F I N A L

City of Centralia General Sewer/ Facility Plan



Prepared for

City of Centralia

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Executive Summary

Purpose of the General Sewer/Facility Plan

The City of Centralia's (City's) wastewater system collects and treats wastewater effluent to state and federal requirements. The system consists of a network of mains, trunks, force mains, and pump stations that transport collected sewage to the City's wastewater treatment plant (WWTP). The WWTP located on Goodrich Road provides primary and secondary treatment for the City service area and North Port District. Besides treating the final effluent that discharges into the Chehalis River after being disinfected with ultraviolet (UV) light, the wastewater treatment facility also produces a Class A biosolids product using aerated static pile composting (with lime stabilization and heat pasteurization as a backup) that is safe for public use.

The City's wastewater system requires an ongoing capital improvement program to replace old components and make improvements to meet federal and state laws. The primary purpose of this General Sewer/Facility Plan is to identify and schedule sewer collection and treatment system improvements that correct existing deficiencies, plan for improvements to accommodate expansion as growth occurs, and provide a safe and reliable wastewater system for current and future customers. This General Sewer/Facility Plan will serve as the planning document for the City's sewer service for the next 20 years. It will be reviewed and approved by Washington State Department of Ecology (Ecology).

Summary of Key Elements

Sewer Service Area

The service area where the City currently provides sewer service, or is planning to provide service in the future, is divided into 29 sewer drainage basins. Outside the service area boundary, Lewis County is responsible for all sewer service, including onsite disposal systems such as septic tanks.

The sewer system consists of a treatment plant, 25 pump stations, and approximately 70 miles of gravity sewer piping and 19 miles of force mains. A summary of the sewer system characteristics is provided in Table ES-1. The gravity pipelines, summarized in Table ES-2, range in diameter from 6 inches to 26 inches. Approximately half of the gravity sewer pipe is 8-inch-diameter.

Table ES-1. Sewer System Characteristics

Description	Data
Population (City, 2015)	16,790
Total connections (2015)	6,488
Number of persons per household	2.4
Average gallons per capita per day (2011-2012; 2014-2015)	126
Average daily flow (2011-2012; 2014-2015)	1.91 mgd
Number of pump stations	25
Total length of gravity sewer main	~ 70 miles
Total length of force mains	~ 19 miles

Notes:
~ = approximately mgd = million gallon(s) per day

Table ES-2. Gravity Sewer Inventory

Diameter (inches)	Concrete (feet)	Asbestos Cement (feet)	Polyvinyl Chloride (feet)	HDPE (feet)	Vitrified Clay (feet)	Ductile Iron (feet)
6	1,962	178	75			
8	87,986	12,257	139,443	1,483	25,614	712
10	6,392	2,819	32,585	529	2,572	
12	2,319		16,478		337	
14					1,561	12
15			12,531			
16				850		
18	516		6,451			
21			5,390			
24	1,209		4,924			
26				752		
Total	**100,384**	**15,254**	**217,877**	**3,614**	**30,084**	**724**

Note:
HDPE = high-density polyethylene

Existing Facilities

The City currently owns and maintains 25 wastewater pump stations. The characteristics of each pump station are presented in Table ES-3.

Table ES-3. Pump Station Inventory

No.	Pump Station	Type	Initial Install	Most Recent Rehab./ Pump Replacement	No. of Pumps	Pump Size (hp)	Pump Capacity (gpm)
1	Borst Park	W/D	1979	2009	2	30	1,100
2	Mt. Vista	W/S	1982	2009	2	1.5	150
3	China Creek	W/S	2004/11	2011	3	289.5	1,100-4,500
4	Eshom	W/S	1982	2012	2	15	250
5	Galvin/Scheuber	W/S	1982	2007	2	20	560
6	Industrial Dr.	W/S	1978	2005	2	1	80
7	Jensen	W/S	1981	2011	2	2.5	150
8	High Street	W/S	1959	2010	2	5	200
9	Reynolds	W/S	1983	2012	2	7.5	250
10	Marion	P	1987	Motor #1 2012	2	3	100
11	State	W/S	1985	2004/2009	2	1.5	80
12	Salzer	W/S	1992	2001	2	7.5	115
13	Floral	W/D	1970	1998	2	7.5	350

Table ES-3. Pump Station Inventory

No.	Pump Station	Type	Initial Install	Most Recent Rehab./ Pump Replacement	No. of Pumps	Pump Size (hp)	Pump Capacity (gpm)
14	Ace Auto (Gold #2)	W/S	1970	2016	2	3	140
15	Fairgrounds (Gold #1)	W/S	1970	2012	2	5	120
16	South Tower	W/S	1978	2010	2	1.5	80
17	Van Buren	W/S	1953	2008	2	3	150
18	Jefferson	W/D	1962	2008	2	15	640
19	Long Road	W/S	1987	2011	2	7.5	150
20	W. Mellen	W/S	1970	2012	2	10	285
21	Military	W/S	1970	2010	2	7.5	100
22	Scammon Creek	W/S	1987	2010	2	7.5	200
23	Highland Park	W/S	1994	2007	2	5	150
24	North Tower	W/S	1999	2012	2	7.5	250
25	North Port	W/S	2007	original	2	7.5	300

Notes:
hp = horsepower
gpm = gallons per minute
N/A = not applicable
No. = number
P = package pump station
Rehab. = rehabilitation
W/D = wet well and dry well
W/S = wet well, submersible pump

Land Use

The study area boundaries for this General Sewer/Facility Plan encompass land within the City's Urban Growth Area (UGA), as described in the *Centralia Comprehensive Plan* (City of Centralia, 2017). Over the last several years, several development areas were proposed and were reviewed for sewer availability and the improvements required to serve these areas. The study areas included the following:

- Ford's Prairie
- Cook's Hill
- Waunch Prairie/Davis Hill
- Widgeon Hill
- Former City Golf Course

The land uses for these five study areas are described in Chapter 2.

Flows

The total influent flow to the WWTP is made up of untreated residential and light industrial flow. The wastewater generated from the collection system is pumped to the WWTP by the China Creek Pump Station and the North Port Pump Station.

The City's existing collection system flows were estimated using the WWTP discharge monitoring reports for the 2011 through 2015 period. Table ES-4 presents the average annual flow per year based on the sewered population. The 2015 average annual wastewater flow was 1.94 mgd.

Table ES-4. Existing Average Annual Flow Rates and Flow per Capita

Year	Average Annual Flow (mgd)	Sewered Population	Average Day Flow (gpcd)
2011	1.86	14,060	132
2012	2.15	15,570	138
2013	1.52	15,570	98
2014	1.69	15,570	109
2015	1.94	15,570	124
		Average[a]	**126**

[a] 2013 flow not included in average, because it is very low and is considered an outlier.
Note:
gpcd = gallon(s) per capita per day

Peaking Factors

A peaking factor is the ratio of a high flow, such as maximum day flow, to the average annual flow (AAF). Future sewer system flow rates are projected based on existing flow rates and are used to analyze how well the existing system is expected to perform in the future, indicating what improvements are needed to maintain or improve system function. Current peaking factors for the existing system are applied to those estimated future flow rates to establish projected peak flow scenarios for the system. Table ES-5 shows the existing flow rates and peaking factors as measured at the City's WWTP from 2011 to 2015.

Table ES-5. Summary of Existing Flows and Peaking Factors

Year	Flow Scenario	Flow (mgd)	Peaking Factor (by AAF)
2011	Average Annual	1.86	1.0
	Maximum Month	3.82	2.1
	Maximum Day	6.40	3.4
	Peak Hour	6.47	3.5
2012	Average Annual	2.15	1.0
	Maximum Month	4.47	2.1
	Maximum Day	6.69	3.1
	Peak Hour	7.35	3.4
2013	Average Annual	1.52	1.0
	Maximum Month	4.20	2.8
	Maximum Day	4.34	2.9
	Peak Hour	5.11	3.4
2014	Average Annual	1.69	1.0
	Maximum Month	3.99	2.4
	Maximum Day	6.28	3.7
	Peak Hour	6.86	4.1
2015	Average Annual	1.94	1.0
	Maximum Month	5.82	3.0
	Maximum Day	8.67	4.5
	Peak Hour	8.99	4.6

Projected Flows

Future flow rates were calculated for the 2020 (5-year) and 2035 (20-year) planning horizons. Population projections, as shown in Chapter 2, were used to calculate the projected flow rates by applying the estimated increases to the existing flow rates. Table ES-6 presents the projected flow rates for the City under average annual, maximum month, and maximum day conditions.

Table ES-6. Projected Flow Rates

Year	Estimated Centralia Population	Flow Scenario	Flow (mgd)
2020	17,500	Average Annual	2.20
		Maximum Month	5.40
		Maximum Day	7.75
		Peak Hour	8.28
2025	18,765	Average Annual	2.36
		Maximum Month	5.79
		Maximum Day	8.31
		Peak Hour	8.88
2030	22,535	Average Annual	2.84
		Maximum Month	6.96
		Maximum Day	9.98
		Peak Hour	10.67
2035	24,164	Average Annual	3.04
		Maximum Month	7.46
		Maximum Day	10.70
		Peak Hour	11.44

The existing WWTP is currently rated for an average annual flow of 2.7 mgd, maximum month flow of 5.5 mgd, a maximum day flow of 8.6 mgd, and a peak hour flow of 9.3 mgd. The hydraulic capacity of the plant will be exceeded within the planning period, based on the projected flows presented in Table ES-6. Refer to Chapter 6 for more discussion regarding the WWTP capacity evaluation and plans for additional capacity.

Infiltration and Inflow

Infiltration and inflow (I/I) is the combination of groundwater and surface water that enters the sewer system. Infiltration is groundwater entering the sewer system through defects in the sewer system infrastructure, such as fractured pipes and leaking pipe joints. Inflow is surface water that enters the sewer system from sources such as roof and street drains and leaky manhole covers.

Inflow is considered to be non-excessive if the average daily flow during periods of heavy rainfall does not exceed 275 gpcd. Between the beginning of 2011 and the end of 2015, peak flows exceeded this threshold about 4.7 percent of the time. The largest peak flow was 516 gpcd in December 2015. This storm event recorded 0.58 inch of precipitation on December 1, 2015, with a peak of 1.35 inches on December 8, 2015, followed by several days of record precipitation for the remaining days of December. The WWTP influent flow does respond to large precipitation events occurring over a few days. The City has included an I/I study as part of their capital improvement plan so that the results can be confirmed and to locate the affected collection system areas to determine if there are any cost-effective sewer rehabilitation measures to remove excessive inflow.

Between the beginning of 2011 and the end of 2015, there were three dry weather flow events during suspected high groundwater conditions. Two of these events (May 2013 and April 2014) did not have excessive infiltration, having average daily dry weather flows of 81 gpcd and 114 gpcd, respectively. The only event that had excessive infiltration occurred in late April of 2015 and had an average daily dry weather flow of 131 gpcd. These numbers indicate that the system does not experience excessive infiltration. Section 3.1.5 provides more information on I/I.

Existing Loads

Table ES-7 presents the total and per capita WWTP loading data for 2015, which is the first full year of data after influent sampling improvements. Based on a sewered population of 15,570, the plant had an annual average 5-day biochemical oxygen demand (BOD_5) loading of 0.177 pound per capita per day (ppcd) and a total suspended solids (TSS) loading of 0.207 ppcd. The BOD_5 value is less than Ecology's criterion of 0.2 ppcd (Ecology, 2008). As shown in Table ES-7, the 2015 maximum month BOD_5 load was 3,776 pounds per day (ppd) and the maximum month TSS load was 3,973 ppd. Based on the City's currently rated BOD_5 loading capacity of 4,400 ppd and TSS loading capacity of 5,000 ppd, the plant is currently operating at 86 percent of its BOD_5 capacity and 79 percent of its TSS capacity. Chapter 6 discusses the WWTP capacity evaluation and the results of that work to re-rate the plant.

Table ES-7. 2015 Wastewater Treatment Plant Loading

Constituent	Flow Scenario	Concentration (mg/L)	Loading (ppd)	Per Capita Loading (ppcd)[a]
BOD_5	Average Annual	230	2,764	0.177
	Maximum Month	317	3,776	0.243
	Maximum Day	349	5,508	0.354
TSS	Average Annual	271	3,230	0.207
	Maximum Month	366	3,973	0.255
	Maximum Day	412	5,486	0.352

[a] Based on sewered population of 15,570.

Note:
mg/L = milligram(s) per liter

Projected Loads

Projected loads for the WWTP were calculated for 2020, 2025, 2030, and 2035 based on the existing per capita load for 2015 using the BOD_5 and TSS per capita loadings shown in Table ES-7. The future loads are presented in Table ES-8.

Table ES-8. Projected Loads

Year	Estimated Centralia Population	Flow Scenario	Projected BOD_5 Loading (ppd)	Projected TSS Loading (ppd)
2020	17,500	Average Annual	3,106	3,630
		Maximum Month	4,244	4,465
		Maximum Day	6,191	6,167
2025	18,765	Average Annual	3,331	3,893
		Maximum Month	4,551	4,788
		Maximum Day	6,638	6,612
2030	22,535	Average Annual	4,000	4,675
		Maximum Month	5,465	5,750
		Maximum Day	7,972	7,941

Table ES-8. Projected Loads

Year	Estimated Centralia Population	Flow Scenario	Projected BOD_5 Loading (ppd)	Projected TSS Loading (ppd)
2035	24,164	Average Annual	4,289	5,013
		Maximum Month	5,860	6,165
		Maximum Day	8,548	8,515

Wastewater Treatment Evaluation

The Centralia WWTP was completed in March 2004 and includes screening, grit removal, activated sludge aeration basins, secondary clarifiers, and UV disinfection prior to discharge to the Chehalis River through a multi-port diffuser at river mile 61.25. Solids processing includes belt filter press dewatering of activated sludge solids and aerated static pile composting. The City also has the ability to use lime pasteurization as a backup solids processing alternative.

Influent sewage is pumped to the WWTP by either the China Creek Pump Station or the North Port Pump Station. Both pump stations use twin force mains of different sizes to maintain minimum velocity over the wide range of flows. Magnetic flow meters measure each of the incoming flows at the headworks.

Potential Future Treatment Requirements

Future regulatory requirements may include advanced treatment to address increasingly stringent river discharge criteria for nutrients. The nutrients evaluated for this General Sewer/Facility Plan were phosphorus and nitrogen. In addition to nutrients, effluent temperature is a concern as indicated by Ecology's 2001 total maximum daily load for temperature in the Centralia segment of the Chehalis River.

Plant Capacity

A WWTP capacity evaluation was completed to determine the capacity of the plant to treat projected flows and loads, and prepare a plan to maintain adequate capacity. The capacity of each treatment process including the headworks screens, aeration basins and secondary clarifiers, UV disinfection system, effluent pumps, and solids handling was reviewed and compared to projected flows and loads. Table ES-9 presents the 2015 plant influent values, the permitted capacity, and projected 2035 influent flows and loads. For 2015, the plant was at 86 percent of the maximum month BOD loading capacity and 106 percent of the maximum month flow capacity.

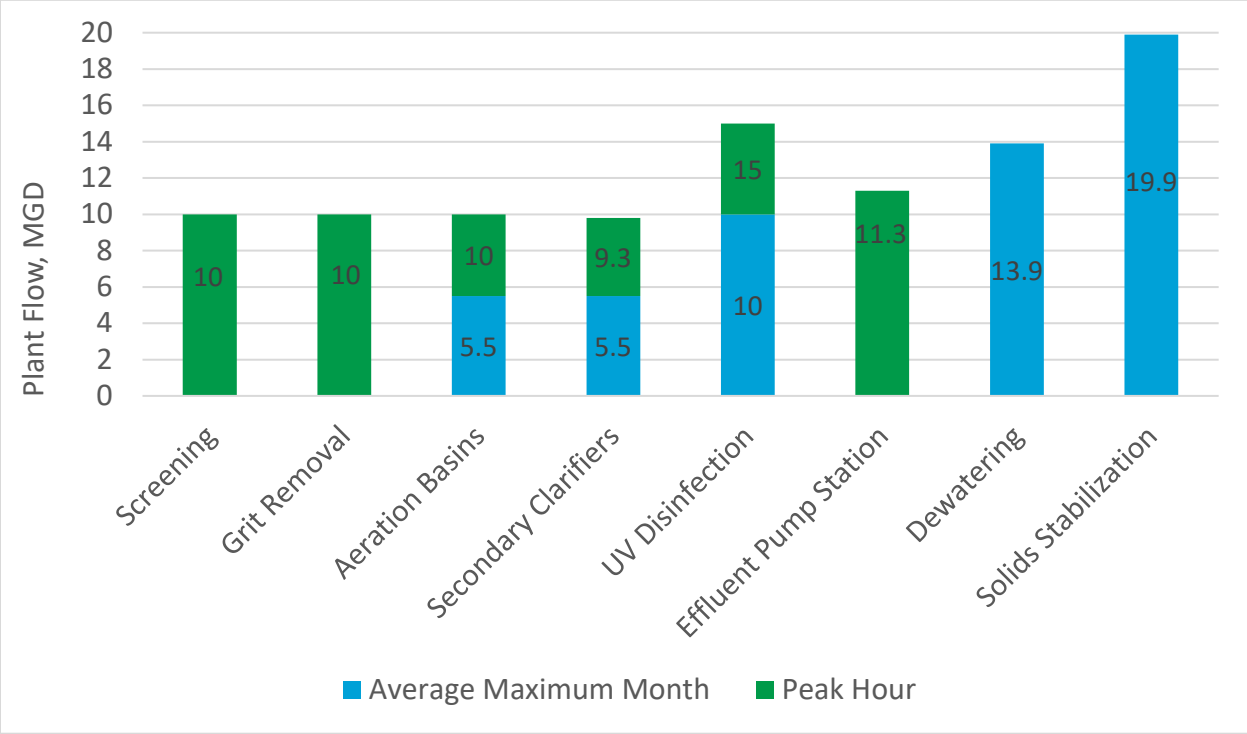
Table ES-9. Capacity Summary

Parameter	2015 Base Year	NPDES Permit Capacity	2015 % of Capacity	2035 Projected Influent Value
Maximum Month BOD_5 (ppd)	3,776	4,400	86	5,860
Maximum Month TSS (ppd)	3,973	5,000[a]	79	6,165
Maximum Month Flow (mgd)	5.82	5.5	106	7.46
Maximum Day Flow (mgd)	8.67	8.6	101	10.70
Peak hour/instantaneous peak flow (mgd)	9.1	9.3	98	11.44

[a] As approved in the 2014 General Sewer Plan Update

Figure ES-1 shows a summary of the process capacity for each treatment process. The current plant process capacity is 5.5 mgd, as limited by the secondary treatment process. The hydraulic capacity (peak hour) is 9.3 mgd, as limited by the secondary clarifiers.

Figures ES-2 and ES-3 show projected flows and loadings along with the revised plant capacity. As shown, in order to accommodate future growth, improvements will be required to expand the capacity of the WWTP. If the population increases as described in Chapter 2, the WWTP hydraulic capacity will be exceeded in 2024 and the plant loading will be exceeded in 2026. The City will closely monitor influent flow and loading on a yearly basis to verify influent assumptions presented in this General Sewer/Facility Plan.



Note:

Dewatering capacity is based on 5 days per week, 8 hours per day operation.

Figure ES-1. Process Capacity Summary

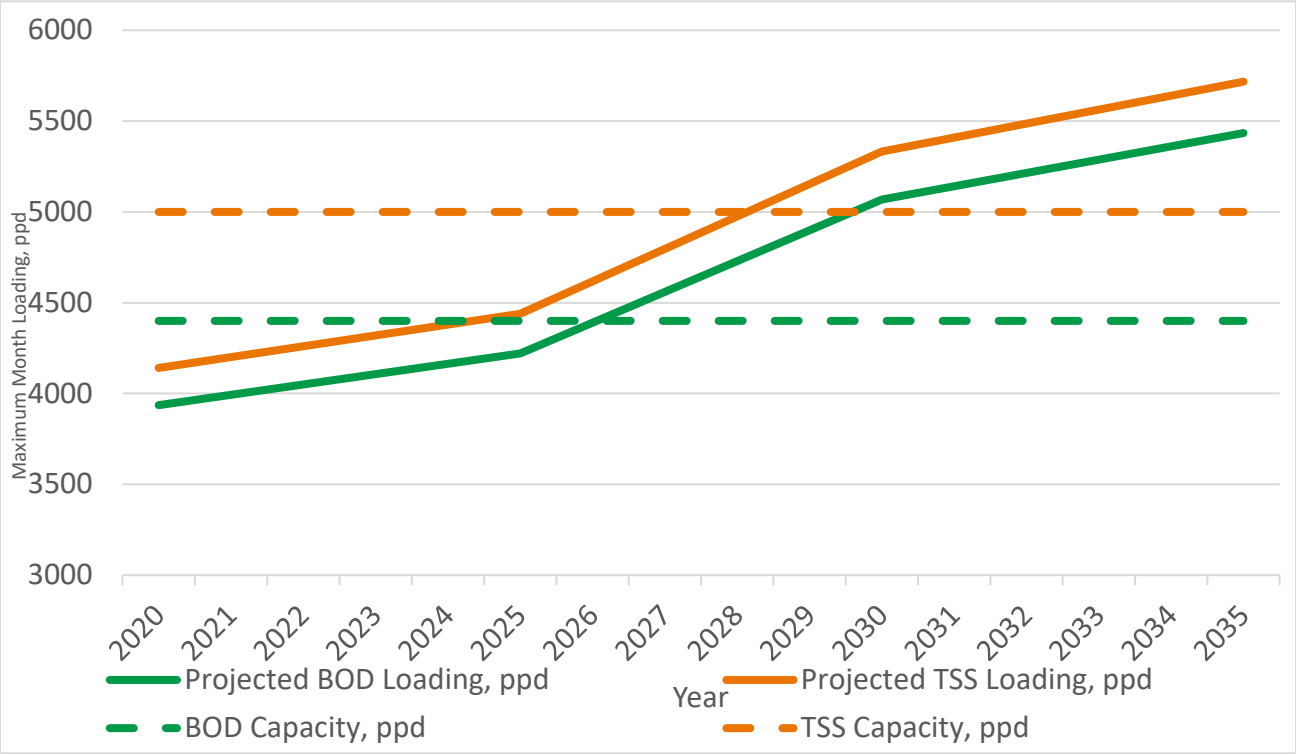


Figure ES-2. Projected Loading Versus Proposed Capacity, Maximum Month

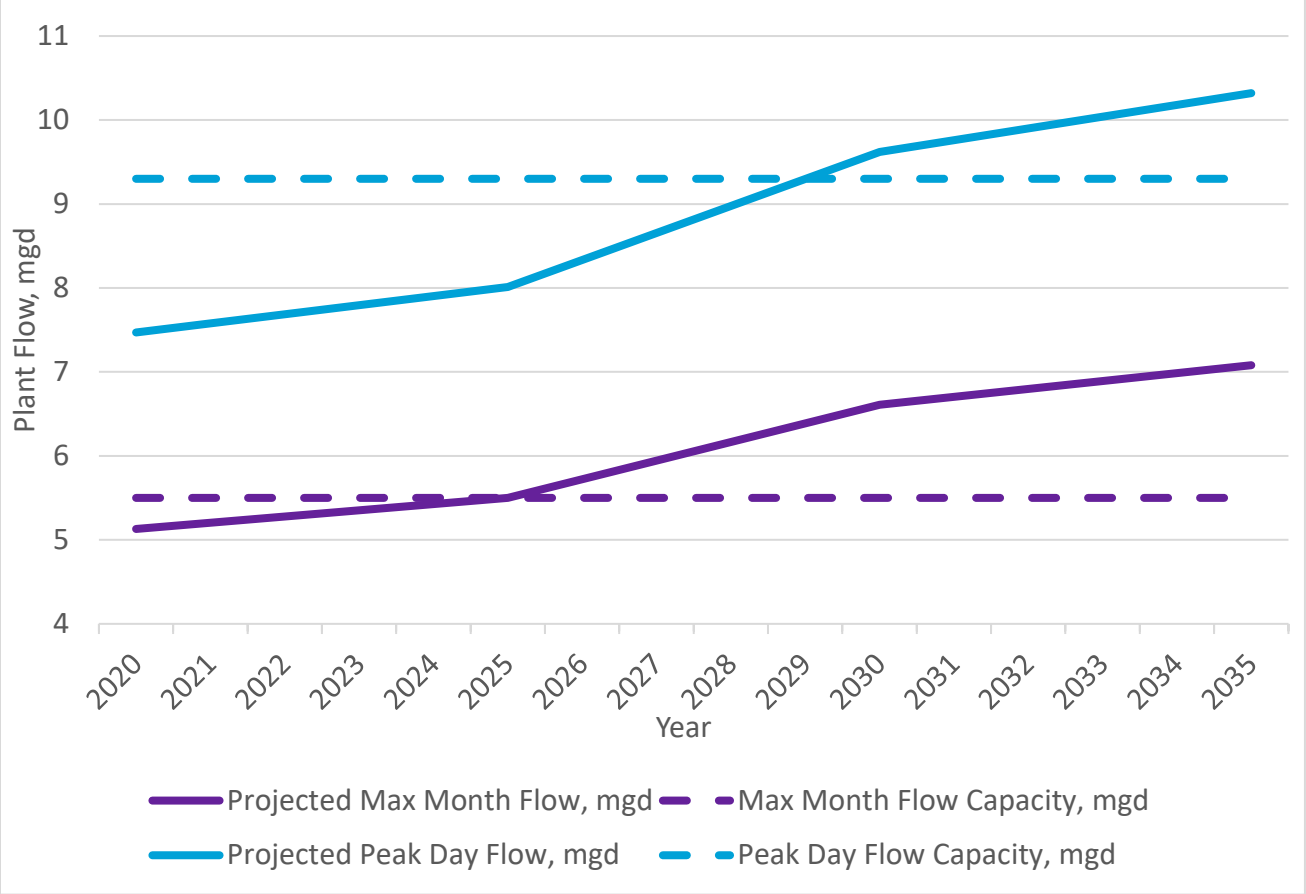


Figure ES-3. Projected Flow Versus Proposed Capacity, Maximum Month

Wastewater Treatment Plant Alternatives

WWTP upgrades are needed by 2024 to increase plant capacity and meet the effluent limits defined in the City's current NPDES permit. Three alternatives were considered to provide the additional process capacity required:

- Alternative 1 – Third Aeration Basin and Secondary Clarifier
- Alternative 2 – Primary Clarifiers and Anaerobic Digester
- Alternative 3 – Membrane Bioreactor

The ability of each alternative to meet potential future nutrient removal requirements was also considered. Alternative 1 has the lowest capital and life-cycle cost (see Chapter 6) and meets WWTP capacity needs for the planning period. Therefore, Alternative 1 is the selected alternative.

The alternatives considered address longer-term plant capacity needs. The City also identified desired improvements to benefit operations in the near-term. Therefore, two phases of plant upgrades are planned: Phase I to add operational flexibility for the near term, and Phase II to address capacity needs for the longer term.

Phase I includes the addition of mixed-liquor recirculation pumps in the aeration basins and dedicated waste activated sludge (WAS) storage tanks to increase operational flexibility and optimize the existing WWTP capacity.

Phase I upgrades will include the following:

- Installing mixed-liquor recirculation (MLR) pumps in the existing aeration basins to pump mixed liquor from the end of the aeration basins to the beginning (anoxic zone) of the aeration basins.

- Improving solids handling by installing waste activated sludge (WAS) storage tanks. WAS will be pumped from the secondary clarifiers to the WAS tanks for storage, then pumped from storage to the belt filter press (BFP) for dewatering.
- Installing new positive-displacement blowers in the existing blower building to provide aeration for the WAS storage tanks.
- Expanding the existing blower building to provide a second electrical room (electrical annex) to allow for expansion of the existing motor control center (MCC) and remote input/output racks to supply power and control to the Phase I equipment.

Refer to Chapter 6 for the design summaries for MLR, WAS storage tanks, and the WAS blowers. Sizing of the electrical annex is also discussed.

Phase II improvements include a third aeration basin, a third secondary clarifier, a third WAS storage tank, a third headworks screen, and a second grit removal system. The existing blower building also would be expanded. If further nitrogen removal is desired or required, additional upgrades will be needed. The existing aeration basins were sized and constructed with sufficient capacity so that a swing zone could be added in the future as needed. A baffle wall can be constructed in the first one-third of the aerobic zone to provide a swing zone after the anoxic zone. Submersible mixers would be added to these new swing zones. The swing zone helps improve the operational flexibility in treating influent TKN/ammonia loading and would be operated differently depending on the season. The existing diffusers may be adequate to supply the required air demand in the aerobic zone; this will be verified with additional influent data.

Table ES-11 presents a summary of the secondary process improvements required and design criteria, including the associated dimensions and capacity, for the Phase II improvements described in Chapter 6.

Table ES-11. Summary of Phase II Improvements Design Criteria

Component	Quantity (new units)	Criteria and Sizing Value
Mechanical Screen	1	5 MG
Vortex Grit Removal System	1	10 MG
Grit Pump	1	250 gpm
Aeration basin	1	
Volume		0.9 MG
Volume unaerated		14 percent
Sidewater depth		15 feet
Length		205 feet
Width		39 feet
Hydraulic retention time (max month)		7.5 hours
Solids retention time (max month)[a]		10 days
Mixed liquor suspended solids		2,900 mg/L
Minimum bioreactor temperature[b]		11.5 degrees Celsius
Aeration equipment		
Multistage centrifugal aeration basin blower	1	3,200 scfm
Fine bubble diffusers	459	2.0 scfm each
Dissolved oxygen concentration		2.0 mg/L

Table ES-11. Summary of Phase II Improvements Design Criteria

Component	Quantity (new units)	Criteria and Sizing Value
Mixed-liquor recirculation pumps	1	2,000 gpm each
Secondary Clarifier (circular)	1	
Diameter		70 feet
Sidewater depth		18 feet
Maximum month overflow rate		715 gpd/sf
Peak flow overflow rate		1,200 gpd/sf
Maximum month solids loading rate		23.2 lb/sf/d
Peak solids loading rate		41.5 lb/sf/d
SVI (peak day design)		150 mL/g
RAS ratio		48 percent
WAS tank (each)	1	
Volume		0.1 MG
Sidewater depth		20 feet
Length		26 feet
Width		26 feet
WAS tank mixers (each)	2 1	7.5 hp maximum
Positive-displacement WAS blower (each)	1	540 scfm
Blower building expansion		20 feet x 32 feet
Ultraviolet Disinfection	1 channel	
Type		Low pressure
Design Flow		3.1 mgd
TSS		30 mg/L
UV Transmittance		65%
Aeration basin mixers for swing zone (each)[c]	3	10 hp

[a] The selected SRT provides a safety factor of 1.23 for what is required to nitrify the anticipated peak day TKN loading. This SRT correlates with the 10.8 days used for the 2002 design.

[b] Equal to the minimum 7-day average influent temperature from 2008 to 2016. According to 2014 and 2015 data, the maximum week loading is expected to occur in the wet weather season when the influent temperature is low. Process performance at minimum 30-day temperature (12 degrees Celsius) and minimum day temperature (10.7 degrees Celsius) was also evaluated to test sensitivity of the proposed design to wet weather temperature fluctuations. The proposed design was found to provide sufficient capacity to meet process performance requirements during minimum day wet weather temperatures.

[c] Only required if TN less than 10 mg/L is required

Notes:
hp = horsepower
scfm = standard cubic foot/feet per minute

Operations and Maintenance

The City's Wastewater Department provides the resources and staff to perform system repairs, implementation of the standard operating procedures, and ongoing system maintenance. The City currently employs the equivalent of 13 full-time positions to oversee the operations and maintenance (O&M) of the collection system and WWTP. Table ES-12 presents a breakdown of the type and amount of staff allocated to different positions within the City's Wastewater Department. Some positions represent less than one full-time position, because duties are shared among other positions and City departments.

Table ES-12. Wastewater Department Operations and Maintenance Staff

Position	Full-time Equivalents
Wastewater Treatment Plant	
Manager	0.5
Operators	3.5
Maintenance	0.5
Laboratory	1.0
Instrumentation and Electrical	0.5
Pretreatment	1.0
Farm	1.0
Total WWTP	**8.0**
Collection System	
Manager	0.5
Instrumentation and Electrical	0.5
Technicians	4
Total Collection System	**5.0**

The plant is staffed 5 days per week, 8 hours per day, by the plant manager, a process analyst, a lead operator, three operators, and an electrical/instrumentation technician. Collection system staff are responsible for the O&M of the collection system sewer mains and pump stations. The City's 25 pump stations are inspected once per week. All pump stations have radio telemetry and are monitored continuously for alarms.

Operations and Maintenance Programs

Sewer Service

The City has a sewer ordinance (Centralia Municipal Code 15.10) that describes domestic and high strength users, user charges, side sewer connections, damage to sewers, permit application, type, and fees, sewer construction and testing, prohibited discharges, violations and penalties, and schedule of charges.

Fats, Oil, and Grease

The City has a fats, oil, and grease (FOG) program including mandatory FOG pretreatment per the Centralia Municipal Code 15.10.280. One staff member is dedicated to the operation of this program, which requires that any customers serving or preparing food where grease may be introduced into the system must have pretreatment facilities to prevent discharge of FOG.

Water Surface Elevation Monitoring

This program consists of measuring water surface elevations at strategic manholes within the existing collection system. This program is one of two approaches the City employs to evaluate the wet weather system flows. This program is used to identify the extent of surcharging in the system and the variation in surcharging during the year.

Flow Monitoring

The City's flow-monitoring efforts include monitoring dry and wet weather flow at selected locations to quantify I/I reduction efforts and recording flows at existing pump stations.

Financial

Capital

Chapter 8 presents the financial analysis for the capital improvement projects identified in this plan, including estimated capital costs, O&M costs, and life-cycle costs. Project financing and user charges required to support the projects are also discussed.

Class 5 capital cost estimates were prepared to the Association for the Advancement of Cost Engineering International standards for the projects identified in this plan. As defined by these standards, the expected accuracy range for a Class 5 estimate is a low of minus 30 percent and a high of plus 50 percent. Table ES-13 summarizes the projects identified in the sewer system evaluation and their estimated costs.

Table ES-13. Proposed Sewer and Facility Plan Capital Projects

ID	Project	Description	Total Estimated Cost (2016 dollars)
CC-1	China Creek Interceptor Stabilization	Install riprap along Chehalis River to protect pipelines from erosion	$1,750,000
CS-1	Centralia Station	New sewer to serve Centralia Station development	$3,880,000
M-1	Pump Station Maintenance	Replacement of mechanical and electrical and concrete corrosion coatings	$1,820,000
II-1	I/I Demonstration and Removal Projects	Demonstrate technology, determine effectiveness and confirm costs of I/I removal technologies	$2,700,000
WW-1	Phase 1 WWTP Improvements	Design and construction of recirculation pumps and solids storage	$5,840,000
WW-2	Solids Handling Upgrades	Upgrade dewatered sludge conveyance, new belt filter press, and compost facility covers	$1,630,000
WW-3	Headworks Screen	Additional headworks screen	$2,120,000
WW-4	PLC and MCC Upgrades	Upgrade PLC and MCC equipment	$500,000
WW-5	Phase 2 WWTP Improvements	Design and construction of additional plant capacity	$17,202,000
WW-6	Temperature Compliance Evaluation Update	Review new temperature data, evaluate and select temperature mitigation	$60,000
WW-7	Thermal Mitigation Needs	Design and construct thermal mitigation alternative	$1,240,000
ES-1	Pipeline Replacement Program	Aging pipeline replacement program	$5,220,000
ES-4	First Street Between G and F Streets	Existing System Improvement	$160,000

Table ES-13. Proposed Sewer and Facility Plan Capital Projects

ID	Project	Description	Total Estimated Cost (2016 dollars)
F-1	Ford's Prairie Interceptor	Provide sewer to UGA	$11,810,000
F-2	Area North of and Adjacent to Kuper Road	Provide sewer to UGA	$2,950,000
F-3	Private Drives Area	Provide sewer to UGA	$1,310,000
F-4	Trailer Park Area	Provide sewer to UGA	$1,270,000
F-5	Southeast Area	Provide sewer to UGA	$7,920,000
F-6	Industrial Area	Provide sewer to UGA	$1,040,000
F-7	Reynolds Avenue Area	Provide sewer to UGA	$2,540,000
F-9	Southwest Area	Provide sewer to UGA	$4,030,000
F-10	Gallagher Road Area	Provide sewer to UGA	$1,950,000
NS-7	Fords Prairie Residential	Provide sewer to UGA	$8,200,000
US-7	Fords Prairie	Provide sewer to unsewered area within City limits	$1,090,000
CH-1	Cook's Hill Sewer Extension	Provide sewer to UGA	$14,520,000
CH-2	Cook's Hill Pump Stations	Provide sewer to UGA	$1,030,000
NS-5	Cooks Hill Residential	Provide sewer to UGA	$7,450,000
NS-15	Graf Road Residential	Provide sewer to UGA	$4,660,000
US-2	South Cooks Hill Residential	Provide sewer to unsewered area within City limits	$80,000
NS-9	Kresky Residential I Commercial	Provide sewer to UGA	$2,120,000
US-3	East of Plummer Lake	Provide sewer to unsewered area within City limits	$670,000
W-1	Waunch Prairie Interceptor	Provide sewer to UGA	$3,310,000
W-2	North Pearl Street Interceptor	Provide sewer to UGA	$4,310,000
W-5	Dixon Road and Roanoke Street Area	Provide sewer to UGA	$1,990,000
W-6	Southeast Area	Provide sewer to UGA	$2,270,000
W-7	Oakview Avenue Area	Provide sewer to UGA	$2,130,000
W-8	Carson Street Area	Provide sewer to UGA	$6,030,000
W-9	Sawall and Lowery Area	Provide sewer to UGA	$3,140,000
WH-1	Widgeon Hill Sewer Extension	Provide sewer to UGA	$3,900,000
WH-2	Widgeon Hill Pump Station	Provide sewer to UGA	$1,040,000
US-4	Ham H/11	Provide sewer to unsewered area within City limits	$9,660,000
NS-10	South Ham Hill Residential	Provide sewer to UGA	$3,000,000
	Total		**$159,542,000**

Capital Financing Plan

Financing for the City's wastewater capital program consists primarily of proceeds from long-term, fixed-rate sewer revenue bond sales; short-term variable rate borrowing; cash transfers from the

operating fund; and low-interest loan programs administered by the State of Washington, such as State Water Pollution Control Revolving Loan Fund loans and Public Works Trust Fund loans. Ongoing system O&M programs (including pump station maintenance and I/I removal) is paid from the wastewater O&M budget and funded by rates. Projects driven by development, such as the Centralia Station, are assumed to be paid for by the developer.

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Acronyms and Abbreviations

°C	degree(s) Celsius
AAF	average annual flow
AFD	adjustable-frequency drive
ASR	aquifer storage and recovery
BFP	belt filter press
BOD	biochemical oxygen demand
BOD_5	5-day biochemical oxygen demand
BPS	booster pump station
C	Candidate
CCI	Construction Cost Index
CCTV	closed-circuit television
cfs	cubic foot/feet per second
CH2M	CH2M HILL Engineers Inc.
C.I.P.	Capital Improvement Plan
CIP	cast-in-place
CIPP	cured-in-place pipe
City	City of Centralia
CMC	Centralia Municipal Code
DMR	discharge monitoring report
DO	dissolved oxygen
DU	dwelling unit
DU/acre	dwelling unit(s) per acre
DWMM	dry weather maximum month
E	Endangered
Ecology	Washington State Department of Ecology
ENR	*Engineering News-Record*
EPA	U.S. Environmental Protection Agency
FOG	fats, oil, and grease
fps	foot/feet per second
FTE	full-time equivalent
General Sewer/ Facility Plan	Centralia General Sewer and Facility Plan
GMA	Growth Management Act

gpcd	gallon(s) per capita per day
gpd/sf	gallon(s) per day per square foot
gpm	gallon(s) per minute
HDPE	high-density polyethylene
hp	horsepower
I/I	infiltration and inflow
I/O	input/output
I-5	Interstate 5
JARPA	Joint Aquatic Resource Permit Application
lbs/d	pound(s) per day
lbs/hr/m	pound(s) per hour per meter
Lewis County Plan	*Comprehensive Land Use Plan for Lewis County, Washington* (Lewis County, 2013)
lf	linear foot/feet
M	Monitor
MBR	membrane bioreactor
MCC	motor control center
MDDF	maximum day design flow
MG	million gallon(s)
mg/L	milligram(s) per liter
mgd	million gallon(s) per day
mL	milliliter(s)
MLR	mixed-liquor recirculation
MLSS	mixed-liquor suspended solids
MLVSS	mixed-liquor volatile suspended solids
MWDF	maximum week design flow
N/A	not applicable
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NS	New Sewer
O&M	operations and maintenance
Orange Book	*Criteria for Sewage Works Design*
P	package pump station
PHDF	peak hour design flow
PHS	Priority Habitats and Species

PIDF	peak instantaneous design flow
PLC	programmable logic controller
ppcd	pound(s) per capita per day
ppd	pound(s) per day
ppd/sf	pounds per day per square foot
PRV	pressure-reducing valve
PS	pump station
psi	pound(s) per square inch
PT	Proposed Threatened
PVC	polyvinyl chloride
RAS	return activated sludge
RCW	Revised Code of Washington
RPA	reasonable potential analysis
S	Sensitive
SC	Species of Concern
SCADA	supervisory control and data acquisition
scfm	standard cubic foot/feet per minute
SEPA	State Environmental Policy Act
SERP	State Environmental Review Process
sf	square foot/feet
SPR	spiral-wound pipe renewal
SRF	State Revolving Fund
SRT	solids retention time
STEP	septic tank effluent pumping
SVI	sludge volume index
SWCAA	Southwest Clean Air Agency
SWD	side water depth
T	Threatened
TKN	total Kjeldahl nitrogen
TMDL	total maximum daily load
TN	total nitrogen
TSS	total suspended solids
UGA	Urban Growth Area
UGB	Urban Growth Boundary
US	Unsewered Communities

USGS	U.S. Geological Survey
UV	ultraviolet
VFD	variable-frequency drive
VSS	volatile suspended solids
WAC	Washington Administrative Code
WAS	waste activated sludge
W/D	wet well and dry well
WDFW	Washington Department of Fish and Wildlife
W/S	wet well, submersible pump
WSDOT	Washington State Department of Transportation
WWMM	wet weather maximum month
WWTP	wastewater treatment plant

CHAPTER 1

Introduction

This chapter provides a brief history of the City of Centralia's (City's) sewer collection and treatment systems, demonstrates the compatibility of the City's General Sewer and Facility Plan (General Sewer/Facility Plan) with other plans, identifies the designated land uses within the existing and future service area, and presents population projections within the City's planning area.

The General Sewer/Facility Plan must be developed and coordinated to support the growth projected in adopted Lewis County comprehensive plans at the time development occurs and is ready for occupancy. At the same time, the General Sewer/Facility Plan must continue to provide established minimum levels of service to the existing population. This General Sewer/Facility Plan will serve as the planning document for the City's sewer service for the next 20 years.

1.1 Background

According to Washington Administrative Code (WAC) 173-240-020(7), a general sewer plan is defined as "a comprehensive plan for a system of sewers adopted by a local government entity." In order to provide sewer service in Washington, a governmental entity must have a plan that is reviewed and approved by Washington State Department of Ecology (Ecology). A general sewer plan typically describes the general location and process of treatment and disposal facilities, trunk and interceptor sewers, pump stations, monitoring and control facilities, and local service areas. Per WAC 173-240-060, a facility plan is defined as "a document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility." (Washington State, 2018)

1.1.1 System Ownership and Management

Centralia is located in Lewis County, approximately 25 miles south of Olympia. The City owns and operates a wastewater collection and treatment system located within the City limits. Sewage collection, treatment, and disposal are provided through a conventional gravity collection system and a treatment facility that includes screening, grit removal, activated sludge aeration basins, secondary clarifiers, and ultraviolet (UV) disinfection prior to discharge to the Chehalis River. The WWTP, 25 pump stations and the associated collection and conveyance system are owned, operated and maintained by the City of Centralia wastewater department. The City has approximately 39 grinder pumps installed throughout the City. Currently, the City and grinder pump homeowner's have a service agreement that states that the homeowner's are responsible for performing the proper maintenance either by a qualified individual or firm. The City's Municipal Code Title 15.10.180 Paragraph H outlines the use of alternative systems which covers the installation, ownership and maintenance of the systems. The City is planning to add a list of approved qualified contractors that can perform maintenance on these systems. All maintenance and inspections scheduled will be tracked and maintained by the City of Centralia maintenance program.

1.1.2 Projects Completed Since the Previous Plan

The sewer portion of this document was last updated in 2008. Since then, the City has implemented several of the recommended projects identified in the last update. Table 1-1 provides a list of projects that have been completed since the last update.

Table 1-1. Projects Completed Since the Previous Plan

Designator	Name
F-8	Galvin Road area
US-1	West Cooks Hill
US-8	Scammon Creek Residential
ES-2	Replace existing trunk sewer along Fifth and Sixth Streets
ES-3	Borst Park
ES-5	Maple and Hansen on North Pearl and along Railroad
ES-6	Euclid Way
ES-7	Oxford between 6th Street and Vienna Street
N/A	Telemetry required at Mt Vista, Jensen, and State pump stations
N/A	Sliplining the gravity main under China Creek

Note:
N/A = not applicable

1.1.3 Overview of Existing Systems

Centralia city limits encompass approximately 7.6 square miles or 4,927 acres, while the Urban Growth Area (UGA) consists of 8.2 square miles or 5,227 acres and includes parts of unincorporated Lewis County. Together, the UGA and the incorporated City of Centralia make up the City's Urban Growth Boundary (UGB). According to the City's Comprehensive Plan (City of Centralia, 2017), "the primary purpose of Centralia's UGB is to define the area where public expenditures already have been made for service facilities or will be in the future and to guide development to that area in order to make more efficient use of public investments." Centralia is primarily a residential community. As of 2015, the City provided service to approximately 15,570 customers within the City's sewer service area. The City's sewer system consists of 1 treatment plant, 25 pump stations, and approximately 70 miles of gravity collection and 19 miles of force main pipes. A summary of sewer system data is provided in Table 1-2.

Table 1-2. Summary of Sewer System Data

Description	Data
2015 Estimated Population (City)	16,790
2015 Estimated Sewer Population	15,570
Total Sewer Connections	6,488
Average Gallons per Capita per Day	126
Average Flow (mgd)	1.92
Number of Pump Stations	25
Length of Sewer Main (miles)	70
Length of Force Main (miles)	19

Note:
mgd = million gallon(s) per day

1.2 Purpose

In February 2016, the City authorized CH2M HILL Engineers, Inc. (CH2M) to prepare a General Sewer/Facility Plan in accordance with WAC 173-240-050 and 173-240-060. The General Sewer/Facility

Plan provides the City with a framework to plan for improvements in the collection system and at the wastewater treatment plant (WWTP) as growth occurs inside the City's sewer service area. The previous General Sewer Plan update was prepared and submitted to Ecology in 2015. The purpose of this updated General Sewer/Facility Plan is to address comments from Ecology on the 2015 General Sewer Plan and to update the plan with the following items:

- Update the existing and projected sewer flows and loads.
- Update the infiltration and inflow (I/I) analysis to evaluate the extent of I/I according to guidelines set forth by the U.S. Environmental Protection Agency (EPA).
- Analyze the existing sewer system to determine if it meets minimum requirements mandated by Ecology and the City's own policies and design criteria.
- Identify sewer system improvements that will resolve existing system deficiencies and accommodate future system needs.
- Determine the overall reliability and vulnerability of the existing wastewater lift stations.
- Identify surface water discharge criteria
- Evaluate and plan for the impacts of potential nutrients limitations.
- Evaluate the impacts of metals and temperature on wastewater treatment.
- Evaluate plant flow and loading capacity.
- Evaluate wastewater treatment and disposal alternatives.
- Prepare a schedule of improvements that meets the goals of the City's financial program.

1.3 Regulatory Requirements

In addition to the City's need for a General Sewer/Facility Plan, other regulations also govern the development of this plan. These regulations are briefly summarized in this section.

1.3.1 Growth Management Act

Under the requirements of the 1990 Growth Management Act, the City must commit to serving the sewer needs of the planned growth that will occur within the City's urban growth boundary within the next 6 years. This General Sewer/Facility Plan includes an evaluation of the existing sewer system and identification of additional facilities needed to accommodate the planned growth to comply with state regulations. This information has been used to develop the Capital Improvement Program presented in Chapter 8 of this General Sewer/Facility.

1.3.2 Washington State Department of Ecology

This General Sewer/Facility Plan was prepared in accordance with the requirements of Ecology as defined in WAC 173-240, which states that a sewer plan should accomplish the following:

- Include sufficient detail to assure the technical feasibility of proposed sewer system improvements.
- Provide a method of distributing the cost and expense of the sewer system.
- Demonstrate the financial feasibility of the plan implementation.

Ecology is responsible for reviewing and approving plans for sewer collection and treatment systems. Before Ecology will review and approve project implementation, the City must have an Ecology-approved sewer plan that describes the need for each project and how the project will fulfill that purpose. The City also needs a Facility Plan before it can receive assistance for those projects from the State of Washington grant and loan programs.

1.3.3 Lewis County

The *Comprehensive Land Use Plan for Lewis County, Washington* (Lewis County Plan) (Lewis County, 2013a) was adopted in June 1999 and updated most recently in 2013. It identifies specific policies that are addressed in this General Sewer/Facility Plan. First, extension of sanitary sewer service should be prioritized to those areas where onsite sewage disposal systems have created known pollution or health hazards. Second, primary fiscal responsibility for provision of new services to proposed developments lies with the developer.

This General Sewer/Facility Plan also acknowledges the *Countywide Planning Policies for Lewis County* (Lewis County, 2013b), which require that sewer service extensions be limited to within the City boundary except to solve immediate health or safety problems. Sewer systems for proposed developments within the City's adopted urban growth boundary where urban sewer systems are not available must be designed, sited, and built to facilitate eventual conversion to urban sewer systems.

1.4 General Sewer/Facility Plan Organization

- **Executive Summary** summarizes the plan.
- **Chapter 1** introduces the reader to the City's sewer system, the objectives of the plan, and the plan organization.
- **Chapter 2** presents the sewer service area, describes the existing sewer system, and discusses related plans, land use, and population characteristics.
- **Chapter 3** presents existing and projected future wastewater flows and loads.
- **Chapter 4** discusses the facilities within the City's existing sewer system.
- **Chapter 5** presents collection system analyses and recommended improvements.
- **Chapter 6** presents the treatment plant capacity evaluation and future treatment plant upgrades.
- **Chapter 7** discusses the City's operations and maintenance program.
- **Chapter 8** presents the implementation schedule as a Capital Improvement Plan (C.I.P.) and discusses the City's financing options for the C.I.P. projects.
- **Chapter 9** summarizes the implementation strategy for adopting the General Sewer/Facility Plan.
- **Chapter 10** lists references cited.
- **Appendices**

1.5 Required Content

The required contents for Facility Plans and General Sewer Plans are included in the Ecology's *Criteria for Sewage Works Design* and WAC 173-240-050. Ecology provided additional comments to be addressed when the 2014 General Sewer Plan Update was approved (Attachment 1 to Centralia General Sewer Plan Approval, dated July 28, 2015). A crosswalk demonstrating this General Sewer/Facility Plan's alignment with these requirements is included in Appendix A.

CHAPTER 2

Service Area and Vicinity Characteristics

This chapter describes the Centralia sewer service area, including a brief history of the City's sewer collection and treatment systems, existing environment, and municipal water system. It also demonstrates the compatibility of the City's General Sewer/Facility Plan with other plans; identifies the designated land uses within the existing and future service areas; and presents population projections within the City's planning area. The plan must be developed and coordinated to support the growth projected in adopted comprehensive plans at the time development occurs and is ready for occupancy. At the same time, the plan must continue to provide established minimum levels of service to the existing population.

2.1 Sewer Service Area

The City's sewer system consists of a network of sewer trunks, laterals, force mains, and pump stations that transport the collected sewage to the City's WWTP. Figure 2-1 presents the vicinity map of the City, and the City's current and future sewer service area boundaries are presented in Figure 2-2.

2.1.1 General History

The City's initial collection system was constructed mostly of clay pipe between 1906 and 1914 to serve the downtown area. The system was expanded using concrete pipe between 1924 and 1970 to include areas west and north of downtown, as well as Fords Prairie. Concrete pipe installed before 1965 used mortar joints between the pipe lengths. It was not until after 1965 that gasketed joints were widely used. Asbestos-cement and concrete pipe were used to expand the collection system between 1960 and 1975 west and south of the original WWTP. Polyvinyl chloride (PVC) pipe has been used for subsequent expansions, such as Fords Prairie and Waunch Prairie. Much of the system is in low-lying areas with highly permeable gravelly soils. Because of the flatness of the terrain, outlying developments had to use pump stations to convey sewage to the collection system or the WWTP. As a result, several pump stations serve a single development, and the City has numerous stations to operate and maintain.

The City's original WWTP was located east of the Mellen Street Bridge and was completed in 1951. The WWTP consisted of headworks, primary clarifiers, trickling filters, secondary clarifiers, disinfection, dechlorination and an outfall to the Chehalis River. In 2004, a new WWTP was constructed that replaced the original WWTP. It is located northwest of the City limits adjacent to the Chehalis River and south of the Thurston County border. The new WWTP includes screening, grit removal, activated sludge aeration basins, secondary clarifiers, and UV disinfection prior to discharge to the Chehalis River through a multi-port diffuser at river mile 61.25.

2.1.2 Sewer Drainage Basins

The service area where the City currently provides sewer service, or is planning to provide service in the future, is divided into 29 sewer drainage basins. Lewis County is responsible for all sewer service outside the service area including onsite disposal systems such as septic tanks. Figure 2-2 shows the boundary of each of the sewer basins.

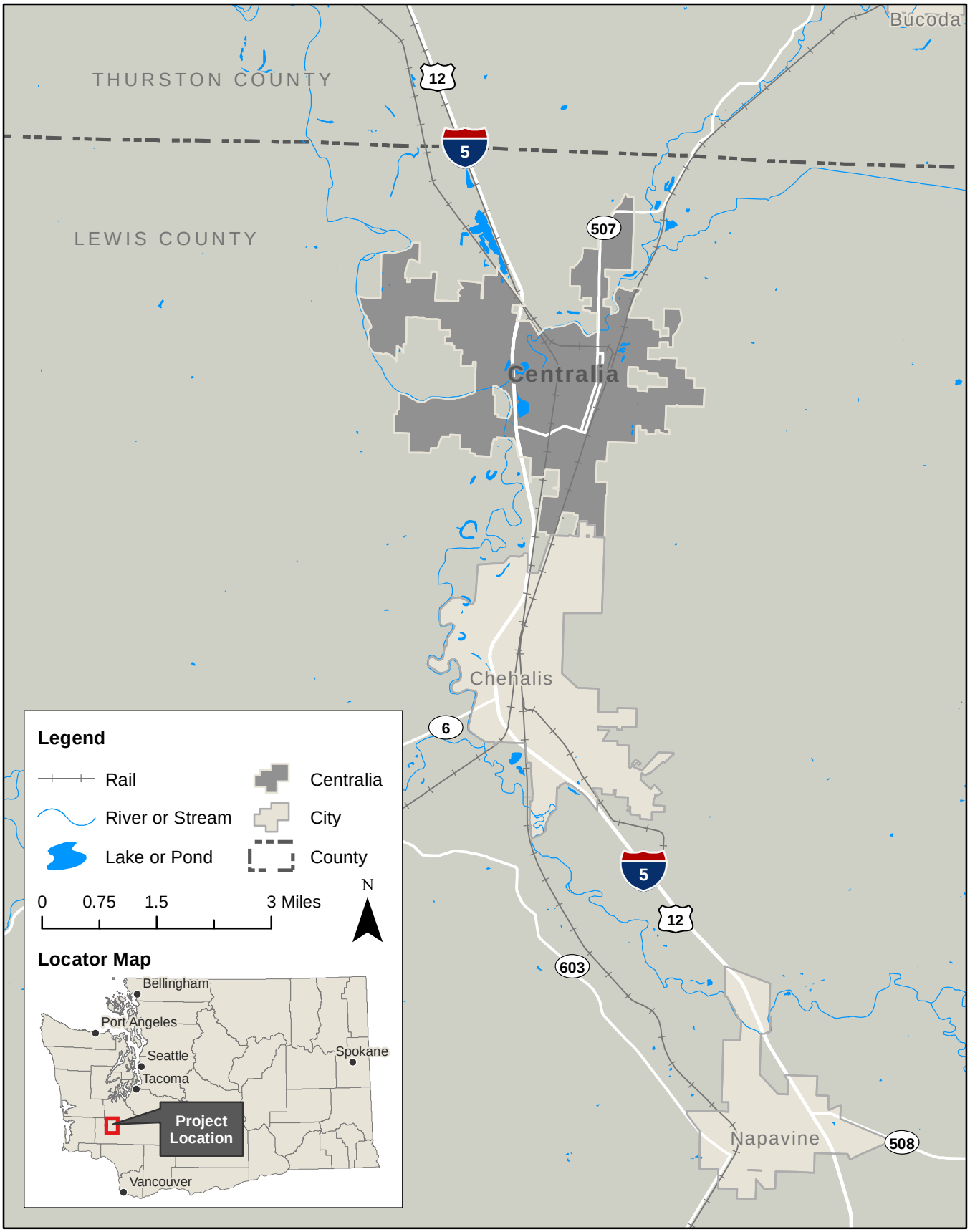
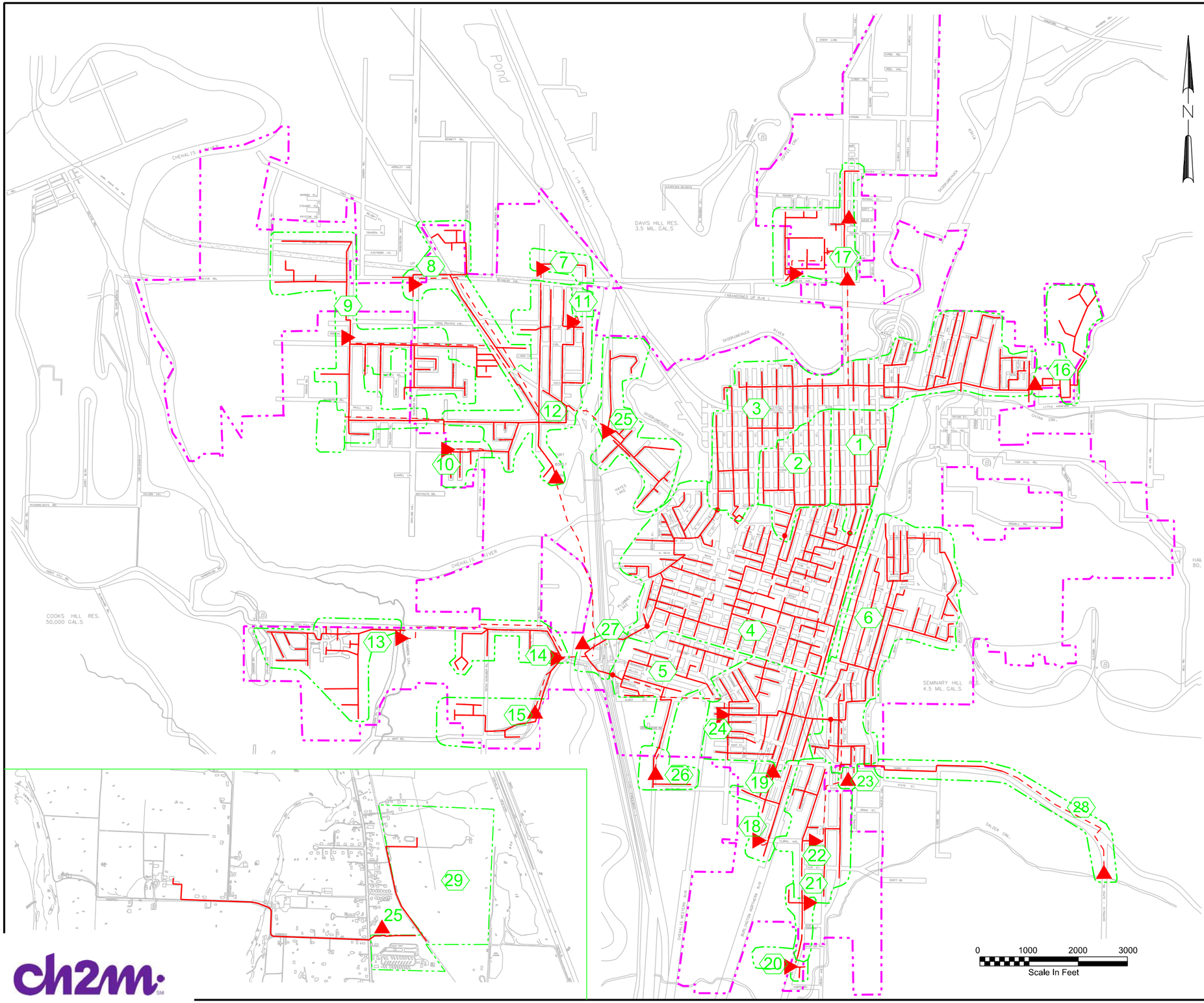


FIGURE 2-1
Vicinity Map
City of Centralia
General Sewer/Facility Plan

Data Sources: WSDOT, King County, Lewis County, US Census Bureau, USGS

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N
LEGEND
City Boundary
1
Sewer Basins
Pump Station
Number Basin
1 Downtown Gravity
2 Downtown Gravity
3 Downtown Gravity
4 Downtown Gravity
5 Downtown Gravity
6 S.E. Gravity
7 Industrial
8 Schueber
9 Eshom
10 Mt Vista
11 Jensen
12 Borst Park
13 Scammon
14 W. Mellen
15 Military
16 Marion
17 Reynolds
18 S. Tower
19 Van Buren
20 Fairgrounds
21 Ace Auto
22 Floral
23 State
24 Jefferson
25 High
26 Long
27 Gravity
28 Salzer Creek
29 North Port
DAVIS HILL RES. 3.5 MIL. GAL.S
COOKS HILL RES. 50,000 GAL.S
SEMINARY HILL RES. 4.5 MIL. GAL.S
0 1000 2000 3000
Scale In Feet
City of Centralia
General Sewer/Facility Plan
Figure 2-2
SEWER SERVICE AREA AND BASINS
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2.1.3 Onsite Sewer Systems

Prior to 2000, documented septic system failures in the Fords Prairie and Waunch Prairie areas have resulted from the Type 1 soils in those areas, which are gravelly or sandy and highly permeable. There are no known geologic barriers between the ground surface and the groundwater. These prairies have groundwater elevations ranging between 10 to 60 feet below the ground surface, depending on location and time of year. To protect public health, the Lewis County Health Department recommended that improved septic designs be used, including pressure distribution and mound systems. The higher level of treatment attained with the improved septic system designs is considered adequate to protect public health in the Fords Prairie and Waunch Prairie areas.

Onsite sewer systems are permitted by the Lewis County Health Department. Lewis County has not completed any sanitary surveys since 1999. Operation and maintenance of onsite sewer systems can be found on the Lewis County Onsite Septic Program website (https://lewiscountywa.gov/environmental-health/operating-and-maintenance).

2.1.4 Unsewered Areas

The following are known unsewered areas within the City limits:

- Central Boulevard
- Linda Lane
- Mountain View Trailer Park
- Reynolds Road
- North end of Waunches Road
- 1300 and 1400 block of W. Main Street

2.2 Existing Environment

2.2.1 Topography, Geology, and Soils

2.2.1.1 Topography

The Chehalis Valley is characterized by a broad floodplain and low terraces surrounded by upland valleys of low to moderate relief that have broad, rounded ridges. The Chehalis Valley and Salzer Valley to the south and east are flat and range in elevation from 180 to 220 feet above sea level. Waunch Prairie and Fords Prairie, and Zenkner and Hanaford valleys to the north, are also flat and range in elevation from 210 to 230 feet above sea level. Figure 2-3 presents the topography and natural drainage basins within the service area as a vicinity map of the area surrounding the treatment plant.

East of the study area, the slope rises abruptly to a plateau approximately 500 feet in elevation. To the north and northwest, valleys and prairies are separated by finger ridges, with slopes that rise moderately to abruptly. The typical elevation of these ridges is 500 feet.

Fords Prairie follows the Chehalis River northwest and opens into a broad area referred to as Grand Mound Prairie.

2.2.1.2 Geology

Geologic deposits in the Chehalis River valley are primarily non-glacial alluvium (sediments deposited by rivers in relatively recent times) consisting of silt, loam, sand, and gravel. Directly east and northeast of Centralia are the Cascade foothills, which are made up of marine sedimentary rock consisting primarily of sand and silt stone. Farther east, glacial and alpine outwash deposits of sand and gravel predominate with minor amounts of silt and clay. The primary geologic formation in this area is the Skookumchuck

formation, which developed during the late Eocene and Oligocene epochs 27 million to 40 million years ago.

To the west of the City are small, discontinuous areas of the Skookumchuck formation. Adjacent to these areas is a large segment of near-shore sedimentary rock consisting of sandstone, siltstone, shale, claystone, and coal interbedded with lava flows and brackish water deposits.

To the north and east of the City, there is a known seismic fault. According to the Geologic Map of Southwest Washington, produced by the Department of Natural Resources (year unknown), there is an inactive syncline over 25,000 years old.

2.2.1.3 Soils

The primary soils in the downtown Centralia area are in the Spanaway soil series. Spanaway gravelly, sandy loam is composed of very deep, somewhat excessively drained soils found on glacial outwash terraces and plains. Permeability of this soil is moderately rapid to a depth of 18 inches and very rapid below this depth. Runoff is slow, and the hazard of water erosion is slight. The very rapid permeability of the soil limits filtration and absorption of contaminants, such as those resulting from septic tank fields, pesticides, and automobiles.

Soils in the northern and western portions of the study area are primarily Newberg fine sandy loam and Chehalis silty clay. The Newberg soil is very deep and well drained, and it is found on river flood plains and low terraces. Permeability is moderately rapid, and runoff is slow. This soil is subject to occasional brief periods of flooding in winter and early spring. Chehalis silty clay is also very deep and well drained, and it is found on low stream and river terraces. Permeability of this Chehalis soil is moderate, and runoff is slow. This soil is also subject to occasional brief periods of flooding in winter and early spring.

Soils found in the south are mostly Indianola loam sand and Nisqually loamy sand. Both soils are very deep, somewhat excessively drained, and located on terraces and broad plains. Permeability is moderately rapid in the surface layer and rapid below. Runoff is very slow. The rapid permeability of the soil restricts filtration and absorption of contaminants caused by septic tanks, pesticides, and automobiles.

To the east, in the Cascade foothills, Buckpeak silt loams are found. This is a very deep, well-drained soil located on hillsides and ridgetops. Permeability of Buckpeak soil is moderate, runoff is medium, and the hazard of water erosion is moderate.

To the southeast and northeast, along Salzer Valley and China Creek, there are Reed silty clay loams. This very deep, poorly drained soil is found on floodplains. Drainage has been altered by tiling, and permeability and runoff are slow, resulting in frequent seasonal flooding.

2.2.2 Climate

Based on historical data from U.S. Climate Data (NOAA, 2016), the climate in the City is typical of Lewis County. The average summer temperature is 62 degrees Fahrenheit with an average daily maximum temperature of 74 degrees Fahrenheit. The average winter temperature in Centralia is 42 degrees Fahrenheit with an average daily minimum temperature of 35 degrees Fahrenheit. Precipitation most often occurs during the months of October to April, with the heaviest rains generally occurring during the month of November. The average total annual precipitation for Centralia is 47 inches.

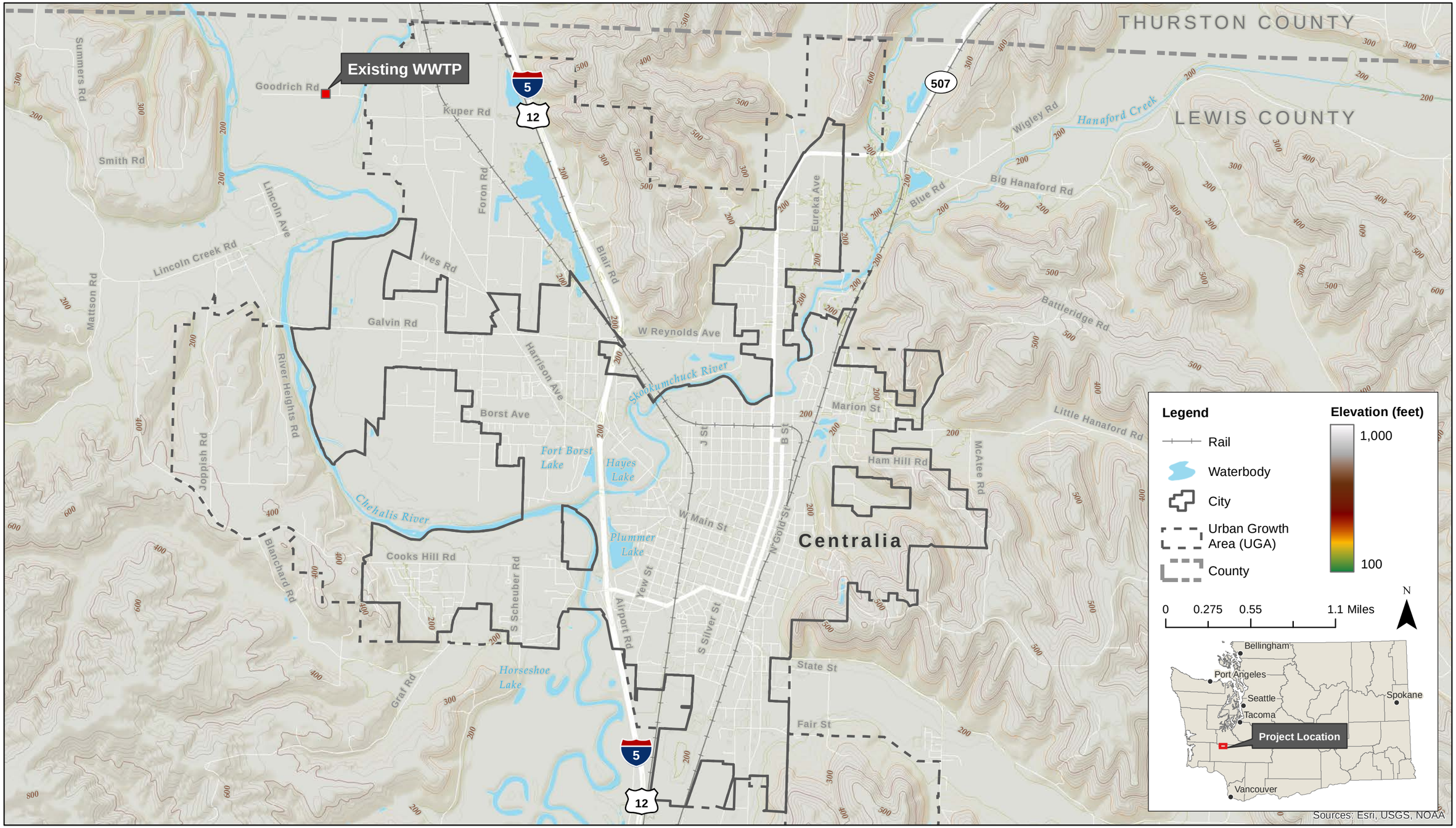


FIGURE 2-3
Topography Map
City of Centralia
General Sewer/Facility Plan

Data Sources:Esri, NOAA, WSDOT, King County, Lewis County, US Census Bureau, USGS

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2.2.3 Air Quality

Under federal regulations, areas that violate primary ambient air quality standards are designated as nonattainment areas, and State Implementation Plans must be developed to bring these areas into attainment. Based on local air quality monitoring data and analysis by Ecology and the Southwest Clean Air Agency (SWCAA), the EPA has determined that the Lewis County area is either in attainment or unclassified for each of these standards. In short, the air quality is good, and the focus of air quality regulatory efforts is to confirm that it remains the same for the future (CH2M, 1999). The SWCAA is responsible for regulating air quality in Centralia. The largest concern for air quality problems in Centralia appears to be the proximity to the Centralia Coal Plant. Combustion of coal produces emissions of sulfur dioxide, nitrogen oxides, particulate matter, carbon monoxide, volatile organic compounds, and certain hazardous air pollutants in sufficient quantities to designate the facility as a Title V source of air pollutants. Additionally, all burning was permanently banned within City limits and UGAs in January 2016.

2.2.4 Water Resources

2.2.4.1 Surface Water

The Chehalis River Basin is the second largest drainage basin in the state and covers 2,114 square miles in western Washington. The cities of Centralia and Chehalis lie in the center of the basin. In the Centralia area, the largest tributary to the Chehalis River is the Skookumchuck River. Other smaller tributaries within the study area include Salzer Creek, China Creek, Hanaford Creek, Coffee Creek, and Scammon Creek. The Chehalis River and its tributaries are shown on Figure 2-4.

Chehalis River: The main stem of the Chehalis River is composed of over 100 river miles and covers a drainage area of approximately 123 square miles. Most of the river's drainage is outside of the Centralia City limits. The Chehalis River supports a diverse variety of aquatic life. Important salmon runs include spring, fall, and summer Chinook, coho, and chum.

Salmon are present within the Chehalis River on a year-round basis. The portion of the Chehalis River located within the Centralia Urban Reserve Boundary is not a prime spawning area but does serve as a transport zone for both spawning and ocean-bound salmon. River banks in this area are commonly lined with deciduous trees or brush, or both. The Chehalis River Basin is not glacially fed, although snowmelt flows make a minor contribution to flows in the upper Skookumchuck River and Newaukum River watersheds.

Skookumchuck River: The Skookumchuck River headwaters begin in the foothills of the Cascade Range, and the river meanders southwesterly along the Waunch Prairie until it joins the Chehalis River at river mile 67 between Hayes Lake and Plummer Lake. The Skookumchuck River covers 38 river miles and covers a drainage area of 180 square miles. The river provides migration, spawning, incubation, and rearing waters for coho, spring Chinook, and fall Chinook salmon. Salmon spawning and rearing occurs in riffles between the mouth of the river and the Skookumchuck Dam. All the main stem Skookumchuck River and at least 43 miles of tributary streams are used by salmon for spawning.

Salzer Creek: Salzer Creek runs northwest along the Salzer Valley, then turns south and west until it meets the Chehalis River west of Interstate 5 (I-5). The Salzer Creek drainage basin consists of approximately 17.3 square miles, passing mostly through agricultural and forested lands. Although a portion of Salzer Creek is inside the City (north and west of the fairgrounds), the majority of the creek is located outside the City.

Hanaford Creek: Hanaford Creek is a major tributary of the Skookumchuck River. A major open-pit coal mine and power plant is located next to the creek.

Scammon Creek: Scammon Creek is a short tributary to the Chehalis River and enters the main stem on the southern bank at river mile 65.8. Its flow in the dry season is very low to nonexistent.

China Creek: China Creek is mostly a manufactured ditch that flows through the City and discharges to the Chehalis River at river mile 67.3; it is primarily a conduit of urban stormwater during the wet and dry seasons.

Coffee Creek: Coffee Creek is a long tributary to the Skookumchuck River that originates in Thurston County and enters the river between I-5 and Pearl Street. A portion of Coffee Creek has been channelized within a drainage-control ditch that extends from West Roanoke Avenue to the Skookumchuck River. Coffee Creek is located within the Thurston/Lewis County Drainage District No. 7.

Standing Freshwater Bodies: There are several manufactured lakes within the City boundary and study area. The lakes are located west of the City (Hayes, Plummer, and Fort Borst lakes) and are former borrow pits that were created as a result of the construction of I-5 in the 1950s. These lakes currently provide recreation opportunities for the public (including swimming, fishing, and boating activities).

To the east within the study area are two additional small lakes, the result of gravel excavations. These lakes adjoin Coffee Creek, with the larger one abutting the Union Pacific Railroad right-of-way and the smaller one located directly adjacent to Coffee Creek. These lakes no longer provide recreation opportunities due to recent residential development on the perimeters. In addition, a series of small lakes are located to the east of the study area, which were once holding ponds for nearby logging activities. The ponds are no longer used for this purpose.

2.2.4.2 Floodplains, Shorelands, and Wetlands

The Chehalis Valley is characterized by a broad floodplain and low terraces surrounded by upland valleys of low to moderate relief that have broad, rounded ridges. To the southeast and northeast, along Salzer Valley and China Creek, there is very deep, poorly drained soil that is typical of floodplains. Drainage has been altered by tiling, and permeability and runoff are slow, resulting in frequent, seasonal flooding. The City lies within the floodplains of the Skookumchuck River in the north, the Chehalis River in the west, and China Creek. Figure 2-5 is a map produced by the City in 2008 that illustrates the boundaries of the 100-year floodplain and floodway for major streams and rivers within and around the UGA. Chapter 4 discusses the impacts of a severe storm to the City's wastewater collection and treatment system.

The shoreline of the Chehalis River is designated a Shoreline of Statewide Significance by the Washington State Shoreline Management Act of 1971. Activities within the shorelines of these waterways are guided by the regulations contained in the Lewis County Shoreline Master Program. Centralia's *Shoreline Master Plan* (City of Centralia, 1998) was amended in June 1998 and is currently being updated. It contains policies and regulations that specify permitted uses within these shoreline areas and affords protection to these areas based on the designated shoreline environments. One policy of note reads as follows: "Sewage treatment, water reclamation, and power plants should be located where they do not interfere with other public uses of water and shoreline" (Shoreline Master Plan, Commercial/Industrial Development, Policy) (City of Centralia, 1998).

Wetlands are considered a critical area according to the City's Critical Area Ordinance and are protected by land use regulations in the Centralia Municipal Code (CMC). Because the City is located in a wide, flat valley with minimal slope variation, the community is surrounded by several small to midsize wetlands. Figure 2-6 was produced by the City in 2009 and approximates wetland boundaries within and around the UGA. Almost all the mapped wetlands are either seasonally or temporarily flooded.

2.2.4.3 Federally Recognized Wild and Scenic Rivers

None of the rivers or tributaries within the study area of this plan are listed under the Federal Wild and Scenic Rivers Act.

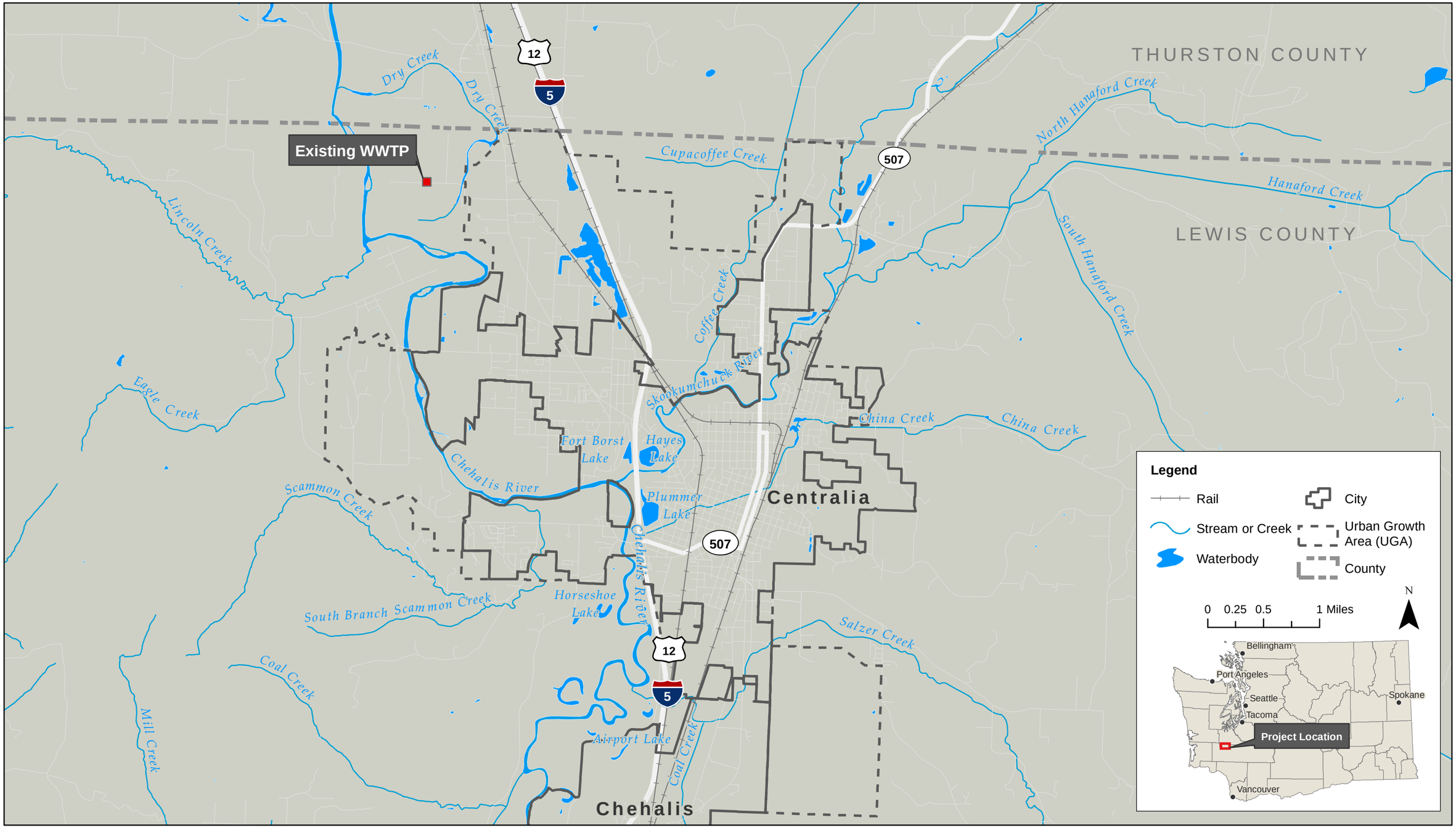
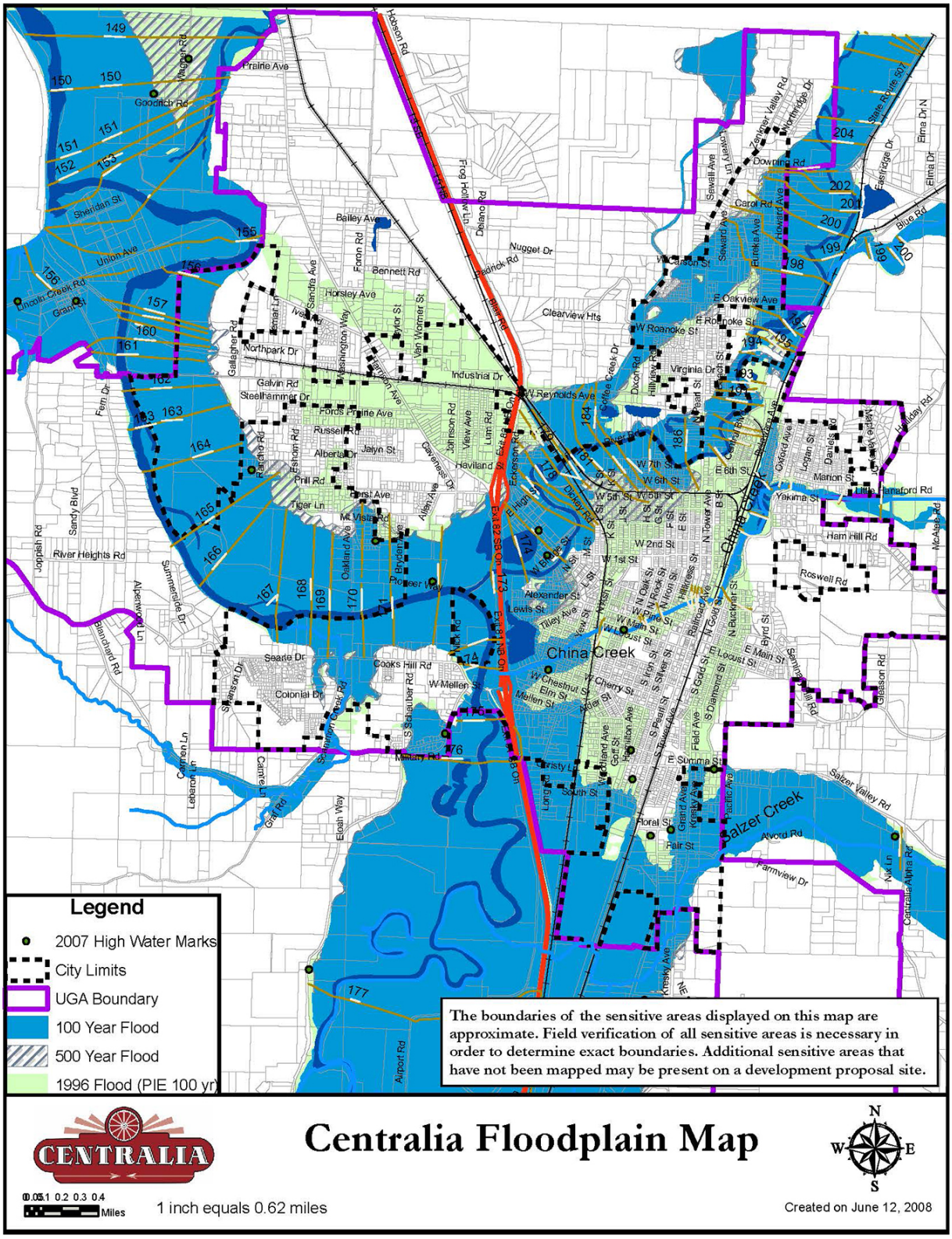


FIGURE 2-4
Chehalis River and Tributaries
City of Centralia
General Sewer/Facility Plan

Data Sources:Esri, NOAA, WSDOT, King County, Lewis County, US Census Bureau, USGS

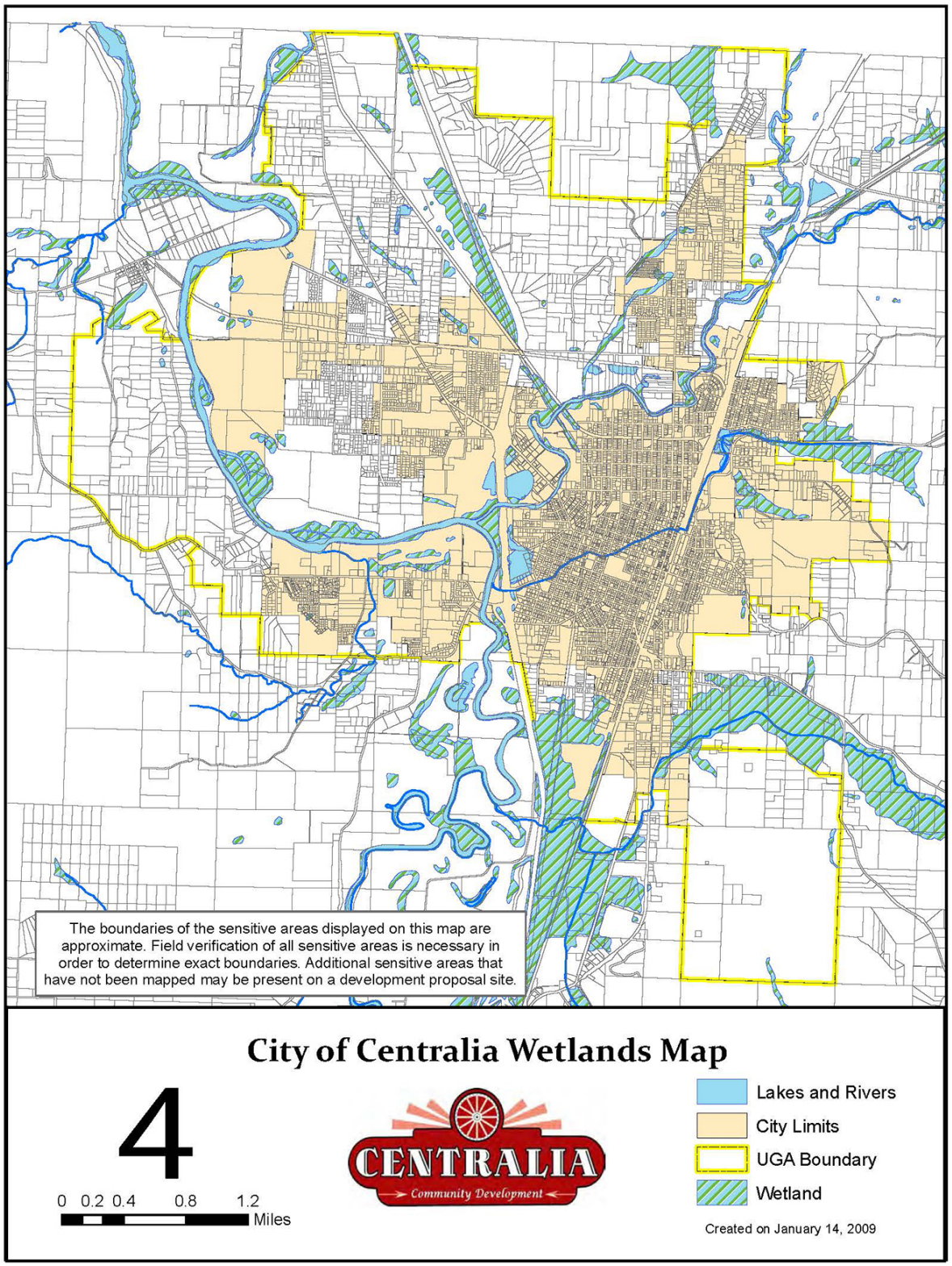
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Source: City of Centralia

Figure 2-5. Centralia Floodplain Map



Source: City of Centralia

Figure 2-6. Centralia Wetlands Map

2.2.5 Cultural Resources

2.2.5.1 Prime or Unique Farmland

Most of Centralia is developed and is not considered farmland. However, there are a few designated prime farmland areas located mainly in the rich alluvial soils adjacent to the Chehalis and Skookumchuck rivers. The soils in these areas are comprised primarily of Newberg fine sandy loam, with lesser amounts of Chehalis silty clay and Cloquato silt loam. These soils are all designated prime farmland soils by the Natural Resources Conservation Service (NRCS). There are no NRCS-designated unique farmlands in the study area.

2.2.5.2 Archaeological and Historical Sites

In order to preserve Washington's historical and cultural resources, historical, architectural, and archaeological sites can be designated as significant and listed in the National Register of Historic Places or the Washington Heritage Register, or both.

Currently, there are nine sites in Centralia listed in the National Register:

- Birge, George E., House
- Borst, Joseph, House
- Centralia Downtown Historic District
- Centralia Union Depot
- Everest, Wesley, Gravesite
- Hubbard Bungalow
- Olympic Club Saloon
- The Sentinel
- U.S. Post Office – Centralia Main

There are two additional sites listed on the Washington Heritage Register:

- Armistice Day Riot
- Fort Borst Blockhouse

Prehistoric use of the Chehalis River Valley by Native American people was high due to the abundance of salmon and other resources in the area. The general likelihood of archaeological resources being present is high throughout the study area. Two historical sites are located in the vicinity of the Influent Pump Station: Fort Borst Blockhouse and Joseph Borst House. In 1922, Allen Borst donated 100 acres of his father's original claim to the City for use as a park where the Borst Blockhouse and Joseph Borst House are currently located.

2.2.6 Endangered Species and Habitats or Threatened Species

The Washington Department of Fish and Wildlife (WDFW) maintains the Priority Habitats and Species (PHS) data set. This data set includes species designated at the state or federal level as Endangered (E), Threatened (T), Sensitive (S), candidate (C), and monitor (M). Additionally, the U.S. Fish and Wildlife Service documents wildlife species and their status, including listed and proposed E and T species, C species, and species of concern. Table 2-1 summarizes the current federal and state status of E or T species in Centralia.

Important habitats are also found within the study area. WDFW's PHS database identifies the presence of numerous wetlands (open water and palustrine) along the Chehalis River; anadromous fish runs and priority fish in the Chehalis River; and regular large concentrations of waterfowl along the river. Scrub-shrub and emergent wetlands support regular large concentrations of wintering waterfowl, cavity-nesting ducks, and some Canada goose nesting.

2.2.7 Public Health

There is no declared health emergency in the City related to unsewered communities. However, the groundwater in Fords Prairie and Waunch Prairie has been monitored for possible public health impacts related to contamination of the groundwater by inadequate septic systems. Three sanitary surveys have been conducted by the Lewis County Department of Health in these areas; the most recent survey was in 1990. The surveys have shown increases in the levels of coliform, nitrates, and nitrites over time, although the results indicate that the contamination levels are still lower than drinking water standards. The total number of septic systems in Lewis County and the number of failed systems are unknown. Lewis County Public Health and Social Services requires selected owners to provide site operation and maintenance plans for their septic system.

Table 2-1. Federal and State Status of Endangered and Threatened Species in Centralia

Common Name	Scientific Name	Federal Status	State Status
Marbled Murrelet	*Brachyramphus marmoratus*	T	T
Streaked Horned Lark	*Eremophila alpestris strigata*	T	E
Yellow-billed Cuckoo	*Coccyzus americanus*	T	C
Bull Trout	*Salvelinus confluentus*	T	C
Golden Paintbrush	*Castilleja levisecta*	T	N/A
Kincaid's Lupine	*Lupinus sulphureus* ssp. *kincaidii*	T	N/A
Nelson's Checkermallow	*Sidalcea nelsoniana*	T	N/A
North American Wolverine	*Gulo luscus*	PT	N/A
Bald Eagle	*Haliaeetus leucocephalus*	SC	S

Note:
Federal and state status: T = Threatened, M = Monitor, S = Sensitive, E = Endangered, C = Candidate, PT = Proposed Threatened, SC = Species of Concern

2.3 Existing Water System

This section provides a description of the City's existing water system components, while Appendix B illustrates the information as a Water System Facility Map. The information presented in this section is taken from Chapter 5 of the *City of Centralia Water System Plan* (HDR, 2013).

2.3.1 Sources of Supply

The City's water system currently relies entirely on groundwater for potable water supply. The primary sources of supply for the City are the Tennis Court and Fords Prairie wellfields (including Eshom Well). Seasonal peaking supply is provided by the K Street Well, and the Washington Well serves as an emergency backup supply.

2.3.2 Water Treatment

Because the City uses groundwater, its water treatment requirements are primarily disinfection, corrosion control, and, for some sources, contaminant removal. Gaseous chlorine is used for disinfection at the K Street and Washington wells. Hypochlorite disinfection is employed at the Tennis Court and Fords Prairie treatment facilities. Air stripping is also used at these facilities; at the Tennis Court site, the objective is corrosion-control to maintain compliance with the Lead and Copper Rule, and at the Fords

Prairie site, the objective is removal of perchloroethylene contamination. Fluoride is also added at the Tennis Court and Fords Prairie facilities.

2.3.3 Storage

A summary of the City's existing water storage facilities is provided in Table 2-2. In total, the City's storage volume is approximately 8 million gallons (MG).

Table 2-2. Existing Water Storage Facilities

Name	Date of Construction	Capacity (MG)	Construction Material	Elevation (feet)		Dimension (feet)	
				Overflow	Floor	Height	Diameter
Seminary Hill	1993	4.500	Concrete	417	397	20	203
Davis Hill	1982	2.500	Welded Steel	417	397	20	150
Ham Hill – Tank 1	1982	0.071	Welded Steel	552	469	83	12
Ham Hill – Tank 2	2005	0.230	Welded Steel	552	469	83	22
Cooks Hill	2005	0.760	Welded Steel	531	410	121	33

Source: Table 5-2 of HDR, 2013.

2.3.4 Distribution System

2.3.4.1 Pressure Zones

The City's water system is divided into seven pressure zones, as summarized in Table 2-3.

Table 2-3. Pressure Zones

Pressure Zone	Source	Maximum Hydraulic Grade Line (feet)
Central	Seminary Hill and Davis Hill Reservoirs	417
Ham Hill	Ham Hill BPS and Reservoirs	552
Zenkner Valley	Zenkner Valley BPS	Variable
Davis Hill	Davis Hill BPS	Variable
Cooks Hill	Cooks Hill BPS and Reservoir	531
Seminary Hill	Seminary Hill and Gleason BPS	Variable
Winterwood Estates	Halliday Ridge BPS	Variable

Source: Table 5-3 of HDR, 2013.
Note:
BPS = booster pump station

2.3.4.2 Booster Pump Stations

Table 2-4 describes the City's seven booster pump stations and their facilities.

Table 2-4. Booster Pump Stations and Zone Pressure Tanks

Pump Station	Number of Pumps	Pump Characteristics		
		Horsepower	Q (gpm)	Head (feet)
Cooks Hill				
- Lead Pump	1	5	145	156
- Lag Pump	1	10	145	156
- Fire Pump	None			
Davis Hill				
- Lead Pump	1	5	50	100
- Lag Pump	2	5	50	160
- Fire Pump	1	25		
Ham Hill				
- Lead Pump	1	5	90	164
- Lag Pump	1	5	90	164
- Fire Pump	None			
Gleason				
- Lead Pump	1	7.5	75	160
- Lag Pump	1	7.5	Combined	160
- Fire Pump	None			
Seminary Hill				
- Lead Pump	1	30	250	140
- Lag Pump	1	30	250	140
- Fire Pump	Combined			
Winterwood Estates (Halliday Ridge BPS)				
- Lead Pump	1	7.5	150	115
- Lag Pump	1	7.5	150	115
- Fire Pump	1	30		
Zenkner Valley				
- Lead Pump	1	7.5	50	200
- Lag Pump	1	7.5	50	200
- Fire Pump	1	25		

Pressure Tank	Tank Set-Pressures (psi)	
	Pump-On	Pump-Off
Gleason Road	40	60
Upper Seminary Hill Road	50	70

Source: Table 5-4 of HDR, 2013.

Notes:
gpm = gallon(s) per minute
psi = pound(s) per square inch
Q = Flow

2.3.4.3 Distribution Lines

Table 2-5 provides a summary of the distribution system piping present in the water system. The system includes approximately 7 miles of 18-inch transmission piping extending to the City from the old Newaukum River supply. This piping is currently maintained for water that is fed from the system (i.e., not from the Newaukum River) to customers along the line.

Table 2-5. Water Distribution Pipe Inventory

Pipe Diameter (inches)	Asbestos Concrete	Ductile Iron	Galvanized	PVC	Total Feet	Total Miles
1		2,459	5,258	317	**8,034**	**1.52**
2		59,694	11,848	5,044	**76,586**	**14.50**
3		381			**381**	**0.07**
4	1,112	39,291		216	**40,619**	**7.69**
6	6,995	194,352		8,199	**209,546**	**39.69**
8		121,391			**121,391**	**22.99**
10	2,195	58,072			**60,267**	**11.41**
12		89,071			**89,071**	**16.87**
16		10,255			**10,255**	**1.94**
18		37,868			**37,868**	**7.17**
36		470			**470**	**0.09**
Total (feet)	**10,302**	**613,304**	**17,106**	**13,776**	**654,488**	
Total (miles)	**1.95**	**116.16**	**3.24**	**2.61**		**124.0**

Source: Table 5-5 of HDR, 2013.

2.3.4.4 Pressure-Reducing Valves

The transmission main along Galvin Road, conveying water from the Fords Prairie Treatment Facility to the eastern side of the City, is a high-pressure line. Two distribution lines that come off the Galvin Road transmission main at Sandra Avenue and Lum Road require pressure reductions to provide suitable service to customers. Therefore, two pressure-reducing valves (PRVs) have been installed at these locations. Both PRVs are set with an operating pressure of 100 psi (HDR, 2013).

2.4 Planning Considerations

The City's Comprehensive Plan was developed to meet the requirements of the State of Washington Growth Management Act (GMA), which requires, among other things, consistency between land use plans and utility plans.

2.4.1 Growth Management Act

The Washington State Legislature adopted the GMA (and its multiple amendments) in 1990 to guide future development in the state. In 1995, the State Environmental Policy Act (SEPA) rules were amended to require the integration of SEPA documents with the GMA process. The goals of the GMA include the following:

1. Planning for urban growth and reducing sprawl while encouraging citizen participation and coordination
2. Providing for transportation, housing, public facilities, and services to meet planned growth
3. Protecting property rights

4. Promoting economic development
5. Providing quality of life by promoting environmental protection, open space and recreation, and historical preservation

The GMA mandates comprehensive planning in counties with either large or rapidly increasing populations such as Lewis County. Each county is required to prepare a countywide comprehensive plan consistent with the goals of the GMA, and the comprehensive plan must designate natural resource lands and critical areas. Cities within the county are required to identify and protect their designated critical areas and prepare public facilities plans, which must include the following:

- An inventory of existing facilities
- Forecasts for future capital needs
- Proposed levels of service
- Proposed locations and capacities of expanded or new capital facilities
- A 6-year plan to finance proposed capital improvements identifying sources of public revenue to be used

2.4.2 Lewis County

On December 16, 2013, the Board of County Commissioners adopted the amended *Countywide Planning Policies for Lewis County* (Lewis County, 2013b). The policies address each of the planning goals cited in the GMA and form the framework from which the Lewis County and City utility elements are developed. The countywide planning policies that specifically pertain to this General Sewer/Facility Plan are as follows:

1. Urban Growth.

1.10 The County and Cities shall collaborate to provide a mechanism for siting and maintaining both existing and new essential public facilities using a 50-year planning horizon for essential public facilities including:

(a) Sewage treatment and municipal water facilities

2. Reduce Sprawl.

2.2 Large-scale commercial and industrial development shall be located in designated UGAs, or areas authorized by state law, where adequate utility services and transportation networks are available or planned.

2.3 Water and sewer infrastructure expansion should not occur in areas outside the UGAs and adopted water and sewer district boundaries at urban levels except to address specific health and safety problems.

2.4 Lewis County recognizes that sewer is an urban service. Public sewer extension outside Urban Growth Areas shall be provided at a level of service consistent with state law, and the County's development standards and comprehensive plan for densities and uses associated with size, scale, and intensity for growth in rural parts of the County. Public sewer connections may be permitted only if hookup sites comply with one of the following situations:

A. The Lewis County Health Officer has determined that extension of sewer service is necessary to protect public health and safety.

B. The public sewer provides service to existing local and major essential public facilities.

C. The public sewer provides levels of sewage collection and treatment necessary to facilitate and support infill development or redevelopment of limited areas of more intensive rural development.

2.6 Developments authorized under Revised Code of Washington (RCW) 36.70A.350, .360, .362, .365, .367 and .368 may be served by urban sewer and water systems consistent with state law. However, no additional connections may be allowed at urban levels of service in the rural area and resource lands between adopted UGAs.

5. Economic Development.

5.9 Lewis County should encourage commercial/industrial development along major transportation corridors and where the potential for expansion of water and sewer development exists consistent with the County Comprehensive Plan and state regulations.

10. Environment.

10.3 Septic systems, disposal of dredge spoils and land excavation, filling and clearing activities shall conform with critical area development regulations and not have a significant adverse effect on Lewis County water bodies with respect to public health, fisheries, aquifers, water quality, wetlands, and fish and wildlife habitat.

The *Comprehensive Land Use Plan for Lewis County, Washington* (Lewis County, 2013a) establishes an overall direction for land use planning in Lewis County and sets guidelines for growth in areas where adequate public facilities and services can be economically provided. The Lewis County Plan does not address zoning for future development, but indicates that individual developments must pay the costs of development. The philosophy of the Lewis County Plan is to provide adequate sewer services for existing development and to provide for future development that will contribute to long-term economic stability in the county. The Utilities Element of the Lewis County Plan identifies the following general and specific goals, objectives, and policies relevant to sewer system development:

U GOAL 1 Ensure that necessary and adequate utilities to support development in Lewis County are provided.

Policy U 1.1 The County will consult with service providers for the efficient sharing of utility corridors.

Policy U 1.2 Ensure adopted County plans, regulations and standards including land use designations and population forecasts are available to utility providers.

Policy U 1.3 Utility agreements between the County and utility system providers will provide for the coordination between functional plans and capital facility plans; address the joint use of corridors, installations, and rights-of-way; ensure that development permit reviews address all affected utilities; and mitigate impacts of utility improvement projects.

Policy U 1.4 The capability of the land and natural systems will be considered when providing services such as storm water drainage, water supply, and sewage disposal.

Policy U 1.5 Encourage the development of alternative energy generation facilities.

Policy U 1.6 Coordinate land use and facility planning to allow siting and construction of utility distribution lines within new rights-of-way or where roads which are being constructed or reconstructed in existing right-of-way.

Policy U 1.7 The County will cooperate with cities and utility providers within designated subareas to form regional utility organizations appropriate to serve local needs when feasible.

Policy U 1.8 The County shall plan, design, and operate public utilities in order to protect public health and safety; comply with appropriate state and federal laws; and accommodate the demands of growth consistent with adopted land use designations and zoning. The County shall cooperate in the regionalization of utility provisions, consistent with financial and resource capabilities.

U GOAL 3 Develop an efficient system of wastewater collection and treatment facilities to support urban growth within designated UGAs.

Policy U 3.1 The extension of sanitary sewer services to those areas where onsite sewage disposal systems have created known pollution or health hazards as determined by the appropriate regulating local, State, or Federal agency will be given priority over other extensions.

Policy U 3.2 The County should consider alternative techniques or innovative systems for sewage and biosolids disposal.

Policy U 3.3 Sewer lines will not be extended into rural areas except to remedy documented groundwater contamination problems or to correct documented existing or impending health hazards.

2.4.3 City of Centralia

The *Centralia Comprehensive Plan* was published in December 1999 and amended in October 2007. The Comprehensive Plan is currently being updated. It was developed to serve as a generalized land use policy for the City over a 20-year planning period. The purpose of the Utilities Element in the City Comprehensive Plan is to confirm that utility services will be consistent with the plan and support the growth anticipated over the next 20 years. This General Sewer/Facility Plan was developed to comply with the following pertinent policies for water/wastewater utilities under the Utilities Element Goals and Policies Section of the City Comprehensive Plan:

Goal U 1 To manage all utility growth throughout the city and urban growth areas.

Policy U 1.1 Consider impacts on future City development and land use patterns due to the timing and location of new facilities and existing facilities improvements.

Policy U 1.2 Facilitate the development and maintenance of all utilities at the appropriate levels of service to accommodate the City of Centralia's projected growth.

Policy U 1.3 Encourage the joint use of public facilities.

Policy U 1.4 Recover costs related to the extension of services, as well as the costs of maintain and operate these systems.

Policy U 1.5 Encourage extension of utilities to mitigate existing or potential environmental problems.

Policy U 1.6 Require all utility design and construction to comply with the City's accepted Public Works Standards and/or adopted Development Guidelines.

Policy U 1.7 Operate, maintain, repair, replace and improve the water, wastewater, stormwater and other utility systems' infrastructure and facilities, in a manner that provides protection to public health and the environment; protects the infrastructure, facilities and system; corrects deficiencies; increases system efficiencies; and is in compliance with federal, state and local regulations.

Policy U 1.8 Review, at regular intervals, the City's utility plans and utility finances to ensure utility revenue and funding sources are sufficient to provide for the utility systems' operation, maintenance, repair, replacement and improvements.

Goal U 2 To use public right-of-ways within the city and the adopted Urban Growth Areas for utilities wherever possible (i.e., water, sewer, communications, electric, stormwater, natural gas, etc.).

Policy U 2.1 Maintain public rights-of-way for existing and/or planned utilities.

Policy U 2.2 Require effective and timely coordination of all public and private utility trenching activities.

Policy U 2.3 Encourage utility providers that work in public rights-of-way to coordinate and install facilities in the common utility trenches.

Goal U 4 To encourage home owners to connect to the City's sewer system.

Policy U 4.1 Allow existing single family homes with septic systems to continue to utilize septic systems, providing there are no health or environmental problems and there is no city sewer line in the vicinity.

Policy 4.2 Require all developers and/or benefiting property owners to be responsible for funding the planning, installation, and possible upgrade of sewer system.

Goal U 5 To plan and develop water and sewer systems to complement the land use plan.

Policy U 5.1 Size sewer system improvements to accommodate for at least a 25-year life cycle as per the uses shown in the comprehensive land use plan.

2.5 Land Use

2.5.1 Current Land Use and Zoning

This section summarizes the land use and zoning of the sewer study area. Title 20 of the CMC contains the City's zoning ordinance. The primary intent of this ordinance is to facilitate orderly growth and development of the City, consistent with the policies, goals, and objectives of the City Comprehensive Plan. Pursuant to this intent, all lands within the City have been assigned a zoning district. The zoning ordinance contains regulations that specify land uses permitted in each of these districts. Table 2-6 lists the zoning districts and the UGA acreage assigned to each district according to the City Comprehensive Plan.

Table 2-6. Zoning Districts within the City's UGA – 2006

Zone	Zone Description	Acres	Percentage of Total UGA Acres
LCR	Lewis County 1 unit per 5 acres	3,609.49	35.55
R1	Low Density Residential	2,565.22	25.26
R2	Moderate Density Residential	390.19	3.84
R3	Medium Density Residential	546.49	5.38
R4	High Density Residential	411.89	4.06
LBD	Limited Business District	15.20	.15
C-1	General Commercial	837.91	8.25
C-2	Highway Commercial	144.15	1.42
C-3	Core Commercial	42.20	.42
H-1	Health Services District	61.44	.61
M-1	Light Industrial	528.64	5.21
M-2	Heavy Industrial	709.06	6.98
PMP	Port Master Plan	292.59	2.88
	Total	**10,154.48**[a]	

Source: City of Centralia, 2007.

[a] The land within the City limits is 4,927 acres, leaving 5,227 acres in the UGA and Lewis County.

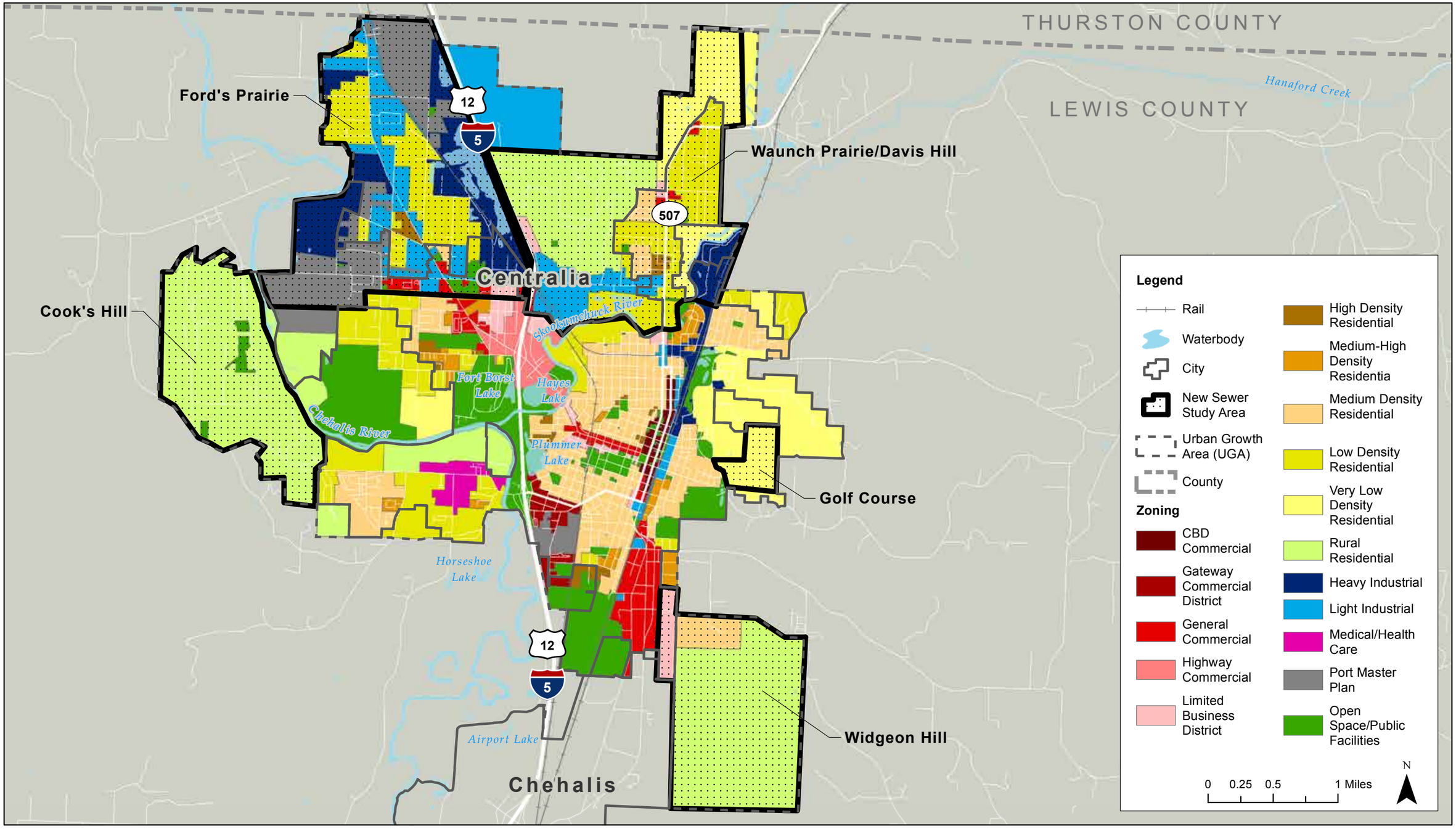
In unincorporated regions of Lewis County, the Lewis County Plan guides land use activities. Under the plan, the Fords Prairie area has been assigned an urban land use designation. This designation provides for urban levels of service and development. Areas of unincorporated Lewis County with the urban designation are either currently served by both Class I public water systems and sanitary sewer systems or are within the identified future service areas of such utility systems. Lewis County has not adopted a zoning ordinance; therefore, this area is not zoned for any specific land use.

Several parcels within the UGA were annexed by the City. Some of the annexed parcels are owned by the Port of Centralia. As a local government body, the Port has its own master plan to guide land use activities in areas within its jurisdiction. When these Port-owned parcels were annexed, the City adopted the Port Master Plan into its Comprehensive Plan. As the Port identifies potential businesses to locate in the City, the sewer utility coordinates with the Port to determine the impact of additional wastewater discharges to the City's sewer facilities.

The study area boundaries for this General Sewer/Facility Plan encompass land within the City's UGA, as described in the City Comprehensive Plan and shown on Figure 2-7. The Land Use Designation shown in this figure was provided by the City in August 2016. The boundaries of the areas studied to locate major pump stations and sewer lines are also shown. The study areas included the following:

- Ford’s Prairie
- Cook’s Hill
- Waunch Prairie/Davis Hill
- Widgeon Hill
- Former City Golf Course

The evaluation for Waunch Prairie/Davis Hill was limited to areas adjacent to Reynolds Avenue and Pearl Street and did not include the very low density residential area on Davis Hill. A proposed development that would use grinder pumps in order to lift domestic sewage to the collection system was evaluated and is labeled "Golf Course." The land uses and maximum densities shown on Figure 2-7 were used to estimate potential wastewater flows in individual sewers. The following discussion further summarizes zoning and land use within the UGA.



** Information provided by City of Centralia in 2016.*

FIGURE 2-7
New Sewer Study Area
City of Centralia
General Sewer/Facility Plan

Data Sources:Esri, NOAA, WSDOT, King County, Lewis County, US Census Bureau, USGS

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2.5.1.1 Ford's Prairie Land Use

Land uses for estimating wastewater flows for Ford's Prairie are summarized in Table 2-7.

Table 2-7. Ford's Prairie Land Use

Zoning	Acres	Population Equivalents	Number of Dwelling Units
Commercial	376	15,027	--
Industrial/Light Industrial	259	10,382	--
Low Density Residential	380	--	1,520
Medium Density Residential	47	--	3,76
High Density Residential	5	4,718[a]	80
Total	**1,067**	**30,127**	**1,976[a]**

[a] Includes all residential densities.

2.5.1.2 Cook's Hill Land Use

It is estimated that there are 780 acres of developable land in the Cook's Hill sewer area. It is all zoned very low density residential, which allows two dwelling units per acre (DU/acre). This allows for up to 1,560 dwelling units (DUs) in the Cook's Hill sewer area. Assuming 2.4 persons per household, the ultimate sewered population would be 3,750 people.

2.5.1.3 Waunch Prairie/Davis Hill Land Use

Land uses for estimating wastewater flows for Waunch Prairie/Davis Hill are summarized in Table 2-8.

Table 2-8. Waunch Prairie/Davis Hill Land Use

Zoning	Acres	Population Equivalents	Number of DUs
Commercial	39	1,566	--
Industrial	3	125	--
Very Low Density Residential	450	--	900
Low Density Residential	393	--	1,572
Medium Density Residential	35	7,193[a]	525
Total	**920**	**8,884**	**2,997[a]**

[a] Includes all residential densities.

2.5.1.4 Widgeon Hill Land Use

The Widgeon Hill area is zoned for future residential development. Approximately 70 acres are zoned medium density residential and could include up to 560 DUs and 1,340 people. The remaining 855 acres are zoned very low density residential, which is estimated to be up to 85 percent developable. There is a ridge running through the Widgeon Hill area that divides the northern and southern portions of the site. The northern portion comprises about 40 percent of the developable area and could include up to 580 DUs and 1,390 people. The southern portion comprises about 60 percent of the developable area and could include up to 870 DUs and 2,100 people.

2.5.1.5 Former City Golf Course Land Use

This area is developer-specific and will be analyzed as development occurs in this area.

2.6 Population – Historical and Projected

The population of Centralia increased approximately 13.9 percent from 2000 to 2015 based on the Washington State Office of Financial Management estimates. Growth from 2000 to 2010 was approximately 1.1 percent per year, while growth in the past 5 years has been approximately 0.55 percent per year. The decreased growth rate over the last several years may be a result of the economic downturn that began in 2008. Table 2-9 illustrates the historical population growth, with the years 1890, 1950, and 1990 included for reference. Chapter 3 presents the sewer customer population.

Table 2-9. Population Growth of Centralia

Year	Population
1890	2,026
1950	8,657
1990	12,101
2000	14,742
2010	16,336
2011	16,440
2012	16,670
2013	16,600
2014	16,640
2015	16,790

Note:
The historical population represents the population within the City limits. The sources of the historical population are the Washington Office of Financial Management Decennial Census Counts (1890 to 2010) and the Official April 1, 2015, population estimates (2011 to 2015).

The population projections for Centralia are presented in Table 2-10. The projected population data were prepared by the City's planning department in May 2016 and align with the City's current Comprehensive Plan as required by the Growth Management Act (GMA). The City's Comprehensive Plan was prepared to be consistent with the GMA and the Lewis County Comprehensive Plan.

Table 2-10. Projected Population

Year	Estimated Population
2020	17,500
2025	18,765
2030	22,535
2035	24,164
2040	26,395

Note:
Population projections were provided by the City on May 4, 2016.

For this General Sewer/Facility Plan, the 20-year planning period is assumed to be 2016 to 2035, and the improvements are based on 2035. The population projections, along with the existing per capita sewer data presented in Chapter 3, form the basis for determining future sewer requirements for the City's

wastewater collection system. The projected sewered customer base cannot be estimated since it is unknown what privately owned systems will fail or be converted to the public sewer system. In order to be conservative, the estimated projected City population is assumed to be connected to the public sewer system.

CHAPTER 3

Flows and Loads

This chapter presents an analysis of the existing and projected sewer flows and loads. It also discusses infiltration and inflow (I/I), water conservation, and wastewater system design criteria. A detailed analysis of flow and loading is crucial to the planning efforts of a sewer service provider. When analyzing a wastewater collection and treatment system, the first step is to identify current flow and load values to determine if the existing system can provide adequate service to its existing customers under the most critical conditions in accordance with federal and state laws. A future sewer system analysis identifies projected flows and loads to determine where the system will need to be improved to satisfy future growth while continuing to meet federal and state laws.

Flow and load values in a wastewater system are used to determine the size of gravity collection piping, lift station facilities, and force main piping, and the size and type of treatment facilities needed. This information is also used to develop the sewer service provider's National Pollutant Discharge Elimination System (NPDES) waste discharge permit, which is required by Ecology. Historical flow and load data were analyzed for the City's sewer system to develop per capita values. Using population projections provided by the City, the per capita values were used to develop planning flows and loads to be used for this study. This process is described in the subsequent sections of this chapter.

3.1 Flows

This section describes existing and future base sanitary flows, peaking factors, I/I, and water conservation.

3.1.1 Existing Base Sanitary Flows

The total influent flow to the WWTP is made up of untreated residential and light industrial flow. The wastewater generated from the collection system is sent to either China Creek Pump Station or North Port Pump Station. Both pump stations have two force mains that differ in size in order to manage the variation of flows. China Creek Pump Station has a 14-inch and 18-inch force main and three submersible pumps capable of conveying a maximum flow of 10 mgd. The North Port Pump station has 10-inch and 6-inch force mains to convey a maximum flow of 300 gpm.

The City's existing collection system flows were estimated using the WWTP discharge monitoring reports (DMRs) for the 2011 through 2015 period. The 2015 average annual wastewater flow was 1.94 mgd. The 2015 average annual value includes I/I on an average day basis. Additionally, the existing base flow with minimal I/I influences was calculated based on seasonal flow rates when groundwater levels were anticipated to be lowest (July and August). Table 3-1 summarizes the average annual, maximum month, maximum day, and dry weather flows to the WWTP for the 2011 through 2015 period.

Table 3-1. Existing Average Annual, Maximum Month, Maximum Day, and Dry Weather Flow Rates

Year	Flow Scenario	Flow (mgd)
2011	Average Annual	1.86
	Maximum Month	3.82
	Maximum Day	6.40
	Dry Weather	1.04
2012	Average Annual	2.15
	Maximum Month	4.47
	Maximum Day	6.69
	Dry Weather	1.06
2013	Average Annual	1.52
	Maximum Month	4.20
	Maximum Day	4.34
	Dry Weather	1.02
2014	Average Annual	1.69
	Maximum Month	3.99
	Maximum Day	6.28
	Dry Weather	1.01
2015	Average Annual	1.94
	Maximum Month	5.82
	Maximum Day	8.67
	Dry Weather	0.99

Note:
Dry weather flow assumed to occur in July and August.

3.1.2 Peaking Factors

Once existing flow rates are measured and defined, projected flow rates can be developed. Projected flows are used to further analyze how well the existing system will perform in the future, and to determine improvements required to maintain or improve system function. In order to establish projected flow scenarios for a sewer system, peaking factors need to be determined for the existing system, which can then be applied to future flow rates. Peaking factors are the ratio of higher flows, such as maximum day flow, to the average annual flow (AAF). Table 3-2 shows the flow rates and peaking factors as measured at the City's WWTP.

Peaking factors for collection system pipes and lift stations are typically based on peak hour flow rates. Peaking factors in the collection system can be greater than those experienced at the WWTP due to the smaller size of the sewer drainage basin feeding the particular collector or lift station. The top 15 highest flows between 2011 and 2015 occurred in November and December of 2015, with the highest maximum day flow of 8.67 mgd occurring on December 10, 2015 after a large, multi-day storm. The highest peak hour flow was 8.99 mgd, also occurring in 2015.

Table 3-2. Summary of Existing Flows and Peaking Factors

Year	Flow Scenario	Flow (mgd)	Peaking Factor (by AAF)
2011	Average Annual	1.86	1.0
	Maximum Month	3.82	2.1
	Maximum Day	6.40	3.4
	Peak Hour	6.47	3.5
2012	Average Annual	2.15	1.0
	Maximum Month	4.47	2.1
	Maximum Day	6.69	3.1
	Peak Hour	7.35	3.4
2013	Average Annual	1.52	1.0
	Maximum Month	4.20	2.8
	Maximum Day	4.34	2.9
	Peak Hour	5.11	3.4
2014	Average Annual	1.69	1.0
	Maximum Month	3.99	2.4
	Maximum Day	6.28	3.7
	Peak Hour	6.86	4.1
2015	Average Annual	1.94	1.0
	Maximum Month	5.82	3.0
	Maximum Day	8.67	4.5
	Peak Hour	8.99	4.6

AAF = average annual flow

3.1.3 Industrial Sources

There are two existing minor industrial establishments that discharge to the City's WWTP. It is anticipated that both of these facilities will remain in the near future. Their permits and associated information are included in Appendix C. The City is unaware of any high strength users that discharge to the City's WWTP.

Lewis County Central Transfer Station (State Waste Discharge Permit ST0006139)

The Lewis County Central Transfer Station is a transfer station located in Centralia. Wastewater is generated during the cleaning/washing of the transfer station solid waste loading and unloading area. The maximum day wastewater generated is 340 gpd and is considered a nonsignificant industrial user since the flow is less than 25,000 gpd. Their maximum daily biochemical oxygen demand (BOD) and total suspended solids (TSS) limit is 50 pounds per day with an oil and grease daily limit of 2 pounds per day. The average monthly limits for these constituents is the same. Review of the existing DMRs did not reveal any violations above their permitted limits. Expansion within the planning period is not anticipated for this facility.

Sierra Pacific Industries (State Waste Discharge Permit ST0006220)

The Sierra Pacific Industries includes a sawmill, planer mill, boiler/kiln complex, seedling cooler, truck shop and main office. Industrial wastewater is produced in boiler operations used to provide steam to the kilns for drying lumber. The reverse osmosis concentrate stream and boiler blowdown water are the

two streams generated by this facility that are discharged to the City's WWTP. Domestic wastewater is also discharge from the on-site restroom. The facility is permitted for an average quarterly flow of 13,040 gpd and maximum day flow of 26,880 gpd. The BOD and TSS limits are 300 milligrams per liter (mg/L) maximum day with an oil and grease maximum day limit of 100 mg/L. Review of the existing DMRs did not reveal any violations above their permitted limits. Expansion within the planning period is not anticipated for this facility.

3.1.4 Contributing Jurisdictions

There are two jurisdictions that contribute wastewater to the City: Lewis County and the Port of Centralia. The City does not have an interlocal agreement with the Port of Centralia. Most of the Port of Centralia's property is within City limits or the UGA. The interlocal agreement with the Lewis County is included in Appendix C and provides for water and sewer services within the UGA consistent with City ordinances and regulations.

3.1.5 Future Base Sanitary Flows

Future flow rates were calculated for the 2020 (5-year) and 2035 (20-year) planning horizons. Population projections, as shown in Chapter 2, were used to calculate the projected flow rates. A population increase was established over the projected period, which was in turn applied to the estimated existing flow rates for the City.

The projected flows at the WWTP were developed using the following assumptions:

- The average flow rate per capita for 2015 is approximately 124 gallons per capita per day (gpcd), as shown in Table 3-3. The 2015 average flow rate per capita corresponds with the per capita flow rate average for the 2011 through 2015 period, excluding the per capita flow rate for 2013 (which is significantly lower and considered an outlier).
- The 2015 per capita flow rate of 124 gpcd also corresponds to the influent flow as documented on the City's discharge monitoring reports for the publicly sewered accounts within the City.
- For planning purposes, the future flow rate per capita will be 126 gpcd, which is the average over the 2011 to 2015 period. This per capita flow is applied to the projected City population. This is a more conservative approach since the exact future sewered population cannot be determined.

Table 3-3. Existing Average Annual Flow Rates and Flow per Capita

Year	Average Annual Flow (mgd)	Sewered Population	Average Day Flow per Capita (gpcd)
2011	1.86	14,060	132
2012	2.15	15,570	138
2013	1.52	15,570	98
2014	1.69	15,570	109
2015	1.95	15,570	124
		Average[a]	**126**

[a] 2013 flow not included in average, because it is very low and considered an outlier.

Gpcd = gallons per capita day

Table 3-4 presents the projected flow rates for the City under average annual, maximum month, maximum day, and peak hour conditions assuming the estimated City population is served by the public sewer system. The pump station improvements identified in this General Sewer/Facility Plan do not

increase the pumping capacities. Historical peaking factors were used to determine future peak flows. Full system sewer modeling will need to be performed during the next sewer planning cycle.

The existing WWTP is currently rated for a maximum month flow of 5.5 mgd, a maximum day flow of 8.6 mgd, and a peak hour flow of 9.3 mgd. The hydraulic capacity of the plant will be exceeded within the planning period, based on the projected flows presented in Table 3-4. It is important to note that these values are conservative in order to plan for the worst-case scenario assuming that 100 percent of the projected City population connects to the public sewer. The City will annually monitor and evaluate flows and loads to determine if population is increasing as outlined in this planning document in order to effectively plan for future improvements.

Refer to Chapter 6 for more discussion regarding the capacity evaluation for the WWTP and planning for additional capacity.

Table 3-4. Projected Flow Rates

Year	Estimated Population (City)	Flow Scenario	Flow (mgd)
2020	17,500	Average Annual	2.20
		Maximum Month	5.40
		Maximum Day	7.75
		Peak Hour	8.28
2025	18,765	Average Annual	2.36
		Maximum Month	5.79
		Maximum Day	8.31
		Peak Hour	8.88
2030	22,535	Average Annual	2.84
		Maximum Month	6.96
		Maximum Day	9.98
		Peak Hour	10.67
2035	24,164	Average Annual	3.04
		Maximum Month Wet Weather	7.46
		Maximum Month Dry Weather	2.1
		Maximum Day	10.70
		Peak Hour	11.44

3.1.6 Infiltration and Inflow

I/I is the combination of groundwater and surface water that enters the sewer system. Infiltration is groundwater entering the sewer system through defects in the sewer system infrastructure (such as fractured pipes, leaking manholes, and pipe joints). Inflow is surface water that enters the sewer system from sources such as roof and street drains and leaky manhole covers.

Reducing sewer collection system I/I is essential for two purposes. I/I reduction results in a lowered risk of sanitary sewer overflows and reduces the cost of treating wastewater. By reducing I/I sources, the extraneous water that previously occupied the conveyance and treatment system can now be occupied by sewage. This leads to delaying conveyance and treatment projects. A sanitary sewer system must be able to carry the domestic wastewater generated by utility customers and the extraneous I/I that is a part of every sewer collection system.

The amount of I/I varies with time of year and between years. The amount of I/I present will impact the ability of the sewer system to accept additional flows, as a given trunk sewer might be adequate for dry weather flows but might be surcharged under wet weather conditions. Wet weather surcharging has been observed within the collection system, indicating that these lines are above design capacity under some conditions.

Additional monitoring is required to determine the adequacy of the existing collection system for future flows. The monitoring program is discussed in Chapter 5 and includes visual inspections of water surface levels and flow monitoring during wet and dry seasons. Chapter 5 also includes proposed projects to mitigate I/I within the system.

The EPA report *Infiltration/Inflow, I/I Analysis and Project Certification* (EPA, 1985) developed guidelines to help determine what amount of I/I is considered "excessive" and what amount can be cost-effectively removed. The report established I/I flow rates that were considered normal or acceptable, based on surveys and statistical evaluations of data from hundreds of cities across the nation. Based on the criteria set forth in this report, historical flow and precipitation data were analyzed to determine if the system had "excessive" I/I. The subsequent sub-sections discuss the results of this analysis, and detailed tables of the analysis can be found in Appendix D.

3.1.6.1 Inflow

The EPA report gives guidelines for determining whether inflow can be classified as non-excessive. Inflow is considered non-excessive if the average daily flow during periods of heavy rainfall or spring thaw (i.e., any event that creates surface ponding and surface runoff) does not exceed 275 gpcd. Between the beginning of 2011 and the end of 2015, peak flows exceeded this threshold about 4.7 percent of the time. Figure 3-1 illustrates the cumulative flow frequency during this period; the largest peak flow was 516 gpcd in December 2015. This storm event recorded 0.58 inch of precipitation on December 1, 2015, with a peak of 1.35 inches on December 8, 2015, followed by several days of record precipitation for the remaining days of December. The WWTP influent flow does respond to large precipitation events occurring over a few days.

The City is conducting an I/I study to confirm these results and to locate the affected collection system areas to determine if there are any cost-effective sewer rehabilitation measures to remove excessive inflow. It is important to note that the inflow in the City's collection system is excessive as defined by the EPA. The City is actively looking for opportunities to reduce inflow by conducting smoke testing, video data collection and other inflow data collection techniques as part of their O&M program.

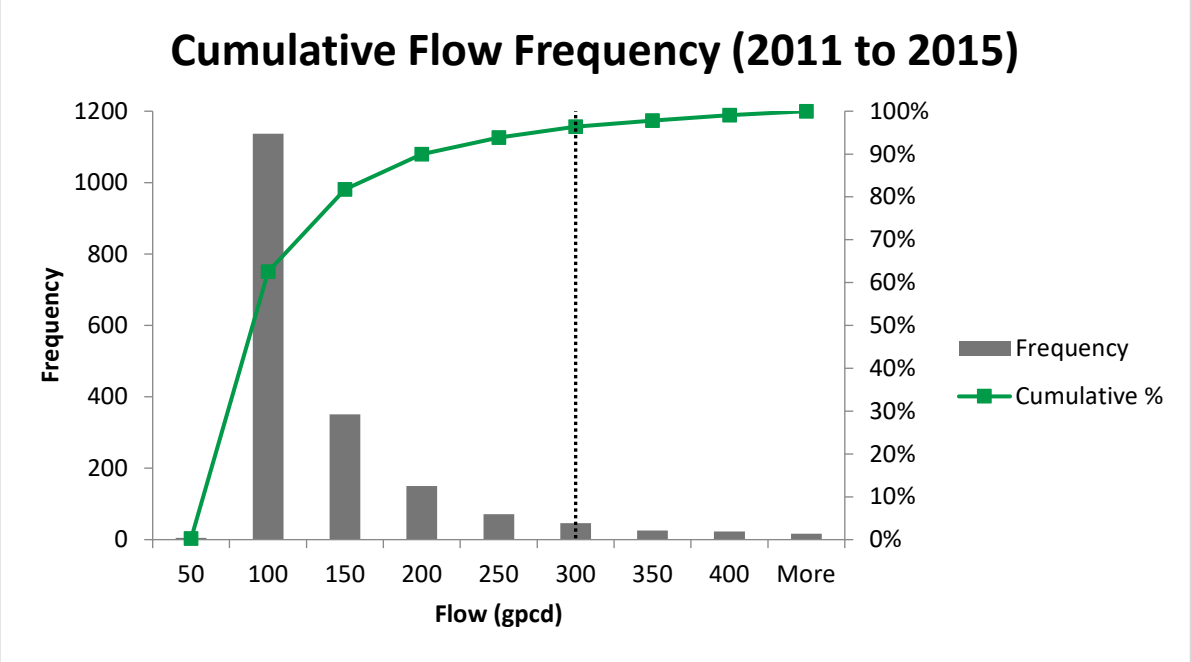


Figure 3-1. Cumulative Flow Frequency (2011 to 2015)

3.1.6.2 Infiltration

Although it can be difficult to determine how much of the flow is due to inflow or infiltration, peak inflow will generally occur immediately during or just after a significant rain event, while peak infiltration will occur during the high groundwater period that follows prolonged precipitation events. This analysis assumed that the high groundwater period occurred in the spring (March through May). In order for the amount of infiltration to be considered non-excessive as defined by the EPA, the average daily flow must be less than the national average for dry weather flow of 120 gpcd (i.e., a 7- to 14-day average measured during periods of seasonal high groundwater but without appreciable rainfall). Between the beginning of 2011 and the end of 2015, there were three dry weather flow events during suspected high groundwater conditions. Two of these events (May 2013 and April 2014) did not have "excessive" infiltration with average daily dry weather flows of 81 gpcd and 114 gpcd, respectively. The only event that had "excessive" infiltration occurred in late April of 2015 and had an average daily dry weather flow of 131 gpcd. These results indicate that the system does not experience excessive infiltration.

3.1.7 Water Conservation

The use of water-conserving fixtures can reduce the total wastewater flow to the sewer system. It has been estimated that conservation measures can reduce per capita wastewater flows by as much as 20 percent. If the water reduction measures are sustained over time, then facilities can be sized to accommodate the smaller flows, saving construction costs.

Low-flow fixtures that can be used to reduce wastewater flows are low-flush toilets, low-flow showerheads, high-efficiency washing machines, and, to a lesser extent, faucet aerators. One note of caution when trying to reduce the size of facilities based on water conservation is that the water savings attributed to many of the fixtures tend to decrease over time as the fixture ages or the homeowner chooses not to use or replace the fixture, or both. Before decreasing the size of any wastewater facilities based on long-term conservation savings, a thorough review of successful case studies such as that undertaken by Lacey/Olympia/ Thurston/Tumwater, should be done to provide reassurance that the

savings can be sustained without impinging on the inherent margin of safety allowed for in facility designs.

An analysis conducted in the previous Facilities Plan (CH2M, 2000b) estimated that the City could potentially realize a flow reduction of approximately 0.4 mgd to the WWTP with a comprehensive conservation program. However, the cost savings per household as a result of decreased water use was not determined to be cost-effective to justify purchasing the water conservation measures required for residential and commercial retrofits. It was suggested that it may be feasible for the City to investigate flow reduction using low-flow showerheads, because they provide nearly one-third of the flow reduction and are relatively inexpensive. In addition, it is worthwhile for the City to continue monitoring conservation efforts in other communities to determine whether the successful efforts and programs of other utilities can be modified to benefit the City's customers. Currently, the City has adopted the 2012 Uniform Plumbing Code, which outlines water conservation performance standards for all new construction and remodeling involving replacement of plumbing fixtures (Washington State Building Code Council, 2012).

3.2 Loads

3.2.1 Existing Loads

The WWTP DMRs were evaluated to determine current wastewater characteristics and influent loads. The annual average influent 5-day biochemical oxygen demand (BOD_5) load ranged from 2,699 pounds per day (ppd) (2011) to 3,406 ppd (2013) for the 5-year period of analysis as shown in Appendix E. The maximum monthly average TSS load ranged from 2,408 ppd (2011) to 4,059 ppd (2013). Apparent BOD_5 and TSS exceedances in 2012 and 2013 prompted a loading analysis on the plant. This analysis revealed that influent BOD_5 and TSS were suspected to be reported higher than actual loadings due to a replaced sampler. After improving air mixing, it is believed that the new sampler is now taking representative samples.

Table 3-5 presents the total and per capita loading data for 2015, which is the first full year of data after the influent sampling improvements. Based on a sewered population of 15,570, the plant had an annual average BOD_5 loading of 0.177 pound per capita per day (ppcd) and a TSS loading of 0.207 ppcd. The BOD_5 value is less than Ecology's *Criteria for Sewage Works Design* (Orange Book) criterion of 0.2 ppcd. As shown in Table 3-5, the maximum month BOD_5 load was 3,776 ppd and the maximum month TSS load was 3,973 ppd. Based on the City's currently rated BOD_5 loading capacity of 4,400 ppd and TSS loading capacity of 5,000 ppd, the plant is operating at 86 percent of its BOD_5 capacity and 79 percent of its TSS capacity.

Table 3-5. 2015 WWTP Loading

Constituent	Flow Scenario	Concentration (mg/L)	Loading (ppd)	Per Capita Loading (ppcd)[a]
BOD_5	Average Annual	230	2,764	0.177
	Maximum Month	317	3,776	0.243
	Maximum Day	349	5,508	0.354
TSS	Average Annual	271	3,230	0.207
	Maximum Month	366	3,973	0.255
	Maximum Day	412	5,486	0.352

[a] Based on sewered population of 15,570.

Notes:
mg/L = milligram(s) per liter

Table 3-5. 2015 WWTP Loading

Constituent	Flow Scenario	Concentration (mg/L)	Loading (ppd)	Per Capita Loading (ppcd)[a]

ppd – pounds per day

ppcd = pounds per capita day

BOD = biochemical oxygen demand

TSS = total suspended solids

3.2.2 Future Loads

Projected loads for the WWTP were calculated based on the existing per capita load for 2015 and were developed using the following assumptions:

- The existing BOD_5 per capita loading is as follows:
  - Average annual = 0.177 ppcd
  - Maximum month = 0.243 ppcd
  - Maximum day = 0.354 ppcd
- The existing TSS per capita loading is as follows:
  - Average annual = 0.207 ppcd
  - Maximum month = 0.255 ppcd
  - Maximum day = 0.352 ppcd
- For planning purposes, the projected BOD and TSS loading is based on the projected City population. This is the conservative approach since the future sewered population cannot be determined.

The future loads based on the estimated City population are presented in Table 3-6. It is important to note that these values are conservative in order to plan for the worst-case scenario assuming that 100 percent of the projected City population connects to the public sewer. The City will review and monitor flows and loads to determine if population is increasing as outlined in this planning document in order to effectively plan for future improvements.

Table 3-6. Projected Loads

Year	Estimated Population (City)	Flow Scenario	Projected BOD Loading (ppd)	Projected TSS Loading (ppd)
2020	17,500	Average Annual	3,106	3,630
		Maximum Month	4,244	4,465
		Maximum Day	6,191	6,167
2025	18,765	Average Annual	3,331	3,893
		Maximum Month	4,551	4,788
		Maximum Day	6,638	6,612
2030	22,535	Average Annual	4,000	4,675
		Maximum Month	5,465	5,750
		Maximum Day	7,972	7,941
2035	24,164	Average Annual	4,289	5,013
		Maximum Month Wet Weather	5,860	6,160
		Maximum Month Dry Weather	5,430	6,220
		Maximum Day	8,548	8,515

Table 3-6. Projected Loads

Year	Estimated Population (City)	Flow Scenario	Projected BOD Loading (ppd)	Projected TSS Loading (ppd)

3.3 Wastewater Design Criteria

This section discusses the design criteria applicable to both the sanitary sewer system and the WWTP. Capacity analysis regarding adherence to these criteria are discussed in Chapter 5 (Sewer Collection System Improvements) and Chapter 6 (Treatment Plant Evaluation).

3.3.1 City of Centralia Design and Development Guidelines

System design criteria and standards have been developed to confirm that a consistent, minimum level of service is maintained throughout the sewer system and to facilitate planning, design, and construction of sewer system projects. The City has developed Design and Development Guidelines (Guidelines), which were adopted in October 2008 and revised in February 2009 (City of Centralia, 2009). These Guidelines cover criteria for both design plans and specifications and are consistent with the *2008 Standard Specifications for Road, Bridge, and Municipal Construction* prepared by the Washington State Department of Transportation and the American Public Works Association (WSDOT and APWA, 2008). The Guidelines also state that sanitary sewer work must conform to Ecology requirements. The Guidelines can be accessed on the City's website at http://www.cityofcentralia.com/Page.asp?NavID=30.

3.3.2 Criteria for Sewage Works Design

The *Criteria for Sewage Works Design* (Orange Book), was originally published in 1978 and revised in 2008 (Ecology, 2019). It guides the design of sewage collection, treatment, and reclamation systems for municipal design engineers and consulting engineers. Table 3-7 provides a summary of design criteria as presented in Table G2-1 of the Orange Book. It is important to note that the Orange Book contains additional design criteria not included in Table G2-1 of the Orange Book.

Table 3-7. Design Criteria Summary

Unit Processes	Flow (F)	Organic or Solids Loading (L)	Effluent Standards Which Determine the Applicable Design Flows & Loadings
All plant pumping, conveyance channels, pipes, and flow structures	PIDF	N/A	N/A
Primary and secondary clarifiers	1200 g/sf/day at PHDF + recirculation flow for overflow rate and weir loading rate.	PHDL (total suspended solids loading rate to clarifiers)[a]	N/A
Biological reactor	MWDF	MWDL (BOD_5 loading to reactor[s])[a]	Secondary treatment and/or nutrient removal and/or reuse
	MDDF	MDDL (BOD_5 loading to reactors)[a]	Toxics removal and/or reuse
Aeration equipment for substrate removal	N/A	PHDL (BOD_5 and for nitrifying systems, TKN loading rate to biological reactor[s])[a]	N/A

Table 3-7. Design Criteria Summary

Unit Processes	Flow (F)	Organic or Solids Loading (L)	Effluent Standards Which Determine the Applicable Design Flows & Loadings
Plant liquid stream pumping equipment	PIDF	N/A	N/A
Filters/screens used in the liquid stream for secondary clarification	Pass all flows	N/A	N/A
Filters used for secondary effluent polishing	Pass all flows requiring tertiary treatment	N/A	Secondary treatment and/or nutrient removal and/or toxics removal and/or reuse
Equalization basins/surge basins	Continuous flow routing analysis[b]	N/A	N/A
Primary and secondary sludge wasting equipment	N/A	MDDL (BOD_5 and TSS loading to primary clarifiers and/or biological reactor[s])[a]	N/A
Sludge digestion and dewatering equipment	N/A	MDDL (BOD_5 loading to reactor[s])[a]	N/A
Disinfection (non-reuse & non- reliability class I plants)	MDDF (for disinfection requirements, PHDF (for hydraulic considerations)	N/A	N/A
Disinfection (reuse & reliability class I plants)	All flows	N/A	Reuse, shellfish harvest protection

[a] Organic or solids loading parameters are to be computed with the same time intervals as hydraulic loadings.

[b] Continuous flow routing analysis to insure the discharge from the equalization basin does not exceed the hydraulic design limit for the downstream unit processes.

Notes:
g/sf/day = gallons per square foot per day

PIDF = peak instantaneous design flow
PHDF = peak hour design flow
MWDF = maximum week design flow
MDDF = maximum day design flow
TKN = total Kjeldahl nitrogen

CHAPTER 4

Existing System

The facilities within the City's existing sewer system are described in this chapter. Figure 4-1 presents a schematic of the wastewater collection system, including lift stations, force mains, collection system, and the WWTP and outfall.

4.1 Collection System

The City's sewer collection system contains 70 miles of gravity pipelines ranging in diameter from 6 inches to 26 inches. Table 4-1 presents an inventory of the City's existing sewer pipelines. Appendix F includes the existing sewer maps and manhole tables.

Table 4-1. Gravity Sewer Inventory

Diameter (inches)	Concrete (feet)	Asbestos Cement (feet)	Polyvinyl Chloride (feet)	HDPE (feet)	Vitrified Clay (feet)	Ductile Iron (feet)
6	1,962	178	75			
8	87,986	12,257	139,443	1,483	25,614	712
10	6,392	2,819	32,585	529	2,572	
12	2,319		16,478		337	
14					1,561	12
15			12,531			
16				850		
18	516		6,451			
21			5,390			
24	1,209		4,924			
26				752		
Total	**100,384**	**15,254**	**217,877**	**3,614**	**30,084**	**724**

Note:
HDPE = high-density polyethylene

As discussed in Chapter 2 of this General Sewer/Facility Plan, the City's original sewer system was constructed using clay pipe over 80 years ago. At the time of construction, clay pipe was installed using short lengths of pipe and no gaskets at the joints. These factors contribute to leaking conditions. Currently, clay pipe represents over 10 percent of the entire collection system. Concrete was the predominant pipeline material used from the mid-1920s to 1970. Before 1965, the concrete pipe was also not gasketed and tends to leak at the joints. Concrete pipe installed prior to 1965 represents over 35 percent of the collection system. Infiltration through the joints in wet weather (which also contributes to inflow) is a major issue of concern for the City. High groundwater, combined with the aging pipe and ungasketed joints, is believed to be a major contributor to the problem. Capital improvement projects ES-1 and ES-4 have been scheduled to address the broken and cracked joints on these older sewer lines. Other than grease buildup in a few localized areas and I/I, the City has very few problems with the collection system beyond those described here.

4.2 Pump Stations

The sewer system includes 25 pump stations as shown on Figure 4-1.

Table 4-2 provides an inventory of the pump stations in the Centralia sewer system and the year of the most recent rehabilitations or pump replacements. Many of the pump stations were installed to serve individual developments. The City strives to serve areas by gravity as much as possible. Pump stations are allowed as an interim solution for individual developments until the development can be connected to the municipal sewer system.

Table 4-2. Pump Station Inventory

No.	Pump Station	Type	Initial Install	Most Recent Rehab./ Pump Replacement	No. of Pumps	Pump Size (hp)	Pump Capacity (gpm)
1	Borst Park	W/D	1979	2009	2	30	1,100
2	Mt. Vista	W/S	1982	2009	2	1.5	150
3	China Creek	W/S	2004/11	2011	3	289.5	1,100-4,500
4	Eshom	W/S	1982	2012	2	15	250
5	Galvin/Scheuber	W/S	1982	2007	2	20	560
6	Industrial Drive	W/S	1978	2005	2	1	80
7	Jensen	W/S	1981	2011	2	2.5	150
8	High Street	W/S	1959	2010	2	5	200
9	Reynolds	W/S	1983	2012	2	7.5	250
10	Marion	P	1987	Motor #1 2012	2	3	100
11	State	W/S	1985	2004/2009	2	1.5	80
12	Salzer	W/S	1992	2001	2	7.5	115
13	Floral	W/D	1970	1998	2	7.5	350
14	Ace Auto (Gold #2)	W/S	1970	2016	2	3	140
15	Fairgrounds (Gold #1)	W/S	1970	2012	2	5	120
16	South Tower	W/S	1978	2010	2	1.5	80
17	Van Buren	W/S	1953	2008	2	3	150
18	Jefferson	W/D	1962	2008	2	15	640
19	Long Road	W/S	1987	2011	2	7.5	150
20	W. Mellen	W/S	1970	2012	2	10	285
21	Military	W/S	1970	2010	2	7.5	100
22	Scammon Creek	W/S	1987	2010	2	7.5	200
23	Highland Park	W/S	1994	2007	2	5	150
24	North Tower	W/S	1999	2012	2	7.5	250
25	North Port	W/S	2007	ORIGINAL	2	7.5	300

Notes:
hp = horsepower
P = package pump station
Rehab. = rehabilitation
W/D = wet well and dry well
W/S = wet well, submersible pump

Borst Park, Floral, Jefferson, and West Mellen pump stations have a dedicated backup power source. The remaining pump stations share a 100-kilowatt portable generator. Historically, this generator appears to be adequate for the City.

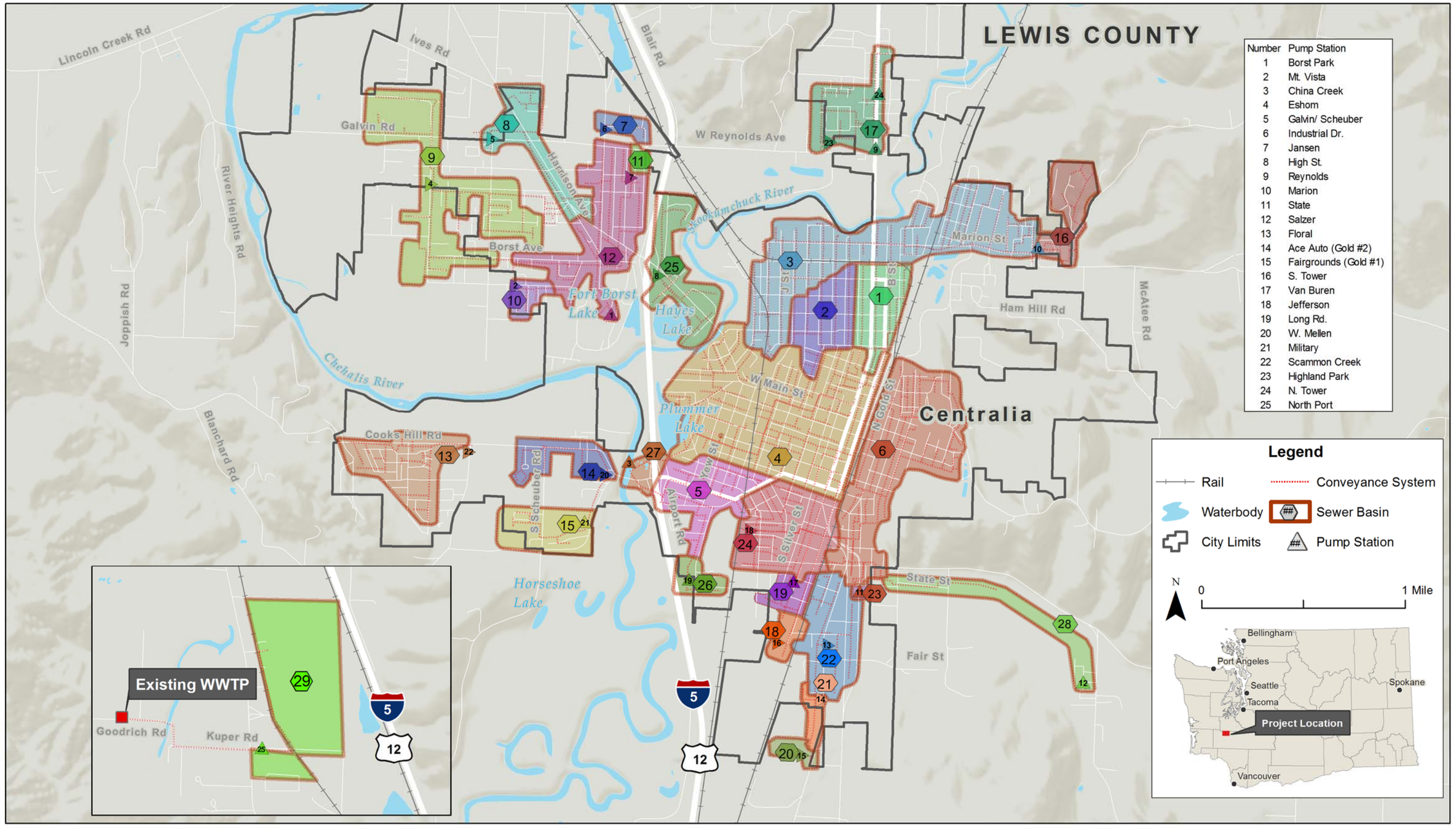


FIGURE 4-1
Existing Sewers and Basins
City of Centralia
General Sewer/Facility Plan

Data Sources:Esri, NOAA, WSDOT, King County, Lewis County, US Census Bureau, USGS

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4.3 Force Mains

Each of the pump stations discharge to the gravity sewer system via a force main. The City's sewer system contains about 19 miles of force mains ranging in size from 2.5-inch-diameter to 18-inch-diameter. Table 4-3 presents an inventory of the system force mains based on mapping provided by the City.

Table 4-3. Force Main Inventory

Size (inches)	Length (feet)	Material
Less than 3	6,365	Polyvinyl chloride
3.0	2,850	Polyvinyl chloride
4.0	1,209	Asbestos cement
	3,756	Ductile iron
	3,111	Polyvinyl chloride
6.0	1,838	Asbestos cement
	13,358	Polyvinyl chloride
8.0	2,753	Asbestos cement
	4,798	Polyvinyl chloride
10.0	2,773	Asbestos cement
	4,041	Ductile iron
	7,452	Polyvinyl chloride
14.0	3,454	Ductile iron
	19,774	Polyvinyl chloride
18.0	3,442	Ductile iron
	19,762	Polyvinyl chloride
Total	**100,736**	

4.4 Flood Events and the Collection and Conveyance System

The City experienced a large storm in December 2007 that resulted in flooding in areas of the City. The City received 8.3 inches of rain over three days with 3.4 inches of rain each day for two of the days. The total rainfall for the month of December 2007 was 16.9 inches with maximum day flows of at or near 8 mgd for four days. The areas affected during these several rain events included:

- Harrison Avenue east of I-5 including Eckerson, High, Lowe and Bridge Streets. All of the manholes were covered with water during this event. The High Street Pump Station that serves this area was able to pump after power was energized to the station.
- Long Road and South Street between I-5 and the railroad tracks. All of the manholes and Long Road Pump Station were covered with water. The Long Road Pump Station has a sealed hatch lid that prevents water from flowing into the wet well. The station was operational when the power was energized.
- South Gold, Grand, Kresky and State Streets. All of the manholes were covered with water. Gold Street #1 and #2 pump stations had water in the panels. Since then, Gold Street #2 has had the panels raised to keep it out of the flood water elevation. Gold #1 has a water tight hatch lid; the panels will be raised within the next few years. The State Street Pump Station has had the panels raised out of the flood water, the lid is bolted down and pick holes are sealed during a flood event. All the manhole frame and lids on South Gold have been modified to locking and sealing lids.

- Jefferson, Woodland, Jackson and Goff Streets. All of the manholes were covered with water. The Jefferson Pump Station had water in the dry well due to sump pump failure. The station is now equipped with redundant sump pumps and the station is tarped and sand bagged before a potential flood event.
- Borst Park Pump Station is tarped and sand bagged to prevent water from entering the dry well. The on-site generator is elevated above the flood waters and this practice seems to control the flooding at the station.

The City has flooding event management practices in place as part of their flooding protocols. These practices have served the City well for several years; no further improvements are required at this time.

4.5 Sewer Overflows

The City is served by a sanitary sewer collection that is classified as a separate system. The original separate system overflow gates were sealed in the early 1980s; therefore, no controlled overflow locations remain.

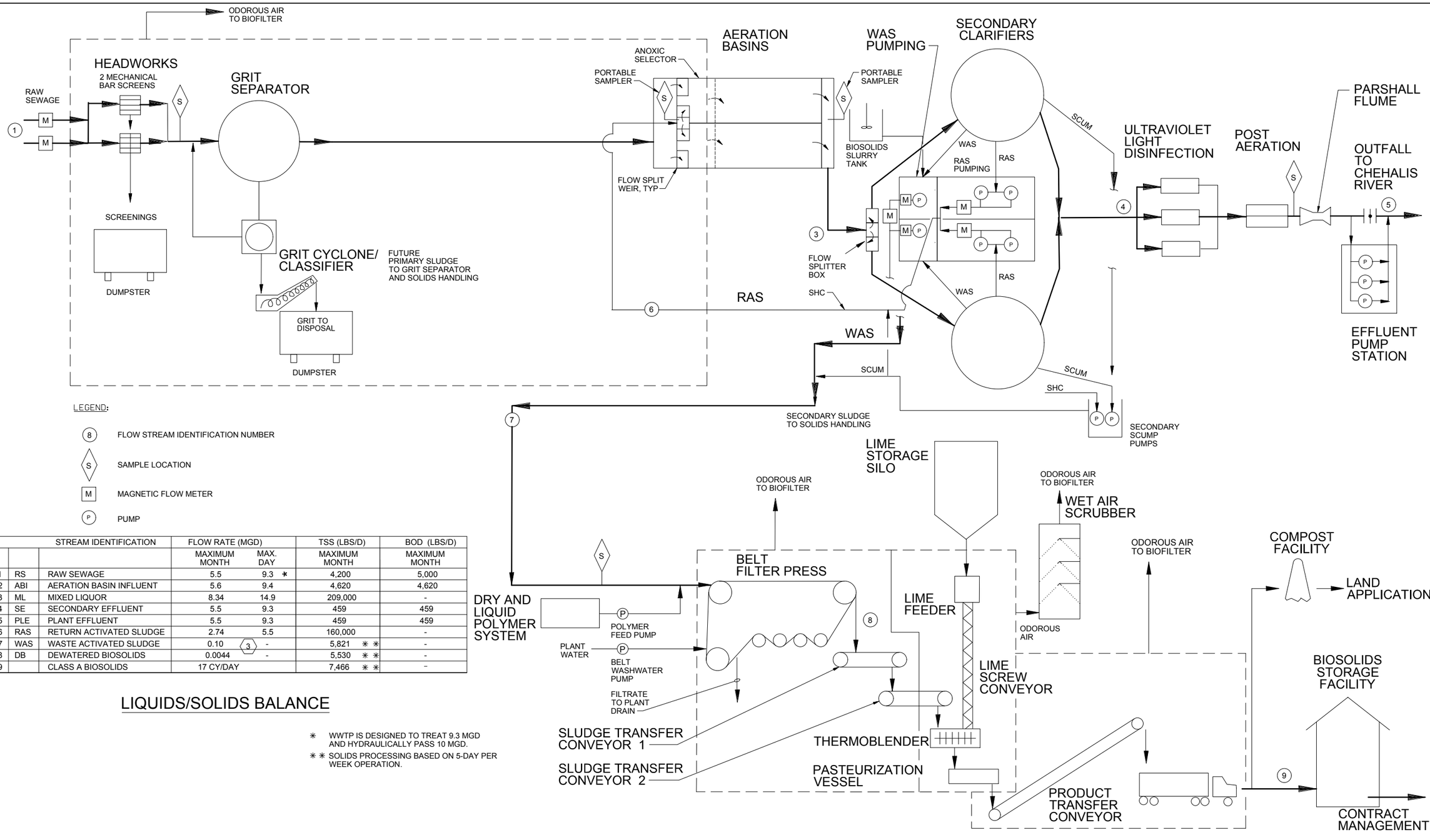
Known overflows after January 2006 are as follows:

- On November 19, 2006, approximately 1,260 gallons seeped out of a faulty pipe joint in the 2600 block of Harrison Avenue. The overflow lasted for approximately 1 day, and the joint was repaired.
- On December 26, 2012, level sensor operation failed at the China Creek pump station during a higher than average rain event. Following correction of sensor operation, debris typical to wastewater was found at two unfinished manholes that were part of a Washington State Department of Transportation (WSDOT) construction project near Lakeshore Drive at I-5 and at China Creek Pump Station. No discharge from the sanitary sewer system was witnessed, and no standing water or ponding was observed. The affected area was treated with hydrated lime to minimize odors and to stabilize residuals left behind.
- On September 5, 2013, a line exfiltrated into the surrounding soil. Staff did not witness any flow; however, there was evidence of sewage flow on the ground. An unknown amount of flow reached China Creek.
- On October 20, 2013, an overflow occurred in the Reynolds Road force main on Pearl Street under the Skookumchuck Bridge. The force main was broken at the air release valve, and an unknown volume of wastewater entered the Skookumchuck River. The pipe has been repaired.

4.6 Wastewater Treatment Plant

4.6.1 Liquids Treatment Processes

Construction of the Centralia WWTP was completed in March 2004. Centralia WWTP replaced a WWTP located north of Mellen Street on the eastern side of the Chehalis River. The treatment plant includes screening, grit removal, activated sludge aeration basins, secondary clarifiers, and UV disinfection prior to discharge to the Chehalis River through a multi-port diffuser at river mile 61.25. Solids processing includes belt filter press dewatering of activated sludge solids and aerated static pile composting. The City also has the ability to use lime pasteurization as a backup processing alternative. The process schematic is shown on Figure 4-2.



LEGEND:

- (8) FLOW STREAM IDENTIFICATION NUMBER
- (S) SAMPLE LOCATION
- [M] MAGNETIC FLOW METER
- (P) PUMP

		STREAM IDENTIFICATION	FLOW RATE (MGD)		TSS (LBS/D)	BOD (LBS/D)
			MAXIMUM MONTH	MAX. DAY	MAXIMUM MONTH	MAXIMUM MONTH
1	RS	RAW SEWAGE	5.5	9.3 *	4,200	5,000
2	ABI	AERATION BASIN INFLUENT	5.6	9.4	4,620	4,620
3	ML	MIXED LIQUOR	8.34	14.9	209,000	-
4	SE	SECONDARY EFFLUENT	5.5	9.3	459	459
5	PLE	PLANT EFFLUENT	5.5	9.3	459	459
6	RAS	RETURN ACTIVATED SLUDGE	2.74	5.5	160,000	-
7	WAS	WASTE ACTIVATED SLUDGE	0.10	-	5,821 * *	-
8	DB	DEWATERED BIOSOLIDS	0.0044	-	5,530 * *	-
9		CLASS A BIOSOLIDS	17 CY/DAY		7,466 * *	-

LIQUIDS/SOLIDS BALANCE

* WWTP IS DESIGNED TO TREAT 9.3 MGD AND HYDRAULICALLY PASS 10 MGD.

* * SOLIDS PROCESSING BASED ON 5-DAY PER WEEK OPERATION.

City of Centralia
General Sewer/Facility Plan

Figure 4-2
CENTRALIA WASTEWATER TREATMENT PLANT PROCESS FLOW SCHEMATIC

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Influent sewage is pumped to the WWTP by either the China Creek Pump Station or the North Port Pump Station. Both pump stations use twin force mains of different sizes to maintain minimum velocity over the wide range of flows. Magnetic flow meters measure each of the incoming flows at the headworks. Wastewater is first screened through two mechanical quarter-inch-diameter screens with integral brush cleaning and compaction screws. A manual screen is provided in case a mechanical screen is out of service during high flows. Grit is then removed by gravity settling in a detritus grit basin. Grit is pumped through a grit cyclone and classifier to separate the inorganic grit from the organic particles and remove water. The dewatered grit and screenings are collected in dumpsters and periodically hauled by the solid waste company to a landfill.

Screened and de-gritted wastewater flows to two aeration basins for activated sludge treatment. Space has been provided between the headworks and aeration basins for future treatment processes or equipment. The aeration basins include anoxic zones where the wastewater is mixed with return activated sludge (RAS). Nitrate in the RAS is used instead of oxygen to remove soluble BOD. The anoxic zone promotes growth of bacteria with good settling characteristics, removes nitrogen, reduces the amount of oxygen required, and produces alkalinity. The mixture, called mixed-liquor suspended solids (MLSS), flows to the aerated portion of the aeration basins where the bacteria remove BOD and convert ammonia to nitrate. The solids retention time is maintained at a long enough duration to provide efficient nitrification (i.e., the conversion of ammonia to nitrate all year round). Aeration is provided by multi-stage centrifugal blowers and fine- and coarse-bubble diffusers with Ethylene Propylene Diene Monomer membranes. Aeration provides oxygen and maintains the MLSS in suspension.

The effluent from the settled MLSS flows over the secondary clarifier weirs, and the settled solids are pumped back to the aeration basins by four submersible RAS pumps. There are two circular secondary clarifiers with spiral mechanisms for moving settled solids to the center of the clarifier for removal. The waste activated sludge (WAS), or settled solids, are periodically pumped to the belt filter press for removal.

Secondary effluent flows by gravity through three UV disinfection channels. Each channel is equipped with arrays of horizontal UV light tubes that disinfect the secondary effluent by exposure to UV light. The disinfected secondary effluent normally flows by gravity to a multiport outfall for discharge into the Chehalis River. At high Chehalis River flows, gravity flow may not be possible and the secondary effluent is pumped through the outfall using submersible pumps.

4.6.1.1 Biosolids Management

The WWTP has two solids processing systems. Aerated static pile composting, constructed in 2013, is the City's primary method of processing solids with lime stabilization as the backup method. WAS is pumped to the belt filter press for dewatering. Dewatered WAS is mixed with green waste and screened compost oversized material called 'overs.' This mixture is placed on a bed of overs and covered with a blanket of overs. The resulting compost pile is aerated by either pulling air through the compost pile or pushing air through the pile using blowers and perforated piping at the base of the compost pile. When air is pulled through the pile, the resulting odorous air is discharged to a compost biofilter for odorous air treatment. The compost piles are made without spaces between individual compost piles to reduce the amount of space required. The compost piles are covered by the biosolids storage building, and the green waste is kept covered to minimize the effect of precipitation. All composting is done on a paved surface, and all runoff is collected and returned to the WWTP for treatment. After composting to achieve sufficient stabilization and temperature to meet EPA Class A biosolids requirements, the composted material is screened. Material passing through the screens is the compost product, and the larger material not passing through the screens is called overs and returned to the process as previously described. The compost product is 'cured' by storing in unaerated piles to provide further stabilization before it is tested prior to distribution.

Originally, the dewatered WAS was treated in a lime pasteurization system manufactured by RDP. Quicklime (calcium oxide) was mixed with the dewatered WAS and mixed in a thermoblender where

additional heat was added by electrical resistance heaters. The temperature of the heated mixture was maintained in an insulated box for 30 minutes to produce Class A biosolids.

4.6.1.2 Outfall

The existing outfall is 36 inches in diameter with eight 16-inch-diameter outlets designed for a maximum future capacity of 30 mgd. The initial required capacity is 10 mgd. Outfall risers 2, 4, 6, and 8 are equipped with 12-inch-diameter "duckbill" outlets, and the remaining four outlets are installed with blind flanges. The blind flanges can be replaced by 12-inch by 16-inch reducing elbows and duckbill outlets to increase capacity in the future.

4.6.2 Plant Bypass

The WWTP has no bypass.

4.6.2.1 Odor Control

Odor control is provided by a biofilter located adjacent to the headworks. Since its original construction, the soil in the biofilter was replaced by bark due to plugging issues from the lime pasteurization process.

4.6.2.2 Design Data

Plant design data are presented in Appendix G.

4.6.3 Other Facilities

The plant has a maintenance facility that includes a maintenance area, laboratory, lunch room, locker rooms, control room, administrative office space, and storage space for chemicals and other supplies.

A storage building for collection system equipment and a wastewater decant facility have been added since the plant's original construction. The collection system storage building is used by collections staff for the eductor trucks and closed-circuit television inspection vehicles and equipment.

The decant facility was completed in 2015 and is used to separate the water from material collected during sewer maintenance. This facility has three bays and is enclosed by a three-sided prefabricated metal building. An oil-water separator captures fats, oil and grease (FOG) in the decanted water prior to discharge to the headworks. The facility is located in the southwestern portion of the existing WWTP, adjacent to existing truck access roads and an entrance gate.

CHAPTER 5

Sewer Collection System Improvements

An evaluation of the City's sewer system is presented in this chapter. The evaluation includes proposed future expansions and improvements to the existing system. The existing and future collection systems for basins likely to be impacted by future growth were analyzed. Apparent capacity-related deficiencies were identified with existing flow and pump station telemetry data; and structural and operational deficiencies were identified from staff observations.

5.1 Introduction

The objective of conducting a sewer system evaluation is to gain an understanding of the system and its response to various flow conditions. The City has a number of concerns to be addressed within the sewer system, such as service for new development, I/I impacts, prevention of overflows, and compliance with current regulations. A comprehensive system evaluation provides the City with the data needed to make informed decisions for the continued operation and maintenance of the system.

5.2 Collection System Evaluation

5.2.1 Existing Collection System and Flows

The following items were developed as part of the 2000 General Sewer Plan:

- Base sanitary flows = 76 gpcd
- Average annual dry weather flow = 1.5 mgd
- Wet weather flow = 6.0 mgd

An evaluation of flow data for the 2011 to 2015 period was also completed for this General Sewer/Facility Plan. As presented in Table 3-2, the 2011 to 2015 average dry weather flow is 67 gpcd. This base sanitary flow is lower compared to the 2000 value, but is just marginally lower than the 2011 value. In addition, the average annual dry weather flow is approximately 1.0 mgd (average of the 2011 to 2015 period), which is also lower compared to the 2000 analysis. It is important to note that, although the sewered population has increased by 4,500 people, base flows are lower likely due to water conservation efforts as described in Chapter 4. Additionally, as presented in Table 3-1, the maximum day flows are approximately 6.5 mgd, slightly higher than the wet weather flow identified in the 2000 General Sewer Plan. For planning purposes, the results and assumptions used in the previous sewer plan are considered valid and carried forward in this General Sewer/Facility Plan when no additional data exist.

A hydraulic model of the City’s collection system was not completed for this General Sewer/Facility Plan. The existing collection system is assumed to be adequate for existing flows. There have been no sewer backups or overflows reported by City staff. Collection system deficiencies are generally related to component age. The initial collection system installed in the early 1900s was constructed of ungrouted clay pipe in lengths of 3.5 to 8 feet. Concrete sewer pipe laid prior to 1965 was typically ungasketed pipe in similar lengths. These construction techniques have historically resulted in pipe sections that are prone to infiltration in high groundwater conditions. Approximately 142,000 feet of clay and concrete pipe were installed prior to 1965. The recommended improvements to resolve this aged piping are included in Section 5.7.

5.2.2 Surcharging of Existing Trunk Sewers

The existing collection system has surcharged during wet weather conditions. City staff have conducted several visual surveys of manhole water levels during wet weather and dry weather conditions. It is desirable for the water level in the manhole to remain at or below the crown (top) of the trunk sewer pipe that enters and leaves the manhole, although minor surcharging is not unusual.

During the dry season, the sewer pipes are flowing less than full, which indicates that the existing collection system has adequate capacity for dry weather flows. Average annual WWTP flows are less than 80 percent of the design average annual flow. The fall season data indicate that the water level in the trunk sewers increases as the WWTP flows increase and as the Chehalis River rises. Surcharging is occurring in downtown trunk sewers No. 1 and 2 and Jefferson. The most significant surcharging is occurring in the deepest sections of the downtown sewers. It is important to note that the level of surcharging within the downtown trunk sewers is directly correlated to the WWTP flow and the Chehalis River elevation. The City has completed several I/I rehabilitation projects that replaced old leaky pipes and has observed reduced surcharging in these areas.

Manhole monitoring was undertaken in the Jefferson and Long pump station areas during wet weather conditions in February 2014. Figure 5-1 presents the water level in each of the manholes monitored compared to the manhole depth and sewer pipe crown and invert (bottom) for February 19, 2014. Peak flow to the WWTP on this date was 5.66 mgd, and the Chehalis River flow was 26,000 cubic feet per second (cfs) at Grand Mound. The results show that at this flow and river flow, the existing system can be surcharged and used as storage.

5.2.3 Projected Development Flows

Projected future wastewater flows are used to define the required collection system improvements and extensions that will be required to accommodate growth within the sewer service area. Peaking factors are added as a flow component to account for the diurnal flow variation within a basin over the course of day and is based on dry weather flow monitoring data. Since there is limited flow monitoring data, diurnal curves developed by the Unified Sewage Agency in Hillsboro, Oregon, were used to characterize the diurnal characteristics of the basin. These curves are based on an extensive flow monitoring program conducted from 1989 to 1992, which resulted in a series of dimensionless unit diurnal flow curves that are characteristic of basins containing certain land uses. The flow curves were based on a linear regression analysis of data from 126 flow monitoring sites. The nonresidential peaking factor was derived from this data. The saturation population of the 20-year Urban Growth Boundary areas was calculated based on projections in the *Centralia Comprehensive Plan* of 6.73 DU/acre, 2.4 people per DU, and the acreage of land available for development. Nonresidential flows were estimated using a peaking factor of 2.83 and the developable acreage. The flow estimates from each area assume maximum development. The flow estimates for all the urban growth areas cannot be added, as the total flow would be greater than that which would result from the projected 20-year growth. This analysis technique provides a conservative analysis of the potential impacts on the existing system, if the maximum possible population growth occurred in an urban growth area without redevelopment. Table 5-1 summarizes the projected peak sewage, I/I at 2,500 gpcd, and total wet weather flows for each of the urban growth areas. These areas are coded NS, as new sewers would be required to serve these areas.

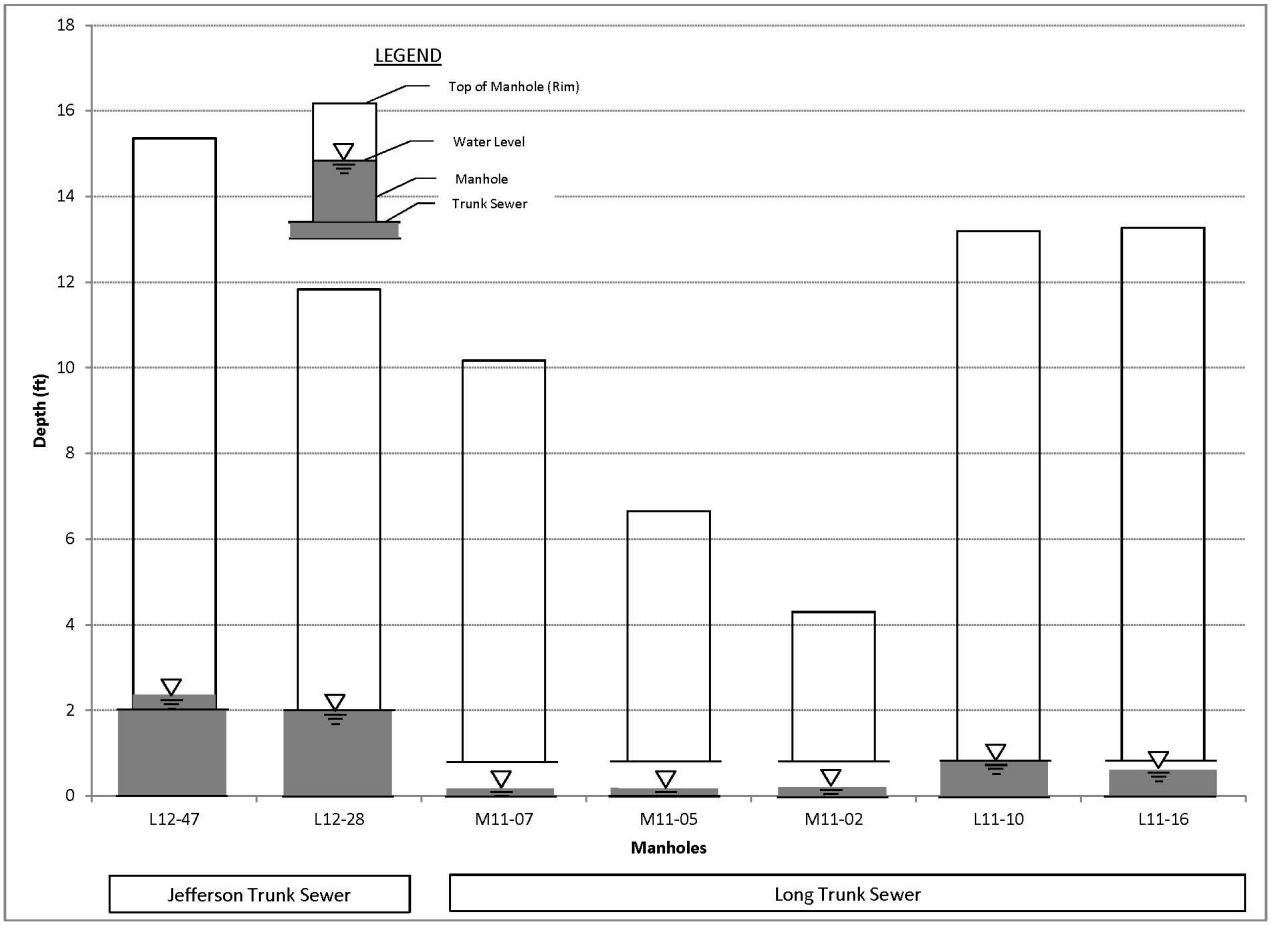


Figure 5-1. Existing (2014) System Surcharging

Table 5-1. Projected Peak Flows within UGA

	New Service Areas	Peak Sewage (mgd)	I/I (mgd)	Total (mgd)
NS-1	South Port Industrial	0.23	0.15	**0.38**
NS-2	North Port Industrial	0.23	0.15	**0.38**
NS-3	East Port Industrial	0.11	0.08	**0.19**
NS-4	Ives Road Industrial	0.06	0.04	**0.09**
NS-5	Cooks Hill Residential	0.42	.017	**0.437**
NS-6	East Waunch Prairie Industrial	0.42	.017	**0.437**
NS-7	Fords Prairie Residential	0.53	0.15	**0.68**
NS-8	South Centralia Residential	0.18	0.06	**0.24**
NS-9	Kresky Residential/Commercial	0.13	0.05	**0.18**
NS-10	South Ham Hill Residential	0.01	0.04	**0.05**
NS-11	Logan District Residential	0.01	0.03	**0.04**
NS-12	Reynolds Road Commercial	0.04	0.01	**0.05**
NS-13	North Centralia Industrial	0.62	0.42	**1.04**
NS-14	Taylor/VanWormer Residential	0.07	0.03	**0.10**
NS-15	Graf Road Residential	0.19	0.08	**0.26**
NS-16	Lum Road Industrial	0.05	0.09	**0.14**

Included in this evaluation are parcels in the UGA that are currently being served by a septic system but that have potential to be served by the municipal sewer collection system in the vicinity. These new unsewered areas are separate from the areas presented in Table 5-1. As the septic system fails, that parcel will need to connect to the City's municipal collection system. Sewage flows from the unsewered areas (US) were estimated based on a house count and assuming 2.4 people per DU. Table 5-2 summarizes the projected peak sewage, I/I, and total wet weather flows for each of the unsewered areas.

Table 5-2. Projected Peak Flows in Unsewered Communities

Unsewered Areas		Peak Sewerage mgd	I/I mgd	Total mgd
US-1	West Edge of Cook's Hill Residential	0.02	0.01	**0.03**
US-2	South of Cook's Hill Residential	0.003	0.001	**0.004**
US-3	East of Plummer Lake Residential	0.01	0.01	**0.02**
US-4	Ham Hill Residential	0.06	0.02	**0.08**
US-5	North of Meridian Avenue Residential	0.02	0.01	**0.03**
US-6	Waunch Prairie Residential	0.23	0.09	**0.32**
US-7	Fords Prairie Residential	0.02	0.01	**0.03**
US-8	Scammon Creek Residential	0.009	0.004	**0.013**

The flows from each of the UGAs and the unsewered areas were allocated to the basin most likely to receive those flows. Table 5-3 summarizes the estimated sewer main capacity and estimated proposed peak sewage flows for each sewer main based on the allocation of future flows. As noted in Section 5.2.1, the base and average annual dry weather flows have not significantly increased over the last several years, but a collection system evaluation was not completed as part of this General Sewer/Facility Plan. As future development occurs, a comprehensive downstream collection system evaluation is mandatory to determine the effects from the point of connection to the WWTP of that development. This collection system evaluation is the responsibility of and will be prepared by the developer and reviewed by the City as part of the permit application process.

Table 5-3. Evaluation of Potential New Flows on Sewer System Capacity (Peak Sewage Flow Only)

			Potential New Flow		
Trunk Sewer Identification	Pipe Size	Estimated Capacity (mgd)	Unsewered Communities (mgd)	UBG Areas (mgd)	Total New Flow (mgd)
Downtown No. 1:					
Central Boulevard to Creekside Court	10-inch	0.8	0.06 -US-4		0.06
G Street to Central Boulevard	12-inch	1.2		0.04	0.1
First Street to G Street	15-inch	1.5 - 2.2			0.1
Plum Street to First Street	18-inch	3.3 - 4.0	0.01 -US-3		0.11
WWTP to Plum Street	24-inch	6.0 - 6.3			0.11
Downtown No. 2:					
Oak Street to Hanson Street	14-inch	1.0 - 1.6			0
Pear Street to Oak Street	15-inch	3.3			0
Courtland Street to Pear Street	18-inch	6.0 - 8.0			0

Table 5-3. Evaluation of Potential New Flows on Sewer System Capacity (Peak Sewage Flow Only)

Trunk Sewer Identification	Pipe Size	Estimated Capacity (mgd)	Potential New Flow		
			Unsewered Communities (mgd)	UBG Areas (mgd)	Total New Flow (mgd)
Downtown No. 3:					
Oak Street to N. Pearl Street	15-inch	3.3			0
Mellen to S. Cooks:					
Military PS to Scheuber Road	8-inch	1	.003 -US-2		0.003
Mellen to N. Cooks:					
Mellen PS to Cooks Hill Landing	8-inch	0.8 - 1.0	0.02	0.49 - NS-5	0.51
Waunch Prairie:					
Reynolds PS to Roanoke Street	12-inch	1.5	0.23 -US-6		0.23
Eshom to S. Port:					
Midway Court to S. Gallagher Road	8-inch	0.6		0.45 - NS-1	0.45
Eshom PS to Midway Court	10-inch	1.3 -1.7		0.06 -NS-4	0.51
				0.02 - NS-3	0.53
				0.03 - NS-2	0.56
Eshom to N. Port:[a]					
Galvin Road to N. Gallagher Road	10-inch	1.5 - 1.8		0.45 - NS-1	0.45
Eshom PS to Galvin Road	10-inch	1.3 - 1.9		0.06 - NS-4	0.51
				0.02 - NS-3	0.53
				0.03 -NS-2	0.56
Scammon to W. Cooks:					
Stillwater Estates	10-inch	0.9 - 1.9	0.02		0.02
Scammon PS to Stillwater Estates	12-inch	1.6 - 3.5		0.49 -NS-5	0.02
Scammon PS to Stillwater Estates	12-inch	1.6 -3.5		0.49 -NS-5	0.51
Borst Park to Borst Avenue:					
Borst PS to Borst Avenue	12-inch	1.1	0.02 -US-7	0.53 - NS-7	0.53
				0.06 -NS-4	0.59
				0.02 -NS-3	0.61
				0.03 -NS-2	0.64
				0.45 -NS-1	1.11
Eshom to Fords Prairie:					
Eshom PS to S. Scheuber Road	8-inch	0.5		0.26 -NS-7[b]	0.26
WWTP and Long:					
E. Borthwick Street to Long PS	10-inch	0.8		0.18	0.48
W. Borthwick Street to E. Borthwick Street	8-inch	0.5			0.18
W. Borthwick Street	10-inch	0.8			0.18
WWTP to W. Borthwick Street	18-inch	2.9			0.18

Table 5-3. Evaluation of Potential New Flows on Sewer System Capacity (Peak Sewage Flow Only)

Trunk Sewer Identification	Pipe Size	Estimated Capacity (mgd)	Potential New Flow		
			Unsewered Communities (mgd)	UBG Areas (mgd)	Total New Flow (mgd)
Jefferson to Basin 6:					
Railroad to Main	15-inch	2.2 - 2.6			0
Pearl Street to Railroad	30-inch	13.4 - 7.5			0
Jefferson PS to Pearl Street	18-inch	3.4			0

[a] Does not include industrial flows from bottling plant.

[b] Represents 1/2 of NS-7 projected peak sanitary flow.

Notes:
-- = not applicable flows
NS = New Sewer
PS = pump station
US = Unsewered Communities

Conceptual sewer system layouts were developed to respond to the identified capacity needs in each area of the City where sewer service does not currently exist or where new growth will require the extension of service. Existing collection system improvements were identified based on information from City staff and an evaluation of the age and pipe type of the gravity collection system.

As new development occurs, a detailed analysis of the affected collection system sewer pipes will be required to confirm adequate capacity under average and peak flow scenarios. A hydraulic system model would be a valuable tool to assist the City to evaluate the impacts of such developments. As previously noted, a collection system evaluation was not completed for this General Sewer/Facility Plan Update. The areas of growth have mostly occurred or will occur in the proposed development areas (Section 5.2.4). These areas were studied to determine the collection system improvements required to serve these areas. As development occurs in these five areas, the impacts to the downstream collection system will need to be carefully evaluated and assessed to determine existing collection system improvements.

5.2.4 Proposed Development Areas

Over the last several years, a number of development areas were proposed and were reviewed for sewer availability and the improvements required to serve these areas. These areas include the following:

- Ford's Prairie
- Cook's Hill
- Waunch Prairie/Davis Hill
- Widgeon Hill
- Former City Golf Course

The results of these evaluations are included in this chapter. Additional sewers must be constructed if the City chooses to provide sewer service either to unsewered residences within the City limits or to areas within the 20-year UGA. The flows associated with each area evaluated are summarized in each growth area section. Flows from each of the new identified areas would connect into the existing system to be conveyed to the WWTP. As noted previously, additional developments that will discharge to the City's collection system and WWTP will need to be evaluated for downstream impacts to verify that capacity is not exceeded.

5.3 Collection System Alternatives

5.3.1 China Creek Interceptor

In the summer of 2003, dual force mains of 14- and 18-inch diameter were installed in an existing road along the Chehalis River between the China Creek and Borst Park pump stations. The pipelines were installed in this road, because the areas on either side were classified as wetlands and would have required extensive permits that would have significantly delayed the project. This road has been in this location since 1960. In December 2007, Chehalis River flows reached the maximum on record of 79,100 cfs. After flood waters receded, the controlled density fill surrounding the pipelines was exposed on the river side about 840 feet upstream of the confluence with the Skookumchuck River. Two alternatives were evaluated to address this issue:

1. Riverbank stabilization using riprap to stabilize more of the bank where the pipeline is close to the Chehalis River
2. Relocation of the pipelines away from the Chehalis River

5.3.1.1 Alternative 1 – Riverbank Stabilization (C.I.P. CC-1)

The City hired a contractor in May 2008 to perform an emergency repair and place riprap along about 150 linear feet (lf) of riverbank where the pipeline was exposed. The riprap appears to be WSDOT "Heavy/Loose" riprap or larger with a maximum size of approximately 2,000 pounds. It appears that woody debris was embedded into the riprap toe for fish habitat. The riprap appears to have stabilized the intended section of bank, but erosion continues both upstream and downstream of this section. Another flood of 50,700 cfs occurred in January 2009.

This alternative involves extending the existing riprap section both upstream (950 lf) and downstream (300 lf) to protect the most threatened sections of pipeline. A riprap volume of 15,000 cubic yards is estimated to be required for this. It is anticipated that riverbank conditions, including existing large trees that may need to be preserved, will mandate that roughly half of this volume will need to be placed by equipment working from the top of the bank, with the remaining volume placed by water-borne equipment. Work done from the top of the bank will have to be done without damaging the existing pipelines. Matting or other methods might be needed to protect the pipelines from concentrated equipment loads during construction.

The project is expected to require several federal and state permits and approvals covered by the Joint Aquatic Resource Permit Application (JARPA). Local permits and approvals from the City will also be required.

5.3.1.2 Alternative 2 – Relocation of Pipelines

To avoid further exposure of the force mains, the option to relocate the pipelines away from the Chehalis River was also evaluated. The relocated pipes will be located in a new access road to the east of the existing access road for the portion of the roadway where the adjacent riverbank continues to erode. The new road alignment will move the pipelines as far away as possible from the riverbank erosion, without encroaching on the WSDOT right-of-way for I-5. The new road will be located in an existing wetland. This wetland encompasses the entire area between the existing access roadway to the west and the WSDOT property to the east, and cannot be avoided. No excavation will take place in the wetland, and imported fill will be used to build up the road over a layer of geotextile. It is assumed that the roadway will have a 15-foot-wide driving surface, covered with crushed rock. Once the road is completed, the force mains would be relocated and reinstalled in the new roadway. One pipeline will need to remain in service while the other pipeline is moved.

Like Alternative 1, this alternative is expected to require federal and state permits and approvals covered by the JARPA, as well as permits and approvals from the City. In addition, compensatory

mitigation will be required due to the extent of wetland impacts, estimated at about 0.9 acre. The amount of mitigation required will depend on the wetland area impacted and the wetland classification of both impacted and mitigation wetlands, and will be negotiated directly with the regulatory agencies during the permitting process. For the purposes of this evaluation, it was assumed that new wetlands can be created at the City's WWTP site, although the purchase of wetland credits from a certified mitigation bank may be less costly and involve a shorter timeframe.

5.3.1.3 Costs

Class 5 cost estimates were prepared for each alternative, along with an estimate of annual operation and maintenance costs. The costs were originally developed in 2013 dollars then escalated to 2016 dollars using the 20-city average Construction Cost Indexes (CCI) published by *Engineering News-Record* (ENR). The base construction cost includes mobilization, bonds, contingency, and sales tax. Total project costs were estimated by adding 30 percent to the base construction costs. This additional cost allowance accounts for design, bidding, services during construction, permits, investigations, and legal and administrative services. At this stage, the expected accuracy level of the base costs shown is minus 30 percent to plus 50 percent. These two values were used to develop a 20-year life-cycle cost for both alternatives, as shown in Table 5-4.

Table 5-4. China Creek Interceptor Alternatives, Estimated Project and Life Cycle Costs

Alternative	Base Project Cost
Riverbank Stabilization	$1,750,000
Relocation of Pipelines[a]	$3,370,000

[a] Assumes that new wetlands will be created at the WWTP site.

Due to the higher cost and challenges of providing wetland mitigation to relocate the pipeline, the City is no longer considering Alternative 2 and will pursue the option of stabilizing the riverbank with riprap to address the exposure of the China Creek force mains.

5.3.2 Evaluation of Centralia Station Development

Providing sewer service to the new Centralia Station Development was evaluated. The development is located within the City's south sewer area. This area has numerous pump stations that collect and convey sewage to the China Creek PS. Four of the pump stations within the south sewer area (South Tower, Ace Auto, Jefferson, and Van Buren) were determined to require high-priority or near-term improvements under the Task 10 evaluation, "General Sewer Plan Update Task 10: Pump Station Improvements."

Historically, the south sewer system is overloaded by I/I, as documented in the 2000 General Sewer Plan prepared by CH2M. During extreme wet weather events, the surcharging of the gravity sewer system upstream of the Jefferson PS nearly reaches the ground surface. In 2008, the City upgraded the pumps at Jefferson PS in an effort to reduce the level of surcharging in the south sewer system.

In 2014 (February 18 to 20), after a significant precipitation event (2.88 inches over 48 hours), the pump station run time (approximately 20 hours a day) showed that the Jefferson PS is still overloaded. Manhole level monitoring indicated there is also surcharging, although much less, in the gravity sewers upstream of the Jefferson PS and in other gravity sewers in the south sewer system. Therefore, there is essentially no capacity for additional flow in the south sewer system, and one of the following two alternatives must be a part of any project to allow new connections:

1. Alternative 1 - Remove I/I to make capacity available for the additional flow being added.

2. Alternative 2 - Increase sewer system capacity by an amount equal to or greater than the additional flow being added.

Both alternatives will discharge to an existing 18-inch-diameter gravity sewer that crosses under I-5. The estimated capacity of the undercrossing is 2,600 gpm. The estimated future flow at this location is 1,700 gpm, indicating that the undercrossing has sufficient capacity for either alternative. Manhole observations during high flows on February 18 to 20, 2014, indicated that the system is at capacity with no surcharging observed at the undercrossing. With the projected peak flow increase from the development, approximately 2 feet of surcharge could occur during the highest flows. No adverse impacts are anticipated from the surcharged conditions, and this condition would be the same for either alternative. As a result, it does not affect the comparison of alternatives. Prior to the design of the selected alternative, confirmation of the capacity of the undercrossing should be re-evaluated during wet weather conditions.

5.3.2.1 Alternative 1

The proposed improvements for Alternative 1 are shown on Figure 5-2. Alternative 1 will convey the Centralia Station Development sewage by gravity to the existing system to the maximum extent possible and will include upgrading the existing Long Road PS capacity from 150 gpm to 745 gpm. The northern portion of the development (properties north of the proposed I-5 off ramp) will be able to drain by gravity to the existing 8-inch and 10-inch sewers along Alder Street, with approximately 645 gpm from the development flowing to the Long Road PS. The upgraded pump station will also serve existing properties to the south of the new development. A total of 745 gpm will be conveyed to Long Road PS. The upgraded pump station will include a new 8-inch, 3,100-foot-long force main that will discharge to the existing 18-inch sewer in Borthwick Street. Additional upgrades will include replacement of pumps with larger pumps, upgrading the electrical system, and increasing the capacity of the wet well. This alternative will also include extending the 10-inch sewer on Alder Street to serve the northeastern portion of the development.

Alternative 1 will retain the existing pump stations in the Centralia south sewer area. Therefore, the project construction costs include costs for completing the high-priority improvements to the South Tower, Van Buren, and Jefferson PSs.

With the increase in flow resulting from the Centralia Station Development, the south Centralia sewer system will be over capacity during prolonged wet-weather periods. Historically, the Jefferson PS and the surrounding area experience significant amounts of I/I. The increase in hydraulic grade at the force main discharge will increase the pumping head and thus reduce the capacity of the Jefferson PS by approximately 10 percent. Because the Jefferson PS is already overloaded, an I/I reduction project should be completed as part of the Centralia Station project to offset the 10 percent (64-gpm) pump station capacity reduction. The I/I project approach will concentrate on replacing or installing cast-in-place (CIP) liners in the pre-1965 concrete pipe and replacing the associated side sewers. This I/I reduction project could be implemented in the Woodland basin for an I/I reduction project that would replace or rehabilitate approximately 6,370 feet of circa 1924 to 1965 sewer.

5.3.2.2 Alternative 2 (C.I.P. CS-1)

Alternative 2 Phase 1 (see Figure 5-3) would provide gravity sewer service to the Centralia Station Development and eliminate four existing pump stations.

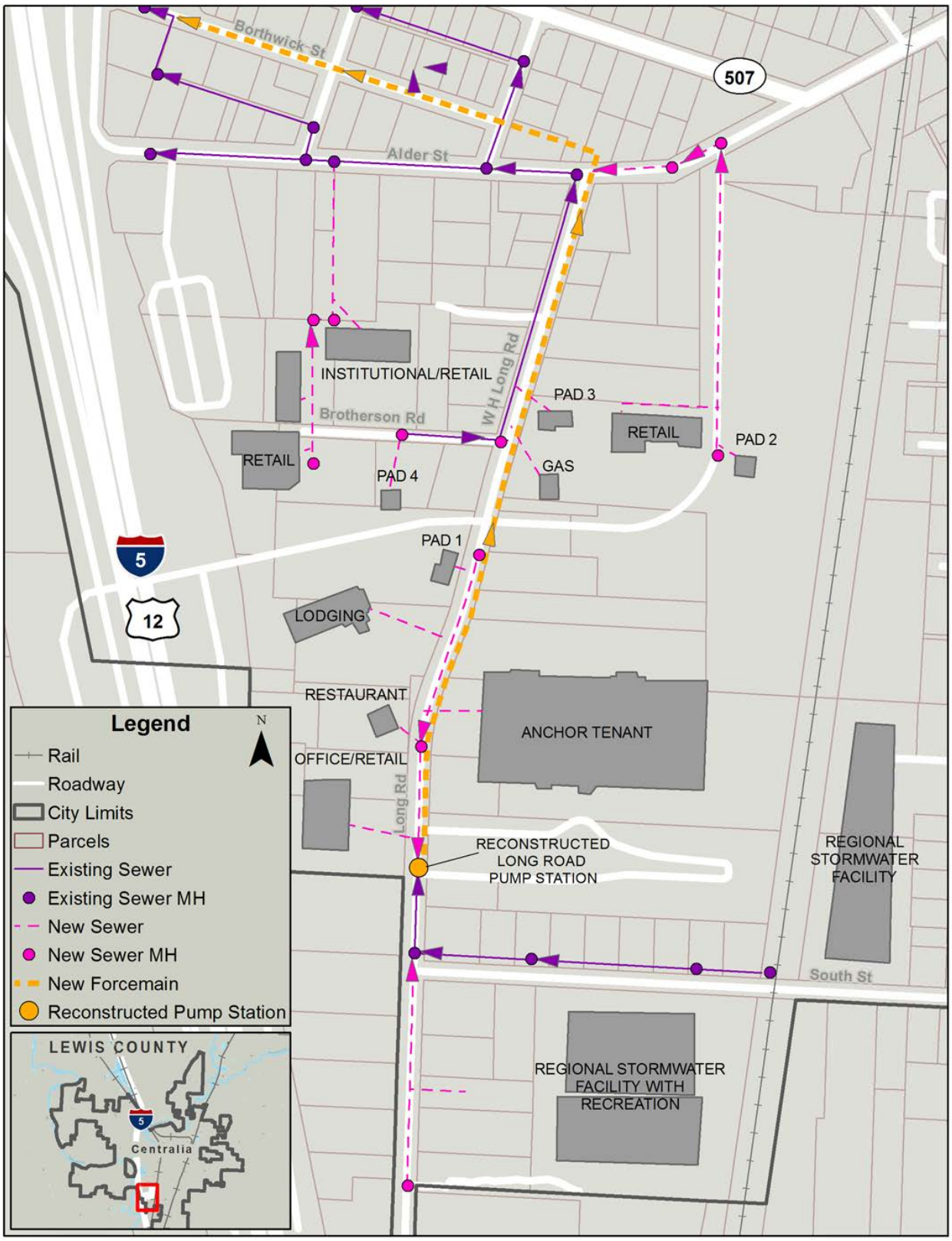


Figure 5-2. Centralia Station Development, Alternative 1

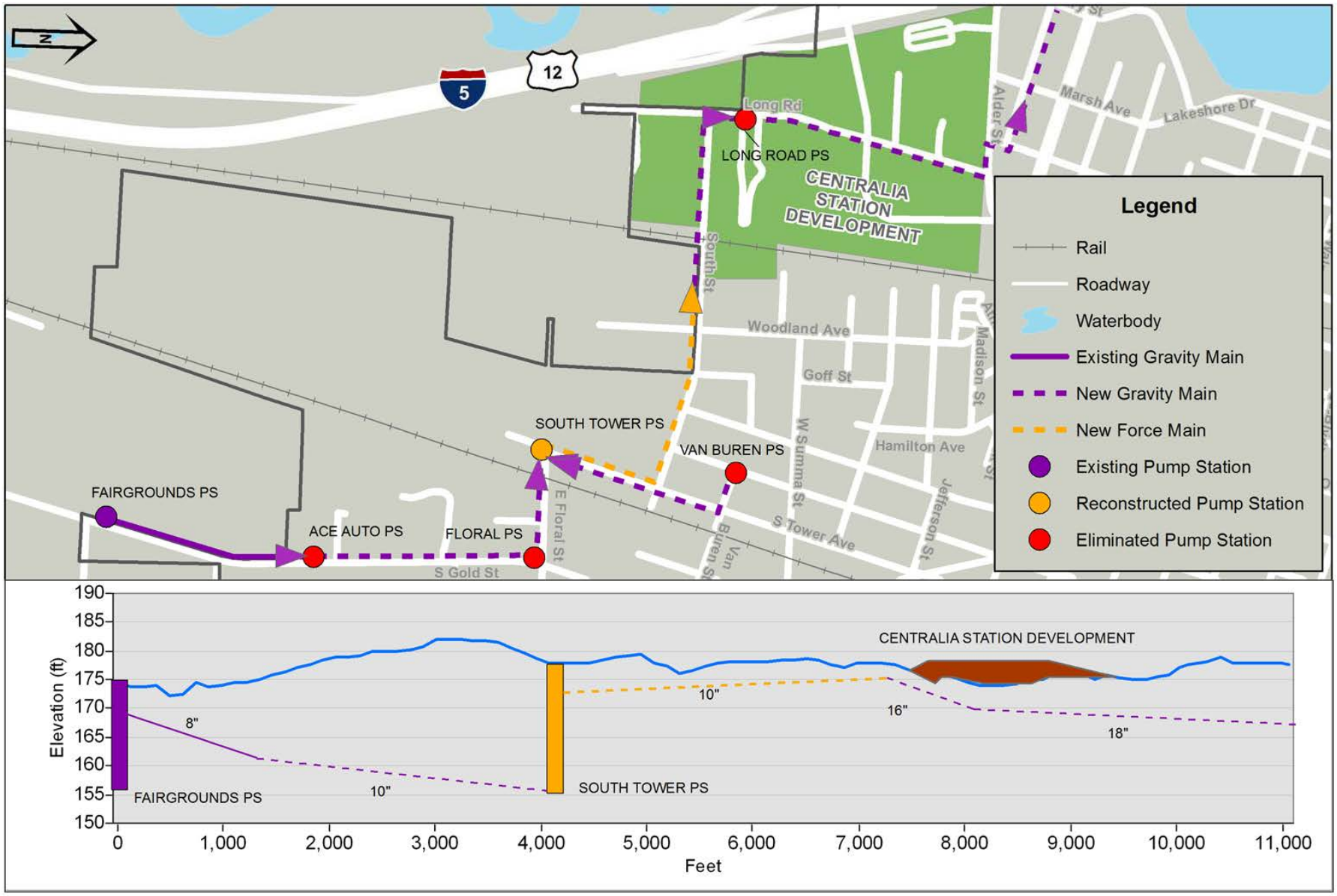


Figure 5-3. Centralia Station Development, Alternative 2

The four abandoned pump stations will be the Floral, Ace Auto, Van Buren, and Long Road PSs. This alternative will also reduce flows to, and increase the capacity of, the Jefferson PS, which, as noted previously, is currently over capacity during significant wet weather events. A new 18-inch-diameter gravity sewer will be constructed to replace the existing 10-inch-diameter sewer, providing increased sewer capacity to south Centralia.

The 18-inch-diameter gravity sewer will run along Long Road to Borthwick Street, receiving the discharge of the Jefferson PS near the intersection of Alder Street and Long Road. This new sewer will eliminate a bottleneck in the gravity sewer system serving south Centralia and increase the capacity of the Jefferson PS (because of a reduction in force main length) and the sewers along South Street, Long Road, Alder Street, and Borthwick Street. This alternative will also reduce infiltration in the existing system by replacing approximately 1,450 feet of aged concrete pipe.

In addition to the new 18-inch-diameter gravity sewer, Alternative 2 Phase 2 will collect and convey sewage from the existing southern sewer area and the Centralia Station Development. For the existing sewer area, Fairgrounds PS will continue to pump toward the abandoned Ace Auto PS location, at which point sewage will be conveyed via a new gravity sewer to the South Tower PS. This new gravity sewer will also serve areas currently draining to the Ace Auto and Floral PSs, allowing them to be abandoned. A new gravity sewer between the South Tower PS and Van Buren PS will serve the area currently draining to the Van Buren PS, allowing the Van Buren PS to be abandoned as well.

The South Tower PS will be upgraded to a capacity of 580 gpm in order to handle its current service area plus the additional flows from the Van Buren and Floral PS service areas. The upgraded pump station will pump through a new 18-inch-diameter force main (which would cross under the BNSF Railroad tracks) into a new 16-inch gravity sewer on South Street west of Woodland Avenue. This new 16-inch-diameter gravity sewer will discharge to the new 18-inch-diameter gravity sewer on Long Road. Properties on South Street, on the western side of the railroad tracks, will be reconnected to the new 16-inch-diameter gravity sewer.

For the properties along South Street and Long Road in the Centralia Station Development, wastewater will flow by gravity to the new 16-inch- and 18-inch-diameter gravity sewers. The remainder of the wastewater from the new development will flow to existing sewers along Alder Street.

Costs in 2016 dollars for the two alternatives are summarized in Table 5-5.

Table 5-5. Centralia Station Development Cost Estimates

Alternative 1	**$4,100,000**
Alternative 2	
Phase 1 (Centralia Station)	$3,880,000
Phase 2 (City share)	$4,170, 000

Alternative 2 can be implemented in two phases, with Phase 1 providing capacity for the new Centralia Station Development and Phase 2 providing capacity for south Centralia. Phase 1 of Alternative 2 has a lower cost than Alternative 1. Alternative 2 provides the following additional benefits to the City compared to Alternative 1:

- Eliminates two pump stations, reducing annual operations and maintenance (O&M) costs for these pump stations
- Removes I/I as a result of replacing 1,450 feet of pre-1965 gravity sewer pipe to accommodate new flow from Centralia Station

- Reduces the flow to the overloaded Jefferson PS by two-thirds, providing additional capacity for new customers in the south service area

It is recommended that the City implement Phase 1 of Alternative 2 to serve the new Centralia Station Development, because it is the lowest-cost alternative and provides the most long-term benefits to the City.

5.4 Evaluation of Pump Stations and Force Mains

A lift station condition assessment was completed in 2013 with City staff. The assessments include the physical condition of the lift stations, their capacity, and their equipment condition. This assessment served as metric to develop the prioritization of the lift station upgrades. This evaluation also assessed the ability of the existing pump stations and force mains to serve both current demands and projected future flows. The adequacy of the pump station at historical peak wet and dry weather flows was determined by evaluating the pump run times during the wet season and the dry season. Pump run times were determined using telemetry data.

The dry season is defined by days in which there was not significant precipitation and when the WWTP flows were below 4 mgd. The wet season is defined by days in which there was significant precipitation or the WWTP flows were at or above 4 mgd. Table 5-6 summarizes the dry and wet weather average daily flows based on information provided by City staff through summer 2014. The difference in run time between wet season and dry season represents an approximation of the I/I present within the collection system. The pump stations with the highest I/I are China Creek (0.88 mgd), Jefferson (0.65 mgd), Borst Park (0.35 mgd), High Street (0.20 mgd), West Mellen (0.16 mgd), and Floral (0.15 mgd), based on the rated station capacity with one pump not in service.

Table 5-6. Historical Pump Run Time Records

	Average Dry Weather Flow		Average Wet Weather Flow		Increase	
Pump Station	Hours of operation per day	mgd	Hours of operation per day	mgd	Hours of operation per day	mgd
Borst Park	3.5	0.23	8.8	0.58	5.3	0.35
Mt. Vista	1.0	0.01	1.5	0.01	0.5	0.00
Scheuber	1.3	0.04	1.5	0.05	0.2	0.01
Industrial	0.5	0.00	1.2	0.01	0.7	0.00
Jensen	0.5	0.00	1.5	0.01	1.0	0.01
High Street	3.8	0.05	20.0	.24	16.2	0.19
Reynolds	3.3	0.05	4.3	0.06	1.0	0.02
State	0.3	0.00	1.2	0.01	0.9	0.00
Salzer Valley	1.5	0.01	12.9	0.09	11.4	0.08
Floral	1.5	0.03	8.7	0.18	7.2	0.15
Fairgrounds (Gold 1)	1.2	0.01	2.5	0.02	1.3	0.01
Jefferson	2.8	0.11	19.6	0.75	16.8	0.65
Long	0.5	0.00	1.0	0.01	0.5	0.00
West Mellen	5.25	0.09	14.6	0.25	9.35	0.16
Military	1.5	0.01	7.3	0.04	5.8	0.03
Scammon	4	0.05	7.0	0.08	3.0	0.04
Highland Park	1.5	0.01	2.0	0.02	0.5	0.00

Table 5-6. Historical Pump Run Time Records

	Average Dry Weather Flow		Average Wet Weather Flow		Increase	
Pump Station	Hours of operation per day	mgd	Hours of operation per day	mgd	Hours of operation per day	mgd
North Tower	1	0.02	1.4	0.02	0.4	0.01
Van Buren	1.8	0.02	5.9	0.05	4.1	0.04
South Tower	0.3	0.00	1.0	0.00	0.7	0.00
Ace Auto	1.0	0.01	3.4	0.03	2.4	0.02
Marion	1.0	0.01	3.4	0.02	2.4	0.01
Eshom	5.0	0.08	6.9	0.10	1.9	0.03
North Port	0.3	0.01	0.3	0.01	0.0	0.00
China Creek	22.0	1.45 – 5.94	24.0	1.58 – 6.48	2.0	0.13 – 0.54
Total		**2.29 – 6.78**		**4.24 – 9.14**		**1.95 – 2.36**

The pump stations were also evaluated for their ability to transfer flows from the UGA and unsewered areas. This analysis was performed using the peak dry weather sanitary flow and did not include I/I for either the existing flows or the flows from the UGA or unsewered areas, assuming that new sewer lines will not leak. Projected future flows were allocated to each pump station based on the most likely point at which the future flows will discharge to the existing collection system. Table 5-7 summarizes the results of the capacity analysis. The "rated capacity" column is the capacity of the pump station with one pump out of service. The "total flow" column combines the estimated existing flow with the projected flows from unsewered and UGA areas. The pump station is predicted to lack sufficient capacity for future flows, if the total flow is greater than the rated capacity.

Table 5-7. Pump Station Capacity for Peak Dry Weather Sanitary Flows

Pump Station	Rated Capacity (mgd)	Existing Flows (mgd)	Unsewered Communities (mgd)	UGA Areas (mgd)	Total Flow (mgd)
Borst Park	1.6	0.36	0.02 -US-7		0.38
M. Vista	0.2	0.03			0.03
Eshom	0.4	0.12		0.23 -NS-1 0.23 - NS-2 0.11 - NS-3 0.06 - NS-4 0.53 - NS-7 0.07 - NS-14	1.28
Scheuber	0.7	0.07			0.14
Industrial	0.1	0.01			0.01
Jensen	0.2	0.01			0.01
High Street	0.3	0.02			0.02
Reynolds	0.4	0.05	0.23 -US-6	0.04 - NS-12 0.21 - NS-6	**0.53**
Marion	0.1	0.02			0.02
State	0.1	0.01		0.13 - NS-9	**0.14**
Salzer Valley	0.2	0.01			0.01
Floral	0.5	0.04			0.04

Table 5-7. Pump Station Capacity for Peak Dry Weather Sanitary Flows

Pump Station	Rated Capacity (mgd)	Existing Flows (mgd)	Unsewered Communities (mgd)	UGA Areas (mgd)	Total Flow (mgd)
Ace Auto	0.2	0.01			0.01
Fairgrounds	0.2	0.01			0.01
S. Tower	0.1	0.01			0.01
Van Buren	0.2	0.05			0.05
Jefferson	0.9	0.22			0.22
Long	0.2	0.03		0.18 -NS-8	0.21
W. Mellen	0.4	0.17	0.02 -US-1 0.003 -US-2	0.42 -NS-5 0.19 - NS-15	**0.663**[a]
Military	0.1	0.03	0.003 -US-2	0.19 - NS-15	**0.223**
Scammon	0.3	0.09	0.02 -US-1	0.42 –NS-5	**0.53**
Total	7.4	1.37			3.87

[a] Capacity should be evaluated during wet weather conditions also.

Note:
Pump station capacities that are exceeded are shown in bold.

West Mellen, State, Military, and Scammon pump stations should be evaluated further if development occurs that would discharge to these pump stations. This analysis should be repeated for conditions representing the 5-year storm to provide certainty that this initial assessment is correct. The pump station run times should be reviewed for two periods of at least 1 week each, during wet weather conditions when the Chehalis River flow is approximately 33,000 cfs according to National Oceanic and Atmospheric Administration.

Force main capacity was evaluated for each of the pump stations that would experience flow increases due to future flows from unsewered or UGB areas, as indicated in Table 5-7. The velocity through the related force mains was calculated for peak sanitary sewage flows for combined existing and future flows. Acceptable velocities are between 4 and 6 feet per second (fps). The results of this analysis are summarized in Table 5-8.

Table 5-8. Force Main Analysis for Peak Dry Weather Sanitary Flows

Pump Station	Force Main Size (inches)	Existing Flow (mgd)	Future Flow (mgd)	Total Flow (mgd)	Velocity (fps)
Borst Park	10	0.36	0.02	0.38	1.1
Eshom	6	0.12	1.16	1.28	**10.1**
Reynolds	6	0.05	0.48	0.53	4.2
Long	6	0.03	0.18	0.21	1.7
W. Mellen	6	0.17	0.493	0.663	5.2
Military	4	0.03	0.193	0.223	4.0
Scammon	4[a]	0.09	0.44	0.53	**9.4**

[a] 4-inch force main discharges to 8-inch at Scheuber Road

This analysis indicates that velocities will be excessive through the Eshom and Scammon force mains for peak dry weather sanitary flows. Therefore, it is concluded that these force mains will be inadequate for

projected future flows if development occurs in these pump station basins. This analysis should be repeated to evaluate the sufficiency of the force mains under wet weather conditions after flow monitoring is performed to quantify the I/I within the existing system. This can be completed as part of C.I.P. M-1 by City staff.

The Fairgrounds, High Street, Jensen, Long Road, Military, and State pump stations have been historically susceptible to flooding for a variety of reasons. The State PS is located within a low-lying area. The Jensen PS is susceptible to flooding from Coffee Creek, and the remaining pump stations experience flooding related to high water in either the Skookumchuck or Chehalis Rivers. Historical protocol has been to sandbag these pump stations when they appear to be in danger of flooding. Table 5-9 presents the surveyed elevations of the wet well rim for each of the pump stations. As the water surface levels rise in the Chehalis River, Skookumchuck River, and Coffee Creek, the operators can sandbag the pump stations as determined by the wet well levels, with the pump stations at the lowest elevations being sandbagged first.

Table 5-9. Pump Station Wet Well Rim Elevations

Pump Station	Wet Well Rim Elevation (feet)
Eshom	166.31
M. Vista	169.00
Scheuber	169.04
Military	169.09
Scammon	169.58
Borst Park	170.32
Long	170.76
Fairgrounds	171.94
High Street	172.84
Jefferson	174.37
Ace Auto	174.73
Jensen	175.84
S. Tower	176.05
Industrial	176.08
State	176.45
Salzer Valley	177.01
Floral	177.17
Van Buren	177.37
W. Mellen	180.29
Marion	194.64
Reynolds	195.04

The City has been able to keep the pump stations operational during high flow events through tarping, sand bagging and with the installation of gasketed hatch lids to prevent water intrusion. Military, Gold #1, and Long Road pumps stations have been retrofitted with gasketed lids. Fairgrounds, Jefferson and Borst are tarped and sand bagged prior to a significant storm event. As noted in Chapter 3, Gold Street Pump Station #1 will have the electrical panel elevated above the flood level in the next few years. Water intrusion during a storm event is controlled with the use of these preventive measures. The City may consider other modifications to the existing pump stations to coincide with a future capital improvement project for a pump station as applicable.

5.5 Pump Station Assessment and Prioritization

A workshop was held with City staff to review the current condition of each of the existing pump stations and the City's operational efforts. All pump stations in the system were considered for upgrades and were identified as being one of the following: high priority improvements, moderate priority with improvements that would take place in the near term, or low priority with improvements that would take place beyond 2020. The key points of discussion during the workshop were as follows:

- Physical condition of each pump station
- Pump station capacity
- Pump station equipment condition (including instrumentation and control, and electrical)
- Improvement priority for capital improvement project

After developing the list of potential and desired improvements, each pump station was giving a priority ranking based on how urgent the City deemed the improvement. The ranking criteria were as follows:

1. High priority improvements (required action in the years 2016 to 2017)
2. Near-term improvements (requiring action in the years 2017 to 2019)
3. Future improvements (requiring further evaluation and action after the year 2020)

Table 5-10 shows the priority given to each pump station. High-priority improvements are further discussed in Section 5.7.4.

Table 5-10. Pump Station Improvement Priority

No.	Pump Station	Telemetry (yes/no)	Redundancy	Gravity Bypass (yes/no)	Priority[a]
1	Borst Park	yes	+1 pump on standby	N	2
2	Mt. Vista	yes	+1 pump on standby	N	3
3	China Creek	yes	+1 pump on standby	N	1
4	Eshom	yes	+1 pump on standby	N	2
5	Galvin / Scheuber	yes	+1 pump on standby	N	2
6	Industrial Drive	yes	+1 pump on standby	N	1
7	Jensen	yes	+1 pump on standby	N	3
8	High Street	yes	+1 pump on standby	N	3
9	Reynolds	yes	+1 pump on standby	N	3
10	Marion	yes	+1 pump on standby	N	3
11	State	yes	+1 pump on standby	N	3
12	Salzer	yes	+1 pump on standby	N	3
13	Floral	yes	+1 pump on standby	N	3
14	Ace Auto (Gold #2)	yes	+1 pump on standby	N	3
15	Fairgrounds (Gold #1)	yes	+1 pump on standby	N	3
16	South Tower	yes	+1 pump on standby	N	3
17	Van Buren	yes	+1 pump on standby	N	2
18	Jefferson	yes	+1 pump on standby	N	2

Table 5-10. Pump Station Improvement Priority

No.	Pump Station	Telemetry (yes/no)	Redundancy	Gravity Bypass (yes/no)	Priority[a]
19	Long Road	yes	+1 pump on standby	N	3
20	Mellen	yes	+1 pump on standby	N	3
21	Military	yes	+1 pump on standby	N	3
22	Scammon Creek	yes	+1 pump on standby	N	3
23	Highland Park	yes	+1 pump on standby	N	2
24	North Tower	yes	+1 pump on standby	N	3
25	North Port	yes	+1 pump on standby	N	3

[a] Priority from 1 to 3, with "1" being high priority and "3" low priority.

5.6 Infiltration and Inflow Alternatives

Similar to other cities in Washington State, infiltration and inflow is a key concern. The City has evaluated a number of alternatives to determine the best alternative to resolve I/I. The following sections describe these efforts and outcomes.

5.6.1 I/I Reduction Projects to Comply with Ecology Administration Order

Ecology Agreed Order No. DE 02WQSR-3551 was originally requested by the City for the NPDES permit for the new WWTP to obtain a waiver of 85 percent removal for BOD and TSS. Historical data from the old WWTP showed that influent BOD and TSS would be less than 100 mg/L during high flows, and 85 percent removal would require effluent less than 15 mg/L. This potentially could require effluent filtration. As a result, the City requested a waiver from 85 percent removal to 75 percent removal for BOD and 70 percent removal for TSS that was incorporated into NPDES permit No. WA0020982 for when the Chehalis River flow exceeds 1,000 cfs. Ecology required that the City agree to Agreed Order No. DE 02WQSR-3551, which required the City to complete I/I projects on a defined schedule to obtain the waiver from 85 percent removal for BOD and TSS. The City has completed all the I/I removal projects in the Agreed Order through the year 2015. Beginning in the year 2017, the Agreed Order required the City to replace 7,000 feet of old ungasketed gravity sewer pipe to reduce I/I until 85 percent removal could be achieved. The cost of replacing this pipe was estimated to be greater than the City could afford, and the City requested that the actual percent removals for the WWTP be evaluated to see if the 85 percent removal waiver was still needed.

In 2006 and 2007, there were a few instances where the BOD and TSS percent removal was less than 85 percent. Since this time, the City has taken a number of steps that have improved percent removal of BOD and TSS. The City changed operation of the China Creek PS to limit maximum flows to the WWTP based on the water level in an indicator manhole to prevent sewer overflows upstream. Operational improvements were also implemented at the WWTP to treat high flows more efficiently. Finally, the City completed all the I/I removal projects scheduled in the Agreed Order through the year 2015, and these have likely reduced the maximum amount of I/I that reaches the WWTP. There have been several major flood events in this time period, including the flood of record in December 2007, and the WWTP has generally exceeded 85 percent removal with the exception of December 2015. Meeting permit limits and achieving a minimum of 85 percent removal for BOD and TSS is a priority for the City and the WWTP personnel strive to operate the WWTP effectively. Additionally, the C.I.P. includes sliplining and other I/I investigative, planning and implementation projects to continue resolving the high I/I the collection

system realizes. Appendix D includes inflow and infiltration projects that the City has undertaken to reduce I/I within the collection system.

The City requested that Ecology terminate the Agreed Order and modify the NPDES permit to eliminate the waiver of 85 percent removal. This provides the City with flexibility in implementing I/I removal projects to maintain conveyance and treatment capacity as required. This request was approved as part of the 2016 NPDES permit renewal.

5.6.2 Infiltration and Inflow Pilot Projects

Pilot I/I reduction projects were evaluated for potential application in Centralia. This evaluation included the following:

- Selecting pilot project locations
- Identifying technology candidates
- Determining pilot project size
- Developing evaluation criteria for the pilot projects
- Developing costs for the pilot projects

The City had previously completed several I/I reduction projects as part of its plan to comply with the Ecology requirement for I/I removal. A portion of the collection system tributary to the Jefferson interceptor was identified as the best candidate for conducting pilot I/I reduction projects with different rehabilitation technologies. This pilot area was selected for the following two reasons:

1. It provided the most homogeneous area in terms of pipe material and size, as well as home construction era and type. This homogeneity will improve the comparison of different rehabilitation technologies performed under similar circumstances.
2. The area is within the project limits for the I/I reduction projects previously identified.

The City has included this in their capital improvement plan in order to determine the best rehabilitation technique (see Section 5.7.5). In addition, the existing per capita flow rates for the City are above the criteria set by the EPA for inflow indicating that sources of inflow should investigated as part of an inflow and infiltration study. The City should conduct a detailed and thorough I/I study to confirm the results of the I/I evaluation presented in Chapter 3 and to locate the affected collection system areas to determine if there are any cost-effective sewer rehabilitation measures to remove any excessive inflow.

5.6.3 Feasibility Evaluation of the Cost of Increasing the Hydraulic Capacity of the WWTP to Address I/I

A preliminary evaluation was completed of the cost of increasing the hydraulic capacity of the WWTP in order to handle I/I. The intent of the evaluation was to compare these costs with collection system I/I reduction costs to determine whether I/I reduction in the collection system is cost-effective compared to upgrading the WWTP to manage extraneous water that occurs during wet weather events. This evaluation was limited to a hydraulic evaluation and did not include treatment capacity evaluation. The current WWTP hydraulic capacity is 10 mgd based on the firm, peak capacity of the China Creek PS, force main interceptors from the China Creek PS to the WWTP, effluent pump station, and outfall. The costs of expanding these facilities to 15 mgd (a 5-mgd increment) and 20 mgd (doubling the capacity) were both evaluated. The upgraded facilities were planned with an ultimate possible expansion to 30 mgd.

Class 5 cost estimates were developed for expanding the pump station to 20 mgd, adding a third force main, expanding the WWTP unit processes to 15 mgd and 20 mgd, and increasing the capacity of the effluent pumps and outfall to 20 mgd (Table 5-11). These costs were originally developed in 2013 dollars and were escalated to 2016 dollars using the 20-city average CCIs published by ENR.

The cost of expanding the WWTP capacity is $27 million for a 5-mgd increase in capacity and $34 million for a 10-mgd increase in capacity, equating to $5.40 per gallon for 5 mgd and $3.40 per gallon for 10 mgd. Unlike collection system I/I removal costs, which can be spent in small increments over a period of time, expansion of the WWTP capacity requires large improvements (and their larger costs) that provide steps of capacity. As described in Section 6.1, the City is continuing its I/I reduction efforts to better quantify I/I flow reduction for comparison to the costs of additional wastewater treatment plant hydraulic capacity. At this time, the City does not plan to expand the wastewater treatment plant hydraulic capacity in order to manage I/I as a result of extreme storm events.

Table 5-11. Estimated Expansion Cost to Accommodate Hydraulic Capacity Expansion Instead of I/I Reduction

Item	Low Range (-30%)	Base Cost	High Range (+50%)
Additional Force Main	$10,230,000	$14,600,000	$21,630,000
Upgraded Pump Station (15 mgd)	$910,000	$1,300,000	$1,950,000
Upgraded Pump Station (20 mgd)	$1,620,000	$2,300,000	$3,470,000
Upgraded WWTP (15 mgd)[a]	$7,940,000	$11,300,000	$16,970,000
Upgraded WWTP (20 mgd)[b]	$11,660,000	$16,680,000	$25,010,000
Total for expansion to 15 mgd (5-mgd increase)	**$19,080,000**	**$27,200,000**	**$40,550,000**
Total for expansion to 20 mgd (10-mgd increase)	**$23,510,000**	**$33,580,000**	**$50,110,000**

[a] Includes increasing WWTP unit process hydraulic capacity to 15 mgd and upgrading WWTP effluent pumps, pipeline, and outfall to 20-mgd capacity

[b] Includes increasing WWTP unit process hydraulic capacity to 10 mgd and upgrading WWTP effluent pumps, pipeline, and outfall to 20-mgd capacity

5.7 Recommended Improvements

This section presents the recommended improvements to the existing collection system. These improvements will provide service to future growth areas and unsewered communities, address capacity deficiencies related to providing service, and remedy existing system deficiencies. These improvements were developed based on the results of the analysis described previously. In all cases, the improvements were developed with a goal of minimizing cost while maximizing performance of the existing system. The timing of the improvements to new service areas will be driven by development in those areas, cost, and the City's desire to provide service.

The historical approach to sewer service development has been to allow individual developers to install the service required solely for the new development. This has resulted in numerous small pump stations and shallow collection systems that cannot be extended to additional service areas. This practice should be modified to minimize the number of pump stations and to provide gravity sewer service by regulating the depth of the pump station wet wells and collection sewers to allow conversion of the collection system proposed for the new development to gravity sewer in the future. The collection sewers should have a slope no greater than 0.004 foot per foot, and the main collector sewer should be located in accordance with the conceptual design discussed and with an invert such that it could be extended to connect with the collection system. Pump station wet wells should be shallow enough to allow them to be drained by gravity to the existing collection system, wherever possible.

Pipeline routing for new service areas was determined primarily by existing roads. Where no roads existed, the pipelines were routed between land ownership boundaries or by location of existing housing if land ownership boundaries were unknown. Actual routing may differ somewhat based on the City’s ability to acquire easements, projects in the area that may afford opportunities for coordination of

utility corridors, and other factors. In all cases, the 8-inch pipelines were assumed to have a slope of 0.004 foot per foot, and 10-inch lines were assumed to have a slope of 0.000285 foot per foot, which are the minimum slopes for gravity sewers allowed by Ecology.

It should be noted the costs of repairing existing roadways adds significant additional cost for patching, overlay, and flaggers and traffic control. Pipeline excavation costs are nearly half the estimated cost, if the pipeline work is done at the same time road work is done. Coordination to construct pipeline projects concurrently with road projects is recommended to minimize the cost of constructing new sewer pipelines. Construction of sewer pipelines outside of pavement is less expensive, if right-of-way and easements are available.

Development of sewer plans for new areas added to the UGA (Ford's Prairie, Waunch Prairie/Davis Hill, Cook's Hill, Widgeon Hill, and former City Golf Course) for the City were developed using the following assumptions. Areas, land use designations, and development densities are from the adopted *Centralia Comprehensive Plan.* The residential densities used for estimating maximum populations are summarized as follows:

- Very low (VLDR) – 2 DU/acre
- Low (LDR) – 4 DU/acre
- Medium (MDR) – 8 DU/acre
- Medium to High (M-HDR) – 15 DU/acre
- High (HDR) – 16 DU/acre

The following assumptions were made for the collection system improvements:

- Residential population was estimated assuming 2.4 persons per DU.
- Average residential wastewater flows are estimated assuming 76 gallons per capita per day.
- Peak residential wastewater flows are estimated by multiplying the average flow times at a peaking factor of 2.92 for new sewers.
- Commercial average flow was estimated using 2,000 gallons per acre per day.
- Industrial average flow was estimated using 1,000 gallons per acre per day.
- The industries will produce domestic wastewater only and will not produce any process water.
- Peak commercial and industrial flows were estimated by multiplying average flow by a peaking factor of 2.83.
- I/I allowance has been added in addition to wastewater flow and is assumed to be 1,000 gallons per acre per day.
- Gravity sewers will be located in existing public right-of-way in roadways.
- Gravity pipeline sizing was based on required flow capacity and minimum slopes in Table Cl-1 in Ecology's *Criteria for Sewage Works Design* (Ecology, 2019). The City follows the sewer standards outlined by Ecology.
- Gravity sewers were assumed to have a minimum depth of 5 feet and maximum depth of 15 feet below grade.
- The maximum length of service laterals would be 150 feet.
- Grinder pumps were assumed to be used in areas that could not be served with gravity sewers because of low elevation relative to the nearest gravity sewer, in low density development areas and areas where extreme elevation changes made gravity sewers impractical. The alternatives

analysis for providing sewer service to low density residential areas that cannot be served by gravity is presented later in this section.

Sewer plans were developed for each geographic area added to the future service area and present the approximate location of gravity sewers, pump stations, and force mains. Individual side sewers, grinder pumps, and small diameter pressure sewers serving grinder pumps are not shown. Sizes and burial depths are estimated for pipe segments for the purpose of showing concept feasibility and for estimating the cost of the pipelines. Using gravity sewers wherever possible is preferred because of the low O&M cost and reliability of gravity sewers. New pump stations should be minimized, and efforts should be made to eliminate existing pump stations where possible because of the higher O&M cost of pump stations. Flows from subareas of each of the new development areas were estimated as described previously.

Service to each area was determined by reviewing the topography and application of design criteria for gravity sewers. Topography from the June 2006 and September 2006 orthophotos and topographic maps of the City was used to evaluate potential gravity sewer alternatives.

Costs were estimated for gravity sewers, pump stations, force mains, and collector pressure sewers serving significant areas on grinder pumps. The following costs are not included:

- Individual service laterals
- Grinder pumps
- Small diameter pressure sewer serving a small number of grinder pumps
- Electrical service
- Emergency generator
- Obtaining rights-of-way or easements

The cost estimates are Class 5 estimates that have an expected accuracy of plus 100 to minus 50 percent of the actual cost when adjusted for the actual date of construction. The accuracy is low, because the level of project definition is low. It is recommended that design and site-specific estimates be developed for each potential sewer project prior to developing a budget for construction. The costs are expressed in July 2016 dollars. The cost opinion shown has been prepared for guidance in project evaluation from the information available at the time of preparation. The final costs of the project will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, final project schedule, and other variable factors. As a result, the final project costs will vary from the cost presented herein. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets. The costs include 30 percent for contingency; 25 percent for engineering, legal, and administration; and 8 percent sales tax. It is assumed that the construction will encounter minimal groundwater and utility conflicts. Pipeline costs assume imported backfill, asphalt patching and full width overlay, and flaggers and traffic control when the pipeline is located within a roadway.

5.7.1 Existing Collection System Deficiencies

The recommended improvement projects described below were developed to address the existing collection deficiencies and to upgrade those portions of the existing collection system that will be insufficient to accept the projected future flows. Costs are estimated for all the improvement projects and are presented in the Capital Improvement Program in Chapter 7 of this General Sewer and Facilities Plan. For existing pipeline projects, estimated costs are based on pipeline replacements. Alternative construction techniques, such as slip-lining and pipe bursting, can also be explored to determine the potential cost savings and decrease in site disturbances. Projects are coded using "ES" to designate existing system features.

ES-1, Pipeline Replacement Program. This will be an ongoing maintenance program over the next 20 years to replace the oldest existing clay and concrete pipes that are approaching or have exceeded their design life. These older pipes are expected to crack at the end of their design life. Additionally, many of the older pipes were not originally installed with gaskets at the pipe joints and tend to be deeper pipes serving as main trunk sewers. These factors combine to make these older pipes more susceptible to groundwater-related I/I. This program would target the oldest pipes for replacement and may have the additional benefit of I/I reduction. The cost estimate for this project is $870,000/year in 2016 dollars.

ES-4, First Street Between G and F Streets. This project will replace 398 lf of cracked existing 8-inch sewer line with a new 8-inch line. The cost for this sewer is estimated to be $160,000 in 2016 dollars.

5.7.2 New Development Area Improvements

5.7.2.1 Ford's Prairie Area

Figure 5-4 presents the proposed new pump station and sewers to provide sewer service to the Ford's Prairie area. Figure 5-5 shows the remaining proposed projects for new sewers and unsewered areas identified in the 2000 General Sewer Plan. The area can be served almost entirely by conventional gravity sewers. A new gravity interceptor sewer is proposed along Harrison Avenue and Reynolds Avenue to provide sewer service to most of this area and to Waunch Prairie /Davis Hill. Areas adjacent to Harrison and Reynolds Avenues will be served by gravity trunk sewers draining to the interceptor along these streets. The existing Scheuber PS will pump into the new gravity interceptor and remove this flow from the Borst Park PS. The Industrial PS will pump into the gravity interceptor sewer serving Waunch Prairie /Davis Hill. The gravity interceptor sewer will flow to the recently completed North Port PS at the intersection of Kuper Road and Harrison Avenue. The North Port PS will pump collected wastewater to the WWTP through twin force mains under Goodrich Road.

Implementation of this plan requires construction of the new gravity interceptor sewer beginning at the North Port PS and extending this interceptor to the location of desired sewer service. It is recommended that this interceptor be constructed before or concurrently with improvements to Harrison Avenue. The phasing of construction will depend on the availability of funding and timing of development in the Ford's Prairie sewer basin. For the purposes of describing the different elements of this sewer plan, the sewers are grouped into 10 separate projects. Figure 5-4 lists the individual segments, and Table 5-12 provides a cost breakdown by individual segments. The main constraint is that the most downstream sewer segments need to be constructed first to permit gravity flow to the North Port PS.

Table 5-12. Ford's Prairie Sewer Extension Projects

Line Designation	Pipe Length (feet)	Pipe Diameter (inches)	Total Cost
F-1 Ford's Prairie Interceptor			
F-1.1	430	36	$526,000
F-1.2	960	36	$1,170,000
F-1.3	620	36	$760,000
F-1.4	2,300	36	$2,800,000
F-1.5	1,040	36	$1,270,000
F-1.6	1,400	36	$1,710,000
F-1.7	220	36	$270,000
F-1.8	1,330	36	$1,630,000
F-1.9	160	36	$200,000

Table 5-12. Ford's Prairie Sewer Extension Projects

Line Designation	Pipe Length (feet)	Pipe Diameter (inches)	Total Cost
F-1.10	840	12	$560,000
F-1.11	60	12	$40,000
F-1.12	220	12	$150,000
F-1.13	690	12	$350,000
F-1.14	700	12	$360.000
F-1.15	620	12	$370,000
		Total	**$11,810,000**
F-2 Area North of and Adjacent to Kuper Road			
F-2.1	2,400	10	$1,150,000
F-2.2	1,460	10	$630,000
F-2.3	460	8	$290,000
F-2.4	380	8	$240,000
F-2.5	1,020	10	$487,000
F-2.6	400	8	$150,000
		Total	**$2,950,000**
F-3 Private Drives Area			
F-3.1	1,200	8	$640,000
F-3.2	1,260	8	$670,000
		Total	**$1,310,000**
F-4 Trailer Park Area			
F-4.1	60	8	$41,000
F-4.2	560	8	$360,000
F-4.3	240	8	$150,000
F-4.4	100	8	$60,000
F-4.5	580	8	$310,000
F-4.6	120	8	$60,000
F-4.7	645	8	$290,000
		Total	**$1,270,000**
F-5 Southeast Area			
F-5.1	2,660	10	$1,280,000
F-5.2	760	12	$580,000
F-5.3	690	12	$460,000
F-5.4	1,470	10	$700,000
F-5.5	540	8	$240,000
F-5.6	380	8	$230,000
F-5.7	490	8	$310,000
F-5.8	380	8	$230,000
F-5.9	1,210	12	$800,000

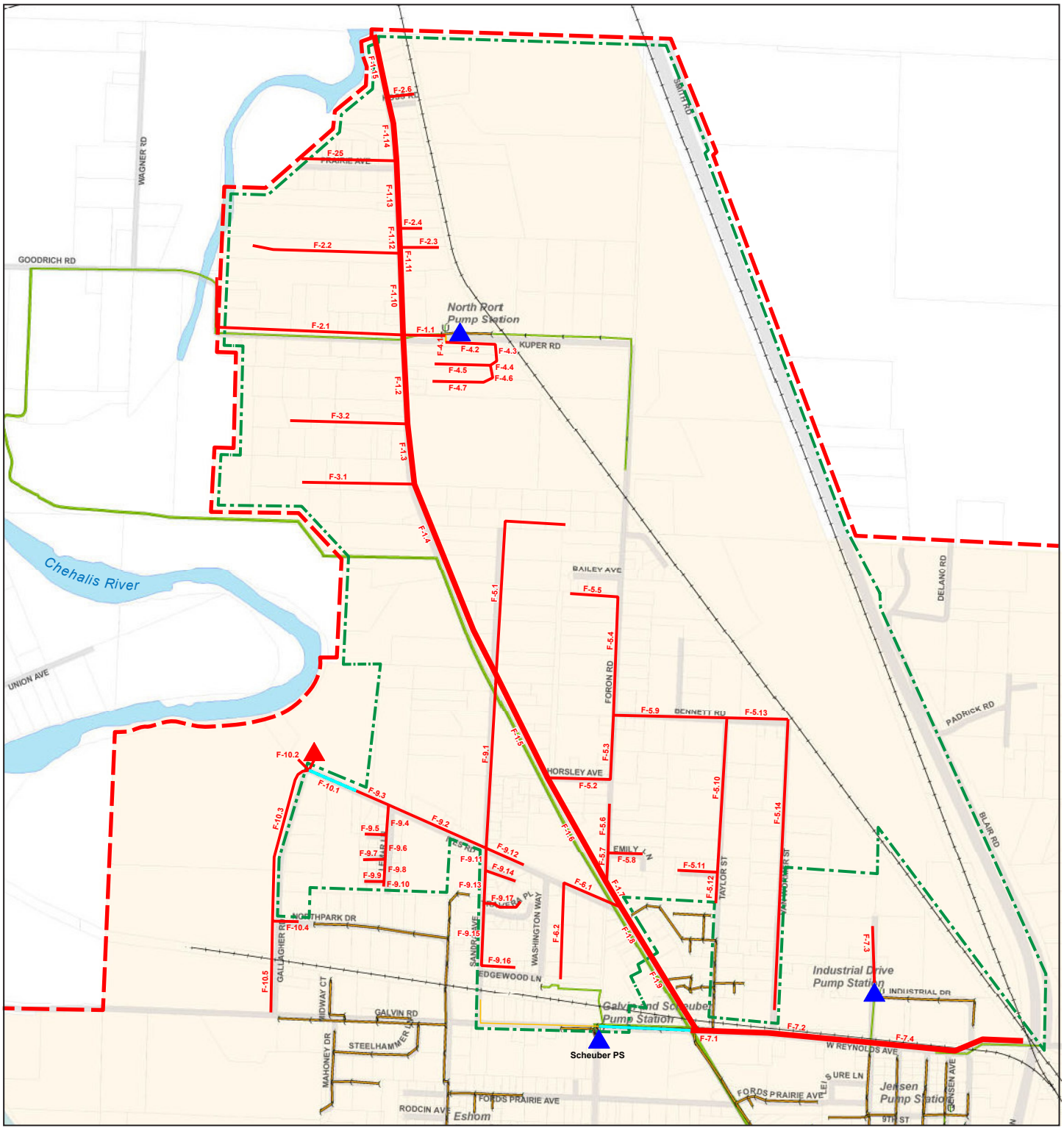
Table 5-12. Ford's Prairie Sewer Extension Projects

Line Designation	Pipe Length (feet)	Pipe Diameter (inches)	Total Cost
F-5.10	1,640	10	$790,000
F-5.11	400	8	$180,000
F-5.12	390	8	$180,000
F-5.13	650	12	$460,000
F-5.14	3,090	10	$1,480,000
		Total	**$7,920,000**
F-6 Industrial Area			
F-6.1	840	10	$470,000
F-6.2	1,180	10	$570,000
		Total	**$1,040,000**
F-7 Reynolds Avenue Area			
F-7.1	200	15	$170,000
F-7.2	1,680	15	$800,000
F-7.3	880	8	$560,000
F-7.4	1,640	15	$1,010,000
		Total	**$2,540,000**
F-9 Southwest Area			
F-9.1	1,710	15	$440,000
F-9.2	1,050	15	$750,000
F-9.3	660	15	$410,000
F-9.4	300	10	$140,000
F-9.5	240	8	$110,000
F-9.6	240	10	$120,000
F-9.7	240	8	$90,000
F-9.8	240	10	$120,000
F-9.9	250	8	$100,000
F-9.10	50	8	$20,000
F-9.11	190	8	$120,000
F-9.12	400	8	$250,000
F-9.13	460	8	$290,000
F-9.14	360	8	$230,000
F-9.15	660	8	$350,000
F-9.16	340	8	$150,000
F-9.17	640	8	$340,000
		Total	**$4,030,000**
F-10 Gallagher Road Area			
F-10.1	550	6	$180,000
F-10.2	180	8	$110,000

Table 5-12. Ford's Prairie Sewer Extension Projects

Line Designation	Pipe Length (feet)	Pipe Diameter (inches)	Total Cost
F-10.3	1,680	15	$1,190,000
F-10.4	80	8	$40,000
F-10.5	1,000	10	$430,000
	‘	**Total**	**$1,950,000**

Land uses used for estimating wastewater flows are summarized in Chapter 2.



Legend

- Urban Growth Area (UGA) Boundary
- Sewer Basin Boundary
- Existing Gravity Sewer
- Existing Force Main
- Exist / New Pump Station
- New Gravity Sewer
- New Force Main
- F-1.1 Line Designation

N

0 750 1500

SCALE IN FEET

CENTRALIA MAPPING
1"=200' SCALE AERIALS
25 FT CONTOURS ABOVE ELEV 200
5 FT CONTOURS BELOW ELEV 200

FIGURE 5-4
Ford's Prairie Basin Urban Growth Area
City of Centralia
General Sewer/Facility Plan

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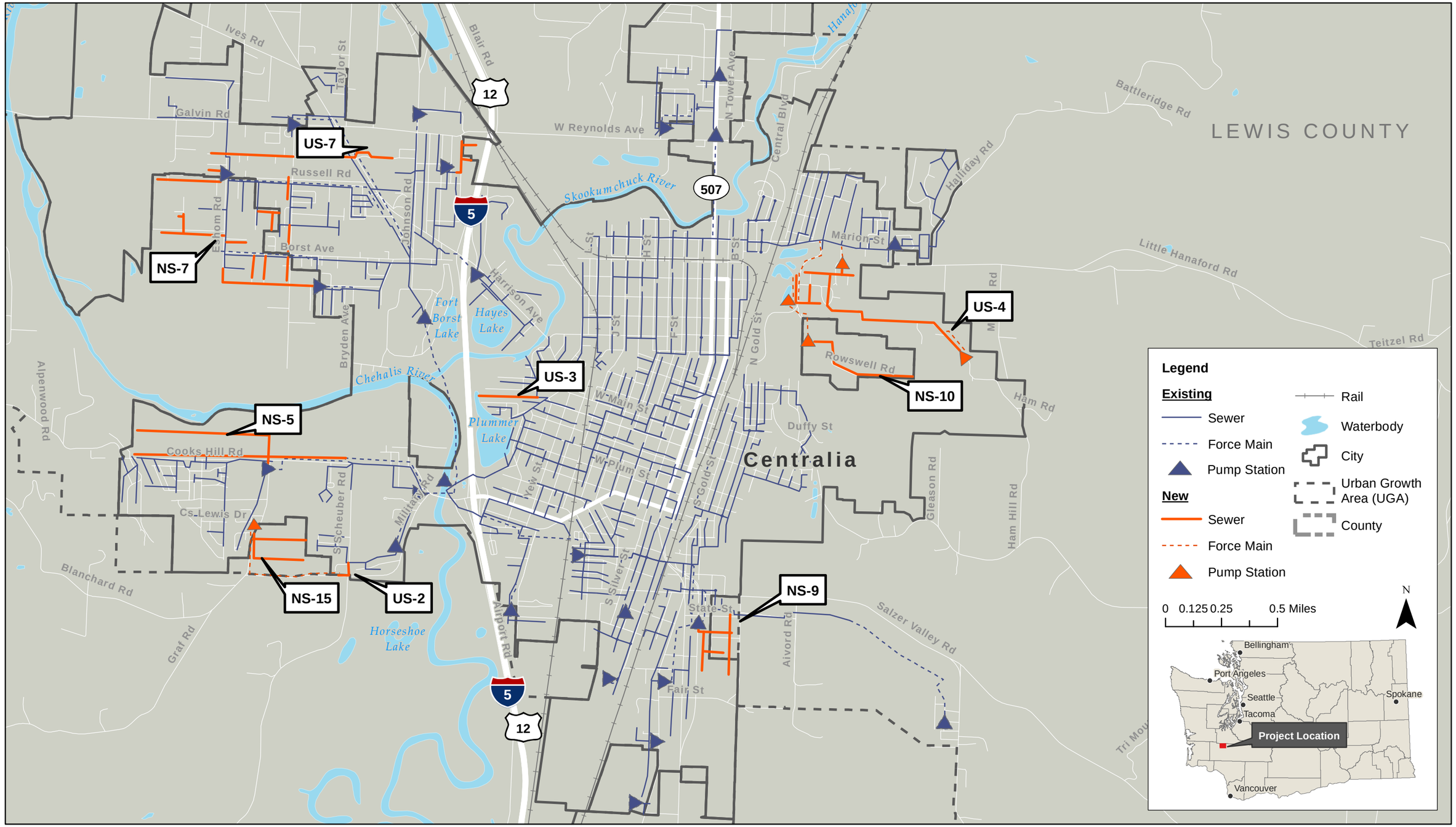


FIGURE 5-5
Proposed New Sewer (NS) and Unsewered (US) Projects
City of Centralia
General Sewer/Facility Plan

Data Sources:Esri, NOAA, WSDOT, King County, Lewis County, US Census Bureau, USGS

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F-1, Ford's Prairie Interceptor

The gravity interceptor conveys flows from all areas in Ford's Prairie and Waunch Prairie/Davis Hill to the North Port PS located on Kuper Road, a short distance from Harrison Avenue. A portion of the 36-inch-diameter interceptor adjacent to the pump station has been constructed to avoid a conflict with the pump station during construction. It would extend from Reynolds Avenue north to approximately the Thurston County line. Residences and businesses located adjacent to Harrison Avenue will discharge flows directly into this interceptor.

The Ford's Prairie interceptor includes the following sewers:

- 8,460 lf of 36-inch sewer
- 3,130 lf of 12-inch sewer

The estimated cost of the entire Ford's Prairie interceptor in July 2016 dollars is $11,810,000. It can be constructed in phases, if desired, beginning at the North Port PS.

F-2, Area North of and Adjacent to Kuper Road

This area is designated as commercial and industrial in the City Comprehensive Plan. The sewers to serve this area include the following:

- 1,240 lf of 8-inch sewer
- 4,880 lf of 10-inch sewer

The estimated cost of these sewers in July 2016 dollars is $2,950,000.

F-3, Private Drives Area

The private drives area is located just south of Goodrich Road and extends west from Harrison Avenue.

The sewers to serve this area include the following:

- 2,460 lf of 8-inch sewer

The estimated cost of these sewers in July 2016 dollars is $1,310,000.

F-4, Trailer Park Area

The trailer park area is located south of the Port PS. There is an existing 8-inch gravity sewer line that travels south from the pump station, beneath Kuper Road. This sewer line can convey flows directly from this area into the pump station wet well.

The sewers to serve this area include the following:

- 2,305 lf of 8-inch sewer

The estimated cost of these sewers in July 2016 dollars is $1,270,000.

F-5, Southeast Area

The southeast area includes trunk sewers located in existing roads. These roads are Sandra Avenue East, Foron, Bennett, Taylor, Van Wormer, and existing adjoining roads.

The sewers to serve this area include the following:

- 2,580 lf of 8-inch sewer
- 8,860 lf of 10-inch sewer
- 3,310 lf of 12-inch sewer

The estimated cost these sewers in July 2016 dollars is $7,920,000. These sewers can be constructed in phases as needed to serve development as it occurs and are grouped together only for discussion purposes.

F-6, Industrial Area

A portion of this area is currently being served by the Industrial PS.

The sewers to serve this area include the following:

- 2,520 lf of 8-inch sewer

The estimated cost of these sewers in July 2016 dollars is $1,040,000.

F-7, Reynolds Avenue Area

The Waunch Prairie gravity interceptor is a 15-inch diameter sewer that conveys flows from Waunch Prairie/ Davis Hill and Industrial PSs to the Ford's Prairie interceptor. It continues in the Waunch Prairie/Davis Hill sewer basin described later. The portion described in the Ford's Prairie sewer basin extends from the I-5 overpass west to Harrison Avenue. A gravity sewer to serve an area north of the Industrial PS is included in this area.

The sewers to serve this area include the following:

- 880 lf of 8-inch sewer
- 3,520 lf of 15-inch sewer

The estimated cost of these sewers in July 2016 dollars is $2,540,000.

F-9, Southwest Area

The southwest area includes the drainage area served by the gravity sewers discharging into the Ford's Prairie interceptor at the intersection with Sandra Avenue.

The sewers serving this area include the following:

- 3,830 lf of 8-inch sewer
- 780 lf of 10-inch sewer
- 3,420 lf of 15-inch sewer

The estimated cost these sewers in July 2016 dollars is $4,030,000. These sewers can be constructed in phases as needed to serve development as it occurs and are grouped together only for discussion purposes.

F-10, Gallagher Road Area

This area serves areas adjacent to Gallagher Road and includes a gravity sewer that flows north to the proposed Ives Road PS. A new 780-gpm pump station is proposed near the Gallagher and Ives intersection, because the ground surface elevations in the area are low. A portion of Cook's Hill wastewater (540 gpm) will be pumped to this pump station. It will pump 550 feet to a gravity sewer into a gravity sewer to the east on Ives Road.

The gravity sewers, pump station, and force main to serve this area include the following:

- Pump station with two 15-hp pumps
- 550 lf of 6-inch force main
- 260 lf of 8-inch sewer
- 1,000 lf of 10-inch sewer
- 1,680 lf of 15-inch sewer

The estimated cost of force main and gravity sewers in July 2016 dollars is $1,950,000. The estimated cost of the Ives Road PS in July 2016 dollars is $350,000.

A few low elevation areas shown on Figure 5-4 are most likely best served using grinder pumps. Costs for grinder pumps and associated small-diameter force mains are not included in the

aforementioned costs, because these costs would likely be paid for by property developers. Costs for side sewers to individual services are also not included in the aforementioned costs.

NS-7, Fords Prairie Residential

This area is designated as Residential in the City Comprehensive Plan. The existing sewer in Fords Prairie was originally designed to be expanded to serve the NS-7 project area. Stubouts exist in the existing system at the correct inverts to extend service (Figure 5-5). The Eshom PS will have to be upgraded to accept the additional flows, and the force main will be rerouted to discharge to the Sandra PS. The NS-7 conceptual sewer includes the following:

- 11,900 lf of 8-inch sewer
- Upgrades to Eshom PS and force main

The estimated cost of the force main and sewers in July 2016 dollars is $8,200,000.

US-7, Fords Prairie

This sewer would provide service to the unsewered residences located east of Fords Prairie within the City limits. This area is also designated Residential. Service can be provided by stubbing out from the existing pipeline at a manhole located at the intersection of Harrison and Fords Prairie Roads. These flows will discharge into Basin 9. The US-7 conceptual sewer includes the following:

- 1,750 lf of 8-inch sewer

The estimated cost of this sewer in July 2016 dollars is $1,090,000.

5.7.2.2 Cook's Hill Area

Figure 5-6 presents the proposed sewers and pump stations to provide sewer service to the Cook's Hill area. The extreme elevation differences and low development density will lead to the use of grinder pumps for most of the services in this area zoned very low density residential. Gravity sewers are used where possible to collect wastewater and convey it off Cook's Hill. Pump Station No. 1 is needed to convey wastewater over a rise in the southern area of Cook's Hill. Wastewater then flows into an existing gravity sewer, where it will flow to the West Mellen PS. Wastewater from the northwestern portion of Cook's Hill will be collected by another gravity sewer to be conveyed to Pump Station No. 2 where it will be pumped to Pump Station No. 3. Wastewater from the northeastern portion of Cook's Hill will be collected by a gravity sewer and conveyed to Pump Station No. 3. Pump Station No. 3 will pump wastewater collected from the northern portion of Cook's Hill to a gravity sewer in southwestern Ford's Prairie. The gravity sewer will flow to a new pump station where it will be pumped to the Ford's Prairie Interceptor.

Construction of sewers on Cook's Hill must begin with the pump stations and sewers at the lower portion of the hill. Significant gravity sewers are needed for collection of wastewater pumped from individual grinder pumps at each residence.

Northern Cook's Hill requires construction of gravity sewers, a new pump station, and the Ford's Prairie Interceptor to provide sewer service. The costs of the grinder pumps and branch small diameter pressure sewers or side sewers where gravity service is possible are not included in the costs shown in Table 5-13. All costs presented in this section are in July 2016 dollars.

The pipeline lengths, pipe diameters, pump station sizes, and total costs for the facilities required to provide sewer service to Cook's Hill are summarized in Table 5-13.

Table 5-13. Cook's Hill Sewer Extension Projects

Line Designation	Pipe Length (feet)	Pipe Diameter (inches)	Total Cost
T01a	3,600	8	$1,560,000
T01b	1,150	8	$500,000
T02	7,300	8	$3,170,000
T03	5,000	8	$2,170,000
FM01	1,650	2.5	$620,000
FM02	1,000	6	$370,000
FM03	700	6	$260,000
FM04	2,800	3	$1,040,000
FM05	1,300	4	$480,000
FM06	1,850	3	$690,000
FM07	1,600	3	$600,000
FM08	3,000	6	$1,120,000
FM09	5,200	6	$1,940,000
Total (C.I.P. CH-1)			**$14,520,000**
Pump Stations			
No. 1		200 gpm	$330,000
No. 2		275 gpm	$330,000
No. 3		380 gpm	$370,000
Pump Station Total (C.I.P. CH-2)			**$1,030,000**

NS-5, Cooks Hill Residential

Figure 5-6 illustrates the sewer improvements that would be required in order to serve the potential saturation development on Cooks Hill. A combination of gravity sewers and pump station upgrades will be required to serve all residences within the 20-year UGA. Scammon PS and its force main will need to be upgraded. In order to avoid upgrades to the Mellen Street PS, the Scammon PS force main would discharge directly to the WWTP pump station via a new line suspended under the Mellen Street bridge. These flows will discharge to Basin 14. The NS-5 conceptual sewer includes the following:

- 5,200 lf of 8-inch sewer
- 3,600 lf of 10-inch sewer
- 4,400 lf of 6-inch force main
- Upgrades to Scammon PS

The estimated cost for these improvements in July 2016 dollars is $7,450,000.

NS-15, Graf Road Residential

This area is designated Residential in the City Comprehensive Plan, and can be served with small collector sewers and a pump station, which would discharge to Basin 16. Military PS will need to be upgraded to be able to transfer the flows. The NS-15 conceptual sewer includes the following:

- 3,800 lf of 8-inch sewer
- 3,200 lf of 4-inch force main
- New pump station
- Upgrades to Military PS

The estimated cost for these improvements in July 2016 dollars is $4,660,000.

US-2, South Cooks Hill Residential

The five existing unsewered residences west of the junction of South Scheuber Road and J. Graf Road can be served by extending the existing sewer, which is routed down Shamrock Road. These flows will discharge to Basin 16. The US-2 conceptual sewer includes the following:

- 100 lf of 8-inch sewer

The estimated cost for this sewer in July 2016 dollars is $80,000.

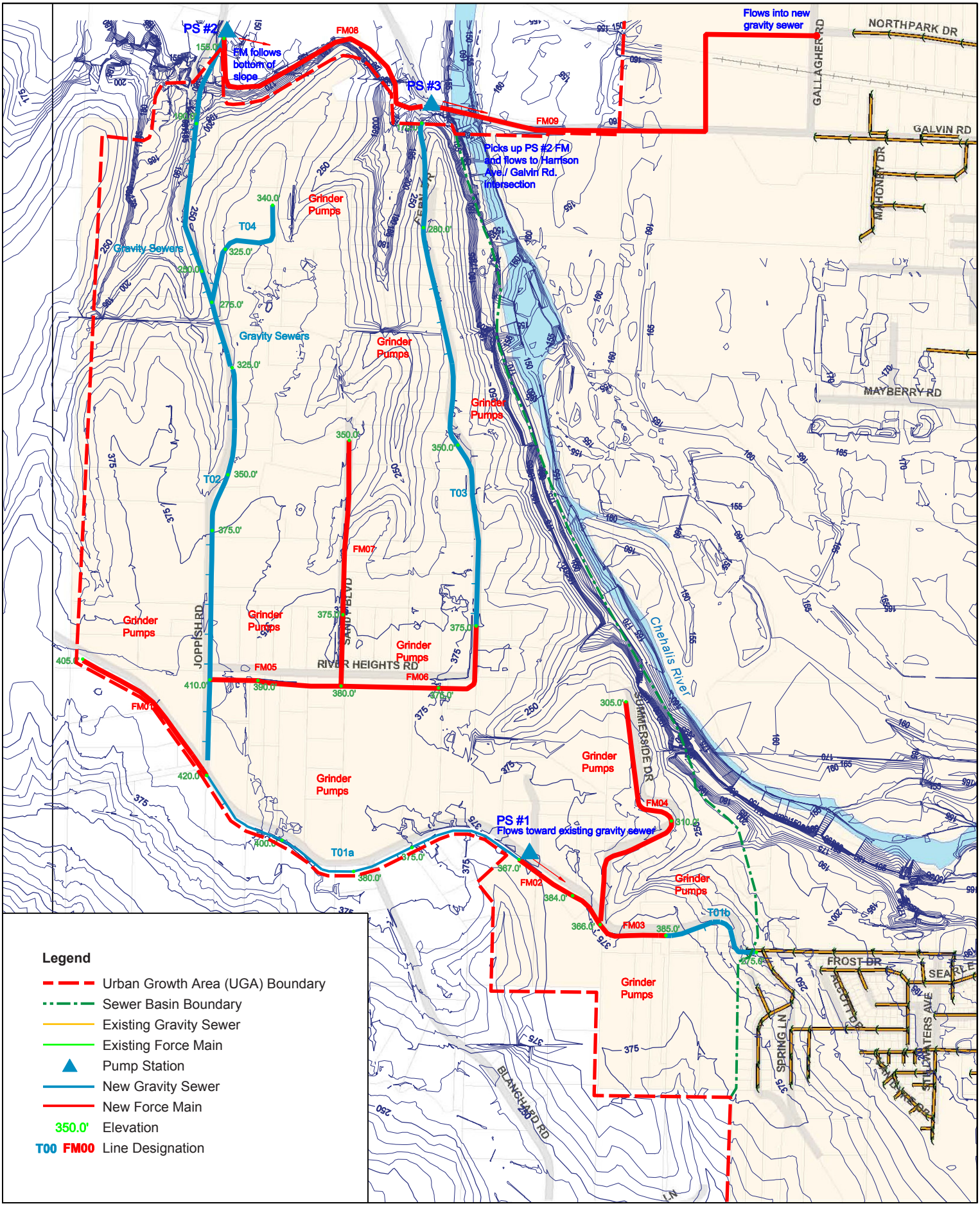


FIGURE 5-6
Cook's Hill Basin Urban Growth Area
City of Centralia General Sewer/Facility Plan

NS-9, Kresky Residential I Commercial

One-third of this area is designated Commercial; the remaining two-thirds are designated Residential. A series of sewers will collect flows from the area and transfer them to State PS. It is assumed that the wet well will need to be modified, because the required pipe inverts are lower than the bottom of the existing wet well. These flows will discharge to Basin 24. The NS-9 conceptual sewer includes the following:

- 2,800 lf of 8-inch sewer
- Modifications to the State PS

The estimated cost for these improvements in July 2016 dollars is $2,120,000.

US-3, East of Plummer Lake

A conceptual sewer for project US-3 was developed to serve the 19 unsewered residences located east of Plummer Lake along West Main Street. The 8-inch trunk sewer can be tapped into a manhole located west of the comer of West Main and Tilley Avenue. These flows will discharge to Basin 4. The US-3 conceptual sewer includes the following:

- 1,100 lf of 8-inch sewer

The estimated cost for this sewer in July 2016 dollars is $670,000.

5.7.2.3 Waunch Prairie/Davis Hill Area

Figure 5-7 presents the gravity sewers and force mains needed to provide sewer service to the Waunch Prairie/Davis Hill sewer basin. The area can be served almost entirely with gravity sewers. A new 15-inch-diameter Waunch Prairie gravity interceptor (W-1) provides the backbone for the gravity sewer system and drains into the upper end of the Harrison Interceptor near the intersection of Reynolds and Harrison Avenues, as shown on Figure 5-4. Construction of the Waunch Prairie interceptor will allow elimination of the Reynolds PS, thereby reducing flows into interceptor No. 1.

Implementation of this plan requires the construction of the Ford's Prairie Interceptor (F-1) and construction of the Waunch Prairie Interceptor (W-1) beginning at the intersection of Reynolds and Harrison Avenues to North Pearl Street. All costs presented in this section were originally developed in October 2007 dollars and escalated to July 2016 dollars.

Table 5-14 summarizes the costs by sewer segment using the designation shown on Figure 5-7. Land uses used for estimating wastewater flows are summarized in Chapter 2.

Table 5-14. Waunch Prairie/Davis Hill Sewer Extension Projects

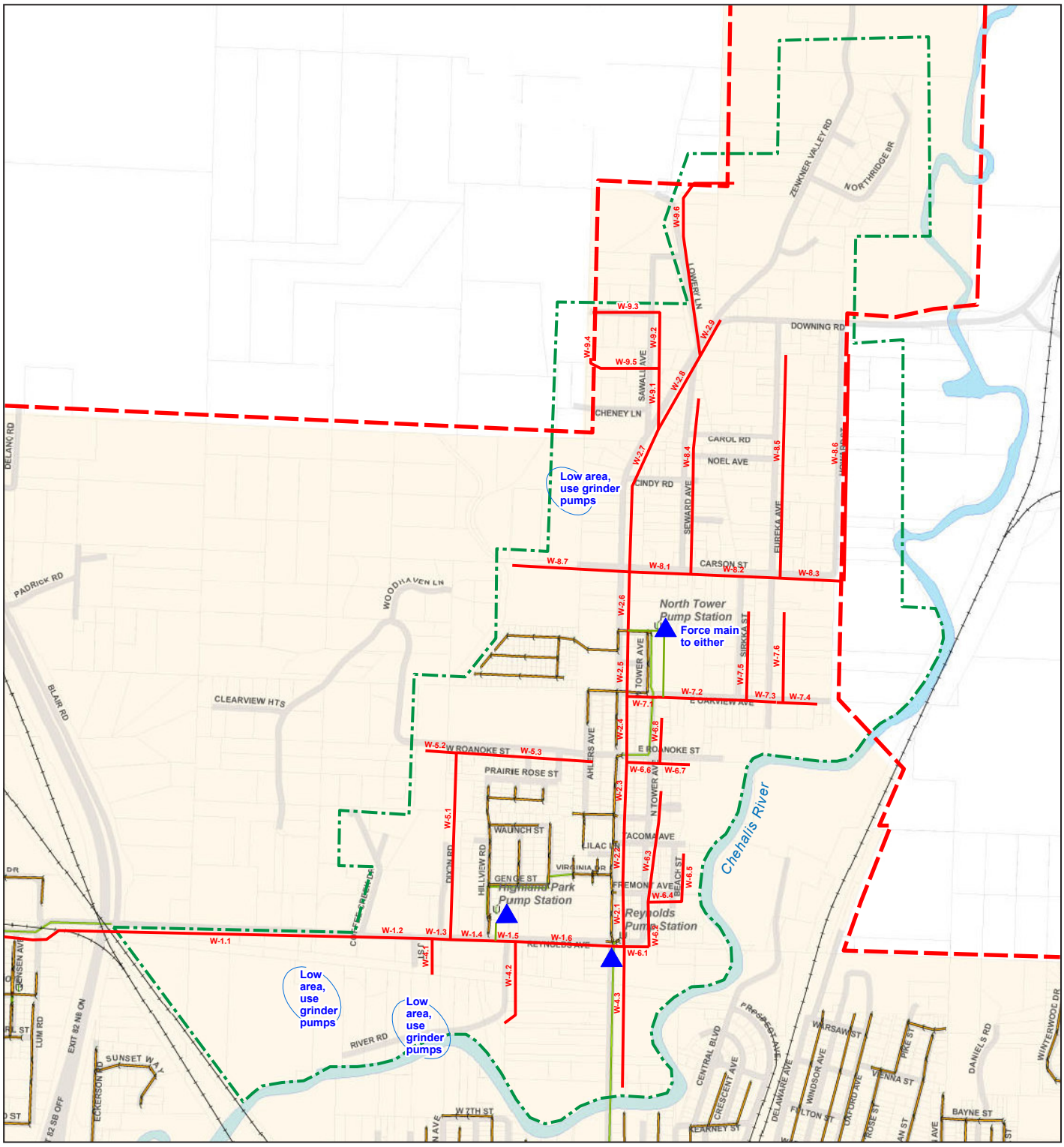
Line Designation	Pipe Length (feet)	Pipe Diameter (inches)	Total Cost
W-1 Waunch Prairie Interceptor			
W-1.1	2,760	15	$1,510,000
W-1.2	550	15	$300,000
W-1.3	280	15	$130,000
W-1.4	500	15	$310,000
W-1.5	200	15	$140,000
W-1.6	1,100	15	$920,000
		Total	**$3,310,000**

Table 5-14. Waunch Prairie/Davis Hill Sewer Extension Projects

Line Designation	Pipe Length (feet)	Pipe Diameter (inches)		Total Cost
W-2 North Pearl Street Interceptor				
W-2.1	700	15		$500,000
W-2.2	620	15		$440,000
W-2.3	620	15		$440,000
W-2.4	660	15		$360,000
W-2.5	640	15		$350,000
W-2.6	680	15		$370,000
W-2.7	1,480	10		$930,000
W-2.8	1,080	10		$780,000
W-2.9	200	10		$140,000
			Total	**$4,310,000**
W-5 Dixon Road and Roanoke Street Area				
W-5.1	2,000	15		$1,090,000
W-5.2	450	8		$290,000
W-5.3	1,400	10		$610,000
			Total	**$1,990,000**
W-6 Southeast Area				
W-6.1	300	8		$190,000
W-6.2	500	8		$300,000
W-6.3	1140	8		$520,000
W-6.4	300	8		$160,000
W-6.5	540	8		$290,000
W-6.6	360	8		$230,000
W-6.7	720	8		$390,000
W-6.8	360	8		$190,000
			Total	**$2,270,000**
W-7 Oakview Avenue Area				
W-7.1	300	12		$150,000
W-7.2	940	12		$660,000
W-7.3	320	12		$160,000
W-7.4	260	10		$110,000 $88,000
W-7.5	1,000	10		$480,000
W-7.6	1,000	10		$480,000
			Total	**$2,130,000**

Table 5-14. Waunch Prairie/Davis Hill Sewer Extension Projects

Line Designation	Pipe Length (feet)	Pipe Diameter (inches)		Total Cost
W-8 Carson Street Area				
W-8.1	640	15		$350,000
W-8.2	940	15		$580,000
W-8.3	640	15		$300,000
W-8.4	1,960	12		$1,300,000
W-8.5	2,320	12		$1,030,000 $801,000
W-8.6	2,300	15		$1,090,000
W-8.7	1,200	10		$580,000
			Total	**$6,030,000**
W-9 Sawall and Lowery Area				
W-9.1	220	8		$140,000
W-9.2	1,020	8		$710,000
W-9.3	940	8		$430,000
W-9.4	120	8		$80,000 $60,000
W-9.5	820	8		$490,000
W-9.6	2,300	8		$1,230,000
			Total	**$3,140,000**



Legend

- Urban Growth Area (UGA) Boundary
- Sewer Basin Boundary
- Existing Gravity Sewer
- Existing Force Main
- Existing Pump Station
- New Gravity Sewer
- New Force Main
- W-1.1 Line Designation

N

0 750 1500

SCALE IN FEET

CENTRALIA MAPPING
1"=200' SCALE AERIALS
25 FT CONTOURS ABOVE ELEV 200
5 FT CONTOURS BELOW ELEV 200

FIGURE 5-7
Waunch Prairie Basin Urban Growth Area
City of Centralia
General Sewer/Facility Plan

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W-1 Waunch Prairie Interceptor

The Waunch Prairie Interceptor is a gravity sewer that extends east from the intersection of Reynolds and Harrison Avenues along Reynolds Avenue to North Pearl Street. The portion west of I-5 has been included in the Ford's Prairie sewer basin.

The Waunch Prairie Interceptor east of I-5 includes the following:

- 5,390 lf of 15-inch sewer

The estimated cost of Waunch Prairie Interceptor east of I-5 in July 2016 dollars is $3,310,000.

W-2 North Pearl Street Interceptor

The North Pearl Street Interceptor extends north along North Pearl Street from Reynolds Avenue to Downing Road.

The North Pearl Street Interceptor includes the following:

- 3,920 lf of 15-inch sewer
- 2,760 lf of 10-inch sewer

The estimated cost of the North Pearl Street Interceptor in July 2016 dollars is $4,310,000.

W-4 South Reynolds Avenue Area

This area includes residential areas south of Reynolds Avenue, bordered by the Skookumchuck River to the south and North Pearl Street to the east. This area is primarily a floodplain. The ground elevations are very low, and it is assumed that grinder pumps will be used to provide sewer service to this area. It is assumed that the grinder pumps and small-diameter force mains will be paid for by the developers of this area, and the costs are not included in the general sewer/facility plan.

W-5 Dixon Road and Roanoke Street Area

This area includes the area adjacent to Dixon Road and West Roanoke Street. It is assumed that Dixon Road will be extended to West Roanoke Street to allow construction of this sewer alignment.

The sewers to serve this area include the following:

- 450 lf of 8-inch sewer
- 1,400 lf of 10-inch sewer
- 2,000 lf of 15-inch sewer

The estimated cost of these sewers in July 2016 dollars is $1,990,000.

W-6 Southeast Area

The southeast area includes areas adjacent to North Tower Avenue and Beach Street and East Roanoke Street. The sewers to serve this area include the following:

- 4,220 lf of 8-inch sewer

The estimated cost of these sewers in July 2016 dollars is $2, 270,000

W-7 Oakview Avenue Area

This area includes areas adjacent to East Oakview Avenue, Sirkka Street, and South Eureka Avenue. These sewers could convey additional flows from the area east of the end of Oakview Avenue that is low and may require grinder pumps. The grinder pumps and small-diameter force mains are assumed to be installed by the developers of this area, and the costs are not included in the general sewer plan.

The sewers to serve this area include the following:

- 2,260 lf of 10-inch sewer
- 1,560 lf of 12-inch sewer

The estimated cost of these sewers is in July 2016 dollars $2,130,000.

W-8 Carson Street Area

The Carson Street area includes areas adjacent to Carson Street west and east of North Pearl Street and along roads extending north from Carson Street-Seward Avenue, Eureka Avenue and Howard Street. This portion of the Waunch Prairie area is zoned low-density residential. Most of the parcels in this area are already developed.

The sewers to serve this area include the following:

- 1,200 lf of 10-inch sewer
- 4,280 lf of 12-inch sewer
- 4,520 lf of 15-inch sewer

The estimated cost of these sewers in July 2016 dollars is $6,030,000.

W-9 Sawall and Lowery Area

This area includes areas along Sawall Avenue and adjoining roads and Lowery Lane. Some flows from the west ridge of Zenkner Valley Road may need to be conveyed to Lowery Lane gravity sewers in the future if the growth management area is expanded to the north.

The sewers to serve this area include the following:

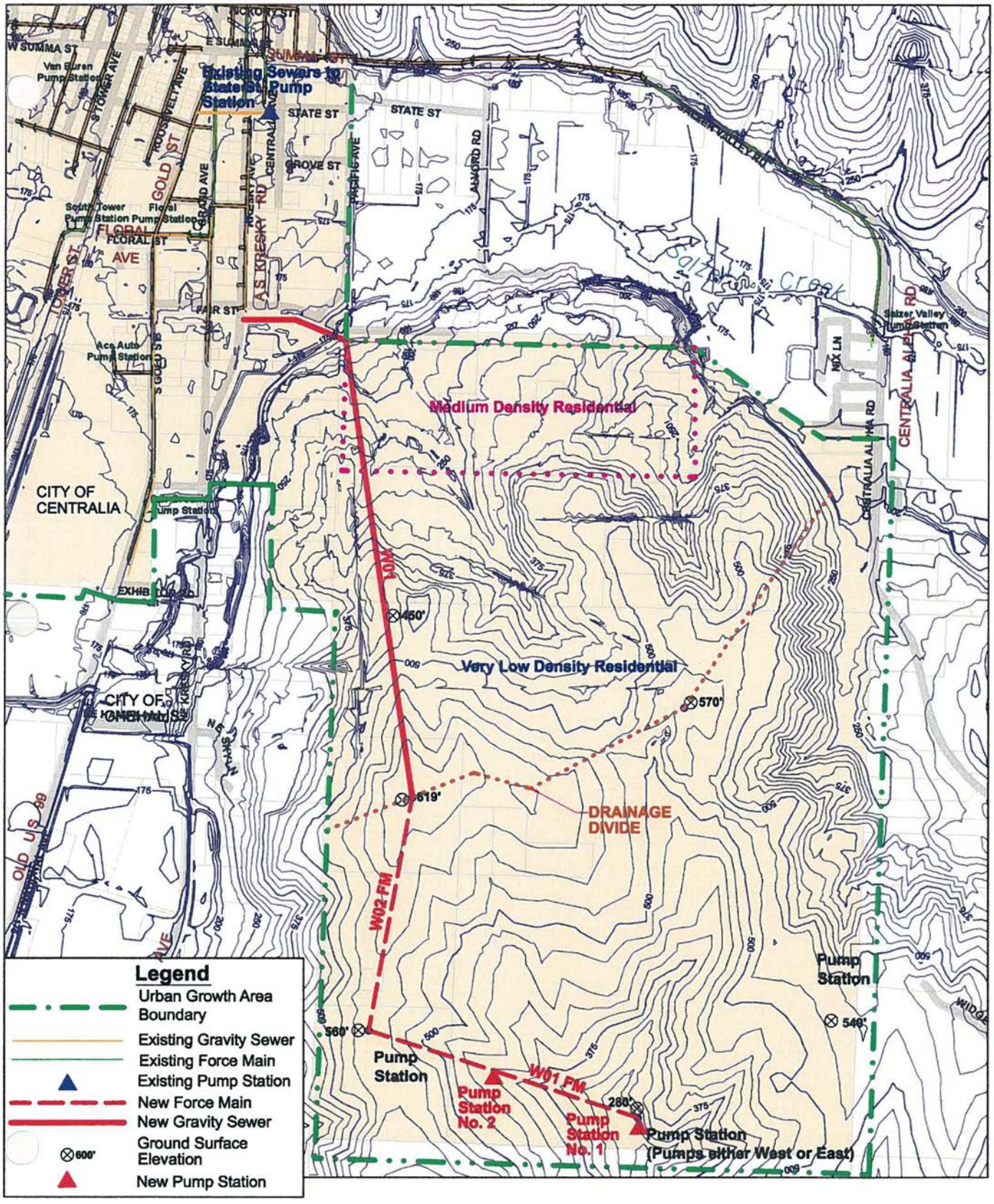
- 5,420 lf of 8-inch sewer

The estimated cost of these sewers in July 2016 dollars is $3,140,000.

5.7.2.4 Widgeon Hill Area

Figure 5-8 presents the proposed pump stations, force mains, and gravity sewers to provide sewer service to the Widgeon Hill area. The sewers shown provide the conveyance of wastewater from Widgeon Hill to the existing City sewer system, but do not show the additional collection sewers that will be required to serve the Widgeon Hill area. It is not possible to determine the additional collection sewers at this time, since the area is nearly undeveloped and the collection sewers need to be constructed as development occurs with the area. The medium density residential area at the northern end of Widgeon Hill may best be served by gravity sewers. The very low density residential portion of Widgeon Hill may be best served by grinder pumps and small-diameter pressure sewers, potentially in combination with gravity collector sewers. A gravity collection sewer can serve the northern portion of the Widgeon Hill area. Two new pump stations and force mains are shown to convey wastewater collected at the southern low point to a high point that will be the beginning of the gravity sewer flowing north through the remainder of the Widgeon Hill area. Two pump stations are required, because the elevation difference between the low and high points is 339 feet, and the maximum pumping head for a wastewater pump station is approximately 200 feet. Sewer service to the southern portion of Widgeon Hill requires the construction of the pump stations and force mains and the gravity collection sewer in the northern portion of Widgeon Hill.

Costs for construction of sewers to the Widgeon Hill area are summarized in Table 5-15. The costs are in July 2016 dollars.



N

0 600 1200

SCALE IN FEET

CENTRALIA MAPPING
1"=200' SCALE AERIALS
25 FT CONTOURS ABOVE ELEV 200
5 FT CONTOURS BELOW ELEV 200

FIGURE 5-8
Widgeon Hill Basin
Urban Growth Area
City of Centralia
General Sewer/Facility Plan

ch2m.

Table 5-15. Widgeon Hill Sewer Extension Projects

Pipeline	Length (feet)	Pipe Diameter (inches)	Cost
W01	5,500	8	$2,120,000
W01FM	1,800	8	$640,000
W02FM	3,200	8	$1,140,000
		Total pipeline (C.I.P. WH-1)	**$3,900,000**
Pump station No. 1		$523,324	$520,000
Pump station No.2		$523,324	$520,000
		Total pump station cost (C.I.P. WH-2)	**$1,040,000**
		Total sewer cost in Widgeon Hill area	**$4,940,000**

The Widgeon Hill area wastewater flows into a portion of the existing Centralia sewer system that is hydraulically overloaded. The existing gravity sewers drain into the Jefferson PS that does not have sufficient capacity for existing flows during extreme wet weather due to I/I. A new gravity sewer alternative was evaluated in concept and appears to be potentially feasible. The gravity sewer will flow from the Widgeon Hill area to the China Creek PS. It will require installation of approximately 12,600 feet of 8- to 24-inch-diameter sewers and have major under crossings of the main north-south railroads and I-5. The cost was originally estimated in October 2007 dollars and escalated to July 2016 dollars. The estimated cost in July 2016 dollars is $14,100,000. This gravity sewer will eliminate the Floral, Jefferson, and Van Buren PSs. Alternatively, the Jefferson PS and force main capacity could be increased or I/I from this area reduced to allow acceptance of additional wastewater flow from the Widgeon Hill area, or a combination of these measures could be implemented. A detailed evaluation of these alternatives is beyond the scope of this evaluation and should be conducted before implementing new sewers to the Widgeon Hill area.

5.7.2.5 Golf Course

A new residential area was proposed for the former City golf course between Roswell Road and Seminary Hill, and the City requested an analysis of the projected wastewater flow loading and the impacts to the City's collection system. The developer proposed using grinder pumps to provide sewer service to this area, because the topography of the site made gravity sewers uneconomic and required several pump stations. Flows were estimated for each segment of the proposed system, and the potential for generation of hydrogen sulfide, a malodorous and corrosive gas, was estimated. Since this analysis was completed, this developer is no longer active. A new analysis will be required for future development in this area. This will be completed as development plans are prepared and provided for this area.

Maximum flow for this area is estimated to be 15 gallons per minute. The previous developer originally proposed discharging into the closest available gravity sewer, but this would drain into the hydraulically overloaded Jefferson PS. It was recommended that the discharge not be allowed at this location and that the discharge be allowed into the downtown gravity sewers on the western side of the railroad tracks, which would require an under crossing of the railroad tracks.

It is estimated that up to 24.5 mg/L of hydrogen sulfide could be generated in the wastewater by the time it reaches the City's gravity sewer system. This will pose a significant odor and corrosion problem for the City at the discharge to the gravity sewer and in the gravity sewer system downstream of the discharge. It is recommended that the developer install a sodium hypochlorite addition system 2,400 feet upstream of the discharge to the gravity sewer system. It is estimated that the sodium hypochlorite dosage will be 240 mg/L and 44 pounds per day at the estimated maximum flow rate and

use of 12.5 percent hypochlorite solution. It is recommended that the sodium hypochlorite feed system be capable of feeding up to 6 gallons per minute and have a storage capacity of 1,000 gallons.

It is further recommended that the City require the developer to pay the City for higher costs associated with the use of grinder pumps. The developer should pay the City for the present worth of adding sodium hypochlorite for the life the sewer system. The City may also be justified in charging a higher monthly service fee for users of grinder pumps, if the City finds that O&M costs of grinder pumps are higher than the rest of the sewer collection system O&M. This is justified because the residents will benefit from the lower initial cost of a grinder pump sewer system in lower home prices, but residents should have to pay for the additional costs associated with use of this type of sewer system.

US-4, Ham H/11. Conceptual sewers were designed to serve the existing 87 unsewered residences on Ham Hill, and the conceptual design allows for expansion to serve future growth. Due to the hilly nature of the area, alternatives will need to be developed to convey the sewage to the gravity portion of the sewage collection system. The preferred alternative will need to be approved by the City. The wastewater will discharge to Basin 3. The US-4 conceptual sewer includes the following:

- 9,800 lf of 8-inch sewer
- 1,300 lf of 4-inch force mains
- Alternatives to pump stations that are yet to be determined; these will be provided by the developer

The estimated cost for these improvements in July 2016 dollars is $9,660,000.

NS-10, South Ham Hill Residential. This collection system will transfer the flows from the residential area along Roswell Road to discharge to Basin 3. A collection sewer will be located in the roadway and drain to a pump station at the western edge of the area. The force main will be routed along North Gold Street to discharge into Interceptor No. 1. The NS-10 conceptual sewer includes the following:

- 2,800 lf of 8-inch sewer
- New pump station
- 2,600 lf of 4-inch force main

The estimated cost for these improvements in July 2016 dollars is $3,000,000.

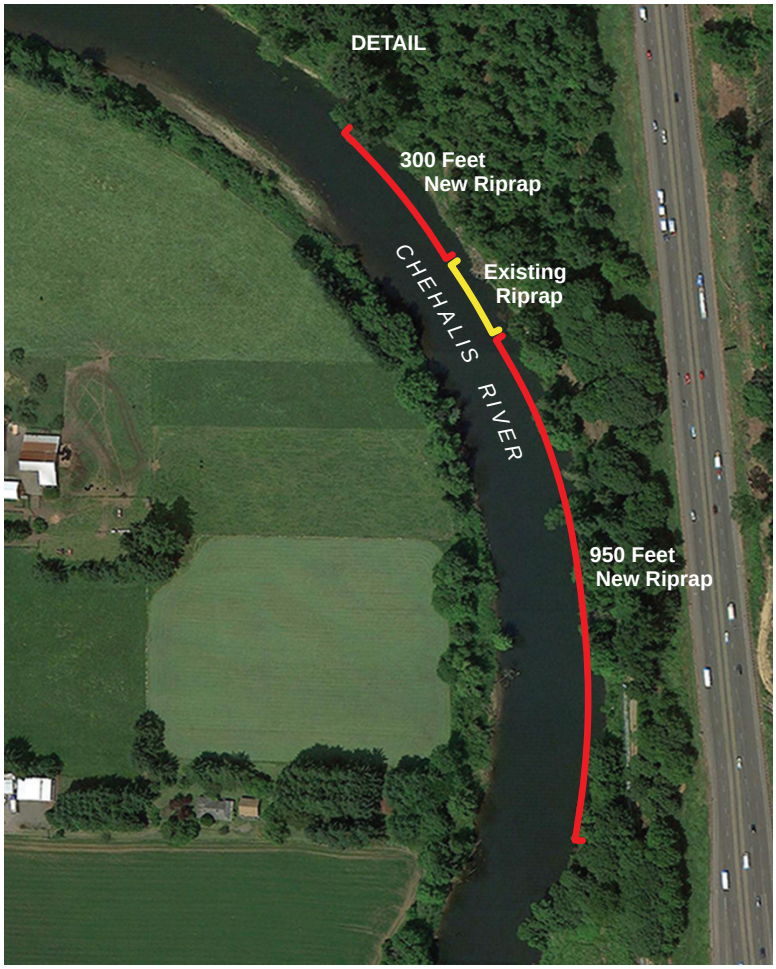
5.7.3 Collection System Recommendations

5.7.3.1 China Creek Interceptor (C.I.P. CC-1)

Because of the difference in cost and challenges of providing wetland mitigation to relocate the pipeline, the City will pursue the option of stabilizing the riverbank with riprap to address the exposure of the China Creek force mains. Alternative 2 is no longer being considered. The City completed a portion of the stabilization in 2009 and will need to complete another 1,500 lf in the future. Figure 5-9 shows the approximate limits of the stabilization. This project is considered a high priority project, because loss of the pipeline would cause sewage to spill into the river. The City will proceed with developing an engineering report and preparing the necessary permit applications for this work. The project is expected to require several federal and state permits and approvals covered by the JARPA. Local permits and approvals from the City will also be required.

The estimated Class 5 base construction cost is $1,750,000 in 2016 dollars, based on the quantities shown in Figures 5-10 and 5-11 and assuming that riprap is used and that most of the riprap is installed from the riverbank. This cost includes mobilization, bonds, contingency, and sales tax. Total project costs were estimated by adding 30 percent to the base construction costs. This additional cost allowance accounts for design, bidding, services during construction, permits, investigations, and legal and administrative services. At this stage, the expected accuracy level of the base costs shown is minus 30 percent to plus 50 percent.





N

0 250 500

SCALE IN FEET

Existing Riprap

New Riprap

FIGURE 5-9
New Riprap Locations
City of Centralia
General Sewer/Facility Plan

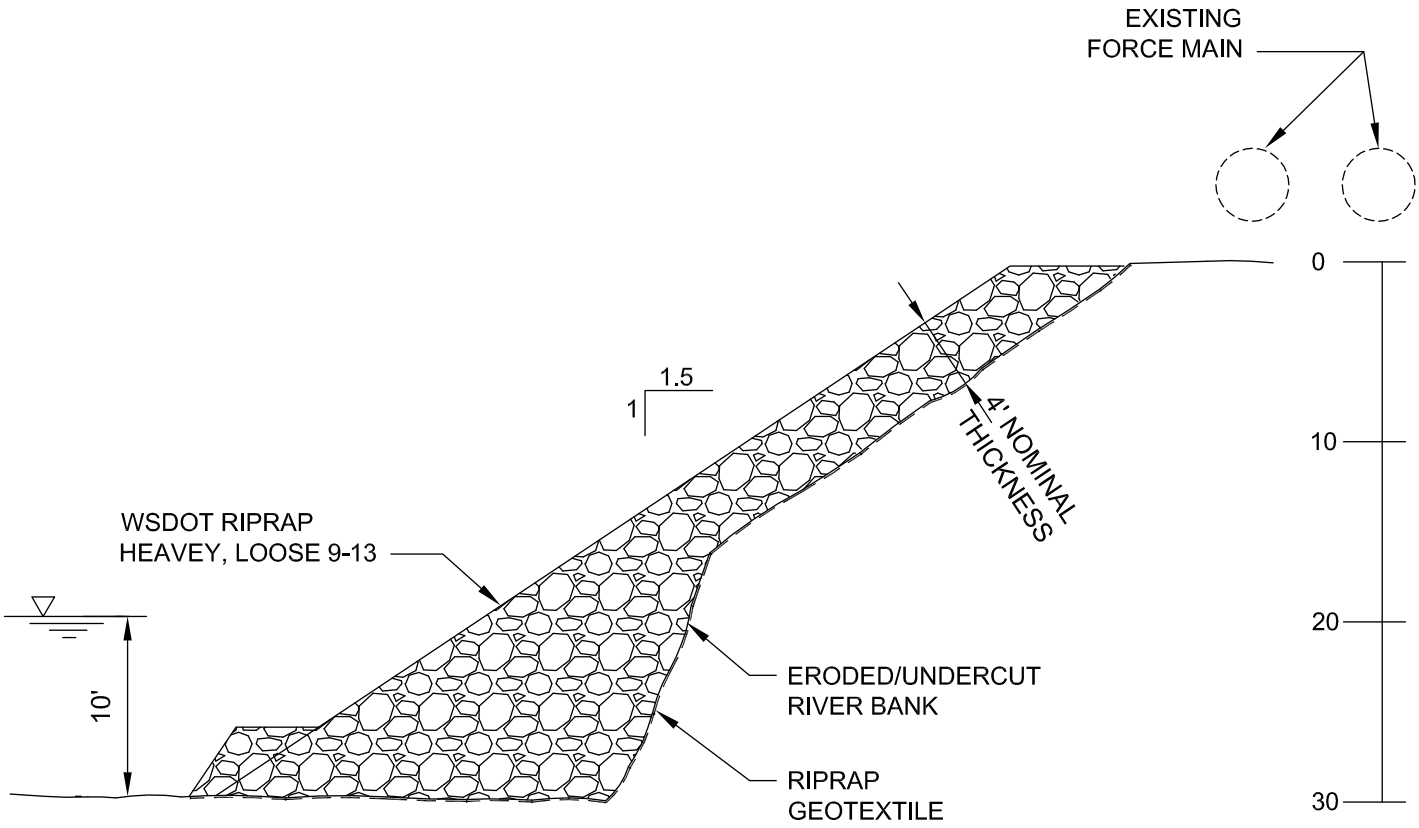


FIGURE 5-10
Riprap Cross Section
City of Centralia
General Sewer/Facility Plan

5.7.3.2 Centralia Station Development (C.I.P. CS-1)

The recommended sewer improvements for the Centralia Station (Alternative 2) are shown on Figure 5-3 in Section 5.3.2 and include the following:

Phase 1

- Construct approximately 3,100 feet of new 18-inch-diameter sewer along Borthwick Street and south along Long Road to the existing Long Road PS. The existing force main from Jefferson PS can be connected to this new sewer main near the Alder Street intersection. This reduces its length by approximately 1,000 feet and increases the capacity of the Jefferson PS, due to less pipe friction head loss allowing the pumping rate to increase.
- The project construction costs include costs for completing the high-priority improvements to the South Tower, Van Buren, and Jefferson PSs, because the time span between the two project phases is unknown.

Phase 2

- Decommission Floral, Ace Auto, Van Buren, and Long Road PSs, and divert approximately 500 gpm flow from Jefferson PS (which would reduce O&M activities).
- Upgrade South Tower PS capacity from 80 gpm to 580 gpm and increase wet well depth to 23 feet (existing depth unknown).
- Construct a new 1,800-foot-long, 10-inch-diameter force main from South Tower PS.
- Construct approximately 550 feet of new sewer up to 10-inch-diameter to collect flows from the new development.
- Construct approximately 850 feet of new 12-inch-diameter sewer and 3,200 feet of 10-inch-diameter sewer from Van Buren, Floral, and Ace Auto PSs. This includes a 100-foot bore-and-jack segment with 24-inch-diameter steel casing under the railroad tracks.
- Replace approximately 1,450 feet of aged 10-inch-diameter concrete pipe and 900 feet of 8-inch-diameter concrete pipe.
- Construct 2,250 feet of new 16-inch-diameter gravity sewer to collect flows from South Tower PS and convey it to the new 18-inch-diameter gravity sewer on Long Road. This includes a 100-foot bore-and-jack section with 30-inch-diameter steel casing under the railroad tracks; properties along South Street (west of the railroad tracks) would be reconnected to the new 16-inch-diameter sewer.

A construction cost estimate was developed. The basis of the cost estimate is summarized as follows:

- Estimate Date: October 25, 2013 (Updated July 2016)
- Accuracy Level: plus 50 percent to minus 30 percent

The final costs of the project will depend on actual labor and material costs at the time of bid, actual site conditions, productivity, competitive market conditions, final project scope, final schedule, and other variable factors. As a result, the final project costs will vary from those presented herein. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.

The construction cost includes mobilization, bonds, contingency, and sales tax. The percentage markups used for this stage of analysis are as follows:

- Contractor overhead and profit (in unit costs): 18 percent
- Mobilization/demobilization/bonds/insurance/general conditions: 10 percent
- Construction cost estimate contingency: 20 percent

- Escalation to mid-point of construction: Not included
- Sales tax (Centralia, WA): 8.0 percent

Total project construction costs were estimated by adding 25 percent to the base construction costs. This additional cost allowance accounts for design, bidding, services during construction, permits, investigations, and legal and administrative services. The estimates were originally developed in October 2013 dollars and escalated to July 2016 dollars using the 20-City Average CCIs published by ENR.

The costs for upgrading Jefferson, Van Buren, South Tower, and Ace Auto PSs were included in the project construction costs.

Table 5-16 shows an itemization of the construction costs in July 2016 dollars.

Table 5-16. Summary of Project Construction Costs for Centralia Station Sewer Improvements (Alternative 2)

Improvement	Cost
PHASE 1	
Centralia Station Sewers	
Gravity Sewer Trunk and Miscellaneous Sewer Improvements [a]	$1,920,000
Mobilization/Bond/Insurance/General Conditions	$190,000
Contingency (20%)	$380,000
Tax (8%)	$150,000
Project Cost Allowance (25%)	$660,000
Pump Station Upgrades (Jefferson, Van Buren, Ace Auto, South Tower)	**$580,000**
Phase 1 Total Project Cost (C.I.P. CS-1)	**$3,880,000**
PHASE 2	
Demo Existing Pump Stations	$30,000
South Tower PS Upgrades	$210,000
Jefferson PS Upgrades	$120,000
Gravity Sewer Trunk and Miscellaneous Sewer Improvements [a]	$1,870,000
Reconnect South Street Services	$20,000
Bore and Jack (two locations)	$170,000
Mobilization/Bond/Insurance/General Conditions	$240,000
Contingency (20%)	$480,000
Tax (8%)	$190,000
Project Cost Allowance (25%)	$830,000
Phase 2 Total Project Cost	**$4,160,000**
ALTERNATIVE 2 TOTAL PROJECT COST	**$8,040,000**

[a] Unit price includes demolition, earthwork, shoring, asphalt-concrete paving, and manhole installation.

5.7.4 Pump Station Improvement Recommendations (C.I.P. M-1)

City staff reviewed the required pump station improvements and developed the following capital improvement program recognizing the needs for high-priority improvements and budget limitations:

2018

- China Creek
  - This pump station consists of three pumps. One of the original (Wemco) pumps was replaced by a small Vaughan pump to handle dry weather flow. Two of the pumps have been rebuilt, with one spare on the shelf. Improvements needed include purchasing another replacement (Wemco) pump.
- Industrial
  - This pump station is located in a high-traffic roadway and will need to be retrofitted with a new highway-rated lid, new pumps (non-ragging), rails, check valve vault, coatings, and a new electrical panel. This pump station currently serves a small area, and relocation should be considered as part of these improvements.

2019 to 2020

- Borst Park
  - There is an existing project to line the 21-foot-diameter caisson wet well. The pump station upgrades will include new electrical (to accommodate the other upgrades) and future rewiring of the pump station.
- Eshom
  - Improvements to this pump station include a new coating for the wet well and new electrical panel. Consideration should be given to relocating this pump station as far north on Eshom as possible; this is included in the capital improvement plan.
- Galvin and Scheuber
  - Upgrades will include rebuilding and rechanneling the bottom of the wet well and providing the wet well with a new coating. New electrical panels will also be required.
- Jefferson
  - The wet well for this pump station is undersized, and the City has been operating the existing gravity system under surcharge conditions to relieve cavitation and to provide more capacity. The existing pump station is a wet well/dry well system, and the City is considering switching to submersible pumps for the upgrade of this pump station.
- Highland Park
  - Needed upgrades include a new valve vault and electrical panel.

Future Improvements

Improvements that will be made after the year 2020 are described as follows:

- Gold #2/Ace Auto
  - This project will require raising the electrical panel at least 5 feet, so that it is above the flood elevation. This work should be completed as soon as possible to protect the electrical system. The pumps will also require replacement in the near future, and replacement of the pumps is included in the costs for upgrading this pump station.

Table 5-17 provides project costs for the 8 pump station improvements.

Table 5-17. Pump Station Improvement Project Costs

Pump Station	Project Costs	High Range	Low Range
Gold #2/Ace Auto	$140,000	$210,000	$100,000
Industrial	$230,000	$340,000	$160,000
China Creek	$330,000	$500,000	$230,000
Jefferson	$140,000	$210,000	$100,000
Highland Park	$80,000	$120,000	$60,000
Borst Park	$90,000	$140,000	$70,000
Galvin and Scheuber	$60,000	$90,000	$40,000
Eshom	$750,000	$1,200,000	$500,000

Note:
Costs are in 2016 dollars.

5.7.5 Inflow and Infiltration Project Recommendations

5.7.5.1 Inflow and Infiltration Pilot Projects (C.I.P. II-1)

Figure 5-11 shows the I/I reduction project boundaries and indicates the area where the pilot projects could be performed. Once implemented, these pilot projects will be evaluated to determine which could be cost-effectively applied to a more extensive portion of the sewer system.

Because of small project sizes, the ability to quantify the differences in I/I reduction for each technology combination will be limited. Therefore, the comparison between the technologies will be primarily qualitative and will be based on the difficulty of implementation, construction implications, and overall installation performance of the technologies. The qualitative analysis can include the use of point velocity meter interrogations and dip-stick measurements at the downstream limits of the pilot project areas during the wet weather seasons both before and after the installation to assess the impacts of the rehabilitation. Additional qualitative analysis could include a pre-installation closed-circuit television (CCTV) inspection of the sewers during high groundwater conditions to observe the number of leaking defects prior to rehabilitation. Table 5-18 summarizes the pilot I/I project technology combinations selected. Each pilot project could be completed for approximately $540,000 in 2016 dollars.

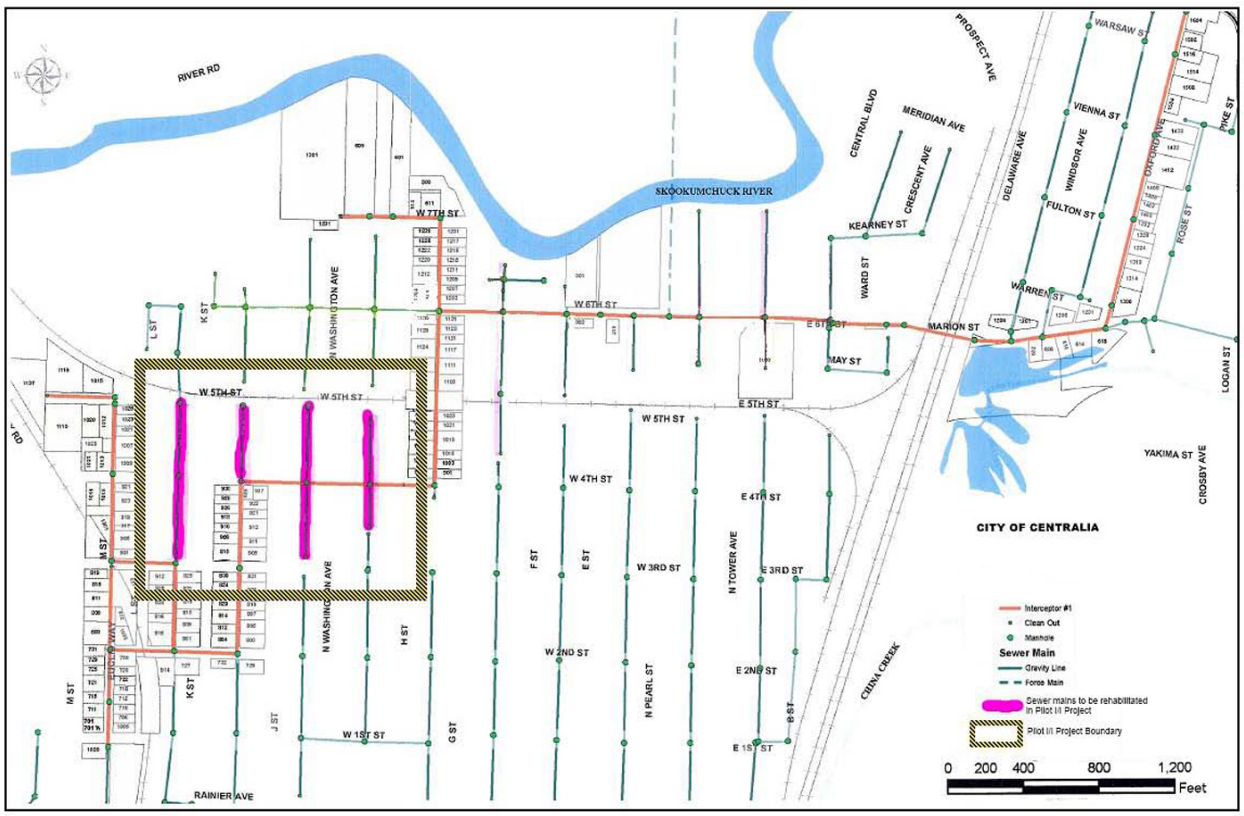


Figure 5-11. I/I Reduction Project

Table 5-18. Pilot I/I Project Rehabilitation/Replacement Technology Combinations

Combi-nation	Sewer Main Technology	Manhole Technology	Lateral Tap Connection Technology	Lateral Side Sewer Technology	Notes
1	CIPP	CIP	Dig and install compression tap fitting (*Inserta Tee*)	CIPP	City staff had limited experience with CIPP. Neighboring utilities had reported problems with CIPP seals at the lateral taps; therefore, replacement tap fittings were preferred.
2	Pipe bursting	Dig and replace	Dig and install electrofusion saddle	Pipe bursting	City staff had previous experience with pipe bursting, where the bursting equipment was stalled on buried obstacles and also caused surface heave in isolated locations.
3	Sliplining	CIP	Dig and install electrofusion saddle	Pipe bursting	City staff had previous experience with sliplining. Pipe bursting (or CIPP) must be combined with sliplining for the lateral side sewers because of the need to maintain a minimum pipe diameter.
4	SPR-EX	CIP	Dig and install compression tap fitting (*Inserta Tee*)	CIPP	There is currently only one manufacturer for the SPR-EX spiral-wound rehabilitation system, with limited installation history in the Pacific Northwest. CIPP (or pipe bursting) must be combined with SPR-EX for the lateral side sewers because of the need to maintain a minimum pipe diameter.

Table 5-18. Pilot I/I Project Rehabilitation/Replacement Technology Combinations

Combi-nation	Sewer Main Technology	Manhole Technology	Lateral Tap Connection Technology	Lateral Side Sewer Technology	Notes
5	Dig and replace	Dig and replace	Dig and replace	Dig and replace	

Notes:
A more detailed description of the different technologies, their capabilities, and their limitations may be found in the 2010 EPA *State of Technology for Rehabilitation of Wastewater Collection Systems Report* (EPA, 2010).

CIP = cast-in-place
CIPP = cured-in-place pipe
SPR-EX = spiral-wound pipe renewal (SPR). SPR-EX is an expandable spiral product trade name.

5.8 Alternative Systems

Gravity wastewater sewer collection systems are historically the conventional system used within a community. Current minimum sizing for such systems is 8-inch-diameter pipeline, which allows for a wide range of flows. By using the natural terrain and gravity flow characteristics, pumping requirements are minimized. With periodic inspection and cleaning, maintenance is typically minimal on the gravity portion of the collection system. The pump stations require more frequent inspections, cleaning, and general maintenance.

During the process of developing this sewer plan, the City considered the use of alternative sewer systems as a means to reduce I/I in the collection system. In general, alternative systems are typically installed at more shallow depths; therefore, high groundwater levels would potentially have a smaller impact on I/I. Refer to Sections 7.2.2 and 9.8 for more information on the requirements for alternative systems.

Gravity wastewater collection systems are not typically suitable for low-lying areas where the access points to the pipelines are located above the residences or where groundwater is extremely shallow, thereby increasing the dewatering construction costs and infiltration potential into the sewer system. Depending on the characteristics of the area to be served, alternative wastewater systems may be more appropriate.

In the following sections, brief descriptions of alternative wastewater systems are presented along with discussion of potential benefits and issues to be considered.

5.8.1 Septic Tank Effluent Pumping Sewer System

A septic tank effluent pumping (STEP) sewer system is a shallow, small-diameter pipeline pressure sewer (force main) that follows the natural profile of the ground. Each sewer service has a septic tank and a small pump to convey the effluent from the septic tank to the small-diameter sewer main. The discharge pipe from each STEP pump to the force main in the street typically ranges from 1 to 1.5 inches in diameter. The force mains in the street range in size from 2 to 6 inches in diameter and are placed 3 to 4 feet deep. Septic tanks remove most of the solids, grit, and grease from the domestic wastewater and provide some anaerobic treatment of the wastewater. Therefore, STEP system pumps can be liquid-only pumps, which are less expensive than pumps designed to handle solids.

The electric power supply for STEP pumps typically comes from the home being served by the system. It is often the property owner's responsibility to provide a suitably sized electrical panel and connection in conformance with applicable codes. There is rarely any provision for an alternative electric power source. However, if the home is old, the electrical systems of the home may not conform to current codes. In such cases, the utility may need to have power supplied from a separate source.

If STEP systems are installed in an area with an existing onsite septic system, the existing septic tanks can occasionally be used. However, it is often found that the septic tanks leak, are otherwise defective, or cannot be inexpensively retrofitted for use with a STEP system. Therefore, it is often assumed that existing septic tanks would be replaced with new septic tanks. New side sewers are also frequently constructed from the structure served to the septic tanks to eliminate any existing I/I problems. Replacement of septic tanks and installation of side sewers can disrupt a homeowner's yard and landscaping.

Maintenance of STEP systems mainly consists of repairing and replacing the pumping units. Each pumping unit and power supply must be inspected and repaired as needed.

Solids also accumulate in the septic tanks and must be removed every 5 to 10 years.

There are a number of benefits to STEP systems over conventional gravity or vacuum sewer systems. Because of the shallow depth of the small-diameter pressure mains, the system can usually be constructed with a minimum of excavation, reducing or eliminating the need for expensive dewatering and minimizing the amount of surface restoration required. Because it is a pressure system, the topography of the area is not as critical as for a gravity system.

The septic wastewater from a STEP system will be more corrosive and odorous than wastewater from a gravity or vacuum system because of the initial treatment that has taken place in the septic tank. A STEP sewer system also requires more maintenance than a gravity or vacuum sewer because of the large number of individual pumping units and variety of installations. As stated previously, electric power supply is often the homeowner's responsibility. Ecology requires that the utility own, operate, and maintain the STEP system in accordance with Ecology's *Criteria for Sewage Works Design* document, Sections Cl-1.2 and Cl-10.4 (Ecology, 2019). Therefore, the homeowner must provide the utility with an easement to access the facilities for maintenance and repair.

5.8.2 Low-pressure Sewer System

A low-pressure sewer system has small-diameter force mains similar to a STEP sewer system. Low-pressure sewer systems differ from STEP systems, in that each service connection has a small sump and grinder pump instead of a septic tank and a liquids-only STEP pump. Solids are shredded by a 1- to 2-hp grinder pump into a slurry, and the sewage is pumped into the small-diameter force mains. Any existing septic tanks are abandoned.

Most of the maintenance of a low-pressure sewer system is in the repair and replacement of the grinder pumps. In particular, the grinder portion of the pump may need frequent replacement, because it becomes dull or is damaged by hard solids. Hard solids can also become lodged in the grinder unit. Frequency of maintenance depends on the quality of the pump.

The benefits and considerations of a low-pressure sewer system over a conventional gravity system or vacuum system are essentially the same as those for a STEP system. And as with a STEP system, Ecology requires that the utility own, operate, and maintain the grinder installations. The City desires to standardize around a single manufacturer to minimize the number of spare parts and spare units kept on hand and to minimize the amount of specialized training required to maintain those units.

5.8.3 Vacuum Sewer System

A vacuum sewer system has three basic components: the service, the collection piping, and the vacuum station.

Wastewater flows by gravity from one or more homes into a vacuum valve pit located on the street right-of-way. Vacuum valve pits consist of a small sump, topped with a vacuum valve that opens when wastewater in the sump rises to a preset level. When the valve is open, vacuum in the main line propels air and wastewater at high velocities from the valve pit into the 4-inch- to 6-inch-diameter vacuum

mains and toward the vacuum pump station. The vacuum mains are typically 3 to 4 feet deep. The vacuum pump station then pumps the collected wastewater into a standard force main or gravity main to the WWTP. An engine generator can be installed at the vacuum pump station to provide electric power when the normal power supply is interrupted. Power to operate the valves in the vacuum valve pits is taken from the vacuum in the system, so an external power source is not required.

The air from the vacuum pump station has minimal odors, primarily because twice as much air as wastewater is allowed into the system each time a valve opens, and travel times to the vacuum pump station are relatively short. For the same reasons, sewage discharged to the gravity system is typically more oxygenated and less corrosive than in a gravity or low-pressure sewer system.

Maintenance for a vacuum sewer system consists of inspecting and periodically rebuilding the vacuum valves and maintenance on the vacuum pump station, which is very similar to the maintenance required for an ordinary gravity pump station. Maintenance for a vacuum sewer system is more than for a gravity sewer system (because of the number of vacuum valve pits that must be inspected and maintained) but less than for a low-pressure sewer system.

As with a STEP sewer, vacuum sewer systems can be beneficial in areas with unstable soils, flat terrain, and high water tables. According to information presented by the EPA in *Alternative Wastewater Collection Systems* (EPA, 1991), vacuum systems are most cost-effective with a minimum of 75 to 100 services per vacuum pump station. Because there is so much air in the line compared to the volume of wastewater, sewage discharged to the gravity system is typically more oxygenated and less corrosive than in a gravity or low-pressure sewer system. A significant advantage is also the presence of the central power supply.

Topography is a factor to consider in vacuum sewer systems. Typically, the lifting power of a vacuum station is limited to 15 to 20 vertical feet, although this can be incorporated into the overall design. In general, vacuum sewers may be less costly to construct than conventional sewers, but they may also be more expensive to operate and maintain. There are also a limited number of vacuum system manufacturers, so system guarantees are a factor to consider.

5.8.4 Summary

Table 5-19 presents a summary of each alternative sewer system, including advantages and disadvantages.

Table 5 19. Alternative Sewer System Comparison

System	Advantages	Disadvantages
STEP system	• Uses liquid-only pumps • Shallow depth reduces construction costs over conventional system • Topography is not critical • Reduced treatment plant costs • Potentially less 1/1	• Power is homeowner's responsibility • Requires new septic tank • Need to remove solids every 5 to 10 years • Effluent can be more corrosive than systems with septic tanks • Increased collection system odor or odor control costs • Pumps require increased maintenance • Homeowner must provide City with access easement for maintenance and repair
Low-pressure sewer	• Abandon septic tanks • Shallow depth reduces construction costs over conventional system • Topography is not critical • Potentially less 1/1	• Frequent repair and replacement of grinder pumps needed • Utility must keep large supply of grinder pumps in stock • Homeowner must provide City with access easement for maintenance and repair

Table 5 19. Alternative Sewer System Comparison

System	Advantages	Disadvantages
Vacuum sewer	• No external power require source is required • Wastewater is more oxygenated and less corrosive than STEP or low-pressure sewers; fewer odor issues • Beneficial in areas with unstable soils, flat terrain, and high water tables • Central power supply • Potentially less 1/1	• Large number of vacuum valve pits frequent inspection and maintenance • Topography limits vertical lift per vacuum station • More expensive to operate and maintain than conventional systems • Limited number of manufacturers
Conventional gravity systems	• No power requirements • Utility staff most familiar with operation and maintenance • Few parts required to keep in stock • Less maintenance required than other types of systems	

After evaluating the alternatives, the decision was made to use conventional gravity systems except where gravity systems are not feasible. The major factor in the decision was the increased operation and maintenance associated with alternative systems, both in terms of equipment cost and increased staff needs. Another factor is that the success of an alternative system depends on the ability of the utility to enforce the program development and equipment requirements; otherwise the system can become problematic, and associated system costs will increase. In the case of the City's sewer system, the advantages of alternative systems did not appear to outweigh the cited disadvantages.

5.9 Application of Alternative Sewer Systems to New Areas

It is recommended that grinder pumps be the alternative sewer system allowed when conventional sewer systems are not feasible (see Section 9.8 for more information). It is further recommended that the City standardize on one manufacturer of grinder pumps to facilitate maintenance of grinder pump installations. E/One is currently the manufacturer selected by the City, based on successful application of their equipment. Vacuum sewers may have application for developments of at least 50 connections in the flatter areas where gravity sewer service is feasible, but finances do not permit construction of gravity sewers at the time the City desires an area to develop.

STEP systems are not recommended. In undeveloped areas, it does not make sense to construct new septic tanks. STEP systems generate septic wastewater that will create significant odor and corrosion problems when discharged to conventional gravity sewers and also require periodic pumping of solids from the septic tank. These disadvantages make grinder pumps a more attractive alternative when alternative sewer systems are justified.

In the Ford's Prairie and Waunch Prairie/Davis Hill areas, gravity sewers can provide service to nearly all the area, and grinder pumps should be limited to a few low-lying areas that cannot be served by conventional gravity sewers. Vacuum sewers could be used to provide service if it is desired to serve larger developments and finances do not allow construction of gravity sewers at the time development is desired by the City. It is not recommended that grinder pumps be allowed to serve isolated development, unless the City stipulates that the development will change to gravity sewers in the future when available, and improvements are made to the conventional sewers receiving grinder pump discharge to deal with odor and corrosion issues.

Grinder pumps are recommended for individual services in the Cook's and Widgeon Hill very low density residential zoned areas, because they will not allow economical sewer service using conventional gravity sewers. Elevation differences preclude the use of vacuum sewers in most of the areas. Some areas adjacent to gravity collection sewers will allow these areas to be served by gravity sewers.

The City will continue to consider the use of alternative systems only where the use of conventional systems is not feasible because of the desire to minimize operation and maintenance costs, which are paid for by all wastewater utility customers.

CHAPTER 6

Treatment Plant Evaluation

This chapter describes the Centralia WWTP discharge standards, reasonable potential analysis (RPA), evaluation of plant capacity, and potential water reclamation and reuse options. It also describes the alternatives analysis to address future growth and planned wastewater treatment improvements.

6.1 Description of Discharge Standards

The City currently discharges treated wastewater to the Chehalis River. The following section describes the applicable water quality standards, required treatment plant effluent quality, and potential future treatment requirements.

6.1.1 Applicable Water Quality Standards

6.1.1.1 Regulatory Authority

The federal Clean Water Act (1972 and 1977, 1981 and 1987 modifications) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the NPDES permit, which is administered by the EPA. The EPA has authorized the State of Washington to administer the NPDES permit program. Chapter 90.48 RCW defines Ecology's authority and obligations in administering the wastewater discharge permit program. The regulations adopted by the State include procedures for issuing permits (Chapter 173-220 WAC), technical criteria for discharges from municipal wastewater treatment facilities (Chapter 173-221 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharging wastewater to waters of the State.

6.1.1.2 Technology-based Standards (WAC 173-221)

Technology-based standards for municipal WWTPs are defined under federal and state regulations. Refer to Discharge Standards and Effluent Limitations for Domestic Wastewater Facilities, Chapter 173-221 WAC. These are the default standards for domestic wastewater facility discharges and are based on treatment levels that are readily attainable with secondary treatment practices. Technology-based limits for pH, fecal coliform, BOD_5, and TSS (WAC 173-221-040) are as follows:

- Effluent pH – The effluent pH shall be between 6.0 and 9.0 standard units unless the permittee demonstrates that:
  - Inorganic chemicals are not added to the waste stream as part of the treatment process;
  - Contributions from industrial sources do not cause the pH of the effluent to be less than 6.0 or greater than 9.0; and
  - The discharge does not cause water quality violations outside of an approved dilution zone.
- Fecal coliform – Fecal coliform limits shall not exceed a monthly geometric mean of 200 organisms/100 milliliters (mL) and a weekly mean of 400 organisms per 100 mL.
- BOD_5 and TSS – Except as allowed under WAC 173-221-050, domestic wastewater facilities which discharge to surface waters shall not exceed a 30-day average of 30 mg/L BOD and 30 mg/L TSS. Seven-day averages shall not exceed 45 mg/L BOD and 45 mg/L TSS. Additionally, the 30-day average percent removals of BOD_5 and TSS shall not be less than 85 percent of influent concentrations.

6.1.1.3 Water Quality Standards for Surface Waters

Actions related to surface waters must comply with *Water Quality Standards for Surface Waters of the State of Washington*, Chapter 173-201A WAC, Publication Number 06-10-091 (Ecology, 2017). Protection of surface waters is regulated under the referenced WAC. Ecology amended the Water Quality Standards, which were made effective on December 21, 2006, and EPA approval has been received.

The Water Quality Standards protect surface waters by narrative criteria, designated uses, and an anti-degradation policy. Based on the designated uses for a water body, numeric and narrative criteria are assigned to protect the water body's existing and designated uses. The Chehalis River is designated as requiring aquatic life protection under "salmonid spawning, rearing, and migration" in the vicinity of the outfall (Ecology, 2006).

Characteristic uses of this segment of the Chehalis River include the following:

- Water supply (domestic, industrial, and agricultural)
- Stock watering
- Fish migration
- Fish rearing, spawning, and harvesting
- Wildlife habitat
- Primary contact recreation
- Sport fishing
- Boating and aesthetic enjoyment
- Commerce and navigation

The Centralia segment of the Chehalis River also has a supplemental spawning and incubation criterion of 13 degrees Celsius (°C) water temperature from October 1 to May 15. Ecology has included the Chehalis River on the federal 303(d) list for not meeting water quality standards for dissolved oxygen, fecal coliform bacteria, and temperature. Total maximum daily loads (TMDLs) have been implemented for each of these to meet water quality standards.

6.1.2 Required Effluent Quality

The City's WWTP has a NPDES permit (Appendix H) from Ecology for discharge of treated wastewater to the Chehalis River. The current permit sets limits on BOD_5 and TSS in the effluent as well as limits on fecal coliform, ammonia, and range of pH, as noted in Table 6-1. It is important to note that the loading limits for ammonia, BOD, and TSS presented in Table 6-1 are more stringent than the concentration-based limits. The City was given loading allocations (as reflected in their NPDES permit) in a consent decree in January 2000 (No. C96-5968 RJB). The ammonia loading limit of 110 pounds per day is reflective of a flow rate of 3.3 mgd at the concentration-based permit limit for ammonia. Similarly, for BOD, the effluent limit of 826 pounds per day equates to a flow of 3.3 mgd at the 20 mg/L limit.

Table 6-1. Effluent Limits[a] at Outfall No. 001

Parameter (at the River Flows Shown Below[f])	Monthly Average	Weekly Average	Daily Maximum[b]
The following parameters apply at the river flows and seasons shown below:[c]			
BOD_5 and TSS (all seasons)			
• flows less than 200 cfs[c]	20 mg/L		30 mg/L, 826 ppd
• flows 200 to 1,000 cfs[d]	20 mg/L, 85% removal of influent BOD_5 and TSS		30 mg/L, 926 ppd

Table 6-1. Effluent Limits[a] at Outfall No. 001

Parameter (at the River Flows Shown Below[f])	Monthly Average	Weekly Average	Daily Maximum[b]
• flows greater than 1,000 cfs	30 mg/L, 925 ppd, 75% removal of influent BOD, 70% removal of influent TSS		45 mg/L, 2,530 ppd
Ammonia (NH_3-N) March 15 to November 30			
• flows 200 to less than 1,000 cfs[d]			4.0 mg/L, 123 ppd
• flows less than 200 cfs[d]			4.0 mg/L, 110 ppd
Ammonia (NH_3-N) December 1 to March 14[d]			
• flows 200 to less than 1,000 cfs[d]			15 mg/L, 463 ppd
• flows less than 1,000 cfs			15 mg/L, 657 ppd
The following parameters apply at all flows and seasons:			
Fecal coliform	200 col/100 mL	400 col/100 mL	
Copper[g]			
Zinc[g]			
pH[d]	Daily minimum is equal to or greater than 6.0 and the daily maximum is less than or equal to 9.0.		

[a] The average monthly and weekly effluent limitations equal the arithmetic mean of the samples taken. The average monthly and weekly limitations for fecal coliform are equal to the geometric mean of the samples taken.

[b] River flows must be determined from the Grand Mount USGS gauge.

[c] 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.

[d] These "dry weather" limits (for BOD_5 and TSS only) apply on the next day after the 7-day moving average flow at the Grand Mound USGS gauge goes below 1,000 cfs and on all subsequent days until the wet weather limits apply.

[e] These “dry weather” limits (for ammonia only) go into effect 14 days after the 7-day moving average flow at the Grand Mound USGS gauge is less than 1,000 cfs. This dry weather limit for ammonia cannot be applied earlier than March 15 of each year following the 14-day phase-in.

[f] Ecology will recalculate final limits for copper in 2015 using water quality data collected by the discharger.

[g] Indicates the range of permitted values. The permittee must report the instantaneous maximum and minimum pH monthly. Do not average pH values.

Note:
USGS = U.S. Geological Survey

6.1.3 Potential Future Treatment Requirements

Effluent quality limits for the parameters in the current NPDES permit, as shown in Table 6-1, are expected to remain unchanged in the future including loading limits. New future regulatory requirements may include advanced treatment to address increasingly stringent river discharge criteria for nutrients. The nutrients reviewed for this General Sewer/Facility Plan were phosphorus and nitrogen. The WWTP does not routinely monitor the effluent phosphorus concentration; however, based on limited data, it appears that the process achieves good phosphorus removal. Phosphorus is a concern in eastern Washington but does not appear to be a near-future concern on the Chehalis River. A

TMDL on the Chehalis River for nitrogen was considered more likely. Upgrades (described in Section 6.6) were considered to reduce nitrogen to 10 mg/L or less for two reasons:

- To improve the water quality discharged to the Chehalis River
- To facilitate the reuse of the WWTP effluent

The City is evaluating conceptual alternatives for reuse of the WWTP effluent as water resources become more limited in the future. It is understood that any future nutrient limits as developed by Ecology would be based on EPA's technical guidance and recommendations for the nutrient ecoregion and the data submitted by the City as part of the 3-year Receiving Water and Effluent Study and annual summary reports from December 2013, 2014, and 2015.

In addition to nutrients, effluent temperature is a concern, as outlined in the 2001 TMDL. As required in the City's NPDES permit, the City measured effluent and ambient river temperature during the months of April through October for 2013, 2014, and 2015 to enable Ecology to better evaluate temperature effects. Based on the data and discussions with Ecology, a future effluent temperature limit may be required. This is discussed further in Section 6.2.

6.2 Reasonable Potential Analysis

A RPA was completed for the Centralia WWTP for inclusion in the General Sewer Plan/Facility Plan (Appendix I). A RPA is used to determine whether a discharge has a reasonable potential to cause or contribute to a violation of Washington state water quality criteria for toxic pollutants. This RPA was requested by Ecology in order to determine whether the WWTP effluent chemistry and updated dilution factors provide compliance with water quality criteria. An evaluation of temperature compliance was also completed. Dilution factors at the designated mixing zone boundaries of the Centralia WWTP outfall have been updated using projected 2035 plant effluent flows. These updated dilution factors have been used to update the RPA for the Centralia WWTP.

The results of the RPA concluded the following:

- No reasonable potential to exceed water quality criteria was identified for ammonia or metals.
- A tentative reasonable potential determination was shown for 18 organic compounds based on non-detect laboratory test results.
- A reasonable potential was identified for bis-ethylhexyl phthalate (BEHP) based on the recently revised human health water quality criteria. Sample contamination is the likely source. BEHP is a plasticizer that may be found in sampling equipment such as autosampler tubing and gloves; as such, future testing requiring a detection limit below the human health criteria, with an emphasis on QC procedures to address the potential for sample contamination is recommended. The City will continue to monitor and enforce QC procedures to prevent future sample contamination. Many of the water quality criteria (updated in December 2016) are less than the lowest laboratory detection limits achieved by the priority pollutant scans. A reasonable potential for cyanide was based on a single detection in 2013 that used an incorrect analytical method for evaluating against water quality criteria.

A reasonable potential was identified for temperature during the weeks of transition from the summer spawning, rearing, and migration criteria period (17.5° C) to the start of the supplemental salmon spawning period (13.0° C criteria applicable October 1 to May 15), based on river and effluent temperature monitoring data reported by the WWTP in 2013, 2014, and 2015 and updated dilution factors for project WWTP flows for 2035. The calculated incremental mixed temperature increase at the mixing zone boundary during the spring and fall transition periods to the salmon spawning period showed temperature increases greater than 0.3° C, the maximum allowable incremental temperature increase. Further evaluation of temperature compliance needs and mitigation strategies under future

conditions is planned to address potential temperature limitations as effluent flows increase. Some mitigation, such as partial diversion of effluent flow to irrigation or groundwater recharge, may be required at least during a portion of this transition into the supplemental spawning period (October 1 to May 15). Based on the results of the RPA, two projects were identified for inclusion in the CIP:

WW-6, **Temperature Compliance Evaluation**
This detailed study would further evaluate temperature compliance and mitigation alternatives and select a recommended alternative. The estimated cost in 2016 dollars is $60,000.

WW-7, **Thermal Mitigation Needs**
After the completion of C.I.P. WW-6, the predesign, design, and construction of the selected alternative can be implemented. A pilot study of the selected alternative could also be completed. The planning level estimate for this C.I.P. item is based on the lowest costs option for meeting thermal mitigation needs of the construction of wetlands for cooling and development of the wetlands for Class C water use as "noncontact recreational or education use with restricted access." The estimated costs in 2016 dollars for the predesign and design is $1.24 M, while the construction is estimated to be $6.21 M.

6.3 Plant Capacity

6.3.1 Background

In 2012 and 2013, analytical results for samples from influent to the Centralia WWTP showed influent BOD_5 and TSS loads that exceeded the plant's rated design capacity multiple times. These apparent exceedances triggered the Ecology requirement that the City develop a plan to show how capacity will be maintained for future loads.

This issue was evaluated in two separate analyses. The initial analysis compared the large increases reported in influent BOD_5 and TSS loads between October 25, 2011, and March 2013 with the measured MLSS and WAS amounts during that period. It was expected that the MLSS and WAS increased proportionally to influent BOD_5 and TSS increases; however, MLSS and WAS had increased only slightly. This analysis concluded that the disparity could be related to replacement of the plant's influent sampler, which occurred on October 26, 2011. That is, the new sampler could be taking non-representative samples that led to inaccurately high influent BOD_5 and TSS results.

This led the City to install additional, improved air mixing in the influent channel to reduce stratification and consequent sample variability. The City also performed intensive manual sampling to determine whether the new wastewater sampler was taking representative samples. The City concluded that (1) improved air mixing reduces variability of BOD_5 and TSS test results, and (2) average BOD_5 and TSS test results were higher when the new sampler with improved air mixing was used than when the old sampler was used.

Additional analysis using the test results from samples taken with the new sampler after improved air mixing was implemented concluded that, with improved air mixing, the new sampler is taking representative samples and that the old sampler was obtaining non-representative samples (lower) based on the following:

- MLSS and WAS concentrations and quantities predicted by activated sludge process simulations agreed with WWTP observations using the influent BOD_5 and TSS measured using samples from the new automatic influent sample with improved air mixing of the influent channel.
- Per capita loadings using influent BOD_5 and TSS measured using samples from the new automatic influent sample with improved air mixing of the influent channel are closer to the 0.2 ppcd value that is considered typical of municipal wastewater.

In light of these results, the City initiated facility planning and an evaluation of plant capacity. The following evaluation was completed to determine the capacity of the plant to treat projected flows and

loads, and prepare a plan to maintain adequate capacity. In the future, the City may further evaluate the plant capacity through a re-rating analysis, as understanding the actual plant capacity is critical to the timing of future WWTP improvements and their associated costs. The City will continue to collect and monitor data for technical validation of the current actual plant capacity. The capacity of each treatment process (including the headworks screens, aeration basins and secondary clarifiers, UV disinfection system, effluent pumps, and solids handling) was reviewed and compared to projected flows and loads. Table 6-2 presents the 2015 plant influent values, the permitted capacity, and projected 2035 influent flows and loads. For 2015, the plant was at 86 percent of the maximum month BOD loading capacity and 106 percent of the maximum month flow capacity.

Table 6-2. Capacity Summary

Parameter	2015 Base Year	NPDES Permit Capacity	2015 % of Capacity	2035 Projected Influent Value
Maximum Month BOD_5 (ppd)	3,776	4,400	86	5,860
Maximum Month TSS (ppd)	3,973	5,000[a]	79	6,165
Maximum Month Flow (mgd)	5.82	5.5	106	7.46
Maximum Day Flow (mgd)	8.67	8.6	101	10.70
Peak hour/instantaneous peak flow (mgd)	9.1	9.3	98	11.44

[a] As approved in the 2014 General Sewer Plan Update

6.3.2 Capacity Evaluation Results

6.3.2.1 Headworks Screening and Grit Removal (WW-3)

The screening facility consists of two quarter-inch rotary screens with a capacity of 5 mgd each. Based on the existing flow data presented in Chapter 3, the screens have adequately passed the highest peak hour flow recorded from 2011 to 2015 of 9.1 mgd. The screens also successfully passed 11.75 mgd during the February 5, 2005, hydraulic performance test. An additional screen will be required as flows increase to the WWTP. This is included in the C.I.P. Aeration Basins and Secondary Clarifiers

As shown in Table 6-2, the projected 2035 flow and loads exceed the plant's rated capacity. Thus, the existing two aeration basins and secondary clarifiers are inadequate for future 2035 flows and loads.

A calculation of the aeration needs estimated a required 5,000 standard cubic feet per minute (scfm) air rate, which is less than the 6,400 scfm blower system firm capacity. These calculations are provided in Appendix J. The plant has demonstrated adequate aeration capacity as well. According to plant staff, only one unit out of the three blowers is needed most of time. This agrees with the historical plant data on the daily air flows, which are presented in Appendix J. As shown in Appendix J, the maximum daily air flow recorded was 3,419 scfm, just slightly higher than the rated blower capacity of 3,200 scfm. Since current maximum month loads correspond to 80 to 85 percent of the plant's rated capacity, the existing three blowers would be adequate for the rated plant capacity.

6.3.2.2 Dewatering

The plant has a 2-meter belt filter press with a capacity of 682 pounds per hour per meter (lbs/hr/m), within the 400 to 700 lbs/hr/m range recommended by the Manual of Practice (Water Environment Research Foundation, 2003). Currently, the plant does not have dedicated solids holding volume, and WAS is dewatered two to three times per week. The belt filter press would need to be operated 3 to

4 days per week, assuming an 8-hour shift, to accommodate future projected plant loads. The plant is able to accommodate scheduled downtime between dewatering periods.

6.3.2.3 Solids Stabilization

The Centralia WWTP has two solids stabilization processes: composting (primary) and lime pasteurization (secondary). The existing composting process capacity is 3,500 pounds per day (lbs/d) dry solids and the lime pasteurization process can handle 1,100 pounds per hour dry solids or 8,800 lbs/d (8-hour operation). No redundancy is required for either process. Projected WAS production at 7.5 mgd maximum month flow is approximately 5,600 lbs/d dry solids. This is well within the rated combined capacity of the two stabilization processes.

6.3.2.4 Disinfection

The UV disinfection system consists of three channels. Each channel has a low-pressure high-output UV bank. Based on plant experience, the UV system provides adequate disinfection at the rated flow of 5 mgd per channel (10 mgd firm capacity; 15 mgd total). The UV system design criteria is 30 millijoules per square centimeter with a UV transmittance of 65 percent. The February 2005 stress test passed 11.75 mgd through 2 UV channels. The results showed that transmittance decreased significantly when the flow was suddenly increased, contributing to higher effluent fecal coliform in the effluent; however, transmittance improved as the test continued. The geometric mean for flow over 3 mgd was 96. The NPDES permit states that the fecal counts cannot exceed a monthly geometric mean average of more than 200 or a weekly geometric mean of 400. Since the geometric mean was less than 100, the test showed that the UV system performed well within the permit limits.

The plant has not experienced any permit violations for effluent fecal coliform. The plant has operated individual channels at their maximum hydraulic capacity for very short durations. Typically, operators are more conservative and bring a second channel online when flows are sustained at 4 mgd or higher. The following major UV system alarms are in place to alert operators to situations where disinfection may be reduced:

- Low UV Intensity Alarm
- Individual Lamp Alarm Failure Alarm
- Multiple Lamp Failure Alarm
- Module Failure Alarm
- Programmable Logic Controller (PLC) failure
- Communication System failure
- Bank failure to energize
- Loss of power to the System Control Center
- Incomplete sequence

6.3.2.5 Effluent Pumping

The Centralia WWTP has three submersible, variable speed effluent pumps that pump effluent to the outfall at periods of high river water levels. Each pump is rated at 5 mgd. The February 5, 2005, hydraulic performance test demonstrated that the plant has a sufficient hydraulic capacity to pass through 11.75 mgd peak flow by gravity, at a river water level of 135-foot elevation, which exceeds the projected maximum peak hour flow of 11.44 mgd.

Typically, effluent will need to be pumped at the peak hour flow by the three existing pumps. Although each pump is rated at 5 mgd, examination of the pump curve and friction losses experienced during the February 5, 2005, hydraulic performance test results, coupled with analysis of pump discharge losses, show that two pumps can pump up to 11.3 mgd at the river level corresponding to the 100-year flood event, with the third unit serving as standby.

6.3.2.6 Backup Power

The plant has one standby generator with a capacity of 1 megawatt. This is sufficient to provide power to the entire plant at full operating conditions.

6.3.2.7 Redundancy Analysis

The plant was also evaluated for plant redundancy requirements per the Orange Book (Ecology, 2008) as shown in Table 6-3.

Table 6-3. Centralia WWTP Redundancy Requirements
Reliability Class II

Requirement[a, b]	Centralia WWTP
Mechanically Cleaned Bar Screens. A backup bar screen, designed for mechanical or manual cleaning, must be provided. Facilities with only two bar screens must have at least one bar screen designed to permit manual cleaning.	The plant has one backup bar screen designed for manual cleaning.
Pumps. A backup pump must be provided for each set of pumps performing the same function. The capacity of the pumps must be such that, with any one pump out of service, the remaining pumps will have the capacity to handle the peak flow.	The plant has the following pumps: • RAS pumps: Quantity 4; 950 gpm capacity each or 3,800 gpm total; 2,750 gpm total peak RAS rate flow • Effluent pumps: Quantity 3; Nominal 5 mgd capacity each; based on the hydraulic analysis, two pumps can pass 11.75 mgd • WAS pumps: Quantity 2; 350 gpm capacity each. The plant does not need to continuously waste during peak flow. The plant typically operates the WAS pumps about two times per week, with peak wasting volumes corresponding to a daily average WAS flow of approximately 45 gpm.
Final Sedimentation Basins The units must be sufficient in number and size so that, with the largest-flow-capacity unit out of service, the remaining units shall have a design flow capacity of at least 50 percent of the design basin flow.	The plant has two 3,848 sf secondary clarifiers, each with a peak day overflow rate of 1,200 gpd/sf or 4.6 mgd capacity. Total maximum month design flow: 5.5 mgd per original design 50% of total design flow: 2.25 mgd per original design
Activated Sludge Process Components. 1. **Aeration Basin.** A backup basin will not be required; however, at least two equal-volume basins must be provided. 2. **Aeration Blowers or Mechanical Aerators.** There must be a sufficient number of blowers or mechanical aerators to enable the design oxygen transfer to be maintained with the largest-capacity-unit out of service. It is permissible for the backup unit to be an uninstalled unit, provided that the installed units can be easily removed and replaced. However, at least two units will be installed. 3. **Air Diffusers.** The air diffusion system for each aeration basin must be designed so that the largest section of diffusers can be isolated without measurably impairing the oxygen transfer capability of the system.	1. The plant has two aeration basins of 0.9 million gallons each. 2. There are three aeration blowers each with a capacity of 3,200 scfm; firm capacity is equal to 6,400 scfm. Calculated air demands at 6.0 mgd are equal to 6,362 scfm. 3. Each basin has two diffuser sections each with its own control valve.

Table 6-3. Centralia WWTP Redundancy Requirements
Reliability Class II

Requirement[a, b]	Centralia WWTP
Disinfectant Contact Basins. The units must be sufficient in number and size so that, with the largest-flow-capacity unit out of service, the remaining units will have a design flow capacity of at least 50 percent of the total design flow.	The plant has three UV channels with a capacity of 5 mgd each. With one channel out of service, the two remaining channels can handle the peak flow of 10 mgd.

[a] Per Orange Book Table G2-9. General Requirements for Each Reliability Classification (Ecology, 2008)

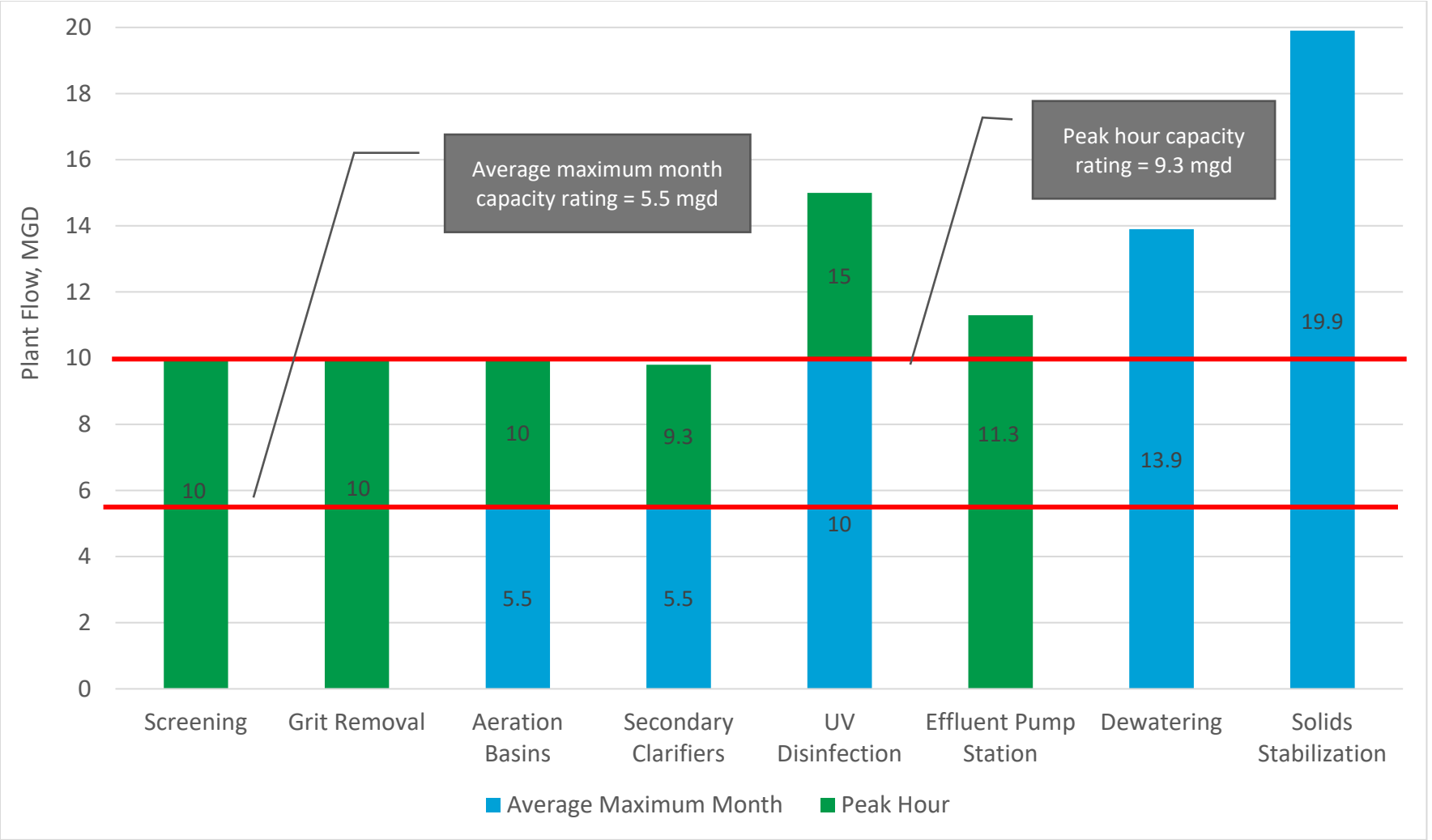
[b] Communition Facility and Primary sedimentation basins and trickling filters not applicable

6.3.3 Capacity Summary

Figure 6-1 shows a summary of the process capacity for each treatment process as presented in the previous section. This shows that the current plant process capacity is 5.5 mgd, as limited by the secondary treatment process. The hydraulic capacity (peak hour) is 9.3 mgd, as limited by the secondary clarifiers.

Peak flows do continue to be a concern. The highest maximum month flow experienced by the plant was in December 2015 (5.7 mgd per the plant DMR). From December 7, 2015, to December 8, 2015, influent plant flow more than doubled (from 3.78 mgd to 7.73 mgd), corresponding to an increase in Chehalis River flows to record levels. The average TSS removal was 75 percent in December 2015, though the concentration limits were not exceeded. The City has an ongoing I/I reduction program, as described in Chapter 5, to reduce I/I flows to the plant and consistently meet 85 percent removals of TSS and BOD.

Figures 6-2 and 6-3 show projected flows and loadings along with the revised plant capacity. As shown, in order to accommodate future growth, improvements will be required to expand the capacity of the WWTP. If the population increases as described in Chapter 2, the WWTP hydraulic capacity will be exceeded in 2024, and the plant loading will be exceeded in 2026. The City will closely monitor influent flow and loading on a yearly basis to verify influent assumptions presented in this General Sewer/Facility Plan.



Note:

Dewatering capacity is based on 5 days per week, 8 hours per day operation.

Figure 6-1. Process Capacity Summary

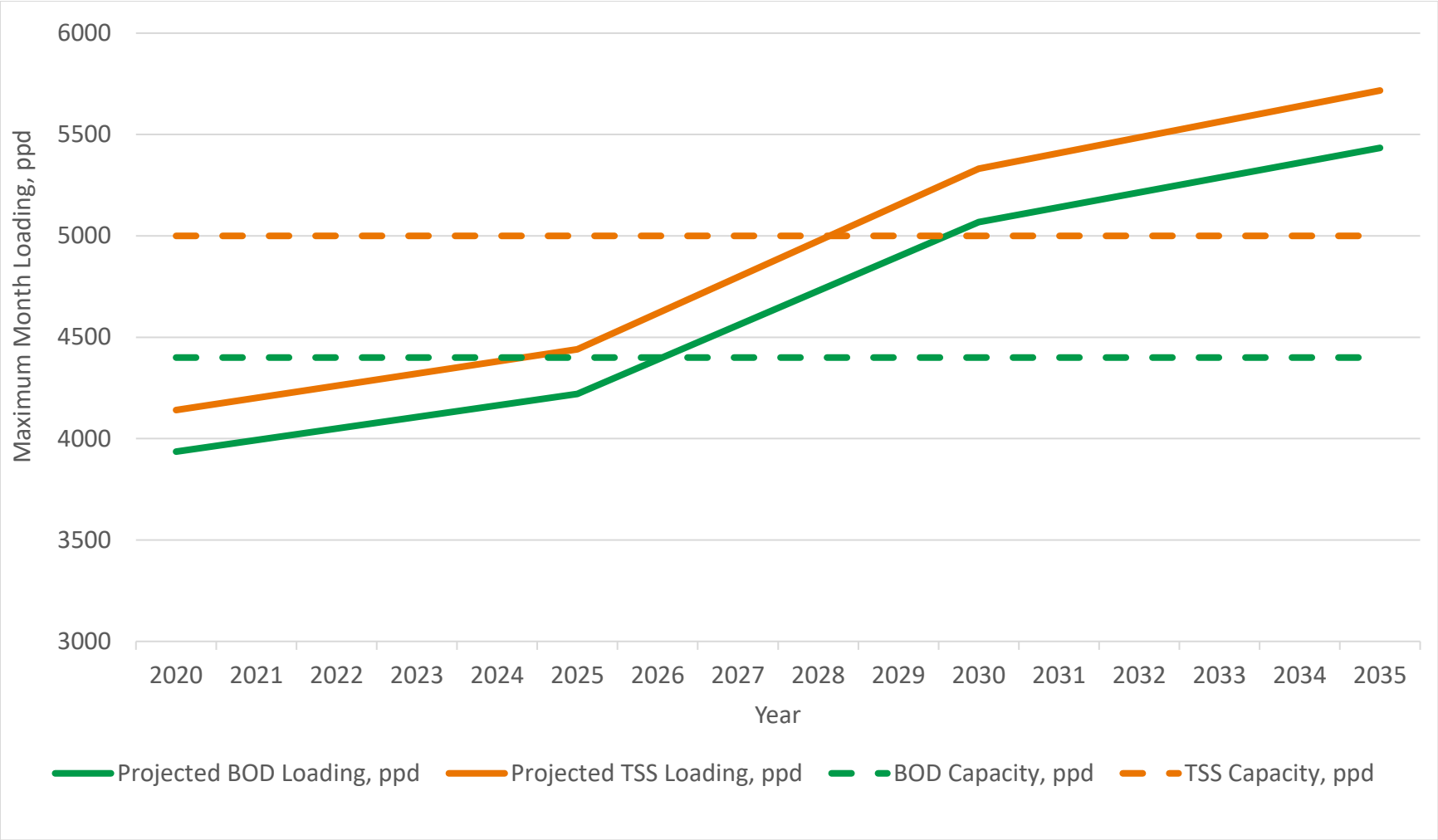


Figure 6-2. Projected Loading versus Proposed Capacity, Maximum Month

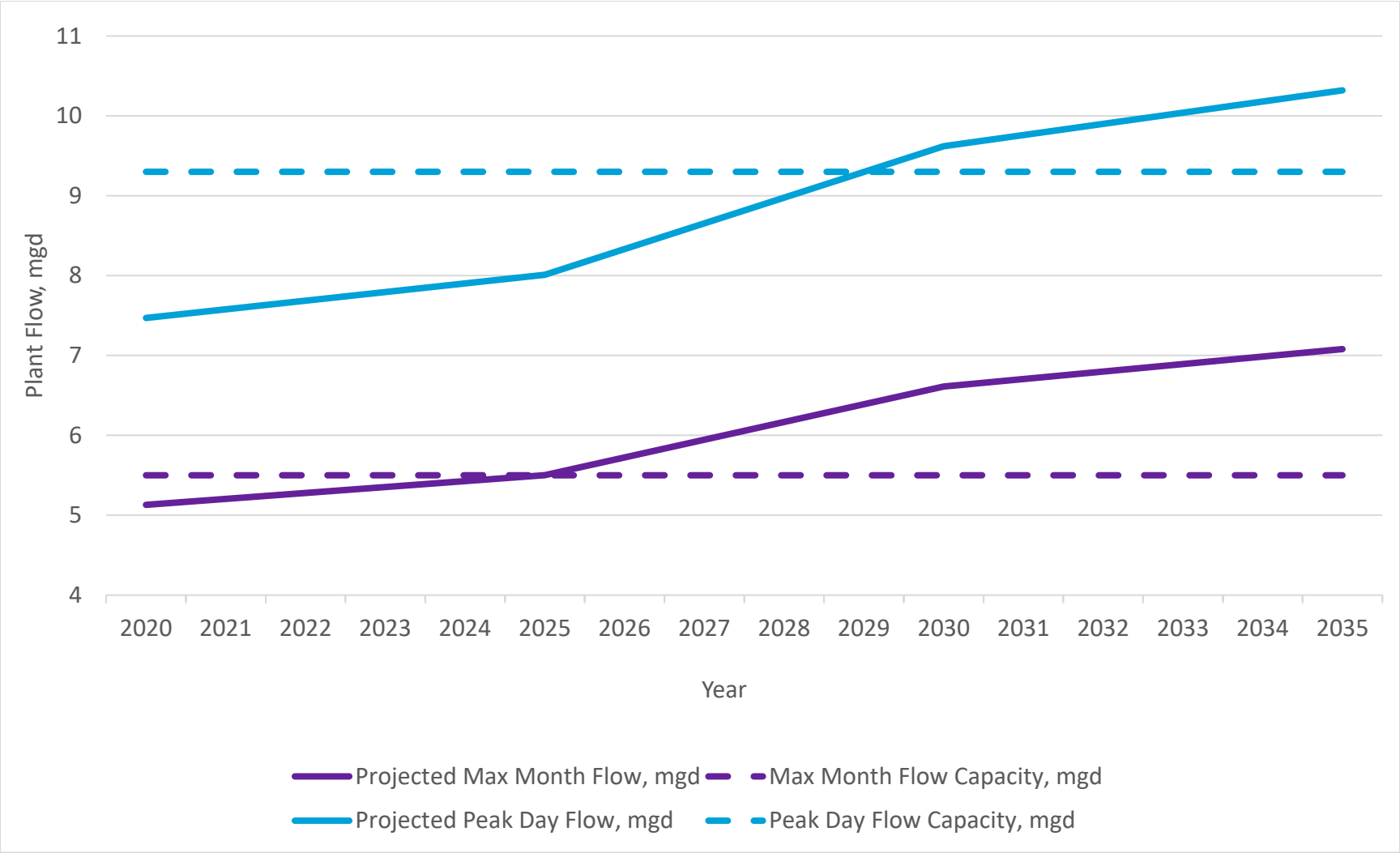


Figure 6-3. Projected Flow versus Proposed Capacity, Maximum Month

6.4 Alternatives Analysis

As shown in Section 6.3, WWTP upgrades are needed by 2024 to increase plant capacity and meet the effluent limits defined in the City's current NPDES permit. Three alternatives were considered to provide the additional secondary treatment capacity required. The potential for each alternative to meet future potential nutrient removal requirements was also considered. Table 6-4 presents the future (year 2035) design flows and maximum month loads and is followed by a description of other key inputs used in the process evaluation. Table 6-1 shows the City's current effluent limits, which dictated the design effluent quality that each alternative had to meet.

Table 6-4. 2035 Design Flows and Loads
Centralia WWTP

Parameter	Design Value
Flow	
Average Annual	3.04 mgd
Maximum Month	7.46 mgd wet weather 2.1 mgd dry weather
Maximum Day	10.70 mgd
Peak Hour	11.44 mgd
Maximum month BOD	5,860 lbs/d wet weather 5,430 lbs/d dry weather
Maximum month COD	12,550 lbs/d wet weather 11,640 lbs/d dry weather
Maximum month TSS	6,160 lbs/d wet weather 6,220 lbs/d dry weather
Maximum month VSS	5,670 lbs/d wet weather 5,720 lbs/d dry weather
Maximum month TKN	1,490 lbs/d wet weather 1,360 lbs/d dry weather
Maximum month ammonia	840 lbs/d wet weather 940 lbs/d dry weather
Minimum temperature	11.5 degrees Celsius

Notes:
TKN = total Kjeldahl nitrogen
VSS = volatile suspended solids

Key operating criteria used in the evaluation are described as follows:

- Influent maximum month concentrations were projected based on historical data. Future wastewater characteristics are anticipated to be the same as the existing characteristics.
- A conservative average effluent ammonia-N goal of 0.5 mg/L was targeted to facilitate reliable compliance with the maximum daily effluent ammonia permit limits of 4 mg/L for summer and 15 mg/L for winter and to avoid partial nitrification that may result in unstable plant operations.

- Influent wastewater characteristics from available plant data and influent COD fractionation, as well as kinetic and stoichiometric parameters for heterotrophs and nitrifiers selected from published ranges (Metcalf & Eddy, 2014), were used to predict the MLSS concentration in the aeration basins. Parameters were selected based on the best correlation to actual WWTP data during three periods of relatively steady operations: July to November 2014, July to October 2015, and March 2015. Steady operations were primarily judged by consistent plant influent loading and temperature, effluent quality, number of aeration basins in service, and operating solids retention time (SRT).

6.4.1 Alternative 1 – Third Aeration Basin

Alternative 1 consists of adding a third 0.9-MG aeration basin, a third 70-foot-diameter secondary clarifier, and WAS storage tanks. These structures would be the same dimensions and capacity as the existing facilities. The WAS increase as growth occurs can be managed by the existing belt filter press and composting system. It will require longer operational hours or 1 additional day of processing. The addition of WAS storage tanks to the plant is discussed in Section 6.5.1. Advantages of this alternative include the following:

- The plant site has space available for future facilities.
- Facility locations for aeration basin and secondary clarifier are already identified as part of original WWTP site planning and design.
- The plant process is the same as the existing process.
- The City can continue composting for solids processing.
- The visual impact is lower relative to the other two alternatives.

Disadvantages of this alternative include the following:

- Aeration demand is higher; energy requirements are higher relative to Alternative 2.
- The biological treatment process is subject to influent loading variability.

To meet potential future nutrient requirements, the existing aeration basins would need to be modified. A swing zone would be added after the anoxic zone by constructing a new baffle wall in the first portion of the aerobic zone. Submersible mixers would be added to maintain solids suspension in the swing zone.

6.4.2 Alternative 2 – Primary Clarifiers and Anaerobic Digester

Alternative 2 includes adding two 50-foot-diameter primary clarifiers, a third 70-foot-diameter secondary clarifier, two 25-foot-diameter gravity thickeners, two 106,000-gallon anaerobic digesters, and two new gravity belt thickeners to meet future growth needs. The addition of primary clarifiers and gravity thickeners was the original planned for the first phase of expansion when the plant was designed. The addition of primary clarification would generate raw primary solids. Originally, the City had planned to incinerate the raw primary solids that would be generated if primary clarification were added. Instead, lime stabilization was implemented as an interim solids-handling process. Recently, the City implemented aerated static pile composting. Composting of raw primary solids is not recommended, because dewatering and handling of raw primary solids presents serious odor and potential health issues for O&M staff. Thus, this alternative includes adding anaerobic digestion to process solids to a Class B product. Gravity thickeners and gravity belt thickeners would be added to thicken the primary solids and WAS, respectively, prior to digestion. Following digestion and dewatering (using the existing belt filter presses), the dewatered biosolids would be composted in the existing composting facility to create a Class A product, similar to the existing product.

Advantages of this alternative include the following:

- Space is available for future facilities.
- Locations are already identified for primary clarifier, secondary clarifier, and gravity thickener facilities as part of original WWTP site plan.
- The City has greater ability to accommodate longer-term expansion.
- Variability of influent loading for the biological treatment process is reduced.
- Energy requirements are lower, and it allows for energy recovery from digestion process.

Disadvantages of this alternative include the following:

- Staff must learn a new solids handling process.
- Anaerobic digestion is a mechanically complex operation.
- O&M cost is higher.
- Initial capital cost is higher.
- Visual impact from digester tanks is higher.

To meet potential future nutrient requirements, the existing two aeration basins would need to be modified as described in Alternative 1. A new swing zone would be created and mixers installed to maintain solids suspension.

6.4.3 Alternative 3 – Membrane Bioreactor

This alternative consists of adding a 4-mgd membrane bioreactor (MBR) to the WWTP and converting part of the secondary treatment facilities to treat flow via the MBR instead of the conventional activated sludge process. It is assumed that two-thirds of the plant flow would be treated by the MBR process and the remaining one-third by the conventional activated sludge process, to maximize use of existing facilities while still providing capacity for growth. MBR effluent flow would be blended upstream of disinfection. The blower building would be expanded to accommodate new blowers for the MBR. A new chemical facility including chemical storage and distribution would also be required to maintain the membranes. Fine screens would be added for the primary effluent feeding the MBR process to protect the membranes. The additional WAS increase as growth occurs can be managed by the existing belt filter press and composting system; however, it will require longer operations hours or 1 additional day of processing.

Advantages of this alternative include the following:

- Less space is required, and the footprint is retained for future facilities.
- It achieves a higher level of treatment with greater ability to meet potential future more stringent treatment requirements and to produce Class A water for reuse without the addition of tertiary filters.

Disadvantages of this alternative include the following:

- It is a more complex operation than conventional activated sludge.
- Two secondary treatment processes must be operated in parallel.
- Chemical addition is required.
- It has the highest initial capital cost.
- It has higher energy requirements.
- It has higher O&M costs.

Like the two other alternatives, modifications to add a swing zone to the existing aeration basins would be needed to meet potential future nutrient requirements.

6.4.4 Alternative Comparison

All three alternatives can be implemented within the existing plant site and would thus have comparable, minimal environmental impacts. Impacts to the public are also comparable among the alternatives. Visually, the facilities would be set back from the public access road, and all would be designed to maintain consistency with the plant's architectural theme. Table 6-5 shows the matrix comparison of the three alternatives.

Table 6-5. Alternative Comparison Matrix

Criteria	Alternative 1 – Third Aeration Basin	Alternative 2 – Primary Clarifiers and Digestion	Alternative 3 - MBR
Footprint required	0	0	+
Ability to meet current effluent limits	+	+	+
Ability to accommodate potential future nutrient removal	+	+	+
Operational complexity	+	-	-
Energy required	-	+	-
Level of maintenance	+	-	-
Environmental impact	0	0	0
Public acceptability	0	0	0
Odor impact	0	0	0
Visual impact	0	-	0
Capital Cost	+	-	-

Notes:
- = negative or worse compared to other alternatives
+ = positive or better compared to other alternatives
0 = neutral compared to other alternatives

Comparing the advantages and disadvantages of each alternative, Alternative 3 – MBR is the least desirable alternative, because it requires the City to operate two different treatment processes in parallel. It also has the highest initial capital cost and adds a great deal of mechanical complexity to the plant. Although an MBR can provide a higher level of treatment than the other alternatives, this level of treatment is not required by the current permit limits, and the other alternatives can also be adapted to meet potentially more stringent effluent requirements in the future. It has a slightly smaller required footprint but also includes the addition of unplanned facilities such as chemical storage, the MBR tank, and a fine screen facility. Alternative 3 has no other significant advantages over Alternatives 1 and 2. Based on this, Alternative 3 was removed from further consideration.

Alternatives 1 and 2 were carried forward for further evaluation. Class 5 capital cost estimates as defined by the Association for the Advancement of Cost Engineering International were developed for both alternatives. Annual O&M costs were developed for both, including labor for operations and routine maintenance, equipment, and electricity. Life-cycle costs were developed for each alternative based on a 50-year project life and a 20-year life for primary equipment. The capital, annual O&M, and life cycle costs developed for each alternative are shown in Table 6-6 for comparison.

Table 6-6. Alternative Cost Comparison (2016 dollars)

Item	Alternative 1	Alternative 2
Capital (Project) Cost	$10,910,000	$20,308,000
Annual O&M	$147,000	$161,000
Life Cycle Cost	$13,540,000	$22,890,000

6.4.5 Selected Alternative

Alternative 1 – Third Aeration Basin, has the lowest capital and life cycle costs and meets WWTP capacity needs for the planning period. Therefore, Alternative 1 is the selected alternative to increase plant capacity.

6.5 Recommended Wastewater Treatment Plant Upgrades

Section 6.4 described the alternatives analysis process to address longer-term plant capacity needs. The City also identified desired improvements to benefit operations in the near-term. Therefore, two phases of major plant upgrades are recommended: Phase I to add operational flexibility for the near term and Phase II to address capacity needs for the longer term. This section describes the recommended improvements for both.

6.5.1 Phase I (C.I.P. WW-1)

Phase I WWTP process upgrades will include adding mixed liquor recirculation in the aeration basins and dedicated WAS storage tanks to increase operational flexibility and optimize the existing WWTP capacity. These items were included in the approved 2000 Facilities Plan and then removed during the original plant design and deferred as future improvements due to budget constraints (CH2M, 2000c).

Phase I upgrades will include the following:

- Installing mixed-liquor recirculation (MLR) pumps in the existing aeration basins to pump mixed liquor from the end of the aeration basins to the beginning (anoxic zone) of the aeration basins
- Improving solids handling by installing WAS storage tanks: WAS will be pumped from the secondary clarifiers to the WAS tanks for storage, then pumped from storage to the BFP for dewatering
- Installing new positive-displacement blowers in the existing blower building to provide aeration for the WAS storage tanks
- Expanding the existing blower building to provide a second electrical room (electrical annex) to allow for expansion of the existing motor control center (MCC) and remote input/output (I/O) racks to supply power and control to the Phase I equipment

The *General Sewer Phase I Improvements Plans and Specifications* (100 percent design documents), dated August 2018, were approved by Ecology on August 29, 2018.

6.5.1.1 Mixed-liquor Recirculation

The addition of MLR in the aeration basin will provide alkalinity recovery and reduction in oxygen demand.

The required MLR rate for alkalinity recovery depends on influent characteristics such as TKN, ammonia, and alkalinity concentrations. During the Phase I design, the plant collected influent samples for TKN, ammonia, alkalinity, BOD, and TSS analyses in both dry and wet weather seasons. The sampling results, along with available historical data, were used for a sensitivity analysis that investigated the effect of

varying influent characteristics, in particular TKN and alkalinity levels, on effluent alkalinity to inform the MLR pump sizing. The data showed an influent TKN range of 13 mg/L to 58 mg/L, and an influent alkalinity range of 75 mg/L to 241 mg/L. The higher concentrations occurred in the dry-weather season as a result of little dilution from I/I.

The MLR rates were selected by trial and error for wet weather maximum month (WWMM) and dry weather maximum month (DWMM) design conditions to optimize the denitrification in the anoxic selectors. A further increase in MLR rates would result in diminishing benefits and increasing risk of oxygen inhibition at the selectors.

WWMM and DWMM conditions for optimized MLR are as follows:

- WWMM: Design flow of 5.5 mgd and MLR rate of 100 percent
- DWMM: Design flow of 1.7 mgd and MLR rate of 170 percent

In total, 1,100 lbs/d influent TKN was used per 2002 design criteria, which is likely higher than actual TKN loading. (Influent sampling results showed the TKN to BOD ratios maximized at 22 percent, or 968 lbs/d TKN for the permitted 4,400 lbs/d BOD loading, and averaged at 16 percent, or 704 lbs/d TKN for the permitted 4,400 lbs/d BOD loading.)

Table 6-7 confirms that the selector sizing and MLR rate are adequate for optimizing the existing selector performance, as measured by alkalinity recovery and effluent nitrate level. A 100 percent MLR rate for the WWMM condition would recover 36 mg/L alkalinity; achieve 6.9 mg/L effluent nitrate-N and 1.5 mg/L effluent ammonia-N; and save approximately 17 percent of the oxygen demand. In the DWMM condition, even with one train out for maintenance, the MLR rate achieving optimal denitrification (approximately 170 percent MLR rate) would recover 145 mg/L alkalinity as calcium carbonate ($CaCO_3$); achieve approximately 17 mg/L effluent nitrate-N and 0.9 mg/L effluent ammonia-N; and save 21 percent of the oxygen demand.

The design MLR rate was selected at 4,000 gallons per minute (gpm), which enables optimal alkalinity recovery for the 5.5-mgd wet-weather maximum month design flow. Two 2,000-gpm pumps equipped with variable-frequency drives (VFDs) will be installed, one at each aeration basin. The size of the proposed MLR pumps (2,000 gpm) is roughly the same size as the MLR pumps indicated in the approved Wastewater Treatment Plant Facilities Plan (1,900 gpm).

The MLR rate can be turned down to about 200 percent of 1.7-mgd dry-weather maximum month influent flow (or 2,400 gpm), to optimize alkalinity recovery in the dry-weather season, if both pumps and both aeration basins operate. The MLR rate can be further turned down during DWMM conditions, by operating only one aeration basin and one MLR pump, thus allowing the MLR rate to be further turned down to approximately 100 percent of DWMM flow.

If nitrogen removal is required in the future, an MLR rate of 700 percent or greater in dry weather season and 300 percent or greater in wet weather season would be needed, depending on the actual effluent nitrogen permit limit and influent TKN load. Upsizing the MLR pumps during Phase I to meet potential future nitrogen removal requirements would result in oversized pumps that could not be turned down to the optimal MLR rate required for alkalinity recovery in Phase I. This may lead to a lower effluent alkalinity and potentially poorer effluent quality. The technical memorandum *Centralia WWTP Phase 1 Improvements Design – Supplemental Calculation and Responses to May 2018 Ecology Comments* and supplemental calculations were provided to Ecology, which contain additional detailed information regarding this anoxic selector evaluation and the aeration basin air diffusers.

Table 6-7. Design Summary for Anoxic Selector/MLR Sizing

Parameter	Unit	WWMM	DWMM
Effluent Ammonia-N	mg/L	1.5	0.9
Effluent Nitrate (NO_3) -N	mg/L	6.91	17.43
Internal Recycle Ratio	Unitless	1.0	1.7
RAS Recycle Ratio	Unitless	0.48	0.68
Anoxic Volume	m^3	954	477
Mixed liquor suspended solids (MLSS)	grams per m^3	2,900	3,640
Overall Specific Denitrification Rate g/g	NO_3/MLVSS	0.13	0.18
Detention Time	Hours	1.1	1.8
Reduction in Oxygen Demand	Percent	17.2	21.2
Mixing Power	Kilowatt	11	6
Alkalinity Recovery	mg/L	36	145

6.5.1.2 Waste Activated Sludge Storage Tank

Currently, the City uses a portion of the aeration basins and secondary clarifiers to store the WAS generated. New WAS storage tanks will allow daily wasting of activated sludge solids on a continuous basis. This will eliminate the need to store sludge in the aeration basins and clarifiers, which will minimize the MLSS-concentration fluctuations in the aeration basins, provide flexibility in operations, and maximize secondary treatment process capacity.

Two WAS storage tanks are proposed providing approximately 4 days of storage in total, which allows for storage over a long weekend without needing to dewater (Table 6-8).

The existing belt filter press feed pumps, which are oversized for continuous WAS wasting, will be relocated to the new WAS storage tanks to convey WAS from the WAS storage tanks to the belt filter presses. Two new smaller WAS pumps will be installed in the existing WAS wet wells to waste WAS more continuously from clarifiers to the WAS storage tanks.

The WAS storage tanks will be aerated to prevent development of a septic condition and associated odor. Coarse bubble diffusers will be used for tank aeration. The aeration will be intermittent to allow denitrification to occur and remove at least 50 percent of the nitrate produced from the nitrification in the tanks. The goal is to minimize the nitrogen load in the belt filter press filtrate that will be recycled to the WWTP, as well as to minimize alkalinity consumption at the WAS storage tanks. Better denitrification performance has been observed in similar processes at other facilities when operated properly.

Mixers will be installed to keep the sludge in suspension to improve denitrification during the unaerated period.

Table 6-8. Waste Activated Sludge Tank Design Criteria Summary

Tank Parameters	Values
Number of Tanks	2
Volume (million gallons, each)	0.1
Dimensions (feet, length by width)	26 x 26
Side Water Depth (feet)	20
Maximum Month Total Sludge Storage (days),	
if no decanting	3.9 (dry weather) 4.2 (wet weather)
if decanting full tank by 5 feet prior to feeding BFP	5.2 (dry weather) 5.6 (wet weather)
Maximum Month WAS Flows (gpd, per process modeling)	51,463 (dry weather) 47,964 (wet weather)
WAS Concentration (mg/L)	8,000 to 10,000 prior to decanting, 10,000 to 15,000 or higher after decanting

The WAS TSS concentration in the WAS storage tank effluent is expected to range from 8,000 to 10,000 mg/L, about the same as the WAS TSS withdrawn from the clarifiers. The City indicated that the BFP performs best at feed solids of 2.0 percent or higher, with a preferred minimum solids concentration of 1.0 to 1.5 percent. To achieve a higher feed solids to facilitate BFP operation, a telescoping valve was included in the Phase I design at each WAS storage tank, which will allow decanting. With the anticipated WAS TSS of 8,000 mg/L to 10,000 mg/L, which can be achieved by adjusting the RAS rate, decanting 5 feet of supernatant after the tank is full is expected to raise the WAS solids content to between 1.0 and 1.5 percent. A thicker WAS feed to the belt press can be obtained by additional decanting, or by lowering the RAS rate, which would result in a higher WAS TSS concentration.

6.5.1.3 WAS Blowers

Two new positive-displacement blowers (540 scfm capacity each with VFDs) will be used to aerate and mix the WAS storage tanks, with one unit dedicated to each tank under normal operation to allow for independent WAS storage tank operation. If one blower needs maintenance and is out of service, the remaining blower will be sufficient to aerate and mix the contents in both WAS storage tanks at a mixing intensity of 20 scfm per 1,000 cubic feet. In this mode, the interconnecting gate between the two WAS storage tanks will need to be opened to equalize the WAS levels between tanks. These blowers will be installed along the western wall in the existing blower building.

6.5.1.4 Electrical Annex

The existing blower building will be expanded to the west to provide a second electrical room (electrical annex) to allow for expansion of the existing MCC and remote I/O racks to supply power and control to the Phase I equipment. The electrical annex will be approximately 13-feet by 30-feet.

6.5.2 Phase II (C.I.P. WW-5)

Phase II improvements for the WWTP to meet capacity needs through year 2035 consist of the selected Alternative 1 – Third Aeration Basin. Further improvements required to meet future potential nutrient removal requirements are also described in this section.

6.5.2.1 Improvements to Increase Plant Capacity

Process-capacity driven improvements include a third aeration basin, a third secondary clarifier, and a third WAS storage tank. These structures would be the same size and configuration as the existing ones. The previous General Sewer/Facility Plan (2000) planned for additional structures for expansion, and space has been allotted for them. The construction of the third aeration basin will require one new centrifugal blower that is identical to the existing units. Depending on the actual TKN/ammonia loading, a third 540-scfm positive-displacement blower may be required for the third WAS storage tank. To accommodate these blower improvements, the existing blower building will be expanded approximately 20 feet to the south. The southern wall frame of the existing blower building was constructed as an interior frame to allow the blower building expansion as growth occurred in the sewer service areas. This expansion allows for the installation of a new 3,200-scfm blower and 540-scfm positive-displacement blower.

As presented in Table 3-4, the projected 2035 peak day flow will be 10.7 mgd. Based on historical plant data from 2011 to 2015, the highest peak hour flow was 9.1 mgd, which was successfully passed through the plant. The WWTP also successfully passed a peak flow of 11.75 mgd during the plant's 1-year certification completed in 2005. To maintain redundancy requirements and hydraulic capacity, the headworks screening and grit removal will need to be expanded by adding a third influent screen and second grit removal unit. Space has been allotted for these expansions in the original WWTP design. Additionally, a fourth UV disinfection channel will need to be added.

Calculations for the recommended alternative using an Excel spreadsheet provided by Ecology are provided in Appendix K. For redundancy, the results of the Excel calculations were also checked against the results of a whole plant process model.

6.5.2.2 Further Improvements Required for Nutrient Removal

If further nitrogen removal is desired or required, additional upgrades will be needed. The existing aeration basins were sized and constructed with sufficient capacity so that a swing zone could be added in the future as needed. A baffle wall can be constructed in the first one-third of the aerobic zone to provide a swing zone after the anoxic zone. Submersible mixers would be added to these new swing zones. The swing zone helps improve the operational flexibility in treating influent TKN/ammonia loading. During the summer months, when the influent TKN/ammonia concentrations are high and a higher level of nitrogen removal is required, the swing zone would be operated in anoxic mode to boost denitrification with a high MLR rate to achieve the required effluent total nitrogen (TN). The existing diffusers may be adequate to supply the required air demand in the aerobic zone. This assumption will need to be verified using additional influent ammonia and TKN data.

A mixed-liquor recycle rate of 700 percent of the DWMM influent flow would be required to achieve 10 mg/L TN. During the winter, when the influent TKN concentration is low, the swing zone may be operated in aerobic mode to reliably remove ammonia while meeting the TN goal of 10 mg/L. Preliminary design calculations suggest a 100 percent mixed-liquor recycle rate of the WWMM influent flow would be required to achieve the effluent TN level. Detailed design of this process would likely consider a more conservative pump sizing to provide 300 percent of the WWMM influent flow.

Process calculations for denitrification are provided in Appendix K. Optimization of the required recycle rate and further evaluation of alternative aeration basin process configurations can be completed as additional influent wastewater data become available. This includes consideration of aeration basin configurations such as the 4-stage Bardenpho.

A budgetary project cost for implementing these improvements is approximately $1 million. `

6.5.2.3 Design Criteria

Table 6-9 presents a summary of the process improvements required to increase plant capacity and design criteria, including the associated dimensions and capacity, for the Phase II improvements described previously.

Table 6-9. Summary of Phase II Improvements Design Criteria

Component	Quantity (new units)	Criteria and Sizing Value
Mechanical Screen	1	5 MG
Vortex Grit Removal System	1	10 MG
Grit Pump	1	250 gpm
Aeration Basin	1	
Volume		0.9 MG
Volume Unaerated		14 percent
Sidewater Depth		15 feet
Length		205 feet
Width		39 feet
Hydraulic Retention Time (maximum month)		7.5 hours
Solids Retention Time (maximum month)[a]		10 days
Mixed-liquor Suspended Solids		2,900 mg/L
Minimum Bioreactor Temperature[b]		11.5 degrees Celsius
Aeration Equipment		
Multistage Centrifugal Aeration Basin Blower	1	3,200 scfm
Fine Bubble Diffusers	459	2.0 scfm each
Dissolved Oxygen Concentration		2.0 mg/L
Mixed-liquor Recirculation Pumps	1	2,000 gpm each
Secondary Clarifier (circular)	1	
Diameter		70 feet
Sidewater Depth		18 feet
Maximum Month Overflow Rate		715 gpd/sf
Peak Flow Overflow Rate		1,200 gpd/sf
Maximum Month Solids Loading Rate		23.2 lb/sf/d
Peak Solids Loading Rate		41.5 lb/sf/d
SVI (peak day design)		150 ml/g
RAS Ratio		48 percent
WAS Tank (each)	1	
Volume		0.1 MG
Sidewater Depth		20 ft
Length		26 ft
Width		26 ft

Table 6-9. Summary of Phase II Improvements Design Criteria

Component	Quantity (new units)	Criteria and Sizing Value
WAS Tank Mixers (each)	2 1	7.5 hp maximum
Positive-displacement WAS Blower (each)	1	540 scfm
Blower Building Expansion		20 ft x 32 ft
Ultraviolet Disinfection	1 channel	
Type		Low pressure
Design Flow		3.1 mgd
TSS		30 mg/L
UV Transmittance		65%
Aeration Basin Mixers for Swing Zone (each)[c]	3	10 hp

[a] The selected SRT provides a safety factor of 1.23 for what is required to nitrify the anticipated peak day TKN loading. This SRT correlates with the 10.8 days used for the 2002 design.

[b] Equal to the minimum 7-day average influent temperature from 2008 to 2016. According to 2014 and 2015 data, the maximum week loading is expected to occur in the wet weather season when the influent temperature is low. Process performance at minimum 30-day temperature (12 degrees Celsius) and minimum day temperature (10.7 degrees Celsius) was also evaluated to test sensitivity of the proposed design to wet weather temperature fluctuations. The proposed design was found to provide sufficient capacity to meet process performance requirements during minimum day wet weather temperatures.

[c] Only required if TN less than 10 mg/L is required

6.5.3 Data Needs

The following additional data are required for final design of the Phase II Improvements in order to confirm assumptions and design conditions:

- Recording of peak hour flow during wet weather conditions
- Daily precipitation (inches) during the peak wet weather events

6.5.4 Site Layout

Figure 6-4 presents the conceptual layout of the WWTP improvements for both Phase I and Phase II. The layout is intended to show how the various facilities could be located and how much land area would be required. Figure 6-4 also includes the improvements required for additional nitrogen removal.

6.5.5 Flow Diagram

Figure 6-5 presents the process flow diagram for the Phase I and Phase II improvements. Appendix K includes the solids mass balance information.

6.5.6 Hydraulic Profile

Figures 6-6a and 6-6b present the hydraulic profiles for the Phase I and Phase II improvements for the WWTP. Flow will be conveyed via gravity when the Chehalis River elevation is low. Pumping is required when the Chehalis River elevation is high. Phase I and Phase II improvements would not significantly change the existing hydraulic profile. For Phase II improvements, a conservative MLR rate of 500 percent of the WWMM influent flow was used to develop the hydraulic profile, which is more than anticipated recirculation rate, even if nitrogen removal is required.

6.5.7 Biosolids Disposal Plan

The plant will continue its existing composting operation with the lime stabilization and heat pasteurization process as a backup and supplemental capacity. Combined, both solids stabilization processes have the capacity to handle additional solids through the planning year.

6.5.8 Design Life and Adequacy of Existing Process

The new facilities are designed to accommodate flows and loads through the planning year 2035. Primary equipment design life is estimated at 20 years. Structures are based on a 50-year life cycle. The existing plant was built in 2004, and its structures are in good condition with adequate service life remaining through the planning period. The existing process units to be retained are also expected to have adequate service life through the planning period. Mechanical, electrical, and instrumentation components will continue to be maintained and replaced as required per the City's maintenance program.

6.5.9 Ability to Expand Treatment Plant

As previously discussed, the original planning and design of the WWTP included identification of future treatment facilities to be implemented in phases as growth required. The basic framework of the original expansion plan is still relevant and can be revisited for the next round of planning as growth continues. The plant will continue to reserve space for potential future facilities including primary clarification.

6.5.10 Staffing Needs

The WWTP currently has 3.5 operator full-time equivalents (FTEs), 1 laboratory technician, 1 pretreatment FTE, 1 farm FTE, 0.5 FTE for maintenance, and 0.5 FTE for instrumentation and electrical. It is anticipated that no additional plant staff are required for the Phase I improvements. Phase II improvements will require 1 additional FTE for increased solids needs and other process requirements. The staffing requirements were verified using the Northeast Guide for Estimating Staffing at Publicly and Privately Owned Wastewater Treatment Plants (NEIWPCC, 2008) as recommended by Ecology.

6.5.11 Future Environment without the Project

Phase I improvements are required so that the City can attain full use of the capacity in the aeration basins and secondary clarifiers. Currently, these structures are used for WAS storage.

Phase II improvements are required to accommodate growth within the City's sewer service areas. If expansion is not planned for and considered, a development moratorium could be imposed until upgrades are planned and completed.

6.5.12 Recreation and Open Space

A required element of facility plans is a discussion of whether recreation and open space can be incorporated in the alternatives. The City's WWTP property includes "The Discovery Trail" that follows the bank of the Chehalis River for over 1 mile. The trail was developed through collaboration between the Chehalis River Land Trust and the City's Utilities Department. Access to the Discovery Trail will not be affected as part of these improvements.

6.6 Water Reclamation and Reuse

The 2014 General Sewer Plan Update considered water reclamation and reuse alternatives that the City may implement through future capital and operations projects to address increasingly stringent river discharge criteria for temperature and nutrients. Solutions that were investigated focused on the use of irrigated reuse, groundwater recharge, and constructed wetlands to provide flow diversion and effluent cooling benefits on land surrounding the Centralia WWTP.

PLANT NORTH
N 11° 20'57.31" E

0 50 100 150
Scale in Feet

NOTES:
1. EACH CONTRACTOR SHALL BE RESPONSIBLE FOR SAFETY, SECURITY, UTILITY HOOK-UPS AND MAINTENANCE OF THEIR RESPECTIVE STAGING AREA.
2. STAGING AREAS SHALL BE CONSTRUCTED WITH 12 INCHES OF BALLAST, SHOULDER BALLAST, CRUSHED SURFACING OR AGGREGATE FOR GRAVEL BASE OVER SEPARATION GEOTEXTILE.
3. PROVIDE GRAVEL CONSTRUCTION ENTRANCES, SILT FENCING AND OTHER EROSION CONTROL MEASURES AS OUTLINED IN THE APPROVED STORMWATER POLLUTION PREVENTION PLAN. SEE DRAWINGS SIT-CG-111,SIT-CG-112 AND SIT-CG-1.
4. COMPLETELY REMOVE GRAVEL AND GEOTEXTILE, AND ALL TEMPORARY UTILITIES FROM STAGING AREA AND RESTORE AREA AT THE COMPLETION OF THE PROJECT

REFERENCE CL-259 FOR MODIFICATIONS TO CONSTRUCTION STAGING AREA.

SURVEY CONTROL MONUMENT TABLE

NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION
944	629411.566	2009797.608	152.925	PK & Washer Stamped LS 16908
946	629424.983	2009182.530	148.380	PK & Washer Stamped LS 16908
947	630093.248	2009193.375	149.244	2x2 H&T

NOTE:
HORIZONTAL DATUM: PROJECT

TO GET TO WASHINGTON STATE PLANE COORDINATE SYSTEM, (WASHINGTON SOUTH - 4602, NAD83/91) SUBTRACT 100,000.000 FEET FROM THE NORTHING AND 1,000,000.000 FEET FROM THE EASTING. THEN MULTIPLY EACH BY COMBINED GRID FACTOR 0.9999132480. HORIZONTAL CONTROL SURVEY PERFORMED USING LEICA SR530 GPS UNITS. BASIS FOR CONTROL BEING WSDOT MONUMENTS 272, 301, 302, 2350, 2351, AND 2514.

VERTICAL DATUM: NAVD 88

ELEVATIONS ESTABLISHED FROM WSDOT MONUMENTS 301, 2350, AND 2514. CONTROL ELEVATIONS ESTABLISHED USING A LEICA NA2002 ELECTRONIC LEVEL.

PHASE I
PHASE II
PHASE II WITH NITROGEN REMOVAL
EXISTING

OUTFALL CONTRACTOR ACCESS
ELECTRICAL BUILDING
UV DISINFECTION AND POST AERATION
SECONDARY CLARIFIER
SECONDARY CLARIFIER
BLOWER BUILDING EXPANSION
AERATION BASINS
WAS STORAGE TANK NO. 1
AERATION BASINS NO. 3
WAS STORAGE TANK NO. 3
BLOWER BLDG
FUTURE FACILITIES, TYP
WAS STORAGE TANK NO. 2
SECONDARY CLARIFIER NO. 3
ADD BAFFLE WALLS AND MIXERS TO CREATE SWING ZONE FOR NITROGEN REMOVAL
REFERENCE CL-259 FOR AREA LEFT BY CONTRACTOR WITH GRAVEL SURFACING ROCK APPROX 250'x200'
REFERENCE CL-46 AREA DESIGNATED FOR CONCRETE RUBBLE PLACEMENT
MECHANICAL SCREEN
GRIT SEPARATOR
HEADWORKS
10' x 18' ODOR CONTROL SLAB
PLANT DRAIN PUMP STATION
BIOFILTER
POTABLE WATER WELL
CONVEYANCE PIPING CONTRACTOR STAGING AREA
ELECTRONIC GATE WITH KEYPAD
SOLIDS HANDLING FACILITY
ACCESS GATE
MAINTENANCE FACILITY
CONVEYANCE PIPING AND TREATMENT PLANT CONTRACTOR ACCESS
GOODRICH
947
946
CONCRETE RUBBLE BURIED 2' TO 12' BELOW SURFACE. RUBBLE 3'-0" MAX SIZE MIXED WITH GRAVEL AND WALKED IN WITH D-8 CAT AND VIB ROLLER
6' CHAIN LINK FENCE
2030
BIOSOLIDS STORAGE FACILITY
TREATMENT PLANT CONTRACTOR STAGING AREA
DOUBLE SWING GATE
CONCRETE RUBBLE BURIED 2' TO 12' BELOW SURFACE. RUBBLE 3'-0" MAX SIZE MIXED WITH GRAVEL AND WALKED IN WITH D-8 CAT AND VIB ROLLER
ELECTRONIC GATE WITH KEYPAD
REFERENCE CL-254 FOR MODIFICATIONS MADE TO GARAGE
ENGINEERS

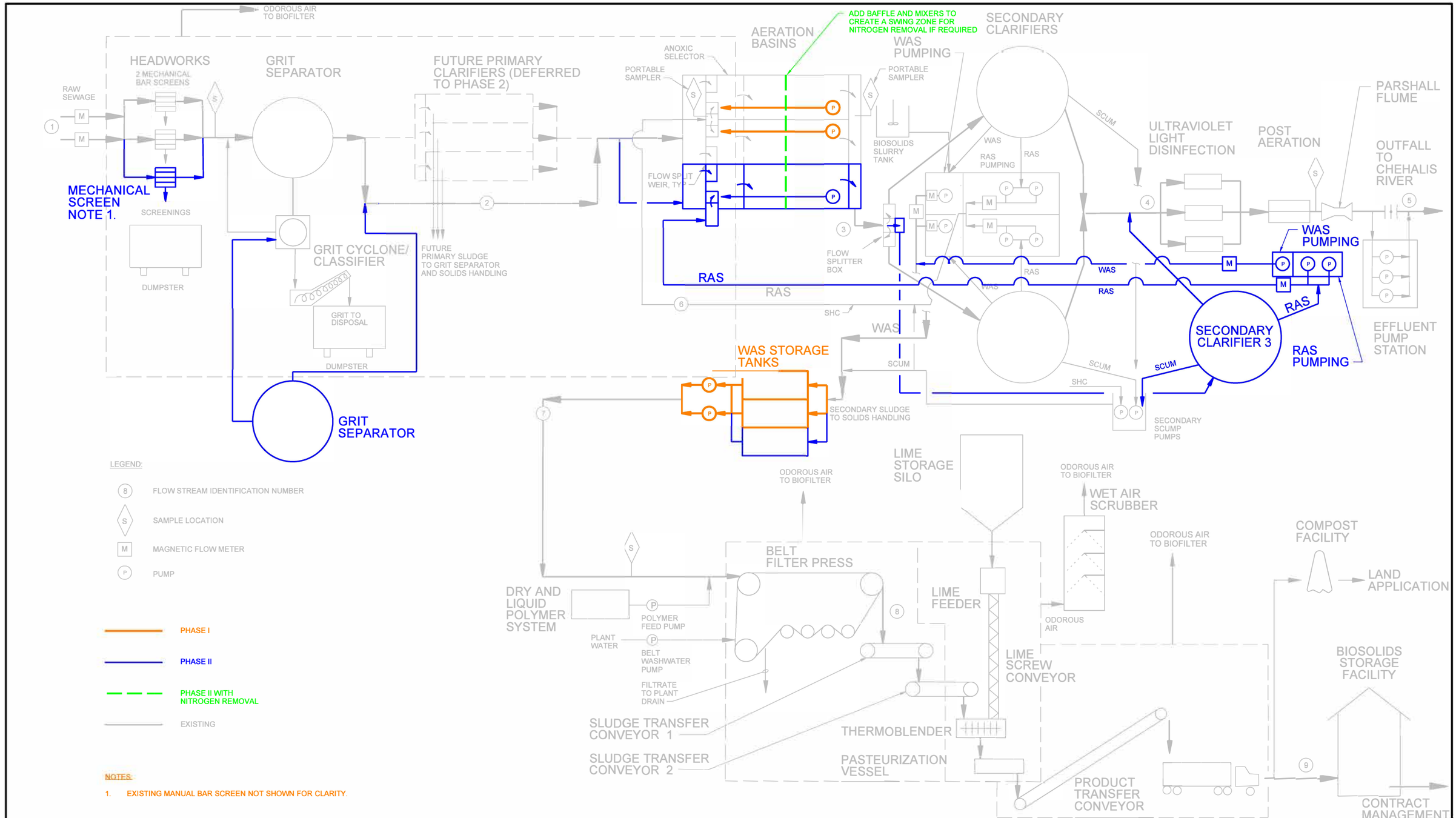
City of Centralia
General Sewer/Facility Plan

Figure 6-4
CENTRALIA WASTEWATER TREATMENT PLANT UPGRADES SITE PLAN

ch2m:

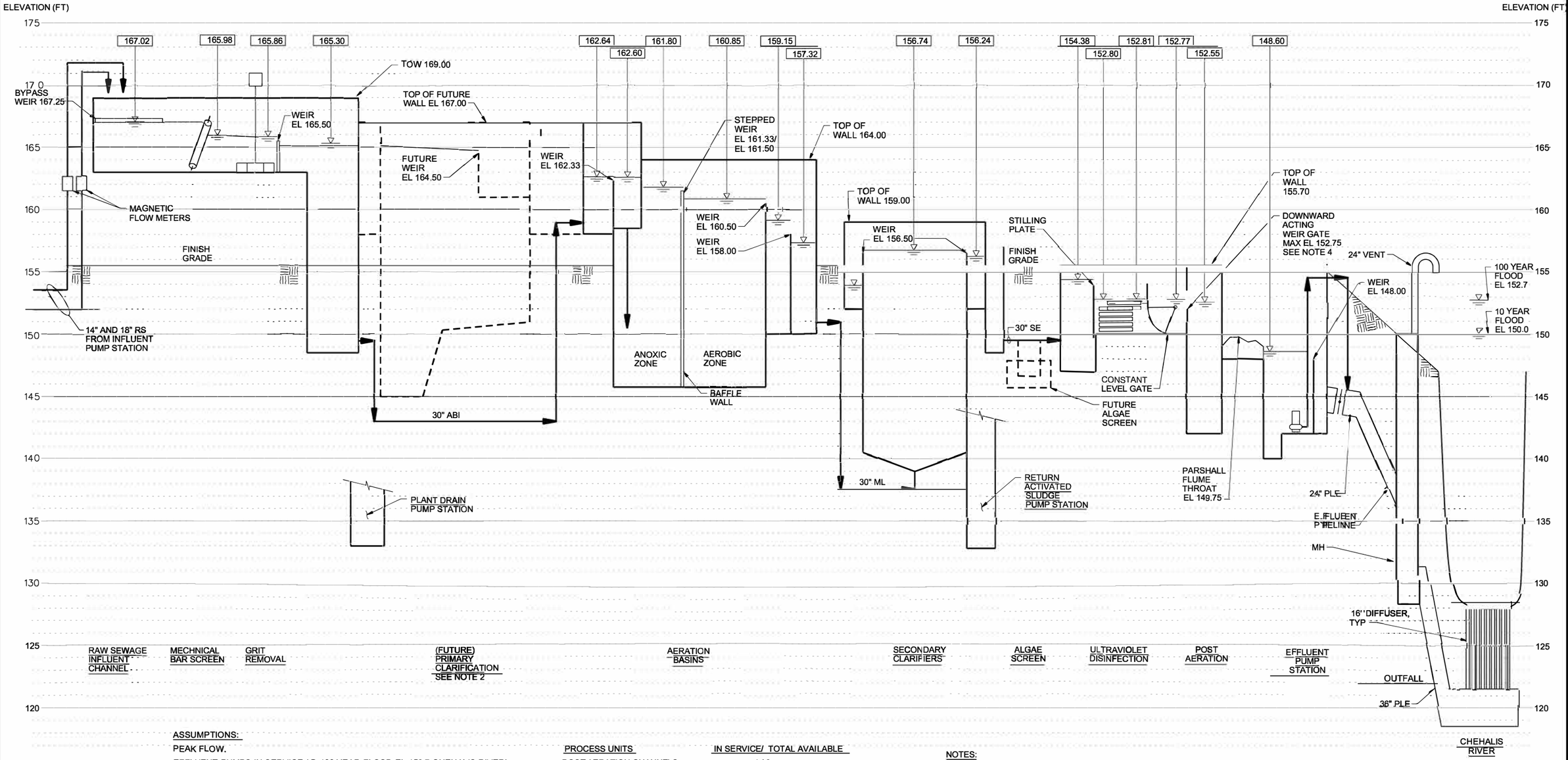
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City of Centralia
General Sewer/Facility Plan

Figure 6-5
CENTRALIA WASTEWATER TREATMENT PLANT PROCESS FLOW DIAGRAM



ASSUMPTIONS:

PEAK FLOW.

EFFLUENT PUMPS IN SERVICE (@ 100 YEAR FLOOD EL 152.7 CHEHALIS RIVER)

LEGEND:

▽ WATER SURFACE ELEVATION SHOWN ON PROFILE

166.98 WATER SURFACE ELEVATION AT PEAK FLOW

	PEAK FLOW
PLANT INFLUENT FLOW	11.3 MGD
RETURN ACTIVATED SLUDGE	4.0 MGD
MIXED LIQUOR RECYCLE	30.0 MGD

PROCESS UNITS	IN SERVICE/ TOTAL AVAILABLE
POST AERATION CHANNELS	1 / 2
UV CHANNELS	2 / 3
SECONDARY CLARIFIERS	2 / 2
AERATION BASINS	2 / 2
PRIMARY CLARIFIERS (FUTURE)	2 / 2
HEADWORKS SCREENS	2 / 2

HYDRAULIC PROFILE

NTS

NOTES:

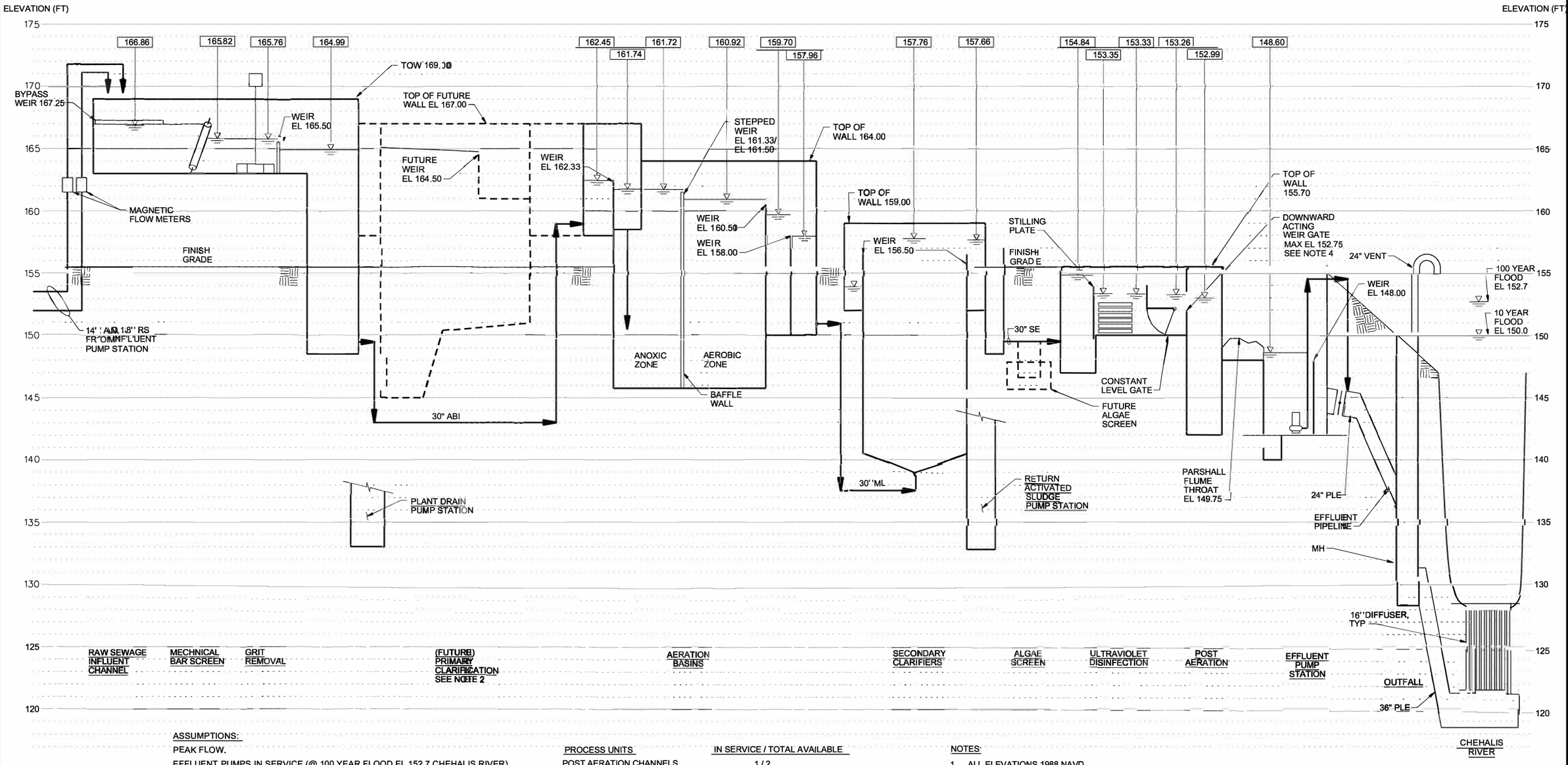
1. ALL ELEVATIONS 1988 NAVD.
2. HEADLOSS REQUIREMENT FOR FUTURE PRIMARY CLARIFIERS HAS BEEN INCLUDED IN HYDRAULIC PROFILE.
3. PLANT RECYCLE FLOWS ADDED DOWNSTREAM OF INFLUENT SAMPLER AT HEADWORKS.
4. WEIR GATE DOWNSTREAM OF CONSTANT LEVEL GATE WILL MODULATE BETWEEN 152.5 AND 152.75 FOR Q<1.2 MGD AND IS SET TO 149.00 FOR Q>1.2 MGD.

CITY OF CENTRALIA
GENERAL SEWER / FACILITY PLAN

Figure 6-6a

HYDRAULIC PROFILE FOR THE CENTRALIA WWTP PHASE I IMPROVEMENTS

ch2m:SM



ASSUMPTIONS:

PEAK FLOW.

EFFLUENT PUMPS IN SERVICE (@ 100 YEAR FLOOD EL 152.7 CHEHALIS RIVER)

LEGEND:

▽ WATER SURFACE ELEVATION SHOWN ON PROFILE

166.98 WATER SURFACE ELEVATION AT PEAK FLOW

	PEAK FLOW
PLANT INFLUENT FLOW	14.1 MGD
RETURN ACTIVATED SLUDGE	6.0 MGD
MIXED LIQUOR RECYCLE	37.3 MGD

PROCESS UNITS	IN SERVICE / TOTAL AVAILABLE
POST AERATION CHANNELS	1 / 2
UV CHANNELS	3 / 3
SECONDARY CLARIFIERS	3 / 3
AERATION BASINS	3 / 3
PRIMARY CLARIFIERS (FUTURE)	3 / 3
HEADWORKS SCREENS	3 / 3

HYDRAULIC PROFILE

NTS

NOTES:

1. ALL ELEVATIONS 1988 NAVD.
2. HEADLOSS REQUIREMENT FOR FUTURE PRIMARY CLARIFIERS HAS BEEN INCLUDED IN HYDRAULIC PROFILE.
3. PLANT RECYCLE FLOWS ADDED DOWNSTREAM OF INFLUENT SAMPLER AT HEADWORKS.
4. WEIR GATE DOWNSTREAM OF CONSTANT LEVEL GATE WILL MODULATE BETWEEN 152.5 AND 152.75 FOR Q<1.2 MGD AND IS SET TO 149.00 FOR Q>1.2 MGD.

CITY OF CENTRALIA
GENERAL SEWER / FACILITY PLAN

Figure 6-6b

HYDRAULIC PROFILE FOR THE CENTRALIA WWTP PHASE II IMPROVEMENTS

ch2m:SM

Due to the changing weather patterns and recent drought, impacts to the City's water supply initiated an investigation of potential long-term options to manage the City's water resources. This investigation built on the previous work and focused on resource recovery options, especially in the event that river discharge becomes infeasible. Options considered the following evaluation criteria:

- Available potential locations
- Practicality of the alternative
- Facility needs (or capital costs)
- Annual maintenance costs
- Regulatory requirements
- Effectiveness of the alternative at reducing the development of potable resources
- Managing WWTP effluent characteristics

Based on the evaluation, three alternatives stood out as the most desirable: aquifer storage and recovery (ASR), constructed wetland, and a combination of ASR and seasonal irrigation. Table 6-10 compares these three options further by identifying capital costs, applicable permits, potential data needs for implementation, and the relation to drivers for reclaimed water use.

Table 6-10. Evaluation of Top Alternatives

Alternative	Class 5 Estimated Cost[a]	Permits	Data Needs	Relation to Drivers	
				Water Quality	Offset Potable Demands
ASR	$1,145,000 to $2,455,000	• Reclaimed Water Permit • State Wastewater Discharge Permit	• Well logs • Soil investigation • Hydrogeologic study • Water chemistry report	• Class A	• Indirectly
Constructed Wetlands	$1,960,000 to $4,203,000	• Reclaimed Water Permit • NPDES Permit	• Soil investigation • Hydrogeologic study • Floodway investigation/site survey • Preferred type of wetland	• Class A	• Indirectly
ASR and Seasonal Irrigation	$1,590,000 to $3,405,000	• Reclaimed Water Permit • State Wastewater Discharge Permit • NPDES Permit	• Soil investigation • Hydrogeologic study • Water balance • Evapotranspiration rates • Crop options	• Class A	• Directly, depending on the season

[a] Class 5 cost estimate includes a -30% to +50% accuracy range (CH2M, 2013).

It is important to note that the estimated costs do not include construction and O&M to produce Class A effluent. Depending on current State regulations for the effluent characteristics at the time of implementation, one of the following options can be used for additional treatment: advanced UV oxidation or reverse osmosis.

Further investigations and data collection are needed to determine the best alternative for the City should reclaimed water become a necessary solution. The City will continue to track water demands (along with developments in reclaiming and reusing wastewater for municipal water supply) and will consider pursuing reuse at the appropriate time, including preparation of a plan that meets the requirements of Chapter 90.46 WAC.

6.7 Other Potential Improvements

Plant staff identified other improvements they wish to implement, which are described in the following subsections.

6.7.1.1 Ultraviolet Channel Gates

The existing Westech floating gates on the UV channel are prone to leakage, which initiates plant alarms. The City tested a finger weir in place of the gate on one channel to provide level control while avoiding nuisance alarms. The test was successful, and the City plans to replace all the gates with steel finger weirs as a permanent solution. This would be implemented as part of the City's plant maintenance program and is not included in the capital improvement projects presented in Chapter 8.

6.7.1.2 Solids Handling Upgrades (C.I.P. WW-2)

Three projects are included in C.I.P. WW-2 and include dewatered sludge conveyance, belt filter press and compost facility covers. The following describes each of the projects in more detail.

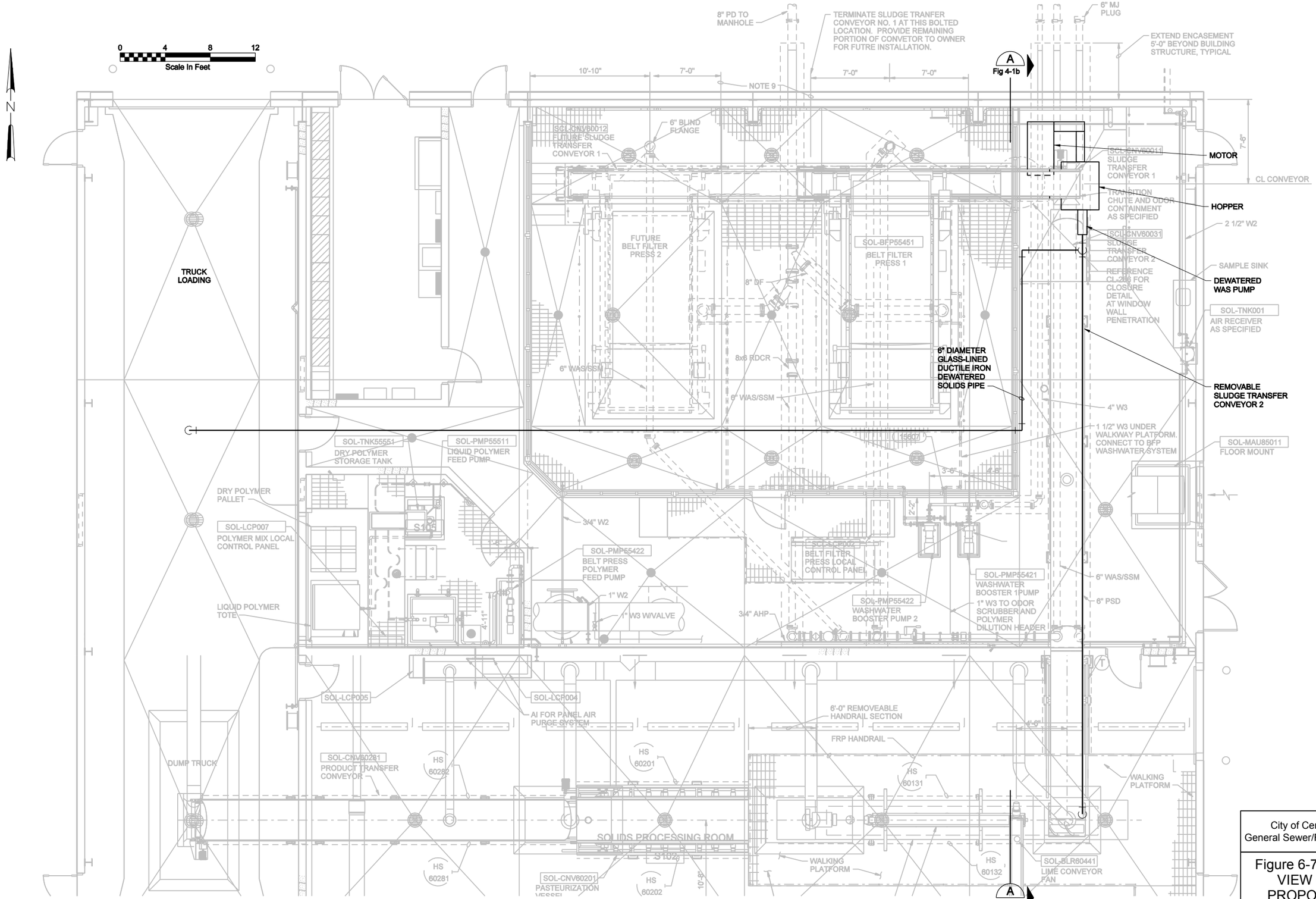
(i) Dewatered Sludge Conveyance (C.I.P. WW-2, part a)

Modifications to the solids handling facility for dewatered sludge conveyance were first described in and approved as part of the 2011 Facility Plan Amendment (CH2M, 2011). WAS is dewatered to 12 to 16 percent total solids using an existing 2-meter BFP in the solids handling facility. Polymer is added to the WAS to coagulate the solids to assist in dewatering. A conveyor belt transports dewatered WAS to a Serpentix conveyor, which feeds the lime pasteurization system. For composting, the dewatered WAS is run through the RDP Technologies equipment without lime addition, so it can be loaded into a truck and taken to the biosolids storage facility for composting.

Modifications to the existing solids handling facility are necessary to transport dewatered WAS to the composting facility without operating the RDP lime pasteurization equipment. Dewatered WAS will be conveyed to a new progressing cavity pump using the existing conveyor belt. The Serpentix conveyor will be removed and a new pump located in its place, so the conveyor belt discharges to the new pump's feed hopper. The pump will be able to discharge either to the RDP system or the truck loading area by use of valves and piping on the discharge of the pump. Figures 6-7 and 6-8 show plan and section views of the proposed modifications.

The pump will be equipped with a receiving hopper and inlet screw conveyor to allow handling of the dewatered WAS. The hopper will be located directly beneath the conveyor belt discharge, so there will likely be a higher surface in the middle of the hopper than the edge. The pump will have a VFD and will operate based on the level in the hopper. An ultrasonic level sensor will be placed in the hopper with an aiming style mount to sense the level at the outer edge of the hopper where the dewatered WAS level is likely lowest. A proportional control will be used to adjust the pump speed to maintain hopper level. A pressure switch would be installed immediately downstream of the pump to automatically stop the progressing cavity pump in the event of low or high pressure. Low pressure indicates the pump is running dry, which will damage the pump. High pressure indicates that the discharge pipeline is blocked.

Dewatered WAS will be pumped through a 6-inch-diameter, glass-lined, ductile iron pipe either to a dump truck in the existing biosolids load-out area for transport to the composting facility or to the inlet of the thermoblender at the beginning of the lime pasteurization process. A tee and two plug valves downstream of the pump discharge will allow plant staff to control where the WAS is pumped.

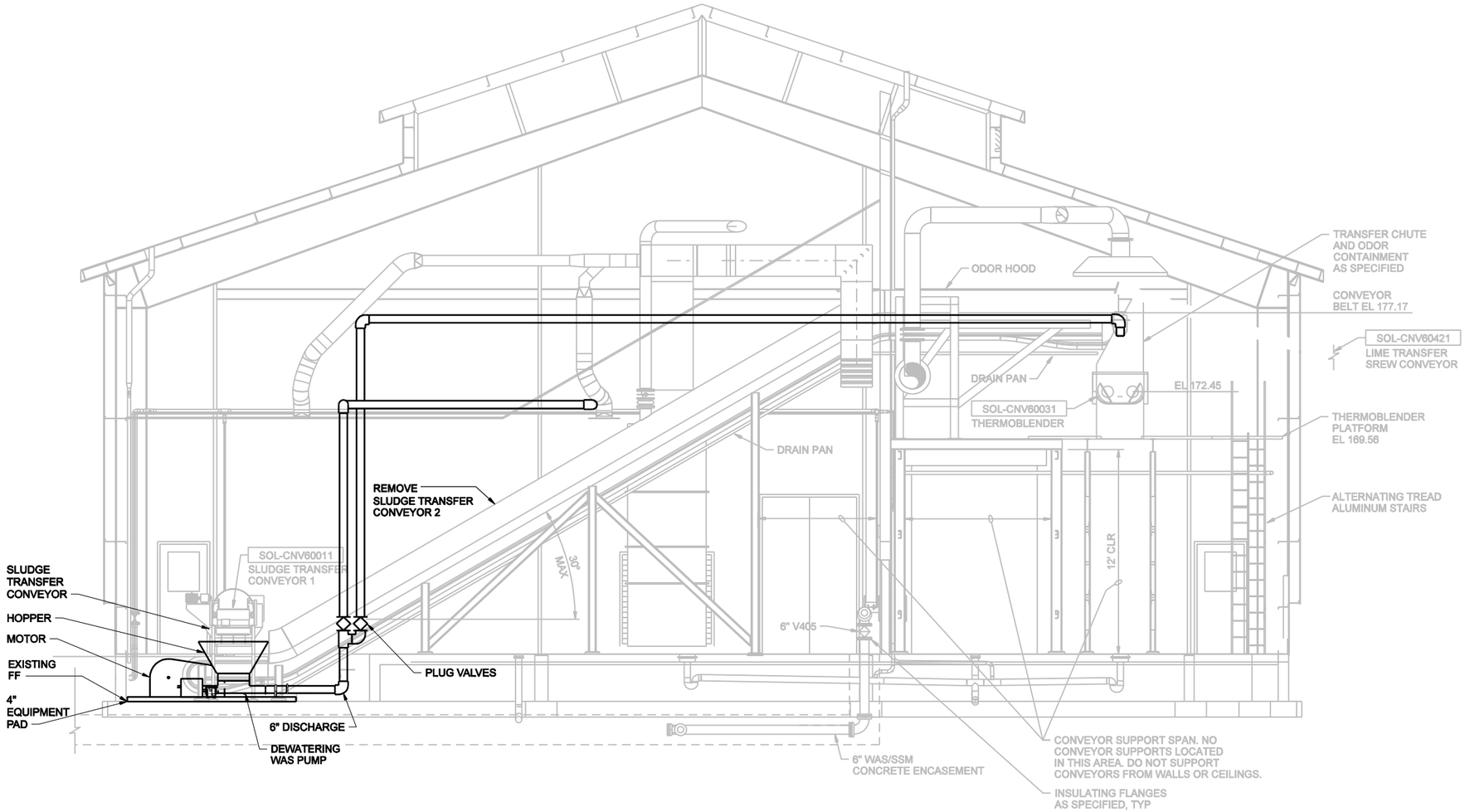


City of Centralia
General Sewer/Facility Plan

Figure 6-7 PLAN VIEW OF PROPOSED MODIFICATIONS

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SECTION A
1/4"=1'-0"
Fig 4-1a

City of Centralia
General Sewer/Facility Plan

Figure 6-8
SECTION VIEW OF PROPOSED MODIFICATIONS

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(b) Belt Filter Press (C.I.P. WW-2, part b)

The City currently has one BFP and, though not required, would like to add a second 2-meter press as a standby unit to increase operational flexibility and better accommodate unforeseen equipment downtime. As discussed in Section 6.4, the existing BFP has enough capacity to handle existing solids production and dewater a few times each week. A second BFP would provide the City with a backup unit, as well as helping to maintain operational flexibility with future growth.

(c) Compost Facility Improvements (C.I.P. WW-2, part c)

While the composting piles are under cover in the biosolids storage building, the green waste used as amendment in the compost operations are outside the building and covered by tarps to protect them from the rain. These tarps tend to break down from UV exposure after 1 year and need to be replaced frequently. The City is considering investing in a manufactured compost cover system that is waterproof but does not trap moisture to cover the amendment piles instead. Additionally, since the compost facility design capacity is short of the capacity needed once maximum month plant flows surpass 5.5 mgd, the City is considering adding concrete or wooden bay walls between compost piles, to allow for taller piles and to use more space between piles. This would increase facility capacity by at least 10 percent and allow the City to continue using the composting facility without the need to use the lime stabilization process for supplemental capacity for a few more years.

6.7.1.3 Programmable Logic Controller and Motor Control Center Upgrades (C.I.P. WW-4)

The WWTP recently experienced a failure of one of the solids system adjustable-frequency drive (AFD) units. While addressing this failure, it was discovered that the AFD units at the WWTP are no longer supported by the manufacturer and that installation of a new AFD would not be supported by the current control system. The control system PLCs were also discontinued by the manufacturer as of March 2011. Upgrading AFD units and PLC controller modules is recognized as a significant upgrade to the facility with the objective of maintaining stable operations. Additionally, the existing DeviceNet communication between the PLCs and the equipment in the MCCs should be replaced. Migrating away from DeviceNet to Ethernet will increase the maintainability of the equipment. Starting in 2017, the City has been working to implement required improvements to the MCCs and PLCs.

CHAPTER 7

Operations and Maintenance

This section presents descriptions of the various routines and programs needed to operate and maintain the City's WWTP and sewer system. The City Wastewater Department provides the resources and staff to perform system repairs, implementation of the standard operating procedures, and ongoing system maintenance. Future projects or equipment replacement recommendations to improve the operation and minimize the maintenance of the system are provided in the last section of this chapter.

7.1 Staffing

The City currently employs the equivalent of 13 full-time equivalent (FTE) positions to oversee the O&M of the collection system and WWTP. Table 7-1 presents a breakdown of the type and amount of staff allocated to various positions within the City's Wastewater Department. Some positions represent less than one FTE position, because of shared duties among other positions and City Departments.

Table 7-1. Wastewater Department Operations and Maintenance Staff

Position	FTE
Wastewater Treatment Plant	
Manager	0.5
Operators	3.5
Maintenance	0.5
Instrumentation and Electrical	0.5
Laboratory	1.0
Pretreatment	1.0
Farm	1.0
Total WWTP	**8.0 FTE**
Collection System	
Manager	0.5
Instrumentation and Electrical	0.5
Technicians	4
Total Collection System	**5.0 FTE**

7.2 Scheduled Operations and Maintenance Activities

7.2.1 Wastewater Treatment Plant

The plant is staffed 5 days per week, 8 hours per day, by the plant manager, a process analyst, a lead operator, three operators, and a half-time I&E technician on a Monday through Friday, 8-hour shift. An on-call person staffs the plant for 2 to 3 hours per day on the weekends and holidays. Additionally, the collection system and WWTP require staff to be on call for afterhours emergencies and unscheduled O&M needs. Plant operations activities include continual process control, laboratory analysis, and

regulatory reporting. Maintenance activities include lubrication, cleaning, equipment maintenance, replacement, and repairs.

7.2.2 Collection System

Collection system staff are responsible for the O&M of the collection system sewer mains and pump stations. The City has adopted a regularly scheduled maintenance program for the pump stations. Additionally, a few problem areas within the collection system require ongoing maintenance.

Grinder Pumps

The City has approximately 39 grinder pumps installed throughout the City. The City has developed a service agreement with the owners of these systems, which states that operations and maintenance of these systems is the responsibility of the owner and that a qualified individual or firm is performing proper maintenance. The City's Municipal Code Title 15.10.180 Paragraph H outlines the use of alternative systems which covers the installation, ownership and maintenance of the systems. The City is planning to add a list of approved qualified contractors that can perform maintenance on these systems in the near future. All maintenance and inspections scheduled will be tracked and maintained by the City of Centralia maintenance program. Appendix L contains the service agreement example between the City and sewer customer.

Sewer Cleaning

Staff members have identified areas that tend to have recurring requirements for sewer cleaning, and these areas have been set up in the City's management system to generate timely work orders (annually, quarterly, or weekly) depending on the severity. Typically, the problem areas are those where grease buildup occurs. On average, a crew spends approximately 5 days per month flushing the lines.

Root Control

Certain areas of the sewer system routinely experience problems root intrusion. Root intrusion is a chronic problem at numerous points in the system. Approximately twice per year, staff must trim and remove roots from inside the affected sewer lines to prevent blockages.

Manhole Lid Replacement and Adjustment

The City routinely replaces up to 10 manhole frames and lids per year. The manhole frame and lid replacement program allows the City to replace broken manholes, replace unsealed manholes, and adjust manholes as needed to match existing road grades. This program is also used to directly address inflow into the City's collection system.

7.2.3 Pump Station

The City's 25 pump stations are inspected once per week. During the weekly check, the wet well and control panel are inspected, the volume of grease in the wet well is noted, and the pumps and valves are exercised. At a minimum, the pump station wet wells are cleaned monthly. Equipment amperage draw is measured every month for predictive maintenance on the mechanical equipment.

All pump stations have radio telemetry and are monitored continuously for alarms. For 2 days each year, the crew will check the alarms triggered from the pump stations as they are received at the WWTP.

The four largest pump stations are equipped with permanent standby power and are tested weekly. The generators are equipped with timers to allow them to be exercised weekly. The generators are serviced annually and are load-tested during that time. The remaining pump stations are powered by one portable unit when necessary, which is tested quarterly.

Staff also maintain the grounds around pump stations on an as-needed basis.

7.3 Programs

7.3.1 Sewer Service

The City has a sewer ordinance (Centralia Municipal Code 15.10) that describes domestic and high strength users, user charges, side sewer connections, damage to sewers, permit application, type, and fees, sewer construction and testing, prohibited discharges, violations and penalties, and schedule of charges. A copy of this ordinance is included in Appendix L.

7.3.2 Fats, Oil, and Grease

The City has a fats, oil, and grease (FOG) program including mandatory FOG pretreatment per the Centralia Municipal Code 15.10.280. One staff member is dedicated to the operation of this program, which requires that any customers serving or preparing food where grease may be introduced into the system shall have pretreatment facilities to prevent discharge of FOG. At a minimum, the grease interceptors must meet the specifications of the current Uniform Plumbing Code, and the dischargers must maintain the grease interceptors in a manner that will prevent FOG from being carried into the system. Grease traps and interceptors are required to be regularly cleaned and maintained by the customer, such that the total volume of captured grease and settled solid material never displaces more than 25 percent of the total volume of the unit. The cleaning frequency shall be at least once per week, unless an alternate schedule is approved by the City. Maintenance logs are required and must be presented to the City during inspections.

Part of the FOG program includes customer education, including spending time with each new customer explaining the purpose for a FOG program, providing materials documenting options to the customer, and providing equipment alternatives. As a result, customers may be more responsive to installing and maintaining the required systems. In addition, the City imposes a fine for City-sponsored cleanings and re-inspection of systems that have not been properly maintained.

7.3.3 Water Surface Elevation Monitoring

This program consists of measuring water surface elevations at strategic manholes within the existing collection system to evaluate the wet weather system flows. Centralia staff began this monitoring program in October 1998 and are continuing to gather data. The initial findings were summarized in the previous General Sewer Plan, and more recent work is summarized in Section 5.2.2. This program is used to identify the extent of surcharging in the system and the variation in surcharging during the year. For each measurement, the manhole lid is removed, and the water surface elevation in relation to the pipe crown is observed and recorded. If the pipe is flowing more than full, the distance between the water surface elevation and the manhole rim is recorded. A data sheet template is presented in Appendix M. Two staff are required for each measurement: one person to control traffic; and the other to remove the manhole lid, take measurements, record the observations, and replace the manhole lid. Measurements are taken routinely at each identified manhole once per month from May through October and weekly from November through April. This frequency was identified because the wet season WWTP flow can fluctuate widely over the course of a single week, while the WWTP flow is relatively stable during dry periods. Each trunk is measured over a 5-year period to develop a relationship with Chehalis River flow. River flow data is recorded on the same day that pipe and manhole levels are measured to develop the correlation between the two items.

Three groundwater monitoring wells were installed in the 1990s in downtown Centralia. The data from these monitoring wells are used to monitor groundwater elevation and its linkage, if any, to sewer surcharging.

7.3.4 Flow Monitoring

The City's flow monitoring program is another approach to evaluating wet weather flow. This program consists of monitoring dry and wet weather flow at select locations and recording and evaluating flows at existing pump stations. Flow monitoring is used to quantify the impact of I/I reduction projects. Positive results in the form of measurable differences between the ratio of dry weather to wet weather flows can serve to validate the City's I/I reduction program and provide justification for future pipeline replacement projects. The City currently has four flow monitors to measure flows in the collection system. In the absence of additional flow monitoring devices, pump station run records are used as surrogates to quantify flows. This information can be used to support the development of a hydraulic model of the sewer system.

7.4 Unscheduled Maintenance Activities

Approximately twice per month, the City will get calls from customers complaining of a backed-up sewer. Staff will perform a customer courtesy check by investigating whether the blockage is occurring on the customer's property or out in the street. If the blockage is within the City's portion of the system, efforts are taken to clear the sewer immediately.

Staff also respond to odor complaints by determining the source of odors and flushing the line as required to remove the odiferous conditions. This approach appears to be adequate to date.

A crew is sent out to perform repairs on collection lines and force mains as breakages occur. Typically, a line break will occur during construction of non-sewer projects in the area, and spot repairs are required.

Staff perform sewer permit connection inspections on an as-requested basis. Typically, the majority of inspections are requested during the summer.

7.5 Management System and Recordkeeping

The City currently uses Rockwell's FactoryTalk View supervisory control and data acquisition (SCADA) system for the WWTP and collections system. The SCADA system controls WWTP operations and Collections lift/pump station monitoring. The historian software (Pi) records flow data and process control data and is used to generate the monthly NPDES permit's required DMR. Data are stored on a server. The WWTP and Collections department use additional software, a computerized maintenance management system, to record maintenance activities and generate work orders.

7.6 Improvements

There are several items or programs that can be added to the City's Wastewater Department to support improvement of the entire sewer system. The following subsections present each potential improvement.

7.6.1 Equipment

To better maintain and operate the system, the City recently purchased a new sewer jet truck and a CCTV truck. In addition, the following equipment items have been identified as required by staff:

- WAS storage tank (discussed in Chapter 6)
- MLSS recirculation pumps/piping (discussed in Chapter 6)
- Vactor truck, purchased in 2003 and scheduled for replacement in 2018
- Service truck with crane, purchased in 2003 and scheduled for replacement in 2018
- Duty truck, half-ton, purchased in 2006 and scheduled for replacement in 2020

- John Deere backhoe, purchased in 2002 and scheduled for replacement in 2020
- Lead Coll tech truck, Chevy Colorado, purchased in 2006 and scheduled for replacement in 2020

7.6.2 Flow Monitoring

The City recognizes that high rates of infiltration are a critical concern for its sewer system; however, there is limited data to substantiate the variation of I/I in the sewer system. High river elevations and a corresponding high groundwater table are believed to be the cause of the City's excessive infiltration occurrences. The collection system contains approximately 41 miles of clay pipeline, 19 miles of concrete pipeline, and 3 miles of asbestos cement pipeline (installed over 80 years ago). These are the areas suspected of having the highest amounts of I/I.

The City has conducted extensive I/I reduction efforts at various times within the past 40 years in an attempt to reduce infiltration into the sewer system. The efforts undertaken between 1977 and 1980 had no noticeable effect. The City replaced approximately 22 percent of its collection system between 1990 and 1996. Based on measurements taken downstream at the WWTP, no significant reduction in I/I was measured as a result of these programs. However, recent efforts to remove I/I, such as slip lining the interceptor that crosses China Creek, have been successful. There was a noticeable decrease in influent flow to the plant corresponding with completion of the slip lining project.

To demonstrate to Ecology that the City is committed to working on the I/I problem, the City has dedicated $540,000 per year for I/I demonstration, reduction and removal projects. The I/I reduction program described in Chapter 5 proposes a methodology for flow monitoring that both establishes whether I/I reduction is effective and provides information necessary to determine whether adequate capacity exists for future flows.

As discussed in Chapter 5, the existing sewer system analysis was based on peak sanitary flows, not peak wet weather flows, because of the absence of data. Prior to connecting new services, it is recommended that the City verify existing wet weather flows in the trunk sewers to determine what additional capacity is present within the existing collection system.

The water surface elevation monitoring approach is a minimal program designed to use the fewest resources to collect data that can be used to verify the pipe flow assumptions made in the Chapter 5 analysis and quantify the impact of I/I on system capacity. The City has a limited number of flow monitors that can be deployed to quantify existing collection system flows. The City is researching new flow monitors to increase the number of useable flow monitors and is also pilot testing the use of SmartCovers that can monitor and record level data in a manhole. The City currently has three SmartCovers in use and is considering installing additional SmartCovers. As more resources become available, a more comprehensive flow monitoring program can be implemented to better characterize the system and form the basis for the development of a hydraulic model. The most critical issue is to determine the extent and impact of surcharging in the existing system, which could limit future system connections. The data from the monitoring program will be used to determine the ability of the existing system to accept additional flows, as discussed in Chapter 9.

7.6.3 Television Inspection and Cleaning

As noted previously, the City cleans sewers on an as-needed basis. To be more proactive in maintaining the sewer system and identifying problem areas, the City is implementing a comprehensive CCTV inspection and sewer cleaning program. In general, the program is conducted during the four summer months when flows are the lowest. It is possible to clean approximately 5,000 feet of pipe per day using a truck-mounted sewer jet. By inspecting the cleaned line with a CCTV camera, problems within the sewer line can potentially be identified before they become critical.

The program has been developed with the goal of cleaning and inspecting the entire system over a 5-year cycle. The priority should be to clean and inspect the main trunk sewers first to determine their

condition. The other sewers should then be inspected in order of those most likely to be impacted by future development. A proposed schedule by area is as follows:

1. Downtown
2. Fords Prairie
3. Waunch Prairie
4. Cooks Hill
5. South Centralia

7.6.4 Smoke Testing

The City does not currently perform regular smoke testing. Smoke testing is a useful tool to identify building sewers, grinder pumps, and under-house plumbing that are a source of I/I. It can also demonstrate to property owners the need for required corrections. Periodic smoke testing throughout the service area would assist the City in identifying sources of I/I, especially inflow, and working with property owners to reduce or eliminate these problems.

7.6.5 Staffing

The Phase II improvements will require 1 additional FTE to handle additional solids and process requirements. Additionally, for the collection system, implementation of an expanded flow monitoring program and routine comprehensive sewer cleaning would be beneficial to the City. Depending on the magnitude of the programs, up to two additional staff could be required to implement the proposed programs.

CHAPTER 8

Financial

This chapter presents the financial analysis for the capital improvement projects identified in this plan, including estimated capital costs, O&M costs, and life-cycle costs. Project financing and user charges required to support the projects are also discussed.

8.1 Costs

Class 5 capital cost estimates were prepared to the Association for the Advancement of Cost Engineering International standards for the projects identified in the plan. As defined by these standards, the expected accuracy range for a Class 5 estimate is a low of minus 30 percent and a high of plus 50 percent.

8.1.1 Capital

Table 8-1 summarizes the capital projects identified in this sewer system evaluation and estimated cost.

Table 8-1. Proposed Sewer and Facility Plan Capital Projects

ID	Project	Description	Total Estimated Cost (2016 dollars)
CC-1	China Creek Interceptor Stabilization	Install riprap along Chehalis River to protect pipelines from erosion	$1,750,000
CS-1	Centralia Station	New sewer to serve Centralia Station development	$3,880,000
M-1	Pump Station Maintenance	Replacement of mechanical and electrical and concrete corrosion coatings	$1,820,000
II-1	I/I Demonstration and Removal Projects	Demonstrate technology, determine effectiveness and confirm costs of I/I removal technologies	$2,700,000
WW-1	Phase 1 WWTP Improvements	Design and construction of recirculation pumps and solids storage	$5,840,000
WW-2	Solids Handling Upgrades	Upgrade dewatered sludge conveyance, new belt filter press, and compost facility covers	$1,630,000
WW-3	Headworks Screen	Additional headworks screen	$2,120,000
WW-4	PLC and MCC Upgrades	Upgrade PLC and MCC equipment	$500,000
WW-5	Phase 2 WWTP Improvements	Design and construction of additional plant capacity	$17,202,000
WW-6	Temperature Compliance Evaluation Update	Evaluate and select temperature mitigation alternative	$60,000
WW-7	Thermal Mitigation Needs	Design and construct thermal mitigation alternative	$1,240,000
ES-1	Pipeline Replacement Program	Aging pipeline replacement program	$5,220,000
ES-4	First Street Between G and F Streets	Existing System Improvement	$160,000
F-1	Ford’s Prairie Interceptor	Provide sewer to UGA	$11,810,000
F-2	Area North of and Adjacent to Kuper Road	Provide sewer to UGA	$2,950,000
F-3	Private Drives Area	Provide sewer to UGA	$1,310,000

Table 8-1. Proposed Sewer and Facility Plan Capital Projects

ID	Project	Description	Total Estimated Cost (2016 dollars)
F-4	Trailer Park Area	Provide sewer to UGA	$1,270,000
F-5	Southeast Area	Provide sewer to UGA	$7,920,000
F-6	Industrial Area	Provide sewer to UGA	$1,040,000
F-7	Reynolds Avenue Area	Provide sewer to UGA	$2,540,000
F-9	Southwest Area	Provide sewer to UGA	$4,030,000
F-10	Gallagher Road Area	Provide sewer to UGA	$1,950,000
NS-7	Fords Prairie Residential	Provide sewer to UGA	$8,200,000
US-7	Fords Prairie	Provide sewer to unsewered area within City limits	$1,090,000
CH-1	Cook's Hill Sewer Extension	Provide sewer to UGA	$14,520,000
CH-2	Cook's Hill Pump Stations	Provide sewer to UGA	$1,030,000
NS-5	Cooks Hill Residential	Provide sewer to UGA	$7,450,000
NS-15	Graf Road Residential	Provide sewer to UGA	$4,660,000
US-2	South Cooks Hill Residential	Provide sewer to unsewered area within City limits	$80,000
NS-9	Kresky Residential I Commercial	Provide sewer to UGA	$2,120,000
US-3	East of Plummer Lake	Provide sewer to unsewered area within City limits	$670,000
W-1	Waunch Prairie Interceptor	Provide sewer to UGA	$3,310,000
W-2	North Pearl Street Interceptor	Provide sewer to UGA	$4,310,000
W-5	Dixon Road and Roanoke Street Area	Provide sewer to UGA	$1,990,000
W-6	Southeast Area	Provide sewer to UGA	$2,270,000
W-7	Oakview Avenue Area	Provide sewer to UGA	$2,130,000
W-8	Carson Street Area	Provide sewer to UGA	$6,030,000
W-9	Sawall and Lowery Area	Provide sewer to UGA	$3,140,000
WH-1	Widgeon Hill Sewer Extension	Provide sewer to UGA	$3,900,000
WH-2	Widgeon Hill Pump Station	Provide sewer to UGA	$1,040,000
US-4	Ham H/11	Provide sewer to unsewered area within City limits	$9,660,000
NS-10	South Ham Hill Residential	Provide sewer to UGA	$3,000,000
	Total		**$159,542,000**

Table 8-2 (which is located at the end of Section 8.1) summarizes proposed system improvements for implementation over the next 6 years (2019 through 2024) based on the analysis described in Chapters 5 and 6 and the review of sewer projects necessary for improvement of the collection system.

It is also recommended that the City begin implementation of the Ford's Prairie interceptor by constructing the first two segments before 2020. The Ford's Prairie interceptor provides several benefits to the City:

- Allows for future growth in an area located outside the flood plain
- Diverts flow away from the China Creek pump station, thus providing capacity without the need to expand the China Creek pump station and interceptor
- Eliminates several pump stations and maximizes gravity sewers, thereby minimizing long-term maintenance costs
- Provides an opportunity to remove flow from the Downtown Trunk 1 by diverting flows from Waunch Prairie/Davis Hill

It is important for the City to begin constructing this interceptor in advance of WSDOT's improvements to Harrison Avenue and to coordinate completion with improvements to Harrison Avenue.

8.1.2 Life Cycle

Table 8-3 presents the estimated total capital, annual O&M, and life cycle costs based on the conceptual design for the Phase 1 and 2 WWTP improvements. These costs are in 2016 dollars and have been rounded. Life-cycle costs were developed from the total capital (project) costs, annual O&M costs, and replacement costs for a 50-year project life. Annual O&M costs included labor for operations and routine maintenance, materials, and electricity. Equipment replacement was based on a 20-year mechanical equipment life. The following are assumptions used in the analysis:

- Initial year of operations: 2018 for Phase 1 and 2027 for Phase 2
- Life-cycle cost analysis period: 50-year operation
- Year of analysis for present worth computations: 2016
- Inflation Rate: 3.0 percent
- Discount rate: 5.0 percent

8.2 User Charges

The two main revenue sources for the wastewater department consist of revenues from the monthly base rate and a usage charge. All residential sewer customers pay a monthly minimum plus an amount that is the lesser of (1) a charge for units of water used that month or (2) the "Winter Cap", which is the average monthly charge for water used in the months December through March. The Winter Cap is reset each April. Commercial customers have no cap feature. The 2016 rates are shown in Table 8-2.

Table 8-2. Monthly Sewer Rates, 2016

Charge	Single-Family Residential	Low-Income Senior/Totally Disabled	Multiple-Family Residential	Domestic-Strength Commercial/ Industrial	High-Strength Commercial/ Industrial
Inside City Limits					
Monthly Base Rate	$63.82	$57.41	N/A	$24.17	To be determined on a case-by-case basis
Usage per unit of water[a]	$2.25	$2.25	$2.21	$12.87	To be determined on a case-by-case basis
First Dwelling	—	—	$62.48	—	—
Each Additional	—	—	$55.68	—	—

Table 8-2. Monthly Sewer Rates, 2016

Charge	Single-Family Residential	Low-Income Senior/Totally Disabled	Multiple-Family Residential	Domestic-Strength Commercial/ Industrial	High-Strength Commercial/ Industrial
Monthly Minimum	—	—	—	$81.17	—
Outside City Limits					
Monthly Base Rate	$95.75	$86.10	—	$36.26	To be determined on a case-by-case basis
Usage per unit of water[a]	$3.39	$3.39	$3.30	$19.33	To be determined on a case-by-case basis
First Dwelling	—	—	$93.72	—	—
Each Additional	—	—	$83.53	—	—
Monthly Minimum	—	—	—	$121.76	—

[a] Unit of water equals 100 cubic feet

8.3 Funding Sources

A number of funding sources might be available to the City for financing the City-sponsored projects presented in Table 8-3. Potential funding sources are described in this section.

The existing system improvements were prioritized by the City based on the perceived need for the improvement to be completed prior to projects with fewer deficiencies or less risk of damage due to failure of the system. Priority and schedule for developer funded projects is dependent on the timing and specific needs of the developer and the industrial facilities. For planning purposes, a general schedule has been established for the developer funded projects; however, the estimated schedule will need to be modified as residential and commercial development occurs.

Future projects that are not identified as part of the City's C.I.P may become necessary. Such projects may be required in order to remedy an emergency situation or to address unforeseen problems. Due to budgetary constraints, the completion of such projects may require modifications to the recommended C.I.P. The City retains the flexibility to reschedule, expand or reduce the projects included in the CIP and to add new projects to the C.I.P when new information becomes available for review and analysis.

8.3.1 Conventional Revenue Bond Financing

Conventional revenue bond financing assumes the City would issue debt in the tax-exempt bond market through an investment banking firm for the capital needs of the C.I.P. Revenue bonds are secured by the rate revenues of the utility. The interest rate is dependent on the market and the bond rating of the City.

Table 8-3. Proposed System Improvements (2016 Dollars)

Project	Description	Year and Estimated Cost						Total Estimated Cost[a]
		2019	2020	2021	2022	2023	2024	
CC-1 - China Creek Interceptor Stabilization	Install riprap along Chehalis River to protect pipelines from erosion		$107,000	$162,000	$1,481,000			$1,750,000
M -1 - Pump Station Maintenance	Replacement of mechanical and electrical and concrete corrosion coatings		$560,000	$560,000	$560,000	$140,000		$1,820,000
II-1 - I/I Demonstration & Removal Projects	Demonstrate technology, determine effectiveness and confirm costs of I/I removal technologies		$540,000	$540,000	$540,000	$540,000	$540,000	$2,700,000
WW-1 - Phase 1 WWTP Improvements	Design and construction of recirculation pumps and solids storage	$800,000	$5,040,000					$5,840,000
WW-4 - PLC and MCC Upgrades	Upgrade PLC and MCC equipment	$100,000	$100,000	$100,000				
Total		**$900,000**	**$6,347,000**	**$1,362,000**	**$2,581,000**	**$680,000**	**$550,000**	**$9,970,000**

[a] All costs are in 2016 dollars and are Class 5 estimates with an expected range of accuracy of -30% to +50%.

[b] Total project cost is shown. It is assumed that the cost will be shared by the Port of Centralia and the City.

Table 8-4 presents the Phase I and Phase II WWTP improvements capital, annual O&M costs and total life cycle costs.

Table 8-4. Wastewater Treatment Plant Improvements Costs (2016 dollars)

Item	Phase I WWTP Improvements	Phase II WWTP Improvements
Capital Cost	$5,840,000	$10,910,000
Annual O&M Cost	$29,000	$147,000
Total Life-Cycle Cost	$5,869,000	$13,540,000

8.3.2 Double-barreled Revenue Bonds

Double-barreled revenue bond financing assumes that the City will issue debt in the governmental tax-exempt bond market though an investment banking firm in the amount of the capital needs. Double-barreled revenue bonds are secured by City taxes but are repaid by the utility's rate revenues. The interest rate is dependent on the market and the bond rating of the City and may be 25 to 50 basis points lower than a conventional revenue bond. Bond coverage is typically not required and is assumed to be zero.

8.3.3 Centennial Clean Water Fund - Design and Construction

The Centennial Clean Water Fund is a state grant/loan program that finances water pollution control facilities and activities. Eligible projects include planning, design, acquisition, construction, and improvement of water pollution control facilities and activities. Facilities planning and design are eligible for loans, and facilities construction is eligible for grants and loans. The interest rate for a 15- to 20-year term is 75 percent of the market rate.

8.3.4 State Revolving Fund for Water Pollution Control

The State Revolving Fund (SRF) for Water Pollution Control is a loan program to fund high-priority projects to protect water quality. Eligible projects include wastewater treatment facilities, nonpoint source pollution projects, and estuary protection and preservation programs for Puget Sound and the lower Columbia River region. Loans are available for planning, design, and construction up to 100 percent of total eligible project costs. Ceiling amounts are dependent on total funds available.

8.3.5 Public Works Trust Fund Construction Program

The Public Works Trust Fund Construction Program is a revolving loan fund that provides low-interest loans to eligible local governments in Washington State to finance the construction phase of infrastructure projects. The interest rate may be 1 to 3 percent with local matches of 10 to 30 percent, respectively. The loan term would be a maximum of 20 years or the life of the project. Eligible projects must improve public health and safety, respond to environmental issues, promote economic development, or upgrade system performance. In addition, only sanitary sewer projects that are *not* eligible for the SRF loan program are eligible for public works board construction loans. The Legislature changed the Construction Loan eligibility criteria when it passed the 2015-2017 Biennial Capital Budget.

8.3.6 Alternate Funding

Projects not financed by the City include those that may be funded partially through various private sources, primarily using developer financing. Another financing possibility for certain types of projects is the formation of special assessment districts, such as local improvement districts, wherein the benefited properties would be assessed the cost of system improvement based on benefits received.

8.4 Capital Financing Plan

Financing for the City's wastewater capital program consists primarily of proceeds from long-term, fixed-rate sewer revenue bond sales; short-term variable rate borrowing; cash transfers from the operating fund; and low-interest loan programs administered by the State of Washington, such as State Water Pollution Control Revolving Loan Fund loans and Public Works Trust Fund loans. Ongoing system O&M programs (including pump station maintenance and I/I removal) is paid from the wastewater O&M budget and is funded by rates. Projects driven by development, such as the Centralia Station, are assumed to be paid for by the developer.

The City contracted with FCS Group to complete a rate and sufficiency analysis including the wastewater system. Due to the Centennial Grant and the ongoing strong fiscal and operational performance of the utility, the analysis determined that no rate adjustments are needed above the previously-adopted inflationary rate adjustment policy of 2.00 percent annually. It recommended that the City revisit the study findings during the budget cycle to check that the assumptions used remain appropriate and no significant changes have occurred that would alter the results of the study. The City should use the study findings as a living document, continuously comparing the study outcomes to actual revenues and expenses. Any significant or unexpected changes will require adjustments to the rate strategy proposed. The City annually reviews the proposed sewer system improvements to prioritize funds and plan financing for capital projects. Annual wastewater budgets, including capital expenditures, are then reviewed and approved each year by the City Council.

The FCS Group analysis also identified the Phase II WWTP Improvements as a significant item for future study. The anticipated timing of this project is outside the capital cost horizon used in the rate study. As such, detailed design and construction costs estimates are not yet available, and the rate revenue requirements for this project are not reflected in the financial modeling. Potential project funding sources include the State Centennial Grant program, the Clean Water State Revolving Fund loan program, wastewater revenue bonds, Capital Facility Charge revenues, and general wastewater rate revenues. FCS Group recommended that once a construction date and project cost estimates are known, an update to the wastewater rate study be conducted. Completing this planning effort at least three years prior to the project will maximize the City's ability to mitigate the rate impacts of the project, as well as position the City to achieve the best outcomes for project funding.

CHAPTER 9

Implementation

This chapter describes the implementation of improvements described in this General Sewer/Facility Plan, including the following:

- Plan adoption
- Water quality management plant conformance
- Environmental checklist and permits
- Public involvement process
- Developer extensions
- Construction standards

9.1 Plan Adoption

A key element of implementing the General Sewer/Facility Plan is proper compliance with state and local requirements governing adoption of such documents. The plan should be reviewed by City staff and then submitted to Ecology for review. An electronic version of the plan should also be made available on the City's website. Following receipt of comments from affected agencies and completion of the final environmental determination, the plan will be adopted by the City Council. The final environmental determination and Ecology approval will serve as additional support and endorsement of the Plan and the recommended improvements contained in the document.

9.2 Water Quality Management Plan

There is no formal water quality management plan in place for the Chehalis River near the City. As previously discussed in Chapter 2, TMDLs for temperature, DO, and fecal coliform are being implemented by Ecology through the City's NPDES discharge permit. In particular, the loading allocations in the City's NPDES permit are part of the TMDL for DO. WWTP effluent is expected to continue to meet or exceed current effluent quality and meet the plant's NPDES discharge permit obligations as discussed in Chapter 6.

9.3 State Environmental Policy Act

Compliance with SEPA is a prerequisite for obtaining any permits and approvals for a WWTP project. SEPA allows agencies to both consider and mitigate for environmental impacts of proposals as well as to provide opportunities for public participation prior to any final decision. SEPA Environmental Checklists were developed for both the Phase I WWTP Modifications project and the non-project review of the plan. The City, as the SEPA lead agency, has conducted SEPA review for the Phase I project and will conduct the non-project review for the plan prior to finalizing the plan. No comments were received during the comment period for the Phase 1 WWTP Modifications SEPA checklist, which ended on November 3, 2017, and the City issued a Determination of Non-Significance for the project on October 10, 2017 and for the plan on March 2, 2019. The SEPA Environmental Checklists and documentation can be found in Appendix N.

9.4 State Environmental Review Process

All projects that apply for financial assistance from the SRF for facility planning or construction must meet the provisions of the State Environmental Review Process (SERP; WAC 173-98-720). SERP compliance helps to ensure that environmentally sound and cost-effective alternatives are selected and

that the public has had an opportunity to learn about and comment on the potential environmental impacts of a proposal. SERP documentation for the Phase I WWTP Modifications project is included in Appendix N.

All projects that apply for financial assistance from the SRF for construction must comply with the federal cross cutting authorities (cross-cutters). These include several federal laws, executive orders, and government-wide policies that apply their own terms to projects and activities receiving federal financial assistance, regardless of whether the statute authorizing the assistance makes them applicable. Appendix O summarizes how the Phase I WWTP Modifications project will comply with the cross-cutters.

9.5 Schedule

Table 8-3 shows the planned system improvement projects for the next 6 years. The design of Phase I WWTP improvements would be completed in 2017 with construction and improvements operational in 2020. If growth continues as projected, Phase II WWTP improvements would be required by approximately 2024. If the City chooses to apply for SRF monies to help fund the Phase II improvements, application for design funding would be completed in 2020, design would be completed in 2021, and construction would be completed in 2022 to 2023.

9.6 List of Required Permits

The following is a preliminary list of anticipated permits and approvals for the Phase I and II WWTP improvements project:

- State Environmental Review Process Compliance, Washington State Department of Ecology
- Notice of Construction, Washington State Department of Ecology
- State Environmental Policy Act Documentation and Determination, City of Centralia
- Building Permit, Lewis County
- Grading Permit, Lewis County
- Electrical permits, Department of Labor and Industries
- Plumbing permits, Department of Health
- NPDES general construction permit, Washington State Department of Ecology

9.7 Public Involvement Process

The draft General Sewer/Facility Plan was made available to the public through the City's website.

9.8 Developer Extensions

Private funding is a frequently used mechanism for financing construction of sewer system improvements in the City. Historically, system improvements have been required as a condition of approval of any proposed development project.

A primary implementation goal of the City is to be able to respond to developer requests for sewer connections. To date, the City is not able to determine the available capacity in its system and the requirements for additional connections. The analysis presented in Chapter 5 gives the City an indication of those lines, which appear to be approaching capacity during existing peak sanitary dry weather flows. In addition, the amount of surcharge that might be expected from the identified additional flows was also estimated. This information, combined with the flow monitoring program, will give the City the tools to better estimate the capability of the existing trunks to accept additional flows.

The ability for the City to make this estimation will improve over time as data is collected and the preliminary assessments in this plan are refined. Three options for a level of effort of data collection are (1) no action, use only existing information, (2) visually inspect water surface elevations in manholes, and (3) detailed flow monitoring analysis. If additional connections are made, the risk to the City includes the potential for sewer backups or overflows. Sewer backups into residences or businesses are highly undesirable and could result in citizen complaints or legal action or both.

The level of effort expended in data collection affects the amount of certainty with which the City can add future hookups. The City can use data collected from monitoring water surface elevations to confirm the estimations in this plan. The level of surcharging present (if any) can be used as an indicator of the remaining capacity of each main trunk sewer. The projected flows from the proposed new hookups can be used to calculate the additional headloss, which could occur in the trunk sewer. This, combined with the documented level of surcharging in the trunk sewer, can be balanced against the potential for overflows and/ or sewer backups and can be used as a basis for determining whether the additional flows should be accepted. The pump station records can be used to quantify how much capacity remains in the appropriate pump station and to determine if it is sufficient for the new flows. Much of this analysis can be conducted by City staff using a basic hydraulics analysis program.

The least risky approach is to perform the detailed flow monitoring analysis. The flow monitoring analysis data could be used to quantify the flows in the existing system under surcharged and non-surcharged conditions and to predict the flow characteristics of new hookups. The flow information could be used to develop a hydraulic model, which predicts the hydraulic grade line through the system with existing and future flows. This can indicate whether potential exists for sewer backups or overflows, or both, related to the addition of the new flows.

Another implementation goal of the City is to minimize the number of pump stations in the system by requiring a comprehensive approach to laying out new systems that employ deeper sewer lines laid at minimum slopes, which could eventually feed into the existing system via gravity. In the past, most developments that applied for sewer service developed a sewer system that meets the development's immediate needs. Often this took the form of a shallow collection system and pump station to connect to the existing system.

In the short-term, developers could be allowed to install pump stations; however, the ultimate plan would be to convert them to a gravity system. This requires the developers to plan ahead and submit a two-phase development approach to the City, demonstrating the compliance of the development's sewer service with the City's vision. The City’s Municipal Code Title 15.10.180 Paragraph H outlines the use of alternative systems which covers the installation, ownership and maintenance of the systems. The City is planning to add a list of approved qualified contractors that can perform maintenance on these temporary systems. All maintenance and inspections scheduled will be tracked and maintained by the City of Centralia maintenance program.

Specific items must be required of new pump stations to permit the area served by the pump station to be connected via gravity sewer in the future. The wet well bottom depth must be low enough so that it could discharge to the existing system via a gravity line at 0.4 percent slope in the future. Lines that discharge to the pump station must be laid out such that they could also discharge directly to the nearest trunk sewer at 0.4 percent slope. An exception to these requirements may be granted if the potential pump station is in a low area, which precludes connecting with the gravity system.

9.9 Construction Standards

Contract documents for all projects constructed within the City shall be prepared based on the most current edition of the City of Centralia Design and Development Guidelines. These guidelines are the same as the standards in Ecology's *Criteria for Sewage Works Design* (Ecology, 2019).

CHAPTER 10

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None

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None

Chapter 8

None

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Appendix A
City of Centralia General Sewer/ Facility Plan Crosswalk

APPENDIX A

City of Centralia General Sewer/Facility Plan Crosswalk

TOPIC	Washington State Department of Ecology Facility Plan	Washington State Department of Ecology General Sewer Plan	Attachment 1 to Centralia General Sewer Plan Approval, dated July 28, 2015	SECTION IN REPORT/COMMENTS
I. General Information				
A. Site Description	X			Chapter 2
B. Location Map	X			Chapter 2
C. Present and Proposed Sewer Service Area	X	X		Chapter 2
D. Problem Identification; Purpose and Need for Proposed Plan	X	X		Chapter 1
E. Description of Discharge Standards including NPDES Permit requirements	X			Chapter 6
F. Remove Legacy Information			X	Completed
II. Background Information				
A. Existing Environment				
1. Water	X			Chapter 2
2. Air	X			Chapter 2
3. Floodplains	X			Chapter 2
4. Shorelands	X			Chapter 2
5. Wetlands	X			Chapter 2
6. Prime or unique farmland	X			Chapter 2
7. Archaeological and historical sites	X			Chapter 2

TOPIC	Washington State Department of Ecology Facility Plan	Washington State Department of Ecology General Sewer Plan	Attachment 1 to Centralia General Sewer Plan Approval, dated July 28, 2015	SECTION IN REPORT/COMMENTS
8. Wild and scenic rivers	X			Chapter 2
9. Endangered and threatened species/habitats	X			Chapter 2
10. Public health	X			Chapter 2
B. Demography and Land Use				
1. Current population	X			Chapter 2
2. Current land use zoning	X			Chapter 2
3. Current land use map	X			Chapter 2
4. Population trends and methods used to determine those trends		X		Chapter 2
5. Design Growth Rate analysis			X	Chapter 2
C. Layout Maps				
1. Boundary lines of municipality and vicinity		X		Chapter 2
2. Existing and proposed sewers and areas served		X		Chapter 4, Chapter 5
3. Existing and proposed pump stations and force mains		X		Chapter 4, Chapter 5
4. Topography and elevations of existing and proposed ground		X		Chapter 2
5. Information on streams, lakes, other bodies of water, and discharges.		X		Chapter 2
6. Information on water systems		X		Chapter 2
D. Existing Wastewater Facilities				
1. Information on existing wastewater facilities in the area.		X		Chapter 4
2. Describe current treatment process	X			Chapter 4
a. Discussion on the provisions for treatment, discharge, and reuse.		X		Chapter 4
b. Existing design capacity & wastewater flows and characteristics	X			Chapter 4

TOPIC	Washington State Department of Ecology Facility Plan	Washington State Department of Ecology General Sewer Plan	Attachment 1 to Centralia General Sewer Plan Approval, dated July 28, 2015	SECTION IN REPORT/COMMENTS
3. Current plant loading (tables of at least 1 year of data)	X			Chapter 3
4. Locations & waste characteristics of current industrial dischargers.	X	X		Chapter 3
5. Sources of plant loadings				
a. Industrial	X			Chapter 3
b. Commercial	X			Chapter 3
c. Domestic	X			Chapter 3
d. Infiltration	X			Chapter 3
e. Inflow	X			Chapter 3
6. Seasonal and diurnal load and flow variations	X			Chapter 3
7. Flow meter accuracy checked	X			Flow meter accuracy has been checked
8. Lab analysis checked for accuracy by state certified lab	X			Lab analysis has been checked
9. Plant bypasses	X			Chapter 4
10. Sewer System Design Criteria			X	Chapter 3
E. Receiving Water Evaluations				
1. Summary of existing water quality data	X			Chapter 6 – Reasonable Potential Analysis
2. AWT need evaluated	X			Chapter 6 – Reasonable Potential Analysis
3. Impairment Analysis			X	Chapter 6 – Reasonable Potential Analysis
a. Water quality analyzed to comply with Antidegradation provisions of WAC 173-201A-300 to 330	X			Chapter 6 – Reasonable Potential Analysis
b. Mixing zone analysis	X			Not applicable. Permit-defined dilution factors used in Impairment Analysis.
c. Toxics in effluent	X			Chapter 6 – Reasonable Potential Analysis

TOPIC	Washington State Department of Ecology Facility Plan	Washington State Department of Ecology General Sewer Plan	Attachment 1 to Centralia General Sewer Plan Approval, dated July 28, 2015	SECTION IN REPORT/COMMENTS
d. Nutrient, bacteria, and chemical impacts	X			Chapter 4, Chapter 6 – Reasonable Potential Analysis
e. Measurable change in water quality standards being at the boundary of the chronic mixing zone (if allowed)	X			Chapter 6 – Reasonable Potential Analysis
f. Receiving water flows	X			Not applicable. Permit-defined dilution factors used in Impairment Analysis.
g. Metals Limits			X	Chapter 6 – Reasonable Potential Analysis
h. Temperature			X	Chapter 6 – Reasonable Potential Analysis
F. I/I Discussion	X	X		Chapter 3
1. Degree in collection system	X			Chapter 3
a. Methods used and data adequate to support excessive or non-excessive I/I determination	X			Chapter 3
b. Non-excessive I/I determined and used as part of base flow in design	X		X	Chapter 3
c. Schedule for sewer rehab including where rehabilitation is proposed and amount of correction from rehabilitation is realistic	X		X	Chapter 5
2. Sewer overflows	X			Chapter 4
a. Fixes recommended	X			Chapter 4 includes improvements made
3. Combined sewer overflows	X			Not applicable; no combined sewer overflows
G. Sanitary surveys for unsewered Communities	X			Chapter 2
H. Information on existing wells or other water supply sources		X		Chapter 2
I. Detailed Plant Capacity Analysis			X	Chapter 6
III. Future Conditions				
A. Demography or Land Use				Chapter 2

TOPIC	Washington State Department of Ecology Facility Plan	Washington State Department of Ecology General Sewer Plan	Attachment 1 to Centralia General Sewer Plan Approval, dated July 28, 2015	SECTION IN REPORT/COMMENTS
1. Population projections based on appropriate data source	X			Chapter 2
2. Future land use changes/zoning densities	X			Chapter 2
3. Reserved capacity	X			Capacity has not been reserved for any specific developers.
4. Recreation and open space alternatives including access to bodies of water	X			Chapter 6
B. Waste Load	X			Chapter 3
1. Future flows & loadings	X			Chapter 3
a. Domestic	X			Chapter 3
b. Commercial	X			Chapter 3
c. Industrial	X			Chapter 3
d. I/I	X			Chapter 3
2. Industrial wastes requiring special handling?	X			None
IV. Alternatives				
A. Locations				
1. Alternative sites	X			Not applicable; all treatment alternatives located within existing plant site
2. Proximity of residences or developed areas	X			Not applicable; all treatment alternatives located within existing plant site
3. Topography and flood potential for 25-year and 100-year flood	X			Not applicable; all treatment alternatives located within existing plant site
3. Impacts to existing wetlands including mapping of existing wetlands	X			Not applicable; all treatment alternatives located within existing plant site

TOPIC	Washington State Department of Ecology Facility Plan	Washington State Department of Ecology General Sewer Plan	Attachment 1 to Centralia General Sewer Plan Approval, dated July 28, 2015	SECTION IN REPORT/COMMENTS
4. Adequacy of site soils to support the facility	X			Not applicable; all treatment alternatives located within existing plant site
B. Design Criteria				
1. Design population	X			Chapter 2
2. Design flow conditions (peak, average, wet, & dry weather)	X			Chapter 3
3. BOD, TSS, nutrients	X			Chapter 3
4. Recycle streams	X			Chapter 3
5. Special handling for industrial wastes	X			Not applicable
a. Treatability in STP	X			Not applicable
b. Pretreatment needs	X			Not applicable
C. Collection System Alternatives	X			Chapter 5
D. Types of Systems Evaluated (i.e., all practicable waste treatment technologies)	X			Chapter 6
1. Fixed growth	X			Not selected for further evaluation; did not want to change existing plant suspended growth process
2. Suspended growth	X			Chapter 6
3. Land treatment	X			Not selected for further evaluation; did not want to change existing plant suspended growth process
4. Lagoons	X			Not selected for further evaluation; did not want to change existing plant suspended growth process
5. Operational improvements and use of existing facilities	X			Chapter 6
6. Innovative or alternative	X			Chapter 4

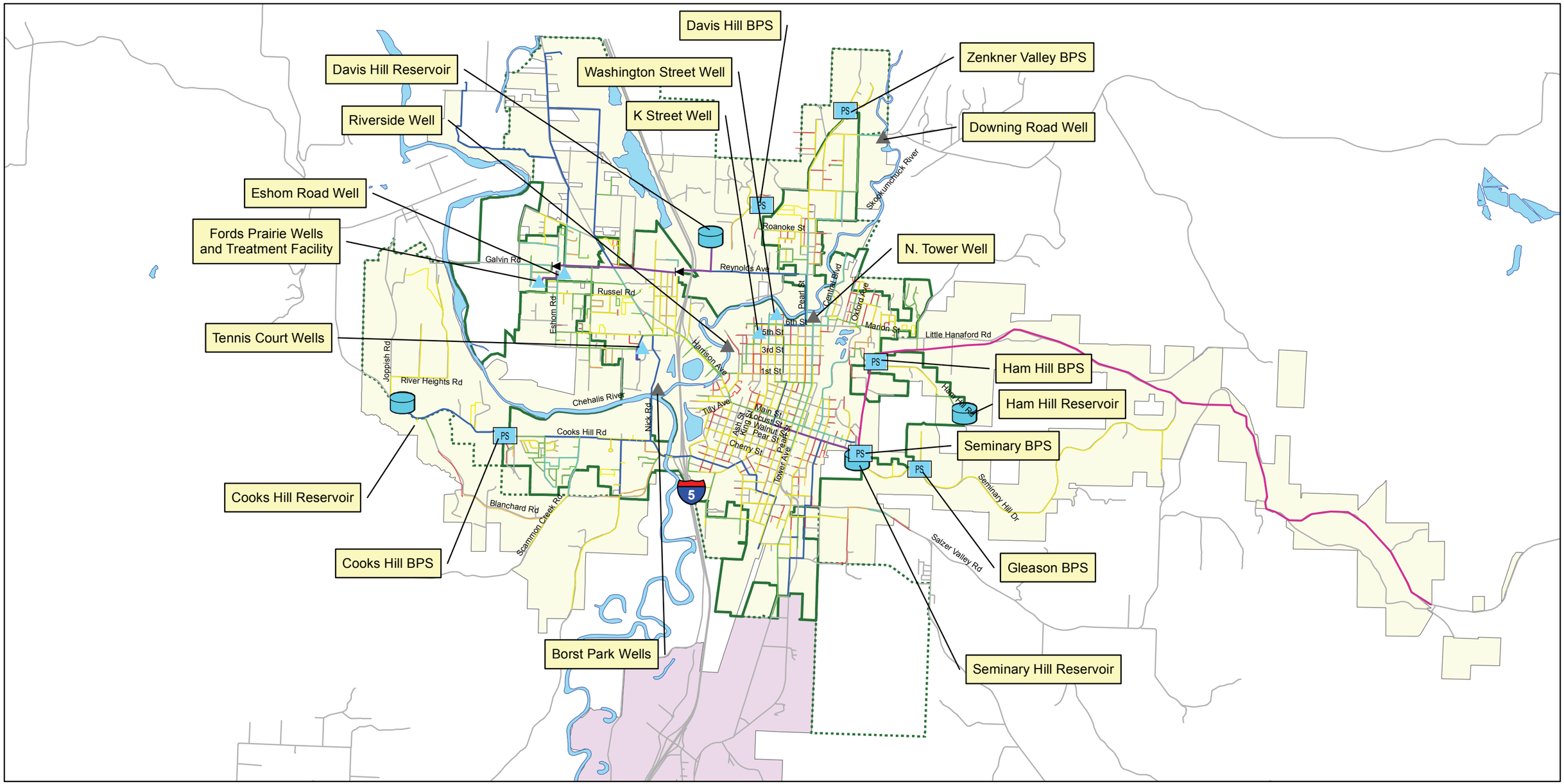
TOPIC	Washington State Department of Ecology Facility Plan	Washington State Department of Ecology General Sewer Plan	Attachment 1 to Centralia General Sewer Plan Approval, dated July 28, 2015	SECTION IN REPORT/COMMENTS
7. No action	X			Not selected for further evaluation; action is required to provide adequate treatment capacity for future growth
8. Provide for nutrient removal			X	Chapter 6
E. Residual Solids Management Plan	X			Chapter 4
1. Evaluation of expected solids quantities and quality	X			Chapter 6
2. Potential disposal or beneficial use options (including regional biosolids disposal and utilization options)	X			Chapter 6
F. Evaluation and Effects of Flow Reduction Measures	X			Chapter 3 and Chapter 5
G. Evaluate & Rank Alternatives	X	X		Chapter 6
1. Criteria				Chapter 6
a. Total capital costs	X			Chapter 6
b. Environmental impacts	X			Chapter 6
c. Public acceptability	X			Chapter 6
d. Meet effluent limits	X			Chapter 6
e. Ease of maintenance	X			Chapter 6
f. Present worth (including O & M)	X			Chapter 6
H. Select Final Alternatives to Further Evaluate and Rank				Chapter 6
1. Evaluate and rank final alternatives	X			Chapter 6
2. Select recommended alternative	X	X		Chapter 6
V. Final Recommended/Selected Alternatives				
A. Site Layout including proposed sampling locations	X			Chapter 6

TOPIC	Washington State Department of Ecology Facility Plan	Washington State Department of Ecology General Sewer Plan	Attachment 1 to Centralia General Sewer Plan Approval, dated July 28, 2015	SECTION IN REPORT/COMMENTS
B. Flow Diagram	X			Chapter 6
C. Hydraulic Profiles (peak plant flow and high receiving water flow or elevation and low plant flow conditions)	X			Chapter 6
D. Solids Mass Balance	X			Chapter 6
E. Follows Recommendations in Criteria Manual	X			Yes
F. Design Criteria for Each Process Unit	X		X	Chapter 6
G. Sizing Calculations for Each Process Unit	X			Chapter 6, appendix
H. Design Life	X			Chapter 6
I. Age and Adequacy of Existing Process	X			Chapter 6
J. Environmental Impacts	X			Chapter 9
K. Recycle Flow Accounted for?	X			Yes, design calculations in appendix
L. Site Specific Outfall Analysis	X			Chapter 6 – Reasonable Potential Analysis
M. Biosolids Disposal Plan	X			Chapter 6
N. Ability to Expand Treatment Plant	X			Chapter 6
O. Growth expectations	X			Chapter 2
1. Population	X			Chapter 2
2. Commercial	X			Chapter 2
3. Industrial	X			Chapter 2
P. Ability to Expand Collection System	X			Chapter 5
Q. Future Environment Without the Project	X			Chapter 6
R. Implementation				

TOPIC	Washington State Department of Ecology Facility Plan	Washington State Department of Ecology General Sewer Plan	Attachment 1 to Centralia General Sewer Plan Approval, dated July 28, 2015	SECTION IN REPORT/COMMENTS
1. O&M Staffing Requirements	X			Chapter 9
2. Lab Staffing Requirements	X			Chapter 9
3. Feasibility of Implementation	X			Chapter 9
6. Schedule				Chapter 9
VI. Financial				
A. Capital, O&M, Costs of Selected Alternative	X			Chapter 8
B. User Charges for Selected Alternative With Loan & Without Loan	X		X	Chapter 8
C. Existing and Proposed Cost per Service		X	X	Chapter 8
D. Funding of Project	X		X	Chapter 8
1. Possible funding sources identified	X			Chapter 8
2. Effects of possible funding sources on project and user costs evaluated	X			Chapter 8
E. Capital Financing Plan	X			Chapter 8
VII. Other Requirements				
A. WQMP Conformance	X	X		Chapter 9
B. SEPA Compliance Achieved	X	X		Chapter 9
C. NEPA compliance	X	X		Chapter 9
D. SERP compliance	X			Chapter 9
E. Environmental Issues Analysis	X			Chapter 9
F. Projects identified in a:				
1. General sewer plan	X			Current Plan
2. Capital improvement plan	X			Chapter 8

TOPIC	Washington State Department of Ecology Facility Plan	Washington State Department of Ecology General Sewer Plan	Attachment 1 to Centralia General Sewer Plan Approval, dated July 28, 2015	SECTION IN REPORT/COMMENTS
G. Public participation	X			Chapter 9
H. List of Needed Permit Approvals for Recommended Alternative	X			Chapter 9
I. Discussion of who will own, operate, and maintain the system		X		Chapter 7

Appendix B
Water System Facility Map



Legend

- Pump Station
- Reservoir
- Inactive Well
- Active Well
- PRV

Waterline Diameter (in)

- <4
- 4
- 6
- 8
- 10
- 12
- 16
- 18

- Water Body
- Road
- Centralia City Limits
- Centralia Urban Growth Boundary
- City of Centralia Retail Service Area
- City of Chehalis Water Service Area

CENTRALIA

HDR

N

0 2,500 5,000 10,000 Feet

Figure 5-1
Water System Facility Map

CITY OF CENTRALIA
WATER SYSTEM PLAN

April 2013

Appendix C
Industrial User Permits and Lewis County Interlocal Agreement

DEPARTMENT OF
ECOLOGY
State of Washington

Issuance Date: February 24, 2015
Effective Date: July 1, 2015
Expiration Date: June 30, 2020

STATE WASTE DISCHARGE PERMIT NUMBER ST 6139

State of Washington
DEPARTMENT OF ECOLOGY
Southwest Regional Office
P.O. Box 47775
Olympia, WA 98504-7775

In compliance with the provisions of the
State of Washington Water Pollution Control Law
Chapter 90.48 Revised Code of Washington, as amended,

Lewis County Community Development Department
P.O. Box 180
Centralia, WA 98531

is authorized to discharge wastewater in accordance with the special and general conditions which follow.

Facility Location: 1411 South Tower Avenue Centralia, WA 98531	SIC Code: 4212 NAICS Code:562111
Industry Type: Solid Waste Transfer Station POTW Receiving Discharge: The City of Centralia	Minor Industrial User

Richard Doenges
Southwest Region Manager
Water Quality Program
Washington State Department of Ecology

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SUMMARY OF PERMIT REPORT SUBMITTALS

Refer to the Special and General Conditions of this permit for additional submittal requirements.

Permit Section	Submittal	Frequency	First Submittal Date
S3.A.	Discharge Monitoring Report (DMR)	Monthly	August 15, 2015
S3.A.	DMR - Priority Pollutant Data - Single Sample Data	2/permit cycle	February 1, 2016 & January 2, 2019
S3.F.	Reporting Permit Violations	As necessary	
S4.B.	Reporting Bypasses	As necessary	
S7.	Application for Permit Renewal	1/permit cycle	January 2, 2019
S9.	Spill Plan	1/permit cycle	February 1, 2016
S10.	Slug Discharge Control Plan	1/permit cycle	February 1, 2016
G1.	Notice of Change in Authorization	As necessary	
G4.	Permit Application for Substantive Changes to the Discharge	As necessary	
G5.	Engineering Report for Construction or Modification Activities	As necessary	
G7.	Notice of Permit Transfer	As necessary	
G10.	Duty to Provide Information	As necessary	

SPECIAL CONDITIONS

S1. DISCHARGE 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 concentration in excess of, that authorized by this permit violates the terms and conditions of this permit.

A discharge of a pollutant in excess of local limits set by the city of Centralia violates the terms and conditions of this permit.

Beginning on the effective date, the Permittee is authorized to discharge wastewater to the city of Centralia sewer system subject to the following limits:

Effluent Limits: Outfall 001 Latitude 46.69933 Longitude -122.96170		
Parameter	**Average Monthly [a]**	**Maximum Daily [b]**
Biochemical Oxygen Demand (BOD_5)	50 lbs/day	50 lbs/day
Total Suspended Solids (TSS)	50 lbs/day	50 lbs/day
Oil and Grease	2 lbs/day	2 lbs/day
Parameter	**Minimum**	**Maximum**
pH	6.0 Standard Units	9.0 Standard Units

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.
b	Maximum daily effluent limit means the highest allowable daily discharge. The daily discharge means the 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. For other units of measurement, the daily discharge is the average measurement of the pollutant over the day. This does not apply to pH.

S2. MONITORING REQUIREMENTS

A. Monitoring Requirements

The Permittee must monitor the wastewater and production according to the following schedule:

The Permittee must monitor in accordance with the following schedule and the requirements specified in Appendix A.

Parameter	Units	Sampling Frequency	Sample Type
(1) Final Wastewater Effluent			
Flow	gpd	Monthly	Metered
BOD_5	mg/L	Monthly	Grab[a]
BOD_5	lbs/day	Monthly	Calculated
TSS	mg/L	Monthly	Grab[a]
TSS	lbs/day	Monthly	Calculated
Oil and Grease	mg/L	Monthly	Grab[a]
Oil and Grease	lbs/day	Monthly	Calculated
TKN	mg/L	Monthly	Grab[a]
pH	Standard Units	Monthly	Grab[a]
(2) Permit Renewal Application Requirements – Final Wastewater Effluent[c]			
Cyanide	µg/L		Grab[a]
Total Phenolic Compounds	µg/L		Grab[a]
Priority Pollutants (PP) – Total Metals	µg/L; ng/L for mercury	1/permit cycle	24-Hour Composite[b] Grab[a] for Mercury
PP – Volatile Organic Compounds	µg/L	1/permit cycle	Grab[a]
PP – Acid-extractable Compounds	µg/L	1/permit cycle	24-Hour Composite[b]
PP – Base-neutral Compounds	µg/L	1/permit cycle	24-Hour Composite[b]
PP - Dioxin	pg/L	1/permit cycle	24-Hour Composite[b]
PP – Pesticides/PCBs	µg/L	1/permit cycle	24-Hour Composite[b]
(3) Effluent Characterization – Final Wastewater Effluent[c]			
Cyanide	µg/L		Grab[a]
Total Phenolic Compounds	µg/L		Grab[a]
Priority Pollutants (PP) – Total Metals	µg/L; ng/L for mercury	1/permit cycle	24-Hour Composite[b] Grab for mercury

PP – Volatile Organic Compounds	µg/L	1/permit cycle[c]	Grab[a]
Parameter	**Units**	**Sampling Frequency**	**Sample Type**
PP – Acid-extractable Compounds	µg/L	1/permit cycle[c]	24-Hour Composite[b]
PP – Base-neutral Compounds	µg/L	1/permit cycle[c]	24-Hour Composite[b]
PP - Dioxin	pg/L	1/permit cycle[c]	24-Hour Composite[b]
PP – Pesticides/PCBs	µg/L	1/permit cycle[c]	24-Hour Composite[b]

a	Grab means an individual sample collected over a 15 minute, or less, period.
b	Twenty-four (24)-hour composite means a series of individual samples collected over a 24-hour period into a single container, and analyzed as one sample.
c	The Permittee is required to submit the priority pollutant scan twice during five year permit cycle. First priority pollutant scan must be submitted by **February 1, 2016**, and second priority pollutant scan must be submitted by **January 2, 2019.**

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, including representative sampling of any unusual discharge or discharge condition, including bypasses, upsets and maintenance-related conditions affecting effluent quality.

Sampling and analytical methods used to meet the water and wastewater monitoring requirements specified in this permit must conform to the latest revision of the following rules and documents unless otherwise specified in this permit or approved in writing by the Department of Ecology (Ecology).

- Guidelines Establishing Test Procedures for the Analysis of Pollutants contained in 40 Code of Federal Regulations (CFR) Part 136
- Standard Methods for the Examination of Water and Wastewater (APHA)

C. Flow Measurement, Field Measurement, and Continuous Monitoring Devices

The Permittee must:

1. Select and use appropriate flow measurement, field 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, the

manufacturer's recommendation, and approved Operation and Maintenance (O&M) Manual procedures for the device and the wastestream.

3. Calibrate flow-monitoring devices at a minimum frequency of at least one calibration per year.

4. Maintain calibration records for at least three years.

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 Washington Administrative Code (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.

E. Request for Reduction in Monitoring

The Permittee may request a reduction of the sampling frequency after 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.

A. Discharge Monitoring Reports

The first monitoring period begins on the effective date of the permit (unless otherwise specified). 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 the Water Quality Permitting Portal. 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 the Water Quality Permitting Portal go to: http://www.ecy.wa.gov/programs/wq/permits/paris/webdmr.html.

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 and calculated total 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 from the same monitoring point 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, pulp and paper chlorophenolics, TTOs) 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 copy of the laboratory report as an attachment 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. Submit DMRs for parameters with the monitoring frequencies specified in S2 at the reporting schedule identified below. The Permittee must:

   a. Submit **monthly** DMRs by the 15th day of the following month.

   b. Submit priority pollutant scan by **February 1, 2016**.

c. Submit permit renewal application monitoring data in WQWebDMR as required in Special Condition S2 by **January 2, 2019**.

B. Permit Submittals and Schedules

The Permittee must use the Water Quality Permitting Portal – Permit Submittals application (unless otherwise specified in the permit) to submit all other written permit-required reports by the date specified in the permit.

When another permit condition requires submittal of a paper (hard-copy) report, the Permittee must ensure that it is postmarked or received by Ecology no later than the dates specified by this permit. Send these paper reports to Ecology at:

Water Quality Permit Coordinator
Department of Ecology
Southwest Regional Office
P.O. Box 47775
Olympia, WA 98504-7775

C. Records Retention

The Permittee must retain records of all monitoring information for a minimum of three 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.

D. 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.

E. Additional Monitoring by the Permittee

If the Permittee monitors any pollutant more frequently than required by 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 Condition S2.

F. 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 30 days of sampling.

   a. Immediate Reporting

      The Permittee must report any noncompliance that may endanger health or the environment immediately to the Department of Ecology's Regional Office 24-hour number listed below:

      Southwest Regional Office 360-407-6300

   b. Twenty-Four-Hour Reporting

      The Permittee must report the following occurrences of noncompliance by telephone, to Ecology at the telephone numbers listed above, within 24 hours from the time the Permittee becomes aware of any of the following circumstances. The Permittee must report:

      i. Any noncompliance that may endanger health or the environment, unless previously reported under immediate reporting requirements.

      ii. Any unanticipated bypass that causes an exceedance of an effluent limit in the permit (see Part S4.A, “Bypass Procedures”).

      iii. Any upset that causes an exceedance of an effluent limit in the permit. 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.

      iv. Any violation of a maximum daily or instantaneous maximum discharge limit for any of the pollutants in Section S1.A of this permit.

v. 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. This requirement does not include industrial process wastewater overflows to impermeable surfaces which are collected and routed to the treatment works.

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:

i. A description of the noncompliance and its cause.

ii. The period of noncompliance, including exact dates and times.

iii. The estimated time the Permittee expects the noncompliance to continue if not yet corrected.

iv. Steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

v. 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.

G. Other Reporting

1. Spills of Oil or Hazardous Materials

The Permittee must report a spill of oil or hazardous materials in accordance with the requirements of Revised Code of Washington (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.

2. 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.

H. 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.

I. Dangerous Waste Discharge Notification

The Permittee must notify the publicly owned treatment works (POTW) and Ecology in writing of the intent to discharge into the POTW any substance designated as a dangerous waste in accordance with the provisions of WAC 173-303-070. It must make this notification at least 90 days prior to the date that it proposes to initiate the discharge. The Permittee must not discharge this substance until authorized by Ecology and the POTW. It must also comply with the notification requirements of Special Condition S8 and General Condition G4.

J. Spill Notification

The Permittee must notify the POTW immediately (as soon as discovered) of all discharges that could cause problems to the POTW, such as process spills and unauthorized discharges (including slug discharges).

S4. OPERATION AND MAINTENANCE

The Permittee must, at all times, properly operate and maintain all facilities or systems of treatment and control (and related appurtenances) which are installed to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems, which are installed by a Permittee only when the operation is necessary to achieve compliance with the conditions of this permit.

A. 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 10 days before the date of the bypass.

2. Bypass 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.
      - Stopping production.
      - 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.

   c. The Permittee has properly notified Ecology of the bypass as required in Condition S3.F 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 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 State Environmental Policy Act (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 the project planning and design process. The project-specific engineering report or facilities plan as well as the plans and specifications must include details of probable construction bypasses 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. PROHIBITED DISCHARGES

The Permittee must comply with these General and Specific Prohibitions.

A. General Prohibitions

The Permittee must not introduce into the POTW pollutant(s), which cause Pass Through or Interference.

B. Specific Prohibitions

In addition, the Permittee must not introduce the following into the POTW:

1. 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 60 degrees C (140 degrees F) using the test methods specified in 40 CFR 261.21.

2. Solid or viscous pollutants in amounts, which will cause obstruction to the flow in the POTW resulting in interference.

3. Any pollutant (including oxygen-demanding pollutants (BOD_5, etc.), released in a discharge at a flow rate and/or pollutant concentration that will cause interference with the POTW.

4. Heat in amounts which will inhibit biological activity in the POTW resulting in interference, but in no case heat in such quantities that the temperature at the POTW treatment plant exceeds 40 degrees C (104 degrees F) unless the approval authority, upon request of the POTW, approves alternative temperature limits.

5. Petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through.

6. Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems.

7. Any trucked or hauled pollutants, except at discharge points designated by the POTW.

8. Pollutants that will cause corrosive structural damage to the POTW.

C. Prohibited Unless Approved

Any of the following discharges are prohibited unless approved by Ecology under extraordinary circumstances (such as a lack of direct discharge alternatives due to combined sewer service or a need to augment sewage flows due to septic conditions):

1. Noncontact cooling water in significant volumes.

2. Storm water and other direct inflow sources.

3. 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 discharge of dangerous wastes as defined in Chapter 173-303 WAC (Unless specifically authorized in this permit).

S6. DILUTION PROHIBITED

The Permittee must not dilute the wastewater discharge with stormwater or increase the use of potable water, process water, noncontact cooling water, or, in any way, attempt to dilute an

effluent as a partial or complete substitute for adequate treatment to achieve compliance with the limits contained in this permit.

S7. APPLICATION FOR PERMIT RENEWAL OR MODIFICATION FOR FACILITY CHANGES

The Permittee must submit an application for renewal of this permit by **January 2, 2019**.

The Permittee must also submit a new application or supplement at least 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.

S8. NON-ROUTINE AND UNANTICIPATED DISCHARGES

A. Beginning on the effective date of this permit, the Permittee is authorized to discharge non-routine wastewater on a case-by-case basis to the sanitary sewer if approved by Ecology and the POTW. Prior to any such discharge, the Permittee must contact Ecology and **at a minimum** provide the following information:

1. The proposed discharge location

2. The nature of the activity that will generate the discharge

3. Any alternatives to the discharge, such as reuse, storage, or recycling of the water

4. The total volume of water it expects to discharge

5. The results of the chemical analysis of the water

6. The date of proposed discharge

7. The expected rate of discharge discharged, in gallons per day

B. The expected rate of discharge in gallons per minute for discharges greater than 20,000 gallons.

C. The Permittee must analyze the water for all constituents limited for the discharge and report them as required by subpart 1.e above. The analysis must also include any parameter deemed necessary by Ecology. All discharges must comply with the effluent limits as established in Condition S1 of this permit and any other limits imposed by Ecology.

D. The discharge cannot proceed until Ecology has reviewed the information provided and has authorized the discharge by letter to the Permittee or by an Administrative Order.

S9. SPILL CONTROL PLAN

A. <u>Spill Control Plan Submittals and Requirements</u>

The Permittee must:

1. Submit to Ecology an update to the existing Spill Control Plan by **February 1, 2016.**

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.

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.

S10. SLUG DISCHARGE CONTROL PLAN

A. Slug Discharge Control Plan Submittal and Requirements

The Permittee must:

1. Prepare and submit to Ecology, by **February 1, 2016**, a plan to minimize the potential of slug discharges from the facility covered by this permit. The Plan and any subsequent revisions become effective 30 days following submission.

2. Review its slug discharge plan and update it as needed.

3. Submit all revisions or updates of this plan to Ecology for review and approval.

4. Keep the current approved plan on the plant site and make it readily available to facility personnel.

5. Follow the approved plan and any approved supplements throughout the term of the permit.

B. Slug Discharge Control Plan Components

The slug discharge control plan must include the following information and procedures relating to the prevention of unauthorized slug discharges; it must include:

1. A description of a reporting system the Permittee will use to immediately notify facility management, the POTW operator, and appropriate state, federal, and local authorities of any slug discharges, and provisions to provide a written follow-up report within five days.

2. A description of operator training, equipment, and facilities (including overall facility plan) for preventing, containing, or treating slug discharges.

3. Procedures to prevent adverse impact from accidental spills including:

   a. Inspection and maintenance of storage areas

   b. Handling and transfer of materials

   c. Loading and unloading operations

   d. Control of plant site run-off

   e. Worker training

   f. Building of containment structures or equipment

   g. Measures for containing toxic organic pollutants (including solvents)

   h. Measures and equipment for emergency response

4. A list of all raw materials, products, chemicals, and hazardous materials used, processed, or stored at the facility; the normal quantity maintained on the premises for each listed material; and a map showing where they are located.

5. A description of discharge practices for batch and continuous processes under normal and non-routine circumstances.

6. A brief description of any unauthorized discharges which occurred during the 36-month period preceding the effective date of this permit and subsequent measures taken by Permittee to prevent or to reduce the possibility of further unauthorized discharges.

7. An implementation schedule including additional operator training and procurement and installation of equipment or facilities required to properly implement the plan.

GENERAL CONDITIONS

G1. SIGNATORY REQUIREMENTS

All applications, reports, or information submitted to Ecology must be signed as follows:

A. All permit applications must be signed by either a principal executive officer or ranking elected official.

B. 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:

1. The authorization is made in writing by the person described above and is submitted to Ecology at the time of authorization, and

2. The authorization specifies either a named individual or any individual occupying a named position.

C. Changes to authorization. If an authorization under paragraph G1.B above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization must be submitted to Ecology prior to or together with any reports, information, or applications to be signed by an authorized representative.

D. 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 ENTRY

Representatives of Ecology have the right to enter at all reasonable times in or upon any property, public or private, for the purpose of inspecting and investigating conditions relating to the pollution or the possible pollution of any waters of the state. Reasonable times include normal business hours; hours during which production, treatment, or discharge occurs; or times when Ecology suspects a violation requiring immediate inspection. Representatives of Ecology must be allowed to have access to, and copy at reasonable cost, any records required to be kept under terms and conditions of the permit; to inspect any monitoring equipment or method required in the permit; and to sample the discharge, waste treatment processes, or internal waste streams.

G3. PERMIT ACTIONS

This permit is subject to modification, suspension, or termination, in whole or in part by Ecology for any of the following causes:

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 material change in the condition of the waters of the state; or

E. Nonpayment of fees assessed pursuant to RCW 90.48.465.

Ecology may also modify this permit, including the schedule of compliance or other conditions, if it determines good and valid cause exists, including promulgation or revisions of regulations or new information.

G4. REPORTING A CAUSE FOR MODIFICATION

The Permittee must submit a new application, or a supplement to the previous application, along with required engineering plans and reports, whenever a new or increased discharge or change in the nature of the discharge is anticipated which is not specifically authorized by this permit. This application must be submitted at least 180 days prior to any proposed changes. Submission of this application does not relieve the Permittee of the duty to comply with the existing permit until it is modified or reissued.

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 should be submitted at least 180 days prior to the planned start of construction. Facilities must be constructed and operated in accordance with the approved plans.

G6. COMPLIANCE WITH OTHER LAWS AND STATUTES

Nothing in the permit excuses the Permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

G7. TRANSFER OF THIS PERMIT

This permit is automatically transferred to a new owner or operator if:

A. A written agreement between the old and new owner or operator containing a specific date for transfer of permit responsibility, coverage, and liability is submitted to Ecology;

B. A copy of the permit is provided to the new owner and;

C. Ecology does not notify the Permittee of the need to modify the permit.

Unless this permit is automatically transferred according to Section A above, this permit may be transferred only if it is modified to identify the new Permittee and to incorporate such other requirements as determined necessary by Ecology.

G8. REDUCED PRODUCTION FOR COMPLIANCE

The Permittee must control production or discharge to the extent necessary to maintain compliance with the terms and conditions of this permit upon reduction of efficiency, loss, or failure of its treatment facility until the treatment capacity 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 for 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 effluent stream for discharge.

G10. PAYMENT OF FEES

The Permittee must submit payment of fees associated with this permit as assessed by Ecology. Ecology may revoke this permit if the permit fees established under Chapter 173-224 WAC are not paid.

G11. PENALTIES FOR VIOLATING PERMIT CONDITIONS

Any person who is found guilty of willfully violating the terms and conditions of this permit is guilty of a crime, and upon conviction thereof shall be punished by a fine of up to $10,000 and costs of prosecution, or by imprisonment in the discretion of the court. Each day upon which a willful violation occurs is a separate and additional violation.

Any person who violates the terms and conditions of a waste discharge permit incurs, in addition to any other penalty as provided by law, a civil penalty in the amount of up to $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 a separate and distinct violation.

G12. 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.

G13. DUTY TO COMPLY

The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of chapter 90.48 RCW and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

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.

When the permit requires the Permittee to measure the base neutral compounds in the list of priority pollutants, it must measure all of the base neutral pollutants listed in the table below. The list includes EPA required base neutral priority pollutants and several additional polynuclear aromatic hydrocarbons (PAHs). The Water Quality Program added several PAHs to the list of base neutrals below from Ecology's Persistent Bioaccumulative Toxics (PBT) List. It only added those PBT parameters of interest to Appendix A that did not increase the overall cost of analysis unreasonably.

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

Pollutant & CAS No. ***(if available)***	**Recommended Analytical Protocol**	**Detection (DL)[1]** ***µg/L unless specified***	**Quantitation Level (QL)[2]** ***µg/L unless specified***
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 and C/D/E/G/H		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	Specified in method - sample aliquot dependent
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-		300

Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL)[1] µg/L unless specified	Quantitation Level (QL)[2] µg/L unless specified
	B/C/D/EF/G/H		
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	Specified in method - sample aliquot dependent
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

Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL)[1] µg/L unless specified	Quantitation Level (QL)[2] µg/L unless specified
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

Pollutant & CAS No. ***(if available)***	**Recommended Analytical Protocol**	**Detection (DL)[1]** ***µg/L unless specified***	**Quantitation Level (QL)[2]** ***µg/L unless specified***
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

Pollutant & CAS No. ***(if available)***	**Recommended Analytical Protocol**	**Detection (DL)[1]** ***µg/L unless specified***	**Quantitation Level (QL)[2]** ***µg/L unless specified***
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
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

Pollutant & CAS No. ***(if available)***	**Recommended Analytical Protocol**	**Detection (DL)[1]** ***µg/L unless specified***	**Quantitation Level (QL)[2]** ***µg/L unless specified***
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

Pollutant & CAS No. ***(if available)***	**Recommended Analytical Protocol**	**Detection (DL)[1]** ***µg/L unless specified***	**Quantitation Level (QL)[2]** ***µg/L unless specified***
Vinyl chloride (75-01-4)	624/SM6200B	1.0	2.0
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

Pollutant & CAS No. *(if available)*	**Recommended Analytical Protocol**	**Detection (DL)[1] *µg/L unless specified***	**Quantitation Level (QL)[2] *µg/L unless specified***
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
BASE/NEUTRAL COMPOUNDS (compounds in bold are Ecology PBTs)			
Di-n-octyl phthalate (117-84-0)	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***
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

Pollutant & CAS No. ***(if available)***	**Recommended Analytical Protocol**	**Detection (DL)[1]** ***µg/L unless specified***	**Quantitation Level (QL)[2]** ***µg/L unless specified***
1,2,4-Trichlorobenzene (120-82-1)	625	0.3	0.6
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
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

Pollutant & CAS No. ***(if available)***	**Recommended Analytical Protocol**	**Detection (DL)[1]** ***µg/L unless specified***	**Quantitation Level (QL)[2]** ***µg/L unless specified***
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. Soluble Biochemical Oxygen Demand method note: First, filter the sample through a Millipore Nylon filter (or equivalent) - pore size of 0.45-0.50 um (prep all filters by filtering 250 ml of laboratory grade deionized water through the filter and discard). Then, analyze sample as per method 5210-B.

4. NWTPH Dx - Northwest Total Petroleum Hydrocarbons Diesel Extended Range – see http://www.ecy.wa.gov/biblio/97602.html

5. NWTPH Gx - Northwest Total Petroleum Hydrocarbons Gasoline Extended Range – see http://www.ecy.wa.gov/biblio/97602.html

6. 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).

7. Total Benzofluoranthenes - Because Benzo(b)fluoranthene, Benzo(j)fluoranthene and Benzo(k)fluoranthene co-elute you may report these three isomers as total benzofluoranthenes.

8. 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.

9. PCB 1016 & PCB 1242 – You may report these two PCB compounds as one parameter called PCB 1016/1242.

DEPARTMENT OF ECOLOGY
State of Washington

Issuance Date: May 12, 2014
Effective Date: June 1, 2014
Expiration Date: May 31, 2019

STATE WASTE DISCHARGE PERMIT NO. ST 6220

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
SOUTHWEST REGIONAL OFFICE

In compliance with the provisions of the
State of Washington Water Pollution Control Law
Chapter 90.48 Revised Code of Washington, as amended,
And
The Federal Water Pollution Control Act
(The Clean Water Act)
Title 33 United States Code, Section 1251 et seq

Sierra Pacific Industries
Centralia Lumber Manufacturing Company
3115 Kuper Road
Centralia, WA 98531

is authorized discharge wastewater in accordance with the special and general conditions which follow.

Facility Address::
Sierra Pacific Industries Lumber
Manufacturing Facility
3115 Kuper Road
Centralia, WA 98531

Discharge Location:
Latitude: 46.755769
Longitude: -122.994286

Publicly Owned Treatment Works (POTW) Receiving Discharge:
The city of Centralia's Wastewater Treatment Plant

Industry Type: Sawmill SIC Code: 2421

Richard Doenges
Southwest Region Manager
Water Quality Program
Washington State Department of Ecology

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SUMMARY OF PERMIT REPORT SUBMITTALS

Refer to the Special and General Conditions of this permit for additional submittal requirements.

Permit Section	Submittal	Frequency	First Submittal Date
S3.A.	Discharge Monitoring Report	Quarterly	July 15, 2014
S3.E	Noncompliance Notification	As necessary	
S4.A.	Operation and Maintenance (O&M) Manual	1/permit cycle	January 2, 2018
S4.A.	O&M Manual Update/Review Letter	Annually	January 2, 2015
S4.B	Reporting Bypasses	As necessary	
S7.	Application for Permit Renewal	1/permit cycle	January 2, 2018
S9.A.	Spill Plan	1/permit cycle	January 2, 2018
S10.	Slug Discharge Control Plan	1/permit cycle	January 2, 2018
G1.	Notice of Change in Authorization	As necessary	
G4.	Permit Application for Substantive Changes to the Discharge	As necessary	
G5.	Engineering Report for Construction or Modification Activities	As necessary	
G7.	Notice of Permit Transfer	As necessary	

SPECIAL CONDITIONS

S1. DISCHARGE 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 concentration in excess of, that authorized by this permit violates the terms and conditions of this permit.

Beginning on the effective date of this permit, the Permittee is authorized to discharge the boiler blowdown and Reverse Osmosis (RO) concentrate to the city of Centralia's wastewater collection system through the discharge point 001 (Outfall 001), subject to the following limits:

EFFLUENT LIMITS – OUTFALL 001		
Parameter	**Average Quarterly [a]**	**Maximum Daily [b]**
Flow (GPD)	13,040	26,880
Temperature (°C)	---	Report [c]
BOD_5 (mg/L)	---	300
TSS (mg/L)	---	300
Oil & Grease (mg/L)	---	100
pH (Standard Units)	Daily minimum is equal to or greater than 6.0 and the daily maximum is less than or equal to 9.0	
[a] Average Quarterly effluent limit means the highest allowable average of daily discharges over a calendar quarter. To calculate the discharge value to compare to the limit, you add the value of each daily discharge measured during a calendar quarter and divide this sum by the total number of daily discharges measured.		
[b] Maximum daily effluent means the highest allowable daily discharge. The daily discharge means the discharge of a pollutant measured during a calendar day. For pollutants with limits expressed in units of mass, the daily discharge is calculated as the total mass of 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.		
[c] See permit condition S5.B.5.		

S2. MONITORING REQUIREMENT

A. Wastewater Monitoring

The Permittee must monitor the wastewater in accordance with the following schedule and requirements specified in Appendix A, before this wastewater is discharged to the city of Centralia's sanitary sewer system.

Parameter	Units	Location	Sample Frequency	Sample Type
Flow	GPD	Wastewater Storage Tank	Continuous [a]	Metered
pH	Standard Units	Wastewater Storage Tank	Daily	Grab
Temperature	°C	Wastewater Storage Tank	Monthly	Grab
BOD_5	mg/L	Wastewater Storage Tank	Quarterly [b]	Composite [c]
TSS	mg/L	Wastewater Storage Tank	Quarterly [b]	Composite [c]
TDS	mg/L	Wastewater Storage Tank	Quarterly [b]	Grab
Chloride	mg/L	Wastewater Storage Tank	Quarterly [b]	Grab
Oil & Grease	mg/L	Wastewater Storage Tank	Quarterly [b]	Grab
Arsenic	µg/L	Wastewater Storage Tank	Quarterly [b]	Composite [c]
Cadmium	µg/L	Wastewater Storage Tank	Quarterly [b]	Composite [c]
Chromium	µg/L	Wastewater Storage Tank	Quarterly [b]	Composite [c]
Copper	µg/L	Wastewater Storage Tank	Quarterly [b]	Composite [c]
Lead	µg/L	Wastewater Storage Tank	Quarterly [b]	Composite [c]
Molybdenum	µg/L	Wastewater Storage Tank	Quarterly [b]	Composite [c]
Nickel	µg/L	Wastewater Storage Tank	Quarterly [b]	Composite [c]
Selenium	µg/L	Wastewater Storage Tank	Quarterly [b]	Composite [c]
Silver	µg/L	Wastewater Storage Tank	Quarterly [b]	Composite [c]
Zinc	µg/L	Wastewater Storage Tank	Quarterly [b]	Composite [c]

[a] Continuous means uninterrupted except for brief lengths of time for calibration, for power failure, or for un-anticipated equipment repair or maintenance. Sampling must be

Parameter	Units	Location	Sample Frequency	Sample Type
taken monthly when continuous monitoring is not possible.				
[b] Quarterly is defined as January through March, April through June, July through September, and October through December.				
[c] Composite sample must consist of a minimum of four grab samples, each collected at least one hour apart.				

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, including representative sampling of any unusual discharge or discharge condition, including bypasses, upsets, and maintenance-related conditions affecting effluent quality.

Sampling and analytical methods used to meet the water and wastewater 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 Code of Federal Regulations (CFR) Part 136 or to the latest revision of *Standard Methods for the Examination of Water and Wastewater* (American Public Health Association), unless otherwise specified in this permit or approved in writing by the Department of Ecology (Ecology).

C. Flow Measurement

The Permittee must:

1. Select and use appropriate flow measurement, field 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. Use field measurement devices as directed by the manufacturer and do not use reagents beyond their expiration dates.

4. Calibrate these devices at the frequency recommended by the manufacturer.

5. Calibrate flow monitoring devices at a minimum frequency of at least one calibration per year.

6. Maintain calibration records for at least three years.

D. Laboratory Accreditation

The Permittee must ensure that all monitoring data required by Ecology is prepared by a laboratory registered or accredited under the provisions of chapter 173-50 Administrative Code (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.

E. Request for Reduction in Monitoring

The Permittee may request a reduction of the sampling frequency after 12 months of monitoring. Ecology will review each request and at its discretion grant the request through a permit modification or when it reissues the permit.

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 RECORDKEEPING 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.

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 WAWebDMR. 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 WAWebDMR go to: http://www.ecy.wa.gov/programs/wq/permits/paris/webdmr.html

   If unable to submit electronically (for example, if you do not have an internet connection), the Permittee must contact Ecology to request a waiver and obtain instructions on how to obtain a paper copy DMR.

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, pulp and paper chlorophenolics, TTOs) on the WAWebDMR 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 WAWebDMR.

   If the Permittee has obtained a waiver from electronic reporting or if submitting prior to the compliance date, the Permittee must submit a paper copy of the laboratory report providing the following information: date sampled, sample location, date of analysis, parameter name, CAS number, analytical method/number, detection limit (DL), laboratory quantitation level (QL), reporting units, and concentration detected.

   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.

   If the Permittee has obtained a waiver, it must ensure that paper forms are postmarked or received by Ecology no later than the dates specified below, unless otherwise specified in this permit.

8. 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 **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.

9. Submit reports to Ecology online using Ecology's electronic WAWebDMR submittal forms (electronic DMRs) as required above. Send paper reports to Ecology at:

Water Quality Permit Coordinator
Department of Ecology
Southwest Regional Office
P.O. Box 47775
Olympia, WA 98504-7775

B. Records Retention

The Permittee must retain records of all monitoring information for a minimum of three 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.

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

D. Additional Monitoring by the Permittee

If the Permittee monitors any pollutant more frequently than required by 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 Condition S2.

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 30 days of sampling.

a. Immediate Reporting

The Permittee must report any noncompliance that may endanger health or the environment immediately to the Department of Ecology's Regional Office 24-hr. number listed below:

Southwest Regional Office 360-407-6300

b. Twenty-Four-Hour Reporting

The Permittee must report the following occurrences of noncompliance by telephone, to Ecology at 360-407-6300, within 24 hours from the time the Permittee becomes aware of any of the following circumstances. The Permittee must report:

i. Any noncompliance that may endanger health or the environment, unless previously reported under immediate reporting requirements.

ii. Any unanticipated bypass that causes an exceedance of an effluent limit in the permit (See Part S4.B., "Bypass Procedures").

iii. Any upset that causes an exceedance of an effluent limit in the permit. 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.

iv. Any violation of a maximum daily or instantaneous maximum discharge limit for any of the pollutants in Section S1.A of this permit.

v. 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:

i. A description of the noncompliance and its cause.

ii. The period of noncompliance, including exact dates and times.

iii. The estimated time the Permittee expects the noncompliance to continue if not yet corrected.

iv. Steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

v. 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.9.

F. Other Reporting

1. 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 .

2. 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.

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.

H. Dangerous Waste Discharge Notification

The Permittee must notify the publicly owned treatment works (POTW) and Ecology in writing of the intent to discharge into the POTW any substance designated as a dangerous waste in accordance with the provisions of WAC 173-303-070. It must make this notification at least 90 days prior to the date that it proposes to initiate the discharge. The Permittee must not discharge this substance until authorized by Ecology and the POTW. It must also comply with the notification requirements of Special Condition S8 and General Condition G4.

I. Spill Notification

The Permittee must notify the POTW immediately (as soon as discovered) of all discharges that could cause problems to the POTW, such as process spills and unauthorized discharges (including slug discharges).

S4. OPERATION AND MAINTENANCE

The Permittee must, at all times, properly operate and maintain all facilities or systems of treatment and control (and related appurtenances) which are installed to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems, which are installed by a Permittee only when the operation is necessary to achieve compliance with the conditions of this permit.

A. Operations and Maintenance Manual

The Permittee must:

1. Prepare an Operations and Maintenance (O&M) Manual in accordance with WAC 173-240-150 and submit it to Ecology for approval by **January 2, 2018**.

2. Review the O&M Manual at least annually and confirm this review by letter to Ecology by **January 2nd of each year**.

3. Submit to Ecology for review and approval substantial changes or updates to the O&M Manual whenever it incorporates them into the manual.

4. Keep the approved O&M Manual at the permitted facility.

5. Follow the instructions and procedures of this manual.

In addition to the requirements of WAC 173-240-150(1) and (2), the O&M manual must include:

1. Emergency procedures for plant shutdown and cleanup in event of wastewater system upset, spill, failure, or demand by the POTW treating the discharge.

2. Wastewater system maintenance procedures that contribute to the generation of process wastewater.

3. Any directions to maintenance staff when cleaning, or maintaining other 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.)

4. Wastewater sampling protocols and procedures for compliance with the sampling and reporting requirements in the wastewater discharge permit.

5. Minimum staffing adequate to operate and maintain the treatment processes and carry out compliance monitoring required by the permit.

6. Treatment plant process control monitoring schedule.

B. 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 is 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 10 days before the date of the bypass.

2. Bypass is unavoidable, unanticipated, and results in noncompliance with the conditions 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.
      - Stopping production.
      - 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.

c. The Permittee has properly notified Ecology of the bypass as required in 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 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 State Environmental Policy Act (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. PROHIBITED DISCHARGES

A. General Prohibitions

The Permittee must not introduce into the POTW pollutant(s) which cause Pass Through or Interference.

B. Specific Prohibitions

In addition, the following must not be introduced into the POTW:

1. 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 $60^{O}C$ ($140^{O}F$) using the test methods specified in 40 CFR 261.21.

2. Solid or viscous pollutants in amounts which will cause obstruction to the flow in the POTW resulting in interference.

3. Any pollutant, including oxygen demanding pollutants (BOD, etc.), released in a discharge at a flow rate and/or pollutant concentration which will cause interference with the POTW.

4. Heat in amounts which will inhibit biological activity in the POTW resulting in interference, but in no case heat in such quantities that the temperature at the POTW treatment plant exceeds 40°C (104°F) unless the approval authority, upon request of the POTW, approves alternative temperature limits.

5. Petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through.

6. Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems.

7. Any trucked or hauled pollutants, except at discharge points designated by the POTW.

8. 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, unless the collection and treatment system is specifically designed to accommodate such discharges.

C. Prohibited Unless Approved

1. Any of the following discharges are prohibited unless approved by Ecology under extraordinary circumstances (such as a lack of direct discharge alternatives due to combined sewer service or a need to augment sewage flows due to septic conditions):

   a. Noncontact cooling water in significant volumes.

   b. Storm water 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.

2. Unless specifically authorized in this permit, the discharge of dangerous wastes as defined in Chapter 173-303 WAC, is prohibited.

S6. DILUTION PROHIBITED

The Permittee must not dilute the wastewater discharge with stormwater or increase the use of potable water, process water, noncontact cooling water, or, in any way, attempt to dilute an effluent as a partial or complete substitute for adequate treatment to achieve compliance with the limits contained in this permit.

S7. APPLICATION FOR PERMIT RENEWAL

The Permittee must submit an application for renewal of this permit by **January 2, 2018**.

S8. NON-ROUTINE AND UNANTICIPATED DISCHARGES

Beginning on the effective date of this permit, the Permittee is authorized to discharge non- routine wastewater on a case-by-case basis if approved by Ecology and the POTW. Prior to any such discharge, the Permittee must contact Ecology and the POTW and **at a minimum** provide the following information:

1. The proposed discharge location.

2. The nature of the activity that will generate the discharge.

3. Any alternatives to the discharge, such as reuse, storage or recycling of the water.

4. The total volume of water it expects to discharge.

5. The results of the chemical analysis of the water. The Permittee must analyze the water for all constituents limited for the discharge. The analysis must also include hardness, any metals that are limited by water quality standards, and any other parameter deemed necessary by Ecology. All discharges must comply with the effluent limits as established in Condition S1 of this permit, water quality standards, and any other limits imposed by Ecology.

6. The date of the proposed discharge.

7. The expected rate of discharge discharged, in gallons per minute.

The discharge cannot proceed until Ecology has reviewed the information provided and has authorized the discharge by letter to the Permittee or by an Administrative Order.

S9. SPILL PLAN

The Permittee must:

A. Submit to Ecology a Spill Control Plan for the prevention, containment, and control of spills or unplanned releases of pollutants by **January 2, 2018**.

B. Review the plan at least annually and update the Spill Plan as needed.

C. Send changes to the plan to Ecology.

D. Follow the Plan and any supplements throughout the term of the permit.

The spill control plan must include the following:

- 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 (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.

- A description of preventive measures and facilities (including an overall facility plot showing drainage patterns) which prevent, contain, or treat spills of these materials.

- A description of the reporting system the Permittee will use to alert responsible managers and legal authorities in the event of a spill.

- 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.

S10. SLUG DISCHARGE CONTROL PLAN

If required to also complete a spill plan as described in S9, the Permittee may combine it with the slug discharge control plan described in this section.

By **January 2, 2018**, the Permittee must prepare and submit to Ecology a plan to minimize the potential of slug discharges from the facility covered by this permit. The plan and any subsequent revisions become effective 30 days following submission. The plan must include the following information and procedures relating to the prevention of unauthorized slug discharges:

A. A description of a reporting system the Permittee will use to immediately notify facility management, the POTW operator, and appropriate state, federal, and local authorities of any slug discharges, and provisions to provide a written follow-up report within five days;

B. A description of operator training, equipment, and facilities (including overall facility plan) for preventing, containing, or treating slug discharges;

C. A list of all raw materials, products, chemicals, and hazardous materials used, processed, or stored at the facility; the normal quantity maintained on the premises for each listed material; and a map showing where they are located.

D. A description of discharge practices for batch and continuous processes under normal and non-routine circumstances;

E. A brief description of any unauthorized discharges which occurred during the 36-month period preceding the effective date of this permit and subsequent measures taken by Permittee to prevent or to reduce the possibility of further unauthorized discharges; and

F. An implementation schedule including additional operator training and procurement and installation of equipment or facilities required to properly implement the plan.

The Permittee must:

- Review its slug discharge plan and update it as needed but no less than every two years.
- Submit all revisions or updates of this plan to Ecology for review and approval.
- Maintain the current approved plan on the plant site and make it readily available to facility personnel.
- The Permittee must submit an update of the Slug Discharge Control Plan, or a certification that it is current with the application for permit renewal.

GENERAL CONDITIONS

G1. SIGNATORY REQUIREMENTS

All applications, reports, or information submitted to Ecology must be signed as follows:

A. All permit applications must be signed by either a principal executive officer or ranking elected official.

B. 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:

1. The authorization is made in writing by the person described above and is submitted to Ecology at the time of authorization, and

2. The authorization specifies either a named individual or any individual occupying a named position.

C. Changes to authorization. If an authorization under paragraph B.2 above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization must be submitted to Ecology prior to or together with any reports, information, or applications to be signed by an authorized representative.

D. 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 ENTRY

Representatives of Ecology must have the right to enter at all reasonable times in or upon any property, public or private, for the purpose of inspecting and investigating conditions relating to the pollution or the possible pollution of any waters of the state. Reasonable time includes normal business hours; hours during which production, treatment, or discharge occurs; or times when Ecology suspects a violation requiring immediate inspection. Representatives of Ecology must be allowed to have access to, and copy at reasonable cost, any records required to be kept under terms and conditions of the permit; to inspect any monitoring equipment or method required in the permit; and to sample the discharge, waste treatment processes, or internal waste streams.

G3. PERMIT ACTIONS

This permit is subject to modification, suspension, or termination, in whole or in part by Ecology for any of the following causes:

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 material change in the condition of the waters of the state; or

E. Nonpayment of fees assessed pursuant to RCW 90.48.465.

Ecology may also modify this permit, including the schedule of compliance or other conditions, if the agency determines good and valid cause exists, including promulgation or revisions of regulations or new information.

G4. REPORTING A CAUSE FOR MODIFICATION

The Permittee must submit a new application, or a supplement to the previous application, along with required engineering plans and reports, whenever a new or increased discharge or change in the nature of the discharge is anticipated which is not specifically authorized by this permit. This application must be submitted at least 60 days prior to any proposed changes. Submission of this application does not relieve the Permittee of the duty to comply with the existing permit until it is modified or reissued.

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 should be submitted at least 180 days prior to the planned start of construction. Facilities must be constructed and operated in accordance with the approved plans.

G6. COMPLIANCE WITH OTHER LAWS AND STATUTES

Nothing in the permit excuses the Permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

G7. TRANSFER OF THIS PERMIT

This permit is automatically transferred to a new owner or operator if:

A. A written agreement between the old and new owner or operator containing a specific date for transfer of permit responsibility, coverage, and liability is submitted to Ecology;

B. A copy of the permit is provided to the new owner and the receiving POTW is notified and;

C. Ecology does not notify the Permittee of the need to modify the permit.

Unless this permit is automatically transferred according to subsection A. above, this permit may be transferred only if it is modified to identify the new Permittee and to incorporate such other requirements as determined necessary by Ecology.

G8. REDUCED PRODUCTION FOR COMPLIANCE

The Permittee must control production or discharge to the extent necessary to maintain compliance with the terms and conditions of this permit upon reduction of efficiency, loss, or failure of its treatment facility until the treatment capacity 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 for 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 effluent stream for discharge.

G10. PAYMENT OF FEES

The Permittee must submit payment of fees associated with this permit as assessed by Ecology. Ecology may revoke this permit if the permit fees established under Chapter 173-224 WAC are not paid.

G11. PENALTIES FOR VIOLATING PERMIT CONDITIONS

Any person who is found guilty of willfully violating the terms and conditions of this permit is guilty of a crime, and upon conviction thereof will be punished by a fine of up to $10,000 and costs of prosecution, or by imprisonment in the discretion of the court. Each day upon which a willful violation occurs is a separate and additional violation.

Any person who violates the terms and conditions of a waste discharge permit will incur, in addition to any other penalty as provided by law, a civil penalty in the amount of up to $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 a separate and distinct violation.

G12. 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.

G13. 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.

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.

When the permit requires the Permittee to measure the base neutral compounds in the list of priority pollutants, it must measure all of the base neutral pollutants listed in the table below. The list includes EPA required base neutral priority pollutants and several additional polynuclear aromatic hydrocarbons (PAHs). The Water Quality Program added several PAHs to the list of base neutrals below from Ecology's Persistent Bioaccumulative Toxics (PBT) List. It only added those PBT parameters of interest to Appendix A that did not increase the overall cost of analysis unreasonably.

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 and C/D/E/G/H		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		0.2° 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	Specified in method - sample aliquot dependent
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/EF/G/H		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	Specified in method - sample aliquot dependent
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

Pollutant & CAS No. (if available)	Recommended Analytical Protocol	Detection (DL)[1] µg/L unless specified	Quantitation Level (QL)[2] µg/L unless specified
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

Pollutant & CAS No. ***(if available)***	**Recommended Analytical Protocol**	**Detection (DL)[1]** ***µg/L unless specified***	**Quantitation Level (QL)[2]** ***µg/L unless specified***
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
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

Pollutant & CAS No. ***(if available)***	**Recommended Analytical Protocol**	**Detection (DL)[1]** ***µg/L unless specified***	**Quantitation Level (QL)[2]** ***µg/L unless specified***
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
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

Pollutant & CAS No. ***(if available)***	**Recommended Analytical Protocol**	**Detection (DL)[1]** ***µg/L unless specified***	**Quantitation Level (QL)[2]** ***µg/L unless specified***
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
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
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

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. Soluble Biochemical Oxygen Demand method note: First, filter the sample through a Millipore Nylon filter (or equivalent) - pore size of 0.45-0.50 um (prep all filters by filtering 250 ml of laboratory grade deionized water through the filter and discard). Then, analyze sample as per method 5210-B.

4. NWTPH Dx - Northwest Total Petroleum Hydrocarbons Diesel Extended Range – see http://www.ecy.wa.gov/biblio/97602.html

5. NWTPH Gx - Northwest Total Petroleum Hydrocarbons Gasoline Extended Range – see http://www.ecy.wa.gov/biblio/97602.html

6. 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).

7. Total Benzofluoranthenes - Because Benzo(b)fluoranthene, Benzo(j)fluoranthene and Benzo(k)fluoranthene co-elute you may report these three isomers as total benzofluoranthenes.

8. 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.

9. PCB 1016 & PCB 1242 – You may report these two PCB compounds as one parameter called PCB 1016/1242.

Lewis County Interlocal Agreement

INTER-LOCAL COOPERATION AGREEMENT

THIS AGREEMENT is made by and entered into between the CITY OF CENTRALIA and LEWIS COUNTY, both political subdivisions of the State of Washington. This Agreement is entered into pursuant to the Interlocal Cooperation Act, RCW Chapter 39.34. This Agreement is intended to address joint management of the City's urban growth area as shown on the official comprehensive plan of the County.

WHEREAS, the County has adopted certain City land use, development and building regulations by reference to apply to the City's designated unincorporated urban growth area, and

WHEREAS, consistent application of such regulations will facilitate development within the UGA in accord with the comprehensive plan of the City and RCW Chapter 36.70A, and

WHEREAS, it is the long term goal of the City to annex the unincorporated UGA into the City, and

WHEREAS, the parties recognize that until those annexations are completed, it is in the public interest for the City to administer the County's land use, development and building regulations within the unincorporated UGA on behalf of the County, and

WHEREAS, it is appropriate that in order to implement such an arrangement an inter-local agreement be executed between the parties to set forth the conditions and terms of that arrangement.

NOW, THEREFORE, in consideration of the terms and conditions contained herein, the City of Centralia and Lewis County agree as follows:

1. **Purpose.** This Interlocal Agreement is intended to provide an efficient way for permit applicants in the unincorporated portion of the Centralia UGA to secure development review, approval and inspections. The parties wish to establish a cooperative undertaking under which the City would issue and administer development permits for this area as an agent for the County and consistent with the regulations adopted by the County.

2. **Means of Joint Undertaking.** No separate legal entity shall be created to implement the terms of this agreement. The City Manager of the City and the County Chief of Staff shall provide joint oversight to administer this agreement.

3. Definitions. All definitions contained within the regulations specified in paragraph 4 below shall have the meanings as specified within those regulations. For purposes of this Agreement, the terms below shall have the following meanings:

(a) "Agent") as used herein means the City, which shall exercise such powers and duties within the Centralia UGA, on the County's behalf, subject to such control by the County and consent by the City as set forth in this agreement and Title 36 RCW.

(b) " Centralia UGA" means the urban growth area adopted pursuant to RCW 36.70A.110 as illustrated in Ch. 17.200 LCC, and in conjunction with the comprehensive plan of the City.

(c) "County" means Lewis County.

(d) "City" means the City of Centralia, Washington.

(e) "County Regulations" means any and all development, building and land use regulations enumerated in paragraph 4 below, and adopted by reference within the Lewis County Code (LCC).

(f) "Capital Investment" means any roadway or roadway feature exceeding $100,000 in construction cost which is approved by the County on or after the date of this agreement, and which is fifty percent (50%) or more completed during the effective dates of this agreement.

(g) "Code Enforcement" (for purpose of this agreement) means any action taken by the City relating to any specific permit or approval issued by the City to apply the County regulations referenced in paragraph 4 below.

(h) "Nuisance Abatement" (for purpose of this agreement) means any action taken by the County to apply any County Code or regulation not referenced in paragraph 4 below.

(i) "Roadway feature" is any improvement within, or adjacent to (pursuant to easement) the right-of-way that materially supports roadway function such as: traffic signals, traffic control devises, roadway signage, bridges, drainage structures and storm water facilities.

4. Regulations.

(a) Development within the unincorporated Centralia UGA shall be governed by County regulations adopted by the County for that area, and, where applicable, by the official zoning maps of the County; EXCEPT, that the following City and County regulations and procedures, as published in the Centralia Municipal Code (CMC) and Lewis County Code (LCC), respectively, and together with amendments noted below, are expressly adopted for the purposes of this agreement and shall govern development within the unincorporated Centralia Urban Growth Area:

(i) Shoreline Master Program for Lewis County and Shoreline Substantial Development Permits and Exceptions under LCC Chapter 17.25;

(ii) Critical Areas Ordinances, LCC Chapter 17.35;

(iii) CMC Title 20, City of Centralia Zoning Code, except as expressly pre-empted by referenced portions of LCC, noted herein;

(iv) Permits under the International Building Code, RCW Chapter 19.27 and CMC Title 18;

(v) CMC Title 19 (Subdivision Ordinance);

(vi) CMC Title 14 (Streets & sidewalks);

(vii) CMC Chapter 10.30 (Nuisances);

(viii) Development standards under City of Centralia Ord. No. 2003 and any subsequent amendments;

(ix) LCC Titles 12 & 15 (Telecommunications)

(x) LCC Title 17 (Airport obstruction zone)

(xi) CMC Chapter 16.04 (SEPA). A City staff person shall be designated Responsible Official.

(b) Preliminary and final plats will be approved and signed by the Board of County Commissioners only after certification by the City that all elements for recording have been met.

(c) Appeals of any decision issued by the City hereunder, to the extent it is appealable, shall be made to a Special Deputy Hearing Examiner under contract with the County, who for the purposes of such appeal shall operate as the City Hearing Examiner. Such appeals shall be heard in City of Centralia facilities and conducted in accord with all procedures set forth therefore under County ordinances and regulations for hearings examiner actions. City staff shall present the case report and defend the action taken in conjunction with these appeals. All appeals of Hearing Examiner decisions shall be by LUPA petition under Ch. 36.70C RCW.

(i) For project permit decisions classified as either Type 2 and Type 3 decisions under Section 20.230.010, for designated City of Centralia Urban Growth Areas, a special deputy hearings examiner for Lewis County, established pursuant to Chs. 2.25 & 17.15 of the Lewis County Code and the Interlocal Cooperation Agreement on Urban Growth Areas between the City of Centralia and Lewis County, shall be the decision maker and appeal body.

(ii) For Type 2 decisions under Section 20.240.020, for designated City of Centralia Urban Growth Areas, a special deputy hearings examiner for Lewis County, established pursuant to Chs. 2.25 & 17.15 of the Lewis County Code and the Inter-local Cooperation Agreement on Urban Growth Areas between the City of Centralia and Lewis County, shall be the decision maker and appeal body.

(iii) For Type 3 decisions under Section 20.240.030 for designated City of Centralia Urban Growth Areas, a special deputy hearings examiner for Lewis County, established pursuant to Chs. 2.25 & 17.15 of the Lewis County Code and the Inter-local Cooperation Agreement on Urban Growth Areas between the City of Centralia and Lewis County, shall be the decision maker and appeal body.

(d) Authority over Lewis County Board of Health regulations on potable water and on-site septic systems shall be retained by Lewis County [Ord. 1179D § 1, 2003]

(e) Engineering Standards @ § 1.20.B Road Closure; road closures shall be administered by Lewis County pursuant to LCC Title 12.

(f) Engineering Standards @ § 1.16 Utilities; utility installation associated with Lewis County franchises within Lewis County rights-of-way shall be administered by Lewis County pursuant to LCC Title 12 and RCW 36.55 & 36.75, et seq.

(g) The County shall provide the City with a copy of the following maps for the Centralia UGA area. Such maps may be copies of those published by other agencies (e.g. NFIP) or may be as depicted on an official GIS map published by the County. The City shall use such maps for determining whether or not a proposal is within an environmentally sensitive area as provided in the adopted regulations:

(i) FEMA Flood Insurance Rate Map (100 year floodplain)

(ii) Shoreline Environment Designation Map

(iii) Steep Slope Area

(iv) Geologically Hazardous Area

(v) Aquifer Recharge Area

(vi) National Wetland Inventory (NWI) Area

(h) The City shall not approve any land use that causes resulting service levels to drop below adopted levels of service for County roads as cited in the Transportation Element of the adopted County Comprehensive Plan, without first requiring mitigation acceptable to the County. The City shall use the SEPA (if applicable) and/or Site Plan Review Committee (SPRC) process to obtain approval of the County for such mitigation.

5. <u>County Regulatory Responsibility</u>. The County shall remain responsible for the following regulations, actions, approval requirements and/or permitting processes:

(a) Any and all improvements associated with franchise agreements allowed or required by state law within the county rights-of-way. Any and all actions pertaining to county roads and rights of way allowed or required by state law.

(b) Any road closures to County roads, subject to notification of the City.

(c) Any access to County roads. The County shall respond to the City's SPRC process to approve, modify, or deny such access when associated with a development permit application.

(d) Preliminary and final plats may be approved and signed by the Board of County Commissioners after a recommendation has been received from the City, containing findings and conclusions, that all applicable requirements of Title 19 CMC and RCW 58.17 have been accomplished, and that all elements for recording have been met.

(e) Any County regulation not contained within CMC Title 10, Title 14 or Title 16, Title 18, Title 19, and Title 20 as provided in paragraph 4 above, and which the County desires to administer under its own authority.

(f) Nothing in this agreement changes any County Board of Health and/or Health Department jurisdiction or authority regarding potable water or septic system approvals.

6. Utilities. The City may agree to make sewer and water utility service available to all properties within the Centralia UGA consistent with all applicable City ordinances and regulations, provided; any application incorporating any private water system, well or private sewage disposal system which may be processed by the City shall be consistent with applicable County regulations and approved by the County. All utilities franchised by the County and located within County rights-of-way shall be administered by the County pursuant to LCC Title 12.

7. Administration.

(a) The County hereby delegates to the City, as an agent for the County pursuant to this agreement, the authority within the unincorporated Centralia UGA to receive and process development permit applications, collect application and permit fees, submit staff recommendations, enter final decisions pursuant to the applicable regulations, and issue permits under the County regulations referenced in section 4 above.

(b) Any appeal initiated against a City permit or approval decision rendered by the City under this agreement shall be heard and decided as provided in CMC 17.09.150, and the City shall be responsible for such appeal(s). Any appeal initiated against a County permit or approval decision rendered by the County shall be heard and decided by the applicable County process, and the County shall be responsible for such appeal(s).

(c) Any application for any conditional use permit, variance or special use permit occasioned by the application of regulations administered by the City shall be heard and decided by the applicable City process, and the City shall be responsible for such application(s). Any application for any variance or other quasi-judicial decision occasioned by the application of regulations administered by the County shall be heard and decided by the applicable County process, and the County shall be responsible for such application(s). Any UGA project related notices published by the City or the County pursuant to their specific quasi-judicial process shall also be forwarded to the planning department or division of the other jurisdiction.

(d) Unless otherwise specified in this agreement, or other adopted regulation or standard, the fee structure established for applications authorized to be heard and decided by the City will be as prescribed in CMC Appendix 'A' (schedule of fees and charges). This schedule will not apply to any applications required to be heard and decided by the County.

(e) This agreement shall authorize and direct the city to perform compliance inspections and effect any necessary corrective action pursuant to its delegated authority for any permit or use approved by the City within the unincorporated Centralia UGA.

(f) The City shall be responsible for code enforcement arising from permits issued by the City within the unincorporated Urban Growth Area. The County shall be responsible for abatement of nuisances within the unincorporated Urban Growth Area.

8. SEPA Regulations and Administration. It is the objective of this Agreement that the City performs functions and actions required by the State Environmental Policy Act (SEPA) for the County within the unincorporated UGA. The terms of this agreement shall constitute compliance with WAC 197-11-944 (determination of lead agency), provided; the County shall retain lead agency status for all County sponsored projects. Such SEPA requirements are contained in CMC Chapter 16.04 and shall be used by the City for making SEPA determinations under this agreement.

9. Fees. As compensation for performance under this Agreement, the City shall collect and retain all fees payable for applications made and/or permits issued pursuant to this agreement. County regulations, other than those enumerated in paragraph 4 above, which do not authorize a fee structure are not included in this agreement.

10. Annexation of streets and roads. The City agrees that it will include all reasonably related abutting and connecting streets and roads within an annexation and that the annexation will not create a County island or peninsula substantially surrounded by property within or to be within the City limits once the annexation is complete.

11. Reimbursement for City and County Capital Investments within the unincorporated UGA. The City and Lewis County shall negotiate in good faith the amount of reimbursement for the locally funded portion of any capital investment constructed by the County, including County roads within the unincorporated Centralia UGA at the time it is annexed by the City, based on an adopted depreciation schedule The basis for cost recovery (absent specific negotiation) shall be the County's portion of the project cost depreciated along a straight line for the useful life of the improvement. Unless otherwise mutually excluded, the useful life of the project shall be 20 (twenty) years. Project costs shall include all costs incurred for the improvement (such as: engineering, permitting and construction).

12. **Mitigation for Loss of Other Tax Revenues.** The City and County agree to appropriate revenue sharing for County road fund revenues lost to annexation actions by the City, pursuant to the following schedule: 50% (fifty percent) revenue for the first tax-eligible year and 25% (twenty-five percent) revenue for the second tax-eligible year. All revenue shall go to the City in the third year following annexation.

13. **Reports.** The City shall provide to the County a yearly status report as part of the required development review process, listing all applications processed by the City under this agreement and their status. The County shall have open access to all permitting information and documents held by the City pertaining to this agreement, and may participate in the weekly SPRC process. The County may respond to SPRC process relating to paragraphs 4(d) or 5(c) above.

14. **Term of Agreement.** This Agreement shall commence upon completion of the required signatures hereon, and run for an initial period of five years. This agreement shall automatically be extended annually thereafter unless terminated as provided herein. Either party may terminate this Agreement at will by giving the other party at least six (6) months notice thereof. Either party may also terminate this Agreement for cause by giving the other party not less than thirty (30) days notice and by giving the other party reasonable opportunity to cure any alleged defect or lack of performance; provided, however, any permit vested under the terms of this agreement shall remain subject to the terms of this agreement, and this provision shall survive any termination of this agreement.

15. **Hold Harmless and Indemnification.** The City shall protect, save harmless, indemnify, and defend, at its own expense the County, its elected and appointed officials, officers, employees and agents from any actions, suits, liabilities, losses, costs, expenses, damages or claim for damages of any nature whatsoever arising out of the City's performance of this agreement. The County shall protect, save harmless, indemnify, and defend, at its own expense the City, its elected and appointed officials, officers, employees and agents from any actions, suits, liabilities, losses, costs, expenses, damages or claim for damages of any nature whatsoever arising out of the County's performance of this agreement.

16. **Dispute Resolution.** The City and the County agree that if a formal disagreement arises between the parties as to the application, affect or interpretation of this Agreement which cannot be reasonably resolved between the parties, they may first refer the matter to dispute resolution, as may be agreed between the parties.

17. **Amendments to this agreement.** Amendments to any provision of this agreement must be presented in strikethrough and underline format, approved by both parties by their signatures thereon, and subsequently attached to this agreement.

18. **Severability.** If any portion of this Agreement shall be determined to be invalid by a court or other body with jurisdiction, the remaining portions shall remain valid and enforceable.

19. **Authority.** This agreement is entered into under the authority of RCW 39.34.040.

IN WITNESS WHEREOF, the parties have executed this Agreement this 28th day of March, 2006.

CITY OF CENTRALIA: WASHINGTON:

By: J. D. Foutz, Jr.

Its: City Manager

LEWIS COUNTY,

By: Richard Graham

Its: BOCC CHAIR.

Appendix D
Infiltration and Inflow (I/I) Analysis and City Completed Projects to Address I/I

City of Centralia Inflow Analysis

Date	Q (MGD)	Precip. (in.)	Q (gpcd)
1/12/2011	3.48	0.90	211
1/13/2011	4.81	0.40	292
1/14/2011	4.63	0.10	281
1/15/2011	5.22	0.60	318
1/16/2011	6.40	0.60	390
1/17/2011	6.11	0.00	372
1/18/2011	5.29	0.20	321
1/19/2011	5.00	0.00	304
1/20/2011	4.65	0.00	283
1/21/2011	4.51	0.20	275
3/9/2011	3.85	0.90	234
3/10/2011	5.66	0.60	345
3/11/2011	5.19	0.00	316
3/12/2011	4.86	0.20	296
3/13/2011	4.86	0.30	295
3/14/2011	4.75	0.30	289
3/15/2011	5.29	0.40	322
3/16/2011	5.16	0.20	314
3/17/2011	4.92	0.00	299
3/18/2011	4.64	0.04	282
1/17/2012	1.57	0.79	94
1/18/2012	1.57	0.04	94
1/19/2012	2.94	0.62	176
1/20/2012	4.43	0.63	266
1/21/2012	5.24	0.30	314
1/22/2012	4.77	0.14	286
3/10/2012	2.32	0.20	139
3/11/2012	2.48	0.97	149
3/12/2012	3.24	0.10	194
3/13/2012	4.01	0.37	240
3/14/2012	4.55	0.41	273
3/15/2012	5.88	0.75	353
3/16/2012	6.04	0.31	363
3/17/2012	6.01	0.29	361
3/18/2012	5.56	0.05	334
3/19/2012	4.83	0.00	290
3/27/2012	2.92	0.12	175
3/28/2012	3.01	0.23	180
3/29/2012	6.00	1.38	360
3/30/2012	6.59	0.24	395
3/31/2012	6.69	0.59	401
4/1/2012	6.10	0.14	366
4/2/2012	5.39	0.00	324
4/3/2012	4.83	0.16	290
11/16/2012	1.33	0.14	80
11/17/2012	1.63	0.46	98
11/18/2012	2.47	0.66	148
11/19/2012	5.57	1.73	334
11/29/2012	1.74	0.11	104
11/30/2012	3.65	1.59	219
12/1/2012	5.06	0.37	304
12/2/2012	5.89	1.28	353
12/3/2012	6.22	0.33	373
12/4/2012	6.54	0.51	393
12/5/2012	5.99	0.02	360
12/6/2012	4.94	0.08	296
12/15/2012	2.57	0.19	154
12/16/2012	3.51	0.58	210
12/17/2012	4.32	0.41	259

Year	Average Annual Flow (mgd)	Sewered Population
2011	1.86	14,060
2012	2.15	15,570
2013	1.96	15,570
2014	1.69	15,570
2015	1.94	15,570

Inflow: non excessive if average daily flow during periods of heavy rainfall < 275 gpcd
Data Source: National Oceanic and Atmospheric Administration (NOAA)
Flow Data Source: City of Centralia Discharge Monitor Reports

12/18/2012	4.10	0.13	246
12/19/2012	5.55	1.07	333
12/20/2012	6.55	0.18	393
12/21/2012	6.10	0.04	366
12/22/2012	5.24	0.14	314
12/23/2012	4.92	0.36	295
12/24/2012	4.57	0.02	274
12/25/2012	3.74	0.56	224
12/26/2012	5.11	0.09	307
2/14/2014	1.83	0.27	110
2/15/2014	2.27	0.50	137
2/16/2014	3.63	0.64	218
2/17/2014	6.28	0.66	378
2/18/2014	5.67	0.33	341
2/19/2014	5.27	0.25	316
2/20/2014	4.90	0.23	294
3/2/2014	2.29	0.20	137
3/3/2014	2.60	0.32	156
3/4/2014	2.56	0.07	154
3/5/2014	2.34	0.04	141
3/6/2014	5.54	0.44	333
3/7/2014	4.61	0.01	277
3/8/2014	5.12	0.60	307
3/9/2014	6.20	0.04	373
3/10/2014	5.94	0.19	357
3/11/2014	5.03	0.00	302
1/4/2015	3.57	1.30	213
1/5/2015	6.48	1.50	386
1/6/2015	6.50	0.00	387
1/7/2015	6.40	0.01	381
1/8/2015	5.10	0.00	304
2/4/2015	1.79	0.31	106
2/5/2015	2.41	0.42	143
2/6/2015	3.55	0.41	212
2/7/2015	5.02	0.86	299
2/8/2015	4.96	0.24	295
11/11/2015	1.25	0.23	74
11/12/2015	1.35	0.15	80
11/13/2015	3.69	1.34	220
11/14/2015	5.20	1.88	310
11/15/2015	5.36	0.58	319
11/16/2015	4.73	0.36	282
11/17/2015	7.74	1.24	461
11/18/2015	7.13	0.12	425
11/19/2015	5.42	0.09	323
12/1/2015	1.75	0.58	104
12/2/2015	1.95	0.06	116
12/3/2015	2.25	0.36	134
12/4/2015	2.35	0.21	140
12/5/2015	2.29	0.09	137
12/6/2015	2.30	0.10	137
12/7/2015	3.78	0.92	225
12/8/2015	7.73	1.35	460
12/9/2015	8.66	0.35	516
12/10/2015	8.67	0.84	516
12/11/2015	8.18	0.16	487
12/12/2015	7.89	0.27	470
12/13/2015	7.41	0.15	442
12/14/2015	6.43	0.00	383
12/15/2015	5.47	0.01	326
12/16/2015	4.81	0.05	287
12/17/2015	6.20	0.97	369
12/18/2015	7.74	0.51	461
12/19/2015	7.22	0.05	430
12/20/2015	6.85	0.31	408
12/21/2015	7.65	0.71	456

12/22/2015	7.39	0.15	440
12/23/2015	7.94	0.74	473
12/24/2015	8.03	0.05	478
12/25/2015	7.07	0.00	421
12/26/2015	6.21	0.00	370
12/27/2015	5.60	0.19	334
12/28/2015	4.88	0.01	290

City of Centralia Infiltration Analysis

Date	Q (MGD)	Precip. (in.)	Q (gpcd)	Average Daily Dry Weather Q (gpcd)
4/27/2012	2.28	0.01	137	
4/28/2012	2.17	0.05	130	
4/29/2012	2.17	0.09	130	
4/30/2012	2.23	0.25	134	
5/1/2012	2.14	0.00	129	
5/2/2012	2.10	0.00	126	
5/3/2012	2.90	0.00	174	
5/4/2012	2.81	0.00	169	
5/5/2012	2.68	0.00	161	
5/6/2012	2.53	0.00	152	
5/7/2012	2.32	0.00	139	
5/8/2012	2.15	0.00	129	
5/9/2012	2.00	0.00	120	
5/10/2012	1.90	0.00	114	
5/11/2012	1.82	0.00	109	
5/12/2012	1.77	0.00	106	
5/13/2012	1.71	0.00	102	
5/14/2012	1.67	0.00	100	**131**
5/26/2013	1.37	0.17	82	
5/27/2013	1.57	0.33	95	
5/28/2013	1.44	0.01	87	
5/29/2013	1.54	0.40	93	
5/30/2013	1.40	0.06	84	
5/31/2013	1.33	0.01	80	
6/1/2013	1.34	0.00	81	
6/2/2013	1.32	0.00	80	
6/3/2013	1.28	0.00	77	
6/4/2013	1.23	0.00	74	
6/5/2013	1.23	0.00	74	
6/6/2013	1.20	0.00	73	
6/7/2013	1.17	0.00	70	**81**
4/5/2014	2.28	0.20	137	
4/6/2014	2.20	0.03	132	
4/7/2014	2.09	0.00	126	
4/8/2014	2.04	0.13	123	
4/9/2014	1.94	0.00	116	
4/10/2014	1.86	0.00	112	
4/11/2014	1.82	0.00	110	
4/12/2014	1.75	0.00	105	
4/13/2014	1.73	0.00	104	
4/14/2014	1.66	0.00	100	
4/15/2014	1.52	0.00	92	**114**

Year	Average Annual Flow (mgd)	Sewered Population
2011	1.86	14,060
2012	2.15	15,570
2013	1.96	15,570
2014	1.69	15,570
2015	1.94	15,570

Infiltration: non excessive if average dry weather daily flow < 120 gpcd
Rainfall Data Source: National Oceanic and Atmospheric Administration (NOAA)
Flow Data Source: City of Centralia Discharge Monitor Reports

Infiltration and Inflow Projects Completed

Inflow and Infiltration projects

2016/2019

- Structure coating with Raven 405
  - Asset # MH-I11-26
  - Asset # MH-O13-02
  - Asset # WW-O13-03
  - Asset # MH-P13-01
  - Asset # WW-M12-22
  - Asset # MH-M12-14

- Spot repairs using CIPP sleeves.
  - Asset # 6233
  - Asset # 6173
  - Asset # 5558
  - Asset # 6396
  - Asset # 6694 (2 spot repairs on same line)
  - Asset # 6467
  - Asset # 5564 (2 spot repairs on same line)
  - Asset # 6203 (2 spot repairs on same line)

- Lines cleaned and camera to verify condition and prioritize for repair.
  - 89,716 feet of mainline.
  - Additional 50,000 feet of mainline cleaned.

- CIPP project
  - Asset # 5827
  - Asset # 5900

- Pipe Bursting project to reduce I&I.
  - 2018
    - Asset # 5987
    - Asset # 5986
    - Asset # 6130
    - Asset # 6672
    - Asset # 6554

    - 2019
        - Asset # 5985
        - Asset # 5988
        - Asset # 5990
        - Asset # 5991
        - Asset # 6356
        - Asset # 6131
        - Asset # 6284
        - Asset # 6128

- Inflow protectors installed in the system
    - 87 total inflow protectors

- Ergo sealing manhole lids and frames
    - 27 installed in system along with along with 36 installed by contractors.
    - City changed its developer guidelines to only allow EJ ergo sealing lids or equivalent within its sewer system to cut down on Infiltration at the lid and frame, also wrapped seal is used to cover all joints and chimney on the manholes during installation

- Coating of manholes during new construction with Ravens 405
    - Another 10 manholes have been coated by contractors in the system.

- Smoke testing.
    - South Tower pump station and its gravity system were smoke tested to determine high flow's during rain events.
    - Salzer valley pump station and its gravity system were smoke tested to find inflow from removed clean outs and broken lines inside the Cherry Blossom Trailer park.

Appendix E
Existing Load Analysis

WASTEWATER TREATMENT OPERATIONS REPORT

2011 - Present

CH2M HILL Calculation

Permit No: WA0020982

Facility Name: City of Centralia

Receiving Water: Chehalis

Plant Type: Activated Sludge

	INFLUENT												
Date	Influent Flow Total	Influent Flow 30-day avg	Influent pH	Influent Temperature	Influent BOD Concentration	Influent BOD Concentration 30-day avg	Influent BOD	Influent BOD 30-day avg	Influent TSS Concentration	Influent TSS Concentration 30-day avg	Influent TSS	Influent TSS 30-day avg	Influent Dissolved Oxygen
	MGD	MGD		°C	mg/L	mg/L	lbs./day	lbs./day	mg/L	mg/L	lbs./day	lbs./day	mg/L
1/1/2011	2.581	3.31	6.9	13		100		2663		82		2177	5
1/2/2011	2.495	3.33	6.8	13		100		2663		82		2177	4
1/3/2011	2.322	3.36	6.9	13		100		2663		82		2177	4
1/4/2011	2.184	3.37	6.9	13	161	104	2939	2684	135	86	2458	2199	4
1/5/2011	2.351	3.40	6.8	13	134	107	2631	2680	117	88	2294	2206	4
1/6/2011	2.506	3.42	6.9	13	131	102	2747	2666	106	84	2216	2192	4
1/7/2011	2.960	3.44	6.9	13		98		2649		80		2160	4
1/8/2011	2.836	3.43	6.9	13		98		2656		79		2136	5
1/9/2011	2.608	3.42	7.0	13		98		2656		79		2136	4
1/10/2011	2.424	3.36	6.8	13		98		2656		79		2136	5
1/11/2011	2.360	3.25	6.8	13	142	102	2797	2667	121	82	2382	2154	5
1/12/2011	3.475	3.19	6.8	13	103	102	2984	2689	102	84	2956	2212	5
1/13/2011	4.805	3.16	6.7	12	57	102	2282	2691	55	84	2204	2212	6
1/14/2011	4.625	3.15	6.6	12		106		2731		87		2234	6
1/15/2011	5.221	3.18	6.9	13		110		2768		90		2262	3
1/16/2011	6.404	3.25	6.0	12		110		2768		90		2262	6
1/17/2011	6.110	3.31	6.5	12		110		2768		90		2262	7
1/18/2011	5.285	3.36	6.5	12	64	106	2841	2774	60	88	2645	2291	5
1/19/2011	5.004	3.42	6.6	12	53	103	2201	2719	41	84	1711	2234	6
1/20/2011	4.652	3.47	6.7	12	56	99	2175	2686	45	82	1746	2214	4
1/21/2011	4.513	3.53	6.8	12		99		2708		82		2237	4
1/22/2011	4.218	3.58	6.7	13		99		2708		82		2237	6
1/23/2011	3.962	3.63	6.9	13		99		2708		82		2237	4
1/24/2011	3.615	3.66	6.6	13		99		2708		82		2237	4
1/25/2011	3.225	3.67	6.8	13	86	98	2308	2677	85	82	2286	2241	5
1/26/2011	3.002	3.64	6.4	13	85	97	2136	2625	82	83	2053	2215	4
1/27/2011	2.827	3.60	6.8	13	102	97	2397	2537	86	85	2028	2226	5
1/28/2011	2.657	3.58	6.9	13		98		2537		86		2248	5
1/29/2011	2.555	3.56	6.8	13		98		2537		86		2248	4
1/30/2011	2.408	3.54	6.7	13		98		2537		86		2248	4
1/31/2011	2.299	3.53	6.7	12		98		2537		86		2248	5
2/1/2011	2.202	3.52	6.8	12	136	101	2499	2534	114	88	2094	2236	4
2/2/2011	2.090	3.51	6.9	13	145	104	2535	2534	125	91	2179	2232	4
2/3/2011	2.015	3.51	6.9	13	151	103	2533	2505	121	90	2033	2202	4
2/4/2011	2.104	3.50	6.9	13		101		2495		88		2195	4
2/5/2011	2.035	3.48	6.9	14		98		2474		86		2193	4
2/6/2011	2.071	3.45	6.9	14		98		2474		86		2193	3
2/7/2011	2.137	3.43	6.8	13		98		2474		86		2193	4
2/8/2011	2.058	3.41	6.9	13	162	103	2773	2497	128	90	2197	2193	4
2/9/2011	1.971	3.40	6.9	13	159	107	2613	2505	131	93	2153	2191	4
2/10/2011	1.921	3.38	6.9	13	189	111	3025	2522	131	93	2099	2170	4
2/11/2011	1.874	3.33	6.8	13		111		2486		93		2110	4
2/12/2011	1.960	3.23	6.9	14		116		2503		96		2102	4
2/13/2011	1.995	3.15	6.8	14		116		2503		96		2102	4
2/14/2011	2.395	3.05	6.9	13		116		2503		96		2102	4
2/15/2011	2.597	2.93	6.8	13	129	117	2784	2525	105	96	2275	2115	5
2/16/2011	2.423	2.80	6.7	13	119	117	2403	2516	95	96	1919	2101	5
2/17/2011	2.257	2.70	6.8	13	138	122	2588	2498	98	99	1845	2044	5
2/18/2011	2.104	2.60	6.9	13		127		2521		104		2070	4
2/19/2011	2.022	2.52	7.1	13		133		2550		108		2097	4
2/20/2011	1.892	2.43	6.8	13		133		2550		108		2097	4
2/21/2011	1.888	2.35	6.8	13		133		2550		108		2097	4
2/22/2011	1.850	2.28	7.0	13	205	139	3159	2596	158	112	2437	2123	4
2/23/2011	1.982	2.23	7.0	13	169	141	2785	2610	132	114	2181	2127	4
2/24/2011	1.960	2.19	7.0	13	174	147	2844	2648	133	117	2174	2119	4
2/25/2011	1.924	2.15	6.9	13		152		2688		120		2124	4
2/26/2011	1.832	2.12	6.9	13		156		2712		123		2132	4
2/27/2011	2.539	2.11	7.0	13		156		2712		123		2132	4
2/28/2011	3.776	2.15	6.7	12		156		2712		123		2132	6
3/1/2011	3.683	2.20	6.7	12	95	151	2906	2727	69	118	2120	2131	7
3/2/2011	3.476	2.23	6.8	12	87	147	2511	2711	74	115	2145	2132	5
3/3/2011	3.255	2.27	6.8	12	90	143	2431	2707	79	113	2145	2136	5
3/4/2011	3.083	2.30	6.7	12		143		2720		112		2132	4
3/5/2011	2.898	2.33	6.8	12		143		2735		111		2141	4
3/6/2011	2.764	2.35	6.8	12		143		2735		111		2141	5
3/7/2011	2.574	2.37	6.6	13		143		2735		111		2141	4
3/8/2011	2.431	2.38	6.8	13	133	142	2695	2732	102	110	2068	2135	5
3/9/2011	3.852	2.44	6.9	12	99	139	3182	2764	113	111	3630	2242	5
3/10/2011	5.665	2.56	6.6	11	62	132	2952	2777	58	106	2740	2281	6
3/11/2011	5.193	2.67	6.6	12		130		2790		104		2291	6
3/12/2011	4.861	2.77	6.7	12		125		2770		101		2307	6
3/13/2011	4.856	2.87	6.6	12		125		2770		101		2307	5
3/14/2011	4.752	2.96	6.6	12		125		2770		101		2307	6
3/15/2011	5.289	3.07	6.6	12	60	120	2634	2760	59	98	2602	2329	6
3/16/2011	5.159	3.16	6.6	12	60	116	2587	2747	57	95	2453	2338	5
3/17/2011	4.923	3.24	6.6	12	58	110	2381	2719	51	91	2094	2325	5
3/18/2011	4.635	3.31	6.7	12		110		2743		91		2356	5
3/19/2011	4.366	3.38	6.6	12		108		2756		90		2399	6
3/20/2011	4.120	3.45	6.7	12		108		2756		90		2399	4

WASTEWATER TREATMENT OPERATIONS REPORT
2011 - Present

CH2M HILL Calculation

Permit No: WA0020982

Facility Name: City of Centralia
Receiving Water: Chehalis
Plant Type: Activated Sludge

	INFLUENT												
Date	Influent Flow Total	Influent Flow 30-day avg	Influent pH	Influent Temperature	Influent BOD Concentration	Influent BOD Concentration 30-day avg	Influent BOD	Influent BOD 30-day avg	Influent TSS Concentration	Influent TSS Concentration 30-day avg	Influent TSS	Influent TSS 30-day avg	Influent Dissolved Oxygen
	MGD	MGD		°C	mg/L	mg/L	lbs./day	lbs./day	mg/L	mg/L	lbs./day	lbs./day	mg/L
3/21/2011	3.592	3.50	6.7	12		108		2756		90		2399	5
3/22/2011	3.209	3.55	6.8	13	96	107	2575	2742	80	90	2141	2379	4
3/23/2011	3.021	3.58	6.7	13	104	107	2633	2734	89	90	2243	2370	6
3/24/2011	2.999	3.62	6.7	13	135	101	3365	2749	117	87	2926	2404	4
3/25/2011	2.781	3.65	6.8	13		96		2746		83		2422	4
3/26/2011	2.725	3.67	6.8	13		90		2738		79		2442	4
3/27/2011	2.626	3.70	6.9	13		90		2738		79		2442	3
3/28/2011	2.542	3.72	6.8	13		90		2738		79		2442	4
3/29/2011	2.701	3.73	6.8	13	128	93	2874	2748	127	83	2861	2474	5
3/30/2011	3.178	3.71	6.7	13	101	93	2670	2743	89	83	2359	2466	5
3/31/2011	3.652	3.71	6.8	13	86	93	2623	2722	70	83	2132	2467	5
4/1/2011	3.521	3.71	6.7	13		93		2739		84		2492	5
4/2/2011	3.153	3.70	6.8	13		93		2764		84		2521	5
4/3/2011	2.870	3.70	6.8	13		93		2764		84		2521	4
4/4/2011	3.375	3.71	6.7	13		93		2764		84		2521	4
4/5/2011	3.598	3.74	6.8	13	68	92	2027	2708	70	83	2100	2488	4
4/6/2011	3.898	3.78	6.7	12	69	90	2236	2674	60	82	1951	2450	5
4/7/2011	3.632	3.82	6.6	13	79	86	2402	2653	60	79	1817	2432	6
4/8/2011	3.311	3.81	6.7	13		85		2612		76		2340	5
4/9/2011	3.031	3.72	6.8	13		87		2584		77		2307	4
4/10/2011	2.805	3.64	7.0	13		87		2584		77		2307	4
4/11/2011	2.640	3.57	6.8	13		87		2584		77		2307	4
4/12/2011	2.522	3.49	6.8	13	122	90	2569	2583	102	79	2146	2294	4
4/13/2011	2.423	3.41	6.8	13	124	92	2499	2577	105	81	2122	2282	5
4/14/2011	2.981	3.33	6.8	13	112	96	2796	2588	108	85	2685	2288	5
4/15/2011	3.298	3.27	6.7	13		99		2588		87		2275	6
4/16/2011	3.105	3.21	6.8	13		102		2606		90		2290	6
4/17/2011	2.892	3.15	6.9	13		102		2606		90		2290	6
4/18/2011	2.677	3.10	6.8	13		102		2606		90		2290	5
4/19/2011	2.457	3.04	6.8	13	130	104	2669	2611	102	91	2090	2275	5
4/20/2011	2.325	3.00	6.7	14	142	107	2754	2621	115	92	2230	2272	5
4/21/2011	2.165	2.96	6.8	14	148	111	2673	2628	115	95	2076	2267	5
4/22/2011	2.098	2.93	6.9	14		111		2628		95		2269	4
4/23/2011	2.056	2.90	6.8	14		109		2566		94		2214	4
4/24/2011	2.011	2.88	6.8	14		109		2566		94		2214	4
4/25/2011	2.297	2.86	6.8	14		109		2566		94		2214	4
4/26/2011	2.110	2.84	6.7	14	176	114	3102	2607	153	98	2692	2251	4
4/27/2011	2.229	2.83	6.8	14	134	116	2484	2599	119	100	2212	2248	5
4/28/2011	2.320	2.82	6.8	14	159	118	3076	2613	135	100	2612	2230	5
4/29/2011	2.154	2.79	6.8	14		119		2609		101		2220	5
4/30/2011	2.059	2.73	6.8	14		122		2607		104		2228	4
5/1/2011	1.992	2.68	6.9	14		122		2607		104		2228	4
5/2/2011	1.880	2.64	6.7	14		122		2607		104		2228	4
5/3/2011	2.073	2.61	6.8	14	189	127	3268	2658	163	108	2818	2273	4
5/4/2011	1.801	2.56	6.8	15	212	133	3179	2695	164	112	2463	2287	5
5/5/2011	1.876	2.50	6.7	14	185	142	2890	2757	150	118	2347	2304	4
5/6/2011	1.895	2.44	6.8	15		147		2797		122		2332	3
5/7/2011	1.952	2.38	7.0	15		153		2830		128		2374	4
5/8/2011	1.888	2.33	7.0	15		153		2830		128		2374	5
5/9/2011	2.042	2.30	6.8	15		153		2830		128		2374	4
5/10/2011	1.733	2.26	6.9	15	188	155	2711	2821	153	130	2211	2362	4
5/11/2011	2.060	2.25	6.8	15	143	155	2457	2795	138	130	2371	2363	4
5/12/2011	1.966	2.23	6.8	15	164	158	2681	2803	129	132	2115	2360	5
5/13/2011	1.881	2.21	6.9	15		160		2826		134		2379	3
5/14/2011	1.975	2.18	6.8	15		164		2829		136		2353	4
5/15/2011	2.862	2.16	6.9	14		164		2829		136		2353	5
5/16/2011	2.519	2.14	6.7	14		164		2829		136		2353	4
5/17/2011	2.302	2.12	6.8	15	128	161	2454	2800	126	136	2419	2358	4
5/18/2011	2.087	2.10	6.8	15	139	160	2411	2772	120	134	2088	2339	4
5/19/2011	1.949	2.09	6.8	15	164	162	2668	2772	139	137	2259	2351	4
5/20/2011	1.809	2.07	6.8	15		164		2774		139		2360	4
5/21/2011	1.753	2.05	6.8	15		165		2782		141		2384	3
5/22/2011	1.702	2.04	6.9	15		165		2782		141		2384	3
5/23/2011	1.664	2.03	6.9	15		165		2782		141		2384	3
5/24/2011	1.600	2.01	6.9	16	197	167	2634	2771	166	143	2214	2371	4
5/25/2011	1.620	1.99	7.1	15	193	169	2610	2759	155	144	2094	2351	4
5/26/2011	1.537	1.97	6.9	16	130	166	1666	2657	164	144	2102	2309	3
5/27/2011	1.514	1.95	7.0	16		168		2670		146		2316	4
5/28/2011	1.466	1.92	7.1	16		169		2636		147		2292	3
5/29/2011	1.432	1.90	6.9	16		169		2636		147		2292	3
5/30/2011	1.484	1.88	7.1	16		169		2636		147		2292	3
5/31/2011	1.493	1.86	7.0	16	233	174	2906	2657	180	150	2242	2288	3
6/1/2011	1.422	1.85	7.1	16	218	177	2588	2652	171	151	2027	2269	4
6/2/2011	1.430	1.82	7.1	16	255	182	3039	2636	187	153	2231	2227	4
6/3/2011	1.393	1.81	7.1	16		180		2594		152		2209	4
6/4/2011	1.389	1.79	7.2	17		179		2569		152		2198	3
6/5/2011	1.368	1.78	7.0	17		179		2569		152		2198	3
6/6/2011	1.334	1.76	7.1	17		179		2569		152		2198	3
6/7/2011	1.269	1.74	7.0	17	257	185	2718	2580	179	154	1894	2174	3

WASTEWATER TREATMENT OPERATIONS REPORT

2011 - Present

CH2M HILL Calculation

Permit No: WA0020982

Facility Name: City of Centralia

Receiving Water: Chehalis

Plant Type: Activated Sludge

	INFLUENT												
Date	Influent Flow Total	Influent Flow 30-day avg	Influent pH	Influent Temperature	Influent BOD Concentration	Influent BOD Concentration 30-day avg	Influent BOD	Influent BOD 30-day avg	Influent TSS Concentration	Influent TSS Concentration 30-day avg	Influent TSS	Influent TSS 30-day avg	Influent Dissolved Oxygen
	MGD	MGD		°C	mg/L	mg/L	lbs./day	lbs./day	mg/L	mg/L	lbs./day	lbs./day	mg/L
6/8/2011	1.299	1.71	7.0	17	234	189	2540	2578	179	156	1939	2158	3
6/9/2011	1.302	1.70	7.0	17	275	195	2984	2597	195	159	2118	2151	2
6/10/2011	1.280	1.67	7.0	17		199		2608		161		2134	3
6/11/2011	1.274	1.65	7.1	17		202		2602		163		2136	7
6/12/2011	1.272	1.63	7.0	17		202		2602		163		2136	3
6/13/2011	1.271	1.60	6.9	17		202		2602		163		2136	2
6/14/2011	1.238	1.55	7.0	17	252	206	2606	2602	202	166	2085	2132	3
6/15/2011	1.235	1.51	6.9	17	211	206	2175	2572	181	167	1865	2113	2
6/16/2011	1.199	1.47	7.0	17	277	217	2774	2594	187	172	1871	2074	2
6/17/2011	1.177	1.44	7.0	18		223		2609		176		2072	3
6/18/2011	1.225	1.42	6.8	18		228		2604		179		2057	3
6/19/2011	1.208	1.40	6.9	18		228		2604		179		2057	3
6/20/2011	1.214	1.38	7.0	18		228		2604		179		2057	3
6/21/2011	1.185	1.36	7.0	18	269	231	2662	2608	203	181	2006	2053	3
6/22/2011	1.175	1.34	6.9	18	268	234	2628	2609	209	183	2049	2053	2
6/23/2011	1.159	1.33	6.9	18	299	241	2887	2628	210	186	2030	2039	2
6/24/2011	1.159	1.31	7.0	18		245		2629		188		2035	2
6/25/2011	1.167	1.30	7.0	18		254		2709		190		2030	3
6/26/2011	1.134	1.29	7.0	18		254		2709		190		2030	3
6/27/2011	1.135	1.28	6.9	18		254		2709		190		2030	3
6/28/2011	1.126	1.27	7.1	18	286	257	2685	2707	215	192	2019	2029	2
6/29/2011	1.117	1.26	7.1	18	285	259	2653	2703	218	194	2031	2029	2
6/30/2011	1.120	1.24	7.0	18	290	263	2711	2689	185	194	1728	1992	2
7/1/2011	1.107	1.23	7.0	19		266		2697		196		1990	2
7/2/2011	1.091	1.22	7.0	19		267		2669		197		1969	3
7/3/2011	1.049	1.21	6.9	19		267		2669		197		1969	3
7/4/2011	1.042	1.20	7.0	19		267		2669		197		1969	3
7/5/2011	1.052	1.19	6.7	19	320	271	2804	2679	257	202	2255	1991	3
7/6/2011	1.069	1.18	7.0	19	291	273	2595	2673	217	203	1934	1987	3
7/7/2011	1.075	1.17	6.9	19	302	276	2704	2672	219	206	1963	1992	3
7/8/2011	1.044	1.16	7.0	19		279		2682		208		1996	2
7/9/2011	1.087	1.16	7.0	19		279		2657		209		1986	3
7/10/2011	1.075	1.15	6.8	20		279		2657		209		1986	3
7/11/2011	1.067	1.14	6.9	20		279		2657		209		1986	3
7/12/2011	1.077	1.14	7.0	19	305	281	2740	2663	248	212	2228	2005	2
7/13/2011	1.114	1.13	7.0	19	311	283	2888	2679	239	214	2221	2020	2
7/14/2011	1.051	1.12	7.0	19	334	289	2926	2702	262	218	2297	2035	2
7/15/2011	1.144	1.12	6.7	19		295		2743		221		2049	3
7/16/2011	1.155	1.12	7.0	19		297		2740		224		2063	3
7/17/2011	1.112	1.12	6.8	19		297		2740		224		2063	3
7/18/2011	1.096	1.11	6.9	20		297		2740		224		2063	3
7/19/2011	1.064	1.11	7.0	19	307	297	2724	2739	241	225	2139	2069	2
7/20/2011	1.064	1.10	6.9	20	334	300	2961	2755	306	231	2716	2115	2
7/21/2011	1.068	1.10	6.9	19	340	305	3029	2781	248	234	2209	2130	2
7/22/2011	1.051	1.10	7.0	19		308		2793		236		2136	2
7/23/2011	1.031	1.09	6.9	20		309		2785		238		2145	3
7/24/2011	1.042	1.09	6.7	20		309		2785		238		2145	1
7/25/2011	1.072	1.08	7.1	20		309		2785		238		2145	2
7/26/2011	1.066	1.08	6.9	20	271	306	2412	2756	266	240	2365	2162	2
7/27/2011	1.049	1.08	7.1	20	279	304	2446	2734	213	238	1864	2141	2
7/28/2011	1.038	1.08	6.9	20	277	303	2393	2713	207	238	1791	2124	2
7/29/2011	1.015	1.07	7.2	20		305		2718		239		2132	3
7/30/2011	0.996	1.07	6.9	20		306		2718		244		2165	3
7/31/2011	1.004	1.07	7.0	20		306		2718		244		2165	3
8/1/2011	1.024	1.06	7.1	20		306		2718		244		2165	2
8/2/2011	1.023	1.06	6.9	21	329	308	2804	2725	271	246	2312	2177	2
8/3/2011	1.010	1.06	7.0	21	304	307	2555	2713	237	245	1995	2164	2
8/4/2011	1.035	1.06	6.9	21	291	305	2507	2692	217	242	1872	2136	1
8/5/2011	1.019	1.06	7.0	20		306		2699		244		2152	2
8/6/2011	1.002	1.06	7.1	21		307		2699		246		2168	2
8/7/2011	1.016	1.06	7.1	21		307		2699		246		2168	2
8/8/2011	1.008	1.05	7.1	21		307		2699		246		2168	2
8/9/2011	1.006	1.05	7.3	21	312	307	2617	2692	233	245	1956	2151	1
8/10/2011	1.022	1.05	7.0	21	313	308	2672	2691	251	246	2140	2150	1
8/11/2011	1.041	1.05	6.8	21	299	307	2595	2681	239	245	2074	2139	2
8/12/2011	1.030	1.05	7.1	21		307		2665		245		2133	3
8/13/2011	1.033	1.04	7.0	21		305		2643		244		2120	2
8/14/2011	1.018	1.04	7.1	21		305		2643		244		2120	4
8/15/2011	1.050	1.04	7.0	21		305		2643		244		2120	2
8/16/2011	1.033	1.03	7.0	21	317	305	2728	2649	239	244	2059	2115	2
8/17/2011	1.022	1.03	6.9	21	294	305	2507	2639	241	244	2054	2111	2
8/18/2011	1.042	1.03	6.7	21	299	304	2600	2630	232	243	2016	2102	2
8/19/2011	1.063	1.03	6.9	21		302		2605		238		2054	2
8/20/2011	1.004	1.03	7.1	21		299		2570		237		2042	2
8/21/2011	1.035	1.03	7.1	21		299		2570		237		2042	3
8/22/2011	1.015	1.03	6.9	21		299		2570		237		2042	2
8/23/2011	0.966	1.03	7.1	21	337	302	2715	2581	262	239	2112	2047	1
8/24/2011	0.993	1.02	6.6	22	359	306	2970	2609	336	246	2783	2099	2
8/25/2011	0.991	1.02	7.2	22	318	309	2627	2624	283	247	2339	2098	1

WASTEWATER TREATMENT OPERATIONS REPORT

2011 - Present

CH2M HILL Calculation

Permit No: WA0020982

Facility Name: City of Centralia

Receiving Water: Chehalis

Plant Type: Activated Sludge

	INFLUENT												
Date	Influent Flow Total	Influent Flow 30-day avg	Influent pH	Influent Temperature	Influent BOD Concentration	Influent BOD Concentration 30-day avg	Influent BOD	Influent BOD 30-day avg	Influent TSS Concentration	Influent TSS Concentration 30-day avg	Influent TSS	Influent TSS 30-day avg	Influent Dissolved Oxygen
	MGD	MGD		°C	mg/L	mg/L	lbs./day	lbs./day	mg/L	mg/L	lbs./day	lbs./day	mg/L
8/26/2011	0.966	1.02	7.2	22		311		2638		250		2116	4
8/27/2011	0.991	1.02	6.7	22		314		2658		253		2143	2
8/28/2011	0.996	1.02	7.0	21		314		2658		253		2143	2
8/29/2011	0.984	1.01	6.9	21		314		2658		253		2143	2
8/30/2011	0.946	1.01	7.2	21	309	314	2438	2641	256	254	2021	2133	1
8/31/2011	0.993	1.01	6.9	21	299	313	2475	2629	252	254	2087	2130	2
9/1/2011	0.966	1.01	6.9	21	314	312	2528	2610	262	253	2112	2116	2
9/2/2011	0.969	1.01	6.8	21		312		2614		254		2125	2
9/3/2011	0.917	1.00	6.9	21		314		2623		257		2146	2
9/4/2011	0.911	1.00	7.1	21		314		2623		257		2146	4
9/5/2011	1.037	1.00	7.0	21		314		2623		257		2146	2
9/6/2011	0.970	1.00	6.8	21	257	310	2082	2581	250	257	2022	2136	1
9/7/2011	0.953	1.00	7.0	22	268	307	2128	2549	256	257	2035	2129	2
9/8/2011	0.966	1.00	6.9	22	286	305	2302	2526	235	257	1893	2125	2
9/9/2011	0.941	0.99	7.0	22		304		2515		257		2123	2
9/10/2011	0.938	0.99	7.1	22		305		2508		259		2128	4
9/11/2011	0.987	0.99	7.0	22		305		2508		259		2128	2
9/12/2011	0.799	0.98	6.8	21		305		2508		259		2128	2
9/13/2011	0.960	0.98	6.7	21	324	306	2593	2515	279	260	2234	2136	2
9/14/2011	0.941	0.98	6.8	21	221	300	1736	2459	271	261	2127	2135	1
9/15/2011	0.949	0.97	6.9	21	266	296	2104	2415	217	259	1718	2111	2
9/16/2011	0.974	0.97	6.8	21		297		2408		261		2115	2
9/17/2011	1.017	0.97	7.0	20		296		2392		263		2123	2
9/18/2011	1.049	0.97	6.9	21		296		2392		263		2123	2
9/19/2011	0.997	0.97	6.9	21		296		2392		263		2123	3
9/20/2011	0.961	0.97	6.9	21	298	297	2390	2391	222	260	1779	2097	1
9/21/2011	0.936	0.97	7.0	21	289	296	2253	2382	222	257	1732	2071	3
9/22/2011	0.943	0.96	6.8	21	305	294	2399	2359	239	256	1880	2054	2
9/23/2011	0.981	0.96	6.7	21		289		2312		250		1998	2
9/24/2011	0.999	0.96	6.9	21		286		2286		247		1970	2
9/25/2011	1.019	0.97	6.9	21		286		2286		247		1970	3
9/26/2011	1.063	0.97	6.9	20		286		2286		247		1970	3
9/27/2011	0.968	0.97	6.9	20	369	293	2977	2339	307	251	2479	2009	2
9/28/2011	0.990	0.97	6.9	20	312	294	2577	2356	245	251	2023	2010	1
9/29/2011	0.962	0.97	7.0	21	342	296	2747	2378	271	252	2175	2021	2
9/30/2011	0.971	0.97	7.0	20		296		2371		252		2016	1
10/1/2011	0.990	0.97	7.0	20		295		2357		251		2008	1
10/2/2011	1.012	0.97	7.0	20		295		2357		251		2008	2
10/3/2011	0.996	0.97	7.0	20		295		2357		251		2008	2
10/4/2011	1.014	0.98	6.8	20	326	297	2759	2388	224	249	1895	1999	1
10/5/2011	1.052	0.98	6.9	20	287	296	2515	2397	225	247	1974	1998	2
10/6/2011	0.968	0.98	6.8	20	306	300	2468	2425	243	247	1962	1993	2
10/7/2011	0.964	0.98	6.9	20		302		2448		246		1990	2
10/8/2011	1.018	0.98	6.7	20		304		2460		247		1998	2
10/9/2011	1.041	0.98	6.8	19		304		2460		247		1998	2
10/10/2011	1.152	0.99	6.9	20		304		2460		247		1998	2
10/11/2011	1.198	1.00	6.9	19	346	307	3462	2537	337	254	3368	2104	3
10/12/2011	1.039	1.00	7.0	19	353	310	3060	2574	365	262	3164	2179	3
10/13/2011	0.999	1.01	7.5	19	335	311	2792	2589	269	261	2241	2180	3
10/14/2011	1.018	1.01	6.9	20		318		2654		260		2184	2
10/15/2011	0.989	1.01	7.0	19		322		2700		264		2223	2
10/16/2011	1.020	1.01	6.9	19		322		2700		264		2223	2
10/17/2011	0.934	1.01	7.1	19		322		2700		264		2223	3
10/18/2011	0.947	1.00	6.9	19	472	334	3732	2779	502	282	3967	2357	2
10/19/2011	0.820	1.00	6.9	19	335	334	2291	2744	317	285	2168	2343	2
10/20/2011	0.923	1.00	6.9	19	432	344	3324	2811	425	299	3270	2450	3
10/21/2011	0.950	1.00	6.9	19		348		2854		305		2505	2
10/22/2011	1.074	1.00	7.1	19		351		2892		311		2557	4
10/23/2011	1.000	1.00	6.9	19		351		2892		311		2557	3
10/24/2011		1.00	6.9			351		2892		311		2557	2
10/25/2011		1.00	6.9		577	369		2892	372	316		2557	2
10/26/2011	0.929	1.00	6.9	19	383	370	2965	2898	432	324	3346	2618	2
10/27/2011	0.914	1.00	7.0	19	389	371	2966	2897	398	330	3034	2661	2
10/28/2011	1.020	1.00	6.9	19		376		2924		337		2714	2
10/29/2011	1.022	1.00	6.9	19		378		2940		342		2763	3
10/30/2011	1.026	1.00	7.2	19		378		2940		342		2763	4
10/31/2011	0.933	1.00	7.0	19		378		2940		342		2763	3
11/1/2011	0.964	1.00	7.0	18	520	389	4183	3043	502	355	4037	2869	2
11/2/2011	1.049	1.00	6.9	18	348	386	3046	3043	336	353	2938	2874	2
11/3/2011	1.015	1.00	7.1	18	400	392	3385	3092	360	363	3047	2963	2
11/4/2011	1.017	1.00	7.0	18		400		3140		374		3045	2
11/5/2011	1.066	1.00	6.9	18		408		3201		385		3144	2
11/6/2011	1.073	1.01	7.1	18		408		3201		385		3144	3
11/7/2011	1.062	1.01	7.0	18	454	411	4018	3269	502	394	4446	3252	2
11/8/2011	1.013	1.01	7.0	17	361	408	3054	3252	456	398	3853	3298	2
11/9/2011	1.037	1.00	7.1	18	638	423	5513	3414	556	409	4808	3406	3
11/10/2011	0.988	0.99	7.1	18		428		3410		414		3409	2
11/11/2011	1.108	1.00	7.2	17		434		3439		417		3430	2
11/12/2011	1.133	1.00	7.1	17		442		3498		430		3538	3

WASTEWATER TREATMENT OPERATIONS REPORT

2011 - Present

CH2M HILL Calculation

Permit No: WA0020982

Facility Name: City of Centralia

Receiving Water: Chehalis

Plant Type: Activated Sludge

	INFLUENT												
Date	Influent Flow Total	Influent Flow 30-day avg	Influent pH	Influent Temperature	Influent BOD Concentration	Influent BOD Concentration 30-day avg	Influent BOD	Influent BOD 30-day avg	Influent TSS Concentration	Influent TSS Concentration 30-day avg	Influent TSS	Influent TSS 30-day avg	Influent Dissolved Oxygen
	MGD	MGD		°C	mg/L	mg/L	lbs./day	lbs./day	mg/L	mg/L	lbs./day	lbs./day	mg/L
11/13/2011	1.187	1.01	7.1	17		442		3498		430		3538	2
11/14/2011	1.170	1.01	7.1	17		442		3498		430		3538	3
11/15/2011	1.157	1.02	7.1	17	389	438	3755	3519	471	433	4545	3622	3
11/16/2011	1.328	1.03	7.2	17	227	423	2516	3442	255	420	2824	3560	4
11/17/2011	1.438	1.05	7.1	16	226	406	2705	3363	256	403	3070	3491	3
11/18/2011	1.342	1.07	7.0	16		411		3453		409		3601	3
11/19/2011	1.290	1.08	8.2	16		409		3464		408		3632	3
11/20/2011	1.246	1.09	7.3	16		409		3464		408		3632	3
11/21/2011	1.487	1.11	7.2	16	224	395	2779	3407	304	400	3771	3643	3
11/22/2011	4.267	1.22	7.1	15	102	374	3618	3423	158	383	5623	3796	2
11/23/2011	4.451	1.34	6.7	14	81	355	3005	3394	91	363	3360	3764	8
11/24/2011	3.227	1.40	6.8	14		339		3394		363		3764	8
11/25/2011	2.560	1.45	6.8	15		335		3427		357		3797	6
11/26/2011	2.100	1.49	6.9	15		331		3465		354		3860	4
11/27/2011	2.173	1.53	7.0	15		331		3465		354		3860	5
11/28/2011	1.921	1.56	7.0	15		331		3465		354		3860	4
11/29/2011	1.762	1.59	7.1	15	169	318	2481	3389	182	341	2675	3769	4
11/30/2011	1.646	1.61	7.1	15	172	308	2360	3316	189	330	2595	3685	4
12/1/2011	1.516	1.63	7.2	15	178	283	2255	3178	189	307	2389	3567	4
12/2/2011	1.503	1.64	6.9	15		278		3188		305		3616	4
12/3/2011	1.395	1.66	7.1	15		268		3172		301		3663	5
12/4/2011	1.436	1.67	7.2	15		268		3172		301		3663	4
12/5/2011	1.388	1.68	7.0	15		268		3172		301		3663	3
12/6/2011	1.328	1.69	7.1	15	170	261	1880	3072	232	295	2564	3579	4
12/7/2011	1.268	1.70	7.0	15	218	243	2303	2940	212	273	2242	3409	3
12/8/2011	1.283	1.70	7.0	15	221	232	2360	2887	234	256	2498	3305	5
12/9/2011	1.275	1.71	6.9	15		198		2668		231		3180	4
12/10/2011	1.203	1.72	7.2	15		198		2668		231		3180	7
12/11/2011	1.228	1.72	7.1	15		198		2668		231		3180	4
12/12/2011	1.242	1.73	7.1	15		198		2668		231		3180	4
12/13/2011	1.181	1.73	7.1	14	257	203	2532	2658	262	233	2575	3133	4
12/14/2011	1.174	1.73	6.9	15	260	207	2544	2649	298	238	2918	3118	3
12/15/2011	1.147	1.73	6.7	14	258	197	2468	2558	245	222	2339	2960	4
12/16/2011	1.173	1.72	6.9	15		195		2561		219		2971	4
12/17/2011	1.226	1.71	7.0	15		192		2549		216		2962	4
12/18/2011	1.171	1.71	7.0	15		192		2549		216		2962	4
12/19/2011	1.174	1.71	7.0	15		192		2549		216		2962	4
12/20/2011	1.167	1.70	6.9	15	245	196	2387	2536	281	221	2731	2945	4
12/21/2011	1.156	1.69	6.9	14	229	197	2211	2493	240	216	2310	2832	4
12/22/2011	1.145	1.59	6.8	14	289	211	2755	2426	270	225	2578	2598	4
12/23/2011	1.193	1.48	7.0	15		222		2378		236		2534	5
12/24/2011	1.143	1.41	7.0	15		222		2378		236		2534	6
12/25/2011	1.026	1.36	7.0	14		222		2378		236		2534	5
12/26/2011	1.187	1.33	7.2	14		222		2378		236		2534	6
12/27/2011	1.435	1.30	7.1	14	213	221	2548	2391	282	239	3369	2599	4
12/28/2011	2.364	1.32	7.1	14	161	217	3179	2447	217	238	4268	2718	4
12/29/2011	2.757	1.35	6.9	13	109	213	2503	2449	124	234	2851	2731	4
12/30/2011	2.722	1.39	6.9	13		216		2456		237		2741	6
12/31/2011	2.121	1.41	7.0	13		219		2473		241		2770	5
1/1/2012	1.834	1.42	7.0	13		219		2473		241		2770	5
1/2/2012	1.775	1.43	7.0	14		219		2473		241		2770	5
1/3/2012	1.594	1.44	7.0	14	173	215	2294	2459	219	239	2905	2781	4
1/4/2012	1.679	1.45	7.1	14	170	212	2387	2454	209	237	2920	2791	4
1/5/2012	1.714	1.46	7.1	14	192	214	2743	2515	209	236	2987	2821	4
1/6/2012	1.628	1.47	6.9	14		214		2532		237		2865	4
1/7/2012	1.575	1.48	7.2	14		213		2546		238		2896	5
1/8/2012	1.558	1.49	7.1	14		213		2546		238		2896	4
1/9/2012	1.464	1.50	7.0	14		213		2546		238		2896	4
1/10/2012	1.437	1.51	7.0	14	195	212	2338	2530	215	236	2577	2871	3
1/11/2012	1.394	1.51	7.1	14	215	212	2495	2527	262	238	3046	2884	4
1/12/2012	1.372	1.52	7.1	14	226	210	2586	2531	244	237	2786	2899	4
1/13/2012	1.327	1.52	7.1	14		206		2530		232		2897	3
1/14/2012	1.360	1.53	7.0	13		201		2536		231		2944	4
1/15/2012	1.356	1.54	7.0	13		201		2536		231		2944	4
1/16/2012	1.361	1.54	7.3	13		201		2536		231		2944	4
1/17/2012	1.569	1.55	7.2	13	195	201	2548	2537	214	229	2794	2932	4
1/18/2012	1.573	1.57	7.2	13	175	199	2294	2519	188	226	2460	2899	4
1/19/2012	2.937	1.63	7.2	12	205	196	5019	2707	267	225	6540	3171	5
1/20/2012	4.428	1.73	6.9	12		194		2745		224		3237	6
1/21/2012	5.242	1.87	6.7	11		186		2745		221		3292	8
1/22/2012	4.765	1.99	6.7	12		186		2745		221		3292	8
1/23/2012	3.938	2.08	6.8	12		186		2745		221		3292	7
1/24/2012	4.130	2.19	6.8	12	89	178	3068	2769	110	212	3772	3329	6
1/25/2012	4.353	2.29	6.8	12	64	170	2310	2737	93	204	3376	3332	8
1/26/2012	3.922	2.38	6.8	12	75	160	2468	2731	95	190	3107	3314	7
1/27/2012	3.399	2.41	6.8	12		160		2696		188		3240	7
1/28/2012	3.021	2.42	6.7	12		164		2712		194		3273	6
1/29/2012	3.277	2.44	6.8	12		164		2712		194		3273	5
1/30/2012	3.425	2.48	6.8	12		164		2712		194		3273	6

WASTEWATER TREATMENT OPERATIONS REPORT

2011 - Present

CH2M HILL Calculation

Permit No: WA0020982

Facility Name: City of Centralia

Receiving Water: Chehalis

Plant Type: Activated Sludge

	INFLUENT												
Date	Influent Flow Total	Influent Flow 30-day avg	Influent pH	Influent Temperature	Influent BOD Concentration	Influent BOD Concentration 30-day avg	Influent BOD	Influent BOD 30-day avg	Influent TSS Concentration	Influent TSS Concentration 30-day avg	Influent TSS	Influent TSS 30-day avg	Influent Dissolved Oxygen
	MGD	MGD		°C	mg/L	mg/L	lbs./day	lbs./day	mg/L	mg/L	lbs./day	lbs./day	mg/L
1/31/2012	3.147	2.52	7.1	12	120	161	3144	2746	138	189	3622	3299	5
2/1/2012	2.870	2.56	6.9	12	115	158	2748	2746	135	185	3232	3295	5
2/2/2012	2.631	2.60	6.9	13	111	153	2439	2756	124	179	2720	3281	5
2/3/2012	2.433	2.62	6.9	13		152		2785		176		3309	6
2/4/2012	2.246	2.64	6.9	13		149		2788		174		3336	5
2/5/2012	2.117	2.65	7.0	13		149		2788		174		3336	5
2/6/2012	1.992	2.67	7.0	13		149		2788		174		3336	5
2/7/2012	1.856	2.68	6.9	13	252	157	3901	2874	265	181	4103	3395	4
2/8/2012	1.823	2.69	7.0	13	227	162	3445	2915	231	184	3511	3403	5
2/9/2012	1.927	2.71	7.0	14	263	166	4227	3050	268	188	4307	3527	4
2/10/2012	1.835	2.72	7.1	15		163		3092		182		3564	5
2/11/2012	1.773	2.73	7.2	13		157		3134		177		3629	5
2/12/2012	1.860	2.75	7.2	14		157		3134		177		3629	5
2/13/2012	1.865	2.77	7.1	13		157		3134		177		3629	5
2/14/2012	1.883	2.79	7.1	13	222	162	3487	3161	238	182	3738	3637	5
2/15/2012	1.769	2.80	7.1	13	227	167	3343	3174	244	186	3600	3635	5
2/16/2012	1.818	2.81	7.2	13	244	171	3699	3257	244	189	3699	3699	5
2/17/2012	1.945	2.82	7.2	13		170		3331		189		3795	4
2/18/2012	2.852	2.82	7.1	12		167		3190		182		3566	5
2/19/2012	2.704	2.76	6.9	12		167		3190		182		3566	5
2/20/2012	2.459	2.67	6.9	13		167		3190		182		3566	5
2/21/2012	2.945	2.61	7.0	12	175	168	4298	3275	202	184	4961	3673	6
2/22/2012	3.849	2.60	7.0	12	137	166	4403	3356	154	181	4943	3764	7
2/23/2012	3.552	2.58	6.9	12	131	169	3874	3413	176	186	5214	3867	7
2/24/2012	3.406	2.55	6.8	12		177		3498		193		3905	7
2/25/2012	3.637	2.54	6.9	13		185		3584		202		3971	6
2/26/2012	3.546	2.55	6.8	12		185		3584		202		3971	6
2/27/2012	3.273	2.56	6.8	12		185		3584		202		3971	6
2/28/2012	3.068	2.55	6.9	12	186	185	4757	3674	254	206	6499	4165	6
2/29/2012	3.763	2.56	7.0	12	151	183	4724	3749	196	205	6152	4307	6
3/1/2012	3.877	2.59	6.8	12	104	182	3351	3764	124	204	4009	4335	7
3/2/2012	3.494	2.61	6.9	12		187		3842		209		4420	8
3/3/2012	3.145	2.62	6.9	12		193		3959		216		4561	7
3/4/2012	2.913	2.64	6.8	14		193		3959		216		4561	5
3/5/2012	3.149	2.67	7.0	12		193		3959		216		4561	5
3/6/2012	2.800	2.69	6.9	12	147	190	3436	3919	190	214	4437	4552	6
3/7/2012	2.620	2.71	7.0	12	167	188	3644	3899	201	213	4392	4540	6
3/8/2012	2.611	2.74	7.0	12	236	187	5134	3987	305	216	6641	4722	5
3/9/2012	2.300	2.75	6.9	13		184		4029		215		4815	5
3/10/2012	2.319	2.77	6.9	13		177		4013		211		4857	5
3/11/2012	2.483	2.79	6.9	13		177		4013		211		4857	8
3/12/2012	3.238	2.84	7.0	12		177		4013		211		4857	6
3/13/2012	4.005	2.91	6.8	12	129	173	4305	4035	184	209	6147	4956	6
3/14/2012	4.549	3.00	6.8	12	161	172	6091	4182	241	211	9144	5255	7
3/15/2012	5.877	3.13	6.8	12	99	164	4841	4279	136	204	6665	5465	8
3/16/2012	6.045	3.27	6.7	11		159		4351		201		5608	8
3/17/2012	6.014	3.41	6.6	11		152		4405		197		5767	8
3/18/2012	5.562	3.54	6.8	12		152		4405		197		5767	5
3/19/2012	4.834	3.60	6.8	12		152		4405		197		5767	7
3/20/2012	4.560	3.66	6.8	12	116	149	4398	4404	173	195	6580	5830	6
3/21/2012	4.459	3.73	6.8	12	104	146	3882	4367	163	193	6062	5846	7
3/22/2012	4.317	3.78	6.8	12	141	143	5075	4423	178	191	6409	5950	7
3/23/2012	3.862	3.78	6.8	12		144		4424		194		6027	7
3/24/2012	3.592	3.78	6.6	12		145		4470		195		6095	6
3/25/2012	3.316	3.77	6.7	12		145		4470		195		6095	5
3/26/2012	3.050	3.75	6.8	13		145		4470		195		6095	6
3/27/2012	2.923	3.73	6.9	13	162	146	3937	4429	250	200	6095	6095	6
3/28/2012	3.006	3.73	7.0	13	165	148	4127	4407	210	200	5265	6035	6
3/29/2012	5.998	3.82	7.0	12	181	147	9044	4714	232	199	11606	6400	9
3/30/2012	6.585	3.92	6.7	12		147		4713		199		6419	8
3/31/2012	6.692	4.01	6.5	12		150		4826		205		6620	4
4/1/2012	6.095	4.10	6.4	12		150		4826		205		6620	8
4/2/2012	5.394	4.17	6.6	12		150		4826		205		6620	7
4/3/2012	4.833	4.24	6.8	12	102	147	4124	4772	126	199	5079	6502	7
4/4/2012	4.496	4.28	6.8	12	114	144	4285	4737	169	197	6336	6490	7
4/5/2012	4.216	4.33	6.7	12	142	144	4985	4848	167	195	5872	6592	7
4/6/2012	3.852	4.37	6.8	13		142		4941		195		6762	8
4/7/2012	3.596	4.40	6.7	13		135		4925		186		6772	6
4/8/2012	3.281	4.44	6.7	13		135		4925		186		6772	6
4/9/2012	3.082	4.46	6.8	13		135		4925		186		6772	5
4/10/2012	2.844	4.47	6.9	13	169	137	4013	4854	222	189	5265	6656	6
4/11/2012	2.990	4.46	6.9	13	167	139	4160	4805	250	193	6235	6626	6
4/12/2012	2.777	4.42	7.0	13	172	142	3984	4782	223	196	5165	6555	6
4/13/2012	2.553	4.36	7.1	13		141		4681		192		6356	5
4/14/2012	2.384	4.24	6.9	14		145		4668		197		6331	5
4/15/2012	2.351	4.12	6.9	14		145		4668		197		6331	5
4/16/2012	2.332	3.99	7.0	13		145		4668		197		6331	5
4/17/2012	2.208	3.88	6.9	13	71	139	1311	4410	229	199	4217	6168	5
4/18/2012	2.112	3.79	7.0	13	197	143	3463	4342	291	206	5126	6094	6

WASTEWATER TREATMENT OPERATIONS REPORT

2011 - Present

CH2M HILL Calculation

Permit No: WA0020982

Facility Name: City of Centralia

Receiving Water: Chehalis

Plant Type: Activated Sludge

	INFLUENT												
Date	Influent Flow Total	Influent Flow 30-day avg	Influent pH	Influent Temperature	Influent BOD Concentration	Influent BOD Concentration 30-day avg	Influent BOD	Influent BOD 30-day avg	Influent TSS Concentration	Influent TSS Concentration 30-day avg	Influent TSS	Influent TSS 30-day avg	Influent Dissolved Oxygen
	MGD	MGD		°C	mg/L	mg/L	lbs./day	lbs./day	mg/L	mg/L	lbs./day	lbs./day	mg/L
4/19/2012	2.702	3.73	7.1	13	218	150	4921	4379	265	213	5972	6050	6
4/20/2012	3.163	3.69	6.9	13		154		4418		216		6049	6
4/21/2012	2.989	3.64	6.8	13		155		4363		220		6019	6
4/22/2012	2.746	3.61	6.8	14		155		4363		220		6019	5
4/23/2012	2.493	3.57	6.9	14		155		4363		220		6019	6
4/24/2012	2.252	3.53	6.9	14	178	157	3345	4285	207	219	3888	5855	4
4/25/2012	2.389	3.51	6.4	14	208	160	4144	4274	268	222	5340	5819	5
4/26/2012	2.487	3.50	6.9	14	206	164	4264	4298	233	221	4833	5728	6
4/27/2012	2.278	3.47	6.9	14		163		4311		222		5764	6
4/28/2012	2.169	3.34	6.8	14		162		3917		221		5277	5
4/29/2012	2.172	3.20	6.8	14		162		3917		221		5277	4
4/30/2012	2.231	3.05	6.9	14		162		3917		221		5277	5
5/1/2012	2.143	2.92	7.0	14	184	164	3289	3868	240	222	4289	5201	5
5/2/2012	2.101	2.81	7.0	14	188	165	3287	3827	260	225	4555	5155	5
5/3/2012	2.904	2.74	7.0	14	186	171	4515	3855	234	233	5667	5197	6
5/4/2012	2.813	2.69	6.9	14		176		3822		238		5109	6
5/5/2012	2.679	2.64	6.9	14		179		3725		244		5046	5
5/6/2012	2.529	2.59	6.9	14		179		3725		244		5046	5
5/7/2012	2.318	2.55	7.1	14		179		3725		244		5046	3
5/8/2012	2.155	2.51	6.9	14	221	182	3973	3744	231	243	4151	4977	5
5/9/2012	2.002	2.48	6.9	14	212	184	3537	3729	231	242	3858	4897	5
5/10/2012	1.900	2.44	6.8	14	256	190	4051	3732	247	244	3913	4801	5
5/11/2012	1.821	2.41	7.1	15		192		3699		243		4690	5
5/12/2012	1.770	2.37	6.9	15		194		3675		245		4651	5
5/13/2012	1.707	2.34	6.9	16		194		3675		245		4651	4
5/14/2012	1.668	2.32	7.0	16		194		3675		245		4651	5
5/15/2012	1.606	2.29	7.0	16	242	197	3235	3641	242	244	3241	4542	5
5/16/2012	1.568	2.27	7.0	16	233	200	3046	3599	245	245	3203	4447	5
5/17/2012	1.538	2.25	7.0	16	249	213	3188	3733	235	245	3014	4361	4
5/18/2012	1.458	2.22	7.0	16		214		3753		241		4302	4
5/19/2012	1.440	2.18	6.9	16		213		3656		239		4163	4
5/20/2012	1.526	2.13	6.8	16		213		3656		239		4163	4
5/21/2012	1.645	2.08	6.9	16		213		3656		239		4163	4
5/22/2012	1.593	2.05	7.0	16	137	208	1827	3515	226	238	3003	4073	4
5/23/2012	1.618	2.02	7.1	16	229	209	3091	3485	217	237	2928	3992	5
5/24/2012	1.629	2.00	7.0	16	227	213	3084	3466	207	237	2812	3915	4
5/25/2012	1.547	1.97	7.0	16		213		3414		234		3805	4
5/26/2012	1.455	1.93	6.8	16		214		3343		235		3719	4
5/27/2012	1.387	1.90	6.9	16		214		3343		235		3719	4
5/28/2012	1.433	1.88	7.0	16		214		3343		235		3719	4
5/29/2012	1.388	1.85	7.0	16	264	218	3061	3322	247	236	2860	3653	4
5/30/2012	1.363	1.82	7.0	17	257	220	2925	3293	255	237	2899	3599	4
5/31/2012	1.404	1.80	7.0	17	251	225	2934	3268	257	238	3009	3508	4
6/1/2012	1.330	1.77	7.1	17		228		3267		236		3428	4
6/2/2012	1.314	1.72	6.8	17		231		3163		237		3241	4
6/3/2012	1.333	1.67	6.9	17		231		3163		237		3241	3
6/4/2012	1.300	1.62	7.0	16		231		3163		237		3241	4
6/5/2012	1.270	1.58	7.0	17	309	237	3269	3171	300	242	3177	3236	5
6/6/2012	1.282	1.55	6.9	17	295	241	3148	3169	307	246	3282	3239	4
6/7/2012	1.435	1.52	6.8	17	297	247	3548	3139	284	250	3398	3185	3
6/8/2012	1.457	1.51	7.1	17		250		3108		251		3134	4
6/9/2012	1.382	1.49	7.0	17		249		3030		252		3069	4
6/10/2012	1.367	1.47	7.0	17		249		3030		252		3069	4
6/11/2012	1.319	1.46	7.0	17		249		3030		252		3069	4
6/12/2012	1.286	1.44	7.1	17	264	250	2835	3015	259	252	2777	3046	4
6/13/2012	1.262	1.43	7.0	17	306	254	3223	3030	327	258	3443	3075	3
6/14/2012	1.258	1.42	7.1	17		255		3014		259		3062	3
6/15/2012	1.242	1.41	7.0	17	299	260	3100	3018	313	264	3241	3065	3
6/16/2012	1.216	1.40	7.1	18		261		3004		267		3069	5
6/17/2012	1.248	1.39	6.9	17		261		3004		267		3069	3
6/18/2012	1.240	1.38	7.0	17		261		3004		267		3069	4
6/19/2012	1.223	1.37	7.0	17	305	265	3105	3012	332	272	3385	3093	4
6/20/2012	1.325	1.36	7.0	18	293	267	3234	3027	324	275	3581	3128	4
6/21/2012	1.173	1.35	7.0	18	268	276	2621	3084	294	280	2877	3119	4
6/22/2012	1.182	1.33	6.9	18		280		3084		285		3134	3
6/23/2012	1.385	1.33	7.0	17		284		3084		292		3161	3
6/24/2012	1.267	1.32	7.1	18		284		3084		292		3161	4
6/25/2012	1.234	1.31	7.0	18		284		3084		292		3161	8
6/26/2012	1.213	1.30	7.0	18	296	285	2997	3077	280	291	2833	3136	4
6/27/2012	1.226	1.30	7.2	18	240	282	2450	3032	270	289	2761	3109	4
6/28/2012	1.193	1.29	7.2	18	272	282	2702	3007	307	294	3054	3123	4
6/29/2012	1.185	1.28	7.0	18		284		3013		296		3140	3
6/30/2012	1.179	1.28	7.0	18		287		3019		300		3151	3
7/1/2012	1.106	1.27	7.1	18		287		3019		300		3151	3
7/2/2012	1.200	1.27	6.9	18		287		3019		300		3151	3
7/3/2012	1.161	1.26	7.1	18	311	289	3011	3019	307	300	2971	3137	4
7/4/2012	1.072	1.25	6.9	19	261	287	2335	2970	282	299	2521	3093	3
7/5/2012	1.187	1.25	7.2	19	275	284	2721	2931	284	298	2811	3067	4
7/6/2012	1.179	1.25	7.0	19		284		2914		297		3050	3

WASTEWATER TREATMENT OPERATIONS REPORT

2011 - Present

CH2M HILL Calculation

Permit No: WA0020982

Facility Name: City of Centralia

Receiving Water: Chehalis

Plant Type: Activated Sludge

	INFLUENT												
Date	Influent Flow Total	Influent Flow 30-day avg	Influent pH	Influent Temperature	Influent BOD Concentration	Influent BOD Concentration 30-day avg	Influent BOD	Influent BOD 30-day avg	Influent TSS Concentration	Influent TSS Concentration 30-day avg	Influent TSS	Influent TSS 30-day avg	Influent Dissolved Oxygen
	MGD	MGD		°C	mg/L	mg/L	lbs./day	lbs./day	mg/L	mg/L	lbs./day	lbs./day	mg/L
7/7/2012	1.143	1.24	7.0	19		282		2861		298		3021	3
7/8/2012	1.128	1.23	7.1	20		282		2861		298		3021	3
7/9/2012	1.130	1.22	7.0	19		282		2861		298		3021	4
7/10/2012	1.118	1.21	7.0	20	289	283	2693	2848	295	298	2751	3000	4
7/11/2012	1.109	1.20	7.1	20	270	282	2500	2823	289	297	2674	2977	2
7/12/2012	1.089	1.20	7.0	19	315	286	2862	2825	319	302	2897	2986	3
7/13/2012	1.250	1.20	7.0	19		284		2795		300		2951	3
7/14/2012	1.136	1.19	7.1	20		284		2795		300		2951	3
7/15/2012	1.080	1.19	7.1	20		283		2769		299		2926	4
7/16/2012	1.048	1.18	6.8	21		283		2769		299		2926	3
7/17/2012	1.065	1.17	7.1	20	357	289	3171	2800	332	301	2950	2928	3
7/18/2012	1.056	1.17	7.1	20	326	291	2867	2805	314	302	2765	2917	3
7/19/2012	1.049	1.16	7.1	20	302	291	2646	2772	296	300	2590	2860	3
7/20/2012	1.055	1.15	7.1	20		291		2737		298		2804	4
7/21/2012	1.048	1.15	7.0	20		293		2746		298		2798	4
7/22/2012	1.071	1.15	7.0	20		293		2746		298		2798	4
7/23/2012	1.077	1.14	7.1	20		293		2746		298		2798	3
7/24/2012	1.050	1.13	7.0	20	328	296	2875	2756	308	299	2697	2790	4
7/25/2012	1.066	1.12	7.0	20	312	297	2773	2757	315	300	2801	2791	3
7/26/2012	1.046	1.12	7.0	20	300	297	2621	2731	300	301	2618	2776	3
7/27/2012	1.037	1.11	6.9	20		301		2752		304		2777	3
7/28/2012	1.043	1.11	6.8	20		304		2756		303		2754	3
7/29/2012	1.051	1.10	6.8	20		304		2756		303		2754	2
7/30/2012	1.030	1.10	6.9	20		304		2756		303		2754	3
7/31/2012	1.022	1.09	6.8	20	386	310	3287	2797	358	308	3052	2777	5
8/1/2012	1.013	1.09	6.8	20	331	312	2795	2797	322	309	2721	2773	4
8/2/2012	1.018	1.08	6.9	20	328	313	2785	2781	317	309	2692	2753	4
8/3/2012	1.015	1.08	6.9	21		317		2815		311		2771	3
8/4/2012	1.034	1.08	7.0	21		320		2823		314		2767	1
8/5/2012	1.025	1.07	7.0	21		320		2823		314		2767	3
8/6/2012	1.047	1.07	7.0	21		320		2823		314		2767	2
8/7/2012	1.008	1.06	6.8	21	341	322	2865	2826	326	315	2741	2765	3
8/8/2012	1.027	1.06	6.8	21	303	321	2594	2810	335	316	2870	2773	4
8/9/2012	1.048	1.06	7.1	21	324	323	2830	2819	333	319	2909	2784	3
8/10/2012	1.074	1.06	7.0	21		327		2844		321		2793	2
8/11/2012	1.044	1.05	6.9	21		328		2843		321		2784	2
8/12/2012	1.043	1.05	6.9	21		328		2843		321		2784	2
8/13/2012	1.032	1.04	7.0	21		328		2843		321		2784	2
8/14/2012	1.033	1.04	6.9	21	334	329	2878	2845	347	323	2991	2800	3
8/15/2012	1.046	1.04	7.1	21	299	326	2611	2829	326	324	2845	2803	2
8/16/2012	1.069	1.04	7.1	22	331	325	2951	2813	336	324	2997	2806	3
8/17/2012	1.070	1.04	7.0	22		325		2809		325		2810	2
8/18/2012	1.055	1.04	7.1	21		326		2822		327		2828	3
8/19/2012	1.051	1.04	7.1	21		326		2822		327		2828	2
8/20/2012	1.013	1.04	6.8	22		326		2822		327		2828	2
8/21/2012	1.009	1.04	6.9	21	333	327	2801	2821	347	328	2920	2835	3
8/22/2012	0.998	1.04	6.8	21	290	324	2411	2791	340	329	2831	2835	2
8/23/2012	0.998	1.04	7.0	21	309	323	2576	2770	356	333	2963	2854	3
8/24/2012	1.030	1.03	6.9	21		324		2770		334		2858	3
8/25/2012	1.017	1.03	7.1	22		326		2782		337		2878	2
8/26/2012	1.043	1.03	6.9	21		326		2782		337		2878	2
8/27/2012	1.034	1.03	7.0	21		326		2782		337		2878	2
8/28/2012	0.990	1.03	6.8	21	279	322	2304	2745	387	341	3195	2902	3
8/29/2012	1.008	1.03	7.0	21	226	315	1902	2685	431	347	3622	2954	3
8/30/2012	0.985	1.03	7.1	21	293	309	2406	2622	423	352	3475	2984	3
8/31/2012	0.971	1.03	7.0	21		307		2609		354		3004	3
9/1/2012	0.971	1.03	7.0	21		305		2594		357		3030	2
9/2/2012	0.940	1.02	7.0	21		305		2594		357		3030	2
9/3/2012	1.043	1.02	7.0	21		305		2594		357		3030	2
9/4/2012	0.986	1.02	6.9	21		305		2594		357		3030	2
9/5/2012	0.993	1.02	7.0	21	296	304	2454	2583	385	359	3188	3042	3
9/6/2012	0.961	1.02	7.0	21	272	299	2184	2531	356	362	2854	3051	2
9/7/2012	0.952	1.02	7.1	21	314	300	2489	2523	387	366	3071	3066	3
9/8/2012	0.973	1.01	6.9	21		298		2497		368		3079	4
9/9/2012	0.996	1.01	6.9	21		298		2497		368		3079	4
9/10/2012	0.938	1.01	6.9	21		298		2497		368		3079	2
9/11/2012	0.945	1.01	7.0	21	341	301	2689	2512	394	370	3107	3081	3
9/12/2012	0.979	1.00	6.9	21	332	304	2709	2526	358	370	2924	3070	3
9/13/2012	0.980	1.00	7.0	21	374	306	3059	2539	388	372	3171	3083	3
9/14/2012	1.005	1.00	6.9	21		307		2533		376		3101	2
9/15/2012	0.973	1.00	6.9	21		305		2499		379		3110	3
9/16/2012	1.008	0.99	7.0	21		305		2499		379		3110	3
9/17/2012	0.968	0.99	7.0	21		305		2499		379		3110	2
9/18/2012	0.973	0.99	6.9	21	344	308	2794	2521	369	379	2995	3101	3
9/19/2012	1.016	0.99	6.8	21	319	309	2699	2534	366	378	3101	3101	3
9/20/2012	0.971	0.99	7.1	21	386	313	3128	2557	390	381	3157	3118	3
9/21/2012	0.994	0.99	7.0	21		314		2569		384		3140	2
9/22/2012	0.991	0.99	6.8	21		315		2568		386		3155	3
9/23/2012	1.016	0.99	7.0	21		315		2568		386		3155	3

WASTEWATER TREATMENT OPERATIONS REPORT

2011 - Present

CH2M HILL Calculation

Permit No: WA0020982

Facility Name: City of Centralia

Receiving Water: Chehalis

Plant Type: Activated Sludge

	INFLUENT												
Date	Influent Flow Total	Influent Flow 30-day avg	Influent pH	Influent Temperature	Influent BOD Concentration	Influent BOD Concentration 30-day avg	Influent BOD	Influent BOD 30-day avg	Influent TSS Concentration	Influent TSS Concentration 30-day avg	Influent TSS	Influent TSS 30-day avg	Influent Dissolved Oxygen
	MGD	MGD		°C	mg/L	mg/L	lbs./day	lbs./day	mg/L	mg/L	lbs./day	lbs./day	mg/L
9/24/2012	0.996	0.99	6.9	21		315		2568		386		3155	2
9/25/2012	0.981	0.98	7.0	21	355	318	2906	2594	375	385	3068	3148	3
9/26/2012	0.991	0.98	7.0	21	303	317	2503	2587	332	382	2744	3119	2
9/27/2012	0.959	0.98	7.1	21	354	322	2832	2625	380	381	3041	3108	3
9/28/2012	0.967	0.98	7.0	21		329		2681		377		3069	2
9/29/2012	0.962	0.98	7.0	21		333		2704		373		3035	3
9/30/2012	1.008	0.98	7.1	21		333		2704		373		3035	4
10/1/2012	1.021	0.98	6.9	21		333		2704		373		3035	4
10/2/2012	0.982	0.98	6.9	21	335	333	2741	2707	363	373	2972	3030	3
10/3/2012	0.984	0.98	6.9	20	307	331	2520	2693	337	370	2765	3011	3
10/4/2012	0.986	0.98	6.9	20	333	331	2737	2696	338	368	2781	2996	3
10/5/2012	0.973	0.98	7.0	20		333		2714		367		2982	4
10/6/2012	0.978	0.98	6.8	20		338		2754		367		2992	3
10/7/2012	1.009	0.98	6.8	20		340		2776		366		2985	2
10/8/2012	0.956	0.98	6.9	20		340		2776		366		2985	3
10/9/2012	0.996	0.98	6.9	20	388	344	3219	2810	391	368	3247	3006	3
10/10/2012	0.948	0.98	6.9	20	385	347	3046	2827	406	371	3211	3020	4
10/11/2012	0.952	0.98	6.9	20	367	349	2915	2843	374	369	2970	3010	4
10/12/2012	0.973	0.98	6.8	20		350		2854		370		3017	4
10/13/2012	0.989	0.98	6.9	20		348		2837		368		3004	3
10/14/2012	1.177	0.99	6.9	20		348		2837		368		3004	2
10/15/2012	1.245	1.00	6.9	20		348		2837		368		3004	4
10/16/2012	1.061	1.00	7.1	20	344	348	3046	2853	362	368	3204	3020	4
10/17/2012	1.006	1.00	7.1	19	410	352	3437	2895	790	398	6629	3277	4
10/18/2012	1.016	1.00	6.7	20	358	353	3029	2911	421	402	3566	3318	3
10/19/2012	1.020	1.00	7.2	19		356		2928		405		3335	3
10/20/2012	1.148	1.01	7.0	19		353		2911		406		3350	3
10/21/2012	1.079	1.01	7.1	19		353		2911		406		3350	4
10/22/2012	1.212	1.02	7.1	19		353		2911		406		3350	4
10/23/2012	1.043	1.02	7.2	18	368	354	3200	2933	366	403	3183	3337	4
10/24/2012	1.062	1.02	7.1	19	292	350	2589	2909	344	398	3047	3316	4
10/25/2012	1.045	1.02	7.0	19	323	348	2817	2902	361	397	3147	3322	4
10/26/2012	1.054	1.03	7.1	18		351		2933		403		3366	4
10/27/2012	1.340	1.04	7.1	18		351		2941		404		3393	3
10/28/2012	1.377	1.05	6.9	18		351		2941		404		3393	3
10/29/2012	1.315	1.07	7.1	18		351		2941		404		3393	4
10/30/2012	1.937	1.10	7.2	18	237	342	3822	3009	274	394	4427	3473	4
10/31/2012	1.986	1.13	7.1	18	154	329	2542	2976	196	380	3246	3457	4
11/1/2012	1.781	1.15	7.0	18	180	317	2674	2971	217	370	3224	3475	4
11/2/2012	1.821	1.18	7.1	18		318		3006		372		3529	4
11/3/2012	1.545	1.20	6.9	18		317		3028		375		3592	4
11/4/2012	1.485	1.22	7.1	18		317		3028		375		3592	4
11/5/2012	1.452	1.23	7.1	18		317		3028		375		3592	3
11/6/2012	1.400	1.25	7.1	18	106	301	1239	2890	266	367	3106	3554	4
11/7/2012	1.346	1.26	7.0	18	212	294	2382	2854	257	359	2884	3507	4
11/8/2012	1.326	1.27	6.9	17	257	285	2837	2827	282	351	3118	3497	4
11/9/2012	1.265	1.28	7.0	17		277		2810		347		3519	4
11/10/2012	1.246	1.29	7.2	17		270		2801		345		3565	4
11/11/2012	1.434	1.31	7.2	17		270		2801		345		3565	4
11/12/2012	1.487	1.32	7.0	17		270		2801		345		3565	4
11/13/2012	1.388	1.33	7.1	17	214	266	2478	2776	271	339	3137	3532	4
11/14/2012	1.371	1.34	7.1	17	218	262	2496	2756	282	335	3225	3510	4
11/15/2012	1.344	1.34	7.2	17	247	255	2772	2737	299	330	3353	3521	4
11/16/2012	1.331	1.36	7.2	17		243		2683		295		3282	4
11/17/2012	1.634	1.38	6.8	17		234		2654		285		3258	4
11/18/2012	2.469	1.42	7.1	16	168	229	3455	2716	207	279	4263	3336	5
11/19/2012	5.566	1.57	7.0	16	126	222	5833	2938	192	272	8912	3734	6
11/20/2012	3.975	1.67	6.8	15	141	216	4682	3055	159	265	5271	3836	7
11/21/2012	3.499	1.74	6.9	15		216		3055		265		3836	7
11/22/2012	2.767	1.80	6.7	16		205		3044		258		3883	5
11/23/2012	2.776	1.86	6.8	15		199		3079		251		3947	5
11/24/2012	2.578	1.91	6.8	15		188		3101		242		4014	5
11/25/2012	2.348	1.95	6.9	15		188		3101		242		4014	5
11/26/2012	2.187	1.98	6.7	15		188		3101		242		4014	1
11/27/2012	1.974	2.00	6.9	15	185	188	3042	3097	250	242	4115	4022	5
11/28/2012	1.868	2.02	7.0	15	206	189	3205	3104	387	253	6030	4165	5
11/29/2012	1.741	2.01	7.1	15	221	188	3213	3061	307	255	4459	4167	5
11/30/2012	3.650	2.07	7.2	16		191		3101		260		4238	4
12/1/2012	5.063	2.18	6.6	14		192		3136		263		4323	8
12/2/2012	5.890	2.31	6.7	14		192		3136		263		4323	7
12/3/2012	6.225	2.47	6.7	14		192		3136		263		4323	6
12/4/2012	6.544	2.64	6.7	14	80	183	4359	3230	99	251	5403	4406	6
12/5/2012	5.993	2.79	6.6	14	64	175	3187	3227	94	239	4699	4427	7
12/6/2012	4.939	2.91	6.7	14	77	172	3151	3364	101	228	4160	4502	7
12/7/2012	4.346	3.01	6.7	14		169		3439		225		4627	6
12/8/2012	3.743	3.09	6.8	15		162		3489		221		4752	6
12/9/2012	3.378	3.16	6.8	15		162		3489		221		4752	6
12/10/2012	3.061	3.22	6.8	14		162		3489		221		4752	5
12/11/2012	2.999	3.27	6.9	15	167	163	4165	3541	206	220	5152	4783	5

WASTEWATER TREATMENT OPERATIONS REPORT

2011 - Present

CH2M HILL Calculation

Permit No: WA0020982

Facility Name: City of Centralia

Receiving Water: Chehalis

Plant Type: Activated Sludge

	INFLUENT												
Date	Influent Flow Total	Influent Flow 30-day avg	Influent pH	Influent Temperature	Influent BOD Concentration	Influent BOD Concentration 30-day avg	Influent BOD	Influent BOD 30-day avg	Influent TSS Concentration	Influent TSS Concentration 30-day avg	Influent TSS	Influent TSS 30-day avg	Influent Dissolved Oxygen
	MGD	MGD		°C	mg/L	mg/L	lbs./day	lbs./day	mg/L	mg/L	lbs./day	lbs./day	mg/L
12/12/2012	2.724	3.31	6.9	15	170	163	3865	3564	243	221	5520	4836	5
12/13/2012	2.635	3.35	6.9	15	134	157	2949	3598	176	214	3868	4888	5
12/14/2012	2.467	3.39	6.9	14		153		3683		209		5016	5
12/15/2012	2.567	3.43	6.9	14		145		3759		202		5154	5
12/16/2012	3.505	3.50	6.9	14		145		3759		202		5154	5
12/17/2012	4.317	3.59	6.8	14		145		3759		202		5154	6
12/18/2012	4.101	3.65	6.8	13	90	138	3088	3728	120	195	4104	5141	6
12/19/2012	5.546	3.65	6.8	13	96	136	4445	3613	148	191	6845	4969	5
12/20/2012	6.548	3.73	6.7	13	66	130	3591	3522	87	185	4751	4925	8
12/21/2012	6.103	3.82	6.7	13		130		3522		185		4925	7
12/22/2012	5.236	3.90	6.7	14		130		3522		185		4925	7
12/23/2012	4.924	3.97	6.6	14		130		3522		185		4925	7
12/24/2012	4.572	4.04	6.7	14		130		3522		185		4925	6
12/25/2012	3.736	4.09	6.7	13	148	131	4622	3606	215	187	6700	5062	6
12/26/2012	5.110	4.18	6.7	13	95	128	4042	3637	139	184	5923	5123	6
12/27/2012	4.275	4.26	6.8	13	80	121	2839	3623	121	175	4315	5138	6
12/28/2012	3.859	4.33	6.7	13		114		3655		158		5069	7
12/29/2012	3.498	4.39	6.7	14		105		3692		146		5120	6
12/30/2012	3.181	4.37	6.8	14		105		3692		146		5120	6
12/31/2012	2.981	4.30	6.8	14		105		3692		146		5120	5
1/1/2013	2.797	4.20	6.9	14	185	112	4306	3739	254	154	5926	5182	5
1/2/2013	2.696	4.08	6.9	14	132	113	2966	3684	147	154	3305	5048	6
1/3/2013	2.537	3.95	6.9	13		116		3632		158		5021	7
1/4/2013	2.383	3.83	7.0	14	171	124	3397	3648	174	164	3458	4925	6
1/5/2013	2.276	3.74	7.0	14		128		3690		169		4989	5
1/6/2013	2.267	3.67	7.0	14		128		3690		169		4989	5
1/7/2013	2.454	3.62	6.9	14		128		3690		169		4989	5
1/8/2013	2.894	3.61	6.9	13	142	129	3421	3669	171	169	4128	4923	5
1/9/2013	4.338	3.65	6.9	13	85	126	3069	3626	109	165	3944	4853	5
1/10/2013	3.799	3.68	6.8	13	103	121	3273	3562	111	158	3517	4736	6
1/11/2013	3.281	3.70	6.8	13		117		3539		152		4676	6
1/12/2013	2.967	3.71	6.8	13		116		3588		150		4743	6
1/13/2013	2.694	3.71	6.9	13		116		3588		150		4743	6
1/14/2013	2.480	3.71	7.0	13		116		3588		150		4743	5
1/15/2013	2.334	3.67	7.0	13		116		3588		150		4743	6
1/16/2013	2.202	3.60	7.0	13	204	123	3747	3601	213	155	3911	4679	6
1/17/2013	2.127	3.54	7.1	13	188	130	3339	3620	176	159	3123	4603	5
1/18/2013	2.034	3.42	7.1	13	195	138	3309	3532	199	163	3376	4337	5
1/19/2013	1.948	3.27	7.0	13		144		3527		169		4302	5
1/20/2013	1.860	3.12	7.1	13		144		3527		169		4302	5
1/21/2013	1.899	3.01	7.1	13		144		3527		169		4302	5
1/22/2013	1.774	2.91	7.1	13	244	152	3613	3534	299	179	4423	4311	5
1/23/2013	1.769	2.81	6.8	13	202	155	2987	3495	212	181	3128	4227	5
1/24/2013	1.765	2.75	7.1	13	211	160	3100	3386	217	182	3195	3976	5
1/25/2013	1.753	2.64	7.2	13		165		3336		185		3827	5
1/26/2013	1.739	2.55	6.9	13		172		3377		190		3786	4
1/27/2013	1.726	2.48	7.1	13		172		3377		190		3786	4
1/28/2013	1.859	2.43	7.1	13		172		3377		190		3786	5
1/29/2013	1.844	2.38	7.0	13	195	174	2999	3348	216	192	3321	3750	5
1/30/2013	1.963	2.35	7.0	13	204	176	3334	3347	216	194	3536	3735	5
1/31/2013	1.903	2.32	7.0	13	194	176	3071	3259	198	190	3142	3536	5
2/1/2013	1.860	2.29	6.9	13		180		3282		193		3554	5
2/2/2013	1.816	2.27	7.0	13		180		3282		193		3554	5
2/3/2013	1.744	2.25	7.0	14		181		3272		195		3562	4
2/4/2013	1.728	2.23	6.9	13		181		3272		195		3562	4
2/5/2013	1.789	2.21	7.0	14	210	183	3140	3262	243	198	3626	3567	4
2/6/2013	1.850	2.19	7.1	13	185	183	2846	3232	239	201	3687	3575	5
2/7/2013	1.853	2.16	7.1	13	200	187	3095	3209	214	204	3308	3517	6
2/8/2013	1.735	2.07	7.0	13		195		3220		212		3484	5
2/9/2013	1.685	2.00	7.1	14		203		3215		220		3481	5
2/10/2013	1.661	1.95	7.1	13		203		3215		220		3481	5
2/11/2013	1.583	1.90	7.1	13		203		3215		220		3481	5
2/12/2013	1.555	1.86	7.2	13	233	205	3025	3200	260	223	3372	3473	5
2/13/2013	1.497	1.83	7.0	13	243	208	3028	3188	284	228	3546	3478	5
2/14/2013	1.479	1.80	7.1	14	303	214	3739	3225	386	238	4760	3564	5
2/15/2013	1.459	1.78	6.7	14		215		3187		240		3539	5
2/16/2013	1.477	1.75	7.1	14		217		3176		245		3571	4
2/17/2013	1.424	1.73	9.1	14		219		3165		249		3587	4
2/18/2013	1.481	1.72	7.0	14		219		3165		249		3587	5
2/19/2013	1.431	1.70	7.2	14	290	224	3458	3187	315	254	3760	3600	5
2/20/2013	1.407	1.69	7.2	14	269	227	3159	3185	346	260	4060	3633	5
2/21/2013	1.422	1.68	7.0	13	321	233	3805	3199	406	268	4814	3661	5
2/22/2013	2.186	1.69	7.2	13		235		3215		272		3702	5
2/23/2013	2.049	1.70	7.1	13		237		3225		277		3744	5
2/24/2013	1.911	1.70	7.0	13		237		3225		277		3744	5
2/25/2013	2.037	1.71	7.1	13		237		3225		277		3744	5
2/26/2013	1.852	1.72	6.8	13	179	233	2759	3189	238	274	3676	3739	5
2/27/2013	1.794	1.72	7.1	13	217	232	3244	3193	282	275	4218	3773	5
2/28/2013	2.101	1.72	7.0	13	240	235	4203	3279	291	280	5099	3900	5

WASTEWATER TREATMENT OPERATIONS REPORT

2011 - Present

CH2M HILL Calculation

Permit No: WA0020982

Facility Name: City of Centralia

Receiving Water: Chehalis

Plant Type: Activated Sludge

	INFLUENT												
Date	Influent Flow Total	Influent Flow 30-day avg	Influent pH	Influent Temperature	Influent BOD Concentration	Influent BOD Concentration 30-day avg	Influent BOD	Influent BOD 30-day avg	Influent TSS Concentration	Influent TSS Concentration 30-day avg	Influent TSS	Influent TSS 30-day avg	Influent Dissolved Oxygen
	MGD	MGD		°C	mg/L	mg/L	lbs./day	lbs./day	mg/L	mg/L	lbs./day	lbs./day	mg/L
3/1/2013	2.064	1.73	7.0	13		237		3275		285		3928	6
3/2/2013	1.980	1.73	6.9	14		241		3292		292		3994	5
3/3/2013	1.883	1.73	7.0	14		241		3292		292		3994	4
3/4/2013	1.780	1.73	7.1	13		241		3292		292		3994	5
3/5/2013	1.754	1.73	6.9	14	251	242	3673	3321	320	294	4682	4047	5
3/6/2013	1.964	1.74	7.2	13	232	241	3801	3355	300	295	4914	4109	6
3/7/2013	1.898	1.74	7.2	13	237	243	3754	3399	301	299	4766	4190	5
3/8/2013	1.785	1.74	7.1	13		247		3442		303		4229	5
3/9/2013	1.697	1.73	7.2	13		251		3471		311		4306	5
3/10/2013	1.661	1.73	7.1	14		251		3471		311		4306	5
3/11/2013	1.616	1.73	7.0	13		251		3471		311		4306	5
3/12/2013	1.627	1.73	7.0	14	229	250	3111	3443	331	312	4492	4320	5
3/13/2013	1.686	1.73	7.2	14	217	247	3056	3415	280	310	3938	4293	5
3/14/2013	1.599	1.73	7.2	14		248		3445		314		4363	5
3/15/2013	1.575	1.74	7.0	14	299	253	3932	3515	330	317	4333	4424	4
3/16/2013	1.618	1.74	7.0	14		248		3496		312		4396	4
3/17/2013	1.592	1.75	7.0	14		248		3496		312		4396	4
3/18/2013	1.546	1.75	7.2	14		248		3496		312		4396	5
3/19/2013	1.729	1.76	7.1	14	276	251	3987	3534	325	313	4687	4418	5
3/20/2013	2.596	1.79	7.1	13	175	245	3798	3553	237	307	5131	4469	5
3/21/2013	2.552	1.83	7.0	13	179	237	3803	3578	207	300	4406	4515	7
3/22/2013	2.330	1.86	6.9	13		235		3610		296		4550	6
3/23/2013	2.152	1.89	7.0	13		228		3593		287		4528	5
3/24/2013	2.010	1.88	7.1	13		228		3593		287		4528	5
3/25/2013	1.884	1.88	7.0	14		228		3593		287		4528	5
3/26/2013	1.763	1.87	7.0	14	229	228	3362	3576	265	285	3897	4480	5
3/27/2013	1.726	1.86	7.1	14	243	229	3496	3570	327	288	4708	4496	5
3/28/2013	1.724	1.86	7.0	14	252	234	3623	3632	347	296	4989	4590	6
3/29/2013	1.624	1.85	7.1	14		235		3661		297		4619	4
3/30/2013	1.609	1.83	6.8	14		235		3616		298		4579	5
3/31/2013	1.503	1.82	8.0	15		235		3616		298		4579	6
4/1/2013	1.47	1.80	7.1	14.6		235		3616		298		4579	
4/2/2013	1.42	1.78	6.9	14.4	286	239	3397	3600	340	301	4033	4537	
4/3/2013	1.41	1.77	7.2	14.6	225	238	2655	3532	318	302	3750	4480	
4/4/2013	1.65	1.77	7.2	14.6	259	239	3561	3524	340	303	4675	4480	
4/5/2013	2.00	1.77	7.0	14.3		239		3503		304		4447	
4/6/2013	2.87	1.80	6.9	13.9		239		3482		304		4420	
4/7/2013	3.82	1.87	6.7	13.2		239		3482		304		4420	
4/8/2013	3.05	1.91	6.8	13.4		239		3482		304		4420	
4/9/2013	2.64	1.95	6.9	13.6	152	233	3357	3472	199	296	4382	4417	
4/10/2013	2.57	1.98	6.9	13.9	126	225	2709	3418	182	288	3906	4381	
4/11/2013	2.30	2.00	6.9	13.9	169	221	3229	3426	232	281	4445	4377	
4/12/2013	2.20	2.02	6.9	14.2		221		3455		281		4411	
4/13/2013	2.18	2.04	7.1	14.2		221		3455		281		4411	
4/14/2013	2.29	2.06	7.1	14.2		214		3415		277		4417	
4/15/2013	2.24	2.08	6.9	14.0		214		3415		277		4417	
4/16/2013	2.12	2.10	7.0	13.8	172	211	3042	3386	199	271	3520	4348	
4/17/2013	2.01	2.12	7.0	14.1	179	209	3002	3359	219	267	3663	4299	
4/18/2013	1.97	2.12	7.0	14.0	216	205	3564	3328	256	262	4215	4266	
4/19/2013	2.08	2.11	7.0	14.0		207		3292		264		4199	
4/20/2013	1.94	2.09	7.0	14.5		209		3250		269		4182	
4/21/2013	1.87	2.07	7.0	14.5		209		3250		269		4182	
4/22/2013	1.78	2.06	7.1	14.5		209		3250		269		4182	
4/23/2013	1.73	2.05	7.0	14.5	217	210	3127	3240	256	268	3693	4144	
4/24/2013	1.69	2.04	7.2	14.7	224	211	3159	3235	293	270	4127	4143	
4/25/2013	1.63	2.04	7.0	15.2	248	212	3376	3236	278	270	3780	4135	
4/26/2013	1.56	2.03	6.9	15.3		210		3216		266		4091	
4/27/2013	1.52	2.03	7.0	15.1		206		3182		259		4016	
4/28/2013	1.52	2.02	7.2	15.5		206		3182		259		4016	
4/29/2013	1.48	2.02	7.0	15.2		206		3182		259		4016	
4/30/2013	1.45	2.02	7.1	15.1	259	210	3132	3178	290	262	3501	3976	
5/1/2013	1.42	2.01	7.0	15.4	245	213	2887	3157	297	264	3507	3943	
5/2/2013	1.55	2.02	7.0	15.6	281	212	3619	3173	330	264	4255	3958	
5/3/2013	1.81	2.03	6.9	15.9		211		3213		259		3974	
5/4/2013	1.38	2.02	7.1	16.3		207		3184		253		3916	
5/5/2013	1.38	2.00	7.0	16.8		207		3184		253		3916	
5/6/2013	1.33	1.95	7.1	18.7		207		3184		253		3916	
5/7/2013	1.34	1.87	7.0	16.4	309	215	3447	3204	310	257	3458	3881	
5/8/2013	1.27	1.81	7.2	16.5	233	217	2476	3152	289	259	3072	3823	
5/9/2013	1.26	1.76	7.0	16.9	265	225	2798	3112	289	266	3047	3728	
5/10/2013	1.40	1.72	6.7	17.2		232		3143		272		3714	
5/11/2013	1.22	1.69	7.0	17.5		237		3136		276		3653	
5/12/2013	1.22	1.65	6.4	17.6		237		3136		276		3653	
5/13/2013	1.26	1.62	7.0	17.0		237		3136		276		3653	
5/14/2013	1.18	1.59	7.2	17.3	302	242	2979	3124	332	280	3279	3624	
5/15/2013	1.22	1.55	7.2	17.0	260	244	2640	3089	364	286	3699	3630	

WASTEWATER TREATMENT OPERATIONS REPORT

2011 - Present

CH2M HILL Calculation

Permit No: WA0020982

Facility Name: City of Centralia

Receiving Water: Chehalis

Plant Type: Activated Sludge

	INFLUENT												
Date	Influent Flow Total	Influent Flow 30-day avg	Influent pH	Influent Temperature	Influent BOD Concentration	Influent BOD Concentration 30-day avg	Influent BOD	Influent BOD 30-day avg	Influent TSS Concentration	Influent TSS Concentration 30-day avg	Influent TSS	Influent TSS 30-day avg	Influent Dissolved Oxygen
	MGD	MGD		°C	mg/L	mg/L	lbs./day	lbs./day	mg/L	mg/L	lbs./day	lbs./day	mg/L
5/16/2013	1.22	1.52	6.8	17.4	306	253	3116	3094	367	298	3732	3645	
5/17/2013	1.20	1.50	7.0	17.2		259		3102		304		3643	
5/18/2013	1.20	1.47	7.2	17.3		262		3063		308		3596	
5/19/2013	1.24	1.44	6.9	17.5		262		3063		308		3596	
5/20/2013	1.26	1.42	7.4	17.4		262		3063		308		3596	
5/21/2013	1.25	1.40	7.3	17.1	289	264	3005	3059	359	312	3737	3607	
5/22/2013	1.31	1.38	7.2	16.8	242	263	2643	3029	294	311	3209	3578	
5/23/2013	1.58	1.38	7.3	16.4	241	265	3189	3033	276	312	3646	3575	
5/24/2013	1.41	1.37	7.0	16.7		268		3024		313		3533	
5/25/2013	1.32	1.36	7.2	16.9		269		2994		316		3512	
5/26/2013	1.37	1.35	7.2	17.1		269		2994		316		3512	
5/27/2013	1.57	1.35	7.2	17.1		269		2994		316		3512	
5/28/2013	1.44	1.35	6.9	17.0	250	268	3008	2995	284	314	3418	3505	
5/29/2013	1.54	1.35	7.0	16.8	208	264	2665	2972	259	310	3324	3492	
5/30/2013	1.40	1.35	7.0	16.8	274	265	3199	2976	343	314	4007	3528	
5/31/2013	1.33	1.35	7.1	17.1		266		2983		315		3530	
6/1/2013	1.34	1.34	7.2	17.4		265		2930		314		3469	
6/2/2013	1.32	1.33	7.1	17.6		265		2930		314		3469	
6/3/2013	1.28	1.32	7.0	17.6		265		2930		314		3469	
6/4/2013	1.23	1.32	6.7	17.8	317	269	3252	2955	367	318	3768	3492	
6/5/2013	1.23	1.31	7.0	18.2	242	267	2478	2921	353	320	3617	3501	
6/6/2013	1.20	1.31	6.9	18.2	290	266	2914	2883	358	324	3597	3511	
6/7/2013	1.17	1.31	7.0	18.0		268		2914		327		3545	
6/8/2013	1.18	1.30	7.1	18.3		268		2924		330		3586	
6/9/2013	1.19	1.30	6.9	18.3		268		2924		330		3586	
6/10/2013	1.18	1.30	7.2	18.3		268		2924		330		3586	
6/11/2013	1.13	1.29	7.1	18.1	318	272	2999	2930	392	334	3698	3595	
6/12/2013	1.14	1.29	7.0	18.2	350	278	3338	2959	377	338	3594	3595	
6/13/2013	1.16	1.29	7.0	18.5	363	282	3521	2998	387	341	3750	3629	
6/14/2013	1.14	1.29	7.0	18.1		284		3025		340		3623	
6/15/2013	1.10	1.28	7.0	18.7		282		3017		337		3614	
6/16/2013	1.11	1.28	7.1	18.7		282		3017		337		3614	
6/17/2013	1.09	1.27	7.2	18.8		282		3017		337		3614	
6/18/2013	1.08	1.27	7.1	18.7	352	287	3184	3030	379	341	3425	3599	
6/19/2013	1.09	1.26	7.1	18.8	346	292	3139	3038	485	351	4399	3657	
6/20/2013	1.11	1.26	7.0	18.7	356	296	3291	3058	386	353	3565	3644	
6/21/2013	1.10	1.25	7.2	18.7		301		3090		357		3678	
6/22/2013	1.08	1.23	7.3	19.3		305		3082		364		3680	
6/23/2013	1.23	1.23	6.9	19.0		305		3082		364		3680	
6/24/2013	1.16	1.22	6.9	18.9		305		3082		364		3680	
6/25/2013	1.18	1.22	7.0	18.9	284	304	2786	3059	341	362	3348	3655	
6/26/2013	1.15	1.20	7.0	18.9	277	302	2656	3031	373	363	3583	3650	
6/27/2013	1.20	1.20	7.1	19.0	289	305	2902	3023	355	368	3559	3660	
6/28/2013	1.18	1.18	7.1	19.6		312		3051		377		3685	
6/29/2013	1.11	1.17	7.1	19.7		315		3038		379		3659	
6/30/2013	1.14	1.17	7.0	19.8		315		3038		379		3659	
7/1/2013	1.11	1.16	7.0	19.8		315		3038		379		3659	
7/2/2013	1.10	1.15	7.0	21.6	306	315	2810	3021	338	376	3105	3616	
7/3/2013	1.10	1.15	6.9	20.0	269	311	2468	2981	371	376	3400	3601	
7/4/2013	1.03	1.14	7.1	19.8	279	309	2399	2920	350	375	3011	3547	
7/5/2013	1.07	1.13	7.1	19.7		314		2954		376		3541	
7/6/2013	1.07	1.13	6.8	20.0		316		2958		378		3536	
7/7/2013	1.08	1.13	7.1	19.9		316		2958		378		3536	
7/8/2013	1.09	1.12	7.0	20.1		316		2958		378		3536	
7/9/2013	1.11	1.12	7.2	20.3	319	316	2954	2957	349	376	3231	3513	
7/10/2013	1.06	1.12	7.0	20.2	284	314	2516	2926	327	372	2899	3469	
7/11/2013	1.09	1.12	7.2	20.2	306	313	2771	2910	376	371	3404	3448	
7/12/2013	1.06	1.11	7.1	20.2		310		2877		371		3437	
7/13/2013	1.12	1.11	7.2	20.4		306		2823		369		3411	
7/14/2013	1.06	1.11	7.1	20.5		306		2823		369		3411	
7/15/2013	1.06	1.11	7.1	20.5		306		2823		369		3411	
7/16/2013	1.04	1.11	7.0	20.6	318	307	2760	2818	413	373	3579	3424	
7/17/2013	1.02	1.10	7.2	20.6	275	304	2344	2784	364	372	3103	3401	
7/18/2013	1.02	1.10	7.2	20.6	319	302	2722	2751	397	373	3391	3398	
7/19/2013	1.01	1.10	7.1	20.8		299		2721		365		3321	
7/20/2013	0.97	1.09	6.9	20.8		294		2674		363		3301	
7/21/2013	1.02	1.09	6.9	20.8		294		2674		363		3301	
7/22/2013	1.04	1.09	7.0	20.8		294		2674		363		3301	
7/23/2013	1.00	1.08	7.0	21.1		294		2674		363		3301	
7/24/2013	1.03	1.08	7.0	21.3	299	294	2578	2667	379	364	3263	3298	
7/25/2013	1.00	1.07	7.1	21.2	316	297	2641	2655	399	369	3336	3297	
7/26/2013	0.99	1.07	6.9	21.3	297	298	2456	2640	402	371	3321	3277	
7/27/2013	1.00	1.06	6.9	21.3		299		2618		372		3254	
7/28/2013	1.01	1.05	7.0	21.1		299		2618		372		3254	

WASTEWATER TREATMENT OPERATIONS REPORT

2011 - Present

CH2M HILL Calculation

Permit No: WA0020982

Facility Name: City of Centralia

Receiving Water: Chehalis

Plant Type: Activated Sludge

	INFLUENT												
Date	Influent Flow Total	Influent Flow 30-day avg	Influent pH	Influent Temperature	Influent BOD Concentration	Influent BOD Concentration 30-day avg	Influent BOD	Influent BOD 30-day avg	Influent TSS Concentration	Influent TSS Concentration 30-day avg	Influent TSS	Influent TSS 30-day avg	Influent Dissolved Oxygen
	MGD	MGD		°C	mg/L	mg/L	lbs./day	lbs./day	mg/L	mg/L	lbs./day	lbs./day	mg/L
7/29/2013	1.01	1.05	6.9	21.3		299		2618		372		3254	
7/30/2013	1.01	1.05	7.3	21.4	287	298	2417	2603	374	372	3150	3246	
7/31/2013	1.05	1.04	7.2	21.5	310	299	2723	2611	381	373	3343	3253	
8/1/2013	0.98	1.04	7.2	21.3	318	300	2609	2597	410	378	3361	3271	
8/2/2013	0.99	1.04	6.9	21.4		302		2607		379		3261	
8/3/2013	1.00	1.04	6.9	21.7		304		2624		381		3282	
8/4/2013	1.00	1.03	7.0	22.3		304		2624		381		3282	
8/5/2013	0.94	1.03	7.0	22.0		304		2624		381		3282	
8/6/2013	0.95	1.02	6.8	21.9	319	305	2519	2616	391	382	3084	3267	
8/7/2013	0.96	1.02	7.1	21.9	210	298	1672	2549	262	373	2089	3182	
8/8/2013	0.96	1.01	7.2	21.9	253	294	2026	2482	298	370	2387	3122	
8/9/2013	0.99	1.01	7.0	21.8		294		2480		373		3139	
8/10/2013	0.99	1.01	7.2	21.7		294		2456		373		3117	
8/11/2013	1.00	1.01	6.9	21.7		294		2456		373		3117	
8/12/2013	0.99	1.00	7.0	21.8		294		2456		373		3117	
8/13/2013	1.00	1.00	7.0	22.0	346	298	2892	2489	447	378	3734	3165	
8/14/2013	1.00	1.00	7.2	21.8	280	296	2323	2477	347	376	2880	3144	
8/15/2013	1.01	1.00	7.1	21.6	302	295	2538	2462	400	375	3359	3129	
8/16/2013	0.98	1.00	7.1	22.0		297		2471		376		3131	
8/17/2013	1.04	1.00	7.0	21.9		295		2450		374		3109	
8/18/2013	0.99	1.00	7.1	22.0		295		2450		374		3109	
8/19/2013	1.04	1.00	6.9	25.3		295		2450		374		3109	
8/20/2013	0.97	1.00	7.1	22.1	306	296	2488	2453	428	378	3477	3137	
8/21/2013	0.94	0.99	7.3	22.2	288	295	2262	2439	389	379	3059	3132	
8/22/2013	0.98	0.99	7.1	22.1	320	297	2626	2451	416	382	3416	3150	
8/23/2013	1.00	0.99	7.0	21.9		297		2442		382		3142	
8/24/2013	1.03	0.99	6.9	22.0		295		2427		380		3128	
8/25/2013	0.96	0.99	7.0	21.7		295		2425		379		3111	
8/26/2013	0.99	0.99	7.0	21.9		295		2425		379		3111	
8/27/2013	1.01	0.99	7.1	22.1	295	295	2484	2429	428	382	3601	3149	
8/28/2013	1.01	0.99	7.1	22.1	309	296	2616	2443	446	387	3774	3194	
8/29/2013	1.09	0.99	7.0	22.0	335	299	3055	2488	460	393	4200	3269	
8/30/2013	1.01	0.99	7.0	22.1		299		2470		394		3263	
8/31/2013	1.00	0.99	6.9	22.4		297		2459		393		3255	
9/1/2013	0.99	0.99	6.9	22.3		297		2459		393		3255	
9/2/2013	1.12	1.00	7.3	22.1		297		2459		393		3255	
9/3/2013	1.08	1.00	7.0	21.8	324	299	2933	2495	385	392	3480	3272	
9/4/2013	1.03	1.00	7.0	21.9	314	300	2689	2509	397	392	3400	3281	
9/5/2013	2.18	1.04	7.1	21.8	471	311	8558	2940	530	402	9640	3750	
9/6/2013	1.96	1.08	6.8	20.7		319		3038		413		3877	
9/7/2013	1.43	1.09	7.1	21.4		324		3122		423		4002	
9/8/2013	1.28	1.10	7.2	21.6		324		3122		423		4002	
9/9/2013	1.23	1.11	7.1	21.7		324		3122		423		4002	
9/10/2013	1.15	1.12	7.0	21.8	298	322	2854	3101	356	418	3413	3956	
9/11/2013	1.12	1.12	7.2	22.1	262	318	2450	3055	327	411	3061	3892	
9/12/2013	1.12	1.12	7.1	21.9	285	313	2654	3038	340	404	3164	3852	
9/13/2013	1.05	1.13	7.1	21.6		316		3093		408		3926	
9/14/2013	1.07	1.13	7.3	21.6		317		3139		409		3974	
9/15/2013	1.12	1.13	7.3	21.5		317		3139		409		3974	
9/16/2013	1.11	1.14	6.9	21.6		317		3139		409		3974	
9/17/2013	1.08	1.14	6.9	21.5	308	316	2777	3111	393	407	3544	3941	
9/18/2013	1.07	1.14	7.0	21.6	280	314	2505	3068	396	407	3545	3912	
9/19/2013	1.04	1.14	7.2	21.7	325	315	2822	3092	452	408	3924	3944	
9/20/2013	1.02	1.14	6.9	21.4		317		3156		410		4013	
9/21/2013	1.05	1.15	6.9	21.3		317		3200		409		4062	
9/22/2013	1.23	1.15	7.2	20.8		317		3200		409		4062	
9/23/2013	1.14	1.16	6.8	20.8		317		3200		409		4062	
9/24/2013	1.11	1.16	6.6	20.7	300	316	2771	3167	381	407	3524	4021	
9/25/2013	1.09	1.17	6.7	20.7	283	313	2565	3124	367	404	3323	3971	
9/26/2013	1.10	1.17	6.7	20.8	388	320	3560	3201	478	408	4391	4027	
9/27/2013	1.23	1.18	6.8	20.3		321		3246		405		4047	
9/28/2013	3.03	1.24	7.0	19.6		320		3262		400		4034	
9/29/2013	3.82	1.33	6.4	19.8		320		3262		400		4034	
9/30/2013	3.67	1.42	6.3	18.3		320		3262		400		4034	
10/1/2013	2.99	1.49	6.4	18.1	129	305	3220	3258	186	384	4638	4081	
10/2/2013	2.92	1.55	6.3	18.1	128	292	3107	3248	181	369	4409	4104	
10/3/2013	2.43	1.60	6.8	18.1	131	279	2665	3229	171	354	3470	4103	
10/4/2013	2.04	1.63	7.3	18.0		276		3270		351		4158	
10/5/2013	1.81	1.62	6.9	18.7		260		2829		336		3701	
10/6/2013	1.70	1.61	7.1	18.9		260		2829		336		3701	
10/7/2013	1.64	1.62	6.9	18.1		260		2829		336		3701	
10/8/2013	1.59	1.63	6.9	18.4	216	256	2856	2831	292	332	3868	3714	
10/9/2013	1.52	1.64	7.3	18.3	237	255	3000	2843	294	330	3716	3714	
10/10/2013	1.42	1.64	7.1	18.4	318	256	3760	2908	350	329	4142	3766	

WASTEWATER TREATMENT OPERATIONS REPORT

2011 - Present

CH2M HILL Calculation

Permit No: WA0020982

Facility Name: City of Centralia

Receiving Water: Chehalis

Plant Type: Activated Sludge

	INFLUENT												
Date	Influent Flow Total	Influent Flow 30-day avg	Influent pH	Influent Temperature	Influent BOD Concentration	Influent BOD Concentration 30-day avg	Influent BOD	Influent BOD 30-day avg	Influent TSS Concentration	Influent TSS Concentration 30-day avg	Influent TSS	Influent TSS 30-day avg	Influent Dissolved Oxygen
	MGD	MGD		°C	mg/L	mg/L	lbs./day	lbs./day	mg/L	mg/L	lbs./day	lbs./day	mg/L
10/11/2013	1.40	1.65	6.9	18.7		256		2943		329		3820	
10/12/2013	1.40	1.66	6.9	18.5		254		2968		328		3875	
10/13/2013	1.37	1.67	6.9	17.9		254		2968		328		3875	
10/14/2013	1.31	1.68	6.9	18.6		254		2968		328		3875	
10/15/2013	1.27	1.69	7.2	18.4	278	255	2945	2966	385	333	4083	3891	
10/16/2013	1.24	1.69	6.9	18.4	302	259	3133	2978	407	338	4224	3914	
10/17/2013	1.24	1.70	7.2	18.5	326	260	3375	3020	405	339	4188	3960	
10/18/2013	1.23	1.70	7.0	18.4		258		3060		335		3992	
10/19/2013	1.20	1.71	7.2	18.2		253		3080		325		3998	
10/20/2013	1.19	1.71	6.9	18.2		253		3080		325		3998	
10/21/2013	1.20	1.72	6.9	18.2		253		3080		325		3998	
10/22/2013	1.18	1.72	6.8	18.4	312	257	3067	3079	427	333	4199	4013	
10/23/2013	1.17	1.72	7.0	18.2	317	262	3083	3079	439	340	4271	4032	
10/24/2013	1.15	1.72	7.1	18.3	328	264	3148	3106	422	343	4054	4070	
10/25/2013	1.14	1.72	6.8	18.4		262		3148		341		4127	
10/26/2013	1.18	1.72	6.8	18.1		252		3113		330		4105	
10/27/2013	1.18	1.72	6.8	18.0		252		3113		330		4105	
10/28/2013	1.18	1.66	7.0	18.3		252		3113		330		4105	
10/29/2013	1.16	1.57	7.0	18.1	335	258	3237	3123	432	338	4174	4110	
10/30/2013	1.14	1.49	7.0	17.8	344	264	3264	3133	453	346	4294	4124	
10/31/2013	1.08	1.42	6.9	18.0	367	281	3303	3139	446	365	4012	4079	
11/1/2013	1.23	1.37	7.0	18.3		293		3141		379		4053	
11/2/2013	1.26	1.33	7.0	17.6		307		3181		396		4102	
11/3/2013	1.25	1.30	7.0	17.6		307		3181		396		4102	
11/4/2013	1.25	1.28	7.0	17.3		307		3181		396		4102	
11/5/2013	1.21	1.27	6.8	17.5	293	306	2966	3164	357	393	3617	4065	
11/6/2013	1.33	1.26	7.0	17.5	284	304	3149	3163	367	391	4074	4065	
11/7/2013	1.87	1.27	7.0	16.9	258	307	4037	3248	337	394	5266	4165	
11/8/2013	1.68	1.27	6.9	16.9		312		3267		402		4200	
11/9/2013	1.54	1.27	7.1	16.8		312		3226		406		4205	
11/10/2013	1.44	1.28	6.9	17.1		312		3226		406		4205	
11/11/2013	1.43	1.28	7.0	17.2		312		3226		406		4205	
11/12/2013	1.35	1.28	7.0	17.1	269	309	3031	3211	377	404	4255	4208	
11/13/2013	1.33	1.28	7.0	17.1	282	307	3137	3205	346	400	3844	4182	
11/14/2013	1.29	1.28	7.1	17.1	300	308	3234	3226	366	399	3947	4173	
11/15/2013	1.39	1.28	6.9	16.8		309		3233		398		4169	
11/16/2013	1.37	1.29	7.1	16.8		307		3221		397		4167	
11/17/2013	1.89	1.31	6.9	16.5		307		3221		397		4167	
11/18/2013	2.30	1.35	6.8	16.3		307		3221		397		4167	
11/19/2013	2.51	1.39	6.7	15.7	182	298	3826	3268	249	386	5222	4248	
11/20/2013	2.05	1.42	6.9	15.8	177	289	3026	3251	225	375	3838	4219	
11/21/2013	1.77	1.44	7.3	15.8	239	284	3520	3283	295	365	4344	4229	
11/22/2013	1.65	1.45	7.1	15.7		281		3298		359		4226	
11/23/2013	1.54	1.47	7.1	15.9		278		3311		354		4241	
11/24/2013	1.51	1.48	7.2	16.1		278		3311		354		4241	
11/25/2013	1.45	1.49	7.1	16.0		278		3311		354		4241	
11/26/2013	1.41	1.50	7.1	15.6		278		3311		354		4241	
11/27/2013	1.45	1.50	7.2	15.8	224	273	2713	3265	330	352	3993	4222	
11/28/2013	1.29	1.51	7.0	16.0	315	272	3397	3277	381	348	4112	4217	
11/29/2013	1.26	1.51	7.1	15.7	363	273	3818	3320	349	340	3667	4169	
11/30/2013	1.40	1.52	7.1	15.7		266		3321		332		4182	
12/1/2013	2.07	1.55	7.1	15.9		266		3321		332		4182	
12/2/2013	2.02	1.58	7.0	14.9		266		3321		332		4182	
12/3/2013	1.81	1.60	7.1	14.9	184	259	2782	3280	240	325	3622	4139	
12/4/2013	1.67	1.61	7.2	14.8	209	256	2921	3254	276	321	3854	4118	
12/5/2013	1.59	1.62	7.3	14.8	336	259	4450	3360	413	325	5470	4251	
12/6/2013	1.55	1.63	7.4	14.6		257		3376		322		4264	
12/7/2013	1.49	1.62	7.1	11.6		257		3321		321		4181	
12/8/2013	1.46	1.61	6.9	9.1		257		3321		321		4181	
12/9/2013	1.40	1.61	7.3	14.3		257		3321		321		4181	
12/10/2013	1.40	1.60	7.1	14.5	394	267	4604	3420	404	327	4727	4223	
12/11/2013	1.36	1.60	7.2	14.4	269	267	3067	3395	295	325	3358	4161	
12/12/2013	1.37	1.60	7.1	14.3	287	269	3268	3412	260	316	2962	4069	
12/13/2013	1.34	1.60	7.0	14.4		268		3433		314		4086	
12/14/2013	1.33	1.60	7.3	14.4		265		3449		310		4097	
12/15/2013	1.33	1.60	7.2	14.6		265		3449		310		4097	
12/16/2013	1.28	1.60	7.3	14.3		265		3449		310		4097	
12/17/2013	1.27	1.58	7.1	14.4	274	266	2896	3407	332	311	3512	4052	
12/18/2013	1.24	1.54	7.2	14.6	273	266	2813	3364	291	310	3002	3977	
12/19/2013	1.22	1.50	7.1	14.4	309	275	3155	3316	313	315	3195	3833	
12/20/2013	1.28	1.47	7.2	14.0		283		3339		321		3832	
12/21/2013	1.27	1.46	6.9	14.6		286		3324		324		3789	
12/22/2013	1.25	1.44	7.0	14.5		286		3324		324		3789	
12/23/2013	1.43	1.44	7.1	14.2		286		3324		324		3789	

WASTEWATER TREATMENT OPERATIONS REPORT

2011 - Present

CH2M HILL Calculation

Permit No: WA0020982

Facility Name: City of Centralia

Receiving Water: Chehalis

Plant Type: Activated Sludge

	INFLUENT												
Date	Influent Flow Total	Influent Flow 30-day avg	Influent pH	Influent Temperature	Influent BOD Concentration	Influent BOD Concentration 30-day avg	Influent BOD	Influent BOD 30-day avg	Influent TSS Concentration	Influent TSS Concentration 30-day avg	Influent TSS	Influent TSS 30-day avg	Influent Dissolved Oxygen
	MGD	MGD		°C	mg/L	mg/L	lbs./day	lbs./day	mg/L	mg/L	lbs./day	lbs./day	mg/L
12/24/2013	1.35	1.43	7.0	14.7	274	285	3097	3306	300	322	3390	3759	
12/25/2013	1.20	1.43	7.1	14.1	273	285	2726	3265	298	320	2978	3703	
12/26/2013	1.32	1.42	7.1	14.2	438	295	4830	3369	317	320	3497	3689	
12/27/2013	1.29	1.42	7.1	14.5		300		3416		319		3668	
12/28/2013	1.24	1.42	7.0	14.4		299		3417		314		3633	
12/29/2013	1.22	1.41	6.9	13.8		293		3384		312		3631	
12/30/2013	1.24	1.41	7.0	14.2		293		3384		312		3631	
12/31/2013	1.25	1.38	7.1	14.1	269	291	2802	3339	311	312	3235	3600	
1/1/2014	1.18	1.35	7.2	14.0	269	290	2654	3290	385	317	3793	3614	
1/2/2014	1.23	1.34	6.9	14.2	330	300	3376	3333	392	328	4010	3642	
1/3/2014	1.18	1.32	7.0	14.4		307		3364		332		3625	
1/4/2014	1.16	1.30	7.1	14.2		305		3274		325		3472	
1/5/2014	1.18	1.29	7.1	14.3		305		3274		325		3472	
1/6/2014	1.26	1.28	7.2	14.1		305		3274		325		3472	
1/7/2014	1.44	1.28	7.2	13.8	285	303	3433	3286	321	325	3864	3502	
1/8/2014	1.69	1.29	7.1	13.7	496	317	7002	3552	320	324	4519	3574	
1/9/2014	1.74	1.31	7.2	13.4	387	317	5612	3624	229	312	3325	3474	
1/10/2014	2.09	1.33	7.2	13.3		320		3666		313		3483	
1/11/2014	3.26	1.39	8.5	12.6		323		3700		317		3527	
1/12/2014	2.97	1.45	6.9	12.8		323		3700		317		3527	
1/13/2014	2.51	1.49	7.0	13.2		323		3700		317		3527	
1/14/2014	2.22	1.52	7.0	13.4	194	313	3595	3692	219	310	4052	3567	
1/15/2014	2.00	1.54	7.0	13.4	158	302	2635	3616	167	300	2781	3511	
1/16/2014	1.84	1.56	7.1	13.6	197	297	3021	3625	221	292	3389	3502	
1/17/2014	1.73	1.58	7.0	13.5		298		3688		292		3541	
1/18/2014	1.62	1.59	7.2	13.7		298		3732		290		3569	
1/19/2014	1.53	1.60	7.1	13.9		298		3732		290		3569	
1/20/2014	1.56	1.61	7.1	13.8		298		3732		290		3569	
1/21/2014	1.45	1.61	7.1	13.6	243	293	2937	3671	276	289	3330	3551	
1/22/2014	1.41	1.61	7.1	13.8	253	291	2979	3621	333	292	3916	3577	
1/23/2014	1.35	1.61	7.2	13.8	366	297	4130	3695	342	295	3855	3610	
1/24/2014	1.33	1.62	7.2	13.9		299		3770		295		3659	
1/25/2014	1.33	1.62	7.1	13.9		287		3681		293		3672	
1/26/2014	1.29	1.62	7.2	13.9		287		3681		293		3672	
1/27/2014	1.31	1.62	7.0	13.8		287		3681		293		3672	
1/28/2014	1.43	1.63	7.0	13.9	430	298	5134	3793	307	294	3668	3672	
1/29/2014	1.43	1.63	7.3	13.6	218	293	2586	3707	283	293	3364	3650	
1/30/2014	1.54	1.64	7.2	13.7	247	291	3177	3734	271	290	3486	3668	
1/31/2014	1.52	1.65	7.1	13.5		293		3817		283		3658	
2/1/2014	1.48	1.66	7.2	13.9		290		3853		274		3629	
2/2/2014	1.46	1.67	7.1	13.9		290		3853		274		3629	
2/3/2014	1.39	1.68	7.1	13.4		290		3853		274		3629	
2/4/2014	1.37	1.69	7.3	13.4	268	288	3051	3792	332	279	3785	3641	
2/5/2014	1.32	1.69	7.2	13.2	328	291	3620	3779	381	286	4208	3682	
2/6/2014	1.35	1.68	7.2	13.0	262	289	2946	3745	306	285	3441	3651	
2/7/2014	1.29	1.67	7.2	13.1		273		3494		282		3585	
2/8/2014	1.24	1.65	7.1	13.2		264		3318		287		3606	
2/9/2014	1.38	1.63	7.1	13.2		264		3318		287		3606	
2/10/2014	1.50	1.57	7.2	13.4		264		3318		287		3606	
2/11/2014	1.60	1.53	7.1	12.8	207	259	2758	3275	204	280	2722	3538	
2/12/2014	1.61	1.50	7.2	13.0	147	251	1970	3181	227	276	3043	3503	
2/13/2014	1.68	1.48	7.2	13.2	184	251	2566	3108	186	274	2600	3399	
2/14/2014	1.83	1.47	7.2	12.9		258		3144		282		3447	
2/15/2014	2.27	1.49	7.0	12.6		263		3154		287		3451	
2/16/2014	3.63	1.55	7.0	12.9		263		3154		287		3451	
2/17/2014	6.28	1.71	6.8	11.4		263		3154		287		3451	
2/18/2014	5.67	1.84	6.8	11.5	76	248	3570	3186	80	271	3782	3477	
2/19/2014	5.27	1.97	6.8	11.7	78	236	3413	3203	87	258	3821	3502	
2/20/2014	4.90	2.08	6.7	11.7	74	224	3036	3210	190	252	7764	3818	
2/21/2014	4.23	2.18	6.7	11.8		222		3227		246		3811	
2/22/2014	3.66	2.25	6.7	12.1		210		3152		238		3807	
2/23/2014	3.30	2.32	6.8	12.3		210		3152		238		3807	
2/24/2014	3.26	2.38	6.9	11.8		210		3152		238		3807	
2/25/2014	2.99	2.44	6.9	12.2	129	203	3201	3156	176	233	4383	3851	
2/26/2014	2.77	2.49	6.8	12.8	150	200	3463	3178	159	228	3674	3839	
2/27/2014	2.58	2.53	6.9	12.8	159	180	3413	3055	189	219	4068	3867	
2/28/2014	2.42	2.56	6.9	13.1		177		3091		214		3906	
3/1/2014	2.22	2.58	7.0	12.8		172		3084		210		3941	
3/2/2014	2.29	2.61	7.0	12.6		172		3084		210		3941	
3/3/2014	2.60	2.64	6.9	13.0		172		3084		210		3941	
3/4/2014	2.56	2.68	6.9	12.9		172		3084		210		3941	
3/5/2014	2.34	2.71	6.9	13.2	130	168	2537	3042	140	204	2730	3848	
3/6/2014	5.54	2.85	6.8	12.3	53	152	2444	2995	56	183	2587	3756	
3/7/2014	4.61	2.96	6.8	12.3	62	131	2396	2901	49	158	1885	3577	

WASTEWATER TREATMENT OPERATIONS REPORT

2011 - Present

CH2M HILL Calculation

Permit No: WA0020982

Facility Name: City of Centralia

Receiving Water: Chehalis

Plant Type: Activated Sludge

	INFLUENT												
Date	Influent Flow Total	Influent Flow 30-day avg	Influent pH	Influent Temperature	Influent BOD Concentration	Influent BOD Concentration 30-day avg	Influent BOD	Influent BOD 30-day avg	Influent TSS Concentration	Influent TSS Concentration 30-day avg	Influent TSS	Influent TSS 30-day avg	Influent Dissolved Oxygen
	MGD	MGD		°C	mg/L	mg/L	lbs./day	lbs./day	mg/L	mg/L	lbs./day	lbs./day	mg/L
3/8/2014	5.12	3.09	6.8	12.3		121		2897		145		3588	
3/9/2014	6.20	3.25	6.7	13.0		121		2897		145		3588	
3/10/2014	5.94	3.41	6.7	12.3		121		2897		145		3588	
3/11/2014	5.03	3.53	6.7	12.3	55	116	2300	2851	50	138	2097	3474	
3/12/2014	4.37	3.62	6.6	12.8	57	111	2069	2795	54	132	1969	3366	
3/13/2014	3.89	3.70	6.7	12.9	44	100	1428	2700	65	122	2110	3322	
3/14/2014	3.81	3.77	6.8	13.1		96		2756		114		3344	
3/15/2014	3.46	3.83	7.2	13.7		89		2772		108		3406	
3/16/2014	4.40	3.92	7.1	12.8		89		2772		108		3406	
3/17/2014	4.29	3.99	6.8	12.4		89		2772		108		3406	
3/18/2014	3.79	3.99	6.7	12.8		89		2772		108		3406	
3/19/2014	3.39	3.90	6.8	12.7	82	88	2334	2739	73	105	2066	3303	
3/20/2014	3.08	3.81	6.8	13.0	104	90	2666	2669	98	107	2513	3205	
3/21/2014	2.83	3.73	6.8	13.0	105	93	2491	2598	90	107	2126	3075	
3/22/2014	2.65	3.65	6.8	13.7		94		2562		100		2684	
3/23/2014	2.50	3.60	7.2	13.8		94		2562		100		2684	
3/24/2014	2.35	3.55	6.9	14.3		94		2562		100		2684	
3/25/2014	2.25	3.52	6.9	13.5	139	98	2601	2565	115	101	2159	2644	
3/26/2014	2.29	3.49	7.0	13.3	135	100	2578	2566	116	102	2212	2613	
3/27/2014	2.23	3.46	6.9	13.8	151	102	2816	2538	207	104	3854	2575	
3/28/2014	2.46	3.45	6.7	13.7		98		2467		100		2490	
3/29/2014	4.28	3.51	6.9	12.8		93		2388		93		2359	
3/30/2014	3.96	3.56	6.7	13.0		93		2388		93		2359	
3/31/2014	3.48	3.60	6.7	13.2		93		2388		93		2359	
4/1/2014	3.05	3.63	6.7	13.6	81	92	2069	2364	53	90	1346	2281	
4/2/2014	2.76	3.63	6.8	13.8	106	93	2441	2369	101	91	2328	2284	
4/3/2014	2.54	3.63	6.9	13.2	116	95	2448	2375	103	91	2182	2278	
4/4/2014	2.33	3.63	6.8	13.8		92		2363		88		2245	
4/5/2014	2.28	3.52	6.9	13.7		95		2357		90		2219	
4/6/2014	2.20	3.44	6.9	14.5		98		2353		94		2247	
4/7/2014	2.09	3.34	6.8	15.1		98		2353		94		2247	
4/8/2014	2.04	3.20	7.1	14.8	53	94	898	2241	88	93	1499	2189	
4/9/2014	1.94	3.07	6.9	15.5	211	103	3399	2324	211	102	3405	2276	
4/10/2014	1.86	2.96	6.9	14.4	200	113	3110	2382	215	114	3338	2365	
4/11/2014	1.82	2.88	6.8	14.7		117		2406		118		2395	
4/12/2014	1.75	2.81	7.0	14.8		124		2488		123		2419	
4/13/2014	1.73	2.74	7.1	15.3		124		2488		123		2419	
4/14/2014	1.66	2.68	7.0	15.4		124		2488		123		2419	
4/15/2014	1.52	2.58	7.1	15.2	223	131	2831	2514	209	129	2658	2437	
4/16/2014	1.63	2.49	7.1	14.7	239	139	3261	2567	281	140	3829	2537	
4/17/2014	2.00	2.43	7.2	14.5	249	146	4152	2673	245	147	4090	2640	
4/18/2014	1.79	2.38	7.0	15.0		151		2697		152		2681	
4/19/2014	1.88	2.34	6.9	14.5		154		2700		156		2694	
4/20/2014	1.73	2.30	6.9	15.4		159		2717		162		2742	
4/21/2014	1.77	2.27	7.0	15.5		159		2717		162		2742	
4/22/2014	2.00	2.26	7.0	14.7	226	164	3755	2797	243	168	4044	2842	
4/23/2014	2.72	2.27	7.0	14.1	160	163	3642	2857	183	169	4159	2936	
4/24/2014	3.35	2.31	6.8	14.2	119	162	3336	2910	147	172	4110	3075	
4/25/2014	2.75	2.32	6.8	14.5		164		2935		176		3142	
4/26/2014	2.52	2.33	6.9	14.5		165		2945		173		3082	
4/27/2014	2.59	2.33	6.9	14.3		165		2945		173		3082	
4/28/2014	2.27	2.27	6.9	14.9		165		2945		173		3082	
4/29/2014	2.10	2.21	6.9	15.7	174	166	3055	2954	206	176	3612	3123	
4/30/2014	2.00	2.16	6.9	16.2	177	167	2960	2954	210	178	3506	3150	
5/1/2014	1.93	2.12	7.0	16.7	206	176	3317	3043	224	190	3608	3312	
5/2/2014	1.82	2.09	6.9	16.2		181		3090		197		3388	
5/3/2014	2.31	2.08	7.0	15.5		186		3143		205		3488	
5/4/2014	2.79	2.10	6.8	15.1		186		3143		205		3488	
5/5/2014	2.48	2.10	6.8	15.1		186		3143		205		3488	
5/6/2014	2.21	2.10	6.9	15.2	142	183	2614	3102	179	203	3303	3474	
5/7/2014	2.06	2.10	6.9	15.4	167	182	2861	3085	215	204	3686	3489	
5/8/2014	2.12	2.10	6.9	14.9	180	191	3177	3248	224	214	3960	3665	
5/9/2014	2.26	2.11	6.9	14.9		189		3236		214		3685	
5/10/2014	2.17	2.13	7.0	16.8		188		3247		214		3714	
5/11/2014	2.05	2.13	6.8	17.7		188		3247		214		3714	
5/12/2014	1.92	2.14	6.8	16.5		188		3247		214		3714	
5/13/2014	1.83	2.14	6.9	17.1	196	189	2987	3227	246	216	3758	3717	
5/14/2014	1.77	2.15	6.9	17.8	197	190	2908	3204	256	219	3781	3722	
5/15/2014	1.67	2.15	6.9	18.0	208	189	2893	3209	256	223	3560	3786	
5/16/2014	1.62	2.15	6.9	16.8		185		3204		218		3783	
5/17/2014	1.63	2.14	6.9	16.7		179		3125		216		3757	
5/18/2014	1.72	2.13	7.0	16.6		179		3125		216		3757	
5/19/2014	1.59	2.13	7.0	17.0		179		3125		216		3757	
5/20/2014	1.48	2.12	7.0	17.4	215	182	2647	3089	254	219	3132	3709	

WASTEWATER TREATMENT OPERATIONS REPORT

2011 - Present

CH2M HILL Calculation

Permit No: WA0020982

Facility Name: City of Centralia

Receiving Water: Chehalis

Plant Type: Activated Sludge

	INFLUENT												
Date	Influent Flow Total	Influent Flow 30-day avg	Influent pH	Influent Temperature	Influent BOD Concentration	Influent BOD Concentration 30-day avg	Influent BOD	Influent BOD 30-day avg	Influent TSS Concentration	Influent TSS Concentration 30-day avg	Influent TSS	Influent TSS 30-day avg	Influent Dissolved Oxygen
	MGD	MGD		°C	mg/L	mg/L	lbs./day	lbs./day	mg/L	mg/L	lbs./day	lbs./day	mg/L
5/21/2014	1.44	2.11	7.0	17.2	212	184	2551	3050	276	223	3315	3681	
5/22/2014	1.43	2.09	7.0	17.9	245	186	2922	2991	306	227	3655	3653	
5/23/2014	1.43	2.04	7.0	17.2		187		2941		231		3614	
5/24/2014	1.38	1.98	7.0	17.5		193		2908		238		3573	
5/25/2014	1.45	1.93	7.0	17.1		193		2908		238		3573	
5/26/2014	1.50	1.90	7.0	17.3		193		2908		238		3573	
5/27/2014	1.38	1.86	7.0	17.5	252	198	2893	2907	298	242	3421	3561	
5/28/2014	1.35	1.83	6.9	17.3	277	203	3108	2921	312	247	3502	3557	
5/29/2014	1.29	1.80	7.0	17.4	320	214	3429	2948	404	261	4333	3609	
5/30/2014	1.28	1.78	7.1	17.8		217		2947		265		3616	
5/31/2014	1.28	1.76	7.0	18.3		217		2916		269		3617	
6/1/2014	1.28	1.74	6.9	18.4		217		2916		269		3617	
6/2/2014	1.31	1.71	7.0	18.3		217		2916		269		3617	
6/3/2014	1.22	1.65	7.0	18.3	330	226	3364	2950	415	280	4235	3665	
6/4/2014	1.22	1.61	7.1	18.1	259	228	2629	2927	306	282	3104	3625	
6/5/2014	1.13	1.58	7.0	18.8	203	233	1925	2878	209	284	1978	3530	
6/6/2014	1.16	1.55	7.1	19.0		238		2880		289		3518	
6/7/2014	1.16	1.51	7.0	19.3		243		2855		295		3481	
6/8/2014	1.19	1.48	6.9	19.3		243		2855		295		3481	
6/9/2014	1.15	1.44	6.9	19.3		243		2855		295		3481	
6/10/2014	1.14	1.41	7.0	19.4	300	247	2845	2854	321	297	3045	3448	
6/11/2014	1.14	1.39	7.0	20.3	314	252	2983	2863	356	301	3382	3443	
6/12/2014	1.22	1.37	6.9	18.9	354	263	3608	2908	422	314	4300	3482	
6/13/2014	1.16	1.35	6.9	18.7		268		2907		318		3459	
6/14/2014	1.11	1.33	7.0	19.0		273		2909		323		3450	
6/15/2014	1.13	1.31	7.0	19.0		273		2909		323		3450	
6/16/2014	1.12	1.29	7.0	18.7		273		2909		323		3450	
6/17/2014	1.06	1.27	7.2	18.5	471	289	4180	3006	560	341	4970	3567	
6/18/2014	1.06	1.26	6.6	18.9	351	293	3106	3014	380	344	3362	3552	
6/19/2014	1.07	1.24	7.6	20.7	256	296	2279	2987	208	341	1853	3461	
6/20/2014	1.08	1.23	7.1	19.3		302		3021		346		3472	
6/21/2014	1.09	1.22	7.1	19.6		307		3029		349		3457	
6/22/2014	1.08	1.21	7.1	20.1		307		3029		349		3457	
6/23/2014	1.24	1.20	7.1	19.4		307		3029		349		3457	
6/24/2014	1.07	1.19	7.0	19.6	298	306	2644	2999	355	350	3154	3434	
6/25/2014	1.25	1.18	7.1	20.3	262	303	2737	2981	340	349	3548	3442	
6/26/2014	1.06	1.17	7.0	19.4	350	310	3104	2996	406	357	3598	3455	
6/27/2014	1.06	1.16	7.1	19.4		313		2987		360		3451	
6/28/2014	1.08	1.15	7.2	20.7		312		2950		357		3377	
6/29/2014	1.06	1.15	6.9	20.9		312		2950		357		3377	
6/30/2014	1.04	1.14	6.9	20.5		312		2950		357		3377	
7/1/2014	1.02	1.13	7.0	21.8	330	314	2809	2939	438	363	3724	3404	
7/2/2014	1.04	1.12	7.0	21.1	294	312	2563	2912	383	364	3336	3399	
7/3/2014	1.03	1.11	7.1	21.3	331	312	2861	2877	372	361	3211	3326	
7/4/2014	0.97	1.11	7.0	23.6		317		2896		365		3343	
7/5/2014	1.04	1.10	7.1	20.1		326		2976		378		3457	
7/6/2014	1.06	1.10	6.9	21.8		326		2976		378		3457	
7/7/2014	1.03	1.09	6.9	21.6		326		2976		378		3457	
7/8/2014	1.01	1.09	7.1	22.0	354	328	2995	2978	396	380	3347	3448	
7/9/2014	1.04	1.09	7.0	21.1	300	326	2604	2951	388	380	3363	3442	
7/10/2014	1.01	1.08	6.9	21.3	342	329	2870	2953	437	389	3671	3487	
7/11/2014	1.00	1.08	7.0	21.8		330		2951		391		3495	
7/12/2014	1.03	1.07	6.9	22.0		328		2896		389		3428	
7/13/2014	1.03	1.07	7.0	21.7		328		2896		389		3428	
7/14/2014	1.02	1.06	7.0	21.4		328		2896		389		3428	
7/15/2014	1.03	1.06	7.0	22.1	327	328	2807	2889	381	388	3273	3416	
7/16/2014	1.02	1.06	7.0	22.3	278	325	2361	2851	360	386	3057	3390	
7/17/2014	1.00	1.05	7.0	21.3	335	315	2794	2752	406	375	3383	3277	
7/18/2014	1.02	1.05	6.9	21.3		312		2725		375		3271	
7/19/2014	1.01	1.05	6.8	21.7		317		2762		389		3389	
7/20/2014	1.00	1.05	7.0	21.1		317		2762		389		3389	
7/21/2014	1.00	1.04	7.1	21.2		317		2762		389		3389	
7/22/2014	1.03	1.04	6.9	21.2	328	318	2819	2767	373	387	3203	3374	
7/23/2014	1.11	1.04	6.9	20.4	301	317	2788	2768	352	385	3265	3367	
7/24/2014	1.04	1.04	7.0	20.8	319	318	2773	2777	389	387	3377	3383	
7/25/2014	1.03	1.03	7.0	21.3		322		2780		391		3370	
7/26/2014	1.02	1.03	6.9	22.1		320		2754		390		3351	
7/27/2014	1.03	1.03	7.1	22.4		320		2754		390		3351	
7/28/2014	1.01	1.03	7.0	27.4		320		2754		390		3351	
7/29/2014	1.01	1.02	7.0	24.9	398	326	3360	2800	258	379	2175	3260	
7/30/2014	0.99	1.02	6.9	22.5	288	323	2372	2770	379	379	3127	3251	
7/31/2014	0.99	1.02	7.0	22.9	332	323	2745	2765	399	377	3299	3221	
8/1/2014	0.97	1.02	6.8	22.7		326		2781		376		3212	
8/2/2014	0.99	1.02	7.0	23.0		325		2774		377		3212	

WASTEWATER TREATMENT OPERATIONS REPORT

2011 - Present

CH2M HILL Calculation

Permit No: WA0020982

Facility Name: City of Centralia

Receiving Water: Chehalis

Plant Type: Activated Sludge

	INFLUENT												
Date	Influent Flow Total	Influent Flow 30-day avg	Influent pH	Influent Temperature	Influent BOD Concentration	Influent BOD Concentration 30-day avg	Influent BOD	Influent BOD 30-day avg	Influent TSS Concentration	Influent TSS Concentration 30-day avg	Influent TSS	Influent TSS 30-day avg	Influent Dissolved Oxygen
	MGD	MGD		°C	mg/L	mg/L	lbs./day	lbs./day	mg/L	mg/L	lbs./day	lbs./day	mg/L
8/3/2014	1.01	1.02	6.9	23.1		325		2774		377		3212	
8/4/2014	0.99	1.02	7.0	23.3		325		2774		377		3212	
8/5/2014	0.93	1.01	7.0	22.3	301	323	2326	2739	389	377	3009	3196	
8/6/2014	0.99	1.01	7.0	23.3	271	320	2232	2703	369	377	3037	3185	
8/7/2014	0.98	1.01	7.0	22.1	333	318	2724	2684	429	379	3511	3196	
8/8/2014	1.00	1.01	7.0	22.1		319		2690		379		3184	
8/9/2014	1.02	1.01	7.0	22.7		318		2675		374		3143	
8/10/2014	0.72	1.00	6.9	23.8		318		2675		374		3143	
8/11/2014	0.99	1.00	6.9	24.2		318		2675		374		3143	
8/12/2014	1.08	1.00	6.8	22.0	350	320	3151	2711	416	377	3745	3189	
8/13/2014	1.08	1.00	6.9	21.7	448	329	4031	2806	363	376	3267	3195	
8/14/2014	1.06	1.00	7.1	22.1	329	329	2904	2813	404	378	3571	3216	
8/15/2014	1.04	1.01	7.0	22.2		333		2847		379		3228	
8/16/2014	1.04	1.01	7.0	24.4		333		2852		377		3216	
8/17/2014	1.04	1.01	7.3	25.8		333		2852		377		3216	
8/18/2014	1.02	1.01	7.0	22.9		333		2852		377		3216	
8/19/2014	1.01	1.01	6.9	22.7	312	331	2616	2834	291	370	2443	3156	
8/20/2014	0.97	1.01	6.9	21.9	310	330	2511	2811	351	369	2843	3134	
8/21/2014	0.95	1.00	7.0	22.1	318	329	2523	2790	412	372	3268	3138	
8/22/2014	0.98	1.00	7.0	22.2		331		2790		373		3129	
8/23/2014	1.00	1.00	7.2	22.7		332		2791		372		3108	
8/24/2014	1.03	1.00	7.1	22.1		332		2791		372		3108	
8/25/2014	0.97	1.00	6.9	22.4		332		2791		372		3108	
8/26/2014	0.97	1.00	7.0	23.3	306	330	2480	2767	384	373	3115	3108	
8/27/2014	0.97	0.99	7.0	22.8	283	327	2286	2733	377	373	3048	3104	
8/28/2014	0.97	0.99	6.9	22.3	359	324	2904	2700	408	384	3302	3185	
8/29/2014	0.97	0.99	7.0	22.1		327		2725		384		3189	
8/30/2014	0.97	0.99	7.0	21.6		327		2724		383		3180	
8/31/2014	0.94	0.99	7.0	22.2		327		2724		383		3180	
9/1/2014	1.00	0.99	7.0	22.3		327		2724		383		3180	
9/2/2014	1.01	0.99	7.0	22.0	306	325	2587	2713	347	380	2931	3161	
9/3/2014	0.97	0.99	7.1	21.5	390	330	3139	2744	356	378	2868	3140	
9/4/2014	0.97	0.99	6.9	22.1	284	328	2293	2741	317	373	2564	3108	
9/5/2014	0.94	0.99	7.0	22.9		333		2781		373		3114	
9/6/2014	0.94	0.99	6.8	23.4		333		2785		369		3080	
9/7/2014	1.00	0.99	7.1	23.1		333		2785		369		3080	
9/8/2014	0.97	0.99	6.9	21.9		333		2785		369		3080	
9/9/2014	0.98	0.99	7.1	22.1	331	333	2695	2778	374	369	3043	3077	
9/10/2014	0.98	0.99	6.7	21.6	311	331	2536	2761	345	368	2814	3059	
9/11/2014	0.95	0.99	7.0	22.0	307	328	2427	2709	358	363	2831	2993	
9/12/2014	0.97	0.99	7.0	22.0		319		2608		363		2972	
9/13/2014	0.97	0.98	7.0	22.9		318		2583		360		2922	
9/14/2014	0.98	0.98	7.2	22.8		318		2583		360		2922	
9/15/2014	0.97	0.98	6.9	23.0		318		2583		360		2922	
9/16/2014	0.96	0.98	6.9	22.0	401	324	3201	2631	394	363	3145	2939	
9/17/2014	0.96	0.97	7.1	22.0	301	323	2404	2614	383	364	3057	2948	
9/18/2014	0.95	0.97	6.8	21.6	325	324	2588	2612	393	371	3130	2997	
9/19/2014	0.95	0.97	7.1	23.3		325		2620		373		3009	
9/20/2014	0.97	0.97	7.0	22.9		325		2628		370		2987	
9/21/2014	0.99	0.97	7.1	22.7		325		2628		370		2987	
9/22/2014	0.96	0.97	6.9	21.2		325		2628		370		2987	
9/23/2014	1.12	0.97	6.9	21.2	299	323	2801	2642	378	370	3542	3030	
9/24/2014	1.21	0.98	7.1	21.2	272	320	2753	2650	383	371	3879	3091	
9/25/2014	1.07	0.99	7.1	21.2	325	321	2888	2679	410	373	3647	3129	
9/26/2014	1.22	0.99	7.2	20.9		324		2709		373		3135	
9/27/2014	1.05	1.00	7.0	21.1		321		2693		370		3121	
9/28/2014	1.03	1.00	7.0	21.0		321		2693		370		3121	
9/29/2014	1.02	1.00	6.9	20.7		321		2693		370		3121	
9/30/2014	0.99	1.00	7.1	20.8	300	319	2481	2676	362	369	2991	3111	
10/1/2014	0.98	1.00	7.1	20.7	298	318	2444	2660	413	372	3391	3131	
10/2/2014	1.00	1.00	7.1	20.7	338	320	2820	2676	420	378	3504	3172	
10/3/2014	0.95	1.00	7.0	20.9		315		2641		379		3195	
10/4/2014	0.97	1.00	7.0	20.9		317		2670		384		3248	
10/5/2014	1.00	1.00	6.9	20.9		317		2670		384		3248	
10/6/2014	0.97	1.00	7.0	21.1		317		2670		384		3248	
10/7/2014	0.98	1.00	6.8	20.9	289	315	2356	2646	367	383	2993	3228	
10/8/2014	0.97	1.00	6.9	20.9	265	312	2147	2610	377	383	3058	3216	
10/9/2014	0.97	1.00	6.9	20.6	372	314	3007	2632	413	385	3339	3237	
10/10/2014	0.94	1.00	7.1	20.8		315		2640		389		3270	
10/11/2014	0.99	1.00	7.2	20.8		315		2658		391		3306	
10/12/2014	1.01	1.00	7.0	20.7		315		2658		391		3306	
10/13/2014	1.11	1.01	6.9	20.6		315		2658		391		3306	
10/14/2014	1.02	1.01	7.0	20.2	319	316	2719	2662	371	390	3159	3295	
10/15/2014	1.02	1.01	7.0	20.1	350	318	2966	2684	463	395	3922	3340	

WASTEWATER TREATMENT OPERATIONS REPORT
2011 - Present

CH2M HILL Calculation

Permit No: WA0020982

Facility Name: City of Centralia
Receiving Water: Chehalis
Plant Type: Activated Sludge

	INFLUENT												
Date	Influent Flow Total	Influent Flow 30-day avg	Influent pH	Influent Temperature	Influent BOD Concentration	Influent BOD Concentration 30-day avg	Influent BOD	Influent BOD 30-day avg	Influent TSS Concentration	Influent TSS Concentration 30-day avg	Influent TSS	Influent TSS 30-day avg	Influent Dissolved Oxygen
	MGD	MGD		°C	mg/L	mg/L	lbs./day	lbs./day	mg/L	mg/L	lbs./day	lbs./day	mg/L
10/16/2014	1.00	1.01	7.2	20.1	344	314	2865	2660	447	399	3729	3381	
10/17/2014	0.98	1.01	6.9	20.0		315		2680		400		3406	
10/18/2014	1.00	1.01	7.0	20.2		314		2687		400		3429	
10/19/2014	1.01	1.02	6.9	20.3		314		2687		400		3429	
10/20/2014	1.05	1.02	7.1	20.1		314		2687		400		3429	
10/21/2014	1.01	1.02	7.2	20.2	300	313	2518	2674	363	397	3046	3400	
10/22/2014	1.40	1.03	7.1	19.8	262	309	3064	2702	388	397	4545	3482	
10/23/2014	1.49	1.05	7.1	19.3	236	305	2935	2712	261	388	3253	3461	
10/24/2014	1.27	1.05	7.1	19.2		307		2709		389		3429	
10/25/2014	1.38	1.06	7.2	19.2		306		2694		387		3411	
10/26/2014	1.39	1.06	6.9	18.9		306		2694		387		3411	
10/27/2014	1.23	1.07	7.0	18.9		306		2694		387		3411	
10/28/2014	1.20	1.08	6.9	18.8	275	304	2752	2698	350	384	3498	3417	
10/29/2014	1.15	1.08	7.0	18.8	276	302	2644	2694	340	381	3254	3406	
10/30/2014	1.45	1.10	7.1	18.9	267	299	3224	2747	325	378	3928	3473	
10/31/2014	1.63	1.12	7.1	18.6		299		2771		376		3479	
11/1/2014	1.39	1.13	7.0	18.5		296		2767		372		3477	
11/2/2014	1.36	1.14	7.0	18.6		296		2767		372		3477	
11/3/2014	1.44	1.16	7.0	18.5		296		2767		372		3477	
11/4/2014	1.42	1.17	7.1	18.4		296		2767		372		3477	
11/5/2014	1.36	1.19	7.3	18.5	232	291	2631	2756	268	364	3046	3444	
11/6/2014	1.61	1.21	7.0	18.3	200	284	2687	2782	239	354	3216	3461	
11/7/2014	1.44	1.22	7.1	18.2	199	279	2393	2801	260	345	3129	3466	
11/8/2014	1.33	1.24	7.1	18.2		272		2783		340		3477	
11/9/2014	1.34	1.25	7.1	18.1		272		2783		340		3477	
11/10/2014	1.25	1.26	7.2	18.1		272		2783		340		3477	
11/11/2014	1.23	1.27	7.2	18.0	300	274	3072	2806	392	344	4021	3519	
11/12/2014	1.17	1.27	7.1	17.8	290	275	2833	2808	373	346	3642	3528	
11/13/2014	1.15	1.27	7.2	17.5	361	278	3458	2860	340	344	3262	3535	
11/14/2014	1.12	1.28	7.0	17.4		272		2852		334		3505	
11/15/2014	1.10	1.28	7.1	17.1		266		2851		325		3487	
11/16/2014	1.15	1.28	7.0	16.8		266		2851		325		3487	
11/17/2014	1.10	1.29	7.0	16.7		266		2851		325		3487	
11/18/2014	1.09	1.29	7.2	17.1	364	274	3301	2886	419	332	3802	3511	
11/19/2014	1.07	1.29	7.1	17.1	270	274	2411	2852	312	331	2786	3459	
11/20/2014	1.06	1.29	7.1	17.1	264	271	2336	2839	282	325	2494	3420	
11/21/2014	1.22	1.29	7.1	16.9		272		2821		320		3333	
11/22/2014	1.31	1.28	6.9	16.7		275		2812		325		3340	
11/23/2014	2.03	1.31	6.9	16.0		275		2812		325		3340	
11/24/2014	1.86	1.32	6.9	16.2	204	269	3170	2840	250	319	3883	3382	
11/25/2014	2.23	1.35	6.9	15.9	169	262	3149	2862	190	310	3536	3393	
11/26/2014	1.93	1.37	6.9	16.3	216	259	3473	2902	212	303	3412	3394	
11/27/2014	1.98	1.40	6.8	16.4		258		2913		300		3387	
11/28/2014	2.27	1.44	7.1	15.9		256		2934		297		3397	
11/29/2014	2.11	1.46	6.8	15.7		256		2910		295		3352	
11/30/2014	1.83	1.46	7.2	15.6		256		2910		295		3352	
12/1/2014	1.63	1.47	7.1	15.8		256		2910		295		3352	
12/2/2014	1.51	1.48	7.2	15.5	230	254	2908	2910	209	288	2639	3298	
12/3/2014	1.43	1.48	7.1	15.7	247	253	2944	2912	257	286	3068	3281	
12/4/2014	1.37	1.48	7.1	15.7	243	253	2775	2903	214	281	2440	3225	
12/5/2014	1.39	1.48	7.0	15.8		254		2922		282		3238	
12/6/2014	1.40	1.47	7.4	15.8		258		2940		285		3240	
12/7/2014	1.36	1.47	7.0	15.8		263		2986		288		3249	
12/8/2014	1.31	1.47	7.1	15.8		263		2986		288		3249	
12/9/2014	1.92	1.49	7.1	15.9	235	261	3756	3045	203	281	3249	3249	
12/10/2014	2.20	1.52	6.8	15.2	157	254	2877	3033	149	272	2730	3212	
12/11/2014	2.62	1.56	6.9	14.9	148	243	3226	3044	154	255	3368	3165	
12/12/2014	2.20	1.60	6.9	15.1		239		3060		245		3128	
12/13/2014	1.90	1.62	6.8	15.3		229		3027		238		3117	
12/14/2014	1.75	1.64	6.9	15.3		229		3027		238		3117	
12/15/2014	1.62	1.66	7.0	15.2		229		3027		238		3117	
12/16/2014	1.50	1.67	7.0	15.3	210	227	2630	2997	209	235	2613	3078	
12/17/2014	1.46	1.69	7.0	15.3	251	229	3053	3001	224	235	2726	3053	
12/18/2014	1.55	1.70	7.1	15.4	203	218	2623	2952	205	219	2646	2971	
12/19/2014	1.57	1.72	7.0	15.1		214		2994		212		2985	
12/20/2014	2.89	1.78	7.3	14.7		209		3049		206		3026	
12/21/2014	3.08	1.84	6.8	14.6	104	201	2672	3020	114	199	2932	3019	
12/22/2014	2.52	1.88	6.8	14.8	127	196	2657	2994	122	194	2559	2986	
12/23/2014	2.52	1.90	6.9	14.9	49	186	1027	2863	55	184	1157	2864	
12/24/2014	2.74	1.93	6.8	14.8		185		2841		180		2791	
12/25/2014	2.18	1.92	6.9	14.6		186		2817		179		2734	
12/26/2014	2.05	1.93	6.8	14.9		184		2762		176		2677	
12/27/2014	2.14	1.93	6.8	14.8		184		2762		176		2677	
12/28/2014	2.03	1.93	6.9	14.8	159	182	2688	2757	165	175	2797	2686	

WASTEWATER TREATMENT OPERATIONS REPORT

2011 - Present

CH2M HILL Calculation

Permit No: WA0020982

Facility Name: City of Centralia

Receiving Water: Chehalis

Plant Type: Activated Sludge

	INFLUENT												
Date	Influent Flow Total	Influent Flow 30-day avg	Influent pH	Influent Temperature	Influent BOD Concentration	Influent BOD Concentration 30-day avg	Influent BOD	Influent BOD 30-day avg	Influent TSS Concentration	Influent TSS Concentration 30-day avg	Influent TSS	Influent TSS 30-day avg	Influent Dissolved Oxygen
	MGD	MGD		°C	mg/L	mg/L	lbs./day	lbs./day	mg/L	mg/L	lbs./day	lbs./day	mg/L
12/29/2014	1.87	1.92	7.0	14.5	173	181	2696	2752	196	177	3064	2713	
12/30/2014	1.76	1.92	7.0	14.4	197	182	2882	2761	216	179	3166	2744	
12/31/2014	1.69	1.92	6.8	14.4		182		2761		179		2744	
1/1/2015	1.56	1.92	6.9	14.3		179		2750		177		2751	
1/2/2015	1.56	1.92	7.0	14.4		173		2735		171		2727	
1/3/2015	1.53	1.93	7.0	14.3		168		2732		168		2751	
1/4/2015	3.57	2.00	6.9	14.3		168		2732		168		2751	
1/5/2015	6.48	2.17	6.5	11.2		168		2732		168		2751	
1/6/2015	6.50	2.34	6.4	12.2	47	158	2571	2720	60	159	3254	2789	
1/7/2015	6.40	2.51	6.4	12.6	55	151	2913	2734	61	152	3255	2823	
1/8/2015	5.10	2.62	6.6	13.0	72	139	3046	2683	97	145	4129	2885	
1/9/2015	3.92	2.68	6.6	13.3		138		2668		144		2897	
1/10/2015	3.27	2.70	6.5	13.7		137		2621		144		2858	
1/11/2015	2.86	2.72	6.7	13.8		137		2621		144		2858	
1/12/2015	2.51	2.74	6.8	13.8		137		2621		144		2858	
1/13/2015	2.30	2.76	6.8	13.9	155	138	2971	2648	165	145	3164	2882	
1/14/2015	2.16	2.78	6.9	14.0	147	139	2643	2648	173	147	3114	2898	
1/15/2015	2.10	2.80	6.9	13.9	151	135	2643	2649	173	145	3036	2929	
1/16/2015	1.98	2.81	6.8	13.9		126		2618		139		2944	
1/17/2015	3.10	2.87	6.9	13.7		119		2617		133		2969	
1/18/2015	3.87	2.94	6.7	13.2		119		2617		133		2969	
1/19/2015	3.75	2.97	6.6	13.3		119		2617		133		2969	
1/20/2015	3.21	2.97	6.7	13.3	103	119	2761	2625	134	135	3592	3024	
1/21/2015	2.86	2.99	6.8	13.7	103	117	2455	2608	135	136	3220	3079	
1/22/2015	2.57	2.99	6.8	13.6	131	124	2817	2757	163	145	3498	3274	
1/23/2015	2.60	2.98	6.8	13.5		124		2757		145		3274	
1/24/2015	2.77	3.00	6.7	13.8		124		2757		145		3274	
1/25/2015	2.53	3.02	6.8	13.9		124		2757		145		3274	
1/26/2015	2.38	3.03	6.8	13.9		124		2757		145		3274	
1/27/2015	2.14	3.03	6.8	13.8	159	124	2828	2769	181	146	3227	3310	
1/28/2015	2.00	3.03	6.9	13.9	166	124	2779	2776	198	146	3309	3330	
1/29/2015	1.94	3.04	6.9	13.8	180	122	2906	2778	208	146	3359	3346	
1/30/2015	1.82	3.04	7.2	13.9		122		2778		146		3346	
1/31/2015	1.82	3.05	6.9	14.1		122		2778		146		3346	
2/1/2015	1.76	3.06	6.9	14.4		122		2778		146		3346	
2/2/2015	1.73	3.07	6.9	14.0		122		2778		146		3346	
2/3/2015	1.65	3.00	7.0	14.1	206	129	2840	2783	242	153	3335	3346	
2/4/2015	1.79	2.85	7.1	14.1	214	135	3190	2812	285	163	4249	3410	
2/5/2015	2.41	2.71	6.9	13.8	191	145	3836	2902	270	178	5417	3565	
2/6/2015	3.55	2.61	6.7	13.4		152		2901		186		3588	
2/7/2015	5.02	2.61	6.6	13.0		159		2889		194		3543	
2/8/2015	4.96	2.65	6.5	13.1		159		2889		194		3543	
2/9/2015	4.51	2.69	6.7	13.1		159		2889		194		3543	
2/10/2015	3.90	2.72	6.5	13.2	85	153	2775	2880	114	188	3708	3556	
2/11/2015	3.50	2.76	6.7	13.3	97	149	2826	2876	128	184	3735	3569	
2/12/2015	3.11	2.78	6.8	13.6	125	147	3228	2895	167	184	4327	3652	
2/13/2015	2.79	2.80	6.7	13.8		147		2914		184		3693	
2/14/2015	2.55	2.82	6.8	14.0		147		2937		185		3748	
2/15/2015	2.40	2.83	6.8	14.2		147		2937		185		3748	
2/16/2015	2.28	2.80	6.9	14.1		147		2937		185		3748	
2/17/2015	2.09	2.75	6.8	14.0	190	150	3317	2966	242	190	4223	3785	
2/18/2015	1.97	2.69	6.9	14.1	206	154	3394	2997	258	195	4242	3817	
2/19/2015	1.90	2.64	7.1	14.1	204	161	3227	3030	245	203	3882	3838	
2/20/2015	1.83	2.61	6.8	14.1		166		3074		208		3885	
2/21/2015	1.77	2.58	6.9	14.5		169		3095		212		3918	
2/22/2015	1.75	2.55	6.8	14.5		169		3095		212		3918	
2/23/2015	1.69	2.52	6.9	14.2		169		3095		212		3918	
2/24/2015	1.62	2.49	6.9	14.3	186	170	2514	3051	216	212	2925	3841	
2/25/2015	1.56	2.46	7.0	14.6	239	175	3117	3055	296	218	3854	3842	
2/26/2015	1.80	2.45	7.0	14.3	208	178	3119	3076	252	223	3774	3881	
2/27/2015	1.93	2.45	6.8	14.1		179		3099		225		3925	
2/28/2015	1.81	2.44	6.8	14.5		179		3115		226		3973	
3/1/2015	1.72	2.44	6.8	14.5		179		3115		226		3973	
3/2/2015	1.66	2.43	6.7	14.4		179		3115		226		3973	
3/3/2015	1.55	2.43	6.7	14.3	198	181	2562	3073	228	226	2957	3894	
3/4/2015	1.53	2.42	6.9	14.7	206	182	2624	3041	248	228	3163	3842	
3/5/2015	1.45	2.41	7.0	14.6	246	185	2990	3051	247	228	2997	3818	
3/6/2015	1.41	2.40	6.9	14.6		183		3041		224		3785	
3/7/2015	1.44	2.37	6.8	14.9		182		2974		220		3649	
3/8/2015	1.44	2.30	6.8	14.9		182		2974		220		3649	
3/9/2015	1.40	2.18	6.8	14.8		182		2974		220		3649	
3/10/2015	1.35	2.06	6.8	14.8	219	185	2464	2935	302	226	3394	3629	
3/11/2015	1.33	1.95	7.0	14.9	251	190	2773	2924	358	236	3961	3653	
3/12/2015	1.29	1.86	7.0	15.1	254	202	2724	2920	298	249	3200	3617	

WASTEWATER TREATMENT OPERATIONS REPORT

2011 - Present

CH2M HILL Calculation

Permit No: WA0020982

Facility Name: City of Centralia

Receiving Water: Chehalis

Plant Type: Activated Sludge

	INFLUENT												
Date	Influent Flow Total	Influent Flow 30-day avg	Influent pH	Influent Temperature	Influent BOD Concentration	Influent BOD Concentration 30-day avg	Influent BOD	Influent BOD 30-day avg	Influent TSS Concentration	Influent TSS Concentration 30-day avg	Influent TSS	Influent TSS 30-day avg	Influent Dissolved Oxygen
	MGD	MGD		°C	mg/L	mg/L	lbs./day	lbs./day	mg/L	mg/L	lbs./day	lbs./day	mg/L
3/13/2015	1.34	1.79	7.4	15.1		210		2927		258		3608	
3/14/2015	2.12	1.76	6.8	14.8		217		2902		266		3548	
3/15/2015	3.60	1.79	6.7	13.6		217		2902		266		3548	
3/16/2015	2.74	1.79	6.6	13.7		217		2902		266		3548	
3/17/2015	2.25	1.79	6.6	14.1	149	212	2788	2893	198	261	3717	3561	
3/18/2015	1.99	1.78	6.8	14.2	165	209	2738	2882	214	257	3554	3560	
3/19/2015	1.86	1.77	6.9	14.4	201	209	3119	2868	261	259	4049	3548	
3/20/2015	1.78	1.76	6.8	14.6		210		2828		259		3494	
3/21/2015	2.02	1.77	6.8	14.8		210		2794		260		3462	
3/22/2015	1.87	1.77	7.0	14.8		210		2794		260		3462	
3/23/2015	2.02	1.78	6.8	14.4		210		2794		260		3462	
3/24/2015	2.08	1.79	6.9	14.4	166	207	2881	2801	197	255	3423	3459	
3/25/2015	2.19	1.80	6.9	14.3	153	203	2797	2801	204	251	3721	3478	
3/26/2015	2.02	1.82	6.9	14.5	160	201	2697	2814	211	251	3550	3522	
3/27/2015	1.89	1.83	6.9	14.6		198		2791		248		3497	
3/28/2015	1.80	1.83	7.0	14.9		197		2763		247		3474	
3/29/2015	1.76	1.82	6.9	15.1		197		2763		247		3474	
3/30/2015	1.66	1.82	7.0	15.0		197		2763		247		3474	
3/31/2015	1.66	1.82	7.0	15.0	189	197	2613	2752	248	247	3424	3470	
4/1/2015	1.67	1.82	7.0	15.0	189	196	2630	2743	247	247	3437	3468	
4/2/2015	1.64	1.82	7.0	15.0	213	197	2903	2767	296	252	4041	3545	
4/3/2015	1.69	1.82	6.8	15.0		197		2778		252		3574	
4/4/2015	1.65	1.83	7.0	15.1		192		2761		253		3623	
4/5/2015	1.55	1.84	6.9	15.2		192		2761		253		3623	
4/6/2015	1.47	1.84	6.9	15.1		192		2761		253		3623	
4/7/2015	1.52	1.84	7.1	15.2	217	194	2756	2760	307	257	3896	3644	
4/8/2015	1.44	1.84	6.9	15.3	222	196	2659	2753	288	259	3452	3630	
4/9/2015	1.39	1.84	7.0	15.3	249	198	2894	2784	310	260	3598	3644	
4/10/2015	1.48	1.85	7.0	15.3		194		2785		252		3620	
4/11/2015	1.56	1.86	7.0	15.2		189		2790		248		3655	
4/12/2015	1.50	1.86	6.8	15.4		189		2790		248		3655	
4/13/2015	1.51	1.84	6.9	15.0		189		2790		248		3655	
4/14/2015	1.45	1.77	6.9	15.2	237	193	2875	2796	258	249	3129	3615	
4/15/2015	1.40	1.73	6.9	15.3	216	195	2509	2776	280	251	3259	3589	
4/16/2015	1.39	1.70	7.0	15.4	236	201	2730	2772	286	258	3315	3560	
4/17/2015	1.34	1.68	6.9	15.6		204		2774		261		3561	
4/18/2015	1.35	1.66	6.9	15.8		204		2745		261		3520	
4/19/2015	1.36	1.64	6.8	16.0		204		2745		261		3520	
4/20/2015	1.30	1.62	6.9	16.0		204		2745		261		3520	
4/21/2015	1.26	1.60	6.9	15.8	244	207	2558	2731	291	263	3047	3484	
4/22/2015	1.24	1.57	7.0	15.9	233	209	2418	2709	313	267	3246	3467	
4/23/2015	1.26	1.55	6.9	15.9	263	216	2751	2699	298	274	3122	3445	
4/24/2015	1.29	1.52	6.9	15.7		221		2692		279		3424	
4/25/2015	1.25	1.49	6.8	16.1		226		2691		285		3414	
4/26/2015	1.23	1.47	6.9	16.1		226		2691		285		3414	
4/27/2015	1.21	1.45	6.9	16.3		226		2691		285		3414	
4/28/2015	1.20	1.43	6.9	16.2	245	227	2457	2673	312	287	3130	3392	
4/29/2015	1.18	1.41	7.0	16.4	253	229	2482	2660	318	289	3121	3373	
4/30/2015	1.17	1.40	6.9	16.4		232		2663	325	295	3185	3355	
5/1/2015	1.15	1.38	6.9	16.5		236		2666		299		3349	
5/2/2015	1.21	1.37	6.9	16.9		238		2644		299		3292	
5/3/2015	1.21	1.35	6.8	17.0		238		2644		299		3292	
5/4/2015	1.17	1.33	6.8	16.9	332	245	3256	2695		299		3292	
5/5/2015	1.18	1.32	7.0	16.8	299	250	2799	2703	357	303	3506	3308	
5/6/2015	1.12	1.31	6.9	16.9	322	255	3048	2728	341	306	3190	3300	
5/7/2015	1.14	1.30	7.0	17.1		258		2726	393	312	3726	3288	
5/8/2015	1.09	1.29	6.9	17.1		261		2731		314		3275	
5/9/2015	1.13	1.28	6.7	17.4		262		2717		314		3248	
5/10/2015	1.13	1.27	7.0	17.5		262		2717		314		3248	
5/11/2015	1.14	1.25	6.8	17.2	251	261	2566	2704		314		3248	
5/12/2015	1.23	1.24	6.8	17.2	253	260	2452	2685	300	313	3069	3234	
5/13/2015	1.16	1.23	6.9	17.2	257	260	2409	2665	301	312	2922	3212	
5/14/2015	1.12	1.22	6.9	17.5		262		2649	301	315	2819	3190	
5/15/2015	1.09	1.21	6.8	17.4		266		2660		318		3184	
5/16/2015	1.10	1.20	6.7	17.5		268		2654		321		3173	
5/17/2015	1.14	1.19	6.7	17.8		268		2654		321		3173	
5/18/2015	1.13	1.19	6.8	17.9	288	270	2627	2652		321		3173	
5/19/2015	1.09	1.18	6.9	18.0	293	272	2592	2647	340	322	3105	3168	
5/20/2015	1.06	1.17	6.9	17.9	292	273	2517	2638	339	324	2998	3156	
5/21/2015	1.03	1.16	6.9	17.8		275		2644	316	325	2723	3133	
5/22/2015	1.01	1.15	6.8	17.9		279		2663		326		3124	
5/23/2015	1.04	1.15	6.9	17.9		280		2655		329		3124	
5/24/2015	1.02	1.14	6.8	18.1		280		2655		329		3124	
5/25/2015	1.08	1.13	6.9	18.2	293	281	2519	2644		329		3124	

WASTEWATER TREATMENT OPERATIONS REPORT

2011 - Present

CH2M HILL Calculation

Permit No: WA0020982

Facility Name: City of Centralia

Receiving Water: Chehalis

Plant Type: Activated Sludge

	INFLUENT												
Date	Influent Flow Total	Influent Flow 30-day avg	Influent pH	Influent Temperature	Influent BOD Concentration	Influent BOD Concentration 30-day avg	Influent BOD	Influent BOD 30-day avg	Influent TSS Concentration	Influent TSS Concentration 30-day avg	Influent TSS	Influent TSS 30-day avg	Influent Dissolved Oxygen
	MGD	MGD		°C	mg/L	mg/L	lbs./day	lbs./day	mg/L	mg/L	lbs./day	lbs./day	mg/L
5/26/2015	1.03	1.13	6.8	18.0	267	280	2299	2617	353	330	3038	3118	
5/27/2015	1.03	1.12	6.9	18.3	315	283	2694	2623	324	330	2794	3095	
5/28/2015	1.02	1.11	6.9	18.5		286		2635	362	334	3092	3092	
5/29/2015	1.00	1.11	6.8	18.5		288		2648		335		3090	
5/30/2015	0.97	1.10	6.8	18.5		288		2648		336		3082	
5/31/2015	1.05	1.10	6.8	18.7		288		2648		336		3082	
6/1/2015	1.04	1.09	6.8	18.4		288		2648		336		3082	
6/2/2015	1.04	1.09	6.8	18.4	297	289	2576	2643	356	337	3088	3082	
6/3/2015	1.13	1.09	6.9	19.5	263	284	2479	2583	341	337	3211	3091	
6/4/2015	1.15	1.08	7.0	18.7	248	280	2391	2551	311	334	2994	3055	
6/5/2015	1.26	1.09	7.0	19.0		276		2510		334		3044	
6/6/2015	1.02	1.09	7.0	19.1		276		2510		329		2988	
6/7/2015	1.07	1.08	6.9	19.4		276		2510		329		2988	
6/8/2015	1.04	1.08	7.0	19.6		276		2510		329		2988	
6/9/2015	1.01	1.08	6.9	19.6	290	277	2450	2505	363	331	3065	2993	
6/10/2015	1.02	1.07	6.9	19.6	268	279	2275	2483	332	331	2815	2981	
6/11/2015	1.01	1.07	7.0	19.5	283	281	2382	2478	348	335	2928	2971	
6/12/2015	1.02	1.06	6.8	19.7		283		2483		337		2974	
6/13/2015	1.01	1.06	6.8	19.7		283		2483		340		2987	
6/14/2015	1.06	1.06	7.0	19.7		283		2483		340		2987	
6/15/2015	1.03	1.05	7.0	19.8		283		2483		340		2987	
6/16/2015	1.03	1.05	7.0	20.0	284	283	2440	2480	327	339	2807	2973	
6/17/2015	1.03	1.05	6.9	20.1	282	283	2422	2464	355	341	3052	2979	
6/18/2015	1.00	1.04	6.9	20.2	296	283	2478	2455	347	341	2908	2965	
6/19/2015	1.00	1.04	6.9	20.3		282		2450		341		2963	
6/20/2015	1.00	1.04	7.0	20.2		282		2450		343		2982	
6/21/2015	0.98	1.04	6.9	20.5		282		2450		343		2982	
6/22/2015	1.01	1.04	6.9	20.6		282		2450		343		2982	
6/23/2015	1.00	1.04	6.9	20.6	294	283	2458	2451	342	343	2858	2973	
6/24/2015	0.98	1.03	6.9	20.6	298	284	2440	2445	363	345	2971	2973	
6/25/2015	1.00	1.03	6.9	20.6	349	290	2893	2491	365	345	3030	2972	
6/26/2015	0.98	1.03	6.9	20.9		288		2474		347		2986	
6/27/2015	0.99	1.03	6.9	20.9		288		2474		346		2977	
6/28/2015	1.01	1.03	6.9	21.0		288		2474		346		2977	
6/29/2015	1.02	1.03	6.9	21.1		288		2474		346		2977	
6/30/2015	0.97	1.03	6.8	21.3	292	288	2374	2466	375	348	3046	2982	
7/1/2015	0.98	1.03	6.9	21.2	261	286	2127	2442	335	347	2733	2965	
7/2/2015	0.99	1.03	6.9	21.4	286	285	2355	2426	336	346	2767	2942	
7/3/2015	1.00	1.02	6.9	21.4		287		2422		346		2921	
7/4/2015	0.94	1.02	6.8	21.5		290		2425		349		2915	
7/5/2015	1.00	1.01	6.8	21.4		290		2425		349		2915	
7/6/2015	1.00	1.01	7.0	21.5		290		2425		349		2915	
7/7/2015	0.99	1.00	6.8	21.6	275	289	2279	2413	328	347	2717	2900	
7/8/2015	0.98	1.00	6.9	21.7	249	286	2041	2387	328	346	2694	2885	
7/9/2015	0.99	1.00	6.8	21.8	298	287	2464	2388	354	345	2924	2875	
7/10/2015	0.97	1.00	6.9	21.9		288		2396		346		2880	
7/11/2015	1.03	1.00	6.9	21.8		289		2398		346		2876	
7/12/2015	1.00	1.00	6.9	21.9		289		2398		346		2876	
7/13/2015	1.00	1.00	6.8	21.9		289		2398		346		2876	
7/14/2015	0.99	1.00	6.9	21.8	278	288	2307	2391	339	346	2813	2871	
7/15/2015	0.99	1.00	6.9	21.9	280	287	2300	2384	350	346	2875	2871	
7/16/2015	0.98	0.99	6.8	21.8	289	288	2371	2379	354	348	2901	2878	
7/17/2015	0.97	0.99	6.8	21.8		288		2376		347		2864	
7/18/2015	0.97	0.99	6.8	22.0		287		2367		347		2861	
7/19/2015	0.98	0.99	6.8	22.1		287		2367		347		2861	
7/20/2015	1.00	0.99	6.9	22.1		287		2367		347		2861	
7/21/2015	1.00	0.99	6.9	22.0	307	289	2566	2383	388	351	3248	2891	
7/22/2015	0.97	0.99	6.9	21.9	254	286	2061	2360	322	349	2618	2871	
7/23/2015	0.97	0.99	7.0	22.1	292	286	2369	2353	362	350	2936	2877	
7/24/2015	0.97	0.99	6.9	22.3		285		2347		349		2869	
7/25/2015	0.97	0.99	6.8	22.1		280		2301		348		2856	
7/26/2015	0.99	0.99	7.0	22.0		280		2301		348		2856	
7/27/2015	0.97	0.99	6.6	22.0		280		2301		348		2856	
7/28/2015	0.96	0.99	6.9	22.1	295	281	2362	2306	344	347	2759	2849	
7/29/2015	0.95	0.98	6.9	22.2	286	281	2268	2303	359	348	2848	2849	
7/30/2015	0.95	0.98	6.9	22.3	321	284	2546	2315	374	348	2966	2843	
7/31/2015	0.95	0.98	6.9	22.3		285		2330		349		2851	
8/1/2015	0.96	0.98	6.8	22.3		285		2328		350		2858	
8/2/2015	0.99	0.98	6.9	22.2		285		2328		350		2858	
8/3/2015	0.96	0.98	6.8	22.4		285		2328		350		2858	
8/4/2015	0.98	0.98	6.8	22.5	295	286	2405	2334	376	352	3061	2874	
8/5/2015	0.98	0.98	6.8	22.3	261	284	2127	2319	320	350	2613	2855	
8/6/2015	0.98	0.98	6.8	22.3	309	287	2532	2337	372	353	3051	2879	
8/7/2015	0.97	0.98	6.8	22.6		290		2360		355		2893	

WASTEWATER TREATMENT OPERATIONS REPORT

2011 - Present

CH2M HILL Calculation

Permit No: WA0020982

Facility Name: City of Centralia

Receiving Water: Chehalis

Plant Type: Activated Sludge

	INFLUENT												
Date	Influent Flow Total	Influent Flow 30-day avg	Influent pH	Influent Temperature	Influent BOD Concentration	Influent BOD Concentration 30-day avg	Influent BOD	Influent BOD 30-day avg	Influent TSS Concentration	Influent TSS Concentration 30-day avg	Influent TSS	Influent TSS 30-day avg	Influent Dissolved Oxygen
	MGD	MGD		°C	mg/L	mg/L	lbs./day	lbs./day	mg/L	mg/L	lbs./day	lbs./day	mg/L
8/8/2015	0.97	0.98	6.9	22.5		289		2351		355		2891	
8/9/2015	0.98	0.98	6.9	22.6		289		2351		355		2891	
8/10/2015	0.97	0.98	6.8	22.5		289		2351		355		2891	
8/11/2015	0.96	0.98	6.8	22.5	324	292	2597	2370	412	359	3300	2922	
8/12/2015	0.99	0.97	6.9	22.6	291	291	2398	2372	355	359	2924	2922	
8/13/2015	0.99	0.97	6.9	22.8	329	295	2705	2401	411	364	3377	2963	
8/14/2015	1.00	0.97	6.8	22.5		296		2408		365		2969	
8/15/2015	1.00	0.98	6.8	22.6		297		2411		366		2975	
8/16/2015	1.00	0.98	6.9	22.5		297		2411		366		2975	
8/17/2015	0.98	0.98	7.0	22.5		297		2411		366		2975	
8/18/2015	0.99	0.98	6.9	22.5	331	300	2739	2437	356	365	2943	2973	
8/19/2015	1.00	0.98	6.9	22.8	280	298	2328	2429	362	365	3012	2975	
8/20/2015	1.00	0.98	6.8	23.5	313	299	2605	2432	347	362	2888	2950	
8/21/2015	0.96	0.98	6.8	22.5		302		2460		365		2975	
8/22/2015	0.97	0.98	6.8	22.5		303		2468		366		2979	
8/23/2015	0.99	0.98	6.9	22.8		303		2468		366		2979	
8/24/2015	0.97	0.98	6.8	22.6		303		2468		366		2979	
8/25/2015	0.96	0.98	6.8	22.4	302	303	2410	2463	339	364	2703	2957	
8/26/2015	0.94	0.97	6.9	22.5	310	303	2429	2461	353	363	2764	2944	
8/27/2015	0.96	0.97	6.9	22.5	325	306	2602	2478	364	364	2916	2955	
8/28/2015	0.97	0.98	6.8	22.5		307		2494		365		2963	
8/29/2015	1.20	0.98	6.8	22.5		306		2490		364		2963	
8/30/2015	1.09	0.99	6.7	22.4		306		2490		364		2963	
8/31/2015	1.01	0.99	7.0	22.2		306		2490		364		2963	
9/1/2015	0.99	0.99	6.8	22.1	292	305	2410	2484	346	363	2859	2955	
9/2/2015	1.00	0.99	6.9	22.3	275	303	2293	2470	306	359	2550	2926	
9/3/2015	0.96	0.99	6.9	22.0	307	304	2468	2475	340	356	2732	2902	
9/4/2015	0.94	0.99	6.8	21.9		307		2501		359		2924	
9/5/2015	0.97	0.99	6.9	22.0		307		2499		358		2914	
9/6/2015	0.95	0.99	6.8	21.8		307		2499		358		2914	
9/7/2015	1.05	0.99	6.8	21.9		307		2499		358		2914	
9/8/2015	1.00	0.99	6.8	21.9	338	309	2810	2523	388	360	3230	2938	
9/9/2015	0.96	0.99	6.8	21.9	285	307	2284	2506	345	359	2769	2926	
9/10/2015	0.96	0.99	6.8	21.9	295	305	2361	2489	349	354	2797	2890	
9/11/2015	0.95	0.99	6.7	22.0		306		2496		354		2888	
9/12/2015	0.97	0.99	6.6	21.9		304		2478		350		2847	
9/13/2015	1.02	0.99	6.7	21.9		304		2478		350		2847	
9/14/2015	0.96	0.99	6.6	21.8		304		2478		350		2847	
9/15/2015	0.95	0.99	6.6	21.7	335	307	2644	2491	333	348	2631	2830	
9/16/2015	0.96	0.99	6.6	21.7	305	307	2435	2487	354	349	2831	2830	
9/17/2015	0.97	0.99	6.6	21.7	342	307	2766	2489	387	351	3131	2844	
9/18/2015	0.94	0.98	6.6	21.6		309		2501		350		2831	
9/19/2015	0.97	0.98	6.6	21.7		309		2493		350		2826	
9/20/2015	1.00	0.98	6.6	21.8		309		2493		350		2826	
9/21/2015	0.95	0.98	6.6	21.6		309		2493		350		2826	
9/22/2015	0.95	0.98	6.6	21.4	309	309	2457	2490	328	349	2604	2809	
9/23/2015	0.92	0.98	6.6	21.5	301	309	2317	2478	338	348	2604	2794	
9/24/2015	0.94	0.98	6.6	21.5	313	309	2458	2481	353	349	2772	2799	
9/25/2015	0.93	0.98	6.8	21.4		309		2485		349		2802	
9/26/2015	0.94	0.98	6.8	21.5		308		2475		347		2792	
9/27/2015	0.96	0.98	6.9	21.3		308		2475		347		2792	
9/28/2015	0.94	0.97	6.9	21.3		308		2475		347		2792	
9/29/2015	0.93	0.96	6.8	21.3	291	307	2254	2458	319	345	2473	2768	
9/30/2015	0.94	0.96	6.8	21.2	303	306	2388	2453	346	345	2724	2765	
10/1/2015	0.93	0.96	6.8	21.1	322	309	2502	2460	336	344	2609	2747	
10/2/2015	0.91	0.96	6.8	21.0		311		2473		347		2762	
10/3/2015	0.96	0.96	6.8	21.1		311		2473		348		2765	
10/4/2015	0.98	0.96	6.7	21.0		311		2473		348		2765	
10/5/2015	0.94	0.96	7.0	21.0		311		2473		348		2765	
10/6/2015	0.93	0.96	6.7	20.8	318	312	2478	2473	333	347	2594	2752	
10/7/2015	1.01	0.96	6.8	20.7	304	311	2547	2479	353	347	2962	2767	
10/8/2015	0.96	0.95	6.7	20.9	297	308	2367	2447	349	345	2785	2735	
10/9/2015	0.94	0.95	6.7	20.8		310		2460		344		2732	
10/10/2015	1.02	0.96	6.6	20.8		312		2468		344		2727	
10/11/2015	0.99	0.96	6.6	20.7		312		2468		344		2727	
10/12/2015	0.97	0.96	6.7	20.6		312		2468		344		2727	
10/13/2015	0.95	0.95	6.8	20.6	321	312	2529	2472	338	344	2665	2722	
10/14/2015	0.96	0.95	6.8	20.6	292	311	2348	2464	363	345	2921	2736	
10/15/2015	0.94	0.95	6.7	20.5	303	309	2378	2445	312	344	2446	2723	
10/16/2015	0.91	0.95	6.7	20.4		309		2445		343		2715	
10/17/2015	0.95	0.95	6.7	20.5		306		2419		339		2680	
10/18/2015	0.98	0.95	6.6	20.5		306		2419		339		2680	
10/19/2015	0.94	0.95	6.7	20.5		306		2419		339		2680	
10/20/2015	0.93	0.95	6.7	20.3	319	307	2488	2424	346	340	2697	2681	

WASTEWATER TREATMENT OPERATIONS REPORT
2011 - Present

CH2M HILL Calculation

Permit No: WA0020982

Facility Name: City of Centralia
Receiving Water: Chehalis
Plant Type: Activated Sludge

	INFLUENT												
Date	Influent Flow Total	Influent Flow 30-day avg	Influent pH	Influent Temperature	Influent BOD Concentration	Influent BOD Concentration 30-day avg	Influent BOD	Influent BOD 30-day avg	Influent TSS Concentration	Influent TSS Concentration 30-day avg	Influent TSS	Influent TSS 30-day avg	Influent Dissolved Oxygen
	MGD	MGD		°C	mg/L	mg/L	lbs./day	lbs./day	mg/L	mg/L	lbs./day	lbs./day	mg/L
10/21/2015	0.93	0.95	6.7	20.3	331	309	2569	2434	363	341	2815	2691	
10/22/2015	0.92	0.95	6.6	20.2	340	311	2618	2446	377	345	2903	2712	
10/23/2015	0.93	0.95	6.7	20.2		312		2456		345		2721	
10/24/2015	0.95	0.95	6.7	20.1		312		2456		345		2716	
10/25/2015	1.12	0.96	6.7	19.9		312		2456		345		2716	
10/26/2015	1.03	0.96	6.6	19.7		312		2456		345		2716	
10/27/2015	0.98	0.96	6.7	19.8	311	312	2541	2462	377	347	3081	2744	
10/28/2015	1.03	0.96	6.8	19.6	314	312	2686	2478	355	348	3035	2765	
10/29/2015	1.11	0.97	6.6	19.7	348	316	3234	2548	405	354	3758	2857	
10/30/2015	1.29	0.98	6.8	19.4		317		2560		354		2867	
10/31/2015	2.81	1.04	6.7	18.6		317		2565		356		2889	
11/1/2015	2.31	1.09	6.4	18.4		317		2565		356		2889	
11/2/2015	1.77	1.12	6.4	18.5		317		2565		356		2889	
11/3/2015	1.41	1.13	6.7	18.5	185	306	2177	2535	235	347	2767	2879	
11/4/2015	1.26	1.14	6.9	18.7	202	299	2115	2505	246	339	2578	2858	
11/5/2015	1.29	1.15	6.7	18.5	228	292	2448	2503	277	335	2976	2885	
11/6/2015	1.18	1.16	6.7	18.8		292		2500		334		2879	
11/7/2015	1.32	1.17	6.8	18.5		291		2511		333		2887	
11/8/2015	1.38	1.18	6.5	18.6		291		2511		333		2887	
11/9/2015	1.25	1.19	6.5	18.3		291		2511		333		2887	
11/10/2015	1.22	1.20	6.7	18.2	282	290	2874	2539	335	333	3413	2927	
11/11/2015	1.25	1.21	6.8	18.3	235	287	2440	2532	298	331	3100	2940	
11/12/2015	1.35	1.22	6.7	18.0	255	282	2867	2556	323	329	3629	3009	
11/13/2015	3.69	1.31	7.1	17.6		281		2572		327		3015	
11/14/2015	5.20	1.46	6.7	15.5		279		2588		328		3063	
11/15/2015	5.36	1.60	6.6	15.5		279		2588		328		3063	
11/16/2015	4.73	1.73	6.9	15.9		279		2588		328		3063	
11/17/2015	7.74	1.96	6.8	15.4	60	262	3881	2688	85	309	5486	3249	
11/18/2015	7.13	2.16	6.7	15.2	54	247	3223	2726	64	292	3806	3289	
11/19/2015	5.42	2.31	6.6	15.4	78	230	3537	2801	90	274	4067	3387	
11/20/2015	4.07	2.42	6.7	15.5		223		2819		267		3431	
11/21/2015	3.33	2.50	6.8	15.7		213		2835		258		3475	
11/22/2015	2.84	2.56	6.9	15.8	140	207	3320	2873	163	250	3854	3504	
11/23/2015	2.51	2.61	7.0	16.0	145	203	3045	2885	178	245	3729	3520	
11/24/2015	2.31	2.65	7.0	15.9	163	200	3149	2902	172	240	3319	3507	
11/25/2015	2.08	2.69	7.2	16.1		200		2902		240		3507	
11/26/2015	1.85	2.72	7.2	16.3		192		2928		230		3537	
11/27/2015	1.75	2.74	7.1	15.9		183		2947		221		3576	
11/28/2015	1.69	2.76	7.2	15.8		169		2923		206		3560	
11/29/2015	1.63	2.77	7.3	15.9		169		2923		206		3560	
11/30/2015	1.52	2.73	7.2	15.6		169		2923		206		3560	
12/1/2015	1.75	2.71	7.0	15.6	242	175	3526	2969	222	207	3238	3536	
12/2/2015	1.95	2.72	7.1	15.4	306	184	4985	3113	144	202	2343	3450	
12/3/2015	2.25	2.74	7.2	15.1	274	190	5139	3325	77	191	1444	3356	
12/4/2015	2.35	2.78	6.9	15.0		189		3418		187		3416	
12/5/2015	2.29	2.81	7.0	15.1		186		3499		179		3452	
12/6/2015	2.30	2.85	6.9	15.4		186		3499		179		3452	
12/7/2015	3.78	2.93	7.1	14.8		186		3499		179		3452	
12/8/2015	7.73	3.14	6.8	13.9	66	177	4227	3555	80	172	5158	3584	
12/9/2015	8.66	3.39	6.5	13.2	35	167	2498	3479	41	162	2960	3539	
12/10/2015	8.67	3.64	6.6	13.1	40	150	2880	3480	43	141	3108	3517	
12/11/2015	8.18	3.87	6.6	13.4	41	136	2808	3506	43	123	2934	3505	
12/12/2015	7.89	4.09	6.4	13.5	59	122	3891	3579	46	103	3026	3462	
12/13/2015	7.41	4.21	6.5	13.7	63	118	3876	3599	49	100	3030	3434	
12/14/2015	6.43	4.25	6.5	13.8	63	114	3364	3584	76	98	4073	3474	
12/15/2015	5.47	4.26	6.7	14.1	79	112	3617	3586	88	98	4012	3505	
12/16/2015	4.81	4.26	6.7	14.2	109	112	4369	3630	136	100	5461	3614	
12/17/2015	6.20	4.21	6.8	13.8		115		3615		101		3504	
12/18/2015	7.74	4.23	6.7	13.3		119		3639		103		3485	
12/19/2015	7.22	4.29	6.6	13.5		122		3646		104		3446	
12/20/2015	6.85	4.38	6.7	13.5		122		3646		104		3446	
12/21/2015	7.65	4.53	6.6	13.0	47	117	2991	3605	56	101	3573	3454	
12/22/2015	7.39	4.68	6.5	13.3	48	111	2960	3583	49	94	3022	3402	
12/23/2015	7.94	4.86	6.6	12.9	83	107	5508	3737	70	87	4636	3459	
12/24/2015	8.03	5.05	6.5	13.0		104		3776		81		3468	
12/25/2015	7.07	5.22	6.6	13.2		104		3776		81		3468	
12/26/2015	6.21	5.36	6.5	13.3		104		3776		81		3468	
12/27/2015	5.60	5.49	6.6	13.3		104		3776		81		3468	
12/28/2015	4.88	5.60	6.7	13.6	90	103	3661	3769	118	84	4799	3551	
12/29/2015	4.38	5.69	6.7	13.6	80	101	2919	3719	90	84	3290	3536	
12/30/2015	3.86	5.76	6.8	13.6	108	102	3475	3705	115	86	3705	3545	
12/31/2015	3.49	5.82	6.7	13.6		94		3716		78		3563	

WASTEWATER TREATMENT OPERATIONS REPORT
2011 - Present

CH2M HILL Calculation

Permit No: WA0020982

Facility Name: City of Centralia
Receiving Water: Chehalis
Plant Type: Activated Sludge

	INFLUENT												
Date	Influent Flow Total	Influent Flow 30-day avg	Influent pH	Influent Temperature	Influent BOD Concentration	Influent BOD Concentration 30-day avg	Influent BOD	Influent BOD 30-day avg	Influent TSS Concentration	Influent TSS Concentration 30-day avg	Influent TSS	Influent TSS 30-day avg	Influent Dissolved Oxygen
	MGD	MGD		°C	mg/L	mg/L	lbs./day	lbs./day	mg/L	mg/L	lbs./day	lbs./day	mg/L
2011													
Average	1.86				226.95		2699.40		200.05		2407.85		
Max	6.40	3.82			637.50	442.43	5513.20	3519.46	556.00	433.00	5623.04	3860.09	
Min	0.80				52.75		1666.45		41.00		1711.06		
2012													
Average	2.15				229.83		3271.60		265.72		3953.76		
Max	6.69	4.47			409.50	355.70	9043.92	4940.69	789.84	405.74	11605.67	6771.54	
Min	0.94				63.64		1239.30		87.00		2460.05		
2013													
Average	1.96				214.45		3405.86		256.05		4058.96		
Max	4.34	4.20			320.90	252.66	4305.63	3739.11	406.00	317.38	5925.60	5181.90	
Min	1.41				84.83		2759.27		109.00		3122.82		
2014													
Average	1.69				247.24		2891.12		281.96		3265.88		
Max	6.28	3.99			495.90	333.27	7002.30	3853.49	560.00	400.33	7763.86	3940.90	
Min	0.72				43.99		898.26		49.00		1156.72		
2015													
Average	1.94				229.79		2763.53		270.73		3229.79		
Max	8.67	5.82			348.50	316.95	5508.06	3775.95	412.00	366.25	5486.49	3972.60	
Min	0.91				43.99		898.26		49.00		1156.72		
Monthly Data													
1/31/2011	2.29898	3.53				97.92		2536.53		86.25		2248.27	
2/28/2011	3.7755	2.15				156.16		2711.90		122.58		2132.16	
3/31/2011	3.65229	3.71				92.72		2722.37		83.21		2467.13	
4/30/2011	2.05888	2.73				121.93		2607.39		103.67		2227.81	
5/31/2011	1.49341	1.86				174.17		2656.76		149.77		2288.03	
6/30/2011	1.11995	1.24				262.67		2689.38		194.36		1992.24	
7/31/2011	1.00432	1.07				305.79		2718.39		243.58		2165.30	
8/31/2011	0.99304	1.01				312.74		2629.41		253.50		2129.88	
9/30/2011	0.97059	0.97				296.20		2370.54		252.00		2016.01	
10/31/2011	0.9328	1.00				378.41		2939.52		342.42		2762.68	
11/30/2011	1.646	1.61				307.90		3315.68		329.82		3685.02	
12/31/2011	2.12064	1.41				219.08		2472.51		241.08		2770.34	
1/31/2012	3.14745	2.52				161.00		2745.68		189.23		3299.43	
2/29/2012	3.76331	2.56				182.81		3749.23		204.93		4307.33	
3/31/2012	6.69242	4.01				150.48		4826.25		205.25		6620.16	
4/30/2012	2.23128	3.05				162.02		3916.62		220.83		5277.31	
5/31/2012	1.40396	1.80				225.11		3268.05		238.14		3508.06	
6/30/2012	1.17936	1.28				286.85		3019.47		299.75		3150.69	
7/31/2012	1.0223	1.09				310.17		2797.13		307.62		2776.85	
8/31/2012	0.97147	1.03				306.88		2608.80		354.15		3003.97	
9/30/2012	1.00814	0.98				332.54		2703.82		373.33		3035.13	
10/31/2012	1.98563	1.13				328.51		2975.71		380.20		3456.76	
11/30/2012	3.65016	2.07				190.83		3100.66		259.69		4238.34	
12/31/2012	2.98059	4.30				105.50		3691.91		145.75		5119.92	
1/31/2013	1.90281	2.32				176.40		3259.03		189.86		3536.13	
2/28/2013	2.10091	1.72				234.75		3279.01		279.86		3900.23	
3/31/2013	1.50323	1.82				235.02		3616.37		297.50		4578.55	
4/30/2013	1.44762	2.02											
5/31/2013	1.328	1.35											
6/30/2013	1.13955	1.17											
7/31/2013	1.05219	1.04											
8/31/2013	0.99684	0.99											
9/30/2013	3.67044	1.42											
10/31/2013	1.0785	1.42											
11/30/2013	1.39637	1.52											
12/31/2013	1.24717	1.38											
1/31/2014	1.5184	1.65											
2/28/2014	2.41807	2.56											
3/31/2014	3.47683	3.60											
4/30/2014	2.00182	2.16											
5/31/2014	1.28322	1.76											
6/30/2014	1.03513	1.14											
7/31/2014	0.9915	1.02											
8/31/2014	0.94006	0.99											
9/30/2014	0.99056	1.00											
10/31/2014	1.62527	1.12											
11/30/2014	1.82794	1.46											
12/31/2014	1.69387	1.92											

WASTEWATER TREATMENT OPERATIONS REPORT

2011 - Present

CH2M HILL Calculation

Permit No: WA0020982

Facility Name: City of Centralia

Receiving Water: Chehalis

Plant Type: Activated Sludge

	INFLUENT												
Date	Influent Flow Total	Influent Flow 30-day avg	Influent pH	Influent Temperature	Influent BOD Concentration	Influent BOD Concentration 30-day avg	Influent BOD	Influent BOD 30-day avg	Influent TSS Concentration	Influent TSS Concentration 30-day avg	Influent TSS	Influent TSS 30-day avg	Influent Dissolved Oxygen
	MGD	MGD		°C	mg/L	mg/L	lbs./day	lbs./day	mg/L	mg/L	lbs./day	lbs./day	mg/L
1/31/2015	1.82084	3.05											
2/28/2015	1.80909	2.44											
3/31/2015	1.65524	1.82											
4/30/2015	1.17495	1.40											
5/31/2015	1.04619	1.10											
6/30/2015	0.97406	1.03											
7/31/2015	0.95212	0.98											
8/31/2015	1.00649	0.99											
9/30/2015	0.94382	0.96											
10/31/2015	2.80821	1.04											
11/30/2015	1.52453	2.73											
12/31/2015	3.49291	5.82											

Appendix F
City of Centralia Sewer Collection System Mapping and Data
(on CD)

Appendix G
Plant Design Data

INFLUENT FLOW AND LOADS

	DESIGN VALUES
YEAR	2025
DESIGN POPULATION	17,158
FLOWS, MGD	
AVERAGE ANNUAL	2.7
MAXIMUM MONTH	5.5
MAXIMUM WEEK	6.8
MAXIMUM DAY	9.3 (10 MGD USED FOR PEAK HYDRAULIC)
BOD LOADINGS, LBS/DAY	
AVERAGE ANNUAL	3,400
MAXIMUM MONTH	4,400
MAXIMUM WEEK	6,100
MAXIMUM DAY	6,800
TSS LOADINGS, LBS/DAY	
AVERAGE ANNUAL	3,200
MAXIMUM MONTH	4,200
MAXIMUM WEEK	5,800
MAXIMUM DAY	6,400
TOTAL KJELDAHL NITROGEN, LBS/DAY	
AVERAGE ANNUAL	855
MAXIMUM MONTH	1,100
MAXIMUM WEEK	1,500
MAXIMUM DAY	1,700

EFFLUENT REQUIREMENTS

DRY WEATHER, MONTHLY AVERAGE	
BOD, MG/L (1)	20
TSS, MG/L	20
WET WEATHER, MONTHLY AVERAGE	
BOD, MG/L (1)	30
TSS, MG/L	30

LIQUID UNIT PROCESS CRITERIA

MECHANICAL SCREEN	
UNITS	2
TYPE	ROTARY SCREEN
CAPACITY, EACH	5 MGD
SCREENING OPENING	1/4 INCH
ESTIMATED UNCOMPACTED SCREENINGS PRODUCTION	12 CUBIC FEET/MILLION GALLONS OF SEWAGE
MANUAL BAR SCREEN	
UNITS	1
SCREENING OPENING	1 INCH

NOTES:

1. ALL DRIVES CONSTANT SPEED UNLESS NOTED ABOVE.

LIQUID UNIT PROCESS CRITERIA

		DESIGN VALUES
SCREENINGS DUMPSTER		
CAPACITY		1-2 CU YD
GRIT REMOVAL		
UNITS		1
TYPE		DETRITOR
CAPACITY, MGD		10
DIAMETER, FT		20
ESTIMATED GRIT PRODUCTION		3.0 CUBIC FEET/MILLION GALLONS OF SEWAGE
GRIT PUMPS		
UNITS		1
TYPE		RECESSED IMPELLER CENTRIFUGAL
CAPACITY, GPM		250
MOTOR, HORSEPOWER		10
GRIT CYCLONE/CLASSIFIER		
UNITS		1 EACH
TYPE		CYCLONE/SCREW
CAPACITY, GPM		250
MOTOR, HORSEPOWER		1/2
GRIT DUMPSTER		
CAPACITY		1-2 CU YD
AERATION BASINS		
UNITS		2
TYPE		PLUG FLOW WITH ANOXIC SELECTOR
SIZE, EA, L x W x D		205 FT x 39 FT x 15 FT
TOTAL VOL, EA, MGAL		0.9
ANOXIC VOLUME		14 PERCENT
HYDRAULIC RETENTION TIME, TOTAL, HRS		
MAXIMUM MONTH		7.8
SOLIDS RETENTION TIME, TOTAL, DAYS		
MAXIMUM MONTH	(AEROBIC)	9.3
	(ANOXIC)	1.5
DESIGN MLSS, MG/L		
MAXIMUM MONTH		3,000
CONTROL		
DISSOLVED OXYGEN TYPE		IN-LINE PROBE
AERATION BLOWERS		
UNITS		3
TYPE		MULTISTAGE CENTRIFUGAL
CAPACITY, SCFM, EACH		3,200
MOTOR HORSEPOWER, EACH		250
AERATION DIFFUSERS		
AEROBIC ZONES		FINE BUBBLE FLEXIBLE MEMBRANE
ANOXIC ZONES		COARSE BUBBLE

	DESIGN VALUES
ANOXIC MIXERS	
UNITS PER BASIN	1
TYPE	AXIAL FLOW/PIER MOUNTED
CAPACITY, GPM	25,000
MOTOR, HORSEPOWER, EACH	7.5
MIXING INTENSITY, HP/1,000 CU FT	0.46 (3)
SECONDARY CLARIFIERS	
UNITS	2
TYPE, MECHANISM	CIRCULAR, SPIRAL
MOTOR, HORSEPOWER, EACH	1/2
DIAMETER, FT	70
SIDEWATER DEPTH, FT	16
SURFACE AREA, EA, SF	3,848
OVERFLOW RATES, 2 IN SERVICE, GPD/SF	
AVERAGE	350
MAXIMUM MONTH	714
PEAK	1,200
RETURN ACTIVATED SLUDGE PUMPS	
UNITS	4
TYPE	SUBMERSIBLE, ADJUSTABLE SPEED
CAPACITY, GPM, EACH	950
MOTOR HORSEPOWER, EACH	10
RETURN ACTIVATED SLUDGE FLOWMETER	
TYPE/SIZE, IN.	MAGNETIC/8
SECONDARY SCUM PUMP	
UNITS	2
TYPE	SUBMERSIBLE
CAPACITY, GPM	50
MOTOR HORSEPOWER, EACH	10
DISINFECTION	
UNITS	1
TYPE	LOW PRESSURE HIGH INTENSITY ULTRAVIOLET LIGHT
DELIVERED DOSE, mW-S/SQ CM, MINIMUM	30.0
TRANSMITTANCE	65 PERCENT
NO. OF BANKS OF LAMPS	3
NO. OF MODULES PER BANK	4
NO. OF BULBS PER MODULE	10
TOTAL NO. OF LAMPS	120
WATTS/LAMP	125
CLEANING	AUTOMATIC W/WIPERS
POST AERATION	
UNITS	2
SIZE, EA, L x W x D	23 FT x 4 FT x 10 FT
TOTAL VOL, EA, GAL	6,200
DESIGN FLOW, EA, MGD	1.1
MIN EFFLUENT DO LEVEL AT DESIGN FLOW, MG/L	8.0
AIR REQUIREMENT, EACH, SCFM	50
DIFFUSERS	FINE BUBBLE FLEXIBLE MEMBRANE

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THE ORIGINAL DRAWING WAS STAMPED BY RICH C. FRANKENFIELD WASHINGTON P.E. No. 38054

DSGN KL KEEFE / SF CLARK BA ENGLESON
DR CJ BROWN
CHK MG NOESEN RG SIEGER
APVD DT REYNOLDS

NO.	DATE	REVISION	BY	APVD
3	2/22/02	ADDENDUM NO. 3	GDS	RCF
1	2/06/02	ADDENDUM NO. 1	GDS	RCF

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

CH2MHILL
in association with
Pfaff Architects
RB Engineering
Foresight Surveying

CENTRALIA WWTP FACILITY
CITY OF CENTRALIA UTILITIES
CENTRALIA, WASHINGTON

GENERAL
DESIGN DATA SUMMARY

SHEET 15
DWG GEN-G-15
DATE JANUARY, 2002
PROJ 166367.WD

geng016d_166367.dgn 25-MAR-2002 13:49:55

LIQUID UNIT PROCESS CRITERIA (CONTINUED)

	DESIGN VALUES
FINAL FLOW MEASUREMENT	
UNITS	1
TYPE	PARSHALL FLUME
THROAT WITDTH, FT	1
CAPACITY, MGD	10
EFFLUENT PUMPS	
UNITS	3
TYPE	SUBMERSIBLE, ADJUSTABLE SPEED
CAPACITY, MGD, EACH	5
MOTOR HORSEPOWER, EACH	30
EFFLUENT PIPELINE	
TYPE/DIAMETER, IN	PVC/24
LENGTH, FT	2,400
OUTFALL	
TYPE/DIAMETER, IN.	WELDED STEEL/36
LENGTH, FT	150
DIFFUSER	
TYPE/DIAMETER, IN.	SIX 12 INCH PORTS WELDED STEEL
MINIMUM SUBMERGENCE AT DRY WEATHER AVERAGE DAY FLOW	APPROX 4 FT
MINIMUM DILUTION AT MIXING ZONE BOUNDARY	
DRY WEATHER CHRONIC DILUTION	7/1

SOLIDS UNIT PROCESS CRITERIA

WASTE ACTIVATED SLUDGE PUMPS	
UNITS	2
TYPE	SUBMERSIBLE, ADJUSTABLE SPEED
CAPACITY,EACH, GPM	350
MOTOR HORSEPOWER, EACH	12
WASTE ACTIVATED SLUDGE FLOWMETER	
TYPE/SIZE, IN	MAGNETIC/4
BIOSOLIDS SLURRY TANK	
VOLUME, GAL	5,600
BIOSOLIDS SLURRY MIXER	
UNITS	1
TYPE	VERTICAL, AXIAL FLOW
MOTOR HORSEPOWER	3

	DESIGN VALUES
BELT FILTER PRESSES	
UNITS	1 EXISTING, 1 NEW
SIZE	EXISTING: 1.7M, NEW: 2.2M
TYPE	TOWER PRESS
CAPACITY	EXISTING: 1050 , NEW: 1,500 LB/HR
BELT DRIVE MOTOR	EXISTING: 2 HP ASD, NEW: 3 HP ASD
BELT TENSIONING COMPRESSOR DRIVE MOTOR	1.5 HP
WASHWATER BOOSTER PUMP	
UNITS	2
TYPE	HORIZONTAL CENTRIFUGAL
CAPACITY	100 GPM
MOTOR	5 HP
SLUDGE TRANSFER CONVEYOR 1	
UNITS	1
SIZE	24 INCH
TYPE	TROUGH BELT
DRIVE MOTOR	2 HP
SLUDGE TRANSFER CONVEYOR 2	
UNITS	1
SIZE	26 INCH
TYPE	TROUGH BELT
DRIVE MOTOR	2 HP
SLUDGE STABILIZATION PROCESS	
UNITS	1
CAPACITY AT 15% SOLIDS AND 35% LIME ADDITION	1,100 LB/HR
THERMOBLENDER MIXER	
UNITS	1
TYPE	SCREW
DRIVE MOTOR	10.0 HP ASD
THERMOBLENDER CONTROL CONSOLE	
UNITS	1
TYPE	RESISTANCE
POWER REQUIREMENTS	480 V, 3 PH, MCA 500 AMP
PASTEURIZATION HEATING REQUIREMENTS	
UNITS	1
TYPE	INCANDESCENT
POWER REQUIREMENTS	480V, 3 PH, MCA 30 AMP
PASTEURIZATION CONVEYOR	
UNITS	1
SIZE	48 INCH
TYPE	BELT
DRIVE MOTOR	1 HP
LIME STORAGE SILO	
UNITS	1
SIZE	12 FT DIAMETER
CAPACITY	30 TONS
LIME BIN ACTIVATOR DRIVE MOTOR	1.5 HP

	DESIGN VALUES
LIME BIN SHAKER MOTOR	0.25 HP
LIME BIN FAN MOTOR	5 HP
LIME CONVEYOR FAN MOTOR	0.5 HP
VOLUMETRIC LIME FEEDER	
UNITS	1
SIZE	140-875 LB/HR
TYPE	SCREW
DRIVE MOTOR	3 HP ASD
CAPACITY	140-875 LB/HR
LIME TRANSFER SCREW CONVEYOR	
UNITS	1
SIZE	9 INCH
TYPE	SCREW
DRIVE MOTOR	3 HP
CAPACITY	140-875 LB/HR
LIME ADDITION SCREW CONVEYOR	
UNITS	1
SIZE	9 INCH
TYPE	SCREW
DRIVE MOTOR	2 HP
CAPACITY	140-875 LB/HR
PRODUCT TRANSFER CONVEYOR	
UNITS	1
SIZE	36 INCH
TYPE	TROUGH BELT
MOTOR	3 HP
POLYMER SYSTEM	
TYPE	DRY AND LIQUID SYSTEM
UNITS	1
DESIGN DOSAGE	16 LB/TON AT 1100 LB/HR
DRY POLYMER FEEDER	
STORAGE CAPACITY	10 CF
POLYMER FEED CAPACITY	9 LB/HR
VOLUMETRIC FEEDER MOTOR DRIVE	.25 HP ASD
POLYMER TANKS	
POLYMER MIX TANK CAPACITY	180 GAL
POLYMER FEED TANK CAPACITY	180 GAL
POLYMER MIX TANK MIXER	
UNITS	1
DRIVE MOTOR	.5 HP
LIQUID POLYMER FEED PUMP	
UNITS	1
TYPE	PROGRESSIVE CAVITY
DRIVE MOTOR	.5 HP

NOTES:

1. ALL DRIVES CONSTANT SPEED UNLESS NOTED ABOVE.

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EXPIRES 11/21/02

DSGN	KL KEEFE / SF CLARK BA ENGLESON					VERIFY SCALE	CH2MHILL in association with Pfaff Architects RB Engineering Foresight Surveying
DR	CJ BROWN					BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	
CHK	MG NOESEN RG SIEGER						
APVD	DT REYNOLDS	NO.	DATE	REVISION	BY	APVD	

CENTRALIA WWTP FACILITY
CITY OF CENTRALIA UTILITIES
CENTRALIA, WASHINGTON

GENERAL
DESIGN DATA SUMMARY

SHEET	16
DWG	GEN-G-16
DATE	JANUARY, 2002
PROJ	166367.WD

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SOLIDS UNIT PROCESS EQUIPMENT (CONTINUED)

	DESIGN VALUES
POLYMER FEED PUMP	
UNITS	1
TYPE	PROGRESSIVE CAVITY
CAPACITY	6 GPM
MOTOR DRIVE	3 HP
BIOSOLIDS PRODUCTION	
ANNUAL BIOSOLIDS PRODUCTION, DRY TONS	750
ANNUAL BIOSOLIDS PRODUCTION, CUBIC YARDS	3406

PLANT UTILITIES SYSTEMS (1)

ODOR CONTROL	
UNITS	1
TYPE	SOIL BIOFILTER
SIZE, LENGTH BY WIDTH BY DEPTH	50 FT X 100 FT X 6 FT
LOADING RATE	3 CFM/SQUARE FEET
SOIL MEDIA GAS RESIDENCE TIME, SECONDS	90
ODOR CONTROL FANS, NUMBER	1
CAPACITY EACH, CFM	15,000
MOTOR HORSEPOWER, EACH	50
PLANT WATER PUMPS	
UNITS	2
TYPE	VERTICAL TURBINE, AJUSTABLE
CAPACITY, EACH	500 GPM
MOTOR HORSEPOWER EACH	60
FIRE WATER PUMPS	
UNITS	1
TYPE	VERTICAL TURBINE, AJUSTABLE
CAPACITY, EACH	500 GPM
MOTOR HORSEPOWER EACH	50
PLANT DRAIN PUMPS	
UNITS	2
TYPE	SUBMERSIBLE, ADJUSTABLE SPEED
CAPACITY, EACH	500 GPM
MOTOR HORSEPOWER EACH	5
SODIUM HYPOCHLORITE PUMPS	
UNITS	3
TYPE	METERING PUMPS
CAPACITY, EACH	2@1.25 GPH
	1@12.5 GPH
POWER, EACH	300 WATTS

STANDBY GENERATOR

	DESIGN VALUES
UNITS	1
TYPE	DIESEL
CAPACITY	900 KW
FUEL CAPACITY	24 HOURS AT 75% LOAD
TRANSFER SWITCH TYPE	AUTOMATIC
RELIABILITY	CLASS 1

ALARM TELEMETRY AND CONTROLS

TELEMETRY TYPE	TONE (BY OTHERS)
INFLUENT OVERFLOW ALARM TYPE	FLOAT SWITCH
NUMBER/TYPE COMPUTERS	2 DESKTOP (FURNISHED AT STARTUP) 1 LAPTOP
DATA LOGGERS	1 IN HMI COMPUTER
PROGRAMMABLE LOGIC CONTROLLERS	4

NOTES:

1. ALL DRIVES CONSTANT SPEED UNLESS NOTED ABOVE.

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RICHARD CHARLES FRANCKENFIELD STATE OF WASHINGTON 36054 REGISTERED PROFESSIONAL ENGINEER
EXPIRES 11/21/02

DSGN KL KEEFE / SL CLARK RA ENGLESON						VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	CH2MHILL in association with Pfaff Architects RB Engineering Foresight Surveying	CENTRALIA WWTP FACILITY CITY OF CENTRALIA UTILITIES CENTRALIA, WASHINGTON	GENERAL DESIGN DATA SUMMARY	SHEET 17
DR CJ BROWN										DWG GEN-G-17
CHK MG NOESEN RG SIEGER	1	2/06/02	ADDENDUM NO. 1	CJB	RCF					DATE JANUARY, 2002
APVD DT REYNOLDS	NO.	DATE	REVISION	BY	APVD					PROJ 166367.WD

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Composting Facility Design Criteria

Description	Value
Amendment Storage	
Volume, Phase 1/Phase 2	35 CY/2,700 CY
Storage Time, Phase 1/Phase 2	1 week/6 months
Pile Depth, Phase 1/Phase 2	6 feet/10 feet
Compost Curing	
Volume, Phase 1/Phase 2	304 CY/1,600 CY
Curing Time, Phase 1/Phase 2	3 months/6 months
Pile Depth, Phase 1/Phase 2	10 feet/10 feet
Compost Aeration Pile	
Volume, Phase 1/Phase 2	207 CY/207 CY
Composting Time	28 days
Pile Depth	8 feet
Aeration Fans	
Number, Phase 1/Phase 2	3/10
Type	Centrifugal
Capacity	450 cfm, 7.5 in w.c.
Power	3 hp
Biofilter Fan	
Number	1
Type	Centrifugal
Capacity	2700 cfm, 10 in w.c.
Power	10 HP
Biofilter	
Design airflow	2 CFM/SF
Expected removal efficiency	98% for hydrogen sulfide; 80% for odor
Volume	203 CY
Media	Wood and /or bark
Filter Depth	4 feet
Stormwater Retention Pond	
Pond Bottom Dimensions	50 feet long, 26 feet wide
Side slope	2 horizontal:1 vertical
Depth	7 feet, including 2 feet of freeboard
Active Storage Volume	41,000 gallons

Composting Facility Design Criteria

Description	Value
Liner	30-mil thick geomembrane
Discharge rate	170 gpm
Discharge pump	One 7.5 hp submersible pump
Discharge pipe	12-inch diameter
Screen	
Number	1
Type	Trommel with Perkins 4 cylinder diesel engine
Capacity	200 CY/hr (based on City experience)
Mixer	
Number	1
Type	Knight Reel Auggie 2450
Capacity	16 CY
Front End Loader	
Number	1
Type	V623 Versa Handler
Capacity	2 CY bucket capacity
Power	99 HP

Appendix H
City of Centralia National Pollutant Discharge Elimination System Waste Discharge Permit

DEPARTMENT OF ECOLOGY
State of Washington

Issuance Date: March 28, 2011
Effective Date: May 1, 2011
Expiration Date: April 30, 2016

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
WASTE DISCHARGE PERMIT NO. WA0020982

State of Washington
DEPARTMENT OF ECOLOGY
Olympia, Washington 98504-7775

In compliance with the provisions of
The State of Washington Water Pollution Control Law
Chapter 90.48 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 Centralia
1100 North Tower Avenue
Centralia, WA 98531

Plant Location: 1101 Goodrich Road, Centralia, WA 98531	Receiving Water: Chehalis River, Approximate River Mile 61.25
Water Body I.D. No.: Old ID No. WA-23-1020, New ID No. 1238225469619	Discharge Location: Latitude: 46.76128 N Longitude: -123.02944W
Plant Type: Extended Air Activated sludge with UV disinfection	

is authorized to discharge in accordance with the special and general conditions that follow.

Steven G Eberl, P.E.
Acting Southwest Regional Manager
Water Quality Program
Washington State Department of Ecology

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SUMMARY OF PERMIT REPORT SUBMITTALS

Refer to the Special and General Conditions of this permit for additional submittal requirements.

Permit Section	Submittal	Frequency	First Submittal Date
S3.	Discharge Monitoring Report	Monthly	June 15, 2011
S3.E	Noncompliance Notification	As necessary	
S4.B.	Plans for Maintaining Adequate Capacity	As necessary	
S4.D.	Notification of New or Altered Sources	As necessary	
S4.E.	Wasteload Assessment	Annually	May 15, 2012
S5.G.	Operations and Maintenance Manual	As necessary	
S5.G.	Operations and Maintenance Manual Update/Review Letter	Annually	March 15, 2012
S6.D.	List of Industrial Users	1/permit cycle	January 1, 2012
S8.	Application for permit renewal	1/permit cycle	November 1, 2015
S9.	Receiving Water and Effluent Study Sampling and Quality Assurance Plan	1/permit cycle	September 15, 2012
S9.	Receiving Water and Effluent Sampling Reports	3/permit cycle	December 15, 2013 December 15, 2014 December 15, 2015
S10.B.	Acute Toxicity Effluent Test Results with Permit Renewal Application	2/permit cycle	September 15, 2013, March 15, 2014, and November 1, 2015
S11.B	Chronic Toxicity Effluent Test Results with Permit Renewal Application	2/permit cycle	September 15, 2013, March 15, 2014, and November 1, 2015
S12.	Outfall Evaluation	1/permit cycle	September 15, 2011
S13.	Copper and Zinc Reduction Activities	Annually	September 1, 2011
G1.	Notice of Change in Authorization	as necessary	
G4.	Reporting Planned Changes	As necessary	
G5.	Engineering Report for Construction or Modification Activities	As necessary	
G21.	Reporting Anticipated Non-compliance	As necessary	
G22.	Reporting Other Information	As necessary	
G23.	Contract Submittal	As necessary	

SPECIAL CONDITIONS

In this permit the word must denotes an action that is mandatory and is equivalent to the word shall used in previous permits.

S1. DISCHARGE LIMITS

A. Effluent Limitations

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 constitutes a violation of the terms and conditions of this permit.

Beginning on the effective date of this permit and lasting through the expiration of the permit, the Permittee may discharge municipal wastewater at the permitted location subject to compliance with the following limits:

EFFLUENT LIMITS[a]: OUTFALL # 001			
Parameter (at the River Flows Shown Below[f])	**Monthly Average**	**Weekly Average**	**Daily Maximum[b]**
BOD_5 and TSS (flows < 200 cfs)[c] (flows 200 -- 1000 cfs)[c]	 20 mg/L 20 mg/L 85% removal of influent BOD and TSS		 30 mg/L, 826 lbs/day 30 mg/L, 926 lbs/day
(flows > 1000 cfs)	30 mg/L, 925 lbs/day 75% removal of influent BOD 70% removal of influent TSS		45 mg/L, 2,530 lbs/day
Ammonia (NH_3-N) (March 15th – November 30th) (flows < 200 cfs)[d] (flows 200–<1000 cfs)[d]			 4.0 mg/L, 110 lbs/day 4.0 mg/L, 123 lbs/day
Ammonia (NH_3-N) (December 1st - March 14th)[d] (flows 200–<1000 cfs)[d]			 15 mg/L, 463 lbs/day

EFFLUENT LIMITS[a]: OUTFALL # 001			
Parameter (at the River Flows Shown Below[f])	**Monthly Average**	**Weekly Average**	**Daily Maximum[b]**
Ammonia (NH_3-N) (flows >1000 cfs)			15 mg/L, 657 lbs/day
The following parameters apply to all flows and seasons			
Parameter	**Monthly Average**	**Weekly Average**	**Daily Maximum**
Fecal coliform	200 col/100 ml	400 col/100 ml	
Copper[g]			
Zinc[g]			
pH[e]	Daily minimum is equal to or greater than 6.0 and the daily maximum is less than or equal to 9.0.		

[a] The average monthly and weekly effluent limitations equal the arithmetic mean of the samples taken. The average monthly and weekly limitations for fecal coliform are equal to the geometric mean of the samples taken.

[b] 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.

[c] These "dry weather" limits (for BOD & TSS only) apply on the next day after the 7-day moving average flow at the Grand Mound USGS gage goes below 1,000 cfs and on all subsequent days until the wet weather limits apply.

[d] These "dry weather" limits (for ammonia only) go into effect 14 days after the seven-day moving average flow at the Grand Mound USGS gage is less than 1,000 cfs. This dry weather limit for ammonia cannot be applied earlier than March 15 of each year following the 14-day phase in.

[e] Indicates the range of permitted values. The Permittee must report the instantaneous maximum and minimum pH monthly. Do not average pH values.

[f] River flows must be determined from the Grand Mound USGS gage.

[g] Ecology will recalculate final limits for copper in 2015 using water quality data collected by the discharger (see Section S9).

Should a condition arise where the Permittee is unable to use UV light disinfection, the Permittee is authorized to use chlorine as a final disinfectant on a limited emergency basis. During periods when chlorine use is necessary, the Permittee shall conform to a total residual chlorine discharge limit of 0.5 mg/L monthly average and 0.75 mg/L weekly average. The limit will remain in effect until such time as UV disinfection has been restored.

B. Mixing Zone Descriptions

The following paragraph defines the maximum boundaries or flow-volume restriction of the mixing zones:

Chronic Mixing Zone

Washington Administrative Code (WAC) 173-201A-400(7)(a)(i) specifies that mixing zones must not extend downstream from the discharge ports for a distance of more than 300 feet plus the depth of water over the discharge ports as measured during the 7Q10 seasonal low flow and must not extend upstream more than one hundred feet. Given a 7Q10 water depth of 5 feet for the Permittee's outfall, the mixing zone boundary is limited to 305 feet downstream and 100 feet upstream from the discharge ports. The maximum width of the mixing zone is limited to not more than 25 percent of the flow and not more than 25 percent of the width of the water body. Therefore, the maximum flow at the 7Q10 flow is limited to 28.5 cfs (18.4 mgd). Because the river width is 160 feet wide at low flow, the maximum plume width is limited to 40 feet. Chronic aquatic life criteria and human health criteria must be met at the edge of the chronic zone.

Acute Mixing Zone

WAC 173-201A-400(8)(a) specifies that in riverine waters a zone where acute criteria may be exceeded must not extend beyond 10 percent of the distance established for the maximum or chronic zone as measured independently from the discharge ports. The acute mixing zone is therefore limited to 30.5 feet downstream, ten feet upstream and no more than 4 feet wider than the maximum width measured from the center of each discharge port. The mixing zone extends from the riverbed to the top of the water surface. Acute aquatic life criteria must be met at the edge of the acute zone.

	Available Dilution (dilution factor)
Acute Aquatic Life Criteria	**2.2**
Chronic Aquatic Life Criteria	**16**
Human Health Criteria - Carcinogen	**48**
Human Health Criteria - Non-carcinogen	**17.4**

S2. MONITORING REQUIREMENTS

A. Monitoring Schedule

The Permittee must monitor in accordance with the following schedule:

Category	Parameter	Units	Sample Point	Minimum Sampling Frequency	Sample Type
Wastewater Influent	BOD_5	mg/L lbs/day	Influent Sampler	3/week	24-hour composite

Category	Parameter	Units	Sample Point	Minimum Sampling Frequency	Sample Type
Wastewater Influent	TSS	mg/L lbs/day	Influent Sampler	3/week	24-hour composite
Wastewater Influent	pH	S.U.	Influent Sampler	Daily	Grab
Wastewater Influent	Temperature[b]	°C	Influent	Continuous[a]	recording
Wastewater Influent	Flow	mgd	Influent mag. meter	Continuous	On-line recording
Wastewater Effluent	Flow	mgd	Effluent Parshall flume	Continuous	On-line recording
Wastewater Effluent	BOD_5	mg/L	Following post aeration	3/week	24-hour composite
Wastewater Effluent	BOD_5	lbs/day	Following post aeration	3/week	Calculation
Wastewater Effluent	BOD_5	% removal	Following post aeration	3/week	Calculation
Wastewater Effluent	TSS	mg/L	Following post aeration	3/week	24-hour composite
Wastewater Effluent	TSS	lbs/day	Following post aeration	3/week	Calculation
Wastewater Effluent	TSS	% removal	Following post aeration	3/week	Calculation
Wastewater Effluent	pH	Standard Units	Following post aeration	Daily	Grab
Wastewater Effluent	Temperature[b]	°C (report 10^{ths} of a degree)	Post aeration or at outfall vent	Continuous	Recording
Wastewater Effluent	Fecal Coliform	Org./100 mL	Following post aeration	3/week	Grab
Wastewater Effluent	Total Ammonia-(As NH_3-N)	mg/L	Following post aeration	3/week	24-hour composite
Wastewater Effluent	Total Ammonia-(As NH_3-N)	lbs/day	Following post aeration	3/week	Calculation

Category	Parameter	Units	Sample Point	Minimum Sampling Frequency	Sample Type
Wastewater Effluent	Total Residual Chlorine[c]	mg/L	Following post aeration	As Needed, Daily	Grab
Receiving Water and Effluent Study (See S9)	Copper, Zinc, Silver, Lead, Mercury, pH, Hardness (influent and effluent), Soluble Reactive Phosphorus, Total Phosphorus, Total Nitrogen, and Dissolved Inorganic Nitrogen	µg/L	Effluent	2/month (2012-2014)[d]	Metals with Clean grab, other parameters with grab
Receiving Water (See S9)	Copper, Zinc, Silver, Lead, Mercury, pH, Hardness (influent and effluent), Soluble Reactive Phosphorus, Total Phosphorus, Total Nitrogen, and Dissolved Inorganic Nitrogen	µg/L	Chehalis River upstream	2/month (2012-2014)[d]	Metals with Clean grab, other parameters with grab
Receiving Water	Temperature[b]	°C	Chehalis River upstream	3/permit	Recording
Acute Toxicity Testing	As specified in S10.		Effluent	2/permit in last year prior to new permit application	24-hour composite

Category	Parameter	Units	Sample Point	Minimum Sampling Frequency	Sample Type
Chronic Toxicity Testing	As specified in S11.		Effluent	2/permit in last year prior to new permit application	24-hour composite
Reapplication Monitoring to be Completed Prior to Application Submittal					
Category	**Parameter**	**Units**	**Sample Point**	**Minimum Sampling Frequency**	**Sample Type**
Reapplication Monitoring	Dissolved Oxygen	mg/L	Effluent	1/year	Grab
Reapplication Monitoring	Oil and Grease	mg/L	Effluent	1/year	Grab
Reapplication Monitoring	Total Dissolved Solids	mg/L	Effluent	1/year	24-hour composite
Reapplication Monitoring	EPA Priority Pollutants - metals, cyanide and total phenols. 1M-15M	µg/L	Effluent	1/year	24-hour composite
Reapplication Monitoring	EPA Priority Pollutants – Volatile Organic Compounds. 1V – 31V	µg/L	Effluent	1/year	24-hour composite
Reapplication Monitoring	EPA Priority Pollutants – Acid-extractable compounds 1A – 11A	µg/L	Effluent	1/year	24-hour composite
Reapplication Monitoring	EPA Priority Pollutants – Base-neutral compounds 1B – 46B	µg/L	Effluent	1/year	24-hour composite

[a] Continuous means uninterrupted except for brief lengths of time for calibration, for power failure, or for unanticipated equipment repair or maintenance. The Permittee must sample daily when continuous monitoring is not possible.

Category	Parameter	Units	Sample Point	Minimum Sampling Frequency	Sample Type
[b] Temperature must be measured continuously. A daily maximum must be determined and reported from half-hour measurements in a 24-hour period. If continuous thermister problems are temporarily unavailable, then sample temperature daily with a grab. Sampling must occur when the effluent is at or near its daily maximum temperature which will usually be in the late afternoon.					
[c] In the event that chlorine use is required for disinfection, the Permittee shall monitor the final effluent for total residual chlorine concentrations. This monitoring shall be conducted with grab sampling, to be performed each day that chlorine is being used.					
[d] Monthly sampling must occur in June, July, September and October of each year from 2012 -2014.					

B. Sampling and Analytical Procedures

Samples and measurements taken to meet the requirements of this permit must be representative of 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 Code of Federal Regulations (CFR) Part 136.

C. Flow Measurement

The Permittee must select and use appropriate flow measurement devices and methods consistent with accepted scientific practices. The Permittee must install, calibrate, and maintain the flow devices. This work is necessary to ensure that the accuracy of the measurements are consistent with the accepted industry standard and the manufacturers recommendation for that type of device. The Permittee must maintain calibration records for at least three years.

D. Laboratory Accreditation

The Permittee must ensure that all monitoring data required by the Department of Ecology (Ecology) 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. Conductivity and pH must be accredited if the laboratory must otherwise be registered or accredited. Ecology exempts crops, soils, and hazardous waste data from this requirement pending accreditation of laboratories for analysis of these media.

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.

A. Reporting

The first monitoring period begins on the effective date of the permit. The Permittee must submit monitoring results each month. The Permittee must summarize, report, and submit monitoring data obtained during each monitoring period on a DMR form provided, or otherwise approved, by Ecology. The Permittee must ensure that DMR forms are postmarked or received by Ecology no later than the 15th day of the month following the completed monitoring period, unless otherwise specified in this permit. The Permittee must submit priority pollutant analysis data no later than 45 days following the monitoring period. Unless otherwise specified, the Permittee must submit all toxicity test data within 60 days after the sample date. The Permittee must send report(s) to Ecology of Ecology, Southwest Regional Office, P.O. Box 47775, Olympia, Washington 98504-7775.

All laboratory reports providing data for organic and metal parameters must include the following information: sampling date, sample location, date of analysis, parameter name, CAS number, analytical method/number, method detection limit (MDL), laboratory practical quantitation limit (PQL), reporting units, and concentration detected. Analytical results from samples sent to a contract laboratory must include information on the chain of custody, the analytical method, QA/QC results, and documentation of accreditation for the parameter.

The Permittee must submit DMR forms monthly whether or not the facility was discharging. If there was no discharge during a given monitoring period, the Permittee must submit the form as required with the words "no discharge" entered in place of the monitoring results.

B. 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; and
6. The results of all analyses.

C. Additional Monitoring by the Permittee

If the Permittee monitors any pollutant more frequently than required by 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.

D. Notice of Noncompliance Reporting

The Permittee must take the following action upon violation of any permit condition: 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 within 30 days of sampling.

1. Immediate Noncompliance Notification

Any failure of the disinfection system, must be reported immediately to Ecology's Regional Office 24-hour number **360-407-6300**.

Any failure of the disinfection system, any collection system overflows, or any plant bypass discharging to a waterbody used as a source of drinking water must be reported immediately to the Department of Ecology and the Department of Health, Drinking Water Program.

The Department of Health's Drinking Water Program number is 360-521-0323 (business hours) or 360-481-4901 (after business hours).

2. Twenty-four (24) Hour Noncompliance Notification

The Permittee must report the following occurrences of noncompliance by telephone, to Ecology at **360-407-6300**, within 24 hours from the time the Permittee becomes aware of any of the following circumstances:

a. Any noncompliance that may endanger health or the environment, unless previously reported under subpart 1. above;

b. Any unanticipated **bypass** that exceeds any effluent limitation in the permit (See Part S4.B., "Bypass Procedures");

c. Any **upset** that exceeds any effluent limitation in the permit (See G.15, "Upset");

d. Any violation of a maximum daily or instantaneous maximum discharge limitation for any of the pollutants in Section S1.A. of this permit; or

e. Any overflow prior to the treatment works, whether or not such overflow endangers health or the environment or exceeds any effluent limitation in the permit.

3. Report Within Five (5) Days

The Permittee must also provide a written submission within five days of the time that the Permittee becomes aware of any event required to be reported under subparts 1 or 2, above. The written submission must contain:

a. A description of the noncompliance and its cause;

b. The period of noncompliance, including exact dates and times;

c. The estimated time noncompliance is expected to continue if it has not been corrected;

d. Steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance; and

e. If the non compliance involves an overflow prior to the treatment works, an estimate of the quantity (in gallons) of untreated overflow.

4. Waiver of Written Reports

Ecology may waive the written report required in subpart 3 above on a case-by-case basis upon request if a timely oral report has been received.

5. Report Submittal

Reports must be submitted to the address in S3 ("REPORTING AND RECORDKEEPING REQUIREMENTS").

F. Other Noncompliance Reporting.

The Permittee must report all instances of noncompliance, not required to be reported immediately or within 24 hours, at the time that monitoring reports for S3.A ("Reporting") are submitted. The reports must contain the information listed in paragraph E.3 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.

The spill of oil or hazardous materials **must** be reported in accordance with the instructions obtained at the following website:
http://www.ecy.wa.gov/programs/spills/other/reportaspill.htm

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 Department inspectors.

S4. FACILITY LOADING

A. Design Criteria

The flows or waste loads for the permitted facility must not exceed the following design criteria:

Average flow for the maximum month:	5.5 mgd
Peak Daily Flow:	9.3 mgd
BOD_5 loading for maximum month:	4400 lbs/day
TSS loading for maximum month:	4200 lbs/day

B. Plans for Maintaining Adequate Capacity

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 increase would reach design capacity within five years, whichever occurs first.

3. The plan and schedule for continuing to maintain capacity must be sufficient to achieve the effluent limitations and other conditions of this permit. This plan must identify any of the following actions or any other actions necessary to meet the objective of maintaining capacity.

    a. Analysis of the present design including the introduction of any process modifications that would establish the ability of the existing facility to achieve the effluent limits and other requirements of this permit at specific levels in excess of the existing design criteria specified in paragraph A above.

    b. Reduction or elimination of excessive infiltration and inflow of uncontaminated ground and surface water into the sewer system.

    c. Limitation on future sewer extensions or connections or additional waste loads.

    d. Modification or expansion of facilities necessary to accommodate increased flow or waste load.

    e. Reduction of industrial or commercial flows or waste loads to allow for increasing sanitary flow or waste load.

4. 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.

5. If the Permittee intends to apply for state or federal funding for the design or construction of a facility project, the plan must also meet the requirements of a “Facility Plan” as described in 40 CFR 35.2030. The plan must specify any contracts, ordinances, methods for financing, or other arrangements necessary to achieve this objective.

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

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 Publicly Owned Treatment Works (POTW) is proposed which:

   a. Would interfere with the operation of, or exceed the design capacity of, any portion of the POTW;

   b. Is not part of an approved general sewer plan or approved plans and specifications; or

   c. Would be 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 POTW'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 POTW, and the anticipated impact on the Permittee's effluent [40 CFR 122.42(b)].

E. Wasteload Assessment

1. The Permittee must conduct an assessment of their flow and waste load and submit a report to Ecology by **May 15, 2012**, and **annually** thereafter.

2. The report must contain the following: an indication of compliance or noncompliance with the permit effluent limitations; a comparison between the existing and design monthly average dry weather and wet weather flows, peak flows, BOD, and total suspended solids loadings; and the percentage change in these parameters since the previous report.

3. The report must also state the present and design population or population equivalent, projected population growth rate, and the estimated date upon which the design capacity is projected to be reached, according to the most restrictive of the parameters above.

4. Ecology may modify the interval for review and reporting if it determines that a different frequency is sufficient.

S5. OPERATION AND MAINTENANCE

The Permittee must at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance also includes keeping a daily operation logbook (paper or electronic), adequate laboratory controls and appropriate quality assurance procedures. This provision of the permit requires the Permittee to operate back-up or auxiliary facilities or similar systems only when the operation is necessary to achieve compliance with the conditions of this permit.

A. Certified Operator

This permitted facility must be operated by an operator certified by the state of Washington 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.

B. O & M Program

1. The Permittee must institute an adequate operation and maintenance program for the entire sewage system.

2. The Permittee must 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. The Permittee must make maintenance records available for inspection at all times.

C. Short-term Reduction

If a Permittee contemplates a reduction in the level of treatment that would cause a violation of permit discharge limitations 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, 30 days prior to such activities,

2. The notice must detail the reasons for, length of time of, and the potential effects of the reduced level of treatment.

3. This notification does not relieve the Permittee of its obligations under this permit.

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.

For Reliability Class II - 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.

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.

F. Bypass Procedures

Bypass is the intentional diversion of waste streams from any portion of a treatment facility. This permit prohibits bypass. Ecology may take enforcement action against a Permittee for bypass unless one of the following circumstances (1, 2, or 3) is applicable.

1. Bypass is 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 limitations 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 is unavoidable, unanticipated and results in noncompliance with the conditions 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
      - Stopping production
      - Maintenance during normal periods of equipment downtime, but not if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass, or
      - Transport of untreated wastes to another treatment facility

   c. The Permittee has properly notified Ecology of the bypass as required in 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 30 days before the planned date of bypass. The notice must contain:

i. A description of the bypass and its cause;

ii. An analysis of all known alternatives which would eliminate, reduce, or mitigate the need for bypassing;

iii. A cost-effectiveness analysis of alternatives including comparative resource damage assessment;

iv. The minimum and maximum duration of bypass under each alternative;

v. A recommendation as to the preferred alternative for conducting the bypass;

vi. The projected date of bypass initiation;

vii. A statement of compliance with State Environmental Policy Act (SEPA);

viii. 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; and

ix. 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:

i. If the bypass is necessary to perform construction or maintenance-related activities essential to meet the requirements of this permit.

ii. 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.

iii. 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. The

public will be given an opportunity to comment on bypass incidents of significant duration, to the extent feasible. Ecology will approve of a request to bypass by issuing an administrative order under Revised Code of Washington (RCW) 90.48.120.

G. Operations and Maintenance (O&M) Manual

The Permittee must keep the approved O&M Manual available at the treatment plant and all operators must follow the instructions and procedures of this manual.

The Permittee must review the O&M Manual at least **annually** and confirm this review by letter to Ecology by **March 15, 2012**, and **annually** thereafter. Whenever the Permittee makes substantial changes or updates to the O&M Manual the Permittee must submit the changes to Ecology.

S6. PRETREATMENT

A. General Requirements

The Permittee must work with Ecology to ensure that all commercial and industrial users of the POTW comply with the pretreatment regulations in 40 CFR Part 403 and any additional regulations that may be promulgated under Section 307(b) (pretreatment) and 308 (reporting) of the Federal Clean Water Act.

B. Wastewater Discharge Permit Required

The Permittee must not allow any significant industrial users (SIUs) to discharge wastewater to the Permittee's sewer system until such user has received a wastewater discharge permit from Ecology in accordance with Chapter 90.48 RCW and Chapter 173-216 WAC.

C. 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 B 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 an 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.

D. Annual Submittal of List of Industrial Users

The Permittee must submit to Ecology a list summarizing all existing and proposed SIUs and PSIUs. The Permittee must submit this list to Ecology by **January 1, 2012,** and **annually** thereafter.

E. Duty to Enforce Discharge Prohibitions

1. Under 40 CFR 403.5(a), the Permittee must not authorize or knowingly allow the discharge of any pollutants into its POTW which 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, etc.) released in a discharge at a flow rate and/or pollutant concentration which will cause interference with the POTW.

   e. Petroleum oil, nonbiodegradable 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. This Permit prohibits all of the following from discharge to the POTW unless approved in writing by Ecology under extraordinary circumstances (such as a lack of direct discharge alternatives due to combined sewer service or the need to augment sewage flows due to septic conditions):

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.

S7. RESIDUAL SOLIDS

Residual solids include screenings, grit, scum, primary sludge, waste activated sludge, and other solid waste. The Permittee must store and handle all residual solids in a manner that prevents their entry into state ground or surface waters. The Permittee must not discharge leachate from residual solids to state surface or ground waters. The Permittee shall comply with WAC 173-308 and any associated order for handling biosolids.

S8. APPLICATION FOR PERMIT RENEWAL

The Permittee must submit an application for renewal of this permit by **November 1, 2015**.

S9. RECEIVING WATER AND EFFLUENT STUDY OF TEMPERATURE, HARDNESS AND METALS

The Permittee must collect information on the effluent and receiving water to confirm that the effluent does or does not have a reasonable potential to cause a violation of the water quality standards. The Permittee must conduct chemical analyses of influent and effluent samples collected from the wastewater treatment system in accordance with protocols, monitoring requirements, and QA/QC procedures specified in this section. The Permittee must conduct sample analysis in accordance with 40 CFR Part 136.

Quality Assurance Project Plan for metals and temperature: The Permittee must submit a sampling and quality assurance plan for temperature and metals monitoring for Ecology review and approval by **September 15, 2012**. The Permittee must conduct all sampling and analysis in accordance with the guidelines given in ***Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies***, Ecology Publication 04-03-030 (http://www.ecy.wa.gov/pubs/0403030.pdf). A model Quality Assurance Plan specific for temperature may be found at: http://www.ecy.wa.gov/programs/wq/permits/guidance.html.

Temperature Sampling

Temperature must be measured in the effluent and in the ambient water upstream of the outfall. Temperature must be measured at a minimum during the months of April through October of each year, beginning April 1, 2013, when flows are below 1,000 cfs in the receiving waters.

Temperature must be monitored using micro-recording temperature devices known as thermistors. Ecology's Quality Assurance Project Plan Development Tool (*Continuous Temperature Sampling Protocols for the Environmental Monitoring and Trends*) contains protocols for continuous temperature sampling. This document is available online at http://www.ecy.wa.gov/biblio/0503202.html. Calibration as specified in this document is not required if the Permittee uses recording devices which are certified by the manufacturer. Ecology does not require manufacture-specific equipment as given in this document; however, if the Permittee wishes to use measuring devices from another company the accuracy must be demonstrated to be equivalent. The recording devices must be set to record at one-half hour intervals.

Temperature monitoring data must be reported as: daily maximum, seven-day running average of the daily maximums, and the monthly maximum of the seven-day running average. The model Quality Assurance Plan shows an example of these calculations.

Temperature data from each April-October sampling period must be submitted to Ecology by **December 15th** of that year.

Metals, Hardness, and Nutrient Sampling

The Permittee shall sample and analyze the **effluent** and **receiving water** twice monthly during the critical season (June, July, August, September, and October) during the years 2013 through 2015 (inclusive) for the following parameters: Hardness (influent and effluent), pH, Copper, Zinc, Lead, Silver, and Mercury.

The Permittee must follow the clean sampling techniques (Method 1669: Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels, EPA Publication No. 821-R-95-034, April 1995). The clean sampling techniques described in method 1669 are intended for ambient monitoring and must be modified for effluent sampling. All metals and hardness samples must be taken as grab samples. Clean sampling requires two samplers working as a team with; one sampler with "dirty hands" and another sampler with "clean hands." The sampling station accuracy requirements are ± 20 meters. The receiving water sampling location must be outside the zone of influence of the effluent. All chemical analysis shall be conducted according to methods given in 40 CFR 136 and shall have the following detection levels:

POLLUTANT PARAMETER	METHOD	DETECTION LIMIT REQUIRED (Total Recoverable)
Copper (T)	200.8	1.0 µg/L
Zinc (T)	200.8	2.0 µg/L
Lead	200.8	1.0 mg/L
Silver	200.8	0.1 mg/L
Mercury	1631 c	0.2 ng/L

Priority pollutant metals must be sampled and tested as total recoverable. The additional metals, that do not have listed minimum detection limits in the table above, require the Permittee to follow minimum detection levels according to the recommended testing procedures given in 40 CFR 136. Any subsequent sampling and analysis must also meet these requirements. The Permittee may conduct a cooperative receiving water study with other National Pollutant Discharge Elimination System (NPDES) Permittees discharging in the same vicinity. The Permittee must submit the results of the study to Ecology within 90 days of completing the effluent and receiving water studies.

Nutrient Monitoring

The Permittee must also monitor four key nutrient levels in both their effluent and the receiving stream and include these values in their annual report of monitoring. The parameters are Total Nitrogen, Dissolved Inorganic Nitrogen (DIN), Total Phosphorus, and Soluble and Reactive Phosphorus (SRP). The Permittee must collect samples twice monthly during the months of June through October (inclusively five months) in both the POTW's effluent and in the river immediately upstream of the outfall. The Permittee must analyze these samples with a method sensitive enough to obtain quantifiable results. If levels are below the detection levels of the method employed, the Permittee shall use a more sensitive method for subsequent tests if such exits. For method listed under 40 CFR part 136, then the Permittee shall achieve that detection level or better. For Total Nitrogen, the Permittee may analyze the sample for Total Kjeldahl Nitrogen (TKN) and Nitrate-Nitrite (both of which are approved methods under 40 CFR part 136) and report the sum as total nitrogen. Two analytes, DIN and SRP, do not have approved methods, and the Permittee must ensure the laboratory uses appropriately sensitive analytical methods for these analytes.

Sampling reports must be submitted which detail the results of the sampling. The Permittee must submit the first report by **December 15, 2013,** the second report by **December 15, 2014,** and the final report by **December 15, 2015**. The reports must contain the results of all sampling to date.

S10. ACUTE TOXICITY

A. Testing When There Is No Permit Limit for Acute Toxicity

The Permittee must:

- Conduct acute toxicity testing on final effluent during **July 2013** and **January 2014** (once in the last summer and once in the last winter prior to submission of the application for permit renewal). Resubmit the results to Ecology with the permit renewal application by **November 1, 2015**.

- Conduct acute toxicity testing on a series of at least five concentrations of effluent, including 100 percent effluent and a control.

- Use each of the following species and protocols for each acute toxicity test:

    1. Fathead minnow, *Pimephales promelas* (96-hour static-renewal test, method: EPA-821-R-02-012).

2. Daphnid, *Ceriodaphnia dubia*, *Daphnia pulex*, or *Daphnia magna* (48-hour static test, method: EPA-821-R-02-012).

3. Rainbow trout, *Oncorhynchus mykiss* (96-hour static-renewal test, method: EPA-821-R-02-012).

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 # 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 or grab 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 # 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 Ecology Publication # 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 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 50 percent 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 percent 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.

9. Reports of individual characterization or compliance test results must be submitted to Ecology within 60 days after each sample date.

10. The Acute Toxicity Summary Report for the summer sampling must be submitted to Ecology by **September 15, 2013,** and the winter sampling must be submitted by **March 15, 2014**. You must also resubmit the full test results to Ecology with the permit renewal application by **November 1, 2015**.

S11. CHRONIC TOXICITY

A. Testing When There Is No Permit Limit for Chronic Toxicity

The Permittee must:

- Conduct chronic toxicity testing on final effluent during **July 2013** and **January 2014** (once in the last summer and once in the last winter prior to submission of the application for permit renewal by **December 1, 2014**).
- Submit the results to Ecology with the permit renewal application.
- 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 5 percent effluent.
- 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.
- 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	*Pimephales promelas*	EPA-821-R-02-013
Water flea	*Ceriodaphnia dubia*	EPA-821-R-02-013

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 # 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 # 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 Ecology Publication # 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 8 percent effluent. The ACEC equals 50 percent effluent.

8. All whole effluent toxicity tests that involve hypothesis testing must comply with the chronic statistical power standard of 39 percent 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.

9. Reports of individual characterization or compliance test results must be submitted to Ecology within 60 days after each sample date.

10. The Chronic Toxicity Summary Report for the summer sampling must be submitted to Ecology by **September 15, 2013,** and the winter sampling must be submitted by **March 15, 2014**. You must also resubmit the full test results to Ecology with the permit renewal application by **November 1, 2015**.

S12. OUTFALL EVALUATION

The Permittee must inspect the submerged portion of the outfall line and diffuser **once per permit** to document its integrity and continued function. If conditions allow for a photographic verification, the Permittee must include such verification in the report. If there were problems found with the outfall, the report must recommend a solution and a schedule to fix the problem. The Permittee must submit a report on the condition of the outfall and solutions by **September 15, 2011,** to Ecology. If the Permittee finds significant integrity and functionality issues with the outfall, they must notify Ecology within 30 days of making that finding.

S13. COPPER AND ZINC COMPLIANCE

The Permittee must take ongoing actions to minimize the discharge of copper and zinc throughout the term of this permit. The Permittee must report annually on efforts to reduce metals levels in the effluent, which may include:

- Control of supply water alkalinity and pH or other corrosion controls.
- Optimizing the existing treatment processes.
- Adding additional treatment to remove metals before discharge.
- Identification and control of non-domestic metal sources.
- Identifying reuse opportunities in lieu of disposal.

Milestone Reporting	**Reporting Date**
Report on copper and zinc reduction activities	**September 1, 2011**, and **annually** thereafter

GENERAL CONDITIONS

G1. SIGNATORY REQUIREMENTS

A. All applications, reports, or information submitted to Ecology must be signed and certified.

1. In the case of corporations, by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means: (i) 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 (ii) 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.

2. In the case of a partnership, by a general partner.

3. In the case of sole proprietorship, by the proprietor.

4. 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.

B. 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:

1. The authorization is made in writing by a person described above and submitted to Ecology.

2. 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.)

C. Changes to authorization. If an authorization under paragraph B.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 B.2

above must be submitted to Ecology prior to or together with any reports, information, or applications to be signed by an authorized representative.

D. 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:

A. 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.

B. 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.

C. To inspect, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, methods, or operations regulated or required under this permit.

D. 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.

A. The following are causes for terminating this permit during its term, or for denying a permit renewal application:

1. Violation of any permit term or condition.

2. Obtaining a permit by misrepresentation or failure to disclose all relevant facts.

3. A material change in quantity or type of waste disposal.

4. 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.

5. 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.

6. Nonpayment of fees assessed pursuant to RCW 90.48.465.

7. Failure or refusal of the Permittee to allow entry as required in RCW 90.48.090.

B. The following are causes for modification but not revocation and reissuance except when the Permittee requests or agrees:

1. A material change in the condition of the waters of the state.

2. New information not available at the time of permit issuance that would have justified the application of different permit conditions.

3. Material and substantial alterations or additions to the permitted facility or activities which occurred after this permit issuance.

4. Promulgation of new or amended standards or regulations having a direct bearing upon permit conditions, or requiring permit revision.

5. The Permittee has requested a modification based on other rationale meeting the criteria of 40 CFR Part 122.62.

6. Ecology has determined that good cause exists for modification of a compliance schedule, and the modification will not violate statutory deadlines.

7. Incorporation of an approved local pretreatment program into a municipality's permit.

C. The following are causes for modification or alternatively revocation and reissuance:

1. When cause exists for termination for reasons listed in A1 through A7 of this section, and Ecology determines that modification or revocation and reissuance is appropriate.

2. 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 G8) 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 60 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; or 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 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 must be construed as excusing 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.

A. Transfers by Modification

Except as provided in paragraph (B) 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.

B. Automatic Transfers

This permit may be automatically transferred to a new Permittee if:

1. The Permittee notifies Ecology at least 30 days in advance of the proposed transfer date.

2. 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.

3. 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 must be punished by a fine of up to $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 will incur, in addition to any other penalty as provided by law, a civil penalty in the amount of up to $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 limitations 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 limitations 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 condition S3.E; and 4) the Permittee complied with any remedial measures required under S4.C 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 must, upon conviction, be punished by a fine of not more than $10,000 per violation, or by

imprisonment for not more than two 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 must be a fine of not more than $20,000 per day of violation, or by imprisonment of not more than four years, or by both.

G20. REPORTING ANTICIPATED NON-COMPLIANCE

The Permittee must give advance notice to Ecology by submission of a new application or supplement thereto at least 180 days prior to commencement of such discharges, of any facility expansions, production increases, or other planned changes, such as process modifications, in the permitted facility or activity which may result in noncompliance with permit limits or conditions. Any maintenance of facilities, which might necessitate unavoidable interruption of operation and degradation of effluent quality, must be scheduled during noncritical water quality periods and carried out in a manner approved by Ecology.

G21. REPORTING OTHER INFORMATION

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, such facts or information must be submitted promptly.

G22. 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 14 days following each schedule date.

G23. CONTRACT REVIEW

The Permittee must submit to Ecology any proposed contract for the operation of any wastewater treatment facility covered by this permit. The review is to insure consistency with chapters 90.46 and 90.48 RCW. In the event that Ecology does not comment within a 30-day period, the Permittee may assume consistency and proceed with the contract.

APPENDIX A

EFFLUENT CHARACTERIZATION FOR POLLUTANTS
THIS LIST INCLUDES EPA REQUIRED POLLUTANTS (PRIORITY POLLUTANTS) AND SOME ECOLOGY PRIORITY TOXIC CHEMICALS (PBTs)

The following table specifies analytical methods and levels to be used for effluent characterization in NPDES and State waste discharge permits. This appendix specifies effluent characterization requirements of the Department of Ecology unless other methods are specified in the body of this permit. This permit specifies the compounds and groups of compounds to be analyzed. Ecology may require additional pollutants to be analyzed within a group. The objective of this appendix is 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. If a Permittee knows that an alternate, less sensitive method (higher DL and QL) from 40 CFR Part 136 is sufficient to produce measurable results in their effluent, that method may be used for analysis.

Pollutant & CAS No. ***(if available)***	**Recommended Analytical Protocol**	**Detection (DL)**[1] ***µg/L unless specified***	**Quantitation Level (QL)**[2] ***µg/L unless specified***
CONVENTIONALS			
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-GH		0.3 mg/L
Flow	Calibrated device		
Dissolved oxygen	4500-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
NONCONVENTIONALS			
Total Alkalinity	SM2320-B		5 mg/L as CaCo3
Chlorine, Total Residual	4500 Cl G		50.0
Color	SM2120 B/C/E		10 color unit
Fecal Coliform	SM 9221D/E,9222	N/A	N/A
Fluoride (16984-48-8)	SM4500-F E	25	100
Nitrate-Nitrite (as N)	4500-NO3-E/F/H		100
Nitrogen, Total Kjeldahl (as N)	4500-NH3-C/E/FG		300

Pollutant & CAS No. ***(if available)***	**Recommended Analytical Protocol**	**Detection (DL)**[1] ***µg/L unless specified***	**Quantitation Level (QL)** [2] ***µg/L unless specified***
Ortho-Phosphate (PO_4 as P)	4500- PE/PF	3	10
Phosphorus, Total (as P)	4500-PE/PF	3	10
Oil and Grease (HEM)	1664A	1,400	5,000
Salinity	SM2520-B		3 PSS
Settleable Solids	SM2540 -F		100
Sulfate (as mg/L SO_4)	SM4110-B		200
Sulfide (as mg/L S)	4500-S^2F/D/E/G		200
Sulfite (as mg/L SO_3)	SM4500-SO3B		2000
Total dissolved solids	SM2540 C		20 mg/L
Total Hardness	2340B		200 as CaCO3
Aluminum, Total (7429-90-5)	200.8	2.0	10
Barium Total (7440-39-3)	200.8	0.5	2.0
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
Tin, Total (7440-31-5)	200.8	0.3	1.5
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	2	10
Cyanide, Weak Acid Dissociable	SM4500-CN I	2	10
Phenols, Total	EPA 420.1		50
DIOXIN			
2,3,7,8-Tetra-Chlorodibenzo-P-Dioxin (176-40-16)	1613B	1.3 pg/L	5 pg/L

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-dichloropropylene (mixed isomers) (542-75-6)	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
Toulene (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

Pollutant & CAS No. ***(if available)***	**Recommended Analytical Protocol**	**Detection (DL)**[1] ***µg/L unless specified***	**Quantitation Level (QL)** [2] ***µg/L unless specified***
Vinyl chloride (75-01-4)	624/SM6200B	1.0	2.0
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
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(j)fluoranthene (205-82-3)	625	0.5	1.0
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
3,4-benzofluoranthene (Benzo(b)fluoranthene) (205-99-2)	610/625	0.8	1.6
11,12-benzofluoranthene (Benzo(k)fluoranthene) (207-08-9)	610/625	0.8	1.6
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-	625	0.1	0.5

Pollutant & CAS No. ***(if available)***	**Recommended Analytical Protocol**	**Detection (DL)**[1] ***µg/L unless specified***	**Quantitation Level (QL)** [2] ***µg/L unless specified***
81-7)			
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,j)acridine (224-42-0)	610M/625M	2.5	10.0
Dibenzo (a,h)acridine (226-36-8)	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
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	607/625	0.5	1.0

Pollutant & CAS No. ***(if available)***	**Recommended Analytical Protocol**	**Detection (DL)**[1] ***µg/L unless specified***	**Quantitation Level (QL)** [2] ***µg/L unless specified***
(621-64-7)			
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
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)	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)	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)	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) is equivalent to EPA's Minimum Level (ML) which is defined in 40 CFR Part 136 as the minimum level at which the entire GC/MS system must give recognizable mass spectra (background corrected) and acceptable calibration points. These levels were published as proposed in the Federal Register on March 28, 1997.

Appendix I
Reasonable Potential Analysis

TECHNICAL MEMORANDUM

City of Centralia Wastewater General Sewer/Facility Plan – Reasonable Potential Analysis

PREPARED FOR:	City of Centralia
COPY TO:	Karla Kasick, Jacobs-CH2M
PREPARED BY:	Erin Thatcher, Jacobs-CH2M Brad Paulson, Jacobs-CH2M
DATE:	December 4, 2018; updated December 6, 2019
PROJECT NUMBER:	672413
REVIEWED BY:	David Wilson, Jacobs-CH2M Jason Smesrud, Jacobs-CH2M

Summary

A reasonable potential analysis (RPA) was completed for the Centralia Wastewater Treatment Plant (WWTP) as part of the 2019 General Sewer Plan/Facility Plan. An RPA is used to determine whether a discharge has a reasonable potential to cause or contribute to a violation of Washington state water quality criteria for toxic pollutants. This RPA was requested by the Washington Department of Ecology (Ecology) in order to determine whether the WWTP effluent chemistry and updated dilution factors provide compliance with water quality criteria. An evaluation of temperature compliance was also completed.

Ecology's Permit Calculation worksheet (November 2016 version) was developed for the WWTP discharge using previously-established dilution factors for critical receiving water conditions, available effluent monitoring data, ambient Chehalis River temperature and chemistry data, and priority pollutant scan data from the past three years (2013 through 2015). This technical memorandum summarizes these data sources and results of the RPA. The Reasonable Potential Calculation spreadsheet is provided in Attachment A.

Dilution factors at the designated mixing zone boundaries of the Centralia WWTP outfall have been updated using projected 2035 plant effluent flows, a most conservative approach. These updated dilution factors have been used to update the RPA for the Centralia WWTP.

No reasonable potential to exceed water quality criteria were identified for ammonia or metals. No reasonable potential was identified for organic priority pollutants except for 18 organic compounds that are based solely on non-detected laboratory test results, and the compound bis-ethylhexyl phthalate (BEHP). Many of the water quality criteria (updated in December 2016) are below the lowest laboratory detection limits achieved by the priority pollutant scans. A reasonable potential for cyanide is based on a single detection in 2013 that used an incorrect analytical method for evaluating against water quality criteria.

Reasonable potential calculations for temperature were completed based on river and effluent temperature monitoring data reported by the WWTP in 2013, 2014 and 2015 and updated dilution factors for project WWTP flows for 2035. Background river temperatures during summer low river flow conditions (May 16 to September 30) often exceed the salmon spawning, rearing and migration criteria

of 17.5° C in the Chehalis River. Using the updated dilution factor based on 2035 projected WWTP flows does not result in a reasonable potential determination for temperature during the summer low flow period. A reasonable potential was identified for temperature during the weeks of transition to the supplemental salmon spawning period (applicable October 1 to May 15). Temperature monitoring data also shows background Chehalis River temperatures periodically exceed the 13.0° C salmon spawning criteria during the spring and fall periods of transition to this salmon spawning period. The calculated incremental mixed temperature increase at the mixing zone boundary during the spring and fall transition periods to the salmon spawning period show temperature increases greater than 0.3° C, the maximum allowable incremental temperature increase.

Background

The Centralia WWTP discharges treated wastewater to the Chehalis River at river mile 61.25 through a 36-inch diameter outfall and multi-port diffuser that was constructed in 2003. The diffuser section begins approximately 35 to 40 feet off of the east bank (at low river flow) and the end gate structure of the diffuser is approximately 60 feet off of the west bank (at low river flow). Based on the latest outfall inspection completed in September 2015, the outfall is in very good condition and no repairs were needed.

The City's NDPES Permit (Permit No. WA0020982) was issued in 2011 and expired on April 30, 2016, and it is administratively extended until a new permit is issued. The City applied for permit renewal in December 2015, in accordance with the permit requirement, and a new permit has not yet been issued by Ecology. The previous permit established requirements for effluent and background receiving water monitoring for temperature and metals, which were completed by the City during 2013, 2014, and 2015. This monitoring established background temperature and background metals in the Chehalis River, as well as effluent metals concentrations, in order to evaluate the City's WWTP effluent discharge with Washington State water quality criteria. The Chehalis River background temperature data were also collected to support Ecology's implementation of the Chehalis River Total Maximum Daily Load (TMDL) for temperature. A total of 35 effluent and 35 background river samples were collected for analyses of metals and conventional pollutants over these three study years and reported by CH2M HILL in three annual reports (CH2M HILL 2013; 2014; 2015), hereinafter referred to as the *Centralia Effluent and Receiving Water Study*.

The reasonable potential analysis (RPA) presented in this document was developed for the NPDES permit renewal based on the *Centralia Effluent and Receiving Water Study* and applicable Discharge Monitoring Report (DMR) data for 2013 - 2015. This RPA was completed as part of the General Sewer/Facility Plan currently being prepared for review and approval by Ecology.

Data Sources and Assumptions

The RPA was completed using Ecology's Permit Calculation spreadsheet (November 2016 version) and is included in Attachment A. The RPA is based on the following data sources:

- *Centralia WWTP Effluent and Receiving Water Study* (CH2M HILL 2013; 2014; 2015): effluent and background river pH, hardness, ammonia, copper, zinc, silver, lead, and mercury.
- Semi-annual priority pollutant scans from July 2013, December 2013, June 2014, December 2014, October 2015, and November 2015: effluent metals and other toxics concentrations.
- City of Centralia QAPP Temperature Study 2013, City of Centralia QAPP Temperature Study 2014, and City of Centralia QAPP Temperature Study 2015 (Microsoft Excel files provided to CH2M by the City): effluent and background river temperature.
- Updated dilution factors calculated in February 2018 to reflect projected 2035 plant flows, as presented in the section below.

- The water quality criteria (human health and acute and chronic aquatic life criteria for freshwater) are from Chapter 173-201A-240 WAC Water Quality Standards for Washington. The RPA calculations here reflect revised human health criteria promulgated in late 2016, which include several federal human health criteria promulgated by the U.S. EPA for Washington state.

Background (river) metals concentrations were analyzed as total recoverable metals in 2013, 2014, and 2015 data collections and as dissolved metals in 2015. Effluent metals concentrations were analyzed as total recoverable metals, in accordance with Sections S2.B and S9 in the NPDES Permit and 40 CFR 136. Background concentrations of other metals and organic pollutants that were not directly measured in the Chehalis River in the *Centralia Effluent and Receiving Water Study*, in accordance with the NPDES permit requirements, and are assumed to be 0 μg/L. Where metals were undetected in all samples, one-half of the laboratory's detection limit was used in the reasonable potential calculation (occurred only for dissolved silver in the background river samples, 2015). Detection limits for mercury, copper, lead, and silver in the 2014 priority pollutant scan were higher than those used in the *Centralia Effluent and Receiving Water Study.* Silver (detection limit of 10 μg/L) and mercury (detection limit of 0.5 μg/L) were undetected at these higher reporting limits in the June and December 2014 priority pollutant scans. These reported non-detect results from the 2014 priority pollutant scan for silver and mercury were excluded from this RPA.

Cadmium, chromium, copper, lead, nickel, silver, and zinc are hardness-dependent. The effluent and receiving water hardness values used in the reasonable potential calculations were the averages of the results of the 35 effluent samples and averages of the 35 receiving water samples collected during the *Centralia Effluent and Receiving Water Study.* Average effluent hardness based on these samples is 85.6 mg/L (as $CaCO_3$), and the average receiving water hardness based on these samples is 31.2 mg/L (as $CaCO_3$).

Dilution Factors

The reasonable potential analysis presented in the following sections is based on the dilution factors presented in Table 1. Previous reasonable potential calculations were based on the dilution factors specified in Section 1.B of the Centralia WWTP NPDES permit (issued 2011), which are: Aquatic Life, Acute: 2.2; Aquatic Life, Chronic: 16; Human Health, Carcinogen: 48; Human Health, Non-carcinogen: 17.

Dilution factors for the Centralia WWTP outfall have been updated using projected 2035 plant effluent flows, which is a conservative approach. These dilution factors have been used to update the reasonable potential analysis (RPA) that was previously completed for the Centralia WWTP in May 2016, and this RPA will be included in the General Sewer/Facility Plan.

The Water Quality Standards for the Surface Waters of the State of Washington (WAC 173-201A-400) specify that dilution in freshwater rivers and streams is restricted to defined acute and chronic mixing zones regions and is also limited based on available river flows. In rivers, the maximum chronic mixing zone boundary is 300 feet downstream from an outfall plus the depth of the outfall diffuser at 7Q10 river flow; and the acute mixing zone is limited to 10% of the chronic mixing zone size. These Water Quality Standards (WAC 173-201A-400) also specify the maximum ambient river flow that may be used in the calculation of dilution factors. The maximum river flow rate in rivers that can be utilized is 25 percent of the total river flow for the chronic mixing zone and volume-based dilution factors; and 2.5 percent of the total river flow for the acute mixing zone and volume-based dilution factor. Therefore, 7Q10 low river flow represents critical conditions that establish the river flow-based dilution restrictions. Under river flows greater than 7Q10 low river flow conditions, the dilution factors may be greater, but the mixing zone width and length restrictions remain the controlling limit to allowable dilution factors.

Ecology's *Guidance for Conducting Mixing Zone Analyses* (Appendix C of the Water Quality Program Permit Writer's Manual; Ecology, 2015) specifies restrictions on the maximum ambient river flow that may be used in the calculation of dilution factors. As stated in this guidance document, the maximum

flow rate in non-tidally reversing rivers and streams that can be utilized by a chronic mixing zone is 25 percent of the total flow; and for an acute mixing zone, the maximum river flow rate that can be utilized is 2.5 percent of the total flow. The formulation of acute and chronic dilution factors for both aquatic life and human health water quality criteria involves solving the following volume-based equations:

$$DF_{max_chronic} = \frac{(0.25 * Q_{amb} + Q_e)}{Q_e}$$

$$DF_{max_acute} = \frac{(0.025 * Q_{amb} + Q_e)}{Q_e}$$

where $DF_{max_}$ is the maximum dilution factor allowed under acute and chronic conditions; Q_{amb} is the critical flow rate of the receiving (ambient) water; and Q_e is the critical effluent flow rate.

The critical condition for the Chehalis River is the 7-day average low river flow with a recurrence interval of ten years (i.e., 7Q10). Additionally, the 30-day average low river flow with a recurrence interval of five years (i.e., 30Q5) and the harmonic mean (long term average) flows were used to develop dilution factors for evaluation of human health water quality criteria.

These hydrologically-based design river flows were updated using the EPA program DFLOW[1] (U.S. EPA, 1986). DFLOW requires input of daily stream flow records--such as those records from the systematic data collection program maintained by the USGS--and calculates user-specified biologically-based design flows, hydrologically-based design flows, harmonic and percentile flows.

The 42-year record period from October 1975 to September 2017 using Chehalis River discharge data collected at USGS gaging station 12027500 located near Ground Mound, WA was used in this evaluation. Based on DFLOW results, these discharge data yielded critical river design flows for the 7Q10, 30Q5, and harmonic mean of 146 cfs, 185 cfs, and 668 cfs, respectively.

Projected effluent flows for 2035 have been previously developed and, based on these future flow estimates, the highest daily maximum, highest monthly average, and the annual average projected 2035 flows are 10.70, 7.46, and 3.04 million gallons per day (mgd), respectively. Further, per Section 6-1 of the mixing zone guidance document, these effluent flows are to be used for determination of the maximum dilution factors for both aquatic life and human health water quality criteria.

Based on the updated river and effluent flow information presented, dilution factors for the projected 2035 effluent flows are summarized in Table 1 below:

Table 1. Dilution Factors and Assumptions for Centralia WWTP Projected 2035 Flows

	Critical River Discharge Conditions		Critical Effluent Conditions (Projected 2035)			Volume-Based Dilution Factor	
Water Quality Criteria	**Design Flow**	**Flow (cfs)**	**Flow Statistic**	**Flow (mgd)**	**Flow (cfs)**	**Acute**	**Chronic**
Aquatic Life	7Q10	146	Daily maximum	10.70	16.56	1.2	--
	7Q10	146	Monthly average	7.46	11.54	--	4.2
Human Health— *Carcinogen*	Harmonic mean	668	Annual average	3.04	4.70	--	37
Human Health— *Non-Carcinogen*	30Q5	185	Annual average	3.04	4.70	--	11

[1] https://www.epa.gov/waterdata/dflow

Section 1.B of the existing NPDES permit specifies the limits of the acute and chronic mixing zone boundaries. Based on the mixing zone rules in the Water Quality Standards (WAC 173-201A-400), the renewed NPDES permit should define the Centralia WWTP mixing zones as: "limited to 305 feet downstream and 100 feet upstream from the discharge ports. The maximum width of the chronic mixing zone is limited to 25 percent of the width of the water body at low flow condition, or 40 feet based on the river width of 160 feet. The volume-based dilution factors are limited to 25 percent of the river flow under critical river discharge conditions for aquatic life and human health criteria. The acute mixing zone boundaries are limited to 30.5 feet downstream, ten feet upstream and no more than 40 feet width. The acute and chronic mixing zones extend from the riverbed to the top of the water surface."

Reasonable Potential Analysis Results

Temperature

Effluent and Background River Temperature Data

The City obtained continuous effluent and background river water temperature data in the Chehalis River during the following low-flow periods: May 15, 2013 – October 31, 2013; June 3, 2014 – October 14, 2014; and April 28, 2015 – October 30, 2015. Effluent temperature data were also collected for similar periods in 2008 through 2012; these data are used again to evaluate future cooling or flow diversion needs. Only 2013-2015 temperature data were used for the reasonable potential calculation.

Figure 1 below shows the Chehalis River temperature probe data and the effluent temperature for the entire paired river and effluent temperature dataset as 7-DADMax values, which is the 7-day average of the daily maximum recorded temperatures. The background Chehalis River temperature exceeded the effluent temperature during most of the summer period and during some weeks in the spring and fall periods of transition to the supplemental salmon spawning period (October 1 to May 15). Figure 1 shows that the effluent temperature was actually lower than the background river temperature during portions of the hottest summer months in 2013, 2014 and 2015. Temperature probe and Centralia WWTP outfall locations are shown on Figure 2.

Temperature Reasonable Potential

The applicable temperature criteria in the Chehalis River during the summer salmonid rearing and migration period (May 16 to September 30) is 17.5° C. As shown in Figure 1, the background Chehalis River temperatures exceed this criteria during the majority of the summer period; during this period an incremental temperature increase up to 0.3° C is allowed at the Centralia WWTP's mixing zone boundary. No reasonable potential for temperatures to exceed the maximum allowable incremental temperature increase (0.3° C) was identified for critical conditions during the summer (May 16 to September 30) period, based on the updated chronic dilution factor of 4.2 at the mixing zone boundary and applicable effluent and river data from 2013-2015. See the reasonable potential calculation in Attachment A. The 95th-percentile 7-DADMax effluent temperature of 23.7° C and 90th-percentile 7-DADMax river temperature of 24.0° C were calculated from the maximum daily temperature data reported by the City for the summer low-flow periods (May 16 – September 30) in 2013, 2014 and 2015.

The applicable temperature criteria in the Chehalis River during the supplemental salmon spawning period (October 1 to May 15) is 13.0° C. Applying the updated chronic dilution factor of 4.2 at the mixing zone boundary results in a worst-case maximum incremental temperature increase of 1.2° C during this period. See the temperature reasonable potential and limit calculation in Attachment A. This calculation used background river and effluent temperature data from only the transition periods for which background river temperature data were collected, which covered only a portion of the October 1 to May 15 time period each year of monitoring (2013, 2014, and 2015). These data periods included early October until the temperature probe in the river was removed, and early May through May 15 when it was re-deployed each year. A 7-DADMax effluent temperature (95th-percentile) of 18.1° C during this

transition period is required under the chronic worst-case conditions applied in the RPA to prevent an incremental increase of 0.3° C.

The low chronic dilution factor of 4.2 is only applicable when river flows are at 7Q10 low flow conditions. Using the temperature reasonable potential calculation worksheet in Ecology's PermitCalc tool, and assuming the same effluent flow and 7DADMax temperatures applied in the RPA, a dilution factor of 15 is needed during the supplemental spawning period (October 1 to May 15) to prevent an incremental temperature increase more than 0.3° C under the conservative effluent flow and temperature conditions applied in the RPA. A dilution factor of 15 can be achieved at river flows of 646 cfs and projected monthly maximum effluent flow of 11.54 cfs (see Table 1 above), according to the volume-based dilution factor equation:

$$DF_{\max_chronic} = 15 = \frac{(0.25 \times Q_{amb} + Q_e)}{Q_e}$$

$$Q_{amb} = 646\ cfs$$

During this supplemental spawning period, actual river flows in the Chehalis River range from 200 to 40,000 cfs. The actual recorded daily average river flow dropped below 646 cfs during this October 1 to May 15 period for the first few or several days during the transition period to the supplemental spawning period (see Figure 3). During the remaining majority of the supplemental spawning period, river flows are substantially higher than 646 cfs and provide more than enough dilution to prevent an incremental temperature increase greater than 0.3° C.

Temperature Acute Lethality

Acute lethality temperature barriers are also addressed in Chapter 173-201A WAC, (1)(c)(vii):

(vii) The department will incorporate the following guidelines on preventing acute lethality and barriers to migration of salmonids into determinations of compliance with the narrative requirements for use protection established in this chapter (e.g., WAC 173-201A-310(1), 173-201A-400(4), and 173-201A-410 (1)(c)). The following site-level considerations do not, however, override the temperature criteria established for waters in subsection (1)(c) of this section or WAC 173-201A-602:

> *(A) Moderately acclimated (16-20°C, or 60.8-68°F) adult and juvenile salmonids will generally be protected from acute lethality by discrete human actions maintaining the 7-DADMax temperature at or below 22°C (71.6°F) and the 1-day maximum (1-DMax) temperature at or below 23°C (73.4°F).*
>
> *(B) Lethality to developing fish embryos can be expected to occur at a 1-DMax temperature greater than 17.5°C (63.5°F).*
>
> *(C) To protect aquatic organisms, discharge plume temperatures must be maintained such that fish could not be entrained (based on plume time of travel) for more than two seconds at temperatures above 33°C (91.4°F) to avoid creating areas that will cause near instantaneous lethality.*
>
> *(D) Barriers to adult salmonid migration are assumed to exist any time the 1-DMax temperature is greater than 22°C (71.6°F) and the adjacent downstream water temperatures are 3°C (5.4°F) or cooler.*

The temperature limits of 22° C and 23° C for moderately acclimated salmon (see subsection A above) and 17.5° C for embryos (see subsection B above) are regularly exceeded by background river temperatures during the summer months. The effluent's contribution to this exceedance was only calculated under critical conditions as defined in the reasonable potential analysis (see Attachment A). Additional analysis would be required to assess whether and how much the discharge contributes to the

exceedances under actual conditions. As described above, during much of the summer months, actual river flows remain above the 7Q10 low flow (see Figure 3), providing more dilution than the 4.2 dilution factor assumed in the reasonable potential calculation.

The temperature limit of 33° C (see subsection C above) to prevent instantaneous lethality applies to all existing and proposed discharges. However, based on historical effluent temperature from the Centralia WWTP only being recorded as high as 24.4° C, this limitation should not require any modifications to current operations. The requirement to assess barriers to adult salmon migration (see subsection D above) requires analysis of additional river temperature data and was not included in this assessment.

Future Effluent Cooling or Flow Diversion Needs

Since the temperature limits are based on an allowable temperature increase at the mixing zone boundary, the limit is a function of both dilution flows and water temperature which represents a thermal wasteload allocation. The process for calculating the maximum allowable temperature increase was presented in the *Water Quality Program Guidance Manual: Procedures to Implement the State's Temperature Standards through NPDES Permits* (Ecology, 2010):

$$T_{NPDES} = [T_{rc} - \ 0.3^{o}\mathrm{C}] + [chronic\ dilution\ factor] \cdot 0.3^{o}\mathrm{C}$$

Where: chronic dilution factor = (Q_{eff} + 0.25 x Q_{7Q10}) / Q_{eff}

T_{NPDES} = maximum allowable effluent temperature (°C)
T_{rc} = aquatic life temperature criteria (°C)
Q_{eff} = effluent flow (cfs)
Q_{7Q10} = 7Q10 river flow (cfs)
0.25 = 25% by volume mixing zone allowance (unitless)

When applied on a seasonal basis, maximum month effluent flows are used and consequently, the temperature limits can be excessively restrictive during lower flow periods. Applying the calculation as a flow-based limit requires continuous measurement of effluent and river flow but provides additional flexibility to adjust the temperature limits according to actual effluent flows. Both effluent and river flows are continuously measured at the WWTP and at the Grand Mound USGS gage, respectively.

The mixing calculations presented above were applied to the daily effluent and river flow and effluent temperature data for the 2008 through 2015 calendar years to evaluate potential compliance issues that would have been encountered using a flow-based limit. The daily effluent temperatures and resulting temperature limits for effluent discharge to the river are presented in Figure 4. The calculated flow-based temperature limits were capped at 33 ^{o}C in accordance with the water quality standard limitations on maximum temperatures to prevent instantaneous lethality. This analysis shows that the effluent temperature limits would not have been exceeded in 2008 through 2014. In 2015, flow-based temperature limits would have been exceeded for most of August 2015; however, during this time the river flow drops below the calculated 7Q10 river flow. At river flows at or above the 7Q10, there would have been no exceedance of flow-based temperature limits in 2015.

The flow-based limits were calculated using actual recorded daily average effluent flow data during 2008 through 2015. Some exceedances would be shown if effluent flows had been higher during these years. For example, if the 2008 through 2012 effluent flows were increased by 0.4 mgd, there would have been 14 days in October 2012 and 4 days in August 2009 during which the temperatures limits would have been exceeded.

Further evaluation of temperature compliance needs and mitigation strategies under future conditions is planned to address potential temperature limitations as effluent flows increase. As shown in the evaluation above, some mitigation may be required at least during a portion of the transition into the supplemental spawning period (October 1 to May 15). One approach to thermal load compliance is partial diversion of effluent flow to irrigation or groundwater recharge. To establish requirements for

flow diversions or effluent cooling and appropriate design conditions will require additional statistical evaluation to correlate effluent flows with low river flows. An updated evaluation of temperature mitigation technologies such as irrigated reuse, discharge to constructed wetlands for ambient cooling, and groundwater recharge, including land availability/suitability and costs, will also be completed.

pH

The applicable pH criteria in the Chehalis River is within the range of 6.5 to 8.5, with a human-caused variation of less than 0.5 pH units within the range. The discharge will not cause a violation of water quality standards for pH. The average and maximum background Chehalis River pH was determined to be 7.48 and 7.97, respectively, based on the *Centralia Effluent and Receiving Water Study*. The average and maximum effluent pH from these studies was 6.97 and 7.30, respectively. The mixed effluent and river pH will limit the variation to less than 0.5 pH units within the range of 6.5 to 8.5.

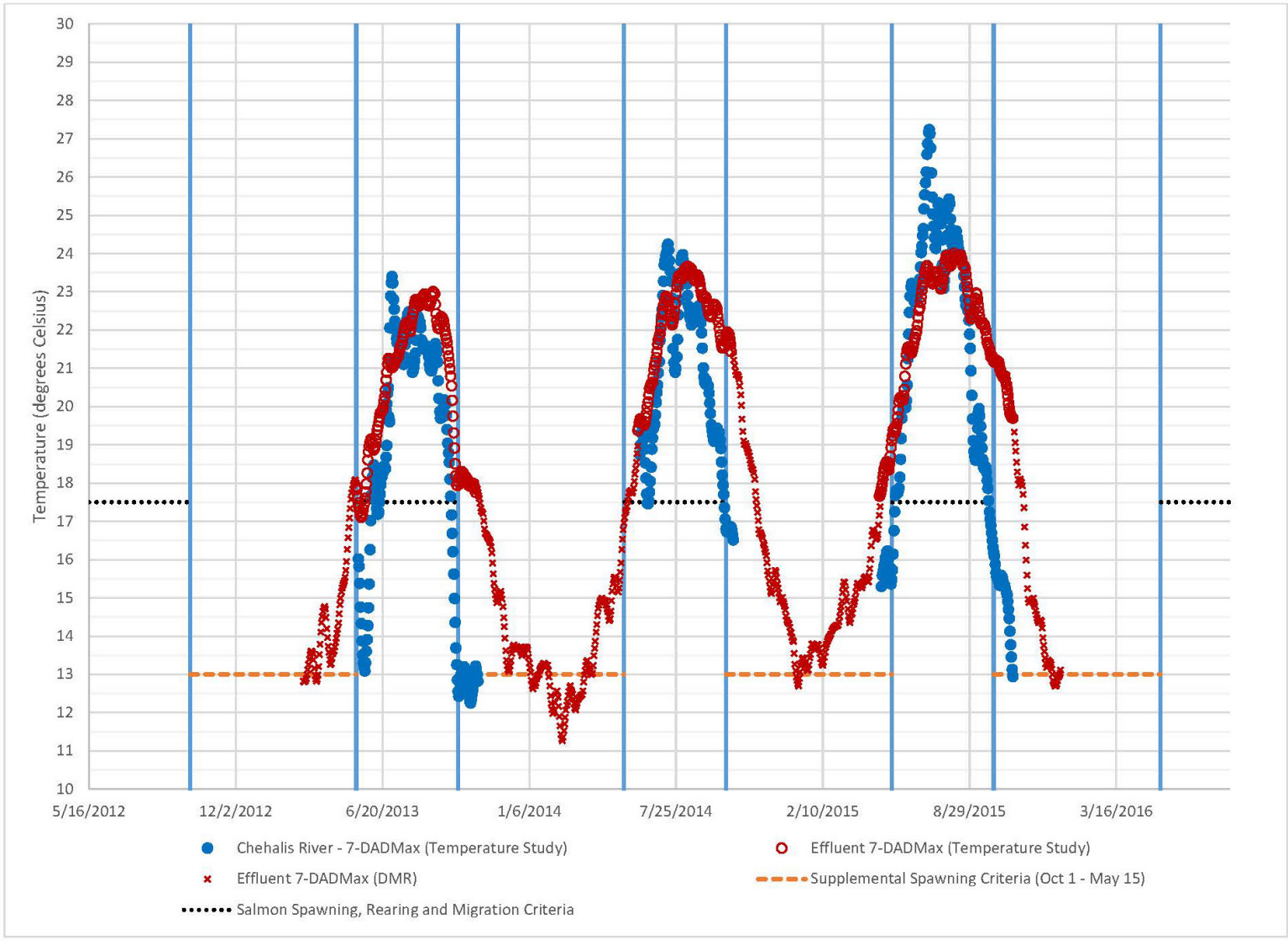


Figure 1. Chehalis River Ambient Temperature and City of Centralia WWTP Effluent Temperature, 2013 – 2015



Figure 2. Chehalis River Background Temperature Probe and City of Centralia WWTP Discharge Locations

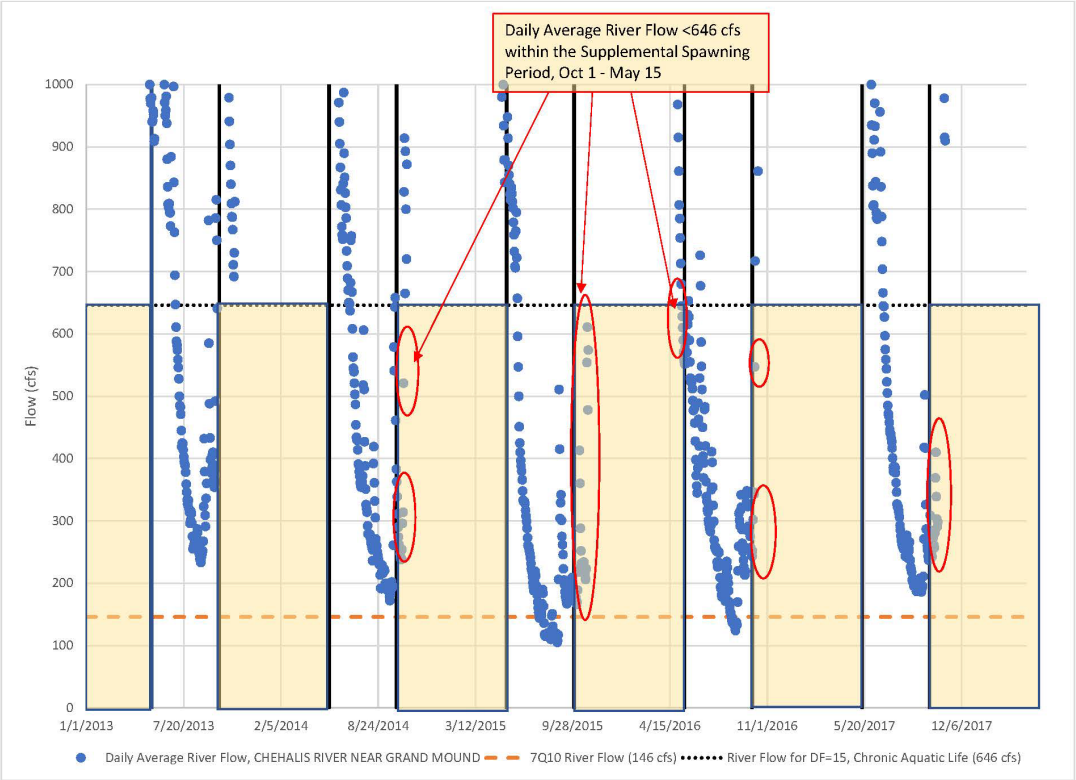


Figure 3. Chehalis River Flows During the Supplemental Spawning Period, Oct 1 – May 15

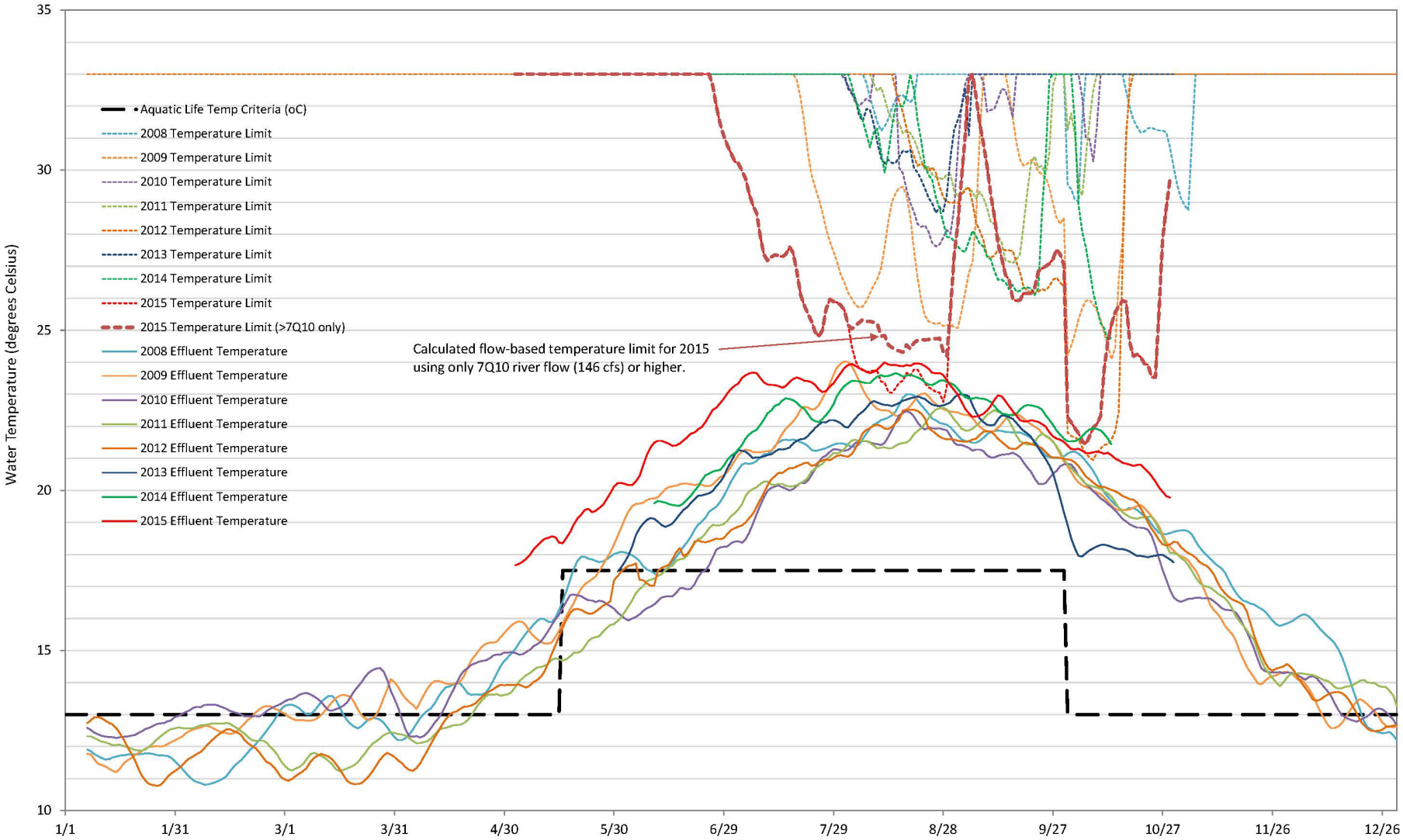


Figure 4. 2008-2015 Analysis of Actual 7-DADM WWTP Effluent Temperatures and Projected Effluent Temperature Limits

Ammonia

Based on this RPA, the Centralia WWTP discharge does not have a reasonable potential to violate water quality standards for ammonia. The Centralia WWTP has very efficient ammonia treatment processes. The 95th-percentile effluent ammonia concentration of 1.176 mg/L was calculated from DMR data and *Centralia Effluent and Receiving Water Study* data, 2013 - 2015. The background ammonia concentration of 0.036 mg/L was calculated from data obtained in the *Centralia Effluent and Receiving Water Study*. This is similar to the background ammonia concentration of 0.033 mg/L used in the RPA completed by Ecology during the previous permit cycle.

Ecology requested the City also consider only river pH in the ammonia criteria calculation as a more conservative approach than using a mixed pH (Attachment B). In addition, Attachment B reflects the ammonia criteria calculations based on the 2015 max 7-DADMax river temp of 27.2° C. The results show that both approaches demonstrate the Centralia discharge complies with ammonia criteria.

Metals

In the previous permit, Ecology identified a reasonable potential to violate water quality criteria for copper, zinc, mercury, and silver, based on limited effluent and river chemistry data. Based on the established dilution factors and effluent and receiving water metals concentrations measured in 2013, 2014, and 2015, the City's discharge does not have a reasonable potential to violate water quality criteria for any metals.

The effluent and river metals data allowed the reasonable potential analysis to be prepared for antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc. Hexavalent chromium was tested for in the December 2014 priority pollutant analyses, and was undetected at a detection limit of 0.016 μg/L. Effluent metals concentrations were not analyzed in the December 2013 scan. See Attachment A for the reasonable potential calculations for each of these metals.

Organic Pollutants

Organic pollutants tested for in the 2013, 2014 and 2015 priority pollutant scans included a large suite of chemicals that includes volatile and semi-volatile organic compounds, pesticides and polychlorinated bi-phenyls (PCBs). In general, the lowest detection limits for organic pollutants were achieved in the 2015 priority pollutant scan.

Assuming a concentration in the effluent of one-half of the lowest detection limit (from 2015) results in a reasonable potential determination for the organic pollutants listed below in Table 2, because the laboratory detection limits are higher than the applicable water quality criteria. The detection limits of these chemicals that were achieved in 2015 are consistent with, and in some cases exceed, the requirements of Appendix A of the Centralia WWTP's current NPDES permit. Future priority pollutant scans may be able to achieve laboratory detection limits that can demonstrate water quality compliance for these chemicals.

Table 2. Organic Priority Pollutants Identified With a Reasonable Potential Based On Non-Detect Test Results

Priority Pollutant	Lowest Laboratory Detection Limit (November 2015)	Reasonable Potential Determination[a]	Applicable Water Quality Criteria
Pesticides/PCBs			
Aldrin	0.0056 μg/L	Chronic Aquatic Life, Human Health	0.0019 μg/L, 0.000000041 μg/L
BHC – Alpha	0.0050 μg/L	Human Health	0.000048 μg/L

Table 2. Organic Priority Pollutants Identified With a Reasonable Potential Based On Non-Detect Test Results

Priority Pollutant	Lowest Laboratory Detection Limit (November 2015)	Reasonable Potential Determination[a]	Applicable Water Quality Criteria
Chlordane	0.005 µg/L	Human Health	0.000022 µg/L
Dieldrin	0.0059 µg/L	Chronic Aquatic Life, Human Health	0.0019 µg/L 0.00000007 µg/L
4,4-DDD	0.0073 µg/L	Human Health	0.0000079 µg/L
4,4-DDE	0.0071 µg/L	Chronic Aquatic Life, Human Health	0.001 µg/L, 0.00000088 µg/L
4,4-DDT	0.014 µg/L	Chronic Aquatic Life, Human Health	0.001 µg/L, 0.0000012
Endrin	0.0074 µg/L	Chronic Aquatic Life	0.0023 µg/L
Heptachlor	0.0073 µg/L	Chronic Aquatic Life, Human Health	0.0038 µg/L, 0.00000034 µg/L
Heptachlor epoxide	0.0071 µg/L	Chronic Aquatic Life, Human Health	0.0038 µg/L, 0.0000024 µg/L
Toxaphene	0.35 µg/L	Acute Aquatic Life, Chronic Aquatic Life, Human Health	0.73 µg/L, 0.0002 µg/L, 0.000032 µg/L
Semi-Volatile Organic Compounds			
Benzo(a)anthracene	0.015 µg/L	Human Health	0.00016 µg/L
Benzo(b)fluoranthene	0.018 µg/L	Human Health	0.00016 µg/L
Benzo(a)pyrene	0.021 µg/L	Human Health	0.000016 µg/L
Benzidine	0.048 µg/L	Human Health	0.00002 µg/L
Dibenzo(a,h)anthracene	0.017 µg/L	Human Health	0.000016 µg/L
Hexachlorobenzene	0.023 µg/L	Human Health	0.000005 µg/L
Indeno(1,2,3-cd)pyrene	0.020 µg/L	Human Health	0.00016 µg/L

[a] Based on a concentration in the effluent assumed to be one-half of the detection limit. See calculations in Attachment A.

Aldrin and heptachlor were detected in the effluent in a single priority pollutant sample prior to the 2011 permit. Aldrin and heptachlor are pesticides that are no longer in legal production or use in this area, and their presence would likely indicate legacy pollution from past land use. The current permit required that the City test for these pollutants during the current permit cycle. Aldrin and heptachlor were tested for in the 2010, 2011, 2014, and 2015 semi-annual priority pollutant scans for the Centralia WWTP. Neither were detected in any of these priority pollutant scans. The lowest laboratory detection limits for these two pollutants were achieved in 2015 and are listed above in Table 2.

A reasonable potential was identified for bis-ethylhexyl phthalate (BEHP) based on the recently revised human health water quality criteria. BEHP was noted in the 2011 NPDES permit fact sheet as present possibly due to sample contamination, as this compound is a plasticizer that may be found in sampling equipment such as autosampler tubing and gloves. The maximum detected concentration of BEHP was 10 µg/L in December 2013, while no sample contamination was indicated by the laboratory quality control results. The recommended detection limit for BEHP in the permit's Appendix A (0.1 ug/L) is

above the current human health limit of 0.045 ug/L (which triggered the reasonable potential). Recent analyses completed by the WWTP (2014, 2015) have resulted in non-detects of BEHP at a detection limit of 1.5 ug/L. As such, we recommend future testing requiring a detection limit below the human health criteria (and below that recommended in the NPDES permit), with an emphasis on QC procedures to address the potential for sample contamination.

Reported effluent cyanide values were based on total cyanide analyses, which is not the correct method to use for evaluating against the water quality criteria. The water quality criteria for cyanide is based on weak acid dissociable cyanide instead of total cyanide. Total cyanide was detected at 0.012 mg/L in the July 2013 priority pollutant scan and the acute water quality standard for cyanide of 22 µg/L (for weak acid dissociable cyanide), higher than the maximum effluent value (12 µg/L). Total cyanide was undetected at a detection limit of 0.0015 mg/L in two samples in 2015. Toluene and di-n-butylphthalate were detected in the effluent at concentrations less than 1 µg/L, which is below the current human health water quality limits of 72 µg/L and 8 µg/L, respectively. As such, it was not necessary to complete the reasonable potential calculation for these two pollutants. Only those organic pollutants for which the water quality criteria are near or below the lowest achieved laboratory detection limit were evaluated in the reasonable potential calculations provided in Attachment A.

Conclusions and Recommendations

- No reasonable potential to cause or contribute to a violation of Washington's current water quality criteria was identified for ammonia, metals, and the majority of the other priority pollutants in the Centralia WWTP discharge to the Chehalis River. This conclusion is based on the reasonable potential analysis developed with three years of comprehensive monitoring data (2013, 2014, and 2015) and dilution factors based on projected 2035 WWTP flows. A tentative reasonable potential determination was shown for 18 organic compounds based on non-detect laboratory test results. These chemicals are not expected to be present in the effluent. The detection limits of these chemicals that were achieved in 2015 are consistent with, and in some cases exceed, the requirements of Appendix A of the Centralia WWTP's current NPDES permit (with the exception of toxaphene).
- We recommend future testing for priority pollutants with detection limit below the human health criteria (and below that recommended in the NPDES permit), where possible, with an emphasis on QC procedures to address the potential for sample contamination. We recommend that the Centralia WWTP require contracted laboratories to test for weak acid dissociable cyanide in future priority pollutant scans to ensure compliance with water quality criteria.
- The results of temperature compliance evaluations show the following:
    - Based on river and effluent temperature monitoring data reported by the City in 2013, 2014 and 2015 and updated dilution factors for project WWTP flows through 2035, a reasonable potential for excess temperature was identified during the weeks of transition from the summer spawning, rearing and migration criteria period (17.5° C) to the start of the supplemental salmon spawning period (13.0° C criteria applicable October 1 to May 15).
    - Further evaluation of temperature compliance needs and mitigation strategies under future conditions is planned to address potential temperature limitations as effluent flows increase. As shown in the evaluation above, some mitigation may be required at least during a portion of the transition into the supplemental spawning period (October 1 to May 15).

References

CH2M HILL. 2013. *Receiving Water & Effluent Study of Metals and Hardness.* Prepared for City of Centralia, Centralia Wastewater Treatment Plant, NPDES Permit No. WA0020982. December.

CH2M HILL. 2014. *Receiving Water & Effluent Study of Metals and Hardness.* Prepared for City of Centralia, Centralia Wastewater Treatment Plant, NPDES Permit No. WA0020982. December.

CH2M HILL. 2015. *Receiving Water & Effluent Study of Metals and Hardness.* Prepared for City of Centralia, Centralia Wastewater Treatment Plant, NPDES Permit No. WA0020982. December.

U.S. Environmental Protection Agency. 1986. Technical guidance manual for performing wasteload allocation; Book VI, design conditions; Chapter 1, stream design flow for steady-state modeling. Office of Water Regulations and Standards, US Environmental Protection Agency. EPA Document PB92-231178.

Washington State Department of Ecology (Ecology). 2010. *Water Quality Program Guidance Manual: Procedures to Implement the State's Temperature Standards through NPDES Permits*. Publication #06-10-100. Revised October 2010.

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Final Permit for NPDES Permit WA0020982, City of Centralia. Effective May 1, 2011.

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Washington Department of Ecology (Ecology). 2015. Water Quality Program Permit Writer's Manual. Publication No. 92-109. Revised January 2015.

Attachments

A Reasonable Potential Calculations (PermitCalc-Nov2016_Centralia2018.xls)

B Reasonable Potential Calculations (Based on River pH)

Attachment A
Reasonable Potential Calculations
(PermitCalc-Nov2016_Centralia2018.xls)

Dilution Factor Calculations and Receiving Water Critical Conditions

Step 1: Enter Waterbody Type

Water Body Type	Freshwater

Facility Name	Centralia WWTP
Receiving Water	Chehalis River

Step 2: Enter Dilution Factors -OR- Calculate DFs by entering Facility/Receiving Water Flow Data

Do you want to enter dilution factors -or- flow data?	Dilution Factors

	Max Dilution Factor Allowed
Aquatic Life - Acute	**1.2**
Aquatic Life - Chronic	**4.2**
HH-Non-Carcinogen	**11.0**
HH-Carcinogen	**37.0**
Whole river at 7Q10	

Step 3: Enter Critical Data

	Effluent	**Receiving Water**
Temp, °C	23.7	24
pH, s.u.	6.97	7.48
Alkalinity, mg/L as CaCO3		
Hardness, mg/L CaCO3	85.6	31.2
Salinity, psu		
Receiving water TSS, mg/L (leave blank if unknown)		
If TSS is annual data, enter 'A'; if from critical period, enter 'S'; If no TSS, leave blank		

Step 4: Specifiy if using 'Mixed' values for hardness, temperature, and pH

	Use 'Mixed Hardness' (Y/N)	**Use 'Mixed Max Temp' (Y/N)**	**Use 'Mixed pH (Y/N)**
	Y	Y	Y
Acute Zone Boundary	76.5	23.8	
Chronic Zone Boundary	44.2	23.9	
Whole river at 7Q10			

Reasonable Potential Calculation

Facility	Centralia WWTP
Water Body Type	Freshwater
Rec. Water Hardness	Acute=76.5, Chronic=44.2 mg/L

Dilution Factors:	**Acute**	**Chronic**
Aquatic Life	1.2	4.2
Human Health Carcinogenic		37.0
Human Health Non-Carcinogenic		11.0

Pollutant, CAS No. & NPDES Application Ref. No.			AMMONIA, Criteria as Total NH3	ANTIMONY (INORGANIC) 7440360 1M	ARSENIC (dissolved) 7440382 2M	BERYLLIUM 7440417 3M	CADMIUM - 7440439 4M Hardness dependent	CHROMIUM(TRI) -16065831 5M Hardness dependent	COPPER - 744058 6M Hardness dependent	LEAD - 7439921 7M Dependent on hardness	MERCURY 7439976 8M	NICKEL - 7440020 9M - Dependent on hardness	SELENIUM 7782492 10M
Effluent Data	# of Samples (n)		267	6	6	6	6	6	40	40	38	6	6
	Coeff of Variation (Cv)		3.1	0.6	0.6	0.6	0.6	0.6	0.5	1.2	1.4	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)		1,176	0.53	0.58	0.07	0.088	0.76	9.24	0.83	0.00528	17	0.401
	Calculated 50th percentile Effluent Conc. (when n>10)								6.12		0.00168		
Receiving Water Data	90th Percentile Conc., ug/L		36		0		0	0	1.23	0.08	0.00135	0	0
	Geo Mean, ug/L			0					0.77		0.0006	0	0
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	13,684	-	360	-	2.77073	440.797	13.226	48.2098	2.1	1128.8	20
		Chronic	1,113	-	190	-	0.56304	91.1275	5.64473	1.02276	0.012	78.7159	5
	WQ Criteria for Protection of Human Health, ug/L		-	6	-	-	-	-	1300	-	0.14	80	60
	Metal Criteria Translator, decimal	Acute	-	-	1	-	0.943	0.316	0.996	0.466	0.85	0.998	-
		Chronic	-	-	1	-	0.943	0.86	0.996	0.466	-	0.997	-
	Carcinogen?		N	N	Y	Y	N	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	0.950
s	$s^2=\ln(CV^2+1)$		1.537	0.555	0.555	0.555	0.472	0.944	1.042	0.555	0.555
Pn	$Pn=(1\text{-confidence level})^{1/n}$		0.989	0.607	0.607	0.607	0.928	0.928	0.924	0.607	0.607
Multiplier			1.00	2.14	2.14	2.14	1.00	1.00	1.00	2.14	2.14
Max concentration (ug/L) at edge of…		Acute	986	1.035	0.148	0.429	7.874	0.336	0.004	30.280	0.716
		Chronic	307	0.296	0.042	0.333	3.128	0.153	0.002	8.643	0.204
Reasonable Potential? Limit Required?			**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Aquatic Life Limit Calculation

# of Compliance Samples Expected per month		
LTA Coeff. Var. (CV), decimal		
Permit Limit Coeff. Var. (CV), decimal		
Waste Load Allocations, ug/L	Acute	
	Chronic	
Long Term Averages, ug/L	Acute	
	Chronic	
Limiting LTA, ug/L		
Metal Translator or 1?		
Average Monthly Limit (AML), ug/L		
Maximum Daily Limit (MDL), ug/L		

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$	0.55451		0.47238	1.04172	0.55451	0.55451
Pn	Pn=(1-confidence level)1/n	0.607		0.928	0.924	0.607	0.607
Multiplier		0.86028		0.50176	0.22455	0.86028	0.86028
Dilution Factor		11		11	11	11	11
Max Conc. at edge of Chronic Zone, ug/L		0.04145		1.3E+00	0.0007	1.32952	0.03136
Reasonable Potential? Limit Required?		**NO**		**NO**	**NO**	**NO**	**NO**

Human Health Limit Calculation

# of Compliance Samples Expected per month	
Average Monthly Effluent Limit, ug/L	
Maximum Daily Effluent Limit, ug/L	

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

Reasonable Potential Calculation - Page 2

Facility	Centralia WWTP
Water Body Type	Freshwater
Rec. Water Hardness	Acute=76.5, Chronic=44.2 mg/L

Dilution Factors:	**Acute**	**Chronic**
Aquatic Life	1.2	4.2
Human Health Carcinogenic		37.0
Human Health Non-Carcinogenic		11.0

Pollutant, CAS No. & NPDES Application Ref. No.			SILVER - 7740224 11M dependent on hardness.	THALLIUM 7440280 12M	ZINC- 7440666 13M hardness dependent	CYANIDE 57125 14M	NITRATE/NITRITE (N)	METHYLENE CHLORIDE 75092 22V	PHENOL 108952 10A	BIS(2-ETHYLHEXYL) PHTHALATE 117817 13B	BENZIDINE 92875 4B	ALDRIN 309002 1P	HEPTACHLOR 76448 16P
Effluent Data	# of Samples (n)		38	4	40	6	35	6	6	5	1	1	1
	Coeff of Variation (Cv)		0.7	0.6	0.4	0.6	0.2	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)		0.03	0.064	79.4	12		4.1	0.995	10	0.024	0.0028	0.00365
	Calculated 50th percentile Effluent Conc. (when n>10)				59.7		23000						
Receiving Water Data	90th Percentile Conc., ug/L		0.0125		3.2	0						0	0
	Geo Mean, ug/L			0	3.2	0	225	0	0	0	0	0	0
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	2.17792	-	91.2415	22	-	-	-	-	-	2.5	0.52
		Chronic	-	-	52.2779	5.2	-	-	-	-	-	0.0019	0.0038
	WQ Criteria for Protection of Human Health, ug/L		-	1.7	1000	9	10000	10	9000	0.045	0.00002	4.1E-08	3.4E-07
	Metal Criteria Translator, decimal	Acute	0.85	-	0.996	-	-	-	-	-	-	-	-
		Chronic	-	-	0.996	-	-	-	-	-	-	-	-
	Carcinogen?		N	N	N	N	N	Y	N	Y	Y	Y	Y

Aquatic Life Reasonable Potential

Effluent percentile value			0.950		0.950	0.950					0.950	0.950
s	$s^2=\ln(CV^2+1)$		0.631		0.385	0.555					0.555	0.555
Pn	$Pn=(1\text{-confidence level})^{1/n}$		0.924		0.928	0.607					0.050	0.050
Multiplier			1.00		1.00	2.14					6.20	6.20
Max concentration (ug/L) at edge of…		Acute	0.023		66.435	21.417					0.014	0.019
		Chronic	0.017		21.267	6.119					0.004	0.005
Reasonable Potential? Limit Required?			**NO**		**NO**	**YES**					**YES**	**YES**

Aquatic Life Limit Calculation

# of Compliance Samples Expected per month												
LTA Coeff. Var. (CV), decimal						0.6					0.6	0.6
Permit Limit Coeff. Var. (CV), decimal						0.6					0.6	0.6
Waste Load Allocations, ug/L		Acute				26.4					3	0.624
		Chronic				21.84					0.00798	0.01596
Long Term Averages, ug/L		Acute				8.4766					0.96325	0.20036
		Chronic				11.5191					0.00421	0.00842
Limiting LTA, ug/L						8.4766					0.00421	0.00842
Metal Translator or 1?						1.00					1.00	1.00
Average Monthly Limit (AML), ug/L						**#DIV/0!**					**#DIV/0!**	**#DIV/0!**
Maximum Daily Limit (MDL), ug/L						**26.4**					**0.0**	**0.0**

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$	0.55451	0.38525	0.55451	0.19804	0.55451	0.55451	0.55451	0.55451	0.55451	0.55451
Pn	Pn=(1-confidence level)1/n	0.473	0.928	0.607	0.918	0.607	0.607	0.549	0.050	0.050	0.050
Multiplier		1.03846	0.56982	0.86028	0.75913	0.86028	0.86028	0.93363	2.48953	2.48953	2.48953
Dilution Factor		11	11	11	11	37	11	37	37	37	37
Max Conc. at edge of Chronic Zone, ug/L		0.00604	8.33636	0.93848	2295.45	9.5E-02	7.8E-02	0.25233	0.00161	0.00019	0.00025
Reasonable Potential? Limit Required?		**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**YES**	**YES**	**YES**	**YES**

Human Health Limit Calculation

# of Compliance Samples Expected per month									
Average Monthly Effluent Limit, ug/L						**1.665**	**0.00074**	**1.5E-06**	**1.3E-05**
Maximum Daily Effluent Limit, ug/L						**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**

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

Reasonable Potential Calculation - Page 3

Facility	Centralia WWTP
Water Body Type	Freshwater
Rec. Water Hardness	Acute=76.5, Chronic=44.2 mg/L

Dilution Factors:	**Acute**	**Chronic**
Aquatic Life	1.2	4.2
Human Health Carcinogenic		37.0
Human Health Non-Carcinogenic		11.0

Pollutant, CAS No. & NPDES Application Ref. No.		HEXACHLOROBENZENE 118741 33B	PENTACHLOROPHENOL 87865 9A (pH dependent in freshwater)	BENZO(a)ANTHRACENE 56553 5B	3,3 DICHLOROBENZIDINE 91941 23B	CHRYSENE 218019 18B	BENZO(b)FLUORANTHENE 205992 7B	BENZO(a)PYRENE 50328 6B	INDENO(1,2,3-cd)PYRENE 193395 37B	DIBENZO(a,h)ANTHRACENE 53703 19B	ACRYLONITRILE 107131 2V	NITROSODIMETHYLAMINE N 62759 41B
Effluent Data	# of Samples (n)	1	1	1	1	1	1	1	1	1	1	1
	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)	0.0115	0.022	0.0075	0.0135	0.011	0.009	0.0105	0.01	0.0085	0.25	0.0044
	Calculated 50th percentile Effluent Conc. (when n>10)		0.022									
Receiving Water Data	90th Percentile Conc., ug/L		0									
	Geo Mean, ug/L	0	0	0	0	0	0	0	0	0	0	0
Water Quality Criteria	Aquatic Life Criteria, ug/L — Acute	-	#DIV/0!	-	-	-	-	-	-	-	-	-
	Aquatic Life Criteria, ug/L — Chronic	-	#DIV/0!	-	-	-	-	-	-	-	-	-
	WQ Criteria for Protection of Human Health, ug/L	5E-06	0.002	0.00016	0.0031	0.016	0.00016	1.6E-05	0.00016	1.6E-05	0.019	0.00065
	Metal Criteria Translator, decimal — Acute	-	-	-	-	-	-	-	-	-	-	-
	Metal Criteria Translator, decimal — Chronic	-	-	-	-	-	-	-	-	-	-	-
	Carcinogen?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Aquatic Life Reasonable Potential

Effluent percentile value		0.950
s	$s^2=\ln(CV^2+1)$	0.555
Pn	$Pn=(1\text{-confidence level})^{1/n}$	0.050
Multiplier		6.20
Max concentration (ug/L) at edge of…	Acute	0.114
	Chronic	0.032
Reasonable Potential? Limit Required?		**#DIV/0!**

Aquatic Life Limit Calculation

# of Compliance Samples Expected per month		
LTA Coeff. Var. (CV), decimal		
Permit Limit Coeff. Var. (CV), decimal		
Waste Load Allocations, ug/L	Acute	
	Chronic	
Long Term Averages, ug/L	Acute	
	Chronic	
Limiting LTA, ug/L		
Metal Translator or 1?		
Average Monthly Limit (AML), ug/L		
Maximum Daily Limit (MDL), ug/L		

Human Health Reasonable Potential

		HEXACHLOROBENZENE 118741 33B	PENTACHLOROPHENOL 87865 9A (pH dependent in freshwater)	BENZO(a)ANTHRACENE 56553 5B	3,3 DICHLOROBENZIDINE 91941 23B	CHRYSENE 218019 18B	BENZO(b)FLUORANTHENE 205992 7B	BENZO(a)PYRENE 50328 6B	INDENO(1,2,3-cd)PYRENE 193395 37B	DIBENZO(a,h)ANTHRACENE 53703 19B	ACRYLONITRILE 107131 2V	NITROSODIMETHYLAMINE N 62759 41B
s	$s^2=\ln(CV^2+1)$	0.55451	0.55451	0.55451	0.55451	0.55451	0.55451	0.55451	0.55451	0.55451	0.55451	0.55451
Pn	$Pn=(1\text{-confidence level})1/n$	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Multiplier		2.48953	2.48953	2.48953	2.48953	2.48953	2.48953	2.48953	2.48953	2.48953	2.48953	2.48953
Dilution Factor		37	37	37	37	37	37	37	37	37	37	37
Max Conc. at edge of Chronic Zone, ug/L		0.00077	0.00059	0.0005	0.00091	0.00074	6.1E-04	7.1E-04	0.00067	0.00057	0.01682	0.0003
Reasonable Potential? Limit Required?		**YES**	**NO**	**YES**	**NO**	**NO**	**YES**	**YES**	**YES**	**YES**	**NO**	**NO**

Human Health Limit Calculation

	HEXACHLOROBENZENE 118741 33B	PENTACHLOROPHENOL 87865 9A (pH dependent in freshwater)	BENZO(a)ANTHRACENE 56553 5B	3,3 DICHLOROBENZIDINE 91941 23B	CHRYSENE 218019 18B	BENZO(b)FLUORANTHENE 205992 7B	BENZO(a)PYRENE 50328 6B	INDENO(1,2,3-cd)PYRENE 193395 37B	DIBENZO(a,h)ANTHRACENE 53703 19B	ACRYLONITRILE 107131 2V	NITROSODIMETHYLAMINE N 62759 41B
# of Compliance Samples Expected per month											
Average Monthly Effluent Limit, ug/L	**0.00019**		**0.00592**			**0.00592**	**0.00059**	**0.00592**	**0.00059**		
Maximum Daily Effluent Limit, ug/L	**#DIV/0!**		**#DIV/0!**			**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**		

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

Instructions

Reasonable Potential Calculation - Page 4

Facility	Centralia WWTP
Water Body Type	Freshwater
Rec. Water Hardness	Acute=76.5, Chronic=44.2 mg/L

Dilution Factors:	Acute	Chronic
Aquatic Life	1.2	4.2
Human Health Carcinogenic		37.0
Human Health Non-Carcinogenic		11.0

Pollutant, CAS No. & NPDES Application Ref. No.			BIS(2-CHLOROETHYL)ETHER 111444 11B	N- NITROSODI-N-PROPYLAMINE 621647 42B	DDT 50293 7P	DDT METABOLITE (DDE) 72559 8P	DDT METABOLITE (DDD) 72548 9P	CHLORDANE 57749 6P	BHC - ALPHA 319846 2P	BHC - BETA 319857 3P	BHC - DELTA 319868 5P	HEPTACHLOR EPOXIDE 1024573 17P	TOXAPHENE 8001352 25P
Effluent Data	# of Samples (n)		1	1	1	1	1	1	1	1	1	1	1
	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)		0.0185	0.012	0.007	0.0036	0.00037	0.0025	0.0025	0.0041	0.0028	0.0036	0.175
	Calculated 50th percentile Effluent Conc. (when n>10)												
Receiving Water Data	90th Percentile Conc., ug/L		0	0	0	0	0	0				0	0
	Geo Mean, ug/L		0	0	0	0	0	0	0	0		0	0
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	-	-	1.1	1.1	1.1	2.4	-	-	-	0.52	0.73
		Chronic	-	-	0.001	0.001	0.001	0.043	ane-Alpha	ane-Beta	-	0.0038	0.0002
	WQ Criteria for Protection of Human Health, ug/L		0.02	0.0044	1.2E-06	9E-07	7.9E-06	2.2E-05	4.8E-05	0.0013	-	2E-06	3E-05
	Metal Criteria Translator, decimal	Acute	-	-	-	-	-	-	-	-	-	-	-
		Chronic	-	-	-	-	-	-	-	-	-	-	-
	Carcinogen?		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Aquatic Life Reasonable Potential

Effluent percentile value					0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
s	$s^2=\ln(CV^2+1)$				0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555
Pn	Pn=(1-confidence level)$^{1/n}$				0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Multiplier					6.20	6.20	6.20	6.20	6.20	6.20	6.20	6.20
Max concentration (ug/L) at edge of…		Acute			0.036	0.018	0.002	0.013	0.013	0.021	0.018	0.904
		Chronic			0.010	0.005	0.001	0.004	0.004	0.006	0.005	0.258
Reasonable Potential? Limit Required?					**YES**	**YES**	**NO**	**NO**	**#VALUE!**	**######**	**YES**	**YES**

Aquatic Life Limit Calculation

# of Compliance Samples Expected per month												
LTA Coeff. Var. (CV), decimal					0.6	0.6					0.6	0.6
Permit Limit Coeff. Var. (CV), decimal					0.6	0.6					0.6	0.6
Waste Load Allocations, ug/L		Acute			1.32	1.32					0.624	0.876
		Chronic			0.0042	0.0042					0.016	0.0008
Long Term Averages, ug/L		Acute			0.42383	0.4238					0.2004	0.2813
		Chronic			0.00222	0.0022					0.0084	0.0004
Limiting LTA, ug/L					0.00222	0.0022					0.0084	0.0004
Metal Translator or 1?					1.00	1.00					1.00	1.00
Average Monthly Limit (AML), ug/L					**#DIV/0!**	**#DIV/0!**					**#DIV/0!**	**#DIV/0!**
Maximum Daily Limit (MDL), ug/L					**0.0**	**0.0**					**0.0**	**0.0**

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$	0.5545	0.5545	0.55451	0.5545	0.55451	0.55451	0.55451	0.5545	0.5545	0.5545
Pn	Pn=(1-confidence level)1/n	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Multiplier		2.4895	2.4895	2.48953	2.4895	2.48953	2.48953	2.48953	2.4895	2.4895	2.4895
Dilution Factor		37	37	37	37	37	37	37	37	37	37
Max Conc. at edge of Chronic Zone, ug/L		0.0012	0.0008	0.00047	0.0002	2.5E-05	1.7E-04	1.7E-04	0.0003	0.0002	0.0118
Reasonable Potential? Limit Required?		**NO**	**NO**	**YES**	**YES**	**YES**	**YES**	**YES**	**NO**	**YES**	**YES**

Human Health Limit Calculation

# of Compliance Samples Expected per month										
Average Monthly Effluent Limit, ug/L			**4.4E-05**	**3E-05**	**0.00029**	**0.00081**	**0.00178**		**9E-05**	**0.0012**
Maximum Daily Effluent Limit, ug/L			**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**		**#DIV/0!**	**#DIV/0!**

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

Override formatting & show Aq. Life Limit Calc?	N	N	N	N	N	N	N	N	N	N	N
Override formatting & show HH Limit Calc?	N	N	N	N	N	N	N	N	N	N	N

Instructions

Reasonable Potential Calculation - Page 5

Facility	Centralia WWTP
Water Body Type	Freshwater
Rec. Water Hardness	Acute=76.5, Chronic=44.2 mg/L

Dilution Factors:	Acute	Chronic
Aquatic Life	1.2	4.2
Human Health Carcinogenic		37.0
Human Health Non-Carcinogenic		11.0

Pollutant, CAS No. & NPDES Application Ref. No.			BENZO(k) FLUORANTHENE 207089 9B	ENDRIN 72208 14P	ENDRIN ALDEHYDE 7421934 15P	DIELDRIN 60571 10P	BENZO(k) FLUORANTHENE 207089 9B	ENDOSULFAN SULFATE 1031078 13P	BHC - GAMMA 58899 4P (Lindane)	2-CHLOROPHENOL 95578 1A	1,3 DICHLOROBENZENE 541731 21B	1,4 DICHLOROBENZENE 106467 22B	1,2 DICHLOROBENZENE 95501 20B
Effluent Data	# of Samples (n)		1	1	1	1	1	1	1	1	1	1	1
	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)		0.01	0.0037	0.00415	0.003	0.01	0.00275	0.00325	0.014	0.0145	0.0145	0.0165
	Calculated 50th percentile Effluent Conc. (when n>10)												
Receiving Water Data	90th Percentile Conc., ug/L		0	0	0	0	0	0		0	0	0	0
	Geo Mean, ug/L		0	0	0	0	0	0	0	0	0	0	0
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	-	0.18	-	2.5	-	-	-	-	-	-	-
		Chronic	-	0.0023	-	0.0019	-	-	ι (lindane)	-	-	-	-
	WQ Criteria for Protection of Human Health, ug/L		0.0016	0.002	0.034	7E-08	0.0016	9	0.43	15	2	200	700
	Metal Criteria Translator, decimal	Acute	-	-	-	-	-	-	-	-	-	-	-
		Chronic	-	-	-	-	-	-	-	-	-	-	-
	Carcinogen?		Y	N	N	Y	Y	N	Y	N	N	N	N

Aquatic Life Reasonable Potential

Effluent percentile value				0.950		0.950			0.950			
s	$s^2=\ln(CV^2+1)$			0.555		0.555			0.555			
Pn	Pn=(1-confidence level)$^{1/n}$			0.050		0.050			0.050			
Multiplier				6.20		6.20			6.20			
Max concentration (ug/L) at edge of…		Acute		0.019		0.015			0.017			
		Chronic		0.005		0.004			0.005			
Reasonable Potential? Limit Required?				**YES**		**YES**			**#VALUE!**			

Aquatic Life Limit Calculation

# of Compliance Samples Expected per month												
LTA Coeff. Var. (CV), decimal				0.6		0.6						
Permit Limit Coeff. Var. (CV), decimal				0.6		0.6						
Waste Load Allocations, ug/L		Acute		0.216		3						
		Chronic		0.0097		0.008						
Long Term Averages, ug/L		Acute		0.0694		0.9632						
		Chronic		0.0051		0.0042						
Limiting LTA, ug/L				0.0051		0.0042						
Metal Translator or 1?				1.00		1.00						
Average Monthly Limit (AML), ug/L				**#DIV/0!**		**#DIV/0!**						
Maximum Daily Limit (MDL), ug/L				**0.0**		**0.0**						

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$	0.5545	0.5545	0.55451	0.5545	0.55451	0.55451	0.55451	0.5545	0.5545	0.5545	0.5545
Pn	Pn=(1-confidence level)1/n	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Multiplier		2.4895	2.4895	2.48953	2.4895	2.48953	2.48953	2.48953	2.4895	2.4895	2.4895	2.4895
Dilution Factor		37	11	11	37	37	11	37	11	11	11	11
Max Conc. at edge of Chronic Zone, ug/L		0.0007	0.0008	0.00094	0.0002	0.00067	6.2E-04	2.2E-04	0.0032	0.0033	0.0033	0.0037
Reasonable Potential? Limit Required?		**NO**	**NO**	**NO**	**YES**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Human Health Limit Calculation

# of Compliance Samples Expected per month					33							
Average Monthly Effluent Limit, ug/L					**3E-06**							
Maximum Daily Effluent Limit, ug/L					**7E-06**							

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

Override formatting & show Aq. Life Limit Calc?	N	N	N	N	N	N	N	N	N	N	N	N
Override formatting & show HH Limit Calc?	N	N	N	N	N	N	N	N	N	N	N	N

Instructions

Reasonable Potential Calculation - Page 6

Facility	Centralia WWTP
Water Body Type	Freshwater
Rec. Water Hardness	Acute=76.5, Chronic=44.2 mg/L

Dilution Factors:	Acute	Chronic
Aquatic Life	1.2	4.2
Human Health Carcinogenic		37.0
Human Health Non-Carcinogenic		11.0

Pollutant, CAS No. & NPDES Application Ref. No.			CHLOROISOPROPYL ETHER (BIS-2) 108601	HEXACHLOROETHANE 67721 36B	TRICHLOROBENZENE 1,2,4 120821 46B	HEXACHLOROBUTADIENE 87683 34B	BUTYLBENZYL PHTHALATE 85687 15B	3,3 DICHLOROBENZIDINE 91941 23B					
Effluent Data	# of Samples (n)		1	1	1	1	1	1					
	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)		0.0175	0.0105	0.018	0.0055	0.0225	0.0135					
	Calculated 50th percentile Effluent Conc. (when n>10)												
Receiving Water Data	90th Percentile Conc., ug/L			0	0	0	0	0					
	Geo Mean, ug/L		0	0	0	0	0	0					
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	-	-	-	-	-	-					
		Chronic	yl) Ether	-	-	-	-	-					
	WQ Criteria for Protection of Human Health, ug/L		400	0.02	0.036	0.01	0.013	0.0031					
	Metal Criteria Translator, decimal	Acute	-	-	-	-	-	-					
		Chronic	-	-	-	-	-	-					
	Carcinogen?		N	Y	-	Y	N	Y					

Aquatic Life Reasonable Potential

Effluent percentile value			0.950
s	$s^2=\ln(CV^2+1)$		0.555
Pn	$Pn=(1\text{-confidence level})^{1/n}$		0.050
Multiplier			6.20
Max concentration (ug/L) at edge of…		Acute	0.090
		Chronic	0.026
Reasonable Potential? Limit Required?			######

Aquatic Life Limit Calculation

# of Compliance Samples Expected per month		
LTA Coeff. Var. (CV), decimal		
Permit Limit Coeff. Var. (CV), decimal		
Waste Load Allocations, ug/L	Acute	
	Chronic	
Long Term Averages, ug/L	Acute	
	Chronic	
Limiting LTA, ug/L		
Metal Translator or 1?		
Average Monthly Limit (AML), ug/L		
Maximum Daily Limit (MDL), ug/L		

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$	0.5545	0.5545	0.55451	0.5545	0.55451	0.55451
Pn	$Pn=(1\text{-confidence level})1/n$	0.050	0.050	0.050	0.050	0.050	0.050
Multiplier		2.4895	2.4895	2.48953	2.4895	2.48953	2.48953
Dilution Factor		11	37	37	37	11	37
Max Conc. at edge of Chronic Zone, ug/L		0.004	0.0007	0.00121	0.0004	0.00509	9.1E-04
Reasonable Potential? Limit Required?		**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Human Health Limit Calculation

# of Compliance Samples Expected per month	
Average Monthly Effluent Limit, ug/L	
Maximum Daily Effluent Limit, ug/L	

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

Override formatting & show Aq. Life Limit Calc?	N	N	N	N	N	N	N	N	N	N	N	
Override formatting & show HH Limit Calc?	N	N	N	N	N	N	N	N	N	N	N	

Freshwater Temperature Reasonable Potential and Limit Calculation

Based on WAC 173-201A-200(1)(c)(i)--(ii) and the Water Quality Program Guidance. All data inputs must meet WQ guidelines. The Water Quality temperature guidance document may be found at: https://fortress.wa.gov/ecy/publications/summarypages/0610100.html

	Spawning/Rearing/ Migration	Supplemental Criteria
INPUT	**May 16 - Sept 30**	**Oct 1 - May 15**
1. Chronic Dilution Factor at Mixing Zone Boundary	4.2	4.2
2. 7DADMax Ambient Temperature (T) (Upstream Background 90th percentile)	24.0 °C	16.7 °C
3. 7DADMax Effluent Temperature (95th percentile)	23.7 °C	21.8 °C
4. Aquatic Life Temperature WQ Criterion in Fresh Water	17.5 °C	13.0 °C
OUTPUT		
5. Temperature at Chronic Mixing Zone Boundary:	23.9 °C	17.9 °C
6. Incremental Temperature Increase or decrease:	-0.1 °C	1.2 °C
7. Maximum Allowable Incremental Temperature Increase:	0.3 °C	0.3 °C
8. Maximum Allowable Temperature at Mixing Zone Boundary:	24.3 °C	17.0 °C
A. If ambient temp is warmer than WQ criterion		
9. Does temp fall within this warmer temp range?	YES	YES
10. Temperature Limit if Required:	NO LIMIT	0.3
B. If ambient temp is cooler than WQ criterion but within 28/(T_{amb}+7) and within 0.3 °C of the criterion		
11. Does temp fall within this incremental temp. range?	---	---
12. Temp increase allowed at mixing zone boundary, if required:	---	---
C. If ambient temp is cooler than (WQ criterion-0.3) but within 28/(T_{amb}+7) of the criterion		
13. Does temp fall within this Incremental temp. range?	---	---
14. Temp increase allowed at mixing zone boundary, if required:	---	---
D. If ambient temp is cooler than (WQ criterion - 28/(T_{amb}+7))		
15. Does temp fall within this Incremental temp. range?	---	---
16. Temp increase allowed at mixing zone boundary, if required:	---	---
RESULTS		
17. Do any of the above cells show a temp increase?	**NO**	**YES**
18. Temperature Limit if Required?	**NO LIMIT**	**14.0 °C**

Attachment B
Reasonable Potential Calculations
(Based on River pH)

Dilution Factor Calculations and Receiving Water Critical Conditions

Step 1: Enter Waterbody Type

Water Body Type	Freshwater

Facility Name	Centralia WWTP
Receiving Water	Chehalis River

Step 2: Enter Dilution Factors -OR- Calculate DFs by entering Facility/Receiving Water Flow Data

Do you want to enter dilution factors -or- flow data?	Dilution Factors

	Max Dilution Factor Allowed
Aquatic Life - Acute	**1.2**
Aquatic Life - Chronic	**4.2**
HH-Non-Carcinogen	**11.0**
HH-Carcinogen	**37.0**
Whole river at 7Q10	

Step 3: Enter Critical Data

	Effluent	**Receiving Water**
Temp, °C	23.7	27.2
pH, s.u.	7.3	7.97
Alkalinity, mg/L as CaCO3		
Hardness, mg/L CaCO3	85.6	31.2
Salinity, psu		
Receiving water TSS, mg/L (leave blank if unknown)		
If TSS is annual data, enter 'A'; if from critical period, enter 'S'; If no TSS, leave blank		

Step 4: Specifiy if using 'Mixed' values for hardness, temperature, and pH

	Use 'Mixed Hardness' (Y/N)	**Use 'Mixed Max Temp' (Y/N)**	**Use 'Mixed pH (Y/N)**
	Y	Y	N
Acute Zone Boundary	76.5	24.3	
Chronic Zone Boundary	44.2	26.4	
Whole river at 7Q10			

Reasonable Potential Calculation

Facility	Centralia WWTP
Water Body Type	Freshwater
Rec. Water Hardness	Acute=76.5, Chronic=44.2 mg/L

Dilution Factors:	Acute	Chronic
Aquatic Life	1.2	4.2
Human Health Carcinogenic		37.0
Human Health Non-Carcinogenic		11.0

Pollutant, CAS No. & NPDES Application Ref. No.			AMMONIA, Criteria as Total NH3	ANTIMONY (INORGANIC) 7440360 1M	ARSENIC (dissolved) 7440382 2M	BERYLLIUM 7440417 3M	CADMIUM - 7440439 4M Hardness dependent	CHROMIUM(TRI) -16065831 5M Hardness dependent	COPPER - 744058 6M Hardness dependent	LEAD - 7439921 7M Dependent on hardness	MERCURY 7439976 8M	NICKEL - 7440020 9M - Dependent on hardness	SELENIUM 7782492 10M
Effluent Data	# of Samples (n)		267	6	6	6	6	6	40	40	38	6	6
	Coeff of Variation (Cv)		3.1	0.6	0.6	0.6	0.6	0.6	0.5	1.2	1.4	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)		1,176	0.53	0.58	0.07	0.088	0.76	9.24	0.83	0.0053	17	0.401
	Calculated 50th percentile Effluent Conc. (when n>10)								6.12		0.0017		
Receiving Water Data	90th Percentile Conc., ug/L		36		0		0	0	1.23	0.08	0.0014	0	0
	Geo Mean, ug/L			0					0.77		0.0006	0	0
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	5,941	-	360	-	2.77073	440.797	13.226	48.21	2.1	1128.8	20
		Chronic	589	-	190	-	0.56304	91.1275	5.64473	1.0228	0.012	78.716	5
	WQ Criteria for Protection of Human Health, ug/L		-	6	-	-	-	-	1300	-	0.14	80	60
	Metal Criteria Translator, decimal	Acute	-	-	1	-	0.943	0.316	0.996	0.466	0.85	0.998	-
		Chronic	-	-	1	-	0.943	0.86	0.996	0.466	-	0.997	-
	Carcinogen?		N	N	Y	Y	N	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	0.950
s	$s^2=\ln(CV^2+1)$		1.537	0.555	0.555	0.555	0.472	0.944	1.042	0.555	0.555
Pn	$Pn=(1\text{-confidence level})^{1/n}$		0.989	0.607	0.607	0.607	0.928	0.928	0.924	0.607	0.607
Multiplier			1.00	2.14	2.14	2.14	1.00	1.00	1.00	2.14	2.14
Max concentration (ug/L) at edge of…		Acute	986	1.035	0.148	0.429	7.874	0.336	0.004	30.280	0.716
		Chronic	307	0.296	0.042	0.333	3.128	0.153	0.002	8.643	0.204
Reasonable Potential? Limit Required?			**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Aquatic Life Limit Calculation

# of Compliance Samples Expected per month		
LTA Coeff. Var. (CV), decimal		
Permit Limit Coeff. Var. (CV), decimal		
Waste Load Allocations, ug/L	Acute	
	Chronic	
Long Term Averages, ug/L	Acute	
	Chronic	
Limiting LTA, ug/L		
Metal Translator or 1?		
Average Monthly Limit (AML), ug/L		
Maximum Daily Limit (MDL), ug/L		

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$	0.55451	0.47238	1.0417	0.5545	0.5545
Pn	$Pn=(1\text{-confidence level})1/n$	0.607	0.928	0.924	0.607	0.607
Multiplier		0.86028	0.50176	0.2245	0.8603	0.8603
Dilution Factor		11	11	11	11	11
Max Conc. at edge of Chronic Zone, ug/L		0.04145	1.3E+00	0.0007	1.3295	0.0314
Reasonable Potential? Limit Required?		**NO**	**NO**	**NO**	**NO**	**NO**

Human Health Limit Calculation

# of Compliance Samples Expected per month	
Average Monthly Effluent Limit, ug/L	
Maximum Daily Effluent Limit, ug/L	

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

Reasonable Potential Calculation - Page 2

Facility	Centralia WWTP
Water Body Type	Freshwater
Rec. Water Hardness	Acute=76.5, Chronic=44.2 mg/L

Dilution Factors:	Acute	Chronic
Aquatic Life	1.2	4.2
Human Health Carcinogenic		37.0
Human Health Non-Carcinogenic		11.0

Pollutant, CAS No. & NPDES Application Ref. No.			SILVER - 7740224 11M dependent on hardness.	THALLIUM 7440280 12M	ZINC- 7440666 13M hardness dependent	CYANIDE 57125 14M	NITRATE/NITRITE (N)	METHYLENE CHLORIDE 75092 22V	PHENOL 108952 10A	BIS(2-ETHYLHEXYL) PHTHALATE 117817 13B	BENZIDINE 92875 4B	ALDRIN 309002 1P	HEPTACHLOR 76448 16P
Effluent Data	# of Samples (n)		38	4	40	6	35	6	6	5	1	1	1
	Coeff of Variation (Cv)		0.7	0.6	0.4	0.6	0.2	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)		0.03	0.064	79.4	12		4.1	0.995	10	0.024	0.0028	0.0037
	Calculated 50th percentile Effluent Conc. (when n>10)				59.7		23000						
Receiving Water Data	90th Percentile Conc., ug/L		0.0125		3.2	0						0	0
	Geo Mean, ug/L			0	3.2	0	225	0	0	0	0	0	0
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	2.1779	-	91.2415	22	-	-	-	-	-	2.5	0.52
		Chronic	-	-	52.2779	5.2	-	-	-	-	-	0.0019	0.0038
	WQ Criteria for Protection of Human Health, ug/L		-	1.7	1000	9	10000	10	9000	0.045	2E-05	4E-08	3E-07
	Metal Criteria Translator, decimal	Acute	0.85	-	0.996	-	-	-	-	-	-	-	-
		Chronic	-	-	0.996	-	-	-	-	-	-	-	-
	Carcinogen?		N	N	N	N	N	Y	N	Y	Y	Y	Y

Aquatic Life Reasonable Potential

Effluent percentile value			0.950		0.950	0.950				0.950	0.950
s	$s^2=\ln(CV^2+1)$		0.631		0.385	0.555				0.555	0.555
Pn	$Pn=(1\text{-confidence level})^{1/n}$		0.924		0.928	0.607				0.050	0.050
Multiplier			1.00		1.00	2.14				6.20	6.20
Max concentration (ug/L) at edge of…		Acute	0.023		66.435	21.417				0.014	0.019
		Chronic	0.017		21.267	6.119				0.004	0.005
Reasonable Potential? Limit Required?			**NO**		**NO**	**YES**				**YES**	**YES**

Aquatic Life Limit Calculation

# of Compliance Samples Expected per month											
LTA Coeff. Var. (CV), decimal						0.6				0.6	0.6
Permit Limit Coeff. Var. (CV), decimal						0.6				0.6	0.6
Waste Load Allocations, ug/L		Acute				26.4				3	0.624
		Chronic				21.84				0.008	0.016
Long Term Averages, ug/L		Acute				8.4766				0.9632	0.2004
		Chronic				11.519				0.0042	0.0084
Limiting LTA, ug/L						8.4766				0.0042	0.0084
Metal Translator or 1?						1.00				1.00	1.00
Average Monthly Limit (AML), ug/L						**#DIV/0!**				**#DIV/0!**	**#DIV/0!**
Maximum Daily Limit (MDL), ug/L						**26.4**				**0.0**	**0.0**

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$	0.55451	0.38525	0.5545	0.19804	0.55451	0.55451	0.5545	0.5545	0.5545	0.5545
Pn	$Pn=(1\text{-confidence level})1/n$	0.473	0.928	0.607	0.918	0.607	0.607	0.549	0.050	0.050	0.050
Multiplier		1.03846	0.56982	0.8603	0.75913	0.86028	0.86028	0.9336	2.4895	2.4895	2.4895
Dilution Factor		11	11	11	11	37	11	37	37	37	37
Max Conc. at edge of Chronic Zone, ug/L		0.00604	8.33636	0.9385	2295.45	9.5E-02	7.8E-02	0.2523	0.0016	0.0002	0.0002
Reasonable Potential? Limit Required?		**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**YES**	**YES**	**YES**	**YES**

Human Health Limit Calculation

# of Compliance Samples Expected per month											
Average Monthly Effluent Limit, ug/L								**1.665**	**0.0007**	**2E-06**	**1E-05**
Maximum Daily Effluent Limit, ug/L								**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**

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

Reasonable Potential Calculation - Page 3

Facility	Centralia WWTP
Water Body Type	Freshwater
Rec. Water Hardness	Acute=76.5, Chronic=44.2 mg/L

Dilution Factors:	Acute	Chronic
Aquatic Life	1.2	4.2
Human Health Carcinogenic		37.0
Human Health Non-Carcinogenic		11.0

Pollutant, CAS No. & NPDES Application Ref. No.		HEXACHLOROBENZENE 118741 33B	PENTACHLOROPHENOL 87865 9A (pH dependent in freshwater)	BENZO(a)ANTHRACENE 56553 5B	3,3 DICHLOROBENZIDINE 91941 23B	CHRYSENE 218019 18B	BENZO(b)FLUORANTHENE 205992 7B	BENZO(a)PYRENE 50328 6B	INDENO(1,2,3-cd)PYRENE 193395 37B	DIBENZO(a,h)ANTHRACENE 53703 19B	ACRYLONITRILE 107131 2V	NITROSODIMETHYLAMINE N 62759 41B
Effluent Data	# of Samples (n)	1	1	1	1	1	1	1	1	1	1	1
	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)	0.0115	0.022	0.0075	0.0135	0.011	0.009	0.0105	0.01	0.0085	0.25	0.0044
	Calculated 50th percentile Effluent Conc. (when n>10)		0.022									
Receiving Water Data	90th Percentile Conc., ug/L		0									
	Geo Mean, ug/L	0	0	0	0	0	0	0	0	0	0	0
Water Quality Criteria	Aquatic Life Criteria, ug/L — Acute	-	24.0431	-	-	-	-	-	-	-	-	-
	Aquatic Life Criteria, ug/L — Chronic	-	15.178	-	-	-	-	-	-	-	-	-
	WQ Criteria for Protection of Human Health, ug/L	5E-06	0.002	0.00016	0.0031	0.016	0.00016	1.6E-05	0.0002	2E-05	0.019	0.0007
	Metal Criteria Translator, decimal — Acute	-	-	-	-	-	-	-	-	-	-	-
	Metal Criteria Translator, decimal — Chronic	-	-	-	-	-	-	-	-	-	-	-
	Carcinogen?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Aquatic Life Reasonable Potential

Effluent percentile value			0.950									
s	$s^2=\ln(CV^2+1)$		0.555									
Pn	$Pn=(1\text{-confidence level})^{1/n}$		0.050									
Multiplier			6.20									
Max concentration (ug/L) at edge of…		Acute	0.114									
		Chronic	0.032									
Reasonable Potential? Limit Required?			**NO**									

Aquatic Life Limit Calculation

# of Compliance Samples Expected per month												
LTA Coeff. Var. (CV), decimal												
Permit Limit Coeff. Var. (CV), decimal												
Waste Load Allocations, ug/L		Acute										
		Chronic										
Long Term Averages, ug/L		Acute										
		Chronic										
Limiting LTA, ug/L												
Metal Translator or 1?												
Average Monthly Limit (AML), ug/L												
Maximum Daily Limit (MDL), ug/L												

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$	0.5545	0.55451	0.55451	0.5545	0.55451	0.55451	0.55451	0.5545	0.5545	0.5545	0.5545
Pn	$Pn=(1\text{-confidence level})1/n$	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Multiplier		2.4895	2.48953	2.48953	2.4895	2.48953	2.48953	2.48953	2.4895	2.4895	2.4895	2.4895
Dilution Factor		37	37	37	37	37	37	37	37	37	37	37
Max Conc. at edge of Chronic Zone, ug/L		0.0008	0.00059	0.0005	0.0009	0.00074	6.1E-04	7.1E-04	0.0007	0.0006	0.0168	0.0003
Reasonable Potential? Limit Required?		**YES**	**NO**	**YES**	**NO**	**NO**	**YES**	**YES**	**YES**	**YES**	**NO**	**NO**

Human Health Limit Calculation

# of Compliance Samples Expected per month										
Average Monthly Effluent Limit, ug/L	**0.0002**		**0.00592**		**0.00592**	**0.00059**	**0.0059**	**0.0006**		
Maximum Daily Effluent Limit, ug/L	**#DIV/0!**		**#DIV/0!**		**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**		

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

Reasonable Potential Calculation - Page 4

Facility	Centralia WWTP
Water Body Type	Freshwater
Rec. Water Hardness	Acute=76.5, Chronic=44.2 mg/L

Dilution Factors:	Acute	Chronic
Aquatic Life	1.2	4.2
Human Health Carcinogenic		37.0
Human Health Non-Carcinogenic		11.0

Pollutant, CAS No. & NPDES Application Ref. No.			BIS(2-CHLOROETHYL)ETHER 111444 11B	N- NITROSODI-N-PROPYLAMINE 621647 42B	DDT 50293 7P	DDT METABOLITE (DDE) 72559 8P	DDT METABOLITE (DDD) 72548 9P	CHLORDANE 57749 6P	BHC - ALPHA 319846 2P	BHC - BETA 319857 3P	BHC - DELTA 319868 5P	HEPTACHLOR EPOXIDE 1024573 17P	TOXAPHENE 8001352 25P
Effluent Data	# of Samples (n)		1	1	1	1	1	1	1	1	1	1	1
	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)		0.0185	0.012	0.007	0.0036	0.00037	0.0025	0.0025	0.0041	0.0028	0.0036	0.175
	Calculated 50th percentile Effluent Conc. (when n>10)												
Receiving Water Data	90th Percentile Conc., ug/L		0	0	0	0	0	0				0	0
	Geo Mean, ug/L		0	0	0	0	0	0	0	0		0	0
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	-	-	1.1	1.1	1.1	2.4	-	-	-	0.52	0.73
		Chronic	-	-	0.001	0.001	0.001	0.043	ane-Alpha	ane-Beta	-	0.0038	0.0002
	WQ Criteria for Protection of Human Health, ug/L		0.02	0.0044	1.2E-06	9E-07	7.9E-06	2.2E-05	4.8E-05	0.0013	-	2E-06	3E-05
	Metal Criteria Translator, decimal	Acute	-	-	-	-	-	-	-	-	-	-	-
		Chronic	-	-	-	-	-	-	-	-	-	-	-
	Carcinogen?		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Aquatic Life Reasonable Potential

Effluent percentile value				0.950	0.950	0.950	0.950	0.950	0.950		0.950	0.950
s	$s^2=\ln(CV^2+1)$			0.555	0.555	0.555	0.555	0.555	0.555		0.555	0.555
Pn	$Pn=(1\text{-confidence level})^{1/n}$			0.050	0.050	0.050	0.050	0.050	0.050		0.050	0.050
Multiplier				6.20	6.20	6.20	6.20	6.20	6.20		6.20	6.20
Max concentration (ug/L) at edge of…		Acute		0.036	0.018	0.002	0.013	0.013	0.021		0.018	0.904
		Chronic		0.010	0.005	0.001	0.004	0.004	0.006		0.005	0.258
Reasonable Potential? Limit Required?				**YES**	**YES**	**NO**	**NO**	**#VALUE!**	**######**		**YES**	**YES**

Aquatic Life Limit Calculation

# of Compliance Samples Expected per month												
LTA Coeff. Var. (CV), decimal				0.6	0.6						0.6	0.6
Permit Limit Coeff. Var. (CV), decimal				0.6	0.6						0.6	0.6
Waste Load Allocations, ug/L		Acute		1.32	1.32						0.624	0.876
		Chronic		0.0042	0.0042						0.016	0.0008
Long Term Averages, ug/L		Acute		0.42383	0.4238						0.2004	0.2813
		Chronic		0.00222	0.0022						0.0084	0.0004
Limiting LTA, ug/L				0.00222	0.0022						0.0084	0.0004
Metal Translator or 1?				1.00	1.00						1.00	1.00
Average Monthly Limit (AML), ug/L				**#DIV/0!**	**#DIV/0!**						**#DIV/0!**	**#DIV/0!**
Maximum Daily Limit (MDL), ug/L				**0.0**	**0.0**						**0.0**	**0.0**

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$	0.5545	0.55451	0.55451	0.5545	0.55451	0.55451	0.55451	0.5545		0.5545	0.5545
Pn	$Pn=(1\text{-confidence level})1/n$	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050		0.050	0.050
Multiplier		2.4895	2.48953	2.48953	2.4895	2.48953	2.48953	2.48953	2.4895		2.4895	2.4895
Dilution Factor		37	37	37	37	37	37	37	37		37	37
Max Conc. at edge of Chronic Zone, ug/L		0.0012	0.00081	0.00047	0.0002	2.5E-05	1.7E-04	1.7E-04	0.0003		0.0002	0.0118
Reasonable Potential? Limit Required?		**NO**	**NO**	**YES**	**YES**	**YES**	**YES**	**YES**	**NO**		**YES**	**YES**

Human Health Limit Calculation

# of Compliance Samples Expected per month											
Average Monthly Effluent Limit, ug/L			**4.4E-05**	**3E-05**	**0.00029**	**0.00081**	**0.00178**			**9E-05**	**0.0012**
Maximum Daily Effluent Limit, ug/L			**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**			**#DIV/0!**	**#DIV/0!**

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

Reasonable Potential Calculation - Page 5

Facility	Centralia WWTP
Water Body Type	Freshwater
Rec. Water Hardness	Acute=76.5, Chronic=44.2 mg/L

Dilution Factors:	**Acute**	**Chronic**
Aquatic Life	1.2	4.2
Human Health Carcinogenic		37.0
Human Health Non-Carcinogenic		11.0

Pollutant, CAS No. & NPDES Application Ref. No.		BENZO(k) FLUORANTHENE 207089 9B	ENDRIN 72208 14P	ENDRIN ALDEHYDE 7421934 15P	DIELDRIN 60571 10P	BENZO(k) FLUORANTHENE 207089 9B	ENDOSULFAN SULFATE 1031078 13P	BHC - GAMMA 58899 4P (Lindane)	2-CHLOROPHENOL 95578 1A	1,3 DICHLOROBENZENE 541731 21B	1,4 DICHLOROBENZENE 106467 22B	1,2 DICHLOROBENZENE 95501 20B
Effluent Data	# of Samples (n)	1	1	1	1	1	1	1	1	1	1	1
	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)	0.01	0.0037	0.00415	0.003	0.01	0.00275	0.00325	0.014	0.0145	0.0145	0.0165
	Calculated 50th percentile Effluent Conc. (when n>10)											
Receiving Water Data	90th Percentile Conc., ug/L	0	0	0	0	0	0		0	0	0	0
	Geo Mean, ug/L	0	0	0	0	0	0	0	0	0	0	0
Water Quality Criteria	Aquatic Life Criteria, ug/L — Acute	-	0.18	-	2.5	-	-	-	-	-	-	-
	Aquatic Life Criteria, ug/L — Chronic	-	0.0023	-	0.0019	-	-	ı (lindane)	-	-	-	-
	WQ Criteria for Protection of Human Health, ug/L	0.0016	0.002	0.034	7E-08	0.0016	9	0.43	15	2	200	700
	Metal Criteria Translator, decimal — Acute	-	-	-	-	-	-	-	-	-	-	-
	Metal Criteria Translator, decimal — Chronic	-	-	-	-	-	-	-	-	-	-	-
	Carcinogen?	Y	N	N	Y	Y	N	Y	N	N	N	N

Aquatic Life Reasonable Potential

Effluent percentile value			0.950		0.950			0.950				
s	$s^2=\ln(CV^2+1)$		0.555		0.555			0.555				
Pn	$Pn=(1\text{-confidence level})^{1/n}$		0.050		0.050			0.050				
Multiplier			6.20		6.20			6.20				
Max concentration (ug/L) at edge of…		Acute	0.019		0.015			0.017				
		Chronic	0.005		0.004			0.005				
Reasonable Potential? Limit Required?			**YES**		**YES**			**#VALUE!**				

Aquatic Life Limit Calculation

# of Compliance Samples Expected per month												
LTA Coeff. Var. (CV), decimal			0.6		0.6							
Permit Limit Coeff. Var. (CV), decimal			0.6		0.6							
Waste Load Allocations, ug/L		Acute	0.216		3							
		Chronic	0.00966		0.008							
Long Term Averages, ug/L		Acute	0.06935		0.9632							
		Chronic	0.0051		0.0042							
Limiting LTA, ug/L			0.0051		0.0042							
Metal Translator or 1?			1.00		1.00							
Average Monthly Limit (AML), ug/L			**#DIV/0!**		**#DIV/0!**							
Maximum Daily Limit (MDL), ug/L			**0.0**		**0.0**							

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$	0.5545	0.55451	0.55451	0.5545	0.55451	0.55451	0.55451	0.5545	0.5545	0.5545	0.5545
Pn	$Pn=(1\text{-confidence level})1/n$	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Multiplier		2.4895	2.48953	2.48953	2.4895	2.48953	2.48953	2.48953	2.4895	2.4895	2.4895	2.4895
Dilution Factor		37	11	11	37	37	11	37	11	11	11	11
Max Conc. at edge of Chronic Zone, ug/L		0.0007	0.00084	0.00094	0.0002	0.00067	6.2E-04	2.2E-04	0.0032	0.0033	0.0033	0.0037
Reasonable Potential? Limit Required?		**NO**	**NO**	**NO**	**YES**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Human Health Limit Calculation

# of Compliance Samples Expected per month					33							
Average Monthly Effluent Limit, ug/L					**3E-06**							
Maximum Daily Effluent Limit, ug/L					**7E-06**							

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

Reasonable Potential Calculation - Page 6

Facility	Centralia WWTP
Water Body Type	Freshwater
Rec. Water Hardness	Acute=76.5, Chronic=44.2 mg/L

Dilution Factors:	Acute	Chronic
Aquatic Life	1.2	4.2
Human Health Carcinogenic		37.0
Human Health Non-Carcinogenic		11.0

Pollutant, CAS No. & NPDES Application Ref. No.			CHLOROISOPROPYL ETHER (BIS-2) 108601	HEXACHLOROETHANE 67721 36B	TRICHLOROBENZENE 1,2,4 120821 46B	HEXACHLOROBUTADIENE 87683 34B	BUTYLBENZYL PHTHALATE 85687 15B	3,3 DICHLOROBENZIDINE 91941 23B					
Effluent Data	# of Samples (n)		1	1	1	1	1	1					
	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)		0.0175	0.0105	0.018	0.0055	0.0225	0.0135					
	Calculated 50th percentile Effluent Conc. (when n>10)												
Receiving Water Data	90th Percentile Conc., ug/L			0	0	0	0	0					
	Geo Mean, ug/L		0	0	0	0	0	0					
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	-	-	-	-	-	-					
		Chronic	yl) Ether	-	-	-	-	-					
	WQ Criteria for Protection of Human Health, ug/L		400	0.02	0.036	0.01	0.013	0.0031					
	Metal Criteria Translator, decimal	Acute	-	-	-	-	-	-					
		Chronic	-	-	-	-	-	-					
	Carcinogen?		N	Y	-	Y	N	Y					

Aquatic Life Reasonable Potential

Effluent percentile value			0.950
s	$s^2=\ln(CV^2+1)$		0.555
Pn	$Pn=(1\text{-confidence level})^{1/n}$		0.050
Multiplier			6.20
Max concentration (ug/L) at edge of…		Acute	0.090
		Chronic	0.026
Reasonable Potential? Limit Required?			######

Aquatic Life Limit Calculation

# of Compliance Samples Expected per month		
LTA Coeff. Var. (CV), decimal		
Permit Limit Coeff. Var. (CV), decimal		
Waste Load Allocations, ug/L	Acute	
	Chronic	
Long Term Averages, ug/L	Acute	
	Chronic	
Limiting LTA, ug/L		
Metal Translator or 1?		
Average Monthly Limit (AML), ug/L		
Maximum Daily Limit (MDL), ug/L		

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$	0.5545	0.55451	0.55451	0.5545	0.55451	0.55451
Pn	$Pn=(1\text{-confidence level})1/n$	0.050	0.050	0.050	0.050	0.050	0.050
Multiplier		2.4895	2.48953	2.48953	2.4895	2.48953	2.48953
Dilution Factor		11	37	37	37	11	37
Max Conc. at edge of Chronic Zone, ug/L		0.004	0.00071	0.00121	0.0004	0.00509	9.1E-04
Reasonable Potential? Limit Required?		**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Human Health Limit Calculation

# of Compliance Samples Expected per month	
Average Monthly Effluent Limit, ug/L	
Maximum Daily Effluent Limit, ug/L	

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

Freshwater Temperature Reasonable Potential and Limit Calculation

Based on WAC 173-201A-200(1)(c)(i)--(ii) and the Water Quality Program Guidance. All data inputs must meet WQ guidelines. The Water Quality temperature guidance document may be found at: https://fortress.wa.gov/ecy/publications/summarypages/0610100.html

	Spawning/Rearing/ Migration	Supplemental Criteria
INPUT	May 16 - Sept 30	Oct 1 - May 15
1. Chronic Dilution Factor at Mixing Zone Boundary	4.2	4.2
2. 7DADMax Ambient Temperature (T) (Upstream Background 90th percentile)	24.0 °C	16.7 °C
3. 7DADMax Effluent Temperature (95th percentile)	23.7 °C	21.8 °C
4. Aquatic Life Temperature WQ Criterion in Fresh Water	17.5 °C	13.0 °C
OUTPUT		
5. Temperature at Chronic Mixing Zone Boundary:	23.9 °C	17.9 °C
6. Incremental Temperature Increase or decrease:	-0.1 °C	1.2 °C
7. Maximum Allowable Incremental Temperature Increase:	0.3 °C	0.3 °C
8. Maximum Allowable Temperature at Mixing Zone Boundary:	24.3 °C	17.0 °C
A. If ambient temp is warmer than WQ criterion		
9. Does temp fall within this warmer temp range?	YES	YES
10. Temperature Limit if Required:	NO LIMIT	0.3
B. If ambient temp is cooler than WQ criterion but within 28/(T_{amb}+7) and within 0.3 °C of the criterion		
11. Does temp fall within this incremental temp. range?	---	---
12. Temp increase allowed at mixing zone boundary, if required:	---	---
C. If ambient temp is cooler than (WQ criterion-0.3) but within 28/(T_{amb}+7) of the criterion		
13. Does temp fall within this Incremental temp. range?	---	---
14. Temp increase allowed at mixing zone boundary, if required:	---	---
D. If ambient temp is cooler than (WQ criterion - 28/(T_{amb}+7))		
15. Does temp fall within this Incremental temp. range?	---	---
16. Temp increase allowed at mixing zone boundary, if required:	---	---
RESULTS		
17. Do any of the above cells show a temp increase?	**NO**	**YES**
18. Temperature Limit if Required?	**NO LIMIT**	**14.0 °C**

Appendix K
Plant Capacity Analysis

Appendix K
Plant Process Calculations

The following plant process Excel calculations for Phase II WWTP Improvements are included on the enclosed CD.

- Phase II expansion under WWMM conditions
- Phase II expansion under DWMM conditions
- Phase II expansion under WWMM conditions and minimum 7-day temperature
- Phase II expansion under WWMM conditions and minimum 30-day temperature
- Phase II expansion under WWMM conditions and minimum day temperature
- Phase II expansion with nutrient removal

Appendix L
City of Centralia Sewer Service Ordinance and Grinder Pump Agreement

Chapter 15.10
SEWER SERVICE

Sections:

15.10.010 Acronyms.
15.10.020 Definitions.
15.10.030 User charges.
15.10.040 Domestic user—Definition—Categories.
15.10.050 Domestic users—User charges.
15.10.060 Domestic-strength commercial/ industrial users—Definitions—Application of charge formula.
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15.10.080 Collection of user charge—Delinquency—Penalties—Shut-off.
15.10.090 Implementation of user charge system.
15.10.100 Use of public sewers required.
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15.10.010 Acronyms.

“AKART” means all known, available, and reasonable methods (prevention, control, and treatment) to prevent and control pollution of the waters of the state of Washington. (Chapter 90.48 RCW.) AKART shall represent the most current methodology that can be reasonably required for preventing, controlling, or abating the pollutants associated with a discharge. AKART shall be applied by all users of the POTW. AKART includes best management practices and may be required by the utilities director for any discharge to the POTW.

“ANSI” means the American National Standards Institute.

“ASTM” means the American Society for Testing and Materials.

“BOD” means biochemical oxygen demand as defined in CMC 15.10.020.

“DOE” or “Ecology” means the Washington State Department of Ecology.

“EPA” means U.S. Environmental Protection Agency.

“ERU” means equivalent residential unit as defined under “normal domestic waste” in CMC 15.10.020.

“FIFRA” means the Federal Insecticide Fungicide Rodenticide Act.

“FOG” means fats, oils and grease.

“NPDES” means the National Pollutant Discharge Elimination System.

“POTW” means publicly owned treatment works as defined in CMC 15.10.020.

“PVC” means polyvinyl chloride.

“RCRA” means the Resource Conservation and Recovery Act.

“RCW” means Revised Code of Washington.

“SDR” means standard dimension ratios.

“SIC” means Standard Industrial Classification.

“SNC” means significant noncompliance as defined in CMC 15.10.020.

“STEP” means septic tank effluent pumping.

“TKN” means total kjeldahl nitrogen as defined in CMC 15.10.020.

“TRC” means technical review criteria as defined in CMC 15.10.020.

“TSCA” means the Toxic Substances Control Act.

“TSS” means total suspended solids as defined in CMC 15.10.020.

“SWDA” means the Solid Waste Disposal Act.

“WAC” means the Washington Administrative Code. (Ord. 2148 § 2, 2005: Ord. 2051 § 1 (part), 2000).

15.10.020 Definitions.

For the purpose of this chapter the words set out in this section shall have the following meanings:

“Act” means the Federal Water Pollution Control Act, also known as the Clean Water Act (33 USC 1251 et seq.), as amended.

“Administrative authority” means the public works director of the city of Centralia or his/her designee.

“Alternative sewer systems” shall mean STEP systems, vacuum sewers, and grinder pump low-pressure sewer systems.

“Applicable pretreatment standards” means for any specified pollutant: the more stringent of the city of Centralia prohibitive standards, state of Washington pretreatment standards, or applicable National Categorical Pretreatment Standards.

“Authorized representative of the user”:

1. If the user is a corporation: the president, secretary, treasurer, or a 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

2. If the user is a partnership or sole proprietorship: a general partner or proprietor, respectively; or

3. If the user is a federal, state, or local governmental facility: a director or highest official appointed or designated to oversee the operation and performance of the activities of the government facility, or his/her designee.

4. The individuals described in subsections (1) through (3) of this definition may designate another authorized representative if the authorization is in writing, the

authorization specifies the individual or position responsible for the overall operation of the facility from which the discharge originates or having overall responsibility for environmental matters for the company, and the written authorization is submitted to the city of Centralia.

“Biochemical oxygen demand (BOD)” means the quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedures during five days at twenty degrees centigrade, usually expressed as a concentration (milligrams per liter (mg/l)).

“Building drain” means that part of the lowest piping of a drainage system which receives the discharge from waste and other drainage pipes inside the walls of the building and conveys it to the side sewer beginning three feet outside the building wall.

“Bypass” means the intentional diversion of waste streams from any portion of a user’s treatment facility.

“Capital costs” means all costs incurred as a result of planning, permitting, design or construction of the wastewater collection or treatment facilities.

“Categorical pretreatment standard or categorical standard” means any regulation containing pollutant discharge limits promulgated by EPA in accordance with Section 307(b) and (c) of the Act (33 USC 1317) which applies to a specific category of users and which appears in 40 CFR Chapter I, Subchapter N, Parts 405—471.

“Categorical user” means a user covered by one or more categorical standards as defined herein.

“Centralia urban region” means the city of Centralia and that portion of Lewis County outside the Centralia corporate city limits that will be served by the Centralia wastewater treatment facility, shown in Figure 2-3 of the 1999 Facility Plan as now in existence or hereinafter amended.

“City” means the city of Centralia.

“City council” means the governing body of the city of Centralia.

“Combined business-residential user” means any user whose plumbing facilities serve both a domestic user and a commercial user.

“Commercial user” means any nonresidential customer who engages in business activities or combination of business and residential activities if combined through a single-meter service.

“Cooling water” means water used for cooling purposes generated from any use, such as air conditioning, heat exchangers, cooling or refrigeration. For purposes of this chapter, such waters are further divided into two subcategories:

1. Uncontaminated: water to which the only pollutant added is heat, which has no direct contact with any raw material, waste, intermediate, or final product, and which does not contain a level of contaminants detectably higher than that of the intake water.

2. Contaminated: water likely to contain levels of pollutants detectably higher than intake water. This includes water contaminated through any means, including chemicals added for water treatment, corrosion inhibition, or biocides, or by direct contact with any process materials, products, and/or wastewater.

“Color” means the optical density at the visual wave length of maximum absorption, relative to distilled water. One hundred percent transmittance is equivalent to zero optical density.

“Composite sample” means the sample resulting from the combination of individual wastewater samples taken at selected intervals based on an increment of either flow or time.

“County” means Lewis County or any other county in which the city’s wastewater facilities are located.

“Customer” (synonymous with user) means each person, business, property owner, sewer user, other entity separately billed by the city for the use or availability of public sewers in the Centralia sanitary sewer service area.

“Department of Ecology (DOE)” means the Washington State Department of Ecology or authorized representatives thereof.

“Domestic user” means any person who contributes, causes, or allows the discharge of wastewater into the city of Centralia’s POTW that is similar in volume and/or chemical make-up to domestic wastewater. For comparison, the utilities director may assume discharges of domestic wastewater from dwelling units to be one hundred gallons containing 0.2 pounds (three hundred mg/l) of BOD, 0.2 pounds (three hundred mg/l) of TSS and 0.024 pounds (24 mg/l) of TKN per capita per day, or as identified in the design of the POTW.

“Domestic wastewater” means wastewater from residential kitchens, bathrooms, and laundries, and water borne human wastes from sanitary facilities in all other buildings, together with such groundwater infiltration or surface waters as may be present.

“Environmental Protection Agency (EPA)” means the U.S. Environmental Protection Agency or, where appropriate, the regional water management division director, or other duly authorized official of the agency.

“Enzyme” means any complex chemical produced by living cells that is a biochemical catalyst.

“Explosion meter” means an electrical device that measures air quality for flammable or explosive gases.

“Facility plan” means a report titled “City of Centralia Wastewater Facilities Plan,” 1999, CH2M Hill as the same now exists or hereafter amended.

“Grab sample or discrete sample” means a sample which is taken from a waste stream on a one-time basis without regard to the flow in the waste stream and without consideration of time.

“Grinder pump systems” means low pressure sewer systems designed to grind or macerate the materials in the domestic sewage discharged from a residential or commercial/industrial customer and pump it to the existing gravity sanitary sewer system. The system includes all tanks, pumps, valves, control systems, and the low-pressure force main pipe conveying the sewage to the gravity sewer.

“Health department” means the Lewis County environmental health department.

“Income,” as used herein, means gross income as defined in Section 61(a) of the Internal Revenue Code of 1954, as now in effect or hereafter amended, plus any and all social security retirement and/or disability payments, Veterans Administration retirement and/or disability payments, Railroad Retirement Board pension and/or disability payments, and payments received from any other public or private pension, retirement, profit-sharing and disability plans, and unemployment compensation.

“Indirect discharge or discharge” means the introduction of pollutants into the POTW from any nondomestic source regulated under Section 307(b), (c), or (d) of the Act. The discharge into the POTW is normally by means of pipes, conduits, pumping stations, force mains, constructed drainage ditches, surface water intercepting ditches, and all constructed devices and appliances appurtenant thereto.

“Industrial user” means any nonresidential user whose wastewater results from any process or activity conducted by that user. Such wastewater includes contaminated wash water or leachate from solid waste facilities that may enter the wastewater utility collection system.

“Industrial wastewater” means water or liquid-carried waste from any industry, manufacturing operation, trade, or business which includes any combination of process wastewater, cooling water, contaminated stormwater, contaminated leachates, or other waters such that the combined effluent differs in some way from purely domestic wastewater, or is subject to regulation under the Federal Categorical Pretreatment Standards, the State Waste Discharge Permit program, or this chapter.

“Interference” means the effect of a discharge or discharges on the POTW from one or more users which results in either: (1) inhibition or disruption of the POTW, its treatment processes or operations, or its sludge processes, use or disposal; (2) violation of any permit regulating the city of Centralia wastewater discharge or sewage sludge; or (3) prevention of sewage sludge use or disposal in compliance with any applicable statutory or regulatory provision or permit issued thereunder. (Application sludge regulations shall include Section 405 of the Clean Water Act (33 USC 1345 et seq.); the Solid Waste Disposal Act (SWDA), including Title II commonly referred to as the Resource Conservation and Recovery Act (RCRA) (42 USC 6901 et seq.); state regulations contained in any state sludge management plan prepared pursuant to Subtitle D of the SWDA; the Clean Air Act (42 USC 7401 et seq.); the Toxic Substances Control Act (TSCA) (15 USC 2601 et seq.); the Marine Protection, Research, and Sanctuaries Act (33 USC et seq.); and 40 CFR Part 503).

“Low-income senior citizen user” shall be defined as sixty-two years of age or older and whose total income, including that of his or her spouse or cotenant, does not exceed the amount specified in RCW 84.36.381(5)(b)(ii) as the same now exists or is hereafter amended.

“Low-income totally disabled user” shall be defined as any person who has been classified as totally disabled by the Social Security Administration and whose total income does not exceed the amount provided for low-income senior citizen users.

“Maximum daily concentration allowed” means the maximum concentration of a pollutant allowed to be discharged at any time, determined from the analysis of any discrete or composited sample collected, independent of the industrial flow rate and the duration of the sampling event.

“Medical wastes” means isolation wastes, infectious agents, human blood and blood products or byproducts, pathological wastes, sharps, body parts, fomites, etiology agents, contaminated bedding, surgical wastes, potentially contaminated laboratory wastes, and dialysis wastes.

“National Pollutant Discharge Elimination System (NPDES)” as defined under Section 402 of the Clean Water Act.

“New source” means:

1. Any facility constructed after proposed categorical standards applicable to operations conducted at the facility where published, provided the facility is or may be a source of discharge to the POTW, and:

a. The building, structure, facility, or installation is constructed at a site at which no other source is located; or

b. The new construction totally replaces the process or production equipment that causes the discharge of pollutants at an existing source; or

c. Construction of a new source as defined under this paragraph has commenced if the owner or operation has either: (i) begun, or caused to begin any placement, assembly, or installation of facilities or equipment; (ii) begun, or caused to begin significant site preparation work including removal of existing facilities necessary for the emplacement of new source facilities or equipment; or (iii) entered into a binding contractual obligation for the purchase of facilities or equipment for use in operation of a new source.

“New user” means any noncategorical user that plans to discharge a new source of wastewater to the city of Centralia’s collection system after the effective date of the ordinance codified in this chapter. This discharge may be from either a new or an existing facility. Any person that buys an existing facility discharging nondomestic wastewater will be considered an “existing user” if no significant changes in facility operation are made and wastewater characteristics are not expected to change.

“Normal domestic waste” means one hundred gpd/c containing less than three hundred mg/l BOD and TSS, twenty-four mg/l TKN, one hundred mg/l FOG.

“Overhead” means all costs and expenses, including administrative overhead and equipment replacement, chargeable directly to the operation and maintenance of the wastewater treatment and collection facilities.

“Pass through” means a condition occurring when discharges from users, (singly or in combination), exit the POTW in quantities or concentrations which either: (1) cause a violation of any requirement of the city of Centralia’s NPDES or state waste discharge permit; (2) cause an increase in the magnitude or duration of a violation; or (3) cause a violation of any water quality standard for waters in the state promulgated under state regulations including Chapter 173-201A WAC.

“Permittee” means any person or user issued a wastewater discharge permit by EPA, DOE or the city.

“Person” means any individual, partnership, firm, company, corporation, association, joint stock company, trust, estate, any federal, state, or local governmental agency or entity, or any other entity whatsoever; or their legal representatives, agents or assigns.

“pH” means a measure of the acidity or alkalinity of a substance, expressed in standard units (technically defined as the logarithm of the reciprocal of the mass of hydrogen ions in gram moles per liter of solution).

“Pollutant” means any substance, either liquid, gaseous, solid, or radioactive, discharged to the POTW which, if discharged directly, would alter the chemical, physical, thermal, biological, or radiological properties of waters of the state of Washington including pH, temperature, taste, color, turbidity, oxygen demand, toxicity or odor. This includes any discharge likely to create a nuisance or render such waters harmful, detrimental or injurious to any beneficial uses, terrestrial or aquatic life, or to public health, safety or welfare.

“Pollution prevention” means source reduction; protection of natural resources by conservation; or increased efficiency in the use of raw materials, energy, water or other resources.

“Population equivalent” means a measure of wastewater production equivalent to one person served by the wastewater treatment facilities: one hundred gallons per day, 0.2 lbs per day BOD and TSS, three hundred mg/l BOD and TSS, 0.024 lbs per day or twenty-four mg/l TKN.

“Population equivalent user factor” means the number of population equivalents assigned to each user for the purposes of calculating sewer service charges.

“Pretreatment” means the reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to (or in lieu of) introducing such pollutants into the POTW. This reduction or alteration can be obtained by physical, chemical, or biological processes; by process changes; or by other means (except by diluting the concentration of the pollutants unless allowed by an applicable pretreatment standard).

“Pretreatment requirements” means any substantive or procedural local, state, or federal requirement related to pretreatment developed under Chapter 90.48 RCW and/or Sections 307 and 402 of the Clean Water Act or this chapter.

“Pretreatment standards” means any pollutant discharge limitations including categorical standards, state standards, and limits of CMC 15.10.280, 15.10.290 and 15.10.300 applicable to the discharge of nondomestic wastes to the POTW. The term shall also include the prohibited discharge standards of this chapter, WAC 173-216-060, and 40 CFR Part 403.5.

“Prohibited discharge standards or prohibited discharges” means absolute prohibitions against the discharge of certain substances; these prohibitions appear in CMC 15.10.260.

“Public sewer” means a common sewer directly controlled by public authority.

“Publicly owned treatment works (POTW)” means a treatment works, as defined by Section 212 of the Act (33 USC 1292) which is owned by the city of Centralia. This definition includes any devices or systems used in the collection, storage, treatment, recycling, and reclamation of sewage or industrial wastewater and any conveyances which convey wastes to a wastewater treatment plant. The terms shall also mean the city of Centralia.

“Septage” means the liquid and solid material pumped from a septic tank, cesspool, or similar domestic sewage treatment system. This includes liquids and solids from domestic holding tanks, chemical toilets, campers, and trailers, when these systems are cleaned or maintained.

“Sewage or wastewater” means water-carried human wastes or a combination of water-carried wastes from residences, business buildings, institutions and industrial establishments, together with such ground, surface, storm, or other waters as may be present.

“Sewer” means any pipe, conduit, ditch, or other device used to collect and transport sewage.

“Sewer service charges” includes all charges billed to a particular user.

“Side sewer” means that part of the horizontal piping of a drainage system which extends from the end of the building drain and which receives the discharge of the building drain and conveys it to a public sewer, private sewer or individual sewage disposal system.

“Significant industrial user”:

1. A user subject to categorical pretreatment standards; or

2. A user that:

    a. Discharges an average of twenty-five thousand gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blowdown wastewater); or

    b. Contributes a process waste stream which makes up five percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or

c. Is designated as such by the DOE with input from the city of Centralia on the basis that it, alone or in conjunction with other sources, has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement.

3. Upon a finding that a user meeting the criteria in subsection (2) of this definition has no reasonable potential for adversely affecting the POTW's operation or for violating any applicable pretreatment standard or requirement, the DOE may at any time, on its own initiative or in response to a petition received from a user or the city of Centralia and in accordance with procedures in 40 CFR 403.8(f)(6) determine that such user should not be considered a significant industrial user.

"Significant noncompliance (SNC)" shall refer to a violation or pattern of violation of one of the following natures:

1. Chronic violations of wastewater discharge limits, defined here as those in which sixty-six percent or more of all wastewater measurements taken during a six-month period exceed the daily maximum limit or average limit for the same pollutant parameter by any amount;

2. Technical review criteria (TRC) violations, defined herein as those in which thirty-three percent or more of all wastewater measurements taken for each pollutant parameter during a six-month period equal or exceed the product of the daily maximum limit or the average limit multiplied by the applicable TRC (1.4 for BOD, TSS, fats, oils and grease, and 1.2 for all other pollutants except pH);

3. Any other discharge violation that the city of Centralia believes has caused, alone or in combination with other discharges, interference or pass through (including endangering the health of the city of Centralia personnel or the general public);

4. Any discharge of pollutants that has caused imminent endangerment to human health, welfare or to the environment, or has resulted in the city of Centralia's exercise of its emergency authority to halt or prevent such a discharge;

5. Failure to meet, within ninety days after the scheduled date, a compliance schedule milestone contained in a wastewater discharge permit or enforcement order for starting construction, completing construction, or attaining final compliance;

6. Failure to provide within thirty days after the due date, any required reports, including baseline monitoring reports, periodic self-monitoring reports, and reports on compliance with compliance schedules;

7. Failure to accurately report noncompliance; or

8. Any other violation(s) which the administrative authority determines will adversely affect the operation or implementation of the local pretreatment program.

“Slug load” means any pollutant released in a discharge at a flow rate or concentration which could violate this chapter, or any discharge of a nonroutine, episodic nature such as an accidental spill or a noncustomary batch discharge.

“Standard Industrial Classification (SIC) Code” means a classification pursuant to the “Standard Industrial Classification Manual” issued by the United States office of management and budget.

“State” means the state of Washington.

“STEP system” means septic tank effluent pumping sewer systems consisting of a liquid/solids separation tank with a pumping system discharging into the gravity sewer system.

“Stormwater” means any flow occurring during or following any form of natural precipitation, and resulting from such precipitation, including snowmelt.

“Total kjeldahl nitrogen (TKN)” means the total of organic compounds, i.e., amino acids, proteins, etc. (human waste). The TKN measures the combined amount of organic nitrogen and the amount of ammonia in a given sample.

“Total suspended solids (TSS)” means the total suspended matter that floats on the surface of, or is suspended in, water, wastewater, or other liquids, and which is removable by laboratory filtering.

“Toxic pollutant” means one or a combination of the pollutants listed as toxic in regulations promulgated by EPA under Section 307 (33 USC 1317) of the Act.

“Treatment plant effluent” means the discharge from the city of Centralia POTW.

“UGA” means the City’s urban growth area.

“Upset” means an exceptional incident in which there is unintentional and temporary noncompliance with applicable treatment standards because of factors beyond the reasonable control of the user. 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.

“User or industrial user” means any nondomestic source of wastewater discharged to the POTW. This excludes domestic users as defined herein.

"Vacuum sewer systems" means sewage conveyance systems consisting of a receiving storage tank, valve system, collection pipeline and a vacuum pump conveying normal domestic sewage from residential or commercial/industrial customers to a discharge point into the sanitary gravity sewer system.

"Wastewater." See "Sewage."

"Wastewater discharge permit (industrial wastewater discharge permit, discharge permit)" means an authorization or equivalent control document issued by the DOE to users discharging wastewater to the POTW. The permit may contain appropriate pretreatment standards and requirements as set forth in this chapter.

"Wastewater treatment facilities" means the city of Centralia wastewater treatment plant and outfall and all facilities designed for the collection and transmission of sewage to the plant.

"Wastewater utility" means the entity reporting to the city manager, which is responsible for the operation, maintenance, upgrade and improvement of the wastewater collection and treatment system serving the city of Centralia urban area. (Ord. 2298 § 1, 2013: Ord. 2051 § 1 (part), 2000).

15.10.030 User charges.

The user charge system shall distribute:

A. The costs of operation and maintenance of the wastewater treatment facilities owned and/or operated by the city, including administrative costs;

B. The costs of repayment of revenue bonds issued for financing the local capital cost of treatment plant renovations or expansion; and

C. The costs of repayment of loans issued by state or federal agencies for utility work, to each user in proportion to such user's contribution of wastewater to the wastewater treatment facilities. (Ord. 2051 § 1 (part), 2000).

15.10.040 Domestic user—Definition—Categories.

A. A domestic user shall be defined as any user whose discharge into the sewage facilities originates only from a residence or residences in which no commercial or industrial activities are taking place.

B. There shall be two categories of domestic users:

1. Single-family residential; and

2. Multiple-family residential.

The administrative authority will establish the population equivalent user factor for each category of domestic user based on water consumption data. (Ord. 2051 § 1 (part), 2000).

15.10.050 Domestic users—User charges.

A. "Low-income senior citizen users" and "low-income totally disabled users" shall qualify to pay a reduced domestic user charge upon qualifying for the exemption by application made to the utilities customer service center; provided, however, this exemption shall only apply to the domestic user charge for low-income senior citizen users and totally disabled users residing in single-family dwelling units. This exemption shall not apply to residents and/or owners of multifamily structures.

All low-income senior citizen customers and totally disabled customers applying for low-income senior citizen customer or totally disabled customer exemptions herein provided shall furnish to the utilities customer service center of the city of Centralia, Washington, a claim for exemption.

Such form shall be furnished to the utilities customer service center on or before the thirty-first day of March of each year or within thirty days from the date of account opening or unexpected change in income status.

B. The user charge for a single-family residential user, defined as a person whose structure, building, or property is designed to house a single family and is connected to a single side sewer to the public sewer, shall be as listed in CMC 15.10.350 (see CMC 15.10.110(B)).

C. Where one side sewer serves more than one separate single-family residential building, structure, or property, the single-family residential user charge shall be charged continuously on each such connected building as long as water service is available for all such buildings, either from a municipal or private supply.

D. The user charge for a multiple-family residential user, defined as a person whose structure, building, or property is designed to house more than one tenant or family in separate units and is connected by a single side sewer to the public sewer, shall be as listed in CMC 15.10.350. This category includes such establishments as apartments, multiplex units, trailer courts, or recreational vehicle courts. Each unit of the structure, building, or property, irrespective of occupancy or size, shall be included in the charge calculations as long as water service is available for that unit, either from a municipal or private supply. If the wastewater facility is required to own, operate or maintain a private collection system for such a user or for a combined commercial-residential user, or for a multiple commercial user, an appropriate contract addressing specific costs shall be entered into by the city and the user.

E. Where a single side sewer serves both commercial (or industrial) and domestic units (either single or multiple-family residential) served by the same water meter, the commercial/industrial rate provided in CMC 15.10.060 or 15.10.070 shall apply, without regard to the fact that the domestic units are connected with that side sewer. (Ord. 2298 § 2, 2013: Ord. 2051 § 1 (part), 2000).

15.10.060 Domestic-strength commercial/ industrial users—Definitions—Application of charge formula.

A. A domestic-strength commercial/industrial user shall be defined as any user not falling into the classification of domestic user as defined. These users shall include, but are not limited to, such establishments as schools, churches, hotels, motels, offices, hospitals, businesses, combined business-residences, and industries with primarily domestic-type sanitary wastes.

B. The same charge formula shall apply to all users within this classification.

C. The user charge for all domestic-strength commercial/industrial users shall be as listed in CMC 15.10.350. This charge shall be based on monthly water meter readings. A minimum user charge equal to the single-family residential charge shall be levied if the charge calculated from water consumption would otherwise be less.

D. No discount will be applied for water not returning to sanitary sewer facilities. A sprinkling meter may be utilized by commercial/industrial users for irrigation purposes only; no sewer billing will be levied on this commercial/industrial water use. (Ord. 2225 § 1, 2008: Ord. 2051 § 1 (part), 2000).

15.10.070 High-strength commercial/ industrial users—User charges.

A. The high-strength user charge, as set forth in CMC 15.10.350, shall apply to those users discharging wastewater or wastes with BOD’s and/or suspended solids greater than three hundred mg/l, in quantities exceeding fifty pounds per day, and/or fats, oil and grease (FOG) greater than one hundred mg/l or greater than twenty-four mg/l TKN.

B. The charge will be based on periodic monitoring of the wastewater entering the public sewer through the side sewer or by reported average values of typical wastewater strengths for that category of discharger. Users will administer these tests through a qualified person and use state certified testing labs at user’s expense.

C. It shall be the responsibility of each sewer user whose wastewater strength exceeds that stipulated in subsection (A) of this section to notify the administrative authority that the discharge may be subject to high-strength surcharge. Those users who discharge higher strength wastes without approval from the administrative authority are subject to the penalties outlined in CMC 15.10.340.

D. If the city's evaluation establishes that a particular user falls within the high-strength industrial/commercial user class, that user may file a written appeal with the administrative authority within thirty days after notification of the classification. Such appeal shall set forth in reasonable detail the source of error being appealed and the appellant's grounds for modification thereof. If the city's analysis determines there is no basis for modification, the decision of the administrative authority shall be final.

E. All high-strength dischargers shall be subject to the terms of the industrial pretreatment program set out in CMC 15.10.270, 15.10.280 and 15.10.290. (Ord. 2051 § 1 (part), 2000).

15.10.080 Collection of user charge—Delinquency—Penalties—Shutoff.

A. The following schedule for sewer user charge reductions shall be used for those domestic users who initiate or terminate sewer service between billing intervals. Charges computed for a actual water usage shall not be reduced.

	PERCENTAGE OF NORMAL CHARGE					
	Service Interval After Last Bill or Before First Bill					
	0—7 Days	8—14 Days	15—22 Days	23—30 Days	31—45 Days	46—60 Days
Monthly	25	50	75	100	—	—

B. Commercial/industrial users who initiate or terminate sewer service between billing periods shall be required to pay user charges only on the basis of water use. The minimum charge shall not apply to commercial/industrial customers in the case of a partial period of less than one month.

C. Sewer users who desire to terminate service shall notify the finance department at city hall before the date of such termination. The notification shall include a forwarding address to which the final billing will be sent. (Ord. 2051 § 1 (part), 2000).

15.10.090 Implementation of user charge system.

A. The city finance department shall keep and maintain the following records for purposes of evaluation and/or updating the user charge system:

1. Expenditures for operation and maintenance of the wastewater collection and treatment facilities;

2. Expenditures attributable to the administration of the wastewater treatment facilities;

3. Expenditures for the repayment of principal and interest on all outstanding revenue bonds and loans;

4. Moneys placed in the equipment rental replacement fund, interest accrued, and withdrawals from the fund;

5. Records of payments from individual users;

6. Records of water consumption from individual users;

7. A record of population equivalent user factor for the classifications of domestic users and each new commercial/industrial user;

8. A record of the total number of domestic and commercial/industrial users by category within the Centralia urban area;

9. Records of total user charge revenue and total revenues received from each user classification;

B. The user charge program shall be reviewed annually to ensure continued equitability and generation of sufficient revenue to ensure self-sufficient operation and maintenance of the wastewater collection and treatment facilities. User charges shall be adjusted by action of the city council if such review reveals a deficiency in the rate structure. (Ord. 2051 § 1 (part), 2000).

15.10.100 Use of public sewers required.

A. It is unlawful for any person to place, deposit, or permit to be deposited in any unsanitary manner upon public or private property within the corporate city limits of Centralia any human excrement, garbage, or other objectionable waste.

B. The owners of all houses, buildings, or properties used for human occupancy, employment, recreation, or other purposes, situated within the city and abutting on any street, alley, easement, or right-of-way in which there is now located or may in the future be located a public sanitary sewer of the city, are required at their expense to install suitable sanitary plumbing fixtures therein and to connect such facilities correctly to the sanitary sewer in accordance with the provisions of this chapter within sixty days after the date of receipt of a notice in writing issued by the administrative authority for connection to be made, providing that the public sewer is within two hundred feet of the building, and the connection is approved by the administrative authority.

Such notice will also be given when the owner is required to repair or completely replace the side sewer, such as during, but not limited to, a sewer rehabilitation project.

When properties with existing dwellings are required to hook up to the sewer due to the extension of new sewer lines the administrative authority is authorized to negotiate a payment schedule for payment of capital facilities charges levied under CMC 15.10.350.

Special benefit fees and latecomer fees must be paid when the permit for the connection is issued.

C. If any such connection, repair or replacement shall not have been made within the time provided, the administrative authority is authorized and directed, at its discretion, to either:

1. Cause such connection to be made, in which case the administrative authority shall file a statement of the cost thereof with the finance director and thereupon a warrant shall be issued under the direction of the city council by the city finance director and against the wastewater utility fund, created by city of Centralia Ordinance No. 1600 passed on December 30, 1986, for the payment of such costs. Such amount, together with applicable interest, in accordance with state law, shall be assessed against the property upon which the building or structure is situated and shall become a lien thereon. Such lien may be enforced by termination of some or all of the utility services provided to the property or in any other manner authorized by law. Such total amount, when collected, shall be paid into the wastewater utility fund; or

2. Cause water service to the property to be terminated, if service is provided by the Centralia water utility. Notice to the owner and occupant shall be by certified mail, return receipt requested, with a copy to the Lewis County environmental health department. Action will be taken thirty days after receipt of notice in the event of failure of other alternatives or high pollution potential. Final decision on the alternative action to be selected by the administrative authority shall be based upon such factors as location of the unconnected building or structure, effectiveness of existing private treatment facilities, if present, and groundwater contamination potential. (Ord. 2179 § 1, 2006: Ord. 2051 § 1 (part), 2000).

15.10.110 Side sewers and connections.

A. All costs and expenses related to the installation and connection, operation and maintenance, and replacement of the side sewer, including backflow devices, where required, 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.

B. A separate and independent side sewer shall be provided for every building. If one building stands at the rear of another on an interior lot under the same ownership and no private sewer is available or can be constructed to the rear building through an adjoining alley, courtyard, yard, or driveway, the side sewer from the front building may be extended to the rear building and the whole considered as one building sewer, with prior approval of the administrative authority. If the administrative authority finds that it may be necessary or beneficial to allow two adjacent buildings to connect to the public sewer through a common side sewer, such side sewer shall have a diameter of six inches or greater. When such

connection is made under one owner, then later sold to multiple owners, it shall be the responsibility of the property owner(s) to provide proof of the recorded easement to the wastewater utility. Penalty for noncompliance after certified mail notice to the owner giving sixty days to remedy the situation may include termination of city water service to any or all involved buildings.

C. Old side sewers may be used in connection with new buildings only after they are found, on examination by the administrative authority, to meet all requirements of this chapter.

D. Any building required to connect to a public sewer shall also disconnect from existing cesspool(s) or septic tank(s). Procedures for abandoning cesspools and septic tanks shall be in accordance with the regulations and standards enforced by the Lewis County environmental health department. Failure to properly abandon may result in the termination of water and sewer service, at the discretion of the administrative authority and on the advice of the Lewis County environmental health department.

E. Any residential, commercial or industrial user requesting connection with the public sewer, shall first install or have installed an approved water meter, if such meter is not already installed. If the user obtains or can obtain water from sources other than the municipal supply, the meter shall measure the incoming flow from all such sources, and the installation and maintenance of the meter shall be at the user's expense. In circumstances where the wastewater flow is not generated through a metered water supply, the wastewater discharge must be metered directly. The meter shall be installed and maintained at the property owner's expense. Such a meter must be located to allow easy accessibility to city staff. Such direct readings will be increased by twenty percent for billing purposes to gain equivalency with other user's billing basis of nonreturning flow. If either type of meter is found to be defective or otherwise inoperative, usage shall be estimated by the city to be at the highest monthly level recorded for the preceding twelve months. Such meter shall be repaired within sixty days of notification from the administrative authority. (Ord. 2051 § 1 (part), 2000).

15.10.120 Damage to sanitary sewer system.

In the event of damage caused by a person, firm or corporation to the city's sewer system, the city reserves the right to reject same and then charge such responsible party the cost of labor, materials, equipment and overhead, which billing, if unpaid sixty days thereafter, shall be turned over to a collection agency as designated by the city, thereto including, but not limited to, lien and discontinuance of service. (Ord. 2051 § 1 (part), 2000).

15.10.130 Permit requirements.

A. No person shall uncover, make any connections with or opening into, use, alter, or disturb any public sewer or appurtenance thereof, or engage in the construction of a side sewer, either on private property or within public rights-of-way, without first obtaining a written side sewer permit from the city community development department. In the event such sewer service is outside the city, the applicant by applying therefore and accepting such service shall be deemed bound by the current and future ordinances of the city affecting such sewer service.

B. A side sewer permit will be required for each individual structure to be connected and for the collection system of a multiple dwelling or multiple commercial installation.

C. Application for a side sewer permit will be made by a registered, bonded, insured side sewer contractor or the owner of the property to be served, in accordance with CMC 15.10.230.

D. No side sewer contractor shall do any side sewer work under any other person's permit nor shall any unauthorized person do any side sewer work under a side sewer contractor's permit, except as may be otherwise authorized by the administrative authority.

E. When a side sewer is to be installed across the private property of another person, the applicant for the side sewer must first provide proof that a duly executed easement has been obtained from other such property owner and officially recorded. A copy shall be provided by the applicant for the wastewater utility records.

F. When work or excavation is performed within the public right-of-way, a right-of-way permit is required. This permit shall be obtained for the work prior to issuance of a side sewer permit by the city.

G. The issuance of a side sewer permit by the city shall not relieve the permit holder from the responsibility of obtaining other such permits or licenses as may be required by the city, the county, or other jurisdictions in which the side sewer is installed. Permit holders shall contact other utilities for location of their facilities before starting excavation through the underground utilities locating service toll-free number (1-800-424-5555).

H. Before a permit shall be issued for the construction of any side sewer to serve any commercial or industrial users, as defined in CMC 15.10.060(A) or 15.10.070(A), the applicant shall first supply proof that an approved water meter has been installed, or will be installed, during the process of constructing the side sewer, in accordance with CMC 15.10.110(E). Alternatively, a direct flow measuring device, in accordance with CMC 15.10.110(E) will be required.

I. The side sewer permit shall expire one hundred eighty days after the date of issuance. Upon expiration, the applicant must re-apply and pay for a new side sewer permit and all other applicable fees. (Ord. 2051 § 1 (part), 2000).

15.10.140 Permit application and fees.

A. There shall be nine classes of side sewer permits/fees: (1) for single-family residential service; (2) for multiple-family residential service; (3) for service to establishments producing commercial or industrial wastes; (4) for alteration or abandonment of an existing side sewer; (5) for infiltration and inflow (I&I) rehabilitation permits; (6) for residential grinder pump connection; (7) for commercial and industrial grinder pump connection; (8) for after hours or holiday inspection fee; and (9) for re-inspection fee.

The permit application shall be supplemented by approvable plans, specifications, or other information considered pertinent in the judgment of the administrative authority.

B. Permit Fees (Includes Inspection During Normal Business Hours).

1. For each single-family residential connection to public sewer, fifty dollars.

2. For each multiple-family residential connection to public sewer, seventy-five dollars.

3. For each commercial or industrial connection to public sewer, one hundred dollars.

4. For alteration, abandonment or repair to existing connection, or complete replacement of side sewer, fifty dollars.

5. I&I rehabilitation project, no charge.

6. Grinder pump residential connection permit, one hundred dollars.

7. Grinder pumps commercial or industrial connection, one hundred fifty dollars.

8. After hours or holiday inspection fee, one hundred dollars.

9. Re-inspection fee, fifty dollars: one hundred dollars if after hours.

C. Demolished or Removed Buildings. The property owner or their contractor engaged in demolishing or removing any structure connected to the public sewer shall notify the city of such work, obtain an abandonment permit from the community development department, and shall expose and plug the side sewer connection of such structure at the property line in accordance with the requirements found in the city of Centralia’s design and development

guidelines. A city inspector must observe and document all abandonments. Obtaining an abandonment permit does not relinquish the right to a future connection.

D. Permit fees shall be paid to the community development department, with such amount credited to the wastewater utility, which conducts such inspections.

E. Reference codes adopted by the city include the most current Washington State Uniform Plumbing Code and the most current DOE manual “Criteria for Sewage Works Design.” Specifications included in this chapter shall prevail when in conflict with, or where not addressed by, the aforementioned codes. In unclear circumstances, interpretation will be made by the administrative authority. (Ord. 2298 § 3, 2013: Ord. 2051 § 1 (part), 2000).

15.10.145 Term of permit.

A. Work authorized by permit shall be completed within one hundred eighty days from date of approval by the city, unless extended by the building official. If a building permit is also required, fees shall be collected and both permits shall be obtained simultaneously. If work is not completed within one hundred eighty days or work is suspended or abandoned during the one hundred eighty day period, the permit shall expire and become null and void. Projects where the permit has been deemed null and void shall require the issuance of a new permit accompanied by the required fees and plan reviews.

B. In the event that permit becomes null and void, the following shall not be refunded:

1. Sewer connection permit fees;

2. Latecomer fees;

3. Five percent capital facility fees. (Ord. 2051 § 1 (part), 2000).

15.10.150 Pipe material.

A. Pipes acceptable for gravity side sewers shall be as follows:

1. Ductile iron: ANSI A 21.51, thickness class 51;

2. Polyvinyl chloride (PVC): ASTM D3034 with SDR equals 35.

B. The water and wastewater utilities director, wastewater manager, lead collections technician and city engineer, as a committee of four shall consider any proposed sewer pipe other than those specifically set forth in subsection (A) of this section to determine its acceptability for use.

C. Whenever possible, side sewers should be laid at least ten feet horizontally from any existing or proposed water main. Should local conditions prevent a lateral separation of ten

feet, a sewer may be laid closer than ten feet to a water main if the sewer is constructed of ductile iron or C-900 PVC pipe with watertight joints, and:

1. It is laid in a separate trench;

2. It is laid in the same trench with the water mains located at one side on a bench of undisturbed earth;

3. In either case the elevation of the crown of the sewer shall be at least eighteen inches below the invert of the water main. (Ord. 2051 § 1 (part), 2000).

15.10.160 Joints.

A. All joints and connections shall be gastight and watertight, as determined by the testing and inspections procedures outlined in this chapter.

B. Joints for PVC pipe shall be rubber-gasketed type conforming to ASTM D3212.

C. Joint for ductile-iron pipe shall be push-on type or mechanical joint conforming to ANSI A21.11.

D. Pipe and joints shall be installed in accordance with the instructions furnished by the pipe manufacturer and approved by the administrative authority.

E. No glued joints will be accepted.

F. Other joining materials and methods may be used only with the approval of the administrative authority. (Ord. 2051 § 1 (part), 2000).

15.10.170 Fittings and cleanout.

A. The side sewer shall be laid at uniform grade and in straight horizontal alignment. Changes in horizontal alignment shall be made only with bends, wye branches, or a combination of a wye branch and bend.

B. All change of horizontal alignment forty-five degrees or greater shall be made with a wye branch and bends as required, with the straight through opening capped for use as a cleanout. Where a ninety degree bend is required, two forty-five degree bends will be installed to complete the bend. No ninety degree fittings shall be allowed.

C. A cleanout shall be installed thirty-six inches from all buildings unless permission to change the location of such cleanout has been obtained from the administrative authority. Additional cleanouts, including those used for commercial properties, shall be installed in locations designated by the administrative authority but in no case shall the distance between cleanouts exceed one hundred feet.

D. Suitable frames and covers of a type designated by the administrative authority shall be used for all cleanouts on commercial property and in paved areas, and such frames shall be cast in a concrete block thirty inches high by thirty inches wide by eight inches deep flush with the final paving.

E. All cleanouts not in paved areas shall extend to within eighteen inches of the ground surface. All cleanouts shall be capped with appropriate plugs, using the standard compression joint of the pipe being used, to prevent entry of dirt, roots, or groundwater and shall be secured against back pressure.

F. A test tee shall be provided at the private property and right-of-way boundary and at any other required point or points, as determined by the administrative authority, to ensure that all portions of the side sewer can be tested.

G. It shall be the responsibility of the permit holder to install all risers, cleanouts, castings, concrete blocks, etc., required before the side sewer will be approved by the city.

H. Backwater Valves. The Uniform Plumbing Code requires backwater valves on building sewers where a finished floor is below the rim of the upstream manhole. Backwater valves, if they are installed, must be located within the building footprint upstream of the cleanout. The city is not responsible for their installation, maintenance, or operation. (Ord. 2298 § 4, 2013: Ord. 2051 § 1 (part), 2000).

15.10.180 Connections to public sewer.

A. The connection of the side sewer shall be made at a wye or tee.

B. Connections at other than an existing wye or tee shall be made only by city personnel or a licensed side sewer contractor with the cost borne by the permit holder. Any work done by city personnel shall be billed for actual costs plus overhead. Terms in CMC 15.10.120 shall apply.

C. If the joint type or dimensions of the wye or tee in the public sewer are different from that of the side sewer pipe, a transition adaptor approved by the administrative authority shall be used to connect the side sewer to the wye or tee. If a suitable transition is not obtainable, the method of making the connection shall be approved by the administrative authority.

D. Connection to the building drain pipe shall be made by means of flexible clamp-type coupling or by other approved method.

E. No connections from gutters, roof drains, down spouts, surface drains or yard drains shall be allowed to the sanitary sewer system.

F. The portion of the building (side) sewer located on the customer's property is owned by the property owner and it shall be their responsibility to keep the sewer in good working order and free from ground water or surface runoff water.

G. Repair to a side sewer shall be made within thirty days from receipt of notice to the owner of the property. In the event of an emergency, the city may establish a shorter period of time for the repair to be made or, if the owner cannot be located or does not promptly make such repairs, the city may make the repairs and bill the owners under the procedure of CMC 15.10.100(C)(1).

H. Alternative Systems. In the event that gravity sewer service is not feasible, as determined by the administrative authority, alternative sewer systems may be permitted. Any alternative sewer system (grinder pumps, vacuum sewers) must be installed at the developer or property owner's expense in accordance with the city's design and development guidelines and the current DOE manual "Criteria for Sewage Works Design." A service agreement provided by the city of Centralia will be signed and notarized stating that all maintenance and inspections shall be the responsibility of the system owner. System owners shall provide a property easement for city staff to access the installation for inspection purposes. Upon completion of installation, successful startup, and acceptance by the city, it shall be the owner's responsibility to contract with a qualified contractor to work on such systems and to contact the city if work is performed on the grinder pump system. All alternative systems will be equipped with pigging ports for cleaning of the force mains, where appropriate and as determined by the administrative authority.

1. The following maintenance is required:

    a. Commercial grinder facilities must have their grinder systems integrity verified by a qualified technician on an annual basis. The frequency of the annual inspection may be increased if the system has a history of nonperformance and unreliability.

    b. Residential systems must have their grinder systems integrity verified by a qualified technician every three years. The frequency of the three-year inspection may be increased if the system has a history of nonperformance and unreliability.

    c. All inspection/maintenance records and repairs shall be e-mailed or mailed to the city of Centralia wastewater department for record keeping purposes.

    d. The owner shall provide the city of Centralia a copy of the manufacturer's operation and maintenance manual to be kept on record for the life of the system as required by the Washington State Department of Ecology.

    e. All alterations to the system will be strictly monitored by the city of Centralia.

I. Sewer connections will not be allowed outside of the city's UGA boundary unless the applicant provides a certificate from Lewis County allowing the connection because of an immediate health or safety problem that cannot otherwise be resolved. (Ord. 2298 § 5, 2013: Ord. 2051 § 1 (part), 2000).

15.10.190 Size and slope of side sewer pipe.

A. The side sewer pipe shall be six inches in diameter from the public sewer main to the property line. From the property line to the building, the side sewer shall be no less than four inches in diameter. If more than one occupied building is attached to the same building sewer as allowed in CMC 15.10.110(B), the diameter of the side sewer shall not be less than six inches from the building to the points of junction of the sewer lines. Side sewers to multiple structures, commercial establishments, or industrial buildings shall not be less than six inches in diameter.

B. All side sewers shall be laid on a uniform slope of not less than one-fourth inch per foot, wherever possible. Where it is impossible to obtain a one-fourth inch per foot slope due to the depth of the public sewer or to the structural features arrangements of the building, a slope of not less than one-eighth inch per foot is permissible, when approved by the administrative authority. Reduced slopes will require an increase in pipe size.

C. In any building, structure, or premises in which the elevation of plumbing fixtures is too low to permit gravity flow to the public sewer, service may be provided by approved ejectors, pumps, or other equally efficient, approved mechanical devices approved by the administrative authority. When only the lower floor of a structure is too low for gravity flow, the remaining floors must flow by gravity.

D. The discharge line from the ejectors, pumps, or other mechanical devices shall be provided with an accessible backflow valve and gate valve. The discharge line shall connect to the gravity side sewer at the crown of the side sewer through a wye fitting. All such installations shall conform with the current requirements set forth by DOE in "Criteria for Sewage Works Design," Section C1-10.

E. When the administrative authority determines there is a possibility of backup in the side sewer from head pressure in the public sewer, flow from any building drain lower than the gravity sewer shall be raised by approved means, or, if determined necessary by the administrative authority for protection against flooding or surcharge, a backflow valve shall be installed and maintained at the owner's expense.

F. Effective operation of any backflow valve shall be the responsibility of the owner of the building sewer. The city shall be saved harmless from any damage or injury sustained from installation or operation of said backflow valve.

G. All pump installations must meet all pertinent building and plumbing codes, current city development standards, and the most current DOE manual “Criteria for Sewage Works Design,” and must be approved by the administrative authority before installation. (Ord. 2051 § 1 (part), 2000).

15.10.200 Excavation and laying of pipe.

A. All excavation required for the installation of a side sewer shall be open trench work unless otherwise approved by the administrative authority.

B. The side sewer permit holder, before beginning excavation in the public right-of-way area, shall have at the site sufficient barricades to properly protect the work. The barricades shall meet the requirements as listed in the current “Manual of Uniform Traffic Control Devices.”

C. The side sewer permit holder shall comply with any additional city, county, state, or other jurisdictional laws, ordinances, and regulations relating to the safety and protection of the excavation, and proper work practices when asbestos-containing pipe is involved.

D. When unsuitable bedding, such as rock, is found, as determined by the administrative authority, the side sewer trench shall be over-excavated and a bedding of sand or fine gravel a minimum of four inches deep shall be prepared. Gravel shall be three-quarter inch maximum in size. If the trench is unintentionally over-excavated, the bottom shall be brought to proper grade using this same bedding material.

E. All pipe shall be laid true to grade with the bell upstream. Pipe shall be cradled in the prepared trench bottom. The bottom of the trench shall be smooth and free from large rocks that could damage the side sewer pipe. (Ord. 2051 § 1 (part), 2000).

15.10.210 Testing and inspection.

A. It shall be the duty of the person installing the side sewer as authorized by the permit to notify the utilities department orally or in writing that the sewer is ready for inspection. Twenty-four hours may be required after the notification before the actual inspection. Inspections can be made on Saturdays, Sundays or holidays, provided the inspection is scheduled forty-eight hours in advance and the contractor or owner agrees to pay an additional one hundred dollar inspection fee prior to inspection (CMC 15.10.140(B)).

B. Side sewers shall be tested for their entire length from the public sewer by testing for visible leakage before backfilling by inserting a removable plumber’s plug at the connection of the side sewer to the public sewer and filling to a line with water to a level of at least one foot above the top of the side sewer at its connection with the building drain. A test tee or tees as required in CMC 15.10.170(F) shall be used for insertion of the plug and shall be secured against backpressure upon completion of the test. A special fitting, provided by the

permit holder, shall be inserted into the cleanout fitting at the connection to the building drain to provide a short standpipe to obtain a one-foot head pressure at that point. The side sewer permit holder or a licensed side sewer contractor must be present at the job during the full duration of the inspection.

C. Products used to seal the inside of the pipe (such as grout, etc.) are not to be used to obtain a passing test.

D. It shall be the duty of the holder of a permit to make sure that the work will pass inspection by performing the test described in subsection (B) of this section before giving notification for inspection. If an additional inspection is necessary due to test failure and/or improper installation, a charge of fifty dollars shall be made for each additional inspection.

E. Notices of corrections or violations shall be written by the administrative authority and may be posted at the site of the work or mailed or delivered to the permittee or his authorized representative. Refusal, failure, or neglect to comply with any such notice or order within ten days after receipt thereof shall be considered a violation of this code and shall be subject to the penalties for violations set forth elsewhere in this code.

F. Upon satisfactory completion of the leakage test and inspection, a certificate of approval shall be issued by the administrative authority on demand. (Ord. 2298 § 6, 2013: Ord. 2051 § 1 (part), 2000).

15.10.220 Backfilling.

A. Trenches shall be backfilled within forty-eight hours after successful completion of inspection. Backfilling of trenches and restoration of roadway surfacing of any thoroughfare or right-of-way, public or private, shall be the responsibility of the permit holder.

B. No backfill shall be placed over pipe until the work has been inspected and approved by the administrative authority. Any portion of the side sewer covered before inspection shall be uncovered at the owner’s expense within two days after notice to do so has been issued by the administrative authority. Re-inspection of the site will cause the owner/contractor to be subject to a fifty-dollar re-inspection fee.

C. Trenches shall be carefully backfilled by tamping to a depth of six inches above the pipe to avoid damaging the pipe. All backfill between the public sewer and the property line shall be water-settled or mechanically tamped in six-inch layers to minimize settlement. Any settlement that occurs within twenty-four months after backfilling shall be corrected at the expense of the permit holder. Additional fill and surfacing materials as approved by the city engineer shall be placed to restore the settled area to original grade.

D. A minimum of six inches of gravel surfacing shall be temporarily placed in the public right-of-way or be temporarily placed in the public right-of-way or traveled areas in commercial properties. Final surfacing equivalent to the adjoining undisturbed roadway shall not be placed until such time as, in the opinion of the city engineer, final settlement has taken place.

E. All pipe installations shall be bedded and backfilled to conform to the pipe manufacturer's specifications.

F. Minimum cover for side sewers shall be eighteen inches, except as hereafter provided:

1. Minimum cover for side sewers at the property line shall be four feet below the crest of the public right-of-way at the property line.

2. Minimum cover for side sewers crossing a ditch in the public right-of-way shall be four feet six inches.

G. Where it is necessary for water and sewer lines to cross each other, the crossing shall be at an angle of approximately ninety degrees and the sewer shall be located eighteen inches or more below the waterline. The administrative authority may require that the sewer be constructed of ductile iron for a distance of at least ten feet on each side of the water main, and/or be placed inside of a protective casing.

H. Failure to call for an inspection will be cause for termination of water service thirty days after receipt of notification. The administrative authority will send such notification by certified mail, return receipt requested. A copy shall be mailed to the Lewis County environmental health department. (Ord. 2051 § 1 (part), 2000).

15.10.230 Side sewer contractor.

A. No person shall hereinafter engage in the business of installing building sewers or in connecting building sewers to any public sewer of the city of Centralia unless such person is registered, bonded and insured as required by the laws of the state of Washington; provided, however, and excepting from the above requirement, the bona fide property owner or direct family member, which would mean spouse, parents or children, may construct the building sewer provided they abide by all requirements of this chapter. For purposes of this chapter, the digging of the ditch in which to lay the sewer shall not of itself be construed as installation of a building sewer.

B. If a side sewer contractor's work is determined by the administrative authority to be unacceptable, further sewer permits may be denied for the following causes: failure to observe the rules and regulations issued by the administrative authority, or other codes referenced in this chapter, governing the construction and laying of side sewers; fraud or

misrepresentation in obtaining licensing, bonding and/or insurance; failure to pay for labor or material used in the construction of a side sewer; fraud or misrepresentation to the owner, agent, or occupant of a building for the purpose of obtaining a contract for the construction of a side sewer; or for nonpayment for work performed by the wastewater utility for the payment of which a side sewer contractor may be liable. (Ord. 2051 § 1 (part), 2000).

15.10.240 Latecomer reimbursement.

A. The owner of the property must pay all applicable fees, including but not limited to any latecomer charges. All connections must be made in accordance with the requirements of this chapter; provided, however, that there shall be no new connections to an existing sewer system unless it is first determined by the administrative authority that such existing sewer system can adequately handle the additional sewage caused by such new connection or connections.

B. A developer who enters into a latecomer reimbursement agreement with the city must initiate the process within ninety days of final acceptance of the sewer project. (Ord. 2179 § 2, 2006: Ord. 2051 § 1 (part), 2000).

15.10.250 Septage dumping.

It is unlawful for any person, firm or corporation to deposit, dump, place, or leave septage, sewage, or effluent from any septic tank, cesspool, or other private or city of Centralia sewage disposal system within the corporate limits of the city of Centralia. (Ord. 2051 § 1 (part), 2000).

15.10.260 Prohibited discharge standards.

A. General Prohibitions. No user shall introduce or cause to be introduced into the POTW any pollutant or wastewater which causes pass through or interference. These general prohibitions apply to all users of the POTW whether or not they are subject to categorical pretreatment standards or any other federal, state, or local pretreatment standards or requirements. (40 CFR 403.5(a) and WAC 173-216-060(2)(b)(i)).

B. Specific Prohibitions. No user shall introduce or cause to be introduced into the POTW the following pollutants in any form (solid, liquid, or gaseous):

1. Any pollutant which either alone or by interaction may create a fire or explosive hazard in the POTW, including, but not limited to, waste streams with a closed-cup flashpoint of less than one hundred forty degrees Fahrenheit (sixty degrees Celsius) using the test methods specified in 40 CFR 261.21 (40 CFR 403.5(b)(1)), or are capable of creating a public nuisance (WAC 173-216-060(2)(b)(ii)). This includes waste streams sufficient to create a public nuisance or a hazard to life, or to prevent

entry into the sewers for maintenance or repair. At no time shall a waste stream cause two successive readings on an explosion meter to be more than five percent nor any single reading over ten percent of the lower explosive limit (LEL) of the meter at any point in the collection system or treatment works;

2. Any pollutant which will cause corrosive structural damage to the POTW, but in no case discharges with a pH less than 6.0 or more than 9.0, or having any other corrosive property capable of causing damage or hazard to structures, equipment, or personnel of the POTW, unless the system is specifically designed to accommodate such discharge and the discharge is authorized by an applicable wastewater discharge permit (40 CFR 403.5(b)(2) and WAC 173-216-060(2)(b)(iv));

3. Any solid or viscous substances including fats, oils, and greases in amounts which may cause obstruction to the flow in a POTW or other interference with the operation of the POTW (40

CFR 403.5(b)(3) and WAC 173-216-060(2)(b)(vi));

4. Any discharge of pollutants, including oxygen-demanding pollutants (BOD, etc.), released at a flow rate and/or pollutant concentration which, either singly or by interaction with other pollutants, sufficient to cause interference with the POTW (40 CFR 403.5(b)(4) and WAC 173-216-060(2)(b)(vi));

5. Any waste stream having a temperature which will inhibit biological activity in the treatment plant resulting in interference, or cause worker health or safety problems in the collection system. In no case shall wastewater be discharged at a temperature which causes the temperature of the influent to the treatment plant to exceed one hundred four degrees Fahrenheit (forty degrees Celsius) unless the system is specifically designed to accommodate such a discharge, and the discharge is authorized by an applicable wastewater discharge permit (40 CFR 403.5(b)(5) and WAC 173-216-060(2)(b)(v));

6. Any petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin, in amounts that will cause interference or pass through (40 CFR 403.5(b)(6)(ii));

7. Any pollutants which result in the presence of toxic gases, vapors, or fumes within any portion of the POTW in a quantity that may cause acute worker health and safety problems (40 CFR 403.5(b)(7) and WAC 173-216-060(2)(b)(ii));

8. Any trucked or hauled wastes, except at discharge points designated by the city and in compliance with all applicable city requirements and during specified hours (40 CFR 403.5(b)(8));

9. Any noxious or malodorous liquids, gases, solids, or other wastewater which, either singly or by interaction with other wastes, are sufficient to create a public nuisance or a hazard to life, or to prevent entry into the sewers for maintenance or repair (WAC 173-216-060(2)(b)(ii));

10. Any of the following discharges unless approved by the administrative authority under extraordinary circumstances such as the lack of direct discharge alternatives due to combined sewer service or need to augment sewage flows due to septic conditions (WAC 173-216-060(2)(b)(vii)):

a. Noncontact cooling water in significant volumes,

b. Stormwater, and other direct inflow sources, or

c. Wastewaters significantly affecting system hydraulic loading, which do not require treatment or would not be afforded a significant degree of treatment by the POTW;

11. Any dangerous or hazardous wastes as defined in Chapter 173-303 WAC, as amended, except as allowed in compliance with that regulation (WAC 173-216-060(1) and 40 CFR Part 261);

12. Any substance which will cause the POTW to violate its NPDES, state waste discharge or other disposal system permits or causing, alone or in conjunction with other sources, the treatment plant's effluent to fail a toxicity test;

13. Any substance which may cause the POTW's effluent or treatment residues, sludges, or scums to be unsuitable for reclamation and reuse or would interfere with the reclamation process or cause the POTW to be in noncompliance with sludge use or disposal criteria, guidelines or regulations developed pursuant to the federal, state, or local statues or regulations applicable to the sludge management method being used;

14. Any discharge which imparts color which cannot be removed by the POTW's treatment process such as dye wastes and vegetable tanning solutions, which consequently impart color to the treatment plant's effluent, thereby violating the city's NPDES permit. Color (in combination with turbidity) shall not cause the treatment plant effluent to reduce the depth of the compensation point for photosynthesis activity in the receiving waters by more than ten percent from the seasonably established norm for aquatic life;

15. Any discharge containing radioactive wastes or isotopes except as specifically approved by the administrative authority in compliance with applicable rate or federal

regulations including WAC 246-221-190 “Disposal By Release Into Sanitary Sewerage Systems”; and meeting the concentration limits of WAC 246-221-290, Appendix A, Table I, Column 2; and WAC 246-221-300, Appendix B;

16. Any sludges, screenings, or other residues from the pretreatment of industrial wastes or from industrial processes;

17. Any medical wastes, except as specifically authorized by the administrative authority;

18. Any detergents, surface-active agents, or other substances in amounts which may cause excessive foaming in the POTW;

19. Any incompatible substance such as: grease, animal guts or tissues, paunch contents, manure, bones, hair, hides or fleshings, entrails, whole blood, feathers, ashes, cinders, sand, spent lime, stone or marble dusts, metal, glass, straw, shavings, grass clippings, rags, spent grains, spent hops, wastepaper, wood, plastics, gas, tar asphalt residues, residues from refining or processing of fuel or lubricating oil, mud, or glass grinding or polishing wastes, or any other organic or inorganic matter greater than one-half inch in any dimension;

20. Persistent pesticides and/or pesticides regulated by the Federal Insecticide Fungicide Rodenticide Act (FIFRA);

21. Any wastewater, which in the opinion of the administrative authority can cause harm either to the sewers, sewage treatment process, or equipment; have an adverse effect on the receiving stream; or can otherwise endanger life, limb, public property, or constitute a nuisance, unless allowed under a legal and binding agreement by the administrative authority (except that no waiver may be given to any categorical pretreatment standard).

C. Pollutants, substances, or wastewater prohibited by this section shall not be processed or stored in such a manner that they could be discharged to the POTW.

D. Every building, structure, or premise used or occupied by any sewer user where any commercial or industrial operations are conducted or permitted which result in the discharge into the sewer system of any products, waste products, or other substances, matter, or liquid in the manner and to the extent prohibited in this section shall be equipped with an adequate and suitable grease trap, filter, or other interception device installed in such a manner that the product, waste products, or other substances, materials, or liquid herein set forth will not flow into or be discharged into the sanitary sewer system. The grease trap, filter, or other interceptor shall be adequately maintained, readily accessible for inspection

by the administrative authority at any time to ensure its proper operation, and is subject to the terms in CMC 15.10.280.

E. The owner of any vehicle-washing facility shall install and maintain in a proper manner and at his own expense an approved sediment and oil trap located in the side sewer line. Records of proper cleaning and maintenance must be kept and made available to city inspectors. (Ord. 2051 § 1 (part), 2000).

15.10.270 Commercial/industrial waste discharges.

A. The administrative authority may allow discharge of commercial/industrial waste not prohibited by CMC 15.10.260 into the public sewer. The decision on whether or not to allow any such discharge will be made on a case-by-case basis once the characteristics of the proposed waste discharge have been fully disclosed and will result in an individual agreement.

B. In instances where the discharge of commercial/industrial waste into the public sewer is proposed, the administrative authority may:

1. Prohibit discharge into the public sewer; and/or

2. Require preliminary treatment (“pretreatment”) to acceptable condition for discharge into the public sewer; and/or

3. Require payment of an additional charge and fee as provided in CMC 15.10.350 for the added cost and expense of treating such waters or wastes so admitted into the sewage system; and/or

4. Require monitoring of the discharge as provided in CMC 15.10.070; and/or

5. Require user to obtain a state discharge permit.

C. In cases where pretreatment is required, plans, specifications, and other information relating to the construction and installation of pretreatment facilities shall be submitted by the industry to the Ecology and the administrative authority for approval. No construction or installation thereof shall commence until written approval has been received from the administrative authority and Ecology. Such pretreatment facilities shall be constructed, operated, and maintained at the owner’s expense. The industry shall comply with the Ecology and the EPA pretreatment regulations and the state waste discharge permit program.

D. Any person constructing a pretreatment facility, as required by the administrative authority or Ecology, shall also install and maintain at the facility owner’s sole expense a sampling and metering manhole for monitoring the discharge to the public sewer. Such

sampling and metering manhole shall be placed in a location approved by the administrative authority and in accordance with approved specifications.

E. The city can require written permits and/or operating plans for any commercial or industrial discharger that does not fall under state and federal permit requirements. Noncompliance with the permit requirements are enforceable under the provisions of this chapter. (Ord. 2148 § 3, 2005: Ord. 2051 § 1 (part), 2000).

15.10.280 Pretreatment of fats, oils and grease required.

A. Dischargers who operate newly constructed multiplex units or apartment complexes, restaurants, cafes, lunch counters, cafeterias, bars, or clubs; or hotels, hospitals, sanitariums, factories, churches or school kitchens; or other establishments that serve or prepare food where grease may be introduced to the sewer system shall have pretreatment facilities to prevent the discharge of fat waste, oil, or grease (FOG). Take-out food establishments or other establishments that prepare food, but do not cook in oil or grease, and who serve food only in disposable containers, may be exempted from this requirement, provided their discharges do not violate the general discharge prohibitions of this chapter. These pretreatment facilities must have grease interceptors installed in the waste line leading from sinks, drains, or other fixtures where grease may be discharged. The grease interceptors must meet, at a minimum, the specifications of the current Uniform Plumbing Code adopted by the city. The administrative authority is authorized to adopt and publish additional criteria for grease interceptors. Dischargers must maintain these facilities in a manner that will always prevent fat waste, oil, or grease from being carried into the sewer system. Fat waste, oil, or grease removed from such a facility shall not be disposed of in sanitary or storm sewers.

B. All existing restaurants, cafes, lunch counters, cafeterias, bars, or clubs, or hotels, hospitals, sanitariums, factories, churches or school kitchens or other establishments that serve or prepare food where grease may be introduced to the sewer system which do not have a grease interceptor at the time of adoption of the ordinance codified in this chapter shall meet the requirements for grease, oil and fats by installing a grease interceptor within one year of the effective date of the ordinance codified in this chapter. Failure to install a grease interceptor within one year shall result in penalties as outlined in CMC 15.10.340. All grease removal systems must be approved by the administrative authority prior to installation.

C. Use of Enzymes within the City of Centralia POTW. Introduction of any additives into a food service establishment’s wastewater system for the purpose of emulsifying FOG is prohibited, unless a specific written authorization from the FOG control program manager is obtained. (Ord. 2298 § 7, 2013: Ord. 2051 § 1 (part), 2000).

15.10.290 Washing facilities, grease rack—Pretreatment.

Dischargers who operate automatic and coin-operated laundries, car washes, filling stations, commercial garages or similar businesses having any type of washing facilities or grease racks and any other dischargers producing grit, sand, oils, or other materials which have the potential of causing partial or complete obstruction of the building sewer or other areas in the sewer system shall install approved interceptors or tanks in accordance with the latest specifications adopted by the city such that excessive amounts of oil, sand and inert solids are effectively prevented from entering the city sewer. Effective April 1, 2000, all new car washes shall be closed loop, no discharge systems. Proof of required operation and maintenance records must be made available for city inspectors. (Ord. 2051 § 1 (part), 2000).

15.10.300 Inspection fees.

All grease interceptors, oil/water separators, settling tanks and grit traps shall be installed, maintained and operated by the discharger at his own expense. The installation shall be kept in continuous operation at all times, and shall be maintained to provide efficient operation. Cleaning must be performed by a service contractor qualified to perform such cleaning. All material removed shall be disposed of in accordance with all state and federal regulations. Certification of maintenance shall be made readily available to city authorized personnel for review and inspection. Inspection and cleaning frequency of grease interceptors/traps is at the sole discretion of the administrative authority. If a failure to maintain settling tanks, grit traps, grease interceptors, or oil/water separators results in partial or complete blockage of the building sewer or other parts of the wastewater utility system, or adversely affects the treatment or transmission capabilities of the system, or requires excessive maintenance by the city, the discharger responsible for the facilities shall be subject to the remedies, including enforcement and penalties detailed in this chapter. Regular inspections will be conducted at no charge to the customer; however, re-inspections for systems not properly maintained will be charged a fifty-dollar re-inspection fee. (Ord. 2051 § 1 (part), 2000).

15.10.310 Right of revision.

The city reserves the right to amend this chapter, and any permits issued under it, to provide for more stringent limitations or requirements on discharges to the wastewater utility system if such amendments are deemed necessary to comply with the prohibitions set forth in CMC 15.10.260, or are otherwise in the public interest. No vested right shall be created by the issuance of any permit under this chapter. (Ord. 2051 § 1 (part), 2000).

15.10.320 Entry of private property.

The administrative authority, bearing proper credentials and identification, shall be permitted to enter upon all and any premises at all reasonable times for the purpose of inspection,

observation, measurement, sampling, testing of sewers and sewage, and performance of all other acts or duties required within the provisions of this chapter. (Ord. 2051 § 1 (part), 2000).

15.10.330 Violations.

A. Definition. For the purposes of enforcement, the provisions of the rules establishing what constitutes a violation for general dischargers are set forth in this chapter. Those dischargers subject to national pretreatment standards will be subject to enforcement action in accordance with this chapter for any violations of the criteria and limitations specified in the categorical standard or the general pretreatment standards set forth in 40 CFR 403, same being incorporated herein by this reference.

B. Sewer Connection Without Permission. It is unlawful to make or cause to be made or to maintain any sewer connection with any sewer of the city of Centralia, or with any sewer which is connected directly or indirectly with any sewer of the city of Centralia without having permission from the administrative authority. In the event permission has not been granted by the city of Centralia, the city shall seek remedies under CMC 15.10.340(D).

C. Maximum Daily Concentration Allowed. The maximum daily allowable concentration for dischargers not regulated under national pretreatment standards is violated under the following circumstances:

1. The arithmetic mean of concentrations for eight consecutive samples collected within a twenty-four hour time period over intervals of fifteen minutes or greater is in excess of the limitation.

2. The concentration value obtained from composite sample that is representative of the twenty-four hour discharge is in excess of the limitation.

3. The concentration of any single sample (whether as single grab sample or a sample within a series) exclusive of any fats, oils, and grease exceeds the limitation by a factor of two and one-half times.

4. The arithmetic means of the concentration of fats, oils, or greases for three grab samples, taken no more frequently than at five minute intervals exceeds the limitation.

D. pH Sample. The pH of any given sample is less than pH 6.0 or greater than pH 9.0.

E. Temperature Limitation. The temperature limitation is exceeded for any single sample.

F. Maximum Allowable Poundage Limitations. A violation shall occur if the maximum allowable effluent poundage limitation as established in the private wastewater discharge permit is exceeded. The daily poundage discharged shall be calculated using the volume of

effluent discharged that day times the concentration for that day either reported by the discharger or obtained through sampling by the city. The poundage shall be determined utilizing the formula:

Lbs/day = conc. in mg/l x gal/day disch
x 8.34/1,000,000

G. Reporting Requirements. A violation shall occur if any reporting requirements established by permit, accidental discharges, upset conditions, written request of the administrative authority, or as specified by general pretreatment standards (40 CFR 403.12) are not complied with. A violation shall occur when any person knowingly makes any false statement, representation, or certification in any application, record, report, plan or other documents filed or required to be maintained pursuant to this chapter, or who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required under this chapter.

H. FOG Pretreatment Facility—Maintenance. A violation shall occur if there is any failure to maintain grease or grit interceptors or oil/water separators which causes maintenance on any sewer line to be greater than once every two years caused by excessive oil, grease, or fat build up in the sewer lines; or excess build up of sand, gravel or other materials clogging the sewer lines. The lack of any device to prevent discharge of grease, oil, fats, sand, gravel or any other materials which will cause excessive maintenance of the sewer lines shall not relieve the discharger of the responsibility of liability for any costs to the city for excessive maintenance and/or other costs, including overhead incurred by the city.

I. Discharge of Dangerous Waste. A violation shall occur if any material listed on the discharge chemical products list of the state of Washington (WAC 173-303-9903) is discharged into any public sewer, or building sewer tributary thereto.

J. Explosion Meter Readings. A violation shall occur if the readings on an explosion meter at any point in the collection system or wastewater treatment plant is greater than ten percent for a single reading or greater than five percent for two successive readings.

K. Pass Through or Interference. Any discharge which causes pass through or interference with the wastewater treatment plant is a violation.

L. Emergency Suspension of Service and Industrial Wastewater Discharge Permit or Limited Permit.

1. The city may, without advance notice, order the suspension of all or some portion of the wastewater treatment service and any applicable industrial wastewater discharge permit or limited permit to a discharger when it appears to the city that an actual or potential discharge:

a. Presents or threatens a substantial danger to the health or welfare of persons or to the environment; or

b. Threatens to or interferes with the operation of the wastewater treatment plant or collection system; or

c. Causes pass through to the environment or treatment process upset.

2. Any discharger notified of the city's suspension order shall cease immediately all discharges. In the event of failure of the discharger to comply with the suspension order, the city may commence judicial proceedings immediately thereafter to compel the discharger's specific compliance with such order and/or to recover civil penalties. The city shall reinstate the wastewater treatment service upon proof by the discharger of the elimination of the noncomplying discharge or of the conditions creating the threat as set forth in this section and payment of all penalties and fees.

3. In addition to all other rights and remedies, the city shall have the authority to immediately discontinue water service to a discharger if the city determines that such action is reasonably necessary to suspend service as authorized by subsection (L)(1) of this section. The city shall have the right of access onto the discharger's private property to accomplish such termination of the water service.

M. Termination of Treatment Services—Permit Revocation. Dischargers holding NPDES or state discharge permits will be referred to DOE for violations and enforcement/revocation of their permit. The city shall have the authority to terminate wastewater treatment services and to revoke any locally issued industrial wastewater discharge permit or limited permit of the discharger if it determines that the discharger has:

1. Failed to accurately report wastewater constituents and characteristics; or

2. Failed to report significant changes in wastewater constituents, characteristics, flow volumes or types of discharge to the wastewater treatment plant; or

3. Refused reasonable access to the discharger's premises for purposes of inspection or monitoring; or

4. Violated conditions of the wastewater discharge permit; or

5. Violated any of the provisions of this chapter or regulations promulgated hereunder; or

6. Violated any lawful order of the city issued with respect to the discharger's permit or this chapter; or

7. Tampers with, disrupts, damages or renders inaccurate any wastewater monitoring device required by this chapter.

N. Other Violations.

1. If reports required by permit, this chapter or state or federal pretreatment regulations are submitted later than thirty days after they are due, the discharger shall be subject to civil penalties of five hundred dollars per day for a maximum of twenty working days. The penalty shall then be increased to one thousand dollars per day with a maximum fine of twenty thousand dollars. In the event the reports have not been submitted at the time the maximum penalty is imposed, the city shall seek remedies under CMC 15.10.340.

2. If any of the actions prescribed in any compliance schedule established by permit or by order of the administrative authority are not complete within thirty days of the time they are required to be complete, the discharger shall be subject to civil penalties of five hundred dollars per day for a maximum of sixty days for each day the action(s) have not been completed. In the event the actions have not been completed ninety days after the date scheduled in the permit or order the city shall seek remedies under CMC 15.10.340.

3. If a discharger fails to maintain grease, oil and/or sediment removal systems which result in excessive maintenance by the city of the collection system or treatment plant, the discharger shall be subject to a civil penalty of five hundred dollars which shall be added to the costs incurred by the city to perform the maintenance. If excessive maintenance is required a second time within a two year period, the penalty shall be one thousand dollars which shall be added to the costs of maintenance by the city. In the event excessive maintenance continues the city shall seek remedies under CMC 15.10.340.

4. Failure to provide accurate or complete information on any wastewater discharge reports or the requirements of a discharge permit shall result in a civil penalty of one hundred dollars for the first offense. Thereafter the discharger shall be subject to remedies under subsection (N)(1) of this section.

5. All commercial and industrial users are required to complete the annual user survey and submit the completed form to the utilities department within forty-five days of receipt. Failure to complete the survey within the required time will subject the user to penalties as outlined in this chapter.

6. In addition to the assessments described in this section any costs incurred by the city, including attorneys' fees, due to violations subject to civil penalty shall be added to the total amount of the civil penalty assessment. (Ord. 2051 § 1 (part), 2000).

15.10.340 Penalties.

A. Criminal Sanctions. Any person, firm, or corporation violating any of the provisions of this chapter shall, in addition to other penalties as are provided herein, be deemed guilty of a misdemeanor and upon conviction thereof shall be punishable by a fine not to exceed one thousand dollars plus costs and penalty assessments. Each separate day or any portion thereof during which any violation of this chapter occurs shall be deemed to constitute a separate offense, and upon conviction thereof shall be punishable as herein provided.

B. Civil Liability for Expenses and Fines. Any discharger violating provisions of this chapter shall be liable for any expense, loss or damage caused to the collection system and/or treatment plant by reason of such violation, including increased costs for sewage treatment, sludge treatment and disposal and operation and maintenance expenses when such increased costs are the result of the discharger's discharge. If the discharger discharges pollutants that cause the city to violate any condition of its NPIDES permit and to be fined by the United States Environmental Protection Agency or the state or federal government for such violation, the discharger shall be liable to the city for the total amount of the fine assessed against the city, including, without limitation, all legal, sampling, analytical and other associated costs and expenses.

C. Termination of Service—Lien. In addition to the foregoing criminal sanctions and penalties detailed in other sections and not in any way a limitation thereof, persons alleged to be violating any provision of this chapter may be subject to termination of water and/or sewer service by the city upon being given ten days' written notice by certified mail, return receipt requested, directed to such person's address as last shown on the city records, informing them of the alleged violation and informing them that failure to correct such violation will result in termination of such service at the end of the ten-day period; provided, however, this section does not apply to termination of service due to nonpayment of the utility billing. Any work accomplished by customer request or necessary for maintenance, operation, and/or sampling of the private sewer, which may be billed for time, materials, equipment and overhead, or to repair damage caused by a customer and so billed, shall be subject to all applicable penalties including, but not limited to, lien and discontinuance of service, as provided for in CMC 15.10.120.

D. RCW 35.67.350, Penalty for Sewer Connection Without Permission, as now in force or hereafter amended, added to or deleted from, is adopted by reference as part of this chapter. (Ord. 2077 § 1, 2001: Ord. 2051 § 1 (part), 2000).

15.10.350 Schedule of charges.

A. User Charges. User charges levied in accordance with CMC 15.10.030 through 15.10.090 shall be as follows:

Inside City Limits	2009	2010	2011	2012	2013
Single-Family Residential					
Monthly Base Rate	$52.92	$56.96	$58.40	$60.15	$61.95
Low-Income Senior Citizen or Low-Income Totally Disabled	$47.59	$51.22	$52.52	$54.10	$55.72
Usage: Lesser of Actual Water Use or Winter Cap (Per 100 Cubic Feet)	$1.87	$2.01	$2.06	$2.12	$2.18
Multiple-Family Residential (includes trailer parks; see CMC 15.10.050(D))					
First Dwelling	$51.28	$55.40	$57.16	$58.87	$60.64
Each Additional	$45.70	$49.37	$50.94	$52.47	$54.04
Usage: Lesser of Actual Water Use or Winter Cap (Per 100 Cubic Feet)	$1.81	$1.96	$2.02	$2.08	$2.14
Domestic-Strength Commercial/Industrial					
Monthly Base Rate	$17.79	$21.35	$22.12	$22.78	$23.46
Usage Per 100 Cubic Feet	$9.48	$11.38	$11.79	$12.14	$12.50
Monthly Minimum	$59.74	$71.69	$74.26	$76.49	$78.78
High-Strength Commercial/Industrial					
Monthly Base Rate—to be determined on a case-by-case basis	N/A	N/A	N/A	N/A	N/A
Usage Per 100 Cubic Feet—to be determined on a case-by-case basis	N/A	N/A	N/A	N/A	N/A

Outside City Limits	2009	2010	2011	2012	2013
Single-Family Residential					
Monthly Base Rate	$79.37	$85.43	$87.59	$90.22	$92.93
Low-Income Senior Citizen or Low-Income Totally Disabled	$71.39	$76.84	$78.78	$81.14	$83.57
Usage: Lesser of Actual Water Use or Winter Cap (Per 100 Cubic Feet)	$2.81	$3.02	$3.10	$3.19	$3.29
Multiple-Family Residential (includes trailer parks; see CMC 15.10.050(D))					
First Dwelling	$76.93	$83.11	$85.74	$88.31	$90.96
Each Additional	$68.56	$74.07	$76.42	$78.71	$81.07

Outside City Limits	2009	2010	2011	2012	2013
Usage: Lesser of Actual Water Use or Winter Cap (Per 100 Cubic Feet)	$2.71	$2.93	$3.02	$3.11	$3.20
Domestic-Strength Commercial/Industrial					
Monthly Base Rate	$26.68	$32.02	$33.17	$34.17	$35.20
Usage Per 100 Cubic Feet	$14.22	$17.06	$17.67	$18.20	$18.75
Monthly Minimum	$89.62	$107.54	$111.40	$114.74	$118.18
High-Strength Commercial/Industrial					
Monthly Base Rate—to be determined on a case-by-case basis	N/A	N/A	N/A	N/A	N/A
Usage Per 100 Cubic Feet—to be determined on a case-by-case basis	N/A	N/A	N/A	N/A	N/A

For new sewer customers connecting or opening a utility account during the nonwinter months, or where there is no history of winter usage for an account, the lesser of the actual usage experienced by the new customer or the average residential usage quantity for all residential customers calculated for the most recent winter period shall be used to determine the monthly usage charge. In the case of low-income senior citizens or low-income totally disabled customers, the same shall apply except that the calculated average winter usage shall be based on low-income senior citizen and low-income totally disabled customer usage only. For new multiple-family residential accounts, the average winter usage per dwelling unit shall be ninety percent of that calculated from all residential usage.

On January 1st of each year beginning in 2014, the rates shall be adjusted to reflect the annual percentage increase in the United States Consumer Price Index, All Urban Consumers (CPI-U) for November of the preceding year as shown in the release from the Bureau of Labor Statistics. Calculation of the change in the index is made by dividing the current index for November by the preceding index for November and subtracting one.

B. Capital Facility Charge.

1. So that the property owners shall bear their equitable share of the cost of the wastewater system and as authorized in RCW 35.92.035, there shall be paid a capital facilities charge at the time the sewer permit is approved for a wastewater connection based on the size of the water meter (see exception in CMC 15.10.100 for certain required connections).

When a request or requirement for a larger size water meter is made, the additional capital facilities charge for wastewater will be the difference between the old water

meter size and the new water meter size based on the current schedule of capital facilities charges.

The capital facility charges shall be as follows:

	Capital Facilities Charge Effective January 1:				
Water Meter Size	**2009**	**2010**	**2011**	**2012**	**2013**
3/4 inch	$4,932	$5,582	$6,232	$6,388	$6,548
1 inch	$8,236	$9,322	$10,407	$10,667	$10,934
1 and 1/2 inch	$16,424	$18,588	$20,753	$21,272	$21,804
2 inch	$26,288	$29,752	$33,217	$34,047	$34,898
3 inch	$52,625	$59,560	$66,496	$68,158	$69,892
4 inch	$82,217	$93,052	$103,888	$106,485	$109,147
6 inch	$164,384	$186,048	$207,713	$212,906	$218,229
8 inch	$263,024	$297,689	$332,354	$340,663	$349,180

On January 1st of each year beginning in 2012, capital facility charges shall be adjusted to reflect the annual percentage increase of the Engineering News Record Construction Cost Index as published for November of the preceding year. Calculation of the change in the index is made by dividing the current index for November by the preceding index for November and subtracting one.

2. For projects not completed within one hundred eighty days after approval and where the permit has expired in accordance with CMC 15.10.145, the capital facilities charge shall be refunded to the applicant subject to a five percent processing fee. Latecomer, permit and inspection fees are non-refundable. Applicant shall be charged fee rates in effect at time of payment.

3. All capital facility fees collected shall be classified as restricted funds for capital system additions and improvements. (Ord. 2378 § 1, 2016: Ord. 2298 § 8, 2013: Ord. 2225 § 2, 2008: Ord. 2212 § 9 (part), 2008: Ord. 2199 § 1, 2007: Ord. 2179 § 3, 2006: Ord. 2134 § 1, 2004: Ord. 2069 § 1, 2001: Ord. 2051 § 1 (part), 2000).

15.10.360 Effective date of charges.

A. Rates set forth in this chapter shall be in full force and effect with the January 2013 billing.

B. Capital facilities charges set forth in this chapter shall be in full force and effect January 2013. (Ord. 2298 § 9, 2013: Ord. 2225 § 3, 2008: Ord. 2212 § 9 (part), 2008: Ord. 2199 § 2, 2007: Ord. 2179 § 4, 2006: Ord. 2134 § 2, 2004: Ord. 2051 § 1 (part), 2000).

SERVICE AGREEMENT

GRINDER PUMP SEWER SYSTEM FOR CUSTOMER

This Agreement for a Grinder Pump Sewer System requested by Customer is entered into by and between The City of Centralia Wastewater Department (the City), a municipal corporation and NAME OF CUSTOMER. ("Customer") for a grinder pump to provide sanitary sewer service to the property located at and commonly known as, PROPERTY ADDRESS ("Property").

Legal Description:

Lot 1 of Centralia North II Commercial Condominium, according to the declaration thereof under Auditor's File No. XXXX and the Condominium Plat recorded in Volume 1 of Condominiums, Page XX under Auditor's File No. XXXX, records of Lewis County, Washington.

TOGETHER WITH an easement for ingress, egress and utilities as disclosed by instrument titled, Street or Highway Easement, recording DATE, under Auditor's File No.(s) XXXX and YYYY.

Parcel #: XXXXX

RECITALS

WHEREAS, the City owns, operates and maintains a centralized sanitary sewer system; and

WHEREAS, the City sanitary system is regulated by the rules and regulations of the Washington State Department of Ecology (DOE); and

WHEREAS, Customer is currently connected to the City's sanitary sewer system to receive sewer service from the City; and

WHEREAS, the elevation and/or slope of the Property in relation to the location of the City's sanitary sewer system requires Customer's use of a low pressure sewer system commonly known as a grinder pump system (" Grinder Pump") in order to transport Customer's sewage to the City's sanitary sewer system; and

WHEREAS, the Customer has installed a Grinder Pump with City approval of the design of the system, including materials and equipment.

WHEREAS, the City has inspected and approved the installed Grinder Pump.

NOW, THEREFORE, in consideration of the mutual promises and covenants contained herein, the City and Customer agree as follows:

1. As a condition of providing sanitary sewer service the Customer agrees to the following:

a. Grinder Pump maintenance: Customer agrees to contract with a licensed and bonded contractor to maintain and inspect every three (3) years their Grinder Pump in accordance with the DOE Criteria for Sewage Works Design [1], and Customer shall pay all cost of maintenance and repair directly to the contractor. The contractor must have a City of Centralia business license and be qualified and capable of performing such maintenance and repair.

b. Customer agrees that the City and its representatives shall have the right to enter the Customer's property with reasonable notice (except in the case of emergencies) to inspect the Grinder Pump as well as to stop discharge from the Grinder Pump in order to prevent contamination of state waters.

c. Customer agrees that the City shall have the right to stop any discharges from the Grinder Pump in order to prevent contamination of state waters.

2. The City and Customer agree that, although the Grinder Pump is owned and maintained by the Customer, the Grinder Pump shall be regarded as an integral component of the City's sanitary sewer system as required by the Rules of the Department of Ecology [2] and is not a part of the home plumbing for the Property.

3. Customer acknowledges and agrees that failure of Customer to pay all cost associated with the operation and maintenance of the Grinder Pump as set forth in the City's Sanitary Sewer Rate Ordinance or failure of Customer to allow the City and its representatives to enter Customer's property, as set forth in Section 1.b. above, shall be grounds for the disconnection of water and wastewater service to the Property.

4. The Customer consents to the jurisdiction of the State of Washington and any action to enforce any of the terms and provisions herein contained shall be brought in Lewis County, Washington and the laws of the State of Washington shall be controlling.

5. No waiver, alteration, or modification of any of the provisions of this Agreement shall be binding unless in writing and signed by a duly authorized representative of the City and Customer.

[1] Criteria for Sewage Works Design (Section C1-10.4.1 thru C1-10.4.4)

[2] Criteria for Sewage Works Design (Section C1-10 Alternative Systems)

6. This Agreement is not assignable by Customer. Upon termination of service to the Property or sale of property a new Customer desiring to receive water and/or wastewater service from the City shall be required to execute their own service agreement.

7. The Customer shall defend, indemnify and hold the City, its officials, employees and volunteers harmless from any and all claims, injuries, damages, losses or suits including attorney fees, arising out of or in connection with the performance of this Agreement, except for injuries and damages caused by the negligence of the City.

8. The Grinder Pump will be powered by Customer's home electrical system. In the event that power service to the Grinder Pump is disrupted, Customer shall be responsible for taking measures to prevent the backup of wastewater on the Property.

ENTERED INTO this the _____day of _____, 20____.

CITY:

City of Centralia

Public Works

Wastewater Department

By: _____

The City's Representative

CUSTOMER:

By: See attached signature page

Printed Name: Attached hereto

Signature Page to Service Agreement – Grinder Pump Sewer System for Customer

CUSTOMER NAME
By: XXXXX, its Manager

By: _____
NAME
TITLE

Signed: _____

Appendix M
Manhole Monitoring Form

APPENDIX H

Manhole Monitoring Form

Manhole No: _____ Date: _____

Time: _____

Location _____ By: _____

Rim Elevation _____

Pipe Invert _____

Depth of Flow in Pipe

_____ < ¼ Full
_____ ¼ Full
_____ ½ Full
_____ ¾ Full
_____ Full pipe
_____ Surcharged

If Full Pipe or Greater, Distance Between Rim and Water Surface

____ ft _____ inches

Other Observations:

Weather/Rainfall

Pipe Location

Manhole Condition

Appendix N
SEPA and SERP Documents

City of Centralia General Sewer/ Facility Plan SEPA Checklist

CITY OF CENTRALIA
COMMUNITY DEVELOPMENT

ENVIRONMENTAL CHECKLIST

WAC 197-11-960 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.

City of Centralia
Community Development
Environmental Checklist

**** OFFICIAL USE ONLY ****
Project #:
Related Cases:
Date Received: By:
**** OFFICIAL USE ONLY ****

1. Applicant: **Mr. Richard Dickinson**
   Address: **City of Centralia Public Works**
   1100 N. Tower Avenue
   Centralia, WA 98531
   Phone: **(360) 330-7512**
   Cell: **N/A**

2. Point of contact: **Mr. Richard Dickinson**
   Address: **1100 N. Tower Ave.**
   Centralia, WA 98531
   Phone: **(360) 330-7512**
   Cell: **N/A**
   E-mail address: rdickinson@cityofcentralia.com

3. Owner: **City of Centralia**
   Address: **1100 N. Tower Ave.**
   Centralia, WA 98531
   Phone: **(360) 330-7512**
   Cell: **N/A**
   E-mail address**: N/A**

4. Property address or location: **1101 Goodrich Road., Centralia, WA 98531**
5. Quarter/Quarter Section/Township/Range: **Section 26/Township 15N/Range 03W**
6. Tax parcel number: (show all 12 digits) **023771001002**
7. Total acres/square feet: **WWTP is located within 263 acres. Improvements would occur within the existing site.**
8. Permit type: **General Sewer/Facility Plan Update**
9. Zoning: **RDD-10**
10. Shoreline environment: **Does not apply**
11. Water body: **Does not apply**
12. Brief description of the project and project name: **City of Centralia General Sewer/Facility Plan**

    The City of Centralia General Sewer/Facility Plan is a planning document that includes elements of both a general sewer plan and a facility plan. It details how the City will provide service for population growth as it occurs, replace out of date or aging infrastructure, and provide adequate capacity at the Centralia Wastewater Treatment Plant.

13. Did you attend a presubmission conference for this project? ☐ Yes ☑ No
    If yes, when? _____
14. Estimated project completion date: **Does not apply**
15. List of all Permits, Licenses or Government Approvals Required for the Proposal (federal, state and local – including rezones): **The plan must be approved by the Washington State Department of Ecology**

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

    The General Sewer/Facility Plan describes the physical expansion and operational activities the City Wastewater Department will implement over the next 20 years to accommodate growth, replace aging infrastructure, and update the City of Centralia Wastewater Treatment Plant.

17. Do you know of any plans by others that may affect the property covered by your proposal? If yes, explain:

    No.

18. Proposed timing or schedule (include phasing, if applicable):

    The elements of the General Sewer/Facility Plan will be implemented over the next 20 years.

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

    This is a non-project SEPA. Individual construction projects will go through separate review as they occur. Past documents include past project specific SEPA checklists, EIS for construction of the wastewater treatment facility (1999), General Sewer Plan (2000), General Sewer Plan update (2008), and various facility plans.

20. 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

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

    The General Sewer/Facility Plan must be approved by the Washington State Department of Ecology.

Evaluation for Agency Use On

To be completed by Applicant

B. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site:

- ☐ Flat
- ☐ Rolling
- ☑ Hilly
- ☐ Steep slopes
- ☐ Mountainous
- ☐ Other:_____

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

The steepest slope in the service area is 40 percent.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat,muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.

General soil types found in the service area include: Spanaway, Newberg, Chehalis, Indianoia, and Nisqually series. Newberg fine sandy loam, Chehalis silt clay and Claquato silt loam are identified as prime farmland soils by the Natural Resource Council.

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

Potentially unstable soils in areas proposed for sewer service will be subject to geotechnical investigations.

e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.

Does not apply.

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

Does not apply.

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

Does not apply.

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

Does not apply.

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.

Does not apply. Exhaust from construction equipment will be minimal. Some dust may result from construction activities. Pump Stations may produce small amounts of air emissions from emergency Generator operation. No odor generation is anticipated.

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:

Does not apply.

3. Water

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.

Chehalis River, Dry creek.

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.

Does not apply.

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

Does not apply.

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

No.

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

Approximately 20 percent of the entire sewer service area lies within floodplains mapped by FEMA.

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.

Discharge from the wastewater treatment facility is regulated under a site specific NPDES permit. Highly treated municipal wastewater is discharged to the Chehalis River.

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.

Does not apply.

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

Does not apply.

c. Water runoff (including stormwater):

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

Does not apply.

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

Does not apply.

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

Does not apply.

4. Plants

a. Check types of vegetation found on the site:

☑ Deciduous tree: ☑ alder ☑ ☐ maple ☐ aspen ☐ other _____

☑ Evergreen tree: ☑ fir ☐ cedar ☐ pine ☐ other _____

☑ Shrubs

☑ Grass

☐ Pasture

☐ Crop or grain

☐ Wet soil plants: ☐ cattail ☐ buttercup ☐ bulrush,

☐ 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?

Does not apply.

To be completed by applicant

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

None known.

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

Does not apply.

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:

☑ **Birds**: ☑ hawk ☑ heron ☑ eagle ☑ songbirds ☐ other: _____
☑ **Mammals:** ☑ deer ☐ 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.

Bald eagles are known to nest in the vicinity of the Chehalis River.

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

Migratory waterfowl.

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

Does not apply.

6. Energy and natural resources

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

Construction equipment and sewer pump station emergency back-up generators will use petroleum based fuels. Pump stations normally use electrical power to operate.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

No.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

Does not apply. Energy conservation will be evaluated when individual components are designed and constructed.

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.

Does not apply.

1) Describe special emergency services that might be required.

Does not apply. Construction of future sewer improvements may encounter ground contamination from past uses.

2) Proposed measures to reduce or control environmental health hazards, if any:

Does not apply.

b. **Noise**

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

Does not apply. Future construction projects will produce typical construction noise which will be addressed during those projects.

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

Does not apply. Future construction projects will produce typical construction noise which will be addressed during those projects.

3) Proposed measures to reduce or control noise impacts, if any:

Does not apply.

8. Land and shoreline use

a. What is the current use of the site and adjacent properties?

The current land use is wastewater facility. Adjacent properties include agriculture and single family on large parcels.

b. Has the site been used for agriculture? If so, describe.

Does not apply. The City of Centralia has agricultural areas where sewer service is provided and has facilities located on land that used to be considered agricultural.

c. Describe any structures on the site.

Does not apply.

d. Will any structures be demolished? If so, what?

Does not apply.

e. What is the current zoning classification of the site?

Based upon information in the 2010 Amended Lewis County Comprehensive Plan, the area is currently zoned as RDD-10 (Rural Development District). This is a mixed-use zoning district that allows a number of different land uses such as single family residential, resource uses and limited types of commercial activity. RDD-10 allows a density of one dwelling unit per ten acres for subdivision purposes.

f. What is the current comprehensive plan designation of the site?

Site is located outside City limits of Centralia in unincorporated Lewis County. The Lewis County Comprehensive Plan designates the area as Rural – Open.

g. If applicable, what is the current shoreline master program designation of the site?

Does not apply.

h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.

There is a critical aquifer area within the City limits and urban growth area.

i. Approximately how many people would reside or work in the completed project?

Approximately 16,750 people live in Centralia.

j. Approximately how many people would the completed project displace?

None.

k. Proposed measures to avoid or reduce displacement impacts, if any:

None needed.

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

None needed.

9. Housing

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

Does not apply.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

Does not apply.

c. Proposed measures to reduce or control housing impacts, if any:

Does not apply.

10. Aesthetics

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

Does not apply.

b. What views in the immediate vicinity would be altered or obstructed?

Does not apply.

c. Proposed measures to reduce or control aesthetic impacts, if any:

Does not apply.

11. Light and glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

Does not apply.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

Does not apply.

c. What existing off-site sources of light or glare may affect your proposal?

Does not apply.

d. Proposed measures to reduce or control light and glare impacts, if any:

Does not apply.

12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?

Does not apply.

b. Would the proposed project displace any existing recreational uses? If so, describe.

Municipal parks, trails

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

Does not apply.

13. 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.

Does not apply.

b. Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site.

Does not apply.

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

Does not apply.

To be completed by applicant

14. 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.

Does not apply.

b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?

Does not apply.

c. How many parking spaces would the completed project have? How many would the project eliminate?

Does not apply.

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public orprivate).

Does not apply.

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

Does not apply.

f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.

Does not apply. Not known at this time.

g. Proposed measures to reduce or control transportation impacts, if any:

Does not apply.

15. 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.

Does not apply.

b. Proposed measures to reduce or control direct impacts on public services, if any.

Does not apply.

16. Utilities

a. Circle utilities currently available at the site: electricity, natural gas, water, refuse service,telephone, sanitary sewer, septic system, other.

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity that might be needed.

Does not apply.

C. SIGNATURE

Pursuant to RCW 9A.72.085, I declare under penalty of perjury under the laws of the State of Washington that the foregoing is true and correct. I understand that the lead agency is relying on them to make its decision.

Signature: _____

Date Submitted: _____

Environmental Checklist submittal Requirements

Fees: $200.00 Please make checks payable to: City of Centralia

Site plan: Submit one copy of site plan on 11" x 17" paper. The plan must be clearly legible and contain pertinent information

Supplemental reports: Include any applicable reports such as wetland report, storm water calculations, or traffic impact analysis

City of Centralia - Community Development 118 W. Maple St. PO Box 609 Centralia, WA 98531 Phone: (360)330-7662

To be completed by applicant

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 the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

   When implemented, the General Sewer/Facility Plan will provide public sanitary sewer services and treatment. Individual components of the General Sewer/Facility Plan will be implemented over 20 years. Construction will produce temporary emissions to air, noise, and disrupt traffic. Construction erosion control practices are required. We do not anticipate implementation of the plan to increase discharge to water since that is regulated under a NPDES permit.

   Proposed measures to avoid or reduce such increases are:

   Construction contracts will include controls and mitigation for air emissions, noise, traffic disruption, and erosion control.

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

   The General Sewer/Facility Plan is designed to ensure wastewater is conveyed to the wastewater treatment plant and treated to standards that protect plants, animals, fish and marine life. It will also protect human health.

   Proposed measures to protect or conserve plants, animals, fish, or marine life are:

   During construction, measures would be implemented as required.

3. How would the proposal be likely to deplete energy or natural resources?

   The proposal does not deplete energy or natural resources.

   Proposed measures to protect or conserve energy and natural resources are:

   Does not apply.

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?

   Implementation of the General Sewer/Facility Plan will protect all the

elements listed.

Proposed measures to protect such resources or to avoid or reduce impacts are:

Implementation of the General Sewer/Facility Plan will protect all the elements listed.

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

   The General Sewer/Facility Plan should not affect land and shoreline use.

   Proposed measures to avoid or reduce shoreline and land use impacts are:

   The General Sewer/Facility Plan and design of projects must be approved by the Washington state department of ecology; all necessary permits (federal, state, and local) will be obtained and identified mitigation measures implemented.

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

   The General Sewer/Facility Plan should not affect the demands on transportation or public services except during construction of site specific improvements which will go through independent environmental review.

   Proposed measures to reduce or respond to such demand(s) are:

   Site specific improvements will go through independent environmental review.

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws orrequirements for the protection of the environment.

   SEPA review for the General Sewer/Facility Plan was required by the Department of Ecology Wastewater Engineer. The proposal does not conflict with any local, state, or federal laws. All necessary permits (federal, state, and local) will be obtained and identified mitigation measures implemented.

City of Centralia General Sewer/ Facility Plan SEPA Determination of Non-significance

SEPA #:2019 0025
Date of Determination: March 2, 2019

FINAL DETERMINATION OF NONSIGNIFICANCE

Description of proposal: The City of Centralia General Sewer/Facility Plan is a planning document that includes elements of both a general sewer plan and a facility plan. It details how the City will provide service for population growth as it occurs, replace out of date or aging infrastructure, and provide adequate capacity at the Centralia Wastewater Treatment Plant.

Proponent: Rick Eaton, (360)330-7512, reaton@cityofcentralia.com

Location of proposal: City Wide, Non-Project Related

Lead agency: Centralia Community Development

The lead agency for this proposal has determined that the update to the City of Centralia General Sewer Plan does not have a probable significant adverse impact on the environment with development conditions. An environmental impact statement (EIS) is not required under RCW 43.21C.030(2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public on request. This DNS is issued under WAC 197-11-340(2).

Responsible official:	Jennifer Kreifels
Position/title:	Planner, City of Centralia - Community Development
Phone:	(360) 330-7684
Email:	jkreifels@cityofcentralia.com
Address:	P.O. Box 609 Centralia, WA 98531

Signature: Jennifer Kreifels

You may appeal this determination to City of Centralia - Community Development, 118 W Maple, Centralia, WA 98531. All appeals must be filed with City of Centralia in writing with a $100.00 fee, submitted by 5:00 pm on March 23. You should be prepared to make specific factual objections. If you have any questions regarding the SEPA or appeal processes please contact the Responsible Official.

The environment threshold determination is based on analysis of information contained in the following documents: Environmental Checklist, City of Centralia Sewer Plan Update.

General Notes/Conditions:

The issuance of a Determination of Nonsignificance does not constitute project approval. The proposal must comply with all applicable requirements of the City of Centralia, as well as all other local, state and federal requirements.

Environmental Notes/Conditions:

Department of Ecology, Southwest Regional Office: see attached letter dated March 1, 2019, and reads as follows.
AIR QUALITY/GREENHOUSE GASES: Gail Sandlin (360) 407-6800
The sewage treatment plan does not discuss greenhouse gas emissions nor does the document discuss climate resilience strategies based on plant location which may or may not be significant.
Ecology's comments are based upon information provided by the lead agency. As such, they may not constitute an exhaustive list of the various authorizations that must be obtained or legal requirements that must be fulfilled in order to carry out the proposed action. If you have any questions or would like to respond to these comments, please contact the appropriate reviewing staff listed above.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

March 1, 2019

Jennifer Keifels, SEPA Responsible Official
City of Centralia
Community Development Department
PO Box 609
Centralia, WA 98531

Dear Jennifer Keifels:

Thank you for the opportunity to comment on the revised determination of nonsignificance for the City of Centralia General Sewer/Facility Plan (2019 0025) as proposed by City of Centralia Public Works, Wastewater Division. The Department of Ecology (Ecology) reviewed the environmental checklist and has the following comment(s):

AIR QUALITY/GREENHOUSE GASES: Gail Sandlin (360) 407-6800

The sewage treatment plan does not discuss greenhouse gas emissions nor does the document discuss climate resilience strategies based on plant location which may or may not be significant.

Ecology's comments are based upon information provided by the lead agency. As such, they may not constitute an exhaustive list of the various authorizations that must be obtained or legal requirements that must be fulfilled in order to carry out the proposed action.

If you have any questions or would like to respond to these comments, please contact the appropriate reviewing staff listed above.

Department of Ecology
Southwest Regional Office

(MLD:201900820)

cc: Gail Sandlin, AQP/GHG
Rick Eaton, City of Centralia Public Works (Proponent)

City of Centralia WWTP Upgrades SEPA Checklist

City of Centralia
Community Development
Environmental Checklist

****** OFFICIAL USE ONLY ******
Project #:
Related Cases:
Date Received: By:
****** OFFICIAL USE ONLY ******

1. Applicant: **Mr. Richard Dickinson**
   Address: **City of Centralia Public Works**
   1100 N. Tower Avenue
   Centralia, WA 98531
   Phone: **(360) 330-7512**
   Cell: **N/A**

2. Point of contact: **Mr. Richard Dickinson**
   Address: **1100 N. Tower Avenue**
   Centralia, WA 98531
   Phone: **(360) 330-7512**
   Cell: **N/A**
   E-mail address: **rdickinson@cityofcentralia.com**

3. Owner: **City of Centralia**
   Address: **1100 N. Tower Ave.**
   Centralia, WA 98531
   Phone: **(360) 330-7512**
   Cell: **N/A**
   E-mail address: **N/A**

4. Property address or location: **1101 Goodrich Rd., Centralia, WA 98531**
5. Quarter/Quarter Section/Township/Range: **Section 26/Township 15N/Range 03W**
6. Tax parcel number: (show all 12 digits) **023771001002**
7. Total acres/square feet: **WWTP is located within 263 acres. Improvements would occur within the existing site.**
8. Permit type: **General Sewer/Facility Plan Update: Building Permit for Tanks and Pumps**
9. Zoning: **RDD-10**
10. Shoreline environment: **Does not apply** Conservancy
11. Water body: **Does not apply** Chehalis River
12. Brief description of the project and project name: **City of Centralia Wastewater Treatment Plant Updates**

    The proposed project includes upgrades to the City of Centralia Wastewater Treatment Plant over two phases; Phase 1 for the near term and Phase II for the longer term (implemented by approximately 2030). All proposed upgrades would be constructed within the existing property boundaries of the existing City of Centralia WWTP property (263 acres). Within the property boundaries, the existing WWTP site is located on approximately 19 acres of the WWTP property. The WWTP site is constructed on engineered fill above the 100-year flood elevation. The area proposed for the waste activated sludge (WAS) storage tank was intended for future expansion of the WWTP. None of the existing infrastructure will need to be demolished.

    Specifics of the proposed action include:

    Phase I WWTP upgrades will include the addition of mixed liquor recirculation pumps in the existing aeration basins, the construction of two WAS storage tanks to increase operational flexibility and optimize the existing WWTP capacity, two new WAS feed pumps to convey WAS from the secondary clarifiers to the WAS storage tanks, installation of two new positive-displacement blowers to provide aeration to the WAS storage tanks, and expansion of the Blower Building to house electrical and control needs associated with Phase I. The mixed liquor recirculation pumps are intended to provide alkalinity recovery and reduction in oxygen demand while the WAS storage tank will enable daily WAS wasting operations. Each WAS tank would be 0.1 MG with a side water depth of 20 feet.

    Phase II upgrades have been proposed, but are not included as part of this SEPA checklist.

13. Did you attend a presubmission conference for this project? ☐ Yes ☒ No
    If yes, when?
14. Estimated project completion date: **Phase 1 - 2018.**
15. List of all Permits, Licenses or Government Approvals Required for the Proposal (federal, state and local – including rezones):
    - **Notice of Construction, Washington Department of Ecology**
    - **Building Permit, Lewis County**
    - **Grading Permit, Lewis County**
    - **Electrical permits, Department of Labor and Industries**
16. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

    Yes. Phase II improvements for the WWTP will include upgrades to expand the capacity of the plant in order to accommodate future growth. These improvements include a third aeration basin, a third secondary clarifier, and a third WAS storage tank. These structures would be the same size and configuration as the existing ones. The previous City of Centralia Facility Plan (2000) planned for additional structures for expansion, and space has been allotted for them. The construction of the third

aeration basin will require one new centrifugal blower that is identical to the existing units. Depending on the actual TKN/ammonia loading, a fourth 480-scfm positive-displacement blower may be required for the WAS storage tank. To accommodate these blower improvements, the existing blower building will be expanded approximately 20 feet to the south. The south wall frame of the existing blower building was constructed as an interior frame to allow the blower building expansion as growth occurred in the sewer service areas. This expansion allows for the installation of two new 3,200-scfm blowers and the 480-scfm positive-displacement blower.

17. Do you know of any plans by others that may affect the property covered by your proposal? If yes, explain:

    No.

18. Proposed timing or schedule (include phasing, if applicable):

    Construction is contingent on obtaining approvals from Washington State Department of Ecology and funding. Implementation of the WWTP updates would be done in two phases (Phase I and Phase II).

    Phase I would be implemented once project approvals are complete and includes purchasing and installing the mixed liquor recirculation pumps, constructing the WAS storage tanks, and purchasing and installing two WAS feed pumps and two positive-displacement blowers. Phase I would also include expansion of the existing blower building for a new electrical annex.

    Phase II would consist of completing the remaining capacity upgrades as funding is available by 2030 to meet the needs for the planning year 2035 and the effluent limits defined in the City's current NPDES permit.

    This SEPA checklist only addresses Phase I of the project as Phase II will not be constructed in the near future.

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

    - **Cultural Resources Technical Report (CH2M HILL 2002)[1]**
    - **State Environmental Review Process (SERP) Federal Cross Cutter Documentation**

20. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal?

    If yes, explain:

    The Washington State Department of Ecology (Ecology) must review and approve the *City of Centralia WWTP – Phase 1 Improvements Design* memorandum and the General Sewer Phase 1 Improvements design documents.

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

    - **Notice of Construction, Washington Department of Ecology**
    - **Building Permit, Lewis County**
    - **Grading Permit, Lewis County**
    - **Electrical permits, Department of Labor and Industries**

[1] Cultural Resources Technical Report is not included to avoid public disclosure and restrict information in this report about the location of potential archaeological sites, as provided for by Section 304 of the National Historic Preservation Act, Section 9(a) of the Archaeological Resources Protection Act, and RCW 27.53.070 and RCW 42.56.300

To be completed by Applicant

Evaluation for Agency Use Only

B. ENVIRONMENTAL ELEMENTS

1. **Earth**

a. General description of the site:

☑ Flat -- **Site is constructed on engineered fill.**

☐ Rolling

☐ Hilly

☐ Steep slopes

☐ Mountainous

☐ Other:_____

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

Does not apply.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.

The proposed action excavates into a layer of engineered fill and into the native brown silt or fine sand. It does not convert any farmland to nonfarm uses. Any impacts to prime farmland were identified as part of the environmental documentation completed prior to the construction of the WWTP facility. The engineered fill was compacted to at least 90-percent modified Proctor at the time of the WWTP's construction in 2002.

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

None known.

e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.

No fill material would be used nor would any grading occur for Phase 1. Excavated fill will be remain onsite and be placed in a designated excavation spoils disposal area northwest of the proposed improvements within the WWTP property. Soils will be spread and compacted to 95% maximum density.

To be completed by Applicant

Evaluation for Agency Use Only

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

As needed, during construction, standard best management practices (BMPs) would beemployed to prevent erosion including the use of straw bales, or plastic sheets during grading activities or stockpiling of materials.

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

The WWTP site is 19 acres located within 263 acres of the WWTP property. The existing paved surface within the 19 acre site is 6.67 acres (35.1 percent). Theengineered fill of the remainder of the WWTP site is expected to have low permeability and is drained to dry wells on the WWTP site. Phase 1 of the project is expected to add 0.06 acre of impervious surface.

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

Does not apply.

To be completed by Applicant

Evaluation for Agency Use Only

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.

During construction, additional airborne dust particles and emissions from construction equipment would occur. Emissions generated by construction traffic would be minimal. During operation of the proposed action, there would be no impacts and no mitigation would be required.

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

No.

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

During construction, dust would be controlled by wetting soils as necessary during dry periods. All construction vehicles and equipment would be equipped with properly maintained pollution prevention control devices. Aeration is provided at the WAS storage tanks to prevent anaerobic conditions from producing odorous air.

To be completed by Applicant

Evaluation for Agency Use Only

3. Water

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.

No. Nearest water body is the Chehalis River, approximately 3,075 feet to the south and 2,050 feet to the west. There are no wetlands within the project site.

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.

No.

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.

No fill or dredge material would be placed in or removed from surface water or wetlands.

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

The site would not require surface water withdrawals or diversions.

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

No. However, the proposal lies within the 500-year floodplain. Construction of the WWTP site in 2002 elevated the site above the 100-year floodplain on engineered fill, but the site is still shown within the floodplain on existing maps. In 2012, a Letter of Map Revision Based on Fill Determination was accepted by the Federal Emergency Management Agency (FEMA); it documents the removal of the site from the 100-year floodplain area. The project is now located within Zone B (moderate flood hazard areas – between the limits of the base flood and the 0.2-percent-annual-chance (or 500-year) flood).

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.

The proposal does not involve any discharges of waste materials to surface waters.

To be completed by applicant

Evaluation for Agency Use Only

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.

If ground water is encountered during excavation for the WAS tanks it would need to be withdrawn. If encountered, ground water would be withdrawn and grit and other suspended solids would be settled out in temporary tanks prior to discharge to the bioswale area on the WWTP property that would allow infiltration. No water would be discharged to ground water.

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

No waste material would be discharged into the ground.

c. Water runoff (including stormwater):

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

Stomwater collected during construction, including construction dewatering, would allow solids to be settled out prior to discharge to the bioswale area for infiltration.

The impervious surface would be paved and sloped to capture all stormwater runoff. Stormwater would be drained to a stormwater retention pond and then pumped back to the WWTP for treatment prior to discharge.

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

No.

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

The use of BMPs as described under B.1(f), Earth, would minimize the transport of soils by stormwater during construction.

To be completed by Applicant

Evaluation for Agency Use Only

4. Plants

a. Check types of vegetation found on the site:

☑ Deciduous tree: ☑ alder ☑ maple ☐ aspen ☐ other _____

☑ Evergreen tree: ☑ fir ☐ cedar ☐ pine ☐ other _____

☑ Shrubs

☑ Grass

☐ Pasture

☐ Crop or grain

☐ Wet soil plants: ☐ cattail ☐ buttercup ☐ bulrush,
☐ 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?

The proposed action would convert an area of grass (approximately 0.06 acres) to pavement, gravel road, building roof and electrical trench.

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

None known.

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

Does not apply.

To be completed by Applicant

Evaluation for Agency Use Only

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:

Birds: ☐hawk ☐heron ☐eagle ☐songbirds ☐other: _____

Mammals: ☐deer ☐bear ☐elk ☐beaver ☐other:_____

Fish: ☐bass ☐salmon ☐trout ☐herring ☐shellfish

other:_____

No animals are known to be on the 19 acre WWTP site, except birds that nest in the eaves of the Biosolids Storage Facility and this nesting habitat would not be changed by this proposal. There are significant populations of birds, mammals and fish on the larger WWTP property and along/within the Chehalis River, but this proposal would not have any effect on the animals.

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

None.

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

No.

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

Does not apply.

6. **Energy and natural resources**

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

Electricity would be used to power the mixed liquor recirculation pumps, the WAS pumps, the WAS tank mixers, and the WAS tank blowers.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

No.

To be completed by Applicant

Evaluation for Agency Use Only

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

The WAS pumps and WAS tank blowers have Variable Frequency Drives (VFD) which provides operational flexibility to optimize power efficiency.

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.

No.

1) Describe special emergency services that might be required.

Does not apply.

2) Proposed measures to reduce or control environmental health hazards, if any:

Does not apply.

b. **Noise**

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

Existing noise levels in the area would not affect the proposed action.

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

Noise would be generated from construction activities and heavy equipment including trucks and earthmoving equipment, associated with grading activitiesand construction of pavement. These activities would occur during the daylighthours, typically 7 a.m. to 7 p.m.

3) Proposed measures to reduce or control noise impacts. if any:

- **Do not allow operation of heavy construction equipment at night (10 p.m. to 7 a.m.), on Sundays, or on legal holidays**
- **Shut off idling equipment**
- **Employ sound control devices on equipment and muffle exhaust**

To be completed by Applicant

Evaluation for Agency Use Only

8. Land and shoreline use

a. What is the current use of the site and adjacent properties?

The site is currently used as the City of Centralia's wastewater treatment facility. The facility is surrounded by farm land, also owned by the City. The adjacent properties are residential on large lots and small farms.

b. Has the site been used for agriculture? If so, describe.

Prior to the city's purchase of the property, the site was previously used by the Washington State University for dairy cattle breeding programs until late 1999. The City has used the property for production of corn and hay.

c. Describe any structures on the site.

Several structures for operation of wastewater treatment are located onsite, including headworks structure, aeration basins, secondary clarifiers, UV/post aeration/ effluent pumping structure, blower building, administration building, solids handling facility, and maintenance building.

d. Will any structures be demolished? If so, what?

No structures will be demolished.

e. What is the current zoning classification of the site?

Based upon information in the 2010 Amended Lewis County Comprehensive Plan, the area is currently zoned as RDD-10 (Rural Development District). This is a mixed-use zoning district that allows a number of different land uses such as single family residential, resource uses and limited types of commercial activity. RDD-10 allows a density of one dwelling unit per ten acres for subdivision purposes.

f. What is the current comprehensive plan designation of the site?

See zoning information above. No additional designations are provided in the comprehensive plan.

Rural - Open

g. If applicable, what is the current shoreline master program designation of the site?

Does not apply.

h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.

The project is located within a Category III Critical Aquifer Recharge Area. The project would modify an existing building and construct new storage tanks. The stormwater would be transported to a retention pond and pumped back to the WWTP for treatment prior to discharge into the Chehalis river; no stormwater would be discharged to groundwater. Thus, the project would comply with Lewis County Municipal Code 17.35A Article IV(D) regarding Critical Aquifer Recharge Areas.

To be completed by Applicant

Evaluation for Agency Use Only

i. Approximately how many people would reside or work in the completed project?

The completed project would not add any workers to the current facility.

j. Approximately how many people would the completed project displace?

None.

k. Proposed measures to avoid or reduce displacement impacts, if any:

Does not apply.

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

Does not apply.

9. Housing

c. Approximately how many units would be provided, if any? Indicate whether high, middle, or low- income housing.

Does not apply.

d. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

Does not apply.

e. Proposed measures to reduce or control housing impacts, if any:

Does not apply.

10. Aesthetics

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

The proposed WAS storage tanks will be about 20' tall with concrete exterior building material and will be partially below ground, with a height to matching those of existing tank structures.

The proposed blower building expansion will be about 15' tall, with a roof lower than the roof of the existing building. The new metal building structure will match the farm architectural theme and color of the existing building.

b. What views in the immediate vicinity would be altered or obstructed?

None. The proposed tanks are shorter than surrounding buildings on site which are approximately 36' tall.

c. Proposed measures to reduce or control aesthetic impacts, if any:

Blower building expansion matches the farm architectural theme of the plant including exterior materials and colors.

To be completed by Applicant

Evaluation for Agency Use Only

11. Light and glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

None.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

No.

c. What existing off-site sources of light or glare may affect your proposal?

None.

d. Proposed measures to reduce or control light and glare impacts, if any:

Does not apply.

12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?

There are no recreation areas in the immediate vicinity of the proposed action.

b. Would the proposed project displace any existing recreational uses? If so, describe.

No existing recreational uses would be displaced.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

Does not apply.

13. 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.

A Cultural Resources Technical Report was prepared in 2002 as part of the EIS that addressed the history of the area within and surrounding the WWTP. As part of the cultural resources investigation, a field survey was conducted within the boundaries of the WWTP site which include subsurface testing. No cultural resources were identified during testing; however, the report recommended, and the Washington State Department of Archaeology and Historic Preservation concurred, the preparation of a Cultural Resource Mitigation Monitoring Plan (CRMMP) to assure that significant cultural resources that could be encountered during construction are protected. The CRMMP covered the entire project area which included the new WWTP facility. The CRMMP addresses the communication protocols, project monitoring, and documentation.

During the construction of the new WWTP in 2002 a precontact archaeological site was discovered below the ground surface. The site contained intact features at depths between 80 cm and 200 cm below the existing surface. Although the site has not been formally evaluated for listing in the National Register of Historic Places (NRHP), it should be considered a potentially NRHP-eligible site. If construction requires excavation within the known boundaries of the site, a formal determination of eligibility for listing in the NRHP must be completed. If the site is considered NRHP-eligible, the CRRMP recommends appropriate mitigation strategies that tie directly to the site's significance. This may include development and implementation of a data recovery plan as outlined in the CRMMP. If the installation of new tanks requires soil disturbance within native soils outside the known boundaries of the site, the mitigation measures identified in the CRMMP will be implemented including monitoring during construction by a professional archeologist.

b. Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural

importance known to be on or next to thesite.

No cultural resources were identified during testing.

c. Proposed measures to reduce or control impacts, ifany:

If construction requires excavation within the known boundaries of the site, a formal determination of eligibility for listing in the NRHP must be completed. If the site is considered NRHP-eligible, the CRRMP recommends appropriate mitigation strategies that tie directly to the site's significance. This may include development and implementation of a data recovery plan as outlined in the CRMMP. If the installation of new tanks requires soil disturbance within native soils outside the known boundaries of the site, the mitigation measures identified in the CRMMP will be implemented including monitoring during construction by a professional archeologist.

To be completed by Applicant

Evaluation for Agency Use Only

14. 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.

The WWTP is accessed via Goodrich Road or via a treatment plant access road, both from Harrison Avenue (Figure 1-1). The City attempts to limit traffic on Goodrich Road by requiring employees and vendors to use the treatment plant access road to the maximum extent allowable by law.

b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?

No. The nearest public transit stop is located approximately 3 miles away (Twin Transit, Bus Route #22 stop).

c. How many parking spaces would the completed project have? How many would the project eliminate?

Does not apply.

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).

Does not apply. There will be no road improvements outside of the WWTP property.

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

Does not apply.

f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.

Does not apply.

g. Proposed measures to reduce or control transportation impacts, if any:

During construction, contractors would be directed to use the access road for worker access and materials deliveries as much as possible to avoid Goodrich Road.

To be completed by Applicant

Evaluation for Agency Use Only

15. Public services

c. 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.

Does not apply.

d. Proposed measures to reduce or control direct impacts on public services, if any.

Does not apply.

16. Utilities

a. Circle utilities currently available at the site: **electricity**, natural gas, **water, refuse service, telephone, sanitary sewer**, septic system, **other**.

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity thatmight be needed.

None required. Existing services would be used.

C. SIGNATURE

I swear, under penalty of perjury, that the above answers are true, correct 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: 10/04/2017

Environmental Checklist submittal Requirements

Fees: $200.00 Please make checks payable to: City of Centralia

Site plan: Submit one copy of site plan on 11" x 17" paper. The plan must be clearly legible and contain pertinent information

Supplemental reports: Include any applicable reports such as wetland report, storm water calculations, or traffic impact analysis
City of Centralia - Community Development 118 W. Maple St. PO Box 609 Centralia, WA 98531 Phone: (360)330-7662

City of Centralia WWTP Upgrades SERP Crosscutter

SERP CROSS CUTTER DOCUMENTATION

The following sections are based upon Ecology's Combined Funding Program: Environmental Review Guidance specific to the Federal Cross Cutters not addressed under SEPA.

The study area for the proposed action is the area associated within the existing WWTP facility where construction and operation would occur (Figure 1-1). The City of Centralia shall comply with the criteria and mitigation conditions for the project as documented in the October 2017 technical memorandum, *City of Centralia WWTP – Phase 1 Improvements Design* for the City's WWTP project. This shall include any associated criteria, plans, or permits identified as required during the construction of the proposed action as a result of new or more detailed information. Additionally, standard construction mitigation measures to control any temporary impacts (i.e., transportation, earth, air quality, water quality, and noise) will be included in design and construction documents/permits prepared for the proposed action.

The following provides information on the Federal Cross Cutters and provides information on the proposed action would not result in any impacts during construction or operation because the elements addressed by the cross cutters are either not located in the project area or would not be affected by the construction and operation of the proposed action.

Clean Air Act. The proposed action is not within a Washington State designated maintenance or non-attainment area. The proposed action would result in some short-term exhaust and particulate emissions would be generated by construction equipment and activities. Vehicles entering and leaving construction sites would also generate dust. These impacts are temporary and would end once construction has been completed. Construction-related mitigation includes measures to minimize the generation of dust during excavation, grading, and filling earth materials includes watering exposed surfaces, covering loads, and wheel washers for trucks, if applicable. During operation of the proposed action there would be no impacts and no mitigation would be required.

Coastal Zone Management Act. Lewis County is not within a coastal zone. In addition, the proposed action is not within any shorelines of the state that would trigger a shoreline permit.

Endangered Species Act. There are no threatened or endangered species within the WWTP facility and construction and operation would not result in any impacts. Construction would be short-term in nature and would only require the removal of grass. All construction activities would meet the applicable city and county requirements regarding stormwater management.

Environmental Justice. The proposed action is within the boundaries of the existing WWTP facility where there are no residents. Construction and operation is within the existing facility and does not result in any disproportionately high and adverse effects to minority, low-income, or tribal populations.

Farmland Protection Policy Act. The proposed action does not convert any farmland to nonfarm uses. The site is located on engineered fill material and the site was converted to the WWTP facility when it was constructed in 2002. Any impacts to prime farmland were identified as part of the environmental documentation completed prior to the construction of the WWTP facility. Because the proposed action is within areas of engineered fill it does not result in any impacts. The new impervious area associated with the Phase I project would be located on engineered fill that was compacted to at least 90-percent modified Proctor at the time of the WWTP's construction in 2002.

Floodplain Management. The proposal lies within the 500-year floodplain. Construction of the WWTP site in 2002 elevated the site above the 100-year floodplain on engineered fill, but the site is still shown within the floodplain on existing maps. In 2012, a Letter of Map Revision Based on Fill Determination was accepted by the Federal Emergency Management Agency (FEMA); it documents the removal of the site from the 100-year floodplain area. The project is now located within Zone B

(moderate flood hazard areas – between the limits of the base flood and the 0.2-percent-annual-chance (or 500-year) flood). There are no shorelines within the study area that would be affected.

National Historic Preservation Act. A Cultural Resources Technical Report was prepared in 2002 as part of the EIS that addressed the history of the area within and surrounding the WWTP. As part of the cultural resources investigation, a field survey was conducted within the boundaries of the WWTP site which include subsurface testing. No cultural resources were identified during testing; however, the report recommended, and the Washington State Department of Archaeology and Historic Preservation concurred, the preparation of a Cultural Resource Mitigation Monitoring Plan (CRMMP) to assure that significant cultural resources that could be encountered during construction are protected. The CRMMP covered the entire project area which included the new WWTP facility. The CRMMP addresses the communication protocols, project monitoring, and documentation.

During the construction of the new WWTP in 2002 a precontact archaeological site was discovered below the ground surface (identified as site 45LE532). The site contained intact features at depths between 80 cm and 200 cm below the existing surface. Although the site has not been formally evaluated for listing in the National Register of Historic Places (NRHP), it should be considered a potentially NRHP-eligible site. If construction requires excavation within the known boundaries of the site 45LE532, a formal determination of eligibility for listing in the NRHP must be completed. If the site is considered NRHP-eligible, the CRRMP recommends appropriate mitigation strategies that tie directly to the site's significance. This may include development and implementation of a data recovery plan as outlined in the CRMMP. If the installation of new tanks requires soil disturbance within native soils outside the known boundaries of the site 45LE532, the mitigation measures identified in the CRMMP will be implemented including monitoring during construction by a professional archeologist.

Safe Drinking Water Act. The project area lies within the Chehalis River basin and is not within any EPA designated sole source aquifers. No construction activities would occur within any surface waters, and all construction would adhere to the applicable city and county codes. Ground water resources are not anticipated to be impacted as a result of the construction or operation of the proposed action. The proposed action would add approximately 0.06 acres of new impervious surface associated with pavement, gravel roadway, building roof and electrical trench. During construction, standard best management practices (BMPs) would be employed to prevent erosion including the use of silt fences, straw bales, or plastic sheets during grading activities or stockpiling of materials. During operation stormwater runoff would be treated prior to discharge and would not impact water quality, therefore no mitigation is required.

Essential Fish Habitat. The proposed action is located within the existing WWTP property and about 2,000 feet east of the Chehalis River. All construction activities would meet the applicable city and county requirements regarding stormwater management. Operation would collect and treat stormwater prior to discharge.

Wetland Protection. The area where the proposed action would be located currently consists of mowed grass and existing impervious surfaces. There are no wetlands within the existing WWTP facility because the facility is located on fill material.

Wild and Scenic Rivers Act. There are no designated Wild and Scenic Rivers located in the project area.

PRATHER RD SW

HWY 99 SW

BURLINGTON NORTHERN

CHEHALIS - WESTERN RAILROAD

HOBSON RD

222ND AVE SW

SW 222ND AVE SW

PLANT NORTH
N 1° 20' 57.31" E

0 600 1200 1800
Scale In Feet

THURSTON CO

LEWIS CO

CHEHALIS RIVER

CENTRALIA WWTP

WAS STORAGE TANKS

HARRISON AVE.

DRY CREEK

GOODRICH RD

CENTRALIA WWTP ACCESS ROAD

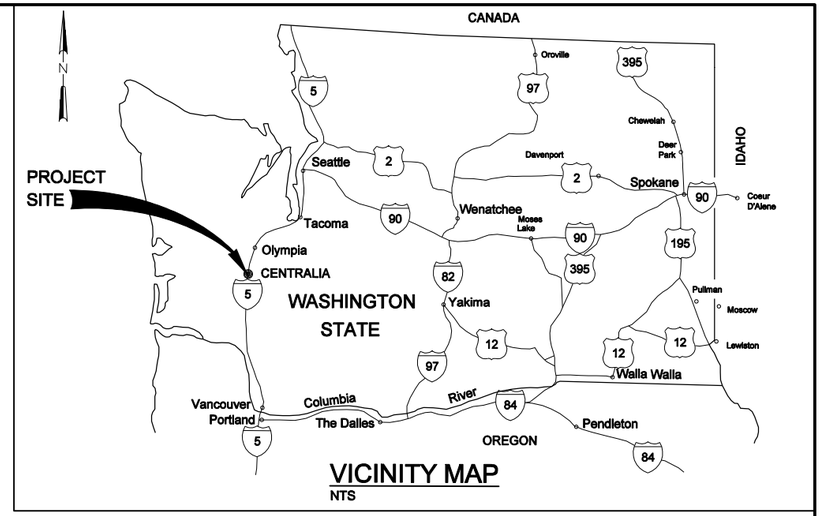
CHEHALIS RIVER

CITY LIMITS

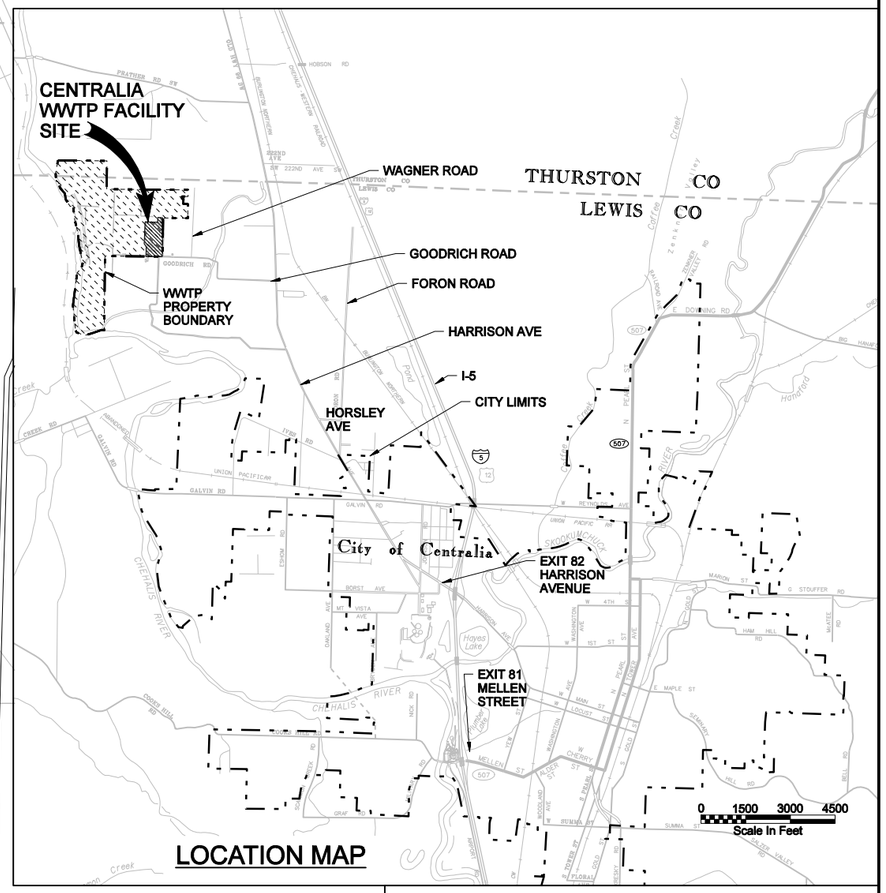
FORON RD

HORSLEY AVE

Lincoln Creek



VICINITY MAP
NTS



LOCATION MAP

City of Centralia
Phase I SEPA Checklist

Figure 1-1
VICINITY MAP

ch2m
406250

City of Centralia WWTP Upgrades SEPA Determination of Non-Significance

SEPA #: 2017 0463
Date: October 10, 2017

NOTICE OF APPLICATION
AND
DETERMINATION OF NONSIGNIFICANCE

Description of proposal: Upgrades to the Wastewater Treatment Plan in two phases. Phase I: Complete State Environment Review Process with Cross Cutter (SERP) documentation, add mixed liquor recirculation pumps in the existing aeration basins, construct two waste activated sludge (WAS) storage tanks, add two new WAS feed pumps, install two new positive-displacement blowers and expand the Blower Building to house electrical and control needs associated with the upgrades. Phase II upgrades will be reviewed under separate application at a future date.

Proponent: City of Centralia Public Works
Richard Dickinson, Wastewater Division
1100 N Tower Avenue
Centralia, WA 98531

Location of proposal: 1101 Goodrich Road

Date of Application: October 4, 2017 Date of Notice of Completeness: October 5, 2017

Lead agency: Centralia Community Development

Project Permits: SEPA, Fill & Grade, Building and Electrical

Environmental Documents on file: SEPA checklist, ch2m Hill Engineers technical memo.

The City of Centralia Community Development Dept. has determined this project does not have a probable significant adverse impact on the environment. An Environmental Impact Statement (EIS) is not required under RCW 43.21C.030(2)(c). This decision was made after review of a completed environmental checklist and other information on file with the City. The proposal may include mitigation measures under applicable codes and the project review process may incorporate or require mitigation measures regardless of whether an EIS is prepared. This information is available to the public upon request.

This DNS is issued under WAC 197-11-340(2); the City of Centralia will not act on this proposal for 15-days from the date of last publication.

Comments are due by: November 3, 2017.

Responsible official: Hillary Hoke
Position/title Planner, City of Centralia - Community Development
Phone: (360) 330-7684 Email: hhoke@cityofcentralia.com
Address: PO Box 609, Centralia WA 98531

The complete application may be viewed at the Community Development Dept. located at 118 W Maple,

Centralia, WA 98531, during regular business hours, M-F. Any person(s) may comment on the proposal, in writing, via mail or email at the addresses above. You may appeal this determination to City of Centralia - Community Development. All appeals must be filed in writing, with the appropriate fee, by 5:00 pm on November 13, 2017. You should be prepared to make specific factual objections. If you have any questions regarding the SEPA or appeal processes please contact the Responsible Official.

Appendix O
City of Centralia Sanitary Sewer Design and Development Guidelines

CHAPTER 3

SANITARY SEWER

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CHAPTER 3
SANITARY SEWER

3.01 General

Sanitary sewer refers to wastewater derived from domestic, commercial and industrial pretreated waste to which storm, surface, and ground water are not intentionally admitted. Pretreatment of industrial and commercial wastes shall follow all the requirements as set forth by the Washington State Department of Ecology (DOE), as administered by the Wastewater Department (Centralia Utilities). These requirements are not included herein (see CMC).

Any extension of City of Centralia's sanitary sewer system must be approved by the City of Centralia and must conform to the City of Centralia's Facilities Plan and General Sewer Plan, Washington State Department of Ecology (DOE) and Washington State Department of Health (DOH) requirements.

Within the corporate City limits where a public sewer is within 200 feet, it must be used (CMC). In the endangered aquifer areas on Waunch and Fords Prairies, this requirement has also been legislated by the Lewis County Board of Health.

All vehicle and equipment wash facilities shall be zero discharge closed loop water recycling. The City will not allow discharge into the municipal sewer system.

Anyone who wishes to extend or connect to the City's sewer system should contact the Community Development Department for Water/Wastewater Application form.

Prior to the release of any water meters all Public Works improvements must be completed and approved, all easements shall be recorded, all bonds received, and all applicable fees must be paid.

See Section 1.04 for definitions of specific sewers. Maintenance of the sanitary sewer lateral shall be the responsibility of the property owner.

3.02 Required Separation Between Water and Sanitary Sewer Mains

See Section 2.13 for requirements regarding sewer and water separation.

3.03 Staking

All surveying and staking shall be performed by an engineering or surveying firm capable of performing such work. The engineer or surveyor directing such work shall be licensed by the State of Washington.

A pre-construction meeting shall be held with the City Engineer before staking begins. All construction staking shall be inspected by the City Engineer prior to construction. Staking shall be maintained throughout construction.

The minimum staking of sewer lines shall be as follows:

3.03.1 Centerline alignment must be staked with cuts and/or fills to flowline every 25 feet.

3.03.2 Manholes must be staked with hubs to include invert elevations of all pipes and top of rim elevations to finished grade.

3.04 Trench Excavation

3.04.1 Clearing and grubbing where required shall be performed within the easement or public right-of-way as permitted by the City and/or governing agencies. Debris resulting from the clearing and grubbing shall be disposed of by the owner or contractor in accordance with the terms of all applicable permits and/or regulations.

3.04.2 Trenches shall be excavated to the line and grade on the plan approved by the City. The minimum depth of cover measured from finished surface grade to the top of the pipe shall be 36 inches. Except for unusual circumstances where approved by the City, the trench sides shall be excavated vertically and trench width shall be no wider than the pipe outside diameter plus 24 inches. The trench shall be kept free of water. Surface water shall be diverted so as to not enter the trench. The developer/contractor shall maintain sufficient dewatering equipment on the job site to insure that these provisions are met.

3.04.3 The contractor shall perform all excavation so that all boulders, rocks, roots and other obstructions shall be entirely removed or cut out of the width of the trench and to a depth of 6 inches below the sewer main grade. The base of the trench must be solid so in some cases the contractor may have to over excavate to obtain a satisfactory base.

3.04.4 Trenching and shoring shall not proceed more than 40 feet in advance of the pipe laying, without approval of the City, and shall be in conformance with Washington Industrial Safety and Health Administration (WISHA) and Occupational Safety and Health Administration (OSHA) safety standards.

3.04.5 The bottom of the trench shall be finished to grade in such a manner that the pipe will have bearing along the entire length of the barrel.

3.04.6 The contractor shall maintain the presence of a "competent person" as defined by the Washington State Department of Labor and Industries (L&I), when any trench excavation and backfill work is being done at the project site.

3.05 Backfilling

3.05.1 Backfilling shall not commence until the pipe installation has been inspected and approved by the City Inspector.

3.05.2 Backfilling shall closely follow pipe installation so that no more than 40 feet is left open without approval of the City.

3.05.3 The backfill in the pipe zone shall be bedding material conforming to Section 9-3.12(3) of the WSDOT Standard Specifications.

3.05.4 If foundation material is required below the pipe zone, the material shall conform to Section 9-03.17 Class B of the WSDOT Standard Specifications.

3.05.5 The backfill between the bedding and road ballast may be native if the native material is approved by the City. If the native material is deemed unsuitable, then select import backfill conforming to Section 9-03.19 of the WSDOT Standard Specifications.

3.05.6 The backfill shall be placed in uniform horizontal lifts, not to exceed 1-foot in depth and compacted to the following percentage of maximum dry density; 90 percent below 2-foot depth and 95 percent in the top 2 feet as determined by ASTM D1557-80 (Modified Proctor). Compaction shall be by mechanical means.

3.05.7 At the conclusion of each day the trench shall be totally backfilled or steel plates shall be used so that there is no open excavation over night.

3.06 Street Patching and Restoration

See Sections 4.15 and 4.16 for requirements regarding street patching and trench restoration.

3.07 Testing

Prior to acceptance and approval of construction, the following tests shall apply to each type of construction.

3.07.1 Gravity Sewer Air Test: Prior to acceptance of the project, the gravity sewer pipe shall be subject to a low pressure air test per WSDOT/APWA Standard Specifications. The contractor shall furnish all equipment and personnel for conducting the test under the observation of the City Inspector. The testing equipment shall be subject to the approval of the City.

Immediately following the pipe cleaning, the pipe installation shall be tested with low pressure air.

The contractor shall make an air test for his own purposes prior to notifying the City to witness the test. The acceptance air test shall be made after the trench is backfilled and compacted and the roadway section is completed to subgrade.

All wyes, tees, and end of side sewer stubs shall be plugged with flexible joint caps, or acceptable alternates, securely fastened to withstand the internal test pressures. Such plugs or caps shall be readily removable and their removal shall provide a socket suitable for making a flexible jointed lateral connection or extension.

3.07.2 Gravity Sewer TV Inspection: Testing of the sewer main shall include a television inspection at the contractor's expense. Television inspection shall be done after the air test has passed and before the roadway is paved. Immediately prior to a television inspection, enough water shall be run down the line so it comes out the lower manhole and the line is flushed clean. All debris collected after flushing shall be removed and disposed of by the contractor at their expense. It shall be disposed of at a legal dump site for this type of waste.

A written log shall accompany the videotape. The audio portion of the tape will identify any laterals and defects seen. On screen counter footage shall be reset in each manhole. Each manhole shall be identified by location and numbering consistent with the plans.

Acceptance of the line will be made after the television inspection tape has been reviewed and approved by the City. Any tap to an existing system needs to be televised as well.

3.07.3 Manhole Test: A vacuum test of all manholes is also required. The vacuum test shall be performed by creating a vacuum of 10 inches of mercury. If the vacuum does not drop in excess of 1-inch of mercury over the specified time period, the manhole passes test. The specified time period for every 2 feet of manhole depth is 5 seconds for a 48-inch diameter manhole and 6.5 seconds for a 60-inch manhole.

3.07.4 Force Main Hydrostatic Test: Prior to acceptance of the project, the pressure line and service lines shall be subjected to a hydrostatic pressure test of 100 psi for 15 minutes. Any leaks or imperfections developing under this pressure shall be remedied by the contractor. No air will be allowed in the line. The main shall be tested between valves. Insofar as possible, no hydrostatic pressure shall be placed against the opposite side of the valve being tested. The pressure test shall be maintained while the entire installation is inspected.

The contractor shall provide all necessary equipment and shall perform all work connected with the tests. Tests shall be made after all connections have been done. This is to include any and all connections as shown on the plan. The contractor shall perform all tests to assure that the equipment to be used for the test is adequate and in good operating condition and that the air in the line has been released before requesting the City to witness the test. The contractor shall give the City a 48 hours notification of the test.

3.07.5 Wet Well Test: A water test for all wet wells in accordance with the manhole test for gravity sewer shall be required.

3.07.6 Force Main Mandrel Test: A mandrel test of all force main, in accordance with Section 7-17.3(2)G of the WSDOT/APWA Standard Specifications is required.

3.07.7 Pump Station Tests: Pump operation, alarms, and electrical inspection of all lift stations is required.

3.08 Gravity Sewer

General

All sewers shall be designed as a gravity system whenever physically and/or economically feasible. Addition of new pumping stations is undesirable.

3.09 Gravity Sewer Design Standards

The design of any sewer extension/connection shall conform to City Standards, DOE's "Criteria of Sewage Works Design" and any applicable standards as set forth herein and in Sections 1.02 and 1.06.

The layout of extensions shall provide for the future continuation of the existing system as determined by the City. See also Section 1.18 for utility extension information.

New gravity sewer systems shall be designed on the basis of an average daily per capita flow of sewage of not less than 100 gallons per day. See the DOE "Criteria" table: Design Basis for Sewage. The numbers are assumed to cover normal infiltration, but an additional allowance shall be made where conditions are unfavorable. Generally, laterals and submain sewers should be designed to carry, when running full, not less than 400 gallons daily per capita contribution of sewage. When deviations from the foregoing per capita rates are used, a description of the procedure used for sewer design shall be submitted to the Engineering Department for review and approval.

The General Notes found in the Standard Detail Section shall be included on any plans dealing with sanitary sewer design and/or construction.

3.10 Gravity Main Line

3.10.1 Sewer mains shall be sized for the ultimate development of the tributary area. Nothing shall preclude the City from requiring the installation of a larger sized main if the City determines a larger size is needed to meet the requirements for future service.

The minimum size for submains and mains shall be 8-inch inside diameter. The minimum size for a lateral within the street right-of-way shall be 6-inch inside diameter.

The design of the sewer line/system is subject to all other requirements as noted in this Chapter.

3.10.2 Main line sewers must be constructed using materials conforming to one of the following:

PVC pipe 6-inch to 15-inch diameter must meet either ASTM D 3034, SDR 35 solid wall pipe, or ASTM F 794 for solid seamless profile pipe.

PVC pipe 18-inch to 27-inch diameter shall conform to ASTM F 679 Type 1 only.

Ductile Iron, conforming to Section 9-05.13, WSDOT/APWA Standard Specifications and ANSI A21.51 or AWWA C151, and cement mortar lined. Minimum thickness shall be Class 51.

All joints for PVC pipe shall conform to ASTM D 3212 with rubber gaskets conforming to ASTM F 477.

3.10.3 Gravity sewer will typically have a minimum depth of 5 feet to provide gravity service to adjoining parcels, adequate head room within manholes for maintenance personnel, future areas to be served, and vertical clearance between water and sewer lines. Actual depth will be determined by slope, flow, velocity, and elevation of existing system.

3.10.4 All building sewer connections to the main shall be made with a sanitary tee (wye) connection. Backflow prevention devices shall be provided as required by the Uniform Building Code (UBC) and Uniform Plumbing Code (UPC), W.A.C. 51.50. All new mains connecting to existing mains shall require the installation of a new manhole if not made at an existing manhole.

3.11 Connection to Existing System

3.11.1 At connection to existing system, all new sewer connections shall be physically plugged until all tests have been completed and the City approves the removal of the plug.

3.11.2 Connection of new pipe lines to existing manholes shall be accomplished by using provided knock-outs. Where knock-outs are not available, the manhole shall be core drilled for connection. The transition of connecting channels shall be constructed so as not to interrupt existing flow patterns. All connections shall utilize cor-seal grouting material. Manhole shall be vacuum tested after connection.

3.11.3 Connection of a pipe line to a system where a manhole is not available shall be accomplished by pouring a concrete base and setting manhole sections. The existing pipe shall not be cut into until approval is received from the City.

3.11.4 Connections to manholes requiring a drop shall follow the criteria as outlined in Section 3.16.

3.11.5 Connections where an existing stub-out is not available or where a new building sewer is the same size as the existing main shall be accomplished by the installation of a new manhole.

3.11.6 Taps shall be done by use of a core drill and shall not be allowed to protrude into the existing main. The City shall be notified two (2) working days prior to any tap of a City sewer and a City Inspector shall be present to witness the tap. At the City's option, the City will install a tap for a fee after the contractor provides L&I acceptable access to the site.

3.12 Manholes

Precast manholes shall meet the requirements of ASTM C 478 with either a precast base or a cast-in-place base made from 3000 psi structural concrete. Manholes shall be Type 1, 60-inch diameter minimum. The minimum clear opening in the manhole frame shall be 24 inches. Joints shall be rubber gasketed, conforming to ASTM C 443 and shall be grouted from the inside. Lift holes shall be grouted from the outside and inside the manhole. Manholes constructed of other materials may be approved by the City Engineer, provided they meet the requirements of Section 2.318 of the DOE "Criteria for Sewage Works Design". Material specifications need to be submitted for review before an alternate material will be considered, See standard drawings 3-02 and 3-03.

Eccentric manhole cones shall be offset so as to not be located in the tire track of a traveled lane.

Manhole frames and covers shall be cast iron castings marked "Sewer", conforming to the requirements of ASTM A-30, Class 25, and shall be free of porosity, shrink cavities, cold shuts or cracks, or any surface defects which would impair serviceability. They shall be bolt down water tight type 2 frame and covers in accordance with WSDOT Standard Plan B-30.70-01. Any variation from this type of frame and cover must be approved by the City Engineer. Repairs of defects by welding or by use of smooth-on or similar material will not be permitted. Manhole rings and covers shall have machine-finished or ground-on seating surfaces so as to assure non-rocking fit in any position and interchangeability.

All manholes shall be equipped with a PRECO sewer guard watertight manhole insert or approved equal.

Where lock-type castings are called for, the casting device shall be such that the cover may be readily released from the ring and all movable parts shall be made of non-corrodible materials and otherwise arranged to avoid binding.

All casting shall be covered with a bituminous coating prior to delivery to the job site.

Safety steps shall be fabricated of polypropylene conforming to the ASTM D-4101 specification, injection-molded around a 0.5-inch ASTM A-615 grade 60 steel reinforcing bar. Steps shall project uniformly from the inside wall of the manhole. Steps shall be installed to form a continuous vertical ladder with rungs equally spaced in 12-inch centers.

Generally, gravity sewers shall be designed with straight alignment between manholes. Curved alignment may only be permitted when conditions warrant and with the advance approval of the City Engineer and the Centralia Utilities.

Manholes shall be provided at a maximum of 400-foot intervals, at intersections, and at changes in direction, grade, or pipe size. (See also Section 3.14.)

Minimum slope through the manhole shall be 0.10-foot from invert in to invert out.

Manholes shall have a minimum diameter of 60 inches.

All exterior joints of the manhole shall be sealed with WrapidSeal as manufactured by Canusa Corrosion Protection and Sealing. This includes the joint between manhole sections and the entire set of adjustment rings. It shall be applied in accordance with the manufacturer's recommendation.

For pipes 15-inch diameter and larger, the size of the manhole shall be approved by the City Engineer.

3.13 Gravity Sewer Slope

All sewers shall be designed and constructed to give mean velocities, when flowing full, of not less than 2 feet per second based on Manning's formula using an "n" value of 0.013. Use of other practical "n" values may be permitted by the City if deemed justifiable on the basis of research or field data submitted. The following minimum slopes shall be provided; however slopes grater than these are desirable.

Sewer Size, Inches	Minimum % Slope, % (Feet per 100 Feet)
8	0.40 (0.0040 Ft/Ft)
10	0.28 (0.0028 Ft/Ft)
12	0.22 (0.0022 Ft/Ft)
14	0.17 (0.0017 Ft/Ft)
15	0.15 (0.0015 Ft/Ft)
16	0.14 (0.0014 Ft/Ft)
18	0.12 (0.0012 Ft/Ft)
21	0.10 (0.0010 Ft/Ft)
24	0.08 (0.0008 Ft/Ft)
27	0.07 (0.0007 Ft/Ft)
30	0.06 (0.0006 Ft/Ft)
36	0.05 (0.0005 Ft/Ft)

Such decreased slopes will only be considered where the depth of flow will be 30 percent of the diameter or greater for design average flow. Whenever such decreased slopes are proposed, the design engineer shall furnish with the plans his/her computations of the depths of flow in such pipes at minimum, average, and daily or hourly rates of flow. Larger pipe

size shall not be allowed to achieve lesser slopes.

Sewers shall be laid with uniform slope between manholes.

3.14 Increasing Size, Gravity Sewer

Manholes shall be provided where pipe size changes occur.

Where a smaller sewer joins a larger one, the invert of the larger sewer should be lowered sufficiently to maintain the same energy gradient. An approximate method for securing these results is to place the 80 percent depth point of both sewers at the same elevation.

3.15 High Velocity Protection

Where velocities greater than 15 feet per second are expected, special provisions such as thrust blocking and piping materials shall be made to protect against displacement by erosion and shock, and the presence of hydrogen sulfide gas.

3.16 Drops

Straight grades between invert out of last manhole and connection to existing are preferred over drops whenever possible. Care must be taken when designing steep grades so as not to create a situation of excessive velocity or excavation. Grade changes associated with "sweeps" shall not be allowed.

An inside drop connection shall be provided for a sewer entering a manhole at an elevation of 24 inches or more above the manhole invert. Where the difference in elevation between the incoming sewer and the manhole invert is less than 24 inches, the invert shall be filleted to prevent solids deposition.

Inside drop structures shall be constructed per standard drawing number 3-06.

Outside drop structures shall be constructed per standard drawing number 3-05. Outside drops will only be allowed in special cases by the City Engineer.

3.17 Cleanouts

Cleanouts are not an acceptable substitute for manholes. However, they may be used in lieu of manholes at the end of 8-inch diameter lines of not more than 150 feet in length. Location of cleanouts for building sewers are governed by the UPC.

All cleanouts in City right-of-way shall be extended to grade and a 3-foot square by 4-inch thick concrete pad shall be installed around all cleanouts that are not in the pavement area. See standard drawing 3-04.

3.18 Laterals

A lateral refers to the extension from a building sewer, beginning 3 feet outside the outer foundation wall at the structure to the sanitary sewer main. Building sewers from the main to the right-of-way line shall be a minimum of 6-inch in diameter. Maintenance of the entire building sewer is the responsibility of the property owner. The portion of line on private property shall be a minimum of 4-inch diameter for single-family and 6-inch diameter for duplex, commercial and industrial facilities. No laterals shall be connected directly to a manhole.

Prior to connection of a building sewer to the public sewer a side sewer permit must be obtained from the City. Design criteria for a building sewer are covered by the UPC and the C.M.C. Chapter 15.10. Acceptable pipe material is PVC or ductile iron, as specified in Section 3.10.2. Inspection of the building sewer is the responsibility of the Wastewater Department (Centralia Utilities). Testing and inspection procedures are similar to those for main installation (excluding television inspection).

3.19 Lift Station Design Standards

The design of any lift station shall conform to City Standards, DOE's "Criteria for Sewage Works Design" and applicable standards as set forth herein and in Sections 1.02 and 1.06. Each lift station shall be evaluated by the City Engineer for buoyancy resistance using site specific soil and groundwater information.

The following equipment and special modifications are standard requirements for all permanent wastewater lift stations constructed for the City of Centralia wastewater collection system. Lift stations shall be landscaped appropriately. The following are minimum standards and are not all inclusive.

3.19.1 The proponent is required to provide the City of Centralia a fee simple site outside existing right-of-way for construction of the lift station. The site shall have sufficient area with dimensions that allow for easy and safe access to the lift station.

3.19.2 A concrete slab 6 inches in depth shall surround the pump station wet well, with a minimum of 2 feet side exposure for all openings.

3.19.3 An access road that will support 20,000 pound axle loads throughout the year shall be provided from the nearest public road to the station, to allow for maintenance of the station.

3.19.4 Wet well shall be provided with a permanent attached, full depth, internal, polypropylene access ladder.

3.19.5 Station entry access shall be keyed to match all other City stations. The Best Lock key system shall be supplied for all other lock points and padlocks; a blank tumbler shall be supplied and the City will key the desired code.

3.19.6 Safety guards shall be provided for all exposed drive lines and couplings.

3.19.7 Spare parts shall be provided as recommended by the manufacturer, with a minimum of one spare impeller, one complete set of seals, filters, and one set of volute gaskets. Four (4) complete sets of O & M Manuals, and a list of the nearest dealers for spare parts and repairs shall be provided prior to acceptance.

3.19.8 The pumps, motors, and wet well shall be in compliance with current engineering practices. They shall be fully compatible as an assembly, and shall be engineered for the specific site. They shall be submersible pumps with stainless steel guide rails. There shall be a pressure gauge for the discharge pipe from each pump. The pumps shall be manufactured by Vaughn or approved by the City. All bolts, chains, and brackets shall be stainless steel.

3.19.9 The station shall be designed to have an isolation valve located in the discharge line no less than 12 pipe diameters from the wet well. Check valves shall have external arms to allow for back flushing. The check valve shall be as manufactured by Waterous and the isolation valve shall be a Dezuric plug valve with a quarter turn shut off. There shall also be a bypass pumping port included with a camloc fitting.

3.19.10 The isolation and check valve shall be housed in a precast concrete vault. The vault shall have a minimum size of 6-foot by 6-foot inside dimension. There shall be a bottom drain that drains back into the wet well. The vault hatch shall be a minimum of 3 feet (L) x 4 feet (W). The hatch shall be supplied with a safety net.

3.19.11 City water shall be provided to the station for hose down and pump seal supply. An approved backflow prevention device shall be provided on the water supply line to protect the public water system. The backflow device shall be tested and certified by a State-Certified Backflow Tester prior to acceptance of the system. The cost of the backflow prevention device, water service, and testing will be the developer's responsibility. If the station is located in the 100-year flood plain, all equipment, controls, and accessories shall be flood proofed.

3.19.12 The station shall have a pigging port for pigging the forcemain. Final design to be approved by the City of Centralia Wastewater Department. The station will also have a flow meter which shall be approved by the City.

3.19.13 The entire interior of the wet well and vault shall be coated. The interior coating shall be Ravens Lining. All the exterior joints of the wet well and vault shall be wrapped with WrapidSeal as manufactured by Canusa Protection and Sealing.

3.19.14 All pump stations up to 200 amp service will be 240 volt 3 phase 4 wire. Any above 200 amp will be 480 volt, 3 phase 4 wire. A transformer will be provided for outlets and lighting per standards. In a special case, where 3 phase power is not available, the City will consider a single phase pump station. Security lighting shall be provided for the station. There shall be a minimum of one light. If an overhead power service is used, the lines shall be located so that they do not interfere with the installation or removal of the mechanical equipment at the station. The cables shall be placed such that all work with the crane can meet the set back requirements from the cables.

3.19.15 All electrical equipment shall be enclosed in a free-standing, vandal-proof, all-weather enclosure, NEMA 3R or better. Electrical control panel shall be manufactured by Superior Custom Control, located at 125 27th NE, Seattle, WA 98125, 206-362-8866.

3.19.16 All pump stations shall have an emergency power hookup or an on-site emergency power generator. The City will make the decision regarding which will be required based on the flows and location of the proposed station. All equipment shall be listed, labeled, and approved for the application.

3.19.17 The electrical equipment shall include a 5 KVA minimum transformer for the 120 volt single phase equipment.

3.19.18 Lift station telemetry shall be current with the City of Centralia Telemetry System. If the catalog number changes, you will use the one that is the City Standards at the time of design approval.

3.19.19 Pump motors shall be 3 phase, 240 volt or 480 volt 4 wire as described in 3.19.11. They shall be high efficiency rated.

3.19.20 Wet well sizing criteria:

Provide a holding period not to exceed 10 minutes for the design average flow, per DOE's "Criteria for Sewage Works Design", Section 3.222.

Provide for a minimum of 45 seconds pump run time per pump cycle, and a maximum of ten pump cycles per hour. The minimum size of wet well shall be 84-inch diameter.

3.19.21 Lift station emergency storage criteria:

Option #1:

Emergency storage shall be provided for 2 hours of design average flow, using a peaking factor of 2. This calculation shall be submitted with the system design and must be approved by the City Engineer.

Note: The peaking factor was set at 2, rather than 3 or 4, due to the typical emergency being caused by power outage.

All volume above area basements and below the hydraulic gradient may be used as emergency storage (wet well, conduit, manholes). This condition must be verified by calculation and submitted for approval by the City Engineer.

Option #2:

Provide emergency power on site per DOE "Criteria for Sewage Works Design", Section 3.34

3.19.22 The pump electrical controls shall be equipped to automatically alternate the pumps.

3.19.23 All replacement parts shall be available in the U.S.A. Permission in writing from the City shall be required and obtained prior to the review and approval of plans and specifications for the installation of a wastewater lift station.

3.19.24 Alarm and station status points:

High wet well
Pump 1 run
Pump 2 run
Pump 1 auto
Pump 2 auto
Pump 1 fail
Pump 2 fail
All pumps not auto

The contractor shall supply and install all sensors and auxiliary contacts for the above points and connect them with the appropriate size wire in conduit to terminal strip. The points terminated on the strip shall be identified by number and labeled showing the number and type.

3.19.25 All pump station sites shall be enclosed with a 6-foot chainlink fence with slats. The fence shall conform to the WSDOT Standard Specifications and WSDOT Standard Plan L-2. The slats shall be redwood or an approved equal. Location of fence shall be approved by the City.

3.20 Pressure Sewer (Force Main) General

Low pressure systems, i.e., force mains, may be considered for situations where high ground water table or topography make gravity sewer impractical. If a system is approved a tracer wire installation will be required. However, STEP systems are not approved for the City of Centralia wastewater collection system.

3.21 Pressure Sewer Design Standards

The design of any sewer extension/connection shall conform to City Standards, DOE's "Criteria for Sewage Works Design", and any applicable standards as set forth herein and in Sections 1.02 and 1.06.

The layout of extensions shall provide for the future continuation of the existing system as determined by the City. In addition, main extensions shall be extended to and across the side of the affected property fronting the main.

The system shall be designed at full depth of flow on the basis of an average daily per capita flow as shown on the DOE table referenced in Section 3.09. A friction factor of 0.013 shall be used for Manning's "n" value.

New sewer systems shall be designed by methods in conjunction with the basis of per capita flow rates. Methods shall include the use of peaking factors for the contributing area, allowances for future commercial and industrial areas, and modification of per capita flow rates based on specific data (I/I). Documentation of the alternative method used shall be provided along with the plans.

The applicable General Notes listed following Section 3.09 shall be included on any plans dealing with pressure sanitary sewer design.

3.22 Force Main

3.22.1 Material: Force mains for sizes up to 12 inches shall be ductile iron AWWA C151 Class 51 or PVC C900 with ductile iron fittings and gasketed joints. Tracer wire and brass wedge requirements are as in Section 2.03. For 14 to 24-inch mains, pipe shall be ductile iron AWWA C151 Class 51 or PVC C905 with ductile iron fittings and gasketed joints. A more rigid pipe may be required where unlimited trench
widths occur. All ductile iron pipe and fittings shall be epoxy coated or PE lined and designed for use with corrosive materials.

3.22.2 Depth: Force mains shall have a minimum 36 inches of cover to top of pipe. See Section 2.13 for sanitary sewer/water main crossings requirements.

3.22.3 Velocity: The minimum velocity allowed is 3 feet per second at average dry weather flow. Three feet per second is required to scour settled solids. Maximum velocity allowed shall be 6 feet per second.

3.23 Pressure Sewer Surge Protection

PVC pipe is subject to fatigue failure due to cyclic surge pressures. Lift stations shall be constructed to minimize rapid changes in velocities and a properly sized surge tank and "soft start and stop" pump controls shall be used.

3.24 Pressure Sewer Air/Vacuum Valves

Air release valves and air/vacuum valves shall be located at the high points of the line within a standard 48-inch manhole or a comparable sized, approved vault. Air release valves shall be fitted with an activated carbon canister to absorb compounds with disagreeable odors prior to releasing the air to the surrounding area. Grades shall be designed to minimize the need for air/vacuum valves when practical. Vehicular access to valve is required for maintenance.

3.25 Force Main Drain

Provisions to drain a force main to facilitate repairs or to temporarily remove force main from service shall be provided. This may be accomplished through the use of a valved tee connected to a drain line at the low point of the line. A manhole shall be set over the force main at the valved tee.

3.26 Pressure Sewer Thrust Blocking

Location of thrust blocking shall be shown on plans. Thrust block concrete shall be Class B poured against undisturbed earth. A plastic barrier shall be placed between all thrust blocks and fittings.

See Standard Drawings 2-10 and 2-18 in the Water Chapter. Designed and approved restraining joint systems may be allowed in lieu of thrust blocking. Restraining joint brand, type and size shall be specified on the plans.

3.27 Force Main Termination

Hydrogen sulfide (H2S) odors and the buildup of sulfuric acid (H2SO4) occur in the operation of a force main. To mitigate these conditions, some type of control method(s) shall be used. This may include chemical addition at the pump station and/or the re-aeration of the wastewater at or near the terminus. Re-aeration may include the following:

Construction of a vault housing an aspiration assembly.

The use of hydraulic fall (vertical siphon) within the terminal manhole.

High velocity discharge with smooth transition so as to not cause splashing of force main into the downstream gravity sewer.

These methods all require an adequate source of fresh air at the vault or manhole. At a minimum, the manhole at the terminus and the two manholes downstream of the terminus shall be coated with Raven 405 or approved equal which is resistant to sulfuric acid and hydrogen sulfide. The downstream gravity sewer line pipe connecting these manholes shall also be protected from the effects of hydrogen sulfide.

3.28 Pump Station Upgrades

The addition of a new pump station or new gravity sewer main extension may cause new flows high enough to make improvements at existing pump stations necessary. Any required upgrades of existing stations shall conform to these standards for a new station.

3.29 Residential Grinder Pumps

3.29.1 A grinder system is a facility consisting of a holding tank, grinder pump and pressure piping system for conveying the wastewater and solids into the sewer system.

3.29.2 The City may allow the installation of residential grinder pumps where feasible. The Wastewater Department (Centralia Utilities) will make the final decision regarding the approval of a grinder pump installation.

Feasible:

1. *Only where a gravity sewer system does not exist and it is physically impossible to accommodate the installation of a gravity main extension*.

2. *Special circumstances make standard methods unusable*.

3.29.3 The grinder pump system shall be designed in accordance with Section C1-10.1 of the DOE's "Criteria for Sewage Works Design".

3.29.4 The grinder pump shall be manufactured by Environment One Corporation.

3.29.5 The owner shall be responsible for construction of the grinder pump system. Once completed and approved by the City of Centralia, the City will provide all maintenance of the system, ownership of the station will remain with the homeowner. The property owner will reimburse the City for all parts and labor associated with operation and maintenance of their system. The City will not be liable for backups and spill clean-up of backups caused by the systems failure.

The developer or homeowner is responsible to supply the City one spare pump core to be placed on the shelf for use in the City's grinder pump program; this pump will become the property of the City and can and will be used throughout the City's LPSS system.

3.29.6 The owner shall be responsible for the power bill for the life of the system.

An emergency/backup power supply may be required for larger or commercial systems and shall be the responsibility of the customer.

3.29.7 **Odor/corrosion control**

All grinder systems shall be required to mitigate for odors and corrosion.

At a minimum, single-family residence installations shall be responsible for the costs of coating three manholes within the cities sanitary sewer system and provide three carbon canister manufactured by SweetStreet.

All other systems must be evaluated for the potential to cause odors and corrosion by an engineer licensed within the State of Washington.

All calculation used to determine said potential and proposed odor/corrosion mitigation efforts shall be submitted to the City for review.

The developer/contractor shall be responsible for all costs accrued during the review process, which may include outside consultation from a licensed engineering firm contracted to the City.

If it is found that the minimum requirements or proposed mitigation efforts are insufficient the City will prescribe an acceptable solution.

All costs incurred in the development of a City provided solution shall be the responsibility of the developer/contractor.

3.29.8 Commercial grinder systems that have kitchen or cooking facilities, such as churches, community gathering places, restaurants, schools, etc., shall require installation of a grease trap/grease interceptor.

3.29.9 All commercial/industrial installation may be required to install a flow meter at the owner's expense if deemed necessary by the Wastewater Department (Centralia Utilities).

3.29.10 **Grinder System Force Main:**

A. Mainline/common pressure main. The minimum pipe size used is 2 inches nominal diameter. This is based on maintenance requirements rather than flow. Pipe will be PVC, or SDR 21 (200) with rubber gasket joints. Gaskets will comply with ASTM D 1869. Mains will have a minimum 36 inches of cover to top of pipe. See DOE's criteria for sewage works design for sanitary sewer/water main crossing requirements.

B. Service Line. Service connection pipe will be minimum 1-1/4 inch diameter, Schedule 80 PVC water pipe, solvent weld joint located at 90 degress to the mainline when possible. Solvent cements and primer for joining PVC pipe and fittings will comply with ASTM D2564 and will be used as recommended by the pipe and fitting manufacturers. Service will have a minimum 24 inches cover to top of pipe. The service line shall have two boxes, one within two feet of the station which will house a clean-out, and a lateral connections manufactured by e-one (clean-out box). The second box will house a lateral connections also manufactured by e-one located at the property line (collector box). See Section

2.13 for requirements regarding sewer and water separation.

C. Building Sewer. The gravity building sewer between the building and the tank will be designed and installed in accordance with the UPC as adopted by the City. The owner will be responsible for maintenance of the building sewer.

D. All pipes will be installed with continuous tracer tape installed 12 to 18 inches under the proposed finished grade. The marker tape will be marked "sewer" and be plastic, non-biodegradable metal core or backing that can be detected by a standard metal detector. Tape will be Terra Tape "D" or approved equal. In addition to tracer tape, install 12-gauge-coated copper wire wrapped around the pipe, brought up and tied off at the valve boxes. A 1-pound magnesium anode will be buried with the sewer line wire splices and connections to anodes will join wires both mechanically and electrically and will employ epoxy resin or heat shrink tape insulation. Furnishing and installing the tracer wire and anodes will be incidental to pipe installation.

E. All pipes shall be bedded with sand or suitable material to protect them from backfilling and settling after construction.

F. Pressure main's will be required to have air release valve's installed at the high points and or at every 2,000 to 2,500 feet along a horizontal run that lacks a clearly defined high point.

GRINDER PUMP INSTALLATION

The grinder sewer pump shall be an Environment One Model DH071 as supplied by Correct Equipment, Inc., 14576 NE 95th Street, Redmond, WA 98052. Contact Howard Taub at (425) 869-1233.

Contact the City for a pre-construction meeting for pump tank and control panel locations before any installation. Contractor shall determine the depth of the existing or future building sewer discharge before any installation, to determine which DH071 will be suitable.

The grinder pump lift station package shall include the following items:

a) Corrugated HDPE tank with single complete pump unit, ready for installation. The tank will have a 1-1/4 NPT discharge connection and a 4-inch inlet grommet.

b) The tank shall include an internal check valve assembly.

c) A breaker panel as supplied by Environment One, with two 15 amp breakers for pump operations, one 15 amp breaker for the alarm system, a *Push to Run* button, an audible alarm with *Silence Button*, and a red light alarm. All wires and connectors are to be color coded and labeled for ease of installation.

d) A minimum of 25-feet of direct bury cable (Supply Cable) between the tank and breaker panel.

e) The pump system operates on two pressure switches. One switch operates the pump on/off and the second operates the alarm.

f) The package system shall meet the requirements of the L & I, Division for Residential, grinder pump systems.

g) The electrical supply to the breaker panel shall be 240-volt single phase-power. Two pole 30 amp breaker, 4 wire circuit required.

h) The tank location shall be accessible for maintenance and repair. The tank cover shall be approximately 3 inches above finished grade. Finish grade shall slope away from the station and the station shall not be installed within a "pot hole". No plants, fences, or other obstructions are to be located within 5 feet of the tank and the valve boxes, and the property owner shall maintain a 5-foot clear zone around the tank.

i) The location of the breaker panel shall be:

- Accessible for maintenance and repair;
- In sight of the tank;
- The bottom of the Panel must be 5 feet above finished grade; and
- The alarm light shall be visible from 50 feet and must be visible in a 180 degree radius.

j) The maximum distance between the breaker panel and the grinder tank shall be 25 feet, and with sight and easy access.

k) Fences, bushes, or any other object shall not hide the alarm light or hinder in the maintenance and/or repair of the system.

l) There shall be no additional junction boxes or splices made once the system has been installed and inspected by City personnel. Anyone tampering with the approved system shall be liable to the City for any expense, loss, damage, cost of inspection or cost of correction incurred by the City, plus a penalty not to exceed $1000.00.

CALL FOR INSPECTION

Arrangements for inspection of a side sewer installation shall be made with the City, 24-hours in advance. The City reserves the right to set the time for inspection. All inspections will be performed during normal working hours. Cancellations must be made a minimum of one hour before the scheduled appointment. Additional inspection may result in additional fees.
(For inspections, phone 360-330-7512)

TESTING OR FINAL INSTALLATION – GRINDER PUMP

Sewers using pump systems shall be tested at 50 psi, or as directed by the City for actual conditions. The following is the procedure used for testing the discharge line:

a) Close the in-line ball valve in the grinder valve box.

b) Open the riser ball valve in the grinder valve box.

c) Close the ball valve at the collector valve box for the street connection.

d) Using hand pump, pressurize with water or air, introduced at the low end, to test for leakage.

e) Hold the required pressure for ten minutes. Allowable leakage = 0.

AS-BUILT DRAWING

As-built drawings shall be prepared by the contractor and checked by the Wastewater Department Inspector (Centralia Utilities) in conjunction with the permit, and shall show the as-built location of all the components of the installations.

3.30 Vehicle and Equipment Washwater Discharge

All businesses that regularly wash vehicles and/or equipment surfaces shall conform to the requirements of the Best Management Practices Manual for Vehicle and Equipment Washwater Discharges prepared by the DOE. These requirements will also apply to farm/construction vehicle, equipment rinsing, mobile washers, new/used car dealerships, and charity car washes.

3.30.1 Businesses that are specifically a ″Car Wash″, shall be designed for zero (0) discharge to the public sanitary sewer system. Any sanitary sewer connection service such as businesses shall be required to install a flow meter on the discharge line connecting to the City's sanitary sewer system.

LIST OF DRAWINGS

CHAPTER 3: SANITARY SEWER

Drawing Title	Number
Sanitary Sewer Main Installation General Notes	
Sanitary Sewer Lateral Service Connection	3-01
Type 1 Manhole	3-02
Manhole Collar	3-03
Cleanout	3-04
Drop Connection (outside manhole)	3-05
Drop Connection (inside manhole)	3-06
Typical Grinder Pump Lateral Installation	3-07GP
Clean-out Box Connection	3-08GP
Collector Box Connection	3-09GP
Residential Grinder Pump Lateral (Collector & Clean-out) Box Requirements	3-10GP
Compression Fitting (instructions)	3-11GP
Force Main Sewer Lateral Service Connection	3-12GP
Type 1 Low Pressure Clean-out (for non-traffic areas only)	3-13GP
Type 2 Low Pressure Clean-out (with manhole – for traffic areas only)	3-14GP
Force Main Drop connection system (inside manhole)	3-15GP

SANITARY SEWER MAIN INSTALLATION
GENERAL NOTES

1. A pre–construction conference must be held with the City prior to start of construction.

2. Underground utilities shown are for the convenience of the contractor only. It is the contractors responsibility to use the "one–call" telephone (1–800–424–5555) 48 hours before construction is started.

3. All materials and construction shall be in accordance with the current edition of the WSDOT standard specifications for roads, bridges and municipal construction and City of Centralia standards.

4. Erosion control measures shall be taken during construction to prevent siltation of existing and proposed facilities.

5. Pipe for sanitary sewer shall conform to Section 7–17.2 of the current standard specifications for road, bridge and municipal construction published jointly by WSDOT and the State Chapter of APWA and be one of the following:

   a. Ductile iron pipe shall conform to Section 9–05.13 and ANSI A21.51 or AWWA C151 and shall be cement mortar lined. Minimum thickness shall be class 51.
   b. Polyvinyl chloride (PVC) pipe shall conform with the provisions of WSDOT Section 9–05.12. 8"–15" ASTM D 3034, SDR 35 / 18"–24" ASTM F 679

6. The end of laterals shall be marked with a 2x4 wooden stake four feet long (minimum) buried in the ground a depth of three (3) feet (minimum).

7. All laterals shall be laid at 2% minimum except where noted. 6" pipe to property line laterals must be provided to all appropriate properties.

8. All laterals shall be connected to mains with manufactured wyes, tees, or a saddled tap .

9. Layout and construction staking will be done by a design engineer or a licensed land surveyor. All vertical control shall be established using the 1929 USGS Datum.

10. All new manholes shall be sixty inches (60") in diameter, Type 1 manholes unless otherwise specified by the City.

11. Low pressure air test is required on all new sanitary sewer lines (including laterals). Testing shall be per APWA specifications and witnessed by the City.

12. A vacuum test is required on all new manholes and altered manholes.

13. Schedule all tests with the City and allow two (2) working days advance notice.

14. A video tape of the T.V. inspection of the sewer main shall be provided to the city prior to final acceptance.

15. As–built drawings shall be submitted to the City prior to final acceptance.

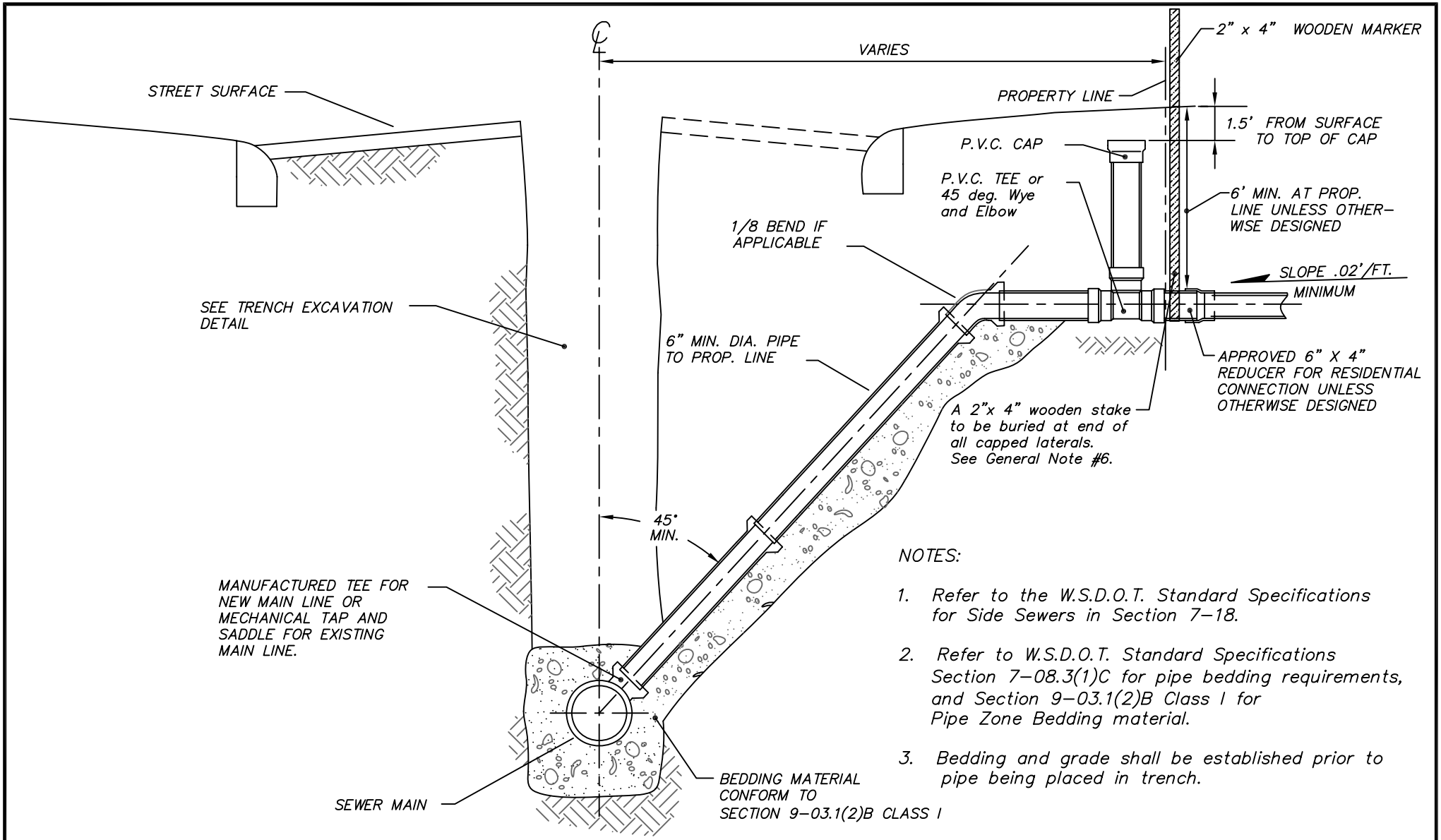
16. All necessary easements must be recorded before final acceptance.

17. The contractor is to notify the City two (2) working days prior to the start of construction.

18. A manhole and clean–out assembly detail shall be submitted prior to construction for the City's approval.

19. On all main extensions, a lateral shall be installed from the main to the right–of–way for all existing residences and for all possible future building lots along the main extension. The actual locations shall be approved by the City of Centralia.

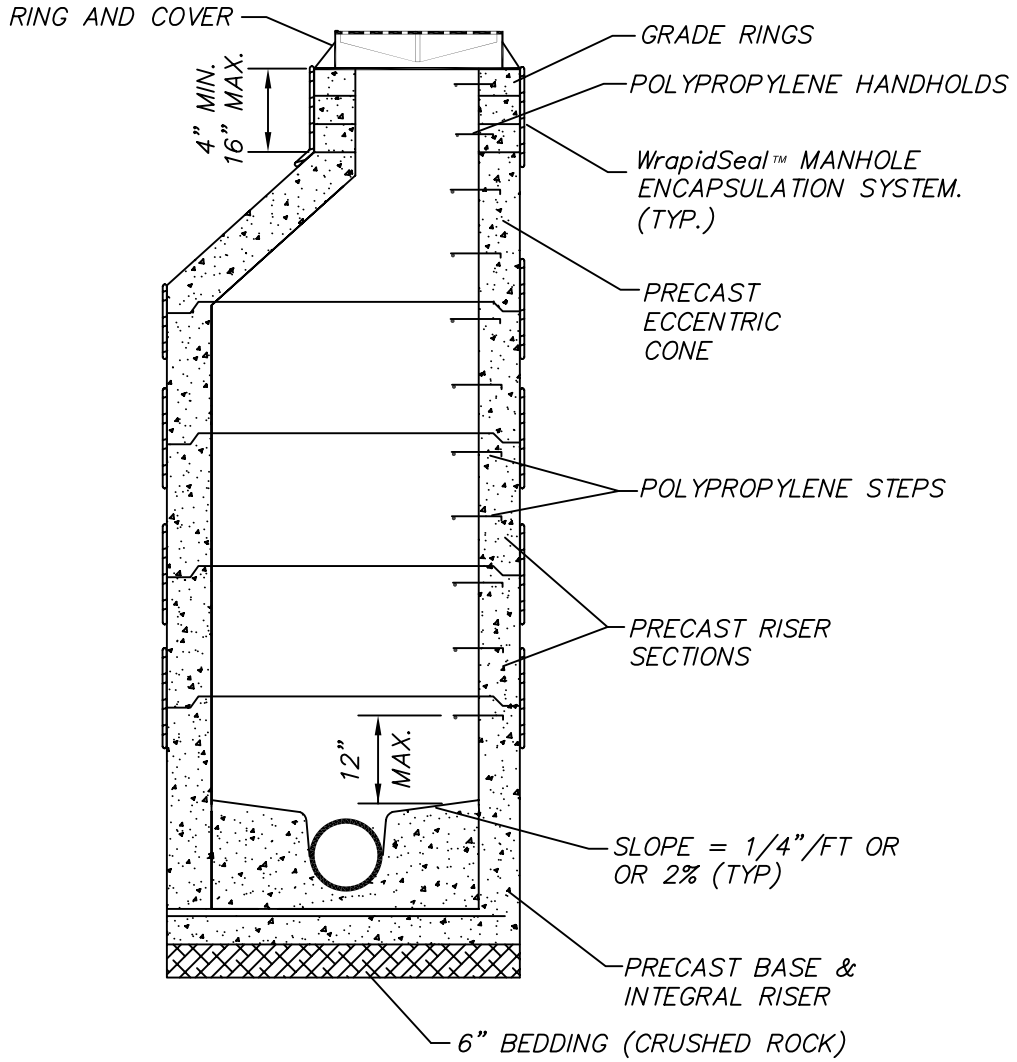
APPROVED BY	REVISED DATE	CITY OF CENTRALIA	
CITY ENGINEER	10-14-08	SEWER MAIN INSTALLATION GENERAL NOTES	1 OF 1



NOTES:

1. Refer to the W.S.D.O.T. Standard Specifications for Side Sewers in Section 7-18.
2. Refer to W.S.D.O.T. Standard Specifications Section 7-08.3(1)C for pipe bedding requirements, and Section 9-03.1(2)B Class I for Pipe Zone Bedding material.
3. Bedding and grade shall be established prior to pipe being placed in trench.

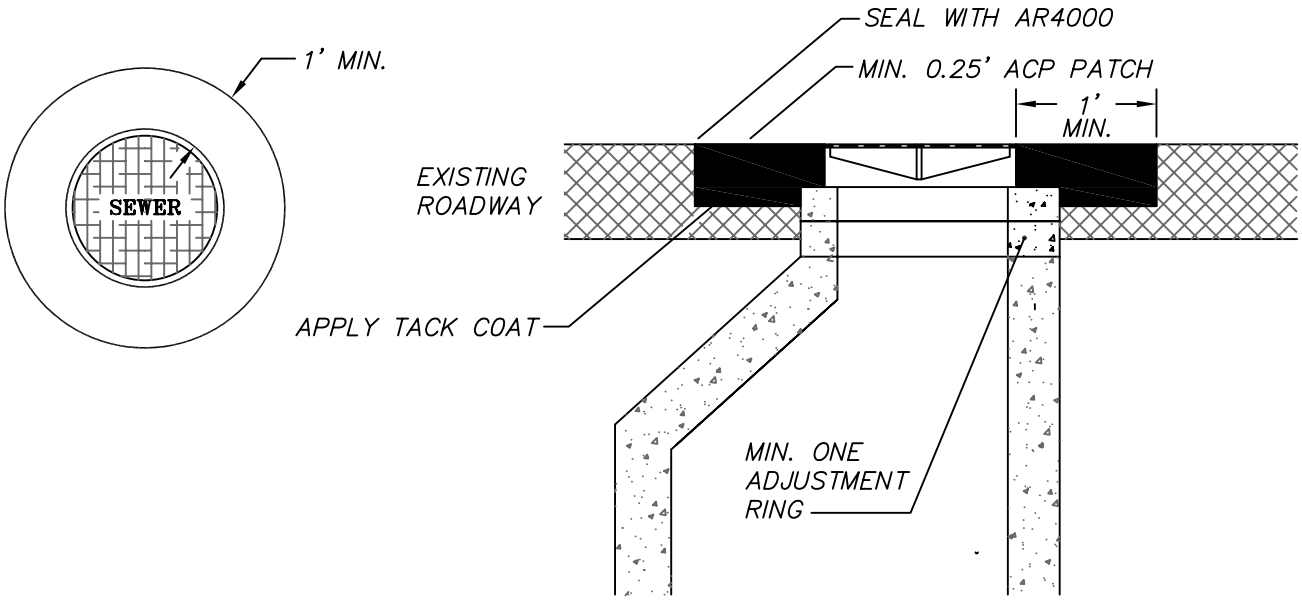
STD. PLAN NO.	APPROVED BY	REVISED DATE	CITY OF CENTRALIA
3-01	CITY ENGINEER	10-14-08	SANITARY SEWER LATERAL SERVICE CONNECTION



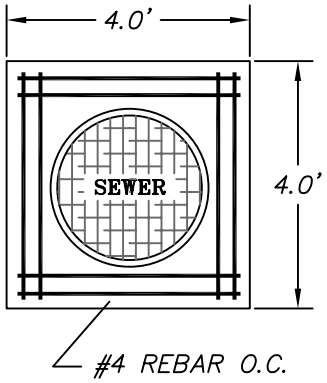
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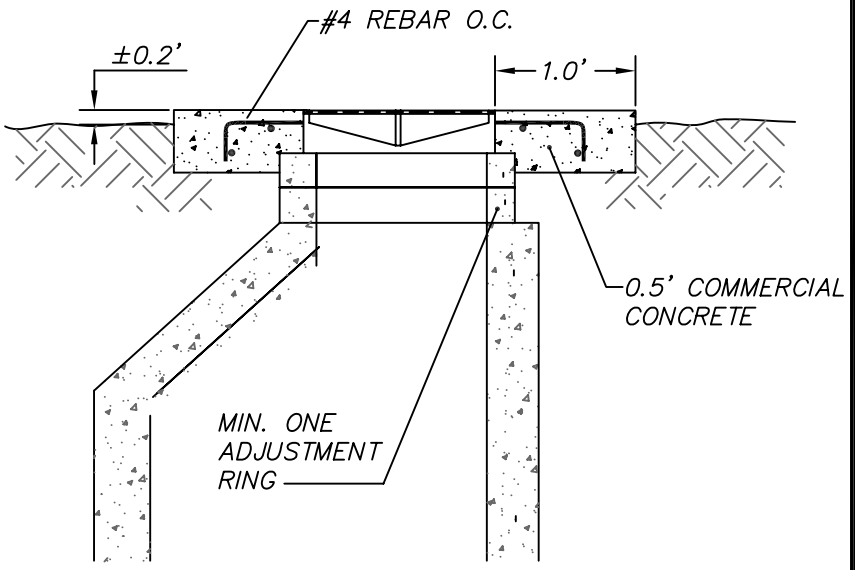
1. PRECAST MANHOLES SHALL MEET THE REQUIREMENTS OF ASTM C478. JOINTS SHALL BE RUBBER GASKETED CONFORMING TO ASTM C443 AND SHALL BE GROUTED FROM THE INSIDE. LIFT HOLES SHALL BE GROUTED FROM THE OUTSIDE AND INSIDE OF THE MANHOLE.
2. STEPS IN MANHOLE SHALL HAVE 6" MINIMUM CLEARANCE. HANDHOLDS IN ADJUSTMENT SECTION SHALL HAVE 3" MINIMUM CLEARANCE. THE FIRST STEP OR HANDHOLD SHALL BE A MAXIMUM OF 12" FROM THE TOP OF THE COVER.
3. PRECAST BASES SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE A WALL THICKNESS OF 2" MINIMUM.
4. CONNECTION TO MANHOLE SHALL BE MADE BY KOR-N-SEAL BOOT, SAND COLLAR OR A-LOCK.
5. SEE STANDARD PLAN 3-03 FOR MANHOLE COLLAR INSTALLATION.
6. A "SEWER GUARD" SHALL BE INSTALLED IN ALL MANHOLES.
7. MANHOLES SHALL BE SIXTY (60) INCHES IN DIAMETER, UNLESS OTHERWISE SPECIFIED BY THE CITY.
8. ALL EXTERIOR JOINTS INCLUDING ADJUSTMENT RINGS SHALL BE WRAPPED WITH WrapidSeal™.
9. MANHOLES SHALLOWER THAN 5 FEET MEASURING FROM THE RIM TO THE INVERT SHALL HAVE A FLAT TOP.

APPROVED BY	REVISED DATE	CITY OF CENTRALIA	STD. PLAN NO.
CITY ENGINEER	10-14-08	TYPE 1 MANHOLE	3-02



MANHOLE IN ASPHALT



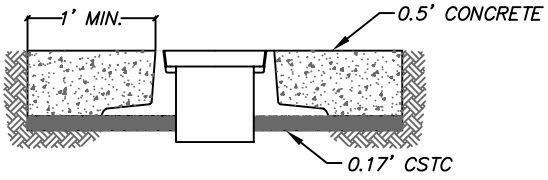


MANHOLE OUTSIDE ASPHALT

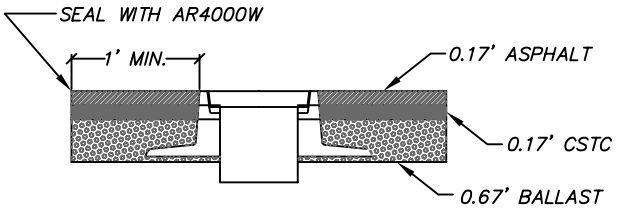
NOTE:

1. ON MANHOLE OUTSIDE ASPHALT ADD REINFORCING STEEL AS SHOWN ABOVE. DEFORMED BAR TO MEET ASTM A615 GRADE 60 FY=60,000 P.S.I.

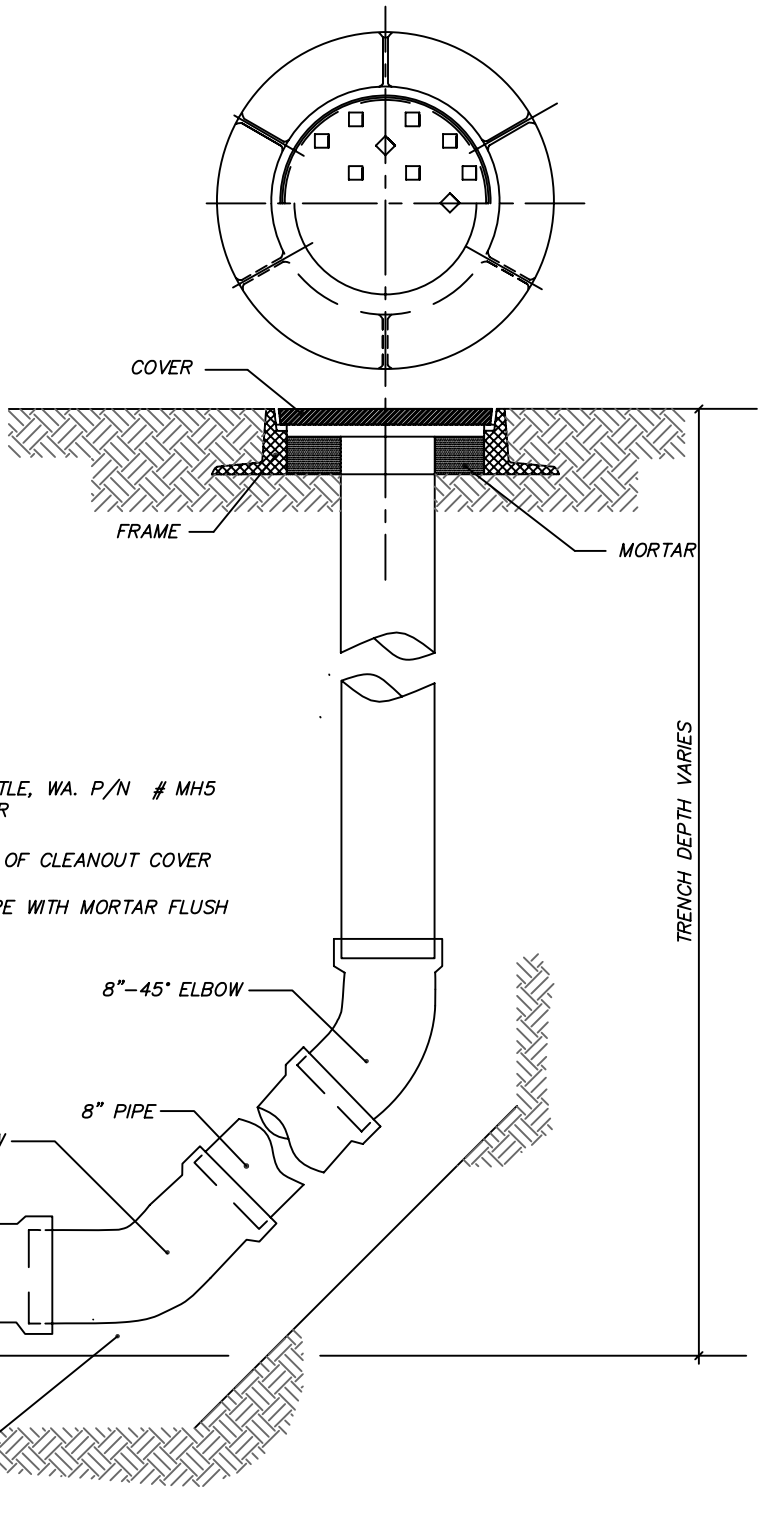
APPROVED BY	REVISED DATE	CITY OF CENTRALIA	STD. PLAN NO.
CITY ENGINEER	10-14-08	MANHOLE COLLAR	3-03



OUTSIDE PAVED AREA



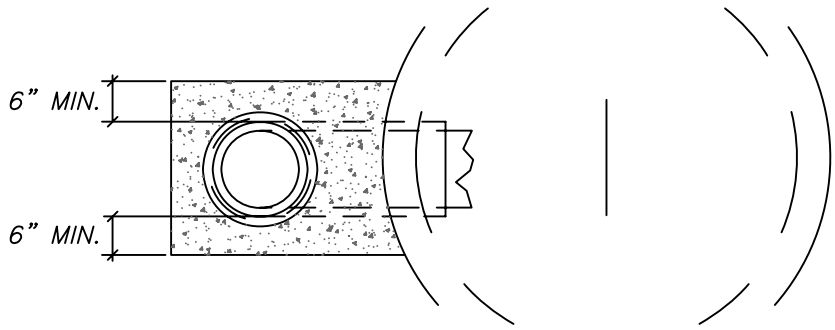
INSIDE PAVED ROADWAY

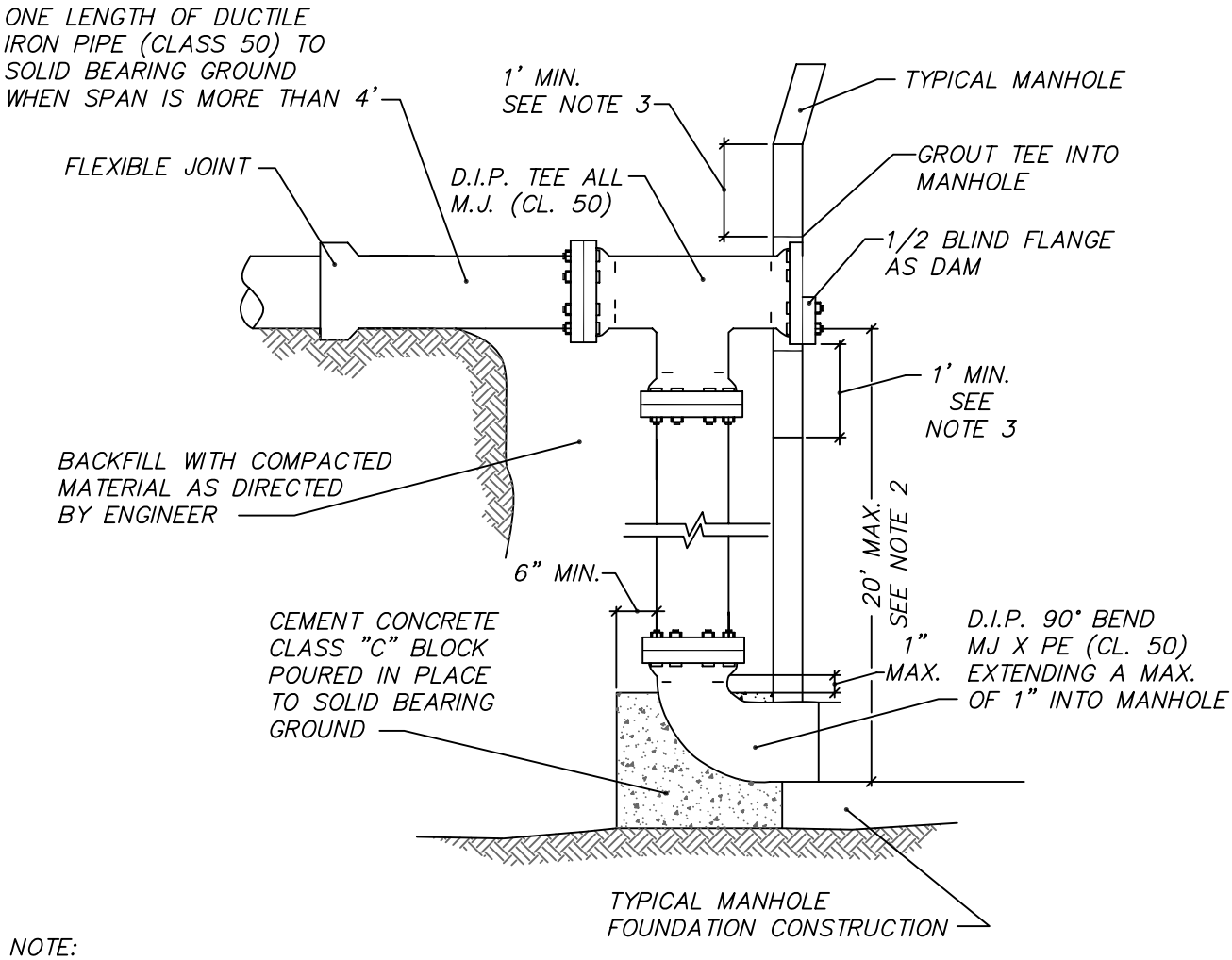


NOTES:

1. ALL SEWER PIPE SHALL BE ASTM 3034 SDR 35.
2. CLEANOUTS SHALL NOT BE INSTALLED ON SEWER MAINS LARGER THAN 8" DIAMETER.
3. CLEANOUT COVER SHALL BE OLYMPIC FOUNDRY, SEATTLE, WA. P/N # MH5 11" x 4" FLANGE DOWN FRAME, C/W 12.25" DIA. COVER
4. END OF PIPE TO BE LOCATED 1" BELOW THE BOTTOM OF CLEANOUT COVER
5. FILL THE AREA BETWEEN THE FRAME AND O.D. OF PIPE WITH MORTAR FLUSH TO THE END OF THE PIPE.

APPROVED BY	REVISED DATE	CITY OF CENTRALIA	STD. PLAN NO.
CITY ENGINEER	10-14-08	CLEANOUT	3-04





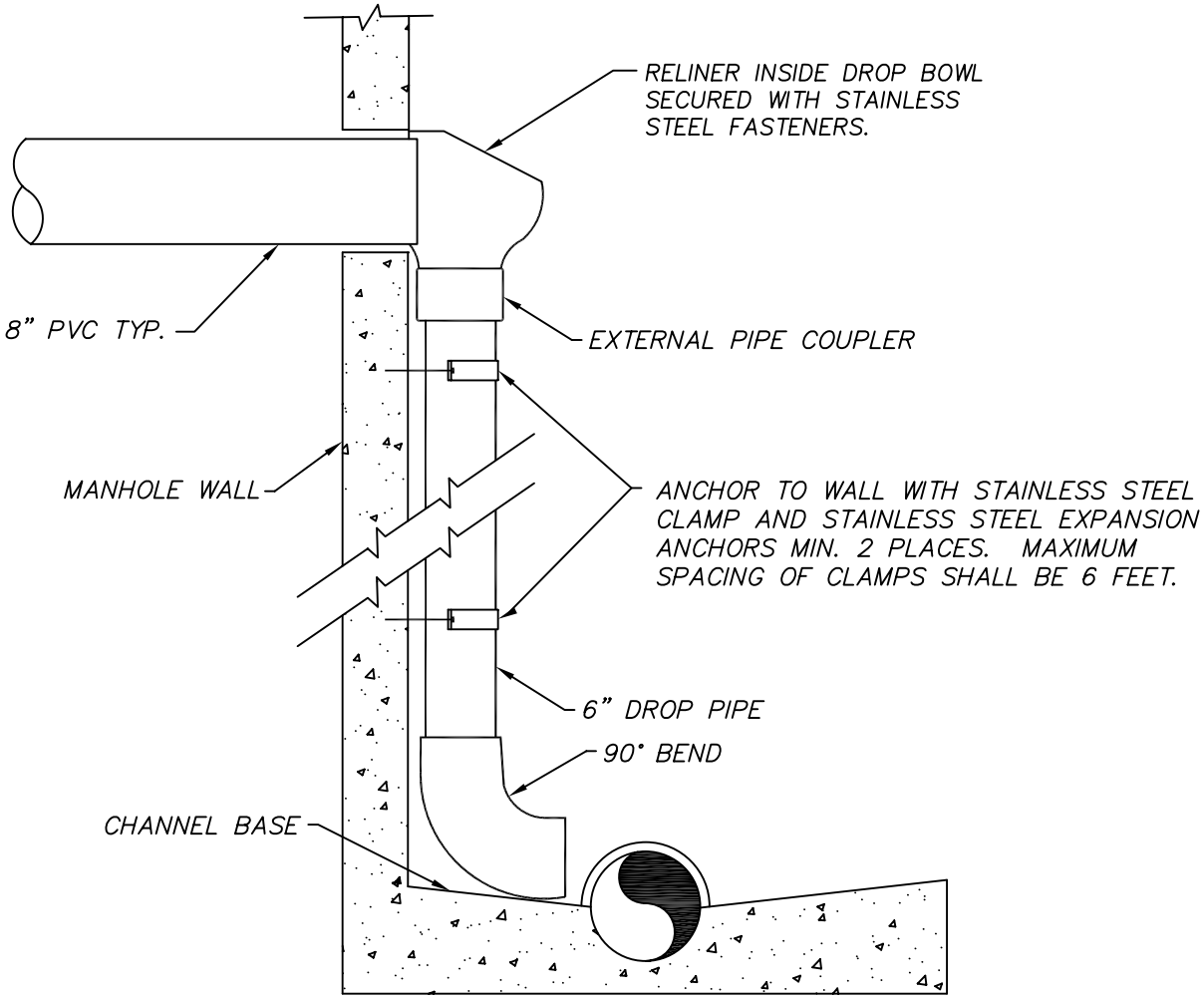
NOTE:

1. THE INTERIOR OF ALL DUCTILE IRON SHALL BE COATED WITH EPOXY OR TNEMEC 66.

2. DEPTHS OVER 20' MAY BE ALLOWED IF MEGA-LUG JOINTS ARE USED.

3. MAINTAIN A MINIMUM OF 1' BETWEEN MANHOLE JOINTS AND TEE.

APPROVED BY	REVISED DATE	CITY OF CENTRALIA	STD. PLAN NO.
CITY ENGINEER	10-14-08	DROP CONNECTION OUTSIDE MANHOLE	3-05

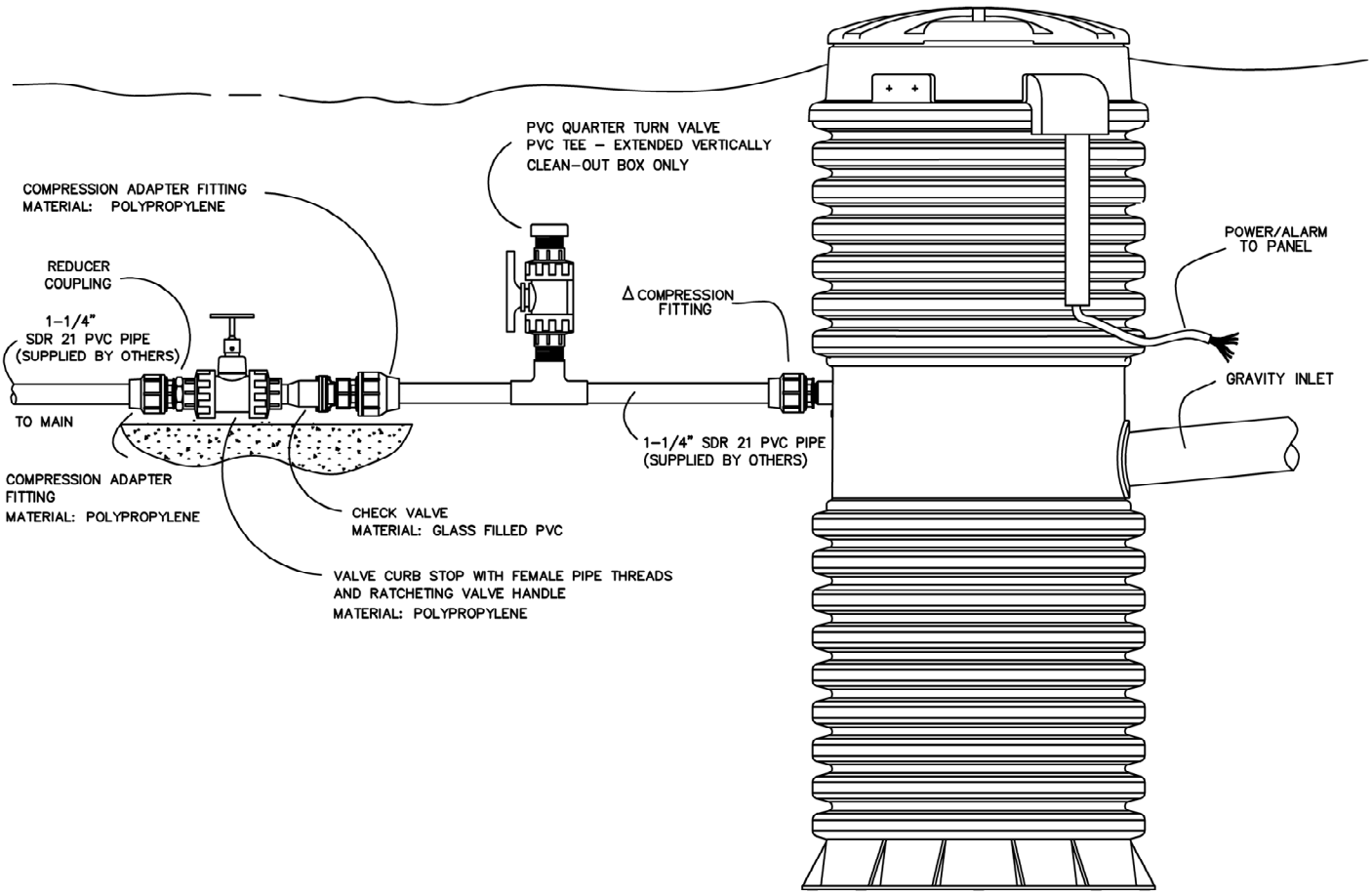


NOTE:

1. RELINER INSIDE DROP SYSTEM BY DURAN INC. LYME, CONNECTICUT. (860)434-0277.

APPROVED BY	REVISED DATE	CITY OF CENTRALIA	STD. PLAN NO.
CITY ENGINEER	10-14-08	DROP CONNECTION SYSTEM INSIDE MANHOLE	3-06

TYPICAL GRINDER PUMP LATERAL INSTALLATION SDR 21 PVC PIPE



MODEL 2010
(NOTE: BALLAST NOT SHOWN)

INSTALL ALL UNDERGROUND PIPING PER ASTM D 2321-89

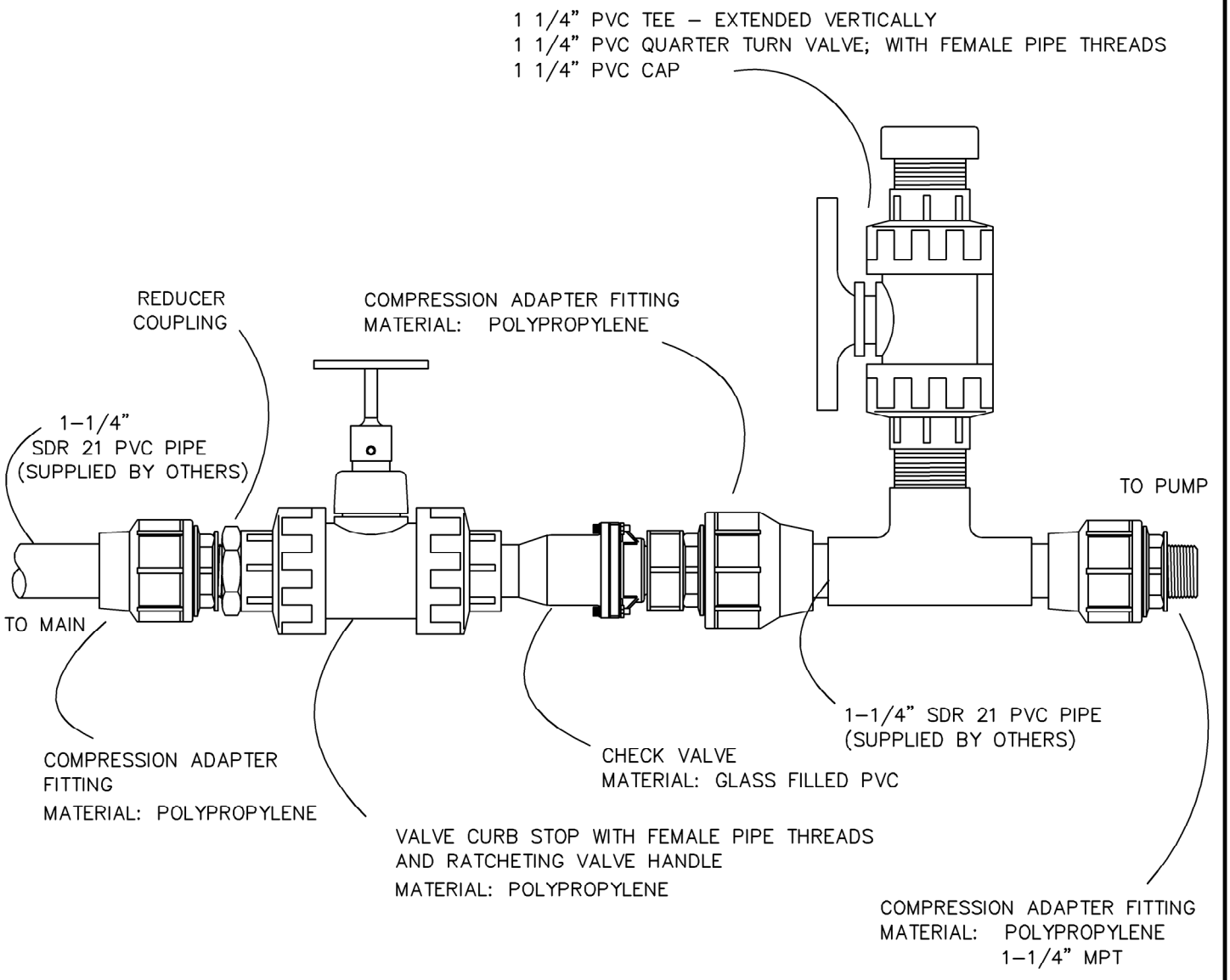
INSTALL GRINDER PUMP STATION PER MANUFACTURERS INSTALLATION INSTRUCTIONS

Δ - INCLUDED IN LATERAL KIT

APPROVED BY	REVISED DATE	CITY OF CENTRALIA	STD. PLAN NO.
CITY ENGINEER	02-01-09	TYPICAL GRINDER PUMP LATERAL INSTALLATION SDR 21 PVC PIPE	3-07GP

CLEAN-OUT BOX CONNECTION

SDR 21 PVC PIPE



PRESSURE RATING 150 psi

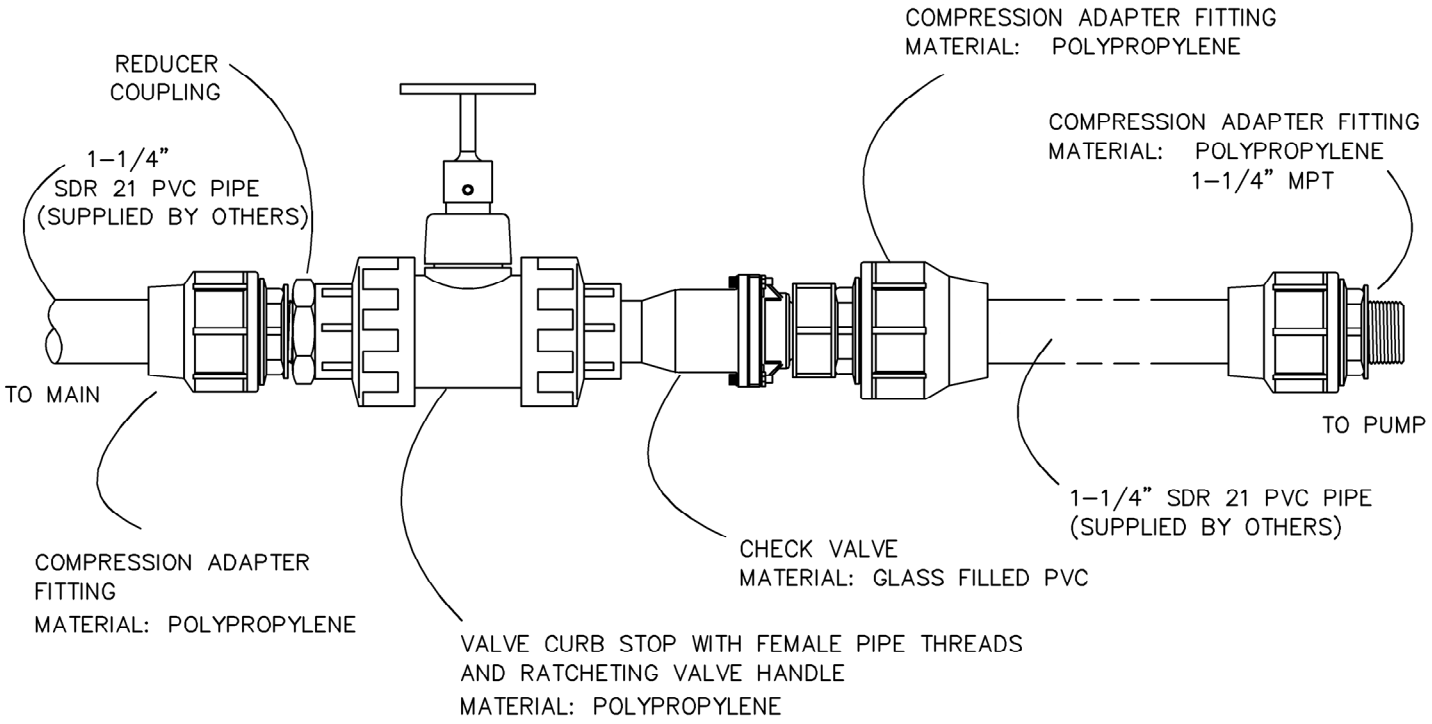
ASSEMBLY TO BE USED WITH 1–1/4" SDR 21 PIPE ONLY
TO ORDER LATERAL ASSEMBLY SHOWN,
USE PART NUMBER PC0645G21.

ORDER CARSON 1730 SUPER JUMBO XL BOX SEPARATE: SEE DRAWING 3–10GP.

APPROVED BY	REVISED DATE	CITY OF CENTRALIA	STD. PLAN NO.
CITY ENGINEER	02-01-09	CLEAN-OUT BOX CONNECTION	3-08GP

COLLECTOR BOX CONNECTION

SDR 21 PVC PIPE



PRESSURE RATING 150 psi

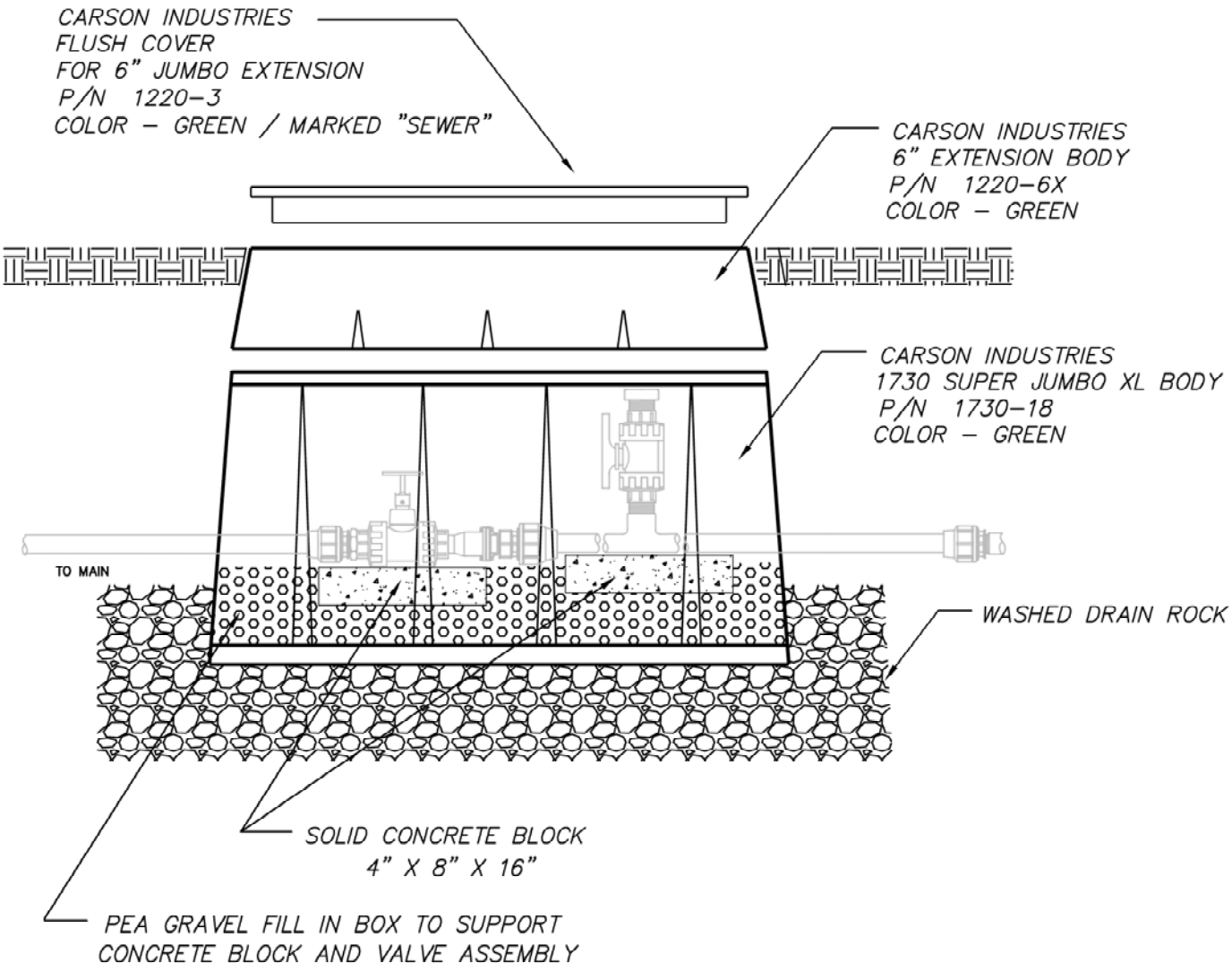
ASSEMBLY TO BE USED WITH 1–1/4" SDR 21 PIPE ONLY

TO ORDER LATERAL ASSEMBLY SHOWN,
USE PART NUMBER PC0645G21.

ORDER CARSON 1730 SUPER JUMBO XL BOX SEPARATE: SEE METER BOX DETAIL DWG.

APPROVED BY	REVISED DATE	CITY OF CENTRALIA	STD. PLAN NO.
CITY ENGINEER	02-01-09	COLLECTOR BOX CONNECTION	3-09GP

RESIDENTIAL GRINDER PUMP LATERAL (COLLECTOR & CLEAN-OUT) BOX REQUIREMENTS

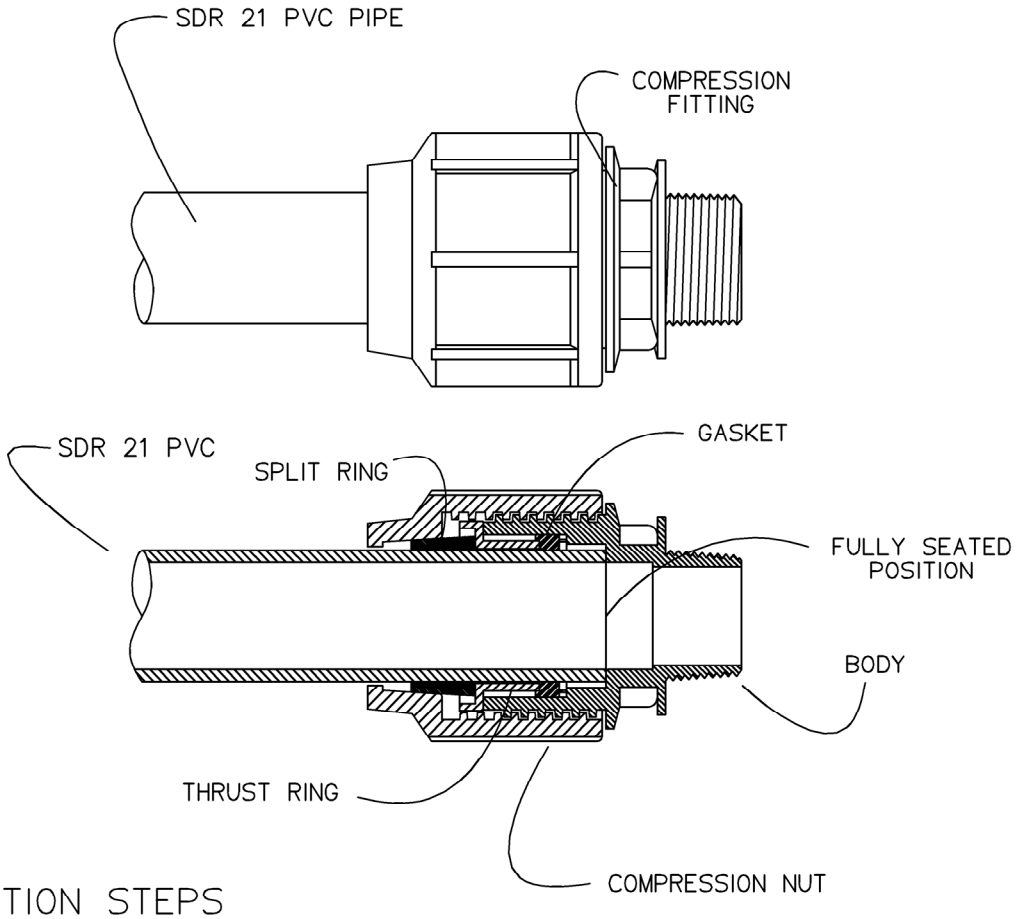


NOTE:

OVERALL DEPTH WITH RISER TO BE 24 INCHES.

OUTSIDE PAVING AREA

APPROVED BY	REVISED DATE	CITY OF CENTRALIA	STD. PLAN NO.
CITY ENGINEER	02-01-09	LATERAL (COLLECTOR + CLEAN-OUT) BOX REQUIREMENTS	3-10GP



INSTALLATION STEPS

1- CUT PIPE SQUARE.

2- MAKE SURE PIPE IS ROUND, NOT FLATTENED.
CLEAN OFF ANY DIRT SO THAT THE SURFACE IS SMOOTH.

3- INSERT PIPE THROUGH COMPRESSION NUT. POSITION SPLIT RING ON THE END OF PIPE WITH THE TAPERED END TOWARD THE COMPRESSION NUT.

4- SLIDE COMPRESSION NUT OVER SPLIT RING AND ALIGN IT WITH THE THREADS ON THE BODY.

5- INSERT PIPE INTO THE BODY OF THE FITTING UNTIL FIRMLY SEATED.

6- TIGHTEN COMPRESSION NUT SECURELY TO THE FITTING BODY.

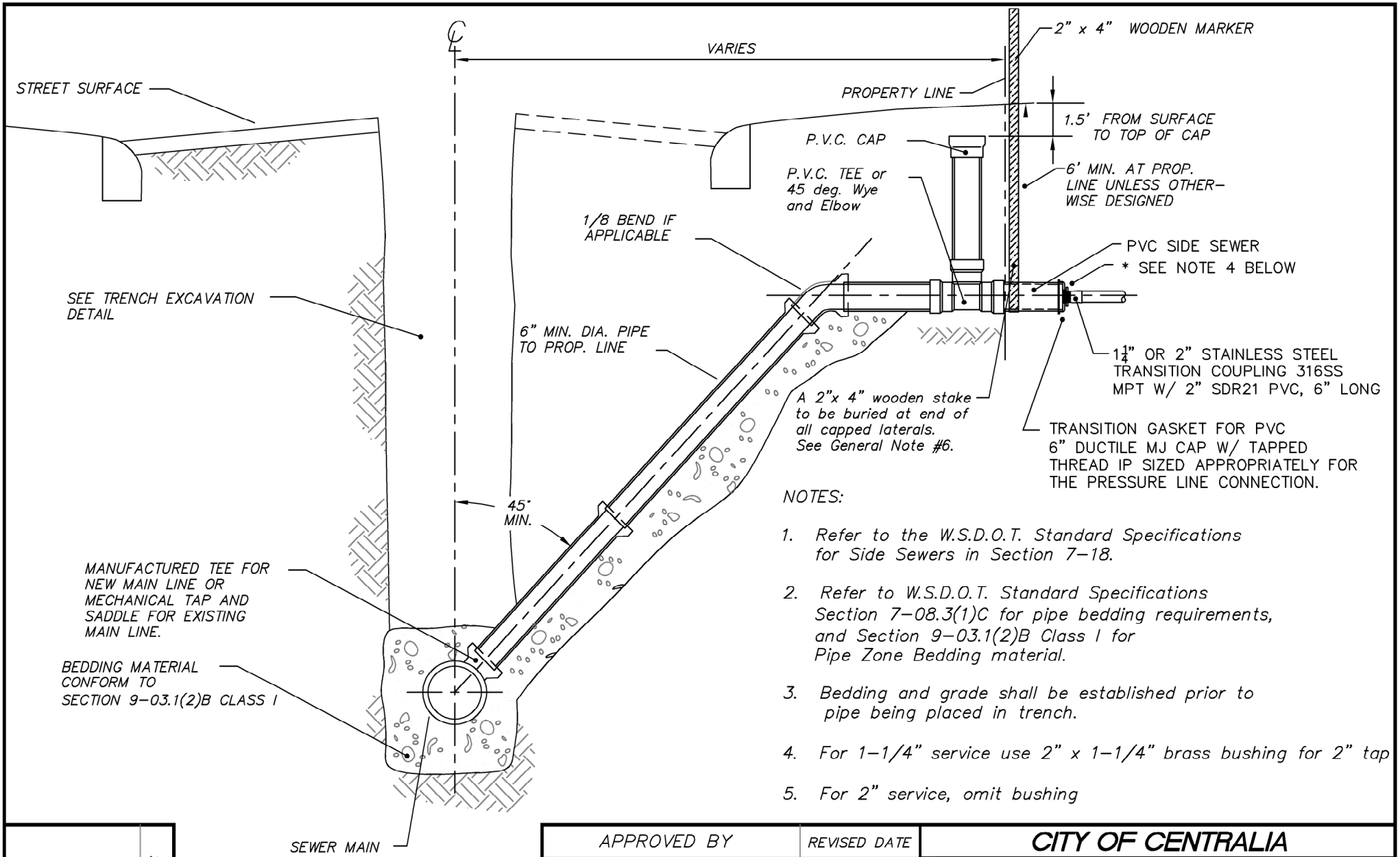
PRECAUTIONS

1- ALWAYS PRESSURE TEST FOR LEAKS PRIOR TO BACKFILLING.

2- FITTINGS CAN BE DAMAGED BY IMPROPER HANDLING. PROTECT THREADS. DO NOT DROP. BACKFILL AND COMPACT CAREFULLY PER ASTM D2321 SO THAT FITTINGS ARE NOT STRESSED BY THE WEIGHT OF THE EARTH.

3- PROTECT BALL VALVE ASSEMBLIES FROM FREEZING. ATTEMPTING TO FORCIBLY OPEN OR CLOSE A FROZEN VALVE WILL DESTROY THE VALVE.

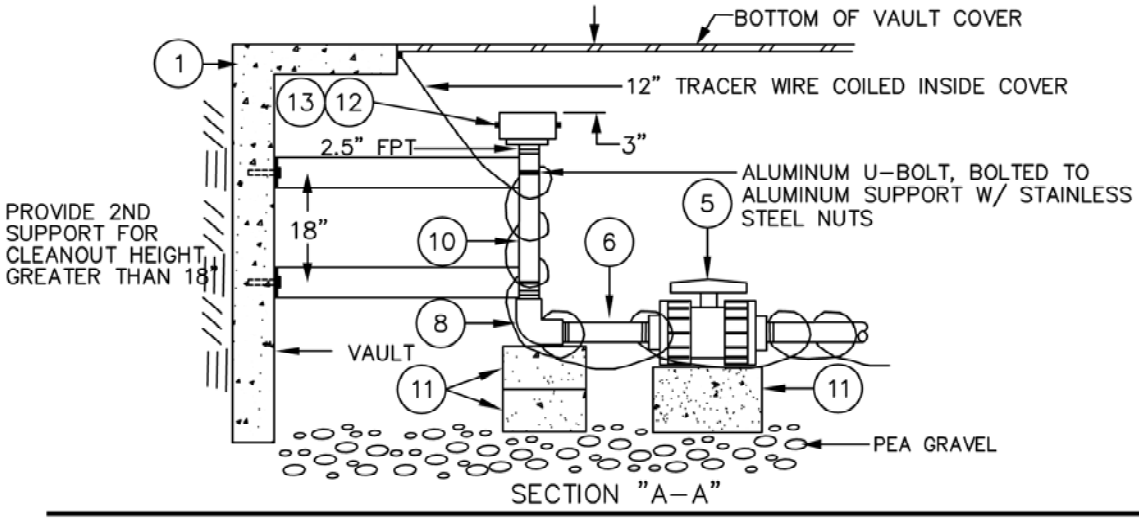
APPROVED BY	REVISED DATE	CITY OF CENTRALIA	STD. PLAN NO.
CITY ENGINEER	02-01-09	COMPRESSION FITTING INSTRUCTIONS	3-11GP



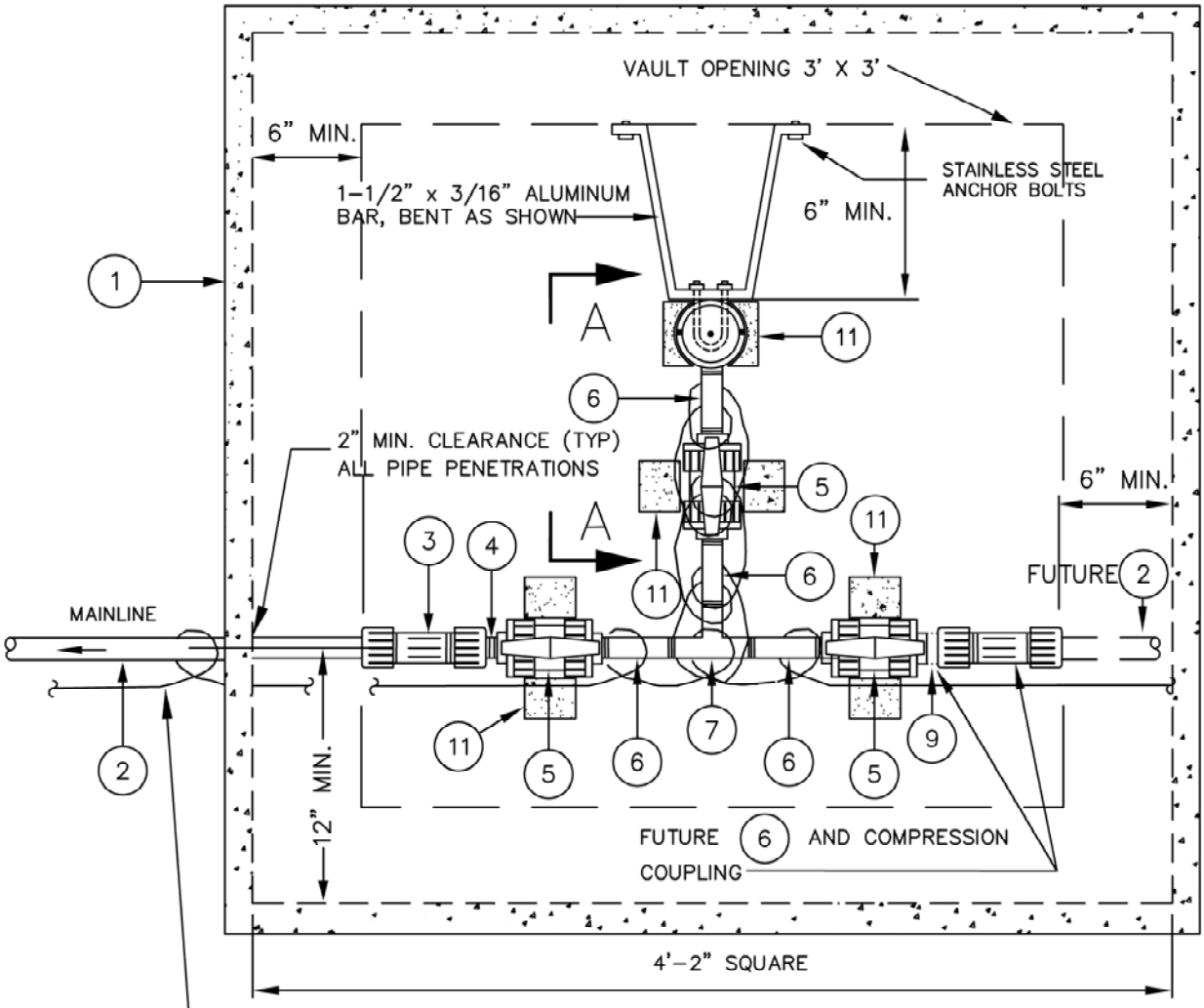
NOTES:

1. Refer to the W.S.D.O.T. Standard Specifications for Side Sewers in Section 7-18.
2. Refer to W.S.D.O.T. Standard Specifications Section 7-08.3(1)C for pipe bedding requirements, and Section 9-03.1(2)B Class I for Pipe Zone Bedding material.
3. Bedding and grade shall be established prior to pipe being placed in trench.
4. For 1-1/4" service use 2" x 1-1/4" brass bushing for 2" tap
5. For 2" service, omit bushing

STD. PLAN NO.	APPROVED BY	REVISED DATE	CITY OF CENTRALIA
3-12GP	CITY ENGINEER	02-01-09	FORCE MAIN SEWER LATERAL SERVICE CONNECTION



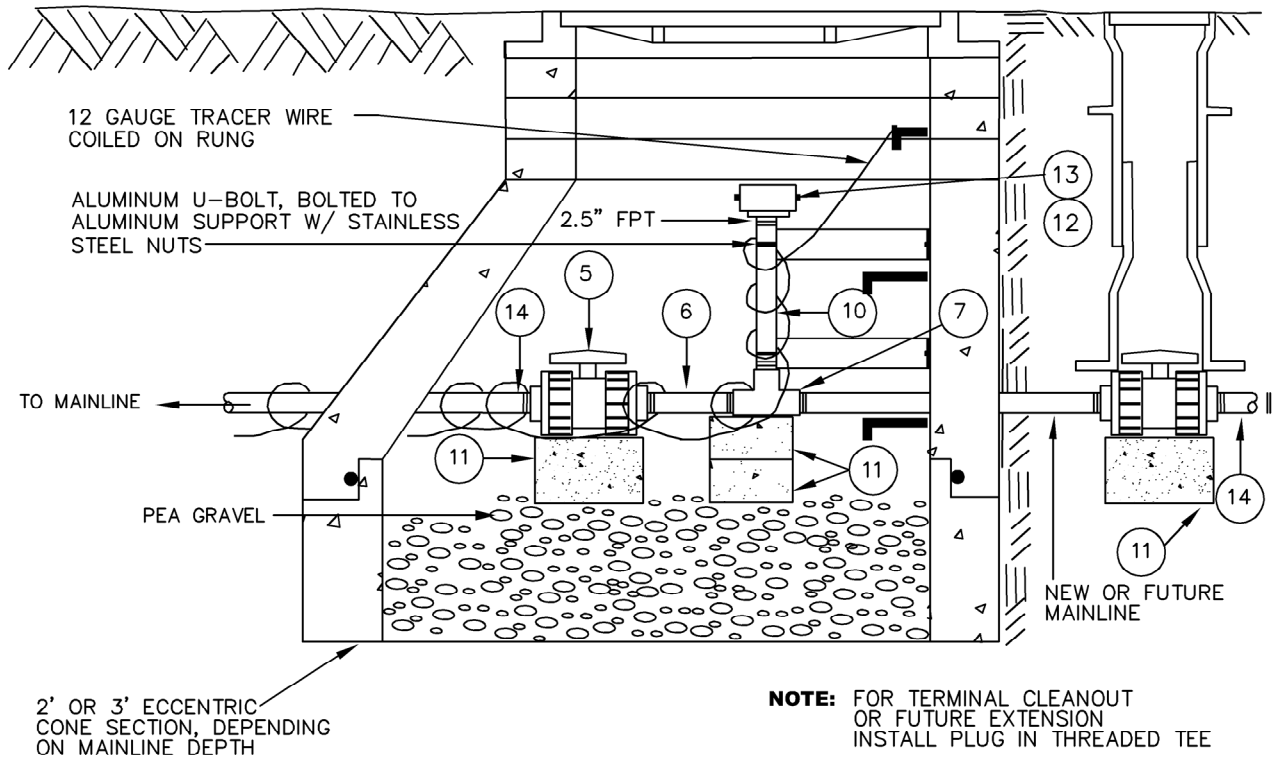
SEE STANDARD PLAN 3-14GP FOR MATERIAL LIST.



TRACER WIRE INSULATED 12 GAUGE WIRE (SOLID CORE) TO BE WRAPPED AROUND THE PIPE AND LOOPED THRU VALVE BOX FROM COLLECTOR VALVE TO GRINDER CLEANOUT (AS SHOWN).

TYPE I LOW PRESSURE CLEANOUT DETAIL (FOR NON-TRAFFIC AREAS ONLY)

APPROVED BY	REVISED DATE	CITY OF CENTRALIA	STD. PLAN NO.
CITY ENGINEER	02-01-09	TYPE I LOW PRESSURE CLEANOUT (FOR NON-TRAFFIC AREAS ONLY)	3-13GP



NOTE: FOR TERMINAL CLEANOUT OR FUTURE EXTENSION INSTALL PLUG IN THREADED TEE

TYPE II LOW PRESSURE CLEANOUT WITH MANHOLE (FOR TRAFFIC AREAS)

CLEANOUT NOTES USED ONLY OUTSIDE OF TRAFFIC AREAS

1. LOCATED EVERY 500' AND AT END OF EACH LINE FOR FUTURE TIE IN AND RR XING'S ADJUST COVER TO MATCH EXISTING GRADE. VAULT OR MANHOLE CONE SHALL BE PLACED LEVEL. DRAIN TO DAYLIGHT OR STORM SYSTEM.

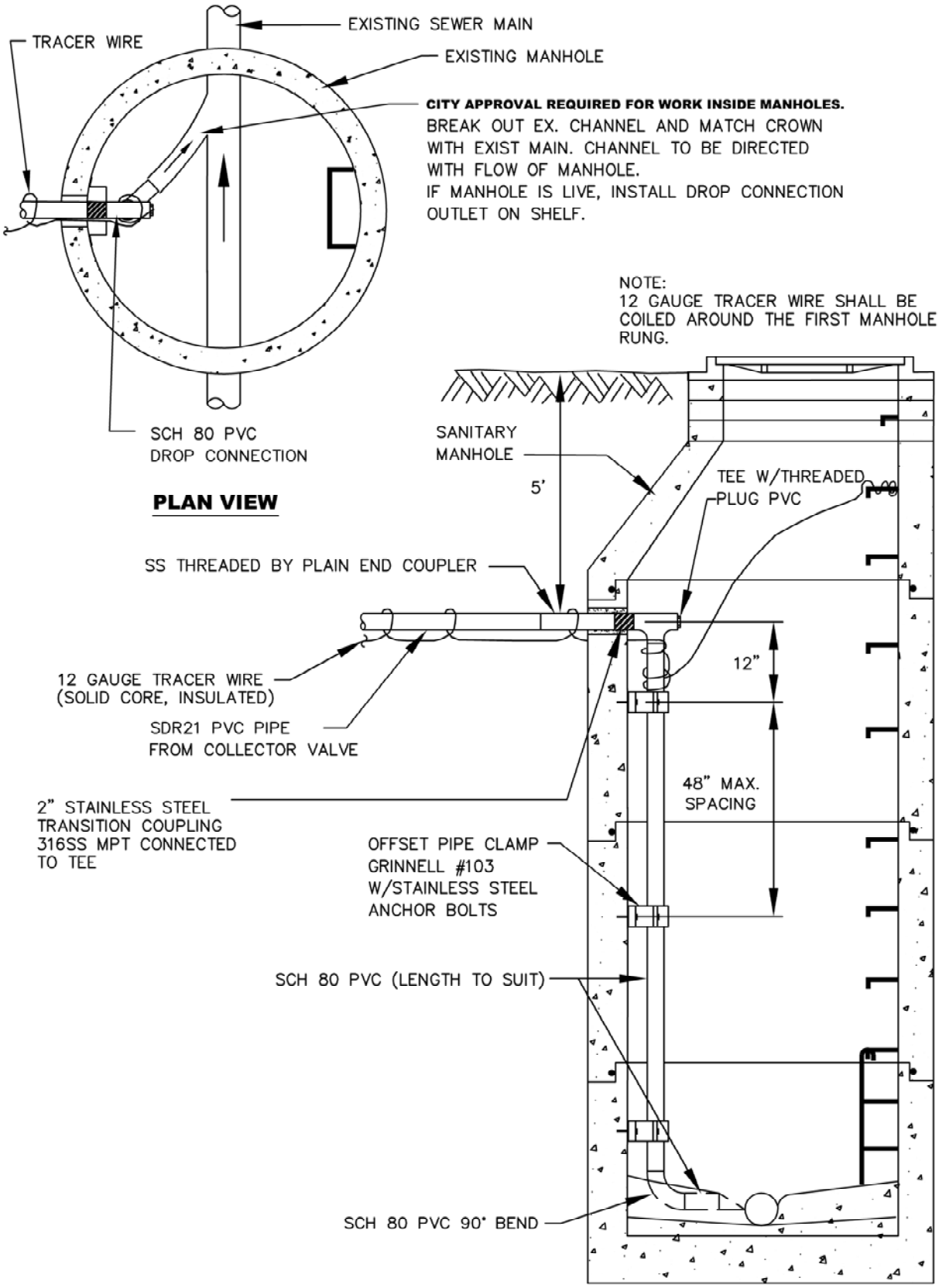
MATERIAL LIST

ALL PVC SCHEDULE 80 WILL BE THREADED EXCEPT AS NOTED

1. 1 – UTILITY VAULT 506-LA W/ (1) DOOR NO. 55-3332P OR (2) GREEN CARSON BOXES #1730 WITH CONCRETE BLOCKS (SIZE TO SUIT) TO SUPPORT BOX FROM RESTING ON POLY PIPE. FOR NON-TRAFFIC AREAS ONLY ALL LIDS ARE TO BE SOLID AND **MARKED "SEWER".**
2. PRESSURE PIPE SDR 21 PVC (LENGTH TO SUIT)
3. 1 – COMPRESSION COUPLING PVC
4. 1 – NIPPLE (1/2 THE LENGTH OF COMPRESSION COUPLING)
5. 3 – UNION BALL VALVE PVC
6. 4 – CLOSE NIPPLE PVC. DIAMETER OF PVC OF CLEANOUT SHALL BE SAME DIAMETER AS THE MAINLINE
7. 1 – TEE PVC
8. 1 – 90° ELBOW PVC
9. 1 – PLUG PVC (MIP)
10. 1 – NIPPLE PVC (LENGTH TO SUIT)
11. CONCRETE BLOCK – (SIZE TO SUIT)
12. 1 – MIP X 2 1/2" MNST SWIVEL BRASS HOSE ADAPTOR (PROVIDE REDUCER AS REQUIRED)
13. 1 – 2 1/2" FNST CAP W/CHAIN
14. 1 – FULL BORE STAINLESS STEEL TRANSITION FITTING (FOWLER OR EQUAL) DIAMETER SHALL BE SAME DIAMETER AS THE MAINLINE.

LOW PRESSURE CLEANOUT NOTES AND MATERIAL LIST

APPROVED BY	REVISED DATE	CITY OF CENTRALIA	STD. PLAN NO.
CITY ENGINEER	02-01-09	TYPE II LOW PRESSURE CLEANOUT WITH MANHOLE (FOR TRAFFIC AREAS)	3-14GP



N.T.S.

PRESSURE SEWER DROP CONNECTION

APPROVED BY	REVISED DATE	CITY OF CENTRALIA	STD. PLAN NO.
CITY ENGINEER	02-01-09	FORCE MAIN DROP CONNECTION SYSTEM INSIDE MANHOLE	3-15GP