438.24 feet;

THENCE S 82°04'54" E, 669.49 feet;

THENCE S 35°54'28" E, 391.79 feet;

THENCE S 61°37'19" E, 620.12 feet;

THENCE S 70°20'21" E, 298.65 feet;

THENCE N 48°49'11" E, 216.63 feet to the east line of said Section 35;

THENCE along the said east line, N 01°40'23" E, 2301.10 feet to the POINT OF BEGINNING.

Containing 1343.2 acres, more or less.

See attached Exhibit "B".

Written by: C.A.G.
Checked by: R.S.M.

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05-18-95

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Document is NOT OFFICIAL! This Document is the property of the King County Department of Records and Elections. The Document may be altered or accurate.

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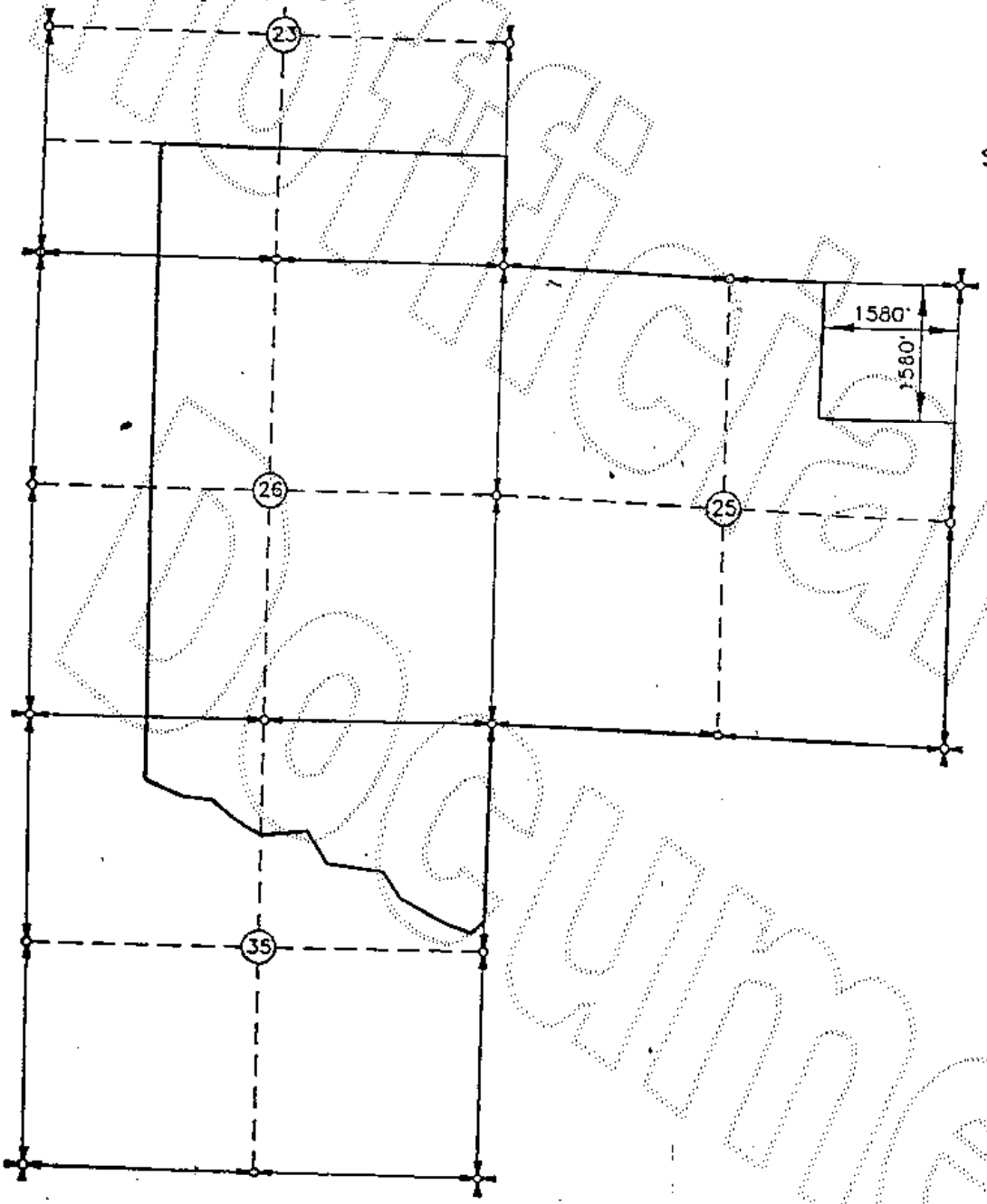
EXHIBIT A

TO ACCOMPANY LEGAL DESCRIPTION

A PORTION OF SECTIONS 23, 25, 26 AND 35, T. 24 N., R. 7 E., W.M.
KING COUNTY, WASHINGTON



ESM inc.
34004 9th AVENUE SO., BLDG. A
FEDERAL WAY, WASHINGTON 98003
PHONE: (206) 838-4113

JOB NO. 129-05-941-002
DRAWING NAME : EXH-B
DATE : 05-18-95
DRAWN : R.J.W./C.A.F.
SHEET 1 OF 1

EXHIBIT B

CITY OF SNOQUALMIE WASTEWATER TREATMENT PLANT SITE

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That portion of the Northeast quarter of Section 30, Township 24 North, Range 8 East, W.M., King County, Washington, more particularly described as follows:

COMMENCING at the Northeast corner of said Section 30;

THENCE along the North line of said Northeast quarter, N 89°03'26" W, 913.57 feet to the TRUE POINT OF BEGINNING;

THENCE S 00°56'34" W, 654.35 feet to a line 30.00 feet Northwesterly of and parallel with the centerline of the existing asphalt road serving the Snoqualmie Ridge Treatment Plant;

THENCE along said parallel line Southwesterly 181.05 feet along the arc of a non-tangent curve to the left, having a radius of 390.00 feet, the radius point of which bears S 06°15'13" E, through a central angle of 26°35'52" to a point of tangency;

THENCE continuing along said parallel line, S 57°08'55" W, 71.90 feet to a point of curvature;

THENCE continuing along said parallel line, Southwesterly 92.24 feet along the arc of a tangent curve to the left, having a radius of 1530.00 feet, through a central angle of 03°27'15" to a point of tangency;

THENCE continuing along said parallel line, S 53°41'40" W, 241.00 feet to a point of curvature;

THENCE continuing along said parallel line, Southwesterly 344.73 feet along the arc of a tangent curve to the left, having a radius of 1530.00 feet, through a central angle of 12°54'34" to the Northeasterly margin of S.E. Millpond Road (AKA Asa J. Story Road);

THENCE along said Northeasterly margin, Northwesterly 242.79 feet along the arc of a non-tangent curve to the left, having a radius of 1939.86 feet, the radius point of which bears S 34°17'01" W, through a central angle of 07°10'16" to a point of tangency;

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THENCE continuing along said Northeasterly margin, N 62°53'15" W, 391.94 feet to a point of curvature;

THENCE continuing along said Northeasterly margin, Northwesterly 218.81 feet along the arc of a tangent curve to the right, having a radius of 924.93 feet, through a central angle of 13°33'15" to a point of tangency;

THENCE continuing along said Northeasterly margin, N 49°20'00" W, 155.57 feet to a point of curvature;

THENCE continuing along said Northeasterly margin, Northerly 89.04 feet along the arc of a tangent curve to the right, having a radius of 45.00 feet, through a central angle of 113°22'27" to a point of reverse curvature on the Southeasterly margin of Tokul Road S.E. (AKA Adolph Weller County Road);

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THENCE continuing along said Southeasterly margin, Northeasterly 214.80 feet along the arc of a tangent curve to the left, having a radius of 377.25 feet, through a central angle of 32°37'23" to a point of tangency;

THENCE continuing along Southeasterly margin, N 31°25'04" E, 302.21 feet to a point of curvature;

THENCE continuing along said Southeasterly margin, Northeasterly 157.99 feet along the arc of a tangent curve to the right, having a radius of 543.14 feet, through a central angle of 16°40'00" to a point of tangency;

THENCE continuing along said Southeasterly margin, N 48°05'04" E, 117.45 feet to the North line of said Northeast quarter of Section 30;

THENCE along said North line, S 89°03'26" E, 1107.79 feet to the TRUE POINT OF BEGINNING;

Containing 30.372 acres, more or less, see attached Exhibit "R".

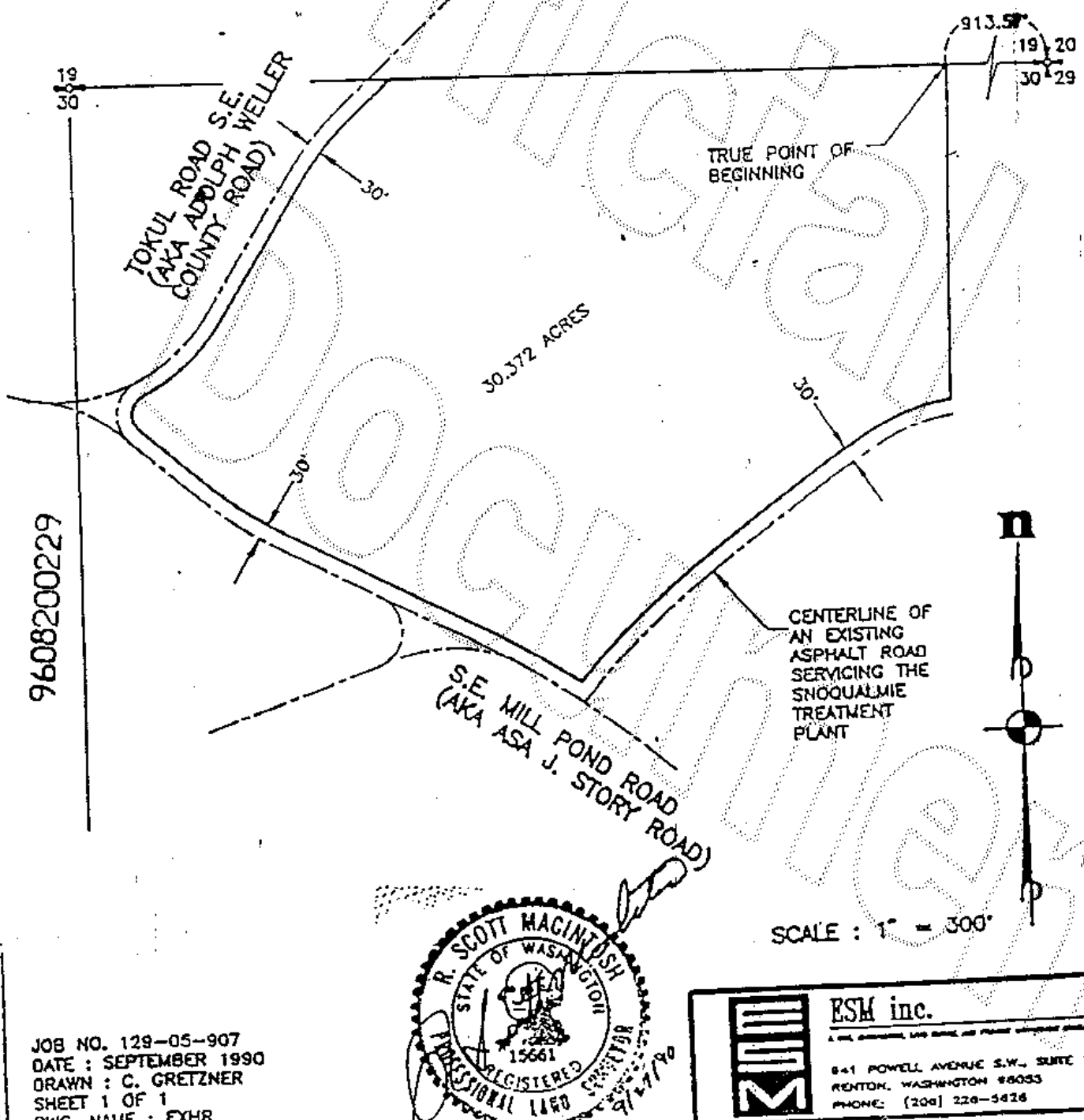
Written by: C.A.G.
Checked by: R.J.W.

L6:L59

R. SCOTT MACINTOSH
STATE OF WASHINGTON
15661

EXHIBIT "B"

A PORTION OF THE NE 1/4 OF SECTION 30, T. 24 N., R. 8 E., W.M.
KING COUNTY, WASHINGTON



SCALE : 1" = 300'

R. SCOTT MACINTOSH
STATE OF WASHINGTON
15661
REGISTERED
PROFESSIONAL LAND SURVEYOR
9/27/90

JOB NO. 129-05-907
DATE : SEPTEMBER 1990
DRAWN : C. GRETZNER
SHEET 1 OF 1
DWG. NAME : EXHR

ESM inc.
841 POWELL AVENUE S.W., SUITE 100
RENTON, WASHINGTON 98055
PHONE: (206) 226-5426

Unofficial Document

Unofficial Document

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EXHIBIT C-1

Phase 1 Facilities

WWTF Improvements. All of the improvements described in the plans and specifications listed in Section 1.11 of the Agreement.

Landscaping and Wetland Mitigation. WRECO shall design, build, and pay for landscaping of the WWTF and wetland mitigation as approved by the City.

Algae Sweepers. WRECO shall purchase and install one algae sweeper in each of the two clarifiers, meeting specifications approved by the City.

Operation Manual. WRECO shall pay for the Operation Manual as described on Exhibit D, subject to approval by DOE.

Equipment and Fixtures. WRECO shall pay the City up to $50,000, based on vendor invoices, to furnish and equip the office, shop and laboratory, to include the following items:

3 desks
3 desk chairs
3 tables
10 chairs
2 office dividers
3 file cabinets
4 bookcases
3 flat files
3 hanging files
1 typewriter
1 fax machine
1 VCR monitor
1 refrigerator
1 coffee maker
1 microwave oven
1 set each, plates, mugs, silver
3 cloths lockers
3 restroom and shower towel dispensers
1 sanitary napkin dispenser
1 clothes washer
1 dryer
2 storage cabinets
1 bin storage system
1 aluminum boat

1 incubator
1 sterilizer
1 distillation apparatus
1 DO meter
1 spectrophotometer
1 BOD incubator
1 set BOD bottles
1 BOD probe
1 commercial dishwasher

1 abrasive chop saw
1 cut-off saw
1 arc welder
1 steam cleaner/pressure washer
1 air compressor
1 retractable hose reel
1 parts washer
1 drill press
1 bench grinder
1 winch
1 chain hoist
1 floor jack
1 shop vac
1 tool chest

EXHIBIT C-2

Phase 2 Facitilites

Capacity Expansion. The Engineering Report calls for a second oxidation ditch, which will double treatment capacity (measured in BOD). At such time as this expansion of the WWTF is required, under the conditions of the NPDES Permit or earlier, plans and specifications will be prepared for City and DOE approval. The City shall determine the method of financing such improvements, provided that in the event the City determines that the improvements are to be made under a Developer Extension Agreement, WRECO shall have the first right of refusal to enter into such agreement with the City and make and pay for such improvements, subject to the provisions in Sections 2.1.2 and 2.2 of the Agreement. WRECO's obligation for such expansion is contained in Conditions 92 and 133.

Later Phase Facilities

Completion of Class A Reclaimed Water System. In addition to elements described in the plans and specifications listed in Section 1.11 of the Agreement, WRECO shall design and construct the following elements of the Class A System, as approved by the City. They must be on-line prior to delivery of Reclaimed Water for irrigation.

Class A chlorination system at the water treatment plant.
Class A Monitoring Station located near BPA power line and telemetry.
Controls and telemetry at the pond at Hole #9.

Sludge Facilities. The existing lagoons will be used for sludge stabilization as part of the Phase 1 Facilities improvements. Their capacity must be increased to accommodate an increase in the capacity of the WWTF beyond Phase 1. WRECO's obligation and rights are as described above in "Phase 2 Capacity Expansion" and the Agreement.

The City and WRECO agree that use of the existing lagoons for sludge stabilization represents a significant savings in both first cost and operation over more standard sludge digestion methods. However, the lagoons may fail to perform adequately in process and/or capacity separate from the need for plant expansion. Therefore, WRECO agrees to design, construct and pay for such required improvements, as determined by the City and DOE, provided their need has been discovered within 15 years of the acceptance of the Phase 1 Facilities, and subject to the provisions of Section 2.2 of the Agreement.

The lagoons will be monitored for leakage indefinitely as required by DOE. In the event DOE determines that leakage of the lagoons is unacceptable, WRECO agrees to design, construct and pay for such required improvements, as determined by the City and DOE, provided their need has been discovered within 15 years of the acceptance of the Phase 1 Facilities, and subject to the provisions of Section 2.2 of the Agreement.

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River Crossing. The improvements to the river crossing in the Phase 1 Facilities are being made to delay a capital expenditure and to provide time to determine the best solution while allowing installation of a limited capacity Class "A" Water line for irrigation of the Golf Course. The capacity of the existing 10" raw sewage force main is not increased.

A new utility river crossing will be required in later phases. The City, in consultation with WRECO, will determine the timing, measured in number of ERU Sewer Use Certificates, for the new crossing. WRECO agrees to design, construct and pay for said river crossing, subject to the provisions of Section 2.2 of the Agreement. In the event King County or other third party elects to participate in the cost of a bridge in exchange for sharing it as a multi-purpose facility, the City will negotiate with WRECO and such third party/s to obtain a fair sharing of the cost.

Kimball Creek Lift Station. A lift station will be required at Kimball Creek to serve the initial development of Snoqualmie Ridge. Provisions for the design and construction of the Kimball Creek Lift Station will be covered by a separate agreement between WRECO and the City. The lift station shall be designed in accordance with the criteria set forth in the letter from the City to John Hatch dated May 16, 1996.

Unofficial Document

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EXHIBIT D

(FIGURE 6.8, SNOQUALMIE VICINITY COMPREHENSIVE PLAN UPDATE - 1994)

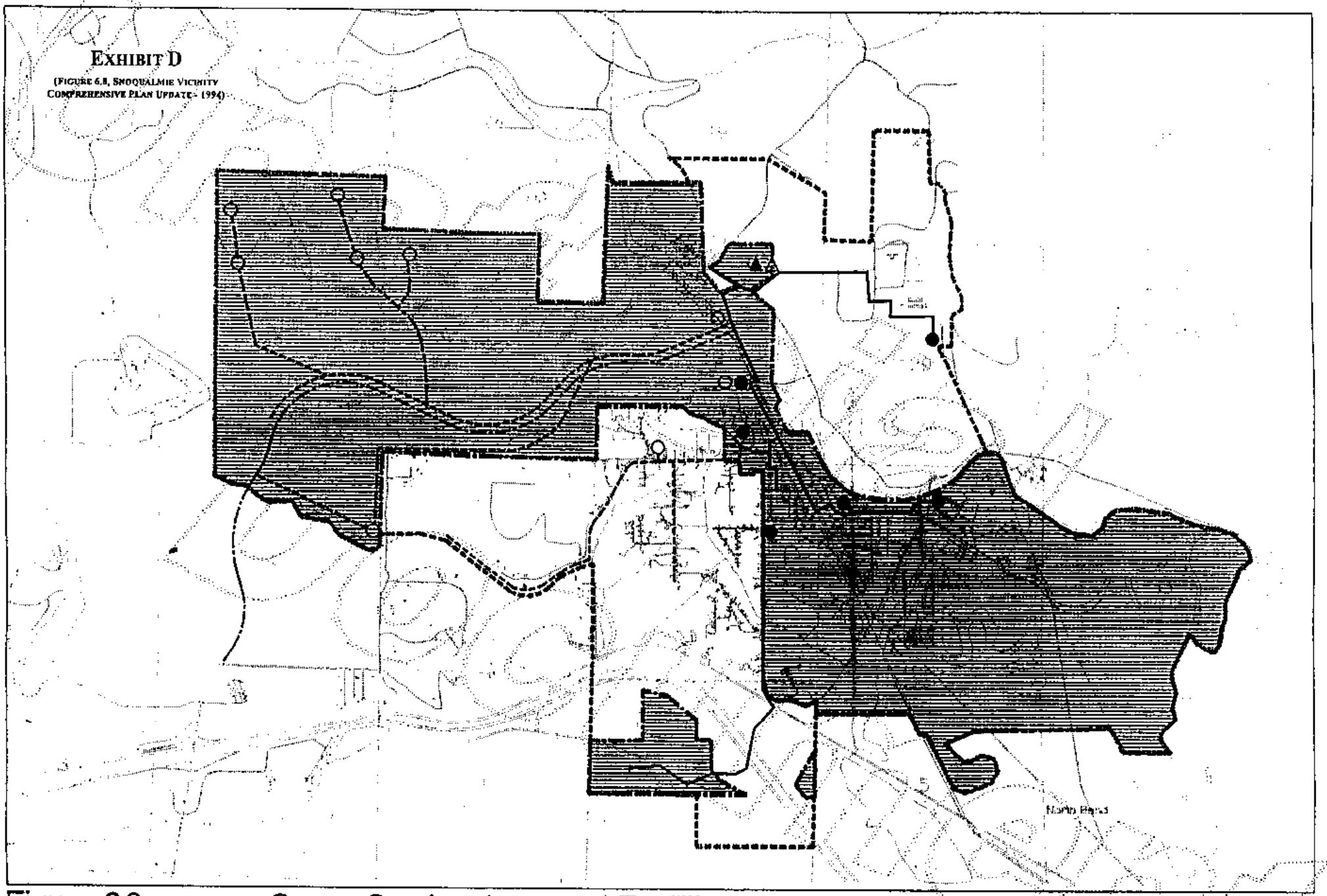

Figure 6.8 Sewer Service Area and Facilities

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LEGEND

- SNOQUALM' 'TY LIMITS
- URBAN GR I AREAS
- PROPOSED SNOQUALMIE PARKWAY
- SNOQUALMIE MUNICIPAL SEWER SERVICE AREA

EXISTING FACILITIES

- TREATMENT P'
- LIFT STATION
- INTERCEPTOR/FORCE MAIN

FUTURE FACILITIES

- TREATMENT PLANT
- LIFT STATION
- INTERCEPTOR/FORCE MAIN

NORTH

SCALE: 1"=3000'

AGREEMENT BETWEEN THE CITY OF SNOQUALMIE AND THE SNOQUALMIE TRIBE FOR THE PROVISION OF POLICE, FIRE AND EMERGENCY MEDICAL SERVICES TO THE SNOQUALMIE HILLS PROJECT AND SEWER UTILITY SERVICE TO THE TRIBE'S INITIAL RESERVATION

THIS AGREEMENT is dated for reference purposes the 26th day of April, 2004.

I
RECITALS

1.1 The City of Snoqualmie ("the City") is a Washington municipal corporation organized and operating under the Optional Municipal Code, Title 35A of the Revised Code of Washington, located in eastern King County.

1.2 The Snoqualmie Tribe ("the Tribe") is a federally recognized Indian tribe, whose initial reservation ("the Property") is to be located within the City's designated Urban Growth Area. The Property is legally described on Exhibit A.

1.3 This Agreement is entered between the City and Tribe in their respective governmental capacities as sovereign entities, under authority of the Interlocal Cooperation Act, Title 39.34 RCW and the 1855 Treaty of Point Elliott.

1.4 The Tribe desires to construct and operate a commercial enterprise that will include, among other uses, entertainment, dining and gaming facilities, commonly known as the Snoqualmie Hills Project ("the Project"). The Project will be comprised of an approximately 150,000 square foot building, plus parking facilities, landscaping and other site amenities upon the Property to provide revenues to the Tribe to fund its health, education, housing, social service, governmental, economic development and other programs for its members, as well as providing employment opportunities for members of the Tribe and the surrounding community.

1.5 The City desires to support the Tribe in the construction and operation of the Project, provided that the Project is initially constructed substantially as represented to the City by the Tribe, and that there is no financial subsidy to the Project from City taxpayers or ratepayers.

1.6 Over the past several years, the Tribe has had many meetings, presentations and discussions with the City and members of the general public about the Project. These meetings and discussions have dealt with the full range of issues related to the construction and operation of a project of this size and nature, including, among other things, building appearance and quality, traffic impacts mitigation, and light and noise mitigation. The Tribe has further made a number of representations to the City about the style, materials and quality of the Project buildings and facilities, on and off site signage, traffic mitigation at Exit 25 and on North Bend Way, mitigation of impacts to adjoining residential properties through land use buffers on the Property, and the nature of operations and other aspects of the Project. The Tribe has also prepared an Environmental Assessment ("EA") under the National Environmental Policy Act, containing a description of the Project, identification of potential impacts and measures to avoid or mitigate impacts. The City respects the sovereignty of the Tribe and its sole authority to approve uses, site plans, signage, building designs, and operations upon the Tribe's reservation. The Tribe acknowledges nonetheless that the City has placed material reliance upon the conceptual plans and representations made by the Tribe and the mitigation measures identified in the EA in its decision to support the Project by entering this Agreement, and that the City would not have entered into this Agreement but for such conceptual plans and representations and proposed mitigations. The conceptual plans and general representations of the Tribe are attached hereto as Exhibits B, C and D. The EA shall be deemed an appendix to this Agreement although not physically attached.

1.7 The Project requires all services and utilities common to commercial enterprises such as this, including the following specific services and utilities: police and fire and emergency medical services and sewer utility services ("Police Services," "Fire and Emergency Medical Services" and "Utility Services" respectively, and collectively "the Services"). Due to the location of the Project within the City's Urban Growth Area, the City is the most logical

jurisdiction to provide the Services to the Project. The City Fire Department and Police Department each have capacity to provide the respective Services to the Project when augmented by the consideration to be paid by the Tribe. The City has sewage treatment capacity within its combined utility to provide Utility Services to the Project while still meeting its obligations to serve the existing City and projected growth within the Urban Growth Area during the term of this Agreement. It is in the best interests of the Tribe and City to provide for provision of the Services to the Project by the City through this Agreement. Due to the large capital investment required in order to construct the Project, the Tribe desires assurances that the Services will be available to the Project prior to undertaking construction.

1.8 The Tribe and the State of Washington entered a Tribal-State Compact for Class III Gaming ("the Compact"), which was approved by the U.S. Secretary of the Interior on or about April 15, 2002. The Compact provides in Section XIV (C) for an impact mitigation fund and a committee to oversee disbursement of the impact mitigation fund. The Compact does not preclude the Tribe from entering into an agreement for services. The City would not enter into this Agreement if the impact mitigation fund were the sole source of payment for the Services. The City and the Tribe recognize that it is in their mutual interests that the impact mitigation fund be the first source available to the Tribe to pay for the Services.

1.9 The Tribe desires the City to provide Police Services for the Project. The Project will have a private security department and an internal detention facility. The Tribe's security department will be the first responders for most incidents. Certain other crimes which may occur within the Project are within the exclusive jurisdiction of the Federal Bureau of Investigation. Certain crimes by Indians within the Property are subject to the exclusive jurisdiction of the Tribe and the Tribal Court. Accordingly, the scope of City polices services anticipated by the parties is receiving the turn-over, as determined by the Tribe, of suspects detained by employees of the Tribe at a secure location with Project buildings, arrest and/or issuance of citations to

persons detained by Tribal security employees as deemed appropriate, and the transport to a jail facility if required. Based on experience at comparable facilities, it is estimated that there will be approximately four calls for service per week on average, but the actual demand for services cannot be accurately forecast at the time of entering this Agreement, and the parties recognize there may be a need for future adjustment. State criminal statutes are effective as to certain crimes committed by non-Indians upon the Property pursuant to Public Law 280, 83rd Congress, 1st Session, and RCW 37.12.010.

1.10 The Tribe desires the City to provide full Fire Suppression and Emergency Medical Services for the Project, but not Fire Marshal or Fire Code Enforcement Services. The City can provide all of the required Services, provided, Advanced Life Support Services (Medic One) are provided by King County as a tax-supported service throughout King County and provided in the City through the Bellevue Fire Department by contract with King County. Calls for service through 911 requiring Advanced Life Support Services will result in the simultaneous dispatch of City personnel and equipment and Medic One personnel and equipment stationed in North Bend. However, the costs of the dispatch of Medic One personnel and equipment stationed in North Bend shall not be the responsibility of the Tribe or the City.

1.11 In order to serve the Project with City sewer service, both on-site sewer improvements ("the On-Site Improvements") and Off-Site sewer improvements ("the Off-Site Improvements) are required. The Off-Site Improvements are set forth in Exhibit E. The preliminary estimate of the cost of the Off-Site Improvements is One Million Nine Hundred Sixteen Thousand Two Hundred Twenty-two Dollars ($1,916,222). The Off-Site Improvements are designed and sized to address certain existing City infrastructure deficits, and construction thereof will confer certain public benefits on the City beyond what is solely necessary to provide sewer service to the Project.

1.12 The Tribe has a limited capital budget for construction of the Project, and may wish to pay the costs of the Off-Site Improvement from revenues of the Project after it is open and operating. The Tribe does not have bonding or borrowing capacity for the Off-Site Improvements over and above the financing committed for its capital budget for construction of the Project, and if the Tribe is to defer payment of the cost of construction of the Off-Site Improvements, the Tribe wishes to avail itself of the City's ability to issue revenue bonds.

1.13 Notwithstanding that the Off-Site Improvements confer a certain public benefit to the City over and above what is solely necessary to provide sewer service to the Project, the City would not construct the Off-Site Improvements at this time or at any time in the foreseeable future.

1.14 The City's financing of the Off-Site Improvements to provide sewer service to the Project through the issuance of revenue bonds would not constitute a prohibited gift or lending of credit by the City because the Tribe is a federally recognized Tribe and as such it constitutes a sovereign government and its purposes constitute public purposes, as determined by the Washington State Supreme Court in Anderson v. O'Brien, 84 Wash.2d 64 (1974).

1.15 The Tribe recognizes and agrees that the ability to avail itself of the City's revenue bonding capacity for financing the Off-Site Improvements, if agreed to by the City, would relieve the Tribe of the necessity to use its capital budget for the Project to construct the Off-Site Improvements, and has significant monetary value comparable to the public benefits conferred upon the City.

1.16 The City would consider issuing revenue bonds to assist the Tribe in financing the construction of the Off-Site Improvements if, and only if, the Tribe pays the bond payments in full, including the share allocable to public benefits, in consideration of the benefits to the Tribe of making the City's revenue bonding capacity available for financing the Off-Site Improvements, and further provided that the City's rate payers are fully protected against

potential rate increases in the event of a default by the Tribe through provision of a guarantee in a form acceptable to the bond underwriter and the City.

1.17 The Project's estimated wastewater treatment demand is estimated at Three Hundred Sixty (360) Equivalent Residential Units (ERUs), measured by both Biological Oxygen Demand (BOD) and flow. For purposes of this Agreement, one ERU is one half-pound BOD per day and flow of One Hundred Eighty (180) gallons per day.

1.18 The Tribe as a sovereign entity is not subject to lawsuit in the courts of the State of Washington. The jurisdiction of federal courts is limited to matters involving a federal question or diversity of citizenship and the parties cannot by agreement confer jurisdiction upon the federal courts. In the absence of a limited waiver of sovereign immunity, the City would not have a remedy for breach of any of the provisions of this Agreement by the Tribe. In order to induce the City to enter this Agreement, the Tribe is willing to agree to a limited waiver of sovereign immunity as to both subject matter and personal jurisdiction over the Tribe, strictly limited to the enforcement of this Agreement and any judgment rendered thereon, by the courts of the State of Washington.

1.19 The City was represented in the negotiation of this Agreement by City Attorney Patrick B. Anderson. The Tribe was represented in negotiation of this Agreement by its representatives, Ray Mullen, Economic Development Chairman, Mathew Mattson Esq., Tribal Administrator and Thomas LeClaire, MGU Companies Chief Executive Officer. Both parties enter this Agreement freely and voluntarily to secure its benefits. Both parties believe the provisions of this Agreement are in accordance with all applicable federal and state statutory and case law, and believe that all of the provisions of this Agreement are valid and enforceable. The City Council approved this Agreement and authorized the Mayor to sign by motion adopted at a regular meeting on April 26, 2004. The Snoqualmie Tribal Council approved this Agreement and authorized the Tribal Chairman to sign by motion adopted at a meeting on April 23, 2004.

II

AGREEMENT

2.1 Assurances

2.1.1 The Tribe will use all commercially reasonable efforts to commence and develop the Project in accordance with this Agreement.

2.1.2 The City will use its best efforts to provide the Project with the Services.

2.1.3 The Tribe and the City will each use their best efforts to timely seek and obtain the regulatory and governmental approvals necessary to construct, maintain and provide for the provision of the Services.

2.2 Police Services

2.2.1 The City shall provide Police services to the Project, provided the police services shall only be provided in response to calls for service from the Tribe. The Tribe and the City, through its Police Department, shall establish written protocols governing requests for service.

2.2.2 The scope of the police services shall include receiving the turn-over of suspects detained by employees of the Tribe at a secure location within Project buildings, arrest and/or issuance of citations to such suspects on the Property as deemed appropriate, and the transport to a jail facility if required. The Police Services shall not include routine patrol services or investigation of routine crimes on the Property or within Project or Project buildings, provided, the Police Services shall include response to major crimes in progress on the Property or within Project Buildings at the request of the Tribe.

2.2.3 The City shall provide the Police Services to the Project according to the City's standard operating procedures for determining priority of response to calls for service from the City as a whole. The City makes no representations or warranties about response time or priority of service, other than that calls for service from the Project will be responded to on the

same basis as calls for service from the City as a whole under such standard operating procedures.

2.2.4 As consideration for the provision of the Police Services, the Tribe shall pay startup costs, including vehicle and equipment, of one police officer, in the amount of Fifty-five Thousand Dollars, payable in full six months prior to the estimated opening date of the Project, and the fully loaded cost of one police officer, as detailed on Exhibit F, payable on a pro rata basis six months prior to the estimated opening date of the Project for the first year, and annually in advance by December 1 of each year for the following year for succeeding years. The initial estimate of the year 2004 fully-loaded cost of one police officer is set forth on Exhibit F, provided, such fully-loaded cost shall be subject to adjustment annually, or more frequently upon the occurrence of any event significantly affecting such fully-loaded cost, including but not limited to changes in salary or benefits for police officers.

2.2.5 All suspects apprehended on the Property either by the Tribe or by the City and turned over to the City shall be charged under Washington State statutes and not under ordinances of the City of Snoqualmie. The Tribe shall assist in the prosecution of all persons charged with offenses occurring within the Property, and all persons employed at the Project shall respond to subpoenas issued for their attendance at all such prosecutions.

2.2.6 All costs, if any, incurred by the City for persons arrested on the Property and transported by the City to any jail facility shall be paid by the Tribe within 30 (thirty) days upon being billed therefore by the City, in addition to all other consideration payable under this Agreement.

2.2.7 The parties shall meet after the first full year of operation, provided, such meeting shall occur sooner on request of either party, to assess whether actual demand for Police Services is consistent with a anticipated demand, and to equitably increase or decrease the

compensation to the City if the demand for Police Services appreciably exceeds or fails to meet anticipated demand.

2.3 Fire and Emergency Medical Services

2.3.1 The City shall provide Fire Suppression and Emergency Medical Services to the Project. The Tribe and the City, through its Fire Department, shall establish written protocols governing requests for service.

2.3.2 The scope of services shall include all Fire Suppression and Emergency Medical Services on the same basis as provided within the corporate limits of the City, but shall not include Fire Marshal or Fire Code Enforcement Services, unless by special request and subject to agreement for additional compensation for such services, provided, the Tribe shall provide the Fire Department with all building plans and such other information as the Fire Department shall require prior to construction, to allow the Fire Department to evaluate and comment on any matter affecting fire prevention and suppression.

2.3.3 The Tribe shall permit access by the Fire Department for inspection as necessary to maintain current information concerning the condition of all buildings and any matters that may affect Fire Suppression and Emergency medical services within such buildings. The Tribe shall further permit access by Fire Department and Police Department personnel into all buildings at a reasonable time upon at least 24-hour prior notice prior to occupancy to determine if all emergency radios work within such buildings, and at reasonable times on prior notice thereafter whenever new radio equipment or changes in radio equipment would prudently require additional emergency radio testing. If emergency radios do not work within any building, Fire Department and/or Police Department personnel may decline to enter such building in emergencies until such time as internal antennas or other radio equipment is installed and emergency radios have been tested and proven functional within such building.

2.3.4 As consideration for the provision of the Fire and Emergency Medical Services, the Tribe shall pay startup costs of two fire fighters, in the amount of Two Thousand Nine Hundred Dollars ($2,900) each, and the fully loaded cost of two fire fighters, as detailed on Exhibit G. The start-cost of one firefighter shall be payable in full six months prior to the estimated opening date, and payment of the start-up cost of the second fire fighter shall be payable on the actual opening date of the Project. The fully loaded costs of both firefighters shall be payable in advance on a pro rata basis on the date the start-up costs are payable for each firefighter respectively for the first year, and annually in advance by December 1 of each year for the following year for succeeding years. The initial estimate of the year 2004 fully-loaded cost per fire fighter is set forth on Exhibit G, provided, such fully-loaded cost shall be subject to adjustment annually, or more frequently upon the occurrence of any event significantly affecting such fully-loaded cost, including but not limited to changes in salary or benefits for fire fighters. As additional consideration for provision of the services, the Tribe shall pay two-fifths of the cost of a ladder truck, as detailed on Exhibit H, anticipated to be obtained in 2005 and for which payments are anticipated to commence in 2006. The City may obtain the ladder truck either by lease or bond financing, and payments from the Tribe for its two-fifths share shall be made to the City sufficiently in advance of the due dates of the City's payments on its underlying obligation.

2.4 On-Site Improvements

2.4.1 All On-site Improvements shall be designed, constructed, owned operated and maintained by the Tribe.

2.4.2 City approval shall be required for the design and equipping of all connections between City owned and operated sewer systems and on-site sewer systems owned by the Tribe, which shall not be unreasonable withheld or delayed.

2.4.3 The connection of the Tribal-owned on-site sewage collection system to the City-owned sewer main shall be made at the property line of the Property, and facilities for

measuring sewage flow and BOD from the Property shall be located in a City-owned manhole in the nearest suitable public right of way, or if any facilities are located above ground then as near as practicable, so long as there is assurance and protection by the City that there is no third-party hookup between the sewage flow measuring facilities and the Property line.

2.5 Off-Site Improvements

2.5.1 The entire cost of the Off-Site Improvements, as detailed in Exhibit E, required to provide sewer service to the Property shall be paid by the Tribe, notwithstanding that there is additional public benefit to the City, provided, however, that the City shall after construction at the request of the Tribe establish the reimbursement amount for the Tribe of a fair pro rata share of the cost of the construction of the sewer facilities, excluding those facilities serving only the Tribe, to be paid by any owner of real estate who did not contribute to the original cost of the sewer facilities and who subsequently connect to or use the same, pursuant to chapter 35.91 RCW.

2.5.2 Subject to the Tribe's obligation to pay the cost of the Off-Site Improvements, the City shall:

(i) construct, own, operate and maintain the Off-Site Improvements;

(ii) cause the Off-Site Improvements to be available for connection to the On-site Improvements, at the location identified in Exhibit E, no later than (to be determined) months after the Bonds (as defined below) are issued; and

(iii) will act in good faith to diligently fulfill its responsibility to complete the Off-Site Improvements in a timely manner.

2.5.3 The City shall issue revenue bonds (the "Bonds") to finance the costs of acquiring, constructing, installing and equipping the Off-Site Improvements, upon satisfaction of the following conditions:

(i) The Tribe provides information regarding itself, the Project, the Property, the On-site Improvements, the Tribe's source of funds to make payments under this Agreement, and other information necessary for the City to prepare a Bond offering document that does not contain material misstatements or omissions (within the meaning of state and federal securities laws);

(ii) The Tribe provides the City and its bond underwriter with one or more certificates, dated the date the Bonds are issued and executed by an authorized officer of the Tribe, of the type typically provided by conduit borrowers in the context of a municipal bond offering (*e.g.* certificates regarding incumbency of tribal officials, due authorization of this Agreement and related documents, litigation matters, and the information provided pursuant to Section 2.5.3(i));

(iii) The Tribe delivers to the City a letter, executed by an authorized officer of the Tribe, stating that it is the letter required by this paragraph (iii) and that the Tribe authorizes the City to proceed with the issuance of the Bonds and commence the acquisition, construction, installation and equipping of the Off-Site Improvements;

(iv) The Tribe causes to be delivered to the City (or the City's designee) an irrevocable letter of credit from a bank (within the meaning of Section 3(a)(2) of the Securities Act of 1933) in an amount sufficient to pay the all principal of the Bonds, together with the interest on the Bonds that accrues over a period of at least 190 days, and with the ability to draw thereon on each Bond payment date (including any accelerated maturity of the Bonds due to the termination of expiration of such letter of credit), provided no costs of such letter of credit (including reimbursement for draws thereunder) shall be payable by the City; and

(v) The Tribe causes to be delivered to the City an opinion of the Tribe's counsel stating that this Agreement is duly authorized, valid, binding and enforceable

with respect to the Tribe and an opinion of counsel from the letter of credit bank stating that the letter of credit is duly authorized, valid, binding and enforceable.

(vi) The Bonds are not secured by the City's full faith and credit or the assets of the City's various utilities, but are special fund obligations payable solely from amounts received by the City pursuant to Section 2.5.4 of this Agreement and amounts received under the letter of credit described in paragraph (iv) above.

In connection with the issuance of the Bonds, the City and the Tribe expect to circulate among themselves and their consultants, for review and comment, drafts of the Bond offering documents, the City's Bond ordinance, the Bond closing documents, and the letter of credit documents. The Tribe acknowledges that the interest on the Bonds may not be exempt from federal income tax due to the expected use and source of security for the Bonds. The Tribe also acknowledges that the marketability of the Bonds, and the interest cost thereof, likely will be affected by the perceived creditworthiness of the letter of credit bank.

2.5.4 The Tribe shall make the following payments with respect to the Bonds:

(i) In the event the Bonds are not issued because of the Tribe's failure to satisfy the conditions of paragraph (i), (ii), (iv) or (v) of Section 2.5.3, the Tribe shall reimburse the City for all costs incurred with respect to the Off-Site Improvements (including costs incurred with respect to issuing the Bonds (or preparing the Bonds for issuance)) after the letter described in Section 2.5.3(iii) is received by the City;

(ii) For the life of the Bonds, the Tribe shall pay the City an amount equal to the principal of and interest on the Bonds next coming due at least seven days prior to each payment date of the Bonds;

(iii) Upon execution of this Agreement, the Tribe pay to the City (or to such persons as the City designates) money necessary for the cost of designing the Off-Site Improvements (which costs are estimated to be $260,000), at such time as may be required to

assure that the design and construction of the Off-Site Improvements can occur within the time specified in Section 2.5.2(ii) of this Agreement (it being understood that any sum advanced under this paragraph (iii) will be reimbursed to the Tribe from the Bond proceeds).

2.6 Provision of Sewer Service to the Project

2.6.1 The City shall accept waste water effluent not exceeding Three Hundred Sixty (360) ERUs from the Property subject to all of the provisions of this section.

2.6.2 The Tribe shall secure waste water treatment plant capacity for Three Hundred Sixty (360) ERUs by payment of a Latecomer charge to the City of the sum of Three Thousand Five Hundred Twenty-nine Dollars ($3,529.00) per ERU. Said amount shall be payable at the time of connection to the municipal sewer system.

2.6.3 Effluent flow and strength shall be periodically monitored at the Tribe's sole cost at a frequency determined appropriate by the City after consultation with the Tribe. If waste water treatment demand exceeds Three Hundred Sixty (360) ERUs in either BOD or flow, the Tribe shall take such steps as may be necessary to bring waste water treatment demand below or equal to Three Hundred Sixty (360) ERUs, including but not limited to pre-treatment. By pre-treating its effluent, the Tribe may generate waste water exceeding said limit within the Project so long as the waste water effluent as measured at the point of connection to the municipal sewer system does not exceed Three Hundred Sixty (360) ERUs.

2.6.4 The Tribe may request additional treatment capacity from the City. However, the City shall not have any obligation to honor the Tribe's request unless there is additional overall capacity to meet the Tribe's request. The cost to the Tribe of any additional ERUs shall be determined by future agreement, and may or may not be subject to a Latecomer Reimbursement agreement.

2.6.5 The Tribe covenants that it shall not discharge nor permit or suffer to be discharged to the City's sewer system any pollutants, greases or oils in quantities that exceed the limits of Snoqualmie Municipal Code 13.04.430. Compliance with the provisions of Snoqualmie Municipal Code 13.04.010 through 13.04.470 inclusive, which are hereby incorporated herein by this reference as contractual obligations, shall be a condition precedent to the City's obligation to accept wastewater effluent from the Project.

2.6.6 The rate for waste water treatment shall be the then-current rate at any time as established by City Council for sewer service for one residence multiplied by the number of ERUs actually flowing through the City-owned facilities based upon the most recent measure sewage flow and BOD from the property. The cost of BOD testing shall be paid to the City by the Tribe in addition to the rate for waste water treatment. The City shall record the measurements from said facilities and bill the Tribe at no greater frequency than monthly, and the Tribe shall duly pay the bill within thirty (30) days of receipt.

2.6.7 Except for the provision above in 2.6.4 regarding the possibility of additional City treatment plant capacity allowing for additional City treatment of waste water effluent from the Property, the City shall not be obligated to accept any waste water effluent in excess of 360 ERUs unless and until this Agreement is amended in writing to provide for such additional waste water treatment.

2.6.8 The City shall not be liable for any damages of any nature whatsoever for any delay in the commencement of provision of sewer service of for interruptions in provision of sewer service, unless the City is reckless or intentional in its conduct.

2.6.9 In the event of delay in the commencement of sewer service or interruption in sewer service, the City shall be responsible for providing temporary facilities for the collection of effluent at the Property and trucking the effluent from the Property to the waste

water treatment plant, or for paying the cost thereof, and the City shall further accept the trucked sewage effluent at the waste water treatment plant at no charge to the Tribe.

2.7 Suspension of Service for Non-Payment

In the event any payment required to be made by the Tribe to the City under this Agreement is more than thirty (30) days past due after the City's written notice thereof to the Tribe, and unless the Tribe notifies the City in writing within ten (10) days of receiving said notice that the Tribe disputes the payment, the City may suspend provision of the service for which the City contends payment is due until such payment has been paid, provided, the City will give not less than forty-eight hours written notice to the Tribe stating the date and time at which the particular service will be suspended for non-payment.

2.8 Relation of Compact and This Agreement

2.8.1 The Tribe's obligation to make payments for Services under this Agreement is entirely contractual in nature and completely independent of the provisions of the Compact.

2.8.2 At the request of the Tribe, the City shall cast its vote relating to disbursal of the impact mitigation fund under the Compact to permit disbursals from the fund to apply to payment for Police, Fire and Emergency Medical Services and sewer service including bond payments and use fees rendered under this Agreement.

2.9 Construction of Project Substantially in Conformity with Representations

The Tribe in the exercise of its sovereignty shall require the Project to be initially constructed and environmentally mitigated substantially in conformity with the conceptual plans general representations in Exhibits B, C and D and the EA.

2.10 Tribal Retail Store in City and Participation in City Shuttle Project

The Tribe and the City shall cooperate in good faith for the establishment of a Tribal retail store in the Snoqualmie Downtown Historic District, and for the Tribe's participation in a potential future City shuttle service to create a transportation link between the Project, the Downtown Historic District and other potential locations within the City and/or Snoqualmie Valley.

2.11 Limited Waiver of Sovereign Immunity

The Tribe hereby consents to the limited waiver of sovereign immunity solely with respect to the enforcement of this Agreement and its provisions. The Tribe further consents to the exercise of subject matter and personal jurisdiction by the Superior Court of the State of Washington for King County for the enforcement of this Agreement, and any judgment of the court rendered thereon. This waiver shall be effective only during the term of this Agreement, provided, the waiver shall remain in force for such time after termination of this Agreement as may be necessary to resolve the rights and obligations of either the City or the Tribe arising out of this Agreement. Service of process upon the Tribe shall be made on the Tribal Chairman or Tribal Secretary at the authorized address of the Tribe as set forth below, provided, that if the offices of Tribal Chair and Tribal Secretary are vacant, then service may be made upon any member of the Tribal Council, and further provided, if all positions on the Tribal Council are vacant, then service may be made upon any member of the Tribe. The Tribe further waives and agrees not to assert any doctrine requiring exhaustion of Tribal Court or administrative remedies prior to proceeding with any arbitration or court proceeding on this Agreement.

2.12 Indemnity and Insurance

2.12.1 The City shall indemnify, defend and hold harmless the Tribe, its agents and employees, from and against any and all liability, including attorney's fees, arising from injury or death to persons or damage to property resulting in whole or in part from negligent acts of the City, its agents or employees, regardless of whether in connection with such act or omission it is alleged or claimed that an act of the City, its agents or employees caused or contributed thereto.

2.12.2 The Tribe shall indemnify, defend and hold harmless the City, its agents and employees, from and against any and all liability, including attorney's fees, arising from injury or death to persons or damage to property resulting in whole or in part from negligent acts of the Tribe, its agents or employees, regardless of whether in connection with such act or omission it is alleged or claimed that an act of the Tribe, its agents or employees caused or contributed thereto.

2.12.3 The Tribe shall indemnify, defend and hold harmless the City, its agents and employees, from and against any and all liability, including attorney's fees, arising from any claim for false arrest or imprisonment or violation of civil rights for any detention, questioning, arrest or other similar claim or cause of action arising out of events occurring on the Property, without regard to negligence or either party, unless the conduct of the officer or employee of the City constitutes gross negligence, reckless or intentional violation of the rights of the person making such claim.

2.13 Interpretation of Agreement

The Recitals to this Agreement are intended to be consulted with respect to the interpretation of this Agreement or its application in particular circumstances. Where any provision is

susceptible of two interpretations, the interpretation most consistent with the intention of the parties as determined by consulting the Recitals shall control.

2.14 Dispute Resolution

In the event that the parties have any disagreement regarding their respective rights or obligations under this Agreement arising from the interpretation of any of the provisions hereof or their application to any particular facts or circumstances, other than an action for termination for material breach, the parties shall first meet in a good faith attempt to resolve their differences by agreement, and failing such agreement, the parties agree to submit such question or questions to binding arbitration administered by the American Arbitration Association under its Commercial Arbitration Rules, and judgment on the award rendered by the arbitrator(s) may be entered and enforced in the Superior Court for the State of Washington for King County.

2.15 Entire Agreement

This Agreement contains the entire understanding of the parties with respect to the provision of services by the City to the Property. All prior discussions or negotiations, whether oral or written, are superceded by this Agreement.

2.16 Amendment

This Agreement may only be amended in a further written document executed by the duly authorized representatives of the Tribe and City, with the prior approval of the Tribal Council and City Council respectively, provided, written protocols for the provision of Police, Fire and Emergency Medical Services shall not be deemed an amendment of this Agreement, nor shall amendments to the sewer regulations of general applicability throughout the City's service area adopted by City Council be deemed amendments to this Agreement.

2.17 Action for Termination for Material Breach or Specific Performance

2.17.1 This Agreement may only be terminated by either party prior to its expiration by material breach by the other party. Any action for termination for material breach of this Agreement shall be brought in the Superior Court of the State of Washington for King County, and all remedies whether legal or equitable as the facts may warrant shall be available to both parties. In the event of any action in Superior Court to terminate this Agreement for material breach, the prevailing party shall be entitled to an award of reasonable attorneys fees and expenses of litigation, including but not limited to expert witness expenses.

2.17.2 For purposes of this Agreement, "material breach" shall include the following:

2.17.3 By the City: Failure to perform any material obligation under this Agreement, provided written notice has been provided to the City stating the nature of the default and the actions required to cure and such default remains uncured for a period exceeding ninety (90) days, and further provided, if such default cannot be cured within ninety (90) days the City shall have additional time provided that the City has commenced actions to cure within the ninety (90) day period, and is diligently proceeding to complete such actions to cure. or substantial delay in the construction of Off-Site Improvements which, as a result thereof, delays the Project development for the opening of the commercial enterprise.

2.17.4 By the Tribe: The failure to initially construct the Project substantially in conformance with the conceptual plans and general representations in Exhibits B, C and D and the EA, provided, the representations regarding construction of signage shall be permanent; the failure to make any payment on the Bonds pursuant to subparagraph 2.5.3 when due; the failure to cure any default in payment of any other sums due the City under

this Agreement for a period of thirty (30) days after receiving the City's written notice to cure such default unless the Tribe notifies the City in writing within ten (10) days of receiving said notice that the Tribe disputes the payment; and the failure to perform any material duty or obligation of the Tribe under this Agreement, provided written notice has been provided to the Tribe stating the nature of the default and the actions required to cure and such default remains uncured for a period exceeding ninety (90) days, and further provided, if such default cannot be cured within ninety (90) days the Tribe shall have additional time provided that the Tribe has commenced actions to cure within the ninety (90) day period, and is diligently proceeding to complete such actions to cure.

2.17.3 Tribe's Remedies: Both Parties agree and recognize that, due to the size and scope of the Project, including the major infrastructure improvements that must be made in the initial phases of the Project, the design and placement of various discrete uses and structures, and the functional and economic interrelationships of the various components of the Project, as a practical matter it will not be possible physically, financially and as a matter of land use planning, to restore the Project to its former state once any significant portion of the Project is developed and/or any portion of the infrastructure is constructed. For the above reasons it may not be possible to determine an amount of monetary damages which would adequately and properly compensate Tribe for this work. Therefore, the Parties agree that, except as provided in Sections 2.6.8, the Tribe's sole remedies shall be specific performance or termination of the agreement for the City's material breach in the event of the City's failure to carry out its material obligations under this Agreement.

2.17.4 City's Remedies: The City's sole remedies under this Agreement shall be the collection of any sums due it for payments on the Bonds, sums due it for the Services, subject to the provisions for Dispute Resolution, or termination of the

agreement for the Tribe's material breach in the event of the Tribe's failure to carry out its material obligations under this Agreement.

2.18 Force Majeure

Neither Party shall be deemed to be in default where failure or delay in performance of any of its obligations under this Agreement is caused by earthquakes, other Acts of God, fires, wars, riots or similar hostilities, strikes and other labor difficulties beyond the Party's control (including the Party's employment force), government regulations, court actions (such as restraining orders or injunctions), or other causes beyond the Party's control. If any such events shall occur, the term of this Agreement and the time for performance shall be extended for the duration of each such even, provided that the term of this Agreement shall not be extended under any circumstances for more than 5 years.

2.19 Term of Agreement

This Agreement shall become effective upon execution hereof by the authorized representatives of the Tribe and the City, and shall remain in full force and effect for a period of 7 (seven) years after the opening of the Project, and shall be automatically renewed for 5 (five) successive additional periods of 7 (seven) years each unless written notice of termination is given by either the Tribe or the City at least 6 (six) months prior to the expiration of the initial term or any renewal term, and further provided, the Tribe's obligation to pay the Bonds shall survive any termination of this Agreement until the Bonds are paid in full.

2.20 Notices

2.20.1 Notice may be given by either party to the other party for any purpose under this Agreement by personal delivery, or certified mailing. Notice shall be deemed given on the date of delivery or three days after the date of mailing.

2.20.2 Notices shall be given to the parties as follows:

To the City:

R. Fuzzy Fletcher, Mayor
PO Box 987
Snoqualmie, WA 98065

With a copy to:

Patrick B. Anderson, City Attorney
PO Box 924
Snoqualmie, WA 98065

To the Tribe

Joseph Mullen, Chairman
PO Box 280
4480 Tolt Ave.
Carnation, WA 98014

With a copy to:

2.20.3 Each party shall be responsible to notify the other of any change in the name, or address of persons to receive notice, provided, any party having actual notice of such change shall give notice to the current holder of the office at such known address.

2.21 Assignment

This Agreement shall not be assignable to either party.

2.22 No Third Party Beneficiaries

This Agreement is entered for the uses and purposes set forth above, for the sole benefit of the City and Tribe, and the provisions hereof are not intended to benefit or protect the interest of any other person or entity.

2.23 Relationship of Parties

This Agreement is intended only to create contractual obligations for the Services, and the City and the Tribe do not intend, and nothing herein shall be construed, to create a partnership or joint venture between them.

CITY OF SNOQUALMIE SNOQUALMIE TRIBE

Original Signed Copy on File with the City Clerk of the City of Snoqualmie

_____ _____

R. Fuzzy Fletcher, Mayor
Dated: April 26, 2004

Joseph Mullen, Chairman
Dated: April 26, 2004

EXHIBIT A

LEGAL DESCRIPTION

PARCEL A:

ALL OF GOVERNMENT LOT 3, AND THAT PORTION OF GOVERNMENT LOT 4, LYING NORTHERLY OF THE NORTH MARGIN OF SR 90 (STATE HIGHWAY NO. 2), SECTION 31, TOWNSHIP 24 NORTH, RANGE 8 EAST W.M.;

SITUATED IN THE COUNTY OF KING, STATE OF WASHINGTON.

PARCEL B:

TRACT 1 IN BLOCK 3 OF THE UNRECORDED PLAT OF SI-VIEW ACRE TRACTS, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT ON THE SOUTH LINE OF THE NORTHWEST 1/4 SECTION 31, TOWNSHIP 24 NORTH, RANGE 8 EAST W.M., 750.75 FEET SOUTH 88º51'11" WEST OF THE SOUTHEAST CORNER OF SAID NORTHWEST 1/4;
THENCE SOUTH 88º51'11" WEST, 660.36 FEET;
THENCE NORTH 03º02'25" WEST, 308.18 FEET;
THENCE NORTH 86º57'35" EAST, 660.00 FEET TO THE WEST LINE OF A 60.0-FOOT STREET;
THENCE SOUTH 03º02'25" EAST ALONG SAID STREET, 330.0 FEET TO THE POINT OF BEGINNING;

EXCEPT THAT PORTION OF LOT 1 IN BLOCK 3 OF THE UNRECORDED PLAT OF SI-VIEW ACRE TRACTS, IN SECTION 31, TOWNSHIP 24 NORTH, RANCH 8 EAST W.M., DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHEAST CORNER OF THE ABOVE DESCRIBED LOT 1, SOUTH 86º57'35" WEST A DISTANCE OF 311.14 FEET ALONG THE NORTH BOUNDARY OF SAID LOT 1;
THENCE SOUTH 03º02'25" EAST A DISTANCE OF 140.00 FEET;
THENCE NORTH 86º57'35" EAST A DISTANCE OF 311.14 FEET TO THE EAST BOUNDARY LINE OF SAID LOT 1;
THENCE NORTH 03º02'25" WEST A DISTANCE OF 140.00 FEET ALONG THE EAST BOUNDARY OF SAID LOT 1 TO THE POINT OF BEGINNING;

SITUATED IN THE COUNTY OF KING, STATE OF WASHINGTON.

EXHIBIT B

EXHIBIT C
Preliminary Site Plan

EXHIBIT D

GENERAL REPRESENTATIONS OF TRIBE

- The building will be located in the approximate middle of the site and below North Bend Way to reduce the visual impact along this roadway and to provide for a more secluded setting for the Project.
- The berm and existing vegetation on North Bend Way will remain undisturbed to the maximum extent feasible with safe and efficient site ingress and egress.
- A significant undisturbed vegetated buffer will be left on the west side of the Property along 372nd Ave. S.E.
- The architectural style and materials of the building will blend elements of the "great lodge" of the West and the Pacific Northwest with the natural characteristics of the Property.
- Signage will be oriented toward North Bend Way. No signage will be erected on site intended to be visible from I-90. Signage will be oriented toward North Bend Way. No signage will be erected on site intended to be visible from I-90. Signage on I-90 will be WSDOT approved signage directing travelers to the Tribe's reservation or to travelers' services.
- Tribe will work with City and WSDOT if experience shows eastbound off-ramp of Exit 27 should be reconfigured or other traffic impact mitigation is required.

EXHIBIT E
SEWER COLLECTION SYSTEM
REQUIRED IMPROVEMENTS

The Required Improvements are based upon the South Snoqualmie Hills Sewer Plan (Tt/KCM, 2002), which should be consulted in connection with this Exhibit. The Tribe shall be responsible for actual costs incurred. Estimated costs are provided for planning purposes only

IMPROVEMENT	**ESTIMATE**
Construct new 10" sewer trunk from northeast corner of Tribe's property southeasterly along SE 88th Street to 384th Avenue SE and connecting to existing manhole #313.	$469,000
Improve existing collection system to eliminate Pump Station No. 5 and bypass Pump Station No. 2 with new 15-inch trunk sewer line by constructing a new trunk sewer to replace existing 10" trunk sewer from manhole 300 upstream from Pump Station No. 5 to manhole 110 at the corner of Cedar Street and Silva Avenue and continuing the sewer line north on Silva Avenue and Fir Street, connecting to the existing 15-inch trunk sewer at manhole # 8.	$568,000
Remove Pump Station 5 following construction of the new sewer.	$20,000
Increase motors from 32 to 40 horsepower at Pump Station No. 1.	$5,000
Correct point source of infiltration and inflow, including smoke reports (mostly on private property), leaking manholes, and water tight manhole lids in flood areas	$47,000
Provide a wastewater monitoring station as near as practicable to the point of connection to the municipal system to specifications and design approved by the City, to include a flow measurement manhole with a Parshal flume, level sensor, and an above grade flow indicator, totalizer and data logger and an automatic sampler for taking time-or flow-composite samples.	$20,000
Contingency	$339,000
Engineering and administration	$367,000
Sales tax	$126,000
TOTAL:	$1,961,000.00

EXHIBIT F

Fully Loaded Cost for One Police Officer

CITY OF SNOQUALMIE – POLICE SERVICES
(2004 Base Year Example)

Formula for projecting costs from Wages for Benefits and Overtime, Equipment and Administrative, and Total Costs for 1 Police Services Personnel

2004 Example

FF Monthly Wage	$5,235.00	X 12 months =
FF Annual Wage	$62,820.00	
Benefit and Overtime Projection		
Annual Wage	$62,820.00	
Benefit and Overtime Multiplier	45.54%	
Projected Benefit and Overtime Cost	$28,609.00	
Equipment and Administrative Projection		
Annual Wage	$62,820.00	
Equipment and Administrative Multiplier	31.60%	
Projected Equipment and Administrative Cost	$19,852.00	
Total Cost Per Employee		
Annual Wage	$62,820.00	
Benefit and Overtime	$28,609.00	
Equipment and Administrative	$19,852.00	
Total Cost for one employee (Annual)	**$111,281.00**	

Actual fully loaded cost will be calculated annually

EXHIBIT G

Fully Loaded Cost for Two Fire Fighters

CITY OF SNOQUALMIE – FIRE AND EMERGENCY SERVICES
(2004 Base Year Example)

Formula for projecting costs from Wages for Benefits and Overtime, Equipment and Administrative, and Total Costs for 1 Police Services Personnel

2004 Example

FF Monthly Wage	$4,619.00	X 12 months =
FF Annual Wage	$55,428.00	
Benefit and Overtime Projection		
Annual Wage	$55,428.00	
Benefit and Overtime Multiplier	42.94%	
Projected Benefit and Overtime Cost	$23,800.00	
Equipment and Administrative Projection		
Annual Wage	$55,428.00	
Equipment and Administrative Multiplier	27.64%	
Projected Equipment and Administrative Cost	$15,321.20	
Total Cost Per Employee		
Annual Wage	$55,428.00	
Benefit and Overtime	$23,800.00	
Equipment and Administrative	$15,321.00	
	$94,549.20	
Total Cost for two employee (Annual)	**$189,098.40**	

Actual fully loaded cost will be calculated annually

Exhibit H

LADDER TRUCK EXAMPLE

Specification:	New 110' aerial ladder truck – "quint" style.
Estimated cost (2004 dollars):	$810,000
Estimated annual payment (5 year term, 5.5% lease rate, one annual payment)	$189,893.67
Tribe's share:	$75,957.47

The Tribe's actual payment will depend upon final purchase cost and nature and terms of financing.

Return Address:
Department of Social and Health Services
Lands and Buildings Division
1115 Washington Street SE
Olympia, WA 98504-4858

Please print or type information **WASHINGTON STATE RECORDER'S Cover Sheet** (RCW 65.04)

Document Title(s) (or transactions contained therein): (all areas applicable to your document **must** be filled in)

1. Developer Extension Agreement 2. _____
3. _____ 4. _____

Reference Number(s) of Documents assigned or released:

Additional reference #'s on page _____ of document
N/A

Grantor(s) (Last name, first name, initials)
1. City of Snoqualmie, _____
2. _____, _____

Additional names on page _____ of document.

Grantee(s) (Last name first, then first name and initials)
1. State of Washington Department of Social and Health Services, _____
2. _____, _____

Additional names on page _____ of document.

Legal description (abbreviated: i.e. lot, block, plat or section, township, range)
Section 34, Township 24 North, Range 7 East, W.M., King County, Washington

Additional legal is on page _____ of document.
N/A

Assessor's Property Tax Parcel/Account Number
342407-9001

Assessor Tax # not yet assigned

The Auditor/Recorder will rely on the information provided on the form. The staff will not read the document to verify the accuracy or completeness of the indexing information provided herein.

I am requesting an emergency nonstandard recording for an additional fee as provided in RCW 36.18.010. I understand that the recording processing requirements may cover up or otherwise obscure some part of the text of the original document.

_____ Signature of Requesting Party

RECEIVED
OCT - 7 2005
DSHS Lands & Building Div

DEVELOPER EXTENSION AGREEMENT AND WASTEWATER TREATMENT SERVICE AGREEMENT BETWEEN THE CITY OF SNOQUALMIE AND THE STATE OF WASHINGTON DEPARTMENT OF SOCIAL AND HEALTH SERVICES

THIS AGREEMENT is made this 25th day of July, 2005, between the **CITY OF SNOQUALMIE** ("the City"), a Washington municipal corporation, and the **STATE OF WASHINGTON DEPARTMENT OF SOCIAL AND HEALTH SERVICES** ("DSHS), an agency of the State of Washington pursuant to authority granted in 39.34 RCW, the Inter-local Cooperation Act .

RECEIVED
AUG 0 5 2005
DSHS - Lands & Building Div.

RECITALS

A. The City is a municipal corporation of the State of Washington, organized under the Optional Municipal Code, Title 35A RCW, located in King County, Washington.

B. DSHS is an agency of the State of Washington, which operates the Echo Glen Children's Center ("Echo Glen"), a juvenile rehabilitation center located in unincorporated King County on S.E. 99th Street. Echo Glen presently houses 170 residents, and has a current design capacity of 210 residents.

C. DSHS operates a wastewater treatment lagoon system at Echo Glen that discharges into Icy Creek. The water quality standards for Icy Creek can not be met during the summer, and eliminating the discharge of Echo Glen's treated effluent to Icy Creek will prevent degradation of water quality in Icy Creek. DSHS has requested to connect to the municipal wastewater system. Echo Glen is located outside the City's Urban Growth Area and outside the City's sewer service area.

2005 AUG -9 AM 10:30
RECEIVED DSHS

D. The City owns and operates a municipal wastewater system, which has capacity to accept a certain quantity of sewer effluent from Echo Glen. Areas outside the corporate limits may be connected to the municipal wastewater system only with the consent of City Council. Areas in unincorporated King County outside the City's Urban Growth Area may be connected to the municipal wastewater system only with the approval of King County Utility Technical Review Committee.

E. Echo Glen, as a juvenile rehabilitation center, has experienced recorded incidents of high BOD loading for the population, largely associated with food wastes, and has experienced recorded incidents of high storm water inflow and infiltration, both of which should be addressed by Echo Glen as a condition of connection to the municipal wastewater system.

F. The portion of the municipal wastewater collection and treatment system that would be used by Echo Glen was constructed by and at the sole expense of Weyerhaeuser Real Estate Company ("WRECO") and its successor in interest, the Quadrant Corporation ("Quadrant").

G. The City and Quadrant have entered and recorded a written reimbursement agreement pursuant to chapter 35.91 RCW, and have agreed as to the fair pro rata share of the cost of construction to be paid by those later connecting to the system who did not contribute to the original cost of the sewer facilities. The latecomer reimbursement cost is Three Thousand Five Hundred Twenty-nine Dollars ($3,529.00) per Equivalent Residential Unit ("ERU"), defined as one-half (1/2) pound of BOD and one hundred eighty (180) gallons of flow per day.

H. The City Council has previously adopted Resolution No. 450, setting forth the City's preliminary consent to accept and treat sewer effluent up to one hundred sixty (160) ERUs from Echo Glen, and the terms and conditions under which the City would be willing to permit Echo Glen to be connected to the municipal wastewater collection and treatment system. The City has included Echo Glen in its Sewer System Comprehensive Plan, approved in 2003.

I. DSHS anticipates it will be able meet the BOD limit of eighty (80) pounds per day (160 ERUs x 0.5 pounds BOD per day) based on a monthly average, but it will not be able to meet the flow limitation of twenty-eight thousand eight hundred (28,800) gallons per day (160 ERUs x 180 gallons per day) initially. The City has agreed to accept greater flows for a period of up to six years, in consideration of a contribution in the amount of Two Hundred Fifty Thousand Dollars ($250,000) to the City to partially fund a City project to reduce inflow and infiltration (I&I) in the City's municipal wastewater collection, and the development and implementation of a work program by DSHS to reduce its flows discharged to the municipal wastewater system.

J. Snoqualmie Municipal Code ("SMC") 12.16.740 requires the City to enter into a developer extension agreement with any person desiring to extend sewer utilities.

K. The City is willing to extend sewer service to Echo Glen, on the terms and conditions set forth in this Agreement, which the City deems necessary to protect the health, safety, and welfare of the public, and to provide that the costs of extending utilities are borne by DSHS and not by the City or its rate payers.

L. This Agreement is made upon the basis of the foregoing provisions, and in consideration of the mutual promises and covenants herein and the mutual benefits to be derived by the parties.

AGREEMENT

1. UNDERTAKINGS OF DSHS. The undertakings of DSHS pursuant to this Agreement as follows:

1.1 DSHS shall at its sole cost and expense design, permit, construct, own, operate, maintain, repair, improve and replace as necessary the Sewer Improvements identified in EXHIBIT A, including the acquisition of all required rights of way, street use permits or easements which may be required, from Echo Glen to the point of connection to the City's municipal wastewater collection system via the route depicted in EXHIBIT B.

1.2 DSHS plans and specifications shall be reviewed by the City as if the facilities were located within the city at DSHS's cost. Such measures required by the City to protect the integrity and efficiency of operation of the municipal wastewater system shall be incorporated into such plans and specifications.

1.3 DSHS shall be solely responsible for securing all permits and approvals of any nature whatsoever for construction and operation of the Sewer Improvements; for the extension of the City's municipal wastewater system into the Rural Area to serve Echo Glen; including King County Utility Technical Review Committee approval; and for compliance with any conditions or limitations placed upon such sewer extension by King County or any state agency with jurisdiction.

1.4 DSHS shall upon execution of this Agreement immediately commence development and implementation of a work program to identify and implement all reasonable measures to reduce its flows discharged to the municipal wastewater system, including but not limited to the repair / rehabilitation of DSHS's on-site collection system to reduce I&I, preparation and implementation of a water conservation plan, and implementation of a water re-use program for on-site irrigation or other uses designed to remove flows from sanitary sewers.

1.5 The existing on-site wastewater treatment aerator tank shall be retained and incorporated into the design of the new on-site system improvements for peak flow retention and controlled discharge to reduce peak day discharges to the municipal wastewater system, and for pre-treatment as necessary to bring DSHS's discharge to the municipal wastewater system to not more than 80 pounds BOD per day based on a daily average for each month.

1.6 Within ninety days after the effective date of this Agreement, DSHS shall obligate the sum of Fifty Thousand Dollars ($50,000.00), which may only expended by the City on the design and implementation of measures to reduce I&I in the City's municipal wastewater collection system. Said sum shall be paid to the city within thirty days of receipt of a properly documented invoice and fully expended by June 30, 2007 By July 31, 2007 DSHS shall obligate an additional $200,000 under the same conditions as the original $50,000 to be fully expended by June 30, 2009. Any funds remaining unexpended after July 1, 2009 shall be retained by DSHS.

1.7 The sewer lines to be constructed by DSHS shall be sized to serve only Echo Glen, and shall be designed for a resident population of not more than three

hundred (300) inmates and required employees. DSHS shall not permit or suffer any other connections to be made to the Sewer Improvements between Echo Glen and the point of connection to the municipal wastewater system.

1.8 DSHS shall take all reasonable precautions to prevent debris from being introduced to the municipal wastewater system which might cause damage or effect efficiency of operation, including but not limited to installation of a bar screen upstream of lift station pumps, subject to City approval.

1.9 DSHS shall include City approved odor control measures in the design of the on-site system and shall augment grease removal systems at Echo Glen, if necessary to meet with City approval. Cleaning and maintenance of the grease removal systems shall conform to City requirements.

1.10 DSHS shall take all reasonable measures to control storm water inflow and infiltration to Echo Glen's on-site wastewater collection system and to the Sewer Improvements.

1.11 DSHS shall take all reasonable steps at Echo Glen to reduce the generation of BOD load, including but not limited to instituting and maintaining a program to minimize the introduction of BOD load from food wastes to the maximum extent practicable, which shall at a minimum include a food waste composting program.

1.12 DSHS shall permit access to Echo Glen by the City's Sewer Superintendent or his designee to inspect and sample discharges into the sewer system at the pump station. The City shall have the right to enter the premises for the purpose of the enforcement of the sewer ordinance and, this Agreement, and to verify compliance with the requirements thereof. Echo Glen is a secure, juvenile corrections facility and

entrance is restricted. DSHS shall provide the Sewer Superintendent or his designee escorted access to all parts of the premises for the purposes of inspection as soon as practical following the City's request, Access to the pump station for inspection and sampling discharges to the sewer system can be coordinated directly with the Echo Glen Plant Manager at any time. Under emergency conditions, DSHS shall make necessary arrangements with its security personnel so that, upon presentation of suitable identification, the Sewer Superintendent or his designee will be permitted to enter without delay for the purposes of performing specific sewer related responsibilities.

1.13 DSHS shall pay the City the sum of Five Hundred Sixty-four Thousand Six Hundred Forty Dollars ($564,640) prior to connection to the municipal wastewater collection and treatment system as a latecomer reimbursement pursuant to chapter 35.91 RCW, for One Hundred Sixty (160 ERUs), which sum the City shall pay over to the Quadrant Corporation pursuant to the latecomer reimbursement agreement.

1.14 DSHS shall pay the cost of purchasing, installing, maintaining and replacing as necessary a flow meter and sampler, which shall be owned and operated by the City, according to specifications provided by the City, to be located at the on-site lift station, and shall pay all costs of periodic monitoring as set forth in paragraph 2.4.

1.15 DSHS covenants that it shall not discharge nor permit or suffer to be discharged to the City's sewer system any pollutants, greases or oils in quantities that exceed the limits of Snoqualmie Municipal Code 13.04.430. Compliance with the provisions of Snoqualmie Municipal Code 13.04.010 through 13.04.470 inclusive, which are hereby incorporated herein by this reference as contractual obligations, shall be a

condition precedent to the City's obligation to accept wastewater effluent from Echo Glen.

1.16 DSHS shall pay the City monthly for wastewater treatment. The base monthly rate for wastewater treatment for shall be the then-current rate at any time as established by City Council for sewer service for one single family residence multiplied by one hundred sixty (160). The cost of monitoring pursuant to section 2.4 shall be billed separately by the City and paid by DSHS to the City in addition to the base rate for wastewater treatment. DSHS shall be subject to all of the provisions of the Snoqualmie Municipal Code relating to sewer regulation and rates and charges as set forth in chapters 13.04 and 13.08 SMC as they now exist or may hereafter be amended. There shall be an annual reconciliation prior to January 31st of each year for discharges to the municipal wastewater system in excess of one hundred sixty ERUs. If flow or BOD monitoring results shows that DSHS has exceeded eighty (80) pounds BOD per day or twenty-eight thousand eight hundred (28,800) gallons per day based on a daily average for any one month period, such additional discharges shall be charged at one hundred fifty percent (150%) of the currently monthly rate for a single family residence for each one-half pound of BOD per day or one hundred eight gallons per day based on the daily average for the month. Payment by DSHS and acceptance of payment by the City for discharges to the municipal wastewater system in excess of one hundred and sixty ERUs shall not excuse DSHS from its obligation to actively take steps to reduce its effluent discharge to the municipal wastewater system to one hundred sixty ERUs.

1.17 If at the expiration of six years from the date of this Agreement, DSHS has not reduced its discharge to the municipal wastewater system to one hundred

sixty (160) ERUs, the City and DSHS shall negotiate in good faith to identify and implement additional measures DSHS shall take to reduce its discharge to one hundred sixty (160) ERUs. DSHS may further be required by the City to make additional latecomer payments to the City pursuant to the latecomer reimbursement agreement for additional ERUs to fairly reimburse Quadrant for DSHS's actual discharges. The requirement of additional latecomer reimbursement payments shall not be construed as a commitment by the City to provide additional wastewater treatment capacity to DSHS, and DSHS acknowledges that all present and future customers of the municipal wastewater system located within the corporate limits or Urban Growth Area shall have a higher priority than Echo Glen to additional treatment capacity. A reduction of flow to the municipal wastewater system within six years to less than thirty-five thousand gallons per day based on a daily average for any month shall be the minimum acceptable reduction.

1.18 DSHS representatives shall meet with City representatives upon request to address any issues or concerns regarding any exceedance of the BOD or flow limits, debris or pollutants in the effluent, any circumstances which affect or might affect the integrity of the municipal wastewater system or efficiency of its operation, or any matter relating to this Agreement.

2. UNDERTAKINGS OF CITY. The undertakings of the City pursuant to this Agreement shall be as follows:

2.1 The City shall use best efforts to own, operate, maintain, repair, improve, and replace as necessary the municipal wastewater system, in good and

functional condition and in compliance with all applicable federal, state and local regulations.

2.2 The City shall use best efforts to assist DSHS in any matters relating to design, permitting, construction and operation of the Sewer Improvements, subject to DSHS's obligation to compensate the City at the City's normal hourly rates. Other than matters requiring City review and approval pursuant to this Agreement, the City will only participate on request of DSHS.

2.3 The City shall accept for treatment by the municipal wastewater treatment system Echo Glen's wastewater effluent, not exceeding One Hundred Sixty (160) ERUs, subject to all provisions of this Agreement.

2.4 The City shall monitor effluent flow and strength at the sole cost of DSHS at a frequency determined appropriate by the City after consultation with DSHS, up to three times per week. The monitoring station shall be located at the on-site lift station at Echo Glen, and shall include provisions for telemetry for the flow meter compatible with any current or future City system. The design and installation of the monitoring facilities shall be subject to City approval. The facilities shall be owned by the City and shall include at a minimum a flow meter with an automatic digital recording totalizing data logger. The station shall also include a permanent automatic sampler, for taking time- or flow-composite samples. with respect to any demand from Echo Glen exceeding the limits of paragraph 1.4.

2.5 The City shall bill DSHS monthly for the base rate for wastewater treatment as provided in subsection 1.16, which shall be due and payable within fifteen (15) days, pursuant to SMC 13.08.

2.6 The City shall bill for periodic effluent monitoring and any other chargeable work as it is performed, which shall be due and payable within thirty (30) days.

2.7 City representatives shall meet with DSHS representatives upon request to address any issues or concerns regarding any matter related to this Agreement.

3. INTERRUPTION IN SERVICE. The City shall not be liable for any damages of any nature whatsoever for interruptions in provision of sewer service regardless of cause.

4. TERM. The term of this Agreement shall be from the date of mutual execution until terminated as provided herein.

5. INDEMNIFICATION. DSHS agrees, to the extent provided by law, to defend, indemnify and hold harmless the City, and all of its elected and appointed officials, staff, employees and contractors from all claims, liability and costs, including without limitation attorney's and expert witness fees, arising in connection with DSHS' acts or omissions related to the design, permitting, construction, ownership, operation, maintenance, repair, improvement, or replacement of the Sewer Improvements, except as may be due to the sole negligence of the City, or that of its officials, staff, employees or contractors.

6. ASSIGNMENT. This Agreement shall not be assignable. The City's agreement to provide wastewater treatment service shall be solely with DSHS and shall not be appurtenant to the real estate.

7. THIRD PARTY BENEFICIARIES. This Agreement is intended solely for the benefit of the parties hereto and not for the benefit of any third party.

8. TERMINATION. This Agreement shall terminate upon any one of the following events:

8.1 The parties agree to termination.

8.2 The Echo Glen facility ceases to be used as a juvenile rehabilitation center, except when such change of use is agreed upon by the city..

8.3 DSHS materially breaches this Agreement. For purposes of this Agreement a "material breach" means:

8.3.1 DSHS shall fail to diligently work to reduce its effluent discharge to the municipal wastewater system as provided herein within thirty (30) days after notice by the City that the City deems DSHS's efforts inadequate.

8.3.2 DSHS fails or refuses to meet its undertakings with respect to construction and/or operation under this Agreement to protect the integrity and treatment efficiency of the municipal wastewater system with respect to debris, pollutants, grease, enzyme digestion, or excessive BOD loading, within thirty (30) days after notice by the City to do so.

8.3.3 DSHS becomes ninety (90) days or more in arrears on any monetary obligation under this Agreement.

8.3.4 DSHS fails or refuses to permit the City's Sewer Superintendent or his designee to access to Echo Glen pursuant to paragraph 1.10.

8.3.5 DSHS fails or refuses after thirty (30) days written notice to comply with any lawful directive of the City's Sewer Superintendent or his designee regarding discharges into the sewer system.

9. Costs Incurred by the City. DSHS shall pay to the City all costs incurred by the City, including consultants, that are associated with this Agreement or the Sewer Improvements, including plan review and inspection fees pursuant to SMC 12.16.720 and .730, and other engineering, legal and administrative costs. The City will bill DSHS for these costs, which shall be payable within thirty (30) days.

10. Notices. All notices pursuant to this Agreement shall be sent to the following addresses:

City of Snoqualmie:	City Clerk City of Snoqualmie P.O. Box 987 Snoqualmie, Washington 98065
With a copy to:	Patrick B. Anderson Snoqualmie City Attorney City of Snoqualmie P.O. Box 924 Snoqualmie, Washington 98065
DSHS:	Director, Lands and Buildings Division Department of Social and Health Services P.O. Box 45848 Olympia, Washington 98504-5848
With a copy to:	Superintendent Echo Glen Children's Center 33010 S.E. 99th Street Snoqualmie, Washington 98065

11. INTERPRETATION OF AGREEMENT. The Recitals to this Agreement are intended to be consulted with respect to the interpretation of this Agreement or its application in particular circumstances. Where any provision is susceptible of two interpretations, the interpretation most consistent with the intention of the parties as determined by consulting the Recitals shall control.

12. DISPUTE RESOLUTION. In the event that the parties have any disagreement regarding their respective rights or obligations under this Agreement arising from the interpretation of any of the provisions hereof or their application to any particular facts or circumstances, other than an action for termination for material breach, the parties shall first meet in a good faith attempt to resolve their differences by agreement, and failing such agreement, the parties agree to submit such question or questions to binding arbitration administered by the American Arbitration Association under its Commercial Arbitration Rules, and judgment on the award rendered by the arbitrator(s) may be entered and enforced in the Superior Court for the State of Washington for King County.

13. ENTIRE AGREEMENT This Agreement contains the entire understanding of the parties with respect to the provision of wastewater treatment by the City to Echo Glen. All prior discussions or negotiations, whether oral or written, are superseded by this Agreement.

14. Governing Law. This Agreement is entered into under the laws of the State of Washington, and the parties intend that Washington law shall apply to the interpretation hereof.

15. Enforcement. Venue and jurisdiction to enforce all obligations under this Agreement shall lie in the King County Superior Court. The obligations of the parties hereunder may not have an adequate remedy by way of an action for damages and may be enforced by an action for specific performance.

16. Severability. In the event a court of competent jurisdiction declares any material provision of this Agreement invalid, unconstitutional, or otherwise

unenforceable, any party may elect to terminate the remainder of this Agreement. In the event a non-material provision of this Agreement is declared invalid, unconstitutional or otherwise unenforceable, such provisions hereof as are not affected by such declaration shall remain in full force and effect.

17. Amendment. This Agreement may be modified only by written instrument duly executed by all parties, after approval of the Snoqualmie City Council.

EXECUTED the day and year first above written.

THE CITY OF SNOQUALMIE,
a Washington municipal corporation
By _____
R. Fuzzy Fletcher/CMC, Mayor

Attest:

_____
Jodi Warren/CMC, City Clerk

Approved as to form:

_____
Patrick B. Anderson, City Attorney

STATE OF WASHINGTON,
Department of Social and Health Services
By _____

Its Central Contracts Supervisor/Counsel

Approved as to form:

_____
Assistant Attorney General

ORDINANCE NO. 984

AN ORDINANCE OF THE CITY OF SNOQUALMIE, WASHINGTON, GRANTING THE STATE OF WASHINGTON DEPARTMENT OF SOCIAL AND HEALTH SERVICES A FRANCHISE TO USE AND OCCUPY A PORTION OF THE SNOQUALMIE PARKWAY, A PUBLIC RIGHT OF WAY, FOR CONSTRUCTING, OWNING, MAINTAINING, REPAIRING, OPERATING AND REPLACING A FORCE MAIN TO SERVE ECHO GLEN CHILDREN'S CENTER

WHEREAS, the Department of Social and Health Services ("DSHS") is an agency of the State of Washington, which operates the Echo Glen Children's Center ("Echo Glen"), a juvenile rehabilitation center located in unincorporated King County on S.E. 99th Street, and

WHEREAS, the City of Snoqualmie is a municipal corporation of the State of Washington organized and operating pursuant to the Optional Municipal Code, Title 35A RCW, which owns and operates the Snoqualmie Parkway, a public right of way, and

WHERAS, RCW 35A.47.040 authorizes code cities to grant non-exclusive franchises for the use of public streets, bridges or other public rights of way or places for water, sewer and other private and publicly owned and operated facilities for public service as may be set by ordinance, and

WHEREAS, DSHS and the City have entered into a Developer Extension Agreement and Wastewater Treatment Service Agreement dated July 25, 2005, providing for the City to accept wastewater from the Echo Glen Children's Center at the Douglas Avenue manhole on the Snoqualmie Parkway from a force main owned and operated by DSHS, and

WHEREAS, DSHS's force main will be located within the Snoqualmie Parkway right of way from the D Creek bridge to the Douglas Avenue manhole on the Snoqualmie Parkway, and

WHEREAS, this ordinance has been submitted to and approved by the City Attorney prior to its adoption at a regular meeting held more than five days after the meeting at which it was introduced, as required by RCW 35A.47.040, and

WHEREAS, it is in the public interest to grant DSHS a franchise to use and occupy a portion of the right of way of the Snoqualmie Parkway for the purpose of constructing, owning, maintaining, repairing, operating and replacing a force main to serve Echo Glen Children's Center on the terms and conditions set forth in this ordinance, now, therefore, be it

ORDAINED by the City Council of the City of Snoqualmie, Washington, as follows:

Section 1. The "Franchise Area" shall mean that portion of the right of way of the Snoqualmie Parkway lying to the south or east of the margin of the existing paved roadway between the Snoqualmie Parkway D Creek Bridge and the Douglas Avenue manhole on the Snoqualmie Parkway. The "Facilities" means a six inch (6") wastewater force main , and all necessary or convenient appurtenances thereto.

Section 2. The City hereby grants DSHS a non-exclusive franchise to use and occupy the Franchise Area for the purpose of constructing, owning, maintaining, repairing, operating and replacing the Facilities upon, over, under, along, across and through Franchise Area, subject to all the terms, conditions and restrictions of this ordinance, and subject to the expressly reserved authority of the City to adopt general ordinances in the exercise of its police power necessary to protect the safety and welfare of the general public.

Section 3. The term of the franchise granted herein shall be thirty (30) years, commencing upon the filing of a written notice of acceptance of the franchise granted herein and the terms and condition hereof, which acceptance must be filed within one hundred twenty (120) days after the effective date of this ordinance, or the franchise granted herein shall be null and void and of no further force or effect.

Section 4. The location of the Facilities and their depth below the surface of the ground shall be approved by the Public Works Director in consultation with the City Engineer. All

facilities shall be designed, located, and installed so as to least interfere with existing and planned City owned or operated utilities and the free flow of traffic. Before any work is done under this franchise DSHS shall apply for and obtain a permit to do such work.

Section 5. The application for a permit for work under this franchise shall include the class and type of material to be used, the equipment to be used, and the mode of safeguarding public traffic during construction. It shall be accompanied by drawings showing the position and location of the force main and appurtenances to be constructed, laid, installed or erected at that time, and their relative positions to the Snoqualmie Parkway, bridges, utilities and other public ways, places or facilities. All permit applications must be approved by the Public Works Director, and shall include such conditions as the Director may deem necessary to protect public property and public safety, including but not limited to requirements for pavement overlays. DSHS shall pay all reasonable costs and expenses incurred in review of the application and inspection of the work to be done pursuant to the permit. Inspection by the City shall be for the sole purpose of determining compliance with the requirements of this ordinance and with City-imposed conditions only. All permits shall conform to all other ordinances and regulations of general applicability in effect at the time of the application, including but not limited to those regulating sensitive areas, flood hazard, clearing and grading and surface and storm water management.

Section 6. A. After doing any work, DSHS shall restore all public streets, bridges and other public ways and places to as good and safe a condition as they were in before the commencement of the work. DSHS shall immediately repair at its sole cost any damage to pavement, turnouts, gutters, ditches, sidewalks, water mains or lines, sanitary and storm sewer

mains or lines, rails or other appurtenances to public streets, bridges or other public ways and places occurring in connection any work under this franchise.

B. DSHS by acceptance of this franchise warrants that any repair and/or restoration shall be of good and workman-like quality, for a period of five years or until the public street, bridge or other public way or place is sooner resurfaced or reconstructed.

C. The City may, whenever the Public Works Director deems it necessary to protect property or the health and safety of the general public, cause any work for which DSHS is responsible under this section to be done, and DSHS shall reimburse the City the cost of such work on demand.

D. The City may in its discretion refuse to approve any permit when any substantial work required as a condition of a prior permit remains uncompleted.

Section 7. A. Whenever the city performs grading, widening, construction or reconstruction in the Franchise Area, and such grading , widening, construction or reconstruction requires the relocation of the Facilities, the City shall provide reasonable notice to DSHS and plans and specifications for such work, and DSHS shall relocate such Facilities within the Franchise Area at no charge to the City.

B. Whenever any other person or entity other than the City requires the relocation of DSHS's Facilities to accommodate the work of such person or entity within the Franchise Area, or whenever the City requires the relocation of the Facilities within the Franchise Area for the sole or principal benefit of any person or entity other than the City and not principally for the public benefit, DSHS shall have the right as a condition of such relocation to require such person or entity to make payment to DSHS, at a time and upon terms acceptable to DSHS, for any and all costs and expenses incurred by DSHS in the relocation of the Facilities.

Section 8. DSHS shall provide the City with as-built drawings showing the location of the Facilities within the Franchise Area.

Section 9. DSHS's rights, benefits and privileges under this franchise shall not be assignable.

Section 10. If any term, provision, condition or portion of this franchise shall be held to be invalid by a court of competent jurisdiction, such invalidity shall not affect the validity of the remaining provisions, conditions or portions, which shall remain in full force and effect.

Section 11. This franchise is non-exclusive and shall not in any manner prohibit the City from granting other and further franchises in, upon, over, under, along, across and through the Franchise Area which do not interfere with DSHS's rights under this franchise.

Section 12. DSHS shall to the extent permitted by law indemnify and save the City harmless from any and all claims and demands made against the City on account of injury or damage to the person or property of another, to the extent such injury or damage is caused by the negligence of DSHS or its agents, servants, or employees in exercising the rights granted DSHS in this franchise. This indemnity shall include all costs and expense of defense incurred by the City in defending any claim subject to this section.

Section 13. If DSHS shall fail to comply with the provisions of this franchise, the City may serve upon DSHS a written notice to comply within sixty (60) days of the receipt of such notice. If DSHS does not comply with such notice within sixty (60) days, the City may by ordinance declare an immediate forfeiture of this franchise, provided, if DSHS cannot with the exercise of due diligence and being subject to unavoidable delays and events beyond DSHS's control comply within such sixty (60) day period, then the time within which DSHS may so

comply shall be extended as necessary and for so long as DSHS commences promptly and diligently pursues actions necessary to achieve compliance.

Section 14. This ordinance shall be effective from and after its adoption and the expiration of five (5) days after its publication as provided by law, provided, the term of the franchise granted herein shall commence as provided in Section 3.

PASSED by the City Council of the City of Snoqualmie, Washington, this 26th day of September, 2005.

R. Fuzzy Fletcher, CML, Mayor

Attest:

Jodi Warren, CMC, City Clerk

Approved as to form:

Patrick B. Anderson, City Attorney

FIRST AMENDMENT TO AGREEMENT BETWEEN THE CITY OF SNOQUALMIE AND THE SNOQUALMIE TRIBE FOR THE PROVISION OF POLICE, FIRE AND EMERGENCY MEDICAL SERVICES TO THE SNOQUALMIE HILLS PROJECT AND SEWER UTILITY SERVICE TO THE TRIBE'S INITIAL RESERVATION

THIS FIRST AMENDMENT TO AGREEMENT is made this 28th day of January, 2008, between the CITY OF SNOQUALMIE ("the City"), a Washington municipal corporation, and THE SNOQUALMIE TRIBE ("the Tribe"), a federally recognized Indian tribe.

RECITALS

1.1. The City is a municipal corporation of the State of Washington, organized under the Optional Municipal Code, title 35A RCW, located in King County, Washington.

1.2. The Tribe is a federally recognized Indian tribe, and is the developer of certain real property within the City's Snoqualmie Hills Planning Area commonly known as the Snoqualmie Hills Project, a gaming and entertainment facility ("the Project"). The real property is legally described on Attachment A hereto ("the Property").

1.3. The City and the Tribe entered a certain agreement entitled "Agreement between the City of Snoqualmie and the Snoqualmie Tribe For the Provision of Police, Fire and Emergency Medical Services to the Snoqualmie Hills Project and Sewer Utility Services to the Tribe's Initial Reservation " dated April 26, 2004 ("the Services Agreement").

1.4. The City and the Tribe desire to amend the Services Agreement in certain respects as set forth in this First Amendment.

1.5. The following amendment of the Services Agreement is made upon the basis of the foregoing recitals, and in consideration of the mutual promises and covenants herein, and the mutual benefits to be derived by the parties therefrom.

AGREEMENT

2.1 POLICE SERVICES

Sections 1.9 and 2.2 and Exhibit F of the Services Agreement, relating to Police Services, are hereby deleted in their entirety. Section 1.7 of the Services Agreement is modified to eliminate "Polices Services" from the definition of "Services." The City shall have no obligation under the Services Agreement to provide Police Services to the

Project and the Tribe shall have no obligation under the Services Agreement to pay the City for such Police Services.

2.2 FIRE AND EMERGENCY MEDICAL SERVICES

2.2.1 The Tribe wishes in time to exercise a portion of its sovereign powers by providing its own Fire and Emergency Medical Services to the Project. The Tribe is not presently in a position to fully provide these Services and desires the City to provide such Services. However, the Tribe and City have obtained the agreement of East Side Fire and Rescue, a Fire and Emergency Medical Services agency composed of King County Washington Fire Districts 10 and 38, and the Cities of Issaquah, North Bend, and Sammamish ("ESFR") to dispatch ESFR's ladder truck to the Project when such a ladder truck is necessary. Consequently, the Services Agreement is amended as follows:

2.2.2 Section 2.3.4 of the Services Agreement is amended by deleting the last two sentences (relating to the ladder truck). The City shall have no obligation under the Services Agreement to acquire a ladder truck and the Tribe shall have no obligation under the Services Agreement to pay the City for such ladder truck.

2.2.3 A new Section 2.3.5 is added to the Services Agreement as follows: "The Tribe may terminate that portion of the Services Agreement relating to Fire and Emergency Medical Services upon no less than one-year's prior written notice to the City. Such termination of that portion of the Services Agreement relating to Fire and Emergency Medical Services may occur no earlier than three and one-half years following the opening of the Project (the "FEMS Termination Date"). Such termination shall affect only the City's obligation to provide such Services after the FEMS Termination Date and the Tribe's obligation to pay for such Fire and Emergency Medical Services performed after the FEMS Termination Date and shall not affect the parties' obligations relating to such Fire and Emergency Medical Services performed prior to the FEMS Termination Date or otherwise affect any other obligations arising under the Services Agreement."

2.3 OFF SITE IMPROVEMENTS

2.3.1 The City and the Tribe acknowledge that since the execution of the Services Agreement, both the scope of the Off-Site Improvements and the manner by which the City financed those Off-Site Improvements and the Tribe reimbursed the City therefore have changed from that contemplated by the Services Agreement. The City and the Tribe wish to memorialize those changes and the manner by which both parties will complete their obligations regarding those Off-Site Improvements in this First Amendment. Consequently, the Services Agreement is amended as follows:

2.3.2 Section 2.5.2(ii) of the Services Agreement is amended to read as follows:

"(ii) cause the Off-Site Improvements to be available for connection to the On-Site Improvements, at the location identified on Exhibit E on the earlier of the date that is (1) three months prior to the opening of the Project or (2) no later than the date that is three business days following the date on which a qualified inspector selected by the Tribe and approved by the City in its reasonable discretion certifies in writing that construction of the Project has been completed to the point where toilets, floor drains and sinks have been installed and are ready for inspection for compliance with applicable building codes."

2.3.3 Sections 2.5.3 and 2.5.4 are deleted in their entirety.

2.3.4 The City acknowledges that the Tribe has paid in full the cost of the Off-Site Improvements described in Exhibit E other than the Off-Site Improvements described in "Schedule C" attached hereto as Attachment B (the "Schedule C Improvements") and that the Tribe has deposited with the City the full estimated cost of the Schedule C Improvements. The Tribe agrees to reimburse the City the amount by which the actual cost of the Schedule C Improvements exceeds the amount the Tribe deposited for the Schedule C Improvements. The City agrees to refund to the Tribe the amount by which the amount the Tribe deposited for the Schedule C Improvements exceeds the actual cost of the Schedule C Improvements. The City shall provide the Tribe a full accounting of the cost of the Schedule C Improvements. The City agrees to provide the Tribe reasonable access to the site of the Schedule C Improvements and to the records of the City relating to the Schedule C Improvements so that the Tribe may assess whether the costs of the Schedule C Improvements are actual costs.

2.3.5 As an alternative to the City designing and constructing the Schedule C Improvements, the Tribe may elect to design and construct the Schedule C Improvements itself pursuant to a developer extension agreement with the City. To keep the Tribe fully informed as to the scope of the Schedule C Improvements, the City shall report to the Tribe on the first and 15th days of each month on the progress of the development of the plans for the Schedule C Improvements and shall provide the Tribe with a full, final set of plans upon which the City shall request bids for construction as soon as such are completed. If the Tribe elects to design and construct the Schedule C Improvements itself, it shall so notify the City in writing at any time before the City lets a contract for the construction of the Improvements. In such event, the City and the Tribe shall execute a developer extension agreement, the City shall refund to the Tribe the amount the Tribe has deposited with the City to cover the full estimated cost of the Schedule C Improvements, plus any interest that has accrued thereon; the City shall provide the Tribe with all plans and other design and construction documents at then current level of completion; and the Tribe shall complete the design, if necessary, and construct the Schedule C Improvements. In no event shall the construction of the Schedule C

Improvements affect the date by which the Off Site Improvements (sewer service) shall be made available as provided in this First Amendment.

2.4 LATECOMER AGREEMENT

There is hereby added to the Services Agreement a new section 2.6.10, Latecomer Reimbursement, to read as follows:

2.6.10 Reimbursement by Latecomers. In addition to all other connection charges and latecomer reimbursement charges, the City shall by ordinance provide for collection of a sum calculated by dividing the total cost of construction of the Off-Site Improvements, excluding the sewer flow monitoring station and the stub-outs provided to lots adjacent to the route by Seven Hundred Seventy (770). The amount so calculated shall be collected by the City from the owner of any property that taps into, uses, or otherwise connects, directly or indirectly, or through laterals or branches, to the wastewater collection facilities paid for by the Tribe as such owner's fair pro rata share. The City shall further by ordinance provide for collection of an additional sum equal to the cost of the stub-out from the owner of each property provided a stub-out at the Tribe's expense. The City shall remit amounts so collected to the Tribe within 60 days of receipt. The latecomer reimbursement amount shall not be affected by any subsequent re-rating of the capacity of the wastewater treatment plant. Such ordinance shall be adopted as soon as practicable after completion of the improvements, but the City shall have no liability for delay in adoption of the ordinance required to implement the reimbursement charges. These reimbursement provisions shall remain in full force and effect for a period of 15 years after the date the City determines the wastewater collection facilities improvements have been completed. The Tribe may assign its right to receive latecomer reimbursement payments, upon notification to the City. The City and the Tribe shall enter into a Latecomer Agreement in a mutually approved form.

2.5 COMPACT IMPACT MITIGATION FUND.

Section 2.8.2 of the Services Agreement is amended to read as follows:

"2.8.2 At the request of the Tribe, the City shall cast its vote relating to disbursal of the impact mitigation fund under the Compact to permit disbursals from the fund to apply to payment for fire and emergency services and sewer service provided by the City including fees rendered under this Agreement. This provision shall not preclude the City from seeking disbursements from the impact mitigation fund established by the Compact for impacts not related to the Services. In addition, during the initial term of this Agreement, at the request of the City, the Tribe shall cast its vote relating to disbursal of the impact mitigation fund under the Compact to permit disbursals from the fund in an amount not to exceed $100,000 annually to the City to be used in the City's discretion for human services purposes. In the event that the Tribe exercises its option to terminate that

portion of the Services Agreement relating to Fire and Emergency Medical Services pursuant to Section 2.3.5 hereof, the City may increase this request to an amount not to exceed $300,000 annually. The Tribe agrees that this disbursal to the City shall be a priority after payment for City-provided fire and emergency services and sewer services."

2.4 GENERAL PROVISIONS

2.4.1 Other Provisions of Agreement Not Affected. All other provisions of the Services Agreement not specifically amended herein shall remain in full force and effect, and not be affected by this First Amendment.

2.4.2 Amendment. This First Amendment may not be modified, supplemented or otherwise amended, except by written instrument duly executed by all parties and approved by the Tribal Council and the City Council.

Executed as of this 28th day of January, 2008

CITY OF SNOQUALMIE

Matthew R. Larson, Mayor

Attest:
Jodi Warren, City Clerk

SNOQUALMIE TRIBE

STATE OF WASHINGTON }
ss.
COUNTY OF KING }

On this 29th day of January, 2008, before me, the undersigned, a Notary Public duly commissioned and sworn, personally appeared MATTHEW R. LARSON, to me known to be the Mayor of the City of Snoqualmie, and acknowledged the said instrument to be the free and voluntary act of said municipal corporation, for the uses and purposes therein stated, and on oath stated that he is authorized to execute the said instrument.

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

Notary Public
State of Washington
E JOANN WARREN
My Appointment Expires Sep 15, 2009

E Joann Warren
Printed Name E. Joann Warren
NOTARY PUBLIC in and for the State of Washington,
residing at Maple Valley
My Commission Expires 9-15-09

STATE OF WASHINGTON }
ss.
COUNTY OF KING }

On this 30th day of January, 2008, before me, the undersigned, a Notary Public duly commissioned and sworn, personally appeared Jerry Enick, to me known to be the Head Chief of the Snoqualmie Tribe, and acknowledged the said instrument to be the free and voluntary act of said Tribe, for the uses and purposes therein stated, and on oath stated that he is authorized to execute the said instrument.

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

Cheryl A. Mullen
Printed Name Cheryl A. Mullen
NOTARY PUBLIC in and for the State of Washington,
residing at Renton, Washington
My Commission Expires 08-12-2009

EXHIBIT A

LEGAL DESCRIPTION

PARCEL A:

ALL OF GOVERNMENT LOT 3, AND THAT PORTION OF GOVERNMENT LOT 4, LYING NORTHERLY OF THE NORTH MARGIN OF SR 90 (STATE HIGHWAY NO. 2), SECTION 31, TOWNSHIP 24 NORTH, RANGE 8 EAST W.M.;

SITUATED IN THE COUNTY OF KING, STATE OF WASHINGTON.

PARCEL B:

TRACT 1 IN BLOCK 3 OF THE UNRECORDED PLAT OF SI-VIEW ACRE TRACTS, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT ON THE SOUTH LINE OF THE NORTHWEST 1/4 SECTION 31, TOWNSHIP 24 NORTH, RANGE 8 EAST W.M., 750.75 FEET SOUTH 88°51'11" WEST OF THE SOUTHEAST CORNER OF SAID NORTHWEST 1/4;
THENCE SOUTH 88°51'11" WEST, 660.36 FEET;
THENCE NORTH 03°02'25" WEST, 308.18 FEET;
THENCE NORTH 86°57'35" EAST, 660.00 FEET TO THE WEST LINE OF A 60.0-FOOT STREET;
THENCE SOUTH 03°02'25" EAST ALONG SAID STREET, 330.0 FEET TO THE POINT OF BEGINNING;

EXCEPT THAT PORTION OF LOT 1 IN BLOCK 3 OF THE UNRECORDED PLAT OF SI-VIEW ACRE TRACTS, IN SECTION 31, TOWNSHIP 24 NORTH, RANCH 8 EAST W.M., DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHEAST CORNER OF THE ABOVE DESCRIBED LOT 1, SOUTH 86°57'35" WEST A DISTANCE OF 311.14 FEET ALONG THE NORTH BOUNDARY OF SAID LOT 1;
THENCE SOUTH 03°02'25" EAST A DISTANCE OF 140.00 FEET;
THENCE NORTH 86°57'35" EAST A DISTANCE OF 311.14 FEET TO THE EAST BOUNDARY LINE OF SAID LOT 1;
THENCE NORTH 03°02'25" WEST A DISTANCE OF 140.00 FEET ALONG THE EAST BOUNDARY OF SAID LOT 1 TO THE POINT OF BEGINNING;

SITUATED IN THE COUNTY OF KING, STATE OF WASHINGTON.

ATTACHMENT B

SCHEDULE C IMPROVEMENTS

Replacement of a failing sanitary sewer main located in Olmstead Alley beginning at SE River Street and terminating at SE King Street, bordered by SE Silva Avenue and SE Olmstead Avenue. The project includes abandoning in place 620 feet of existing failing sewer collector, the installation of 19 new side sewers, connection to the existing system, manholes and clean-outs, and other sewer appurtences as necessary.

Return Address:

CITY OF SNOQUALMIE
Attention: Jodi Warren, City Clerk
P.O. BOX 987
SNOQUALMIE, WA 98065

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PAGE-001 OF 006
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KING COUNTY, WA

WASHINGTON STATE RECORDER'S Cover Sheet (RCW 65.04)

Document Title(s) (or transactions contained therein) all areas applicable to your document must be filled in: **1.** Fourth Amendment to the Salish Expansion Development Agreement
Reference Number(s) of Documents assigned or released:
Grantor(s) (Last name first, then first name and initials) 1. Muckleshoot Indian Tribe
Grantee(s) (Last name first then first name and initials) 1. Snoqualmie, City of
Legal Description (abbreviated: i.e. lot, block, plat or section, township, range Parcel A – Section 19, Township 24 N, Range 8 E WM in King County Washington Parcel B – Section 19, Township 24 N, Range 8 E WM in King County Washington Parcel F – Government Lot 9 of Section 30, Township 24 N Range8E WM in King County, Washington
Assessor's Property Tax Parcel /Account Number 3024089002, 3024089082, 1924089035

I am requesting an emergency nonstandard recording for an additional fee as provided in RCW 36 18 010. I understand that the recording processing requirements may cover up or otherwise obscure some part of the text of the original document.

_____ _____ Signature of Requesting Party

FOURTH AMENDMENT TO
SALISH EXPANSION DEVELOPMENT AGREEMENT

THIS FOURTH AMENDMENT TO DEVELOPMENT AGREEMENT is entered into effective this 8th day of February, 2010, between the City of Snoqualmie and the Muckleshoot Indian Tribe.

RECITALS

A. The City of Snoqualmie ("the City") is a municipal corporation organized and operating under title 35A RCW, the Optional Municipal Code.

B. The Muckleshoot Indian Tribe ("the Tribe") is a federally recognized tribe, and is the successor in interest to Gateway Cascades, LLC, in the subject property described in the recorded Development Agreement.

C. On March 8, 2004 the City entered into a Development Agreement with Gateway Cascades, LLC, pursuant to authority of chapter 36.70B RCW, for a project commonly known as the Salish Expansion, recorded under King County Recording Number 20040804002287. The First Amendment to the Salish Development Agreement was executed effective June 14, 2005, and recorded under King County Recording Number 20050630001948. The Second Amendment to the Salish Expansion Development Agreement was executed effective April 9, 2007, and recorded under King County Recording Number 20070605000314. The Third Amendment to the Salish Expansion Development Agreement was approved by City Council on March 23, 2009.

D. The term of Development Agreement expires in 2014, and the reservation of sewer capacity expires in 2009.

E. The development anticipated pursuant to the Salish Expansion Development Agreement has not commenced as of this date, and will not commence prior to the expiration of the reservation of sewer capacity. The national and local economies have experienced a severe recession, and it is uncertain when the recession will end. The recession has affected the economic positions of both the City and the Tribe. It is uncertain when the Tribe will be ready to proceed with development of the Salish Expansion, but construction is not likely to occur within the next two years.

F. The Tribe's predecessors in interest paid $1,000,000 toward the design and construction of the Tokul Roundabout, in lieu of the realignment of Tokul Road and installation of a traffic signal in accordance with the First Amendment. As specified under Section 2 of that amendment, and as per RCW 82.20.020, the Payment shall be refunded to the Tribe if not expended by June 2010.

G. City has expended $570,000 on the design of the Tokul Roundabout. The parties recognize the expenditure of said funds to be appropriate at the time, due to the commitment of state funding through a Transportation Improvement Board grant

approval, and likely construction of the roundabout. The parties further recognize the loss of state funding and the economic downturn have put the roundabout project on hold indefinitely, until further funding can be obtained.

H. The parties desire to reaffirm their commitment to the development contemplated by the Development Agreement, and to amend the Development Agreement in light of the foregoing circumstances as set forth herein.

AGREEMENT

NOW, THEREFORE, it is agreed as follows:

1. The Development Agreement as previously amended is hereby amended as specifically provided herein.

2. The parties agree that it is appropriate to extend the term of the Development Agreement. Provisions for extension of the term of the Development Agreement, including the duration of the extension, the development milestones that must be achieved, and any other conditions of the extension, shall be addressed in a Fifth Amendment.

3. The term of the reservation of sewer capacity is extended to be co-extensive with the term of the Development Agreement, including any future extension thereof.

4. The City shall not expend any remaining funds from the traffic mitigation payment provided under the First Amendment. All remaining funds, in the amount of $430,000, shall be returned to the Tribe, subject to all other provisions of this Fourth Amendment. Notwithstanding any other provision of the Development Agreement or prior amendment, the City shall not be obligated in any case to return the funds expended to date on design and environmental review of the Tokul Roundabout.

5. The parties shall continue to jointly pursue all available funding mechanisms for construction of the Tokul Roundabout. If adequate funding is obtained for Tokul Roundabout, the Tribe shall make a voluntary payment in the amount of $430,000 or more as the parties may agree, and the City will proceed to construct the Tokul Roundabout. This provision is intended only to address the unexpended portion of the original $1,000,000 payment returned pursuant to Section 4 as required by RCW 82.02.020. Actual contributions by the City and Tribe to the Tokul Roundabout over and above future grant funding shall be subject to future agreement.

6. The following provisions of the Development Agreement shall be amended as shown herein:

a. Section 3.1 Permitted Uses. The Gateway Property shall be developed in substantial conformance with the Site Plan attached to this Agreement as **EXHIBIT D** and incorporated herein by this reference. Development of the site shall

generally be guided by the Site Plan and shall be limited to hotel, commercial and residential uses more specifically described in the following sections.

b. Section 3.1.3 Residential Development. Subject to PR plan approval and other applicable city regulations and procedures in accordance with SMC Title 14, Gateway is authorized to apply for, and the City will process, subdivision or binding site improvement plan approval for residential lots or units on the Morgan Parcel, in the general location designated on the site plan, subject to the affordable housing and timing requirements of this Development Agreement. The hotel design may include condominium units as part of the hotel which shall not be included in the residential unit cap.

The following **TABLE 2** shows the types and quantity of each housing type.

Table 1

	Housing Type	Quantity
a.	Affordable housing (minimum)	15% of the total residential units, excluding condominium units within the hotel
b.	Single-family, or other Residential (maximum)	175

c. Section 3.2 Affordable Housing. Fifteen percent (15%)of the total number of residential dwelling units, excluding condominium units within the hotel if any, shall be developed on site to provide housing for households earning 80% or less of King County median income, based on income figures provided annually by Puget Sound Regional Council. Maximum sale prices shall be determined at the time of preliminary plat approval, using the following assumptions: 5% down payment; mortgage rate at the average for the previous six months; 30% of income to home payment; home payment to include taxes and mortgage insurance, but not property insurance or utilities. An Affordable Housing Plan shall be completed and approved as a part of the PCI/PR plan review. The plan shall address such issues as how to treat for sale units versus rental units, should they be provided, and address the ability to sell such units to any buyer regardless of income in the event affordable units do not sell to income qualified buyers under these parameters within 6 months of marketing.

7. All other provisions of the Development Agreement, as amended by the First and Second Amendments, shall remain in full force and effect.

8. The effective date of this Fourth Amendment shall be the latter of the date of the City resolution approving this Fourth Amendment and its execution by both parties.

9. This Fourth Amendment shall run with the land and be binding upon the parties and their respective successors and assigns.

CITY OF SNOQUALMIE
Signed:

Matthew R. Larson
Mayor

MUCKLESHOOT INDIAN TRIBE
Signed: Charlotte Williams

Charlotte Williams
Chair of Muckleshoot Tribal Council

STATE OF WASHINGTON }
} ss.
COUNTY OF KING }

On this day personally appeared before me MATTHEW R. LARSON, to me known to be the Mayor of The City of Snoqualmie, the Washington municipal corporation that executed the foregoing instrument, and acknowledged such instrument to be the free and voluntary act and deed of such company, for the uses and purposes therein mentioned, and on oath stated that she/he was duly authorized to execute such instrument.

GIVEN UNDER MY HAND AND OFFICIAL SEAL this 8th day of February, 2010.

Notary Public
State of Washington
E JOANN WARREN
My Appointment Expires Sep 15, 2013

E Joann Warren
Printed Name
E Joann Warren
NOTARY PUBLIC in and for the State of Washington,
residing at Maple Valley
My Commission Expires
9-15-13

STATE OF WASHINGTON }
ss.
COUNTY OF KING

On this day personally appeared before me CHARLOTTE WILLIAMS, to me known to be the Chairperson of the Tribal Council of the Muckleshoot Indian Tribe, the Indian tribe that executed the foregoing instrument, and acknowledged such instrument to be the free and voluntary act and deed of such Indian tribe, for the uses and purposes therein mentioned, and on oath stated that she/he was duly authorized to execute such instrument.

GIVEN UNDER MY HAND AND OFFICIAL SEAL this 11TH day of JANUARY, ~~2009~~ 2010.

ELIZABETH J. BARGALA
NOTARY PUBLIC
STATE OF WASHINGTON
COMMISSION EXPIRES
07-23-11

ELIZABETH J. BARGALA
Printed Name
Elizabeth J. Bargala
NOTARY PUBLIC in and for the State of Washington,
residing at KING COUNTY
My Commission Expires
07/23/2011

Return Address:
City of Snoqualmie
Jodi Warren
P.O. Box 987
Snoqualmie, WA 98065

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PAGE001 OF 027
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KING COUNTY, WA

Please print or type information **WASHINGTON STATE RECORDER'S Cover Sheet** (RCW 65 04)

Document Title(s) (or transactions contained therein) (all areas applicable to your document **must** be filled in)

1 Salish Expansion Development Agreement 2 _____
3 _____ 4 _____

Reference Number(s) of Documents assigned or released:

Additional reference #'s on page _____ of document

Grantor(s) (Last name, first name, initials)
1 Cascades, Gateway
2 _____, _____

Additional names on page _____ of document

Grantee(s) (Last name first, then first name and initials)
1 Snoqualmie, City of
2 _____, _____

Additional names on page _____ of document

Legal description (abbreviated i e lot, block, plat or section, township, range)
Parcel A- Section 19, Township 24 North, Range 8 East, WM in King County Washington
Parcel B- Section 19, Township 24 North, Range 8 East, WM, in King County, Washington
Parcel F- Government Lot 9 of Section 30, Township 24 North, Range 8 East, WM, in King County, Washington

Additional legal is on page 20 of document

Assessor's Property Tax Parcel/Account Number Assessor Tax # not yet assigned
Tax numbers 3024089002, 3024089082, 1924089035

The Auditor/Recorder will rely on the information provided on the form The staff will not read the document to verify the accuracy or completeness of the indexing information provided herein

I am requesting an emergency nonstandard recording for an additional fee as provided in RCW 36 18 010 I understand that the recording processing requirements may cover up or otherwise obscure some part of the text of the original document

_____Signature of Requesting Party

ORIGINAL

SALISH EXPANSION
DEVELOPMENT AGREEMENT

Between

THE CITY OF SNOQUALMIE

and

GATEWAY CASCADES, LLC

Date: March 8, 2004

Unofficial Document

ORIGINAL

THIS DEVELOPMENT AGREEMENT is entered into effective the 8th day of March, 2004, by and between the **CITY OF SNOQUALMIE,** a Washington municipal corporation (the "City"), and **GATEWAY CASCADES, LLC**, a limited liability company ("Gateway").

RECITALS

A The City is incorporated under the Optional Municipal Code of the State of Washington The City has authority under RCW 36 70B.170-210 to enter into agreements to control the use and development of property within its jurisdiction, and for property outside its boundaries as part of a proposed annexation RCW 36 70B 170(1) The City has authority under ch 35A.14 RCW and Senate Bill ("SB") 5409 to consider annexations of property within its Urban Growth Boundary

B Gateway is the owner of two parcels of real property comprising approximately 52 8 acres and commonly referred to as the Morgan and Tokul Parcels (collectively, "the Gateway Property") The Gateway Property is more particularly described on **EXHIBIT A** Approximately 12 5 acres of the Gateway Property is presently situated within the Snoqualmie City limits (the "Incorporated Property") The balance of the Gateway Property, approximately 40 3 acres, is presently situated in unincorporated King County, Washington, and is more particularly described on **EXHIBIT B** ("the Annexation Property"). The Morgan and Tokul Parcels are graphically depicted on **EXHIBIT C**

C King County and the City have adopted comprehensive plans as required by the Growth Management Act, RCW 36 70A ("GMA") King County's Comprehensive Plan places the Annexation Property within the City's Urban Growth Area pursuant to the GMA, and designates it "Rural Urban Growth Area" ("Rural UGA") Snoqualmie's Comprehensive Plan designates the Incorporated Property Planned Residential and Planned Commercial/Industrial, and the Annexation Property Planned Residential and Planned Commercial/Industrial

D. King County's zoning map classifies the Annexation Property "Urban Reserve" and "Industrial " The City's zoning map classifies the Annexation Property "Planned Residential" and "Planned Commercial/Industrial " The City's zoning map classifies the Incorporated Property "Planned Residential," "Business," and "Planned Commercial/Industrial "

E The vicinity maps and current planning and zoning designations for the Gateway Property are shown on **EXHIBIT C**

F Despite the division of the Morgan and Tokul Parcels between jurisdictions and land use designations, the Morgan and Tokul Parcels are geographically single areas The City and Gateway seek to develop a site plan and development

standards that promote the most beneficial development of the Morgan and Tokul Parcels as coherent wholes without the current divisions within the Parcels.

G Gateway has filed a proper and sufficient petition for annexation of the Annexation Property into the City

H The City is considering annexation of the Annexation Property, which is located within the City's Urban Growth Area, in light of the public benefits associated with the annexation of the Property These include consolidating the Gateway Property in one jurisdiction, controlling the use, development and mitigation of development of the Gateway Property, accommodating a portion of the City's projected employment and population growth, and increasing the City's tax base On April 23, 2001, the City and Gateway entered into the Salish Expansion Annexation Process Agreement, identifying the basis and process for reviewing the annexation proposal.

I In compliance with the State Environmental Policy Act ("SEPA") and relevant SEPA procedures, King County prepared an Environmental Impact Statement ("EIS") for the County's Comprehensive Plan, which EIS considered the Urban Growth Boundary designation for the Annexation Property The City adopted prior EISes for adoption of the City's Comprehensive Plan These SEPA documents did not fully review the Development Standards for the Gateway Property that are contemplated by this Development Agreement Therefore, the City has reviewed an Expanded Environmental Checklist for the actions covered by this Development Agreement, and on June 11, 2003, issued a Mitigated Determination of Non-Significance ("MDNS")

J On June 23, 2003, the City approved the Notice of Intention to Petition for Annexation, submitted by Gateway, as required by SB 5409 Gateway submitted a Petition for Annexation, dated June 25, 2003, to the City as provided by Section 10 of SB 5409.

K. The Snoqualmie Falls Planning Area Annexation Implementation Plan ("AIP"), implements the Snoqualmie Comprehensive Plan by providing additional land use policies for future development of the undeveloped property within the Snoqualmie Falls Planning Area A public hearing on the AIP was held by the City of Snoqualmie Planning Commission on March 4, 2002 and subsequent review of the document was given by the Planning Commission on April 15, May 6, May 14, 2002 and June 16, 2003 The Planning Commission recommended approval of the AIP to the City Council on June 25, 2003. The City Council approved the AIP on July 14, 2003

L On March 11, 2002 and March 8, 2004, the City Council held public hearings on the pre-annexation zoning, as required by RCW 35A 14 340 On August 11, 2003, the City Council approved Ordinance No 933, an ordinance amending the Planned Residential Development Regulation, SMC 17 15 050, and amending the Planned Commercial Industrial Regulations, SMC 17 20 050, providing zoning regulations to be applied to this annexation On March 8, 2004, the City held a public hearing on this

Development Agreement, as required by RCW 36 70B 200, and on the annexation, as required by SB 5409, Section 11.

M This agreement is intended to be a Development Agreement pursuant to the authority of RCW 36 70B 170 – 210 Gateway and the City intend by this agreement to define the Development Standards and Mitigations, as defined in RCW 36 70B 170(3), that will apply to the Gateway Property upon annexation of the Annexation Property and consolidation with the Incorporated Property The parties intend that this Development Agreement supersede the Annexation Process Agreement and be interpreted to the full extent authorized by law under Title 35A RCW and RCW 36.70B 170-210 Applicable Mitigations identified in the MDNS are incorporated into Section 4 of this Development Agreement, as provided by RCW 36 70B.170(3)(c) RCW 36 70B 170(4) further authorizes a party to a Development Agreement to obligate itself to fund or provide services, infrastructure, or other facilities (collectively, the "Mitigations"). The Mitigations identified herein have been identified pursuant to SEPA The obligations of Gateway to fund or provide services, infrastructure, or other facilities established herein are pursuant to authority of RCW 36 70B 170(4) and 36 70B.210

N The parties acknowledge that this Development Agreement is intended to be a contract binding upon the Parties and their successors and assigns

NOW, THEREFORE, for and in consideration of the mutual covenants and agreements contained in this Agreement, the parties hereby covenant and agree as follows

AGREEMENTS

1. **ANNEXATION.** Following City Council approval of this Development Agreement, the City agrees to consider an ordinance annexing the Annexation Property Upon the effective date of the annexation ordinance, the Development Standards and Mitigations provided by this Agreement shall be binding upon the City and Gateway

2. **ZONING.** Upon the effective date of the annexation ordinance, the Gateway Property will be subject to the use classifications and regulations applied to it in the Snoqualmie Zoning Code, Planned Residential (PR), SMC 17.15.050 and Planned Commercial Industrial (PCI), SMC 17 20 050.

3. **DEVELOPMENT STANDARDS.** Upon the effective date of the annexation ordinance described in Section 2 of this Development Agreement, the following Development Standards and Mitigation Measures shall apply to the Gateway Property

3.1. Permitted Uses. The Gateway Property shall be developed in substantial conformance with the Site Plan attached to this Agreement as **EXHIBIT D** and incorporated herein by this reference Development of the site shall generally be guided by the Site Plan and shall be limited to hotel and residential uses more specifically

described in the following sections No commercial development of the site shall be permitted, other than that which is approved as an integral part of the Hotel

*3.1.1. **Hotel.*** Subject to PCI plan approval and other applicable city regulations and procedures in accordance with SMC Title 14, Gateway is authorized to apply for land division approval and building permits to construct a hotel of up to 250 rooms on the Morgan Parcel in the general location designated on the Site Plan The following **TABLE 1** shows allowed conceptual elements and dimensions Final design may differ significantly but may not increase in size any of the following elements

Table 1

	Element	**Approximate Number or Dimension**
a	Guest Rooms	250
b.	Meeting Rooms	Approximately 25,000 s f
c.	Restaurant and Bar	Approximately 570 seats
d	Recreational Facilities	Approximately 12,000 s f

*3.1.2. **Hotel Design.*** Final design of the hotel will be guided by a series of design goals and attributes. These shall include

(1) Northwest Elegance Influenced by local and historical northwest architectural style, use of natural materials, light and flow of space;

(2) Authentic· Avoid the "theme" designs that remove a design from its sense of place, reflect the time and place that the Northwest and local region offer,

(3) Enhance the site by respecting the natural beauty of the area;

(4) Community Support Seek design elements that connect the site as an extension of the larger community for both the guest and local residents

Elements of design that may be used to accomplish these goals include articulating and modulating the building and rooflines to break down the scale of the structure, orienting the building to allow excellent views of distant mountains, use of muted colors to blend with the surrounding environment; use of wood siding, timber, stone, tile, brick, and/or other warm materials, and use of full cut-off light fixtures that maintain safe lighting levels while minimizing off-site spillage or glare.

*3.1.3 **Residential Development.*** Subject to PR plan approval and

other applicable city regulations and procedures in accordance with SMC Title 14, Gateway is authorized to apply for, and the City will process, subdivision or binding site improvement plan approval for residential lots or units on the Morgan Parcel, in the general location designated on the site plan, to provide up to 110 dwelling units, subject to the affordable housing and timing requirements of this Development Agreement.

The following **TABLE 2** shows the types and quantity of each housing type.

Table 2

	Housing Type	Quantity
a	Affordable housing	up to 17 units
b	Single-family	up to 93 units

3.2. Affordable Housing. Fifteen percent of the total number of residential dwelling units shall be developed on site to provide housing for households earning 80% or less of King County median income, based on income figures provided annually by Puget Sound Regional Council Maximum sale prices shall be determined at the time of preliminary plat approval, using the following assumptions: 5% down payment, mortgage rate at the average for the previous six months, 30% of income to home payment; home payment to include taxes and mortgage insurance, but not property insurance or utilities An Affordable Housing Plan shall be completed and approved as a part of the PCI/PR plan review The plan shall address such issues as how to treat for sale units versus rental units, should they be provided, and address the ability to sell such units to any buyer regardless of income in the event affordable units do not sell to income qualified buyers under these parameters within 6 months of marketing

3.3. Timing of Residential Development. Application for subdivision or binding site improvement plan for residential development may be submitted concurrent with or following application for the hotel building permit

3.4. Development Standards.

3.4.1. Height Limits. The PCI/PR Plan shall include the following standards The height limitations for the various project components shall be as shown on **Table 3** below

Table 3

	Use	Height Limitation
a	Hotel/Conference Facility	up to 75 feet from finished grade
b	Residential	up to 35 feet from finished grade

3.4.2. Setbacks. The setback limitations for the various project components shall be determined through design review and approval of the PCI/PR plan

3.4.3. Landscaping. Project site landscaping shall be as required in the Snoqualmie Municipal Code, Landscaping Requirements, SMC 17.70.

3.4.4. Signage. The City agrees to allow for adequate signage for the hotel project, exact location and design to be determined at design review stage, but in any case no less than two project signs on the Tokul parcel and one sign on Tokul Road shall be permitted Specific sign design specifications shall be determined through the PCI/PR Plan review and approval Signs shall be compatible in scale and character with other such signs in the City, including the Salish Hotel and Snoqualmie Ridge Business Park entrance signs No interior lit monument signs shall be used

3.4.5. Hotel Operational Measures. Gateway will implement a recruitment program to seek local residents for consideration of jobs within the Hotel Gateway will evaluate design and operational measures that would help provide links to the community. Such measures might include sponsorship of community events, shuttle availability to hotel guests as determined by the operational manager of the hotel, or providing information promoting local activities to guests

3.5. Parks, Trails and Open Space. While the final location and specific boundaries of the open space will be determined at the time of final plat approval, a minimum of 35% of the site will remain in open space Approximately 18 7 acres of the total 53 3-acre site will be retained in open space, including up to approximately 8,000 lineal feet (approximately 1 5 acres) of on-site trails and the majority of the Tokul Parcel (see 3 5 2 below)

3.5.1. Trail System. A project-wide trail system shall be provided Pedestrian access from all areas of the project site to the existing foot bridge crossing SR-202 shall be developed Project trails shall provide linkage within the project property boundaries, between the Snoqualmie Valley Trail, which currently ends approximately 500 feet north of the project boundary on Tokul Road, and SR-202 The same length of trail may be located within city owned property immediately east of Tokul Road, at the city's request, rather than on the project site Trail users will be able to connect to the Snoqualmie Centennial Trail, Snoqualmie Falls Park and historic downtown Snoqualmie. Project trails will help provide eventual linkage from the Snoqualmie Valley Trail to the proposed Preston-Snoqualmie Trail extension

*3.5.2. **Greenbelts.*** A greenbelt buffer shall remain intact around the project, adjacent to city or state roadways Greenbelts shall not necessarily screen the hotel from visibility, but will soften the view where needed To the extent feasible, existing vegetation shall be maintained within greenbelt areas A predominant use of native and adapted plant material shall be used for any required supplemental plantings in greenbelt areas Plants used for such purpose shall be chosen for adaptability to glacial till and gravely soils. Extensive use of evergreen trees is likely to enhance the native character of the site Selection of low water use plant material shall be considered to minimize water demand and impacts

*3.5.3. **Tokul Parcel Open Space.*** Upon issuance of the hotel building permit, Gateway shall convey the Tokul Parcel, consisting of approximately 3 8 acres, to the City, subject to a covenant, in a form approved by the City, declaring the Tokul Parcel as permanent open space with reservations for traffic mitigation and storm water control At no time will Gateway seek to develop the Tokul Parcel, other than for purposes of traffic mitigation and storm water control Based on the value of comparable parcels at highest and best use, the City finds that the Tokul Parcel conveyance and declaration as permanent open space will satisfy all requirements for park acreage and recreation facility contributions for both the Hotel proposal and any potential future residential component, except that a mini-park shall be required as defined by the Comprehensive Plan to serve future residential development

4. MITIGATION MEASURES AND MITIGATION PAYMENTS.

4.1. Environmental Mitigation Measures. The following mitigation measures shall apply to the project in accordance with the Mitigated Determination of Non-Significance, issued June 11, 2003

4.1.1. The project shall comply with all applicable City codes, including but not limited to SMC 12 16, Street Design Standards, SMC 17 15 050 Planned Residential District and SMC 17 20 050 Planned Commercial/Industrial District, SMC 17 55, Use Regulations, SMC 19 12, Sensitive Areas Regulations, SMC 15 20, Clearing and Grading, and SMC 15.18, Surface Water and Storm Water Management Regulations, including the requirements of the King County Storm Water Design Manual (1998)

4.1.2. The re-delineation, flagging and surveying of the south terminus of Wetland A as shown on **EXHIBIT D** shall be re-confirmed by the City Upon confirmation, the revised wetland boundary shall be depicted on the engineering plan for the Tokul Road realignment required by Section 5.5, below The boundary shall extend south approximately 25 feet

4.1.3. The previously unidentified wetland located within the buffer of Wetland B, just west off-site as shown on **EXHIBIT D**, will not be required to be delineated and flagged but the applicant shall show the approximate location on the engineering plan for the Tokul Road realignment required by Section 5 5, below If the

realignment of Tokul Road shifts in any way that might affect this newly identified wetland, at that time the City will require this wetland be surveyed and delineated

4.1.4. To the extent practical the Tokul Road realignment shall avoid disturbance of Wetlands A and B Prior to engineering plan approval, the applicant shall provide evidence to the City that no practical alternative exists and adequate provision is made to protect or enhance the wetlands through appropriate mitigation for the location of the Tokul Road realignment.

4.1.5. Prior to engineering plan approval for the Tokul Road realignment, the applicant shall provide the following information to the City for review: 1) acreages of potential sensitive area impact, 2) rating and classification of wetland types to be potentially impacted, 3) City code requirements for replacement or enhancement ratios and acreages, 4) a commitment to provide required mitigation on an off-site City-approved location that currently includes degraded existing wetlands, which may be within Kimball Creek Village, Meadowbrook Farm, or other areas deemed appropriate by the City; 5) an assessment of the location as well as goals and objectives for the off-site compensation and mitigation.

4.1.6. The permanent stormwater drainage control system for the Morgan Parcel shall incorporate "low impact drainage" facilities as generally described and depicted in the Conceptual Design Proposed Salish Expansion Drainage Conditions, attached as **EXHIBIT E** These low impact features may include rain gardens and open ditches and swales, and water quality treatment which should convey stormwater through the site to infiltration facilities, eliminating discharge off site.

4.1.7. Prior to the onset of winter, any exposed subgrade shall be hydroseeded, covered with plastic sheeting, or otherwise protected. Seeding shall be planted in September in order to have the grass established in October In addition, exposed construction slopes shall be trackwalked (up and down) in order to roughen the ground surface and reduce potential runoff velocities

4.1.8. Check dams shall be established along all roadways during construction In addition, silt fences shall also be used along the lower elevations of the roadway and future residential lots

4.1.9. Temporary sedimentation ponds shall be established during construction to provide erosion and sediment transport control Infiltration ponds are not designed to function as sedimentation ponds and therefore shall not be utilized as part of the erosion control measures for the development

4.1.10. All outlets from temporary and permanent settling/infiltration ponds would be designed to prevent direct flow over unprotected slopes This shall be accomplished by either tightlining the outlets or by armoring the outlets down to less steep areas An erosion control inspector shall periodically be on-site during construction to observe that the required mitigation functions as intended

4.1.11. Additional slope stability analysis shall be performed if construction is proposed within 40 feet from the top of any 40 percent or greater slope that is more than 20 feet in height or within 40 feet of a Landslide Hazard Area

4.1.12. Any fill planned for slopes steeper than 5H 1V on the property shall be benched into the slope and placed as structural fill Compaction values and drainage recommendations for structural fill shall be reviewed by the City's geotechnical engineer once specific grading plans have been determined

4.1.13. A 200-foot setback distance shall be maintained from the western-facing slope on the Morgan Parcel for proposed individual infiltration galleries and rain gardens In addition, roof drains from the future residential lots adjacent to the off-site Landslide Hazard Zone 3 area, if proposed, shall be tightlined to the community infiltration pond

4.1.14. The overflow spillway from the proposed infiltration pond shall be connected into the stormwater drainage system for Tokul Road rather than discharging near the crest of the slope south of the pond and Tokul Road, to preclude the potential for erosion

4.1.15. The infiltration pond proposed for the Morgan Parcel shall be set back from the top of all slopes exceeding 15 percent, a minimum distance of 200 feet, and shall have a minimum setback of 300 feet from the top of the steep western slope. This 200 foot setback could be reduced if allowed by a site specific geotechnical study designed to evaluate impacts to slopes as part of the detailed design process.

4.1.16. Groundwater seepage may be encountered during grading for the proposed roadway Temporary and/or permanent drainage control measures shall be provided as necessary These could include, but would not be limited to, interceptor drains, curtain drains, or rip-rap on slopes

4.1.17. Any ground water seepages encountered in roadside cuts above the wetland downslope of the proposed road (Wetland A) shall be intercepted and directed to the wetland to maintain recharge. Energy dissipaters may be required at the outfall point to reduce the risk of erosion Specific erosion control measures for these drainage features shall be assessed during the design phase

4.1.18. Conventional stormwater control facilities, such as the proposed wet pond, shall be included in the stormwater management system for the Morgan Parcel These facilities shall be designed in accordance with the King County Surface Design Manual (1998)

4.1.19. The infiltration pond on the Morgan Parcel shall be expanded to handle the runoff from the residential area The expansion shall be reviewed and approved by the City prior to development within the residential area

4.1.20.Prior to engineering plan approval, the City shall verify that all cut slopes comply with SMC 15.20.060(A)(1)

4.1.21.Prior to any development including clearing, grading and excavating, the applicant shall prepare a final TESC Plan to be approved by the City of Snoqualmie

4.1.22.All permanent cut slopes in the Vashon recessional delta deposits shall be no steeper than 2 5H 1V. Permanent cut slopes in Vashon lodgement till, pre-Vashon deposits, or weathered bedrock shall be graded to a maximum of 2H 1V Cuts in the unweathered bedrock, if encountered, shall be reviewed by a geotechnical engineer, to determine the maximum allowable angle If steeper gradients are proposed, approval from a geotechnical engineer shall by obtained and approved erosion protection structure or retaining structure shall be utilized

4.1.23.Any fill planned for slopes steeper than 5H·1V on the site shall be benched into the slope and placed as structural fill Compaction values and drainage recommendations for structural fill shall be reviewed by a geotechnical engineer once specific grading plans have been determined All fills shall be compacted to a minimum of 90 percent of maximum density as determined by UBC Standard No 70-1. In place density shall be determined in accordance with UBC Standard No 70-2, 70-3, 70-4 and 70-5

4.1.24.Prior to Clearing and Grading Permit approval for the construction of the Tokul Road realignment, the applicant shall provide temporary and or permanent erosion control measures as determined necessary by the City. All drainage/erosion control measures determined to be necessary by the City shall be implemented to provide site stabilization, slope protection, drainage way protection and sedimentation control

4.1.25.All pedestrian facilities described in **EXHIBIT F,** shall be constructed Prior to commencement of any construction related to the Salish Expansion project the applicant shall submit plans to the City for review and approval

4.1.26.Implementation of traffic demand management (TDM) measures that promote trip reduction shall be reviewed and approved by the City Such measures shall include shuttle bus or van transportation between the hotel/conference and other local destinations for hotel guests; preferential carpool parking for employees and bicycle storage on site, scheduling of conference commencement and dismissal times outside of the peak periods of adjacent street traffic, as feasible, and completion of a direct and separated trail system between the existing Salish Lodge and the new facility to reduce vehicle trips between the uses and provide for convenient access for shared employment

4.1.27.An on-site non-motorized trail system shall be constructed, providing public opportunities for pedestrian and bicycle travel Connections to regional

trail systems shall also be afforded Trail crossing treatments, i e , curb cuts and signage at a minimum, shall be provided to enhance safety The applicant shall submit to the City for review and approval the on-site trail plan prior to construction.

4.1.28. Prior to approval of any construction activities, development standards establishing the size, height, number, wattage and shielding method of parking lot lighting shall be reviewed and approved by the City Full cut off fixtures shall be used

4.2. Schools. School impact fees shall be paid as provided by Title 20 SMC

4.3. Fiscal Mitigation Payment. Based on a detailed fiscal analysis, no additional fiscal mitigation payments will be required to provide fiscal mitigation for this project proposal Gateway will assume its pro rata share of existing City indebtedness, as provided in RCW 35A 14 120

4.4. Public Services. Gateway shall pay the sum of $350,000 to the City as a voluntary mitigation payment to be expended for fire equipment or fire capital improvements, one-half ($175,000) to be paid upon issuance of the building permit for the Hotel, and one-half ($175,000) to be paid upon issuance of the certificate of occupancy for the Hotel Such payments shall be expended within five (5) years of the second payment or refunded to Gateway with interest at the rate applied to judgments; provided that if the payment is not expended within five years due to delay attributable to Gateway, the payment shall be refunded without interest

4.5. Tokul Road Intersection Improvement. Gateway shall at its sole expense fund construction of the realignment of Tokul Road to the intersection with SR-202 and installation a traffic signal and any required channelization improvements, as further defined under Sections 4 6 and 4 7 below, provided, that in the event the City proceeds with construction of a roundabout at the Tokul Road/ SR-202 intersection, funds committed by Gateway for the Tokul Road realignment and signal under Sections 4 6 and 4 7, may be used for such purpose, subject to the following

4.5.1. The City will use its best efforts to complete construction of the roundabout to meet the needs of the hotel schedule, provided the hotel may open before completion of the roundabout, if desired by Gateway, and subject to reasonable additional temporary traffic control measures as the City may require

4.5.2. The payment in lieu of construction of the Tokul Road realignment and traffic signal installation as provided in Sections 4 6 and 4 7, shall be One Million Dollars ($1,000,000) No additional funds will be required of Gateway for this purpose

4.5.3. Funds will be provided to the City within the same approximate timeframes as would have been required under the construction schedule of

the Tokul Road realignment design as required by Section 4 6, commencing at the issuance of the hotel building permit. The funds shall be expended within five (5) years of the last payment or refunded to Gateway with interest at the rate applied to judgments, provided that if the payment is not expended within five years due to delay attributable to Gateway, the payment shall be refunded without interest

4.5.4. The City agrees to pursue a total funding package for the roundabout through application for additional and adequate state funds by the end of May 2004, and to undertake a design and construction schedule that would allow for a 2005 construction season If adequate funding for the roundabout is not secured by January 1, 2005, Gateway can, at its option, pursue road improvements in accordance with Sections 4.6 and 4 7, unless otherwise agreed upon by the City and Gateway

4.5.5. The City shall provide a greenbelt in perpetuity on City property adjacent to Tokul Road to screen the Hotel from views of the Waste Water Treatment Plant, subject to the future needs of the Waste Water Treatment Plant and Water Treatment Plant expansion

4.6. Alternative Tokul Road Intersection Improvement. In the event the City does not proceed with design and construction of a roundabout at the Tokul Road/SR-202 intersection, Gateway will fund the realignment of Tokul Road and appropriate channelization to mitigate impacts of the project to the Tokul Road / SR-202 intersection The City will obtain permits and construct the realignment, provided that Gateway may elect to undertake the realignment under a developer extension agreement with the City Funds provided by Gateway for this improvement shall be subject to reimbursement from any pro rata share of mitigation or impact fee payments required by the City from other development projects to mitigate impacts to the Tokul Road/SR-202 intersection In the event the cost for the Tokul Road realignment is anticipated to exceed $1 3 million (excluding traffic signal cost, which is provided for in Section 4 7, below), alternative design solutions and/or additional funding sources shall be sought by mutual agreement of the City and Gateway, provided, the City shall not in any event be obligated to provide funding for this improvement. In the event Gateway constructs the Tokul Road realignment and traffic signal installation pursuant to a developer extension agreement, the City will·

4.6.1. Dedicate the necessary right-of-way, at no cost to Gateway, for the Tokul Road realignment as necessary to support the site plan

4.6.2. Provide a greenbelt in perpetuity on City property adjacent to Tokul Road to screen the Hotel from views of the Waste Water Treatment Plant, subject to the future needs of the Waste Water Treatment Plant and Water Treatment Plant expansion

4.6.3. Assist in seeking a solution for wetland remediation due to

Tokul Road realignment

4.7. Tokul Road Traffic Signal Cost. In the event the City does not proceed with design and construction of a roundabout at the Tokul Road/SR-202 intersection, Gateway will fund the installation of a traffic control device at the SR-202 and Tokul Road intersection in the form of a traffic signal The traffic control device shall be reviewed and approved by the City prior to construction Funds for the traffic signal at the Tokul Road intersection with SR-202 shall be no more than $200,000 00 These funds shall be made available to the City when the traffic signal is warranted, as determined by the City, or upon completion of 50% of the housing, whichever occurs first Funds provided by Gateway for this improvement shall be subject to reimbursement from any pro rata share of mitigation or impact fee payments required by the City from other development projects to mitigate impacts to the Tokul Road/SR-202 intersection

4.8. Parkway Improvement Cost Sharing. Gateway shall pay a share of the Snoqualmie Parkway lane widening (from current 2 lanes to 4 lanes) south of 96th Street, which the City is requiring be constructed as a condition of approval of Snoqualmie Ridge Phase 2, in an amount equivalent to 5% of the total cost, not to exceed $37,500 These funds will be provided to the City upon issuance of the hotel occupancy permit or upon issuance of the parkway improvement contract, whichever shall occur later In the event the Parkway improvement contract is not issued within five (5) years of the date of this agreement, the requirement for such funds shall expire.

4.9. Transportation Concurrency. The provisions of this agreement satisfy all required transportation concurrency mitigation. Gateway shall not be required to pay any share of the future improvements at the SR-18/I-90 interchange, which have committed funding from WSDOT

4.10 Community Center Payment. Gateway shall pay a Community Center mitigation payment of $1,388 per residential dwelling unit, excluding the affordable dwelling units required by subsection 3 2 of this Agreement. This payment shall be paid at the time of building permit approval for each unit In the event that construction of a Community Center on the SR I Neighborhood Center Community Park site is not commenced within five years after the mitigation payment for the final residential building permit is issued, each payment shall be returned to the payor if available or, if not available, to the current owner of each residential unit with interest at the rate of judgment

5. UTILITY SERVICE.

5.1. Water. The City agrees to provide water service to the Gateway Property, and will reserve water in the amount up to 104 gpm at peak and 69 annual acre feet for that purpose The City will use the 1040 reservoir to serve the Property, provided, Gateway will be required to contribute to the incremental costs of increased storage capacity at the 1040 reservoir based on latecomer charges as assessed by the City

Gateway agrees to pay the connection fee in effect on the dates of each connection to the City's water system

5.2. Sewer. Gateway has entered into a separate agreement with The Quadrant Corporation ("Quadrant") (as successor to Weyerhaeuser Real Estate Company), and Quadrant has released 241 ERUs of sewer capacity The City agrees to reserve this capacity in the existing wastewater treatment plant to serve the Gateway Property As Gateway has reimbursed Quadrant for this capacity, the City agrees that no connection charge will apply to these connections to the sewer system. The City further agrees to provide Gateway with an additional 120 ERUs of sewer capacity needed for build out of the property for a period of up to five (5) years from the date of this agreement After five years, sewer capacity will be provided to Gateway Cascades, subject to availability Gateway agrees to pay the connection fee in effect on the dates of each connection to the City's sewer system for use of these additional ERUs

6. PROCESS FOR SUBSEQUENT DEVELOPMENT APPROVALS.

6.1. Master Plan. Prior to any development of the site, other than that associated with the Tokul Road realignment, Gateway shall obtain PCI / PR plan approval as a Master Plan for the site, and obtain approvals required under any other applicable city regulations and procedures in accordance with SMC Title 14, including subdivision or binding site improvement plan approvals, Design Review Board approvals, Certificate of Zoning Compliance, and all engineering approvals

6.2. Hotel. Construction of the hotel/conference center and associated parking may occur upon issuance of a building permit, subject to compliance with city codes and regulations Compliance with the provisions of this Agreement must be assured prior to issuance of the building permit. Notwithstanding anything to the contrary contained in this Agreement, Gateway shall not be required to pay any amounts otherwise required by the terms of this Agreement until a hotel building permit has been issued

6.3. Residential. Construction of the residential component of this site plan may occur upon approval of a final plat or binding site improvement plan in accordance with the Snoqualmie Municipal Code and the provisions of this Agreement

7. COMPLIANCE WITH OTHER CODES. Gateway acknowledges that nothing in this Agreement shall be construed to relieve it of the obligation to comply with such statutes, codes or regulations as may be applied to or enforced against the uses and activities on the Gateway Property by agencies with jurisdiction other than the City

8. TERM OF AGREEMENT; VESTING. This Agreement shall remain in full force and effect for ten (10) years from the effective date of this Agreement unless terminated prior to that date by the mutual agreement of the parties For purposes of this Agreement, the term "Applicable Law" means the Development Standards and Mitigations of this Development Agreement, and those City plans, policies, rules and

regulations in effect as of the date this Development Agreement is approved by City Council, shall govern During the term of this Agreement, the Applicable Law set forth herein shall govern the Gateway Property, and the Gateway Property shall not be subject to any zoning or land use amendment, any development standard or regulation adopted after the effective date of this Agreement, except as follows

8.1. Procedural regulations which are not substantive relating to hearing bodies, petitions, applications, notices, findings, records, hearings, reports, recommendations, appeals and any other matter of procedure

8.2. The Uniform Building Code, or such other building code as may be adopted by the City from time to time, including electrical, plumbing, fire or other similar ancillary uniform codes

8.3. The City's authority to require additional SEPA review and potential mitigation in connection with applications for subsequent development or construction approvals as provided by RCW 43.21C and WAC 197-11.

8.4. Any plans, policies, ordinances or regulations or Development Standards that the City must change by direction of, or that the City reasonably determines to be necessary to change in order to comply with, the requirements of any state or federal law or the directive of any state or federal agency or court, in order to avoid being in violation of state or federal law or to preserve eligibility for shared revenues, grants or other funding programs, but only to the extent necessary to comply with state or federal law To the extent that the City can achieve compliance with the subject state or federal law or directive by making changes to local plans, policies, ordinances or regulations or Development Standards that are applicable prospectively, this exception shall not apply to allow retroactive changes to the terms, conditions or development standards under this Agreement

8.5. Water, sewer and storm utility rates as the City Council may from time to time impose or amend

8.6. Any law, rule or regulation deemed by the City as necessary to address a serious threat to public health or safety.

9. TRANSFERS OF OBLIGATIONS. Gateway shall have the right to assign or transfer all or any portion of its interests, rights, obligations, or responsibilities under this Agreement to third parties acquiring an interest in all or any portion of the Gateway Property, provided such assignment or transfer shall not release Gateway from its obligations hereunder, without City consent

10. TERMINATION. Gateway reserves the right to terminate this agreement should development plans specified herein be abandoned In this event, comprehensive plan designations and zoning code requirements applicable to the Gateway Property as of the effective date of this agreement shall be binding No reimbursement will be made by

the City for any improvements or mitigation measures made by Gateway prior to abandonment.

11. AUTHORITY. The obligations to fund or provide services, infrastructure, or other facilities undertaken by Gateway in this Agreement for monetary payments to fund are pursuant to authority of RCW 36.70B.170(4).

12. REPRESENTATIONS. The City and Gateway each represent and warrant to the other that it has the respective power and authority, and is duly authorized to execute and deliver this Agreement. Gateway represents and warrants that it is the fee owner of the Gateway Property Gateway represents and warrants that it is entering into this Agreement knowingly and voluntarily and in consideration of the benefits to be derived herefrom. Gateway represents and warrants that it accepts the Mitigation Measures herein as reasonably related to the nature and degree of impacts from its proposed development, and that the methods to calculate the Mitigation Measures are correct and appropriate. Gateway acknowledges that the City has relied upon Gateways acceptance of the Mitigation Measures in making the land use and development decisions contained in the Agreement

13. GENERAL PROVISIONS.

13.1. Governing Law. This Agreement shall be governed by and interpreted in accordance with the laws of the State of Washington

13.2. Binding on Successors; Recording. This Agreement is intended to protect the value of the Gateway Property, as well as the public health, safety and welfare of the City of Snoqualmie, and the benefits and obligations inuring to the Gateway Property and the City as a result of this Agreement shall run with the land and shall be binding upon Gateway, its heirs, successors and assigns, and upon the City, for the term of this Agreement. Gateway shall record this Agreement or memorandum hereof against the Property as a covenant running with the land. If this Agreement is terminated, the City will execute appropriate documents to so indicate

13.3. No Severability. The provisions of this Agreement are not severable In the event any provisions of this Agreement are determined to be unenforceable or invalid by a court of law, then this Agreement shall thereafter be rendered voidable at the option of either party, which option shall be exercised in writing no later than ten (10) business days after the court determination or thereafter shall be deemed waived No determination of invalidity occurring after the effective date of annexation shall affect the validity of the annexation

13.4. Amendment. This Agreement and attached exhibits may be modified only by a written instrument duly executed by both parties In the case of a proposed major modification by Gateway to the land use provisions set forth in this Agreement and Exhibits, the Category II permit processing procedures of SMC ch 14 30 shall be utilized At the request of Gateway, the Director of Community Development

may authorize minor modifications to the land use provisions set forth in this Agreement if the Director of Community Development determines that a proposed modification to this Agreement does not constitute a "major" modification hereunder

13.5. Exhibits. EXHIBITS A through F attached hereto are incorporated herein by this reference as if fully set forth.

13.6. Headings. The headings in this Agreement are inserted for reference only and shall not be construed to expand, limit or otherwise modify the terms and conditions of this Agreement

13.7. Integration. This Agreement and Exhibits represents the entire agreement of the parties with respect to the subject matter hereof This Agreement terminates and supersedes the Annexation Process Agreement There are no other agreements, oral or written, except as expressly set forth herein

13.8. Mutual Drafting. Both the City and Gateway have participated fully in the drafting of this Agreement, and the rule of construction of ambiguities against the drafter shall not apply to either party

13.9. Attorneys Fees and Costs. In any judicial action to enforce or determine a party's rights under this Agreement, the prevailing party (or the substantially prevailing party) shall be entitled to reasonable attorneys fees and costs, including fees and costs incurred in any appeal of the ruling of a lower court. The "substantially prevailing party" shall be determined considering all claims and defenses in the action.

13.10. No Third Party Beneficiaries. Nothing in this Agreement shall be construed to inure to the benefit of any third party

14. INDEMNIFICATION. Gateway releases and agrees to defend, indemnify and hold harmless the City and all of its elected and appointed officials and its employees from all liability, claims, appeals and costs, including the costs of defense of any claim or appeal, arising in connection with the annexation of the Annexation Property and this Agreement, except to the extent resulting from the sole negligence of the City or its officers, agents or employees in performance of this Agreement.

15. COMPLIANCE. In the event Gateway shall fail to satisfy any of its obligations under this Agreement, the City shall have the right to exercise any remedy at law or in equity to compel the performance of such obligation, in addition to such remedies as may be provided under the enforcement provisions of the Land Use Code In addition, Gateway's failure to satisfy any of its material obligations in this Agreement shall constitute a breach of contract and shall be grounds for termination of this Agreement by the City, or for the withholding of subsequent development approvals until such breach has been cured

16. POLICE POWER. Nothing in this Agreement shall be construed to diminish or restrict the police powers of the City as granted by the Washington State constitution or by general law, but this agreement is an exercise of the City's authority granted under RCW 35A.14 330, and RCW 36 70B 170 through 210 and other powers and is binding on the City for its term

17. EFFECTIVE DATE. This Agreement shall become effective upon the effective date of the City ordinance approving this Agreement and after execution of the Agreement by both parties.

18. BINDING ON SUCCESSORS AND RECORDING. This Agreement shall run with the land and be binding upon the parties hereto, and upon their respective successors and assigns. Gateway shall cause a Memorandum of Agreement in a form approved by the City Attorney to be recorded against the real property covered by this Agreement in the King County Recorder's Office within ten days after mutual execution of this Agreement

DATED as of the date first above written

CITY OF SNOQUALMIE,
a Washington municipal corporation

By _____
R Fuzzy Fletcher
Its Mayor

GATEWAY CASCADES, LLC,
a California limited liability company

By _____
Earl W Buehner
Its Vice President, Asst Secretary, & Asst Treasurer

STATE OF WASHINGTON

ss

COUNTY OF KING

On this day personally appeared before me R Fuzzy Fletcher, to me known to be the Mayor of the **CITY OF SNOQUALMIE**, the municipal corporation that executed the foregoing instrument, and acknowledged such instrument to be the free and voluntary act and deed of such corporation, for the uses and purposes therein mentioned, and on oath stated that he was duly authorized to execute such instrument

GIVEN UNDER MY HAND AND OFFICIAL SEAL this 8th day of March, 2004

E Joann Warren

Printed Name E Joann Warren

NOTARY PUBLIC in and for the State of Washington,

residing at Maple Valley

My Commission Expires 9-15-05

Notary Public
State of Washington
E JOANN WARREN
My Appointment Expires Sep 15, 2005

Document Consent

ACKNOWLEDGMENT

STATE OF CALIFORNIA)
) ss
COUNTY OF LOS ANGELES)

On March 12, 2004, before me, Beulah S Canevari, Notary Public, personally appeared Earl W Buehner, personally known to me to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his authorized capacity, and that by his signature on the instrument the person, or the entity upon behalf of which the person acted, executed the instrument

WITNESS my hand and official seal

Beulah S Canevari
Notary Public

BEULAH S. CANEVARI
Commission # 1466839
Notary Public - California
Los Angeles County
My Comm. Expires Jan 27 2008

Document

EXHIBIT A
Legal Description of Gateway Property

MORGAN PARCEL

PARCEL A (within City of Snoqualmie)

A parcel of land located in the southwest quarter of Section 19, Township 24 North, Range 8 East, W M , in King County, Washington, more particularly described as follows.

Beginning at the south quarter corner of said Section 19, thence north 89°50'20" west along the south line of said Section 19 a distance of 756 09 feet,
thence north 1°09'40" east a distance of 148 30 feet to the TRUE POINT OF BEGINNING,
thence south 50°05'40" west a distance of 72 95 feet,
thence north 28°58'50" west a distance of 9 70 feet,
thence north 61°01'10" east a distance of 5 31 feet,
thence north 28°58'50" west a distance of 21 00 feet,
thence south 60°27'10" west a distance of 39.7 feet,
thence north 28°57'20" west a distance of 66 78 feet,
thence north 60°59'10" east a distance of 88 46 feet,
thence south 55°27'30" east a distance of 27 95 feet,
thence south 33°44'20" east a distance of 58 54 feet to the TRUE POINT OF BEGINNING

PARCEL B (outside of City of Snoqualmie)

That portion of the southwest quarter of the southeast quarter of Section 19, Township 24 North, Range 8 East, W.M , in King County, Washington, lying westerly of the westerly margin of Tokul Road Southeast (also known as Adolph Weller County Road)

PARCEL F (within City of Snoqualmie)

A parcel of land lying in Government Lot 9 of Section 30, Township 24 North, Range 8 East, W M , in King County, Washington, and being more particularly described as follows

Beginning at the north quarter corner of said Section 30, thence along the north-south quarter section line of said Section 30, south 0°22'10" west a distance of 1,009 43 feet to the intersection of said north-south quarter section line with the southerly right-of-way line of Washington State Road No 2,
thence along said southerly right-of-way line north 41°21'10" west a distance of 524 51 feet,
thence north 48°38'50" east a distance of 166 66 feet,
thence north 35°23'40" west a distance of 635 00 feet to the north line of said Section 30,
thence along said north line south 88°50'20" east a distance of 595 86 feet to the point of beginning,
EXCEPTING therefrom the right-of-way of State Road No 2

PARCEL H (outside of City of Snoqualmie)

That portion of Government Lot 8 in Section 30, Township 24 North, Range 8 East, W M , in King County, Washington, lying westerly of the westerly margin of Tokul Road Southeast (also known as Adolph Weller County Road)

TOKUL PARCEL

PARCEL J (outside of City of Snoqualmie)

That portion of the northeast quarter of Section 30, Township 24 North, Range 8 East, W M., in King County, Washington, more particularly described as follows

Commencing at the northwest corner of the said northeast quarter of Section 30;
thence along the west line of said subdivision, south 00°25'14" west 667 74 feet to the southerly right-of-way margin of Southeast Mill Pond Road (also known as Asa J Story Road) and the TRUE POINT OF BEGINNING,
thence continuing along said west line south 00°25'14" west 194.00 feet to Point "A", said point being on the northeasterly right-of-way margin of Southeast Fall City-Snoqualmie Road;
thence along said northeasterly margin, south 41°23'43" east 339 92 feet to a point of curvature;
thence continuing along said northeasterly margin, southeasterly 98 03 feet along the arc of a tangent curve to the right, having a radius of 737 60 feet, through a central angle of 07°36'54" to a point on a non-tangent curve, said point being on the northerly right-of-way margin of Mill Pond County Road,
thence along said northerly margin, northeasterly 131.60 feet along the arc of said non-tangent curve to the left, having a radius of 298 00 feet, the radius point of which bears north 05°48'48" east, through a central angle of 25°18'06" to a point of tangency,
thence continuing along said northerly margin, north 70°30'42" east 255 00 feet to a point of curvature;
thence continuing along said northerly margin, northeasterly 36 13 feet along the arc of a tangent curve to the right having a radius of 280 00 feet, through a central angle of 07°23'38" to a point on said southerly margin of Southeast Mill Pond Road (also known as Asa J. Story Road);
thence along said southerly margin, north 64°23'02" west, 291.48 feet to a point of curvature,
thence continuing along said southerly margin, northwesterly 233 00 feet along the arc of a tangent curve to the right, having a radius of 984.93 feet, through a central angle of 13°33'15" to a point of tangency,
thence continuing along said southerly margin, north 50°49'47" west 190 18 feet to a point of curvature,
thence continuing along said southerly margin, northwesterly 93 61 feet along the arc of a tangent curve to the left, having a radius of 270 00 feet, through a central angle of 19°51'54" to the TRUE POINT OF BEGINNING

EXHIBIT B
Legal Description of Annexation Property

MORGAN PARCEL

PARCEL B·

That portion of the southwest quarter of the southeast quarter of Section 19, Township 24 North, Range 8 East, W.M , in King County, Washington, lying westerly of the westerly margin of Tokul Road Southeast (also known as Adolph Weller County Road)

PARCEL H·

That portion of Government Lot 8 in Section 30, Township 24 North, Range 8 East, W.M., in King County, Washington, lying westerly of the westerly margin of Tokul Road Southeast (also known as Adolph Weller County Road)

TOKUL PARCEL

PARCEL J

That portion of the northeast quarter of Section 30, Township 24 North, Range 8 East, W.M , in King County, Washington, more particularly described as follows·

Commencing at the northwest corner of the said northeast quarter of Section 30,
thence along the west line of said subdivision, south 00°25'14" west 667.74 feet to the southerly right-of-way margin of Southeast Mill Pond Road (also known as Asa J Story Road) and the TRUE POINT OF BEGINNING;
thence continuing along said west line south 00°25'14" west 194 00 feet to Point "A", said point being on the northeasterly right-of-way margin of Southeast Fall City-Snoqualmie Road,
thence along said northeasterly margin, south 41°23'43" east 339 92 feet to a point of curvature;
thence continuing along said northeasterly margin, southeasterly 98 03 feet along the arc of a tangent curve to the right, having a radius of 737.60 feet, through a central angle of 07°36'54" to a point on a non-tangent curve, said point being on the northerly right-of-way margin of Mill Pond County Road,
thence along said northerly margin, northeasterly 131 60 feet along the arc of said non-tangent curve to the left, having a radius of 298 00 feet, the radius point of which

bears north 05°48'48" east, through a central angle of 25°18'06" to a point of tangency,
thence continuing along said northerly margin, north 70°30'42" east 255 00 feet to a point of curvature,
thence continuing along said northerly margin, northeasterly 36.13 feet along the arc of a tangent curve to the right having a radius of 280 00 feet, through a central angle of 07°23'38" to a point on said southerly margin of Southeast Mill Pond Road (also known as Asa J Story Road),
thence along said southerly margin, north 64°23'02" west, 291 48 feet to a point of curvature,
thence continuing along said southerly margin, northwesterly 233 00 feet along the arc of a tangent curve to the right, having a radius of 984 93 feet, through a central angle of 13°33'15" to a point of tangency;
thence continuing along said southerly margin, north 50°49'47" west 190.18 feet to a point of curvature,
thence continuing along said southerly margin, northwesterly 93 61 feet along the arc of a tangent curve to the left, having a radius of 270.00 feet, through a central angle of 19°51'54" to the TRUE POINT OF BEGINNING,

<u>TOKUL ROAD/S.E 66TH STREET/S.E MILL POND ROAD</u>

That portion of Tokul Road, S E 66th Street, and S E Mill Pond Road lying adjacent to the above described areas.

Consent

EXHIBIT F
Pedestrian Facilities

Within the project site, proposed trails along the perimeter and within the immediate vicinity of the hotel/conference center would provide nonmotorized opportunities between the Salish Expansion and the existing Salish Lodge and Snoqualmie Falls Park Trails constructed as part of the Salish Expansion would measure approximately 1 2 acres (6,300 lineal feet) and would be accessible within approximately 500 feet of the Snoqualmie Valley Trail, providing an off-street opportunity for nonmotorized travel between this regional trail and the Centennial Trail. The new trail system would provide a direct connection between the Salish Expansion and downtown Snoqualmie via the Centennial Trail.

Nonmotorized crossing treatments within the site boundaries would be provided across the main access roadways to the Salish Expansion and within parking areas Crossing treatments at a minimum would include curb cuts and signage at locations and an advance warning for crossing areas as well as adequate illumination for evening periods Although traffic volumes would be relatively low on internal roadways within the site, additional treatments would be provided to enhance pedestrian safety, driver awareness of crossing areas, and enhance the nature of the development Example treatments could include textured pavement treatments to identify crossing locations at the main access roadways and raised speed tables on internal roadways to provide safe crossing environments for pedestrian and bicycles as well as manage vehicular traffic speeds A final enhancement to the overall nonmotorized system proposed on-site would be signage on the trail system for users, identifying points of interest, connections to other trail systems and locations of specific building or areas within the Salish Expansion

To better accommodate pedestrian circulation between the Salish Expansion and the existing Salish Lodge and Snoqualmie Falls Park, a direct and separated trail system between the proposed hotel/conference center and SR 202 and the existing overhead walkway would be constructed by the proponent to provide for safe and efficient circulation between these two facilities and associated uses

Excerpted from
Salish Expansion – Transportation Impact Study
November 30, 2001
Transportation Engineering NorthWest, LLC

Consent

When Recorded, Return to:

CITY OF SNOQUALMIE
Attention: Jodi Warren
P.O. Box 987
Snoqualmie, WA 98065

200706050000314
NATHANSON AMND 44.00
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06/05/2007 09:40
KING COUNTY, WA

SECOND AMENDMENT

TO

SALISH EXPANSION DEVELOPMENT AGREEMENT

Grantor: CITY OF SNOQUALMIE
(Last, First, Middle Initial) *(Last, First, Middle Initial)*

Grantee: GATEWAY CASCADES LLC
(Last, First, Middle Initial) *(Last, First, Middle Initial)*

Legal Description (abbreviated): That portion of the south half of the south half of Section 19 AND of the north half of Section 30, T. 24 N., R. 8 E., W.M., King County, WA, lying westerly and northerly of Tokul Road S.E. and easterly and northerly of S.E. Fall City - Snoqualmie Road (aka SR 202); TOGETHER WITH that portion of said Section 30 lying southerly of Tokul Road S.E. AND southerly of S.E. 66th Street AND northerly of S.E. Mill Pond Road AND easterly of S.E. Fall City - Snoqualmie Road (aka SR 202).

Assessor's Tax Parcel ID #: 302408-9065; 302408-9002; 1924089041

Reference Nos. of Documents Released or Assigned: N/A
Complete all blanks within this "recording box."

Unofficial Document

SECOND AMENDMENT

TO

SALISH EXPANSION DEVELOPMENT AGREEMENT

Between

THE CITY OF SNOQUALMIE

And

GATEWAY CASCADES, LLC

Dated: April 9, 2007

Unofficial Document

THIS SECOND AMENDMENT TO DEVELOPMENT AGREEMENT is dated for reference the 9th day of April 2007, by and between the CITY OF SNOQUALMIE, a Washington municipal corporation (the "City"), and GATEWAY CASCADES, LLC, a California limited liability company ("Gateway").

RECITALS

A. The City is incorporated under the Optional Municipal Code of the State of Washington.

B. Gateway is the owner of real property subject to that certain Salish Expansion Development Agreement, dated March 8, 2004 ("Development Agreement"), and that First Amendment to Salish Expansion Development Agreement, dated June 14, 2005 ("First Amendment"), executed between the City and Gateway.

C. It has come to the attention of Gateway that the legal description attached as Exhibit A to the Development Agreement and as Exhibit A to the First Amendment was incorrect in its description of what is commonly referred to as the Morgan Parcel.

D. The City and Gateway agree that Exhibit A attached hereto provides the correct legal description of the Morgan Parcel for the purposes of the Development Agreement and First Amendment. The City and Gateway desire to amend the Development Agreement and the First Amendment to provide a correct legal description of the subject property.

E. Gateway is the owner of all the real property affected by this correction to the legal description. Gateway is the owner of the real property commonly referred to as the Morgan Parcel, and at the time that the Development Agreement and First Amendment were executed, Gateway was the owner of the Tokul Parcel, each of which are more particularly described on Exhibit A hereto. Gateway has since conveyed ownership of the Tokul Parcel to the City.

NOW, THEREFORE, and in consideration of mutual agreements, the City and Gateway hereby agree that the Development Agreement and First Amendment are amended as follows:

AGREEMENT

1. Substitution of Legal Description – Development Agreement. Exhibit A to the Development Agreement is hereby superseded and replaced in its entirety by Exhibit A attached hereto.

2. Substitution of Legal Description – First Amendment. Exhibit A to the First Amendment is hereby superseded and replaced in its entirety by Exhibit A attached hereto.

3. Exhibits. All exhibits attached hereto are incorporated herein by this reference.

4. Other Provisions Not Affected. Except as previously amended and as specifically amended herein, all other provisions of the Development Agreement shall remain in full force and effect.

5. Effective Date. The parties agree that this amendment represents the original intent of the parties, and therefore the effective date of this amendment and the correction implemented herein dates back to the effective date of the original Development Agreement, and the effective date of the First Amendment, respectively.

6. Binding on Successors; Recording. This Agreement shall run with the land and be binding upon the parties hereto and upon their respective successors and assigns. Gateway shall record this Amendment in a form approved by the City Attorney to be recorded against the real property covered by this Agreement in the King County Recorder's Office within 10 days after mutual execution of this Amendment.

DATED as of the date first above written.

CITY OF SNOQUALMIE,
a Washington municipal corporation

By _____
Matthew R. Larson, Its Mayor

GATEWAY CASCADES, LLC
a California limited liability company

By _____
Earl W. Buehner
Its: Vice President, Asst. Secretary & Asst. Treasurer

State of California)
) ss:
County of Los Angeles)

On April 9, 2007, before me, Shirley T. Sarkisian, Notary Public, personally appeared Earl W. Buehner, personally known to me to be the person whose name is subscribed to the within instrument, and acknowledged to me that he executed the same in his authorized capacity, and that by his signature on the instrument the person, or the entity upon behalf of which the person acted, executed the instrument.

WITNESS my hand and official seal.

Shirley T. Sarkisian [seal]

Print Notary Name: Shirley T. Sarkisian
Notary Public

SHIRLEY T. SARKISIAN
Commission # 1583982
Notary Public - California
Los Angeles County
My Comm. Expires Jun 28, 2009

Document

STATE OF WASHINGTON }
ss.
COUNTY OF KING }

On this day personally appeared before me Matthew R. Larson, to me known to be the Mayor of the CITY OF SNOQUALMIE, a municipal corporation, the municipal corporation that executed the foregoing instrument, and acknowledged such instrument to be the free and voluntary act and deed of such municipal corporation for the uses and purposes therein mentioned, and on oath stated that he was duly authorized to execute such instrument.

Given under my hand and official seal this 9th day of April, 2007.

Notary Public
State of Washington
E JOANN WARREN
My Appointment Expires Sep 15, 2009

E Joann Warren
Printed Name E Joann Warren
NOTARY PUBLIC in and for the State of Washington,
residing at Maple Valley
My Commission Expires 9-15-09

STATE OF _____ }
ss.
COUNTY OF _____ }

On this day personally appeared before me Earl W. Buehner, to me known to be the Vice President, Asst. Secretary and Asst. Treasurer of GATEWAY CASCADES, LLC, a California limited liability company, the company that executed the foregoing instrument, and acknowledged such instrument to be the free and voluntary act and deed of such company, for the uses and purposes therein mentioned, and on oath stated that he/she was duly authorized to execute such instrument.

Given under my hand and official seal this _____ day of _____, 2007.

Printed Name _____
NOTARY PUBLIC in and for the State of _____,
residing at _____
My Commission Expires _____

Salish
Job No. 831-001-006-0002
March 14, 2007

EXHIBIT A

LEGAL DESCRIPTION OF GATEWAY PROPERTY

MORGAN PARCEL

PARCEL B

That portion of the southwest quarter of the southeast quarter of Section 19, Township 24 North, Range 8 East, W.M., in King County, Washington, lying westerly of the westerly margin of Tokul Road Southeast (also known as Adolph Weller County Road);

PARCEL F

A parcel of land lying in Government Lot 9 of Section 30, Township 24 North, Range 8 East, W.M., in King County, Washington, and being more particularly described as follows:

Beginning at the north quarter corner of said Section 30;

Thence along the north-south quarter section line of said Section 30, South 0°22'10" West a distance of 1,009.43 feet to the intersection of said north-south quarter section line with the southerly right-of-way line of Washington State Road No. 2 (aka SR 202);

Thence along said southerly right-of-way line, North 41°21'10" West a distance of 524.51 feet;

Thence North 48°38'50" East a distance of 166.66 feet;

Thence North 35°23'40" West a distance 635.00 feet to the north line of said Section 30;

Thence along said north line, South 88°50'20" East a distance of 595.86 feet to the POINT OF BEGINNING;

EXCEPTING therefrom the right-of-way of State Road No. 2;

PARCEL H

That portion of Government Lot 8 in Section 30, Township 24 North, Range 8 East, W.M., in King County, Washington, lying westerly of the westerly margin of Tokul Road Southeast (also known as Adolph Weller County Road);

PARCEL L

That portion of the following described property lying east of the east margin of the right-of-way of State Road No. 2 (also known as SR 202), lying in Government Lots 2, 3 and 4, Section 19, Township 24 North, Range 8 East, W.M., in King County, Washington, and being more particularly described as follows:

Beginning at the south quarter of said Section 19;

Thence along the east line of Government Lot 3, North 0°29'50" East a distance of 1,322.18 feet to the northeast corner of said Lot 3;

Thence along the north line of said Lots 3 and 2, North 89°02'00" West a distance of 2,290 feet, more or less, to the left bank of the Snoqualmie River;

Thence northerly along said left bank of the river to the west line of said Section 19;

Thence along the west line of said Section 19, South 1°21'20" West a distance of 1,660 feet, more or less, to the southwest corner of said Section 19;

Thence along the south line of said Section 19, South 88°50'20" East a distance of 377.16 feet;

Thence North 5°49'20" West a distance of 44.19 feet;
Thence North 15°12'20" East a distance of 56.04 feet;
Thence North 8°06'10" West a distance of 198.73 feet;
Thence North 60°13'00" West a distance of 120.23 feet;
Thence North 11°48'20" East a distance of 208.86 feet;
Thence North 0°53'00" East a distance of 213.90 feet;
Thence North 21°33'20" West a distance of 45.59 feet;
Thence South 78°52'20" East a distance of 489.80 feet;
Thence South 21°27'00" West a distance of 184.22 feet;
Thence South 31°28'10" East a distance of 89.19 feet;
Thence North 55°33'50" East a distance of 630.43 feet;
Thence South 35°23'40" East a distance of 1,054.95 feet to a point on the south line of said Section;
Thence along said south line South 88°50'20" East a distance of 595.86 feet to the POINT OF BEGINNING;

TOKUL PARCEL

PARCEL J

That portion of the northeast quarter of Section 30, Township 24 North, Range 8 East, W.M., in King County, Washington, more particularly described as follows:

Commencing at the northwest corner of said northeast quarter of Section 30;

Thence along the west line of said subdivision, South 00°25'14" West 667.74 feet to the southerly right-of-way margin of Southeast Mill Pond Road (also known as Asa J. Story Road) and the TRUE POINT OF BEGINNING;

Thence continuing along said west line South 00°25'14" West 194.00 feet to Point "A", said point being on the northeasterly right-of-way margin of Southeast Fall City-Snoqualmie Road;

Thence along said northeasterly margin, South 41°23'43" East 339.92 feet to a point of curvature;

Thence continuing along said northeasterly margin, southeasterly 98.03 feet along the arc of a tangent curve to the right, having a radius of 737.60 feet, through a central angle of 07°36'54" to a point on a non-tangent curve, said point being on the northerly right-of-way margin of Mill Pond County Road;

Thence along said northerly margin, northeasterly 131.60 feet along the arc of said non-tangent curve to the left, having a radius of 298.00 feet, the radius point of which bears North 05°48'48" East, through a central angle of 25°18'06" to a point of tangency;

Thence continuing along said northerly margin, North 70°30'42" East 255.00 feet to a point of curvature;

Thence continuing along said northerly margin, northeasterly 36.13 feet along the arc of a tangent curve to the right, having a radius of 280.00 feet, through a central angle of 07°23'38" to a point on said southerly margin of Southeast Mill Pond Road (also known as Asa J. Story Road);

Thence along said southerly margin, North 64°23'02" West 291.48 feet to a point of curvature;

Thence continuing along said southerly margin, northwesterly 233.00 feet along the arc of a tangent curve to the right, having a radius of 984.93 feet, through a central angle of 13°33'15" to a point of tangency;

Thence continuing along said southerly margin, North 50°49'47' West 190.18 feet to a point of curvature;

Thence continuing along said southerly margin, northwesterly 93.61 feet along the arc of a tangent curve to the left, having a radius of 270.00 feet, through a central angle of 19°51'54" to the TRUE POINT OF BEGINNING;

TOGETHER WITH that portion of Tokul Road Southeast., S.E. 66th Street, and Southeast Mill Pond Road lying adjacent to the above described areas.

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Unofficial Document

EXHIBIT B
Legal Description of Annexation Property

MORGAN PARCEL

PARCEL B:

That portion of the southwest quarter of the southeast quarter of Section 19, Township 24 North, Range 8 East, W.M., in King County, Washington, lying westerly of the westerly margin of Tokul Road Southeast (also known as Adolph Weller County Road).

PARCEL H:

That portion of Government Lot 8 in Section 30, Township 24 North, Range 8 East, W.M., in King County, Washington, lying westerly of the westerly margin of Tokul Road Southeast (also known as Adolph Weller County Road).

TOKUL PARCEL

PARCEL J:

That portion of the northeast quarter of Section 30, Township 24 North, Range 8 East, W.M., in King County, Washington, more particularly described as follows:

Commencing at the northwest corner of the said northeast quarter of Section 30;
thence along the west line of said subdivision, south 00°25'14" west 667.74 feet to the southerly right-of-way margin of Southeast Mill Pond Road (also known as Asa J. Story Road) and the TRUE POINT OF BEGINNING;
thence continuing along said west line south 00°25'14" west 194.00 feet to Point "A", said point being on the northeasterly right-of-way margin of Southeast Fall City-Snoqualmie Road;
thence along said northeasterly margin, south 41°23'43" east 339.92 feet to a point of curvature;
thence continuing along said northeasterly margin, southeasterly 98.03 feet along the arc of a tangent curve to the right, having a radius of 737.60 feet, through a central angle of 07°36'54" to a point on a non-tangent curve, said point being on the northerly right-of-way margin of Mill Pond County Road;
thence along said northerly margin, northeasterly 131.60 feet along the arc of said non-tangent curve to the left, having a radius of 298.00 feet, the radius point of which

bears north 05°48'48" east, through a central angle of 25°18'06" to a point of tangency;
thence continuing along said northerly margin, north 70°30'42" east 255.00 feet to a point of curvature;
thence continuing along said northerly margin, northeasterly 36.13 feet along the arc of a tangent curve to the right having a radius of 280.00 feet, through a central angle of 07°23'38" to a point on said southerly margin of Southeast Mill Pond Road (also known as Asa J. Story Road);
thence along said southerly margin, north 64°23'02" west, 291.48 feet to a point of curvature;
thence continuing along said southerly margin, northwesterly 233.00 feet along the arc of a tangent curve to the right, having a radius of 984.93 feet, through a central angle of 13°33'15" to a point of tangency;
thence continuing along said southerly margin, north 50°49'47" west 190.18 feet to a point of curvature;
thence continuing along said southerly margin, northwesterly 93.61 feet along the arc of a tangent curve to the left, having a radius of 270.00 feet, through a central angle of 19°51'54" to the TRUE POINT OF BEGINNING;

<u>TOKUL ROAD/S.E. 66TH STREET/S.E. MILL POND ROAD</u>

That portion of Tokul Road, S.E. 66th Street, and S.E. Mill Pond Road lying adjacent to the above described areas.

When Recorded, Return to:

CITY OF SNOQUALMIE
Attention: Jodi Warren, City Clerk
P.O. Box 987
Snoqualmie, WA 98065

20110427000564
CHICAGO TITLE AG 71.00
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04/27/2011 11:18
KING COUNTY, WA

SNOQUALMIE SLUDGE FACILITY LATECOMER AGREEMENT

Grantor: 1) THE QUADRANT CORPORATION

Grantee: 1) CITY OF SNOQUALMIE

Legal Description (abbreviated): PTN of Sections 19, 20, 29, 30, 31, 32 + 33-24N and " 4, 5 + 6-23-8.
☒ Additional on : EXHIBIT A

Assessor's Tax Parcel ID #: 302408-9077 +

Reference Nos. of Documents Released or Assigned: N/A

THIS AGREEMENT ("Sludge Facility Latecomer Agreement") is made and entered into as of this 11th day of April, 2011 ("Effective Date"), by and between the **CITY OF SNOQUALMIE**, a Washington municipal corporation ("the City"), and **THE QUADRANT CORPORATION**, a Washington corporation ("Quadrant").

RECITALS

A. The City is a municipal corporation of the State of Washington, organized under the Optional Municipal Code, Title 35A RCW, located in King County, Washington.

B. Quadrant is a Washington corporation and successor to Weyerhaeuser Real Estate Company ("WRECO") as developer of that certain real property within the

City commonly known as Snoqualmie Ridge Phase I. Quadrant is also the developer of that certain real property within the City commonly known as Snoqualmie Ridge Phase II.

C. The City and WRECO entered into that certain "Snoqualmie Wastewater Treatment Facilities Developer Extension Agreement" dated August 16, 1996, and recorded under King County Recording No. 9608200229 (hereafter "Wastewater Treatment Facilities DEA"). The Wastewater Treatment Facilities DEA provided for construction of certain wastewater system improvements.

D. In order to provide for latecomer reimbursement to Quadrant under applicable statutes and ordinances and Section 2.2 of the Wastewater Treatment Facilities DEA, the City and Quadrant subsequently entered into that certain "Snoqualmie Wastewater Treatment Facilities Latecomer Agreement," recorded under King County Recording No. 200408310011O3 (hereafter "Wastewater Treatment Facilities Latecomer Agreement").

E. The City and WRECO also entered into that certain written Settlement Agreement dated March 24, 2008 (hereafter "Settlement Agreement"). The Settlement Agreement provided for construction of a wastewater sludge facility in accordance with an Approved Scope of Work, as defined in the Settlement Agreement ("the Sludge Facility").

F. This Sludge Facility Latecomer Agreement is intended to provide for latecomer reimbursement to Quadrant under applicable statutes and ordinances and Section 2.5 of the Settlement Agreement. The reimbursement to Quadrant authorized herein is in addition to the reimbursement authorized under the Wastewater Treatment Facilities Latecomer Agreement, which remains in full force and effect.

G. The design capacity of the completed Sludge Facility is sufficient to treat the full capacity of the wastewater treatment plant, as permitted under the City's NPDES permit, which has been quantified in Equivalent Residential Units ("ERUs"). The wastewater treatment plant is currently rated to have a capacity of 7,640 ERUs. For purposes of this Sludge Facility Latecomer Agreement, the Sludge Facility is similarly defined and considered to have a capacity of 7,640 ERUs.

H. Chapter 35.91 RCW and Snoqualmie Municipal Code 13.04.360 authorize the City to contract with owners and developers of real property to construct wastewater facilities and improvements for conveyance to the City, and to provide by contract for partial reimbursement of a fair pro rata share by owners of properties who did not contribute to the original cost and who will benefit from such facilities and improvements, at such time as such other properties tap into, use, or otherwise connect, directly or indirectly, or through laterals or branches, to the improved wastewater system. The total cost of the Sludge Facility paid or contributed by Quadrant, as represented in Statements of Cost in the Bills of Sales conveying the improvements to the City,

is $3,022,055.60. The reimbursement per ERU is therefore $395.56 (= $3,022,055.60 ÷ 7,640) ("Latecomers Charge").

I. With the exception of the Exempt Properties as defined hereafter, it is the intent of the parties that all properties that connect to or expand their usage of the City's wastewater facilities, directly or indirectly, will be required to reimburse Quadrant a per-ERU Latecomers Charge, representing a pro rata fair share of the cost of the Sludge Facility, pursuant to the terms and conditions set forth herein.

NOW, THEREFORE, in consideration of the Recitals set forth above, the mutual agreements and covenants herein, and the mutual benefits to be derived by the parties therefrom, the City and Quadrant hereby agree as follows:

AGREEMENTS

1. EXEMPT PROPERTIES

1.1 Exempt Properties - General. Condition 130 of the SR I Final Plan excludes from the definition of "new development," which may be subject to a requirement to reimburse a fair pro rata share of the cost of the new Sludge Facility, certain properties within the city limits. The following reimbursement exemption for "Exempt Properties - City" satisfies Condition 130. Chapter 35.91 RCW also exempts from the obligation to contribute to latecomer reimbursement those property owners that contributed to the original cost of construction of the facilities subject to reimbursement. Quadrant paid the full original cost of the Sludge Facility. The City and Quadrant therefore agree that the following-described properties shall be deemed exempt from application of the Latecomers Charge authorized herein and shall be referred to herein as "the Exempt Properties":

1.1.1 Exempt Properties – Quadrant: All properties owned by Quadrant or Snoqualmie Ridge II Development LLC at the time any such property is proposed for connection to the City sewer system, as well as any property subject to a written waiver of latecomer contribution executed by Quadrant at the time such property is proposed for sewer connection. Quadrant will provide such a waiver to any property owner that satisfies its reimbursement obligations under a private agreement with Quadrant for the use of, or connection to, the Sludge Facility.

1.1.2 Exempt Properties - City: New construction, new utility connections and expansion of existing utility connections on any existing platted residential lot or any commercial or institutional use within the Historic City, the boundaries of which are established on **EXHIBIT A** attached hereto, up to a total of 1,127 ERUs. The Exempt Properties - City shall not include new residential subdivisions within the Historic City, and lots within such new residential subdivisions shall be

deemed Benefited Properties as defined below. The allocation for the Exempt Properties - City is based upon the treatment capacity of the City's pre-existing wastewater treatment facilities of 490 pounds per day BOD (980 ERUs), increased by a factor of 15% (563.5 pounds per day BOD, or 1,127 ERUs).

1.1.3 Exempt Properties - Habitat for Humanity: All properties owned by Habitat for Humanity as of the Effective Date hereof.

1.1.4 Exempt Properties - Casino Properties: All properties within Phase One of Casino Snoqualmie, as set forth in that certain agreement between the City and the Snoqualmie Tribe dated April 26, 2004, up to a total of 360 ERUs. Any expansion of Casino Snoqualmie onto property beyond Phase One will not be deemed part of the Exempt Properties - Casino Properties.

2. REIMBURSEMENT PROVISIONS

2.1 Reimbursement by Non-Exempt Latecomers. Pursuant to RCW 35.91.020, the City will collect a Latecomers Charge in the amount of $395.50 per ERU from the owner of any Benefited Property as defined below, not qualifying as Exempt Properties under Section 1, before the City will permit any such Benefited Property to connect to the City's municipal sewer system, as that owner's pro rata fair share of the cost of the Sludge Facility. The City will remit amounts so collected to Quadrant within 60 days of receipt. The Latecomers Charge will not be affected by any subsequent re-rating of the capacity of the wastewater treatment plant. The City agrees to use its best efforts to implement a process for tracking applications and permits for new connections to the city's wastewater treatment plant, and to provide the tracking information to Quadrant on a timely basis, which must be at least one time per year, or more often upon request by Quadrant.

2.2 Benefited Property. A Benefited Property means and includes all those properties within the City's sewer service area, as it now exists or is amended in the future, except for Exempt Properties as defined in Section 1 above. A Benefited Property also includes any property outside the City's sewer service area to which City sewer service may be extended by contract. The City will include an express provision for reimbursement under this Sludge Facility Latecomer Agreement in any contract it enters into for providing sewer service to property outside the City's sewer service area, requiring the owner thereof to pay the requisite Latecomers Charge for the benefit of Quadrant before connection of such property to the City's sewer system.

2.3 Recording and Duration. This Sludge Facility Latecomer Agreement will become effective as to the owner of any Benefited Property within the City's present or future sewer service area upon the date of its recording at Quadrant's expense with the King County Department of Records and Elections. This Sludge Facility Latecomer Agreement will become effective as to the owner of any Benefited

Property outside the City's present or future sewer service area upon the date such owner assumes a contractual obligation to pay the Latecomers Charge. This Sludge Facility Latecomer Agreement shall remain in full force and effect for a period of 15 years after the Effective Date.

2.4 Successors and Assigns. If Quadrant assigns or transfers its rights or benefits under this Sludge Facility Latecomer Agreement, whether voluntarily, involuntarily, or by operation of law, then the City will pay all benefits accruing hereunder, after receipt of written notice of the assignment or transfer, to such successor, assign, or transferee. If conflicting demands are made upon the City for benefits accruing under this Sludge Facility Latecomer Agreement, then the City may at its option commence an action in interpleader joining any party claiming rights under this Sludge Facility Latecomer Agreement or other parties that the City believes to be necessary or proper, and the City will be discharged from further liability upon paying the parties whom any court having jurisdiction over such interpleader action shall determine to have accrued benefits under this Sludge Facility Latecomer Agreement. In any such action, the City will be entitled to recover its reasonable costs and attorney's fees, which costs and fees will constitute a lien upon all funds accrued or accruing pursuant to this Sludge Facility Latecomer Agreement.

3. GENERAL PROVISIONS

3.1 Recitals and Exhibits. All of the recitals set forth above and all exhibits attached hereto are adopted by the parties as material and integral elements and/or findings related to this Sludge Facility Latecomer Agreement. All such exhibits are incorporated herein by this reference as if fully set forth.

3.2 Assignment. Quadrant shall have the right to assign its rights and interest under this Sludge Facility Latecomer Agreement, in whole or part, to another entity, so long as the assignee assumes Quadrant's corresponding obligations hereunder in writing. No such assignment will release Quadrant from any of its obligations to the City under this Sludge Facility Latecomer Agreement, or under any other agreement between Quadrant and the City, except as any subsequent agreement expressly so provides.

3.3 Indemnification. Except as otherwise provided herein, Quadrant releases and agrees to defend, indemnify, and hold harmless the City, all of its elected and appointed officials, and its employees, from all liability, claims, and costs arising in connection with the enforcement of the provisions of Section 2 above, except to the extent resulting from any gross negligence or intentional act or omission of the City, or its elected or appointed officials, officers, agents, or employees, in connection with this Sludge Facility Latecomer Agreement.

3.4 Notices. All notices under this Sludge Facility Latecomer Agreement must be in writing, and must be delivered or mailed by certified mail, return

receipt requested, and will be effective as of the date of delivery, on the date of receipt as shown by the return receipt, or three days after the postmark date if there is no return receipt. Notices must be addressed to the following addresses or to such other address as a party may hereafter specify in writing:

City:

City of Snoqualmie
P.O. Box 987
Snoqualmie, WA 98065-0987

With a copy to:

Pat Anderson
City Attorney
P.O. Box 987
Snoqualmie, WA 98065-0987

Quadrant:

Bonnie Geers
Vice President, Community Development
and Public Affairs
The Quadrant Corporation
14725 SE 36th Street, Suite 200
P.O. Box 130
Bellevue, WA 98009

With a copy to:

Hillis Clark Martin & Peterson
Attn: Richard R. Wilson
1221 Second Avenue, Suite 500
Seattle, WA 98101-2925

3.5 Enforcement. Venue and jurisdiction to enforce all obligations under this Sludge Facility Latecomer Agreement will lie exclusively in King County Superior Court. The obligations of the parties hereunder do not have an adequate remedy at law by way of an action for damages and may be enforced by an action for specific performance.

3.6 Governing Law. This Sludge Facility Latecomer Agreement is entered into under the laws of the State of Washington, and the parties intend that Washington law shall apply to the interpretation hereof.

3.7 Severability. In the event a court of competent jurisdiction declares any material portion of this Sludge Facility Latecomer Agreement invalid, unconstitutional or otherwise unenforceable, the provisions hereof not affected by such declaration will remain in full force and effect.**Amendment.** This Sludge Facility Latecomer Agreement may not be modified, supplemented or otherwise amended, except by written instrument approved by the City Council and duly executed by all parties.

3.9 Binding Effect. This Sludge Facility Latecomer Agreement is intended to be and will be binding upon and inure to the benefit of the parties and their respective heirs, successors, and assigns.

3.10 Time of the Essence. Time is of the essence of this Sludge Facility Latecomer Agreement and of every provision hereof.

3.11 Recording. Quadrant will cause this Sludge Facility Latecomer Agreement to be recorded with the King County Department of Records and Elections at Quadrant's sole expense.

IN WITNESS WHEREOF, the parties have executed this Sludge Facility Latecomer Agreement as of the Effective Date first above written.

CITY OF SNOQUALMIE

Matthew R. Larson, Mayor

Attest:

Jodi Warren, City Clerk

Approved as to Form:

Patrick B. Anderson, City Attorney

THE QUADRANT CORPORATION

By

~~David E. Dorothy~~, Vice President / ~~General Manager, Snoqualmie Ridge~~

Bonnie Lee I

STATE OF WASHINGTON }
ss.
COUNTY OF KING }

On this 25th day of April, 2011, before me, the undersigned, a Notary Public duly commissioned and sworn, personally appeared ~~David E. Dorothy~~ Bonnie Ellis, to me known to be the Vice President ~~/ General Manager~~ of **THE QUADRANT CORPORATION**, and acknowledged the said instrument to be the free and voluntary act of said corporation, for the uses and purposes therein stated, and on oath stated that he was authorized to execute the said instrument.

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

GAIL M. ACHESON NOTARY PUBLIC STATE OF WASHINGTON COMMISSION EXPIRES 9-15-11

Printed Name Gail M. Acheson
NOTARY PUBLIC in and for the State of Washington,
residing at Kirkland
My Commission Expires 9/15/11

STATE OF WASHINGTON }
ss.
COUNTY OF KING }

On this 11th day of April, 2011, before me, the undersigned, a Notary Public duly commissioned and sworn, personally appeared Matthew R. Larson and Jodi Warren, to me known to be the Mayor and City Clerk, respectively, of the **CITY OF SNOQUALMIE**, and acknowledged the said instrument to be the free and voluntary act of said city, for the uses and purposes therein stated, and on oath stated that they were authorized to execute the said instrument.

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

Notary Public
State of Washington
DIANE HUMES
My Appointment Expires Sep 8, 2014

Printed Name Diane Humes
NOTARY PUBLIC in and for the State of Washington,
residing at Snoqualmie, WA
My Commission Expires Sept. 8, 2014

EXHIBIT A

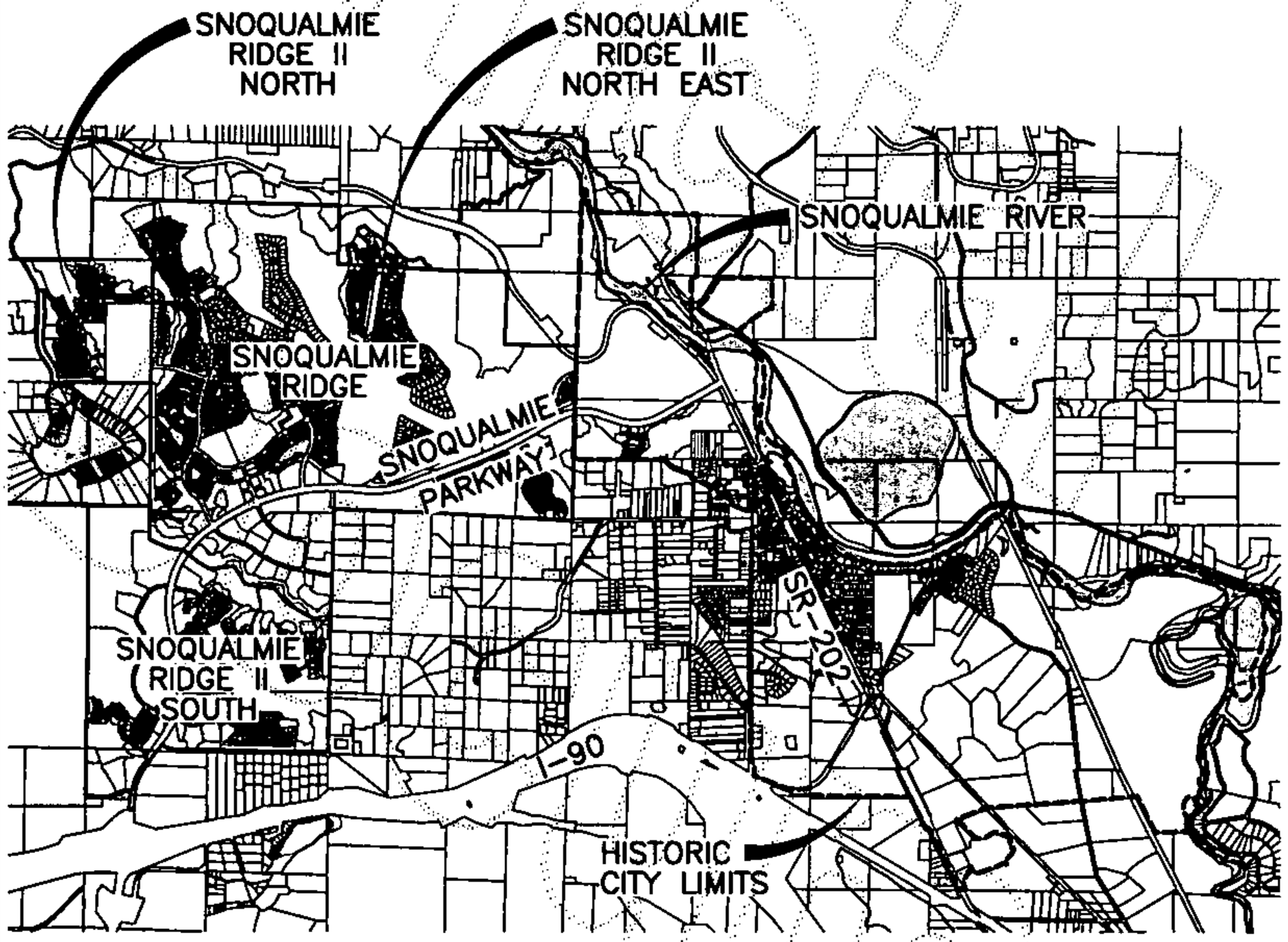
Historic City Limits

That certain property in the City of Snoqualmie depicted inside the dotted line on the map attached hereto, which property is all or part of Sections 19, 20, 29, 30, 31, 32, and 33 in Township 24 N,, Range 8 E,, W.M., and Sections 4, 5, and 6 in Township 23 N., Range 8 E., W.M., all in King County, Washington.

Official Document

EXHIBIT "A"
HISTORIC CITY LIMITS

NOT TO SCALE



ESM CONSULTING ENGINEERS LLC
181 S 333rd St, Bldg C, Suite 210
Federal Way, WA 98003

FEDERAL WAY (253) 838-6113
EVERETT (425) 297-9900
ELLENSBURG (509) 962-2608

www.esmcivil.com

Civil Engineering
Public Works
Land Surveying
Project Management
Land Planning
Landscape Architecture

JOB NO. 129-051-980
DRAWING NAME : EN-29
DATE : 3/30/11
DRAWN : DCL
SHEET 1 OF 2

Return Address:

CITY OF SNOQUALMIE
Attention: Jodi Warren, City Clerk
P.O. BOX 987
SNOQUALMIE, WA 98065

20100317000713
BERRY AMND 65.00
PAGE-001 OF 004
03/17/2010 14:43
KING COUNTY, WA

WASHINGTON STATE RECORDER'S Cover Sheet (RCW 65.04)

Document Title(s) (or transactions contained therein) all areas applicable to your document must be filled in: **1.** Third Amendment to the Salish Expansion Development Agreement
Reference Number(s) of Documents assigned or released:
Grantor(s) (Last name first, then first name and initials) 1. Muckleshoot Indian Tribe
Grantee(s) (Last name first then first name and initials) 1. Snoqualmie, City of
Legal Description (abbreviated: i.e. lot, block, plat or section, township, range Parcel A – Section 19, Township 24 N, Range 8 E WM in King County Washington Parcel B – Section 19, Township 24 N, Range 8 E WM in King County Washington Parcel F – Government Lot 9 of Section 30, Township 24 N Range8E WM in King County, Washington
Assessor's Property Tax Parcel /Account Number 3024089002, 3024089082, 1924089035

I am requesting an emergency nonstandard recording for an additional fee as provided in RCW 36 18 010. I understand that the recording processing requirements may cover up or otherwise obscure some part of the text of the original document

____ _____ Signature of Requesting Party

THIRD AMENDMENT TO
SALISH EXPANSION DEVELOPMENT AGREEMENT

THIS THIRD AMENDMENT TO DEVELOPMENT AGREEMENT is entered into effective this 23rd day of March, 2009, between the City of Snoqualmie and the Muckleshoot Indian Tribe.

RECITALS

A. The City of Snoqualmie ("the City") is a municipal corporation organized and operating under title 35A RCW, the Optional Municipal Code.

B. On March 8, 2004 the City entered into a Development Agreement with Gateway Cascades, LLC, pursuant to authority of chapter 36.70C RCW, for a project commonly known as the Salish Expansion, recorded under King County Recording Number20040804002287. The First Amendment to the Salish Development Agreement was executed effective June 14, 2005, and recorded under King County Recording Number 20050630001948. The Second Amendment to the Salish Expansion Development Agreement was executed effective April 9, 2007, and recorded under King County Recording Number 20070605000314.

C. The Muckleshoot Indian Tribe is a federally recognized tribe, and is the successor in interest to Gateway Cascades, LLC, in the subject property described in the recorded Development Agreement.

D. Section 5.2 of the Salish Expansion Development Agreement provides for the City to reserve 120 ERUs of sewer capacity for a period of five years from the date of the agreement.

E. Due to unforeseen circumstances, the development anticipated pursuant to the Salish Expansion Development Agreement has not occurred and will not occur within such five year period.

F. The City is willing to extend the reservation of sewer capacity but only upon terms and conditions ensuring the satisfactory progress is being made toward accomplishing the anticipated development.

G. The City and the Tribe anticipate it will require a period of three months to negotiate the terms and conditions for extension of the reservation of sewer capacity, to be set forth in an anticipated Fourth Amendment to the Salish Expansion Development Agreement.

H. The parties desire to amend the Salish Expansion Development Agreement to extend the reservation of sewer capacity by an additional three months in order to negotiate the terms and conditions of an extension of sewer capacity reflecting the Tribe's current development plans.

NOW, THEREFORE, it is agreed as follows:

1. Section 5.2 of the Salish Expansion Development Agreement is hereby amended to read as follows:

> **5.2 Sewer.** Gateway has entered into a separate agreement with The Quadrant Corporation ("Quadrant") (as successor to Weyerhaeuser Real Estate Company), and Quadrant has released 241 ERUs of sewer capacity. The City agrees to reserve this capacity in the existing wastewater treatment plant to serve the Gateway Property. As Gateway has reimbursed Quadrant for this capacity, the City agrees that no further connection charges will apply to these connections to the sewer system. The City further agrees to provide Gateway with an additional 120 ERUs of sewer capacity needed for build out of the property for a period of up to five (5) years and three (3) months from the date of this agreement. After five years and three months, sewer capacity will be provided to Gateway Cascades, subject to availability. Gateway agrees to pay the connection fee in effect on the dates of each connection to the City's sewer system for use of these additional ERUs.

2. All other provisions of the Development Agreement, as amended by the First and Second Amendments, shall remain in full force and effect.

3. The effective date of this Third Amendment shall be the latter of the date of the City resolution approving this Third Amendment and its execution by both parties.

4. This Third Amendment shall run with the land and be binding upon the parties and their respective successors and assigns.

CITY OF SNOQUALMIE

Matthew R. Larson, Mayor
Signed: 2-23-09

MUCKLESHOOT INDIAN TRIBE

Charlotte Williams
Charlotte Williams, Chair of Tribal Council
Signed: 2-20-09

Approved by Council
3/23/09

Gateway Cascades

STATE OF WASHINGTON }
ss.
COUNTY OF KING }

On this day personally appeared before me MATTHEW R. LARSON, to me known to be the Mayor of The City of Snoqualmie, the Washington municipal corporation that executed the foregoing instrument, and acknowledged such instrument to be the free and voluntary act and deed of such company, for the uses and purposes therein mentioned, and on oath stated that she/he was duly authorized to execute such instrument.

GIVEN UNDER MY HAND AND OFFICIAL SEAL this 23 day of February, 2009.

Notary Public
State of Washington
E JOANN WARREN
My Appointment Expires Sep 15, 2009

E. Joann Warren
Printed Name
E Joann Warren
NOTARY PUBLIC in and for the State of Washington,
residing at Maple Valley
My Commission Expires
9-15-09

STATE OF WASHINGTON }
ss.
COUNTY OF KING }

On this day personally appeared before me CHARLOTTE WILLIAMS, to me known to be the Chairperson of the Tribal Council of the Muckleshoot Indian Tribe, the Indian tribe that executed the foregoing instrument, and acknowledged such instrument to be the free and voluntary act and deed of such Indian tribe, for the uses and purposes therein mentioned, and on oath stated that she/he was duly authorized to execute such instrument.

GIVEN UNDER MY HAND AND OFFICIAL SEAL this 20 day of February, 2009.

DARCIE JUNE BROWN-ARCHIE
NOTARY PUBLIC
STATE OF WASHINGTON
COMMISSION EXPIRES
1-19-10

Deryl June Brown-Archie
Printed Name
Deryl June Brown-Archie
NOTARY PUBLIC in and for the State of Washington,
residing at Federal Way
My Commission Expires
1/19/10

When Recorded, Return to

CITY OF SNOQUALMIE
Attention: Jodi Warren, City Clerk
P O Box 987
Snoqualmie, WA 98065

20040831001103
SHARP AG 33 00
PAGE001 OF 015
08/31/2004 09 53
KING COUNTY, WA

SNOQUALMIE WASTEWATER TREATMENT FACILITIES LATECOMER AGREEMENT

Grantor: 1)	THE QUADRANT CORPORATION
Grantee: 1)	CITY OF SNOQUALMIE
Legal Description (abbreviated):	**[City limits; urban growth area, potential urban growth area]**
☒ Additional on	EXHIBIT A
Assessor's Tax Parcel ID #:	
Reference Nos. of Documents Released or Assigned:	N/A

THIS AGREEMENT is made this 9th day of August, 2004, between the CITY OF SNOQUALMIE ("the City"), a Washington municipal corporation, and THE QUADRANT CORPORATION ("Quadrant"), a Washington corporation

I
RECITALS

1 1 The City is a municipal corporation of the State of Washington, organized under the Optional Municipal Code, title 35A RCW, located in King County, Washington

1.2. Quadrant is a Washington corporation which is the successor to Weyerhaeuser Real Estate Company ("WRECO") as the developer of that certain real

property within the City commonly known as Snoqualmie Ridge Phase I, and is the developer of that certain real property within the City commonly known as Snoqualmie Ridge Phase II

1 3 The City and WRECO entered a certain developer extension agreement entitled "Snoqualmie Wastewater Treatment Facilities Developer Extension Agreement" dated August 16, 1996, and recorded under King County Recording No 9608200229 (hereafter "Wastewater Treatment Facilities DEA") The Wastewater Treatment Facilities DEA provided for construction of the Wastewater System Improvements in phases, including Phase 1 Facilities per EXHIBIT A, Phase 2 Facilities per EXHIBIT B and Later Phase Facilities per EXHIBIT C. The Wastewater Treatment Facilities DEA also provided in Section 2 2 for latecomer reimbursement to WRECO This agreement, entitled "Snoqualmie Wastewater Treatment Facilities Latecomer Agreement" (hereafter "Latecomer Agreement") is intended to provide for latecomer reimbursement to Quadrant under applicable statutes and ordinances and Section 2 2 of the Wastewater Treatment Facilities DEA for the Wastewater System Improvements which WRECO or Quadrant have constructed, including Phase 1 and Phase 2, the Kimball Creek Lift Station and the contribution for a pedestrian / equestrian / utility bridge for the river crossing required as part of the Later Phase Facilities

1 4 WRECO has constructed the Phase 1 Wastewater Treatment Facilities and conveyed them to the City

1 5 Quadrant has constructed the Phase 2 Wastewater Treatment Facilities, including the second oxidation ditch, second bank of UV lights and third sand filter, and conveyed them to the City

1 6 WRECO has constructed certain components of the Later Phase Facilities and conveyed them to the City, including the Class A Reclaimed Water System and the Kimball Creek Lift Station

1 7 Quadrant has paid the sum of $1,000,000 to the City as part of the Snoqualmie Preservation Initiative for the construction of a pedestrian / equestrian / utility bridge

1 8 The design capacity of the completed wastewater treatment facilities, including the Phase 2 Facilities, is limited by Biological Oxygen Demand ("BOD") and flow For purposes of this Latecomer Agreement, treatment capacity is expressed in Equivalent Residential Units ("ERUs") based upon the following BOD assumptions

1 8 1 One person equals 0 20 pounds per day BOD

1 8 2 One residential unit equals 2 5 persons

1.8.3 One ERU equals 0 5 pounds per day BOD

1 8 4 The basis for calculating ERUs for multifamily, commercial and other uses based on BOD will be developed by the City in consultation with Quadrant and the design engineer

1 9 The total design capacity of the wastewater treatment plant after construction of the Phase 2 Facilities is 3,820 pounds per day BOD (7,640 ERUs) The City may apply to Ecology in the future to re-rate the design capacity of the wastewater treatment plant, based on performance If a plant re-rating creates additional capacity, such re-rating shall not affect the reimbursement provisions herein for connections up to 7,640 ERUs of capacity.

1 10 Of the total design capacity of 7,640 ERUs, a total of 1,127 ERUs are allocated to the Exempt Properties—City The number of new ERUs is 6,513

1 11 Chapter 35 91 RCW, and Snoqualmie Municipal Code 13 04.360, authorize the City to contract with owners and developers of real property to construct wastewater facilities and improvements for conveyance to the City, and to provide by contract for partial reimbursement of a fair pro rata share by owners of properties who did not contribute to the original cost and who will benefit from such facilities and improvements, at such time as such other properties tap into, use, or otherwise connect, directly or indirectly, or through laterals or branches, to the improved wastewater system The total cost of the Wastewater Facilities Improvements paid or contributed by WRECO and Quadrant as represented in Statements of Cost in the Bills of Sales conveying the improvements to the City is $22,988,837 The reimbursement per ERU is $3,529 ($22,988,838 / 6,513)

1.12. Condition 130 of the SR I Final Plan excludes from the definition of "new development," which may be subject to a requirement to reimburse a fair pro rata share of the cost of new Wastewater System Improvements, certain properties within the city limits The following reimbursement exemption for "Exempt Properties—City" satisfies Condition 130 Chapter 35 91 RCW also exempts from the obligation to contribute to latecomer reimbursement those property owners that contributed to the original cost of construction of the facilities subject to reimbursement Quadrant paid the full original cost of the Phase 2 facilities, and is the assignee of WRECO, which paid the full original cost of the Phase 1 facilities The City and Quadrant agree that the following-described properties shall be deemed exempt from application of the Latecomers Charge authorized herein and shall be referred to herein as the "Exempt Properties"

1 12 1 Exempt Properties—Quadrant All properties owned by The Quadrant Corporation at the time the property is proposed for connection to the City sewer system, and any properties subject to a written waiver of latecomer contribution

provided by The Quadrant Corporation at the time proposed for connection Quadrant will provide such a waiver to any party that satisfies its reimbursement obligations under a private agreement with Quadrant for the use of, or connection to, the Wastewater System Improvements or Phase 2 Facilities

1 12 2 Exempt Properties—City New construction, new utility connections and expansion of existing utility connections on any existing platted residential lot or any commercial or institutional use within the Historic City, the boundaries for which are established on EXHIBIT D attached hereto, up to a total of 1,127 ERUs. The Exempt Properties—City shall not include new residential subdivisions within the Historic City (The allocation for the Exempt Properties—City is based upon the treatment capacity of the City's pre-existing wastewater treatment facilities of 490 pounds per day BOD (980 ERUs) increased by a factor of 15% (563 5 pounds per day BOD, or 1.127 ERUS))

1 12 3 Exempt Properties – Habitat for Humanity: All properties owned by Habitat for Humanity as of the Effective Date of this Latecomer Agreement

1 13 With the exception of the Exempt Properties defined in section 1 12, it is the intent of the parties that all properties that connect to or expand their usage of the City's wastewater facilities, directly or indirectly, be required to reimburse a fair pro rata share of the cost of Wastewater System Improvements, pursuant to the terms and conditions below

1 14 The following Latecomer Agreement is made upon the basis of the foregoing recitals, and in consideration of the mutual promises and covenants herein. and the mutual benefits to be derived by the parties therefrom

II
AGREEMENT

2.1. REIMBURSEMENT PROVISIONS

2.2 1 **Reimbursement by Non-Exempt Latecomers** Pursuant to RCW 35 91 020, the City shall collect the sum of Three Thousand Five Hundred Twenty-nine Dollars ($3,529) per ERU from the owner of any property not qualifying as an Exempt Property under section 1 12 prior to connection of such property to the municipal sewer system as that owner's fair pro rata share The City shall remit amounts so collected to Quadrant within 60 days of receipt The latecomer reimbursement amount shall not be affected by any subsequent re-rating of the capacity of the wastewater treatment plant

2.2.2 **Benefited Properties.** Benefited Properties shall be those properties within the City's sewer service area, as it now exists or as amended in the future, the present boundaries being described in EXHIBIT E attached hereto and incorporated herein by reference Benefited Properties shall also include any properties outside the sewer service area to which service may be extended by contract The City shall include provision for reimbursement under this Agreement in any contract for sewer service outside the City's sewer service area and include an express statement that such latecomer amount shall be paid over to Quadrant

2 2 3 **Recording and Duration.** This Latecomer Agreement shall become effective as to any owner of real estate in the Benefited Properties upon its being recorded at Quadrant's expense with the King County Department of Records and Elections, or upon the owner of a Benefited Property assuming a contractual obligation to pay the latecomer reimbursement This Latecomer Agreement shall remain in full force and effect for a period of 15 years after February 9, 2004 (the date of conveyance of the second oxidation ditch)

2.2.4 **Successors and Assigns.** In the event of the assignment or transfer of Quadrant's rights or benefits under this Latecomer Agreement voluntarily, involuntarily, or by operation of law, then the City shall pay all benefits accruing hereunder, after written notice of the assignment, to such successor, assign, or transferee In the event conflicting demands are made upon the City for benefits accruing under this Restated Agreement, then the City may, at its option, commence an action in interpleader joining any party claiming rights under this Restated Agreement or other parties that the City believes to be necessary or proper, and the City shall be discharged from further liability upon paying the parties whom any court having jurisdiction over such interpleader action shall determine to have accrued benefits under this Restated Agreement In such action the City shall be entitled to recover its reasonable attorney's fees and costs, which fees and costs shall constitute a lien upon all funds accrued or accruing pursuant to this Restated Agreement

2.2.GENERAL PROVISIONS

2 2 1 **Recitals and Exhibits** All of the recitals set forth above and all exhibits attached hereto are adopted by the parties as material elements and/or findings related to this Restated Agreement, and are incorporated into this Restated Agreement as integral terms hereof

2 2 2 **Assignment** Quadrant shall have the right to assign its rights and interest under this Restated Agreement, in whole or part, to another entity, so long as the assignee assumes Quadrant's corresponding obligations hereunder in writing No such assignment shall release Quadrant from any of its obligations to the City under this

Restated Agreement, or any other agreement between Quadrant and the City, except as any subsequent agreement expressly so provides

2.2 3 **Indemnification**. Except as otherwise provided herein, Quadrant releases and agrees to defend, indemnify and hold harmless the City and all of its elected and appointed officials and its employees from all liability, claims and costs arising in connection with the construction of the Later Phase Facilities, and the enforcement of the provisions of Section 2 1, except to the extent resulting from any gross negligence or intentional act or omission of the City or its officers, agents or employees in performance of the Restated Agreement

2 2 4 **Notices.** All notices under this Restated Agreement shall be in writing, and shall be delivered or mailed by certified mail, return receipt requested, and shall be effective as of the date of delivery, on the date of receipt as shown by the return receipt, or three days after the postmark date if there is no return receipt Notices shall be addressed to the following addresses or to such other address as a party may specify in writing

City:

City of Snoqualmie
City Clerk's Office
P O Box 987
Snoqualmie, WA 98065

With a copy to:

Pat Anderson
City Attorney
P O Box 924
Snoqualmie, WA 98065

Quadrant:

David E Dorothy, Vice President /
General Manager
Snoqualmie Ridge
Snoqualmie Ridge Project Office
35131 SE Douglas Street, #112
Snoqualmie, WA 98065

With a copy to:

Hillis, Clark Martin & Peterson
Attn Ann M Gygi
500 Galland Building
1221 Second Ave
Seattle, WA 98101-2925

2 2.5 **Enforcement.** Venue and jurisdiction to enforce all obligations under this Restated Agreement shall lie exclusively in the King County Superior Court Some of the obligations of the parties hereunder do not have an adequate remedy by way of an action for damages, and may be enforced by specific performance

2 2 6 **Governing Law.** This Latecomer Agreement is entered into under the laws of the State of Washington, and the parties intend that Washington law shall apply to the interpretation hereof

2 2 7 **Severability.** In the event a court of competent jurisdiction declares any material portion of this Latecomer Agreement invalid, unconstitutional or otherwise unenforceable, the provisions hereof not affected by such declaration shall remain in full force and effect

2 2 8 **Amendment.** This Latecomer Agreement may not be modified, supplemented or otherwise amended, except by written instrument duly executed by all parties and approved by the City Council

2.2 9 **Binding Effect.** This Latecomer Agreement shall be binding upon, and shall inure to the benefit of, the parties and their respective heirs, successors and assigns

2 2.10 **Recording.** Quadrant shall cause this Latecomer Agreement to be recorded with the King County Department of Records and Elections at its sole expense

CITY OF SNOQUALMIE

R Fuzzy Fletcher, Mayor

THE QUADRANT CORPORATION

David E Dorothy, Vice President / General Manager, Snoqualmie Ridge

STATE OF WASHINGTON }
ss
COUNTY OF KING }

On this 9th day of August, 2004, before me, the undersigned, a Notary Public duly commissioned and sworn, personally appeared R FUZZY FLETCHER, to me known to be the Mayor of the City of Snoqualmie, and acknowledged the said instrument to be the free and voluntary act of said municipal corporation, for the uses and purposes therein stated, and on oath stated that he is authorized to execute the said instrument

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

Notary Public
State of Washington
E. JOANN WARREN
My Appointment Expires Sep 15, 2005

E Joann Warren

Printed Name E Joann Warren
NOTARY PUBLIC in and for the State of Washington, residing at Maple Valley
My Commission Expires 9/15/05

Original
Document

STATE OF WASHINGTON }
ss
COUNTY OF KING }

On this 30th day of August, 2004, before me, the undersigned, a Notary Public duly commissioned and sworn, personally appeared DAVID E DOROTHY, to me known to be the Vice President / General Manager of the Quadrant Corporation, and acknowledged the said instrument to be the free and voluntary act of said corporation, for the uses and purposes therein stated, and on oath stated that he is authorized to execute the said instrument

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

JODIE L SHARP
COMMISSION EXPIRES
NOTARY
PUBLIC
9-9-06
STATE OF WASHINGTON

Printed Name Jodie L Sharp
NOTARY PUBLIC in and for the State of Washington,
residing at Seattle
My Commission Expires 9-9-2006

Copy
Original

EXHIBIT A

Phase 1 Facilities

D 1 **WWTF Improvements:** All of the improvements described in the following plans and specifications

D 1.1 Plans and specifications entitled City of Snoqualmie, Washington, Wastewater Facility Improvements, Wastewater Treatment Plant, June 1996, prepared by KCM, Inc

D 1 2 Plans and specifications entitled City of Snoqualmie, Washington, Wastewater Facility Improvements, Pipelines and Outfalls, June 1996, prepared by KCM, Inc

D 1 3 Sheets 37 through 39 and 66 through 77 of 86 of a plan set entitled Phase 3 Construction Plans for Snoqualmie Ridge Parkway and Related Improvements, prepared by ESM, Inc

D 1 4 Plans and specifications entitled Class A Transmission Pipeline, June 1996, prepared by Earth Tech

D 2 **Landscaping and Wetland Mitigation.** WRECO shall design, build, and pay for landscaping of the WWTF and wetland mitigation as approved by the City

D 3 **Algae Sweepers.** WRECO shall purchase and install one algae sweeper in each of the two clarifiers, meeting specifications approved by the City

D 4 **Operation Manual.** WRECO shall pay for the Operation Manual as described on Exhibit D, subject to approval by DOE

D 5 **Equipment and Fixtures.** WRECO shall pay the City up to $50,000, based on vendor invoices, to furnish and equip the office, shop and laboratory, to include the following items

EXHIBIT A (continued)

Phase 1 Facilities

3 desk
3 desk chairs
3 tables
10 chairs
2 office dividers
3 file cabinets
4 bookcases
3 flat files
3 hanging files
1 typewriter
1 fax machine
1 VCR monitor
1 refrigerator
1 coffee maker
1 microwave oven
1 set each, plates, mugs, silver
3 cloth lockers
3 restroom and shower towel dispensers
1 sanitary napkin dispenser
1 clothes washer
1 dryer
2 storage cabinets
1 bin storage system
1 aluminum boat

1 incubator
1 sterilizer
1 distillation apparatus
1 DO meter
1 spectrophotometer
1 BOD incubator
1 set BOD bottles
1 BOD probe
1 commercial dishwasher

1 abrasive chop saw
1 cut-off saw
1 arc welder
1 steam cleaner/pressure washer
1 air compressor

1 retractable hose reel
1 parts washer

1 drill press
1 bench grinder
1 winch
1 chain hoist
1 floor jack
1 shop vac
1 tool chest

EXHIBIT B

Phase 2 Improvements

B 1 Second Oxidation Ditch

B 2 Third Sand Filter

B 3 Two banks of ultraviolet lights

Unofficial Document

EXHIBIT C

LATER PHASE FACILITIES

C 1 Completion of Class A Reclaimed Water System elements, other than those described in the plans and specifications listed in Exhibit A 1, as described in the plans and specifications entitled Class "A" Transmission Pipeline, June 1996, by EarthTech

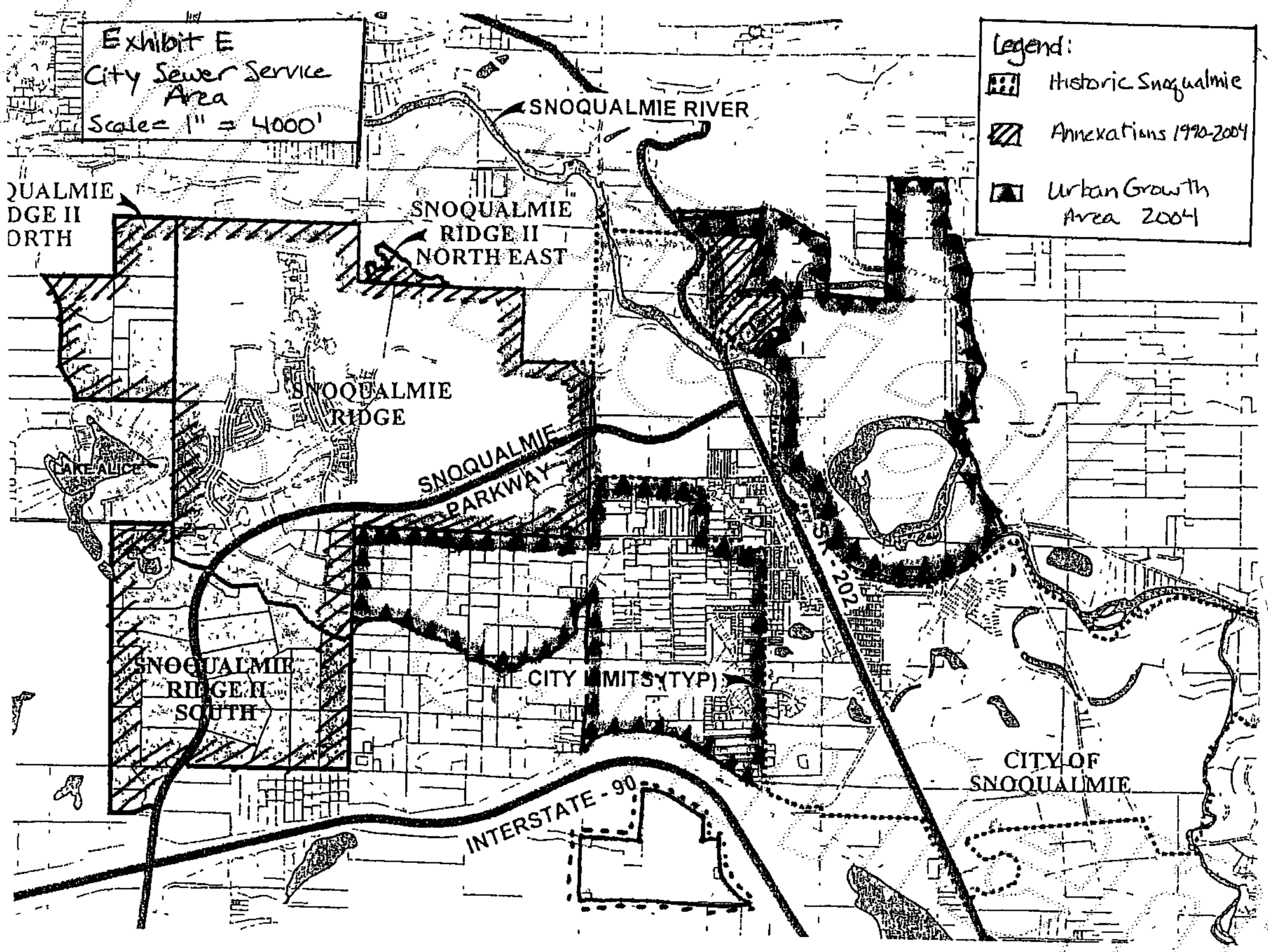
C 2 Kimball Creek Lift Station as described in the plans and specifications entitled Kimball Creek Pump Station, May 21, 1997, by KCM

C.3 One-million dollar ($1,000,000 00) payment for new utility river crossing

C 4 Eighty-eight thousand dollar ($88,000 00) payment for odor control

Original Document

Exhibit E
City Sewer Service Area
Scale = 1" = 4000'



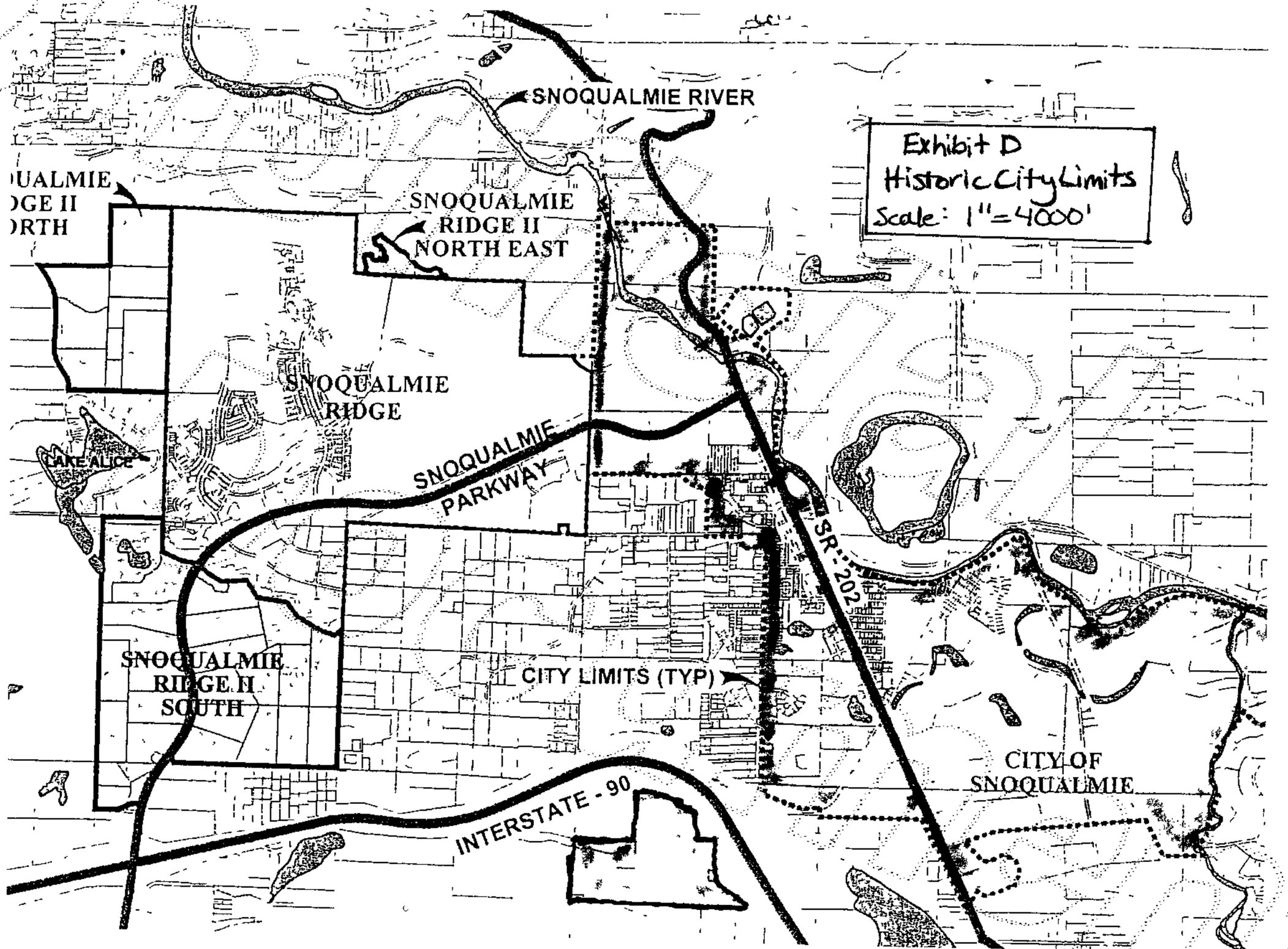


Exhibit D
Historic City Limits
Scale: 1"=4000'
SNOQUALMIE RIVER
UALMIE
GE II
RTH
SNOQUALMIE
RIDGE II
NORTH EAST
SNOQUALMIE
RIDGE
LAKE ALICE
SNOQUALMIE
PARKWAY
SR - 202
SNOQUALMIE
RIDGE II
SOUTH
CITY LIMITS (TYP)
CITY OF
SNOQUALMIE
INTERSTATE - 90

APPENDIX O

SEWER FRANCHISE AGREEMENT

FRANCHISE NO. 14780

In the matter of the application for a franchise to operate, maintain, repair, and construct and sewer mains, service lines, and appurtenances in, over, along, and under County roads and rights-of-way in King County, Washington.

The application of the City of Snoqualmie for a franchise to operate, maintain, repair and construct sewer mains, service lines, and appurtenances in, over, along, and under County roads and rights-of-way located within the area described in attached Exhibit "A" has been heard on this 20th day of October, 2003. All of the property described in Exhibit "A" lies outside the limits of any incorporated Town or City.

Legal notice of the franchise application and of the hearing has been given as is required by law.

The King County Council, having considered the interests proposed and advanced, and finding that the granting of this franchise is in the public interest, ORDERS that a franchise be granted to the City of Snoqualmie, the Grantee, subject to the conditions set forth in Exhibit "B" attached hereto, this franchise and Ordinance No.14780. This franchise grants the right, privilege, authority and franchise to operate, maintain, repair and construct mains and service lines and appurtenances as a part of its distribution system in, over, along, and under County roads and rights-of-way located within the area described in Exhibit "A".

This franchise is granted subject to all of the terms and conditions contained herein, within Ordinance No. 14780 and Exhibit "B", and shall expire in twenty-five years on October 20, 2008.

Dated this 30 day of October, 20___.

KING COUNTY, WASHINGTON

BY _____

TITLE King County Executive

The undersigned accepts all the rights, privileges, and duties of this franchise subject to all terms, conditions, stipulations, and obligations contained herein, within Ordinance 14780 and Exhibit "B".

CITY OF SNOQUALMIE
GRANTEE

BY _____

TITLE Mayor

Dated this 24th day of November, 2003.

EXHIBIT "A"

ALL COUNTY ROAD RIGHT-OF-WAYS WITHIN THE FOLLOWING DESCRIBED BOUNDARIES:

THOSE PORTIONS OF SECTIONS 30 AND 31, TOWNSHIP 24 NORTH, RANGE 8 EAST, W.M. MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE INTERSECTION OF THE WEST LINE OF THE SOUTHWEST QUARTER OF SAID SECTION 31 WITH THE NORTHERLY MARGIN OF S.E. NORTH BEND WAY (STATE HIGHWAY NO. 2)

THENCE NORTHERLY ALONG SAID WEST LINE TO THE NORTHWEST CORNER OF SAID SUBDIVISION;
THENCE EASTERLY ALONG THE NORTH LINE OF SAID SUBDIVSION TO THE SOUTHWEST CORNER OF LOT 1, BLOCK 3, SI VIEW ACRE TRACTS, ACCORDING TO THE UNRECORDED PLAT THEREOF;
THENCE NORTHERLY ALONG THE WEST LINE THEREOF TO THE NORTHWEST CORNER OF SAID LOT;
THENCE EASTERLY ALONG THE NORTH LINE THEREOF TO THE NORTHWEST CORNER OF THE NORTH 140.00 FEET OF THE EAST 311.14 FEET OF SAID LOT;
THENCE SOUTHERLY ALONG THE WESTERLY LINE OF SAID EAST 311.14 FEET TO ITS INTERSECTION WITH THE SOUTH LINE OF SAID NORTH 140.00 FEET;
THENCE EASTERLY ALONG SAID SOUTH LINE TO THE WESTERLY MARGIN OF 378TH AVENUE N.E.;
THENCE NORTHERLY ALONG SAID WESTERLY MARGIN TO ITS INTERSECTION WITH THE WESTERLY PROJECTION OF THE NORTH LINE OF LOT 14, BLOCK 2, SAID UNRECORDED PLAT;
THENCE EASTERLY ALONG SAID WESTERLY PROJECTION AND ALONG SAID NORTH LINE OF SAID LOT 14 TO THE WEST LINE OF THE NORTHEAST QUARTER OF SAID SECTION 31;
THENCE NORTHERLY ALONG SAID WEST LINE TO ITS INTERSECTION WITH THE CITY OF SNOQUALMIE CITY LIMITS LINE;
THENCE EASTERLY ALONG SAID CITY LIMITS LINE TO THE EAST LINE OF THE WEST ONE-HALF OF THE NORTHEAST QUARTER OF SAID SECTION 31;
THENCE SOUTHERLY ALONG SAID EAST LINE TO THE SOUTH LINE OF SAID SUBDIVISION,
SAID POINT ALSO BEING ON THE EASTERLY MARGIN OF 384TH AVENUE S.E;
THENCE CONTINUING SOUTHERLY ALONG SAID EASTERLY MARGIN TO ITS INTERSECTION WITH THE SOUTH LINE TO THE SOUTHEAST QUARTER OF SAID SECTION 31;
THENCE WESTERLY ALONG SAID SOUTH LINE TO THE NORTHERLY MARGIN OF SAID S.E. NORTH BEND WAY;
THENCE WESTERLY ALONG SAID NORTHERLY MARGIN TO THE POINT OF

BEGINNING.

EXECPT ANY PORTION OF THE NORTHWEST QUARTER OF THE NORTHEAST QUARTER OF SAID SECTION 31 LYING WESTERLY OF KIMBALL CREEK.

SITUATED IN KING COUNTY, WASHINGTON

A STRIP OF LAND 8.00 FEET IN WIDTH, LYING WITHIN THE NORTHEAST QUARTER OF SECTION 6, TOWNSHIP 23 NORTH, RANGE 8 EAST, W. M., AND 4.00 FEET ON EACH SIDE OF THE SANITARY SEWER LINE AS NOW CONSTRUCTED, WHICH LINE TRAVELS THROUGH APPROXIMATELY THE FOLLOWING DESCRIBED PORTION OF SAID SUBDIVISION;

BEGINNING AT THE INTERSECTION OF MOST SOUTHERLY CITY OF SNOQUALMIE CITY LIMITS LINE WITH 384TH AVENUE S.E., SAID INTERSECTION BEING IN THE SAME VICINITY OF THE INTERSECTION OF MEADOWBROOK WAY S.E. AND S.E. NORTH BEND WAY;
THENCE RUNNING IN A GENERALLY WESTERLY/SOUTHWESTERLY DIRECTION TO AN INTERSECTION WITH THE EASTERLY CITY LIMITS LINE OF THAT PORTION OF THE CITY OF SNOQUALMIE LYING SOUTH OF AND ABUTTING SR 90 (P.S.N. NO. 2)

EXCEPT ANY PORTION THEREOF LYING WITHIN THE CITY OF SNOQUALMIE CITY LIMITS.

SITUATED IN KING COUNTY, WASHINGTON.

EXHIBIT "B"

TERMS AND CONDITIONS APPLICABLE TO UTILITIES FRANCHISES GRANTED BY KING COUNTY

THIS FRANCHISE is subject to the following terms and conditions:

1. DEFINITIONS

References to any County official or office also refers to any office that succeeds to any or all of the responsibilities of the named office or official. References to laws or "applicable laws" include federal, state, and local laws and regulations adopted pursuant to those laws; unless otherwise stated, references to laws include laws now in effect, as the same may be amended from time to time during the operation of this franchise. In addition, the following definitions shall apply:

Cable Services. The term "Cable Services" is used as defined in 47 United States Code 522 (5), as amended.

Cable System. The term "Cable System" is used as defined in 47 United States Code 522 (6), and King County Code 6.a.010 (J) as amended.

County Road Rights-of-Way. The term "County Road Rights-of-Way" includes any road, street, avenue, or alley located within the area described in the attached Exhibit "A", it does not include recreational or nature trails except where the trails intersect or are within roads, streets, avenues or alleys.

Director. The term "Director" refers to the chief executive of the King County Department of Transportation.

Grantee. The term "Grantee" refers to the City of Snoqualmie, its successors and those assignees approved pursuant to paragraph 16 herein.

Utility. The term "utility" refers either to the Grantee or, depending on the context, to any other person, firm, or corporation, public or private, which may hold a franchise to maintain and operate similar facilities in, under, over, across, and along any of the County property described in Exhibit "A".

Council. The term "Council" refers to the King County Council, acting in its official capacity.

Other Governing Body. The term "Other Governing Body" refers to any public official or other public board or body as may have the power and jurisdiction to permit or regulate the installation and maintenance of utilities and other facilities in, under, over, across, and along any of the county property described in Exhibit "A".

2. ACCEPTANCE BY GRANTEES OF TERMS AND CONDITIONS

The full acceptance of this franchise and all of its terms and conditions shall be filed with the Clerk of the Council within thirty (30) days from _____, 20____, by the Grantee. Full acceptance of this franchise is a condition precedent to its taking effect, and unless this franchise is accepted within the time specified, this grant will be null and void and have no force or effect.

3. NON-EXCLUSIVE FRANCHISE

This franchise is not exclusive. It does not prohibit King County from granting franchises for other public or private utilities, in, under, over, across, and along any County property, including County road rights-of-way.

This franchise does not prevent or prohibit King County from constructing, altering, maintaining or using any County road rights-of-way covered by this franchise. King County retains full power to make all changes, relocations, repair, maintenance, etc. as it may deem fit.

4. JURISDICTION

This franchise is intended to convey limited rights and interest only as to those roads and rights-of-way in which King County has an actual interest. It is not a warranty of title or of interest in County road rights-of-way.

Whenever any of the County road rights-of-way as designated in this franchise, by reason of the subsequent incorporation of any Town or City or extension of the limits of any Town or City, shall later fall within the City or Town limits, this franchise shall continue in force and effect until such time as the incorporation and/or annexation is complete according to applicable State law, after which time the County will no longer have any responsibility for maintenance of any County roads, rights-of-way or other County property within the area of annexation/incorporation.

None of the rights granted to the Grantee shall affect the jurisdiction of King County over County road rights-of-way or the County's power to perform work upon its roadways, rights-of-way or appurtenant drainage facilities including by constructing, altering, renewing, paving, widening, grading, blasting or excavating.

All of the rights herein granted shall be subject to and governed by this franchise; provided, however, that nothing in this franchise may be construed in any way as limiting King County's

rights to adopt ordinances which are necessary to protect the health, safety and welfare of the general public.

5. REGULATION OF USE AND CONTROL

This franchise does not deprive King County of any powers, rights, or privileges it now has or may later acquire in the future to regulate the use of and to control the County road rights-of-way covered by this franchise.
This franchise authorizes the use of County rights-of-way solely for the delivery by the Grantee of sewer to it customers. Additional uses of County rights-of-way by the Grantee, including for cable communication services, shall first require a separate franchise from King County, which conforms to the requirements of K.C.C. 6.27 as amended, or K.C.C. 6.27A as amended, and other applicable law.

Any use of the Grantee's equipment of facilities in County rights-of-way by others, including for telecommunication or cable communication services, is prohibited unless separately authorized and approved in writing by King County. The Grantee agrees that prior to authorizing any person to use the Grantee's equipment or facilities located in County rights-of-way, the Grantee will require the user to provide the Grantee with an affidavit that it has obtained the necessary franchise or other approval from the County to operate and provide the proposed service in County rights-of-way. At least thirty (30) days prior to executing any agreement with a potential user for the use of the Grantee's equipment or facilities, the Grantee shall fax the affidavit to the King County Office of Cable Communication at 206-296-0842.

6. EMINENT DOMAIN

This franchise and the limited rights and interests for the operation, maintenance, repair, and construction of Grantee's transmission and service lines and appurtenances are subject to the exercise of eminent domain. In the event of an exercise of eminent domain by King County, the value to be attributed to all the rights and interests granted under this franchise shall not exceed the actual amount the Grantee paid to King County in obtaining this franchise.

7. ENFORCEMENT

Failure of King County, on one or more occasions to exercise a right or to require compliance or performance under this franchise or any applicable law, shall not be deemed to constitute a waiver of such right or a waiver of compliance or performance, unless such right has been specifically waived in writing. Failure of King County to enforce or exercise its rights under any provision of this franchise or applicable law does not constitute a waiver of its rights to enforce or exercise a right in any other provision of this franchise or applicable law.

8. INDEMNITY AND HOLD HARMLESS

The Grantee agrees to indemnify and hold harmless King County as provided herein to the maximum extent possible under law. Accordingly, the Grantee agrees for itself, its successors, and assigns to defend, indemnify and hold harmless King County, its appointed and elected officials, and employees from and against liability for all claims, demands, suits, and judgments, including costs of defense thereof, for injury to persons, death, or property damage which is caused by, arises out of, or is incidental to Grantee's exercise of rights and privileges granted by this franchise. The Grantee's obligations under this section shall include:

(a) Indemnification for such claims whether or not they arise from the sole negligence of the Grantee, the concurrent negligence of both parties, or the negligence of one or more third parties.

(b) The duty to promptly accept tender of defense and provide defense to the County at the Grantee's own expense.

(c) Indemnification of claims made by the Grantee's own employees or agents.

(d) Waiver of the Grantee's immunity under the industrial insurance provisions of Title 51 RCW, which waiver has been mutually negotiated by the parties.

In the event it is necessary for the County to incur attorney's fees, legal expenses, or other costs to enforce the provisions of this section, all such fees, expenses and costs shall be recoverable from the Grantee.

In the event it is determined that RCW 4.24.115 applies to this franchise agreement, the Grantee agrees to defend, hold harmless and indemnify King County to the maximum extent permitted thereunder, and specifically for its negligence concurrent with that of King County to the full extent of Grantee's negligence. Grantee agrees to defend, indemnify and hold harmless the County for claims by Grantee's employees and agrees to waiver of its immunity under Title 51 RCW, which waiver has been mutually negotiated by the parties.

King County shall give the Grantee timely written notice of the making of any claim or of the commencement of any such action, suit, or other proceeding covered by the indemnity in this section. In the event any such claim arises, the County or any other indemnified party shall tender the defense thereof to the Grantee and the Grantee shall have the duty to defend, settle, or compromise any claims arising hereunder and the County shall cooperate fully therein.

Notwithstanding the above, the County shall have no obligation to tender a defense as a condition of the indemnity where there is a material conflict between the interests of the Grantee and King County.

9. VACATION

If at any time King County vacates any County road rights-of-way covered by this franchise, King County will not be held liable for any damages or loss to the Grantee by reason of such vacation. King County may, after giving thirty (30) days written notice to the Grantee, terminate this franchise with respect to any County road rights-of-way vacated.

10. REPAIR, REMOVAL OR RELOCATION

The Grantee hereby covenants, at its own expense, to repair, remove, or relocate existing facilities including all appurtenant facilities and service lines connecting its system to users, within King County road rights-of-way if such repair, removal, or relocation is required by King County for any County road purpose. Such repair, removal, or relocation shall not be unreasonably required.

The grantee shall, at no expense to the County, adjust, remove or relocate existing facilities within County road rights-of-way, including all appurtenant facilities and service lines connecting its system to users, if the County determines such adjustment, removal or relocation is reasonably necessary to allow for an improvement or alteration planned by the County in such road right-of-way. The County shall give the Grantee written notice of such requirement as soon as practicable, at the beginning of the pre-design stage for projects that are part of the County's capital improvement program, including such available information as is reasonably necessary for the Grantee to plan for such adjustment, removal or relocation.

For projects that are a part of the County's capital improvement program, in addition to any other notice given to the Grantee, the County shall provide a vertical and horizontal profile of the roadway and drainage facilities within it, both existing and as proposed by the County, and the proposed construction schedule; notwithstanding any permit conditions that may later be applied to the County project, this initial design information shall be given at least 180 days before construction is scheduled to begin, except in cases of urgent construction or emergencies. The Grantee shall respond to this notice, and to any later notices of revised designs based on permit conditions, within no more than thirty (30) days by providing to the County the best available information as to the location of all of the Grantee's facilities, including all appurtenant facilities and service lines connecting its system to users and all facilities that it has abandoned, within the area proposed for the public works project.

The County shall offer the Grantee the opportunity to participate in the preparation of bid documents for the selection of a contractor to perform the public works project as well as all required adjustments, removals or relocations of the Grantee's facilities. Such bid documents shall provide for an appropriate cost allocation between the parties. The County shall have sole authority to choose the contractor to perform such work. The Grantee and the County may negotiate an agreement for the Grantee to pay the County for its allocation of costs, but neither party shall be bound to enter into such an agreement. Under such an agreement, in addition to the Grantee's

allocation of contractor costs, the Grantee shall reimburse the County for cost, such as for inspections or soils testing, related to the Grantee's work and reasonably incurred by the County in the administration of such joint construction contracts. Such costs shall be calculated as the direct salary cost of the time of County professional and technical personnel spent productively engaged in such work, plus overhead costs at the standard rate charged by the County on other similar projects, including joint projects with other County agencies.

11. REQUIREMENT OF CONSTRUCTION PERMITS

The Grantee, its successors or assigns, has the right, privilege, and authority to enter the County road rights-of-way for the purpose of operating, maintaining, repairing or construction its transmission and service lines and appurtenances on the condition that it obtains permits approved by the Director and Property Services Division and, when applicable, by the Department of Development and Environmental Services. Applications for work permits shall be presented to the Property Services Division, which may require copies of plans, blueprints, cross-sections, or further detailing of work to be done. In the event of an emergency, the Grantee may immediately commence the necessary work and shall apply the next business day for the work permit. Any work done, whether by Grantee, its contractors, or third parties will include necessary paving, patching, grading and any other reasonably necessary repair or restoration to the County road rights-of-way. All work shall be done to the satisfaction of the Director.

All equipment, lines and appurtenances which are used in the operation, maintenance, repair or construction of the Grantee's service and which are located within the County road rights-of-way shall be considered to be part of the Grantee's system and shall be the responsibility of the Grantee. All permits for the operation, maintenance, repair or construction of said system shall be applied for and given in the name of the Grantee, who will be responsible for all work done under the permit. The Grantee remains responsible whether the work is done by the Grantee, its contractors, or by third parties.

The Grantee shall post a bond to King County in the amount necessary for road restoration. The amount of the bond shall be set by the Department of Transportation, Roads Services Division and shall be filed with the Property Services Division before the issuance of any permit.

The Grantee shall, at no expense to the County, assume the following obligations with respect to the facilities connected to its system that are within County road rights-of-way and which it does not own, including appurtenant facilities and service lines connecting its system to users:

(a) The Grantee shall apply for, upon request and on behalf of the owner of the facilities, a County right-of-way construction permit for any repairs required for such facilities; provided such owner agrees to reimburse the Grantee for all costs incurred by the Grantee and any other reasonable conditions the Grantee requires as a precondition to applying for the permit. All work to be performed in the County right-of-way shall comply with all conditions of the County permit and all

applicable County requirements. The Grantee may at its option perform any part of the repair with its own forces or require the owner to employ a contractor for that purpose, provided such contractor is approved by the County;

(b) In the event that the County determines emergency repair of such facilities is necessary to halt or prevent significant damage to County road rights-of-way or significant threats to the health, safety and welfare of parties other than the owner or the occupants of the building served by such facilities, the Grantee shall take prompt remedial action to correct the emergency to the County's approval, which the County shall not unreasonably withhold;

(c) When the County or its contractor provides notice to the Grantee, pursuant to RCW 19.122, of its intent to excavate within County road rights-of-way, the Grantee shall provide to the County or its contractor the best information available from the Grantee's records or, where reasonable, from the use of locating equipment as to the location of such facilities, including surface markings where these would reasonably be of use in the excavation. If the Grantee fails to make good faith efforts to provide the above information within the deadlines provided by RCW 19.122, the Grantee shall hold the County harmless for all reasonable costs that result from damage to such facilities if such damage occurs as a result of the failure to provide such information. Nothing in this subsection is intended or shall be construed to create any rights in any third party or to form the basis for any obligation or liability on the part of the County or the Grantee toward any third party, nor is anything in this subsection intended to be construed to alter the rights and responsibilities of the parties under RCW 19.122, as amended.

12. RESTORATION OF COUNTY ROAD RIGHTS-OF-WAY

After work on, under or adjacent to County road rights-of-way, the Grantee is responsible for and will leave all County road rights-of-way in as good a condition as they were in before any work was done. In the event that the Grantee, its contractors, or third parties working under permit should fail to restore County road rights-of-way to the satisfaction of the Director, King County may make such repairs or restorations as are necessary to return the County road rights-of-way to its pre-work condition. Upon presentation of an itemized bill for repairs or restorations, including the costs of labor and equipment, the Grantee will pay the bill within thirty (30) days. If suit is brought upon the Grantee's failure to pay for repair and restoration, and if judgment in such a suit is entered in favor of King County, then the Grantee shall pay all of the actual costs, including interest from the date the bill was presented, disbursements, and attorney's fees and litigation related costs incurred.

13. PERFORMANCE OF WORK

The Grantee covenants that in consideration for the rights and privileges granted by this franchise, all work performed by the Grantee on County road rights-of-way shall conform to all County requirements including, but not limited to, the requirements of the current edition of the County

Road Standards in force when the work is performed and all traffic control shall also conform to the current edition of the Manual of Uniform Traffic Control Devices in force when the work is performed.

14. BLASTING REQUIREMENTS

The right to operate, maintain, repair and construct Grantee's distribution and service lines and appurtenances granted by this franchise does not preclude King County, its agents or contractors from blasting, grading, or doing other road work to the Grantee's lines and appurtenances. Except in the case of an emergency, the Grantee will be given ten (10) business days written notice of any blasting so that the Grantee may protect its lines and appurtenances. If the Grantee notifies the County within ten (10) business days that the facilities will have to be relocated to protect them from blasting, the County will defer the blasting for up to ninety (90) days from the date of the original notice. In no event will the Grantee be given less than two (2) business days written notice of any blasting. Notification of any excavation shall be provided through the One-Call System as provided by RCW 19.122, as hereinafter amended.

15. SURVEY MARKERS AND MONUMENTS

It shall be the responsibility of the Grantee performing any construction work in the County road rights-of-way to restore any survey markers or monuments disturbed by such construction in accordance with RCW 58.09.130, and as hereinafter amended.

16. ASSIGNMENT

The Grantee shall not have the right to assign this franchise without the consent of the Metropolitan King County Council given by Ordinance. No assignment shall be effective unless an acceptance by the assignee of all rights, conditions, terms, provisions, and responsibilities contained within the franchise, as well as surety bonds, which the Council deems necessary to be posted, are received. Council approval of the assignment may be made subject to the assignee's acceptance of new or modified terms of the franchise.

17. EXPIRATION AND RENEWAL

To the extent described in Exhibit "A", all rights granted by this franchise to County road rights-of-way outside incorporated Towns and Cities apply to all existing County road rights-of-Way improved and unimproved and to all County road rights-of-way acquired by King County during the term of this franchise.

If the Grantee has initiated a renewal of this franchise before it expires, the County may, at its sole discretion, extend the term of the franchise on a month to month basis for up to one year. Should the County elect to extend the franchise, written notice shall be provided to the Grantee before the franchise expiration date.

If the Grantee has not applied for a renewal of this franchise before it expires, King County has the right to remove or relocate any lines and appurtenances of the Grantee as is reasonably necessary for the public's health, welfare, safety, or convenience including, but not limited to, the safe operation of County roads, franchise holders, or for the construction, renewing, altering, or improving of any County road right-of-way, or for the installation of lines and/or facilities of other franchise holders. Grantee shall be liable for the costs incurred in any removal or relocation of its lines and appurtenances under this section. Costs include the expense of labor and equipment.

Upon expiration of this franchise, the Grantee shall continue to be responsible for the operation and maintenance of existing facilities in the County road rights-of-way until removed, assigned to another franchised utility or abandoned; however, the Grantee shall not have the right to provide additional services or construct new facilities. King County will issue permits required for the repair and maintenance of the existing facilities in accordance with K.C.C. 14.44.055 as amended and Section 11 of this franchise. This section and sections 8, 10-13 and 15 of this franchise shall continue in force until such time as the lines are removed from County road rights-of-way, assigned to another franchised utility, or abandoned in place with the approval of the Manager of the Department of Transportation, Road Services Division.

18. RESERVATION OF RIGHTS

King County specifically reserves for itself the right to impose a utility tax on the Grantee if State of Washington grants such taxing authority and the local option is exercised by the King County Council.

King County also specifically reserves the right to exercise authority it has or may acquire in the future to secure and receive fair market compensation for the use of its property, pursuant to an ordinance. If King County elects to exercise such authority, the fair market compensation requirement for Grantee shall be imposed by ordinance not less than one hundred eighty (180) days after written notice ("Compensation Notice") is delivered to the Grantee, said Compensation Notice identifying with specificity the definition, terms and/or formula to be used in determining such fair market compensation. Acceptance of King County's definition terms and/or formula identified in the Compensation Notice will occur if the Grantee accepts in writing within thirty (30) days of receipt of the Compensation Notice; or, if Grantee takes no action in writing within thirty (30) days of receipt of the Compensation Notice; in which case the applicable ordinance that the King County Council passes will be determinative.

Nothing in this section shall be construed as an agreement by the Grantee of King County's right to exercise authority it has or may acquire in the future to secure and receive fair market compensation for the use of property. Nothing in this section shall be construed to prohibit the Grantee from challenging, in King County Superior Court or a court of competent jurisdiction, the legality of such right.

Grantee's rejection of the definition, terms, and/or formula identified in the Compensation Notice will only occur if such rejection is in written form, identifying with specificity the grounds for such

rejection, and delivered to King County within thirty (30) days after receipt of the Compensation Notice, in which case the below identified arbitration terms will apply:

(a) The Grantee and King County will select one arbitrator each, and the two selected arbitrators will select a third arbitrator. If the two arbitrators have not selected a third arbitrator within thirty (30) days after the selection of the last selection of the two, either the Grantee or King County may apply to the presiding judge of the King County Superior Court for the appointment of a third arbitrator. The three arbitrators will determine the method for determining the fair market compensation for the County property used by the Grantee. The arbitration procedure employed shall be consistent with the rules and procedures of the American Arbitration Association. The decision of a majority of the arbitrators will bind both the Grantee and King County. At the conclusion of the arbitration, the arbitrators will submit written reports to the Grantee and King County, which shall contain all pertinent evidence that, led to their conclusion together with an explanation of their reasoning for such conclusion.

(b) The fees of the arbitrators selected by each party shall be paid by that party and the fees of the third arbitrator shall be paid one-half by the County and the Grantee. The County and the Grantee shall share the other costs of the proceeding equally.

(c) In event that the question of fair market compensation is not resolved prior to the effective date specified by the ordinance authorizing said compensation; the arbitration decision will be applied retroactively to the effective date in the ordinance. The Grantee will pay the retroactive sum plus interest in the amount of twelve percent (12%) per annum.

Nothing in this franchise may be construed to limit the exercise of authority now or later possessed by the County or any other governing body having competent jurisdiction to fix just, reasonable and compensatory rates or other requirements for services under this franchise. Nothing in this section shall be construed to prohibit the Grantee from challenging, in King County Superior Court or a court of competent jurisdiction, the authority of the County or any other governing body to fix rates or other requirements for services.

19. COMPLIANCE WITH LAWS

Grantee shall conform to all applicable federal, state and local laws and regulations including, but not limited to, the State Environmental Policy Act and King County environmental standards and ordinances.

20. NON-DISCRIMINATION CLAUSE

In all hiring or employment made possible or resulting from this franchise agreement, there shall be no discrimination against any employee or applicant for employment because of sex, sexual

orientation, age, race, color, creed, national origin, marital status or the presence of any sensory, mental, or physical handicap, unless based upon a bona fide occupational qualification, and this requirement shall apply to but not be limited to the following: employment, advertising, lay-off or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship.

No person shall be denied, or subjected to discrimination in receipt of the benefit of any services or activities made possible by or resulting from this agreement on the grounds of sex, sexual orientation, race, color, creed, national origin, age except minimum age and retirement provisions, marital status, or the presence of any sensory, mental or physical handicap.

Any violation of this provision shall be considered a violation of a material provision of this agreement and shall be grounds for cancellation, termination or suspension in whole or in part, of the agreement by the County and may result in ineligibility for further County agreements.

The Grantee shall make the best efforts to make opportunities for employment and/or contracting services available to women and minority persons. The Grantee recognizes that King County has a policy of promoting affirmative action, equal opportunity and has resources available to assist Grantee in these efforts.

21. PENALTY FOR VIOLATION OF CONDITIONS

If the Grantee shall violate or fail to comply with any of the material terms, conditions, or responsibilities of this franchise through neglect or failure to obey or comply with any notice given the Grantee under the provisions of this franchise or if the Grantee abandons its franchise, the Council may revoke this franchise. King County shall give written notice of its intent to revoke this franchise. A public hearing shall be scheduled within forty-five (45) days following the notification. The decision to revoke this franchise will become effective ninety (90) days following the public hearing if the County, by ordinance, finds:

A. That the Grantee has not substantially cured the violation or failure to comply which was the basis of the notice; or

B. that the violation or failure to comply which was the basis of the notice is incapable of cure; or

C. that the Grantee has repeatedly violated or failed to comply with any of the material terms, conditions, or responsibilities of the franchise, even though the individual violations have been cured; and

D. that the revocation of the franchise is in the public interest.

During the forty-five (45) days following the notification, the Grantee shall have the opportunity to remedy the failure to comply.

22. RIGHT OF APPEAL

Decisions, requirements, or approvals of the Director are binding on the parties to this document. Appeals from the Director's determinations will be made by filing a complaint with the King County Superior Court.

23. SEVERANCE

This franchise gives effect to purposes and uses, which are consistent with economical and efficient services rendered in the public interest. If any provision of this franchise, or its application is determined to be invalid by a court of law, then the remaining provisions of this franchise shall continue and remain valid unless the dominant purpose of the franchise would be prevented or the public interest is no longer served.

14780

Attachment B
2003-440

Phone (425) 831-4919
Fax (425) 831-4798

CITY OF SNOQUALMIE
Office of the City Administrator
P.O. Box 987, Snoqualmie, Washington 98065
www.ci.snoqualmie.wa.us

3/18/2003

Clerk of the King County Council
Room 402 King County Courthouse
516 Third Avenue
Seattle, WA 98104

Subject: City of Snoqualmie Sewer Franchise Application

The City of Snoqualmie is requesting a franchise to extend sanitary sewer service to an area outside the City limits. The Snoqualmie Tribe has proposed development of a casino to be owned and operated by the Tribe on a 56-acre parcel south of the City of Snoqualmie. The franchise area includes the casino site and an area to the east that is partially developed with homes.

The franchise area is in unincorporated King County outside Snoqualmie city limits but within the City's sewer planning area and UGA. The proposed 10-inch diameter sewer begins at the northeast corner of the casino parcel and continues southeasterly along SE 88th Street and SE 92nd Street to connect to an existing sewer in 384th Avenue SE. The wastewater would then flow through the City's existing collection system and pump stations to the treatment plant.

The creek north of the franchise area has indications of pollution from septic tanks and this project represents an opportunity to prevent this. The franchise area would allow for the following:

- The new sanitary sewer along SE 88th Street and SE 92nd Street would allow homeowners along this street to connect to the proposed 10-inch sewer instead of continuing to use septic tank systems.
- Residences in the Johnson Heights area of South Snoqualmie Hills (along SE 90th and 91st Streets and 381st Avenue SE, west of SE 92nd Street) will be able to connect to the proposed 10-inch sewer instead of continuing to use septic tank systems.
- Residences in the Williams Addition area of South Snoqualmie Hills (along SE 85th Street, 381st Place SE and 382nd Avenue SE, west of 384th Avenue SE) will be able to connect to the existing sewer line along 384th Ave SE instead of continuing to use septic tank systems.

- Residences on the west side of 384th Avenue SE in South Snoqualmie Hills will be able to connect to the existing sewer line along 384th Ave SE instead of continuing to use septic tank systems.

Lastly, the franchise area provides the City with maintenance and operation access to the existing 8-inch sewer, which provides service to approximately 10 acres of land owned by the City in the Rattlesnake Ridge planning area (south of Preston - North Bend Road).

The planning documents discuss improvements needed to provide sewer capacity for the area. Proposed projects include improvements to reduce I/I in the existing collection system and projects to improve the capacity of the collection system. There is adequate capacity at the City's wastewater treatment plant for this development so no treatment issues are anticipated.

A sewer plan, named the South Snoqualmie Hills Sewer Plan, has been prepared for the proposed development, and it was submitted to Bruce Bennett of King County on December 20, 2002 for review and approval. The sewer plan examines the ability of the existing City of Snoqualmie sewer system to provide service for the proposed casino and adjacent homes. It examines the impacts of the project on the drainage basin it is within, the adjacent basins, the gravity collection system, pump stations, and the treatment plant. The plan addresses the physical system, planning issues such as land use and growth, and recommended improvements. The plan also considers other current projects and addresses some issues that have arisen since the latest approved 1991 Sewer System Comprehensive Plan.

Attached are eight copies of a vicinity map (Figure 1) showing the location of the franchise area, eight copies of a map of the franchise area (Figure 2), a metes and bounds legal description of the franchise area on paper and on a computer disk, and a certified check for $1,400.00 for the fee.

We believe that development of this parcel and the associated sewer improvements benefits the City and we would like to proceed with this project. City staff is available to respond to any questions that may arise during the franchise review process.

Sincerely,

Gary Armstrong
City Administrator

KAW:js

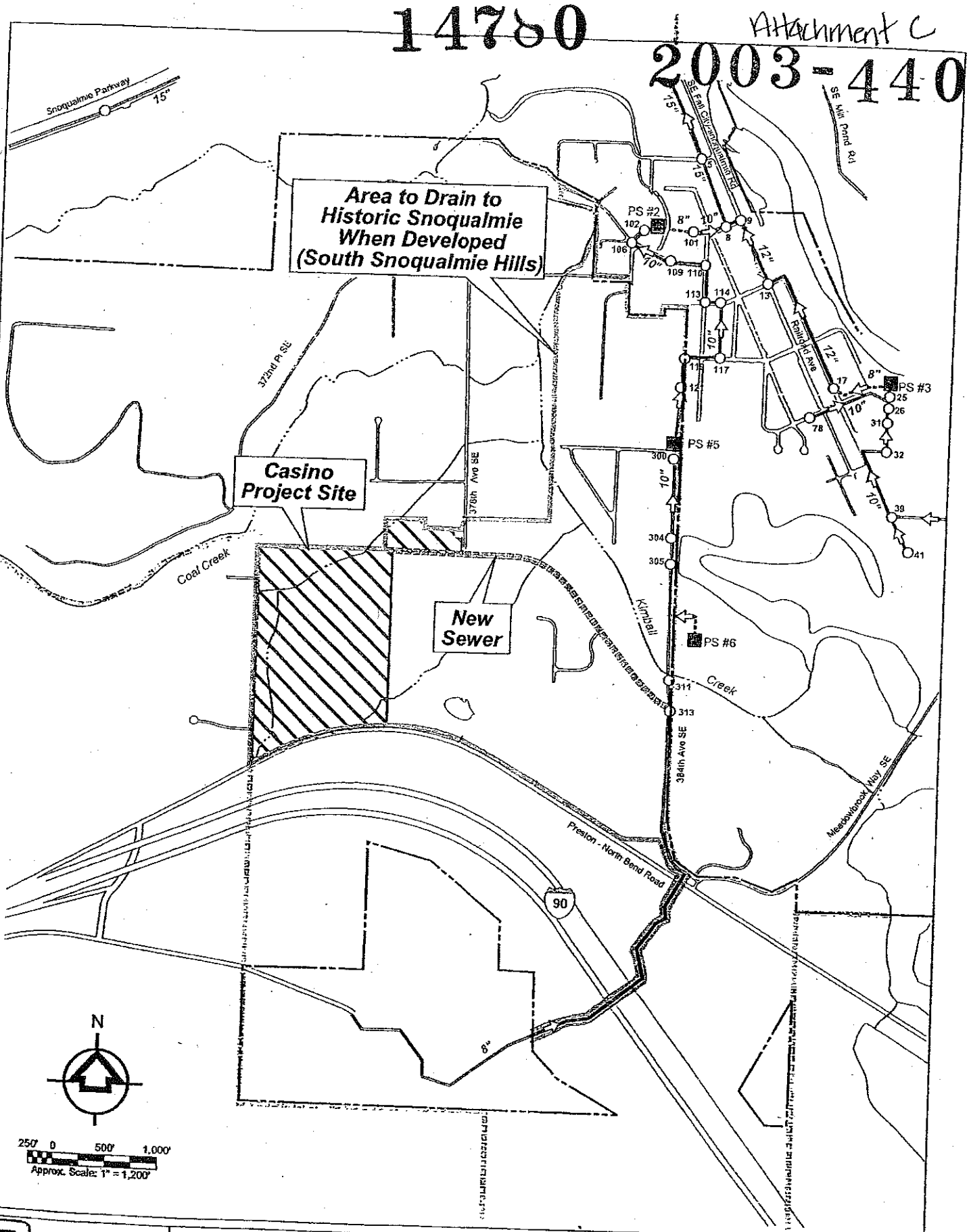
cc: *Bruce Bennett, King County*
G.I.James,, King County
Jim Santroch, Tt/KCM
Steve Walker, Heartland
Bernard Thompson
Mayor "Fuzzy" Fletcher, City of Snoqualmie
Pat Anderson, City Attorney
file

Enclosures

14780

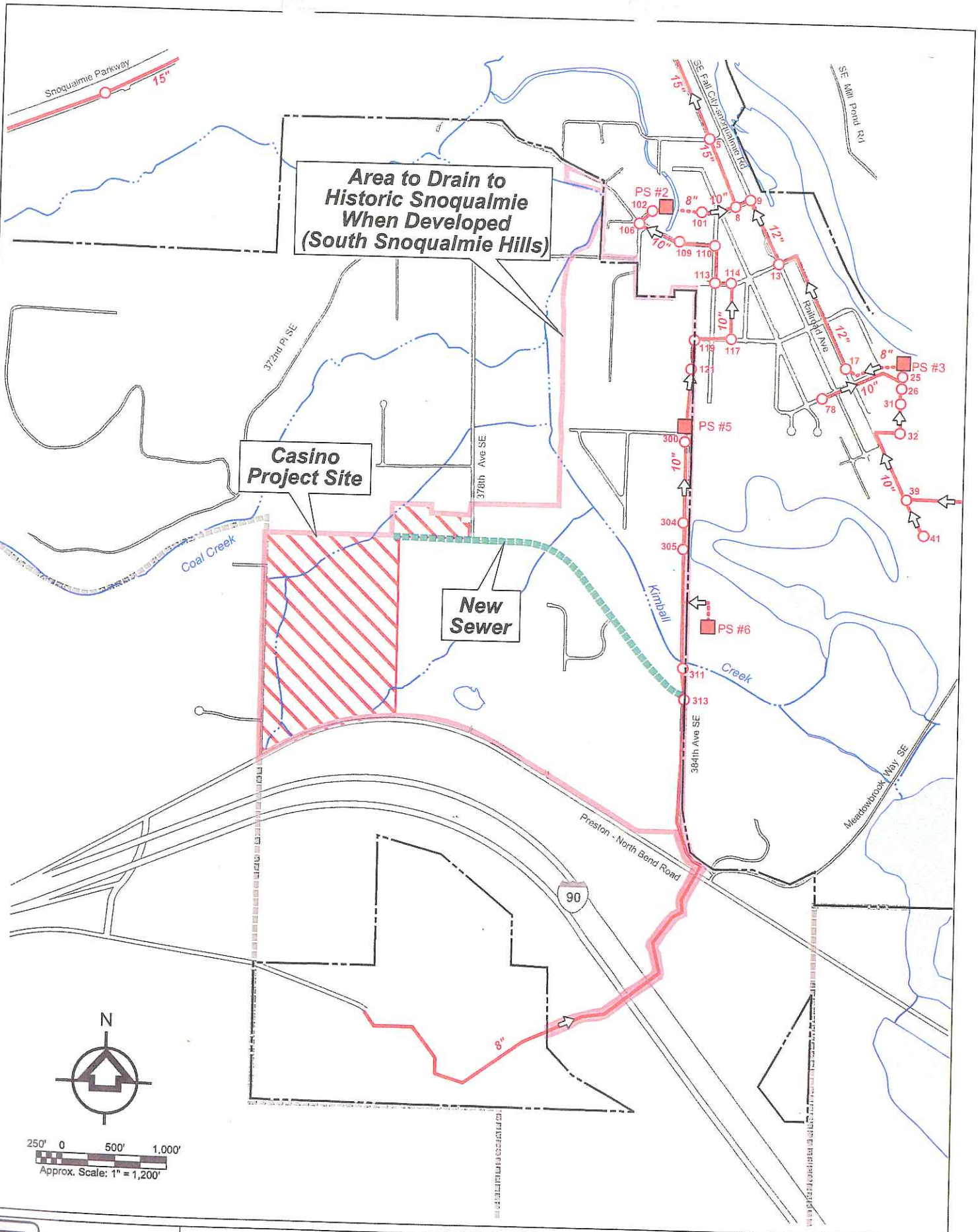
Attachment C

2003-440



213007/figure2 FranchiseArea.fh10

Tetra Tech/ KCM, Inc. 1917 First Avenue Seattle, Washington 98101	SOUTH SNOQUALMIE HILLS SEWER FRANCHISE Snoqualmie Tribe – *Owner*; MGU Development, LLC – *Developer* Heartland, LLC – *Development Manager*	Figure 2. FRANCHISE AREA



2130078/Figure2 FranchiseArea.fh10

Tetra Tech/ KCM, Inc. 1917 First Avenue Seattle, Washington 98101	SOUTH SNOQUALMIE HILLS SEWER FRANCHISE Snoqualmie Tribe – *Owner;* MGU Development, LLC – *Developer* Heartland, LLC – *Development Manager*	Figure 2. FRANCHISE AREA

APPENDIX P

DEVELOPER STANDARDS

Chapter 13.04
SEWER REGULATION[1]

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13.04.010 Definitions.
13.04.020 Grammatical interpretation.

Article II. General Provisions

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13.04.040 Discharge of pollutants into natural outlets.
13.04.050 Privy, septic tank, cesspool.
13.04.060 Suitable toilet facilities – Connection – Repairs.
13.04.070 Connection, repairs – Authorization by city.
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13.04.140 Wyes, tees, stubs.
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Article I. Definitions

13.04.010 Definitions.

Unless the context specifically indicates otherwise, the meaning of terms used in this chapter shall be as set

forth in this section:

1. “BOD” (denoting biochemical oxygen demand) means the quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedure in five days at 20 degrees centigrade, expressed in parts per million by weight.

2. “Building drain” means that part of the lowest horizontal piping of a drainage system which receives the discharge from soil, waste, and other drainage pipes inside the walls of the building and conveys it to the side sewer.

3. “Clerk” means the city administrator or his designee.

4. “Commercial structure” means business and industrial structures, and all structures other than residential.

5. “Downspout” means the leader or pipe above the ground which is installed to conduct storm water from the roof gutter of any structure.

6. “Duplex” means a residential structure containing two individual dwelling units, designed or used to house not more than two families living independently of each other.

7. “Garbage” means solid waste from the preparation, processing, cooking and dispensing of food, and from the handling, storing and sale of produce.

8. “Industrial waste” means any liquid, solid or gaseous substance, or combination thereof, resulting from any process of industry, manufacturing, business, trade or research, including development, recovering or processing of natural resources.

9. “Inspector” means the utilities director or his designee.

10. “Lateral” means a sewer which will receive the flow from one or more side sewers and discharge into a trunk or interceptor.

11. “Licensed side sewer contractor” means any contractor who is duly licensed under this chapter to construct, install, repair, reconstruct, excavate, or connect any side sewer to the public sewers of the city.

12. “Multiple dwelling” means a residential structure containing more than two dwelling units designed or used to house more than two families living independently of each other, and also includes mobile home parks, in which each space or stall shall be deemed a dwelling unit.

13. “Natural outlet” means any outlet into a watercourse, pond, ditch, lake or other body of surface or groundwater.

14. “Occupant” means any person or owner in physical possession of a structure to which sewer service is available.

15. “Person or owner” means any individual or firm, company, association, society, corporation or group, and the singular shall include the plural.

16. “Private sewer” means a sewer, exclusive of side sewers, which is neither owned nor operated by the city or other public authority.

17. “pH” means the logarithm of the reciprocal of the weight of hydrogen ions in grams per liter of solution.

18. “Properly shredded garbage” means garbage which has been shredded to such a degree that all particles will be carried freely under the flow conditions normally prevailing in public sewers, with no particle greater than one-half inch in diameter.

19. “Public sewer” means a sewer which is owned or operated by the city or other public authority.

20. “Residential structure” means a single-family, duplex or multiple-family dwelling structure, and includes mobile homes, motels and hotels.

21. “Sanitary sewer” means a sewer which carries sewage into which storm water, surface water and ground water are not intentionally admitted.

22. “Sewage” means water-carried wastes discharged from the sanitary facilities of structures occupied or used by human beings.

23. “Sewage treatment plant” means any arrangement of devices, lagoons, or structures used for treating sewage.

24. “Sewage works” means all facilities for collecting, pumping, treating and disposing of sewage.

25. “Sewer” means a pipe or conduit for sewage.

26. “Sewer superintendent” means the sewer department crew chief.

27. “Side sewer” (or building sewer) means the extension from the building drain to the public sewer or other place of disposal, beginning two and one-half feet outside the foundation wall.

28. “Standard participation contract” means a form of contract required by this chapter to be entered into before properties which have not been assessed for sewers, or otherwise qualified, may use the public sewers of the city.

29. “Storm drain” means a conduit designed to or used to transport storm water.

30. “Storm water” means waters on the surface of the ground or underground resulting from rainfall or other natural precipitation.

31. “Structure” means anything constructed or erected, the use of which requires location or attachment to something having location on the ground, including mobile homes and trailers, but not including fences.

32. “Suspended solids” means solids that either float on the surface of or are in suspension in water, sewage, or other liquids, and which are removable by laboratory filtering.

33. “Utilities director” means the director of public utilities, or his designee.

34. “Waste water” means water containing either or both of sewage or industrial wastes.

35. “Watercourse” means a channel in which a flow of water occurs, whether continuous or intermittent. (Ord. 627 § 1, 1989).

13.04.020 Grammatical interpretation.

“Shall” is mandatory. “May” is permissive. (Ord. 627 § 1, 1989).

Article II. General Provisions

13.04.030 Deposit of excrement, garbage, wastes.

It is unlawful for any person to place, deposit or permit to be deposited in an unsanitary manner upon public or private property within the city any human or animal excrement, garbage or other objectionable waste. (Ord. 627 § 1, 1989).

13.04.040 Discharge of pollutants into natural outlets.

It is unlawful to discharge into any natural outlet within the city any sewage, industrial waste, or other polluted waters, except where suitable treatment has been provided in accordance with the provisions of this chapter. (Ord. 627 § 1, 1989).

13.04.050 Privy, septic tank, cesspool.

Except as provided in this chapter, it is unlawful to construct, maintain or use privy, privy vault, septic tank, cesspool or other facility intended or used for the disposal of sewage in the city. (Ord. 627 § 1, 1989).

13.04.060 Suitable toilet facilities – Connection – Repairs.

A. The owner of each lot or parcel of real property within the city upon which there is situated any structure for human occupancy, employment, recreation or other purpose or use, which lot or parcel abuts on any street, alley, easement or right-of-way in which there is now located or may in the future be located a public sewer, and where the public sewer is within 150 feet of that lot or parcel and service by such public sewer is available, is required, at his expense, to install suitable toilet facilities therein and to connect the facilities to the public sewer, including the making of any repairs to the public sewer required by damage occurring during the making of such connection, regardless of the cause of such damage, in accordance with the provisions of this chapter. Such installation and connection must be made within 30 days after the date of mailing or personal delivery of notice by the clerk to the owner of property to be served, notifying such owner to make such connection. All connections to the public sewers of the city shall be made in a permanent and sanitary manner, and shall be sufficient to carry all the sewage and waste and waste fluids of every kind from the house, building or structure to the public sewer, and each toilet, sink, lavatory, washing machine, dishwasher and other piece of equipment of whatever type producing waste water shall be connected to the public sewer.

B. Any structure hereafter constructed or made available for human occupancy or use for any purpose shall, when required by this section, be connected to the public sewer before the completion of construction of such building or structure or before any occupancy or use thereof, or in the event that the public sewer capable of serving the structure has not been completed prior to the construction or occupancy of such structure, within 30 days after written notice from the clerk as provided in the preceding paragraph, whichever occurs first.

C. The limit of responsibility of the city shall be maintenance of the public sewer. Any needed repair to a side sewer or connection to a public sewer shall be the responsibility of the owner of the property served, and shall be made within 30 days after the date of mailing or personal delivery of a notice by the clerk or the utility director or his designee to the owner of the property served, notifying such owner to make such repair or connection. In the event of an emergency, a shorter period of time may be established for the repair to be made, or, if the owner cannot be located or does not promptly make such repair, the city may make repairs under the procedure of SMC 13.04.070. (Ord. 627 § 1, 1989).

13.04.070 Connection, repairs – Authorization by city.

A. If any connection to a public sewer or needed repair to a side sewer is not made within the time and in the manner provided in SMC 13.04.060, the utilities director may forthwith cause the same to be made.

B. In all cases in which the utilities director causes required connections or repairs to be made, he shall file a statement of the cost thereof with the clerk. The clerk shall notify the owner or reputed owner of the property of the cost of making such connection or repair, and if the same is not paid within four months, such cost, together with interest at the rate of 12 percent per year, shall be a lien against the property, and the clerk shall direct the city attorney to file a notice of claim of lien with the auditor of King County. Such lien may be foreclosed in the manner provided for mechanics liens. (Ord. 627 § 1, 1989).

13.04.080 Property determined serviceable by city sewer lines.

All property is capable of being served by a public sewer of the city, and service by such public sewer is available if the first floor plumbing of any building or structure located thereon can be served by gravity into the city sewer lines, as provided in SMC 13.04.060, even though the basement drains of such building or structure cannot be served into the city sewers. (Ord. 627 § 1, 1989).

Article III. Private Sewers

13.04.090 Private disposal – Conditions for use.

Where a public sanitary sewer is not available for use as provided by SMC 13.04.060, 13.04.070 and 13.04.080, and that is so certified by the utilities director, the building drain may be connected to a private sewage disposal system or replacement thereof, any of which must comply with applicable city ordinances, and in the absence of such applicable ordinances, with King County regulations for septic systems. (Ord. 627 § 1, 1989).

Article IV. Side Sewers and Connections

13.04.100 Permit – Requirement.

No person other than representatives of the city shall uncover, make connections with or opening into, use, alter, or disturb any public sewer or appurtenance thereof without first obtaining a written permit from the clerk. (Ord. 627 § 1, 1989).

13.04.110 Permit – Classes – Application.

A. There shall be three classes of side sewer permits:

1. For residential service;

2. For commercial service; and

3. For service to any establishment producing industrial wastes.

B. In each case, the owner or his agent shall make an application on a special form furnished by the clerk. The permit application shall be supplemented by any plans, specifications, or other information considered pertinent in the judgment of the clerk or water and sewer superintendent, including, in case of a new building, a plan or diagram of plumbing and drainage facilities. (Ord. 627 § 1, 1989).

13.04.120 Permits – Acquisition procedure.

Side sewer permits shall be obtained in the following manner:

A. Side sewer permits shall be issued only upon proper application at the office of the city engineer.

B. A permit which includes side sewer work in a public area may be issued only to a licensed side sewer

contractor.

C. A permit which includes side sewer work on private property only may be issued to the owner of the property or to a licensed side sewer contractor.

D. No licensed side sewer contractor shall lay any pipe pursuant to any other person's permit, nor shall any unauthorized person lay any pipe pursuant to a licensed side sewer contractor's permit.

E. The applicant for a side sewer permit shall supply the city engineer with the following information:

1. Owner's name;

2. Address to be served;

3. Owner's mailing address;

4. Name and address to which bill shall be mailed;

5. Licensed side sewer contractor's name;

6. Legal description of property to be served;

7. All outside dimensions of building to be served;

8. Location of buildings on property to be served;

9. Purpose of building;

10. Full course of the proposed side sewer.

F. A permit shall be obtained and the fees thereafter paid before any side sewer is started.

G. No permit shall be issued for side sewer connection before the main sewer is accepted.

H. The permit must be posted on the job and must be readily accessible for inspection by the utilities director or sewer superintendent.

I. A licensed side sewer contractor shall meet with the utilities director or sewer superintendent on the job whenever so directed. (Ord. 769 § 4, 1996; Ord. 627 § 1, 1989).

13.04.130 Side sewer contract – Conditions.

A side sewer contract between owners and a licensed side sewer contractor shall be subject to the following requirements:

A. The contract between the owner and the licensed side sewer contractor shall provide that the side sewer contractor shall connect all outlets from the plumbing fixtures existing at the time the work is done unless specifically noted otherwise.

B. The contractor shall, when requested by the owner, furnish the owner with a release of lien or claims of both labor and material or with an affidavit stating the same have been paid before payment is accepted for the side sewer work. (Ord. 627 § 1, 1989).

13.04.140 Wyes, tees, stubs.

Wyes, tees and stubs shall be located in the following manner:

A. Connection will be made at the point designated by the sewer superintendent.

B. If a side sewer tee or stub is not found at the measurement given by the sewer superintendent, the contractor shall prospect two feet in all directions from the measurement given and if not found, then notify the sewer superintendent.

C. Wyes may be used only if the sewer superintendent permits and at a location provided by the sewer superintendent.

D. An inspection tee with a riser to not less than one foot from the surface of the ground shall be placed on every side sewer at or near the connection to a common sewer, the location to be approved by the water and sewer superintendent. The tee shall be capped with a cast iron cover. If the inspection tee is located on private property, the city shall have the right to enter onto that private property and excavate to the inspection tee at any time when there is a reasonable doubt on the legal use of the building sewer, but the city shall restore the surface after such excavation. (Ord. 627 § 1, 1989).

13.04.150 Installation – Costs borne by property owner.

All costs and expense incident to the installation and connection of the side sewer shall be borne by the owner. The owner shall indemnify the city from any loss or damage that may directly or indirectly be occasioned by the installation of the side sewer. (Ord. 627 § 1, 1989).

13.04.160 Single sewer for each building – Exceptions.

A. A single side sewer shall be provided for every building unless the connection of more than one building to a single side sewer is approved by the utilities director prior to the construction of such side sewer. Nor more than one multiple dwelling, industrial, or commercial building shall be connected to a side sewer, unless otherwise approved by the utilities director.

B. If the side sewer is to be installed across or exist upon the property of another person, approved easement documents assuring that all property involved shall have perpetual use of the side sewer, and having provisions for maintenance and access for repair purposes, shall be signed by the recorded owners. These documents shall be acknowledged and recorded with the county auditor, and a copy provided to the city. (Ord. 627 § 1, 1989).

13.04.170 Use of old facilities.

Old side sewers, including septic tank lines, may be used only when they are found on examination and test by the sewer superintendent to meet all requirements of this chapter. The owner or his agent shall demonstrate to the sewer superintendent that no connection to such side sewer or septic tank line exists which conveys any material prohibited by SMC 13.04.420 through 13.04.500. (Ord. 627 § 1, 1989).

13.04.180 Materials – Construction.

The side sewer shall be cast iron soil pipe, ASTM specification A-74, with leaded joints, vitrified clay with “Brant” or approved equal rubber joint gaskets cement-asbestos with standard couplings and fittings, or other suitable material approved by the sewer superintendent. Joints shall be tight and waterproof. Any part of the side sewer that is located within less than 10 feet of the water service pipe shall be constructed of cast iron oil pipe with leaded joints unless such part is at least three feet lower than such water pipe. If installed and filled on unstable ground, the side sewer shall be of cast iron soil pipe, except that nonmetallic materials may be accepted if laid

on a suitable concrete bed or cradle as approved by the sewer superintendent. (Ord. 627 § 1, 1989).

13.04.190 Size and slope.

The size and slope of the building sewer shall be subject to the approval of the water and sewer superintendent, but in no event shall the diameter be less than four inches for single connections and six inches for multiple connections. The slope of such building sewer

shall be not less than three-sixteenths inch per foot for four-inch pipe or one-eighth inch per foot for six-inch pipe unless the depth of the public sewer requires a lesser slope, and such a lesser slope is approved by the water and sewer superintendent. (Ord. 627 § 1, 1989).

13.04.200 Placement.

Whenever possible, the side sewer shall be brought to the building at an elevation below the basement floor. No side sewer shall be laid under any building or within two and one-half feet of any foundation wall unless the side sewer is constructed of cast iron pipe. The minimum depth of trench shall be two feet. The side sewer shall be laid at uniform grade and in straight alignment insofar as possible. Changes in direction shall be made only with properly curved pipe fittings, as approved by the water and sewer superintendent. Fittings shall be used at all major changes of direction and a clean-out shall be provided at such fittings. Whenever any new building drain is constructed too low to permit gravity flow to the public sewer, sewage carried by such drain shall be lifted by approved artificial means and discharged to the public sewer at the owner's expense. (Ord. 627 § 1, 1989).

13.04.210 Grade and elevation – Sewer tee and stub.

The owner of any building shall be responsible for obtaining from the sewer superintendent the location and elevation of the sewer tee or sewer stub at the point of connection and, in the case of new construction, for planning the building and plumbing to provide adequate slope for the side sewer. The applicant for permit shall be responsible for determining the available grade between the building drain and the sewer tee or stub. (Ord. 627 § 1, 1989).

13.04.220 Excavation – Pipe laying and backfill.

All excavations required for the installation of the side sewers shall be open trench work unless otherwise approved by the sewer superintendent. Pipe laying and backfill shall be performed in accordance with the following specifications:

A. Pipe shall be carefully bedded, either by forming the trench bottom to support the bottom one-quarter of the pipe or by over excavating and bedding the granular material thoroughly tamped or trod under and along side of the pipe.

B. No large rocks shall be left in the trench bottom which may damage the pipe, and no large rocks shall be placed in the backfill.

C. Pipe shall be laid with spigot ends downstream and all changes of directions shall be made by suitable fittings. The trench shall be free of water during laying of pipe.

D. No backfill shall be placed over the pipe until the work has been inspected and approved.

E. Backfill shall be placed by hand and be thoroughly tamped or trod to six inches above the top of the pipe.

F. Only the owner or a licensed side sewer contractor may excavate in the vicinity of a public sewer and stubs.

G. No downspouts or outside drains shall be connected to a side sewer. (Ord. 627 § 1, 1989).

13.04.230 Joints and connections – Material, method.

All joints and connections shall be made gastight and watertight. Cast iron pipe joints shall be firmly packed with oakum or hemp and filled with molten lead, federal specifications QQ-L-156, not less than one inch deep. Lead shall be run in one pouring and caulked tight. No paint, varnish or other coating shall be permitted on the joining material until after the joint has been tested and approved by the sewer superintendent. All joints between metallic and nonmetallic pipe, or between two pipes of nonmetallic pipe shall be made with hot poured joining material or cement mortar approved by the sewer superintendent. Material for hot poured joints shall not soften sufficiently to destroy the effectiveness of the joint when subjected to a temperature of 160 degrees Fahrenheit, nor be soluble in any of the waste carried by the drainage system. The joint shall first be caulked tight with jute, hemp or similar material approved by the water and sewer superintendent. Other joining materials and methods may be used only by approval of the sewer superintendent. (Ord. 627 § 1, 1989).

13.04.240 Joints and connections – Location.

The connection of the side sewer into the public sewer shall be made at the stub, if such stub is available at the suitable location. If no properly located stub is available, a neat hole may be cut into the public sewer to receive the side sewer, with entry at right angles or in the downstream direction at an angle of about 45 degrees, which hole may be cut only by licensed side sewer contractor. A 45-degree L may be used to make such connection, with the spigot end cut so as not to extend past the interservice of the public sewer. The invert of the side sewer at the point of connection shall be at the same or a higher elevation than the invert of the public sewer. A smooth neat joint shall be made, and the connection made secure and watertight by encasement in concrete. Special fittings may be used for the connection only when approved by the sewer superintendent. (Ord. 627 § 1, 1989).

13.04.250 Inspections – Procedures.

A. The applicant for the side sewer permit shall notify the sewer superintendent when the side sewer is ready for inspection. After pipe has been inspected, the bottom of the trench shall be puddled and the line will be checked for infiltration by the sewer superintendent by observing the flow through the inspection tee. An infiltration rate of more than four gallons per hour per 100 feet of pipe shall be sufficient reason for rejection.

B. As an alternate to the infiltration as specified, the pipe may be tightly sealed above the inspection tee by a plumber's ball or similar apparatus, the pipe filled with water to the level of the lowest fixture, and the loss through exfiltration observed. Any joints observed to leak shall be repaired, and the test repeated until exfiltration is reduced to specified amount.

C. Proof that downspouts are not connected to the side sewer may be established by watering roof gutters and again observing flow through inspection tee or by any other acceptable test. (Ord. 627 § 1, 1989).

13.04.260 Barricades, lights – Restoration.

All excavations for side sewer installations shall be adequately guarded with barricades and lights so as to protect the public from hazard. Streets, sidewalks, parkways and other public property disturbed in the course of the work shall be restored in a manner satisfactory to the utilities director, when applicable. (Ord. 627 § 1, 1989).

13.04.270 Permit – Failure to secure.

Any person who makes or causes to be made any connection to public sewers of the city without receiving a permit therefor or executing the standard participation contract, provided by the city before such connection, shall be subject to the penalties set forth in SMC 13.04.510, and $200.00 in addition to charges payable to the

city. (Ord. 627 § 1, 1989).

13.04.280 Conveyance of private sewer to city.

A private sewer constructed in a public right-of-way or in an easement conveyed to the city may be conveyed to the city subject to acceptance by the city. If the city accepts that conveyance, the sewer thereafter shall be a public sewer under the jurisdiction of the city. Prior to acceptance of the conveyance, the city may require that the grantor of the private sewer satisfy certain construction and other reasonable standards, including, but not limited to, the payment of a connection charge and an inspection fee and the execution of a standard participation contract. (Ord. 627 § 1, 1989).

13.04.290 Property outside city limits – Contract for service.

The owners of property outside the boundaries of the city or of property within the city which has not been assessed for sewers by the district may, if the city council consents, connect to the public sewer of the city and obtain sewage disposal service by entering into a standard participation contract, provided for by SMC 13.04.320 through 13.04.360. (Ord. 627 § 1, 1989).

13.04.300 Connection charges, assessments.

If the property to be connected has been assessed for sewers, the cost of constructing that portion of the side sewer between the main sewer and the property line of the public right-of-way or easement shall be borne by the city, and the owner shall pay to the city a connection charge as established by this chapter. If the property to be connected to the sewer has not been assessed for sewers, the owner shall pay to the city, in addition to the connection charge, the cost of constructing the side sewer between the main sewer and the property line as provided in SMC 13.04.380. (Ord. 627 § 1, 1989).

13.04.310 Disconnection – Procedure.

No structure may be disconnected from a side sewer and no side sewer may be disconnected from the public sewer for any reason without prior notification to and approval of the city (acting through its sewer superintendent). No approval shall be given unless the disconnection is lawful under this chapter and other applicable ordinances of the city, and satisfactory protection is given by the owner or his contractor to the city, including, but not limited to, the satisfactory capping of the side sewer or public sewer. Sewer service charge for any structure disconnected or to be disconnected shall continue until such disconnection is approved by the city council and the building and public sewer capped and otherwise protected to the satisfaction of the sewer superintendent. (Ord. 627 § 1, 1989).

Article V. Standard Participation Contract

13.04.320 Required when.

Properties, either inside or outside of the city, which are not entitled to sewer service by reason of not having been subject to a sewer assessment of the city or otherwise qualifying for sewer service, may be connected to the public sewers of the city and served thereby when the owner thereof executes a standards participation contract and the city council concurs therewith. (Ord. 627 § 1, 1989).

13.04.330 Terms.

The standard participation contract shall provide the following:

A. That the property owner warrants that he is the owner of that property with full authority to bind the property with the covenants and conditions contained in the contract;

B. The property owner shall subject his property to the terms of the contract and shall use the public sewer of the city in accordance with the rules and regulations of the city as they may be amended from time to time, and that the property shall be subject to the regular schedule of sewer service charges of the city as may be from time to time fixed by the city for its use classification, including, if the city so provides, a reasonable split rate for property served in particular areas;

C. That the property described in the contract shall be the only property served with sewer service pursuant to that contract;

D. That the property subject to the contract shall be subject to liens, penalties and interest for nonpayment of sewer service charges to the same extent as any other property served by the city;

E. That the property owner and his successors in interest shall not object to any annexation to the city or the formation of any utility local improvement district, the area of which may include the property subject to the contract. Credit shall be given on assessment for any reasonable cost incurred by the property owner in installing his own sewer lines which have been deeded to the city.

F. The contract shall be filed for record at the office of the King County auditor and shall constitute a charge against the property and a covenant running with the land and shall bind the property and all of the future owners thereof. (Ord. 627 § 1, 1989).

13.04.340 Charges.

A standard participation contract shall provide that before the property shall receive sewer service, the property owner must pay to the city, in addition to any trunkage, connection and permit fee or charge which may be due, an amount of money which shall constitute a charge in lieu of assessment and which may be determined as near as may be by the use of the assessment formula used in the city whose sewer lines will be tapped to serve the property subject to the contract, or by any fair means at the discretion of the city council. The charge in lieu of assessment must be paid in full before connection to the public sewers of the city as permitted, but if the city council approves, and if the property owner prepays at least 10 percent thereof, the balance of the charge in lieu of assessment may be paid in equal annual installments, plus interest at six percent annually on the unpaid balance, payable in not more than five years, or sooner. Unpaid balance plus interest shall become and remain a lien against the property prior to any other charges whatsoever, except taxes. (Ord. 627 § 1, 1989).

13.04.350 Council right to impose additional conditions.

To protect the interest of the city, the city council may require other conditions and provisions to be inserted in the standard participation contract as the individual case may warrant. (Ord. 627 § 1, 1989).

13.04.360 Real estate owners.

The city may also enter into contracts with owners of real estate as provided in the Municipal Water and Sewer Facilities Act. (Ord. 627 § 1, 1989).

Article VI. Fees and Charges

13.04.370 Connection and/or trunkage charge – Requirement.

At the time when a side sewer permit is applied for, or prior to the issuance of a “letter of availability” of the subject property to the building department of the county, if any, whichever event occurs first, the applicant shall pay to the city, as set forth in SMC 13.04.380, the connection and/or trunkage charge, if any required by code SMC 13.04.380 and Ordinance 357, Sections 6.03 and 6.04. There shall be no charge for the application and

issuance of the permit by the city; however, if the city does not issue a permit, the trunkage or connection charge, or any part thereof which has been paid, shall be refunded. (Ord. 627 § 1, 1989).

13.04.380 Connection and/or trunkage charge – Established.

A. Charges for Side. There shall be a charge for each side sewer connection in such amount as city council shall from time to time establish by ordinance. The connection charge so established shall only apply to sewer lines on which sewer stub has already been provided for service to the property and does not apply to property for which a sewer stub has not been installed at the time of the installation of the city's sewer line. Such connection may be paid immediately or shall be paid as follows:

1. One-fourth at the issuance of the permit;

2. The balance in three equal annual installments on the anniversary date of the issuance of the permit;

3. The balance of the connection charge shall bear interest at 12 percent per year, and shall be a lien against the property;

4. In the event the owners fail to pay any installment when due, the entire balance shall become immediately due and payable. A penalty of 10 percent of the remaining balance shall be imposed as an administrative fee and the balance and penalty shall thereafter bear interest at 12 percent per year, and the city attorney may immediately file a lien with the King County auditor and shall, after the lien has been delinquent for four months, file a lien with the King County auditor.

B. Such connection charge shall become payable for all properties capable of being served by the city sewage system and for which the city has already installed a side sewer stub from the city sewer line to the property line 30 days after mailing of notices provided in SMC 13.04.060. For all future connections for which the city must provide a stub, such charge shall become due upon application being made for such connection or may be paid in four annual installments as set forth in this section. The connection charge for all such property shall be $2,500 plus $250.00 for each additional living unit in excess of one, plus the actual cost of labor and materials to install such stub, plus 15 percent for administrative costs.

C. Charges collectible pursuant to latecomer agreements shall be paid in full prior to the time the connection is made.

D. The connection charges collectible pursuant to this section shall be waived for side sewer connections with the Snoqualmie Ridge Planning Area as defined in the Snoqualmie Vicinity Comprehensive Plan 1994. (Ord. 880 § 2, 2001; Ord. 810 § 1, 1998; Ord. 639 § 2, 1990; Ord. 627 § 1, 1989).

13.04.390 Service charge – When due.

A. All charges for sewer service shall be due and payable on receipt of the city's billing for the services rendered.

B. As for buildings or residences in existence at the time sewage services become available to the building or residence, the first billing shall be made during the month next following the month in which written notice was given by the city, pursuant to SMC 13.04.060.

C. As for buildings or residences constructed after the time sewage disposal facilities have been constructed capable of serving such buildings or residences, the first service charge shall be billed during the month next following connection to the sewage system of the city. (Ord. 627 § 1, 1989).

13.04.400 Delinquency – Determination, penalty.

All connection charges against property owners receiving or capable or receiving such service are deemed charges against the property served, and if such charges as established in this title are not paid by the fifteenth day of the month, or if the fifteenth day of the month is a legal holiday, then on the next business day, such charges shall be delinquent. Upon any such sewage connection charge becoming delinquent, there shall be added a penalty of 10 percent of the amount of such charge then due, and from the date of delinquency of any connection charge or sewer service charge there shall be charged interest at 12 percent on the delinquent charges and penalty added thereto. Delinquent charges, penalties added thereto, and interest on such charges and penalties shall be a lien against the property to which service was provided or which was capable of being served, subject only to the lien for general taxes. The clerk shall direct the city attorney to prepare and file a lien with the King County auditor whenever such charges have been delinquent for a period of four months, but may be so certified whenever such charges have been delinquent for a period of three months. The city may at any time thereafter bring suit and foreclose such lien by civil action in the superior court of the state for King County, pursuant to RCW 35.67.220 et seq. (Ord. 627 § 1, 1989).

13.04.410 Delinquency – Notice.

Delinquent notices may be mailed either to the occupant or to the owner of the property on which the structure so served is located so far as the city may reasonably ascertain the same. Failure to receive such bills shall not relieve any person liable therefor from the obligation to pay the same, nor the property receiving such service, or capable of receiving such service, from such lien therefor as may thereafter attach to the property in the manner provided by law. (Ord. 627 § 1, 1989).

Article VII. Use of Public Sewer

13.04.420 Discharge of specified unpolluted waters – Prohibited.

No person shall discharge or cause to be discharged any storm waters, surface waters, roof runoff, subsurface drainage, cooling water, or unpolluted industrial process water to any sanitary sewer. (Ord. 627 § 1, 1989).

13.04.430 Discharge of specified pollutants – Prohibited.

Except as provided in this chapter, no person shall discharge or cause to be discharged any of the following described waters or wastes to any public sewer:

A. Any liquid or vapor having temperature higher than 100 degrees Fahrenheit;

B. Any water, or wastes which may contain more than 100 parts per million, by weight, of fat, oil, or grease;

C. Any gasoline, benzene, naphtha, fuel oil, lube oil, or other flammable or explosive liquid, solid or gas;

D. Any garbage that has not been properly shredded;

E. Any ashes, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, paunch manure, or any other solid or viscous substance capable of causing obstruction to the flow in sewers or other interference with the proper operation of the sewage works;

F. Any waters or wastes having a pH lower than 5.5 or higher than 9.0 or having any other corrosive property capable of causing damage or hazard to structures, equipment, and personnel of the city;

G. Any waters or wastes containing toxins or poisonous substances in sufficient quantity to injure or interfere with any sewage treatment process, constitute a hazard to humans or animals, or create any hazard in the

receiving waters of the sewage treatment plant;

H. Any waters or wastes containing suspended solids of such character and quantity that unusual attention or expense is required to handle such materials at the sewage treatment plant;

I. Any noxious or malodorous gas or substance capable of creating a public nuisance. (Ord. 627 § 1, 1989).

13.04.440 Grease, oil, sand interceptors – Required when.

Grease, oil and sand interceptors shall be provided when, in the opinion of the utilities director they are necessary for the proper handling of liquid wastes containing grease in excessive amounts, or any flammable wastes, sand and other harmful ingredients. Such interceptors shall be of a type and capacity approved by the utilities director and shall be so located as to be readily and easily acceptable for cleaning and inspection. Grease and oil interceptors shall be constructed of impervious materials capable of withstanding abrupt and extreme changes in temperature. They shall be of substantial construction, watertight and equipped with easily removed covers, which when bolted in place shall be gastight and watertight. (Ord. 627 § 1, 1989).

13.04.450 Grease, oil, sand interceptors – Maintenance.

Where installed, all grease, oil and sand interceptors shall be maintained by the owner, at his expense, for continuously efficient operation at all times. (Ord. 627 § 1, 1989).

13.04.460 Discharge of specified wastes – Approval required.

A. The admission into the public sewer of any waters or wastes having the qualities set forth in this subsection shall be subject to review and approval by utilities director:

1. A five-day BOD greater than 300 parts per million weight; or

2. Containing more than 350 parts per gallon by weight of suspended solids; or

3. Containing any quantity of substances having the characteristics described in SMC 13.04.430; or

4. Having an average daily flow greater than two percent of the average daily sewage flow of the district.

B. Where necessary, in the opinion of the utilities director, the owner shall provide, at his expense, such preliminary treatment as may be necessary to:

1. Reduce BOD to 300 parts per million by weight, and the suspended solids to 350 parts per million by weight; or

2. Reduce objectionable characteristics or constituents to within the maximum limits provided for in SMC 13.04.430; or

3. Control the quantities and rates of discharge of such waters or wastes.

C. Plans, specifications and other pertinent information relating to proposed preliminary treatment facilities shall be submitted to the approval of the utilities director and of the Pollution Control Commission of the state when required by law, and no construction of such facilities shall be commenced until such approvals are obtained in writing. Any expenses incurred by the city in reviewing such plans, specifications and information shall be paid by the property owner or his representative before the utilities director's approval shall be issued. (Ord. 627 § 1, 1989).

13.04.470 Preliminary treatment facilities.

Where preliminary treatment facilities are provided for any waters or wastes, they shall be maintained continuously in satisfactory and effective operation and by the owner at his expense. (Ord. 627 § 1, 1989).

13.04.480 Manholes.

When required by the utilities director, the owner of any property served by a side sewer carrying industrial wastes shall install a suitable control manhole in the side sewer to facilitate observation, sampling and measurement for the wastes. Such manhole, when required, shall be accessibly and safely located, and shall be constructed in accordance with plans approved by the utilities director. The manhole shall be installed by the owner, at his expense, and shall be maintained by him so as to be safe and accessible at all times. (Ord. 627 § 1, 1989).

13.04.490 Measurements, test samples.

All measurements, tests and analysis of the characteristics of waters and wastes to which reference is made in SMC 13.04.430 and 13.04.460 shall be determined in accordance with standard methods for the examination of water sewage, and shall be determined at the control manhole provided for in SMC 13.04.480, or upon suitable samples taken at such control manhole. In the event that no special manhole has been required, the control manhole shall be considered to be the nearest downstream in the public sewer to the point at which the side sewer is connected. (Ord. 627 § 1, 1989).

13.04.500 Admission of wastes by special agreement.

Nothing in this chapter shall be construed as preventing any special agreement or arrangement between the city and the manufacturing of any industrial wastes whereby industrial wastes of unusual strength or character may be accepted by the city for treatment, subject to payment therefor by that manufacturer. (Ord. 627 § 1, 1989).

Article VIII. Side Sewer Contractors

13.04.510 Requirement – Exemption.

For the purpose of assuring safe and quality construction of side sewers, safe and quality connection of side sewers of the city, and affording satisfactory protection of the sewer users of the city, no person other than the owner of the property involved or his agent may construct, install, repair, reconstruct, excavate, or connect to the public sewers of the city any side sewer unless he is a side sewer contractor holding a valid license of the city, pursuant to this chapter, and also holding a valid Washington Contractor License. (Ord. 627 § 1, 1989).

13.04.520 License – Application procedure.

Side sewer contractor licenses shall be issued annually by the city, based upon information contained on the application and obtained from other reliable sources relating to the experience, ability to perform the necessary work, and reputation of the applicant and his satisfying the requirements of this chapter. All applicants for the license shall complete an application furnished by the clerk which shall require the applicant to furnish information relating to the experience, ability to perform side sewer work, and personal, financial, and previous work references. The application shall contain a statement that the side sewer contractor agrees to abide by the requirements of this chapter. (Ord. 627 § 1, 1989).

13.04.530 License – Bond insurance requirement.

A. Every applicant for a license must, prior to the issuance of the license to him, deposit with the clerk:

1. A surety bond in favor of the city in the amount of $50,000, with a surety or sureties thereon approved by the clerk and conditioned that he will perform the obligations imposed by this chapter and the resolutions and requirements of the city relating to side sewers and side sewer contractors; and

2. Satisfactory proof that the applicant currently carries the following insurance coverage:

a. Public liability insurance in an amount not less than $300,000 for injuries and accidental death, and

b. Property damage and fire insurance in an amount not less than $50,000.

B. As long as a side sewer contractor has a license, he shall maintain such bond and insurance, and such additional limits as may be required from time to time, and shall furnish proof thereof to the city whenever required by the utilities director or clerk. (Ord. 627 § 1, 1989).

13.04.540 Liabilities and responsibilities.

Every licensed side sewer contractor shall:

A. Post a valid side sewer permit at the site of the work prior to commencing the work relating thereto;

B. Contract for work using only a form of side sewer contract as may be provided by the clerk or utilities director, executed in triplicate, which provides:

1. A clear description, including sketch, of the work to be performed and the materials to be used, and

2. That the workmanship and materials shall be guaranteed for a period of one year after installation and acceptance thereof;

C. Adhere at all times to the then current requirements of the city for side sewers and side sewer contractors, including such reasonable requirements of the utilities director or sewer superintendent relating to construction, installation, reconstruction and repair; and

D. Be liable for and indemnify the city against all damages to the sewage system of the city occasioned by his work. (Ord. 627 § 1, 1989).

13.04.550 License – Revocation.

A. The license of a side sewer contractor may be revoked by the city council or temporarily suspended by the utilities director until the next meeting of the city council, for any of the following causes:

1. Fraud or misrepresentation in applying for a license;

2. Failure to observe the rules and regulations of the city relating to side sewers and side sewer contractors;

3. Failure to pay for labor or materials used in the construction of side sewers;

4. Fraud or misrepresentation to the owner, occupant, or agent or representative thereof for the purpose of obtaining a contract for the construction of a side sewer, or during the course of work done pursuant to such a contract, and including the failure to adhere to the standard side sewer contract;

5. Failure to correct work or pay any default covered by the guaranty in the standard side sewer contract;

6. Failure to pay for work performed by the sewer superintendent or city, or caused to be performed

thereby, for which the contractor may be liable; or

7. Failure to maintain, or, when requested, prove the maintenance of, the surety bond and insurance required to be maintained by SMC 13.04.530.

B. Prior to the meeting of the city council at which action or revocation of a license will be taken, the contractor shall be notified and shall be afforded an opportunity to be heard by the city council at that meeting. If the license is revoked, or suspended, the contractor must forthwith cease any side sewer construction work being performed by him within the city. (Ord. 627 § 1, 1989).

13.04.560 License – Renewal.

The side sewer contractor's license may be renewed annually by application as aforesaid and satisfaction of the requirements of this chapter. (Ord. 627 § 1, 1989).

Article IX. Administration and Enforcement

13.04.570 Agent or owner of serviced premises.

Any person who has the care, custody, control or management of any premises or building, or who has control of the operation thereof or the collection of rentals therefrom, shall, for the purpose of this chapter, be deemed the agent of the owner of such premises or building, and the giving of all notices provided in this chapter to that agent shall be deemed notice to the owner. The mailing or delivery of bills for sewer service charges, permit fees, connection or trunkage charges, or other charges to that agent shall be deemed mailing or delivery to the owner. (Ord. 627 § 1, 1989).

13.04.580 Right of entry to inspect.

The utilities director and other duly authorized employees or representatives of the city bearing proper credentials and identification shall be permitted to enter upon all properties for the purpose of inspection, observation, measurement, sampling, and testing in accordance with the provisions of this chapter. (Ord. 627 § 1, 1989).

13.04.590 Sewer superintendent – Authority.

The utilities director shall be the administrator of the city's sewerage system, and all instructions and decisions made by him shall be final, but appeals from such instructions or decisions may be made to the city council in writing at any regular meeting of the council. Where this chapter requires approval by permission or decision of, or instruction from the utilities director, the utilities director shall be guided solely by generally recognized engineering standards and practices, the operational demands and requirements of the sewerage system, and the peculiarities of construction, topographies, soil condition, and other relevant special factors affecting specific decisions to be made by the utilities director. (Ord. 627 § 1, 1989).

13.04.600 Vandalism.

No unauthorized person shall maliciously, willfully or negligently break, damage, destroy, uncover, deface or tamper with any structure, appurtenance or piece of equipment which is a part of the city sewer works. (Ord. 627 § 1, 1989).

13.04.610 Violator – Subject to expenses.

Any person who violates any provision of this chapter, shall be liable to the city for any expense, loss, damage, cost of inspection or cost of correction incurred by the city by reason of such violation, including any expenses

incurred by the city in collecting from such person of such loss, damage, expense, cost of inspection or cost of correction. (Ord. 627 § 1, 1989).

13.04.620 Violator – Notice.

Any person found to be violating any provision of this chapter shall be served by the city with or mailed written notice stating the nature of the violation and providing a reasonable time limit for the satisfactory correction thereof. The offender shall, within the period of time stated in such notice, permanently cease all violations and make all necessary corrections. (Ord. 627 § 1, 1989).

13.04.630 Violator – Continued offense.

Any person who continues any violation beyond the time limit provided for in SMC 13.04.620, shall in addition to the items of expense provided in SMC 13.04.610, become liable to the city for a penalty in the amount of $500.00 for each day that the violation continues, together with interest thereon at 12 percent per year, from the expiration of the time limit provided in SMC 13.04.610. (Ord. 627 § 1, 1989).

13.04.640 Violations – Abatement.

Any violation of the provisions of this chapter which in the opinion of the utilities director constitutes a hazard to the public health, safety or welfare, is hereby declared to be a public nuisance, and may be abated by action in the superior court. (Ord. 627 § 1, 1989).

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[1] Prior legislation: Ords. 357, 364 and 541.

The Snoqualmie Municipal Code is current through Ordinance 1128, passed March 24, 2014.
Disclaimer: The City Clerk's Office has the official version of the Snoqualmie Municipal Code. Users should contact the City Clerk's Office for ordinances passed subsequent to the ordinance cited above.