Attachment A

City of Enumclaw

COMPREHENSIVE GENERAL SEWER PLAN

September 2016 with Amendments 1-3

City of Enumclaw

KI&A

BHC CONSULTANTS

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300

March 3, 2017

DATE RECEIVED
MAR 09 2017
CITY OF ENUMCLAW

Mr. Scott Woodbury, PE Assistant Public Works Director
Public Works Department
City of Enumclaw
1309 Myrtle Ave
Enumclaw WA 98022

RE: 1. City of Enumclaw Comprehensive General Sewer Plan, September 2016 (BHC consultants)
2. Delegation of Authority for Sewerage Collection System Extension and Replacement

Dear Mr. Woodbury:

In accordance with Chapter 173-240 of the Washington Administrative Code (WAC), and on behalf of the Department of Ecology (Ecology), the referenced General Sewer Plan is hereby **APPROVED.**

In addition, delegation of authority for sewerage collection system extension and replacement pursuant to WAC 173-240-030 (5) is hereby **CONDITIONALLY APPROVED.**

Under this conditional approval, Ecology is delegating our review and approval authority to the city for a) engineering reports and b) plans and specifications for extension or replacement of the sewer system including pump stations, provided that the city:

- submits to us for review and approval, by June 30th, 2018, it's updated guidelines for sewer system review and approval, including specifications and standard drawings;
- provides annually by January 15th a brief description of projects approved in the preceding year under this delegation; and
- provides annually by January 15th a list of overflow events occurring at the Highway 410 overflow point in the preceding year, including the event dates and estimates of overflow volume and duration.

In the following situations, Ecology is retaining its authority for approval of engineering reports and plans and specifications:

- The proposed sewers, or pump stations involve installation of overflows or bypasses; and

- The proposed sewers, pump or lift stations discharge to a treatment, collection, or disposal facility that is operating beyond its design capacity, excepting the current overflow point on Highway 410.

We also want to note that Ecology provides financial assistance for sewer system improvements. We accept applications once a year, generally at the end of October. We accept applications for design and construction for projects whose total cost is less than $5 million; and design or construction for projects above that amount. We suggest contacting us several months before the application due date if interested as there are prerequisites for funding, including documentation of public involvement in the project.

Nothing in this approval shall be construed as satisfying other applicable federal, state or local statutes, ordinances or regulations.

If you have any questions, please contact Vicky Epp, Facility Manager, at (360) 407-6318, or Greg Zentner, Supervisor of the Municipal Operations Unit, at (360) 407-6368.

Sincerely,

R Doenges

Rich Doenges
Southwest Region Manager
Water Quality Program

Enclosure

City of Enumclaw

COMPREHENSIVE GENERAL SEWER PLAN

Final September 2016

REVIEWED BY: APPROVED BY:

DATE 2/28/17

DEPARTMENT OF ECOLOGY
WATER QUALITY PROGRAM
SOUTHWEST REGIONAL OFFICE

Mayor
Liz Reynolds

City Council
Juanita Carstens
Morgan Irwin
Chance LaFleur
Kimberly Lauk
Jan Molinaro
Hoke Overland
Mike Sando

City Administrator
Chris Searcy, PE

Interim Public Works Director
Scott Woodbury, PE
Phone: (360) 615-5728

City of Enumclaw
1309 Myrtle Avenue
Enumclaw, WA 98022

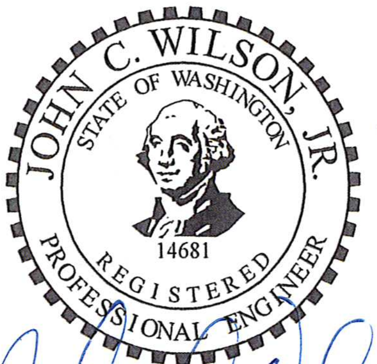
BHC Consultants, LLC
1601 Fifth Avenue, Suite 500
Seattle, WA 98104

Project Manager
John Wilson, PE
(206) 505-3400

Katy Isaksen & Associates
PO Box 30008
Seattle, WA 98113

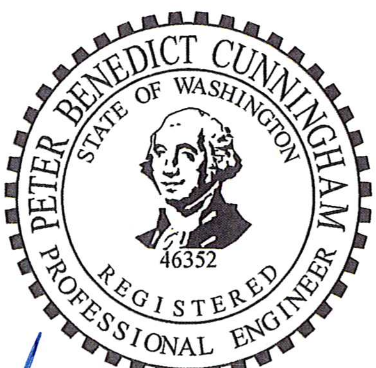
Katy Isaksen
President
(206) 706-8893

This document was prepared under the direct supervision of the following:



John C. Wilson, PE
Project Manger

Tom P. Giese, PE
Project Manager



Peter Benedict Cunningham, PE
Project Engineer

City of Enumclaw

COMPREHENSIVE GENERAL SEWER PLAN

Draft March 2016

Mayor
Liz Reynolds

City Council
Juanita Carstens
Morgan Irwin
Chance LaFleur
Kimberly Lauk
Jan Molinaro
Hoke Overland
Mike Sando

City Administrator
Chris Searcy, PE

Interim Public Works Director
Scott Woodbury, PE
Phone: (360) 615-5728

City of Enumclaw
1309 Myrtle Avenue
Enumclaw, WA 98022

BHC Consultants, LLC
1601 Fifth Avenue, Suite 500
Seattle, WA 98104

Project Manager
John Wilson, PE
(206) 505-3400

Katy Isaksen & Associates
PO Box 30008
Seattle, WA 98113

Katy Isaksen
President
(206) 706-8893

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

GLOSSARY

100-year flood: The magnitude of a flood likely to occur, on average, once every 100 years.
Average Wet Weather Flow: Wastewater flow during period when groundwater table is high and precipitation is at its peak, generally from October to May in the Lynnwood area.
Biochemical Oxygen Demand (BOD): Measure of the biodegradable material in a wastewater sample by the amount of oxygen used by waste-consuming organisms over 5-days**.**
Bioselector: Process component in beginning of wastewater treatment train wherein air and nutrients are kept at a level to select for the most desirable organisms to biodegrade the organic materials in the wastewater.
Class 'A' Reclaimed Water: An oxidized, coagulated, filtered, disinfected wastewater with the median number of total coliform organisms not exceeding 2.2 per 100 milliliters and the maximum number of total coliform organisms in any one sample not exceeding 23 per 100 milliliters.

Class 1 Stream: A perennial or intermittent stream that is used by threatened or endangered fish or larger numbers of other fish, or that is used as a direct source of water for domestic use.
Infiltration: Groundwater entering the sewage collection system through defective joints, pipes, and improperly sealed manholes.
Inflow: Sewage flows resulting from stormwater runoff entering the sewage collection system, typically through manhole covers, roof leaders, and area drains connected directly to sewer, cross connections from storm drains and catch basins, and direct flows into broken sewers.
Maximum Monthly Flow: Average daily flow during the highest flow month of the year.
Orange Book: *Criteria for Sewage Works Design,* published by the Washington State Department of Ecology
Peak Hourly Flow: Wastewater flow during the highest flow hour.
Polymer: Chemical mixed with sludge to enhance coagulation in the dewatering process.
Sensitive Area: Area in which development potential is limited by environmental factors such as steep slopes, cultural resources, wetlands, and valuable natural habitat.
Secondary Clarifier: Large quiescent tank in which activated sludge is directed into a center hopper and clear effluent is discharged over a weir.
Sewer Lateral: A sewer from a sewer main to serve one or more customers with no other common sewers discharging into it.
Sewer Submain: A sewer that receives flow from one or more sewer lateral.
Sewer Main or Trunk: A sewer that receives flow from one or more submains.
Sewer Interceptor: A sewer that receives flow from a number of main or trunk sewers, force mains, etc.
Total Suspended Solids: Measure of the total of biodegradable and non-biodegradable solids in wastewater.
UV Disinfection: Disinfection of clarified treated sewage effluent by exposure to ultraviolet radiation using banks of lamps suspended in a narrow effluent channel.

ABREVIATIONS

AWWF	Average Wet Weather Flow
BOD	Biochemical Oxygen Demand
CFR	Code of Federal Regulations
CIP	Capital Improvement Program
CWA	Clean Water Act
DOE	Washington State Department of Ecology
DOH	Washington State Department of Health
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Act
FPS	Feet per second
FWPCA	Federal Water Pollution Control Act (“The Clean Water Act”)
GPCD	Gallons per capita per day

GPAD	Gallons per acre per day
GPD	Gallons per day
HPA	Hydraulic Project Approval
I & I	Infiltration and Inflow
MGD	Million Gallons per Day
mg/L	Milligrams Per Liter
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
OCD	Washington State Office of Community Development
OFM	Washington State Office of Financial Management
POTW	Publicly Owned Treatment Works
PVC	Polyvinyl Chloride
RCW	Revised Code of Washington
SRF	State Revolving Fund
TSS	Total Suspended Solids
USFWS	United States Fish and Wildlife Service
UV	Ultraviolet
WDFW	Washington Department of Fish and Wildlife

Executive Summary

Introduction

The last General Sewer Plan (GSP) for the City of Enumclaw was completed and approved by the state Department of Ecology in 1998. While state law requires Comprehensive Water System Plans be updated every 6 years, there is no such requirement for GSPs. An update was planned in the 2008 and subsequent City annual budgets but was not implemented due to the funding being needed for other purposes, lack of available staff, or other reasons. Work on this GSP was initiated in 2014 and includes updating the existing system analysis, forecasting and evaluating future conditions and needs, preparing a capital and financing plan, and summarizing the findings in an updated plan.

Background, Goals, and Policies

The Urban Growth Area (UGA) as existing in 2015 formed the basis for development of this Comprehensive General Sewer Plan. The UGA was defined by King County in association with the City. The Growth Management Act (GMA) limits provision of sewer service to be within an approved UGA and requires sewer agencies to plan for eventual extension of sewer service to all property parcels within the UGA.

Goals and Policies to implement the GMA have been developed by City Staff as extensions of past practices for management of the sewer utility.

An update of the Enumclaw Comprehensive Plan is in process with final adoption planned for mid-2016. Sewer planning was based on zoning classifications as presented in the 2015 draft Comprehensive Plan, including sensitive area considerations.

Existing population was based on the 2010 Census as updated annually through 2014 and average single family occupancy rates. Employment was estimated from statistics generated through the Washington Unemployment Insurance Act as adjusted for self-employed and part-time workers.

City winter water consumption records were used to estimate water consumption within the City that would enter the sewer system. Together with the population and employment data, this information provided an indication of existing and historic sewage generation per capita and per employee. The existing annual average day flow is about 1.48 million gallons per day (MGD) and the maximum day flow is about 8.17 MGD

Existing Sewer Collection System

Records from the City sewer utility were collected to define the existing collection piping, the interceptor system, lift stations, and the extent onsite sewage treatment systems are used.

Daily Discharge Monitoring Reports (DMRs) for the Wastewater Treatment Facility (WWTF) for 2011 through 2013 were evaluated to identify historic peak day, average annual day and peak day wastewater flows. Selected dates were analyzed to define the historic peak hour and typical minimum hour flows.

Together with Staff observation and maintenance records, the above data was combined to define the existing sewage generated per capita and per employee together with base infiltration per acre served by sewers and peak hour rain-induced infiltration-inflow per served acre.

Projected Conditions

The existing sewer piping system and topography were used to define 24 existing basins at least partially served by sewers plus an additional 12 basins to be served at some future date, all within the existing UGA. Aerial photography and other records were used to distribute existing population and employment among these basins as well as estimating the acreage served within each basin.

A variety of data and sources were used to project a build-out scenario assumed to occur in 2035. Based on existing developable land, the build-out population and employment were distributed among all basins future acreage to be served by sewers.

These projected 2035 conditions were used to project wastewater flows in 2035 based on the assumptions that sewage generated per capita and per employee remained unchanged, which seems reasonable given that historic data for the City indicates this projection is likely.

Projected 2035 wastewater flows also assumed that the infiltration and rain-induced infiltration-inflow per acre will also remained unchanged. Flow records from the DMRs do show that the sewer collection system experiences higher levels of rain-induced infiltration-inflow than is typical with other sewer systems in the Puget Sound area. Most of this extraneous flow is believed to originate within the older developed areas of the City, even though some rehabilitation has been conducted in these areas. Flow monitoring and rehabilitation evaluation will be needed to determine where the extraneous water enters the public sewers, how rehabilitation may be achieved, estimated rehabilitation costs and whether that effort is likely to be cost-effective. As a conservative approach the Sewer Plan assumes no significant rehabilitation will occur by 2035, or any that does may be canceled by further deterioration of the existing sewer pipe system.

Annual average day flow in 2035 is projected to be about 2.64 MGD and the maximum day flow is projected to be 13.24 MGD.

Hydraulic Model

InfoSWMM Suite 12.0, Update #3, by Innovyze is the software used to simulate the City sewer system hydraulics. This hydraulic model simulates dynamic flow conditions in gravity sewer pipes with inputs from tributary land areas defined in GIS format and pump stations. For each lift station the dynamic model uses the specific hydraulic curve, pump controls and wet well parameters to simulate flow pumped into the system at discrete time intervals.

Recognizing that rates of base infiltration and rain-induced-infiltration-inflow varied, sewer basins were categorized into high, medium and low rates of extraneous flow per acre based on available flow data, lift station operating records and Staff observations. These assumed flow rates combined with the existing acres served by sewers were totaled and adjusted to closely approximate the flows actually recorded at the WWTF.

Flow data derived from the recorded DMRs was used to create a diurnal curve for an annual average 24-hour day and a separate diurnal curve for the design storm day. The model was then run with these flow inputs and calibrated for the annual average day and the peak day existing conditions in relation to the flow recorded at the WWTF for these conditions. Average day and peak day conditions were adjusted to achieve variation of less than 7 percent from the recorded data.

Flows projected for the 2035 conditions were modeled to identify the new facilities needed to serve projected development and the improvements needed to the existing pipes and lift stations.

The model provided graphic plots showing hydraulic profiles through the pipes system which allowed pipe segments to be identified that would experience surcharged conditions, or flow above the top of the pipe or even where manholes would overflow. System improvements were developed by substituting larger pipe segments until the surcharge conditions were reduced to meet City design criteria.

Treatment Facilities

The City WWTF operates under a discharge permit issued by the Department of Ecology (DOE) effective May 1, 2003. Issuance of a new permit has been delayed pending DOE completion of a Total Maximum Daily Loading (TMDL) Study for the White River, which is the receiving water for discharge from the City WWTF. The TMDL process will determine additional discharge restrictions that may be necessary to meet water quality standards. These added requirements are expected to be addressed when the new NPDES permit is issued. On-going work is determining what, if any, treatment modifications may be needed.

The existing treatment facilities began operation in November 2008 to produce secondary quality effluent for average day wastewater flows and some storm events. The facilities include chemically enhanced primary treatment (CEPT) to accommodate larger storm events before disinfecting the entire effluent stream through an ultraviolet (UV) process.

All flow passes through the headworks for screening, metering, sampling, and flow splitting as needed. Secondary treatment is provided through biological tanks organized into anaerobic, anoxic and aeration zones, which are followed by settling in secondary clarifiers for removal of solids. The UV system has a rated peak flow capacity of 10 MGD; however, the UV banks have been in danger of flooding even as flow approaches 8 MGD.

Solids removed through the treatment processes are collected in sludge holding tanks and dewatered using a belt filter press to about 15 percent solids and trucked to eastern Washington for application on agricultural land.

Evaluation of the expected performance of the existing treatment components under projected 2035 flows and pollutant loads indicate that several unit processes will require additional capacity. Several deficiencies exist within the layout of the current treatment facilities that should be improved to enhance operational efficiencies for cost effectiveness.

Alternatives & Evaluation

It is assumed that all of the sewer basins presently not served will have at least some sewer service by 2035, though not all will be fully developed. Topographic constraints require that each of these basins have at least one lift station. Pumped wastewater flows allow several alternatives for the discharge to be directed to different gravity sewers; and to allow basin development to occur in stages perhaps using temporary lift stations. This projected development will require added capacity in at least some of the gravity sewers.

Rain-induced infiltration-inflow from several downtown basins inhibits the capacity of the 30-inch Enumclaw Buckley Road interceptor. Rehabilitation of the downtown collector sewers might relieve that hydraulic constriction; however adding a parallel interceptor would be more certain to provide the needed capacity at a more definite project cost and reduce backwater conditions east in the SR 410 interceptor.

A lift station is planned to be built next to 244th Avenue SE near SE 440th Street by a subdivision developer. Subsequent development west of 244th out to the UGA boundary will require several additional lift stations and eventual expansion of the 244th Lift Station.

The existing Willowgate, Takoba and McHugh Lift Stations can be replaced with a single new lift station near SE 433rd Street and 248th Avenue SE and would extend sewer service to the UGA limits in the area.

Hydraulic modeling also shows a significant backwater effect in the Semanski trunk. A diversion sewer at Terry Place through the Warner Basin into Laukala Place could be built largely by developer extensions.

Some additional improvements to existing lift stations will improve reliability and make better use of available pipe capacities.

The treatment facilities need additional UV capacity now. Several alternatives were evaluated and the most cost-effective will be to replace the existing equipment within the existing channels with low pressure, high intensity UV banks. Planning for this improvement is underway.

Better metering is essential to control high flows into the CEPT clarifiers. Several types of meters are available for wastewater applications. For this installation a clamp-on style ultrasonic flow meter installed in a new location downstream of the headworks will provide adequate metering for flow control.

Several smaller treatment upgrades are desirable to improve cost-effective maintenance and operation of the major treatment components and will be implemented as funds become available.

Recommended Improvements

Recommended improvements are identified separately for the collection sewer system and for the treatment facilities. Each of these in turn is tabulated for near-term improvements and longer-term improvements to aid in developing the financial program.

Recommended collection system improvements are summarized in the first two of the following tables. Recommended treatment improvements are shown in the two subsequent tables.

ES-1
Short-Term Collection System Improvements of General Benefit

Number	Improvement	Description	Opinion of Probable Cost
1	Flow Monitoring Program	8 flow monitoring gages	$ 80,000
2	General Sewer Plan Update	Update dynamic model	$ 100,000
3	Rate and Charge Study	Update rates and charges	$ 30,000
		Total Opinion of Probable Costs	**$ 210,000**

ES-2
Long-Term Collection System Improvements of General Benefit

Number	Improvement	Description	Opinion of Probable Cost
1	Enumclaw Buckley Road	24" x 4,630 LF	$ 3,490,000
2	Dickson & Watson	15" x 4,020 LF	$ 1,770,000
3	Warner Basin	12" x 1,560 LF	$ 740,000
4	Semanski	12" x 290 LF	$ 140,000
5	Semanski Influent to WWTP	18" x 389 LF	$ 240,000
6	Roosevelt Avenue East	15" x 1,120 LF + 12" x 1,510 LF	$ 940,000
7	Railroad Street	24" x 1,120 LF + 18" x 580 LF + 10" x 160 LF	$ 910,000
8	New Willowgate LS & Piping	8" x 450 LF x 12" x 2,500 LF 950 GPM LS + 8" x 2,500 LF FM	$2,930,000
9	SCADA for Existing LS	11 Lift Stations	$ 360,000
10	Other Improvements	See note 1	To Be Determined
		Total Opinion of Probable Cost Excluding Other Imp =	**$ 11,520,000**

Note:
1) Other Improvements include: rerouting the Berilla LS force main, gravity sewer to replace the Clovercrest LS, sewer oversizing or additional force main for future development, infiltration-inflow rehabilitation, gravity overflows for lift stations, and other improvements.

ES-3 Summary of Near-Term WWTP Improvements		
Number	**Improvement**	**Opinion of Probable Cost**
1	Evaluate alternatives to address reduced phosphorus discharge limits	$20,000
2	Retrofit Aquaray® 40 HO in the two existing UV channels	$1,120,000
3	New flow meter for flow splitting control to CEPT clarifiers	$60,000
4	Install coarse bubble diffuser systems in the sludge holding tanks and upgrade blower motor	$340,000
5	Install a pressure reducing valve on the odor scrubber	$2,000
6	Install channel isolation slide gates and replace drain valve	$105,000
7	Install utility water filtration and replace fiberglass slide gate	$100,000
	Near-Term Total =	**$1,747,000**

ES-4 Summary of Long-Term WWTP Improvements		
Number	**Improvement**	**Opinion of Probable Cost**
1	Construct third UV channel and install additional UV equipment	$710,000
2	Increase capacity of influent pumping	$1,000,000
3	Install higher capacity mechanical screens	$770,000
4	Construct access roadways to facilitate equipment maintenance	$120,000
5	Install a monorail in the RAS/WAS Building	$60,000
6	Install actuated valves on the WAS discharge	$60,000
	Long-Term Total =	**$2,720,000**

Financial Outlook

Financial history, ending balances of the Sewer Fund, outstanding debt, debt payments to be made in the future, existing sewer rates and charges, rate comparisons with neighboring cities and available funding sources were evaluated to assemble the Financial Outlook.

The Six-Year Capital Improvement Program (CIP) incorporating the conclusion from the above evaluations projects about $1,586,800 to be spent in the Year 2017 and an additional $164,000 for the Year 2021. This allocation produces the most favorable impact on the existing sewer rates and charges while meeting anticipated operating, maintenance, reserves, and debt obligations and while making realistic assumptions for funding sources.

The resulting estimated impact of financing the Six-Year CIP on sewer rates is summarized in the following table.

ES-5 Impact of Six-Year CIP	
Annual Impact of Six-Year CIP	
Rate-funded (average annual for six-year)	$42,000
New Debt Service	$96,000
Total Annual Impact of Six-Year CIP	**$138,000**
Sewer Customers (December 2015)	3,461
Estimated Monthly Cost per Customer	**$3.32**

This financial outlook assumes repayment of an existing interfund loan, annual inflationary rate adjustments, and modest growth in new customers while maintaining a reserve for system replacements during the six-year period.

Chapter 1 Policies and Design Criteria

1.1 Introduction

The City of Enumclaw operates and plans sewer service according to the design criteria, laws, regulations, and policies that originate from the federal, state, county, and local sources. The following chapters in the Enumclaw Municipal Code (EMC) establish much of the current framework controlling operation of the City's sewer utility.

- 3.20 Local Improvement District Assessments
- 14.01 General Regulations for Utilities
- 14.02 General Regulations for Water and Sewer
- 14.08 Sewer Regulations and Rates
- 14.20 Latecomers Agreement
- 14.90 Low-Income Senior and Low-Income Disability Utility Discounts.

1.2 Goals and Policies

The policies associated with the following categories are presented in this chapter:

1. Purpose and Need
2. Service Area
3. Terms of Service and Responsibilities
4. Facilities
5. Financial
6. Operations and Maintenance
7. Reclamation and Reuse
8. Organizational

1.2.1 Purpose and Need

1. Develop a plan for providing reliable sanitary sewer service at a reasonable cost to the customer.
2. Produce a comprehensive, detailed sewer planning document to guide how unsewered areas of the City and UGA will be served and so avoid the need for separate sewer service subarea analyses that acts as an impediment to development.
3. Update future sewer flow estimates and sewer service plans based on the development and population growth projections set forth in the City's Comprehensive Plan.
4. Correct deficiencies in the 1998 GSP that was due to lack of available detailed contour data.
5. Document the current and future needs of the sewer utility, the costs of those needs, and how to finance them.

1.2.2 Service Area

1. The City comprehensive planning includes the provision for future sewer service to all properties located within its current city limits and Urban Growth Area (potential annexation area). Sewer expansions or connections shall not occur outside the Urban Growth Area (UGA) except where needed to address specific health and safety problems threatening existing structures, or as allowed by King County Countywide Planning Policy (KCCPP) DP-47, or as provided in Appendix 5 to the KCCPPs related to school siting.
2. Sanitary sewer service to properties outside the City's corporate limits will not be permitted except under the following conditions:
   a. Public Facility: The applicant is a governmental or quasi-governmental corporation including a school, hospital or fire district, or similar public facility; or
   b. Necessary Service: Service is necessary to convert from a failed or failing septic system; or
   c. In the City's Sewer Service Area, Existing Legal Lot(s) Desiring to Construct One Single-Family Residence or Connect One Existing Single Family Residence: The Administration may approve the connection of one single family residence on an existing legal lot.

   In any case, as a condition of sewer service by the City, the property owner(s) shall execute a covenant to annex for each parcel served within the UGA.
3. The owners of private sewerage collection and/or disposal systems shall operate and maintain the facilities in a sanitary manner at all times at no expense to the City.

1.2.3 Terms of Service and Responsibilities

1. Adequate sewer service capacity should be assured prior to the approval of any new development application.
2. All new development within the City shall be connected to the City sanitary sewer system except under the following conditions:
   a. Development of a single family residence on an existing lot of record where sewer service is not within 200 feet of a property may be served by an individual onsite system on an interim basis if the individual lots are large enough to accommodate onsite systems per the requirements of the King County Department of Health. However, these properties will be required to sign an agreement that shall be a permanent condition on the property running with the land to connect to sewer once it becomes available and pay all costs of the connection, and to not protest formation of a local improvement district for extension of sewers.
   b. Development served by alternative technology other than septic systems in areas specifically designated on the City's current adopted service area map that:
      i. Provide equivalent performance to sewers, including the same provisions for storage or back-up systems in the event of a power failure as exists in the City system; and
      ii. Provide capacity to achieve the planned densities as designated in the City's Comprehensive Plan; and

iii. Will not create a barrier to the extension of sewer service within the UGA.

3. Existing development served by on on-site septic system (OSS) that is within two hundred feet (200') of a public sewer shall connect to the public sewer when any of the following conditions exist:
   a. Repair, modification, or replacement of the system is necessary, or the existing OSS has failed.
   b. At such time that additional construction which in any way affects the on-site sewage system is proposed.
   c. They are part of a sewer Local Improvement District (LID).
4. Sewage shall be transported by gravity as the most cost-effective method. Pumped systems will only be allowed when it is not feasible to install a total gravity system. The City will give preference to the construction of fewer large lift stations over a greater number of smaller stations.
5. Low pressure force mains are discouraged but may be allowed by the City Public Works Director on a case-by-case basis. The City will not assume maintenance responsibility of sewer pumps serving individual properties.
6. No property shall be served by City sewer unless the sewer main is extended to the extreme boundary limit of said property as required by this section at a minimum of 8-feet to the pipe invert. All extensions shall extend and cross the full width of the property to be served by sewer at the minimum depth except when shown by engineering methods, to the satisfaction of the Wastewater Utility, that future extension or minimum depth is not possible or necessary. If an exemption is granted, the property owner is not relieved of the responsibility to extend the main and shall execute a covenant agreeing to participate in an extension if, in the future, the Wastewater Utility determines that it is necessary.
7. The City, at the discretion of the Wastewater Utility, may defer compliance with non-health related standards dealing with extension, design, or capacity for temporary sanitary sewer service. Temporary sanitary sewer service may include pump tests, temporary discharge permits, connections for temporary construction sites, or other similar usage. The property owner will retain the responsibility and will execute an agreement to either directly or financially meet said standards at the direction of the City.
8. Preference should be given to sewer system improvements that will support high growth areas concurrent with the anticipated growth.
9. Sewer service shall be expanded so that the levels of service are maintained through build-out of the adopted land use.
10. Grease and oil interceptors or other approved methodology, shall be required on all restaurant, garage, and gas station premises and shall be so situated as to intercept the sources of grease and oil wastes but exclude domestic or human wastes. Grease, oil, and sand interceptors shall be provided in any other case if, in the opinion of the Wastewater Utility, they are necessary for the proper handling of liquid wastes. All interceptors shall be of a type and capacity approved by the Wastewater Utility.
11. Old building sewers may be used in connection with new buildings only when, after examining and testing them, the Wastewater Utility finds they meet all standards and specifications of the City.

12. Sewer fixtures in structures below adjacent surface grades, such as in basements, are discouraged. Where they are installed a check valve and manual shutoff valve should be added to the side sewer line to the basement to protect against the basement flooding from a sewer main line backup.
13. The property owner is responsible for and shall maintain side sewer stubs (that portion of the side sewer within the right-of-way or easement) including replacement if needed. If a side sewer becomes plugged, it is the property owner's responsibility to correct the problem. The City will assist in locating the side sewer based on any as-built records it has. If it is determined that the problem exists within the City sewer main, the City will provide professional clean up and repair service.

1.2.4 Facilities

1. All proposed developments shall conform to the City's adopted design criteria, construction standards and specifications.
2. The technical criteria utilized by the City for the design and construction of its sanitary sewer infrastructure are based on the most recent versions of the Department of Ecology publication "Criteria for Sewage Works Design" and WSDOT/APWA Standard Specifications.
3. The City shall ensure that the sewer system is constructed, operated and maintained to protect against failures of power supply, treatment process, equipment, or structure with appropriate backup facilities.
4. All existing and future lift stations will be modified/constructed to comply with the City's lift station requirements and the following minimum standards:
    a. All structures will be non-combustible with aesthetic exterior treatment as directed by the City;
    b. All buildings will have adequate electrical, heating, cooling, ventilation, insulation, lighting, instrumentation and telemetry, drainage, access, and work spaces as required by the City for efficient and cost effective operation and maintenance;
    c. Sites will be fenced to provide screening and reduce vandalism and City liability, where appropriate;
    d. Stations shall provide the peak design flow with the largest pump out of order;
    e. Each station will be equipped with all necessary instrumentation to assist personnel in operating and troubleshooting the facility.

1.2.5 Financial

1. Capacity upgrades within the existing system required by future development should be funded by future developers. Development should be required to pay an equitable share of construction costs for improvements to the sanitary sewer system.
2. The Utility shall implement an adequate system of internal controls and shall adopt an annual budget.
3. The Utility shall remain a self-supported enterprise fund; however, grants and other alternative financing may be sought and used.
4. The funding for the Capital Improvement Program shall be sustained at a level sufficient in order to maintain system integrity.

5. The Utility shall establish fees and charges to recover all utility costs related to development.
6. The Sanitary Sewer Utility should maintain adequate reserves for operation and maintenance, capital improvement, and sewer debt obligations to ensure that the utility can provide continuous, reliable service and meet its financial obligations under reasonably anticipated circumstances.
7. The City shall seek to require new customers to substantially pay for the costs of improvements designed to accommodate growth, while the costs to operate, maintain, repair, and improve the existing system capacity are paid by all sewer system customers.
8. The City has an established policy of reinvesting in utility capital assets to ensure that the integrity of the existing utility plant and equipment is maintained. This reinvestment is generally referred to as repair and replacement.
9. In addition to projects designed to maintain and replace existing facilities, the City shall seek to invest annually in system improvements designed specifically to upgrade the system to meet the City's standards and criteria. These improvements may include upgrades to the sanitary sewer SCADA and data management systems, upgrades to increase safety for both City personnel and the public, and reduction of environmental impacts.
10. Rates and additional charges established for the City should be:
    a. Cost-based rates which recover current, historical, and future costs associated with the City's sewer system and services;
    b. Equitable charges that allocate costs fairly between different customer classes and recover costs from customers, commensurate with the benefits they receive;
    c. Adequate and stable source of funds to cover the current and future cash needs of the City and maintain reserves.
    d. Easily understood, flow based, and uniform for all customers of the same class throughout the service area.
    e. Evaluated as part of the budgeting process.
    f. Annually adjusted for inflation by the Consumer Price Index (CPI-U) for the Seattle-Tacoma-Bremerton area.
11. Rate assistance programs may be provided for qualified specific low-income seniors or the disabled.
12. New customers seeking to connect to the sewer system will be required to pay one or more of the following charges prior to connection:
    a. Latecomers Fees: Latecomers fees are negotiated with developers and property owners. They provide for the reimbursement of a pro rata portion of the original cost of extensions and facilities.
    b. Connection Charge: An equitable share of the historical cost of the system and the system's capital improvement program. Connection charge revenues will be used to fund the CIP in conjunction with rate revenue.
    c. Developer Extension Charges: These charges are for the administration, review, engineering and inspection of a developer extension project.

13. The City will maintain information systems that provide sufficient financial and statistical information to ensure conformance with rate-setting policies and objectives.
14. Reserves will be maintained as established by the City Council to cover unanticipated emergencies and fluctuations in cash flow.

1.2.6 Operation and Maintenance

1. Facility and equipment breakdown is given highest maintenance priority. Emergency repairs will be made even if overtime labor is involved.
2. Equipment will be scheduled for replacement when it becomes obsolete, and as funding is available.
3. Worn parts will be repaired, replaced, or rebuilt before they represent a high failure probability.
4. Spare parts will be stocked for all equipment items whose failure will impact the ability to meet other policy standards.
5. Equipment that is out of service will be returned to service as soon as possible.
6. A preventive maintenance schedule will be established for all facilities, equipment, and processes.
7. Tools will be obtained and maintained to repair all items whose failure will impact the ability to meet other policy standards.
8. Dry, heated shop space will be available for maintenance personnel to maintain facilities.
9. All maintenance personnel will be trained to efficiently perform their job descriptions. The City will provide the resources necessary for personnel to obtain the required level of operator certification and to encourage pursuit of advanced certification.
10. Detailed operation and maintenance manuals will be kept of all facilities and equipment, with identical copies stored with the equipment in the field or at the City's maintenance shop. Manuals will be kept current.
11. Written records and reports showing operation and maintenance history will be maintained on each facility and item of equipment.

1.2.7 Wastewater Reclamation and Reuse

While the City sanitary sewer utility has no plans for wastewater reuse, the City will support the use of reclaimed water technologies where economically feasible.

1.2.8 Organizational

1. The Public Works Department manages the sewer utility, including planning, budgeting, design, operations and maintenance, staffing, and construction.
2. The Finance and Public Works Departments are responsible for customer billing, payment collection, project cost accounting, and fund activity reporting.
3. The Human Resources and Public Works Departments are responsible for employee records, union labor negotiations and salary schedules.
4. The Police Department and Public Works Departments are responsible for enforcement response to violations of City ordinances and policies.

5. Fire District 28 is responsible for emergency response to hazardous events at sewer system facilities.

1.3 Lift Station Requirements

A. Unless otherwise allowed, lift stations shall be wetwell mounted (suction lift) and shall be manufactured as a package by Smith and Loveless, or approved equal. Submersible and Vertical Solids Handling Line Shaft Pumps are not allowed.

B. All new wetwell mounted sewer lift stations shall be enclosed within a permanent building subject to local building codes including the IBC and approval by the city. Minimum building dimensions shall allow a minimum of 4 feet of clearance to the interior walls on all sides of the pumping equipment. The roof structure shall be designed to be used as a support for lifting pumps. Minimum ceiling height shall be 8 feet. The building shall have a vehicle entry roll up door and a standard door. The building exterior shall have an aesthetically pleasing appearance that shall fit in with its surroundings.

C. The lift station shall be initially constructed with adequate volume to accommodate the ultimate planned system capacity. An emergency bypass to storm drain with shutoff valve shall be required, subject to approval by the WDOE. A hydraulic analysis of the capacity of the downstream gravity main will be required in order to determine whether variable speed pumps will be required.

D. A standby generator shall be included with the lift station and shall be suitably sized to the power demand of the lift station. The generator shall be powered by either natural gas or diesel (gasoline power is not allowed). If diesel power is chosen, enough fuel storage shall be provided to last at least 48 hours. The generator shall automatically come on when a power failure occurs. An adjustable delay in automatic generator startup shall be included in the controls. The delay time shall be adjustable in a range from 0 to at least 30 minutes in maximum 10-minute increments. The generator can either be located within the building or outside. If outside, the generator shall have weather protection or be rated for continuous outside use and have a sound attenuating enclosure suitable for use in a residential setting in compliance with local and state noise regulations. Below ground fuel storage is not allowed.

E. All sewer lift stations shall include telemetry equipment and an alarm system compatible with other existing City alarm systems. Stations will be operated with the provision for at least two methods of control to minimize system vulnerability and shall include a visible flashing light alarm system for all conditions listed in the WDOE "Criteria for Sewage Works Design" for the following conditions:

   - Pump start failure;
   - Low voltage and power phase failure;
   - Power outage/generator running;
   - Communication failure;
   - Water in structure;
   - High wetwell level;
   - High discharge pressure;
   - Intrusion;
   - Smoke detection;
   - Low control air;
   - Loss of prime;
   - Other as required.

F. The following items shall be included in the design:

1. Real time data shall be provided at the station and at the Operations and Maintenance office, including flow rate indication and totalizing, wetwell level and discharge pressure, and other as required.
2. A dehumidifier with adjustable automatic humidistat and drain to sump.
3. All wetwells shall be vented to the outside.
4. Thermostat controlled automatic heating (minimum 1500 watts) with blower.
5. Halon-type fire extinguisher.
6. Oiled filled combination pressure/vacuum gauges on each pump discharge line. Gauges shall be capable of handling pressure surges.
7. Electrical panel, conduit and wiring to be sized for ultimate capacity pumps. Electrical conduits between wall mounted controls and pumping equipment shall be run beneath the floor.
8. Suction and discharge pipe sized for ultimate capacity with a minimum diameter of 4 inches unless otherwise approved by city.
9. Duplex pumps with double mechanical seals. Pumps and motors shall be specified to meet maximum efficiency for the particular station. All pumps and motors shall be directly coupled. Pumps shall be automatically alternated and shall have switch positions of on, off, and auto. Each motor shall have a start counter and run meter. Unless otherwise allowed, motors shall be rated at either 200/208 or 230/240 volts three phase with rated power shown on casing. Pumps shall be automatically self-priming by duplex vacuum pumps. Suction pipes shall have foot valves to facilitate retaining prime. Pumps shall have emergency water connection fittings for priming in case primary priming system fails.
10. Epoxy dip motors with 1.15 service factor, minimum.
11. Conventional fluorescent lighting within building. A minimum of 2 fixtures in a building spaced for maximum coverage.
12. Spring-loaded man access hatches with locking hasps.
13. Repair kit to include a complete set of seals for each pump, touch-up paint and a one-year supply of all lubricants used.
14. Three sets of 3-ring bound operation and maintenance manuals shall be provided along with the original digital file and a digital copy in pdf format.
15. Station access and site to be paved with asphalt concrete.
16. Station to be fenced with a security fence according to city's fencing specifications, six-foot minimum with screening when near residential areas. A vehicle entrance shall be provided.
17. City water connection (faucet) inside and outside next to building, one 5/8-inch meter and backflow prevention device.
18. The City shall own the site.
19. A minimum of one 120-volt outlet must be provided inside the building.
20. Lifting hook/eye above wetwell entrance.

21. Access rungs to lower area of wetwell.
22. A warranty period of 1-year is required and shall begin from the date of acceptance by City no matter what the date of shipment is.
23. For wetwell level control, provide either simplex stored air bubbler or Consolidated Electric A1000 submersible transducer with a D152 controller or equal (Float switches are not allowed). The level control shall be adjustable for any water level in the wetwell for automatic pump on and off. For bubbler, tank and compressor must be located minimum 6 inches above floor; include purge valve for bubbler. Also include a ball valve drain on the air tank. The wetwell level gauge shall be operated from the air bubbler control system or transducer. All equipment, tool, and training shall be provided for re-calibration of the level gauge.
24. The pump discharge line (force main) shall be fitted with a 4 or 6 inch flanged resilient wedge gate valve to atmosphere to facilitate emergency pumping for above grade stations. This valve shall be placed on a flanged cross located at the junction of each pump's discharge lines. A 4-inch cam lock adaptor and cap shall be screw mounted to a flanged 90 degree elbow by a screw flange fitting that is connected to the gate valve. The 90-degree elbow is necessary to horizontally position the adaptor. The adaptor shall face the building's double door entry. The cam lock adaptor shall be a Dixon 400-F with a Dixon 400-DC cap, or equal.
25. Landscaping of the site shall be required.

Chapter 2 Background

2.1 Urban Growth Area

A vicinity map showing the City of Enumclaw within King County and in relation to Pierce County across the White River to the south is displayed as Figure 2-1. All existing wastewater treatment facilities within a 20-mile radius of the City are also shown on the figure.

The City of Enumclaw and the urban growth area (UGA) together with recent annexations is shown in Figure 2-2. The existing city limits encompass about 5.2 square miles, or about 3,308 acres.

2.2 Natural Features and Topography

In the Enumclaw vicinity, the most recent glacial event of 13,000 years ago left extensive deposits of unconsolidated sand and gravel on top of older glacial activity that resulted in a complex glacial straigraphy. The City occupies an upland plain composed of lahar deposits as part of the 5,000 year-old Osceola Mudflow Plain. The Green and White Rivers with their tributaries have eroded these formations over the years to create the topography visible today.

The City straddles the divide between the Green River to the north as represented by its' tributary, Newaukum Creek; and the White River to the south with its' tributary, Boise Creek. Both streams provide fish habitat as well as riparian habitats. Additionally several perennial and seasonal watercourses and drainage channels also exist that provide additional habitat.

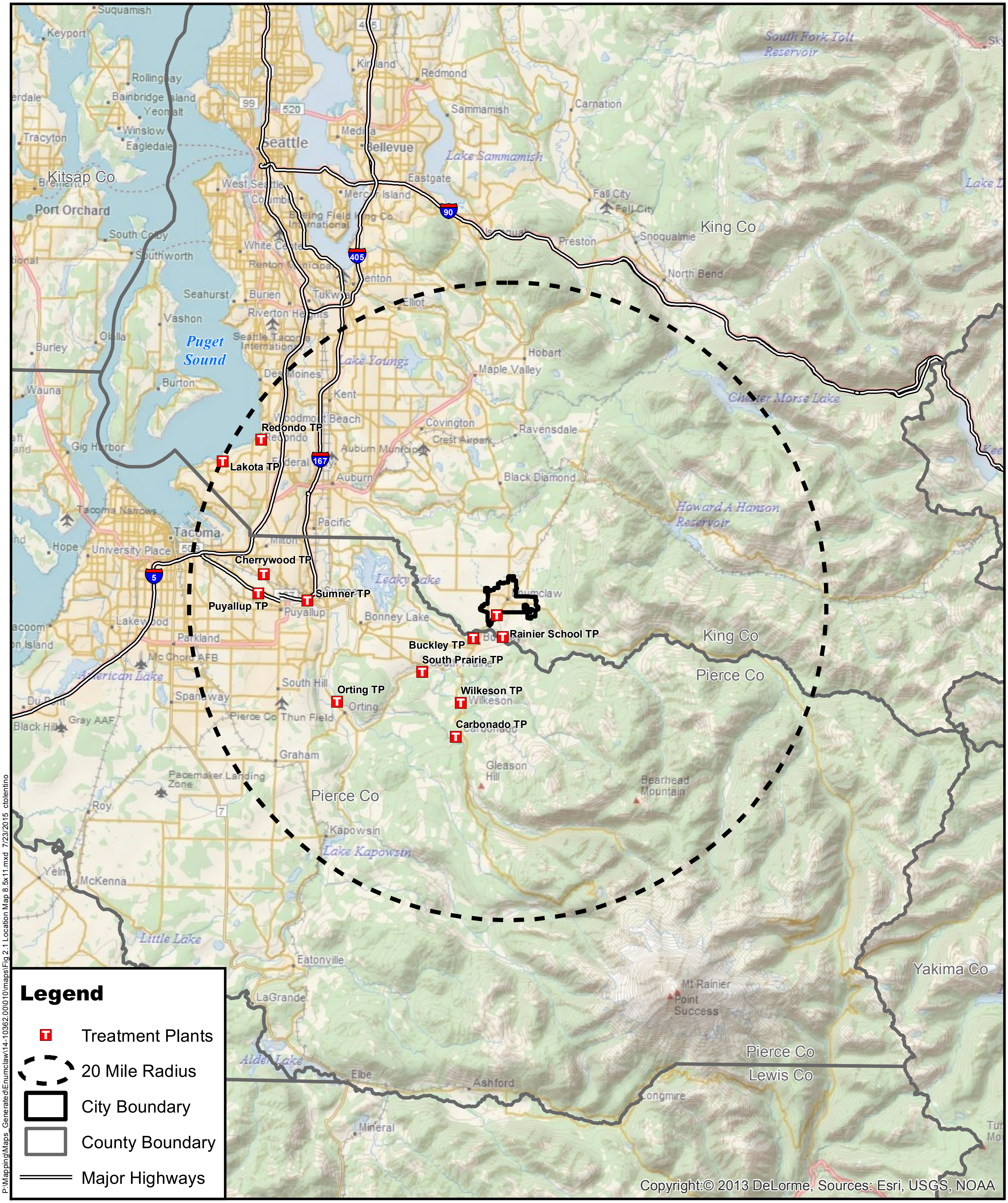
A few wetlands exist within the UGA, including 11 acres of wetland constructed in 2009 as mitigation for the latest expansion of the wastewater treatment plant. A few man-made lagoons and storm water detention basins exist within the City. Water features are shown in Figure 2-3

Generally speaking, land surfaces within the City and the UGA are flat or gently sloping. A few steeper slopes are present along Newaukum Creek and along the eastern city limits as the land rises into the foothills of the Cascade Mountains. Topography is shown in Figure 2-4.

2.3 Land Use

The 'Winds of Tomorrow': Enumclaw Comprehensive Plan 2005 to 2022 was adopted with the date of June 2005 in compliance with the requirements of the Growth Management Act. It was amended by Ordinance No 2513 on 24 September 2012. A new Plan is in process of review and adoption.

Existing zoning for the City is shown in Figure 2-5. The zoning classifications used in 2015 are summarized in Table 2-1.



P:\MappingMaps_Generated\Enumclaw\14-10362.00\010\maps\Fig 2.1 Location Map 8.5x11.mxd 7/23/2015 ctolentino

This map is a geographic representation based on available information. No warranty is made concerning the accuracy, currency, or completeness of data depicted on this map. Source: King County.

BHC CONSULTANTS

N
W E
S

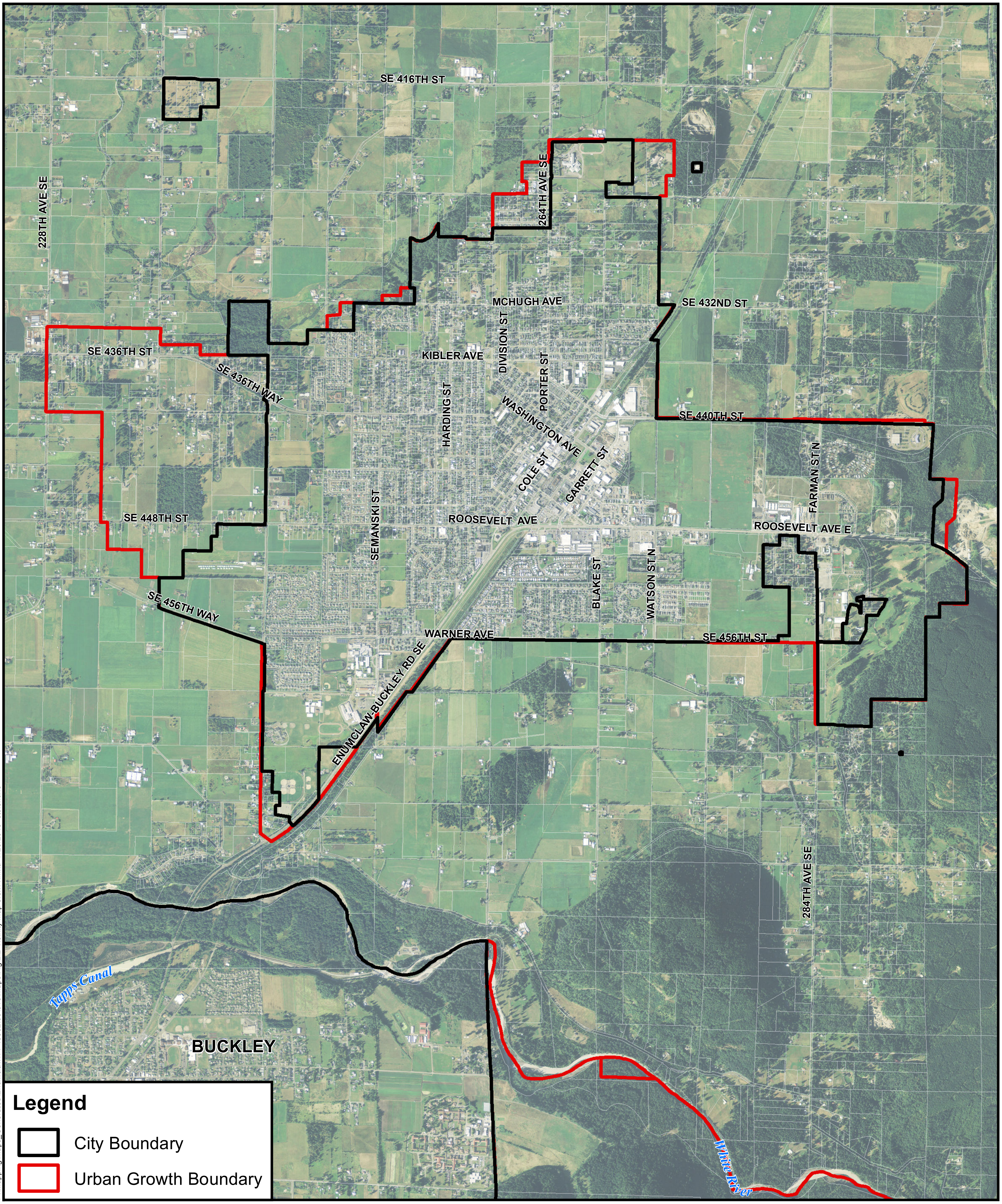
0 4 8 Miles

City of Enumclaw

Location Map

General Sewer Plan Update
City of Enumclaw
July 2015

Figure
2-1



P:\Mapping\Maps_Generated\Enumclaw\14-10362.00\010\maps\Fig 2.2 Vicinity Map 8.5x11.mxd 7/28/2015 ctolentino

This map is a geographic representation based on available information. No warranty is made concerning the accuracy, currency, or completeness of data depicted on this map. Source: King County.

BHC CONSULTANTS

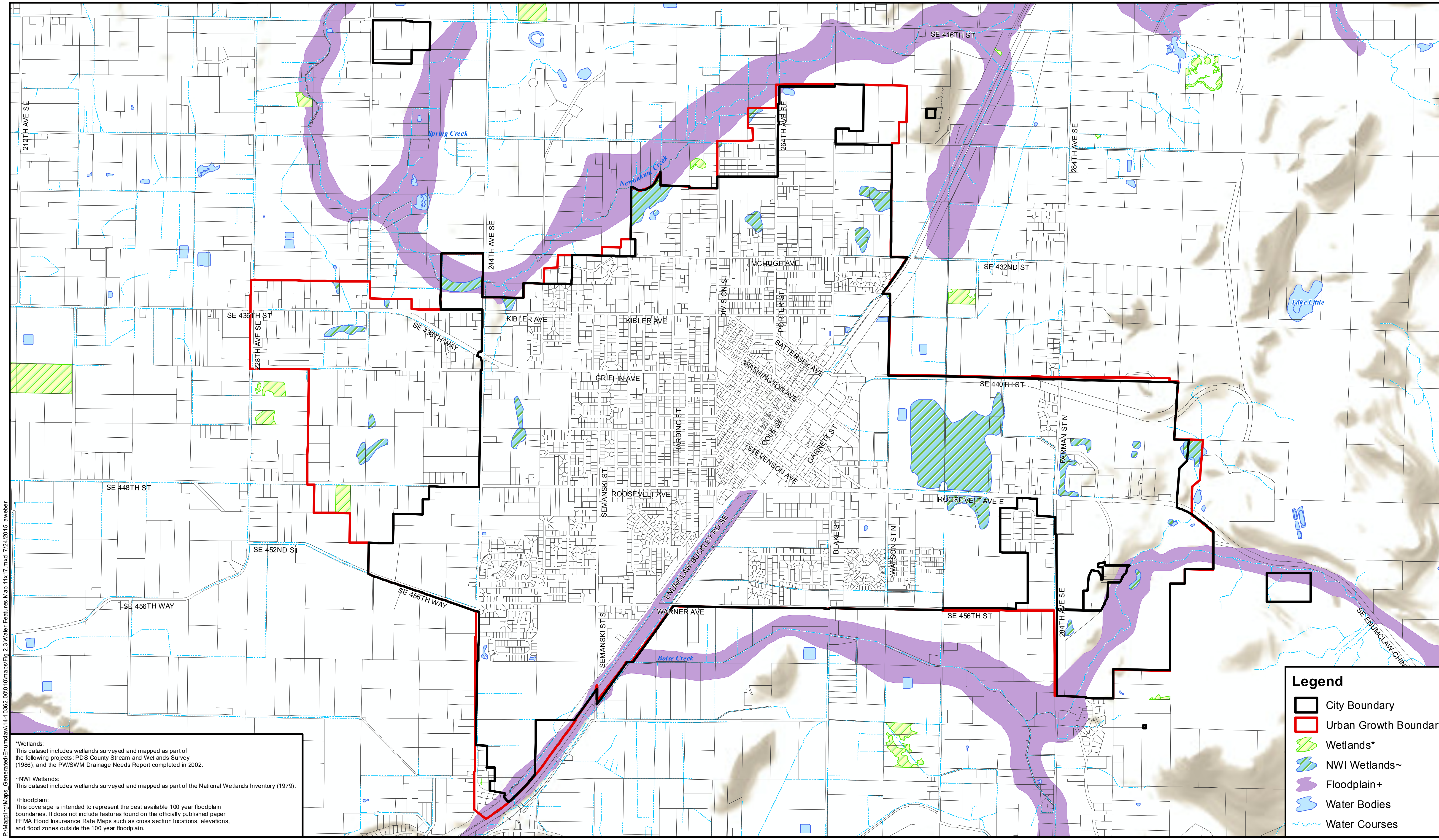
N W E S

0 1,500 3,000 Feet

City of Enumclaw

Vicinity Map
General Sewer Plan Update
City of Enumclaw
July 2015

Figure
2-2



*Wetlands:
This dataset includes wetlands surveyed and mapped as part of the following projects: PDS County Stream and Wetlands Survey (1986), and the PW/SWM Drainage Needs Report completed in 2002.

~NWI Wetlands:
This dataset includes wetlands surveyed and mapped as part of the National Wetlands Inventory (1979).

+Floodplain:
This coverage is intended to represent the best available 100 year floodplain boundaries. It does not include features found on the officially published paper FEMA Flood Insureance Rate Maps such as cross section locations, elevations, and flood zones outside the 100 year floodplain.

P:\Mapping\Maps_Generated\Enumclaw\14-10362.00\010\maps\Fig 2.3 Water Features Map 11x17.mxd 7/24/2015 aweber

BHC CONSULTANTS

Source: King County base data, City of Enumclaw zoning and wetlands data

Data sources supplied may not reflect current or actual conditions. This map is a geographic representation based on available information. It does not represent survey data. No warranty is made concerning the accuracy, currency, or completeness of data depicted on this map.

BHC Consultants LLC., assumes no responsibility for the validity of any information presented herein, nor any responsibility for the use or misuse of the data.

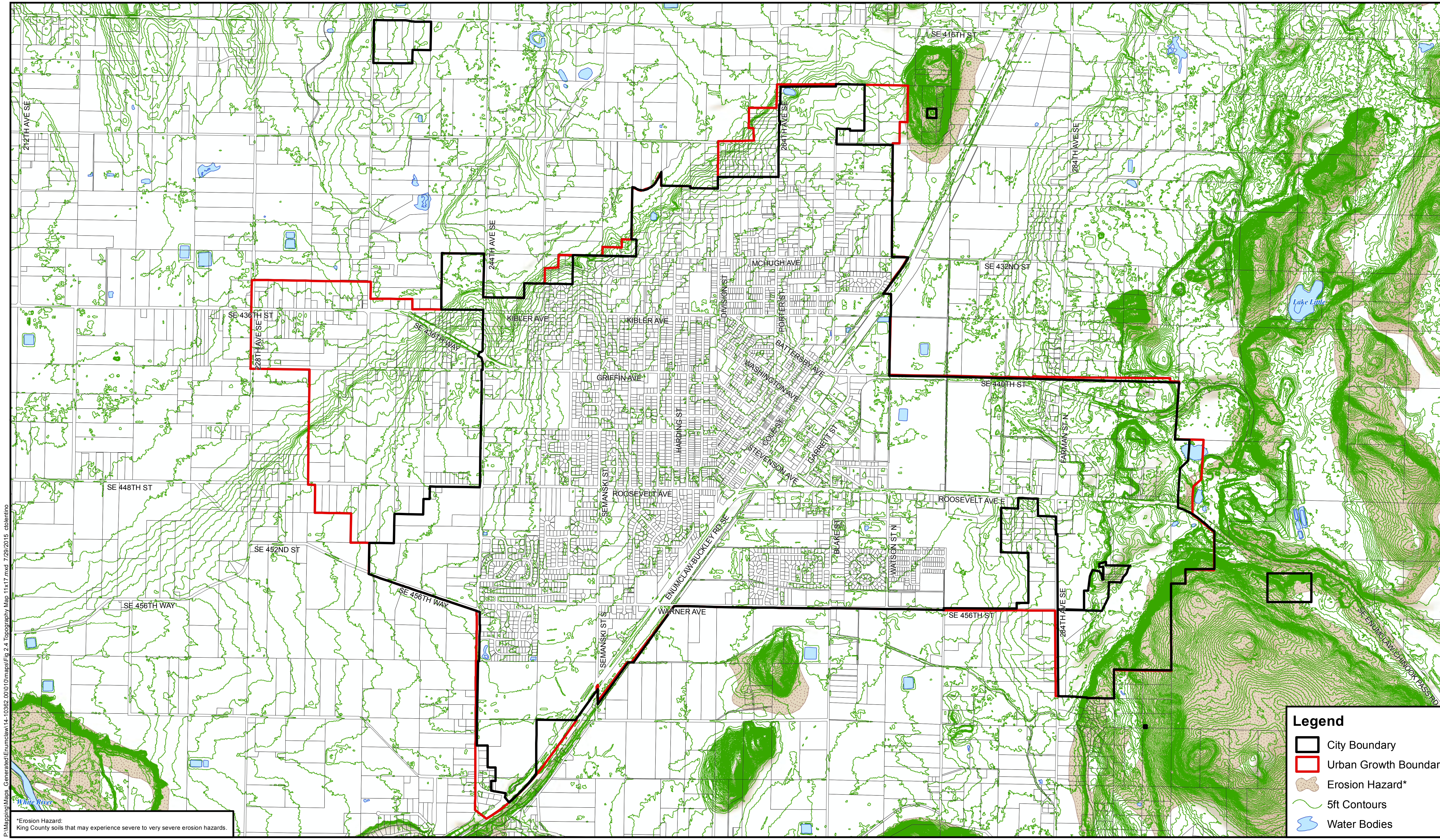
N W E S

0 1,000 2,000 4,000 Feet

City of Enumclaw

Water Features Map
General Sewer Plan Update
City of Enumclaw
July 2015

Figure
2-3



BHC CONSULTANTS

Source: King County base data

Data sources supplied may not reflect current or actual conditions. This map is a geographic representation based on available information. It does not represent survey data. No warranty is made concerning the accuracy, currency, or completeness of data depicted on this map.

BHC Consultants LLC., assumes no responsibility for the validity of any information presented herein, nor any responsibility for the use or misuse of the data.

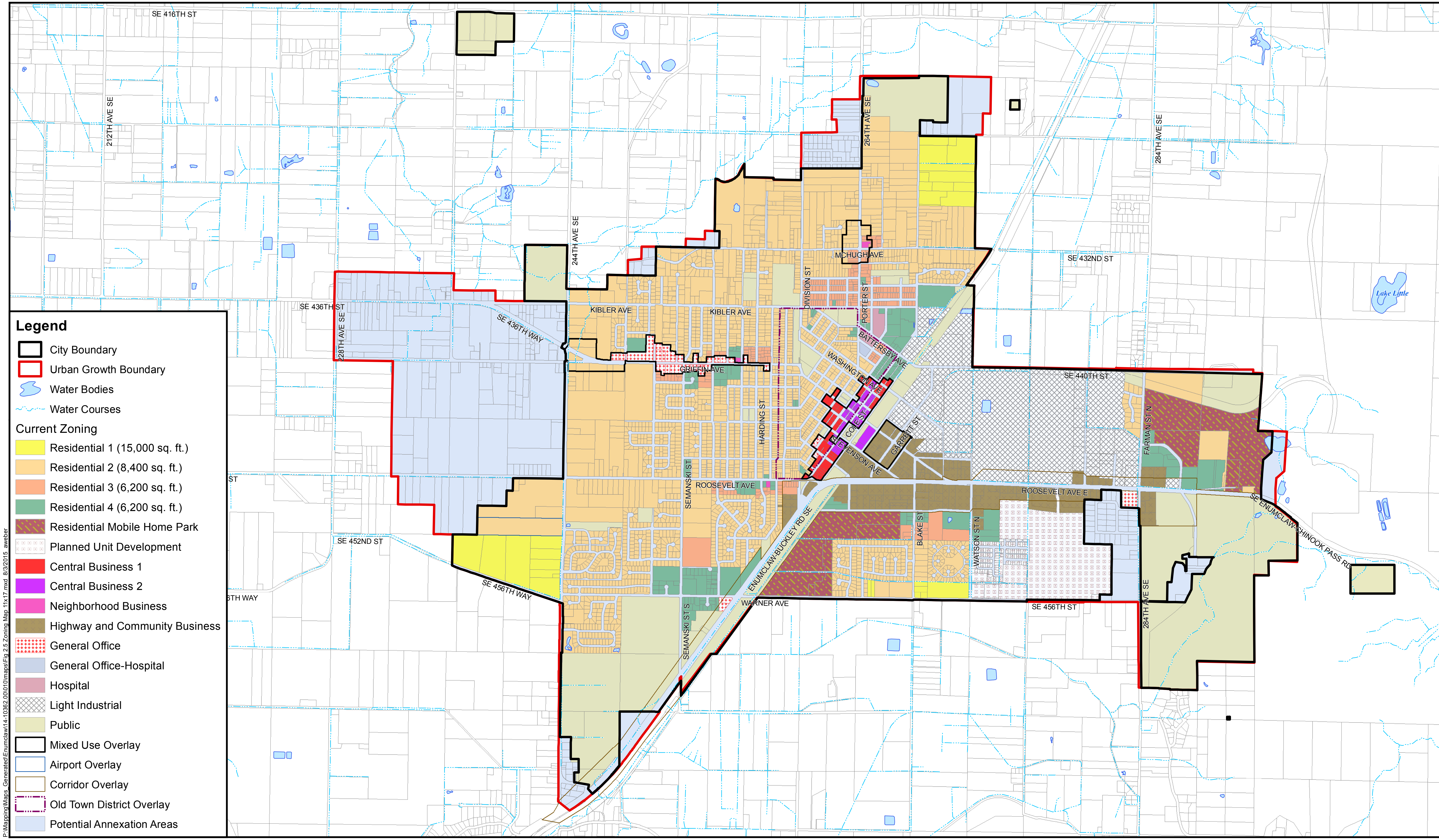
N W E S

0 1,000 2,000 4,000 Feet

City of Enumclaw

Topography Map
General Sewer Plan Update
City of Enumclaw
July 2015

Figure
2-4



BHC CONSULTANTS

Source: King County base data, City of Enumclaw 2015 zoning data

Data sources supplied may not reflect current or actual conditions. This map is a geographic representation based on available information. It does not represent survey data. No warranty is made concerning the accuracy, currency, or completeness of data depicted on this map.

BHC Consultants LLC., assumes no responsibility for the validity of any information presented herein, nor any responsibility for the use or misuse of the data.

City of Enumclaw

Zoning Map

General Sewer Plan Update

City of Enumclaw

July 2015

Figure

2-5

Table 2-1
Zoning Classifications

Zoning Class	Description	Additional Comments
R-1	Low density Single Family Residential	15,000 SF Lots
R-2	Moderate Density Residential	8,200 SF Lots
R-3	Mixed Residential	6,200 SF Lots in Range of Use
R-4	Multifamily Residential	Up to 15 Units per Acre
GO	General Office	Professional & Financial Uses
RMHP	Residential Manufactured Home Park	One-Family Homes, Small Lots
NB	Neighborhood Business	Small, compatible shopping
HCB	Highway & Community Business	Vehicle Oriented
CB-1	Central Business District	Pedestrian Oriented
CB-2	Central Business District	Off-street Parking Not Required
LI	Light Industrial	Truck Oriented
P	Public Use	Parks, City Buildings & Facilities
H	Hospital	Hospital & Related Uses
PUD	Planned Unit Development	<80% Impervious, <50% Building
---	Old Town Overlay	Demolition not SEPA Exempt

Four annexations in 2010 to 2012 added about 505 acres with 366 existing residents.

The remaining urban growth area has been designated as 'urban growth reserve' and is expected to ultimately be annexed and developed primarily as single family residential.

2.4 Population

City population as enumerated by the decimal US Census is tabulated in Table 2-2.

Table 2-2
Census Records for Enumclaw

Census	Population	Percent Increase
1900	483	---
1910	1,129	133.7
1920	1,378	22.1
1930	2,084	51.2
1940	2,267	26.1
1950	2,789	6.2
1960	3,269	17.2
1970	4,703	43.9
1980	5,427	15.4
1990	7,227	33.2
2000	11,116	53.8
2010	10,669	(-4.0)

The 2010 Census identified about 4,430 households within the City. The average household size was 2.41 persons. This is similar to the King County 2010 average of 2.40 persons per household, and slightly smaller than the 2.52 persons per household found during the 2000 Census.

Since the 2010 census the City population is estimated to have increased as shown in Table 2-3.

Table 2-3
Estimated Enumclaw Population Since 2010

Year of Estimate	Population	Percent Increase
2011	10,920	2.4
2012	11,028	1.0
2013	11,162	1.2
2014	11,297	1.2

Although part of the population increase shown in Table 2-3 reflects residents added through annexation, the total population increase exceeds just the annexation additions.

2.5 Existing Employment

The Puget Sound Regional Council published an estimate of full-time employment covered by the Washington Unemployment Insurance Act for the region in 2013 which tabulated the City of Enumclaw as follows:

Construction & Resources	227
Finance, Insurance & Real Estate	491
Manufacturing	527
Retail	683
Services	1,710
Wholesale, Transportation & Utilities	113
Government	289
Education	578
Total	4,618

Not included in the tabulation are most self-employed and many part-time workers.

2.6 Enumclaw School District

The Enumclaw School District serves the Cities of Enumclaw and Black Diamond as well as a large unincorporated area of King County. In addition to the administration facilities, the District operates seven schools within the Enumclaw sewer service area as summarized in Table 2-4.

Table 2-4
Enumclaw Public Schools

School	Faculty	Students
Kibler Elementary	46	400
Southwood Elementary	49	300
Sunrise Elementary	46	410
Westwood Elementary	49	300
Enumclaw Middle School	46	470
Thunder Mountain Middle School	52	470
Enumclaw High School	71	1050
Totals	359	3,400

The numbers tabulated in Table 2-4 do not include District administrative personnel and the numbers shown for each school are approximate. Students enter and leave a school throughout the school year, and there are occasional staff changes.

2.7 Water System

The City of Enumclaw 'Comprehensive Water System Plan' (WSP) was completed in September 2013. The water system and service area is shown in Figure 2-6. Figure 2-7 shows the water system hydraulic profile illustrating the operating concept for the wells, reservoirs and pressure zones comprising the water system.

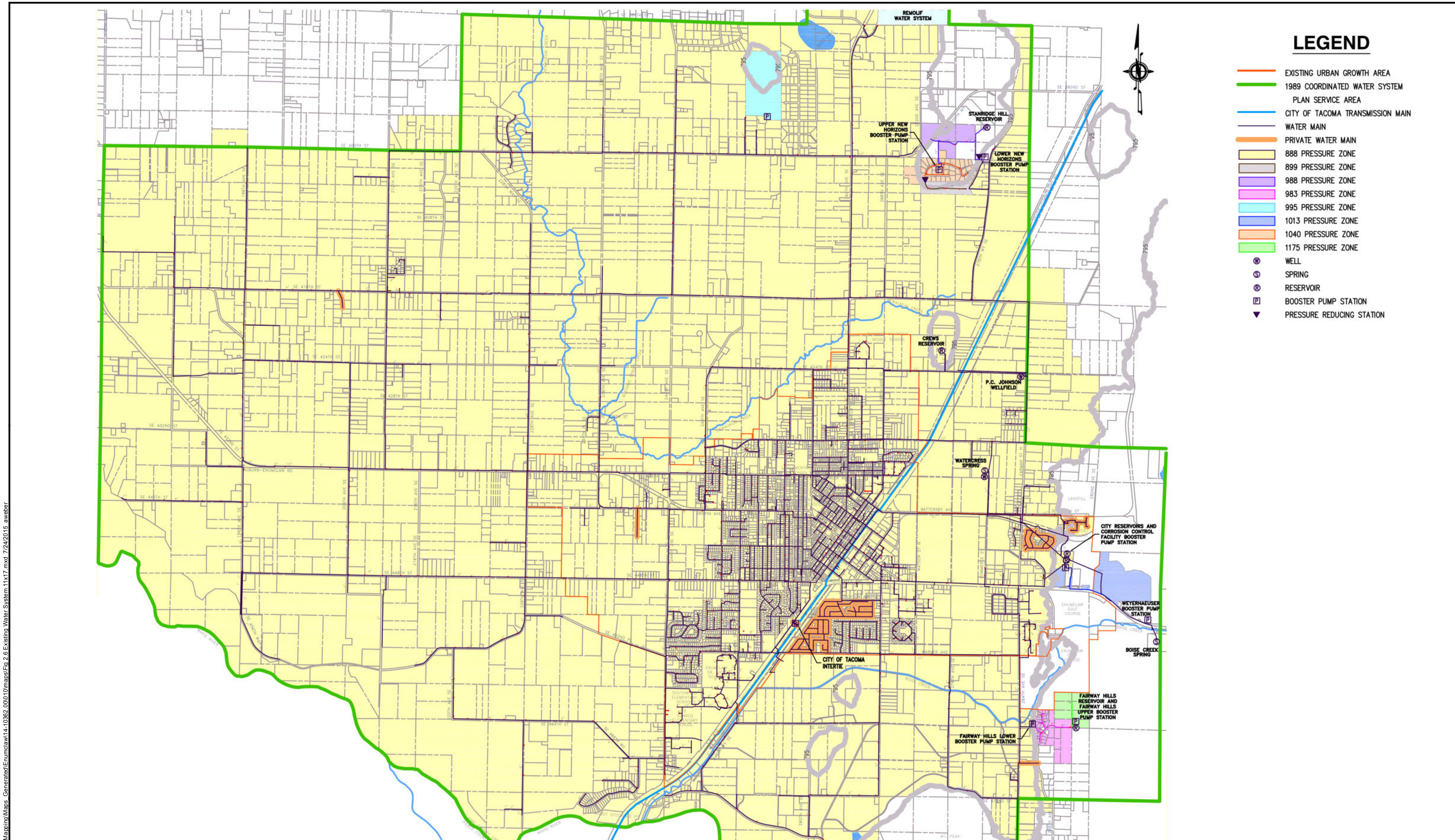
Wells within the City vicinity are shown on Figure 2-8.

The City provides water throughout the City and to a smaller number of customers outside the city limits. The numbers change monthly as new accounts are added and existing accounts are closed. Table 2-5 summarizes recent accounts from City records.

Table 2-5
Approximate Annual Water Customer Accounts

Customer Class	2013		2012	
	In City	Outside	In City	Outside
Single Family	3,110	1,660	3,080	1,700
Multifamily	222	3	224	1
Commercial	342	28	340	30
School	19	1	19	1
City	39	0	41	0
Agriculture	2	105	2	100
Totals	3,734	1,797	3,706	1,831

Monthly winter water demand for Single Family residential accounts within the City is summarized in Table 2-6 in hundreds of cubic feet (CCF) and converted into average gallons per day per customer account.



P:\Mapping\Maps Generated\Enumclaw\14-10362.00\010\maps\Fig 2.6 Existing Water System 11x17.mxd 7/24/2015 aweber

BHC CONSULTANTS

Source: City of Enumclaw 2013 Comprehensive Water System Plan

Data sources supplied may not reflect current or actual conditions. This map is a geographic representation based on available information. It does not represent survey data. No warranty is made concerning the accuracy, currency, or completeness of data depicted on this map.

BHC Consultants LLC., assumes no responsibility for the validity of any information presented herein, nor any responsibility for the use or misuse of the data.

City of Enumclaw

Existing Water System

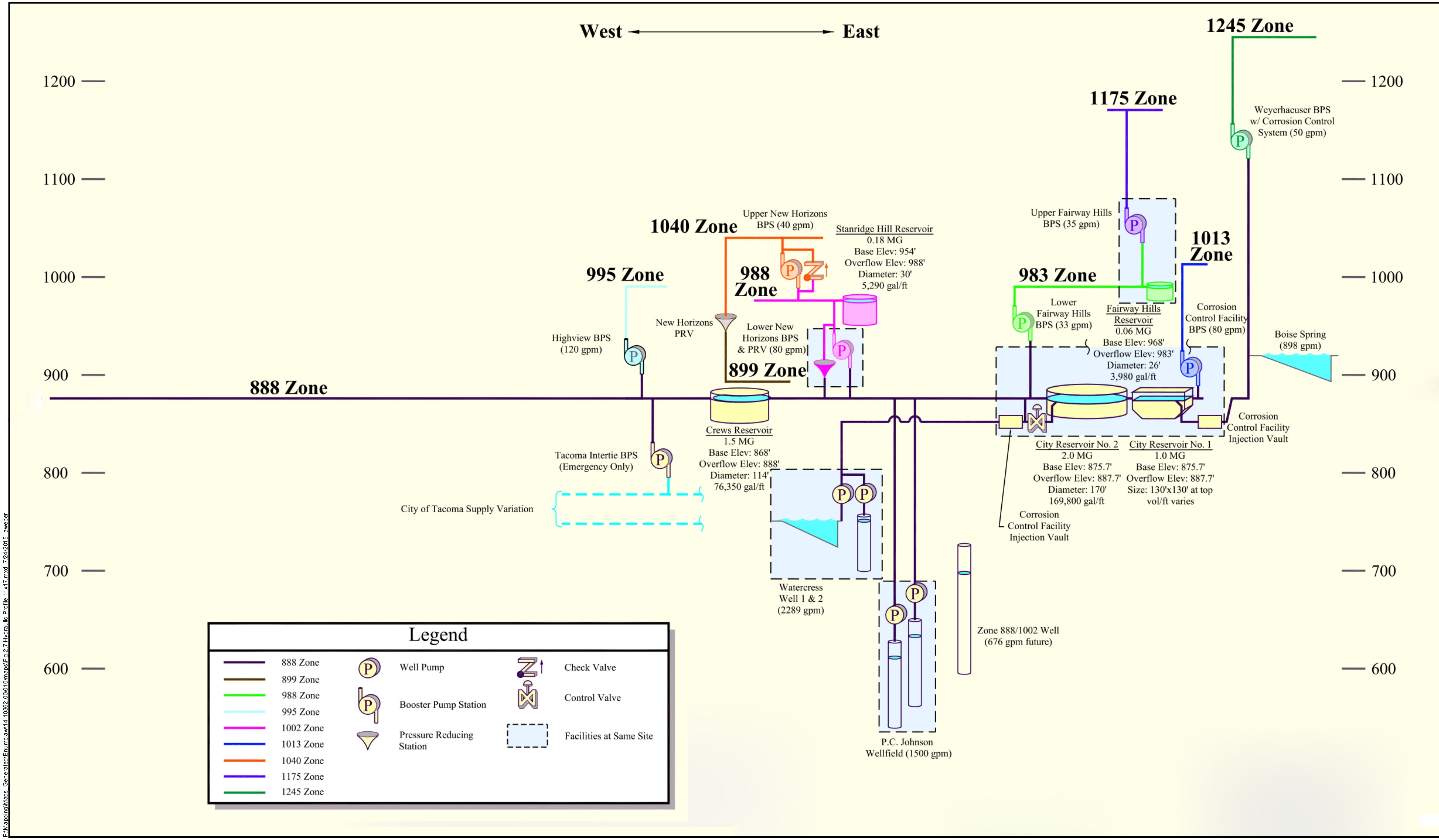
General Sewer Plan Update

City of Enumclaw

July 2015

Figure

2-6



P:\Mapping\Maps_Generated\Enumclaw\14-10362_00010\maps\Fig 2.7 Hydraulic Profile 11x17.mxd 7/24/2015 aweber

BHC CONSULTANTS

Source: City of Enumclaw 2013 Comprehensive Water System Plan

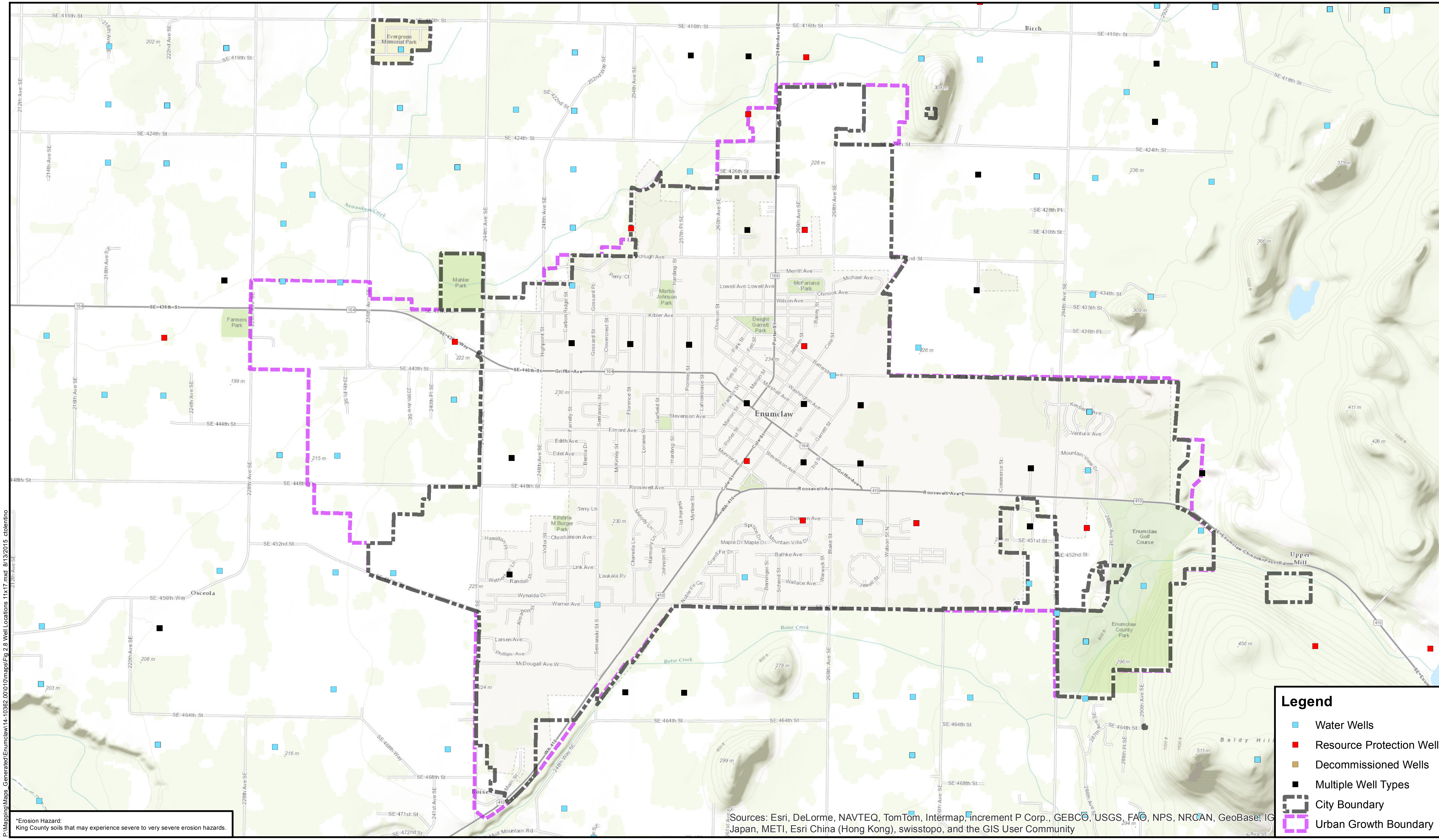
Data sources supplied may not reflect current or actual conditions. This map is a geographic representation based on available information. It does not represent survey data. No warranty is made concerning the accuracy, currency, or completeness of data depicted on this map.

BHC Consultants LLC., assumes no responsibility for the validity of any information presented herein, nor any responsibility for the use or misuse of the data.

City of Enumclaw

Existing System Hydraulic Profile
General Sewer Plan Update
City of Enumclaw
July 2015

Figure
2-7



BHC CONSULTANTS

Source: Department of Ecology 2015

Data sources supplied may not reflect current or actual conditions. This map is a geographic representation based on available information. It does not represent survey data. No warranty is made concerning the accuracy, currency, or completeness of data depicted on this map.

BHC Consultants LLC., assumes no responsibility for the validity of any information presented herein, nor any responsibility for the use or misuse of the data.

N W E S

0 1,000 2,000 4,000 Feet

City of Enumclaw

Wells Locations
General Sewer Plan Update
City of Enumclaw
August 2015

Figure
2-8

Table 2-6
Single Family In-City Winter Water Demand

	Winter 2012 to 2013			Winter 2011 to 2012		
	CCF	**Customers**	**GPD/Each**	**CCF**	**Customers**	**GPD/Each**
November	17,246	3,110	138			
December	16,878	3,106	131			
January	20,014	3,107	155	18,979	3,076	149
February	16,243	3,105	140	16,535	3,079	143
March	15,984	3,120	124	16,669	3,086	130
April	18,012	3,122	144	16,943	3,084	133

Note:
2011 available records do not separate in-city accounts from customer class total

The ten months of available records summarized in Table 2-6 average 138.7 GPD per single family residence. This demand is assumed to be entirely domestic in-home use.

Non-Residential water demand is tabulated in Table 4-3 of the City WSP as excerpted into Table 2-7. Almost all non-residential water demand is within the city limits. However, Table 2-5 indicates about 30 commercial connections and one school are outside the city limits. Agricultural connections are excluded from Table 2-7.

Table 2-7
Non-Residential Water Demand

Million Gallons per Year						
Year	**City**	**Commercial**	**Schools**	**Total**	**% Change**	**Avg GPD**
2004	13	168	11	192	---	526,000
2005	12	161	9	182	-5.2	499,000
2006	15	172	9	196	+7.7	537,000
2007	15	84	8	107	-45.4	293,000
2008	13	75	7	95	-11.2	260,000
2009	8	73	9	90	-5.3	247,000
2010	6	64	8	78	-13.3	214,000
2011	7	63	9	79	+1.3	216,000
2012	7	60	8	75	-5.1	205,000

In 2007, commercial connections declined to 366, due to removing multi-family connections from the commercial class, and were never above 376 in the remaining years. The WSP does document a general decline of water demand per customer across all customer classes for these years of record.

The decline shown in Table 2-7 appears sufficiently sustained to justify using only the final three years tabulated to determine current non-residential water demand. The average annual day water demand for the years 2010, 2011 and 2012 is 212,000 MGD.

Table 4-6 of the WSP calculates the Equivalent Residential Units (ERU) for the average connection in each customer class from the 2011 water demand for the City water system as a whole and not just within the city limits. This data is reproduced herein as Table 2-8 using the average winter water demand for single family homes derived from Table 2-5 as 139 GPD per ERU.

Table 2-8
Calculation of Average Water Customer Equivalent Residential Units for 2011

Class	Connections	Annual Avg GPD	ERU's	Avg ERU/Connection
Multifamily	277	229,300	1,650	6.0
Non - Residential				
City	43	18,400	132	3.1
Commercial	367	171,500	1,234	3.4
School	19	23,500	169	8.9
Sub-totals	429	213,500	1,535	3.6
Totals	706	------------	3,185	-----------

The annual average GPD shown in Table 2-8 includes some summer irrigation. The 139 GPD per ERU was derived from residential single family winter water demand in an effort to exclude irrigation for computation of wastewater generation:

- Some irrigation is likely included in the Table 2-8 Annual Average GPD calculation, which probably means the average GPD per non-residential ERU should be a little less than the single family residential GPD per ERU.
- School is only in session for nine months so an annual calculation may understate the actual ERU equivalent for a school, although summer athletic field irrigation may result in a more appropriate average annual water demand.

The Average ERU per Connection calculated in Table 2-8 provides a basis for estimating non-residential sewage generation. The comments above indicate that 135 GPD per ERU may be a more appropriate non-residential water consumption rate. Sewage generation is estimated as 80 percent of the water demand, or 108 GPD per non-residential ERU.

Chapter 3 Existing Sewer Collection System

3.1 Pipe System

The City of Enumclaw has owned and operated a sewer collection system since 1915. The existing pipe system is shown in Figure 3-1 and available data is tabulated in Table 3-1 based on extraction of diameters and footage from the GIS information.

Table 3-1
Sewerage Pipe System Data

Pipe Diameter Inches	Length in Feet
Active Collection System Piping	
8-inch	170,034
10-inch	31,962
12-inch	16,918
14-inch	2,930
15-inch	3,665
16-inch	4,415
18-inch	7,368
24-inch	4,660
30-inch	10,041
36-inch	1,470
Subtotal	253,463
Active Customer Service Piping	
2-inch	1,650
4-inch	20,992
6-inch	122,501
Subtotal	145,143
Abandoned	23,814
Unknown	2,543

Collection system piping totals about 48 miles for 8 through 36-inch diameters. The newer portions are mostly concrete with some PVC. The material used for most older pipes are not categorized. According to the GIS information, customer services total an additional 27 miles of pipe, but the accuracy of this data is questionable. About 4-1/2 miles of abandoned pipe is known to exist and can be located. Diameter is not documented for about ½ mile of located pipe.

The present historical downtown area contains the oldest portions of the present pipe system. Originally this was a combined system collecting both sewage and storm water. Considerable rehabilitation has been performed in recent years to create separated systems, though some direct storm connections to the sewer system may still exist.

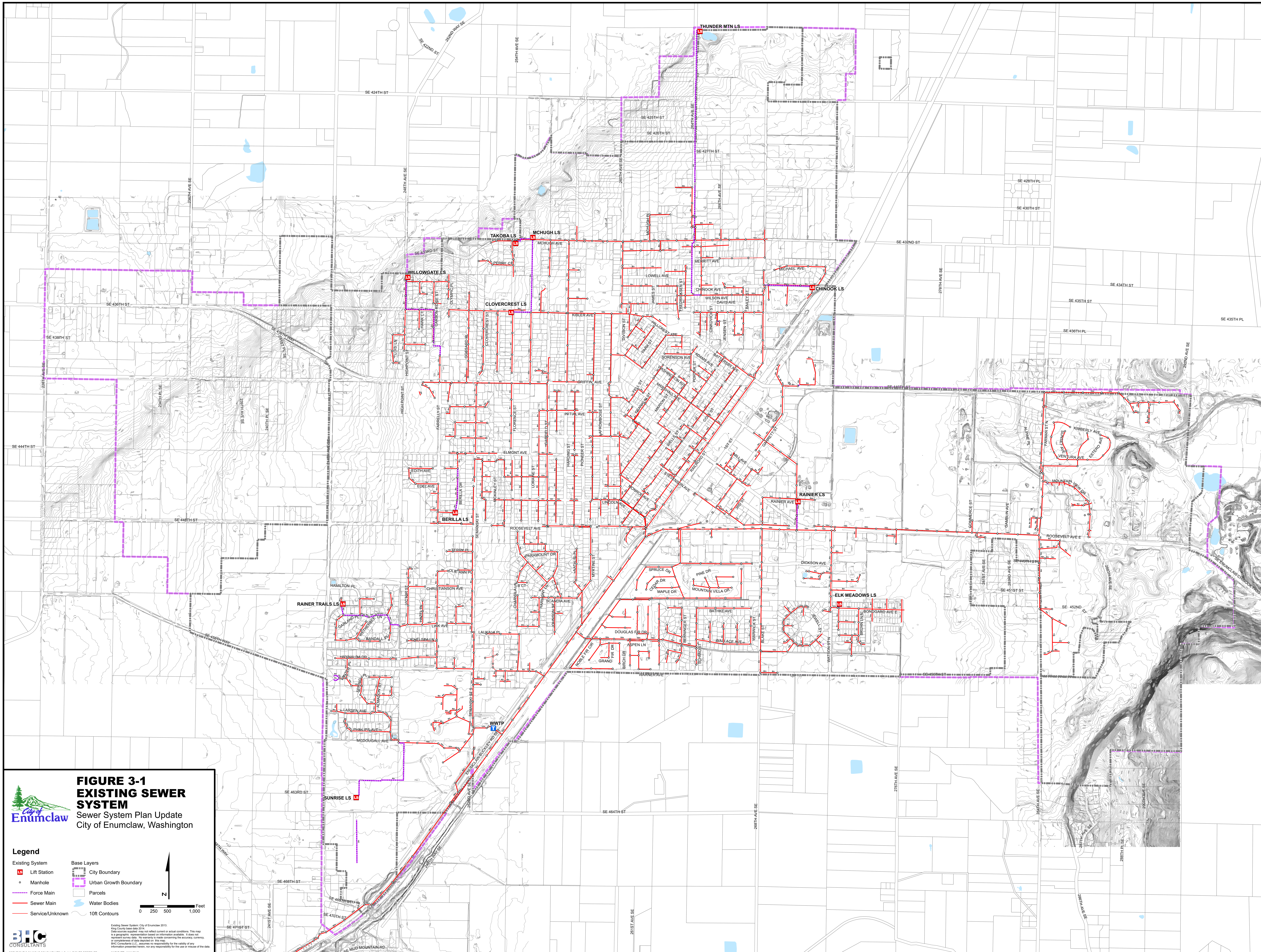


FIGURE 3-1 EXISTING SEWER SYSTEM

Sewer System Plan Update
City of Enumclaw, Washington

Legend

Existing System	Base Layers
LS Lift Station	City Boundary
Manhole	Urban Growth Boundary
Force Main	Parcels
Sewer Main	Water Bodies
Service/Unknown	10ft Contours

N

0 250 500 1,000 Feet

Existing Sewer System: City of Enumclaw 2013.
King County base data 2014.
Data sources supplied may not reflect current or actual conditions. This map is a geographic representation based on information available. It does not represent survey data. No warranty is made concerning the accuracy, currency, or completeness of data depicted on this map.
BHC Consultants LLC., assumes no responsibility for the validity of any information presented herein, nor any responsibility for the use or misuse of the data.

MAP DATE: JULY 2015

BHC CONSULTANTS

P:\Mapping\Maps_Generated\Enumclaw\14-10362.00\010\maps\Fig 3-1 Existing Sewer System 36x48.mxd 7/30/2015 ctolentino

3.2 Lift Stations

The City sewer system presently has eleven connected lift stations as shown on Figure 3-1 and summarized in Table 3-2. Two of these are presently owned by the School District and may be transferred to the City: Thunder Mountain Middle School and Sunrise Elementary School. In addition, a City grinder pump station at the Ball Field Complex is connected by force main into the Sunrise Lift Station.

Table 3-2
Sewer Lift Station Data

Station	Station Age	Pump Age	GPM	Horsepower	TDH	Generator
McHugh	1947	1984	400	7.5	unk	Yes
Clovercrest	1962	1962	200	5	unk	Portable
Rainier	1965	1965	350	5	17.5	Portable
Berilla	1990	2005	150	5	30	Portable
Willowgate	1990	1990	215	7.5	64	Yes
Chinook	1990	1990	215	7.5	58	Yes
Rainier Trails	1991	1991	150	7.5	42	Portable
Sunrise	1992	1992	120	3	30	Portable
Takoba	1999	1993	360	10	50	Portable
Thunder Mtn	2000	2000	260	15	102	Portable
Elk Meadows	2005	2005	325	7.5	24	Yes

A 12-inch overflow pipe was constructed in 2002 from the McHugh Lift Station into the Takoba Lift Station. Table 3-3 summarizes data for the lift station wet wells, pump controls, and force mains used for the hydraulic model. Figure 3-2 contains photos of the lift stations.

Figure 3-2
City of Enumclaw Wastewater Lift Stations


Berilla Lift Station


Chinook Lift Station

Clovercrest Lift Station

Elk Meadows Lift Station

McHugh Lift Station

Rainier Lift Station

Rainier Trails Lift Station

Sunrise Elementary Lift Station

Takoba Lift Station

Thunder Mountain Lift Station

Willowgate Lift Station

Willowgate – typical station interior

Table 3-3
Lift Station Wet Well and Force Main Data

Station	Wet Well	Lead Pump On	Lead Pump Off	Force Main
McHugh	9' x 5'-3"	3.42	1.42	8" x 1,375'
Clovercrest	6' dia	5.41	4	6" x 370'
Rainier	3'-6" x 9'	5.68	3.58	8" x 530'
Berilla	7' dia	3.72	1.22	4" x 820'
Willowgate	6' dia	3.85	2.25	6" x 2,100'
Chinook	6'-2" dia	2.95	2.45	4" x 920
Rainier Trails	7' dia	3.43	1.63	4" x 1,460'
Sunrise	6'-6" dia	2.98	1.48	4" x 1,960'
Takoba	9' dia	4.08	3.48	6" 370'
Thunder Mtn	6' dia	4.90	3.40	6" x 5,100'
Elk Meadows	8' dia	4.18	1.48	6" x 100'

In the absence of flow measurement at selected locations around the pipe collection system, analysis of lift station operating data provides the best tool for narrowing the areas of the sewer system to those most likely to be significant sources of rain-induced infiltration-inflow. City records show the monthly operating hours for seven of the eleven lift stations for 2010, 2011, 2012 and 2013, though data is missing for at least one month in each of the past three years. Similar records are not available for the other four lift stations. Monthly flow from theses seven lift stations can be computed from the pump operating hours provided by the City and the GPM pumping rate shown in Table 3-2. However, the pumping rate is not calibrated so the resulting flow is approximate and may include significant errors.

Table 3-4 compares the Daily Monitoring Report (DMR) recorded average day of the maximum month for 2011, 2012 and 2013 for the Wastewater Treatment Facility with the monthly lift station pump operation data. The peak operating month for a pump station is not the same for all stations in any given year, and is not always the maximum month recorded at the WWTP.

Table 3-4
Lift Station Operating Summary

Pump Operating Hours per Month unless Otherwise Stated

Parameter	Berilla	Chinook	Clovercrest	McHugh	Rainier	Rainier T	Willowgate
Served Ac	22	22	39	54	57	27	35
Pump GPM	150	215	200	400	350	150	215
2013 – Maximum Month at WWTP, April = 2.1 MGD							
Avg Hrs/Mo	105	58	72	75	47	90	59
Pk Month	132 Apr	69 Dec	118 Apr	126 Apr	64 Apr	120 Jan	88 Apr
Min Month	67 Aug	49 Jun	33 Sep	39 Aug	31 Aug	65 Jun	35 Jun
Pk Mo GPD	38,000	21,000	46,000	97,000	44,000	30,000	37,000
Pk / Min Hrs	2.0	1.4	3.6	3.2	2.1	1.8	2.5
% WWTP	1.8 %	1.0 %	2.2 %	4.6 %	2.1 %	1.5 %	1.7 %
GPD / Acre	1,700	900	1,200	1,800	760	1,100	800
2012 – Maximum Month at WWTP, January = 2.6 MGD							
Avg Month	121	68	91	96	66	100	76
Pk Month	166 Nov	81 Aug	146 Jan	169 Jan	111May	139 Dec	114 Dec
Min Month	62 Sep	61 Oct	28 Sep	38 Sep	29 Sep	65 Sep	39 Sep
Pk Mo GPD	50,000	35,000	58,000	135,000	78,000	37,000	49,000
Pk / Min Hrs	2.7	1.3	5.2	4.4	3.8	2.1	2.9
% Max GPD	1.9 %	1.3 %	2.2 %	5.2 %	3.0 %	1.4 %	1.9 %
GPD / Acre	2,300	1,600	1,500	2,500	1,400	1,400	1,100

Table 3-4
Lift Station Operating Summary

Pump Operating Hours per Month unless Otherwise Stated							
Parameter	**Berilla**	**Chinook**	**Clovercrest**	**McHugh**	**Rainier**	**Rainier T**	**Willowgate**
2011 – Maximum Month at WWTP, January = 2.8 MGD							
Avg Month	113	60	76	78	77	98	63
Pk Month	168 Apr	64 Mar	130 Mar	144 Apr	115 Oct	125 Apr	99 Apr
Min Month	73 Sep	56 Nov	30 Sep	39 Sep	49 Aug	73 Sep	44 Sep
Pk Mo GPD	50,000	27,000	50,000	111,000	78,000	37,000	42,000
Pk / Min Hrs	2.3	1.1	4.3	3.7	2.3	1.7	2.3
% Max GPD	1.8 %	1.0 %	1.8 %	4.0 %	2.8 %	1.3 %	1.5 %
GPD / Acre	2,300	1,200	1,300	2,100	1,400	1,400	900

The relationships of peak hours to minimum hours for a given lift station provide an approximate indication of rain-induced infiltration-inflow originating within that service area.

3.3 Onsite Sewerage Systems

A City survey in 2013 identified a number of residential units within the city limits that were not connected to the City sewer system as shown on Figure 3-3 and summarized in Table 3-5.

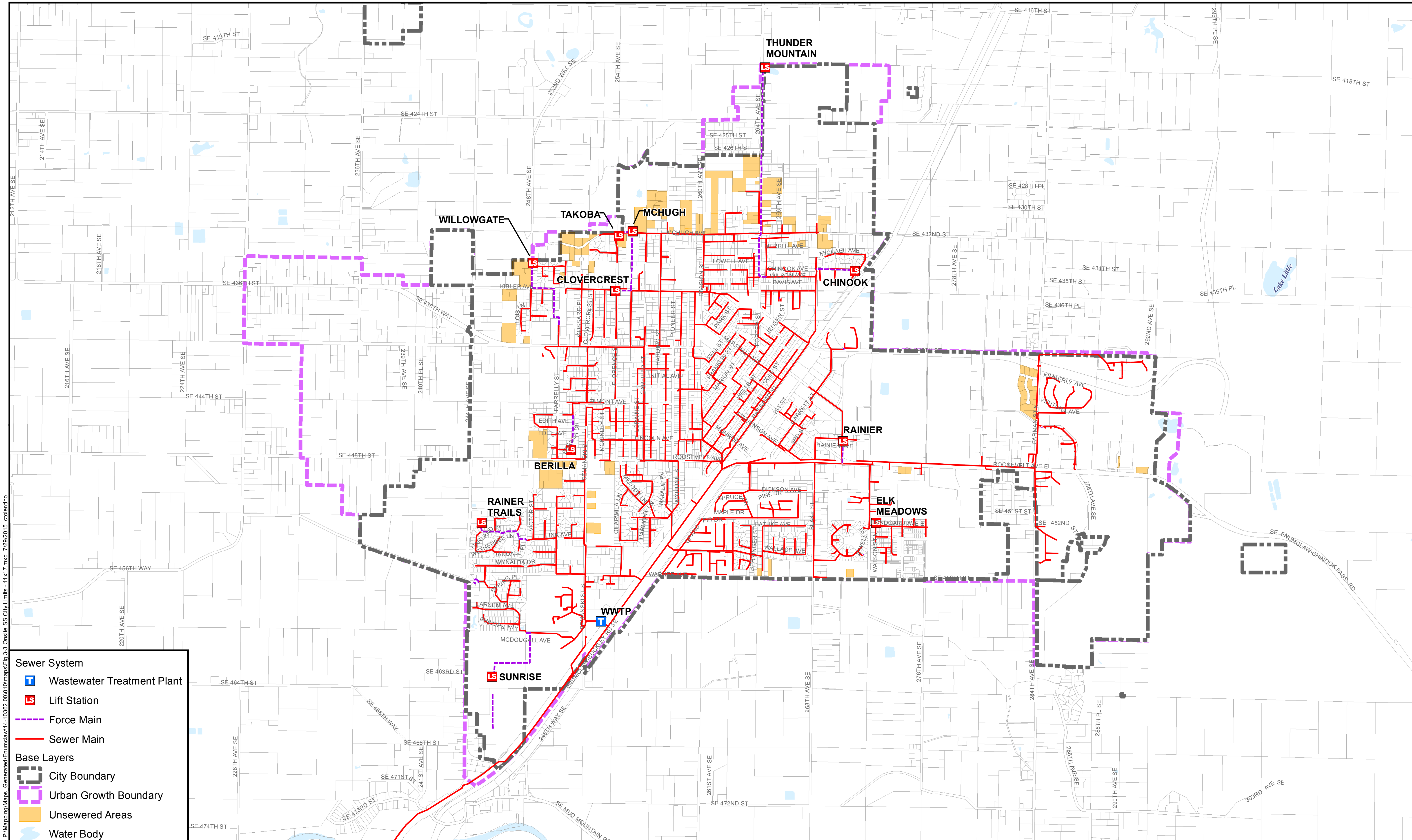
Table 3-5
Onsite Sewerage Systems

	<200 Feet from Sewer	**>200 Feet from Sewer**
Within 2010 City Limits	37	30
Within 2010- 2012 Annexations	27	not counted
Totals	64	N/A

Table 3-5 indicates that within the current city limits at least 94 single family residences are not presently connected to the City sewer system. About 227 people may reside in the homes, or about 2 percent of the estimated City population in 2013, leaving about 10,935 people served by the City sewer system.

3.4 Historic Wastewater Flows

Influent flows recorded in the DMRs for the Wastewater Treatment Facility are summarized in Table 3-6.



BHC CONSULTANTS

Sewer System: City of Enumclaw 2013
King County GIS base data.
Data sources supplied may not reflect current or actual conditions. This map is a geographic representation based on available information. It does not represent survey data. No warranty is made concerning the accuracy, currency, or completeness of data depicted on this map.
BHC Consultants LLC., assumes no responsibility for the validity of any information presented herein, nor any responsibility for the use or misuse of the data.

N W E S

0 1,000 2,000 4,000 Feet

City of Enumclaw

Onsite Sewer Systems within City Limits
Sewer Collection System
City of Enumclaw
July 2015

Figure
3-3

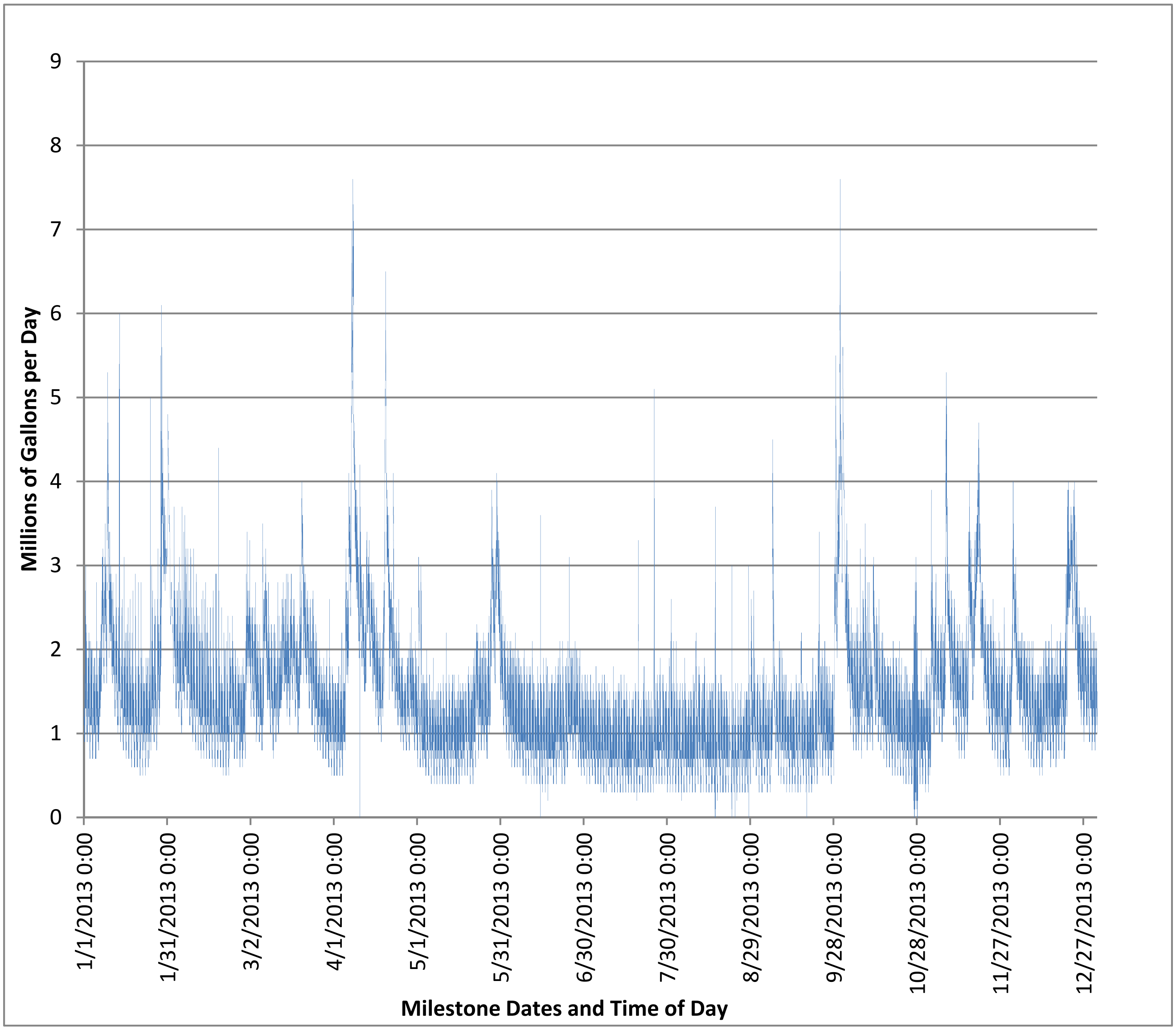
P:\Mapping\Maps_Generated\Enumclaw\14-10362.00\010\maps\Fig 3-3 Onsite SS City Limits - 11x17.mxd 7/29/2015 ctolentino

Table 3-6
Summary of DMR Recorded Flow

Millions of Gallons per Day									
Month	**2011**			**2012**			**2013**		
	Avg	**Max**	**Min**	**Avg**	**Max**	**Min**	**Avg**	**Max**	**Min**
Jan	**2.8**	6.0	1.3	**2.6**	**6.1**	1.4	1.7	3.4	1.0
Feb	1.9	3.4	1.4	2.0	4.2	1.3	1.4	2.3	1.0
Mar	2.4	4.7	1.6	2.2	4.5	1.2	1.7	2.9	1.0
Apr	2.6	5.9	1.5	1.9	4.9	1.1	**2.1**	**5.6**	1.0
May	2.1	**6.6**	1.4	1.7	4.6	0.9	1.3	3.0	0.8
Jun	1.5	2.5	1.2	1.6	2.9	1.1	1.0	1.5	0.9
Jul	1.0	1.2	0.9	1.0	1.8	0.8	0.8	1.0	**0.7**
Aug	0.9	1.3	**0.8**	0.8	0.8	0.7	0.8	1.3	0.8
Sep	0.9	1.2	**0.8**	0.7	0.9	**0.7**	1.2	4.3	0.8
Oct	1.2	1.7	0.9	1.3	3.8	**0.7**	1.4	3.8	0.9
Nov	1.8	5.2	1.0	2.2	4.7	1.2	1.7	3.3	1.1
Dec	1.5	4.2	1.0	2.3	3.8	1.2	1.6	3.1	1.1
Total	20.6	43.9	13.8	20.3	43.0	1.5	16.7	35.5	11.1
Average	1.7			1.7			1.4		
Note: Highest Average and Maximum and lowest Minimum Day per year are **BOLD**									

The existing NPDES permit became effective May 1, 2003 and is overdue for updating due to delays in completion of a Total Maximum Daily Loading study for the White River. The permitted flow limit is 2.6 MGD for the average day of the maximum month. The maximum day flow noted above excludes flows that bypass the treatment plant due to process capacity limitations in the plant's ultraviolet disinfection system discussed in Chapter 6.
Figure 3-4 provides a graphic representation of wastewater flow for the year 2011.

Figure 3-4
Graphic Plot of 2013 Wastewater Flow into WWTP



A number of observations can be made from the information in Table 3-6 and Figure 3-4:

- Considerable seasonal variation in flow exists in the sewer collection system, which is indicative of significant infiltration and rain-induced inflow.
- The average of the three-year annual average day flow is about 1.6 MGD.
- The highest maximum day flow shown in Table 3-6 was recorded on 15 May 2011 at 6.6 MGD although 7.6 MGD peak hour flows were recorded on two other dates.
- Minimum daily flows during dry summer weather were 0.7 to 0.9 MGD.
- The open space below the flow graph shows the minimum flow recorded during the year. During the early morning hours of 2 to 5 AM flow during the summer usually declines into a range of 0.3 to 0.6 MGD, though occasionally even lower.

- Much of the variation seen in Figure 3-4 may reflect the starts and stops of the 11 lift stations in the collection system. The few times when the instantaneous recording at the plant drops to zero are believed to be instrument errors.

Although some sewage flow continues year-round throughout the night, a significant part of the early morning minimum flow is infiltration. Even during dry summer weather the early morning minimum flow does not fall below about 100,000 GPD which is assumed to be mostly infiltration.

Figure 3-5 provides an aerial photograph of the existing treatment plant site and principal facilities.

3.5 Non-Residential Sewage

Section 2.7 reviewed the City water system and the Water System Plan. Table 2-8 calculated the average ERU per connection for each of three non-residential customer classes. These classes totaled 429 connections in 2011 and 1,535 ERU for the water system. About 30 of the non-residential connections with about 100 ERU are outside of the city limits and are not connected to the sewer system.

ERUs are calculated in Section 2.7 from annual average day water demand, which includes any irrigation water used for summer landscaping. Non-residential landscaping is usually minimal. Accordingly, it is assumed that about 80 percent of the non-residential water demand enters the sewer system.

Non-residential sewage during the 2010 through 2013 period is estimated as follows:

Non-Residential Sewage = 1,435 ERU x 135 GPD x 0.8 = 155,000 GPD

Section 2.5 tabulated 2013 covered employment as totaling 4,618 people. About 100 employees are estimated to work on parcels not served by sewers, leaving about 4,518 covered employees connected to the sewer system. Total employment is estimated at about 12 percent greater to include non-covered employees such as self-employed or part-time/on-call for a sewer served total of about 4,560 employees. Sewage generated per employee is estimated as follows:

Sewage per Employee = 155,000 GPD / 4,560 Employees = 34 GPD / Employee

This estimated sewage generation rate is similar to the values suggested by Washington State Health *Water System Design Manual* and the Department of Ecology *Criteria for Sewage Works Design*.

3.6 Industrial Customers

The King County Transfer Station at the east end of Battersby Avenue East is the only industrial facility connected to the City sewer system discharging other than domestic strength wastewater. Pretreatment is provided by an oil-water separator.

The ten largest, non-residential water users are listed in Table 3-7. It should be noted that several of the listed water customers are not sewer customers and that the Transfer Station, which is a customer of the sewer utility, is not included.

BHC CONSULTANTS

CITY OF Enumclaw

Wastewater Treatment Plant Existing Site Plan
Enumclaw
July 2015

Figure
3-5

PLOT DATE & TIME AUG 13 2015 11:39:39

FILE NAME (UPDATED BY) S:\CAD\ENUMCLAW\14-10362-010\DWG\F14-10362_010-FIG 3-5.DWG (PLS)
XREFS: NONE

Table 3-7
Largest Non-Residential Water Users in 2011

Customers	Annual Consumption In GPD
Dairy	11,500
Hospital	11,200
Dairy	11,200
Dairy	9,300
Grocery Store	7,900
Dairy	6,000
School	6,000
Dairy	5,200
Dairy	4,700
Nursing Home	4,400

Although some of the water users listed in Table 3-7 may discharge at higher strength than typical residential household, the discharge remains of domestic quality.

3.7 Residential Sewage

The minimum day flows during 2011-2013 as shown in Table 3-6 were about 0.8 MGD. Subtraction of the estimated 100,000 GPD of base infiltration leaves 700,000 GPD as sewage. Non-Residential sewage was determined in Section 3.5 to be 160,000 GPD. Therefore, residential sewage is the remaining 540,000 GPD.

Dividing residential sewage by the 2013 estimated population derived from Section 3.3 as 10,935 people yields a sewage flow of 49 GPD per capita. This value includes both single family and multifamily residents while excluding an estimated 227 people using onsite sewage systems.

About 3,010 single family homes were connected to the city sewer system in 2013, though the precise number varied month-to-month as new accounts were activated and others inactivated.

The average household size is 2.41 people, so the average sewage generated per household is about 118 GPD. The average winter day domestic water demand determined from Table 2-6 to be 139 GPD per household. It appears that about 85 percent of winter household potable water becomes sewage. These are similar statistics to those reported by most Puget Sound communities.

3.8 Infiltration and Inflow

Section 3.7 estimates that summer dry weather flows of about 800,000 GPD includes about 100,000 GPD of base infiltration. The remaining flow of 700,000 GPD is 160,000 GPD of non-residential sewage and 540,000 GPD of residential sewage.

The annual average day flow over three years as determined from Table 3-6 was 1,600,000 GPD. It therefore appears that the annual average day flow includes about 800,000 GPD of rain-induced infiltration-inflow over and above the 100,000 GPD base infiltration that is included in the average of the summer dry weather flows.

The average day of the maximum month shown in Table 3-6 ranged from 2.1 to 2.8 MGD for those three years and averaged 2.5 MGD. This flow is 900,000 GPD above the 1,600,000 GPD annual average day, and 56 percent above the annual average. The total rain-induced infiltration-inflow is estimated below:

Base infiltration	100,000 GPD
Annual average day rain-induced I&I	800,000 GPD
Maximum month average day I&I	900,000 GPD
Total Rain-Induced I&I	1,800,000 GPD

The peak day for the three years shown in Table 3-6 ranged from 5.6 to 6.6 MGD. The average for the maximum day flow of 6.1 MGD is compared below to identify peaking factors:

Annual average day	1.6 MGD	
Dry weather minimum day	0.8 MGD	0.50 factor
Average day, maximum month	2.5 MGD	1.54 factor
Apparent peak day	6.1 MGD	3.81 factor

The apparent peak day is 3.8 times the annual average day flow and 4.5 MGD above that annual average. However, Table 3-6 records do not include flows bypassing the plant during heavy rain events as noted in Section 3.4. Accordingly, the adjusted maximum day flow is assumed to be about 7.0 MGD. The additional 0.9 MGD flow is assumed to be all rain-induced infiltration-inflow. Peak day rain-induced infiltration-inflow thus totals 6.3 MGD.

Maximum peak hour flows including that bypassing the plant have been estimated by the City to approach 12 MGD, with at least 11 MGD of rain-induced infiltration-inflow.

The City of Enumclaw in 2013 had an area within the city limits of about 3,308 acres. Of this gross area, parcels served by sewers have an estimated 1,340 acres within 100 feet of a sewer main. The City rights-of-way with sewers installed comprise an estimated additional 260 acres. Therefore, about 1,600 acres is roughly within about 200 feet of a sewer main and may contribute rain-induced infiltration inflow to the sewer system. The average rates of infiltration and rain-induce infiltration-inflow are summarized in Table 3-8.

Table 3-8
Summary of Rain-Induced Infiltration-Inflow

Gallons per Day		
Parameter	**Total Infiltration-Inflow**	**Infiltration-Inflow per Acre**
Dry Weather	100,000	63
Annual Average Day	900,000	560
Average Day Max Month	1,800,000	1,100
Peak Day	6,300,000	4,000
Peak Hour	11,000,000	7,000

The values summarized in Table 3-8 are believed appropriate for the existing City sewer system as a whole. Calibrating the truncated hydraulic model of the existing sewer system requires distinguishing which sewer basins have higher than average infiltration-inflow rates from those that have lower; and estimated approximate unit flow magnitudes for each basin.

Chapter 4 Projected Conditions

4.1 Sewer Basins

Figure 4-1 shows the Sewer Basins comprising the existing sewer service area within the present Enumclaw city limits and the additional properties within the Urban Growth Area.

Table 4-1 summarizes acreage within each Sewer Basin. Column headings used in Table 4-1 were developed as follows:

1. Sewer Service Basins are the designations shown on Figure 4-1
2. Gross Acres is the total area within the Basin including rights-of-way, undevelopable critical areas and buildable parcels
3. Existing Onsite Acres is the area developed within each Basin using onsite sewage treatment and disposal technologies in 2013
4. Percent Unusable is the estimated percentage of the gross area that is not developable due to critical area constraints, primarily steep slopes and wetlands
5. 2013 Percentage is the estimated percentage of the gross area actually served by sewers in 2013, including rights-of-way, developed parcels and undeveloped properties within about 100 feet of an existing sewer or lateral that might contribute infiltration-inflow to the sewer collection system
6. 2013 Acres is the net acreage tributary to the sewer collection system in 2013
7. 2035 Acres is the net acreage projected to be tributary to the sewer collection system in 2035 including rights-of-way and developable properties, assuming all parcels currently served by onsite sewage treatment and disposal system will be connected to the City sewer system and the estimated acres needed to accommodate the projected additional 2035 population and employment

Some area within several basins is projected to remain undeveloped in 2035 and is not included in the current hydraulic model as generating wastewater flow

Table 4-1
Projected Sewer Basin Acreages (Ac)

Sewer Service Basin	Gross Ac	Exist Onsite Ac	% Unusable	2013%	2013 Ac	2035 Ac
244	261.6	11.7	10	0	0	201.2
420	28.6			0	0	7.9
424	48.3	3.2	20	0	0	11.3
436	153.8		20	0	0	91.0
440	131.4		10	0	0	106.3
448	136.6		20	0	0	109.2
452	66.6		30	0	0	46.6
470	16.3			0	0	2.4
Berilla	36.8	6.2		100	30.7	36.8

Table 4-1
Projected Sewer Basin Acreages (Ac)

Sewer Service Basin	Gross Ac	Exist Onsite Ac	% Unusable	2013%	2013 Ac	2035 Ac
Blake	67.4	0.7		60	40	66.8
Bruhn	10.8			0	0	0.0
Chinook	91.5			20	18.3	70.7
City Park	303.7			0	0	2.4
Clovercrest	49			90	44.1	49.0
Cole	65.3			100	65.3	65.3
Commerce	60.1			0	0	48.4
Dickson	62			100	62	62.0
Division	110.7			100	110.7	110.7
Elk Meadows	141.6			20	28.3	136.9
Farman	314.7	9.4		60	183.2	290.0
Farmland Preserve	168.5			10	16.9	20.7
Garfield	170.5	1.8		90	151.8	169.2
Garrett	40.9			90	36.8	40.9
Harding	57.5	19.4	10	0	0	39.7
Kibler	65.8			100	65.8	65.8
McHugh	165.8	22.2	30	80	75.1	116.1
Melody	75.1			100	75.1	75.1
Newaukum	31.8	2		0	0	18.0
Pinnacle Estates	90.5	1.2		90	80.4	90.5
Railroad	72			80	57.6	65.1
Rainier	78.1			80	62.5	78.1
Rainier Trails	56.8			60	34.1	49.4
Roosevelt East	99.1	1.1		40	39.2	74.9
Semanski	209.8			70	146.9	151.5
Sunrise	99.3			10	9.9	18.0
Takoba	39.9	5	10	40	12.3	29.6
Thunder Mountain	116.8	1.7	10	20	20.7	81.1
Warner	49.7	3.2		50	23.3	49.7
Willowgate	59.3	10.7	30	60	18.5	28.1
Wilson	47.5			90	42.8	45.6
TOTAL	3,951.5	99.5			1,552.3	2,819.9


FIGURE 4-1
SUB-BASIN MAP
Sewer System Plan Update
City of Enumclaw, Washington
City of Enumclaw
Legend
Proposed System
Proposed Pump Station
Proposed Forcemain
Proposed Interceptor
Forcemain
Sanitary Sewer
Existing System
Lift Station
Force Main
Sewer Main
Unknown
Base Layers
City Boundary
Urban Growth Boundary
Sub-Basins
Parcels
Water Bodies
10ft Contours
Feet
0 250 500 1,000
BHC CONSULTANTS
Thunder Mountain
420
424
Harding
Chinook
McHugh
Takoba
Willowgate
City Park
Wilson
436
Newaukum
Clovercrest
Kibler
Railroad
Division
Cole
Rainier
440
Garfield
Farmland Preserve
Commerce
City Park
244
Berilla
448
Garrett
Farman
Melody
Dickson
Roosevelt East
Rainier Trails
452
Blake
Elk Meadows
Pinnacle Estates
Warner
Bruhn
Semanski
Farman
Sunrise
470
THUNDER MTN LS
MCHUGH LS
TAKOBA LS
WILLOWGATE LS
CHINOOK LS
CLOVERCREST LS
RAINIER LS
BERILLA LS
RAINER TRAILS LS
ELK MEADOWS LS
SUNRISE LS
SE 424TH ST
SE 432ND ST
SE 444TH ST
SE 464TH ST
SE 472ND ST

4.2 Projected Population

The future land use shown in Figure 4-2 provides the basis for the data and methodology used to project the residential population for the Enumclaw urban growth area are described below. The analysis produced population estimates for 2013 and a 2035 scenario for each basin. For purposes of the Plan the 2035 data is treated as 'Build-Out'.

The following data and resources were used in establishing the baseline and build-out populations:

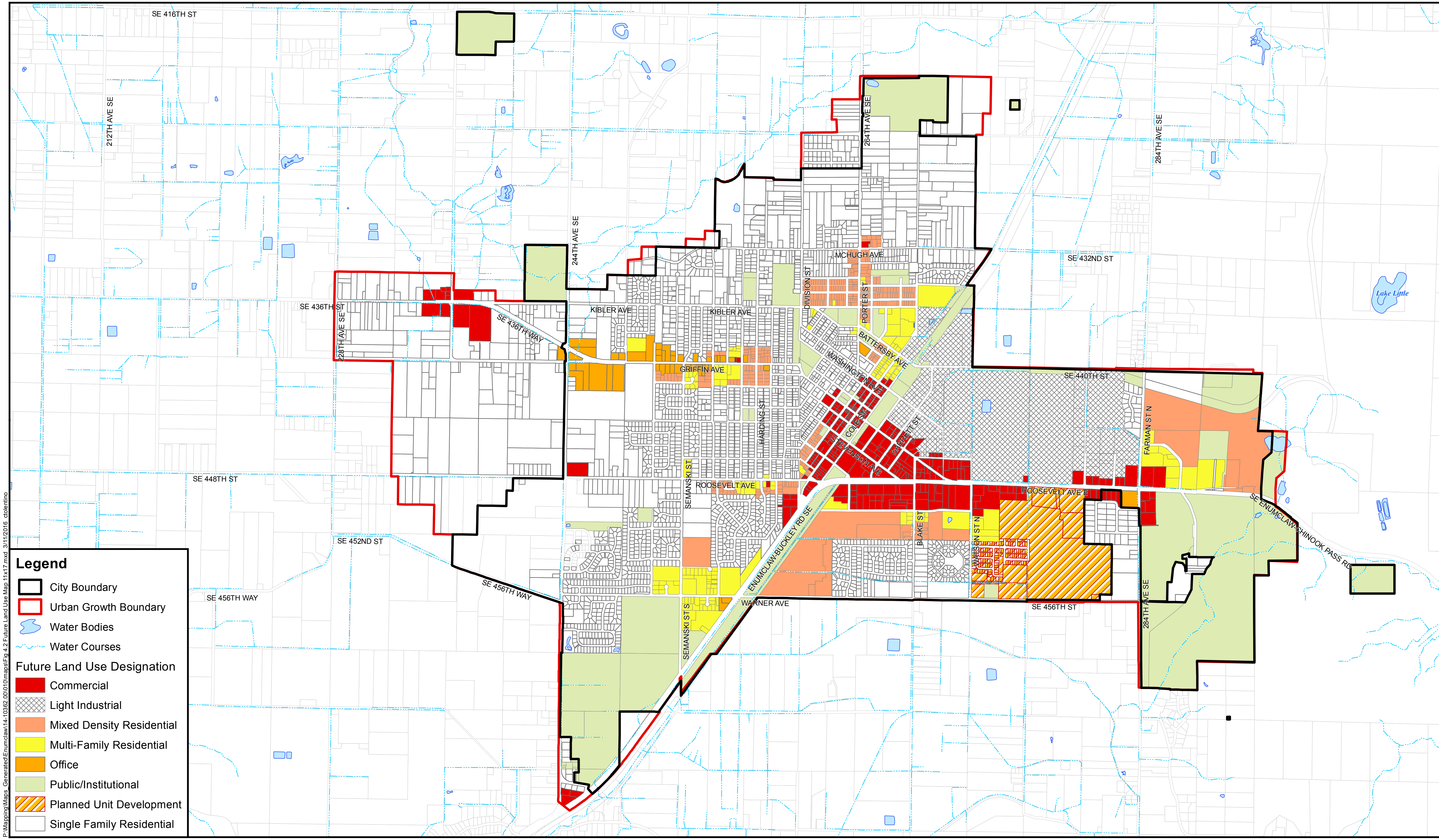
- 2010 Census
  - Enumclaw population data by census block
  - Enumclaw average household size as 2.39 people
- City of Enumclaw
  - Zoning and parcel data
  - Proposed development and land use data
  - Municipal Code – Housing density
- King County
  - City, UGA and parcel boundary data
- Office of Financial Management (OFM)
  - Small Area Estimate Program – 2014 population estimate by census block group

Year 2010 served as the Baseline year. Population estimates were calculated using 2010 census population data and county parcel data. Census block data and parcel data were joined spatially using GIS, and a residential density was calculated for each census block (the ratio of population to total residential acreage). Residential parcels were identified using King County Land Use Codes and GIS parcel data. The residential density was then applied to the acreage of each individual residential parcel to produce a population estimate per parcel. The parcel population values were re-aggregated by basin.

Current year 2013 population estimates were calculated using the baseline population data and OFM growth estimates. Through the Small Area Estimate Program (SAEP), OFM generates annual population estimates for census areas and other areas of significance; the smallest area available is the Census block group. The percent change in population from 2010 to 2013 was calculated for each Census block group. The parcel-based, baseline population data was joined spatially to the block group-based, SAEP data using GIS. The percent change was then applied to the 2010 population estimate to produce a 2013 population estimate per residential parcel. The 2013 parcel population values were aggregated by basin.

Build-Out 2035 residential population capacity estimates were provided by the City from the updated buildable lands analysis. The City calculated the total additional housing unit capacity for each vacant and re-developable parcel, and multiplied the housing unit capacity by an average household size of 2.49 to estimate the additional population capacity per parcel. This was aggregated by basin and added to the current (2014) population to estimate the build-out residential population.

Table 4-2 summarizes the projected population for the City urban growth area.



BHC CONSULTANTS

Source: King County base data, City of Enumclaw 2015 future land use data

Data sources supplied may not reflect current or actual conditions. This map is a geographic representation based on available information. It does not represent survey data. No warranty is made concerning the accuracy, currency, or completeness of data depicted on this map.

BHC Consultants LLC., assumes no responsibility for the validity of any information presented herein, nor any responsibility for the use or misuse of the data.

City of Enumclaw

Future Land Use Map

General Sewer Plan Update

City of Enumclaw

August 2015

Figure

4-2

Table 4-2
Projected UGA Population by Sewer Basin

Basin	Residential Population	
	YR 2013	2035 Capacity
244	115	765
420	11	34
424	274	311
436	131	212
440	97	427
448	52	258
452	22	122
470	24	34
Berilla	262	275
Blake	430	530
Bruhn	12	12
Chinook	561	692
City Park	0	0
Clovercrest	354	371
Cole	352	419
Commerce	0	0
Dickson	317	369
Division	879	878
Elk Meadows	175	1,349
Farman	328	1,171
Farmland Preserve	61	60
Garfield	1,187	1,243
Garrett	11	11
Harding	137	269
Kibler	462	473
McHugh	554	764
Melody	731	797
Newaukum	33	73
Pinnacle Estates	759	765
Railroad	408	502
Rainier	13	13
Rainier Trails	348	431
Roosevelt East	319	388
Semanski	1,175	1,192
Sunrise	2	26

Table 4-2 Projected UGA Population by Sewer Basin		
Basin	**Residential Population**	
	YR 2013	**2035 Capacity**
Takoba	139	205
Thunder Mountain	80	238
Warner	407	711
Willowgate	326	350
Wilson	334	345
Total	**11,881**	**17,086**

4.3 Projected Employment

The data and methodology used to project employment for the Enumclaw urban growth area are described below.

Year 2013 served as the baseline employment population year. Employment population projections were calculated using 2013 Covered Employment estimates and 2013 American Community Survey (ACS) self-employment estimates. Covered employment estimates were provided by Puget Sound Regional Council staff per sewer basin by custom data request. Covered employment refers to positions covered by the WA Unemployment Insurance Act, and accounts for approximately 85-90 percent of all employment. The Act exempts self-employed individuals, which are accounted for by increasing covered employment figures by the ACS self-employment estimate of 12 percent.

The City provided 2035 employment population capacity estimates resulting from the City's updated buildable lands analysis. The City calculated the total employment capacity for each vacant and re-developable commercial or industrial zoned parcel. This was aggregated by basin and added to the current (2013) employment to estimate the build-out non-residential population.

The resulting projected employment is summarized in Table 4-3.

Table 4-3 Projected UGA Employment by Sewer Basin		
Basin	**Projected Employment**	
	YR 2013	**2035 Capacity**
244	41	698
420	0	0
424	0	0
436	30	420
440	4	189
448	2	2
452	0	0
470	7	7
Berilla	19	19

Table 4-3
Projected UGA Employment by Sewer Basin

Basin	Projected Employment	
	YR 2013	2035 Capacity
Blake	48	84
Bruhn	0	0
Chinook	11	11
City Park	3	3
Clovercrest	65	95
Cole	645	768
Commerce	78	648
Dickson	212	266
Division	157	161
Elk Meadows	2	2
Farman	123	533
Farmland Preserve	0	23
Garfield	232	261
Garrett	511	588
Harding	12	12
Kibler	7	7
McHugh	102	102
Melody	77	77
Newaukum	7	99
Pinnacle Estates	6	6
Railroad	631	732
Rainier	706	1,203
Rainier Trails	2	2
Roosevelt East	454	923
Semanski	410	410
Sunrise	109	109
Takoba	2	2
Thunder Mountain	104	104
Warner	45	45
Willowgate	22	70
Wilson	38	38
Total	**4,925**	**8,719**

4.4 Infiltration-Inflow Projections

The actual lift station flow values derived through Table 3-4 may not be accurate as discussed in Section 3.4. However, the relationships of peak hours to minimum hours for a given station do provide a good indication of rain-induced infiltration-inflow originating in that service area.

The percent of maximum month is calculated for each station from the WWTP maximum month even though the peak lift station operation may have occurred in a different month. This overstates the lift station contribution to the treatment plant in the interests of a conservative, prudent relationship. Typically, the seven lift stations with adequate flow records contribute about 15 percent of the total City flow recorded at the WWTP. For all eleven existing stations the contribution is estimated to be about 20 percent.

Several points relative to infiltration and rain-induced infiltration-inflow can be seen in Table 3-4 as described below:

1. The ratio of peak month operating hours to minimum month operating hours is indicative of the rain-induced flow passing through each lift station. This ratio is less than 2.0 for two stations, Berilla and Rainier Trails. It is over 3.0 for two other stations: Clovercrest and McHugh.
2. The small percentage of the total flow originating from the lift stations indicates that none of these seven stations, and probably none of the remaining four newer stations, are a significant factor in the rain-induced infiltration-flow to the collection system as recorded at the treatment plant because the WWTP peak day to average day flow ratio in recent years is 3 or 4 to 1.
3. However, the large peak to minimum pumping ratios for the Clovercrest and McHugh Lift Stations indicate these basins do have significant collection system defects.

A flow monitoring program conducted by King County Metro of their collection system a few years ago involved over 800 flow meters. Analysis of the recorded flows identified a number of local areas for pilot rehabilitation projects. Results from those pilot projects concluded that typically 60 to 70 percent of the collection system defects occurred on private properties. This means any rehabilitation program that does not include a rigorous effort to identify and correct defects on private property is unlikely achieve significant reductions in extraneous wastewater flows.

The older collection piping in the Enumclaw sewer system serves the downtown areas. Some rehabilitation work has been done in these areas. Table 3-4 indicates that since none of the lift station service areas are major sources of infiltration or rain-induced infiltration-inflow, these downtown areas are the most likely locations where significant reductions in rain-induced wastewater flow may be achieved.

4.5 Projected Wastewater Flows

Flow projections are based on existing land use planning. The City Comprehensive Plan will be updated several times before 2035 Build-Out is achieved and land uses as well as densities may change. No effort is made to identify such future changes that the City may choose to adopt.

The 2013 Comprehensive Water System Plan projected future water demands using the existing demands as the prudent approach whether or not future water reductions are achieved through conservation or other means.

Accordingly, a similar approach is used for wastewater planning. Existing 2013 City population served by sewers is the 11,162 census estimate less the 227 people within the City using onsite systems for a 10,935 total. This total differs from Table 4-2 which summarizes the UGA population. Employment is projected to maintain the same ratio of employment per capita as existed in the City during 2012, or 0.414 employees per capita.

Acreage served by sewers in 2013 was estimated from basin boundaries superimposed on an aerial photograph for each basin, then totaled for the City as a whole. This acreage estimate is intended to reflect the land area within about 100 feet of the existing or proposed sewers that may affect wastewater flow either through base infiltration under annual average day conditions, or including rain-induced infiltration-inflow for peak flow conditions. This results in the following estimated acreage:

Estimated portion of parcels served by sewers	1,340 acres
Estimated area of public rights-of-way with sewer piping	260 acres
Total area that may contribute infiltration	1,600 acres

Extraneous flow rates from rain-induced infiltration-inflow are assumed to decline as the sewer system expands with better constructed pipe extensions. Projected wastewater flows are computed in Table 4-4, first for sewage then adding an appropriate I&I component to project annual average day, average day maximum month, peak day and peak instantaneous flows. For 2013 and 2020 some developed parcels are served by on-site systems while all 2035 parcels are assumed to be served by sewer.

Population, employment and served acres for 2020 are projected from the 2013 data with an interpolation towards the 2035 projection. Table 4-4 summarizes the projected wastewater flow volumes for 2013, 2020 and 2035.

Table 4-4 Projected Sewer System Wastewater Flows			
Gallons per Day Unless Otherwise Stated			
Parameters	**2013**	**2020**	**2035**
Population Served by Sewers	10,935	12,050	17,086
GPD per Capita	49	49	49
Annual Average GPD	536,000	590,000	837,000
Employment	4,618	5,027	8,719
GDP per Employee	35	35	35
Annual Average GDP	162,000	176,000	305,000
Annual Average Day Sewage	**698,000**	**766,000**	**1,142,000**
Served Acres	1,600	1,700	2,800
Average GDP per Acre	560	550	500
Annual Average GDP	896,000	935,000	1,400,000
Total Annual Average Day GPD	**1,594,000**	**1,701,000**	**2,622,000**
Avg Day Max Month GDP/Acre	1,100	1,000	900
Average Day Max Mo GPD	1,760,000	1,700,000	2,520,000
Average Day Max Month	**2,458,000**	**2,466,000**	**3,742,000**
Peak Day GDP per Acre	4,000	3,900	3,500
Peak Day GPD	6,400,000	6,630,000	9,800,000
Total Peak Day GDP	**7,098,000**	**7,396,000**	**11,022,000**
Peak Hour GDP per Acre	7,000	6,800	6,000
Peak Hour GDP	11,200,000	11,560,000	16,800,000
Total Peak Hour GDP	**11,898,000**	**12,326,000**	**18,022,000**

The Table 4-4 projections are estimates for facilities planning purposes. As better data becomes available the projections should be refined.

Chapter 5 Hydraulic Model

5.1 Hydraulic Model Description

InfoSWMM Suite 12.0, Update #3, by Innovyze is the software used to simulate the City sewer system hydraulics. It is an urban water modeling software package that integrates GIS with water modeling for sewers, water distribution and/or storm drainage systems. The packages are available in modules of different sizes to be relevant to the application envisioned. The model simulates unsteady flow in pipe and channel networks. It has a wide range of network components and flow processes such as:

- Standard and flexible cross-sections, circular manholes, detention basins, overflow weirs, orifices, pump curves and flow regulators
- Simulation of subcritical as well as supercritical flow conditions in partially full, full and pressurized pipes
- A long term simulation tool for continuous simulations of long time series and
- An automatic pipe design tool, which finds optimal pipe dimensions based on dynamic simulations.

The model also computes advanced real-time control capabilities for weir crest levels, gate openings, and pump discharges. It permits description of the controllable devices and makes the definition of complex operational logic for interdependent regulating devices fully transparent.

The model software simulates the dynamic operations of pumps and wet wells to describe diurnal flows into force mains and through the gravity piping. A truncated sewer model was developed to make the most cost-efficient, effective use of available resources. Since 8-inch pipes at minimum slopes provide adequate capacity for hundreds of homes, perhaps as many as a thousand, there is little reason to model such pipe capacities as the Theissen distribution methodology accounts for the hydraulic attenuation in such pipes. The model as developed operates according to the protocol summarized below:

- Catchment areas, or Basins, were created in GIS format based upon the topographic drainage and the existing collection system
- The software creates catchment areas or Theissen polygons for each sewer basin
- Each polygon has a flow load point located at the centroid of the polygon
- Flow load points are connected to manholes in the truncated model within each of the 27 existing basins served by the sewer system
- Sum of flows within each catchment area was calculated and distributed equally among the number of Theissen polygon flow load points contributing to each modeled manhole within the catchment area
- Key manholes are the points of flow origin for the hydraulic model
- Theissen polygon load points insert a travel time for flow to reach the key manhole and thus attenuate the basin flow to more accurately simulate actual flow conditions

Other software modules can address pollution transport as well as simulate chemical and biological processes in wastewater facilities.

5.2 Existing System Model

The truncated model of the City sewer system is shown in Figure 5-1 highlighting those pipes comprising the existing trunk sewer system. This truncated model is based upon the hydraulic model from the 2006 Comprehensive Sewer Plan, and modified to reflect the current System as shown in the City GIS mapping. The truncated model of the existing system is organized into 27 served sewer basins comprising 207 pipes, 207 nodes and 11 lift stations flowing into the influent lift station at the wastewater treatment plant.

The sewer basins as shown in Figure 5-1 are described in Table 4-1 to identify the acreage served by sewer in 2013. Population was distributed among the basins according to Table 4-2 and Table 4-3 shows the related employment distribution.

The hydraulic model wastewater input uses a dimensionless diurnal curve averaging 1.0 to distribute a specific daily total throughout the day. The hourly values for the diurnal pattern are computed as a ratio greater or lesser than one. The resulting diurnal pattern multiplied by the residential and non-residential unit flows times the number of such units in each basin, plus the unit infiltration-inflow allocated to each basin times the served acres as collected through the trunk sewers, computes total flow for the sewer system

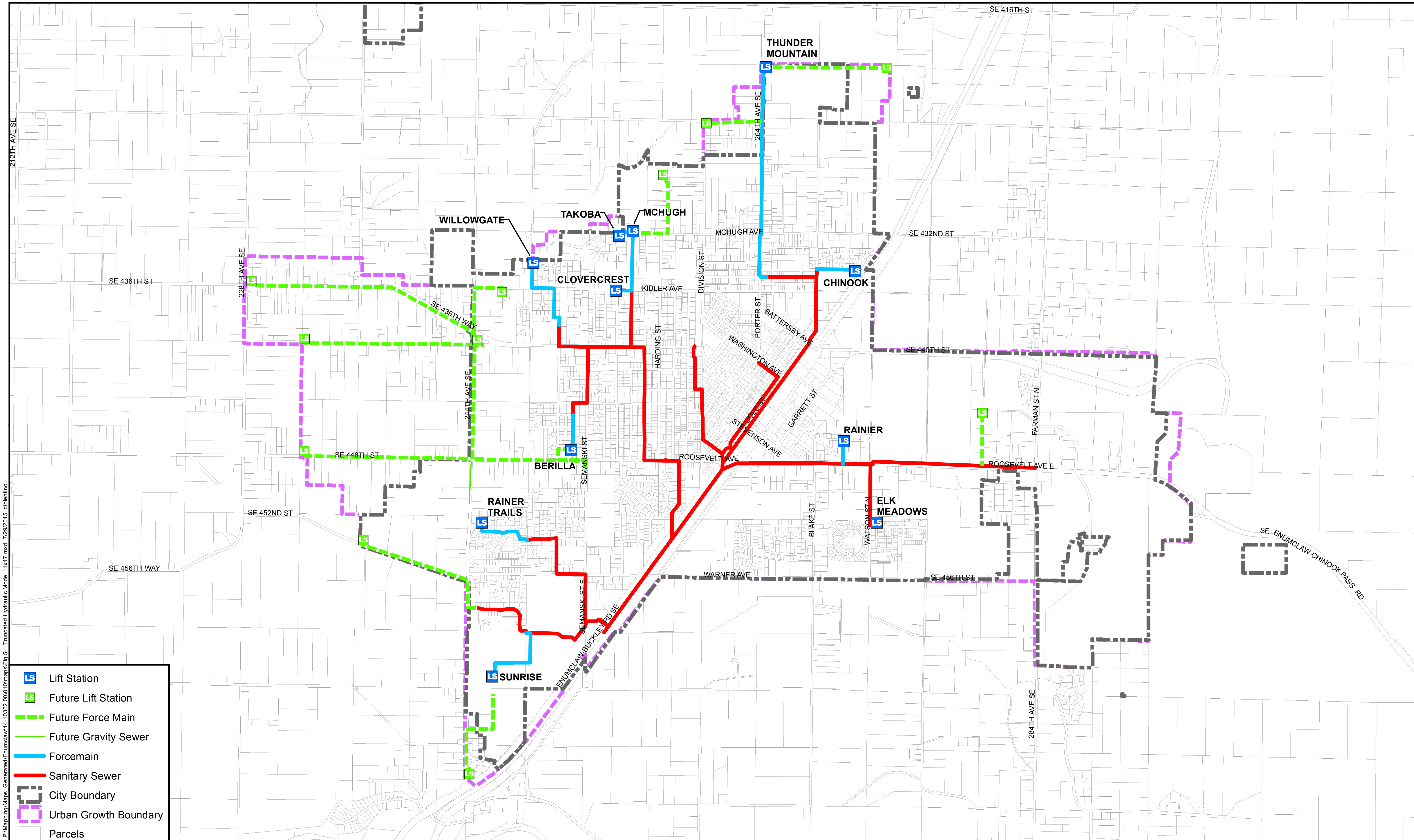
Dynamic flow simulation models storage in pump station wet wells, pump operations and attenuation through the pipe system. As a result of this compensation, the diurnal curves for some sub-basins may need adjustment so the resulting model flow at the WWTP matches the WWTP recorded data. The intent is to bring the output of the model into as close agreement with the recorded DMR results as seem practicable.

Due to the flow attenuation through a dynamic model a collection system of given pipe and pump parameters will accommodate larger flows than would be shown through a static model that just sums the volumes computed for each sub-basin. Results from a dynamic model may identify smaller pipe sizes and lower pumping requirements than a static model. The dynamic model results in a more cost-effective capital improvement program and justifies the greater effort and cost of a dynamic model.

5.3 Hydraulic Model Calibration

All hydraulic models require calibration to accurately project future conditions. Calibration essentially means achieving a realistic distribution of existing flow collected through an accurate representation of the collection system. Initial model runs are compared with a measured base condition and input parameters are adjusted until model results approximate the measured results to some desired accuracy.

Determining such adjustments as may be appropriate to the sub-basins is essentially a trial-and-error process to see which adjustments distributed among all basins best fit the DMR record. That trial-and-error process calibrates the model using such real flow data as is available for a selected date. It is desirable for the model to produce a total flow volume into the WWTP within a few percent of the actual flow recorded at the WWTP. The calibration also needs to produce a diurnal curve approximating the shape of the curve actually recorded for that date. The maximum and minimum modeled flow needs to approximate the maximum and minimum recorded flows at approximately the equivalent time of day.



BHC CONSULTANTS

Sewer System: City of Enumclaw 2013
King County GIS base data.
Data sources supplied may not reflect current or actual conditions. This map is a geographic representation based on available information. It does not represent survey data. No warranty is made concerning the accuracy, currency, or completeness of data depicted on this map.
BHC Consultants LLC., assumes no responsibility for the validity of any information presented herein, nor any responsibility for the use or misuse of the data.

N W E S

0 1,000 2,000 4,000 Feet

City of Enumclaw

Truncated Hydraulic Model
Sewer Plan
City of Enumclaw
July 2015

Figure
5-1

Calibration of the truncated model used the City-wide unit flow for population and employment plus the allocated infiltration and rain-induced inflow to match the flows recorded at the wastewater treatment facility. Calibration addressed two operating conditions:

- Annual Average Day was shown in Table 3-6 to be about 1.7 MGD. Influent flow recorded at the WWTP for April 3, 2013, was 1.7 MGD. No precipitation was recorded for that date although 0.06 inches had been recorded the previous day. April 3rd was chosen as representative of annual average day conditions and the diurnal curve recorded for that date was chosen as the model input for average day conditions.
- Peak flow conditions through the truncated sewer system model were calibrated for the 16 through 17 March 2014 period when 8.01 MGD was recorded at the WWTP. Precipitation totaled 2.15 inches over 24 hours. Larger storms have been recorded in recent years and have resulted in larger wastewater overflows, meaning not all wastewater volume was able to be measured. March 17th provided a high flow date with an adequate measurable volume to calibrate the model for peak conditions as shown in Figure 5-3.

The above data is sufficient to model the performance of the treatment plant processes. However to evaluate the collection system hydraulic capacities, the wastewater volume must be distributed among the sewer basins. The starting point for this distribution is the area served by lift stations. Table 3-4 summarizes the operating data for the most significant seven of the existing eleven stations. Table 5-1 builds on that data to estimate the operation of these seven stations under annual average day conditions.

Table 5-1
Estimation of Average Annual Day Operation for Seven Lift Stations

Based on April 2013

Parameter	Berilla	Chinook	Clovercrest	McHugh	Rainier	Rainier T	Willowgate
Pump GPM	150	215	200	400	350	150	215
Av Hrs/Mo	105	58	72	75	47	90	59
Av Dy GPD	31,500	24,900	28,800	60,000	32,900	27,000	25,400
Sewage	13,500	27,900	19,600	30,700	25,300	17,100	16,700
Remain I&I	18,000	(-3,000)	9,200	29,300	7,600	9,900	8,700
Acres	31	18	44	75	63	34	19
I&I GPD/Ac	580	****	200	390	160	290	460

**** Negative 'Remain I&I' means no estimated GPD/Ac is possible

Sewage estimated for Table 5-1 equals the estimated basin population and employment shown in Tables 4-2 and 4-2 multiplied by the average unit sewage factors documented in Chapter 3 as 49 GPD/capita and 34 GPD per employee. Subtraction of the sewage flow from the April average flow equals a remainder that is the average infiltration-inflow for each basin.

Precipitation recorded at the WWTP for the month of April 2013 totaled 6.3 inches. Since April is near the end of the rainy season, ground water was high making infiltration and inflow both significant.

However, several cautions are needed regarding Table 5-1. All values are averages for the month and can be only be approximate when applied to a specific day during that month. The average unit flow factors for population and employment are likely to vary among the City basins. The accuracy of some pumping records or pumping rates may be questionable. The daily average infiltration-inflow appears reasonable for most pumped basins; except Chinook.

The 18 acres presently served by the Chinook Lift Station include more than 100 single family and multifamily homes. Table 4-2 shows the 2013 estimated population as 561 people, which may be too many since the average household size shown in Section 3.7 is 2.41 people. Domestic sewage may be only about 100 ERU x 139 GPD per ERU = 13,900 GPD. The infiltration-inflow remainder of about 11,000 GPD, or about 610 GPD per acre, is more in line with the other pumped basins.

April 2013 estimated flows are not available for the four remaining pumped basins. These four basins are relatively new with small flows and probably low rates of infiltration-inflow. Total April flow for these four basins is estimated to average 30,000 to 40,000 GPD. Therefore, the estimated total flow from all 11 lift station basins is estimated to average about 270,000 GPD, or about 13 percent of the 2.1 MGD measured at the WWTP for April 2013. The 11 pumped basins served about 355 acres, or about 23 percent of the total 1,553 acres served. These percentages indicate that the infiltration-inflow unit flow per acre must be much larger in the non-pumped basins and must average about 1,500 GPD per acre.

Flow measurements are not available for the 16 non-pumped sewer basins. Some differentiation in infiltration-inflow rates must be assumed to create a realistic hydraulic model. Historic and existing conditions together with City staff observations over the years provides a basis for subjectively organizing the basins into three groups according to estimated infiltration-inflow unit flow per acre:

High – Cole, Division, Garrett & Railroad: these include the oldest piping segments which were built as a combined sewer-storm system; some separation has been achieved; but some storm connections are believed to remain, especially on private properties.

Medium – Farmland Preserve, Garfield, Dickson, Roosevelt East, Semanski, Warner & Wilson: piping of intermediate age in average soil conditions.

Low – Blake, Farman, Kibler, Melody & Pinnacle Estates: relatively recent construction believed to have few piping faults or illicit connections.

With the discussion thus far in this section, an initial tabulation was prepared for all basins as input to the hydraulic model. Recognizing that all of the input parameters involve some subjective assumptions, adjustments were made to the infiltration-inflow unit flows to create a model diurnal curve approximating the actual curve recorded for April 3, 2013. Table 5-2 summarizes to unit flows eventually used in the model, recognizing that some basins were not served in 2013 and hence zero flow was entered for calibration.

Table 5-2
Estimated Basin Average & Peak Day Infiltration-Inflow for Hydraulic Model

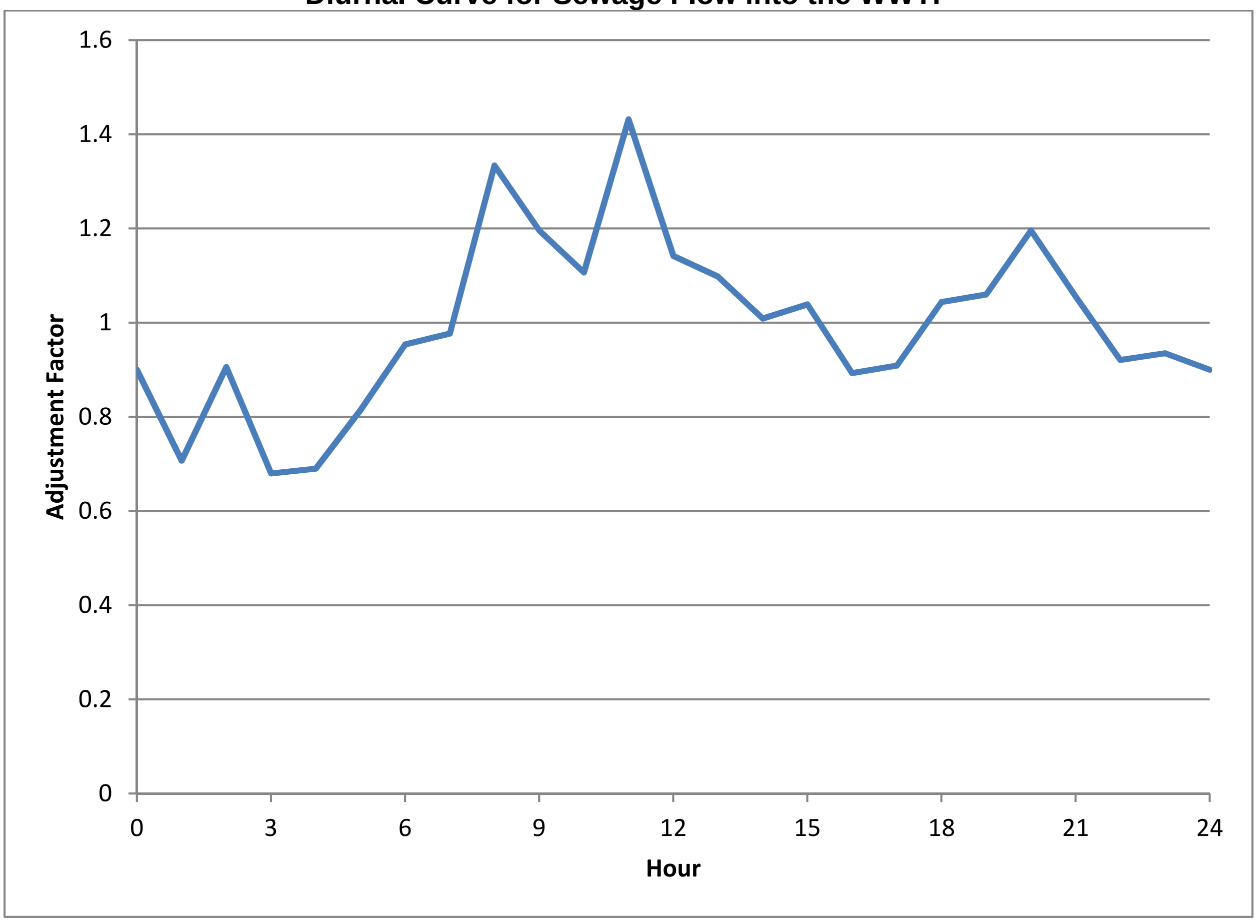
Gallons per Day per Acre		
Basin	**Annual Average Day**	**Peak Day**
244	300	1,000
420	300	1,000
424	300	1,000
436	300	1,000
440	300	1,000
448	300	1,000
452	300	1,000
470	300	1,000
Berilla	300	3,000
Blake	300	3,000
Bruhn	300	1,000
Chinook	300	2,000
City Park	300	1,000
Clovercrest	560	2,000
Cole	1,000	10,000
Commerce	300	1,000
Dickson	560	5,000
Division	1,000	10,000
Elk Meadows	300	1,000
Farman	560	2,500
Farmland Preserve	560	5,000
Garfield	560	5,000
Garrett	1,000	10,000
Harding	300	1,000
Kibler	560	3,000
McHugh	560	5,000
Melody	300	4,000
Newaukum	300	1,000
Pinnacle Estates	560	3,000
Railroad	560	10,000
Rainier	1,000	1,000
Rainier Trails	300	1,000
Roosevelt East	300	5,000
Semanski	560	5,500
Sunrise	300	1,000
Takoba	300	1,000
Thunder Mountain	300	1,000
Warner	560	5,500

Table 5-2
Estimated Basin Average & Peak Day Infiltration-Inflow for Hydraulic Model

Gallons per Day per Acre		
Basin	**Annual Average Day**	**Peak Day**
Willowgate	300	5,000
Wilson	560	5,000

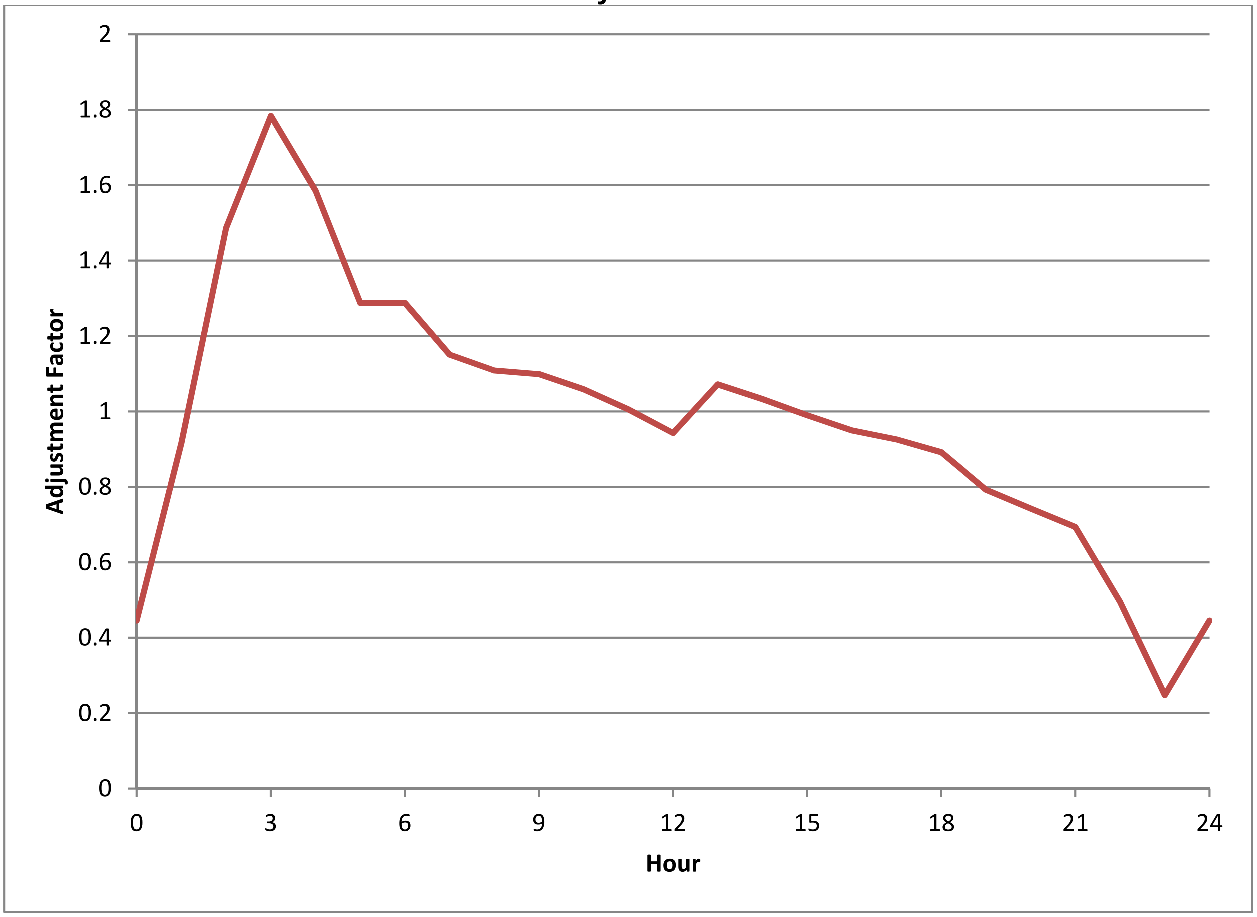
No data is available to adjust unit flows for the population or employment sewage components among the sewer basins so the City average is used for all basins. A review of the WWTP influent flow record during dry weather allowed development of the dimensionless diurnal curve for the existing system as shown in Figure 5-2

Figure 5-2
Diurnal Curve for Sewage Flow into the WWTP



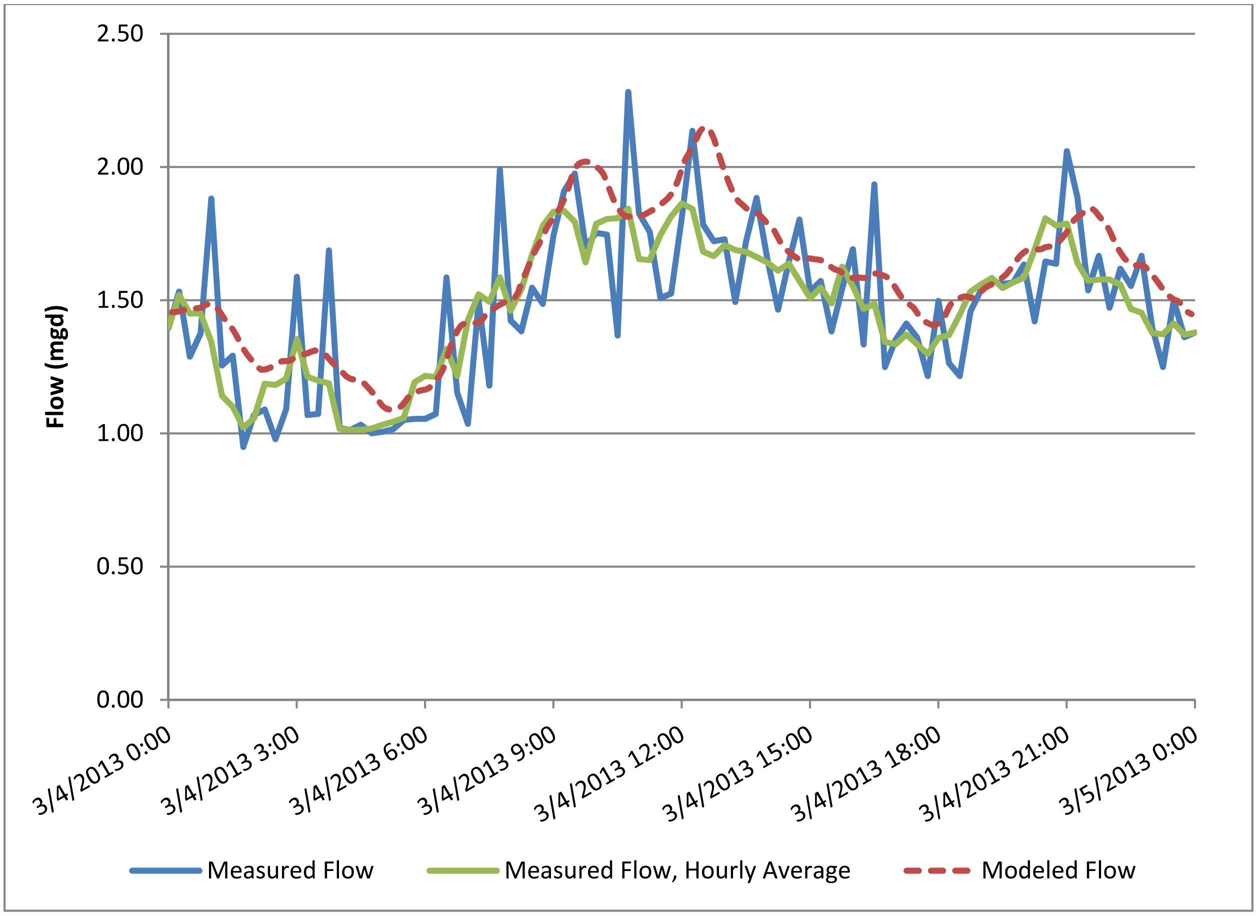
Peak day infiltration-inflow is taken from Table 5-2 to create a typical diurnal curve based on the wet weather flow patterns recorded at the WWTP as shown in Figure 5-3.

Figure 5-3
Diurnal Curve for Peak Day Infiltration-Inflow into WWTP



The diurnal curves from Figures 5-2 and 5-3 were used to input sewage plus infiltration-inflow into the hydraulic model for existing average annual day flow conditions. The calibration results are shown in Figure 5-4.

Figure 5-4
Average Annual Flow Calibration – 3 April 2013



The resulting average day calibration shown Figure 5-4 is a plot of the measured versus modeled diurnal curves. The measured flow record at the WWTP includes numerous 'spikes' believed due to the cyclic operation of the pumps. These flows were aggregated into an hourly plot for better comparison with the modeled flows. A comparison of the Annual Average Day calibration accuracy is shown in Table 5-5.

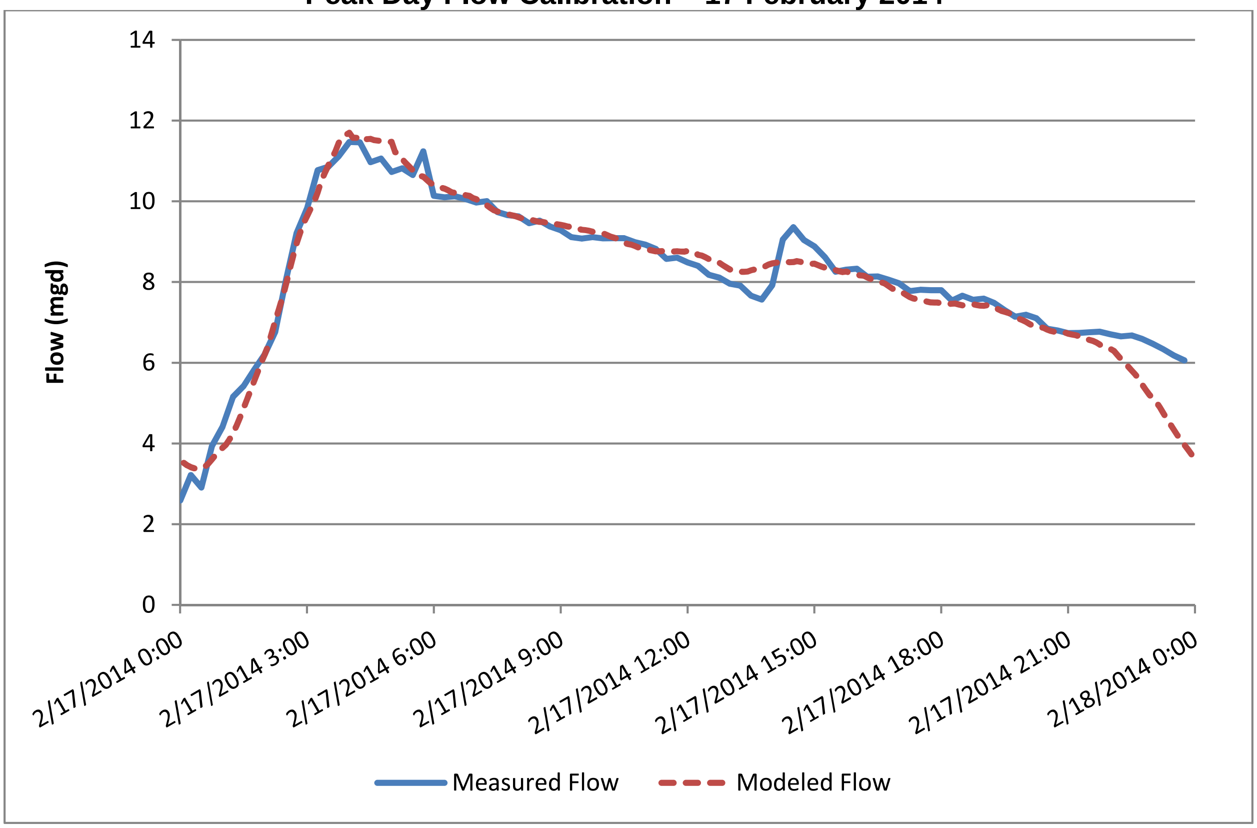
Table 5-5
Annual Average Day Model Calibration Accuracy

17 March 2014			
Parameter	**Measured Value**	**Modeled Value**	**Percent Difference**
Daily Total MGD	1.48	1.58	+6.8
Maximum MGD	2.28	2.15	-5.7
Minimum Day	0.95	1.09	+14.7

Peak Day calibration used the flow data recorded during 17 March 2014 at the WWTP when 2.15 inches of precipitation was recorded. No overflows were observed at manholes or other locations within the City sewer system so all wastewater entering the collection system reached the WWTP. However, part of the flow exceeded WWTP influent capacity and was diverted through the overflow to the outfall. The measured volume for the date was computed by summing the WWTP influent flow meter record plus the overflow volume calculated from the recorded water depth passing over the weir.

The Peak Day hydraulic model input was generated from the average day unit flows for population and employment multiplied by the values assigned to each sewer basin as shown in Tables 4-2 and 4-3. The Peak Day infiltration-inflow unit flow shown in Table 5-2 was entered for the served acres in 2013 for each basin shown in Table 4-1 with the diurnal curve shown in Figure 5-3. The resulting measured and modeled diurnal curves at the WWTP are shown in Figure 5-5.

Figure 5-5
Peak Day Flow Calibration – 17 February 2014



The comparison of resulting model accuracy is summarized in Table 5-4.

Table 5-4
17 March 2014 Peak Day Model Calibration Accuracy

Parameter	Measured Value	Modeled Value	Percent Difference
Daily Total MGD	8.17	8.09	-1.0
Maximum MGD	11.47	11.70	+2.0
Minimum MGD	2.59	3.38	+30.5

The modeled minimum flows shown in both Tables 5-3 and 5-4 exceeded to minimum flow actually recorded. However, the daily total and the maximum values closely agree. It is the peak day modeled maximum flow that is particularly important as the calibrated peak day diurnal curve was used to generate projected hydraulic gradients, identify potential and define additional conveyance capacities needed at locations exceeded the accepted criteria.

5.4 Modeled Projected Flows

Tables 4-1, 4-2 and 4-3 show the projected served acres, population and employment for 2035. The projection assumes that all population and employment within the UGA is served by sewers, though not all buildable land is developed for the expanded truncated sewer system. Projected population and employment for development by 2035 of the basins west of 344th Street will be particularly limited as considerable undeveloped property still exists within the existing city limits in 2013.

Unit flows defined for 2013 population, employment and infiltration-inflow are used for the 2035 projection. These rates may change over 20 years, though no data is available indicating what such changes could be or when they might occur.

New lift stations are shown on Figure 5-6 to serve the entire buildable area of the 11 sewer basins that will be added to the system. No information is presently available to define specific development patterns by 2035 for any of these basins, so served acres are estimated from the planned land use densities. Geographic terrain indicates that eventually Basins 452, 448 and 440 can all flow by gravity into the lift station serving Basin 436. This lift station plus the Newiakum lift station would be pumped into the Basin 244 lift station. Hence property developments within these basins should include easements and/or rights-of-way to facilitate construction of these gravity sewers when needed or appropriate.

The projected 2035 hydraulic model used the same diurnal curve that was calibrated for the existing conditions. This diurnal curve is not intended to evaluate sewer conveyance capacity under extraordinary storm conditions such as 50 or 100 year events. If desired, such severe events can be evaluated by the model when more basin-specific flow data is available.

5.5 Projected Collection System Deficiencies

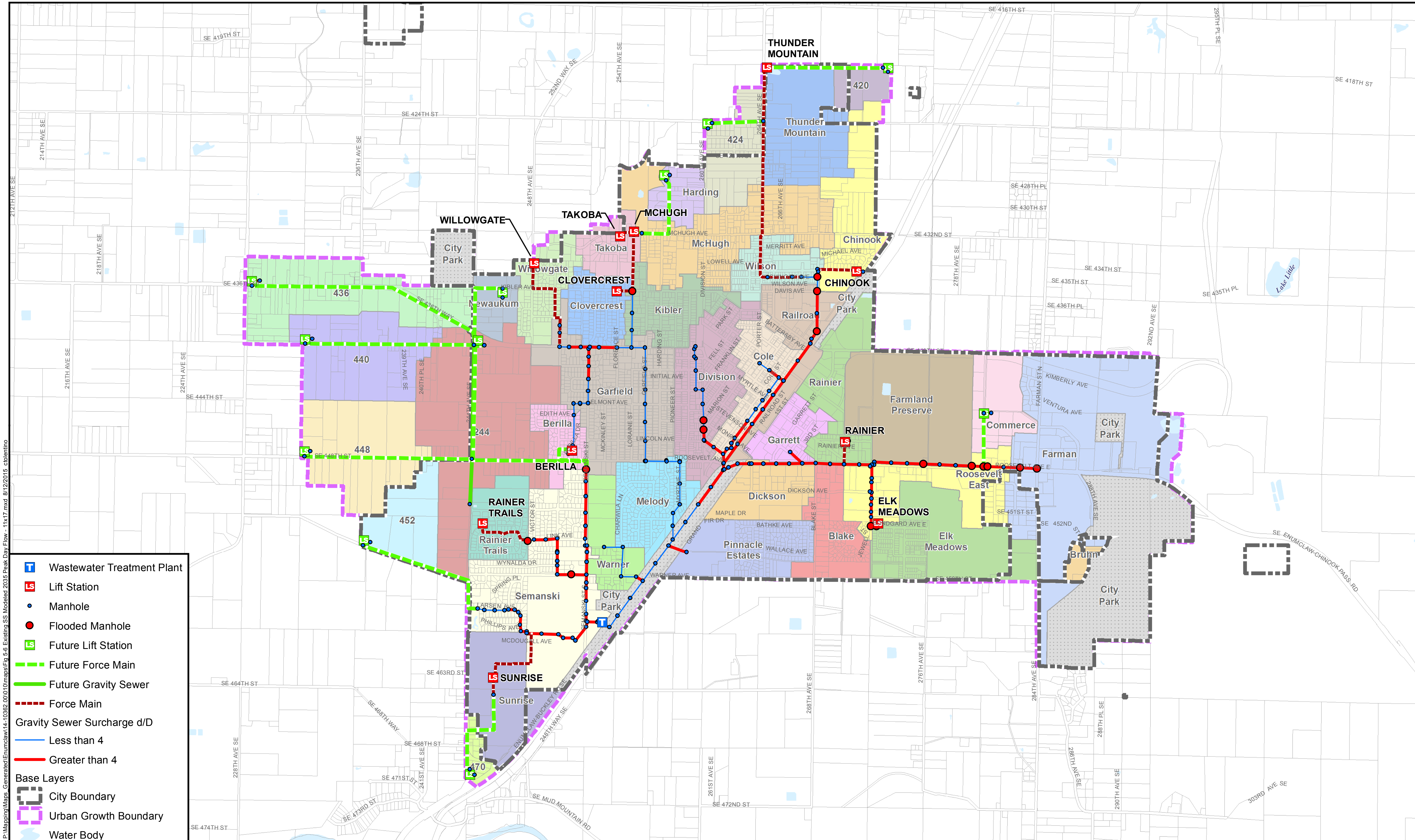
Figure 5-6 shows the truncated City sewer system operating under 2035 peak day conditions with the deficiencies projected to exist highlighted. Primarily these are manholes where wastewater overflow can be expected, without defining the overflow duration or volume. Those gravity sewer segments where the hydraulic gradient is projected to exceed 4 times the pipe diameter are also shown.

Figure 5-7 shows the hydraulic gradient from the WWTP influent wet well upstream in the Enumclaw Buckley Road to junction with Roosevelt Road. Considerable surcharging is projected, but no overflows.

Figure 5-8 shows the hydraulic gradient in Roosevelt Road from the Enumclaw Buckley Road east to Farman Street.

Figure 5-9 shows the hydraulic gradient in Railroad Street from the Enumclaw Buckley Road north to Kibler Avenue.

Figure 5-10 shows the hydraulic gradient in Semanski Street north from the WWTP.



BHC CONSULTANTS

Sewer System: City of Enumclaw 2013
King County GIS base data.
Data sources supplied may not reflect current or actual conditions. This map is a geographic representation based on available information. It does not represent survey data. No warranty is made concerning the accuracy, currency, or completeness of data depicted on this map.
BHC Consultants LLC., assumes no responsibility for the validity of any information presented herein, nor any responsibility for the use or misuse of the data.

N W E S

0 1,000 2,000 4,000 Feet

City of Enumclaw

Existing Sewer System Modeled for 2035 Peak Day Flow
General Sewer Plan Update
City of Enumclaw
August 2015

Figure
5-6

Figure 5-7: Hydraulic Gradient for 2035 Peak Hour in Enumclaw Buckley Road

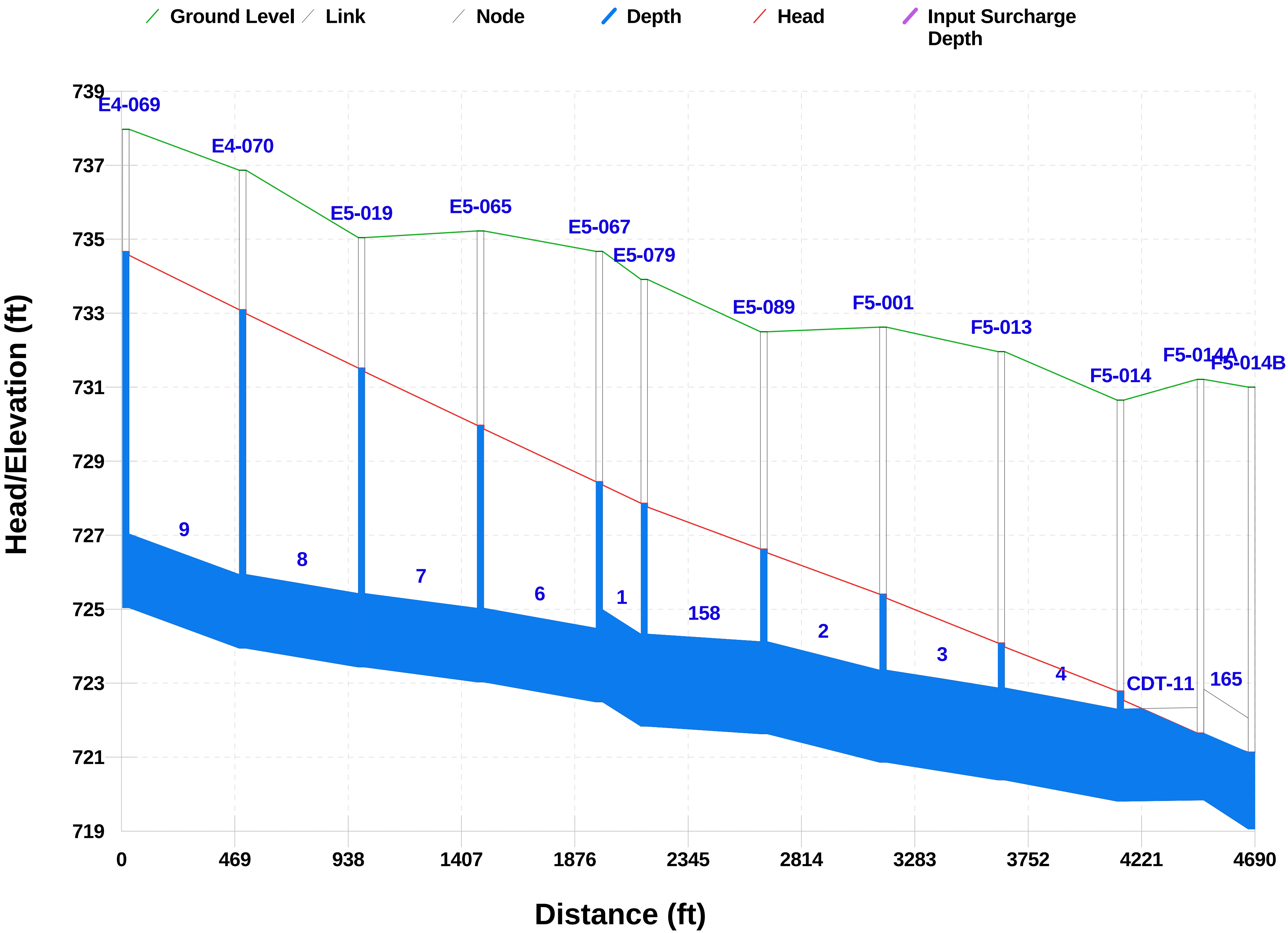


Figure 5-8: Hydraulic Gradient for 2035 Peak Hour in Roosevelt Avenue

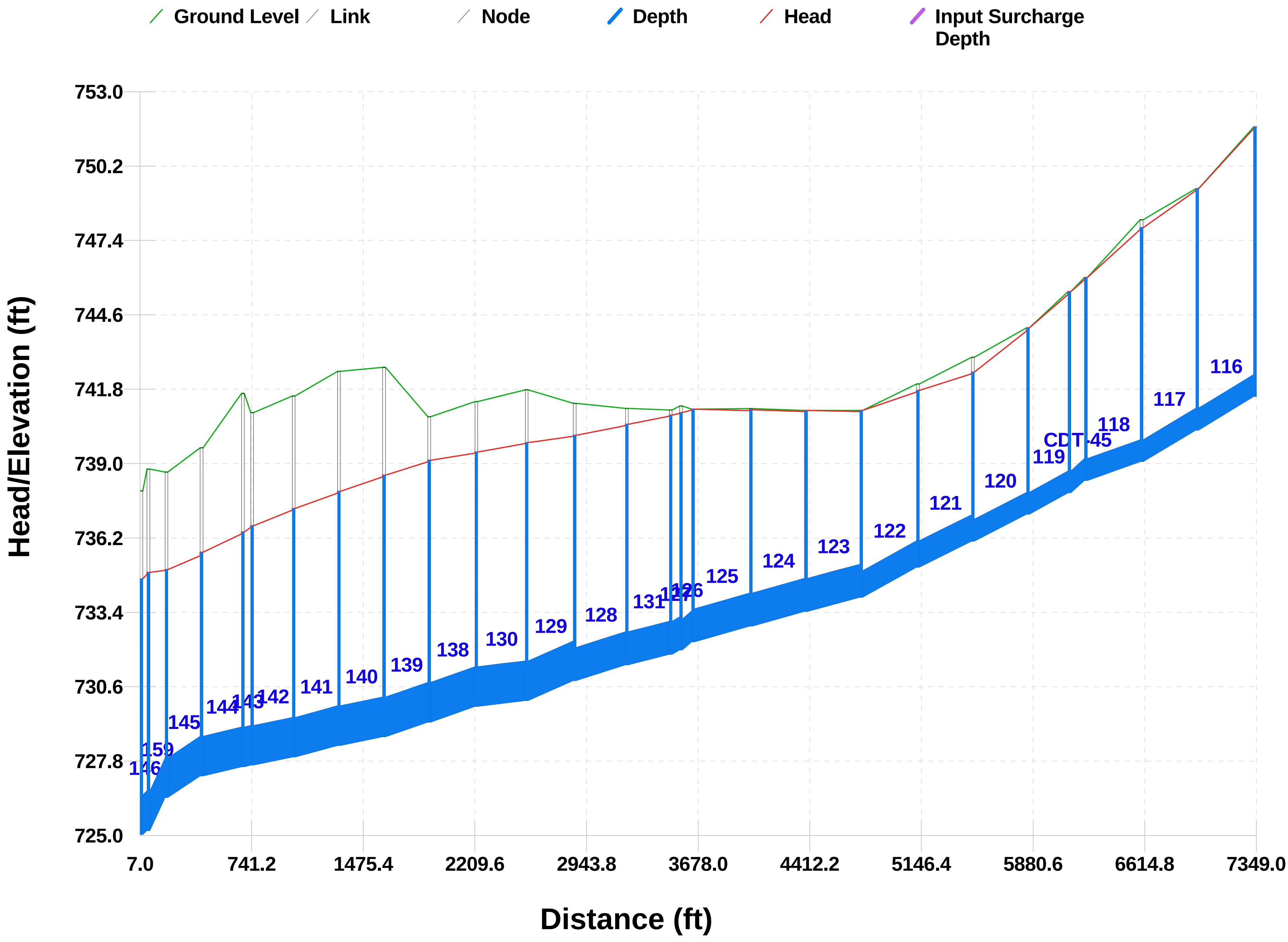


Figure 5-9: Hydraulit Gradient for 2035 Peak Hour in Railroad Avenue

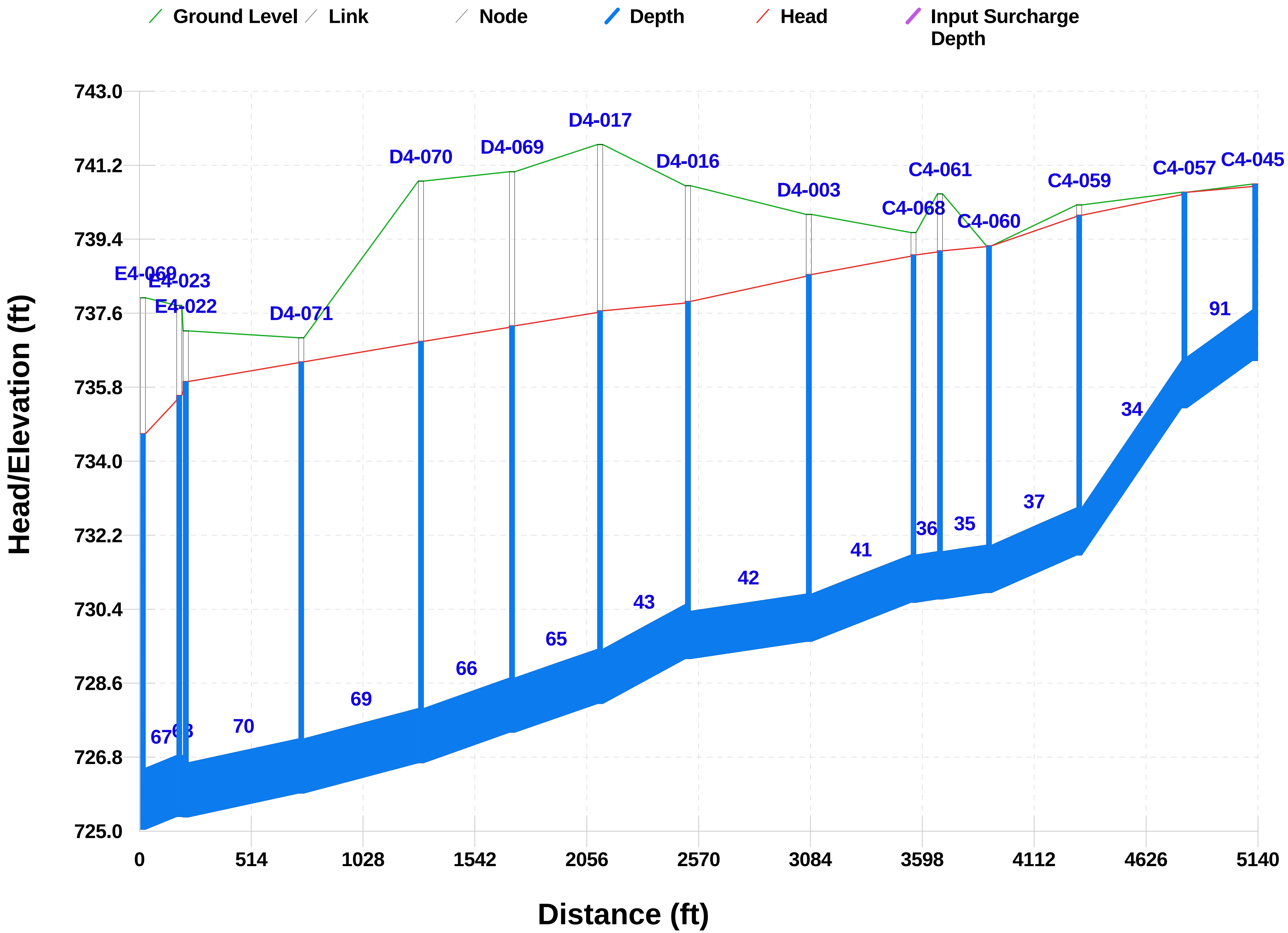
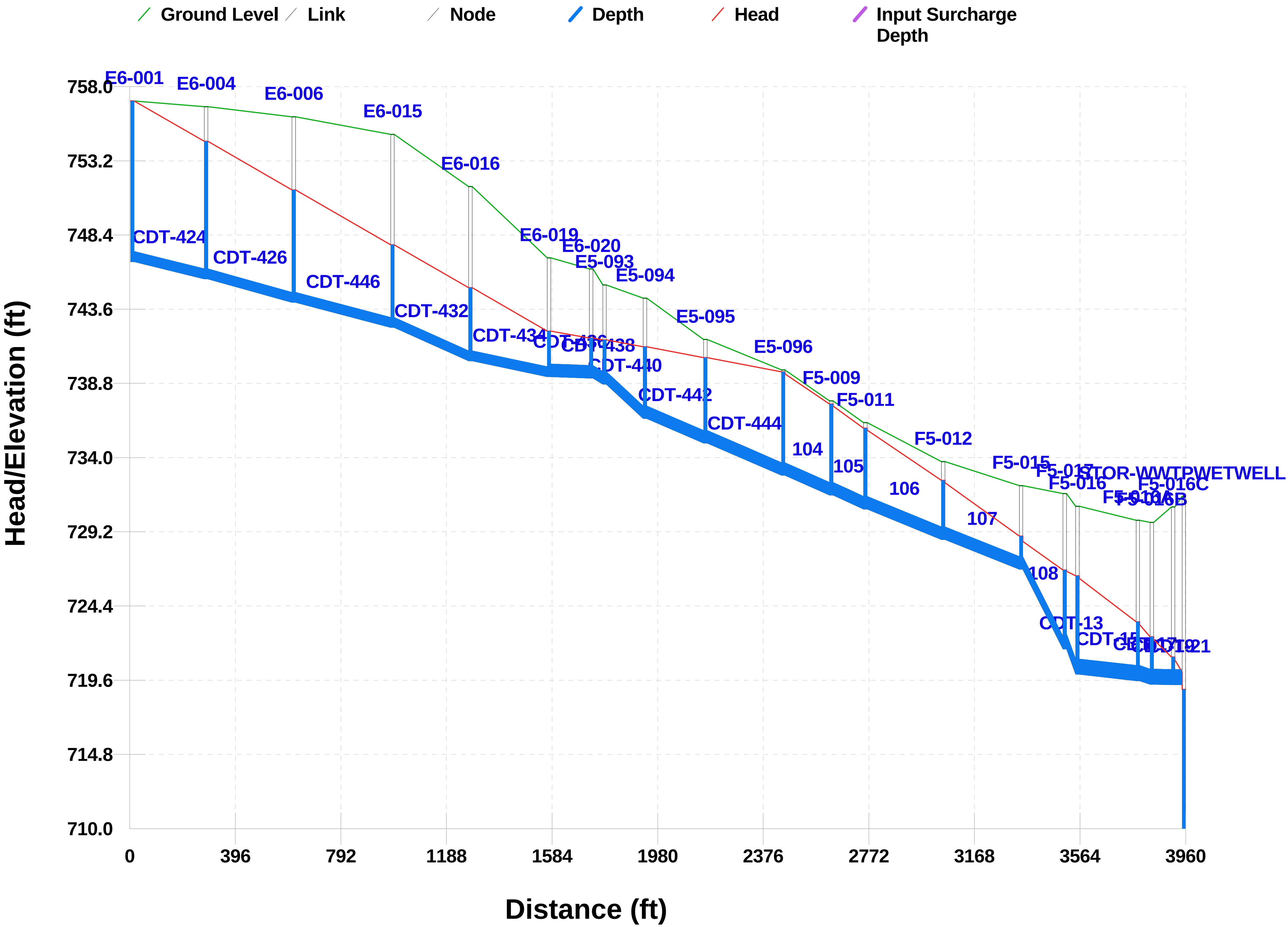


Figure 5-10: Hydraulic Gradient for 2035 in Semanski Street



The above four profiles show overflows occurring at some manholes along each of these trunks that will need additional capacity in some manner to contain projected peak day 2035 flow. How this capacity can best be provided is evaluated in Chapter 8.

Chapter 6 Treatment Facilities

This chapter provides an overview of treatment requirements, the existing wastewater treatment facility, and an evaluation of the existing facility with respect to current deficiencies and projected capacity requirements. Alternatives to address deficiencies and increase capacity to meet future projections will be identified and discussed in Chapter 7 and compared and evaluated in Chapter 8.

6.1 Treatment Permit Requirements

Effluent from the Enumclaw Wastewater Treatment Plant (WWTP) discharges on the north bank of the White River just downstream of the State Route 410 Bridge. The most recent water quality assessment approved by the U.S. Environmental Protection Agency was published in 2012. This water quality assessment identified some segments of the lower White River downstream of the WWTP discharge as not meeting water quality standards and requiring a total maximum daily load limit (TMDL) (i.e., Category 5 listing) for temperature and pH. However, the segment of the river receiving the discharge did not have any Category 5 listings.

The currently proposed water quality assessment (still under review), which updates fresh water listings using data collected as of December 2010, has additional Category 5 listings for temperature and pH within more downstream segments of the lower White River compared to the 2012 assessment. Additionally, the proposed water quality assessment lists dissolved oxygen for two downstream segments, though there are still no Category 5 listings for the segment of the river receiving the discharge. It is conceivable that these downstream listings may have an impact on future National Pollutant Discharge Elimination System (NPDES) permit limits for the WWTP.

The Washington State Department of Ecology (Ecology) is in the process of implementing TMDL limits for phosphorus on the lower White River to reduce its effect on pH levels in the river. Reduced nutrient loading to the river, due to improvements in wastewater treatment at facilities like the Enumclaw WWTP, and changes in the diversion of flow from the White River, as a result of the acquisition of Lake Tapps water rights by the Cascade Water Alliance, has had a significant beneficial impact on river flows and pH levels. However, Ecology has concluded that further reductions in nutrient loading may be necessary to prevent future violation of pH water quality standards in the period from May to October. Work is in progress on determining whether or not any modifications to the WWTP will be required to meet the NPDES permit limits that will be imposed through the TMDL process.

The WWTP is currently operating under an NPDES permit issued in April 2003 and that expired in April 2008. A new permit has not been issued pending completion of TMDL process. The current NPDES permit limits are summarized in Table 6-1. The WWTP normally operates in compliance with the existing NPDES permit limits.

Table 6-1
Current NPDES Permit Limits

Parameter	Average Monthly	Average Weekly
5-Day Biochemical Oxygen Demand (BOD_5)	30 mg/L 336 lbs/day 85% min removal	45 mg/L 504 lbs/day
Total Suspended Solids (TSS)	30 mg/L 381 lbs/day 85% min removal	45 mg/L 572 lbs/day
Fecal Coliform Bacteria	100/100 mL	200/100 mL
pH	6.0 – 8.5	6.0 – 8.5
Parameter	**Average Monthly**	**Maximum Daily**
Total Ammonia May - October	9.1 mg/L	15 mg/L 99 lbs/day
Total Ammonia November – April	6.5 mg/L	10.7 mg/L
Total Copper	14.7 µg/L	17 µg/L

The 2003 NPDES permit required that the City complete a receiving water study, which was completed by Cosmopolitan Engineering Group in September 2005. The purpose of the study was to obtain additional ambient data for metals and nutrients in the lower White River, since little data existed previously. The metals data was used to re-evaluate the reasonable potential for metals in the discharged effluent to cause water quality standards not to be met. The receiving water study determined that reasonable potential for failure to meet water quality standards does not exist for any metals. Therefore, it is expected that the next NPDES permit will not continue discharge limits for copper, as is included in the current NPDES permit.

The ambient nutrient data was provided to Ecology to assist with their TMDL study for the lower White River. As noted above, TMDL limits will be issued for phosphorus in the next NPDES permit. The existing WWTP is designed to achieve enhanced phosphorus removal, but results of the TMDL modeling indicate that the limits may be set below what the plant would be able to achieve without additional process modifications.

6.2 Description of Existing Facilities

The existing WWTP, as shown in Figure 6-1, was upgraded and expanded to improve effluent quality and increase treatment capacity. The upgraded and expanded WWTP went into service in November 2008. A layout of the upgraded and expanded WWTP is shown in Figure 6-2. A schematic of the existing liquid treatment system is shown in Figure 6-3. The schematic of the solids handling and chemically enhanced primary treatment (CEPT) systems are shown in Figure 6-4, which is a continuation of Figure 6-3. Also, a hydraulic profile of the existing WWTP is shown in Figure 6-5. All of these figures are taken from the original design drawings for the recent WWTP upgrade and expansion project. The following paragraphs provide a brief description of the main components of the existing WWTP.

PLOT DATE & TIME
JUL 14 2015 10:04:11

FILE NAME (UPDATED BY)
S:\CAD\ENUMCLAW\14-10362-010\DWG\F14-10362_010-FIG_6-1.DWG (GOC)
XREFS: NONE

BHC CONSULTANTS

CITY OF Enumclaw

Wastewater Treatment Plant Existing Site Plan
Enumclaw
July 2015

Figure
6-1

Figure 6-2
WWTP Site Layout

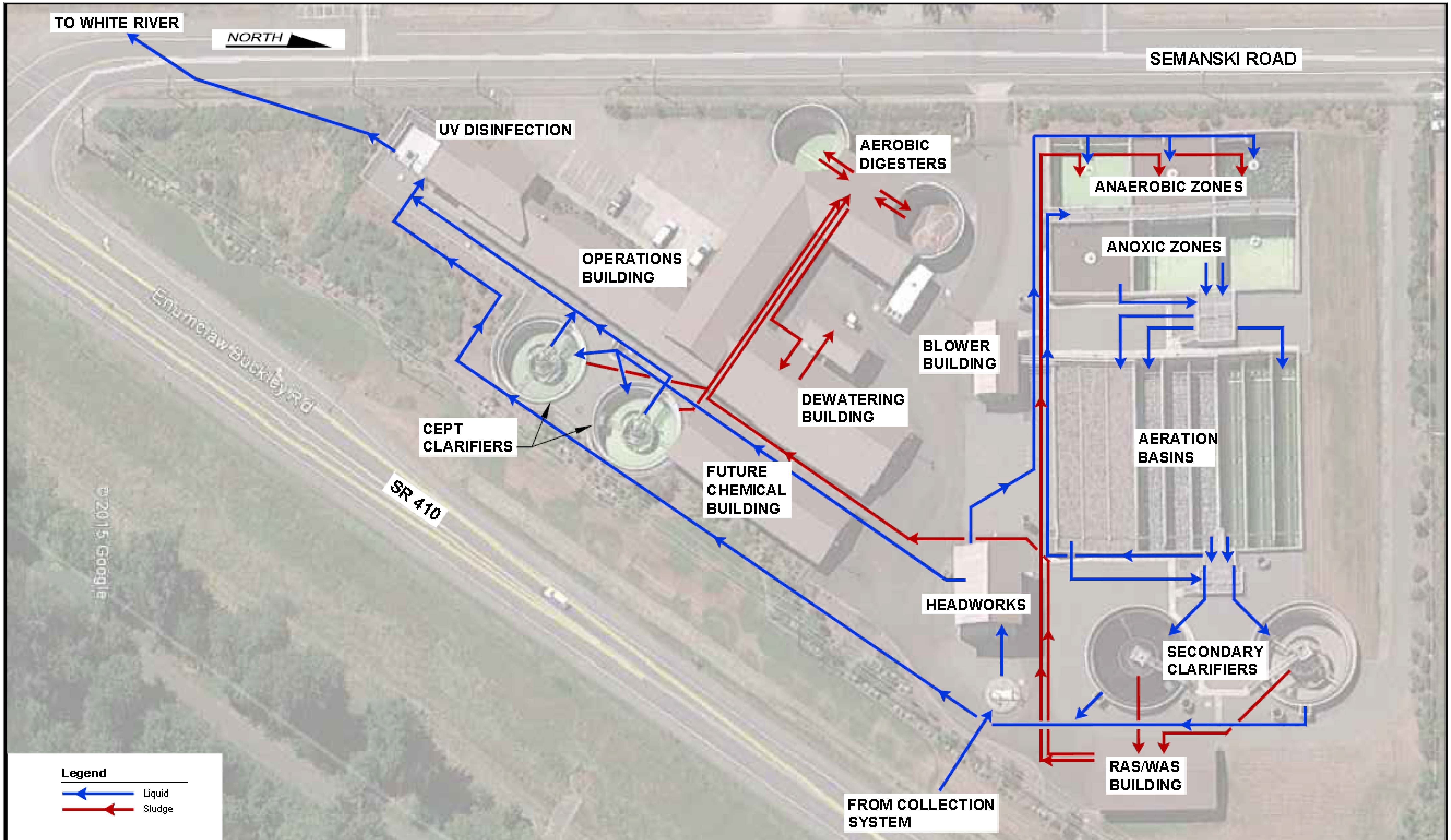
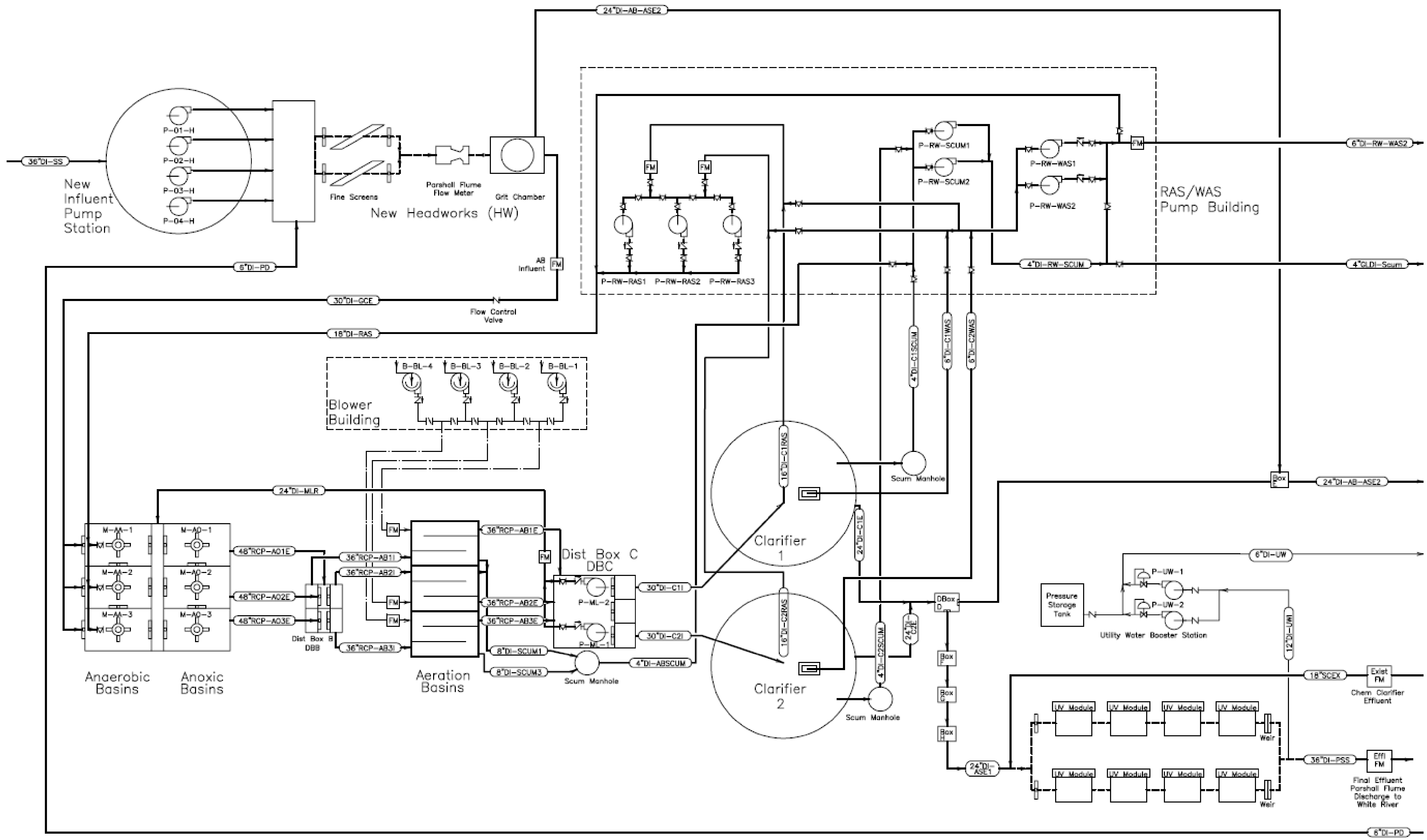
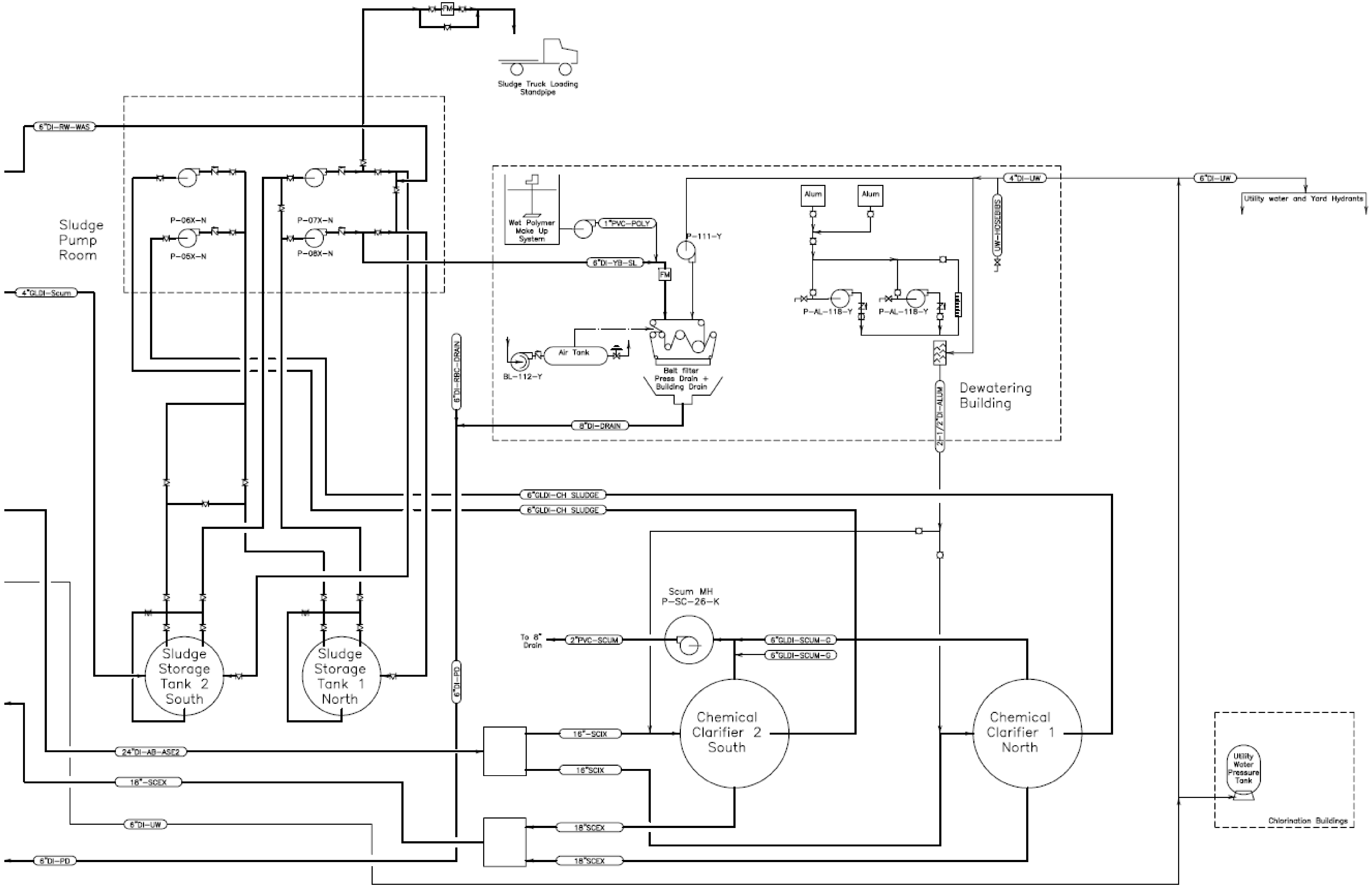


Figure 6-3
WWTP Liquid Treatment Stream Schematic



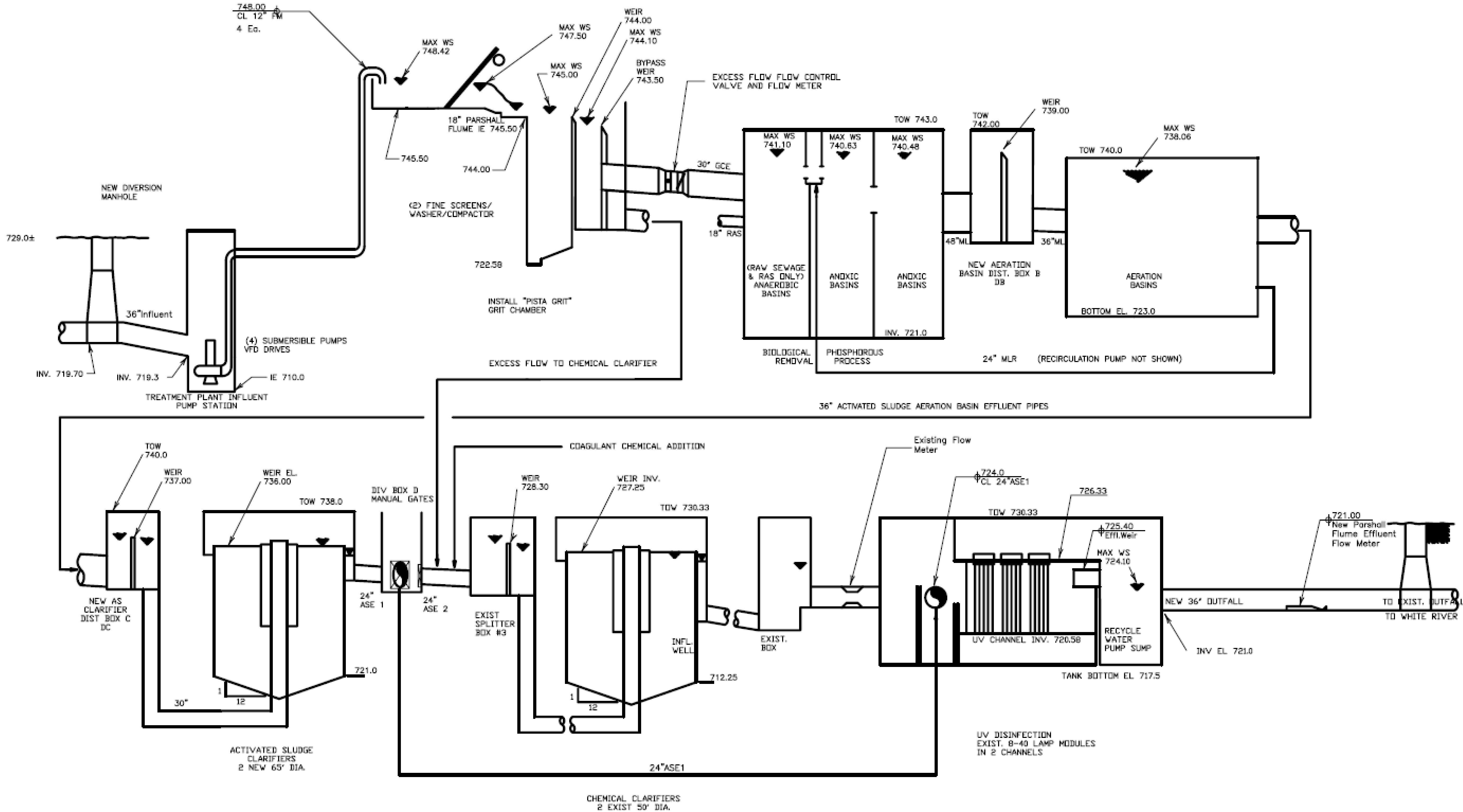
BHC CONSULTANTS

Figure 6-4
WWTP Chemically Enhanced Primary Treatment and Solids Handling Schematic



BHC CONSULTANTS

Figure 6-5
WWTP Hydraulic Profile



6.2.1 Headworks and Flow Splitting

The existing headworks consist of influent pumping, screening, grit removal, flow measurement and sampling. Influent flow is lifted to the headworks by one of four submersible pumps. Two filter screens with ¼-inch diameter perforations are used to remove trash and debris from the influent wastewater. A Parshall flume measures the influent flow volume. Following screening and flow measurement, influent wastewater passes through a vortex grit removal system for protection of downstream equipment from excessive wear due to abrasion from grit. A photo of the influent pump station and Headworks Building is shown in Figure 6-6.

Figure 6-6
Influent Pump Station and Headworks Building

After grit removal, flow is normally conveyed by gravity to the secondary treatment process. A flow meter and modulating valve are installed in the 30-inch pipeline conveying influent wastewater to the secondary treatment process. At high flows, the position of the modulating valve can be adjusted to generate headloss and force a portion of the flow over a bypass weir in the flow splitting structure at the downstream end of the headworks, limiting the amount of flow to the secondary treatment process and conveying excess flow to the CEPT clarifiers. However, due to problems with location and type of flow meter used to control the modulating valve and capacity limitations of the ultraviolet (UV) disinfection system, the CEPT clarifiers have not been used for several years.

6.2.2 CEPT Clarifiers

As discussed above, the flow splitting structure in the headworks is intended to split the flow between the secondary treatment process and the CEPT clarifiers. The two 50 foot diameter clarifiers can be dosed with coagulant (aluminum sulfate) to help aggregate particles into larger floc for enhanced settling. Effluent from the clarifiers flows by gravity to the UV disinfection system where it combines with the secondary effluent just upstream of the UV channels. Sludge from the CEPT clarifiers is pumped to the sludge holding tanks. A photo of a CEPT clarifier is shown in Figure 6-7 below.

Figure 6-7
Chemically Enhanced Primary Treatment Clarifier

6.2.3 Secondary Treatment

The secondary treatment process consists of biological treatment and settling. Biological treatment is comprised of anaerobic zones, anoxic zones and aeration basins. The anaerobic zones select for phosphorus accumulating organisms to achieve enhanced biological phosphorous removal. The anoxic zones provide an environment in which nitrate is utilized as an oxygen source (in the absence of aeration) for oxidation of carbonaceous biochemical oxygen demand (CBOD), thereby reducing nitrate to nitrogen gas (i.e., denitrification), which is then released to the atmosphere to reduce the nitrogen load in the effluent. Each anaerobic zone and anoxic zone has a floating mixer (6 total). A photo of the anaerobic and anoxic zones is shown in Figure 6-8.

Figure 6-8
Anaerobic (Left) and Anoxic (Right) Zones

Currently, there are no slide gates within the common channel between anaerobic and anoxic zones. As a result, a significant portion of this channel can contain stagnant water, since only one anaerobic zone and one anoxic zone are typically in service. Additionally, the drain valve in Anoxic Zone #3 is in need of repair.

The aeration basins provide an aerobic environment for oxidation of CBOD and oxidation of ammonia to nitrate (i.e., nitrification). Air is introduced into the aeration basins using compressed air delivered by blowers and diffusing the air into the mixture of microorganisms and wastewater (i.e., mixed liquor) to increase oxygen transfer. Mixed liquor is recycled from the downstream end of the aeration basins back to the anoxic zones for denitrification using two mixed liquor recycle pumps. This recirculation of nitrified mixed liquor to an upstream anoxic zone is termed the Modified Ludzack-Ettinger (MLE) process. A photo of an aeration basin is shown in Figure 6-9.

Figure 6-9
Aeration Basin

Mixed liquor leaving the aeration basins is conveyed by gravity and split between two 65-foot diameter secondary clarifiers, where the microorganisms (i.e., activated sludge) that have consumed the waste in the biological treatment process are settled by gravity. The clarified effluent overflows the effluent weirs and flows by gravity to the UV disinfection system. The settled activated sludge is returned via pumping to the anaerobic zones at the head of the biological treatment process. A portion of the activated sludge is wasted to sludge holding tanks to control the population of microorganisms. A photo of a secondary clarifier is shown in Figure 6-10.

Figure 6-10
Secondary Clarifier

This particular arrangement of anaerobic, anoxic and aerobic zones and recycle streams is termed the A^2O (anaerobic/anoxic/aerobic) process. Typically, only one of three anaerobic zones, anoxic zones and aeration basins is in operation with effluent total phosphorus of 0.3 to 1.9 milligrams per liter (mg/L) and effluent ammonia of around 0.1 mg/L.

6.2.4 Disinfection and Utility Water Systems

The WWTP relies on UV light to disinfect the effluent prior to discharge into the White River. The existing UV disinfection system consists of two channels, each with four UV banks installed. The UV banks each contain 40 low pressure, low intensity UV lamps. The UV system does not have a flow-pacing feature, so all banks must be on continuously. This yields inefficient operation with respect to energy use and frequency of lamp replacement. Furthermore, the lamps must be cleaned manually, requiring several hours per week of labor. The existing UV system was installed in 1996 and has a peak disinfection flow capacity of about 10 million gallons per day (MGD). However, influent peak flows have exceeded this rated capacity. Additionally, flows approaching 8 MGD have been observed to put the UV banks in danger of flooding, indicating that the hydraulic capacity of UV channel is a limiting factor on the rate of flow that can be conveyed through the plant. No capacity issues have been observed with the existing effluent outfall. However, it is recommended that the outfall capacity be evaluated when improvements to the UV disinfection system are designed to ensure it will not be a hydraulic restriction at the projected flows. A photo of the UV disinfection system is shown in Figure 6-11.

Figure 6-11
UV Disinfection System

Disinfected effluent passes through the old chlorine contact chamber adjacent to the UV disinfection system where it can be withdrawn by pumps for use as in-plant utility water. The in-plant utility water is currently not filtered and the existing fiberglass slide gate allowing disinfected effluent to enter the chamber is in need of replacement.

6.2.5 Solids Handling

Waste activated sludge and any sludge pumped from the CEPT clarifiers is conveyed to the sludge holding tanks for stabilization and processing. There are two 45-foot diameter tanks with a total volume of about 523,000 gallons.

Sludge is dewatered using a belt filter press. The belt filter press typically achieves 14 to 15 percent dewatered cake concentrations, but this cake quality requires a lot of polymer. The operators believe that the dewatering characteristics of the sludge are affected by the low dissolved oxygen concentrations in the sludge tanks, which necessitates a higher polymer dose. Dewatered sludge is off-loaded into a truck via a conveyor and transported to eastern

Washington for beneficial application on agricultural land through a program managed by King County. There are currently no known issues or concerns with the long-term viability of this beneficial use and no pending regulatory requirements that would cause the City to consider an alternative for biosolids management. A photo of the belt filter press and off-loading of the dewatered sludge are shown in Figures 6-12 and 6-13 below.

Figure 6-12
Belt Filter Press

Figure 6-13
Dewatered Sludge Off-Loading

6.3 WWTP Evaluation

An overview of capacity by unit process is summarized in Table 6-2. The table includes physical and operating parameters for each process. Operating parameters are shown based on the design flows and loads, current flows and loads, and the projected 2035 flows and loads. Projected average annual, maximum day and peak hour flows are based on flow projections developed from hydraulic modeling of the wastewater collection system, as discussed in Chapters 4 and 5. The projected maximum month flow is based on applying the existing average annual flow to maximum month flow ratio to the projected 2035 average annual flow value. The projected average annual and maximum month loadings are based on applying the highest historical per capita value between 2011 and 2014 to the projected 2035 population.

The current, projected and design flows and loads used in this evaluation are summarized at the beginning of Table 6-2. Values of physical and operating parameters recommended in the Washington State Department of Ecology's Criteria for Sewage Works Design (Orange Book) and Wastewater Engineering by Metcalf & Eddy/AECOM (Metcalf & Eddy) are shown for comparison, where applicable. Operating values are highlighted in yellow where they exceed the operating values recommended in the Orange Book and/or Metcalf & Eddy. Additionally, equipment capacity values are highlighted in yellow where they are insufficient compared to the existing or projected 2035 required capacity values. It is important to note that this comparison only evaluates theoretical and rated capacities. Condition of equipment, actual performance, and other limitations discussed following Table 6-2 may necessitate improvements despite assessment of capacity.

Table 6-2
Unit Process Overview and Capacity Summary

Component	Design	Projected		Metcalf & Eddy		Orange Book
		Existing	2035	Typical	Range	
Population	N/A	11,881	17,064			
Flow, MGD						
Average Annual Flow (AAF)	2.6	1.48	2.64			
Maximum Month Flow (MMF)	3.5	3.17	5.65			
Maximum Day Flow (MDF)	6.4	8.17	13.24			
Peak Hour Flow (PHF)	8.0	11.47	19.75	(Design Flow Limited by UV System)		
BOD_5, lbs/day						
Average Annual	3,500	2,139	3,072			
Maximum Month	4,600	2,614	3,754			
TSS, lbs/day						
Average Annual	3,500	2,614	3,754			
Maximum Month	4,600	3,921	5,119			
Total Kjeldahl Nitrogen (TKN), lbs/day						
Average annual	700	457	656			
Maximum Month	800	621	893			
Total Phosphorus, lbs/day						
Average Annual	90	57	82			
Maximum Month	130	68	97			
Influent Pumps						
Type	Submersible					
Number, each	4					
Capacity, each, MGD	3.7					
Design TDH, ft	36					
Motor size, each, HP	30					
Total Capacity, MGD	15.0	11.5	19.8			

Table 6-2
Unit Process Overview and Capacity Summary

Component	Design	Projected		Metcalf & Eddy		Orange Book
		Existing	2035	Typical	Range	
Total Firm Capacity, MGD	11.2	11.5	19.8			
Screening						
Mechanical screens:						
Type	Perforated Filter Screens					
Number, each	2					
Opening size, mm (in)	6 (1/4)					
Capacity, each, MGD	6.0					
Screen channel width, each, feet	3.0					
Total Capacity, MGD	12.0	11.5	19.8			
Total Firm Capacity, MGD	6.0	11.5	19.8			
Min Upstream Freeboard, feet	0.5					
Max Upstream Water Elev., feet	749.0					
Max Allowable Screen Loss, feet						
@ peak hour flow	1.65	1.47	0.63			
Manual screen:						
Number, each	N/A					
Opening size, mm (in)	N/A					
Influent Parshall Flume						
Throat Width, inches	18					
Flume Capacity, MGD	15.8	11.5	19.8			
Flume Head @ Peak Hour Flow, feet	1.85	2.03	2.87			
Flume Invert Elev., feet	745.50					
Flume Submergence Ratio						
@ peak hour flow	0.64	0.48	0.51			

Table 6-2
Unit Process Overview and Capacity Summary

Component	Design	Projected		Metcalf & Eddy		Orange Book
		Existing	2035	Typical	Range	
Grit Removal						
Type	Vortex Grit Chamber					
Number, each	1			Table 5-18 (5th Ed.)		
Upper Chamber Diameter, feet	12.0				4 - 24	
Lower Chamber Diameter, feet	5.0				3 - 6	
Capacity, MGD	12.0	11.5	19.8			
Outlet Weir Elevation, feet	745.17					
Head Over Broad Crested Weir, feet	1.31	1.10	1.58			
Outlet Water Surface Elev., feet	746.48	746.27	746.75			
Inlet Invert Elev., feet	744.00					
Inlet Channel Width, feet	2.5					
Grit Chamber Headloss, feet	0.2					
Inlet Channel Velocity, ft/sec						
@ peak hour flow	2.3	2.9	4.2	3	2 - 3.5	
Chemically Enhanced Primaries (Bypass)						
Max Design Biological Process Flow, MGD	6.0					
Max PHF to Clarifiers, MGD	4.0	5.5	13.8			
Number, each	2					
Diameter, feet	50					
Side Water Depth, feet	12					
Surface Area, each, square feet	1,963					
Total Surface Area, square feet	3,927					
Surface Overflow Rate, gpd/sf				Table 6-4 (5th Ed.)		
@ Max peak hour flow	1,019	1,393	3,501	2000		

Table 6-2
Unit Process Overview and Capacity Summary

Component	Design	Projected		Metcalf & Eddy		Orange Book
		Existing	2035	Typical	Range	
Aeration Basins						
Type	A^2O Process (Plug Flow)					
Number, each	3					
Anaerobic Zones						
Length, each, feet	46					
Width, each, feet	50					
Side Water Depth, feet	18.5					
Volume, each, MG	0.32					
Total Anaerobic Volume, MG	0.95			Table 8-29 (5th Ed.)		
Retention Time at MMF (No Recycle), hrs	6.5	7.2	4.1		0.5 - 1.5	0.5 - 1.5
Anoxic Zones						
Length, each, feet	50					
Width, each, feet	50					
Side Water Depth, feet	18.5					
Volume, each, MG	0.35					
Total Anoxic Volume, MG	1.05					
Retention Time at MMF (No Recycle), hrs	7.1	7.9	4.4		1 - 3	0.5 - 2.0
Aerobic Zones						
Length, each, feet	123					
Width, each, feet	48					
Side Water Depth, feet	14.5					
Volume, each, MG	0.64					
Total Aerobic Volume, MG	1.92					
Retention Time at MMF (No Recycle), hrs	13.2	14.5	8.2		4 - 8	6 - 15
Design SRT @ Max Month Load	10.1	10.1	10.1		5 - 25	5 - 15

Table 6-2
Unit Process Overview and Capacity Summary

Component	Design	Projected		Metcalf & Eddy		Orange Book
		Existing	2035	Typical	Range	
Observed Yield, lbs/lb BOD	1.09	1.09	1.09			1.0 - 1.2
Total MLSS Mass, lbs	50,641	28,776	41,329			
Max Month MLSS Conc, mg/L						
w/ 1 basin in service	4,654	2,645	3,799		3000-4000	1500 - 3500
w/ 2 basins in service	2,327	1,322	1,899		3000-4000	1500 - 3500
w/ 3 basins in service	1,551	882	1,266		3000-4000	1500 - 3500
Assumed MLVSS:MLSS Ratio	0.75	0.75	0.75			0.75
Total MLVSS Mass, lbs	37,981	21,582	30,997	Table 8-19 (5th Ed.)		
F:M Ratio @ Max Month	0.12	0.12	0.12		0.2 - 0.4	0.2 - 0.7
Max Month BOD Loading, lbs/1,000 cf						
w/ 1 basin in service	26.4	15.0	21.5		20 - 40	
w/ 2 basins in service	13.2	7.5	10.8		20 - 40	
w/ 3 basins in service	8.8	5.0	7.2		20 - 40	
Mixed Liquor Recycle Pumps						
Type	Submersible					
Number, each	2					
Capacity, each, MGD	6.0					
Design TDH, ft	25					
Motor size, each, HP	40 and 42					
Total Capacity, MGD	12.0					
Total Firm Capacity, MGD	6.0					
Max Recycle w/ Firm Capacity, %	171%	189%	106%		100 - 400%	
Aeration Blowers						
Type	Positive Displacement					

Table 6-2
Unit Process Overview and Capacity Summary

Component	Design	Projected		Metcalf & Eddy		Orange Book
		Existing	2035	Typical	Range	
Number, each	4					
Capacity, each, scfm	1,660					
Total Firm Capacity, scfm	4,980					
Oxygen Req'd @ Max Mo., lbs/ day	9,430	6,126	8,798			
Standard Oxygen Transfer Eff.	22.8%					
Standard Oxygen Required, lbs/day	21,278	13,823	19,853			
Air Req'd @ Max Mo., scfm	3,754	2,439	3,503			
Secondary Clarifiers						
Number, each	2					
Diameter, feet	65			Table 8-34 (5th Ed.)		
Side Water Depth, feet	15				13 - 18	
Surface Area, each, square feet	3,318					
Total Surface Area, square feet	6,636					
Surface Overflow Rate, gpd/sf						
@ design avg flow	383	223	398			
@ design max month flow	527	478	852		600 - 800	
@ peak flow limited to 6 MGD	904	904	904		1200-1600	1200
@ full peak flow	1,507	1,728	2,976		1200-1600	1200
Max Month Solids Loading Rate, lbs/sf·hr	Assumes 100% return activated sludge (RAS)					
w/ 1 basin in service	1.71	0.88	2.25		1.0 - 1.5	
w/ 2 basins in service	0.85	0.44	1.12		1.0 - 1.5	
w/ 3 basins in service	0.57	0.29	0.75		1.0 - 1.5	
Peak Hour Solids Loading Rate, lbs/sf·hr	Assumes 100% return activated sludge (RAS)					
w/ 1 basin in service	3.29	2.03	5.05	2.0		
w/ 2 basins in service	1.65	1.01	2.53	2.0		

Table 6-2
Unit Process Overview and Capacity Summary

Component	Design	Projected		Metcalf & Eddy		Orange Book
		Existing	2035	Typical	Range	
w/ 3 basins in service	1.10	0.68	1.68	2.0		
Return Activated Sludge Pumps						
Type	Screw Centrifugal					
Number, each	3					
Capacity, each, MGD	2.9					
Design TDH, ft	40					
Motor size, each, HP	30					
Total Capacity, MGD	8.7					
Total Firm Capacity, MGD	5.8			Table 8-29 (5th Ed.)		
Max Recycle Ratio @ Max Mo. Flow	166%	183%	103%		25 - 100%	50 - 75%
UV Disinfection						
Type	In-channel, vertical, low pressure, low intensity					
Number of Channels	2					
UV Banks per Channel	4					
UV Lamps per UV Bank	40					
Total UV Lamps	320					
UV System Capacity, MGD	8.0	11.5	19.8			
WAS Pumping						
WAS Pumps						
Type	Self-Priming Centrifugal					
Number, each	2					
Capacity, each, gpm	400					

Table 6-2
Unit Process Overview and Capacity Summary

Component	Design	Projected		Metcalf & Eddy		Orange Book
		Existing	2035	Typical	Range	
Design TDH, ft	44					
Motor size, each, HP	10					
Total Capacity, gpm	800					
Total Firm Capacity, gpm	400					
Max Month Sludge Production, lbs/day	5,014	2,849	4,092			
Assumed Average % Solids	1.34%	1.34%	1.34%			
Max Month Sludge Production, gpd	43,974	24,987	35,887			
Max Month Sludge Production, gpm	31	17	25			
Sludge Holding Tanks						
Number, each	2					
Diameter, feet	45					
Depth, feet	22					
Total Volume, cf	69,979					
Total Volume, gallons	523,443			Table 13-44 (5th Ed.)		
Max Month HRT and SRT, days	11.9	20.9	14.6			10 - 15
Max Month Volatile Solids Loading, lbs/cf/day	0.05	0.03	0.04		0.1 - 0.3	0.1 - 0.3
Sludge Holding Tank Blowers						
Type	Positive Displacement					
Number, each	2					
Design Pressure, psig	7					
Capacity, each, scfm	700					
Total Firm Capacity, scfm	700					
Mixing Energy, scfm/1,000 cf						
w/ 1 holding tank in service	20	20	20	30	20 - 40	

Table 6-2
Unit Process Overview and Capacity Summary

Component	Design	Projected		Metcalf & Eddy		Orange Book
		Existing	2035	Typical	Range	
w/ 2 holding tanks in service	10	10	10			
Targeted VSS Reduction	40%					
% VSS into Holding Tanks	1.01%	1.01%	1.01%			
% TSS out of Holding Tanks	1.06%	1.01%	1.02%			
% VSS out of Holding Tanks	0.72%	0.67%	0.68%			
VSS:TSS out of Holding Tanks	0.54	0.50	0.51			
% VSS Reduction (Van Kleeck Eqn.)	61%	66%	65%			
Oxygen Demand, lbs/day	2,422	1,622	2,259			
Standard Oxygen Transfer Eff.	30.0%					
Standard Oxygen Required, lbs/day	5,464	3,659	5,097			
Air Req'd @ Max Mo., scfm	731	490	682			
Belt Filter Press Feed Pumping						
Belt Filter Press Feed Pumps						
Number, each	2					
Capacity, each, gpm	200					
Motor size, each, HP	10					
Total Capacity, gpm	400					
Total Firm Capacity, gpm	200					
Feed Rate at Max Month (40 hrs/wk), gpm	128	73	105			
Sludge Dewatering						
Type	Belt Press					
Number, each	1			Table 14-4 (5th Ed.)		
Influent Solids Concentration	1.1%				1 - 3%	
Cake Solids Concentration	14.5%				12 - 22	

Table 6-2
Unit Process Overview and Capacity Summary

Component	Design	Projected		Metcalf & Eddy		Orange Book
		Existing	2035	Typical	Range	
Motor Size, HP	5					
Hydraulic Capacity, gpm	100-300					
Solids Loading Capacity, lbs/hr	500 - 1,000					
Max Hydraulic Flow @ 1,000 lbs/hr, gpm	185					
Belt press run time, hrs/week						
@ design max month & max hydraulic flow	28	16	23			

As shown in Table 6-2 above, there are some unit processes that will require additional capacity, particularly to meet the projections for 2035. A discussion of capacity and improvement needs by unit process is provided below. This discussion includes process deficiencies related to reliability, performance, operation and maintenance (O&M) access, in addition to capacity issues. Following this discussion, alternatives to address these improvement needs are identified in Chapter 7 and evaluated in Chapter 8.

6.3.1 Headworks and Flow Splitting

The firm capacity of the influent pumps is already slightly below the existing peak hour flow (PHF). Therefore, additional pumping capacity should be considered to reduce the risk of flows bypassing the plant should a pump be out of service. A possible alternative to larger capacity pumps would be to make control modification to allow operation of the pumps at over 100% speed.

The rated capacity of the influent screens is currently sufficient to treat the existing PHF with both in service. However, there is no redundancy or manual backup bar screen. In the near-term, it may be helpful to run the screens continuously during periods of high flow to keep them as clean as possible and maximize their hydraulic throughput. Eventually, they will need to be replaced with higher capacity screens. A photo an existing influent screen is shown in Figure 6-14 below.

Figure 6-14
Influent Screen

Although the projected 2035 PHF exceeds the capacity of a typical flume with an 18-inch throat width, it appears the flume height is such that it might still work adequately at this flow rate, though this would require adjusting the position and calibration of the associated level transducer.

Although the projected 2035 PHF exceeds the capacity of the existing grit removal system, it appears it could still pass the flow without submerging the upstream flume to the point that it would be impacting influent flow measurement. So, if the City is willing to accept reduced grit removal during PHF, the existing grit removal process may be adequate without significant modification.

The City indicated that the insertion type flow meter currently installed to control flow splitting between the secondary treatment process and CEPT clarifiers is suited for a clean water application, but not a wastewater application, which is why it has not functioned properly. The City has evaluated a strap-on type flow meter, but indicated the degree of accuracy was less than expected because the location currently available to install a meter is immediately upstream of the flow control modulating valve. The flow meter needs to be located the proper distance from any turbulence generating feature to improve accuracy, which will require a new flow metering vault on the influent line to the biological process or a new meter on the influent line to the CEPT clarifiers.

6.3.2 CEPT Clarifiers

The design for the CEPT clarifiers is to treat flows in excess of 6 MGD, limiting the flow to the secondary treatment process to 6 MGD. However, at the projected 2035 PHF, this flow splitting strategy would result in a hydraulic load of approximately 13.75 MGD to the CEPT clarifiers. Based on typical overflow rates for CEPT clarifiers, they are estimated to have a capacity of only about 7.85 MGD. However, as discussed below for secondary treatment, it appears the existing secondary clarifiers may have sufficient capacity to treat a significantly higher portion of the flow than originally intended, such that additional CEPT clarifier capacity should not be necessary.

6.3.3 Secondary Treatment

The existing secondary treatment process has excess capacity available. Normally, a single treatment train consisting of one anaerobic zone, one anoxic zone and one aeration basin will provide sufficient capacity, though at least two trains will eventually be required to treat the projected 2035 maximum month loading. The third train is generally not needed, except that having it online in the future will help reduce solids loading to the secondary clarifiers by reducing the MLSS concentration. So, for that reason the third train will eventually still be necessary.

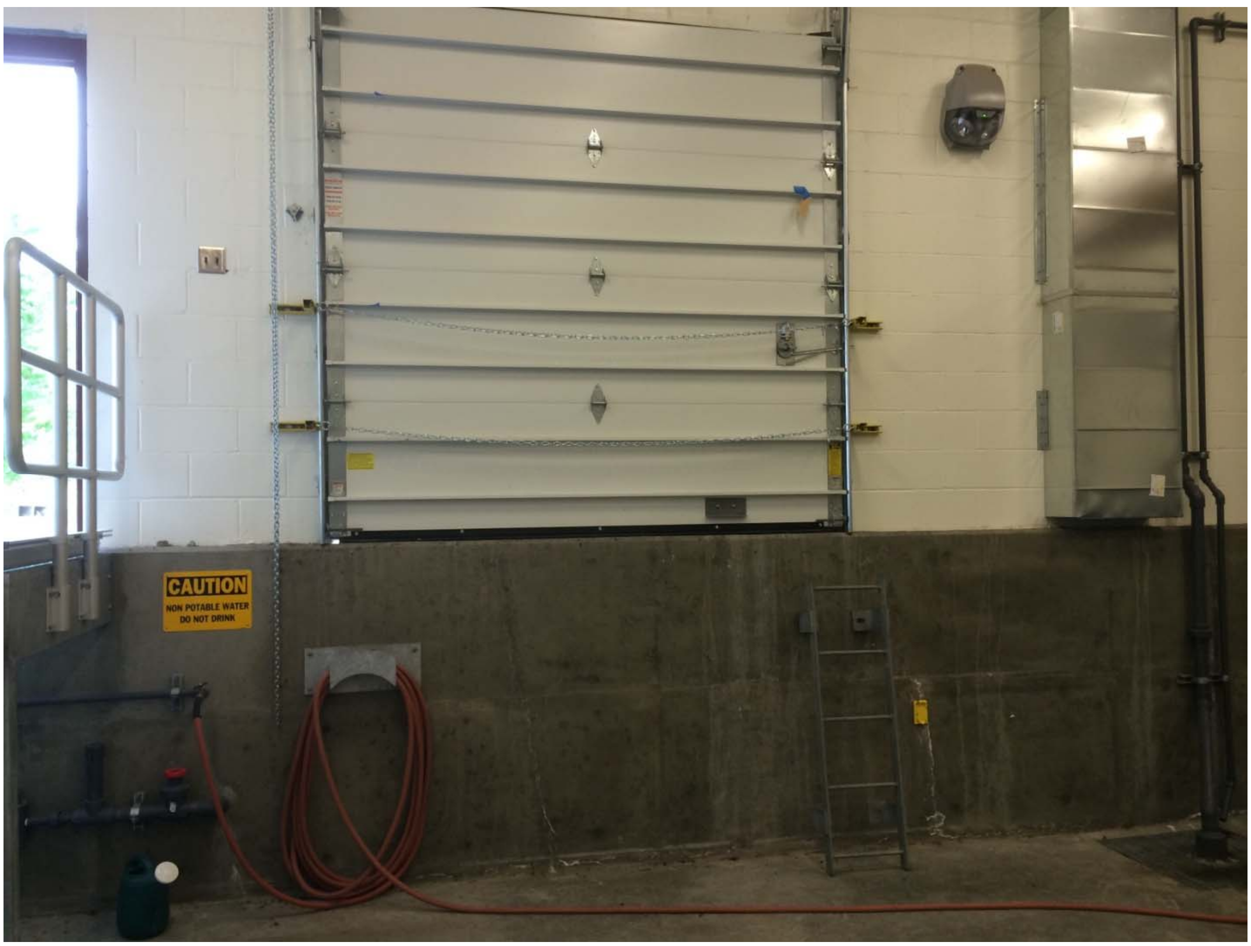
To avoid stagnant wastewater in the common channel between the anaerobic and anoxic zones from becoming septic and depositing solids, two slide gates should be installed so that the sections of the channel not required for conveyance of flow can be isolated. Additionally, the drain valve for Anoxic Zone #3 needs to be repaired.

The secondary clarifiers cannot handle the entire peak hour flow (either current or projected for 2035). They have capacity of about 10.6 MGD. Combined with the capacity of the CEPT clarifiers, the WWTP has a total clarifier capacity of 18.5 MGD, which is a little short of the projected 2035 PHF of 19.75 MGD. However, with three treatment trains in service the projected 2035 solids loading rate will be below the typical maximum, so it is possible that the secondary clarifiers could accommodate a higher hydraulic loading than would be typical. This would need to be confirmed with stress testing at some point in the future. As a result, it appears that major additions to or modifications of the existing secondary treatment process to increase capacity will not be necessary. However, some modifications are still necessary to improve operations and access to equipment for maintenance.

The anaerobic and anoxic zone mixers and mixed liquor recycle pumps are large and difficult to access with a mobile crane and/or vehicle, except for the two mixers in the southern most anaerobic and anoxic zones. Improved access around the anaerobic/anoxic zone structure and aeration basin structure is necessary to facilitate removal and maintenance of this equipment.

Similarly, an access ramp is needed to allow entry of a forklift into the RAS/WAS Building. The floor of the building is depressed about 5 feet and so forklift access is not possible, making it very difficult to get access for removal of equipment for maintenance. A photo depicting the depressed floor compared to finished grade outside the building is shown in Figure 6-15 below.

Figure 6-15
Depressed Floor of RAS/WAS Building



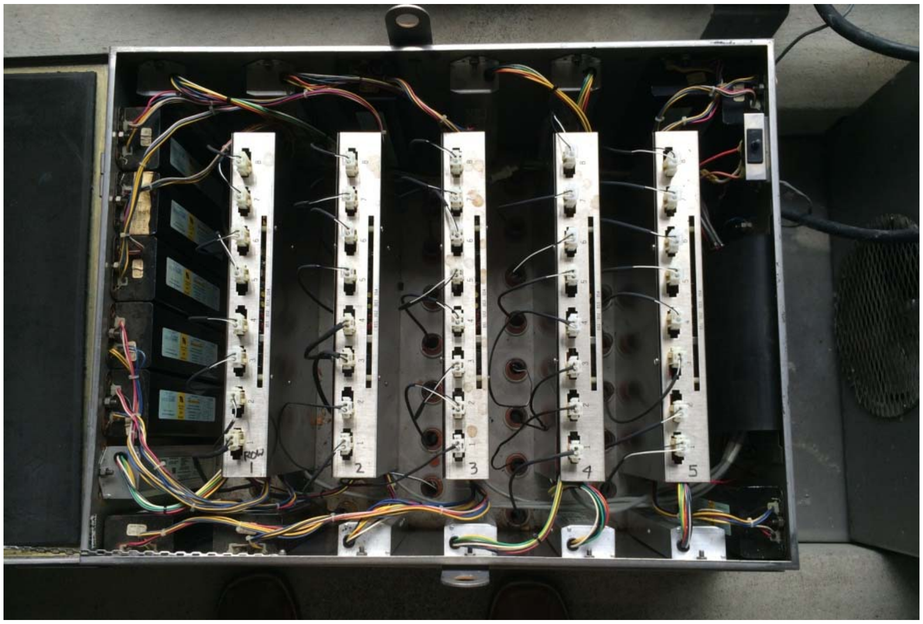
Because the secondary clarifiers do not have drain piping, the operators utilize the RAS and WAS pumps to drain the clarifiers. The RAS pumps can't provide enough suction lift to completely drain the clarifiers, so the WAS pumps must also be used to drain the remaining mixed liquor. However, the WAS pump discharge piping is typically valved to convey all flow to the sludge holding tanks. The operators generally do not want to waste all of this relatively thin mixed liquor to the tanks and so must then manually alter valve positions to pump through the RAS discharge piping using the WAS pumps. While the WAS pumps are discharging through the common RAS header pipeline, the RAS pumps must be turned off. As a result, the operators can only empty a portion of the clarifier with the WAS pumps at a time before the RAS pumps must be restarted. This requires the operators to toggle operation between the RAS and WAS pumps multiple times before the clarifiers are emptied. This procedure either needs to be automated or a separate discharge added for the WAS pumps. A photo of the WAS pumps is shown in Figure 6-16 below.

Figure 6-16
WAS Pumps

6.3.4 Disinfection and Utility Water Systems

As discussed above, both the treatment capacity and hydraulic capacity of the existing low pressure, low intensity UV system is insufficient to handle current peak flows. Therefore, additional disinfection capacity is required. A photo of an existing UV bank with low pressure, low intensity lamps is shown in Figure 6-17.

Figure 6-17
Existing Low Pressure, Low Intensity UV Bank



The City has indicated a need to add filtering for the utility water system. Presumably solids in the effluent or debris that enters the open tanks and channels causes spray nozzles used to clean and maintain equipment to clog. Filtering the effluent would remove these problematic solids and debris and significantly decrease the frequency with which the spray systems require cleaning and maintenance. Additionally, the City has indicated the desire to replace the existing fiberglass slide gate allowing effluent to enter the utility water storage chamber with a new stainless steel slide gate. Presumably the existing gate is no longer sealing properly and may not be operating correctly.

6.3.5 Solids Handling

The existing sludge holding tanks appear to have sufficient capacity to handle the projected 2035 loading. Additionally, the existing belt filter press has sufficient capacity to dewater sludge at the projected sludge production rate for 2035 with less than 30 hours a week of operation. The City recently installed a new 75 hp sludge holding tank blower, but limited its output to the 700 cfm that the existing 30 hp blower can discharge to avoid potential damage to the existing tank fine bubble diffuser system. A new coarse bubble system is needed before the full capacity of the new blower can be utilized, which will enable the tanks to be filled to their full volume and provide for improved mixing. A photo of the 30 hp blower is shown in Figure 6-18.

Figure 6-18
30 HP Sludge Holding Tank Blower

6.3.6 Other Improvement Needs

Other improvements that the City identified include addition of a pressure reducing valve on the water supply to the odor control system. The existing odor scrubber does not work properly because the water supply pressure is too high.

6.3.7 Summary of Improvement Needs

The following list is a summary of improvement needs identified in this chapter divided into "near-term" and "long-term" needs and listed in order of recommended priority. Improvements addressing "near-term" needs are recommended for inclusion in the six-year capital improvement program due to the fact that they represent a more critical need. Improvements to address these needs are discussed in Chapter 7. Where more than one practical alternative for improvement exists, all practical alternatives will be identified and described. Opinions of probable construction costs for the improvements and evaluation of alternatives are summarized in Chapter 8.

<u>Near-Term Improvement Needs</u>

- If further nutrient reduction is required, evaluate alternatives to address reduced phosphorus discharge limits
- Additional UV disinfection capacity

- New flow meter for flow splitting control to CEPT clarifiers
- Install coarse bubble diffuser system in the sludge holding tanks
- Upgrade the 30 hp sludge holding tank blower motor to 75 hp.
- Installation of a pressure reducing valve on the odor scrubber
- Install isolating slide gates in the common channel between the anaerobic and anoxic zones and repair the drain valve in Anoxic Zone #3.
- Provide filtering for the utility water and replace the existing fiberglass slide gate

<u>Long-Term Improvement Needs</u>

- Additional influent pumping capacity
- Additional screening capacity
- Facilitate equipment removal from the anaerobic/anoxic zones and aeration basins
- Facilitate equipment removal from the RAS/WAS Building
- Valve/piping modifications to allow improved control of WAS pumps for draining clarifiers

6.3.8 Other Desired Improvements

In addition to the needs identified above, the City has also indicated a desire for other improvements that are not a critical need, but would provide a benefit to operation of the WWTP. As these are not critical items, they would likely not be considered in the near-term. Rather, they are more likely to be considered in the long-term. Furthermore, because these are desired improvements, they are simply listed below for future consideration, but not further evaluated in Chapter 7, nor are opinions of probable construction costs developed for these alternatives in Chapter 8. The list of other desired improvements communicated by the City is as follows:

- Install a scale to weigh trucks hauling dewatered biosolids
- Re-plumb the scum discharge piping to allow returning scum to the headworks
- Add two additional gates in the existing site fencing to improve access
- Replace the residential gutter system at the Lab/Office Building with commercial grade gutters and install additional downspouts
- Add mesh netting to cover the sludge holding tanks for bird control
- Replace discontinued interior light fixtures

Chapter 7 Alternatives

This chapter identifies and describes reasonable improvement alternatives for needs identified in Chapters 5 and 6 and screens these alternatives for further evaluation. Evaluations of the screened alternatives, where multiple screened alternatives remain, and development of opinions of probable construction costs are summarized in Chapter 8.

7.1 Collection System

7.1.1 Existing and Projected 2035 Sewer Collection Systems

March 17, 2014 was selected as the calibration date for the existing peak day flow as described in Section 5.3. Wastewater flow totaled 8.17 MGD for this date. The peak rate recorded at the WWTP was computed by combining the influent meter and overflow weir readings for a total of 11.47 MGD. No overflows were reported for any manholes and no service problems were reported by any customers. Accordingly, these results indicate that no additional trunk conveyance capacity is needed in the immediate future, which means no conveyance alternatives are included in the Six-Year Capital Improvement Program.

By the year 2035 sewer service is assumed to be provided to all basins within the current UGA, though not all basins will be fully developed to allowable densities. All of these added basins initially will require lift stations discharging to some interceptor sewer. Some basins may develop in stages with temporary lift stations until permanent stations become feasible. The new basins in the northwest portion of the UGA present the major challenge as to how these new flows will be routed. The City will have very limited financial ability to build new collection facilities so sewer extensions must be provided by developer extensions and these extensions must be economically viable to the developers so temporary lift stations will likely be necessary.

An application to develop Bella's Meadows within Basin 244 has been received by the City. Bella's Meadows will be required to send all wastewater by gravity north in 244th Avenue SE to the new Lift Station 244 site, build the initial lift station with two 400 GPM x 25 HP pumps and space for a third, plus construct the 6-inch force main. The most appropriate force main route is south in 244th, east through Bella's Meadows to Roosevelt Avenue and on to discharge into the Semanski trunk sewer. A new 4-inch force main for the Berilla Lift Station will be installed in the same trench to Semanski Street and improve the lift station discharge flow routing.

Basins 440 and 448 could flow by gravity to the low spot in Basin 436 on SR 164 at the western edge of the UGA. This is a desirable long-term goal for the City and new development plats should be required to provide the easements or rights-of-way to achieve this result. However within the 2035 timeframe Basins 440 and 448 will probably see limited development with separate lift stations. All these basins plus the Newaukum Basin will discharge to Lift Station 244. These tributary developments will be responsible adding a third pump to Lift Station 244 and such increases in impeller size, motor power and other upgrades as may be required.

Lift stations needed to develop the remaining UGA basins involve rather straight-forward force main alignments. Figure 5-6 shows the initial assumptions as to how the additional wastewater from all of the new basins will be conveyed to the WWTP.

Under these assumptions several trunk sewers are projected to surcharge with a hydraulic gradient more than 4 times the pipe diameter and a number of manholes are projected to overflow. Additional capacity in some manner will be needed for these trunks. The most likely alternatives are shown in Figure 7-1. The 2035 sewer improvements include a planning-level capacity solution for each. However, these solutions are based on the flows projected for 2035 based on the flow data available. Flow data for the City sewer system should be updated from time to time and an engineering report prepared for each improvement that reconsiders available alternatives.

7.1.2 Collection System Alternatives

Infiltration-inflow Rehabilitation: A major factor limiting hydraulic capacity as identified in Section 5.5 is extraneous water. Four sewer service basins comprising the downtown area include some of the oldest portions of the City sewer system:

- Cole
- Division
- Garrett
- Railroad

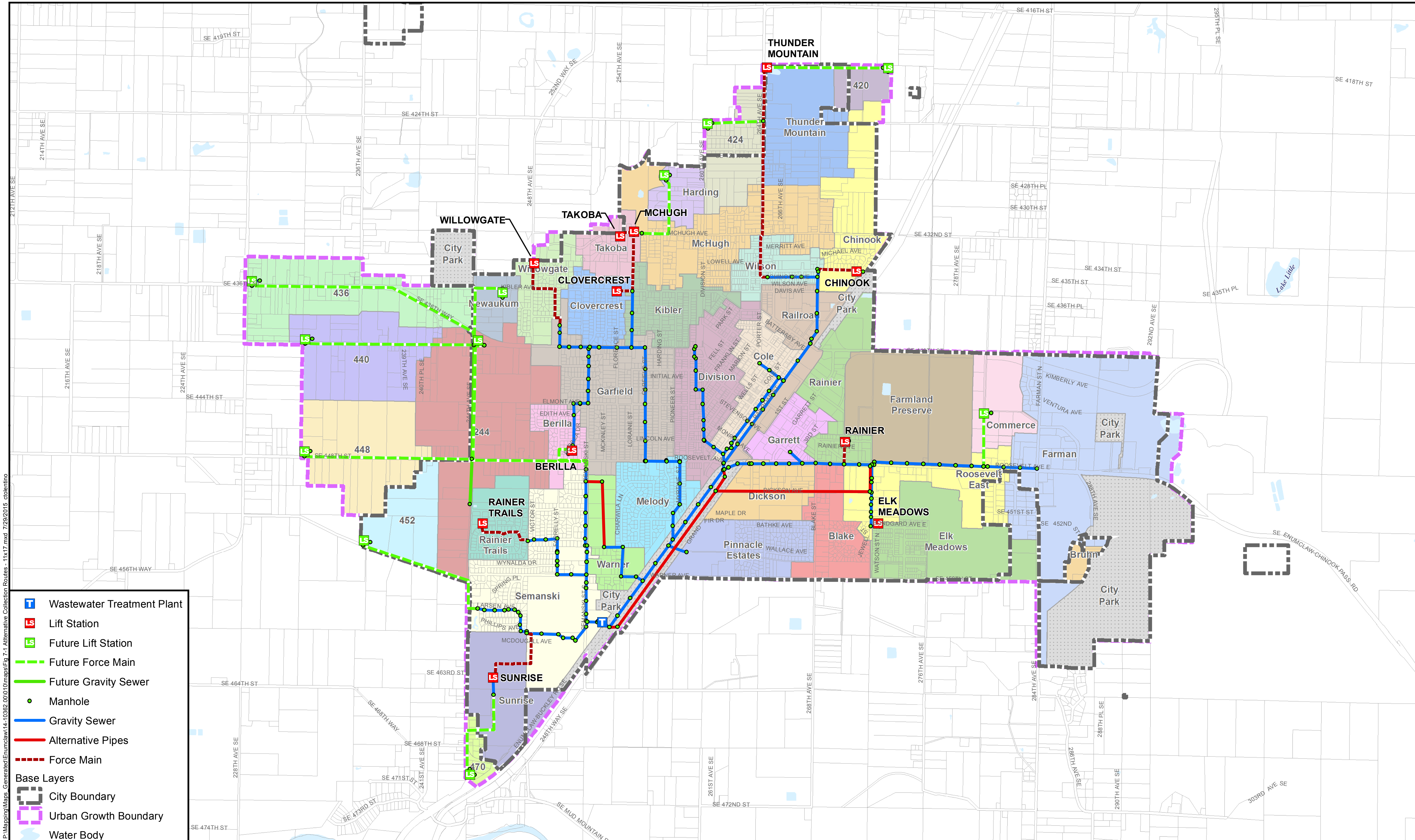
Many of these pipes were originally built as a combined system for both sewage and storm water. Some separation has been achieved through past rehabilitation programs. However, it is suspected that a number of illicit connections still remain though little information is available to identify specific addresses or particular sources. Further investigation is needed to verify these assumptions, the resulting extraneous flow; and to develop a cost-effective rehabilitation program.

Model results presented in Section 5.5 indicate that the hydraulic grade line rises steadily in the 30-inch Enumclaw Buckley Road interceptor. While not creating hydraulic problems in the 30-inch pipe itself, the hydraulic gradient does create backwater conditions for the trunks in Roosevelt Avenue and in the downtown basins that does create capacity problems. Two solutions are possible:

- Rehabilitation to reduce I&I in the downtown basins
- A parallel pipe in the Enumclaw Buckley Road

Rehabilitation experience within King County in years past indicates that most of the infiltration-inflow sources originate on private properties and comprise perhaps 2/3 of the total peak extraneous flow. Efforts to separate direct storm water connections and to seal pipe defects that allow infiltration into the sewer mains have not been very effective because private property defects are often ignored as too difficult or expensive to address. These concerns may well be true, and as a result rehabilitation programs for some jurisdictions have apparently achieved little or no I&I reduction despite the money spent.

Parallel Pipe along Enumclaw Buckley Road: The addition of a 24-inch diameter parallel pipe could resolve the hydraulic backwater conditions at the Roosevelt junction. Construction could occur outside of the highway right-of-way in the park strip of the former railway. This alignment in such an unobstructed location would minimize project costs for construction and traffic disruption would be minimal. The capacity achieved would be much more certain and easier to implement than the trial I&I program.



BHC CONSULTANTS

Sewer System: City of Enumclaw 2013
King County GIS base data.
Data sources supplied may not reflect current or actual conditions. This map is a geographic representation based on available information. It does not represent survey data. No warranty is made concerning the accuracy, currency, or completeness of data depicted on this map.
BHC Consultants LLC., assumes no responsibility for the validity of any information presented herein, nor any responsibility for the use or misuse of the data.

N W E S

0 1,000 2,000 4,000 Feet

City of Enumclaw

Alternative Collection Routes
Sewer Collection System
City of Enumclaw
July 2015

Figure
7-1

Roosevelt Avenue: Model results show the Roosevelt trunk has inadequate capacity for 2035 in several locations and that additional pipe capacity would be needed before 2035. However, flows generated in the Farman Basin are only estimates. Flow monitoring is recommended to establish actual flows before engineering is undertaken for adding pipe capacity. The parallel pipe could be installed in Dickson Avenue to Watson Street to intercept the Farman Basin flow and lower the hydraulic gradient in Roosevelt at Watson to about the top of pipe. Disruptions on Roosevelt Avenue/SR 410 would be minimized; however, 2035 capacity issues would still exist for the eastern Roosevelt pipe.

Semanski Street: Modeling shows a backwater effect from the Semanski trunk for tributary pipes. Adding capacity with a parallel pipe would reduce the hydraulic gradient sufficiently to eliminate backwater affects to the tributary pipes. The most attractive alternative for diverting flow from Semanski is at Terry Place through the Warner Basin into Laukala Place. This can be built as a developer extension to provide capacity for future development beyond the existing City sewer service area. It would not resolve all existing Semanski capacity issues however as more influent pipe capacity will be needed at the WWTP.

Berilla Lift Station: Construction of the force main from the Lift Station 244 in Roosevelt Avenue allows a new 4-inch force main to be placed in the same trench to serve the Berilla Lift Station. This new pipe would discharge directly into the Semanski/Warner trunk instead of discharging north into the Griffin Avenue trunk.

Willowgate-Takoba-McHugh: Construction of a new lift station within the UGA at the low elevation near SE 433rd Street and 248th Avenue SE would allow sewer service for the presently unserved properties along SE 433rd Street as well as eliminate three existing lift stations: Willowgate, Takoba and McHugh. The work would involve construction a new 2,300 lineal feet x 12-inch gravity sewer west in McHugh Avenue/SE 433rd Street and the new lift station with an extension of the existing Willowgate force main.

Clovercrest Lift Station: Gravity interception of the flow into the Clovercrest Lift Station would be desirable. The station is totally below the street level in the edge of the Kibler Avenue right-of-way. The pipe invert to the south in Griffin Avenue is about 7 feet higher than the Clovercrest inlet. However, the flow could be routed north in Florence Street to the south end of the Takoba plat, which is a distance of about 700 lineal feet. The Clovercrest invert is about El 724 and the pipe invert at the Takoba plat is about El 709, a difference of about 15 feet. This difference is a gradient of about 2 percent. There are some large diameter storm drain lines in Kibler Avenue that may affect the depth of the gravity main extension.

Rainier Trails Lift Station: Construction of the sewer interceptor in 244th Avenue SE flowing north into Lift Station 244 offers an opportunity to eliminate the Rainier Trails Lift Station. Topography indicates that a gravity sewer can be installed west to 244th at a reasonable depth and gradient. However, in the absence of an engineering report, it is not clear that eliminating the lift station through a circuitous route and increasing flow at LS 244 is justified.

Future service to 424 Basin: The lowest pat of the 424 Basin is outside the present city limits and this northern portion is largely developed with onsite sewerage systems. It is unlikely to be annexed into the City soon. Accordingly as the southern portion of the 424 Basin that is within the city limits is developed a temporary lift station will be required on 260th Avenue SE.

Potential Future Sewer Extensions: Some of the potential sewer extensions anticipated to be necessary to expand the service area are shown in Figure 4-1 and in Appendix D. Most, if not all, will be developer funded extensions, although some may require City participation to oversize a sewer or to add a force main where such oversizing or additional main cannot be attributed to the development.

Gravity Overflows for Lift Stations: A shallow gravity sewer could manage overflow conditions at some lift stations without the need for emergency power, perhaps providing increased reliability and potential cost savings. Two stations have gravity overflow pipes:

- McHugh LS has a 12-inch gravity overflow into the Takoba LS
- Rainier LS has a 12-inch line gravity line interconnected with the Roosevelt trunk line as an overflow route
- Elk Meadows LS has an 8-inch gravity overflow into the Watson sewer.

A gravity sewer overflow should function as intended for a pump fail or power outage under normal operating conditions. During peak storm conditions a gravity overflow may fail because the hydraulic gradient in the receiving sewer may be too elevated to accept the overflow volume and the lift station may overflow. Lift station overflow pipes are generally useful only where it can be demonstrated that the receiving sewer will have capacity even under peak hour design storm conditions.

Additional Lift Station 244 Capacity: Beyond the 2035 timeframe development in Basins 244, 436, 440, and 448 may exceed the 800 GPM capacity planned for Lift Station 244 which would also exceed the allowed velocity of 8 feet per second in 6-inch force main. An alternative to reconstructing the 800 GPM lift station and laying an additional force main parallel to the 6-inch pipe could be a supplemental lift station on the same site with a new force main south in 244th discharging to the McDougall sewer. The supplemental lift station would be intertied to the 800 GPM station to use the same upgraded control system to alternate starts among the pumps (at least five for the upgraded site) and to manage peak flow conditions.

7.2 Treatment Facility

The following paragraphs discuss alternatives for the near-term and long-term improvement needs identified for the WWTP in Chapter 6.

7.2.1 Additional UV Disinfection Capacity

There are four alternatives for increasing capacity of the UV disinfection system:

- Add a third parallel UV channel to expand the existing UV system.
- Relocate the existing UV system to the chlorine contact chamber currently used for plant utility water storage and expand the existing system.
- Replace the existing low pressure, low intensity UV equipment with higher capacity and higher efficiency low pressure, high intensity UV equipment within the existing channels.
- Construct a new low pressure, high intensity UV system in the chlorine contact chamber currently used for plant utility water storage.

The first two alternatives listed above rely on reusing the existing UV disinfection equipment. As stated in Chapter 6, the existing UV equipment is nearly 20 years old, which is near the end of the typical useful life for this sort of equipment. Additionally, the existing UV system does not allow flow-pacing, which yields inefficient operation, and the lamps must be cleaned manually.

A new low pressure, high intensity UV system would include all new equipment, flow pacing for higher energy efficiency and improved lamp life, and automated cleaning to reduce labor requirements. For these reasons, alternatives relying on reusing the existing UV disinfection equipment are not recommended. Rather, it is recommended that alternatives for expanding capacity of the UV disinfection system focus on replacement with a new low pressure, high intensity system.

The most cost-effective and efficient alternative for replacing the existing UV disinfection system is to retrofit the new UV disinfection system within the existing channels. The manufacturer of the existing UV system (Ozonia, previously Infilco Degremont) makes low pressure, high intensity UV banks that can fit within the existing channels with little modification. H.R. Esvelt Engineering produced a technical memorandum in November 2009 that briefly described this option and included a preliminary sizing and layout from Ozonia. However, that was based on providing a capacity of 16 MGD and it is unclear what level of redundancy was included in that sizing. The layout of the new UV system must allow space for sufficient UV banks to treat the projected 2035 peak hour flow of 19.75 MGD and include space for a redundant UV bank in each channel for reliability.

Because the existing UV disinfection system cannot monitor UV dose or UV transmittance, assumptions needed to be made for these parameters based on experience and knowledge of similar facilities. It was assumed that the UV transmittance would have a minimum 30-day average of 55 percent. This value seems reasonable based on what is typical at other similar facilities and considering future solids and hydraulic loading on the secondary clarifiers. A minimum UV dose of 40 millijoules per square centimeter (mJ/cm^2) is assumed necessary to meet the permitted monthly average fecal coliform concentration of 100 mean probable number per 100 milliliters (MPN/100 mL). At the time of the WWTP upgrade, the permitted monthly average fecal coliform concentration was 200 MPN/100 mL. At that concentration, a design dose of 30 mJ/cm^2 is generally reasonable. However, given that the permitted fecal coliform concentration is now lower, a higher design dose is advised and also recommended by Ozonia. BHC requested an updated budgetary quote and preliminary layout from Ozonia based on these criteria.

Ozonia provided budgetary quotations for two systems: the Aquaray® 40 HO and the Aquaray® 3X. Both are low pressure, high intensity, vertical UV lamp systems. However, the Aquaray® 3X UV lamps are higher output and allow variable output. The output of the Aquaray® 3X UV lamps is 400 watts compared to 165 watts with the Aquaray® 40 HO UV lamps. This means that a single bank of Aquaray® 3X UV lamps can treat up to 2.5 times the amount of flow, depending on specific conditions and effluent characteristics. Additionally, the output of the Aquaray® 3X UV lamps can vary between 60 and 100 percent, whereas the Aquaray® 40 HO UV lamps are either on or off. As a result, the Aquaray® 3X system provides greater energy efficiency by providing more exact flow pacing of the UV dose. The Aquaray® 3X system can not only turn rows of lamps on and off as needed to maintain a target UV dose, but can also vary the output of the individual rows of lamps. Although the Aquaray® 3X UV banks have slightly fewer lamps than the Aquaray® 40 HO UV banks (36 lamps versus 40 lamps), the Aquaray® 3X UV banks are about 6 inches taller and 6 inches wider. So, although the Aquaray® 40 HO UV banks can fit in the existing UV channels, the Aquaray® 3X UV banks cannot. Therefore, the Aquaray® 3X UV system can only be considered for the alternative of relocating the UV system to the chlorine contact chamber currently used for plant utility water storage, because the existing channels cannot be made wider without completely rebuilding them. Figures 7-2 and 7-3 below depict a typical installation for the Aquaray® 40 HO and Aquaray® 3X UV systems, respectively.

Figure 7-2
Typical Ozonia Aquaray® 40 HO System

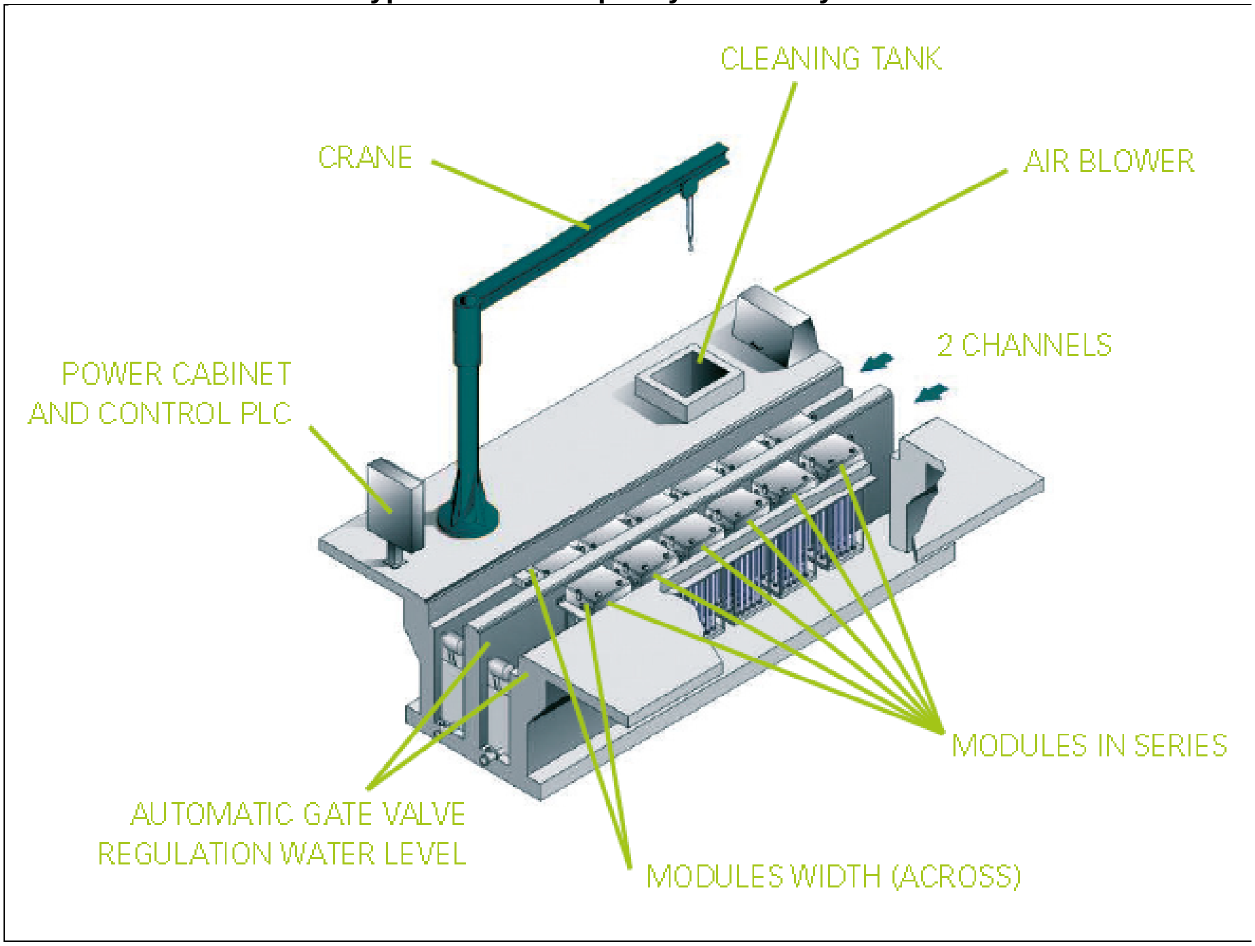
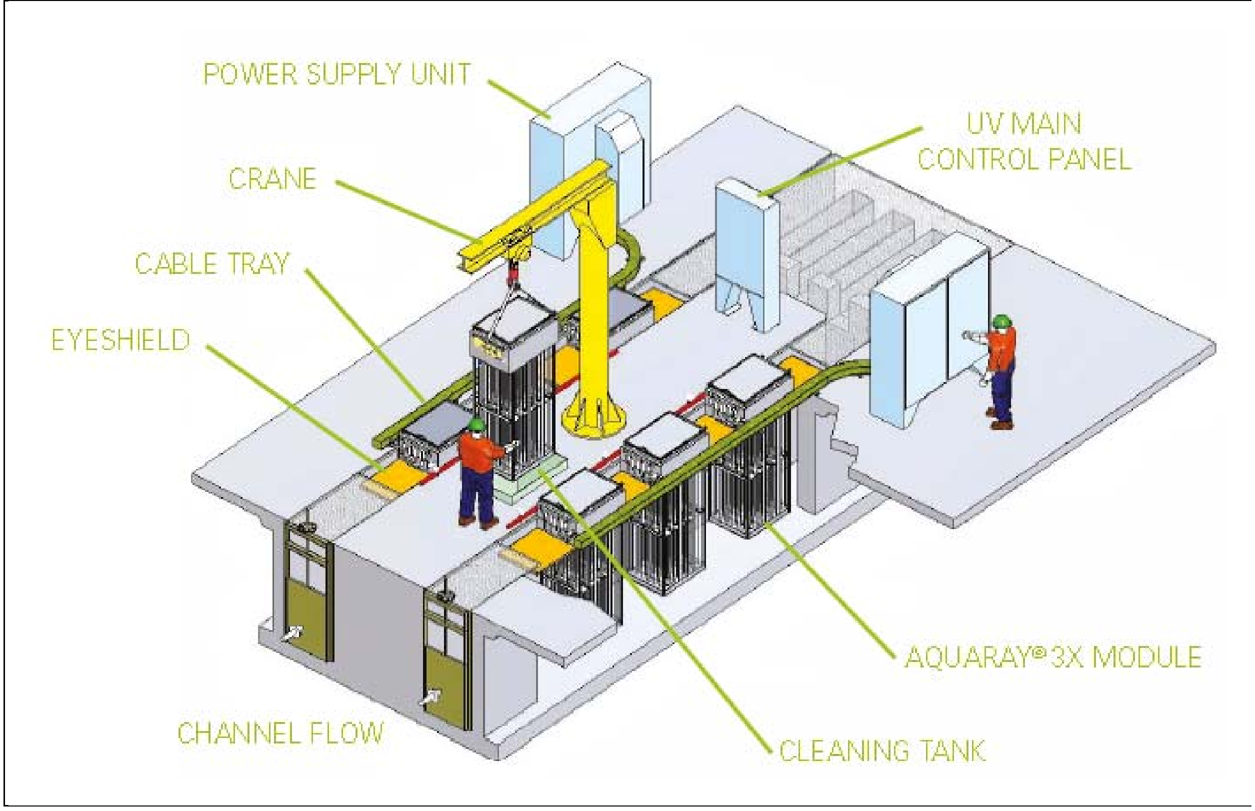


Figure 7-3
Typical Ozonia Aquaray® 3X System



As seen in the figures above, the Aquaray® 3X UV system has the power supply units for each UV bank located in a separate panel outside of the channel, whereas with the Aquaray® 40 HO UV system they are integral with each UV bank. It should also be noted that Ozonia has modified their recommended positioning of UV banks since the installation of the existing system. They currently recommend at least 5 feet of channel length before the first UV bank for the Aquaray® 40 HO UV system to ensure a uniform flow profile and even UV dose. Additionally, it is recommended that there be at least 2 feet of clearance between UV banks in series so that the cooling air intake on one module is not drawing exhausted heat from the other modules nearby. Based on these guidelines, there is space for only five UV banks in each of the existing channels, requiring addition of a third channel if the two existing channels are to be reused. Of these five UV banks, one is standby for redundancy in each channel. So, alternatives utilizing the Aquaray® 40 HO UV system will require 3 channels with 5 banks each. The Aquaray® 3X UV system would require two channels with 5 banks each, where each of the fifth banks are for redundancy. The following three alternatives will be evaluated in Chapter 8:

- Aquaray® 40 HO UV system installed in two existing channels and third new channel.
- Aquaray® 40 HO UV system installed in three new channels in the chlorine contact chamber used for plant utility water storage.
- Aquaray® 3X UV system installed in three new channels in the chlorine contact chamber used for plant utility water storage.

The evaluation will consider both the opinion of probable construction cost and the estimated O&M cost, since there is significant differences in the cost of replacement parts and energy efficiency for the two systems.

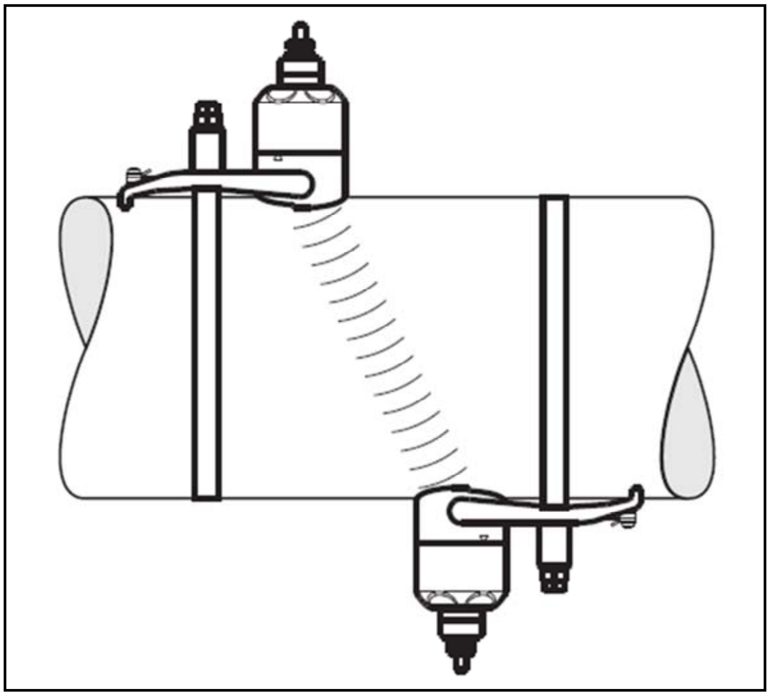
7.2.2 New Flow Meter for Flow Split to CEPT Clarifiers

Although an inline type magnetic flow meter would provide the best accuracy and precision, it would be very difficult and expensive to cut the main 30-inch pipeline between the headworks and aeration basins to install this type of flow meter. Therefore, an insertion type magnetic flow meter or clamp-on style ultrasonic flow meter is recommended for the 30-inch line. An alternative may be to install an inline type magnetic meter on the 24-inch pipeline from the headworks flow splitter to the CEPT clarifiers, which runs within an existing utilidor.

An ultrasonic flow meter is generally suitable for an application measuring flow of raw sewage. Applications with high suspended solids and/or entrained air can cause loss of echo and false readings. The concentrations of suspended solids in domestic wastewater are low enough that this is not a concern with raw sewage. However, there is potential for entrainment of air from the influent wastewater cascading over the weir in the upstream splitter box. This could be mitigated by locating the flow meter far enough downstream that most of the entrained air will have had time to rise to the crown of the pipe. The ultrasonic transducers could be located so that the ultrasonic signal between the transducers does not pass through the crown of the pipe, thereby reducing the potential for loss of echo. The primary advantage of a clamp-on style ultrasonic flow meter is that it involves no disruption to the pipe or operation of the WWTP. The transducers are strapped to the outside of the pipe and the ultrasonic signal is able to pass through the pipe and interior lining. The City has briefly tested a clamp-on style ultrasonic flow meter, but the test did not validate well due to the location being too close to the modulating valve controlling flow to the biological process. However, the expected accuracy is +/- 2 percent of the measured value for a commonly used instrument for this application, such as the Prosonic 93W by Endress + Hauser.

The advantage of an insertion type magnetic flow meter is that these meters are able to obtain a reading as long as the fluid has sufficient conductivity to induce a measurable voltage, which is typically not an issue with domestic wastewater. However, the design and application of some insertion type magnetic flow meters are limited to relatively clean water. Those that are suitable for wastewater have lower accuracy at low flows, compared to ultrasonic flow meters. For example, the Krohne model DWM 1000/2000 insertion type magnetic flow meter has an accuracy of about +/- 15 percent at the current average annual flow of about 1.5 MGD. With the plant design based on splitting flow in excess of 6 MGD, the meter would have an accuracy of about +/- 5%. The pipeline velocity needs to reach 3.3 feet per second to obtain a +/- 2 percent accuracy. Additionally, the pipe would need to be tapped to install the meter. Although a hot-tap is possible, a cold-tap would be recommended to ensure proper installation, which would likely require some bypassing and shutdown of the 30-inch pipeline. For these reasons, a clamp-on style ultrasonic flow meter is recommended instead of an insertion type magnetic flow meter if a new meter is installed on the biological process line. A depiction of the installation and operation of a clamp-on style ultrasonic flow meter is shown in Figure 7-4 below.

Figure 7-4
Clamp-On Style Ultrasonic Flow Meter Installation
(Viewed from Top of Pipe)



The clamp-on style ultrasonic flow meter would need to be installed in a new vault upstream from the location of the existing flow meter to provide the proper distance from the actuated butterfly valve to achieve maximum accuracy. To minimize excavation and avoid disruption to operations, it is recommended that a precast vault with a poured footing be installed. The vault would have no bottom, but the walls of the precast vault would be rest on a poured footing. This would allow the precast vault to be slipped over the existing 30-inch pipe, such that the pipeline would not need to be disturbed. The area inside the vault would be filled with pea gravel to a short distance below the spring line of the pipe to allow for drainage and access to the clamp-on transducers. The transducers would be rated for submergence (IP68), in case the groundwater level causes the vault to flood.

7.2.3 New Coarse Bubble Diffusers and Blower Motor Upgrade

As mentioned in Chapter 6, the fine bubble diffuser systems in the sludge holding tanks need to be replaced with coarse bubble diffuser systems to allow for higher airflow so that the full capacity of the new blower can be utilized. This will enable the tanks to be filled to their full volume while still receiving adequate mixing. A duckbill coarse bubble diffuser system has been successfully employed in many sludge tank applications. Unlike more traditional coarse bubble diffuser designs, the duckbill coarse bubble diffusers prevent backflow of sludge and solids into the diffuser and manifold piping. Additionally, the duckbill diffusers direct discharged airflow towards the tank floor to reduce solids accumulation in the tank. A photo of a recent duckbill diffuser installation in an aerobic digester tank at the Monroe, WA wastewater treatment plan is shown in Figure 7-5 below.

Figure 7-5
Monroe, WA Aerobic Digester Duckbill Diffuser Installation

Also, as mentioned in Chapter 6, the motor on the older 30 HP blower needs to be upgraded to a 75 HP motor so that it can match the output of the newer 75 HP blower, thereby providing the necessary redundancy and reliability when operating the sludge holding tanks at their full volume.

7.2.4 Pressure Reducing Valve for Odor Scrubber

As discussed in Chapter 6, the City has indicated the packed bed odor scrubber for the Headworks Building has not been functioning properly because the water supply pressure is too high and causes issues with its operation. The odor scrubber is supplied with utility water through a 1-inch Schedule 80 PVC pipe. A 1-inch PVC pressure regulating valve (e.g., Series PR by Hayward) would cost about $750 to purchase and could be configured and installed by the WWTP staff. The 1-inch PVC pipe would be cut and the new pressure regulating valve installed using 1-inch PVC unions (approximately $30 each) on each end to facilitate future removal if the valve needs to be repaired or replaced. Prior to purchasing the pressure regulating valve, the WWTP staff should confirm the correct pressure setting for proper operation of the odor scrubber and verify this setting is within the range of the selected valve. It is recommended that the selected valve have an adjustable pressure set point feature, in case pressure requirements change in the future.

7.2.5 Anoxic and Anaerobic Zone Drain Repair and Isolation Slide Gates

The existing buried 8-inch gate valve used to isolate the drain pipe from Anoxic Zone #3 needs to be excavated and replaced. However, because these valves are nearly 20 feet below grade, it would take significant excavation and shoring to remove and replace this valve. It would be significantly less expensive to install a knife gate valve at the upstream end of the flared elbow inside the tank and extend the valve stem up to the top of the tank using guide brackets. The existing buried gate valve could then be locked in the full-open position and abandoned in place. This would also make access for future valve repair much easier.

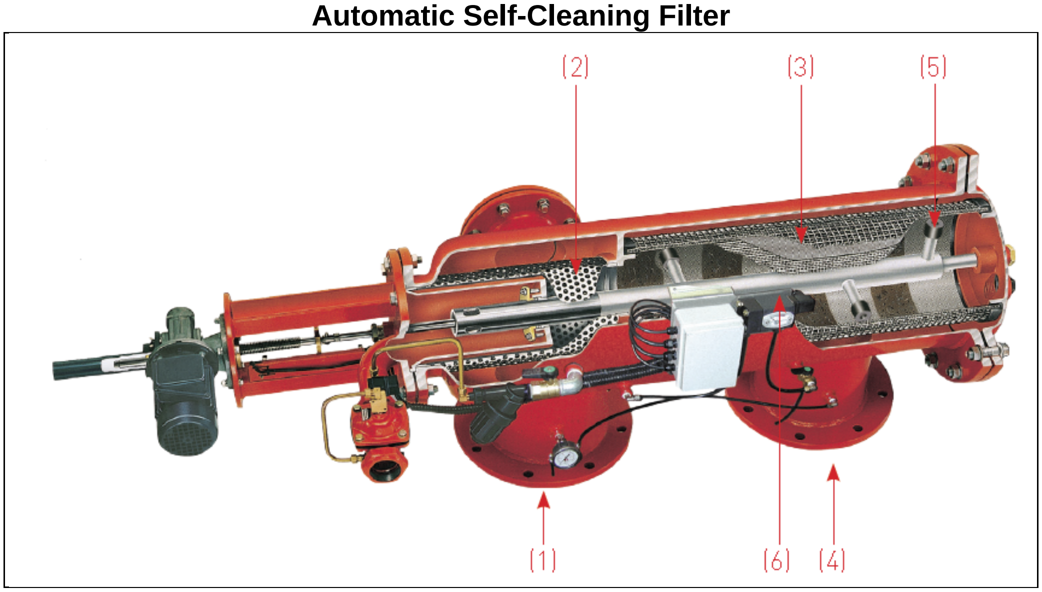
Aluminum or stainless steel slide gates could be retrofitted into the common channel between the anaerobic and anoxic zones. So as not to block the walkway along the top of the channel, the slide gate frame could not extend above the top of the channel. However, this would result in the slide gate opening being submerged most, if not all, of the time, which would yield additional headloss and trap floating debris and scum. This necessitates the slide gate extending above the walkway, which means the walkway will need to be widened on one side where the slide gates are located so as not to impede access. The expanded walkway could be cantilevered off the tank wall. For ease of installation, it is recommended that a self-contained slide gate be installed.

7.2.6 Utility Water Slide Gate and Filtration

The existing fiberglass slide gate should be able to be replaced fairly easily with a new aluminum or stainless steel gate. Bulkheads would need to be installed around the gate to isolate it for replacement and a temporary trash pump installed at the downstream end of the UV disinfection system to transfer disinfected effluent to the utility water storage.

Adding filtration to the existing utility water system could consist of installing an automatic strainer or manual cartridge filter on the discharge side of the utility water pumps. A manual cartridge filter would require ongoing replacement and could impact operations if not regularly replaced. Therefore, an automatic self-cleaning filter is recommended. Typically, the pressure drop across these filters is less than 10 psi before the cleaning cycle is initiated, but it should be confirmed that addition of the filter will not adversely affect pressure at the end uses before being purchased and installed. The utility water pump discharge piping could be looped atop the storage basin to provide room for the strainer and then reconnected to the existing piping before it goes below grade. A photo of an automatic self-cleaning filter is shown in Figure 7-6 below.

Figure 7-6
Automatic Self-Cleaning Filter



BHC CONSULTANTS

7.2.7 Additional Influent Pumping Capacity

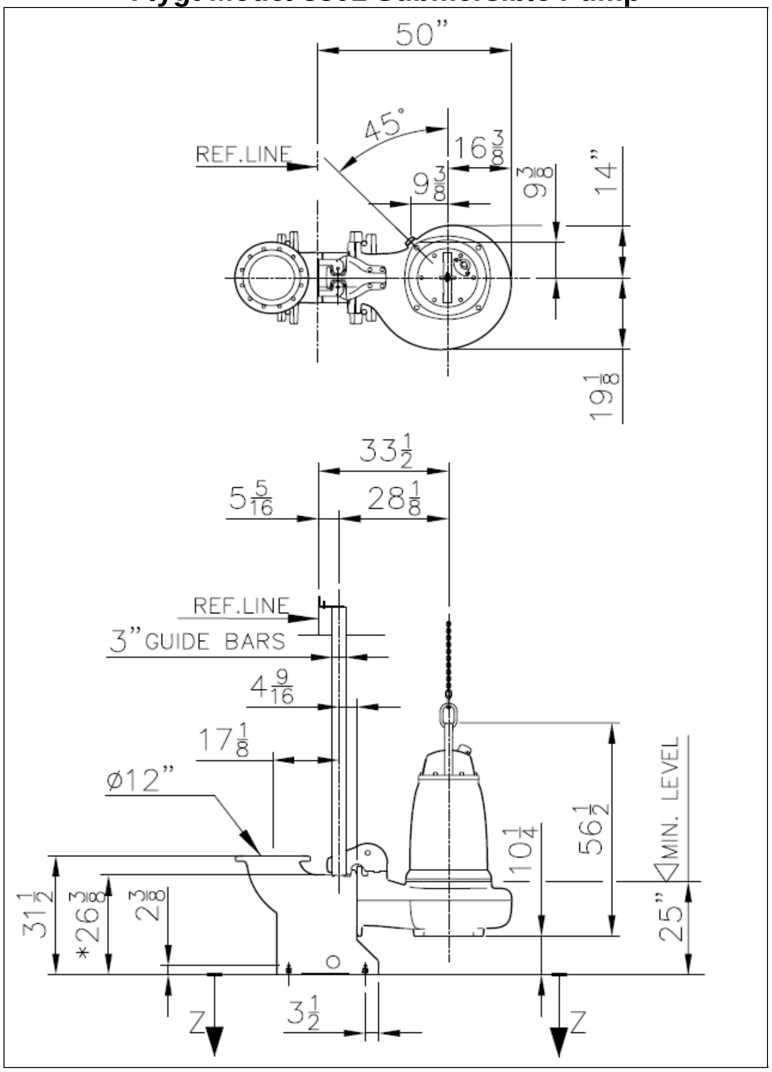
The existing Influent Pump Station consists of four submersible pumps inside a 16-foot diameter wet well. The physical size of the submersible pumps and wet well is such that there is not space for additional pumps or pumps that are significantly larger in physical size. However, there is a need to increase the firm capacity of the pump station from the current value of 11.2 MGD to 19.75 MGD for the projected 2035 peak hour flow. Given that the estimated current peak hour flow is 11.5 MGD, the City may want to consider increasing influent pumping capacity in two phases to provide greater influent pumping capacity in the near-term as well.

Because each influent pump has its own discharge pipe to the headworks, their capacities are directly cumulative. This means that any increase in the capacity of an individual pump will yield the same total increase for the influent pump station as a whole.

To be able to have a firm capacity of at least 19.75 MGD, each pump would need to have a capacity of 6.6 MGD. Currently, each pump has a capacity of 3.75 MGD at about 36 feet of total dynamic head (TDH). Most of the TDH is comprised of the static lift (about 33 feet), since the length of the discharge pipe is relatively short at about 50 feet long. Therefore, increasing the pump output to 6.6 MGD only increases the TDH to about 42 feet, due to greater friction and minor losses in the same 12-inch diameter discharge pipes.

The existing pumps appear to have a dimension of approximately 30 inches in diameter. Examining available submersible pumps from one of the primary manufacturers (Flygt), the Flygt model 3301 has a diameter of about 33 inches and a capacity of about 6.6 MGD at 42 feet of TDH, which is very near the best efficiency point for this pump. However, the power rating of the Flygt model 3301 is 70 horsepower (HP), compared to 30 HP for the existing pumps. A larger pump will require a larger variable frequency drive (VFD) and larger wiring. Preliminary assessment indicates that the larger wire could be pulled through the existing 1.25-inch conduits without exceeding limits for conduit fill set by the National Electric Code. It is not known at this point if the associated line reactor would also need to be replaced with a larger unit. It appears that there is space available to add another section or two to the motor control center (MCC) in the Headworks Building Electrical/Grit Pump Room, if necessary to accommodate the larger VFDs and/or line reactors. A dimensional drawing of the Flygt model 3301 is shown in Figure 7-7.

Figure 7-7
Flygt Model 3301 Submersible Pump



In addition to a larger motor, the Flygt model 3301 has a 12-inch discharge connection, compared to a 10-inch discharge connection for the existing pumps. To facilitate the larger discharge connection, the existing 10-inch base elbow and 10-inch by 12-inch reducer would need to be replaced with a new 12-inch base elbow and a 12-inch spool to fill the gap after removal of the reducer. Additionally, due to the higher flow, the spacing of the pumps should be modified to avoid hydraulic interference between adjacent pumps. This would require shifting the position of the pump bases and modifying the discharge piping within the wet well to accommodate these modified positions. Accomplishing these modifications within the wet well would necessitate temporary bypass pumping from the influent manhole to the upstream end of the headworks. This would also require installation of a new larger hatch and a new oversized concrete lid for the wet well to accommodate the larger hatch. It is also assumed that the existing guide rails will need to be replaced to accommodate the larger pumps.

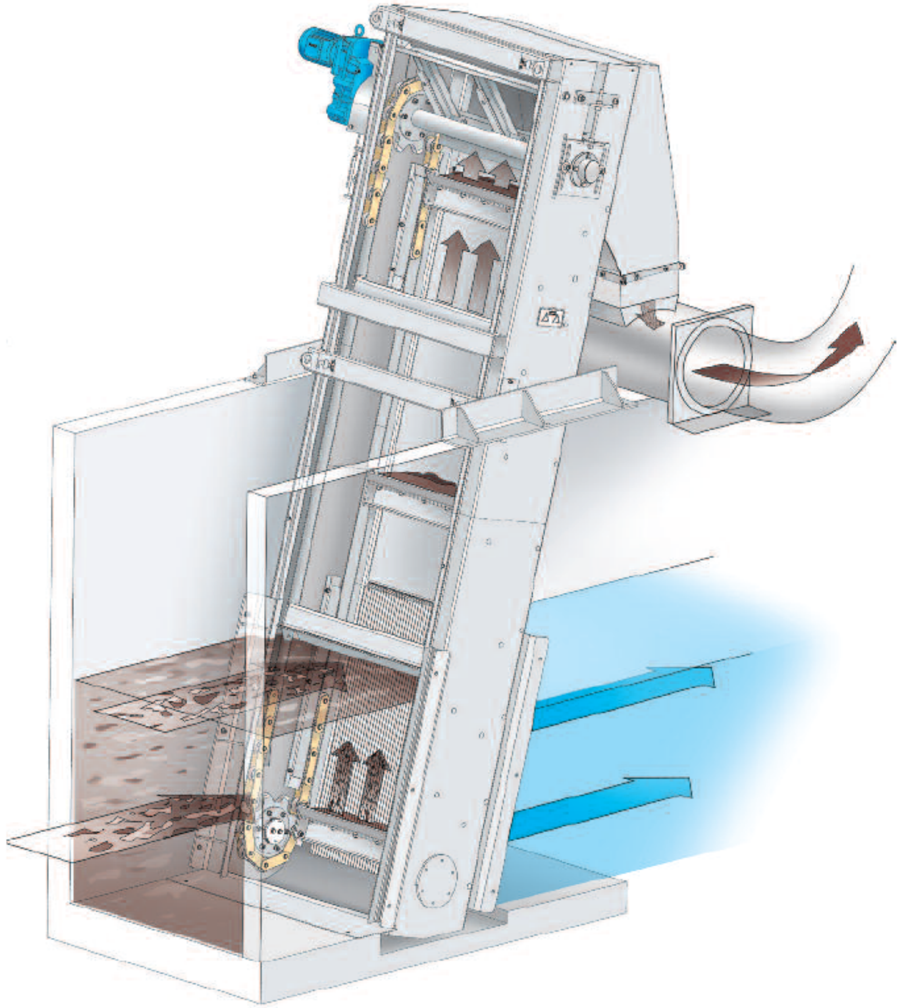
As mentioned previously, consideration could be given to switching out two of the influent pumps initially to increase the firm capacity from 11.2 MGD to 14.1 MGD. However, this is not an immediate need, since the existing firm capacity is only slightly less than the current peak hour flow and the collection system upstream of the WWTP can handle some small amount of surcharging in the near-term until eventually the recommended parallel influent trunkline is installed.

7.2.8 Additional Screening Capacity

As indicated in Chapter 6, the existing screens do not have enough total capacity to treat the projected 2035 peak hour flow and do not have sufficient firm capacity to treat the current peak hour flow. There is not sufficient space within the existing building to add a third screening channel. The Headworks Building would need to be expanded to the north to add a third channel, which would be very expensive. Even if there was room within the existing building to add a third channel, the channel is suspended and so would be expensive to form and pour. Additionally, it is quite possible that the existing foundation would need to be modified to support the additional suspended channel. For these reasons, it will be much more cost-effective to replace the existing screens with higher capacity screens.

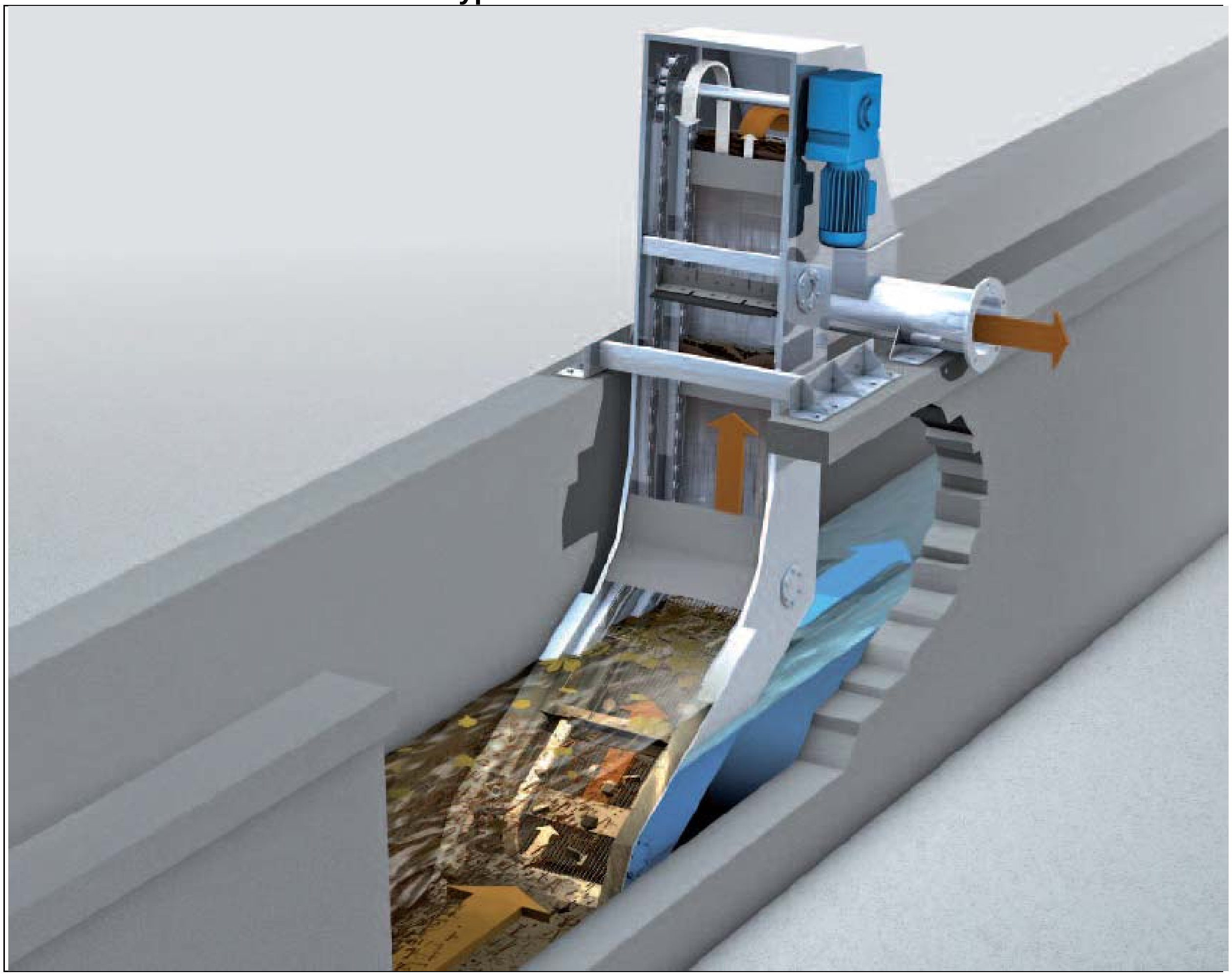
The existing screen channels are 3 feet wide and the existing screens have ¼-inch openings. A preliminary sizing analysis indicates that retrofitting two new 3-foot wide multi-rake bar screens with ¼-inch openings into the existing channels would provide sufficient total capacity to screen the projected 2035 peak hour flow. This sizing analysis was based on available information on hydraulics in the headworks and screen sizing by Huber, a well known manufacturer of multi-rake bar screens. Using that hydraulic information, it appears that the downstream water level, which is controlled by the influent Parshall flume, would be approximately 2.87 feet deep at the 2035 projected peak hour flow. Based on maintaining at least 6 inches of freeboard, the upstream water level cannot exceed a depth of 3.5 feet. That means the headloss across the screen should not exceed about 8 inches at the projected 2035 peak hour flow of 19.75 MGD. Huber estimated approximately 7 inches of headloss with 30 percent blinding of the screen (common for traditional multi-rake bar screens) when the projected 2035 peak hour flow is split between two traditional multi-rake bar screens. Figure 7-8 below depicts a typical Huber multi-rake bar screen installation.

Figure 7-8
Schematic of Typical Huber RakeMax® Installation



As an alternative, Huber also offers a high flow version of their multi-rake bar screen, for which a single screen could handle projected 2035 peak hour flow. This would provide redundant screening and firm capacity to treat the projected 2035 peak hour flow. The high flow multi-rake screen consists of a flat bottom section, providing a large screening surface with high hydraulic throughput, and a steep conveying section, providing a small footprint. Huber estimated approximately 9 inches of headloss with 20 percent blinding of the screen when the entire projected 2035 peak hour flow passes through one high flow multi-rake bar screen. With either type of screen, the traditional or high flow multi-rake bar screens, it appears they could be retrofit into existing channel without significant modifications. Both of these screen types will be evaluated in Chapter 8. It is expected that the new screens would utilize the existing screenings conveyor and washer/compactor. Figure 7-9 below depicts a typical Huber high flow multi-rake bar screen installation.

Figure 7-9
Schematic of Typical Huber RakeMax®-hf Installation



7.2.9 Equipment Removal from Anaerobic/Anoxic Zones and Aeration Basins

There are two primary options for facilitating equipment removal capability from the secondary process tanks: 1) retrofit permanent lifting equipment for removal of the mixers and pumps or 2) provide access around the structures for retrieval of equipment using a boom truck.

Retrofitting lifting equipment could consist of installing jib cranes in multiple locations, one or more gantry cranes, or a bridge crane. However, gantry cranes or a bridge crane would be prohibitively expensive and significantly impact aesthetics due to the height and span of these lifting mechanisms. They would need to span much of the area of the anoxic and anaerobic zones to allow retrieval of the mixers and conveyance to an already accessible location.

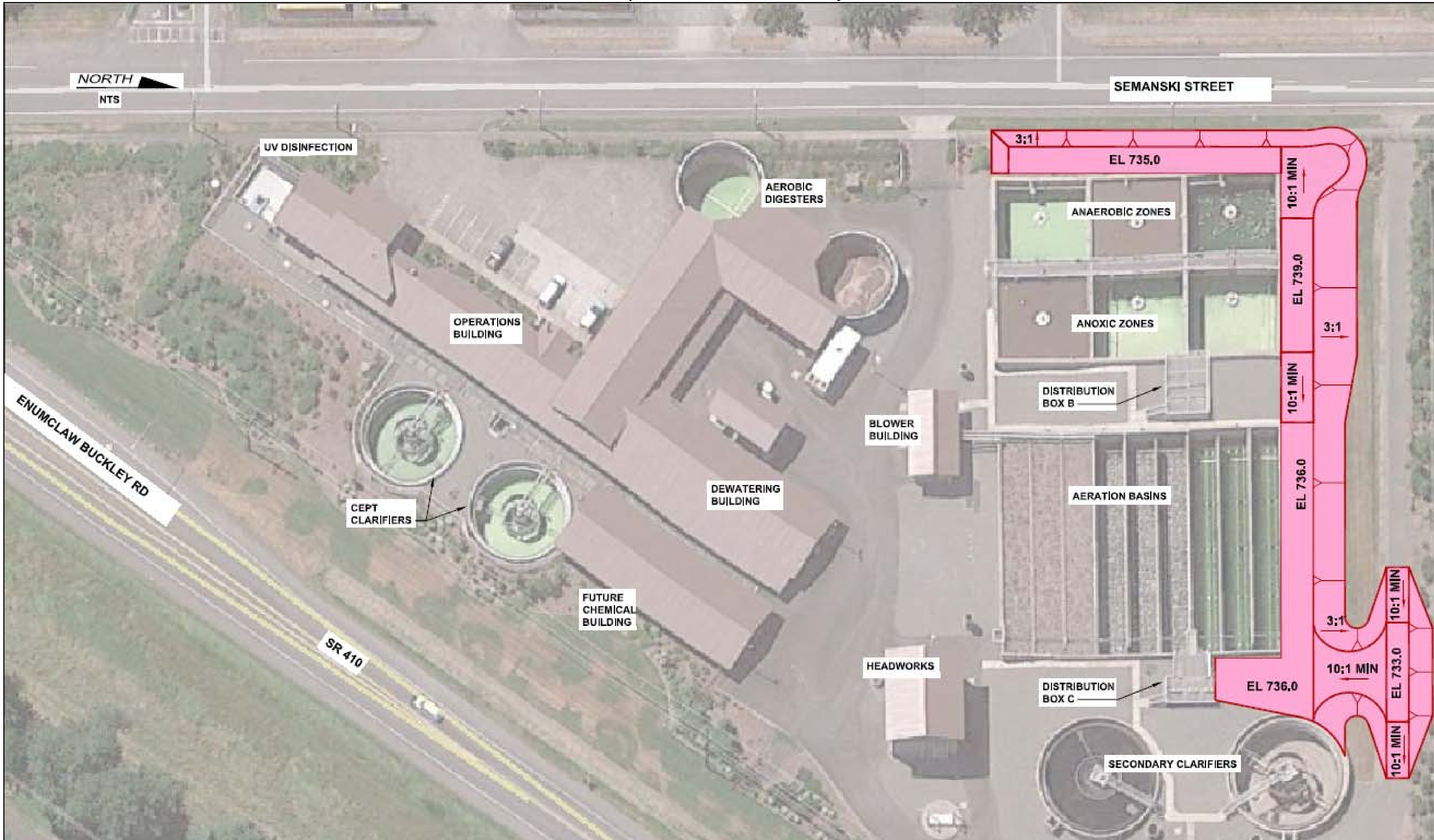
Although jib cranes would likely be more economical, at least 5 separate jib cranes would need to be installed. One could be installed at the south end of Anaerobic Zone #1 and Anoxic Zone #1 near the common divider wall to allow retrieval of the mixer from either of these zones. Similarly, one could be installed at the north end of Anaerobic Zone #3 and Anoxic Zone #3 near the common divider wall. The mixers could be floated over to the corner near the jib crane, lifted, and then the jib crane rotated to drop the mixer on the other side of the wall. Separate jib cranes would be required at the west end of Anaerobic Zone #2 and at the east end of Anoxic Zone #2 for retrieval of mixers from those tanks.

The primary issue with jib cranes is that they cannot convey the equipment significant distances, as can be done with a gantry or bridge crane. As a result, there must be vehicle access to areas adjacent to the jib cranes for retrieval of equipment. Given that vehicle access must be provided to these points and the equipment is not removed with any regularity, it is more cost-effective to go with the second option, which is providing access around the structures for retrieval of equipment using a boom truck. Additionally, this option does not require maintenance of any lifting device and would facilitate access for activities and if the City were to purchase a boom truck for removal of equipment, rather than renting as needed, it could be utilized for other City activities as well.

Currently only the south and southeast sides of the anaerobic and anoxic zones are accessible by vehicle. The north, west and north east sides of the anaerobic and anoxic zones are not accessible by vehicle, nor is there currently heavy vehicle access to Distribution Box C. The existing grade along the west side of the anaerobic zones and the north side of the aeration basins and anaerobic and anoxic zones is a 4:1 slope. Steepening this slope to 3:1 will allow space for about a 20-foot wide access road along the north sides of the tanks and up to a 15-foot wide access road along the west side of the anaerobic and anoxic zones; however, outriggers for some cranes may require even greater width. This assumes the same grade is maintained at the tank walls, although the grade could be reduced to allow for an even wider access roadway. Additionally, the space in between the anoxic zones and aeration basins could be re-graded to eliminate the current 8:1 cross slope and provide a more level area for operation of a boom truck.

Placement and compaction of imported fill would allow construction of the access roadway. The access roadway could be covered with crushed surfacing to minimize cost, particularly given that vehicle access would be rare. The access roadway could extend east from near Semanski Street along the north side of the tanks. The access road would also branch off along the west side of the anaerobic zones, allow access to the paved area along the northeast side of the anoxic zones and branch off along the northeast side of the aeration basins to Distribution Box C. The locations of Distribution Boxes B and C do not allow looping the access road, so the main road down the north side of the tanks would need to be wide enough to allow a vehicle to back down the roadway or drive in and back out. Having vehicle access around the tanks may also be useful for other maintenance or operations related activities. A conceptual layout of the access road and associated grading is shown in Figure 7-10. The road would require removing and replacing the landscaping along Semanski Street.

Figure 7-10
Conceptual WWTP Access Road Layout



7.2.10 Equipment Removal from RAS/WAS Building

There are two primary options for facilitating equipment removal from the RAS/WAS Building:

1) retrofit permanent lifting equipment or
2) provide forklift access into the building.

A forklift access ramp could either be provided inside or outside the building. The simplest approach would be to install a prefabricated dock ramp inside the building to allow a forklift to transition from the outside grade down to the building floor, a distance of 5 vertical feet. Many forklifts are rated for grades of around 20 percent, though the rated grade can be different between manufacturers and models, and most ramps are built with a 10 percent grade. Some rough terrain 4-wheel drive forklifts are rated for steeper grades of 30 to 40 percent. These ratings identify the maximum grade a forklift is capable of climbing and stopping with a full capacity load. At a 20 percent grade, the 5-foot elevation difference between the interior floor and exterior ground surface would require a 25-foot long ramp. Because there is less than 20 feet between the roll-up door into the building and the nearest obstacle, there is not sufficient space to install an interior ramp. The ramp would need to have about a 50 percent grade to leave sufficient space at the bottom for forklift turning, which is too steep. Therefore, a ramp would need to be located outside the building.

It appears there is sufficient space on the south side of the RAS/WAS Building to construct a ramp at 20 percent grade, leaving at least 8 feet between the top of the ramp and the fence line for forklift turning. To minimize cost, the ramp could be constructed with an asphalt driving surface and precast concrete block sidewalls, rather than cast-in-place concrete slab and walls. Handrail would need to be installed atop the walls on both sides for fall protection. Additionally, a section of the concrete foundation wall would need to be cut-out to allow vehicle access down to the building floor and a new taller roll-up door installed to cover the additional 5 feet in door height with the section of foundation wall removed. It is unknown at this point if cutting out a section of the foundation wall would create any significant structural concerns, and the wall removal may require some additional reinforcement around the new opening. Also it may be possible that part of the ramp can be inside the building with part outside. In any event a drain and connecting piping would need to be installed at the base of the ramp to collect runoff that flows down the ramp and prevent it from entering the building.

Lifting equipment could consist of a monorail or freestanding bridge crane inside the building. A freestanding bridge crane would be both prohibitively expensive and unnecessary. There is sufficient space inside the building to move equipment around with a pallet jack or similar device. The issue is conveying the equipment to the higher exterior grade, which an interior bridge crane would not facilitate. However, a short monorail could be installed to simply lift equipment from just inside the rollup door and convey it a short distance outside so that it can be placed on the exterior ground and moved from that point with a forklift or into the bed of a truck. For the monorail to extend outside the building, the existing rollup door would need to be replaced with swinging double doors that have cutouts for closing around the monorail.

Although being able to drive a forklift up and down a ramp would make removal of equipment a little easier by reducing the effort involved in handling the equipment, a monorail would be less expensive. As mentioned above, the monorail could be relatively short and would not need to have a very large capacity to lift the pumps. If the existing building frame could not support the weight of a loaded monorail, the monorail could be constructed as a freestanding structure. Or some form of a jib-crane may be suitable. One of these options could be considerably less expensive than re-grading the south side of the building, constructing retaining walls, cutting the foundation wall and installing a new drain. For any option, the existing rollup door would need to be replaced.

7.2.11 Modifications to Support Clarifier Draining with WAS Pumps

As discussed in Chapter 6, either the current procedure for initiating clarifier draining and toggling operation of the RAS and WAS pumps during the draining process should be automated or a separate WAS discharge pipeline installed. Automating the current procedure would may be simpler and less expensive compared to installing a new pipeline for WAS discharge, though further engineering study is needed to identify the most cost-effective solution.

Currently, to initiate the process, two manual valves (V-WAS-D6 and V-WAS-D7) must be repositioned to direct WAS discharge from the sludge holding tanks to the RAS discharge pipeline, which allows WAS to be pumped to the anaerobic zones. It would be relatively easy and inexpensive to retrofit these two valves with electric actuators or replace them with new actuated valves. This would allow the operator to initiate clarifier draining remotely and automatically and for the valve positions to be automatically returned to their normal positions following completion of the draining.

The City indicated that during draining of the clarifiers with the WAS pumps, the discharge is normally directed into the anaerobic zones through the RAS discharge pipeline. The City mentioned that they only run one set of pumps at a time (either the RAS pumps or the WAS pumps). Because it can take a significant amount of time to drain a clarifier with the WAS pumps, the City must toggle operation of the RAS and WAS pumps, because if the RAS pumps remain off too long. Otherwise, the sludge blanket in the clarifiers can become too high such that there is potential for loss of solids over the weir and there can be insufficient biomass in the aeration basins for treatment without the RAS.

The design data for the RAS and WAS pumps indicate that it may be possible for these pumps to run simultaneously, though it would likely reduce the output of the WAS pumps. However, it would seem as though that may not be much of a concern if the RAS pumps continued running. To provide maximum flexibility, it is recommended that the existing control programming be modified to add a clarifier draining sequence. This added feature would allow the operator to initiate a draining sequence remotely (with the valves automatically being repositioned) and to select the duration of the on and off intervals for WAS pumping and the WAS pump(s) to be utilized during the draining sequence. During the interval that the WAS pumps are off, the RAS pumps would run. If the interval for the WAS pumps to be off is set at zero, the RAS and WAS pumps would be run simultaneously. The operator could also select the speed of the WAS pumps, though the default would be full speed to drain the clarifiers as quickly as possible. The operator would still be required to end the draining sequence manually, based on observation of liquid level in the clarifiers, after which the programming would return operations to the normal settings.

Chapter 8 Evaluation

This chapter evaluates improvement alternatives, where multiple alternatives remained in Chapter 7, and develops opinions of probable construction costs for 2015. All costs are shown in 2015 dollars based on the 'Engineering News Record' Construction Cost Index of July 2015. No escalation is considered, though it is recognized that budget constraints require that improvements be prioritized and implemented over a period of years.

8.1 Collection System

Infiltration-Inflow Rehabilitation: Some further flow monitoring and preliminary engineering is needed to define an appropriate rehabilitation program. A trial assumption that might be achievable for I&I may be a rehabilitation program that removed an average of 2,000 GPD per acre for all four downtown basins. Such reductions across the four basins would total about 1,000,000 peak day GPD. Figure 8-1 graphically illustrates the resulting hydraulic gradient.

The lower hydraulic gradient shown in Figure 8-1 is insufficient to resolve the capacity constraints, which indicates that a major rehabilitation investment is not likely to be cost-effective. However, selected flow monitoring may identify significant I&I sources on specific properties where rehabilitation may be cost effective.

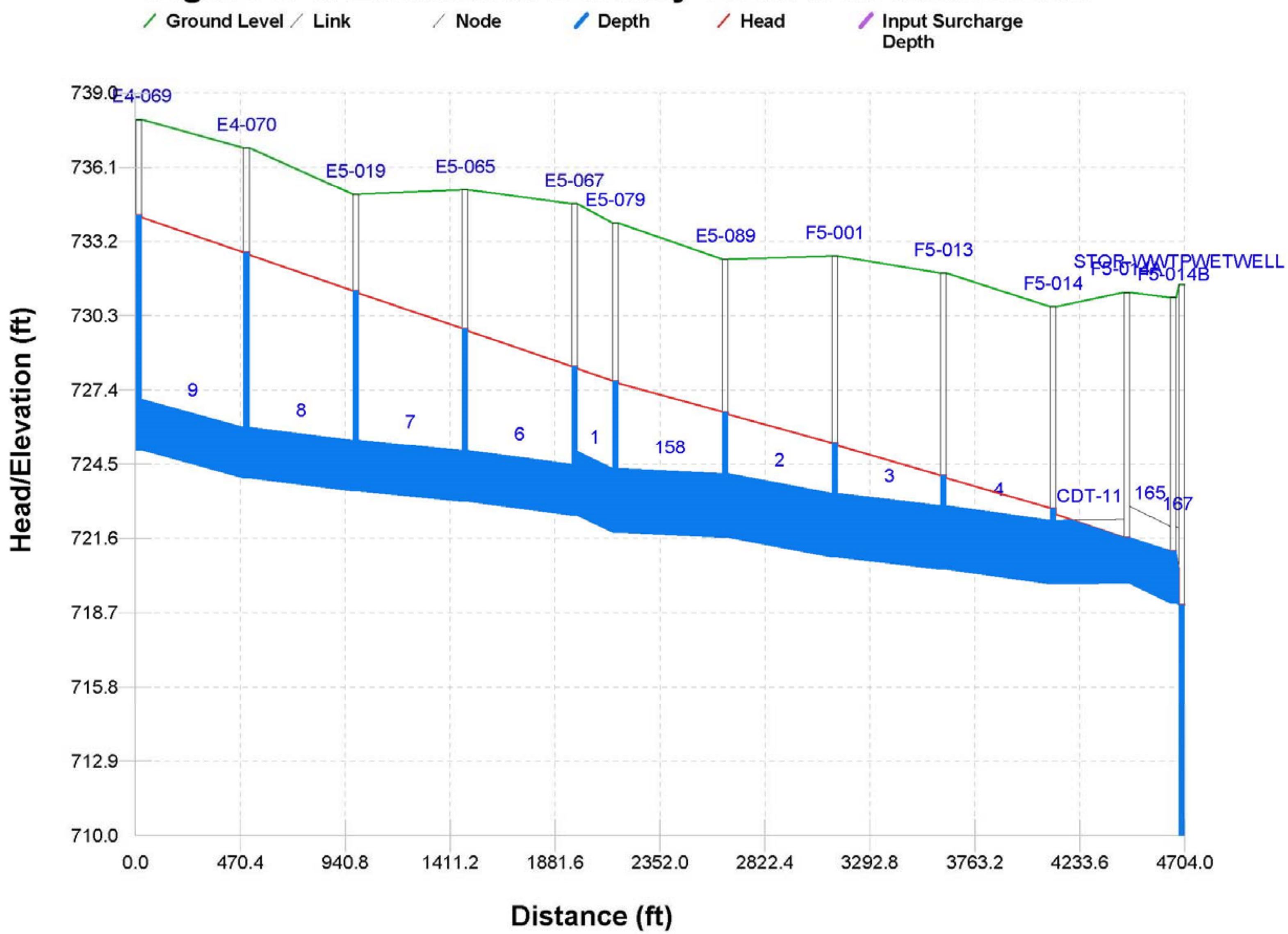
Parallel Pipe along Enumclaw Buckley Road: The hydraulic model indicates that the parallel pipe should be 24-inch diameter to lower the hydraulic gradient sufficiently to produce acceptable surcharge levels for projected 2035 flow conditions. Figure 8-2 shows the resulting hydraulic gradient. It is recommended that an engineering report be prepared before design of the pipe to review the available flow data. The report may verify that 24-inch is the appropriate diameter, or conclude that a different, perhaps larger diameter pipe should be provided.

Roosevelt Road: A diversion pipe in Watson to Dickson and thence to the Enumclaw Buckley trunk that lowers the hydraulic gradient in Roosevelt at Watson would produce the results shown in Figure 8-3. This improvement resolves surcharge issues west of Watson; however, the 2035 flow projection continues to show flooding to the east.

Semanski Road: A relief sewer main through the Warner Basin would resolve capacity issues for the sewer in Semanski Road north of McDougall Avenue. Projected flows from the Berilla and 244 Lift Stations in 2035 indicate that at least a 12-inch diameter pipe should be installed resulting in the hydraulic gradient shown in Figure 8-4. However the existing receiving pipes in Laukala Place, Charwila Lane and Warner Avenue are only 8-inch diameter in the Enumclaw Buckley Trunk. These sewers would also need to be upsized before 2035 to at least 12-inch diameter equivalent. An engineering report will be needed when the relief sewer is formally considered to verify these pipe sizes.

In addition, more influent pipe capacity will be needed at the WWTP to lower the hydraulic gradient in McDougall Avenue sewer.

Figure 8-1: Enumclaw-Buckley Road with Reduced I/I



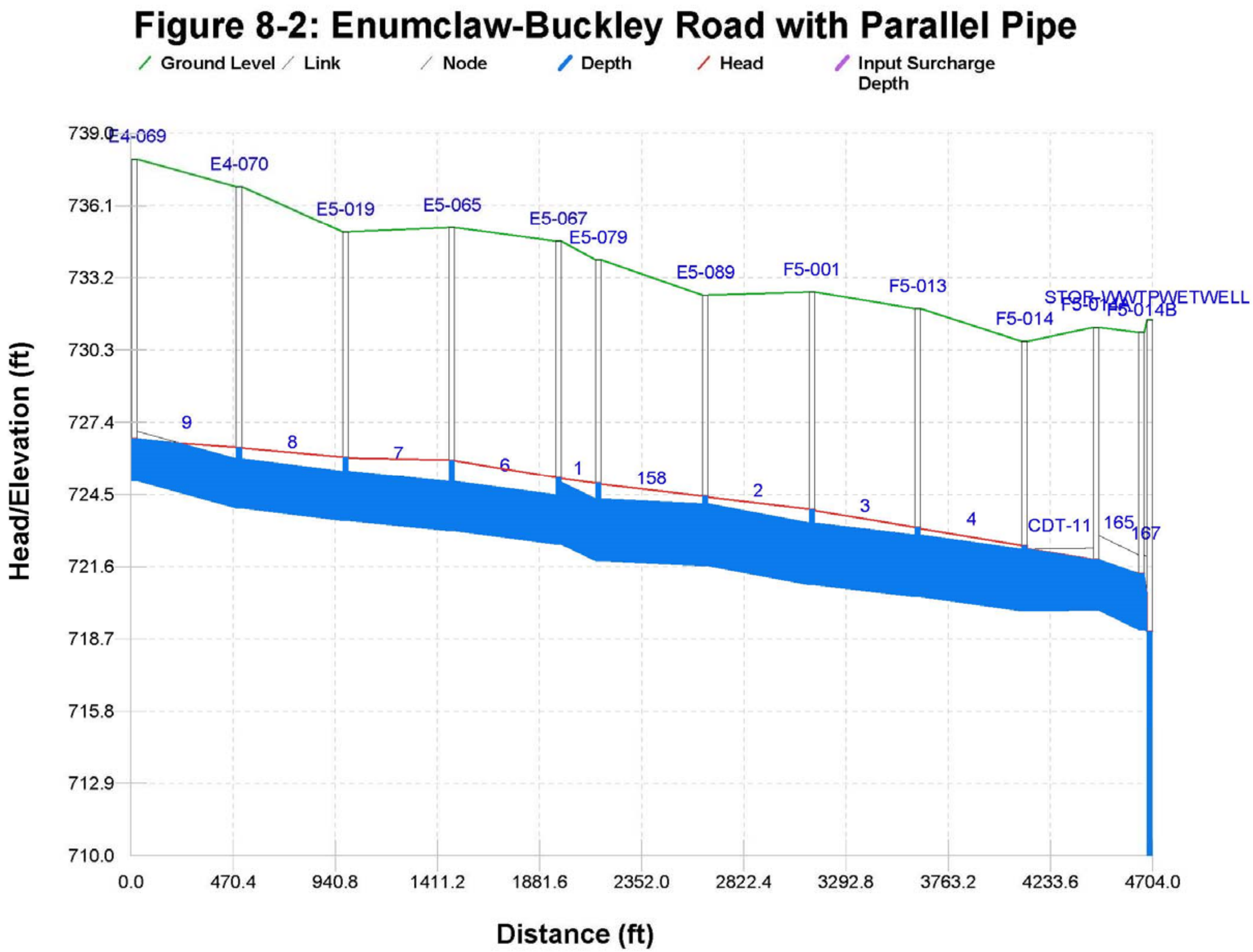


Figure 8-2: Enumclaw-Buckley Road with Parallel Pipe
Ground Level
Link
Node
Depth
Head
Input Surcharge Depth
Head/Elevation (ft)
Distance (ft)
739.0
736.1
733.2
730.3
727.4
724.5
721.6
718.7
715.8
712.9
710.0
0.0
470.4
940.8
1411.2
1881.6
2352.0
2822.4
3292.8
3763.2
4233.6
4704.0
E4-069
E4-070
E5-019
E5-065
E5-067
E5-079
E5-089
F5-001
F5-013
F5-014
F5-014B
9
8
7
6
1
158
2
3
4
CDT-11
165
167

Figure 8-3: Roosevelt Avenue with Dickson Diversion

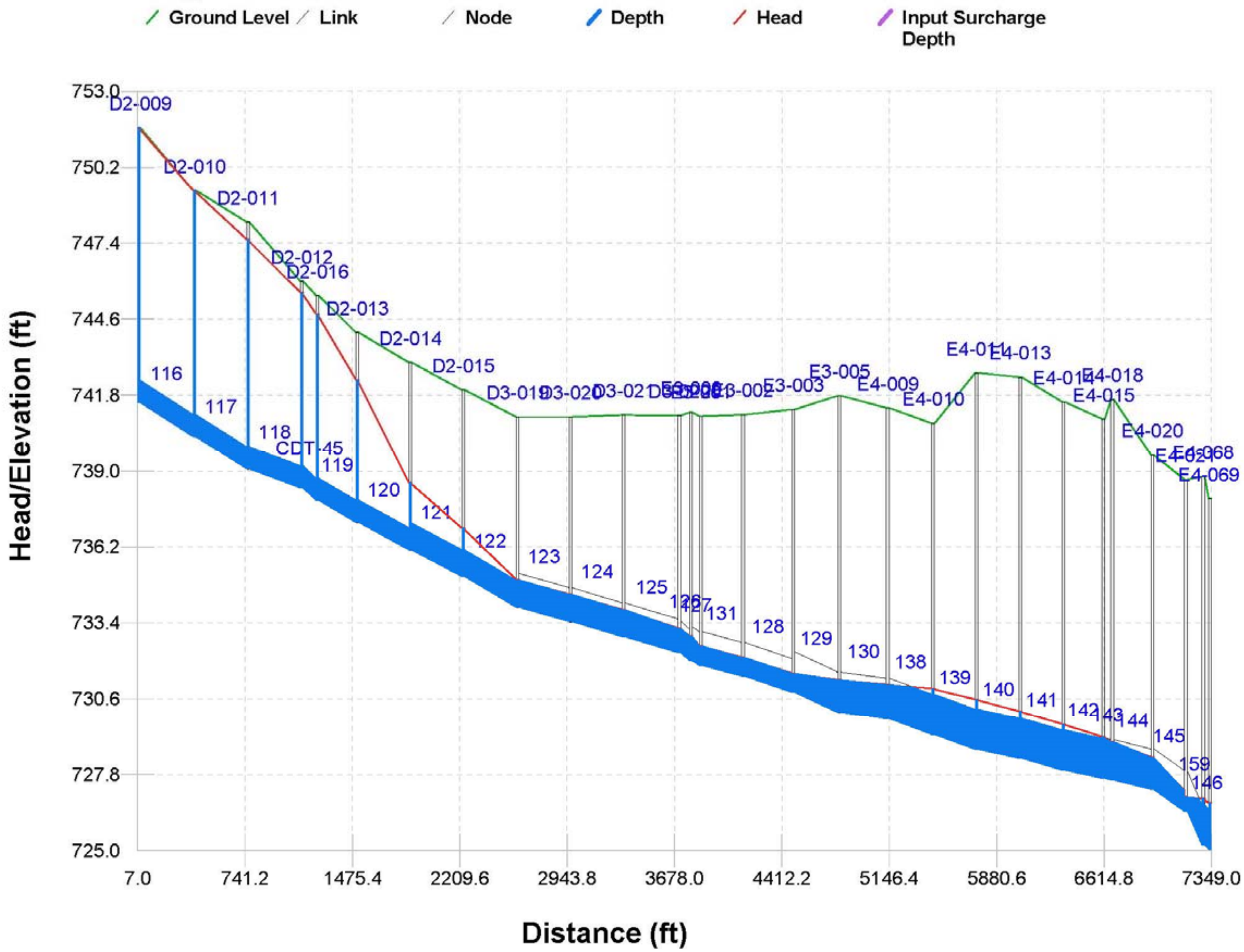
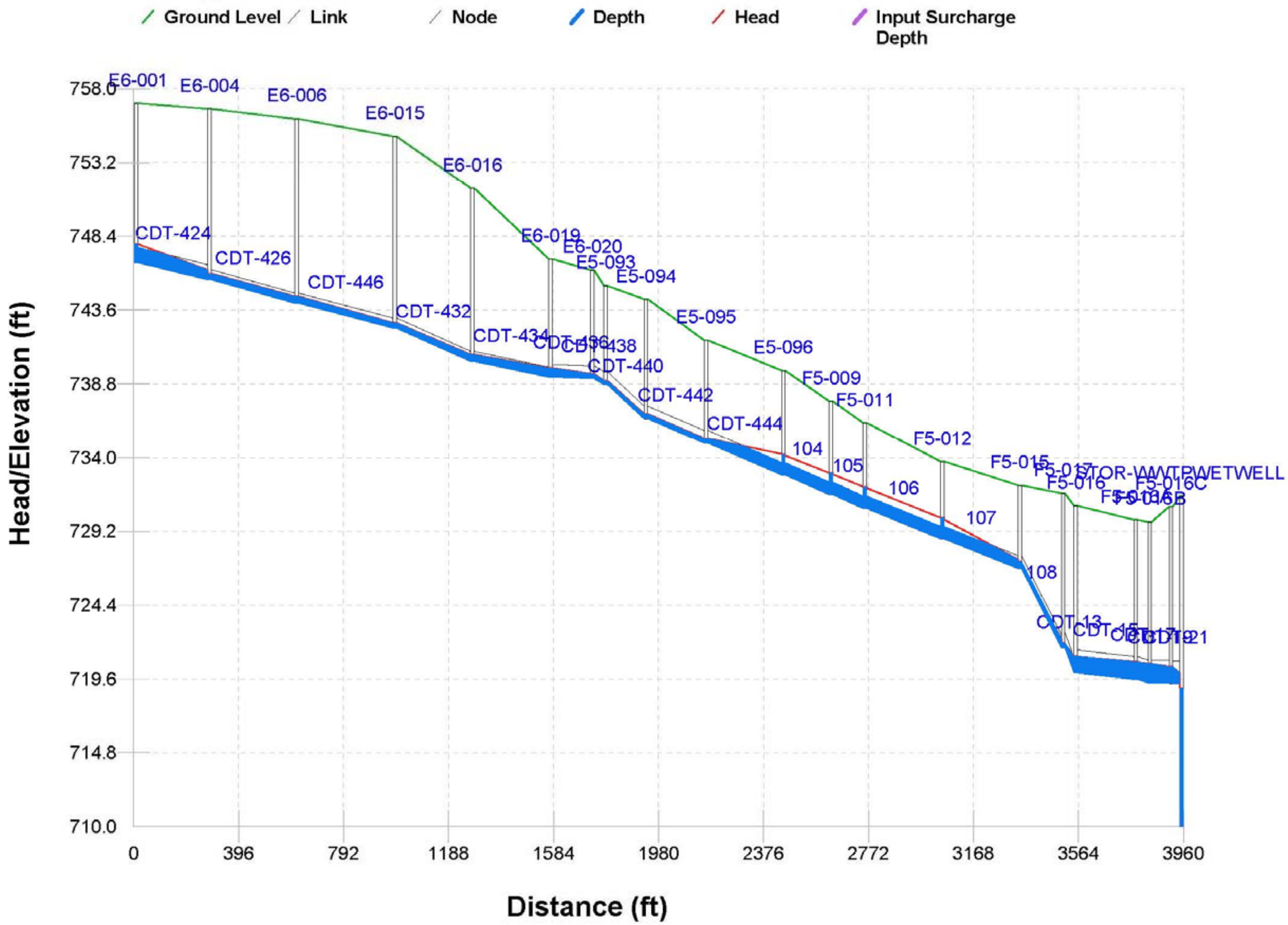


Figure 8-4: Semanski Street with Warner Diversion



Railroad Avenue: Two overflows are shown on Figure 5-5 along Railroad Avenue and many pipe segments surcharge. Since the much of the pipe length has only 3 to 4 feet of cover this degree of surcharge may be a problem for adjacent properties as well as further north in other basins. The trunk needs the capacity of 24-inch diameter pipe tapering to 18-inch and eventually to 10-inch at the northern segment. Whether this capacity can best be provided by replacing the existing pipe or by installing a parallel pipe providing the equivalent capacity will require an engineering report.

Clovercrest Lift Station: Peak hour 2035 flow from the Clovercrest Lift Station is projected to be less than 140 GPM or about 200,000 GPD. This flow rate is insufficient to achieve a 2 FPS flushing velocity in an 8-inch pipe unless the gradient is at least 0.4 percent. Low flow in low pipe gradients will allow solids accumulation, lead to odor and create a maintenance issue. This alternative cannot be recommended.

Rainier Trails Lift Station: Topography indicates that a gravity sewer can be installed west to 244th at a reasonable depth and gradient. However, in the absence of an engineering report, it is not clear that eliminating the lift station through a circuitous route and increasing flow at LS 244 is justified.

Figure 8-5 depicts the truncated hydraulic model operating under 2035 peak day conditions with the improvements described above. All of the overflowing manholes are addressed by incorporating the selected alternatives; however, some pipes with significant surcharge conditions will remain. There is no indication available that these surcharge locations will present problems. Future updates to this Plan may or may not confirm these conclusions as better data becomes available and further experience with the sewer system operation is gained.

8.2 Treatment Facility

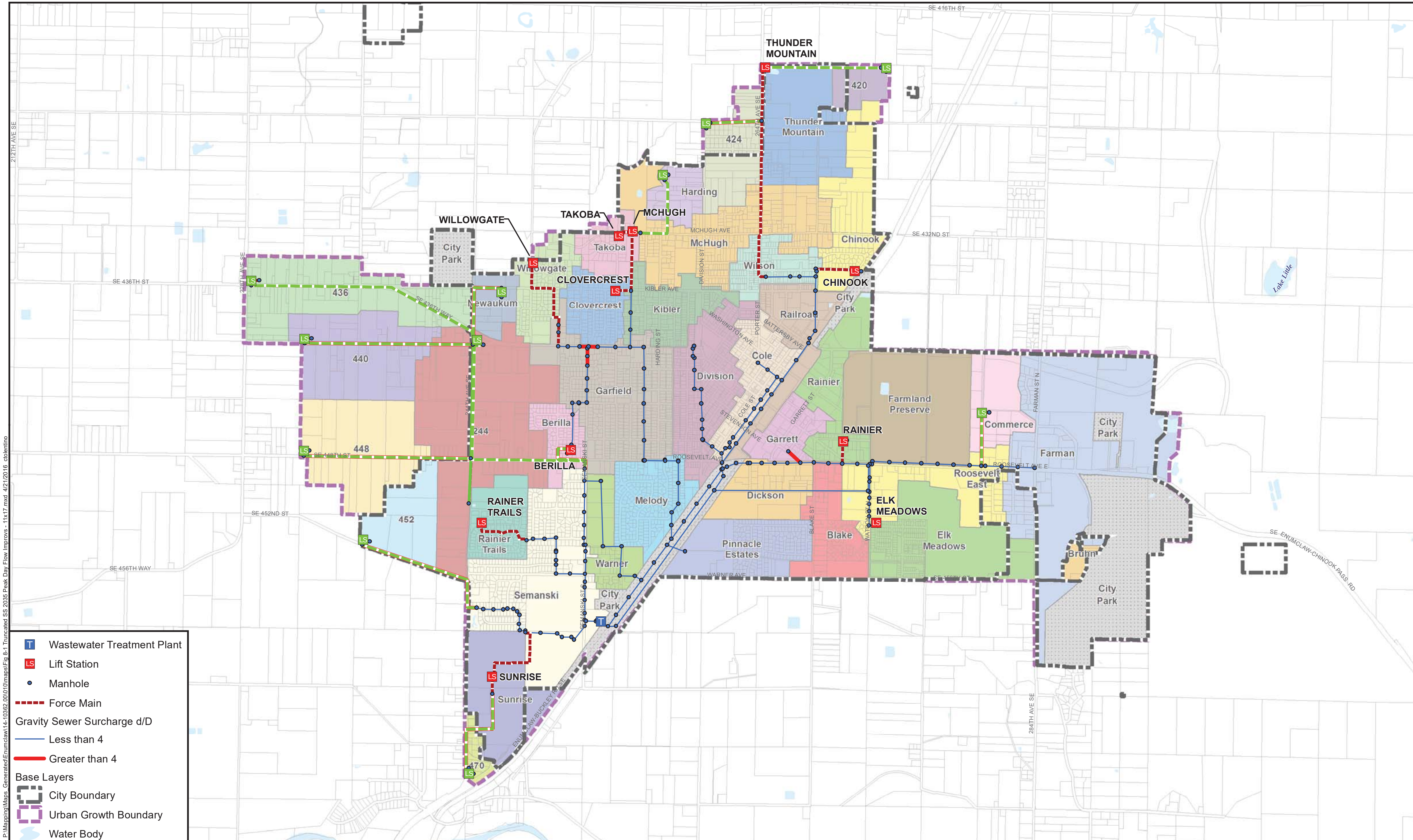
The following paragraphs provide opinions of probable construction costs for screened WWTP improvement alternatives shown in Chapter 7. Where multiple alternatives remained, these alternatives are evaluated in this chapter and the best apparent alternative selected.

Opinions of probable construction cost presented herein are considered Class 5 estimates (i.e., order-of-magnitude) in accordance with the American Association of Cost Engineers. The opinions of probable cost include markups for contractor overhead and profit, mobilization/demobilization, electrical, instrumentation and controls, sales tax, contingency, engineering, and construction management and administration. See Appendix E for detailed cost information associated with the WWTP improvement alternatives.

8.2.1 Additional UV Disinfection Capacity

As identified in Chapter 7, options for expanding capacity of the UV disinfection system were condensed into the following three alternatives:

- Alternative 1 - Aquaray® 40 HO UV system installed in two existing channels and a new third channel.
- Alternative 2 - Aquaray® 40 HO UV system installed in three new channels in the chlorine contact chamber used for plant water storage.
- Alternative 3 - Aquaray® 3X UV system installed in three new channels in the chlorine contact chamber used for plant water storage.



BHC CONSULTANTS

Sewer System: City of Enumclaw 2013
King County GIS base data.
Data sources supplied may not reflect current or actual conditions. This map is a geographic representation based on available information. It does not represent survey data. No warranty is made concerning the accuracy, currency, or completeness of data depicted on this map.
BHC Consultants LLC., assumes no responsibility for the validity of any information presented herein, nor any responsibility for the use or misuse of the data.

N W E S

0 1,000 2,000 4,000 Feet

City of Enumclaw

Truncated Sewer System 2035
Peak Day Flow with Improvements
General Sewer Plan Update
City of Enumclaw
August 2015

Figure
8-5

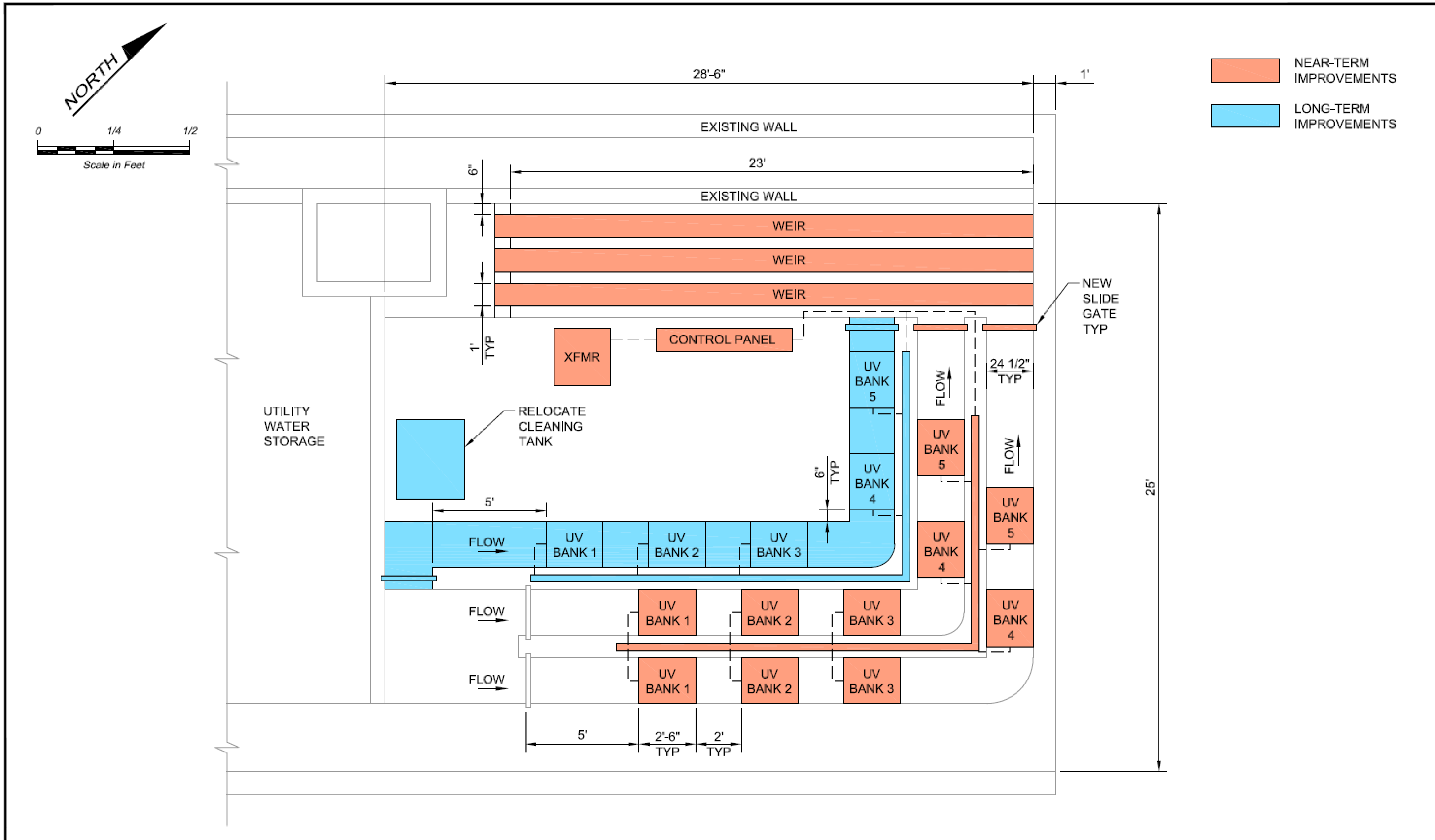
20-year life cycle costs, considering both the opinion of probable construction cost and the estimated annual O&M cost, were developed for each remaining alternative. Because of the high cost associated with this improvement, it is recommended that it be split into a near-term and long-term phase. The near-term improvements would provide sufficient capacity for at least the next 6 years, after which the long-term improvements could be implemented to provide sufficient capacity through 2035. Table 8-1 below summarizes the life cycle cost analysis for the three UV disinfection system improvement alternatives.

Table 8-1
Life-Cycle Comparison of UV Disinfection Improvement Alternatives

Cost Item	Alternative 1	Alternative 2	Alternative 3
Near-Term Opinion of Probable Construction Cost	$1,120,000	$1,470,000	$1,720,000
Long-Term Opinion of Probable Construction Cost	$710,000	$500,000	$970,000
Estimated Annual O&M Cost	$39,700	$39,700	$64,900
Near-Term Present Worth	$1,120,000	$1,470,000	$1,720,000
Long-Term Present Worth	$630,000	$444,000	$861,000
Annual O&M Present Worth	$649,000	$649,000	$1,061,000
Total Present Worth	**$2,399,000**	**$2,563,000**	**$3,642,000**

It is clear from comparison of the alternative life cycle costs that the Aquaray® 3X UV system provides neither capital nor O&M cost savings. As for the Aquaray® 40 HO UV system, the O&M costs are the same, but there is lower capital cost if existing channels are reused (Alternative 1). This is because there is more capital investment overall with Alternative 2 (e.g., greater structural work and relocation of the existing hoist), and more of the capital cost (i.e., construction of the third channel) can be deferred to the long-term phase with Alternative 1. For these reasons, it is recommended that the Aquaray® 40 HO UV system be installed in the two existing channels in the near-term and long-term additional UV equipment be installed in a third new channel. According to Ozonia, the near-term improvements could treat a peak hour flow up to about 15 MGD, which is limited by headloss through the system. Figure 8-2 depicts the proposed layout and phasing of the UV disinfection system improvements, which was developed with input from Ozonia.

Figure 8-6
Layout of Proposed UV Disinfection System Improvements



All of the UV effluent weirs will be installed as part of the near-term phase. There will be three weir troughs, each approximately 23 feet long, to limit the headloss over the weir to no more than 2 inches at the projected 2035 peak hour flow. Additionally, UV Bank 1 will be stepped 1.5 inches and UV Bank 2 will be stepped 1 inch in each channel to allow for increased water level at the upstream end due to headloss through the banks and over the weirs.

8.2.2 New Flow Meter for Flow Split to CEPT Clarifiers

As identified in Chapter 7, it is recommended that an IP68 rated clamp-on style ultrasonic flow meter be installed in a new vault upstream from the location of the existing flow meter. To minimize excavation and avoid disruption to operations, the precast vault will not have a bottom and will rest on a poured footing, allowing it to be slipped over the existing 30-inch pipe. The order-of-magnitude opinion of probable construction cost for these improvements is estimated to be $60,000.

8.2.3 New Coarse Bubble Diffusers and Blower Motor Upgrade

As identified in Chapter 7, it is recommended that the City install a duckbill coarse bubble diffuser system (e.g., Tideflex coarse bubble diffuser system) in the sludge holding tanks to increase mixing so that the tanks can be operated at their full volume. It is also recommended that the motor on the older blower be upgraded from 30 HP to 75 HP so it will match the output and capacity of the newer 75 HP blower, thereby providing redundancy when operating the tanks at full volume. The order-of-magnitude opinion of probable construction cost for these improvements is estimated to be $340,000.

8.2.4 Pressure Reducing Valve for Odor Scrubber

As mentioned in Chapter 7, it is recommended that a 1-inch adjustable PVC pressure regulating valve be purchased and installed by the WWTP staff. It is estimated that the cost associated with purchase of materials and staff time would amount to approximately $2,000.

8.2.5 Anoxic and Anaerobic Zone Drain Repair and Isolation Slide Gates

As identified in Chapter 7, it is recommended that the existing drain valve be abandoned in place and locked in the full-open position. Rather than replacing the valve, it is recommended that a new knife gate valve be installed on the upstream side of the flared elbow at the drain pocket in the tank. This would be much less expensive and disruptive compared to excavating and replacing the valve and would make access for future maintenance much simpler.

Additionally, the City has identified a need for isolation slide gates in the channel between the anaerobic and anoxic zones to prevent large stagnant areas in the channel when tanks are not in use. To avoid impeding access, a cantilevered walkway would be installed on one side of the channel to allow personnel to walk around the slide gate frame. The order-of-magnitude opinion of probable construction cost for both of these improvements is estimated to be $105,000.

8.2.6 Utility Water Slide Gate and Filtration

As previously identified, the existing fiberglass slide gate needs to be replaced with a new aluminum or stainless steel gate and filtration is needed on the utility water system to protect the end uses (e.g., spray nozzles, chemical makeup, etc.) A self-cleaning filter was recommended to avoid excessive maintenance and potential operational issues that could result with a manually cleaned filter. The order-of-magnitude opinion of probable construction cost for both of these improvements is estimated to be $100,000.

8.2.7 Additional Influent Pumping Capacity

As identified in Chapter 7, it is recommended that the existing submersible pumps be replaced with higher capacity submersible pumps. It was determined that Flygt model 3301 submersible pumps could fit within the existing wet well and provide firm capacity meeting the projected 2035 peak hour flow. Although these pumps are not significantly physically larger, the larger motor and flow capacity do require the following additional improvements:

- Replacing the pump base elbows and guide rails
- Replacing the pump VFDs and line reactors
- Pulling new wire to power the pumps
- Modifying the discharge piping in the wet well to provide greater separation between the pumps to avoid interference at the higher flows
- Replacing the wet well lid and hatch to accommodate the wider pump spacing
- Modifying the monorail to accommodate the wider pump spacing
- Modifying the wet well grout fill to accommodate the wider pump spacing
- Bypass pumping to facilitate work inside the influent wet well

The order-of-magnitude opinion of probable construction cost for these improvements is estimated to be $1,000,000.

The City could elect to replace two pumps in the near-term with an estimated opinion of probable construction cost of $540,000. However, the City has limited funding available. Although the firm capacity of the influent pumps is right at the current peak hour flow of 11.5 MGD, the total capacity of all four pumps is 15 MGD. If the City is willing to accept the potential for surcharging in the tributary trunk lines when one pump is out of service, then replacement of all pumps could be completed long-term.

8.2.8 Additional Screening Capacity

As discussed in Chapter 7, it is recommended that new multi-rake bar screens be retrofitted into the existing screening channels. The estimated opinion of probable construction costs for the standard and high-flow multi-rake screens are $730,000 and $770,000, respectively. Because there is not a very significant cost difference, it is recommended that the high-flow multi-rake screens be installed, since they would provide full redundancy at the projected 2035 peak hour flow. The existing conveyor and washer/compactor should be capable of accommodating the new screens with relatively minor modifications.

8.2.9 Equipment Removal from Anaerobic/Anoxic Zones and Aeration Basins

It was recommended in Chapter 7 that access be provided around the structures for retrieval of equipment using a boom truck. The existing slopes along the west side of the anaerobic zones and north side of the aeration basins and anaerobic and anoxic zones will be steepened to a 3:1 grade to allow space for an access road adjacent to the structures. The access roadway would be covered with crushed surfacing and include an entrance off of Semanski Road. Refer to Figure 7-9 in the previous chapter for a conceptual layout. The order-of-magnitude opinion of probable construction cost for this improvement is estimated to be $120,000.

8.2.10 Equipment Removal from RAS/WAS Building

As discussed in Chapter 7, it is recommended that a monorail be retrofitted into the RAS/WAS Building to move equipment from inside to outside. The monorail could be attached to the existing building if it can support the weight, or a freestanding monorail could be installed. The existing rollup door would need to be replaced with swinging double doors that have cutouts for closing around the monorail. The order-of-magnitude opinion of probable construction cost for this improvement is estimated to be $60,000, which assumes installation of a freestanding monorail.

8.2.11 Modifications to Support Clarifier Draining with WAS Pumps

As discussed in Chapter 7, it was recommended that the current procedure for initiating clarifier draining be automated. This involves installing actuators on two manual valves (V-WAS-D6 and V-WAS-D7) that currently must be repositioned manually at intervals throughout the draining process. Additionally, the existing control programming would be modified to automate the clarifier draining sequence using these actuated valves. The order-of-magnitude opinion of probable construction cost for this improvement is estimated to be $60,000, which assumes new valves are provided with the actuators.

Chapter 9 Recommended Improvements

This chapter tabulates improvements identified in Chapter 8 and separates them in to prioritized near-term and long-term categories. The list of near-term improvements will be used to develop the 6-year capital improvement program. Various life cycle costs will occur during future years which are not addressed as specific line item improvements which will be funded as 'other improvements' with 'costs to be determined'.

9.1 Collection System

No overflow conditions were identified for any collection system locations under existing peak day flow conditions. Limited additional development is expected within the City over the next six years; and none is anticipated to cause immediate capacity concerns. Consequently, no piping improvements are proposed for the collection system as part of the six-year CIP.

A Flow Monitoring Program to better define the infiltration-inflow quantities originating in the downtown basin is the only item included in the Six-Year Capital Improvement Plan. This is projected to require about eight flow monitoring stations operating for a single wet season from September through January. The existing rain gage at the King County Transfer Station will provide adequate precipitation data. The program cost is estimated to be $80,000.

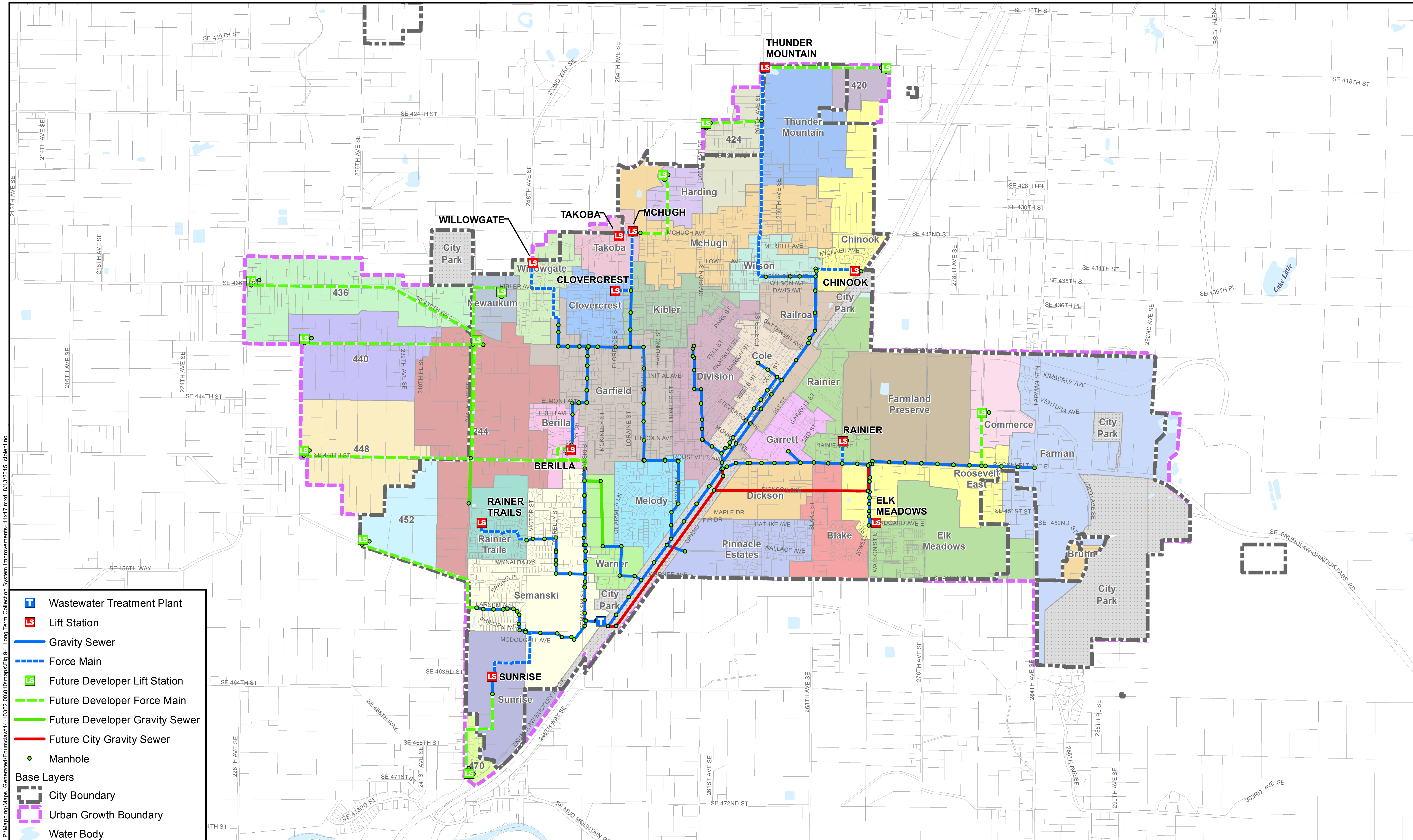
The City needs to update the Sewer Plan every six years to provide input to the Capital Facilities Plan which must be updated every six years. The dynamic model usedshould be updated with the most recent population, employment, land use and recorded flow data at the WWTP plus the localized data produced through the flow monitoring program.

Table 9-1
Short-Term Collection System Improvements of General Benefit

Number	Improvement	Description	Opinion of Probable Cost
1	Flow Monitoring Program	8 flow monitoring gages	$ 80,000
2	General Sewer Plan Update	Update dynamic model	$ 100,000
3	Rate and Charge Study	Update rates and charges	$ 30,000
		Total Opinion of Probable Costs	**$ 210,000**

Projected development that does occur will be required to participate in upgrading the collection system to provide capacity for the projected 2035 hydraulic conditions. The City does not expect to contribute financially to the improvements required by the development and developments may be required to build or contribute towards off-site improvements that support a development.

Chapter 7 discussed capacity alternatives for the existing sewer collection facilities. The long-term recommended collection system improvements are shown in Figure 9-1; as well as several other beneficial improvements that are desirable for improved future operations. Long-term collection system improvements generally benefiting the City sewer system as a whole or in part that may be funded totally or in part by the City are summarized in Table 9-2 in approximate order of priority.



BHC CONSULTANTS

Sewer System: City of Enumclaw 2013
King County GIS base data.
Data sources supplied may not reflect current or actual conditions. This map is a geographic representation based on available information. It does not represent survey data. No warranty is made concerning the accuracy, currency, or completeness of data depicted on this map.
BHC Consultants LLC., assumes no responsibility for the validity of any information presented herein, nor any responsibility for the use or misuse of the data.

N W E S

0 1,000 2,000 4,000 Feet

City of Enumclaw

Long Term Collection System Improvements
General Sewer Plan Update
City of Enumclaw
August 2015

Figure
9-1

Table 9-2
Long-Term Collection System Improvements of General Benefit

Number	Improvement	Description	Opinion of Probable Cost
1	Enumclaw Buckley Road	24" x 4,630 LF	$ 3,490,000
2	Dickson & Watson	15" x4,020 LF	$ 1,770,000
3	Warner Basin	12" x 1,560 LF	$ 740,000
4	Semanski	12" x 290 LF	$ 140,000
5	Semanski Influent to WWTP	18" x 389 LF	$ 240,000
6	Roosevelt Avenue East	15" x 1,120 LF + 12" x 1,510 LF	$ 940,000
7	Railroad Street	24" x 1,120 LF + 18" x 580 LF + 10" x 160 LF	$ 910,000
8	New Willowgate LS & Piping	8" x 450 LF x 12" x 2,500 LF 950 GPM LS + 8" x 2,500 LF FM	$2,930,000
9	SCADA for Existing LS	11 Lift Stations	$ 360,000
10	Other Improvements	See note 1	To Be Determined
Total Opinion of Probable Cost Excluding Other Imp =			**$ 11,520,000**

Note:
1) Other Improvements include: rerouting the Berilla LS force main, gravity sewer to replace the Clovercrest LS, sewer oversizing or additional force main for future development, infiltration-inflow rehabilitation, gravity overflows for lift stations, and other improvements identified in Chapter 7 but not specifically listed in Table 9-2.

Priorities may be revised as funding becomes available and as data is collected to better define City needs and will be subject to change. As noted in Chapter 8, 2035 peak day conditions will still cause some pipes to surcharge but are not projected to cause sufficiently significant problems to warrant inclusion in the recommended improvements.

9.2

9.2 Treatment Facility

Improvements to the treatment facilities are necessarily of general benefit to the sewer system as a whole and are normally funded through the utility. The WWTP improvements are organized into near-term and long-term as shown in Tables 9-2 and 9-3. This organization of needs and the prioritization shown in the tables is in accordance with Chapter 6 conclusions.

Table 9-2
Summary of Near-Term WWTP Improvements

Number	Improvement	Opinion of Probable Cost
1	Evaluate alternatives to address reduced phosphorus discharge limits	$20,000
2	Retrofit Aquaray® 40 HO in the two existing UV channels	$1,120,000
3	New flow meter for flow splitting control to CEPT clarifiers	$60,000
4	Install coarse bubble diffuser systems in the sludge holding tanks and upgrade blower motor	$340,000
5	Install a pressure reducing valve on the odor scrubber	$2,000
6	Install channel isolation slide gates and replace drain valve	$105,000
7	Install utility water filtration and replace fiberglass slide gate	$100,000
	Near-Term Total =	**$1,747,000**

Table 9-3
Summary of Long-Term WWTP Improvements

Number	Improvement	Opinion of Probable Cost
1	Construct third UV channel and install additional UV equipment	$710,000
2	Increase capacity of influent pumping	$1,000,000
3	Install higher capacity mechanical screens	$770,000
4	Construct access roadways to facilitate equipment maintenance	$120,000
5	Install a monorail in the RAS/WAS Building	$60,000
6	Install actuated valves on the WAS discharge	$60,000
	Long-Term Total =	**$2,720,000**

The exclusion of replacing any of influent pumps in the near-term assumes the City is willing to accept potential surcharging in the tributary trunk lines in order to defer replacement of all influent pumps to long-term.

As discussed in Chapter 6, the City has also indicated a desire for other improvements that are not a critical need, but would provide a benefit to operation of the WWTP. As these are not critical items, they would likely not be considered in the near-term. Rather, they are more likely to be considered in the long-term. Neither costs nor prioritization have been developed for these other desired improvements as they are considered optional. The list of other desired improvements communicated by the City is as follows:

- Install a scale to weigh trucks hauling dewatered biosolids
- Re-plumb the scum discharge piping to allow returning scum to the headworks

- Add two additional gates in the existing site fencing to improve access
- Replace the residential gutter system at the Lab/Office Building with commercial grade gutters and install additional downspouts
- Add mesh netting to cover the sludge holding tanks for bird control
- Replace discontinued interior light fixtures

Design and construction challenges for the above desired improvements have not been explored and no opinion of probable costs has been developed.

Chapter 10 Financial Program

This chapter summarizes the financial history of the sewer utility, describes the financial policies, capital funding sources and provides a financing plan for the capital improvements along with the impact on rates and fees. This chapter was prepared by Katy Isaksen & Associates for inclusion in the plan.

10.1 Summary Financial History

The City owns and operates a sewer system along with water, stormwater and natural gas systems. The self-supporting sewer utility is accounted for separately in Wastewater Utility Fund 420 and includes operating, debt and capital expenditures. The ending fund balance remains in the fund to provide for future sewer use and/or improvements. Table 10-1 provides a 3-year financial history of the sewer fund.

Table 10-1 Sewer Financial History

Sewer Fund 420 History	2013	2014	2015
Operating & Non-Oper Revenue			
Monthly Charges	$ 3,896,237	$ 3,924,755	$ 4,122,696
Miscellaneous Charges	$ 13,908	$ 31,142	$ 35,609
Misc. Operating Revenues	$ 4,304	$ 7,296	$ 10,490
Interfund (IF) Loan Draw	$ -	$ 200,000	$ -
Other, Transfer from Equip. Fund	$ 75,000	$ 275,000	$ -
Capital Facilities Charge Revenue	$ 31,495	$ 98,132	$ 251,500
Total Sewer Revenue	**$ 4,020,944**	**$ 4,536,325**	**$ 4,420,295**
Operating Expenditures			
Salaries	$ 462,172	$ 445,370	$ 438,930
Benefits	$ 198,286	$ 189,793	$ 203,510
Supplies	$ 37,977	$ 48,830	$ 54,371
Services/Charges	$ 90,631	$ 90,939	$ 77,754
Electricity	$ 140,881	$ 143,398	$ 141,124
Bio-solids Tipping Fees	$ 103,561	$ 98,272	$ 119,643
City Utility Tax	$ 302,730	$ 315,762	$ 330,300
State PU/B&O Tax	$ 93,563	$ 94,177	$ 95,954
Intergovt/Taxes	$ 18,452	$ 16,220	$ 13,899
Interfund Services			
IF Genl Fund Prof Svcs	$ 237,667	$ 217,833	$ 175,719
IF Data Processing	$ 21,406	$ 38,109	$ 45,398
IF Facilities Maintenance	$ 73,910	$ 68,412	$ 92,103
IF Equipment Rental	$ 70,377	$ 76,755	$ 81,954
Subtotal Operating Exp	$ 1,851,613	$ 1,843,870	$ 1,870,659
Debt Repayment			
Debt Service-DOE/2005 Bonds	$ 34,290	$ 34,361	$ 34,316
Debt Service-2016 LOCAL Program			
Debt Service-PWTF	$ 1,492,314	$ 1,485,289	$ 1,472,167
2011 Revenue Bond P&I/BAN Interest	$ 683,091	$ 457,950	$ 459,481
Interfund Loan Principal Payment	$ -	$ -	$ 250,000
Interfund Loan Interest Payment	$ 19,500	$ 17,124	$ 8,826
Subtotal Debt Repayment	$ 2,229,195	$ 1,994,724	$ 2,224,790
Capital Expenditures			
Capital Outlay/Major Maintenance	$ 11,180	$ 69,694	$ 336,493
Subtotal Capital Exp	$ 11,180	$ 69,694	$ 336,493
Total Sewer Expenditures	**$ 4,091,988**	**$ 3,908,288**	**$ 4,431,942**
Annual Increase/(Use) of Reserves	***$ (71,044)***	***$ 628,037***	***$ (11,647)***

Monthly sewer service charges are the primary source of ongoing revenue along with miscellaneous charges. The capital facilities charges are collected from new connections and development activity has picked up over the period. The City completed an upgrade of the treatment plant in 2009. This required grants/loans and an interfund loan to finance the project.

At the bottom of Table 10-1, the Annual Increase/(Use) of Reserves line provides a quick view of whether the revenue was sufficient to meet the expenses in each year. If revenue exceeds expenses, then the reserves are increased. And if revenues do not meet expenditures, then the reserves are used to balance the year. The utility dipped into reserves in 2013 & 2015 and added in 2014. The total is to the positive for the 3 years due to loans and capital facilities charges.

Table 10-2 shows the sewer ending fund balance and the reserves set aside within. At the end of 2015, the sewer fund balance was $1,616,502. After subtracting $1,408,806 in committed reserves, there was $207,696 available for future capital improvements. The utility met the target reserve level that includes six months of PWTF debt payments, one percent of fixed assets and two months (16%) of operating expenses.

Table 10-2
2015 Ending Sewer Balance

Ending Fund Balance	**$1,616,502**
Reserves Within Ending Balance	
Committed Reserve - PWTF Debt	$736,084
Committed Reserve - 1% Fixed Assets	$373,417
Assigned Reserve - O&M	$299,305
Subtotal Committed Reserves	$1,408,806
Unassigned Reserve	$207,696
Meets Target Reserves?	*Ok*

10.2 Outstanding Debt

The City currently has six outstanding sewer debt issues as shown in Table 10-3. These include two revenue bonds (2005 and 2011), three public works trust fund (PWTF) low-interest loans (2003, 2005, and 2006) and an interfund loan.

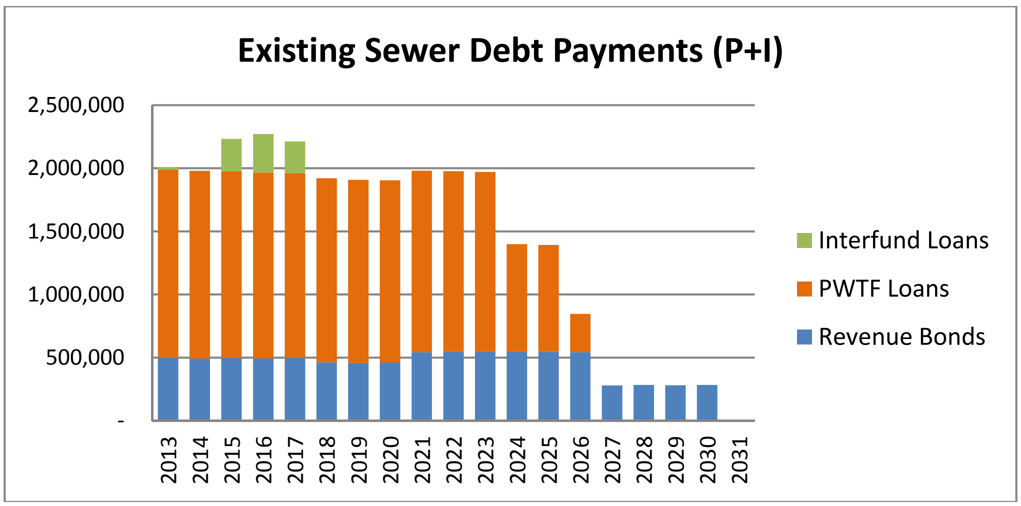
Table 10-3
Summary of Outstanding Debt

Debt Issue	Principal Outstanding End of 2014	Interest Rate	Repayment Years	Year Debt Retires	Payment in 2015	Comments
2005 Rev Bonds	95,146	2.6%-4.0%	13	2017	34,316	
2011 Rev Bonds	5,020,000	2.0%-5.0%	20	2030	462,175	early redemption 9/1/21+
Subtotal	*5,115,146*				*496,491*	*Parity Bonds*
PWTF 2003	5,075,981	0.50%	20	2023	589,378	
PWTF 2005	5,932,854	0.50%	20	2025	569,015	
PWTF 2006	3,621,176	0.50%	20	2026	319,871	
Interfund Loan	800,000	1.25%	3	2017	258,828	
Subtotal	*15,430,011*				*1,737,091*	*Junior Lien*
Totals	**$20,545,157**				**$2,233,582**	

In 2015, the sewer utility made principal and interest payments of $2,233,582. The outstanding principal balance at the end of 2014 was $20,545,157 with interest rates ranging from 0.50% to 5.0%. All existing debt will be paid off by 2030.

Revenue bonds come with a promise that the utility will generate enough revenue each year to pay for operations and maintenance, revenue bond payments plus a little extra. The extra is known as coverage. The PWTF loan program, operated by the State of Washington, has been designed to provide loans that are subordinate to revenue bonds and does not have a coverage requirement, nor does the interfund loan. Coverage is not only an issue for existing debt, it is also important to keep in mind as a strong coverage ratio results in better terms and rates for future bond sales. The City tracks the coverage ratio in the annual financial statement.

The following chart maps the existing sewer debt payments for outstanding revenue bonds, PWTF loans and interfund loans. This does not include new debt associated with the CIP recommended in this plan.



10.3 Current Rates & Charges

The City Council has authority to set rates and charges for the sewer utility to ensure it remains self-sufficient and meets all covenants on outstanding debt. The rates are reviewed annually during the budget process.

10.3.1 Monthly Sewer Rates

The City bills customers monthly for sewer service. The current rates are shown in Table 10-4. Each customer pays a monthly base charge and a volume charge based on metered water use.

A typical single family customer using 600 cubic feet (average winter use) pays $80.80 per month for sewer service. This type of rate structure with a volume charge reinforces the message of water conservation and allows the customer to control their costs for water and sewer service.

Enumclaw Municipal Code EMC 14.08.030 authorizes an annual rate increase based on the CPI-U to keep up with inflation. The rates were adjusted effective January 1, 2016 to reflect additional increases anticipated to fund the CIP under development in this plan. The Council adopted this increase to step up and avoid higher increases that may be necessary to fund the CIP recommended in this sewer plan.

Table 10-4
Current Sewer Rate, effective January 1, 2016

Sewer Rates for Customers With City Sewer		Base Charge per Month	Volume Charge Per CCF
Residential			
	Single Family Residential	$29.02	$8.63
	Low Income Residential	$20.31	$6.04
	Multi-Family Residential (2-4 units)	$29.02	$8.63
	Multi-Family Residential (4 units +)	$29.02	$8.63
	Manufactured Home Park	$29.02	$8.63
Commercial			
	Retail	$29.02	$8.63
	General Office	$29.02	$8.63
	Restaurant	$29.02	$8.63
	Hotels & Motels	$29.02	$8.63
	Public Schools	$29.02	$8.63
	Service Station	$29.02	$8.63
	Other non-residential	$29.02	$8.63

10.3.2 Capital Facilities Charges

Sewer connection fees are charged for each equivalent residential unit (ERU) connecting to the sewer system. All new or upgraded connections that generate additional flow and loading pay a capital facilities charge (CFC). All connections must obtain a sewer permit and pay the associated inspection fees. The current capital facilities charge is $5,716 per ERU.

Multifamily and mixed use classes pay for 0.75 or 0.67 ERU’s per dwelling unit as shown in EMC 14.08.280. All other customer classes define one ERU per 900 cubic feet of water usage per month.

10.4 Capital Improvement Funding

10.4.1 Capital Funding Sources

The City has successfully used a variety of capital funding sources for sewer improvements in the past. These include Revenue bonds, PWTF loans, Utility Local Improvement District (ULID) assessments, connection fees, developer extensions, monthly rates and reserves.

There are other sources of capital funding available for sewer. These include State grants and low-interest loans from the Department of Ecology for the Centennial Clean Water Fund and Clean Water State Revolving Fund (SRF).

The PWTF loan program has been successfully used by the City. Unfortunately, this program is in flux in recent years due to the legislature redirecting the funds to other state uses such as education. The construction program requires that projects be ready to proceed and thus the loans must be drawn within 36 months of approval. This is a competitive program with an annual application cycle in May of each year, with funds being available the following year. The City can monitor to determine whether the program is open for applications each year with the understanding that there is no certainty of funding. If successful, there are low-interest loans.

Ecology has an annual competitive cycle for combined water quality funding sources. The application cycle is typically in October of each year. Early planning is recommended, as Ecology requires certain approvals prior to application, including approval of this sewer plan. The SRF loans would be available the following year at low interest. This is considered the primary funding program for sewer improvements at this time. Projects that combine design and construction into one funding application must be $5 million or less and able to complete the design and have it approved by Ecology within one year of the funding agreement.

The Department of Commerce also has energy efficiency grants and the Community Economic Revitalization Board (CERB) program geared to infrastructure improvements for job creation.

There is an infrastructure funding program database that is provided by the Infrastructure Assistance Coordinating Council (IACC). This can be accessed on the web directly at www.infrafunding.com or through the Public Works Board Website, www.pwb.wa.gov. This database is very helpful in determining which funding assistance programs may be available at the time the City is considering a project and how to contact the agencies.

10.4.2 Local Funding Sources

Monthly sewer rates can provide an on-going level of funds for planned capital repairs and improvements. This is appropriate for repair and replacement of the sewer system to serve existing customers. Capital facilities charges from new connections are also available to fund improvements to the sewer system.

The sewer utility is able to borrow from the above-mentioned financial assistance programs and any loans would need to be repaid by sewer rates and connection charges.

The sewer utility is able to sell revenue bonds and/or general obligation bonds to fund planned system improvements. Revenue bonds would be repaid by sewer rates and connection fees. General obligation bonds could be repaid by sewer rates and charges or general city tax revenue.

The cost of developer-funded projects is not addressed in this financial plan. The identified projects would be completed as necessary by developers in order to connect their property to the system.

10.4.3 Affordability

The Environmental Protection Agency (EPA) defines affordable sewer rates as two percent of median household income (MHI) for a community. This also reflects the test applied by Washington State Department of Ecology to determine the level of hardship in a community when applying for grants and loans for sewer improvement projects. The level of hardship can influence the financial assistance offer, such as amount of grant, interest rate on loans, etc. If the rates are higher, the community would be considered in hardship, would receive extra points on the application and be offered some portion of grant and/or a lower interest rate.

For Enumclaw, the most recent Ecology water quality funding guidelines (SFY2017) show a MHI of $58,000. The threshold for hardship at 2.0% of MHI would be residential sewer rates of

$96.67 per month. A typical residence in Enumclaw currently pays $80.80 per month, assuming 600 cubic feet of average winter use. This level is considered affordable and is non-hardship.

Another measure of affordability is what residents in other local jurisdictions are paying. Table 10-5 compares current sewer rates for a single family residence using 600 cubic feet per month.

Table 10-5
Single Family Sewer Rate Comparison (@600cf)

Sewer Provider	Monthly Rate
Enumclaw	$80.80
Buckley	$77.99
North Bend	$72.94
Black Diamond	$62.00
Maple Valley, Covington (Soos Creek)	$59.53
Orting - High Cedars	$54.09
Bonney Lake (gravity - city grinder)	$37.13 - $51.53
Snoqualmie	$48.51
Orting	$42.59

10.5 Sewer Capital Improvements

Chapter 9 identifies $15, 807,000 in recommended capital improvements for the sewer system during the planning period. The cost estimates are in 2015 dollars. The projects have been scheduled out in Table 10-6 to display the projects as near term or long term and shown by year. The $1,597,000 in near term projects are planned within six years and the majority $14, 210,000 are long term planned for years 7-20.

The colors in Table 10-6 are set to indicate funding sources for the CIP. Green indicates pay-as-you-go and orange indicates borrowing through an Ecology SRF loan.

Table 10-6 Sewer CIP Program	*Est. Cost $2015*		*Escalated to year of construction at 4.0% per year*					
Sewer CIP Program	**Near Term CIP**	**Long Term CIP**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Collection System Improvements - Near Term								
Flow Monitoring Program - Near term	80,000			$86,500				
General Sewer Plan Update	100,000							$126,500
Rate and Charge Study	30,000							$38,000
WWTP Improvements - Near Term								
Retrofit Aquaray 40 HO in 2 exixting UV Channels	1,120,000			$1,211,400				
New flow meter for flow splitting control to CEPT clarifiers	60,000			$64,900				
Install a pressure reducing valve on the odor scubber	2,000			$2,200				
Install channel isolation slide gates & replace drain valve	105,000			$113,600				
Install utility water filtration and replace fiberglass slide gate	100,000			$108,200				
Other process improvements	to be determined							
Collection & Transmission Projects - Long Term								
Enumclaw Buckley Road - Collection		3,490,000						
Dickson & Watson - Collection		1,770,000						
Warner Basin - Collection		740,000						
Semanski - Collection		140,000						
Semanski Influent to WWTP		240,000						
Roosevelt Ave East - Collection		940,000						
Railroad Street - Collection		910,000						
New Willowgate LS & Piping		2,930,000						
SCADA for existing LS		360,000						
Other Improvements*		to be determined						
WWTP Improvements - Long Term								
Construct third UV channel & install additional UV equipment		710,000						
Increase capacity of influent pumps		1,000,000						
Install higher capacity mechanical screens		770,000						
Construct access roadways to facilitate equipment maintenance		90,000						
Install a monorail in the RAS/WAS building		60,000						
Install actuated valves on the WAS discharge		60,000						
Total Sewer CIP	**1,597,000**	**14,210,000**	0	1,586,800	0	0	0	164,500
**Other improvements identified in Chapter 7 but not specifically listed in Table 9-2.*		**15,807,000**	= total CIP in 2015 dollars				6-yr CIP escal	**1,751,300**
Six-Year Funding: Green =Pay-as-you-go, Orange = SRF Loan								

It is reasonable to assume that the costs will be higher in the future when projects are completed. The estimated 2015 costs have been escalated by 4.0% per year to reflect construction cost escalation as shown by year. Thus the $1,597,000 (2015 dollars) is estimated to grow to $1, 751,300 after escalation with the schedule displayed.

10.5.1 Six-Year Capital Improvement Funding

The near term projects have been reviewed for potential funding sources, such as pay-as-you-go through rates and borrowing from a SRF loan. The projects are highlighted by color in Table 10-6 to display the recommended funding source. The projects highlighted in green are to be funded pay-as-you-go by rates and the projects highlighted in orange are to be funded in one SRF loan. Table 10-7 summarizes the funding sources for the six-year CIP.

Table 10-7
Six-Year CIP Funding Sources

Funding Source	Est. in $2015	Escalated
DOE SRF Loan Program	$1,387,000	$1,500,300
Sewer Reserves/Rates	$210,000	$251,000
Total Funding Sources	**$1,597,000**	**$1,751,300**

It is recommended that all the near term wastewater treatment plant improvements be included in one application in October 2016. This would provide funding in 2017 for the City to complete these high priority projects. This sewer plan will need to be approved by Ecology prior to that time.

The loan repayments are assumed to be one year after the improvements are made. The repayment assumes a 20-year loan at 2.5% interest. A loan of $1.5 million would have an estimated annual repayment of $96,000.

10.5.2 Estimated Impact of Six-Year CIP

Table 10-8 shows the estimated impact on customers to complete the six-year CIP. The annual impact is estimated to be $138,000. The monthly cost per customer would be $3.32 to fund the six-year CIP.

Table 10-8
Impact of Six-Year CIP

Annual Impact of Six-Year CIP	
Rate-funded (average annual for six-year)	$42,000
New Debt Service	$96,000
Total Annual Impact of Six-Year CIP	**$138,000**
Sewer Customers (December 2015)	3,461
Estimated Monthly Cost per Customer	**$3.32**

10.6 Six-Year Financial Plan

The six-year plan was developed based on the 2016 budget. Several adjustments were made and future year revenue and expenses were projected using key assumptions. One adjustment is related to new debt for CIP projects. Care was taken to be sure that this financial plan did not double count anticipated new debt proceeds or repayment (such as LOCAL loan for vactor truck). Attempts were made to be conservative in the projections (lower on revenues and higher on expenses) to avoid results that are not achievable.

The key assumptions used in the six-year projections are shown in Table 10-9. These include the number of new customers per year and three cost escalation factors. The Capital Facilities Charge is held constant for the six-years.

Table 10-9
Key Assumptions

Growth - New Sewer ERU's	25
Cost Escalation - Salary	2.0%
Cost Escalation - Benefits	5.0%
Cost Escalation - General	2.0%
Capital Facilities Charge per ERU	$5,716
Average Monthly SF Rate (@ 6ccf)	$80.80
Annual Inflation Adjustment to Rates	1.0%

The average single family monthly bill of $80.80 in 2016 is escalated by 1.0% each year to reflect the automatic inflationary adjustment in City code.

10.6.1 Six-Year Rate Outlook

The six-year outlook for sewer fund 420 is shown in Table 10-10 at the end of this chapter. System replacement funding is assumed to be adjusted as needed to maintain level rates. For example, the system replacement funding is anticipated to increase to $300,000 after the interfund loan has been paid off. The annual inflationary rate adjustment (1.0% per year included) appears to be sufficient to meet the six-year CIP after the 2016 rate increase.

10.6.2 Sewer Fund 420 Revenue

The sewer service charges are estimated using existing 2016 rates and have been adjusted each subsequent year for the annual inflationary increase. City code specifies the CPI-U as of October each year. The model includes 1.0% per year as a conservative estimate for the six-year period. This allows the model to calculate the impact on existing rates to have a balanced program. New customers (25 per year) are added for six-months in the first year. Other revenue is held flat throughout the six-year outlook.

The connection fees reflect the 2016 budget and include capital facilities charges for 25 new connections going forward. Additional new connections would positively impact the sewer bottom line and be available to fund additional CIP either now or in the future.

10.6.3 Sewer Fund 420 Expenditures

The operating expenses are generally projected to increase by cost escalation in Table 10-9. The six-year plan shows an Annual Use of Sewer Reserves in 2017. For one year, this can be addressed by applying reserves. If this were in multiple years, it would be addressed by reduced expenses, increased rates and/or fees, and/or new customer growth exceeding expectations.

10.6.4 Sewer Fund 420 Reserves

The target minimum reserve is set aside in the fund balance as committed or assigned reserves. The unassigned reserve is available for future CIP or other sewer program expenditures.

Table 10-10
Six-Year Sewer Fund Outlook

Sewer Fund 420 Six-Yr Outlook	2016 Budget	2017	2018	2019	2020	2021	Comments
Assumptions							
Growth - New Sewer ERU's	25	25	25	25	25	25	
Cost Escalation - Salary	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	
Cost Escalation - Benefits	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	
Cost Escalation - General	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	
Capital Facilities Charge per ERU	$5,716	$5,716	$5,716	$5,716	$5,716	$5,716	per single fam equiv
Average Residence per Month - 6ccf	$80.80	$81.61	$82.42	$83.25	$84.08	$84.92	2016 rates+1% CPI-U per yr
Operating & Non-Oper Revenue							
Monthly Charges (w 1.0% CPI-U adj)	$ 4,160,000	$ 4,226,082	$ 4,293,070	$ 4,360,976	$ 4,429,810	$ 4,499,584	rates above + new cust
Miscellaneous Charges	$ 28,000	$ 28,000	$ 28,000	$ 28,000	$ 28,000	$ 28,000	flat
Misc. Operating Revenues	$ 11,500	$ 11,500	$ 11,500	$ 11,500	$ 11,500	$ 11,500	flat
LOCAL Loan Proceeds	$ 337,168		$ -	$ -	$ -	$ -	vactor
Capital Facilities Charge Revenue	$ 142,900	$ 142,900	$ 142,900	$ 142,900	$ 142,900	$ 142,900	
Total Sewer Revenue	**$ 4,679,568**	**$ 4,408,482**	**$ 4,475,470**	**$ 4,543,376**	**$ 4,612,210**	**$ 4,681,984**	
Operating Expenditures							
Salaries	$ 463,683	$ 473,000	$ 482,500	$ 492,200	$ 502,000	$ 512,000	by salary escal
Benefits	$ 234,465	$ 246,200	$ 258,500	$ 271,400	$ 285,000	$ 299,300	by benefits escal
Supplies	$ 68,000	$ 69,400	$ 70,800	$ 72,200	$ 73,600	$ 75,100	by general escal
Services/Charges	$ 165,625	$ 168,900	$ 172,300	$ 175,700	$ 179,200	$ 182,800	by general escal
Electricity	$ 145,000	$ 147,900	$ 150,900	$ 153,900	$ 157,000	$ 160,100	by general escal
Bio-solids Tipping Fees	$ 115,000	$ 117,300	$ 119,600	$ 122,000	$ 124,400	$ 126,900	by general escal
City Utility Tax	$ 335,000	$ 341,200	$ 346,600	$ 352,000	$ 357,500	$ 363,100	.08 x oper rev
State PU/B&O Tax	$ 102,000	$ 76,800	$ 78,000	$ 79,200	$ 80,400	$ 81,700	.018 x oper rev
Intergovt/Taxes	$ 19,000	$ 19,400	$ 19,800	$ 20,200	$ 20,600	$ 21,000	by general escal
Interfund Services							
IF Genl Fund Prof Svcs	$ 180,403	$ 184,000	$ 187,700	$ 191,500	$ 195,300	$ 199,200	by general escal
IF Data Processing	$ 57,570	$ 58,700	$ 59,900	$ 61,100	$ 62,300	$ 63,500	by general escal
IF Facilities Maintenance	$ 98,024	$ 100,000	$ 102,000	$ 104,000	$ 106,100	$ 108,200	by general escal
IF Equipment Rental	$ 51,226	$ 52,300	$ 53,300	$ 54,400	$ 55,500	$ 56,600	by general escal
Subtotal Operating Exp	$ 2,034,996	$ 2,055,100	$ 2,101,900	$ 2,149,800	$ 2,198,900	$ 2,249,500	
Existing Debt Repayment							
Existing Debt - DOE/2005 Bonds P&I	$ 34,225	$ (0)	$ -	$ -	$ -	$ -	final pmt 2017 by reserve
Existing - 2011 Revenue Bond P&I	$ 460,275	$ 463,225	$ 463,425	$ 458,225	$ 461,525	$ 544,150	by debt sched.
Existing Debt -PWTF Loans P&I	$ 1,471,238	$ 1,464,212	$ 1,457,186	$ 1,450,161	$ 1,443,135	$ 1,436,110	by debt sched.
New '16 Budget - LOCAL Loan P&I	$ 7,027	$ 38,524	$ 38,524	$ 38,524	$ 38,524	$ 38,524	vactor not in CIP below
Existing - Interfund Loan Payment P&I	$ 310,343	$ 256,464	$ 5,188	$ -	$ -	$ -	fr '16 bdgt-not match debt
Subtotal Exist/Bdgt Debt Repayment	$ 2,283,108	$ 2,222,425	$ 1,964,323	$ 1,946,910	$ 1,943,184	$ 2,018,784	
Capital Expenditures							
Capital Outlay/Major Maintenance	$ 225,000						from 2016 budget
System Replacement Funding	$ 50,000	$ 50,000	$ 300,000	$ 300,000	$ 300,000	$ 150,000	system repl/expansion
CIP - New Loan Proceeds - SRF		$ (1,500,300)					see CIP tab
CIP - New Debt Payments			$ 96,000	$ 96,000	$ 96,000	$ 96,000	see CIP tab
CIP - Program Expenditures		$ 1,586,800	$ -	$ -	$ -	$ 164,500	see CIP tab
Subtotal Capital Exp	$ 275,000	$ 136,500	$ 396,000	$ 396,000	$ 396,000	$ 410,500	
Total Sewer Expenditures	**$ 4,593,104**	**$ 4,414,025**	**$ 4,462,223**	**$ 4,492,710**	**$ 4,538,084**	**$ 4,678,784**	
Annual Increase/(Use) of Reserves	***$ 86,463***	***$ (5,542)***	***$ 13,247***	***$ 50,666***	***$ 74,125***	***$ 3,201***	
Beginning Fund Balance - 420	**$ 1,616,502**	**$ 1,702,965**	**$ 1,697,423**	**$ 1,710,670**	**$ 1,761,336**	**$ 1,835,462**	
Annual Increase/(Use) of Reserves	*$ 86,463*	*$ (5,542)*	*$ 13,247*	*$ 50,666*	*$ 74,125*	*$ 3,201*	
Ending Fund Balance - 420	**$ 1,702,965**	**$ 1,697,423**	**$ 1,710,670**	**$ 1,761,336**	**$ 1,835,462**	**$ 1,838,662**	
Reserves Within Ending Balance							
Committed Reserve - PWTF Debt	$ 735,619	$ 732,106	$ 728,593	$ 725,080	$ 721,568	$ 718,055	six months PWTF pmts
Committed Reserve - 1% FA	$ 373,417	$ 373,417	$ 373,417	$ 373,417	$ 373,417	$ 373,417	1% fixed assets
Assigned Reserve - O&M	$ 325,599	$ 328,816	$ 336,304	$ 343,968	$ 351,824	$ 359,920	2 mos oper exp (16%)
Subtotal Committed Reserves	$ 1,434,635	$ 1,434,339	$ 1,438,314	$ 1,442,465	$ 1,446,809	$ 1,451,392	
Unassigned Reserve	$ 268,330	$ 263,084	$ 272,356	$ 318,871	$ 388,653	$ 387,270	
Meets Target Reserves?	*ok*	*ok*	*ok*	*ok*	*ok*	*ok*	

Conclusion: The annual inflationary rate ajdustment (1.0% per year included in estimated revenue) appears to be sufficient to meet the six-year CIP.
The monthly sewer bill for the average residence is shown above in assumptions.

Appendix A – NPDES Permit

FACT SHEET FOR NPDES PERMIT WA0020575
FACILITY NAME: CITY OF ENUMCLAW
WASTEWATER TREATMENT FACILITY

TABLE OF CONTENTS

INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) 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 National Pollutant Discharge Elimination System (NPDES) permits, which is administered by the Environmental Protection Agency (EPA). The EPA has delegated responsibility to administer the NPDES permit program to the state of Washington on the basis of Chapter 90.48 Revised Code of Washington (RCW) which defines the Department of Ecology's (Department) authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the state include procedures for issuing permits [Chapter 173-220 Washington Administrative Code (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 discharge of wastewater to waters of the state is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least 30 days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see <u>Appendix A--Public Involvement</u> of the fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix D--Response to Comments.

GENERAL INFORMATION	
Applicant	City of Enumclaw 1309 Myrtle Avenue Enumclaw, WA 98022
Facility Name and Address	Enumclaw Wastewater Treatment Facility 451 Semanski Street South Enumclaw, King County, WA 98022
Type of Treatment:	Rotating Biological Contactors Secondary Treatment and Ultraviolet Disinfection
Discharge Location	White River at Enumclaw, River Mile 23.1 Latitude: 47º 10' 31" N Longitude: 122º 01' 21" W.
Water Body ID Number	WA-10-1030

BACKGROUND INFORMATION

DESCRIPTION OF THE FACILITY

HISTORY

The existing secondary treatment plant for the City of Enumclaw was completed in May, 1980, with a design capacity of 2.45 million gallons per day (mgd) and a service population of 11,000. The current annual average flow is 1.67 mgd, current maximum month flow is 2.26 mgd, and the current population served is 10,740. The Enumclaw Wastewater Treatment Facility (WWTF) has been designated as requiring a major permit by the United States EPA.

Beginning in 1990, the Department conducted a total maximum daily load (TMDL) study for dissolved oxygen, ammonia and chlorine in the Puyallup River basin (White, Carbon, and Puyallup Rivers). The study provided recommendations for implementation of seasonal permit limits and exchanging a portion of an ammonia allocation to increase an allocation for BOD. The TMDLs wasteloads proposed for the Puyallup River basin currently are:

20,322 pounds per day of BOD_5

3,350 pounds per day of ammonia (as nitrogen)

Wasteload allocations currently set for Enumclaw are:

504 pounds per day of BOD_5

99 pounds per day of ammonia (as nitrogen) effective May 1, through October 31.

Additional information on the TMDL can be obtained in the Department's July 1993, TMDL Report and the July 22, 1994, addendum.

Additional TMDL studies have been conducted regarding pH and nutrient limitations in the White River and will result in new discharge standards for total phosphorus. These new and more stringent discharge standards cannot be met with the type of process currently utilized by the City of Enumclaw's wastewater treatment plant.

As a result the City of Enumclaw submitted a facility plan in September 2001, outlining proposals for a new wastewater treatment plant to provide the necessary treatment to meet the more stringent discharge requirements for ammonia and nitrogen reduction, biological and chemical phosphorus reduction, as well as an increase in plant capacity to accommodate population projections over the next 20 years.

COLLECTION SYSTEM STATUS

The existing collection system consists of approximately 40 miles of separate gravity sewers (primarily concrete pipe) and seven pump stations with force mains. None of the lift stations have overflow capabilities.

The collection system experiences significant amounts of infiltration and inflow (I/I) especially in the older sections of town. Monitoring of flows vs. rainfall data indicates considerable inflow. Since the original collection system had combined sanitary and storm sewers, it is possible that some stormwater inflows remain.

The Permittee has performed a number of repairs to the collection system and continues efforts to reduce I/I. One bypass point exists at manhole A-7 located on the east side of Highway 410 across from the treatment plant. A bypass occurs when the volume of water exceeds the capacity of collection system to transport flows. The overflow manhole is an elevated invert with pressure-treated wood slats installed in a slide gate. The overflow is set for discharge at approximately 5 feet above the influent invert. The collection system is allowed to surcharge to a point of near flooding in upstream homes and businesses before the bypass becomes activated. The bypass flows combine with the treated effluent in the outfall line for discharge to the White River. Bypasses only occur during exceptional storm events for the protection of the treatment plant. The bypass has not been known to occur during the past four years and has occurred maybe twice in the history of the plant. The operators have installed an indicator light connected to floats to visually indicate when a bypass is occurring, however, there is no metering device to gauge the volume of discharge. Since there is no power near the bypass manhole the alarm system is powered by a 12 volt car battery which is changed out about every three months.

TREATMENT PROCESSES

Flow enters the plant through two sewers, one from the east and one from the west, discharging into a shallow wet well. Three WEMCO immersible Pre-rotation Hydrostal pumps (replacing the three former screw pumps) lift the wastewater up to the channel grinder. The grinder structure has two divided channels with the grinder in one and a simple bar screen in the second channel. Immediately downstream of the channel grinder is the Parshall flume to measure influent flows followed by the aerated grit chamber to remove sand and gravel and other heavy solids. The wastewater then flows by gravity to the two 50-foot diameter primary clarifiers.

Flow from the primary clarifiers flows to the rotating biological contractors (RBCs) used for secondary treatment. The flow to the RBC's can be diverted to all or any of the four trains of three shafts. The process is currently operated with two parallel flow trains of six shafts per train. Part of the flow can be diverted to the fourth shaft to decrease the loading on the first three shafts.

From the RBC secondary process flow travels to the two 50 foot diameter secondary clarifiers. Effluent from the secondary clarifiers is disinfected with ultraviolet light prior to discharge into the discharge line which runs under SR 410 and connects with the 30-inch discharge line.

The only significant industry, Farman Brothers Pickle Company, has closed down so there are no major industrial users left in the City of Enumclaw WWTF service area.

The City of Enumclaw Wastewater Treatment Facility is a Class III facility and is staffed 8 hours a day by a Class III Operator. The facility has four positions but currently has only three operators which operate the plant 365 days a year. The operators rotate holidays and weekends to come in to do the necessary test and check the plant.

The publicly owned treatment works (POTW) has a state accredited laboratory for general chemistry and microbiology. The Permittee sends whole effluent toxicity, metals, and priority pollutant samples to Metro for analysis.

The facility has a monitored 24-hour alarm system that notifies the operating personnel of a system failure during the hours an operator is not on duty. The plant also has an emergency on-site generator.

DISCHARGE OUTFALL

The outfall line consists of 260 lineal feet of 24-inch diameter pipe that crosses under SR 410 and connects up with the 30-inch diameter outfall line at manhole A-3. Manhole A-3 also receives raw influent bypass flow from diversion manhole A-7 during extremely high flow conditions that is discharged along with the plant effluent. The 30-inch diameter outfall line continues southwest for 7,300 feet along SR 410 and discharges on the north bank of the White River just downstream of the SR 410 bridge. At the river the 30-inch pipe splits into two separate 70 foot long outlet pipes encased in concrete. The diffuser end is above the flow channel during late-summer low flows, with effluent filtering through the local gravel bed to reach the river. Consequently, the plume hugs the shoreline for some distance downstream and proper mixing is delayed.

Near the Enumclaw outfall, the White River has a relatively high gradient with significant coarse gravel mobility. The river has a very active channel morphology characterized by heavy scour during flood flows as well as mobile gravel bars. A multi-port diffuser would be subject to cyclic scour and erosion around anchoring structures, followed by coverage and plugging from sediment loads. Therefore, a multi-port diffuser is not considered feasible at this location of the White River. It is preferable to retain the discharge location at present rather than to continue to disrupt the receiving environment by continued repairs to a multi-port diffuser type outfall structure in an attempt to provide better initial mixing.

The permitted outfall is located on the White River at river mile 23.1. Upstream of the discharge at river mile 24.3, a large portion of the White River flow is diverted through Lake Tapps for power generation and then returned to the White River at river mile 3.6. A fish screen return flow of 20 cfs is returned to the natural river channel at river mile 21 below the City of Buckley's WWTF outfall.

The instream flow of the natural channel of the White River is regulated by the Federal Energy Regulatory Commission (FERC). Flows may not be diverted into Lake Tapps such that flows in the natural channel of the White River fall below the following schedule as measured at USGS 12100000 located below Bosie Creek at river mile 23.1:

Interim Flows as of July 2001 (below Boise Creek at USGS 12100000)

Month	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
cfs	130	200	275	350	350	250	250	250	275	250	130	130

There are several proposals by FERC and the National Marine Fisheries Service (NMFS) to change these interim flows so that higher flows would be maintained in the natural channel of the White River for salmonid passage.

RESIDUAL SOLIDS

The treatment facilities remove solids during the treatment of the wastewater at the headworks (grit and screenings), and at the primary and secondary clarifiers, in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. Grit, rags, scum and screenings are drained and disposed of as solid waste at the local landfill.

Solids that settle out in the clarifiers are transported to a primary anaerobic digester for stabilization. Sludge is then transferred to a secondary digester for settling and thickening. The stabilized sludge is then pumped from the tank and hauled for land application at approved sites in King County. According to the data submitted with the NPDES application, the Permittee is in compliance with the requirements of 40 CFR 503 for a Class B sludge. The Permittee is investigating other options for beneficial use or disposal since land application sites may not remain available during wet weather.

PERMIT STATUS

The previous permit for this facility was issued on March 8, 1995. The previous permit placed effluent limitations on 5-day Biochemical Oxygen Demand (BOD_5), Total Suspended Solids (TSS), pH, Fecal Coliform Bacteria, Ammonia-N, Chlorine Residual, Mercury, Copper and Whole Effluent Toxicity.

An application for permit renewal was submitted to the Department on October 13, 1999, and accepted by the Department on November 14, 2000.

SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT

During the history of the previous permit, information from Discharge Monitoring Reports (DMRs) submitted to the Department indicate the following permit violations:

> There have been five loading violations and eight percent removal violations for BOD_5. There were five violations of the percent removal and one loading violation for TSS and there were 32 violations of the monthly average and 11 violations of the daily maximum limit for total copper.

The City of Enumclaw continues to work on infiltration and inflow in their collection system to reduce the peak flows causing their BOD_5 and TSS loading violations. Enumclaw is also in the process of upgrading their wastewater facility to include biological and chemical removal of phosphorus which along with corrosion control on the water supply for the City will reduce the amount of copper in their wastewater discharges.

WASTEWATER CHARACTERIZATION

The concentration of pollutants in the discharge was reported in the NPDES application and in discharge monitoring reports. The effluent is characterized as follows:

Table 1: Wastewater Characterization

Parameter	Concentration or Rate
Flow	1.41 MGD ADWF – 2.26 MGD AFMM
BOD_5	14.3 mg/L annual average – 17.7 mg/L weekly average
TSS	10.6 mg/L annual average – 13.8 mg/L weekly average
Fecal Coliform Bacteria	40.2 cfu annual average – 109.4 cfu weekly average
pH	6.2 SU – 7.6 SU
Total Ammonia as N (Summer)	1.76 mg/L annual average – 2.91 mg/L maximum monthly average
Total Ammonia as N (Winter)	2.27 mg/L annual average – 3.57 mg/L maximum monthly average
Dissolved Oxygen	5.6 mg/L annual average
Temperature (Summer)	17.3°C avg., 20.6°C max month avg., 12.2°C min. month avg.
Temperature (Winter)	13.0°C avg., 15.6°C max month avg., 11.1°C min. month avg.
Total Copper	49.8 µg /L average, 75 µg/L maximum value
Total Mercury	0.0 µg/L
Hardness	71.4 mg/L

PROPOSED PERMIT LIMITATIONS

Federal and state regulations require that effluent limitations set forth in a NPDES permit must be either technology- or water quality-based. Technology-based limitations for municipal discharges are set by regulation (40 CFR 133, and Chapters 173-220 and 173-221 WAC). Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992.) The most stringent of these types of limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the state of Washington were determined and included in this permit. The Department does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent**.** Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation**.** Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

DESIGN CRITERIA

In accordance with WAC 173-220-150 (1)(g), flows or waste loadings shall not exceed approved design criteria.

The current design criteria for this treatment facility were taken from the previous permit and the City of Enumclaw Wastewater Treatment and Disposal Facilities Engineering Report prepared by H.R. Esvelt Engineering and Cosmopolitan Engineering Group, September 2001 and are as follows:

Table 2: Design Standards for the City of Enumclaw WWTP.

Parameter	Current Design Criteria
Monthly average flow (max. month)	2.6 MGD
Monthly average dry weather flow	1.8 MGD
Peak daily flow	4.9 MGD
Peak hourly flow	6.4 MGD
BOD_5 influent loading	2,540 lb./day
TSS influent loading	2,540 lb./day
BOD_5/TSS Removal efficiency	85%

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Municipal wastewater treatment plants are a category of discharger for which technology-based effluent limits have been promulgated by federal and state regulations. These effluent limitations are given in the Code of Federal Regulations (CFR) 40 CFR Part 133 (federal) and in Chapter 173-221 WAC (state). These regulations are performance standards that constitute all known available and reasonable methods of prevention, control, and treatment for municipal wastewater.

The following technology-based limits for pH, fecal coliform, BOD_5, and TSS are taken from Chapter 173-221 WAC are:

Table 3: Technology-based Limits.

Parameter	Limit
pH	Lower bound to 6.0 standard units

Parameter	**Limit**
BOD_5 (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L
TSS (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L

The following technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b).

The BOD_5 weekly average effluent mass loading was set by the Puyallup River TMDL at **504 lbs./day**. The BOD_5 monthly average effluent mass loading is calculated as 2/3 x weekly average mass loading = **336 lbs/day**.

TSS monthly effluent mass loadings (lbs/day) were calculated as the maximum monthly influent design loading (2,540 lbs/day) x 0.15 = **381 lbs/day**. The TSS weekly average effluent mass loading is calculated as 1.5 x monthly mass loading = **571.5 lbs/day**.

SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards. The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) is a state regulation designed to protect the beneficial uses of the surface waters of the state. Water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading study (TMDL).

NUMERICAL CRITERIA FOR THE PROTECTION OF AQUATIC LIFE

"Numerical" water quality criteria are numerical values set forth in the state of Washington's Water Quality Standards for Surface Waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving water while remaining protective of aquatic life. Numerical criteria set forth in the Water Quality Standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

NUMERICAL CRITERIA FOR THE PROTECTION OF HUMAN HEALTH

The state was issued 91 numeric water quality criteria for the protection of human health by the U.S. EPA (EPA 1992). These criteria are designed to protect humans from cancer and other disease and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

Narrative Criteria

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the state of Washington.

Antidegradation

The state of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when the natural conditions of a receiving water are of higher quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. More information on the state Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

The Department has reviewed existing records and is unable to determine if ambient water quality is either higher or lower than the designated classification criteria given in Chapter 173-201A WAC; therefore, the Department will use the designated classification criteria for this water body in the proposed permit. The discharges authorized by this proposed permit should not cause a loss of beneficial uses.

Critical Conditions

Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic water body uses.

Mixing Zones

The Water Quality Standards allow the Department to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving all known, available, and reasonable methods of prevention, control and treatment (AKART) and in accordance with other mixing zone requirements of WAC 173-201A-100.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

Description of the Receiving Water

The facility discharges to the White River at RM 23.1 which is designated as a Class A receiving water in the vicinity of the outfall. Downstream of the Enumclaw outfall at RM 21.8 is the City of Buckley's wastewater outfall. Upstream of the Enumclaw discharge at RM 24.3, a large portion of the White River flow is diverted through Lake Tapps for power generation and then returned to the White River at RM 3.6. The instream flow of the natural White River channel is currently maintained above 130 cfs at USGS 12100000 located below Bosie Creek at river mile 23.1 by an agreement between Puget Sound Power and Light Company and the Muckleshoot Tribe. There is also a fish screen return flow of 20 cfs returned to the natural river channel below the City of Buckley's outfall.

Characteristic uses of this stretch of the White River include the following: water supply (domestic, industrial, agricultural); stock watering; fish migration; fish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation.

Water quality of this class shall markedly and uniformly exceed the requirements for all or substantially all uses.

SURFACE WATER QUALITY CRITERIA

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Criteria for this discharge are summarized below:

Fecal Coliforms	100 organisms/100 mL maximum geometric mean
Dissolved Oxygen	8 mg/L minimum
Temperature	18 degrees Celsius maximum or incremental increases above background
pH	Upper bound to 8.5 standard units
Turbidity	less than 5 NTUs above background
Toxics	No toxics in toxic amounts (see Appendix C for numeric criteria for toxics of concern for this discharge)

CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR NUMERIC CRITERIA

Pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls which the Department has determined to be AKART. A mixing zone is authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC and are defined as follows:

Chronic Mixing Zone: 26.75 feet wide, extends 300 feet downstream and 100 feet upstream.

Acute Mixing Zone: 26.75 feet wide, extends 30 feet downstream and 10 feet upstream.

The dilution factors of effluent to receiving water that occur within these zones have been determined at the critical condition by the use of continuous stream flow and effluent flow data and the RIVPLUM5 model. The dilution factors have been determined to be (from Appendix C):

	Acute	Chronic
Aquatic Life	1.81	4.32
Human Health, Carcinogen		17.6
Human Health, Non-carcinogen		11.8

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants--their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

Section 305(b) of the Clean Water Act requires the state to assess the quality of surface waters and to identify impairment of designated beneficial uses pursuant to the state water quality standards (WAC 173-201A). The most recent assessment indicates that the White River (RM 0 to 29.6) occasionally exceeds the fecal coliform criterion. The high fecal coliform count occurs after rainfall events and appears to be related to storm water runoff.

In addition, the upper bound of the water quality criteria for pH (6.5 to 8.5 standard units) is violated in the natural White River channel between the diversion to and outflow from Lake Tapps. Water quality toxicity criteria for ammonia are also seasonally affected by high temperature and pH. Conditions in the White River channel appear to be most limiting for ammonia between May and October.

For aquatic life protection, the critical condition for the White River is the seven day average low river flow with a recurrence interval of ten years (7Q10). Ambient data at critical conditions in the vicinity of the Enumclaw outfall was taken from the TMDL study which considered both historical data and an intensive monitoring study conducted in June, 1993. The ambient data used for this permit include the most restrictive values in the immediate vicinity of the Enumclaw outfall (see Appendix C) as follows:

Parameter	**Value used**
7Q10 low flow	130 cfs
Velocity	1.45 ft/sec
Depth	0.82 feet
Width	107 feet
Roughness (Manning)	n=0.0777
Slope	6.6 E-03 (0.378 degrees)
Temperature	1.5 ^{o}C – 12.7 ^{o}C
pH (high)	8.1
Dissolved Oxygen	11.32 mg/L
Total Ammonia-N	0.013 mgN/L
Fecal Coliform	42/100 mL dry weather, 260/100 mL wet weather (>1300/100 mL storm related)
Turbidity	27 NTU
Alkalinity	24.25 mg/L as CaCO3
Hardness	25.35 mg/L as CaCO3
Metals	Ambient metal concentrations shall be determined from the receiving water study. For reasonable potential determinations ambient metals were assumed to be zero due to the lack of sufficient data.

All Other Metals	0.0 (below detection limits)

The critical river conditions for human health protection are defined in EPA's "National Toxics Rule" (NTR, 57 FR 60848, December 1992) as the 30Q5 low flow (30-day average flows with a recurrence interval of five years) for noncarcinogens and the harmonic mean flow for carcinogens. The following summary statistics were estimated using the 14 complete annual periods between November 7, 1986, and December 31, 2001:

	FERC Interim Flows as of July 2001 @ USGS 12100000
Harmonic mean flow	303 cfs
30Q5 low flow	147 cfs

BOD_5--Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters within the allowed mixing zones near the outfall. Therefore, the technology-based effluent limitation for BOD_5 was placed in the permit. There will be loading limits imposed from the Puyallup TMDL to protect any cumulativenm downstream impacts on Dissolved Oxygen.

The impact of BOD on the receiving water was modeled using Streeter-Phelps analysis of critical dissolved oxygen sag at critical condition and with the technology-based effluent limitation for BOD_5 described under "Technology-Based Effluent Limitations" above. The calculations used to determine dissolved oxygen impacts are shown in Appendix C.

Temperature -- The impact of temperature on the receiving water was modeled using a simple mixing analysis for both a summer and winter season. The input variables for May to October where a dilution factor of 9.04, upstream temperature 13.94°C, and effluent temperature 20°C. This simple mixing analysis resulted in a calculated mixed temperature of 14.6°C and an incremental increase of the ambient water temperature of 0.67°C. The water quality standards for temperature in a class A (excellent) receiving water are not to exceed 18°C and a maximum incremental temperature increase of t = 28/(13.94°C +7) = 1.39°C. The input variables for November to April where a dilution factor of 4.08, upstream temperature 7.73°C, and effluent temperature 15°C. This simple mixing analysis resulted in a calculated mixed temperature of 9.5°C and an incremental increase of the ambient water temperature of 1.78°C. The water quality standards for temperature in a class A (excellent) receiving water are not to exceed 18°C and a maximum incremental temperature increase of t = 28/(7.73°C +7) = 1.9°C.

There is no predicted violation of the temperature standard so no permit limit for temperature will be placed in the permit.

pH-- There is currently a TMDL for pH on the White River due to excursions of background pH that sometimes reach 9.3 SU downstream of the outfall, therefore the upper bound water quality criteria of 8.5 SU and the lower bound technology based limit of 6.0 SU was placed in the permit to be protective of the pH criterion.

Fecal coliform - Since background levels of fecal coliform were found to be above the water quality criterion for fecal coliform the water quality criteria of 100 organisms/100 ml was placed in the permit to be protective of the fecal coliform criterion instead of the technology-based limitation.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

The following toxics were determined to be present in the discharge: ammonia, copper, nickel, and, zinc. A reasonable potential analysis (See Appendix C) was conducted on these parameters to determine whether or not effluent limitations would be required in this permit.

The determination of the reasonable potential for ammonia, copper, nickel, and, zinc to exceed the water quality criteria was evaluated with procedures given in EPA, 1991 (Appendix C) at the critical condition. The parameters used in the critical condition modeling are as follows: acute dilution factor 1.81, chronic dilution factor 4.32, May-October receiving water temperature 15.2^{o}C, November-April receiving water temperature 8.4^{o}C, effluent hardness 72.03 mgCaCO3/L, receiving water hardness 23.3 mg $CaCO_3$/L), receiving water total ammonia 0.02 mg/L May-October and 0.04 mg/L November to April. Receiving water monitoring were set at zero until the receiving water study is completed.

There was very little ambient data available for ammonia and heavy metals. The Permittee is required in section S8 of the proposed permit to perform a receiving water study during the next permit term. This information may result in a permit modification or limits in the next renewal.

Effluent limits were derived for total ammonia and copper, which were determined to have a reasonable potential to cause a violation of the Water Quality Standards. Effluent limits for copper were calculated using methods from EPA, 1991 as shown in Appendix C. Effluent limits for Ammonia-N were calculated using dynamic modeling to calculate daily waste load criteria and used a three year return period for a log normal distribution to determine the monthly average and daily maximum permit limit Appendix C.

The resultant effluent limits are as follows:

<table>
<tr><th>Parameter</th><th colspan="2">Average Monthly</th><th colspan="2">Maximum Daily</th></tr>
<tr><td>Total Ammonia (as NH_3-N)
May-October</td><td colspan="2">9.1 mg/L</td><td colspan="2">15 mg/L,
99 lb/day</td></tr>
<tr><td>Total Ammonia (as NH_3-N)
November to April</td><td colspan="2">6.5 mg/L</td><td colspan="2">10.7 mg/L</td></tr>
<tr><td></td><td>Interim</td><td>Final</td><td>Interim</td><td>Final</td></tr>
<tr><td>Total Copper</td><td>72 µg/L</td><td>14.7 µg/L</td><td>84 µg/L</td><td>17 µg/L</td></tr>
</table>

The proposed permit contains a compliance schedule for meeting the water quality-based limits for copper. The City is currently installing a corrosion control system on the water supply to comply with Department of Health requirements for copper in the City of Enumclaw drinking water. This system should be completed in October 2002 and we should be seeing results in the wastewater effluent within six months. The proposed permit contains interim limits for copper, as required by Chapter 173-201A WAC, that are based on existing demonstrated performance. The permit also contains water quality derived final permit limits for copper.

Water quality criteria for metals in Chapter 173-201A WAC are based on the dissolved fraction of the metal.

The Permittee may provide data clearly demonstrating the seasonal partitioning of the dissolved metal in the ambient water in relation to an effluent discharge. Metals criteria may be adjusted on a site-specific basis when data is available clearly demonstrating the seasonal partitioning in the ambient water in relation to an effluent discharge.

Metals criteria may also be adjusted using the water effects ratio approach established by USEPA, as generally guided by the procedures in USEPA Water Quality Standards Handbook, December 1983, as supplemented or replaced.

WHOLE EFFLUENT TOXICITY

The WET tests during effluent characterization indicate that no reasonable potential exists to cause receiving water acute toxicity, and the Permittee will not be given an acute WET limit and will only be required to retest the effluent prior to application for permit renewal in order to demonstrate that acute toxicity has not increased in the effluent.

If the Permittee makes process or material changes which, in the Department's opinion, results in an increased potential for effluent toxicity, then the Department may require additional effluent characterization in a regulatory order, by permit modification, or in the permit renewal. Toxicity is assumed to have increased if WET testing conducted for submission with a permit application fails to meet the performance standards in WAC 173-205-020, "whole effluent toxicity performance standard." The Permittee may demonstrate to the Department that changes have not increased effluent toxicity by performing additional WET testing after the time the process or material changes have been made.

Chronic toxicity was measured in the previous permit term. This toxicity was found to be at levels that, in accordance with WAC 173-205-050(2)(a), have a reasonable potential to cause receiving water toxicity. The results of this WET testing cannot be used to characterize effluent toxicity or make the regulatory determination required in Chapter 173-205 WAC. In accordance with WAC 173-205-030(5)(b), the Permittee is required to conduct a effluent characterization for whole effluent toxicity.

HUMAN HEALTH

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the state by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

The Department has determined that the applicant's discharge does not contain chemicals of concern based on data collected during the current permit term. The discharge will be re-evaluated for impacts to human health at the next permit reissuance.

SEDIMENT QUALITY

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

The Department has been unable to determine at this time the potential for this discharge to cause a violation of sediment quality standards. If the Department determines in the future that there is a potential for violation of the Sediment Quality Standards, an order will be issued to require the Permittee to demonstrate that either the point of discharge is not an area of deposition or, if the point of discharge is a depositional area, that there is not an accumulation of toxics in the sediments.

GROUND WATER QUALITY LIMITATIONS

The Department has promulgated Ground Water Quality Standards (Chapter 173-200 WAC) to protect uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

This Permittee has no discharge to ground, and therefore, no limitations are required based on potential effects to ground water.

COMPARISON OF EFFLUENT LIMITS WITH THE EXISTING PERMIT ISSUED MARCH 8, 1995

Existing Limits			Proposed Limits		
BOD_5	30 mg/L 45 mg/L	336 lbs/day 504 lbs/day	BOD_5	30 mg/L 45 mg/L	336 lbs/day 504 lbs/day
TSS	30 mg/L 45 mg/L	381 lbs/day 572 lbs/day	TSS	30 mg/L 45 mg/L	381 lbs/day 572 lbs/day
F. Coliform 200/100 mL - 400/100 mL			F. Coliform 100/100 mL - 200/100 mL		
pH 6.0 - 8.5			pH 6.0 - 8.5		
Ammonia-N May-Oct	3 mg/L 7 mg/L	99 lbs/day	Ammonia-N May-Oct	9.1 mg/L 15 mg/L	99 lbs/day
Ammonia-N Nov-Apr	5.2 mg/L 12 mg/L		Ammonia-N Nov-Apr	6.5 mg/L 10.7 mg/L	
Chlorine	11 µg/L 28.5 µg/L		Chlorine	N/A	
Mercury	1 µg/L 5 µg/L	0.08 µg/L 0.12 µg/L	Mercury	N/A	
Copper	49 µg/L 59 µg/L	13 µg/L 18 µg/L	Copper	72 µg/L 84 µg/L	12 µg/L 14 µg/L

MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

Monitoring of sludge quantity and quality is necessary to determine the appropriate uses of the sludge. Sludge monitoring is required by the current state and local solid waste management program and also by EPA under 40 CFR 503.

The monitoring schedule is detailed in the proposed permit under Condition S.2. Specified monitoring frequencies take into account the quantity and variability of discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of Ecology's *Permit Writer's Manual* (July 1994) for Rotating Biological Contactors Secondary Treatment with Ultraviolet Disinfection.

LAB ACCREDITATION

With the exception of certain parameters the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories.* The laboratory at this facility is accredited for BOD_5, COD, TSS, Ammonia-N, Dissolved Oxygen, Total Residual Chlorine, Fecal Coliform and pH.

OTHER PERMIT CONDITIONS

REPORTING AND RECORDKEEPING

The conditions of S3 are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

PREVENTION OF FACILITY OVERLOADING

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to take the actions detailed in proposed permit requirement S.4 to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Condition S.4 restricts the amount of flow.

OPERATION AND MAINTENANCE (O&M)

The proposed permit contains Condition S.5 as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

RESIDUAL SOLIDS HANDLING

To prevent water quality problems the Permittee is required in permit Condition S7 to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and State Water Quality Standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503. The disposal of other solid waste is under the jurisdiction of the King County Health Department.

PRETREATMENT

Federal and State Pretreatment Program Requirements

Under the terms of the addendum to the "Memorandum of Understanding between Washington Department of Ecology and the United States Environmental Protection Agency, Region 10" (1986), the Department has been delegated authority to administer the Pretreatment Program (i.e. act as the Approval Authority for oversight of delegated POTWs)**.** Under this delegation of authority, the Department has exercised the option of issuing wastewater discharge permits for significant industrial users discharging to POTWs which have not been delegated authority to issue wastewater discharge permits.

There are a number of functions required by the Pretreatment Program which the Department is delegating to such POTWs because they are in a better position to implement the requirements (e.g. tracking the number and general nature of industrial dischargers to the sewerage system). The requirements for a Pretreatment Program are contained in Title 40, part 403 of the Code of Federal

Regulations. Under the requirements of the Pretreatment Program [40 CFR 403.8(f)(1)(iii)], the Department is required to approve, condition, or deny new discharges or a significant increase in the discharge for existing significant industrial users (SIUs) [40 CFR 403.8 (f)(1)(i)].

The Department is responsible for issuing state waste discharge permits to SIUs and other industrial users of the Permittee's sewer system. Industrial dischargers must obtain these permits from the Department prior to the Permittee accepting the discharge [WAC 173-216-110(5)]. (Industries discharging wastewater that is similar in character to domestic wastewater are not required to obtain a permit. Such dischargers should contact the Department to determine if a permit is required.) Industrial dischargers need to apply for a state waste discharge permit 60 days prior to commencing discharge. The conditions contained in the permits will include any applicable conditions for categorical discharges, loading limitations included in contracts with the POTW, and other conditions necessary to assure compliance with state water quality standards and biosolids standards.

The Department requires this POTW to fulfill some of the functions required for the Pretreatment Program in the NPDES permit (e.g. tracking the number and general nature of industrial dischargers to the sewage system). The POTW's NPDES permit will require that all SIUs currently discharging to the POTW be identified and notified of the requirement to apply for a wastewater discharge permit from the Department. None of the obligations imposed on the POTW relieve an industrial or commercial discharger of its primary responsibility for obtaining a wastewater discharge permit (if required), including submittal of engineering reports prior to construction or modification of facilities [40 CFR 403.12(j) and WAC 173-216-070 and WAC 173-240-110, et seq.].

Wastewater Permit Required

RCW 90.48 and WAC 173-216-040 require SIUs to obtain a permit prior to discharge of industrial waste to the Permittee's sewerage system. This provision prohibits the POTW from accepting industrial wastewater from any such dischargers without authorization from the Department.

Requirements for Routine Identification and Reporting of Industrial Users

The NPDES permit requires non-delegated POTWs to " take continuous, routine measures to identify all existing, new, and proposed SIUs and potential significant industrial users (PSIUs) discharging to the Permittee's sewerage system." Examples of such routine measures include regular review of business tax licenses for existing businesses and review of water billing records and existing connection authorization records. System maintenance personnel can also be diligent during performance of their jobs in identifying and reporting as-yet unidentified industrial dischargers. Local newspapers, telephone directories, and word-of-mouth can also be important sources of information regarding new or existing discharges. The POTW is required to notify an industrial discharger, in writing, of their responsibilities regarding application for a State waste discharge permit and to send a copy of the written notification to the Department. The Department will then take steps to solicit a state waste discharge permit application.

Requirements for Performing an Industrial User Survey

This POTW has the potential to serve significant industrial or commercial users and is required to perform an Industrial User Survey. The goal of this survey is to develop a list of SIUs and PSIUs, and of equal importance, to provide sufficient information about industries which discharge to the POTW, to determine which of them require issuance of state waste discharge permits or other regulatory controls. An Industrial User Survey is an important part of the regulatory process used to prevent interference with treatment processes at the POTW and to prevent the exceedance of water quality standards. The Industrial User Survey also can be used to contribute to the maintenance of sludge quality, so that sludge can be a useful biosolids product rather than an expensive waste problem. An Industrial User Survey is a rigorous method for identifying existing, new, and proposed significant industrial users and potential significant industrial users. A complete listing of methodologies is available in the Department guidance document entitled "Conducting an Industrial User Survey."

Duty to Enforce Discharge Prohibitions

This provision prohibits the POTW from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer. The first portion of the provision prohibits acceptance of pollutants which cause pass through or interference. The definitions of pass through and interference are in Appendix B of the fact sheet..

The second portion of this provision prohibits the POTW from accepting certain specific types of wastes, namely those which are explosive, flammable, excessively acidic, basic, otherwise corrosive, or obstructive to the system. In addition wastes with excessive BOD, petroleum based oils, or which result in toxic gases are prohibited to be discharged. The regulatory basis for these prohibitions is 40 CFR Part 403, with the exception of the pH provisions which are based on WAC 173-216-060.

The third portion of this provision prohibits certain types of discharges unless the POTW receives prior authorization from the Department. The discharges include cooling water in significant volumes, stormwater and other direct inflow sources, and wastewaters significantly affecting system hydraulic loading, which do not require treatment.

Support by the Department for Developing Partial Pretreatment Program by POTW

The Department has committed to providing technical and legal assistance to the Permittee in fulfilling these joint obligations, in particular assistance with developing an adequate sewer use ordinance, notification procedures, enforcement guidelines, and developing local limits and inspection procedures.

RECEIVING WATER STUDY

Proposed permit condition S8 requires a receiving water study to gather information to determine if the effluent has a reasonable potential to cause a violation of the water quality standards.

<u>Total and Dissolved Metals</u> – The receiving water near the outfall will be sampled for both total and dissolved metals as well as hardness to determine if there is a potential to violate water quality standards for metals and to develop translator values for the total recoverable to dissolved fraction of metals.

<u>Dissolved Oxygen</u> - The receiving water near the outfall will be sampled for BOD_5, Total Kjedahl Nitrogen (TKN), dissolved oxygen, and temperature to determine if there is the potential for a violation of dissolved oxygen standard.

<u>Ammonia</u> - The receiving water near the outfall shall also be sampled for total ammonia, pH and temperature to determine the potential for the effluent to cause a violation of the water quality standards for total ammonia.

<u>pH</u> - Alkalinity will be tested to determine whether the water quality or technology based standard for pH should apply to the discharge.

SPILL PLAN

The Department has determined that the Permittee stores a quantity of chemicals that have the potential to cause water pollution if accidentally released. The Department has the authority to require the Permittee to develop best management plans to prevent this accidental release under section 402(a)(1) of the Federal Water Pollution Control Act (FWPCA) and RCW 90.48.080.

OUTFALL EVALUATION

Proposed permit Condition S.11 requires the Permittee to conduct an outfall inspection and submit a report detailing the findings of that inspection. The purpose of the inspection is to determine the condition of the discharge pipe and diffusers and to determine if sediment is accumulating in the vicinity of the outfall.

GENERAL CONDITIONS

General Conditions are based directly on state and federal law and regulations and have been standardized for all individual municipal NPDES permits issued by the Department.

PERMIT ISSUANCE PROCEDURES

PERMIT MODIFICATIONS

The Department may modify this permit to impose numerical limitations, if necessary to meet Water Quality Standards, Sediment Quality Standards, or Ground Water Standards, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended state or federal regulations.

RECOMMENDATION FOR PERMIT ISSUANCE

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to protect human health, aquatic life, and the beneficial uses of waters of the state of Washington. The Department proposes that this permit be issued for five years.

REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

Metcalf and Eddy.

1991. Wastewater Engineering, Treatment, Disposal, and Reuse. Third Edition.

Tsivoglou, E.C., and J.R. Wallace.

1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Washington State Department of Ecology.

1994. Permit Writer's Manual. Publication Number 92-109

Water Pollution Control Federation.

1976. Chlorination of Wastewater.

Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to reissue a permit to the applicant listed on page 1 of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public notice of application was published on August 26, 2001, and August 31, 2001, in the *Tacoma News Tribune* to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Department will publish a Public Notice of Draft (PNOD) on February 12, 2003, in the *Courier Herald* to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments should be mailed to:

Water Quality Permit Administrator
Department of Ecology
Southwest Regional Office
P.O. Box 47775
Olympia, WA 98504-7775.

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the 30-day comment period to the address above. The request for a hearing shall indicate the interest of the party and the reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least 30 days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within 30 days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, (360) 407-6275, or by writing to the address listed above.

This permit and fact sheet were written by Glenn Pieritz.

APPENDIX B--GLOSSARY

Acute Toxicity--The lethal effect of a pollutant on an organism that occurs within a short period of time, usually 48 to 96 hours.

AKART-- An acronym for "all known, available, and reasonable methods of prevention, control, and treatment".

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

Ammonia--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Average Monthly Discharge Limitation --The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month (except in the case of fecal coliform). The daily discharge is calculated as the average measurement of the pollutant over the day.

Average Weekly Discharge Limitation -- The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The daily discharge is calculated as the average measurement of the pollutant over the day.

Best Management Practices (BMPs)--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD_5--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD_5 is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass--The intentional diversion of waste streams from any portion of a treatment facility.

CBOD5 – The quantity of oxygen utilized by a mixed population of microorganisms acting on the nutrients in the sample in an aerobic oxidation for five days at a controlled temperature of 20 degrees Celcius, with an inhibitory agent added to prevent the oxidation of nitrogen compounds. The method for determining CBOD5 is given in 40 CFR Part 136.

Chlorine--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity--The effect of a pollutant on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Combined Sewer Overflow (CSO)--The event during which excess combined sewage flow caused by inflow is discharged from a combined sewer, rather than conveyed to the sewage treatment plant because either the capacity of the treatment plant or the combined sewer is exceeded.

Compliance Inspection - Without Sampling--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the percent removal requirement. Additional sampling may be conducted.

Composite Sample--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing a minimum of four discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots.

Construction Activity--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Continuous Monitoring –Uninterrupted, unless otherwise noted in the permit.

Critical Condition--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample--A single sample or measurement taken at a specific time or over as short period of time as is feasible.

Industrial User-- A discharger of wastewater to the sanitary sewer which is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

Industrial Wastewater--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Infiltration and Inflow (I/I)--"Infiltration" means the addition of ground water into a sewer through joints, the sewer pipe material, cracks, and other defects. "Inflow" means the addition of precipitation-caused drainage from roof drains, yard drains, basement drains, street catch basins, etc., into a sewer.

Interference -- A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal and;

Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Major Facility--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limitation--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Method Detection Level (MDL)--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

Minor Facility--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone--A volume that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in State regulations (Chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

Pass through -- A discharge which exits the POTW into waters of the–State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

pH--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Potential Significant Industrial User--A potential significant industrial user is defined as an Industrial User which does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;

b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

The Department may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation Level (QL)-- A calculated value five times the MDL (method detection level).

Significant Industrial User (SIU)--

1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N and;

2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

State Waters--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, wetlands, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based Effluent Limit--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)--Total suspended solids are the particulate materials in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent 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, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit--A limit on the concentration or mass of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

APPENDIX C--TECHNICAL CALCULATIONS

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at http://www.ecy.wa.gov.

APPENDIX D--RESPONSE TO COMMENTS

This response to comments (RTC) is an appendix to the fact sheet for the NPDES permit. The RTC summarizes comments received during the 30-day public notice and comment period on the draft permit, and provides the Department's response. All changes to the draft permit are noted below. The Department has determined to issue this permit as revised.

Comments were received from the City of Enumclaw and Citizens for a Healthy Bay.

City of Enumclaw Comments:

1. **Comment:**

The monitoring requirements listed in S2 include weekly effluent sampling of total and ortho-phosphate. We request that the Department remove this sampling requirement from the proposed permit. We understand that in the future the permit will be modified to include a limit for phosphorus in accordance with the Lower White River TMDL. This would logically occur along with the upgrade of the treatment plant to include a treatment process designed for phosphorus removal. The current RBC plant is not capable of accomplishing phosphorus removal. Furthermore, our lab is not accredited for phosphorus testing. Therefore, all such sampling would be sent out at an additional cost to the city. The city conducted weekly sampling of its effluent from September 1998 through August 1999, including both total phosphorus and ortho-phosphate. I would be happy to provide the Department with this data to show what variation occurs throughout the year. We fail to see how this requirement achieves any benefit that approaches its cost in labor and outsourced laboratory work prior to the plant upgrade.

Response:

The Department agrees that monitoring the effluent for total phosphorus and ortho-phosphate until the upgrades to the existing facility are complete is not necessary and will remove the monitoring requirement from the proposed permit.

2. **Comment:**

In my January 10, 2003, letter I requested that the permit be revised to require BOD_5 and TSS monitoring twice per week rather than three times. I would additionally request that the fecal coliform monitoring requirement be set at twice per week. As I mentioned in the previous comment letter, the plant upgrade that is now entering the design phase will provide additional laboratory space necessary for the additional testing requirements associated with this new plant. A further consideration is the fact that the upcoming construction activity at the existing plant will have to be carefully coordinated to avoid impacting the operator's ability to accomplish their current twice per week sampling. Interruptions due to modification/expansions to the lab area with three per week sampling would only become more problematic. We feel strongly that this requirement should be deferred until the permit is modified for the upgraded plant.

Response:

The increase testing frequencies are due to changes made to WAC 173-230 since the last permit renewal. These changes increase the classification of the existing Enumclaw WWTF from a

Class II to a Class III facility. The sampling frequencies in the permit were increased to bring the existing Enumclaw WWTF up to the current standards for Class III facilities required by WAC 173-230 and the recommendations for monitoring in the permit writers manual. Therefore, no changes in testing frequencies will be made to the permit.

Citizens for a Healthy Bay Comments:

1. **Comment:**

Mixing zone: A mixing zone, which allows discharge of pollutants that exceed the state water quality standards into Commencement Bay, is not in the spirit of the Clean Water Act. The objective of this act is to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." The routine authorization of mixing zones is counterproductive to meeting this objective. It is clearly stated in section 1251 of the CWA that, "it is the national policy that the discharge of toxic pollutants in toxic amounts be prohibited," and that "it is the national goal that the discharge of pollutants into the navigable waters be eliminated by 1985." The Department's failure to phase out these mixing zones or even to include sunset language, which will encourage movement towards the elimination of these zones does nothing to achieve the goals of the CWA and is in direct violation of the spirit of the act. This wholesale authorization of mixing zones violates water quality standards determined and implemented by the state of Washington. The City of Enumclaw should be required to meet water quality standards at the end of the pipe.

Response:

The mixing zone for the City of Enumclaw's wastewater treatment facility discharge was established in accordance with, and is authorized under, WAC 173-201A-100. The permit process is not the forum to address your concerns which would be better served during the update to WAC 173-201A which is currently underway. No change to permit.

2. **Comment:**

Anti-degradation: The White River is a class "A" water body. The anti-degradation policy in the state of Washington's Pollution Control Act WAC 173-201A-070 clearly states, "Existing beneficial uses shall be maintained and protected and no further degradation which would interfere with or become injurious to existing beneficial uses shall be allowed." Discharging pollutants known to be injurious to fish populations in amounts that exceed state water quality standards in an area which characterizes fish migration, rearing, and spawning habitat among the "beneficial uses" is in violation of this act and should not be allowed.

Response:

The permit limits derived for the discharge from the City of Enumclaw's wastewater treatment facility are in compliance with the state of Washington water quality standards established in WAC 173-201A. As stated in the previous comment, the proper forum to address your concerns is the update to WAC 173-201A, which is currently underway. No change to permit.

3. **Comment:**

Plant Expansion: We applaud the City of Enumclaw for submitting a facility plan, outlining proposals for a new plant to provide the necessary treatment to meet the more stringent discharge requirements for the reduction of ammonia, nitrogen, and biological and chemical phosphorus. This plan will also address the projected population increase of the area, as well as the considerable infiltration and inflow of stormwater.

Response:

Comment noted.

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Issuance Date: April 10, 2003
Effective Date: May 1, 2003
Expiration Date: April 30, 2008
Modification Date: December 23, 2003

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM WASTE DISCHARGE PERMIT No. WA0020575

State of Washington
DEPARTMENT OF ECOLOGY
Olympia, Washington 98504-7600

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 1251 et seq.

City of Enumclaw
1309 Myrtle Avenue
Enumclaw, WA 98022

Plant Location: 451 Semanski Street South Enumclaw, King County, Washington	Receiving Water: White River, River Mile 23.1
Water Body I.D. No.: WA-10-1030	Discharge Location: Latitude: 47° 10' 31" N Longitude: 122° 01' 21" W
Plant Type: Secondary Treatment – RBC UV disinfection	

is authorized to discharge in accordance with the special and general conditions that follow.

Kelly Susewind, P.E., P.G.
Southwest Regional Manager
Water Quality Program
Washington State Department of Ecology

TABLE OF CONTENTS

GENERAL CONDITIONS

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
S1.B.	Compliance Schedule Status Report	1/permit cycle	August 31, 2003
S3.	Discharge Monitoring Report	Monthly	June 15, 2003
S3.E	Noncompliance Notification	as necessary	
S4.B.	Plans for Maintaining Adequate Capacity	as necessary	
S4.C.	Notification of New or Altered Sources	as necessary	
S4.D.	Infiltration and Inflow Evaluation	Annually	January 15, 2004
S4.E.	Waste load Assessment	Annually	January 15, 2004
S6.D.	Industrial User Survey	1/permit cycle	June 30, 2006
S8.	Receiving Water Study Sampling and Quality Assurance Plan	1/permit cycle	November 1, 2003
S8.	Receiving Water and Effluent Study Results	1/permit cycle	May 1, 2005
S9.A	Acute Toxicity Effluent Characterization with Permit Renewal Application	2/permit cycle	Once in the Last Summer & Once in the Last Winter Prior to Submission of the Renewal Application
S10.A	Chronic Toxicity Characterization Data		Testing shall begin March, 2003
S10.A	Chronic Toxicity Tests Characterization Summary Report	1/permit cycle	90 days following the last characterization sampling event
S10.C	Chronic Toxicity Compliance Monitoring Reports	If necessary semi-annually for the remainder of the permit term.	If necessary compliance testing shall begin March, 2004, and the first monitoring report is due April 15, 2004.
S10.D	Chronic Toxicity: "Causes and Preventative Measures for Transient Events."	As necessary	
S10.D	Chronic Toxicity TI/TRE Plan	As necessary	
S10.E	Chronic Toxicity Effluent Characterization with Permit Renewal Application	2/permit cycle if there is no permit limit for chronic toxicity	Once in the last summer & once in the last winter prior to submission of the renewal application.
S11.	Outfall Evaluation	Monthly	

Permit Section	Submittal	Frequency	First Submittal Date
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.	Application for Permit Renewal	1/permit cycle	November 30, 2007
G21	Notice of Planned Changes	As necessary	
G22	Reporting Anticipated Non-compliance	As necessary	

SPECIAL CONDITIONS

S1. DISCHARGE LIMITATIONS

A. Effluent Limitations

All discharges and activities authorized by this permit shall be consistent 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 shall constitute a violation of the terms and conditions of this permit.

Beginning on the effective date of this permit and lasting through the expiration date the Permittee is authorized to discharge municipal wastewater at the permitted location subject to complying with the following limitations:

	EFFLUENT LIMITATIONS: OUTFALL # 001			
Parameter	**Average Monthly[a]**		**Average Weekly[a]**	
Biochemical Oxygen Demand[b] (5 day)	30 mg/L, 336 lbs/day 85% minimum removal		45 mg/L, 504 lbs/day	
Total Suspended Solids[b]	30 mg/L, 381 lbs/day 85% minimum removal		45 mg/L, 572 lbs/day	
Fecal Coliform Bacteria	100/100 mL		200/100 mL	
pH[c]	Daily minimum is equal to or greater than 6.0 and the daily maximum is less than or equal to 8.5.			
Parameter	**Average Monthly[a]**		**Maximum Daily[d]**	
Total Ammonia (as NH_3-N) May-October	9.1 mg/L		15 mg/L, 99 lbs/day[e]	
Total Ammonia (as NH_3-N) November to April	6.5 mg/L		10.7 mg/L	
	Interim	**Final**	**Interim**	**Final**
Total Copper[f]	72 µg/L	14.7 µg/L	84 µg/L	17 µg/L
Chronic Toxicity[g]	No chronic toxicity detected in a test concentration representing the chronic critical effluent concentration (CCEC).			
[a] The average monthly and weekly effluent limitations are based on the arithmetic mean of the samples taken with the exception of fecal coliform, which is based on the geometric mean.				
[b] The average monthly effluent concentration for BOD_5 and Total Suspended Solids shall not exceed 30 mg/L or 15 percent of the respective monthly average influent concentrations, whichever is more stringent.				
[c] Indicates the range of permitted values. When pH is continuously monitored, excursions between 5.0 and 6.5, or 8.5 and 10.0 shall not be considered violations provided no single excursion exceeds 60				

minutes in length and total excursions do not exceed 7 hours and 30 minutes per month. Any excursions below 5.0 and above 10.0 are violations. The instantaneous maximum and minimum pH shall be reported monthly.
[d] 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.
[e] When flows exceed 0.8 MGD, the pounds/day maximum daily May to October effluent limitation for ammonia is more stringent.
[f] See compliance schedule in S1.B.
[g] The Permittee has an effluent limit for chronic toxicity only if any of the tests conducted for effluent characterization shows a significant difference between the control and the ACEC at the 0.05 level of significance using hypothesis testing (Appendix H, EPA/600/4-89/001).

B. Compliance Schedule

Beginning on the effective date of this permit, the Permittee shall comply with the interim limits for copper. Within 48 months the effective date of this permit, but no later than March 1, 2007, the Permittee shall comply with the final water quality based limits for copper.

By August 31, 2003, the Permittee shall submit a status report on the progress being made toward meeting the final effluent water quality-based limits for copper. The report shall include data showing the trend of influent and effluent copper concentrations and shall describe further actions necessary to comply with the final water quality-based limits for copper by March 1, 2007.

C. Mixing Zone Descriptions

The maximum boundaries of the mixing zones are defined as follows:

Chronic Mixing Zone: 26.75 feet wide, extends 300 feet downstream and 100 feet upstream.

Acute Mixing Zone: 26.75 feet wide, extends 30 feet downstream and 10 feet upstream.

S2. MONITORING REQUIREMENTS

A. Monitoring Schedule[(1)]

Category	Parameter	Units	Minimum Sampling Frequency	Sample Type
Wastewater Influent	BOD_5	mg/L lbs/day	3/week	24-hour composite
Wastewater	TSS	mg/L	3/week	24-hour composite

Category	Parameter	Units	Minimum Sampling Frequency	Sample Type
Influent		lbs/day		
Wastewater Effluent	Flow	MGD	continuous(2)	record daily totalizer
Wastewater Effluent	Temperature	^oC	daily (7/week)	grab/meter
Wastewater Effluent	BOD_5	mg/L lbs/day	3/week	24-hour composite
Wastewater Effluent	TSS	mg/L lbs/day	3/week	24-hour composite
Wastewater Effluent	Fecal Coliform Bacteria	cfu/100mL	3/week	grab
Wastewater Effluent	pH	Standard Units	daily (7/week)	grab/meter
Wastewater Effluent	Total Ammonia (as NH_3-N)	mg/L	2/week	grab
Wastewater Effluent	Dissolved Oxygen	mg/L	daily (7/week)	grab
Wastewater Effluent	Alkalinity ($CaCO_3$)	mg/L	1/month	24-hour composite
Wastewater Effluent	Hardness (as $CaCO_3$)	mg/L	1/month	grab
Wastewater Effluent	Total Copper	µg/L	1/month	24-hour composite
Wastewater Effluent	Priority Pollutant Scan	mg/L	yearly(5)	24-hour composite
Gauge near plant	Rainfall	inches	daily (7/week)	24-hr measurement
Final Sludge	Priority Pollutant Scan	mg/L	yearly(5)	grab
Wastewater Effluent	Chronic Toxicity Characterization Testing		per S10.A quarterly(3) for one year	24-hour composite
Wastewater Effluent	Chronic Toxicity Testing		if necessary per S10.C semi-	24-hour composite

Category	Parameter	Units	Minimum Sampling Frequency	Sample Type
			annual[4] for the remainder of the permit term	

[1] For all monitoring, the Permittee shall use methods that can achieve a Method Detection Level (MDL) equal to 0.1 times the effluent limitation or the most sensitive Environmental Protection Agency (EPA) approved method, whichever is greater. If the analytical result for any sample is below the MDL, the permittee shall report "less than {numeric MDL}" on the Discharge Monitoring Report (DMR). For purposes of averaging results, the Permittee shall use actual values for all values above the MDL and zero for values below the MDL.
[2] Continuous means uninterrupted except for brief lengths of time for calibration, for power failure, or for unanticipated equipment repair or maintenance. Sampling shall be taken every four hours when continuous monitoring is not possible.
[3] Quarterly is defined as: March, June, September, and December of each year.
[4] Semi-annual is defined as June and December of each year.
[5] Yearly is defined as March of each year.

B. Sampling and Analytical Procedures

Samples and measurements taken to meet the requirements of this permit shall be representative of 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 monitoring requirements specified in this permit shall 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* (APHA), unless otherwise specified in this permit or approved in writing by the Department of Ecology (Department).

C. Flow Measurement

Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the quantity of monitored flows. The devices shall be installed, calibrated, and maintained to ensure that the accuracy of the measurements are consistent with the accepted industry standard for that type of device. Frequency of calibration shall be in conformance with manufacturer's recommendations and at a minimum frequency of at least one calibration per year. Calibration records shall be maintained for at least three years.

D. Laboratory Accreditation

All monitoring data required by the Department shall be prepared by a laboratory registered or accredited under the provisions of, *Accreditation of Environmental Laboratories*, Chapter 173-50 Washington Administrative Code (WAC). Flow, temperature, settleable solids, conductivity, pH, and internal process control parameters are exempt from this requirement. Conductivity and pH shall be accredited if the laboratory must otherwise be registered or accredited. The Department exempts crops, soils, and hazardous waste data from this requirement pending accreditation of laboratories for analysis of these media.

S3. REPORTING AND RECORDKEEPING REQUIREMENTS

The Permittee shall monitor and report in accordance with the following conditions. The falsification of information submitted to the Department shall constitute a violation of the terms and conditions of this permit.

A. Reporting

The first monitoring period begins on the effective date of the permit. Monitoring results shall be submitted monthly. Monitoring data obtained during each monitoring period shall be summarized, reported, and submitted on a DMR form provided, or otherwise approved, by the Department. DMR forms shall be received by the Department no later than the 15th day of the month following the completed monitoring period, unless otherwise specified in this permit. Priority pollutant analysis data shall be submitted no later than 45 days following the monitoring period. Unless otherwise specified, all toxicity test data shall be submitted within 60 days after the sample date. The report(s) shall be sent to the Department of Ecology, Southwest Regional Office, P.O. Box 47775, Olympia, Washington 98504-7775.

All laboratory reports providing data for organic and metal parameters shall 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.

Discharge Monitoring Report forms must be submitted monthly whether or not the facility was discharging. If there was no discharge during a given monitoring period, submit the form as required with the words "no discharge" entered in place of the monitoring results.

B. Records Retention

The Permittee shall retain records of all monitoring information for a minimum of three years. Such information shall 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. This period of retention shall be extended during the course of any unresolved litigation regarding the discharge of pollutants by the Permittee or when requested by the Department.

C. Recording of Results

For each measurement or sample taken, the Permittee shall 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.

D. Additional Monitoring by the Permittee

If the Permittee monitors any pollutant more frequently than required by this permit using test procedures specified by Condition S2 of this permit, then the results of such monitoring shall be included in the calculation and reporting of the data submitted in the Permittee's DMR.

E. Noncompliance Notification

In the event the Permittee is unable to comply with any of the terms and conditions of this permit due to any cause, the Permittee shall:

1. Immediately take action to stop, contain, and cleanup unauthorized discharges or otherwise stop the noncompliance, correct the problem and, if applicable, repeat sampling and analysis of any noncompliance immediately and submit the results to the Department within 30 days after becoming aware of the violation.

2. Immediately notify the Department of the failure to comply.

3. Submit a detailed written report to the Department within 30 days (five days for upsets and bypasses), unless requested earlier by the Department. The report shall contain a description of the noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

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.

S4. FACILITY LOADING

A. Design Criteria

Flows or waste loadings of the following design criteria for the permitted treatment facility shall not be exceeded:

Average flow for the maximum month:	2.6 MGD
BOD_5 loading for maximum month:	2540 lbs/day
TSS loading for maximum month:	2540 lbs/day

B. Plans for Maintaining Adequate Capacity

When the actual flow or waste load reaches 85 percent of any one of the design criteria in S4.A for three consecutive months, or when the projected increases would reach design capacity within five years, whichever occurs first, the Permittee shall submit to the Department, a plan and a schedule for continuing to maintain capacity at the facility sufficient to achieve the effluent limitations and other conditions of this permit. This plan shall address any of the following actions or any others necessary to meet this objective.

1. 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.

2. Reduction or elimination of excessive infiltration and inflow of uncontaminated ground and surface water into the sewer system.

3. Limitation on future sewer extensions or connections or additional waste loads.

4. Modification or expansion of facilities necessary to accommodate increased flow or waste load.

5. Reduction of industrial or commercial flows or waste loads to allow for increasing sanitary flow or waste load.

Engineering documents associated with the plan must meet the requirements of WAC 173-240-060, "Engineering Report," and be approved by the Department prior to any construction. The plan shall specify any contracts, ordinances, methods for financing, or other arrangements necessary to achieve this objective.

C. Duty to Mitigate

The Permittee is required to 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

The Permittee shall submit written notice to the Department 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: (1) would interfere with the operation of, or exceed the design capacity of, any portion of the POTW; (2) is not part of an approved general sewer plan or approved plans and specifications; or (3) would be subject to pretreatment standards under 40 CFR Part 403 and Section 307(b) of the Clean Water Act. This notice shall 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. Infiltration and Inflow Evaluation

1. The Permittee shall conduct an infiltration and inflow evaluation. Refer to the U.S. EPA publication, *I/I Analysis and Project Certification*, available as Publication No. 97-03 at: Publications Office, Department of Ecology, P.O. Box 47600, Olympia, Washington 98504-7600. Plant monitoring records may be used to assess measurable infiltration and inflow.

2. A report shall be prepared which summarizes any measurable infiltration and inflow. If infiltration and inflow have increased by more than 15 percent from that found in the first report based on equivalent rainfall, the report shall contain a plan and a schedule for: (1) locating the sources of infiltration and inflow; and (2) correcting the problem.

3. The report covering the previous year from November 1, through October 31, shall be submitted by January 15, 2004, and annually thereafter.

F. Waste load Assessment

The Permittee shall conduct an annual assessment (November 1, through October 31) of their flow and waste load and submit a report to the Department by January 15, 2004, and annually thereafter. The report shall 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 (except for the first report) the percentage increase in these parameters since the last annual report. The report shall 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. The interval for review and reporting may be modified if the Department determines that a different frequency is sufficient.

S5. OPERATION AND MAINTENANCE

The Permittee shall at all times properly operate and maintain all facilities and 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 also 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. Certified Operator

An operator certified for at least a Class III plant by the state of Washington shall 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 shall be in charge during all regularly scheduled shifts.

B. O & M Program

The Permittee shall institute an adequate operation and maintenance program for their entire sewage system. Maintenance records shall be maintained on all major electrical and mechanical components of the treatment plant, as well as the sewage system and pumping stations. Such records shall clearly specify the frequency and type of maintenance recommended by the manufacturer and shall show the frequency and type of maintenance performed. These maintenance records shall be 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 shall give written notification to the Department, if possible, 30 days prior to such activities, detailing the reasons for, length of time of, and the potential effects of the reduced level of treatment. This notification does not relieve the Permittee of their obligations under this permit.

D. Electrical Power Failure

The Permittee is responsible for maintaining adequate safeguards to 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 either by means of alternate power sources, standby generator, or retention of inadequately treated wastes. The Permittee shall maintain Reliability Class II (EPA 430-99-74-001) at the wastewater treatment plant, which requires primary sedimentation and disinfection.

E. Prevent Connection of Inflow

The Permittee shall strictly enforce their sewer ordinances and not allow the connection of inflow (roof drains, foundation drains, etc.) to the sanitary sewer system.

F. Bypass Procedures

Bypass, which is the intentional diversion of waste streams from any portion of a treatment facility, is prohibited, and the Department may take enforcement action against a Permittee for bypass unless one of the following circumstances (1, 2, or 3) is applicable.

1. Bypass for essential maintenance without the potential to cause violation of permit limits or conditions.

Bypass is authorized if it is 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 the Department prior to the bypass. The Permittee shall submit prior notice, if possible at least 10 days before the date of the bypass.

2. Bypass which is unavoidable, unanticipated and results in noncompliance of this permit.

   This bypass is permitted 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. There are no feasible alternatives to the bypass, 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 which occurred during normal periods of equipment downtime or preventative maintenance), or transport of untreated wastes to another treatment facility.

   c. The Department is properly notified of the bypass as required in Condition S3E of this permit.

3. Bypass which is anticipated and has the potential to result in noncompliance of this permit

   The Permittee shall notify the Department at least 30 days before the planned date of bypass. The notice shall contain: (1) a description of the bypass and its cause; (2) an analysis of all known alternatives which would eliminate, reduce, or mitigate the need for bypassing; (3) a cost-effectiveness analysis of alternatives including comparative resource damage assessment; (4) the minimum and maximum duration of bypass under each alternative; (5) a recommendation as to the preferred alternative for conducting the bypass; (6) the projected date of bypass initiation; (7) a statement of compliance with State Environmental Policy Act (SEPA); (8) a request for modification of water quality standards as provided for in WAC 173-201A-110, if an exceedance of any water quality standard is anticipated; and (9) steps taken or planned to reduce, eliminate, and prevent reoccurrence of the bypass.

   For probable construction bypasses, the need to bypass is to be identified as early in the planning process as possible. The analysis required above shall be considered during preparation of the engineering report or facilities plan and plans and specifications and shall be included to the extent practical. In cases where the probable need to bypass is determined early, continued analysis is necessary up to and including the construction period in an effort to minimize or eliminate the bypass.

The Department will consider the following prior to issuing an administrative order for this type bypass:

a. If the bypass is necessary to perform construction or maintenance-related activities essential to meet the requirements of this permit.

b. If there are feasible alternatives to bypass, 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.

c. If the bypass is planned and scheduled 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, the Department will approve or deny the request. The public shall be notified and given an opportunity to comment on bypass incidents of significant duration, to the extent feasible. Approval of a request to bypass will be by administrative order issued by the Department under Revised Code of Washington (RCW) 90.48.120.

G. Operations and Maintenance Manual

The approved Operations and Maintenance Manual shall be kept available at the treatment plant and all operators shall follow the instructions and procedures of this manual. The O&M Manual shall be reviewed by the Permittee at least annually and substantial changes or updates shall be submitted to the Department whenever they are incorporated into the manual

S6. PRETREATMENT

A. General Requirements

The Permittee shall work with the Department to ensure that all commercial and industrial users of the POTW are in compliance with the pretreatment regulations promulgated 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 shall not allow significant industrial users (SIUs) to discharge wastewater to the Permittee's sewerage system until such user has received a wastewater discharge permit from the Department in accordance with Chapter 90.48 RCW and Chapter 173-216 WAC, as amended.

C. Identification and Reporting of Existing, New, and Proposed Industrial Users

1. The Permittee shall 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 sewerage system (see Appendix B of 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 shall notify such user by registered mail that, if classified as an SIU, they shall be required to apply to the Department and obtain a state waste discharge permit. A copy of this notification letter shall also be sent to the Department within this same 30-day period.

3. The Permittee shall also notify all PSIUs, as they are identified, that if their classification should change to an SIU, they shall be required to apply to the Department for a state waste discharge permit within 30 days of such change.

D. Industrial User Survey

The Permittee shall complete and submit to the Department an Industrial User Survey listing all SIUs and PSIUs discharging to the POTW. The survey shall be received by the Department by June 30, 2006. At a minimum, the list of SIUs and PSIUs shall be developed by means of a telephone book search, a water utility billing records search, and a physical reconnaissance of the service area. Information on PSIUs shall at least include: the business name, telephone number, address, description of the industrial process(es), and the known wastewater volumes and characteristics. For assistance with the development of the Industrial User Survey, the Permittee shall refer to the Department's guidance document entitled "Performing an Industrial User Survey."

E. Duty to Enforce Discharge Prohibitions

1. In accordance with 40 CFR 403.5(a), the Permittee shall not authorize or knowingly allow the discharge of any pollutants into its POTW which cause pass through or interference, or which otherwise violates general or specific discharge prohibitions contained in 40 CFR Part 403.5 or WAC-173-216-060.

2. The Permittee shall 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 40ºC (104ºF) unless the Department, 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. All of the following are prohibited from discharge to the POTW unless approved in writing by the Department 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 shall notify the Department 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 shall store and handle all residual solids in such a manner so as to prevent their entry into state ground or surface waters. The Permittee shall not discharge leachate from residual solids to state surface or ground waters.

S8. RECEIVING WATER STUDY

The Permittee shall collect receiving water information necessary to determine if the effluent has a reasonable potential to cause a violation of the water quality standards. If reasonable potential exists the Department will use this information to calculate effluent limits. All sampling and analysis shall be conducted in accordance with the guidelines given in *Guidelines and Specifications for Preparing Quality Assurance Project Plans*, Ecology Publication 91-16. The Permittee shall submit a sampling and quality assurance plan for Department review and approval within 180 days of the effective date of this permit.

The Permittee shall sample and analyze the receiving water for BOD_5, Total Suspended Solids, Dissolved Oxygen, Alkalinity, Total Ammonia, Total Kjeldahl Nitrogen, Total Phosphorus, Ortho Phosphorus, Hardness, Temperature, pH, Salinity, Mercury, and Arsenic. The following metals shall be analyzed for both total recoverable and dissolved: Cadmium, Chromium, Copper, Lead, Nickel, Silver, and Zinc. Sampling shall be once a month for twelve consecutive months and concluded within 24 months of the permit effective date. The Permittee shall 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 sampling station accuracy requirements are ± 20 meters. The receiving water sampling location should be outside the zone of influence of the effluent. The Department considers ten receiving water samples to be the optimal data set and four to be the minimum, for determining reasonable potential to cause a violation of the water quality standards. All chemical analysis shall be conducted according to methods given in 40 CFR 136 and shall have the following detection levels:

POLLUTANT PARAMETER	DETECTION LIMIT REQUIRED
Copper	1.0 µg/L
Lead	1.0 µg/L
Nickel	1.0 µg/L
Chromium	1.0 µg/L
Zinc	4.0 µg/L
Cadmium	0.1 µg/L
Selenium	2.0 µg/L
Silver	0.2 µg/L
Mercury	0.2 µg/L
Arsenic	1.0 µg/L

Any subsequent sampling and analysis shall also meet these requirements. The Permittee may conduct a cooperative receiving water study with other NPDES Permittees discharging in the same vicinity. The Permittee shall submit the results of the study to the Department within 90 days of completing the effluent and receiving water studies.

S9. ACUTE TOXICITY

A. Testing Requirements

The Permittee shall test final effluent once in the last summer and once in the last winter prior to submission of the application for permit renewal. The two species listed below shall be used on each sample and the results submitted to the Department as a part of the permit renewal application process. The Permittee shall conduct acute toxicity testing on a series of five concentrations of effluent and a control in order to be able to determine appropriate point estimates and an NOEC. The percent survival in 100 percent effluent shall also be reported.

Acute toxicity tests shall be conducted with the following species and protocols:

1) Fathead minnow, *Pimephales promelas* (96 hour static-renewal test, method: EPA/600/4-90/027F)

2) Daphnid, *Ceriodaphnia dubia*, *Daphnia pulex*, or *Daphnia magna* (48 hour static test, method: EPA/600/4-90/027F).

B. Sampling and Reporting Requirements

1. All reports for effluent characterization or compliance monitoring shall be submitted in accordance with the most recent version of Ecology Publication # WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria* in regards to format and content. Reports shall contain bench sheets and reference toxicant results for test methods. If the lab provides the toxicity test data on floppy disk for electronic entry into the Department's database, then the Permittee shall send the disk to the Department along with the test report, bench sheets, and reference toxicant results.

2. Testing shall be conducted on 24-hour composite effluent samples. Samples taken for toxicity testing shall be cooled to 4 degrees Celsius while being collected and shall be sent to the lab immediately upon completion. The lab shall begin the toxicity testing as soon as possible but no later than 36 hours after sampling was ended.

3. All samples and test solutions for toxicity testing shall have water quality measurements as specified in Ecology Publication # WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria* or most recent version thereof.

4. All toxicity tests shall meet quality assurance criteria and test conditions in the most recent versions of the EPA manual listed in subsection A. and Ecology Publication # WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*. If test results are determined to be invalid or anomalous by the Department, testing shall be repeated with freshly collected effluent.

5. Control water and dilution water shall be laboratory water meeting the requirements of the EPA manual listed in subsection A or pristine natural water of sufficient quality for good control performance.

6. The whole effluent toxicity tests shall be run on an unmodified sample of final effluent.

7. The Permittee may choose to conduct a full dilution series test during compliance monitoring 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 ACEC. The ACEC means the maximum concentration of effluent during critical conditions at the boundary of the zone of acute criteria exceedance assigned pursuant to WAC 173-201A-100. The zone of acute criteria exceedance is authorized in Section S1.C of this permit. The ACEC equals 55 percent effluent.

8. All whole effluent toxicity tests, effluent screening tests, and rapid screening tests that involve hypothesis testing and do not comply with the acute statistical power standard of 29 percent as defined in WAC 173-205-020 must be repeated on a fresh sample with an increased number of replicates to increase the power.

S10. CHRONIC TOXICITY

A. <u>Effluent Characterization</u>

The Permittee shall conduct chronic toxicity testing on the final effluent. The two chronic toxicity tests listed below shall be conducted on each sample taken for effluent characterization.

Testing shall begin March, 2003.

Effluent testing for chronic toxicity shall be conducted quarterly for one year. The Permittee shall conduct chronic toxicity testing during effluent characterization on a series of at least five concentrations of effluent in order to determine appropriate point estimates. This series of dilutions shall include the ACEC. The Permittee shall 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.

Chronic toxicity tests shall be conducted with the following two species and the most recent version of the following protocols:

Freshwater Chronic Toxicity Test Species		Method
Fathead minnow	*Pimephales promelas*	EPA/600/4-91/002
Water flea	*Ceriodaphnia dubia*	EPA/600/4-91/002

B. Effluent Limit for Chronic Toxicity

After completion of effluent characterization, the Permittee has an effluent limit for chronic toxicity if any test conducted for effluent characterization shows a significant difference between the control and the ACEC at the 0.05 level of significance using hypothesis testing (Appendix H, EPA/600/4-89/001) and shall complete all applicable requirements in subsections C, D, and F.

If no significant difference is shown between the ACEC and the control in any of the chronic toxicity tests, the Permittee has no effluent limit for chronic toxicity and only subsections E and F apply.

The effluent limit for chronic toxicity is no toxicity detected in a test concentration representing the chronic critical effluent concentration (CCEC).

In the event of failure to pass the test described in subsection C, of this section, for compliance with the effluent limit for chronic toxicity, the Permittee is considered to be in compliance with all permit requirements for chronic whole effluent toxicity as long as the requirements in subsection D are being met to the satisfaction of the Department.

The CCEC means the maximum concentration of effluent allowable at the boundary of the mixing zone assigned in Section S1.C pursuant to WAC 173-201A-100. The CCEC equals 23 percent effluent.

C. Monitoring for Compliance With an Effluent Limit for Chronic Toxicity

Monitoring to determine compliance with the effluent limit shall be conducted semi-annually for the remainder of the permit term using each of the species listed in subsection A on a rotating basis and performed using at a minimum the CCEC, the ACEC, and a control. The Permittee shall schedule the toxicity tests in the order listed in the permit unless the Department notifies the Permittee in writing of another species rotation schedule.

Compliance with the effluent limit for chronic toxicity means no statistically significant difference in response between the control and the test concentration representing the CCEC. The Permittee shall immediately implement subsection D if any chronic toxicity test conducted for compliance monitoring determines a statistically significant difference in response between the control and the CCEC using hypothesis testing at the 0.05 level of significance (Appendix H, EPA/600/4-89/001). If the difference in response between the control and the CCEC is less than 20 percent, the hypothesis test shall be conducted at the 0.01 level of significance.

In order to establish whether the chronic toxicity limit is eligible for removal from future permits, the Permittee shall also conduct this same hypothesis test (Appendix H, EPA/600/4-89/001) to determine if a statistically significant difference in response exists between the ACEC and the control.

D. Response to Noncompliance With an Effluent Limit for Chronic Toxicity

If a toxicity test conducted for compliance monitoring under subsection C determines a statistically significant difference in response between the CCEC and the control, the Permittee shall begin additional compliance monitoring within one week from the time of receiving the test results. This additional monitoring shall be conducted monthly for three consecutive months using the same test and species as the failed compliance test. Testing shall be conducted using a series of at least five effluent concentrations and a control in order to be able to determine appropriate point estimates. One of these effluent concentrations shall equal the CCEC and be compared statistically to the nontoxic control in order to determine compliance with the effluent limit for chronic toxicity as described in subsection C. The discharger shall return to the original monitoring frequency in subsection C after completion of the additional compliance monitoring.

If the Permittee believes that a test indicating noncompliance will be identified by the Department as an anomalous test result, the Permittee may notify the Department that the compliance test result might be anomalous and that the Permittee intends to take only one additional sample for toxicity testing and wait for notification from the Department before completing the additional monitoring required in this subsection. The notification to the Department shall accompany the report of the compliance test result and identify the reason for considering the compliance test result to be anomalous. The Permittee shall complete all of the additional monitoring required in this subsection as soon as possible after notification by the Department that the compliance test result was not anomalous. If the one additional sample fails to comply with the effluent limit for chronic toxicity, then the Permittee shall proceed without delay to complete all of the additional monitoring required in this subsection. The one additional test result shall replace the compliance test result upon determination by the Department that the compliance test result was anomalous.

If all of the additional compliance monitoring conducted in accordance with this subsection complies with the permit limit, the Permittee shall search all pertinent and recent facility records (operating records, monitoring results, inspection records, spill reports, weather records, production records, raw material purchases, pretreatment records, etc.) and submit a report to the Department on possible causes and preventive measures for the transient toxicity event which triggered the additional compliance monitoring.

If toxicity occurs in violation of the chronic toxicity limit during the additional compliance monitoring, the Permittee shall submit a Toxicity Identification/Reduction Evaluation (TI/RE) plan to the Department. The TI/RE plan submittal shall be within 60 days after the sample date for the third additional compliance monitoring test. If the Permittee decides to forgo the rest of the additional compliance monitoring tests required in this subsection because one of the first two additional compliance monitoring tests failed to meet the chronic toxicity limit, then the Permittee shall submit the TI/RE plan within 60 days after the sample date for the first additional monitoring test to violate the chronic toxicity limit. The TI/RE plan shall be based on WAC 173-205-100(2) and shall be implemented in accordance with WAC 173-205-100(3).

E. Monitoring When There Is No Permit Limit for Chronic Toxicity

The Permittee shall test final effluent once in the last summer and once in the last winter prior to submission of the application for permit renewal. All species used in the initial chronic effluent characterization or substitutes approved by the Department shall be used and results submitted to the Department as a part of the permit renewal application process.

F. Sampling and Reporting Requirements

1. All reports for effluent characterization or compliance monitoring shall be submitted in accordance with the most recent version of Ecology Publication #WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria* in regards to format and content. Reports shall contain bench sheets and reference toxicant results for test methods. If the lab provides the toxicity test data on floppy disk for electronic entry into the Department's database, then the Permittee shall send the disk to the Department along with the test report, bench sheets, and reference toxicant results.

2. Testing shall be conducted on 24-hour composite effluent samples. Composite samples taken for toxicity testing shall be cooled to 4 degrees Celsius while being collected and shall be sent to the lab immediately upon completion. The lab shall begin the toxicity testing as soon as possible but no later than 36 hours after sampling was ended. The lab shall store all samples at 4°C in the dark from receipt until completion of the test.

3. All samples and test solutions for toxicity testing shall have water quality measurements as specified in Ecology Publication #WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria* or most recent version thereof.

4. All toxicity tests shall meet quality assurance criteria and test conditions in the most recent versions of the EPA manual listed in subsection A and Ecology Publication #WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*. If test results are determined to be invalid or anomalous by the Department, testing shall be repeated with freshly collected effluent.

5. Control water and dilution water shall be laboratory water meeting the requirements of the EPA manual listed in subsection A or pristine natural water of sufficient quality for good control performance.

6. The whole effluent toxicity tests shall be run on an unmodified sample of final effluent.

7. The Permittee may choose to conduct a full dilution series test during compliance monitoring 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 ACEC and the CCEC.

8. All whole effluent toxicity tests, effluent screening tests, and rapid screening tests that involve hypothesis testing, and do not comply with the chronic statistical power standard of 39 percent as defined in WAC 173-205-020, must be repeated on a fresh sample with an increased number of replicates to increase the power.

S11. OUTFALL EVALUATION

The Permittee shall inspect the outfall line and diffuser at least once a month to document its integrity and continued function. The inspection shall be noted on the monthly Discharge Monitoring Report submitted to the Department.

GENERAL CONDITIONS

G1. SIGNATORY REQUIREMENTS

All applications, reports, or information submitted to the Department shall be signed and certified.

A. All permit applications shall be signed by either a principal executive officer or a ranking elected official.

B. All reports required by this permit and other information requested by the Department shall 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 the Department.

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 the Department 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 shall 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 shall allow an authorized representative of the Department, 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 the Department's initiative. However, the permit may only be modified, revoked and reissued, or terminated for the reasons specified in 40 CFR 122.62, 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 [40 CFR Part 122.64(3)].

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 [40 CFR Part 122.64(4)].

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. The Department 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. Cause exists for termination for reasons listed in A1 through A7 of this section, and the Department determines that modification or revocation and reissuance is appropriate.

2. The Department 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 A CAUSE FOR MODIFICATION

The Permittee shall submit a new application, or a supplement to the previous application, along with required engineering plans and reports whenever a material change to the facility or in the quantity or type of discharge is anticipated which is not specifically authorized by this permit. This application shall be submitted at least 60 days prior to any proposed changes. The filing of a request by the Permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance 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 shall be submitted to the Department for approval in accordance with Chapter 173-240 WAC. Engineering reports, plans, and specifications shall be submitted at least 180 days prior to the planned start of construction unless a shorter time is approved by the Department. Facilities shall be constructed and operated in accordance with the approved plans.

G6. COMPLIANCE WITH OTHER LAWS AND STATUTES

Nothing in this permit shall be construed as excusing the Permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

G7. DUTY TO REAPPLY

The Permittee shall apply for permit renewal at least 180 days prior to the specified expiration date of this permit.

G8. TRANSFER OF THIS PERMIT

In the event of any change in control or ownership of facilities from which the authorized discharge emanate, the Permittee shall notify the succeeding owner or controller of the existence of this permit by letter, a copy of which shall be forwarded to the Department.

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 the Department 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. The Department 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.

G9. REDUCED PRODUCTION FOR COMPLIANCE

The Permittee, in order to maintain compliance with its permit, shall 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.

G10. REMOVED SUBSTANCES

Collected screenings, grit, solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall not be resuspended or reintroduced to the final effluent stream for discharge to state waters.

G11. DUTY TO PROVIDE INFORMATION

The Permittee shall submit to the Department, within a reasonable time, all information which the Department 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 shall also submit to the Department upon request, copies of records required to be kept by this permit [40 CFR 122.41(h)].

G12. OTHER REQUIREMENTS OF 40 CFR

All other requirements of 40 CFR 122.41 and 122.42 are incorporated in this permit by reference.

G13. ADDITIONAL MONITORING

The Department may establish specific monitoring requirements in addition to those contained in this permit by administrative order or permit modification.

G14. PAYMENT OF FEES

The Permittee shall submit payment of fees associated with this permit as assessed by the Department.

G15. PENALTIES FOR VIOLATING PERMIT CONDITIONS

Any person who is found guilty of willfully violating the terms and conditions of this permit shall be deemed 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 may be deemed a separate and additional violation.

Any person who violates the terms and conditions of a waste discharge permit shall 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 shall be a separate and distinct offense, and in case of a continuing violation, every day's continuance shall be deemed to be a separate and distinct violation.

G16. 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 shall 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 S5 of this permit.

In any enforcement proceeding the Permittee seeking to establish the occurrence of an upset has the burden of proof.

G17. PROPERTY RIGHTS

This permit does not convey any property rights of any sort, or any exclusive privilege.

G18. DUTY TO COMPLY

The Permittee shall 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.

G19. TOXIC POLLUTANTS

The Permittee shall 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.

G20. PENALTIES FOR TAMPERING

The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than two years per violation, or by both. If a conviction of a person is for a violation committed after a first conviction of such person under this Condition, punishment shall be a fine of not more than $20,000 per day of violation, or by imprisonment of not more than four years, or by both.

G21. REPORTING PLANNED CHANGES

The Permittee shall, as soon as possible, give notice to the Department 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, 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 of the terms and conditions of this permit.

G22. REPORTING ANTICIPATED NON-COMPLIANCE

The Permittee shall give advance notice to the Department 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, shall be scheduled during noncritical water quality periods and carried out in a manner approved by the Department.

G23. 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 the Department, it shall promptly submit such facts or information.

G24. REPORTING REQUIREMENTS APPLICABLE TO EXISTING MANUFACTURING, COMMERCIAL, MINING, AND SILVICULTURAL DISCHARGERS

The Permittee belonging to the categories of existing manufacturing, commercial, mining, or silviculture must notify the Department as soon as they know or have reason to believe:

A. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in this permit, if that discharge will exceed the highest of the following "notification levels:"

1. One hundred micrograms per liter (100 µg/l).

2. Two hundred micrograms per liter (200 µg/l) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/l) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/l) for antimony.

3. Five times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR 122.21(g)(7).

4. The level established by the Director in accordance with 40 CFR 122.44(f).

B. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in this permit, if that discharge will exceed the highest of the following "notification levels:"

1. Five hundred micrograms per liter (500µg/L).

2. One milligram per liter (1 mg/L).

3. Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR 122.21(g)(7).

4. The level established by the Director in accordance with 40 CFR 122.44(f).

G25. 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 shall be submitted no later than 14 days following each schedule date.

Appendix B – SEPA Checklist and Determination

PUBLIC NOTICE

STATE ENVIRONMENTAL POLICY ACT (SEPA) DETERMINATION OF NONSIGNIFICANCE (DNS) FOR THE 2015/2016 CITY OF ENUMCLAW COMPREHENSIVE PLAN UPDATE

Permit Application Number: SEPA Environmental Checklist File **#16097**

Applicant: City of Enumclaw
Chris Pasinetti, Interim Community Development Director

Description of Proposal: The proposed action is the 2015/2016 Comprehensive Plan Update. The updated plan includes revisions to the land use, housing, transportation elements as well as other elements included in the plan from 2005. The plan includes revised goals and policies for the planning horizon. The revisions include an updated vision, revised growth targets and new updated information and inventories. Amended Chapters are as follows:

1. Introduction
2. Community Profile
3. Land Use
4. Community Development and Design
5. Transportation
6. Capital Facilities
7. Housing
8. Natural Environment
9. Parks & Recreation
10. Economic Development
11. Human Services

Location of Proposal: Citywide.

Environmental Studies:

- *SEPA Checklist*
  Prepared by the City of Enumclaw, Dated March 4, 2016.
- *EIS dated June 15, 1992 with an addendum in 1994.*
  Prepared by the City of Enumclaw.

Lead Agency: City of Enumclaw, 1309 Myrtle Avenue, Enumclaw, WA 98022

Determination of Non-Significance: The lead agency for this proposal has determined that it does not have a probable significant adverse impact. 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.

The City of Enumclaw as the lead agency has also determined that the requirements for environmental analysis, protection, and mitigation measures have been adequately addressed in the development regulations and the comprehensive plan adopted under Chapter 36.70A RCW and in other applicable local, state, or federal laws or rules as provided by RCW 43.21C.240 and WAC 197-11-158. Therefore, the City will not require mitigation measures under SEPA.

Comment and Appeal Period: The lead agency will not act on this proposal for fifteen (15) days from the publication date identified. Written comments must be received by 4:30 pm, March 31, 2016. Contact the Community Development Department for copies of the SEPA file. Appeals must be accompanied by a written statement and appeal fee as specified by the City fee resolution.

Comment Period for Other Agencies: This DNS is issued under WAC 197-11-340. Commenting agencies should submit any comments within the above-stated period. Upon request, the City will reconsider its lead agency status, the issuance of this DNS, or any mitigating measures. The City will not be taking action on this proposal until June 2016. Written comments may be submitted to the Community Development Department prior to the date of the any public hearing. Written materials may be submitted and oral testimony given at the public hearing. Further information, contact the Community Development Department.

Administrator of Development Regulations and Responsible SEPA Official

_____ ________________ __March 16, 2016__

Chris Pasinetti, Interim Community Development Director Date
cpasinetti@ci.enumclaw.wa.us
1309 Myrtle Avenue
Enumclaw, WA 98022
Phone 360-615- 5726 FAX 360-825-7232

Community Development Department
1309 Myrtle Avenue
Enumclaw, WA 98022-3101
(360) 825-3593

Environmental Checklist for SEPA Review Application Form

To be completed by Staff:

Application # ____16097____

Received by: __________________________ Date:__________________________

Processing Fee: $350.00 plus public notification costs _____________________

A. Staff review determined that project:

___ Meets categorically exempt criteria.

___ Has no probable significant adverse environmental impact(s) and application should be processed without further consideration of environmental effects.

___ Has probable, significant impact(s) that can be mitigated through conditions. EIS not necessary.

___ Has probable, significant averse environmental impact(s). An Environmental Impact Statement will be prepared.

____ _____________________
Signature of Responsible Official Date

B. Comments:

____
____
____

C. Type of Permit or Action Requested:

_2015/2016 Comprehensive Plan Amendment______________________

____

D. Zoning District:

____

SEPA ENVIRONMENTAL CHECKLIST

UPDATED ***2014***

Purpose of checklist:

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

Instructions for applicants**:** [help]

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

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

Instructions for Lead Agencies:

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

Use of checklist for nonproject proposals: [help]

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

To be completed by Applicant:

A. background [help]

1. Name of proposed project, if applicable: [help] 2015/2016 Comprehensive Plan

2. Name of applicant: [help]: City of Enumclaw.

3. Address and phone number of applicant and contact person: [help]

   Chris Pasinetti, Interim Community Development Director
   1309 Myrtle Avenue, Enumclaw WA 98022
   360-615-5726
   cpasinetti@ci.enumclaw.wa.us

   (Note that all correspondence will be mailed to the applicant listed above unless a project contact is designated here and on an addendum attached to this page.

4. Applicant is (owner, agent, other): _Same as above

5. Date checklist prepared: [help]__Friday, March 04, 2016

6. Agency requesting checklist: [help]_City of Enumclaw

7. Proposed timing or schedule (including phasing, if applicable): [help]__________

   Planning Commission review on March 24 & April 28, 2016.
   Open Houses April 6 & May 20, 2016
   Planning Commission Public Hearing May 26, 2016
   City Council Public Hearing June 27, 2016

   The city has a Public Participation Plan ("PPP") for the Comprehensive Plan Update. The PPP includes dates and proposed timing for adoption.

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

   Future Comprehensive Plan Amendments will likely occur, however none are proposed at this time. A final EIS for the first GMA comprehensive plan was prepared on June 15, 1992 with an addendum in 1994, for the 1995 comprehensive plan update.

9. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal. [help]__

Entire Comprehensive Plan to include 11 chapters. Land Use, Transportation, Housing, Natural Environment, Parks & Recreation, Economic Development and Human Services. Also, this SEPA Checklist.

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

City Council review and approval as well as review from the Department of Commerce and certification from the Puget Sound Regional Council.

11. List any government approvals or permits that will be needed for your proposal, if known. [help]

City Council Adoption, Department of Commerce verification and Puget Sound Regional Council Certification.

12. **Project description:** Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of agencies may modify this form to include additional specific information on project description.) [help] (Attach site plans as described in the instructions):

The proposed action is the 2015/2016 Comprehensive Plan Update. The updated plan includes revisions to the land use, housing, transportation elements as well as other elements included in the plan from 2005. The plan includes revised goals and policies for the planning horizon. The revisions include an updated vision, revised growth targets and new updated information and inventories. Amended Chapters are as follows:

1. Introduction
2. Community Profile
3. Land Use
4. Community Development and Design
5. Transportation
6. Capital Facilities
7. Housing
8. Natural Environment
9. Parks & Recreation
10. Economic Development
11. Human Services

Also, updated Natural Gas and Sewer Comprehensive Plan are adopted by reference.

Adoption of this Comprehensive Plan required under the Washington State Growth Management Act and is the City's official statement concerning its vision for future growth and development.   It identifies goals, policies, and strategies for maintaining the health, welfare, and quality of life for the citizens of Enumclaw. The plan is comprised of numerous individual elements addressing land use, neighborhoods, housing, transportation, parks, utilities, capital facilities, and the environment. The City is required to review and, if needed, update its comprehensive plan and development regulations to ensure compliance with the Washington State Growth Management Act (GMA), Chapter 36.70A RCW, by June 30, 2015 pursuant to RCW 36.70A.130.   This periodic review and update of the City's comprehensive plan and development regulations is necessary to ensure that the City's comprehensive plan and development regulations reflect current laws, local needs and goals, and new data. Development regulations will be adopted concurrent with this comprehensive plan, or very shortly thereafter.

All of the proposed materials can be downloaded at the City's website here: http://cityofenumclaw.net/479/2015-Comprehensive-Plan-Update and can be provided upon request.

13. **Location.** Give general location of proposed project (street address, nearest intersection of streets and section, township and section).

The City of Enumclaw is situated in south-central King County at the intersections of State Highways 164, 169 and 410 at an elevation approximately 700 feet, with a view of Mount Rainier to the east. The City is between Buckley, Auburn, Mount Rainier Nation Forest and Crystal Mountain Ski Resort. The planning area encompasses both the area within the city boundaries and the surrounding Urban Growth Area (UGA).

14. Legal description and tax identification number

Citywide

a. Legal description (if lengthy, attach as separate sheet)

Citywide

b. Tax Identification number:

Citywide

15. **Existing conditions:** Give a general description of the property and existing improvements, size, topography, vegetation, soil, drainage natural features, etc. (If necessary, attach a separate sheet).

Non-project Action.
Specific project related existing conditions will be reviewed at the time of permit

application. Most of Enumclaw includes Buckley-Alderwood soils, poorly to moderately well drained soils.

16. Site Area (acres and/or square feet): ____N/A_ Site Dimensions: ______

17. **Schedule:** Describe the timing or schedule (include phasing and phasing dates, if possible) - See above

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

Future Comprehensive Plan amendments are likely however none are proposed at this time. SEPA review will be done with regard to any future amendments to the Comprehensive Plan.

19. **Permits/Approvals:** List all permits or approvals for this project from local, state, federal, or other agencies for which you have applied or will apply as required for your proposal, if known.

Department of Commerce and Puget Sound Regional Council Review and City Council adoption.

20. **Environmental Information:** List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

This SEPA Checklist.

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

Same as above.

Evaluation for Agency Use Only

B. Environmental Elements

Pursuant to WAC 197-11-315(1)(e), no discussion of the individual environmental elements is required for this non-project as the City has determined that the questions in Part B do not contribute meaningfully to the analysis of the proposal.

C. Signature [HELP]

Under penalty of perjury the above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature:

Name of signee: Chris Pasinetti

Position and Agency/Organization: City of Enumclaw

Date: Friday, March 4, 2016.

DO NOT USE THIS SHEET FOR PROJECT ACTIONS

Evaluation for Agency Use Only

D. Supplemental Sheet for Nonproject Actions [help]

Because these questions are very general, it may be helpful to read them in Conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

   The proposed amendments will not likely increase discharges to water, the city's Natural Environment Chapter (Chapter 8) includes policies to maintain and protect surface and ground water resources. Best Management Practices (BMPs) to control stormwater run-off rates, volumes and water quality from development

   The proposed amendments will not likely increase emissions to air, the land use element includes policies regarding mitigating for air quality impacts on surrounding areas. The transportation element includes improvements to the roadway network that will improve air quality.

   The proposed amendments will not increase productions, storage or release of toxic substances or increases to noise.

   Proposed measures to avoid or reduce such increases are:

   BMP's also include education and enforcement are required through the city code. Code requirements currently mitigate adverse impacts from the above mentioned affects. Noise, stormwater, zoning, Critical Areas Ordinance, NPDES permit requirements will mitigate impacts. This is a non-project action and site specific review will be required for all projects at the time of permit application.

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

   The DRAFT Comprehensive Plan will not likely affect plants, animals, fish or marine life as this is a non-project action. Impacts

Evaluation for Agency Use Only

from new development could increase impervious surfaces, increases in stormwater discharges, increased traffic and could negatively affect plants, animals, fish or marine life.

Proposed measures to protect or conserve plants, animals, fish, or marine life?

The plan concentrates new development within the existing urban growth area. Critical Areas regulations are in place to mitigate any adverse impacts to plants, animals fish or marine life in addition to the Shoreline Master Program. The Natural Environment Element gives policy guidance for the protection of sensitive and critical areas.

3. How would the proposal be likely to deplete energy or natural resources are:

The proposal will not likely deplete energy or natural resources.

Proposed measures to protect or conserve energy and natural Resources are:

There are none proposed, however existing building code and critical areas regulations will conserve energy and natural resources.

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?

The DRAFT Comprehensive Plan will not likely affect environmentally sensitive areas. The Parks and Recreation Element establishes the need for an additional 7.13 acres of Neighborhood parks and 2 additional miles of trails. There are no wilderness, wild and scenic rivers within the City. The Natural Environment chapter give goal and policy guidance for maintaining wildlife habitat corridors and critical areas, flood storage, floodplain development and avoiding or reducing development within the 100 year floodplain. The chapter also includes goals regarding preservation and protection of artifacts and historic/culturally significant sites within the city. The Land Use Chapter includes goals regarding job creation and agri-tourism within areas located within the Farmland Preservation Program.

Proposed measures to protect such resources or to avoid or reduce impacts are:

No additional mitigation is proposed. The city's critical areas ordinance is maintained and updated as necessary.

Evaluation for Agency Use Only

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 DRAFT Comprehensive Plan does include changes to the Future Land Use Map. The changes are generally described below:

- East side of town near Farman Avenue includes a large industrial area. The proposed amendment will change the land use designation from Industrial to Light Industrial.
- The intersection of Porter Street and McHugh Avenue previously included a "Mixed Use Overlay District" that will be removed.
- West side of town off of Griffin Avenue near 244th Avenue expands the "Mixed Use Overlay District" and designates the land use as "Office" from "Single Family Residential."
- The Future Annexation Area at the intersection of 236th Avenue SE and SE 436th Way to "Commercial" from "Single Family Residential and Mixed Use Overlay". Also, surrounding properties were designated "Single Family Residential" from "PUD" and the Mixed Use Overlay was Removed.
- At the north east corner of Roosevelt Avenue and 244th Avenue SE the area will be designated "Commercial and Single Family Residential" from "PUD."
- South of Roosevelt Avenue, east and west along 244th Avenue includes an "Airport and Airport Overlay". Surrounding the airport includes a designation for "Urban Rural Transition Overlay" which is a change from the "Single Family."
- Directly North of Laukala Place a large parcel of land will be designated to "Mixed Density Residential."
- SR 410 and 244th property near the intersection will be designated "Commercial" from "PUD."

See DRAFT Future Land Use Map – The DRAFT Future Land Use Map can be downloaded, as well as all of the revised chapters of the Comprehensive Plan on the City's Website here: http://cityofenumclaw.net/479/2015-Comprehensive-Plan-Update

All of the new Elements of the Comprehensive Plan can also be provided upon request.

Proposed measures to avoid or reduce shoreline and land use impacts are:

Existing State and local laws will be utilizes to reduce and avoid shoreline and land use impacts that may be adverse.

Evaluation for Agency Use Only

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

The adoption of the Comprehensive Plan will include a new DRAFT Land Use, Transportation and Public Facilities Element (among others). The future growth is estimated to impact three intersections within the city. SR 410/244th Avenue SE, SR 410/Blake Street and Roosevelt Avenue/244th Avenue SE. These three intersections indicate a level of Service F. Increased growth may affect the city's ability to meet its level of service for parks, ability to provide water and sewer services, solid waste, police, fire services and will affect stormwater runoff within the city.

Proposed measures to reduce or respond to such demand(s) are:

Policies within the Capital Facilities Element ensure public facilities and services can adequately serve development envisioned within the land use element without negatively impacting services levels. Required mitigation for impacts to intersections and other roads are consistent with the Countywide Planning Policies and the City's policies established within the Plan. Mitigation for impacts to services through Transportation Impact fees, street utility (Transportation Benefit District), parks impact fee all are required or may be required in the future to mitigate impacts from development. The transportation element and the established six-year transportation improvement program includes a list of improvements necessary to mitigate impacts future transportation impacts. Levels of service for public facilities are listed in the Capital Facilities Element ("CFE"). The CFE includes policies that require adequate school facilities should be in place prior to new development or mitigation required. General policies include requiring public services concurrent with growth.

The city currently has adopted an Impact Fee Program for traffic and parks. Consideration for Fire and School impacts fees may be reviewed upon completion of this Comprehensive Plan.

Water and Sewer Capital Facilities Charges are required to maintain these capital programs.

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

   There are no conflicts with any laws at the state or federal level for protection of the environment. Enumclaw's proposed comprehensive plan and land use regulations are consistent with the County Wide Planning Policies and state and federal statutes.

Appendix C – Opinions of Probable Cost

Preliminary Project Cost Estimate -- 11-5-14 Draft

Project Admin	$38,500	3.5%
Environmental Review -Permitting	$5,000	0.5%
Preliminary Engineering	$30,000	2.7%
Design	$100,000	9.1%
Construction	$882,500	80.2%
Const Mgmt	$44,000	4.0%
Total	$1,100,000	100.0%

City of Enumclaw
Sewer Comprehensive Plan
Planning Level Opinion of Probable Project Costs
Buckley Rd - Gravity Sewer
Prepared by: T McClaskey
Reviewed by: P. Cunningham
8/17/2015

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$106,500	1	ls	$106,500
2	Temporary Erosion & Sediment Control	$21,300	1	ls	$21,300
3	Dewatering	$21,300	1	ls	$21,300
4	24-inch PVC Sewer Pipe, SDR 35	$200	4,630	lf	$926,000
5	48-inch Manhole	$6,500	16	ea	$104,000
6	Bypass	$15,000	1	ls	$15,000
7	HMA Trench Patch	$150	130	tn	$19,500
8	Traffic Control	$21,300	1	ls	$21,300
9	General Restoration	$21,300	1	ls	$21,300
	Subtotal				$1,256,200
	Sales Tax	8.6%			$108,033
	TOTAL OPINION OF PROBABLE CONSTRUCTION COST				$1,364,233

Planning	5%	$68,000
Design and Permitting	15%	$205,000
Services During Construction	15%	$205,000
TOTAL OPINION OF PROBABLE ALLIED COST		$478,000
Contingency	35%	$645,000
TOTAL OPINION OF PROBABLE PROJECT COST		$2,490,000

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Gen. Rest., Dewatering, Traffic Control, Erosion Control at 2% Construction Costs
4. Mobilization is assumed to be 10% of Construction
5. Pipe costs includes all fittings, pipe, bedding, excavation, haul, and pavement restoration
6. Costs are in 2015 dollars

The opinion of probable cost herein is based on our perception of current conditions at the project location. This opinion reflects our professional opinion of costs at this time and is subject to change as the project design progresses. BHC Consultants has no control over variances in the cost of labor, materials, equipment; nor services provided by others, contractor's means and methods of executing the work or of determining prices, competitive bidding or market conditions, practices or bidding strategies. BHC Consultants cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the costs presented as shown.

City of Lacey
Wastewate Comprehensive Plan Update
Engineer's Planning Level Estimate of Probable Project Costs
Sleater-Kinney Trunk Replacement
Prepared by: P. Cunningham
Reviewed by: A. Schuyler
4/5/2013

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
	Gravity Sewer				
1	48-inch Manhole	$5,000		ea	$0
2	8-inch PVC Sewer Pipe, SDR 35	$110		lf	
3	10-inch PVC Sewer Pipe, SDR 35	$117		lf	
4	12-inch PVC Sewer Pipe, SDR 35	$125		lf	
5	15-inch PVC Sewer Pipe, SDR 35	#REF!		lf	#REF!
6	4-inch PVC C900 Force Main	$76			
7	6-inch PVC C900 Force Main	$83			
8	8-inch PVC C900 Force Main	$92			
9	10-inch PVC C900 Force Main	$103			
10					
	Subtotal				#REF!
	Sales Tax	8.7%			#REF!
	ESTIMATED CONSTRUCTION COST				#REF!
	Construction Contingency	35%			#REF!
	TOTAL ESTIMATED CONSTRUCTION COST				#REF!

Planning	5%	#REF!
Design and Permitting	10%	#REF!
Construction and Construction Management	15%	#REF!
TOTAL ESTIMATED PROJECT COST		#REF!

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Gen. Rest., Dewatering, Traffic Control, Erosion Control at 2% Construction Costs
4. Mobilization is assumed to be 10% of Construction

The estimate of probable cost herein is based on our perception of current conditions at the project location. This estimate reflects our professional opinion of accurate costs at this time and is subject to change as the project design matures. BHC Consultants has no control over variances in the cost of labor, materials, equipment; nor services provided by others, contractor's means and methods of executing the work or of determining prices, competitive bidding or market conditions, practices or bidding strategies. BHC Consultants cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the costs presented as shown

City of Lacey
Wastewate Comprehensive Plan Update
Engineer's Planning Level Estimate of Probable Project Costs
Sleater-Kinney Trunk Replacement
Prepared by: P. Cunningham
Reviewed by: A. Schuyler
4/5/2013

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$700	1	ls	$700
2	Temporary Erosion & Sediment Control	$100	1	ls	$100
3	48-inch Manhole	$5,000	1	ea	$5,000
4	Temporary Bypass	$2,000	1	ls	$2,000
5	Dewatering	$100	1	ls	$100
6	General Restoration	$100	1	ls	$100
	Subtotal				$8,000
	Sales Tax	8.7%			$696
	ESTIMATED CONSTRUCTION COST				$8,696
	Construction Contingency	35%			$3,044
	TOTAL ESTIMATED CONSTRUCTION COST				$12,000

Planning	5%	$600
Design and Permitting	10%	$1,200
Construction and Construction Management	15%	$1,800
TOTAL ESTIMATED PROJECT COST		$16,000

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Gen. Rest., Dewatering, Traffic Control, Erosion Control at 2% Construction Costs
4. Mobilization is assumed to be 10% of Construction

BHC Consultants
City of Lacey
Wastewater Comprehensive Plan Update
Labor and Equipment Costs for Trenching Operations

8 -inch Gravity

Assumptions:
1. Assume 10' average cover over gravity sewer (including road surface profile)
2. Assume 160 lineal feet per day production rate

4. Assume trench sides slope at 15% off vertical on each side

Determine Unit Quantities per LF for Items included in Force Main Unit Price

Pipe diameter, in	0.67	feet	Nominal Diameter
Average Cover, ft	8.00	feet	Depth to invert minus pipe diameter & bedding
Bottom Width of Trench	3.67	feet	Box trench with 40" max pay limits
Top Width of Trench	6.07	feet	15% Side Slope
Pipe bedding depth, above pipe	0.50	feet	Minimum trench requirements
Pipe bedding depth, below pipe	0.50	feet	Minimum trench requirements
% import material	50%		
Temporary HMA Patch	0.17	feet	Assume 2" thick temp. patch

Calculated Volumes

Trench Excavation	1.58	CY/LF	2.52	Tons/LF
Foundation Gravel	0.14	CY/LF	0.22	Tons/LF
Pipe Bedding	0.26	CY/LF	0.41	Tons/LF
Native Trench Backfill	0.65	CY/LF	1.04	Tons/LF
Imported Trench Backfill	0.65	CY/LF	1.04	Tons/LF
Backfill	1.30	CY/LF	2.09	Tons/LF
Compaction	1.30	CY/LF	2.09	Tons/LF
Temporary HMA Patch	0.04	CY/LF	0.08	Tons/LF

Materials

8" PVC SDR 35 Pipe	$10.40	/LF	$10.40	/LF
Foundation Gravel	$27.00	/Ton	$5.87	/LF
Pipe Bedding	$27.00	/Ton	$11.06	/LF
Import Trench Backfill	$26.00	/Ton	$27.12	/LF
Tracer Tape	$3.00	/LF	$3.00	/LF
Temporary HMA Patch	$150.00	/Ton	$11.80	/LF
Material Disposal Fees	$10.00	/Ton	$10.43	/LF
Total Material Costs			$79.67	/LF

	Cost/Day	Production		Cost/LF
Labor*	**$5,220**	320	LF/Dy	$16.31
Equipment*	**$4,188**	320	LF/Dy	$13.09

Total Cost per LF		$109.07	
USE		$110	/LF
Import Trench Backfill	$20.00 /Ton	$20.86	/LF

12 -inch Gravity

Assumptions:
1. Assume 10' average cover over gravity sewer (including road surface profile)
2. Assume 160 lineal feet per day production rate

4. Assume trench sides slope at 15% off vertical on each side

Determine Unit Quantities per LF for Items included in Force Main Unit Price

Pipe diameter, in	1.00	feet	Nominal Diameter
Average Cover, ft	8.00	feet	Depth to invert minus pipe diameter & bedding
Bottom Width of Trench	4.00	feet	Box trench with 40" max pay limits
Top Width of Trench	6.40	feet	15% Side Slope
Pipe bedding depth, above pipe	0.50	feet	Minimum trench requirements
Pipe bedding depth, below pipe	0.50	feet	Minimum trench requirements
% import material	50%		
Temporary HMA Patch	0.17	feet	Assume 2" thick temp. patch

Calculated Volumes

Trench Excavation	1.78	CY/LF	2.84	Tons/LF
Foundation Gravel	0.15	CY/LF	0.24	Tons/LF
Pipe Bedding	0.32	CY/LF	0.51	Tons/LF
Native Trench Backfill	0.71	CY/LF	1.14	Tons/LF
Imported Trench Backfill	0.71	CY/LF	1.14	Tons/LF
Backfill	1.42	CY/LF	2.28	Tons/LF
Compaction	1.42	CY/LF	2.28	Tons/LF
Temporary HMA Patch	0.04	CY/LF	0.08	Tons/LF

Materials

12" PVC SDR 35 Pipe	$12.36	/LF	$12.36	/LF
Foundation Gravel	$27.00	/Ton	$6.40	/LF
Pipe Bedding	$27.00	/Ton	$13.85	/LF
Import Trench Backfill	$26.00	/Ton	$29.58	/LF
Tracer Tape	$3.00	/LF	$3.00	/LF
Temporary HMA Patch	$150.00	/Ton	$12.44	/LF
Material Disposal Fees	$10.00	/Ton	$11.38	/LF
Total Material Costs			$89.02	/LF

	Cost/Day	Production		Cost/LF
Labor*	**$5,220**	320	LF/Dy	$16.31
Equipment*	**$4,188**	320	LF/Dy	$13.09

Total Cost per LF		$118.42	
USE		$120	/LF
Import Trench Backfill	$20.00 /Ton	$22.76	/LF

15 -inch Gravity

Assumptions:
1. Assume 3' average cover over gravity sewer (including road surface profile)
2. Assume 200 lineal feet per day production rate
3. Assume 50% of Native Material is reusable
4. Assume trench sides slope at 15% off vertical on each side
5. Assume temporary cold patch is used and maintained until HMA installed

Determine Unit Quantities per LF for Items included in Force Main Unit Price

Pipe diameter, in	1.25	feet	Nominal Diameter
Average Cover, ft	8.00	feet	Depth to invert minus pipe diameter & bedding
Bottom Width of Trench	4.25	feet	Box trench with 40" max pay limits
Top Width of Trench	6.65	feet	15% Side Slope
Pipe bedding depth, above pipe	0.50	feet	Minimum trench requirements
Pipe bedding depth, below pipe	0.50	feet	Minimum trench requirements
% import material	50%		assume 50% native material usable
Temporary HMA Patch	0.17	feet	Assume 2" thick temp. patch

Calculated Volumes

Trench Excavation	1.94	CY/LF	3.10	Tons/LF
Foundation Gravel	0.16	CY/LF	0.25	Tons/LF
Pipe Bedding	0.37	CY/LF	0.59	Tons/LF
Native Trench Backfill	0.76	CY/LF	1.21	Tons/LF
Imported Trench Backfill	0.76	CY/LF	1.21	Tons/LF
Backfill	1.51	CY/LF	2.42	Tons/LF
Compaction	1.51	CY/LF	2.42	Tons/LF
Temporary HMA Patch	0.04	CY/LF	0.09	Tons/LF

Materials

15" PVC Pipe	$18.54	/LF	$18.54	/LF
Foundation Gravel	$27.00	/Ton	$6.80	/LF
Pipe Bedding	$27.00	/Ton	$16.00	/LF
Import Trench Backfill	$26.00	/Ton	$31.43	/LF
Tracer Tape	$3.00	/LF	$3.00	/LF
Temporary HMA Patch	$150.00	/Ton	$12.93	/LF
Material Disposal Fees	$10.00	/Ton	$12.09	/LF
Total Material Costs			$100.79	/LF

	Cost/Day	Production		Cost/LF
Labor*	**$5,220**	320	LF/Dy	$16.31
Equipment*	**$4,188**	320	LF/Dy	$13.09

Total Cost per LF		$130.19	
USE		$130	/LF
Import Trench Backfill	$20.00 /Ton	$24.18	/LF

18 -inch Gravity

Assumptions:
1. Assume 3' average cover over gravity sewer (including road surface profile)
2. Assume 200 lineal feet per day production rate
3. Assume 50% of Native Material is reusable
4. Assume trench sides slope at 15% off vertical on each side
5. Assume temporary cold patch is used and maintained until HMA installed

Determine Unit Quantities per LF for Items included in Force Main Unit Price

Pipe diame	1.50	feet	Nominal Diameter
Average Co	8.00	feet	Depth to invert minus pipe diameter & bedding
Bottom Wic	4.50	feet	Box trench with 40" max pay limits
Top Width (	6.90	feet	15% Side Slope
Pipe beddir	0.50	feet	Minimum trench requirements
Pipe beddir	0.50	feet	Minimum trench requirements
% import m	50%		assume 50% native material usable
Temporary	0.17	feet	Assume 2" thick temp. patch

Calculated Volumes

Trench Exc	2.10	CY/LF	3.36	Tons/LF
Foundation	0.17	CY/LF	0.27	Tons/LF
Pipe Beddi	0.42	CY/LF	0.67	Tons/LF
Native Trer	0.80	CY/LF	1.28	Tons/LF
Imported Tı	0.80	CY/LF	1.28	Tons/LF
Backfill	1.60	CY/LF	2.56	Tons/LF
Compactioı	1.60	CY/LF	2.56	Tons/LF
Temporary	0.04	CY/LF	0.09	Tons/LF

Materials

18" PVC Pi	$28.84	/LF	$28.84	/LF
Foundation	$27.00	/Ton	$7.20	/LF
Pipe Beddi	$27.00	/Ton	$18.21	/LF
Import Trer	$26.00	/Ton	$33.28	/LF
Tracer Tap	$3.00	/LF	$3.00	/LF
Temporary	$150.00	/Ton	$13.42	/LF
Material Di:	$10.00	/Ton	$12.80	/LF
Total Material Costs			$116.74	/LF

	Cost/Day	Production		Cost/LF
Labor*	**$5,220**	320	LF/Dy	$16.31
Equipment'	**$4,188**	320	LF/Dy	$13.09

Total Cost per LF		$146.14	
USE		$150	/LF
Import Trer	$20.00 /Ton	$25.60	/LF

21

Assumptions:
1. Assume 3' average cove
2. Assume 200 lineal feet p
3. Assume 50% of Native M
4. Assume trench sides slo
5. Assume temporary cold

Determine Unit Quantities

Pipe diame	1.75
Average Co	8.00
Bottom Wic	4.75
Top Width (	7.15
Pipe beddir	0.50
Pipe beddir	0.50
% import m	50%
Temporary	0.17

Calculated Volumes

Trench Exc	2.27
Foundation	0.18
Pipe Beddi	0.47
Native Trer	0.84
Imported Tı	0.84
Backfill	1.69
Compactioı	1.69
Temporary	0.04

Materials

21" PVC Pi	$43.26
Foundation	$27.00
Pipe Beddi	$27.00
Import Trer	$26.00
Tracer Tap	$3.00
Temporary	$150.00
Material Di:	$10.00
Total Material Costs	

	Cost/Day
Labor*	**$5,220**
Equipment'	**$4,188**

Total Cost per LF	
USE	
Import Trer	$20.00

	Cost/Day
Labor*	**$5,220**
Equipment*	**$4,188**

*Costs from CK PS 6 project with 2014 Labor rates

	2014 # Inflated	3%			
8-inch PVC SDR 34	$10.40		/LF	HD Fowler 5/7/15	
12-inch PVC SDR 35	$12.36	12	/LF	HD Fowler quote 11/10/	11/10/2014
15-inch PVC SDR 35	$18.54	18	/LF	HD Fowler quote 11/10/	11/10/2014
18-inch PVC SDR 35	$28.84	28	/LF	HD Fowler quote 11/10/	11/10/2014
21-inch PVC SDR 35	$43.26	42	/LF	HD Fowler quote 11/10/	11/10/2014
24-inch PVC SDR 35	$52.53	51	/LF	HD Fowler quote 11/10/	11/10/2014
30-inch PVC SDR 35 Gravity Pipe	$120.51	117	/LF	HD Fowler quote 11/10/	11/10/2014
36-inch PVC SDR 35	$174.07	169	/LF	HD Fowler quote 11/10/	11/10/2014
8-Inch C905 PVC Force Main	$10.40		/LF	HD Fowler 5/7/15	5/7/2015
16-inch C905 PVC Pipe	$53.00		/LF	HD Fowler 5/7/15	5/7/2015
30-inch C905 PVC Pipe	$120.50		/LF	HD Fowler 5/7/15	5/7/2015
Gravel Backfill for Foundations (Allo	$30.00			Mean for Northshore 20	5/4/2015
Crushed Surfacing Top Course	$38.00			Average Bid from NC PS	5/4/2015
Crushed Surfacing Base Course	$27.00			Average Bid from Everso	5/4/2015
Temporary HMA Pavement	$150.00			Asphalt overlay Northsh	5/4/2015
Permanent HMA Pavement	$150.00			Asphalt overlay Northsh	5/4/2015
Type 1 Manhole, 48-inch Dia.	$6,500.00			Northshore 2014 Averag	5/4/2015
Imported Trench (Subsequent) Back	$26.00			Northshore 2014 Averag	5/4/2015
Controlled Density Fill (Allowance)	$127.67			Average Bid from NC PS	5/4/2015
Extra Trench Excavation (Allowance	$65.00			Average Bid from NC PS	5/4/2015

-inch Gravity

r over gravity sewer (including road surface profile)
er day production rate
aterial is reusable
pe at 15% off vertical on each side
patch is used and maintained until HMA installed

per LF for Items included in Force Main Unit Price

feet	Nominal Diameter	
feet	Depth to invert minus pipe diameter & bedding	
feet	Box trench with 40" max pay limits	
feet	15% Side Slope	
feet	Minimum trench requirements	
feet	Minimum trench requirements	
	assume 50% native material usable	
feet	Assume 2" thick temp. patch	

CY/LF	3.63	Tons/LF
CY/LF	0.28	Tons/LF
CY/LF	0.76	Tons/LF
CY/LF	1.35	Tons/LF
CY/LF	1.35	Tons/LF
CY/LF	2.70	Tons/LF
CY/LF	2.70	Tons/LF
CY/LF	0.09	Tons/LF

/LF	$43.26	/LF
/Ton	$7.60	/LF
/Ton	$20.46	/LF
/Ton	$35.13	/LF
/LF	$3.00	/LF
/Ton	$13.90	/LF
/Ton	$13.51	/LF
	$136.86	/LF

Production		Cost/LF	
320	LF/Dy	$16.31	
320	LF/Dy	$13.09	
		$166.26	
		$170	/LF
/Ton		$27.02	/LF

24 -inch Gravity

Assumptions:
1. Assume 3' average cover over gravity sewer (including road surface profile)
2. Assume 200 lineal feet per day production rate
3. Assume 50% of Native Material is reusable
4. Assume trench sides slope at 15% off vertical on each side
5. Assume temporary cold patch is used and maintained until HMA installed

Determine Unit Quantities per LF for Items included in Force Main Unit Price

Pipe diame	2.00	feet	Nominal Diameter
Average Co	8.00	feet	Depth to invert minus pipe diameter & bedding
Bottom Wic	5.00	feet	Box trench with 40" max pay limits
Top Width	7.40	feet	15% Side Slope
Pipe beddi	0.50	feet	Minimum trench requirements
Pipe beddi	0.50	feet	Minimum trench requirements
% import m	50%		assume 50% native material usable
Temporary	0.17	feet	Assume 2" thick temp. patch

Calculated Volumes

Trench Exc	2.44	CY/LF	3.91	Tons/LF
Foundation	0.19	CY/LF	0.30	Tons/LF
Pipe Beddi	0.53	CY/LF	0.84	Tons/LF
Native Trer	0.89	CY/LF	1.42	Tons/LF
Imported Tr	0.89	CY/LF	1.42	Tons/LF
Backfill	1.78	CY/LF	2.84	Tons/LF
Compactior	1.78	CY/LF	2.84	Tons/LF
Temporary	0.05	CY/LF	0.10	Tons/LF

Materials

24" PVC Pi	$52.53	/LF	$52.53	/LF
Foundation	$27.00	/Ton	$8.00	/LF
Pipe Beddi	$27.00	/Ton	$22.77	/LF
Import Trer	$26.00	/Ton	$36.98	/LF
Tracer Tap	$3.00	/LF	$3.00	/LF
Temporary	$150.00	/Ton	$14.39	/LF
Material Di	$10.00	/Ton	$14.22	/LF
Total Material Costs			$151.89	/LF

	Cost/Day	Production		Cost/LF	
Labor*	**$5,220**	180	LF/Dy	$29.00	RS Means
Equipment	**$4,188**	180	LF/Dy	$23.27	
Total Cost per LF				$204.15	
USE				$200	/LF
Import Trer	$26.00	/Ton		$36.98	/LF

30 -inch Gravity

Assumptions:
1. Assume 3' average cover over gravity sewer (including road surface profile)
2. Assume 200 lineal feet per day production rate
3. Assume 50% of Native Material is reusable
4. Assume trench sides slope at 15% off vertical on each side
5. Assume temporary cold patch is used and maintained until HMA installed

Determine Unit Quantities per LF for Items included in Force Main Unit Price

Pipe diame	2.50	feet	Nominal Diameter
Average Co	8.00	feet	Depth to invert minus pipe diameter & bedding
Bottom Wic	5.50	feet	Box trench with 40" max pay limits
Top Width	5.50	feet	15% Side Slope
Pipe beddi	0.50	feet	Minimum trench requirements
Pipe beddi	0.50	feet	Minimum trench requirements
% import m	50%		assume 50% native material usable
Temporary	0.17	feet	Assume 2" thick temp. patch

Calculated Volumes

Trench Exc	2.81	CY/LF	4.50	Tons/LF
Foundation	0.20	CY/LF	0.33	Tons/LF
Pipe Beddi	0.64	CY/LF	1.02	Tons/LF
Native Trer	0.98	CY/LF	1.56	Tons/LF
Imported Tr	0.98	CY/LF	1.56	Tons/LF
Backfill	1.96	CY/LF	3.13	Tons/LF
Compactior	1.96	CY/LF	3.13	Tons/LF
Temporary	0.03	CY/LF	0.07	Tons/LF

Materials

30" PVC Pi	$120.51	/LF	$120.51	/LF
Foundation	$27.00	/Ton	$8.80	/LF
Pipe Beddi	$27.00	/Ton	$27.54	/LF
Import Trer	$26.00	/Ton	$40.68	/LF
Tracer Tap	$3.00	/LF	$3.00	/LF
Temporary	$150.00	/Ton	$10.69	/LF
Material Di	$10.00	/Ton	$15.64	/LF
Total Material Costs			$226.86	/LF

	Cost/Day	Production		Cost/LF	
Labor*	**$5,220**	140	LF/Dy	$37.29	Estimate
Equipment	**$4,188**	140	LF/Dy	$29.91	
Total Cost per LF				$294.06	
USE				$290	/LF
Import Trer	$20.00	/Ton		$31.29	/LF

8 -inch Force Main

Assumptions:
1. Assume 10' average cover over gravity sewer (including road surface profile)
2. Assume 160 lineal feet per day production rate
3. Assume 20% of Native Material is reusable
4. Assume trench sides slope at 15% off vertical on each side
5. Assume temporary cold patch is used and maintained until HMA installed

Determine Unit Quantities per LF for Items included in Force Main Unit Price

Pipe diameter, in	0.67	feet	Nominal Diameter
Average Cover, ft	4.00	feet	Depth to invert minus pipe diameter & bedding
Bottom Width of Trench	4.00	feet	Box trench with 40" max pay limits
Top Width of Trench	5.20	feet	15% Side Slope
Pipe bedding depth, abov	0.50	feet	Minimum trench requirements
Pipe bedding depth, belov	0.50	feet	Minimum trench requirements
% import material	50%		
Temporary HMA Patch	0.17	feet	Assume 2" thick temp. patch

Calculated Volumes

Trench Excavation	1.01	CY/LF	1.61	Tons/LF
Foundation Gravel	0.15	CY/LF	0.24	Tons/LF
Pipe Bedding	0.28	CY/LF	0.45	Tons/LF
Native Trench Backfill	0.36	CY/LF	0.57	Tons/LF
Imported Trench Backfill	0.36	CY/LF	0.57	Tons/LF
Backfill	0.71	CY/LF	1.14	Tons/LF
Compaction	0.71	CY/LF	1.14	Tons/LF
Temporary HMA Patch	0.03	CY/LF	0.07	Tons/LF

Materials

8-inch C900	$10.40	/LF	$10.40	/LF
Foundation Gravel	$27.00	/Ton	$6.40	/LF
Pipe Bedding	$27.00	/Ton	$12.13	/LF
Backfill	$26.00	/Ton	$14.79	/LF
Tracer Tape	$3.00	/LF	$3.00	/LF
Temporary HMA Patch	$150.00	/Ton	$10.11	/LF
Material Disposal Fees	$10.00	/Ton	$5.69	/LF
Total Material Costs			$62.52	/LF

	Cost/Day	Production		Cost/LF	
Labor	$3,500	264	LF/Dy	$13.26	
Equipment	$3,500	264	LF/Dy	$13.26	
Total Cost per LF				$89.04	
USE				$90	/LF

Import Trench Backfill	$20.00	/Ton	$11.38	/LF

City of Lacey
Wastewate Comprehensive Plan Update
Engineer's Planning Level Estimate of Probable Project Costs
Sleater-Kinney Trunk Replacement
Prepared by: P. Cunningham
Reviewed by: A. Schuyler
4/5/2013

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$2,100	1	ls	$2,100
2	Temporary Erosion & Sediment Control	$400	1	ls	$400
3	Flow Meter Vault	$21,000	1	ea	$21,000
4	Traffic Control	$400	1	ls	$400
5	Dewatering	$400	1	ls	$400
6	General Restoration	$400	1	ls	$400
	Subtotal				$24,700
	Sales Tax	8.7%			$2,149
	ESTIMATED CONSTRUCTION COST				$26,849
	Construction Contingency	35%			$9,397
	TOTAL ESTIMATED CONSTRUCTION COST				$36,000

Planning	5%	$2,000
Design and Permitting	10%	$4,000
Construction and Construction Management	15%	$5,000
TOTAL ESTIMATED PROJECT COST		$47,000

Notes
1. Gen. Rest., Dewatering, Traffic Control, Erosion Control at 2% Construction Costs
2. Mobilization is assumed to be 10% of Construction

3. Vault includes piping, fittings, valves, flow meter, excavation, foundation, backfill, and connection to existing force main

The estimate of probable cost herein is based on our perception of current conditions at the project location. This estimate reflects our professional opinion of accurate costs at this time and is subject to change as the project design matures. BHC Consultants has no control over variances in the cost of labor, materials, equipment; nor services provided by others, contractor’s means and methods of executing the work or of determining prices, competitive bidding or market conditions, practices or bidding strategies. BHC Consultants cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the costs presented as shown.

City of Lacey
Wastewate Comprehensive Plan Update
Engineer's Planning Level Estimate of Probable Project Costs
Sleater-Kinney Trunk Replacement
Prepared by: P. Cunningham
Reviewed by: A. Schuyler
4/5/2013

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$1,300	1	ls	$1,300
2	Temporary Erosion & Sediment Control	$300	1	ls	$300
3	Pump Structure	$3,000	1	ea	$3,000
4	Pump	$2,000	1	ea	$2,000
5	Septic Tank	$2,000	1	ea	$2,000
6	Electrical House Connect	$1,000	4	ea	$4,000
7	Decommission Septic Tank	$1,000	1	ea	$1,000
8	Side Sewer Connection	$1,000	1	ea	$1,000
9	Dewatering	$300	1	ls	$300
10	General Restoration	$300	1	ls	$300
	Subtotal				$15,200
	Sales Tax	8.7%			$1,322
	ESTIMATED CONSTRUCTION COST				$16,522
	Construction Contingency	35%			$5,783
	TOTAL ESTIMATED CONSTRUCTION COST				$22,000

Planning	5%	$1,000
Design and Permitting	10%	$2,000
Construction and Construction Management	15%	$3,000
TOTAL ESTIMATED PROJECT COST		$28,000

Notes
1. Gen. Rest., Dewatering, Erosion Control at 2% Construction Costs
2. Mobilization is assumed to be 10% of Construction

The estimate of probable cost herein is based on our perception of current conditions at the project location. This estimate reflects our professional opinion of accurate costs at this time and is subject to change as the project design matures. BHC Consultants has no control over variances in the cost of labor, materials, equipment; nor services provided by others, contractor's means and methods of executing the work or of determining prices, competitive bidding or market conditions, practices or bidding strategies. BHC Consultants cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the costs presented as shown.

City of Lacey
Wastewate Comprehensive Plan Update
Engineer's Planning Level Estimate of Probable Project Costs
Sleater-Kinney Trunk Replacement
Prepared by: P. Cunningham
Reviewed by: A. Schuyler
4/5/2013

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$1,100	1	ls	$1,100
2	Temporary Erosion & Sediment Control	$200	1	ls	$200
3	Grinder Pump Structure	$3,000	1	ea	$3,000
4	Grinder Pump	$2,000	1	ea	$2,000
5	Electrical House Connect	$1,000	4	ea	$4,000
6	Decommission Septic Tank	$1,000	1	ea	$1,000
7	Side Sewer Connection	$1,000	1	ea	$1,000
8	Dewatering	$200	1	ls	$200
9	General Restoration	$200	1	ls	$200
	Subtotal				$12,700
	Sales Tax	8.7%			$1,105
	ESTIMATED CONSTRUCTION COST				$13,805
	Construction Contingency	35%			$4,832
	TOTAL ESTIMATED CONSTRUCTION COST				$19,000

Planning	5%	$1,000
Design and Permitting	10%	$2,000
Construction and Construction Management	15%	$3,000
TOTAL ESTIMATED PROJECT COST		$25,000

Notes
1. Gen. Rest., Dewatering, Erosion Control at 2% Construction Costs
2. Mobilization is assumed to be 10% of Construction

The estimate of probable cost herein is based on our perception of current conditions at the project location. This estimate reflects our professional opinion of accurate costs at this time and is subject to change as the project design matures. BHC Consultants has no control over variances in the cost of labor, materials, equipment; nor services provided by others, contractor's means and methods of executing the work or of determining prices, competitive bidding or market conditions, practices or bidding strategies. BHC Consultants cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the costs presented as shown.

City of Lacey
Wastewate Comprehensive Plan Update
Engineer's Planning Level Estimate of Probable Project Costs
Lift Station 2 - Replacement
2012
Prepared by: P. Cunningham
Reviewed by: A. Schuyler
4/5/2013

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$41,300	1	ls	$41,300
2	Temporary Erosion & Sediment Control	$8,300	1	ls	$8,300
3	Wet Well Dewatering (wells)	$40,000	1	LS	$40,000
4	Wet Well Struct Excavation	$40	140	CY	$5,600
5	Wet Well Structural Shoring	$30	1,000	SF	$30,000
6	Wet Well Base (precast or CIP)	$4,000	1	LS	$4,000
7	Wet Well (8 ft inside dia precast MH)	$7,500	1	LS	$7,500
8	Wet Well Structural Backfill	$35	100	CY	$3,500
9	Wet Well Lid (CIP w/non-traffic hatch)	$10,000	1	LS	$10,000
10	Sandblast, Caulk Jts and Coat Int Wet Well, Pipe & Equip.	$10,000	1	LS	$10,000
11	SST Pump Rails	$3,500	1	LS	$3,500
12	Disch Piping in Wet Well, incl. support/thrust restraint	$6,000	1	LS	$6,000
13	Duplex Submersible Pumps	$85,000	1	LS	$85,000
14	Valve Vault Excav & Backfill	$4,000	1	LS	$4,000
15	Valve Vault Shoring	$2,500	1	LS	$2,500
16	Valve Vault (CIP vault, non-traffic hatch, piping & valves)	$25,000	1	LS	$25,000
17	Gravity Sewer from Wet Well to Ex. MH in Street	$125	50	LF	$6,250
18	Electrical Equipment Foundation (6-in gravel & 6-in reinf. conc. pad)	$1,500	1	LS	$1,500
19	Structural Aluminum Equipment Canopy/Shelter (~14ft x 10ft)	$10,000	1	LS	$10,000
20	Primary Power Supply	$10,000	1	LS	$10,000
21	UG Power & Controls to Wet Well & Vaults	$7,500	1	LS	$7,500
22	Level Controls in Wet Well	$1,500	1	LS	$1,500
23	Pump Inst. & Controls in NEMA 3R Enclosures	$30,000	1	LS	$30,000
24	MCC in NEMA 3R Enclosures	$15,000	1	LS	$15,000
25	Eng-Generator Foundation	$2,500	1	LS	$2,500
26	Weather/Acoustical Enclosure w/Eng-Gen, fuel tank, critical silencer, ATS)	$40,000	1	LS	$40,000
27	Telemetry	$10,000	1	LS	$10,000
28	Flow Meter Vault	$21,000	1	LS	$21,000
29	Misc. Yard Piping (water, vault drains, site SD)	$6,000	1	LS	$6,000
30	Minor Landscaping	$5,000	1	LS	$5,000
31	Site Parking Area (Gravel)	$3,500	1	LS	$3,500
32	Site Fencing (50' x 50' site)	$35	200	LF	$7,000
33	Traffic Control	$8,300	1	ls	$8,300
34	General Restoration	$8,300	1	ls	$8,300
	Subtotal				$479,550
	Sales Tax	8.7%			$41,721
	ESTIMATED CONSTRUCTION COST				$521,271
	Construction Contingency	35%			$182,445
	TOTAL ESTIMATED CONSTRUCTION COST				$704,000

Planning	5%	$35,000
Design and Permitting	10%	$70,000
Construction and Construction Management	15%	$106,000
TOTAL ESTIMATED PROJECT COST		$915,000

Notes
1. Based on Kitsap Facilities Plan Estimates - Small PS
2. Import backfill assumed to be 100%
3. Foundation Gravel assumed to be 100%
4. Gen. Rest., Dewatering, Traffic Control, Erosion Control at 2% Construction Costs
5. Mobilization is assumed to be 10% of Construction
6. 10" pipe includes all fittings, pipe, bedding, excavation, haul, and pavement restoration

The estimate of probable cost herein is based on our perception of current conditions at the project location. This estimate reflects our professional opinion of accurate costs at this time and is subject to change as the project design matures. BHC Consultants has no control over variances in the cost of labor, materials, equipment; nor services provided by others, contractor's means and methods of executing the work or of determining prices, competitive bidding or market conditions, practices or bidding strategies. BHC Consultants cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the costs presented as shown.

City of Lacey
Wastewate Comprehensive Plan Update
Engineer's Planning Level Estimate of Probable Project Costs
Small Lift Station
Prepared by: P. Cunningham
Reviewed by: A. Schuyler
4/5/2013

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$41,300	1	ls	$41,300
2	Temporary Erosion & Sediment Control	$8,300	1	ls	$8,300
3	Wet Well Dewatering (wells)	$40,000	1	LS	$40,000
4	Wet Well Struct Excavation	$40	140	CY	$5,600
5	Wet Well Structural Shoring	$30	1,000	SF	$30,000
6	Wet Well Base (precast or CIP)	$4,000	1	LS	$4,000
7	Wet Well (8 ft inside dia precast MH)	$7,500	1	LS	$7,500
8	Wet Well Structural Backfill	$35	100	CY	$3,500
9	Wet Well Lid (CIP w/non-traffic hatch)	$10,000	1	LS	$10,000
10	Sandblast, Caulk Jts and Coat Int Wet Well, Pipe & Equip.	$10,000	1	LS	$10,000
11	SST Pump Rails	$3,500	1	LS	$3,500
12	Disch Piping in Wet Well, incl. support/thrust restraint	$6,000	1	LS	$6,000
13	Duplex Submersible Pumps	$85,000	1	LS	$85,000
14	Valve Vault Excav & Backfill	$4,000	1	LS	$4,000
15	Valve Vault Shoring	$2,500	1	LS	$2,500
16	Valve Vault (CIP vault, non-traffic hatch, piping & valves)	$25,000	1	LS	$25,000
17	Gravity Sewer from Wet Well to Ex. MH in Street	$125	50	LF	$6,250
18	Electrical Equipment Foundation (6-in gravel & 6-in reinf. conc. pad)	$1,500	1	LS	$1,500
19	Structural Aluminum Equipment Canopy/Shelter (~14ft x 10ft)	$10,000	1	LS	$10,000
20	Primary Power Supply	$10,000	1	LS	$10,000
21	UG Power & Controls to Wet Well & Vaults	$7,500	1	LS	$7,500
22	Level Controls in Wet Well	$1,500	1	LS	$1,500
23	Pump Inst. & Controls in NEMA 3R Enclosures	$30,000	1	LS	$30,000
24	MCC in NEMA 3R Enclosures	$15,000	1	LS	$15,000
25	Eng-Generator Foundation	$2,500	1	LS	$2,500
26	Weather/Acoustical Enclosure w/Eng-Gen, fuel tank, critical silencer, ATS)	$40,000	1	LS	$40,000
27	Telemetry	$10,000	1	LS	$10,000
28	Flow Meter Vault	$21,000	1	LS	$21,000
29	Misc. Yard Piping (water, vault drains, site SD)	$6,000	1	LS	$6,000
30	Minor Landscaping	$5,000	1	LS	$5,000
31	Site Parking Area (Gravel)	$3,500	1	LS	$3,500
32	Site Fencing (50' x 50' site)	$35	200	LF	$7,000
33	Traffic Control	$8,300	1	ls	$8,300
34	General Restoration	$8,300	1	ls	$8,300
	Subtotal				$479,550
	Sales Tax	8.7%			$41,721
	ESTIMATED CONSTRUCTION COST				$521,271
	Construction Contingency	35%			$182,445
	TOTAL ESTIMATED CONSTRUCTION COST				$704,000

Planning	5%	$35,000
Design and Permitting	10%	$70,000
Construction and Construction Management	15%	$106,000
TOTAL ESTIMATED PROJECT COST		$915,000

Notes
1. Based on Kitsap Facilities Plan Estimates - Small PS
2. Import backfill assumed to be 100%
3. Foundation Gravel assumed to be 100%
4. Gen. Rest., Dewatering, Traffic Control, Erosion Control at 2% Construction Costs
5. Mobilization is assumed to be 10% of Construction
6. 10" pipe includes all fittings, pipe, bedding, excavation, haul, and pavement restoration

The opinion of probable cost herein is based on our perception of current conditions at the project location. This opinion reflects our professional opinion of costs at this time and is subject to change as the project design progresses. BHC Consultants has no control ove variances in the cost of labor, materials, equipment; nor services provided by others, contractor's means and methods of executing the work or of determining prices, competitive bidding or market conditions, practices or bidding strategies. BHC Consultants cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the costs presented as shown.

City of Enumclaw
Wastewate Comprehensive Plan Update
Engineer's Planning Level Estimate of Probable Project Costs
Medium Lift Station Mechanical and Electrical
Prepared by: Tiffany Neier
Reviewed by: Peter Cunningham
7/24/2015

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Wet Well	$70,000	1	ls	$70,000
2	Sandblast, Caulk Jts and Coat Int Wet Well, Pipe & Equip.	$11,000	1	LS	$11,000
3	SST Pump Rails	$4,000	1	LS	$4,000
4	Disch Piping in Wet Well, incl. support/thrust restraint	$6,500	1	LS	$6,500
5	Duplex Submersible Pumps	$120,000	1	LS	$120,000
6	Valve Vault (CIP vault, non-traffic hatch, piping & valves)	$65,000	1	LS	$65,000
7	Electrical Equipment Foundation (6-in gravel & 6-in reinf. conc. pad)	$1,500	1	LS	$1,500
8	Structural Aluminum Equipment Canopy/Shelter (~14ft x 10ft)	$11,000	1	LS	$11,000
9	Primary Power Supply	$11,000	1	LS	$11,000
10	UG Power & Controls to Wet Well & Vaults	$8,000	1	LS	$8,000
11	Level Controls in Wet Well	$2,000	1	LS	$2,000
12	Pump Inst. & Controls in NEMA 3R Enclosures	$37,000	1	LS	$37,000
13	MCC in NEMA 3R Enclosures	$21,000	1	LS	$21,000
14	Eng-Generator Foundation	$3,000	1	LS	$3,000
15	Weather/Acoustical Enclosure w/Eng-Gen, fuel tank, critical silencer, ATS)	$63,000	1	LS	$63,000
16	Telemetry	$11,000	1	LS	$11,000
17	Flow Meter Vault	$33,000	1	LS	$33,000
18	Misc. Yard Piping (water, vault drains, site SD)	$6,500	1	LS	$6,500
19	Minor Landscaping	$5,000	1	LS	$5,000
20	Site Parking Area (Gravel)	$4,000	1	LS	$4,000
21	Site Fencing (50' x 50' site)	$35	200	LF	$7,000
	Subtotal				$500,000
	Sales Tax	8.7%			$43,500
	ESTIMATED CONSTRUCTION COST				$543,500
	Construction Contingency	35%			$190,225
	TOTAL ESTIMATED CONSTRUCTION COST				$734,000

Planning	5%	$37,000
Design and Permitting	10%	$73,000
Construction and Construction Management	15%	$110,000
TOTAL ESTIMATED PROJECT COST		$954,000

Notes
1. Based on Kitsap Facilities Plan Estimates - Medium PS

The opinion of probable cost herein is based on our perception of current conditions at the project location. This opinion reflects our professional opinion of costs at this time and is subject to change as the project design progresses. BHC Consultants has no control over variances in the cost of labor, materials, equipment; nor services provided by others, contractor’s means and methods of executing the work or of determining prices, competitive bidding or market conditions, practices or bidding strategies. BHC Consultants cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the costs presented as shown.

City of Lacey
Wastewate Comprehensive Plan Update
Engineer's Planning Level Estimate of Probable Project Costs
Small Lift Station Mechanical and Electrical
Prepared by: P. Cunningham
Reviewed by: A. Schuyler
4/5/2013

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Temporary Erosion & Sediment Control	$6,300	1	ls	$6,300
2	Sandblast, Caulk Jts and Coat Int Wet Well, Pipe & Equip.	$10,000	1	LS	$10,000
3	SST Pump Rails	$3,500	1	LS	$3,500
4	Disch Piping in Wet Well, incl. support/thrust restraint	$6,000	1	LS	$6,000
5	Duplex Submersible Pumps	$85,000	1	LS	$85,000
6	Valve Vault Excav & Backfill	$4,000	1	LS	$4,000
7	Valve Vault Shoring	$2,500	1	LS	$2,500
8	Valve Vault (CIP vault, non-traffic hatch, piping & valves)	$25,000	1	LS	$25,000
9	Gravity Sewer from Wet Well to Ex. MH in Street	$125	50	LF	$6,250
10	Electrical Equipment Foundation (6-in gravel & 6-in reinf. conc. pad)	$1,500	1	LS	$1,500
11	Structural Aluminum Equipment Canopy/Shelter (~14ft x 10ft)	$10,000	1	LS	$10,000
12	Primary Power Supply	$10,000	1	LS	$10,000
13	UG Power & Controls to Wet Well & Vaults	$7,500	1	LS	$7,500
14	Level Controls in Wet Well	$1,500	1	LS	$1,500
15	Pump Inst. & Controls in NEMA 3R Enclosures	$30,000	1	LS	$30,000
16	MCC in NEMA 3R Enclosures	$15,000	1	LS	$15,000
17	Eng-Generator Foundation	$2,500	1	LS	$2,500
18	Weather/Acoustical Enclosure w/Eng-Gen, fuel tank, critical silencer, ATS)	$40,000	1	LS	$40,000
19	Telemetry	$10,000	1	LS	$10,000
20	Flow Meter Vault	$21,000	1	LS	$21,000
21	Misc. Yard Piping (water, vault drains, site SD)	$6,000	1	LS	$6,000
22	Minor Landscaping	$5,000	1	LS	$5,000
23	Site Parking Area (Gravel)	$3,500	1	LS	$3,500
24	Site Fencing (50' x 50' site)	$35	200	LF	$7,000
	Subtotal				$319,000
	Sales Tax	8.7%			$27,753
	ESTIMATED CONSTRUCTION COST				$346,753
	Construction Contingency	35%			$121,364
	TOTAL ESTIMATED CONSTRUCTION COST				$468,000
	Planning	5%			$23,000
	Design and Permitting	10%			$47,000
	Construction and Construction Management	15%			$70,000
	TOTAL ESTIMATED PROJECT COST				$608,000

Notes
1. Based on Kitsap Facilities Plan Estimates - Small PS
2. Import backfill assumed to be 100%
3. Foundation Gravel assumed to be 100%
4. Gen. Rest., Dewatering, Traffic Control, Erosion Control at 2% Construction Costs
5. Mobilization is assumed to be 10% of Construction
6. 10" pipe includes all fittings, pipe, bedding, excavation, haul, and pavement restoration

The opinion of probable cost herein is based on our perception of current conditions at the project location. This opinion reflects our professional opinion of costs at this time and is subject to change as the project design progresses. BHC Consultants has no control over variances in the cost of labor, materials, equipment; nor services provided by others, contractor's means and methods of executing the work or of determining prices, competitive bidding or market conditions, practices or bidding strategies. BHC Consultants cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the costs presented as shown.

City of Lacey
Wastewate Comprehensive Plan Update
Engineer's Planning Level Estimate of Probable Project Costs
Lift Station - ????
Prepared by: P. Cunningham
Reviewed by: A. Schuyler
4/5/2013

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$41,300	1	ls	$41,300
2	Temporary Erosion & Sediment Control	$8,300	1	ls	$8,300
3	Wet Well Dewatering (wells)	$40,000	1	LS	$40,000
4	Wet Well Struct Excavation	$40	140	CY	$5,600
5	Wet Well Structural Shoring	$30	1,000	SF	$30,000
6	Wet Well Base (precast or CIP)	$4,000	1	LS	$4,000
7	Wet Well (8 ft inside dia precast MH)	$7,500	1	LS	$7,500
8	Wet Well Structural Backfill	$35	100	CY	$3,500
9	Wet Well Lid (CIP w/non-traffic hatch)	$10,000	1	LS	$10,000
10	Sandblast, Caulk Jts and Coat Int Wet Well, Pipe & Equip.	$10,000	1	LS	$10,000
11	SST Pump Rails	$3,500	1	LS	$3,500
12	Disch Piping in Wet Well, incl. support/thrust restraint	$6,000	1	LS	$6,000
13	Duplex Submersible Pumps	$85,000	1	LS	$85,000
14	Valve Vault Excav & Backfill	$4,000	1	LS	$4,000
15	Valve Vault Shoring	$2,500	1	LS	$2,500
16	Valve Vault (CIP vault, non-traffic hatch, piping & valves)	$25,000	1	LS	$25,000
17	Gravity Sewer from Wet Well to Ex. MH in Street	$125	50	LF	$6,250
18	Electrical Equipment Foundation (6-in gravel & 6-in reinf. conc. pad)	$1,500	1	LS	$1,500
19	Structural Aluminum Equipment Canopy/Shelter (~14ft x 10ft)	$10,000	1	LS	$10,000
20	Primary Power Supply	$10,000	1	LS	$10,000
21	UG Power & Controls to Wet Well & Vaults	$7,500	1	LS	$7,500
22	Level Controls in Wet Well	$1,500	1	LS	$1,500
23	Pump Inst. & Controls in NEMA 3R Enclosures	$30,000	1	LS	$30,000
24	MCC in NEMA 3R Enclosures	$15,000	1	LS	$15,000
25	Eng-Generator Foundation	$2,500	1	LS	$2,500
26	Weather/Acoustical Enclosure w/Eng-Gen, fuel tank, critical silencer, ATS)	$40,000	1	LS	$40,000
27	Telemetry	$10,000	1	LS	$10,000
28	Flow Meter Vault	$21,000	1	LS	$21,000
29	Misc. Yard Piping (water, vault drains, site SD)	$6,000	1	LS	$6,000
30	Minor Landscaping	$5,000	1	LS	$5,000
31	Site Parking Area (Gravel)	$3,500	1	LS	$3,500
32	Site Fencing (50' x 50' site)	$35	200	LF	$7,000
33	Traffic Control	$8,300	1	ls	$8,300
34	General Restoration	$8,300	1	ls	$8,300
	Subtotal				$479,550
	Sales Tax	8.7%			$41,721
	ESTIMATED CONSTRUCTION COST				$521,271
	Construction Contingency	35%			$182,445
	TOTAL ESTIMATED CONSTRUCTION COST				$704,000

Planning	5%	$35,000
Design and Permitting	10%	$70,000
Construction and Construction Management	15%	$106,000
TOTAL ESTIMATED PROJECT COST		$915,000

Notes
1. Based on Kitsap Facilities Plan Estimates - Small PS
2. Import backfill assumed to be 100%
3. Foundation Gravel assumed to be 100%
4. Gen. Rest., Dewatering, Traffic Control, Erosion Control at 2% Construction Costs
5. Mobilization is assumed to be 10% of Construction
6. 10" pipe includes all fittings, pipe, bedding, excavation, haul, and pavement restoration

The estimate of probable cost herein is based on our perception of current conditions at the project location. This estimate reflects our professional opinion of accurate costs at this time and is subject to change as the project design matures. BHC Consultants has no control over variances in the cost of labor, materials, equipment; nor services provided by others, contractor's means and methods of executing the work or of determining prices, competitive bidding or market conditions, practices or bidding strategies. BHC Consultants cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the costs presented as shown.

City of Lacey
Wastewate Comprehensive Plan Update
Engineer's Planning Level Estimate of Probable Project Costs
Force Main - ???
Prepared by: P. Cunningham
Reviewed by: A. Schuyler
4/5/2013

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	#REF!	1	ls	#REF!
2	Temporary Erosion & Sediment Control	#REF!	1	ls	#REF!
3	Dewatering	#REF!	1	ls	#REF!
4	4-inch PVC C900 Force Main	#REF!	2,700	lf	#REF!
5	Air Release/Vacuum Valve Vault	$26,000	1	ea	$26,000
6	Blowoff	$3,200	1	ea	$3,200
7	12-inch PVC Sewer Pipe, SDR 35	#REF!	500	lf	#REF!
8	48-inch Manhole	$5,000	4	ea	$20,000
9	HMA Trench Patch	$200	615	tn	$123,000
10	Traffic Control	#REF!	1	ls	#REF!
11	General Restoration	#REF!	1	ls	#REF!
	Subtotal				#REF!
	Sales Tax	8.7%			#REF!
	ESTIMATED CONSTRUCTION COST				#REF!
	Construction Contingency	35%			#REF!
	TOTAL ESTIMATED CONSTRUCTION COST				#REF!

Planning	5%	#REF!
Design and Permitting	10%	#REF!
Construction and Construction Management	15%	#REF!
TOTAL ESTIMATED PROJECT COST		#REF!

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Gen. Rest., Dewatering, Traffic Control, Erosion Control at 2% Construction Costs
4. Mobilization is assumed to be 10% of Construction
5. Pipe costs includes all fittings, pipe, bedding, excavation, haul, and pavement restoration

The estimate of probable cost herein is based on our perception of current conditions at the project location. This estimate reflects our professional opinion of accurate costs at this time and is subject to change as the project design matures. BHC Consultants has no control over variances in the cost of labor, materials, equipment; nor services provided by others, contractor's means and methods of executing the work or of determining prices, competitive bidding or market conditions, practices or bidding strategies. BHC Consultants cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the costs presented as shown.

City of Lacey
Wastewater Comprehensive Plan Update
Planning Level Opinion of Probable Project Costs
CIP 106-116, 118-120 - Obsolete LS Mechanical and Electrical Upgrades
Prepared by: P. Cunningham
Reviewed by: A. Schuyler
3/6/2014

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$31,900	1	ls	$31,900
2	Temporary Erosion & Sediment Control	$6,400	1	ls	$6,400
3	Lift Station Mechanical and Electrical Upgrade	$319,000	1	ls	$319,000
4	Traffic Control	$6,400	1	ls	$6,400
5	General Restoration	$6,400	1	ls	$6,400
	Subtotal				$370,100
	Sales Tax	8.7%			$32,199
	ESTIMATED CONSTRUCTION COST				$402,299
	Construction Contingency	35%			$140,805
	TOTAL ESTIMATED CONSTRUCTION COST				$543,100

Planning	5%	$27,000
Design and Permitting	10%	$54,000
Construction and Construction Management	15%	$81,000
TOTAL ESTIMATED PROJECT COST		$705,000

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Gen. Rest., Dewatering, Traffic Control, Erosion Control at 2% Construction Costs
4. Mobilization is assumed to be 10% of Construction
5. Pipe costs includes all fittings, pipe, bedding, excavation, haul, and pavement restoration
6. Lift Station costs include new mechanical and electrical equipment, valve vault, rehabilitation of existing wet well, generator set, flow meter, and site restoration

City of Lacey
Wastewater Comprehensive Plan Update
Planning Level Opinion of Probable Project Costs
CIP 16(b) - STEP Flow Meters
Prepared by: P. Cunningham
Reviewed by: A. Schuyler
9/6/2013

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$4,200	1	ls	$4,200
2	Temporary Erosion & Sediment Control	$840	1	ls	$840
3	Flow Meter Vault	$21,000	2	ea	$42,000
4	Traffic Control	$840	1	ls	$840
5	Dewatering	$840	1	ls	$840
6	General Restoration	$840	1	ls	$840
	Subtotal				$49,560
	Sales Tax	8.7%			$4,312
	TOTAL OPINION OF PROBABLE CONSTRUCTION COST				$53,872

Planning	5%	$3,000
Design and Permitting	15%	$8,000
Services During Construction	15%	$8,000
TOTAL OPINION OF PROBABLE ALLIED COST		$19,000
Contingency	35%	$26,000
TOTAL OPINION OF PROBABLE PROJECT COST		$100,000

Notes
1. Gen. Rest., Dewatering, Traffic Control, Erosion Control at 2% Construction Costs
2. Mobilization is assumed to be 10% of Construction

3. Vault includes piping, fittings, valves, flow meter, excavation, foundation, backfill, and connection to existing force main

The opinion of probable cost herein is based on our perception of current conditions at the project location. This opinion reflects our professional opinion of costs at this time and is subject to change as the project design progresses. BHC Consultants has no control over variances in the cost of labor, materials, equipment; nor services provided by others, contractor's means and methods of executing the work or of determining prices, competitive bidding or market conditions, practices or bidding strategies. BHC Consultants cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the costs presented as shown.

City of Lacey
Wastewate Comprehensive Plan Update
Engineer's Planning Level Estimate of Probable Project Costs
Gravity - ???
Prepared by: P. Cunningham
Reviewed by: A. Schuyler
4/5/2013

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$0	1	ls	$0
2	Temporary Erosion & Sediment Control	$0	1	ls	$0
3	Dewatering	$0	1	ls	$0
4	8-inch PVC Sewer Pipe, SDR 35	$120		lf	$0
5	48-inch Manhole	$5,000		ea	$0
6	Side Sewer Connections	$500	0	ea	$0
7	HMA Trench Patch	$200	0	tn	$0
8	Traffic Control	$0	1	ls	$0
9	General Restoration	$0	1	ls	$0
	Subtotal				$0
	Sales Tax	8.7%			$0
	ESTIMATED CONSTRUCTION COST				$0
	Construction Contingency	35%			$0
	TOTAL ESTIMATED CONSTRUCTION COST				$0

Planning	5%	$0
Design and Permitting	10%	$0
Construction and Construction Management	15%	$0
TOTAL ESTIMATED PROJECT COST		$0

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Gen. Rest., Dewatering, Traffic Control, Erosion Control at 2% Construction Costs
4. Mobilization is assumed to be 10% of Construction
5. Pipe costs includes all fittings, pipe, bedding, excavation, haul, and pavement restoration

SHEET NO:

ELECTRICAL CONSTRUCTION COST ESTIMATE

FOLLETT ENGINEERING, PLLC
ENGINEERING & CONSULTING
ELECTRICAL
SEATTLE,
WA 425-765-6304

BASIS FOR ESTIMATE
(NO DESIGN COMPLETED)
90% DESIGN
X (FINAL DESIGN)
OTHER (SPECIFY)

Project: Kitsap Collection Improvements LS1 **NO:**
ESTIMATOR: V FOLLETT
DATE: FEB 11 2015
LABOR RATE:

SUMMARY:

SUMMARY LS1	QUANITY NO. UNITS	UNIT MEAS.	MATERIAL PER UNIT	MATERIAL TOTAL	LABOR PER UNIT	LABOR TOTAL	TOTAL COST
ELECTRICAL EQUIPMENT	4	EA	4000	$16,000	1000	$4,000	$20,000
CONTROL PANELS (MCP)	1	EA	35000	$35,000	6000	$6,000	$41,000
OTHER CONTROL PANELS	2	EA	3000	$6,000	500	$1,000	$7,000
TELEMETRY PANEL	1	EA	8000	$8,000	1000	$1,000	$9,000
MISC. MOTOR CONTROL EQUIPMENT	2	EA	4000	$8,000	500	$1,000	$9,000
RACEWAYS AND WIRE	40		600	$24,000	500	$20,000	$44,000
SUBSTRUCTURES	1		2000	$2,000	1000	$1,000	$3,000
INSTRUMENTATION							
MISC	2	EA	200	$400	500	$1,000	$1,400
ANALOG	3	EA	1000	$3,000	500	$1,500	$4,500
DISCRETE	8	EA	200	$1,600	200	$1,600	$3,200
PROGRAMMING/TESTING	180	HRS	2	$360	120	$21,600	$21,960
VFDS/MOTOR STARTERS 160hp	2	EA	22000	$44,000	4000	$8,000	$52,000
COMMUNICATIONS EQUIPMENT	1	EA	1000	$1,000	1500	$1,500	$2,500
SITE WORK	200	LF	2	$400	20	$4,000	$4,400
SUBSTRUCTURES	1	EA	1000	$1,000	1000	$1,000	$2,000
LIGHT, HVAC MISC ELEC	15	EA	200	$3,000	100	$1,500	$4,500
GENERATOR 400KW	1	EA	90000	$90,000	12000	$12,000	$102,000
ATS	1	EA	9000	$9,000	2000	$2,000	$11,000
SUBTOTALS				$252,760		$89,700	$342,460
MISCELLANEOUS					(15)%		$51,369
						SUBTOTAL	**$393,829**
TAX					(8.5)%		$33,475
MOBILIZATION					(4)%		$13,698
CONTRACTOR OVERHEAD (15)% & PROFIT (10)%					(26.5)%		$104,365
TOTAL							**$545,368**

ELECTRICAL CONSTRUCTION COST ESTIMATE

FOLLETT ENGINEERING, PLLC
ENGINEERING & CONSULTING
425-765-6304
ELECTRICAL
SEATTLE, WA

BASIS F
X

Project: Kitsap Collection Improvements LS6 **NO:**
ESTIMATOF
DATE:
LABOR RAT

SUMMARY:

SUMMARY LS6	QUANITY NO. UNITS	UNIT MEAS.	MATERIAL PER UNIT	MATERIAL TOTAL
ELECTRICAL EQUIPMENT	4	EA	3000	$12,000
CONTROL PANELS (MCP)	1	EA	35000	$35,000
OTHER CONTROL PANELS	2	EA	3000	$6,000
TELEMETRY PANEL	1		8000	$8,000
MISC. MOTOR CONTROL EQUIPMENT	2	EA	3000	$6,000
RACEWAYS AND WIRE	35		500	$17,500
SUBSTRUCTURES	1		2000	$2,000
INSTRUMENTATION				
MISC	2	EA	200	$400
ANALOG	3	EA	1000	$3,000
DISCRETE	8	EA	200	$1,600
PROGRAMMING/TESTING	180	HRS	2	$360
VFDS/MOTOR STARTERS 60hp	2	EA	12000	$24,000
COMMUNICATIONS EQUIPMENT	1	EA	1000	$1,000
SITE WORK	100	LF	2	$200
SUBSTRUCTURES	1	EA	1000	$1,000
LIGHT, HVAC MISC ELEC	15	EA	200	$3,000
GENERATOR 150KW	1	EA	50000	$50,000
ATS	1	EA	7000	$7,000
SUBTOTALS				$178,060
MISCELLANEOUS				(
TAX				(
MOBILIZATION				(
CONTRACTOR OVERHEAD 15)% & PROFIT (10)%				(
TOTAL				

SHEET NO:

-OR ESTIMATE
(NO DESIGN COMPLETED)
90% DESIGN
(FINAL DESIGN)
OTHER (SPECIFY)

R: V FOLLETT
FEB 11 2015
TE:

LABOR PER UNIT	LABOR TOTAL	TOTAL COST
1000	$4,000	$16,000
6000	$6,000	$41,000
500	$1,000	$7,000
1000	$1,000	$9,000
500	$1,000	$7,000
500	$17,500	$35,000
1000	$1,000	$3,000
500	$1,000	$1,400
500	$1,500	$4,500
200	$1,600	$3,200
120	$21,600	$21,960
3000	$6,000	$30,000
1500	$1,500	$2,500
20	$2,000	$2,200
1000	$1,000	$2,000
100	$1,500	$4,500
10000	$8,000	$58,000
1500	$1,500	$8,500
	$78,700	$256,760
15	)%	$38,514
	SUBTOTAL	**$295,274**
8.5	)%	$25,098
4	)%	$10,270
26.5	)%	$78,248
		$408,890

SHEET NO:

ELECTRICAL CONSTRUCTION COST ESTIMATE

FOLLETT ENGINEERING, PLLC
ENGINEERING & CONSULTING
ELECTRICAL
SEATTLE, WA 425-765-6304

BASIS FOR ESTIMATE
(NO DESIGN COMPLETED)
90% DESIGN
X (FINAL DESIGN)
OTHER (SPECIFY)

Project: Kitsap Collection Improvements LS8 **NO:**

ESTIMATOR: V FOLLETT
DATE: FEB 11 2015
LABOR RATE:

SUMMARY: **SUMMARY LS8**	QUANITY NO. UNITS	UNIT MEAS.	MATERIAL PER UNIT	MATERIAL TOTAL	LABOR PER UNIT	LABOR TOTAL	TOTAL COST
ELECTRICAL EQUIPMENT	4	EA	2000	$8,000	1000	$4,000	$12,000
CONTROL PANELS (MCP)	1	EA	35000	$35,000	6000	$6,000	$41,000
OTHER CONTROL PANELS	2	EA	3000	$6,000	500	$1,000	$7,000
TELEMETRY PANEL	1		8000	$8,000	1000	$1,000	$9,000
MISC. MOTOR CONTROL EQUIPMENT	2	EA	2000	$4,000	500	$1,000	$5,000
RACEWAYS AND WIRE	35		400	$14,000	500	$17,500	$31,500
SUBSTRUCTURES	1		2000	$2,000	1000	$1,000	$3,000
INSTRUMENTATION							
MISC	2	EA	200	$400	500	$1,000	$1,400
ANALOG	3	EA	1000	$3,000	500	$1,500	$4,500
DISCRETE	8	EA	200	$1,600	200	$1,600	$3,200
PROGRAMMING/TESTING	180	HRS	2	$360	120	$21,600	$21,960
VFDS/MOTOR STARTERS 40hp	2	EA	10000	$20,000	3000	$6,000	$26,000
COMMUNICATIONS EQUIPMENT	1	EA	1000	$1,000	1500	$1,500	$2,500
SITE WORK	100	LF	2	$200	20	$2,000	$2,200
SUBSTRUCTURES	1	EA	1000	$1,000	1000	$1,000	$2,000
LIGHT, HVAC MISC ELEC	15	EA	200	$3,000	100	$1,500	$4,500
GENERATOR 60KW	1	EA	40000	$40,000	6500	$6,500	$46,500
ATS	1	EA	6000	$6,000	1500	$1,500	$7,500
SUBTOTALS				$153,560		$77,200	$230,760
MISCELLANEOUS				(	15	)%	$34,614
						SUBTOTAL	**$265,374**
TAX				(	8.5	)%	$22,557
MOBILIZATION				(	4	)%	$9,230
CONTRACTOR OVERHEAD 15)% & PROFIT (			10	)% (	26.5	)%	$70,324
TOTAL							**$367,485**

ELECTRICAL CONSTRUCTION COST ESTIMATE

FOLLETT ENGINEERING, PLLC
ENGINEERING & CONSULTING
WA 425-765-6304

Project: Kitsap Collection Improvements LS18 **NO:**

SUMMARY: **SUMMARY LS18**	QUANITY NO. UNITS
ELECTRICAL EQUIPMENT	4
CONTROL PANELS (MCP)	1
OTHER CONTROL PANELS	2
TELEMETRY PANEL	1
MISC. MOTOR CONTROL EQUIPMENT	3
RACEWAYS AND WIRE	35
SUBSTRUCTURES	1
INSTRUMENTATION	
MISC	2
ANALOG	3
DISCRETE	8
PROGRAMMING/TESTING	180
VFDS/MOTOR STARTERS 40hp	
COMMUNICATIONS EQUIPMENT	1
SITE WORK	400
SUBSTRUCTURES	2
LIGHT, HVAC MISC ELEC	15
GENERATOR 40KW	1
ATS	1
SUBTOTALS	
MISCELLANEOUS	
TAX	
MOBILIZATION	
CONTRACTOR OVERHEAD 15)% & PROFIT (	
TOTAL	

SHEET NO:

ELECTRICAL
SEATTLE,

BASIS FOR ESTIMATE
(NO DESIGN COMPLETED)
90% DESIGN
X (FINAL DESIGN)
OTHER (SPECIFY)

ESTIMATOR: V FOLLETT
DATE: FEB 11 2015
LABOR RATE:

	MATERIAL		LABOR		TOTAL
UNIT MEAS.	PER UNIT	TOTAL	PER UNIT	TOTAL	COST
EA	1000	$4,000	1000	$4,000	$8,000
EA	35000	$35,000	6000	$6,000	$41,000
EA	3000	$6,000	500	$1,000	$7,000
	8000	$8,000	1000	$1,000	$9,000
EA	1000	$3,000	500	$1,500	$4,500
	300	$10,500	500	$17,500	$28,000
	2000	$2,000	1000	$1,000	$3,000
EA	200	$400	500	$1,000	$1,400
EA	1000	$3,000	500	$1,500	$4,500
EA	200	$1,600	200	$1,600	$3,200
HRS	2	$360	120	$21,600	$21,960
EA	10000		3000		
EA	1000	$1,000	1500	$1,500	$2,500
LF	2	$800	20	$8,000	$8,800
EA	1000	$2,000	1000	$2,000	$4,000
EA	200	$3,000	100	$1,500	$4,500
EA	30000	$30,000	5000	$5,000	$35,000
EA	5000	$5,000	1500	$1,500	$6,500
		$115,660		$77,200	$192,860
		(	15	)%	$28,929
				SUBTOTAL	**$221,789**
		(	8.5	)%	$18,852
		(	4	)%	$7,714
	10	)% (	26.5	)%	$58,774
					$307,130

Central Kitsap Collection and Conveyance System Upgrades
Pump Stations 1, 6, 8, and 18 Improvements
Opinion of Probable Project Cost for Pump Station 8 Upgrades
February 18, 2015

PS 1, 6 Meter Vault

UV 676-LA	1	$5,000	Quote for vault on 8-3-11: $3,500 includes hatch and delivery. Use $5K for 2013 prices	
Flow meter (8")	1	$6,978	Krohne Optiflux	
ladder	1	$600	est	
Double 5'-0" x 6'-0" H20 hatch	1	$0	included in vault cost	Krohne Optiflux: $5,582, 10"; $10,361, 14" per Ken Hogan, 8-4-11 email
8" Victaulic Coupling	2	$1,000	est	
8" spool	4	$1,000	est	
pressure gage	1	$500	est	
8" flex coupling	2	$1,200	est	
12" to 8" reducer	2	$2,258	RS Means	
8" tee	2	$3,000	est	
8" bypass pipe	20	$1,500	LF, RS Means	
8" restrained 90^o bend	2	$1,995	RS Means	
8" gate valve	4	$5,040	RS Means	
excavation and placement	1	$2,000	est	
TOTAL, PS 1, 6		$32,070		

PS 8 Meter Vault

UV 676-LA	1	$5,000	Quote for vault on 8-3-11: $3,500 includes hatch and delivery. Use $5K for 2013 prices	
Flow meter (6")	1	$6,978	Krohne Optiflux	
ladder	1	$600	est	
Double 5'-0" x 6'-0" H20 hatch	1	$0	included in vault cost	Krohne Optiflux: $5,582, 10"; $10,361, 14" per Ken Hogan, 8-4-11 email
6" Victaulic Coupling	2	$1,000	est	
6" spool	4	$1,000	est	
pressure gage	1	$500	est	
6" flex coupling	2	$1,200	est	
6" to 8" reducer	2	$1,533	RS Means	
6" tee	2	$1,974	RS Means	
6" bypass pipe	20	$1,400	LF, RS Means	
6" restrained 90^o bend	2	$1,510	RS Means	
6" gate valve	4	$4,200	RS Means	
6" restrained 22 1/2^o bend	2	$1,426		
excavation and placement	1	$2,000	est	
TOTAL, PS 8		$30,320		

Valve Vault - PS 1

Vault: 7' x 12' x 7' depth (UV 712-LA)	1	$18,900	includes 50% markup, quote for 7-24-13 Oldcastle precast (Kevin Roland):	
Double 72" x 120" H20 Hatch	1	$0	included in vault cost	$12,600 includes hatch and delivery
10" check valve	3	$17,010	RS Means	
10" gate valve	3	$5,828	RS Means	
12" tee	2	$5,303	RS Means	
10" x 12" reducer	3	$3,780	est	
10" x 6" reducer	3	$2,867	RS Means	
10" DI spool	10	$2,500	10" x 24" length, PExPE, Cl 52 @ $85/LF per HD Fowler, 7-25-13; add 50% to unit price to account for 1 or 2 flanges on many of the pieces = $250/ea	
12" DI spool	2	$600	est	
10" DI 90^o bend	7	$9,371	RS Means	
12" DI 90^o bend	1	$1,785	RS Means	
ladder	1	$600	RS Means EST.	
floor drain, p-trap, tideflex valve	1	$1,000	est	
excavation and placement	1	$5,000	est	
TOTAL		$74,543		

Valve Vault - PS 6

Vault: 7' x 12' x 7' depth (UV 712-LA)	1	$18,900	includes 50% markup, quote for 7-24-13 Oldcastle precast (Kevin Roland):	
Double 72" x 120" H20 Hatch	1	$0	included in vault cost	$12,600 includes hatch and delivery
10" check valve	3	$17,010	RS Means	
10" gate valve	3	$5,828	RS Means	

16" cross	1	$1,654	RS Means	
10" x 16" reducer	3	$6,000	est	
10" DI spool	6	$1,200	8" x 24" length, PExPE, Cl. 52 @ $62/LF per HD Fowler, 7-25-13, add 50% to unit price to account for 1 or 2 flanges on many of the pieces = $200/ea	
10" DI 90^o bend	3	$4,016	RS Means	
16" DI 90^o bend	2	$6,143	RS Means	
16" DI spool	2	$800	est	
ladder	1	$600	RS Means EST.	
floor drain, p-trap, tideflex valve	1	$1,000	est	
excavation and placement	1	$5,000	est	
	TOTAL	$68,150	LS 1, 8 (VERIFY FOR 8)	

Valve Vault - PS 8

Vault: 9' x 12' x 7' depth	1	$20,250	includes 35% markup due to siz	7-24-13 Oldcastle precast (Kevin Roland):
Double 72" x 120" H20 Hatch	1	$0	included in vault cost	$12,600 includes hatch and delivery
8" check valve	3	$6,930	RS Means	
8" gate valve	3	$3,780	RS Means	
8" x 12" reducer	1	$1,129	RS Means	
12" x 8" tee	2	$4,000	est	
8" DI spool	3	$600	8" x 24" length, PExPE, Cl. 52 @ $62/LF per HD Fowler, 7-25-13, add 50% to unit price to account for 1 or 2 flanges on many of the pieces = $200/ea	
12" DI spool	1	$300	est	
8" DI 90^o bend	4	$3,990	RS Means	
12" DI 90^o bend	2	$3,570	RS Means	
ladder	1	$600	RS Means EST.	
floor drain, p-trap, tideflex valve	1	$1,000	est	
excavation and placement	1	$5,000	est	
	TOTAL	$51,149		

Valve Vault - PS 18

Vault: 4.5' x 7.5' x 4' depth	1	$12,285	includes 35% decrease due to si	7-24-13 Oldcastle precast (Kevin Roland):	
Double 72" x 48" H20 Hatch	1	$0	included in vault cost	$12,600 includes hatch and delivery	4410
3" check valve	2	$2,730	RS Means, use 4" price		
3" gate valve	2	$1,617	RS Means, use 4" price		
3" x 6" reducer	2	$1,103	RS Means, use 4" price		
6" tee	1	$1,000	est		
6" DI spool	1	$150	est		
3" DI 90^o bend	2	$872	RS Means, use 4" price		
6" DI 90^o bend	1	$620	RS Means		
ladder	1	$600	RS Means EST.		
floor drain, p-trap, tideflex valve	1	$1,000	est		
excavation and placement	1	$5,000	est		
	TOTAL	$26,976			

Pumper Port Vault

UV 4242-LA	1	$1,000	includes 25% markup
Single 2'-0" x 3'-6" H30 hatch	1	$2,276	includes 25% markup
4" gate valve	1	$824	RS Means
6" x 4" tee	1	$861	RS Means
8-inch DI spool	2	$500	est
8" flex coupling	1	$400	est
excavation and placement	1	$1,500	est
	TOTAL	$7,362	

Electrical housekeeping concrete pads

8" thick pads, 7'x6' @$400/CY	1	$416
8" thick pads, 7'x5' @$400/CY	1	$344
	TOTAL	$760
	Rounded	$1,000

City of Enumclaw
Sewer Comprehensive Plan
Planning Level Opinion of Probable Project Costs
Willow Gate - PS and Pipes
Prepared by: T McClaskey
Reviewed by: P. Cunningham
8/17/2015

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$95,800	1	ls	$95,800
2	Temporary Erosion & Sediment Control	$19,200	1	ls	$19,200
3	Dewatering	$19,200	1	ls	$19,200
4	8-inch PVC Sewer Pipe, SDR 35	$110	450	lf	$49,500
5	12-inch PVC Sewer Pipe, SDR 35	$120	2,500	lf	$300,000
6	8- inch Force Main	$90	2,500	lf	$225,000
7	48-inch Manhole	$6,500	10	ea	$65,000
8	Bypass	$10,000	1	ls	$10,000
9	Abandon Pump Station	$24,000	3	EA	$72,000
10	Pump Station (~950 gpm)	$500,000	1	LS	$500,000
9	HMA Trench Patch	$150	570	tn	$85,500
10	Traffic Control	$19,200	1	ls	$19,200
11	General Restoration	$19,200	1	ls	$19,200
	Subtotal				$1,479,600
	Sales Tax	8.6%			$127,246
	TOTAL OPINION OF PROBABLE CONSTRUCTION COST				$1,606,846

Planning	5%	$80,000
Design and Permitting	15%	$241,000
Services During Construction	15%	$241,000
TOTAL OPINION OF PROBABLE ALLIED COST		$562,000
Contingency	35%	$759,000
TOTAL OPINION OF PROBABLE PROJECT COST		$2,930,000

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Gen. Rest., Dewatering, Traffic Control, Erosion Control at 2% Construction Costs
4. Mobilization is assumed to be 10% of Construction
5. Pipe costs includes all fittings, pipe, bedding, excavation, haul, and pavement restoration
6. Costs are in 2015 dollars

City of Enumclaw
Sewer Comprehensive Plan
Planning Level Opinion of Probable Project Costs
Railroad St - Gravity Sewer
Prepared by: T McClaskey
Reviewed by: P. Cunningham
8/17/2015

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$12,500	1	ls	$12,500
2	Temporary Erosion & Sediment Control	$2,500	1	ls	$2,500
3	Dewatering	$2,500	1	ls	$2,500
4	18-inch PVC Sewer Pipe, SDR 35	$150	580	lf	$87,000
5	24-inch PVC Sewer Pipe, SDR 35	$200	1,120	lf	$224,000
6	30-inch PVC Sewer Pipe, SDR 35	$290	160	lf	$46,400
7	48-inch Manhole	$6,500	7	ea	$45,500
8	Side Sewer Connections	$2,000	6	ea	$12,000
9	Bypass	$15,000	1	ls	$15,000
10	HMA Trench Patch	$150	40	tn	$6,000
11	Traffic Control	$2,500	1	ls	$2,500
12	General Restoration	$2,500	1	ls	$2,500
	Subtotal				$458,400
	Sales Tax	8.6%			$39,422
	TOTAL OPINION OF PROBABLE CONSTRUCTION COST				$497,822

Planning	5%	$25,000
Design and Permitting	15%	$75,000
Services During Construction	15%	$75,000
TOTAL OPINION OF PROBABLE ALLIED COST		$175,000
Contingency	35%	$235,000
TOTAL OPINION OF PROBABLE PROJECT COST		$910,000

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Gen. Rest., Dewatering, Traffic Control, Erosion Control at 2% Construction Costs
4. Mobilization is assumed to be 10% of Construction
5. Pipe costs includes all fittings, pipe, bedding, excavation, haul, and pavement restoration
6. Costs are in 2015 dollars

The opinion of probable cost herein is based on our perception of current conditions at the project location. This opinion reflects our professional opinion of costs at this time and is subject to change as the project design progresses. BHC Consultants has no control over variances in the cost of labor, materials, equipment; nor services provided by others, contractor's means and methods of executing the work or of determining prices, competitive bidding or market conditions, practices or bidding strategies. BHC Consultants cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the costs presented as shown.

City of Enumclaw
Sewer Comprehensive Plan
Planning Level Opinion of Probable Project Costs
Roosevelt Ave - Gravity Sewer
Prepared by: T McClaskey
Reviewed by: P. Cunningham
8/17/2015

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$24,800	1	ls	$24,800
2	Temporary Erosion & Sediment Control	$5,000	1	ls	$5,000
3	Dewatering	$5,000	1	ls	$5,000
4	12-inch PVC Sewer Pipe, SDR 35	$120	1,510	lf	$181,200
5	15-inch PVC Sewer Pipe, SDR 35	$130	1,120	lf	$145,600
6	48-inch Manhole	$6,500	9	ea	$58,500
7	Bypass	$5,000	1	ls	$5,000
8	HMA Trench Patch	$150	260	tn	$39,000
9	Traffic Control	$5,000	1	ls	$5,000
10	General Restoration	$5,000	1	ls	$5,000
	Subtotal				$474,100
	Sales Tax	8.6%			$40,773
	TOTAL OPINION OF PROBABLE CONSTRUCTION COST				$514,873

Planning	5%	$26,000
Design and Permitting	15%	$77,000
Services During Construction	15%	$77,000
TOTAL OPINION OF PROBABLE ALLIED COST		$180,000
Contingency	35%	$243,000
TOTAL OPINION OF PROBABLE PROJECT COST		$940,000

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Gen. Rest., Dewatering, Traffic Control, Erosion Control at 2% Construction Costs
4. Mobilization is assumed to be 10% of Construction
5. Pipe costs includes all fittings, pipe, bedding, excavation, haul, and pavement restoration
6. Costs are in 2015 dollars

The opinion of probable cost herein is based on our perception of current conditions at the project location. This opinion reflects our professional opinion of costs at this time and is subject to change as the project design progresses. BHC Consultants has no control over variances in the cost of labor, materials, equipment; nor services provided by others, contractor's means and methods of executing the work or of determining prices, competitive bidding or market conditions, practices or bidding strategies. BHC Consultants cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the costs presented as shown.

City of Enumclaw
Sewer Comprehensive Plan
Planning Level Opinion of Probable Project Costs
Semanski Influent - Gravity Sewer
Prepared by: T McClaskey
Reviewed by: P. Cunningham
8/17/2015

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$10,400	1	ls	$10,400
2	Temporary Erosion & Sediment Control	$2,100	1	ls	$2,100
3	Dewatering	$2,100	1	ls	$2,100
4	18-inch PVC Sewer Pipe, SDR 35	$150	380	lf	$57,000
5	48-inch Manhole	$6,500	2	ea	$13,000
6	Bypass	$20,000	1	ls	$20,000
7	HMA Trench Patch	$150	90	tn	$13,500
8	Traffic Control	$2,100	1	ls	$2,100
9	General Restoration	$2,100	1	ls	$2,100
	Subtotal				$122,300
	Sales Tax	8.6%			$10,518
	TOTAL OPINION OF PROBABLE CONSTRUCTION COST				$132,818

Planning	5%	$7,000
Design and Permitting	15%	$20,000
Services During Construction	15%	$20,000
TOTAL OPINION OF PROBABLE ALLIED COST		$47,000
Contingency	35%	$63,000
TOTAL OPINION OF PROBABLE PROJECT COST		$240,000

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Gen. Rest., Dewatering, Traffic Control, Erosion Control at 2% Construction Costs
4. Mobilization is assumed to be 10% of Construction
5. Pipe costs includes all fittings, pipe, bedding, excavation, haul, and pavement restoration
6. Costs are in 2015 dollars

The opinion of probable cost herein is based on our perception of current conditions at the project location. This opinion reflects our professional opinion of costs at this time and is subject to change as the project design progresses. BHC Consultants has no control over variances in the cost of labor, materials, equipment; nor services provided by others, contractor's means and methods of executing the work or of determining prices, competitive bidding or market conditions, practices or bidding strategies. BHC Consultants cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the costs presented as shown.

City of Enumclaw
Sewer Comprehensive Plan
Planning Level Opinion of Probable Project Costs
Semanski - Gravity Sewer
Prepared by: T McClaskey
Reviewed by: P. Cunningham
8/17/2015

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$5,800	1	ls	$5,800
2	Temporary Erosion & Sediment Control	$1,200	1	ls	$1,200
3	Dewatering	$1,200	1	ls	$1,200
4	12-inch PVC Sewer Pipe, SDR 35	$120	290	lf	$34,800
5	48-inch Manhole	$6,500	2	ea	$13,000
6	HMA Trench Patch	$150	70	tn	$10,500
7	Traffic Control	$1,200	1	ls	$1,200
8	General Restoration	$1,200	1	ls	$1,200
	Subtotal				$68,900
	Sales Tax	8.6%			$5,925
	TOTAL OPINION OF PROBABLE CONSTRUCTION COST				$74,825

Planning	5%	$4,000
Design and Permitting	15%	$11,000
Services During Construction	15%	$11,000
TOTAL OPINION OF PROBABLE ALLIED COST		$26,000
Contingency	35%	$35,000
TOTAL OPINION OF PROBABLE PROJECT COST		$140,000

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Gen. Rest., Dewatering, Traffic Control, Erosion Control at 2% Construction Costs
4. Mobilization is assumed to be 10% of Construction
5. Pipe costs includes all fittings, pipe, bedding, excavation, haul, and pavement restoration
6. Costs are in 2015 dollars

City of Enumclaw
Sewer Comprehensive Plan
Planning Level Opinion of Probable Project Costs
Warner Basin - Gravity Sewer
Prepared by: T McClaskey
Reviewed by: P. Cunningham
8/17/2015

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$31,900	1	ls	$31,900
2	Temporary Erosion & Sediment Control	$6,400	1	ls	$6,400
3	Dewatering	$6,400	1	ls	$6,400
4	12-inch PVC Sewer Pipe, SDR 35	$120	1,560	lf	$187,200
5	48-inch Manhole	$6,500	6	ea	$39,000
6	Side Sewer Connections	$2,000	12	ea	$24,000
7	Bypass	$15,000	1	ls	$15,000
8	HMA Trench Patch	$150	360	tn	$54,000
9	Traffic Control	$6,400	1	ls	$6,400
10	General Restoration	$6,400	1	ls	$6,400
	Subtotal				$376,700
	Sales Tax	8.6%			$32,396
	TOTAL OPINION OF PROBABLE CONSTRUCTION COST				$409,096

Planning	5%	$20,000
Design and Permitting	15%	$61,000
Services During Construction	15%	$61,000
TOTAL OPINION OF PROBABLE ALLIED COST		$142,000
Contingency	35%	$193,000
TOTAL OPINION OF PROBABLE PROJECT COST		$740,000

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Gen. Rest., Dewatering, Traffic Control, Erosion Control at 2% Construction Costs
4. Mobilization is assumed to be 10% of Construction
5. Pipe costs includes all fittings, pipe, bedding, excavation, haul, and pavement restoration
6. Costs are in 2015 dollars

The opinion of probable cost herein is based on our perception of current conditions at the project location. This opinion reflects our professional opinion of costs at this time and is subject to change as the project design progresses. BHC Consultants has no control over variances in the cost of labor, materials, equipment; nor services provided by others, contractor's means and methods of executing the work or of determining prices, competitive bidding or market conditions, practices or bidding strategies. BHC Consultants cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the costs presented as shown.

City of Enumclaw
Sewer Comprehensive Plan
Planning Level Opinion of Probable Project Costs
Dickson Ave - Gravity Sewer
Prepared by: T McClaskey
Reviewed by: P. Cunningham
8/17/2015

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$75,700	1	ls	$75,700
2	Temporary Erosion & Sediment Control	$15,100	1	ls	$15,100
3	Dewatering	$15,100	1	ls	$15,100
4	15-inch PVC Sewer Pipe, SDR 35	$130	4,020	lf	$522,600
5	48-inch Manhole	$6,500	14	ea	$91,000
6	Bypass	$5,000	1	ls	$5,000
7	HMA Trench Patch	$150	920	tn	$138,000
8	Traffic Control	$15,100	1	ls	$15,100
9	General Restoration	$15,100	1	ls	$15,100
	Subtotal				$892,700
	Sales Tax	8.6%			$76,772
	TOTAL OPINION OF PROBABLE CONSTRUCTION COST				$969,472

Planning	5%	$48,000
Design and Permitting	15%	$145,000
Services During Construction	15%	$145,000
TOTAL OPINION OF PROBABLE ALLIED COST		$338,000
Contingency	35%	$458,000
TOTAL OPINION OF PROBABLE PROJECT COST		$1,770,000

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Gen. Rest., Dewatering, Traffic Control, Erosion Control at 2% Construction Costs
4. Mobilization is assumed to be 10% of Construction
5. Pipe costs includes all fittings, pipe, bedding, excavation, haul, and pavement restoration
6. Costs are in 2015 dollars

The opinion of probable cost herein is based on our perception of current conditions at the project location. This opinion reflects our professional opinion of costs at this time and is subject to change as the project design progresses. BHC Consultants has no control over variances in the cost of labor, materials, equipment; nor services provided by others, contractor's means and methods of executing the work or of determining prices, competitive bidding or market conditions, practices or bidding strategies. BHC Consultants cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the costs presented as shown.

BUDGETARY PROPOSAL

Project Name: Enumclaw, WA

Date: May 28, 2015

Huber Contact:
Regional Sales Manager: John Lewis
Email Address: John@hhusa.net
Phone Number: 704.995.5451

Represented By:
Representative Firm: Goble Sampson Associates
Representative Associate: John Simon
Email Address: JSimon@goblesampson.com
Phone Number: 425.392.0491

Equipment: RakeMax

- Efficient Removal of High Screening Loading
- Unimpaired by Grit
- Maintenance Free Lower Bearings
- Fully Passivated SS Construction
- Completely Enclosed

WASTE WATER Solutions

Huber Technology, Inc.
9735 NorthCross Center Court
Suite A
Huntersville, NC 28078

Phone: (704) 949-1010
Fax: (704) 949-1020

HUBER TECHNOLOGY
WASTE WATER Solutions

DESCRIPTION

RakeMax® Multi-Rake Bar Screen
Model: Two (2) x RakeMax 3300/652/6

Hydraulic Conditions:
Peak Hourly Flow per Screen: 9.875MGD
DSWL During Normal Peak Flows: 2.87'
Max. Headloss Across Screen at 30% Blinding: 7"

Peak Hourly Flow per Screen (9.875MGD)			
Blinding	Headloss	Upstream Head	Flow Velocity Between Slots
[%]	inch	inch	ft/sec
0	1	36	5.39
10	3	37	5.73
20	5	39	6.14
30	7	42	6.64
35	9	44	6.78
40	12	46	6.96

Design Information:
Channel Depth: 4' – 0"
Channel Width: 3' – 0"
Screen Width: 25.7" (652 mm)
Inclination: 75°
Bar Spacing: 1/4" (6 mm)
Discharge Height Above Channel Invert: 9' – 3"

Scope Includes:
- 304 Stainless Steel Construction with Full Submersion Passivation for Superior Corrosion Resistance.
- Teardrop-Shaped Bars
- Type 304 Stainless Steel Chain with Polyamide Rollers
- Cast Iron Flanged Upper Bearings; Silicium Carbide Slide Lower Bearings
- Screen Covers and Supports in 304 Stainless
- Pivoting Scraper Mechanism with Proximity Switch and Polyethylene Blades
- Class 1 Division 1 Motor, 1-HP, 480 VAC, 3 Phase, 60 Hz, S.F. 1.0
- Control Panel, Including:
  - NEMA 4X 304 Stainless Steel Enclosure
  - VFD, Square D Altivar 312 w/ MCP Branch Circuit [Screen - 480VAC, 1HP Max]
  - PLC: AB MicroLogix 1400
  - OIT: AB PanelView Plus 400 Color Touch
  - UL Label
  - Preprogrammed and Factory Tested
  - One (1) HydroRanger 200 Differential Level Controller
  - One (1) 3-hole, NEMA7 LCS (Screen)
- Standard Manufacturer's Services and Freight to Site Included

Unit Price: $260,000.00

Technical Clarifications:
1. If there are site-specific hydraulic constrains that must be applied, please consult the manufacturer's representative to ensure compatibility with the proposed system
2. Electrical disconnects required per local NEC code are not included in this proposal
3. Huber Technology warrants all components of the system against faulty workmanship and materials for a period of 12 months from date of start-up or 18 months after shipment whichever occurs first
4. Budget estimate is based on Huber Technology's standard Terms & Conditions and is quoted in CAD$.
5. Huber has estimated the Control Panel cost based information provided with the RFQ. If control panel information is not provided with RFQ Huber will use a cost and scope of supply based on our standard panel. Huber reserves the right to change the price and scope at time of bid based on the final plans and specifications.

BUDGETARY PROPOSAL

Project Name: Enumclaw, WA

Date: May 28, 2015

Huber Contact:
Regional Sales Manager: John Lewis
Email Address: John@hhusa.net
Phone Number: 704.995.5451

Represented By:
Representative Firm: Goble Sampson Associates
Representative Associate: John Simon
Email Address: JSimon@goblesampson.com
Phone Number: 425.392.0491

Equipment: RakeMax HF

- Efficient Removal of High Screening Loading
- Unimpaired by Grit
- Maintenance Free Lower Bearings
- Fully Passivated SS Construction
- Completely Enclosed
- 30° Lower Section for Large Hydraulic Throughput

WASTE WATER Solutions

Huber Technology, Inc.
9735 NorthCross Center Court
Suite A
Huntersville, NC 28078

Phone: (704) 949-1010
Fax: (704) 949-1020

HUBER TECHNOLOGY
WASTE WATER Solutions

DESCRIPTION

RakeMax® High Flow Multi-Rake Bar Screen
Model: Two (2) x RakeMax-hf 2500/2112/652/6

Hydraulic Conditions:
Peak Hourly Flow per Screen: 19.75MGD
DSWL During Normal Peak Flows: 2.87'
Max. Headloss at 20% Blinding: 9"

Blinding	Headloss	Upstream Head	Flow Velocity Between Slots
[%]	[mm]	[mm]	[m/sec.]
0	3	37	5.36
10	6	40	5.50
20	9	44	5.71
30	13	47	6.02
35	17	51	6.02
40	20	55	6.09

Design Information:
Channel Depth: 4' – 0"
Channel Width: 3' – 0"
Screen Width: 25.7" (652mm)
Inclination: 30/85°
Bar Spacing: 1/4" (6mm)
Discharge Height Above Channel Invert: 10' – 4"

Scope Includes:

- 304 Stainless Steel Construction with Full Submersion Passivation for Superior Corrosion Resistance.
- Teardrop-Shaped Bars
- Type 304 Stainless Steel Chain with Polyamide Rollers
- Cast Iron Flanged Upper Bearings; Silicium Carbide Slide Lower Bearings
- Screen Covers and Supports in 304 Stainless
- Pivoting Scraper Mechanism with Proximity Switch and Polyethylene Blades
- Class 1 Division 1 Motor, 1-HP, 480 VAC, 3 Phase, 60 Hz, S.F. 1.0
- Control Panel, Including:
  - NEMA 4X 304 Stainless Steel Enclosure
  - VFD, Square D Altivar 312 w/ MCP Branch Circuit [Screen - 480VAC, 1HP Max]
  - PLC: AB MicroLogix 1400
  - OIT: AB PanelView Plus 400 Color Touch
  - Preprogrammed and Factory Tested
- HydroRanger 200 Differential Level Controller (Per Screen)
- 3-hole, NEMA7 LCS (Per Screen)
- Standard Manufacturer's Services and Freight to Site Included

Unit Price: $275,000.00

Technical Clarifications:

1. If there are site-specific hydraulic constrains that must be applied, please consult the manufacturer's representative to ensure compatibility with the proposed system
2. Electrical disconnects required per local NEC code are not included in this proposal
3. Huber Technology warrants all components of the system against faulty workmanship and materials for a period of 12 months from date of start-up or 18 months after shipment whichever occurs first
4. Budget estimate is based on Huber Technology's standard Terms & Conditions and is quoted in CAD$.
5. Huber has estimated the Control Panel cost based information provided with the RFQ. If control panel information is not provided with RFQ Huber will use a cost and scope of supply based on our standard panel. Huber reserves the right to change the price and scope at time of bid based on the final plans and specifications.

HUBER Technology, Inc.
Huber Technology, Inc. · 9735 NorthCross Center Court STE A · Huntersville, NC 28078
Phone (704) 949-1010 · Fax (704) 949-1020 · huber@hhusa.net · www.huber-technology.com

FIELD INSTRUMENTS & CONTROLS, INC.
9629 N. Colfax Road
Spokane, WA 99218
www.fieldinst.com
Spokane Office: Phone: 509-466-8226 Fax: 509-466-8227
Vancouver Office: Phone: 360-896-9910 Fax: 360-896-9905

PAGES: 2 (Including Cover)	**DATE**: 6/23/2015

QUOTATION

TO: BHC Consulting	**ATTENTION**: Tom Giese
FROM: Jordan Radley (For: Jamie Sullivan)	**EMAIL**: Jordan@fieldinst.com
SUBJECT: E+H Clamp On Ultrasonic Flow Meter	
E+H QUOTATION NUMBER: **2300429241**	
PO Should be Addressed to this Vendor: **Endress & Hauser C/O Field Instruments & Controls**	

Tom,

Thank you for the opportunity to quote on the referenced requirement. We offer the following for your consideration:

Item	QTY		Description	Unit Price in USD	Total Price in USD
1	**1**	**PC**	**Prosonic Flow 93WA1 Clamp On 1Ch/1Set** **Model No: 93WA1-MA3B20RCBAAA** **Measurement: flow, non-contact ultrasonic, transit time** **Version: full featured** **1 channel, 1 sensor set;** **2 channel, 1 or 2 sensor set (optional)** **Application: water, waste water, process water, cooling water, hydro power, sea water; steel, cast-/ductile iron, PVDF, PE, PVC, PP,GRP pipes** **mortar,rubber lined metal pipe** **! GRP > DN1000 0.5MHz required** **:: Installation without process interruption**	**6,167.43**	**6,167.43**
		M	Flow Sensor: DN100-DN4000, -20...80oC, IP68, 1.0 MHz 4”-160”, -4...176oF, NEMA6P		
		A	Sensor Holder: Fixed retaining nut		
		3	Installation Set: DN600-DN2000 24”-80”		
		B	Sensor Cable: 10m/30ft, -20...70 oC/-4...158oF		
		2	Cable entry sensor: Gland + conduit adapter NPT 1/2		
		0	Additional Test, certificate: w/o		
		R	Approval: FM NI Cl.I Div.2/CSA Cl.I Div.2, ABCD + Zone 2		
		C	Housing: Remote, wall, Aluminium, IP67/NEMA4X		
		B	Cable Entry: Thread NPT 1/2”		
		A	Power Supply; Display: 85-260VAC; WEA, 4-line + touch control WEA= language DE+EN+FR+IT+ES+PT+NL		
		A	Adjustment; Software Feature: Factory Setup; Basic Version		
		A	Output, Input: 4-20mA HART + frequency		

TERMS AND CONDITIONS:	
QUOTE VALIDITY:	30 days from date of quotation
F.O.B. POINT:	Greenwood, IN
FREIGHT:	Prepaid and added to invoice
PAYMENT TERMS:	Net 30 days from date of invoice, Handling fees may be applicable
VENDOR:	**Endress & Hauser C/O Field Instruments & Controls**
LEAD TIME:	**20** business days after receipt of order, to ship

Please give us a call if you have any questions regarding this information. Thanks again!

Sincerely,
FIELD INSTRUMENTS & CONTROLS
Jordan Radley
Inside Sales / Spokane, WA

cc: Jamie Sullivan/FIC-Seattle
FIC Quote File

"Providing the Finest Process Measurement Equipment in the World"

Whitney Equipment Company Inc

Manufactures' Representative

21222 30th Drive SE, Suite 110
Bothell, WA 98021
Phone 425-486-9499 Fax 425-485-7409

Quotation

DATE: **05/27/2015**

Quote#:
Flygt Pump Budget Quote

Quotation valid for 30 days
Prepared by: **Scott Vande Vusse, P.E.**
Phone: 425-486-9499
FAX: 425-485-7409
svandevusse@weci.com

Name: **Tom Giese, P.E.**
Company: **BHC Consultants**

Email: tom.giese@bhcconsultants.com
Phone: (253) 344-5084
Re: **Enumclaw WWTP Influent Pumps**

Comments or Special Instructions:
This quote does not include installation, electrical, or any other products and services not specifically listed.
All conduits, anchors, piping, fasteners, and interconnection supplied by others.

Quantity	Description	EACH	TOTAL
	Influent Pumps - Option 1		
4	Flygt NP3301.095LT-626 Submersible Pump with 460V/3P, 70 HP FM Explosion-Proof Rated Motor, Hard Iron N-Impeller, 50' Combined Power/Signal Cable, Closed-Loop Cooling System	$53,560.00	$214,240.00
4	Standard Accessories - 12" Discharge Elbow, 3" Stainless Steel Guide Rails and Mounting Brackets, Stainless Steel Lifting Chain/Cable, Grip-Eye Lifting Device, MiniCAS Thermal/Leakage Sensor	$12,100.00	$48,400.00
4	Optional MAS711 Monitoring & Status Unit	$5,202.00	$20,808.00
	Influent Pumps - Option 2		
4	Flygt NP3356/615-415mm Submersible Pump with 460V/3P, 70 HP FM Explosion-Proof Rated Motor, Hard Iron N-Impeller, 50' Power, 50' Signal Cable, Closed-Loop Cooling System	$72,048.00	$288,192.00
4	Standard Accessories - 14" Discharge Elbow, 3" Stainless Steel Guide Rails and Mounting Brackets, Stainless Steel Lifting Chain/Cable, Grip-Eye Lifting Device, MAS711 Monitoring & Status Unit	$13,200.00	$52,800.00
4	Required MAS711 Monitoring & Status Unit	$5,202.00	$20,808.00
2	Days Whitney Equipment Startup	$1,300.00	$2,600.00
1	Estimated Freight - 4 Pumps with Accessories	$11,000.00	$11,000.00

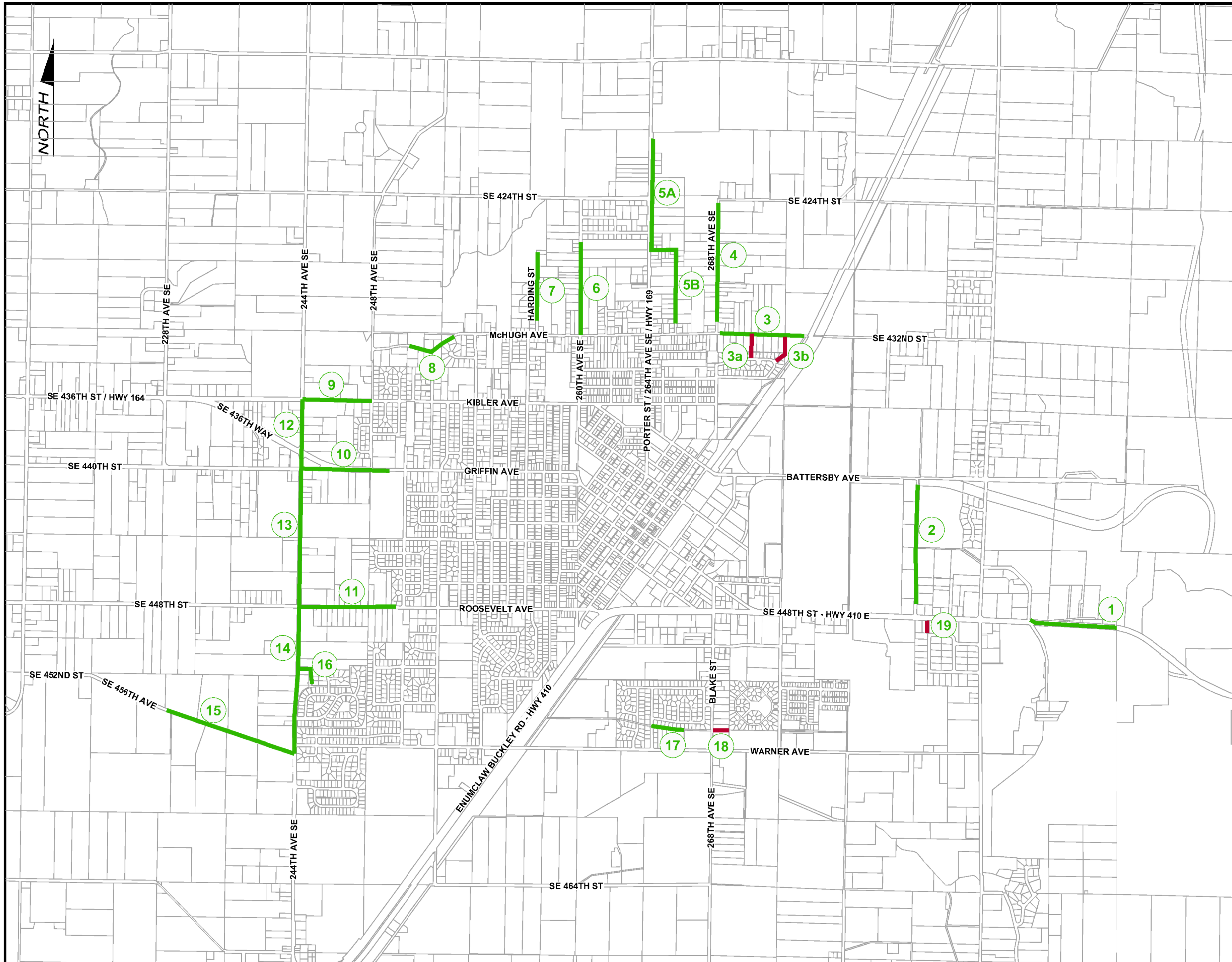
Note: These are budget prices that are subject to change at the time of purchase.

Please make purchase orders out to: Whitney Equipment Company Inc.

Freight: Estimated Above
Terms: Net 30 days & per attached terms and conditions.

Lead Time: 10-14 weeks ARO
Sales and/or use tax not included

Appendix D – Potential Sewer Extensions



LEGEND

\# POTENTIAL SEWER EXTENSION

POTENTIAL SEWER EXTENSION ALIGNMENT

THERE ARE NO PROFILES FOR THOSE POTENTIAL LINES SHOWN IN RED

PLOT DATE & TIME
MAR 09 2016 08:02:39

FILE NAME (UPDATED BY)
S:\CAD\ENUMCLAW\14-10362-013 SEWER PLAN\DWGS\F14-10362_INDEX.DWG (PLS)
XREFS: X14-10362_Parcels GIS 07-14

BHC CONSULTANTS

CITY OF Enumclaw

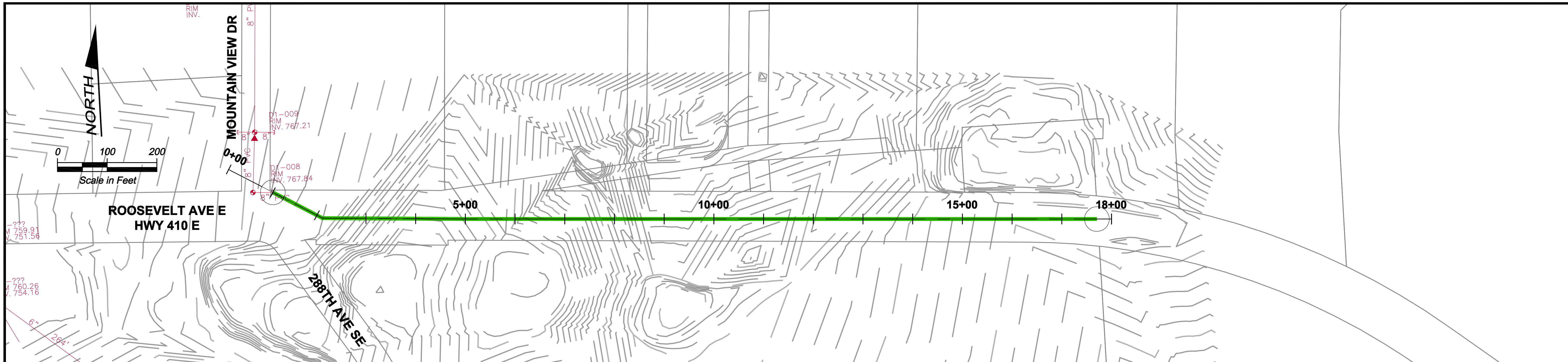
Sheet Index

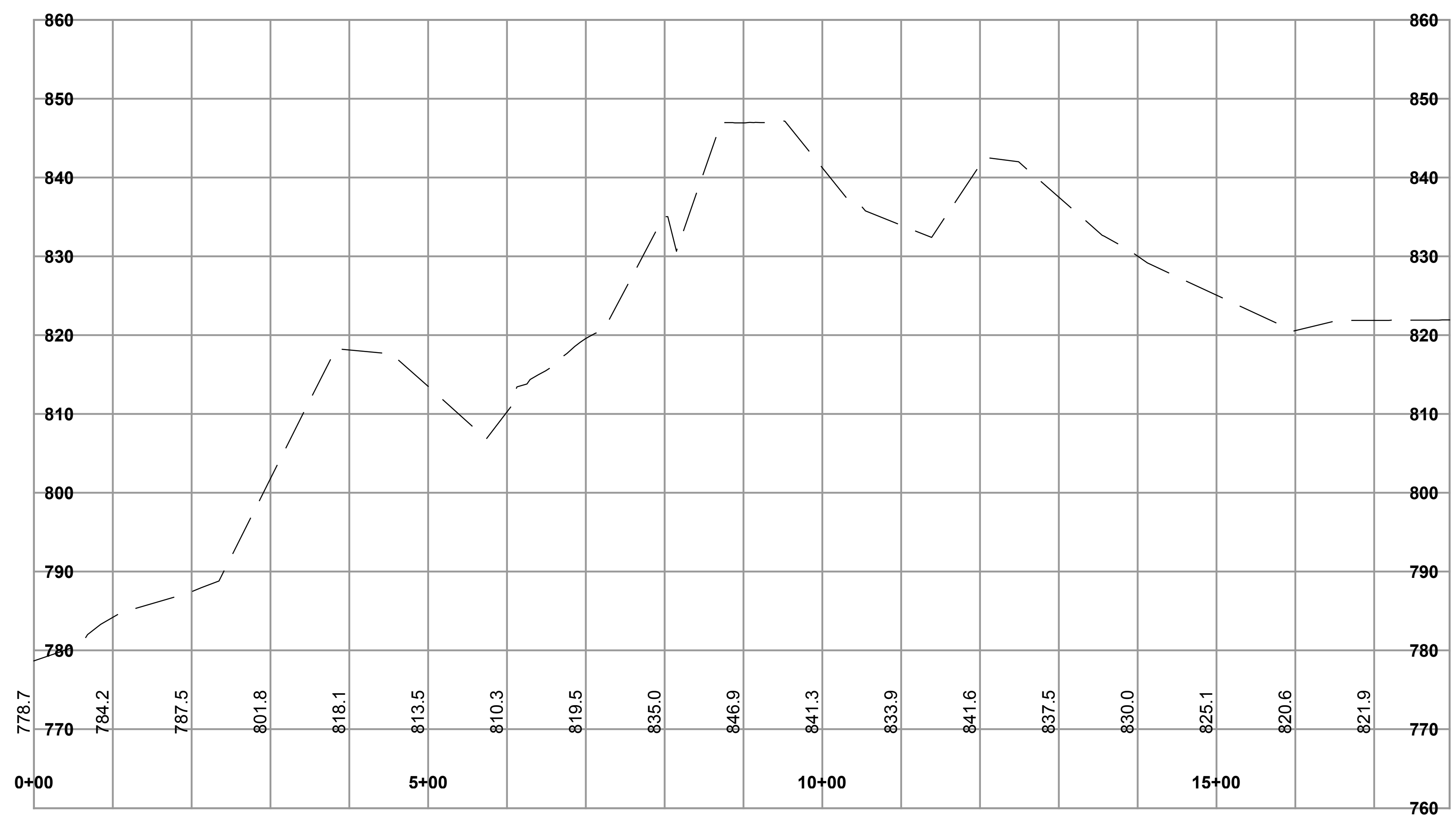
Sewer Collection System Improvements

March 2016

Figure

1





FILE NAME (UPDATED BY) S:\CAD\ENUMCLAW\14-10362-013 SEWER PLAN\DWGS\F14-10362_D-1.DWG (PLS)
XREFS: X14-10362_Align1-2, X14-10362_City Map, X14-10362_Ex Sewer, X14-10362_Parcels GIS 07-14, X14-10362_Prop Sewer
PLOT DATE & TIME AUG 06 2015 13:45:26

BHC CONSULTANTS

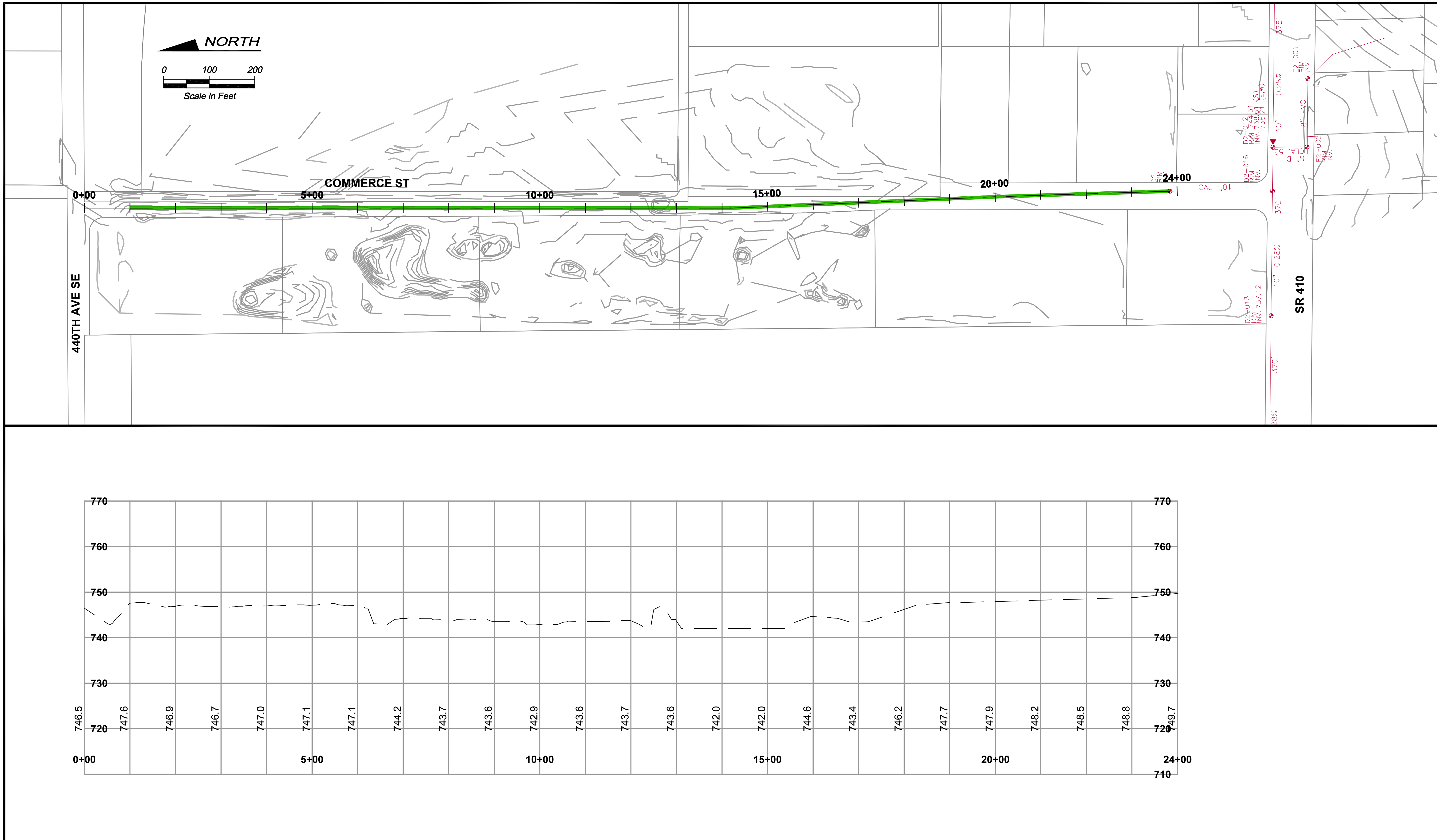
Legend

- Potential Sewer Extensions
- Potential Manhole
- Existing Sewer Main
- Existing Sewer Force Main
- Existing Manholes
- LS Existing Lift Stations

CITY OF Enumclaw

Potential Sewer Extension 1
Plan and Profile
Sewer Collection System Improvements
March 2016

Figure
D-1



FILE NAME (UPDATED BY)
S:\CAD\ENUMCLAW\14-10362-013 SEWER PLAN\DWGS\F14-10362_D-2.DWG (PLS)
XREFS: X14-10362_Align1-2, X14-10362_City Map, X14-10362_Parcels GIS 07-14, X14-10362_Ex Sewer, X14-10362_Prop Sewer

PLOT DATE & TIME
AUG 06 2015 13:52:12

BHC CONSULTANTS

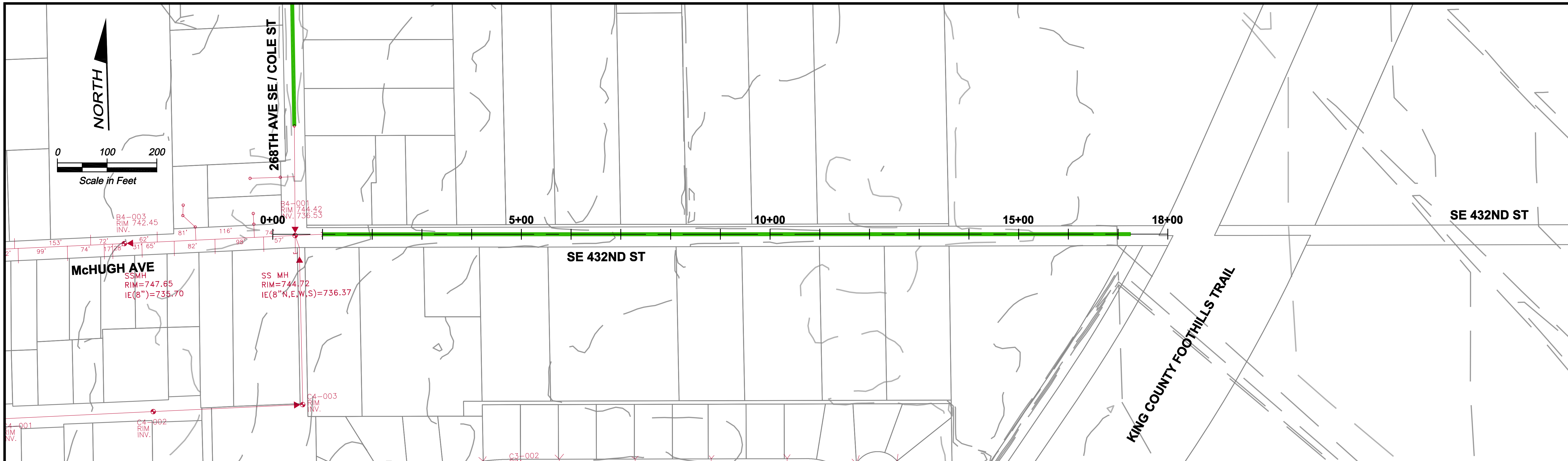
Legend

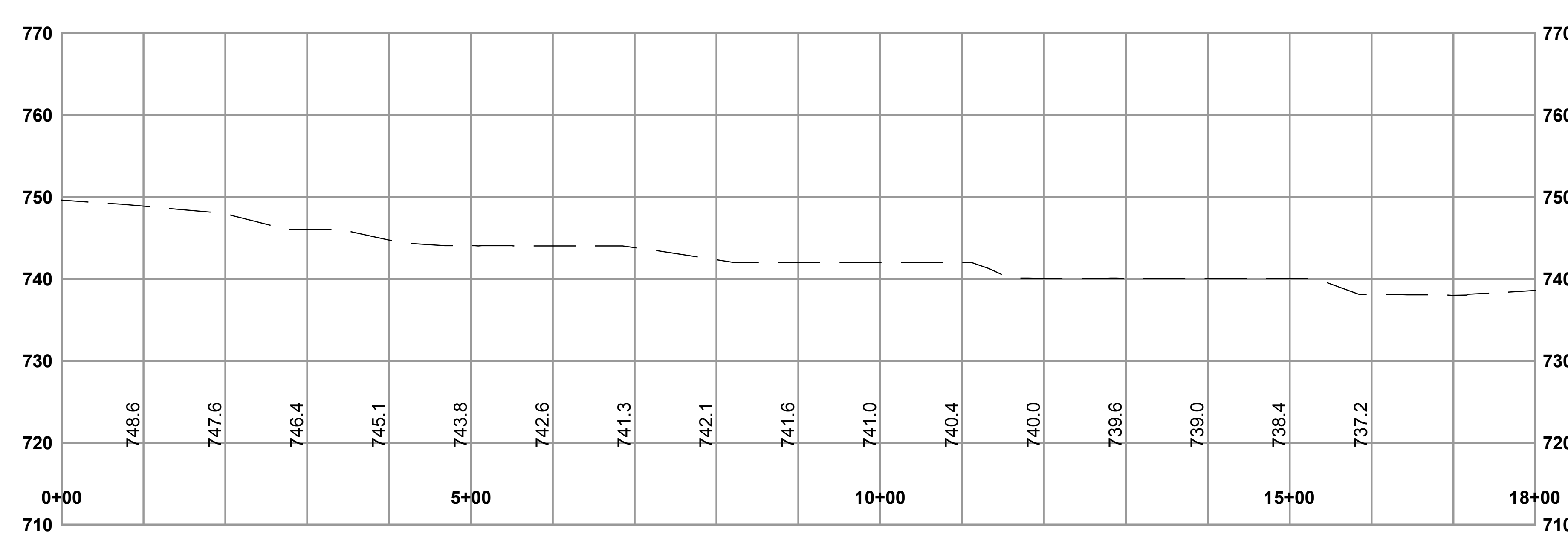
- Potential Sewer Extensions
- Potential Manhole
- Existing Sewer Main
- Existing Sewer Force Main
- Existing Manholes
- Existing Lift Stations

CITY OF Enumclaw

Potential Sewer Extension 2
Plan and Profile
Sewer Collection System Improvements
March 2016

Figure
D-2





PLOT DATE & TIME
AUG 06 2015 14:41:37

FILE NAME (UPDATED BY)
S:\CAD\ENUMCLAW\14-10362-013 SEWER PLAN\DWGS\F14-10362_D-3.DWG (PLS)
XREFS: X14-10362_Align3-4-5, X14-10362_City Map, X14-10362_Ex Sewer, X14-10362_Parcels GIS 07-14, X14-10362_Prop Sewer

BHC CONSULTANTS

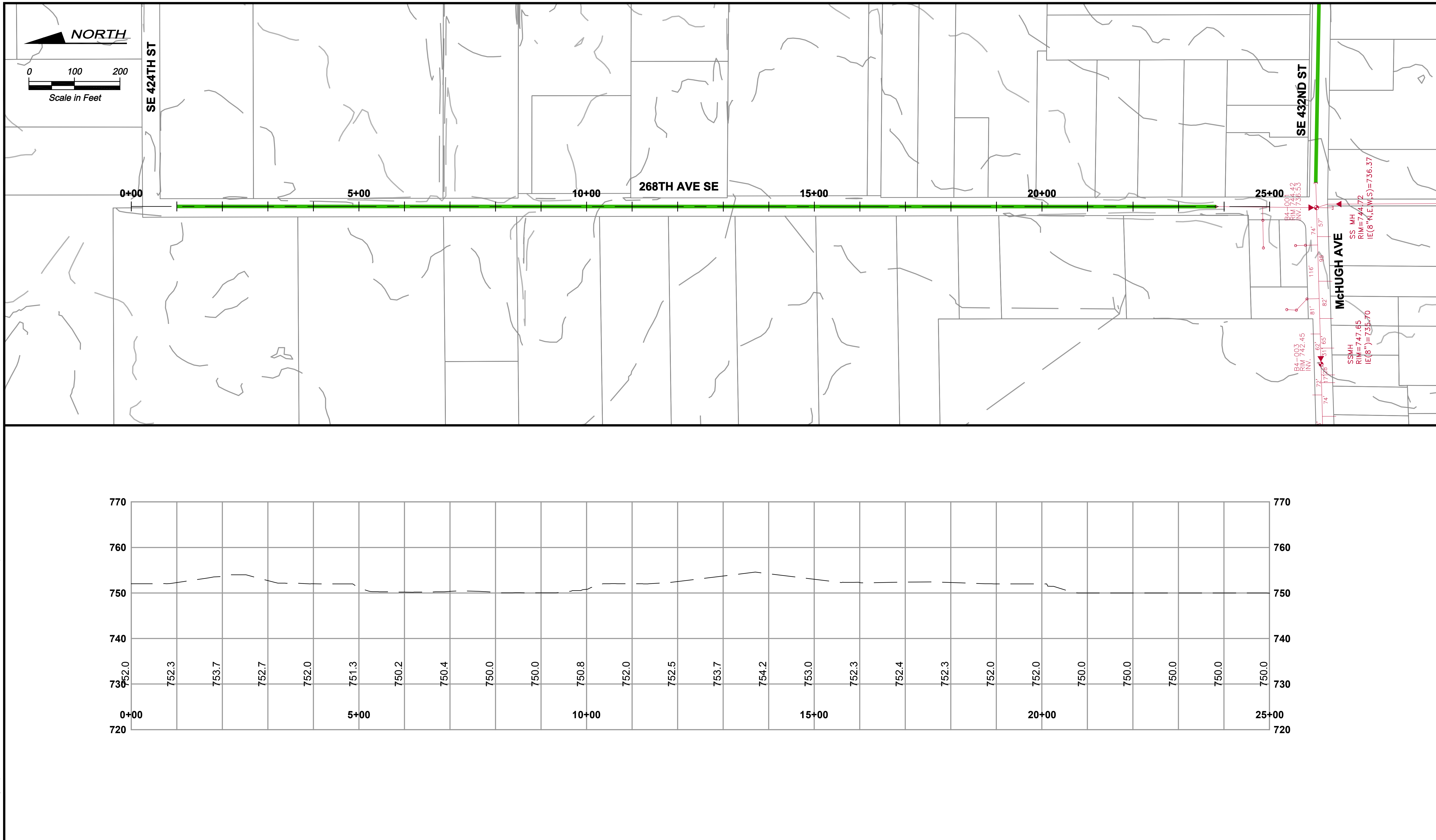
Legend

- Potential Sewer Extensions
- Potential Manhole
- Existing Sewer Main
- Existing Sewer Force Main
- Existing Manholes
- Existing Lift Stations

CITY OF Enumclaw

Potential Sewer Extension 3
Plan and Profile
Sewer Collection System Improvements
March 2016

Figure
D-3



PLOT DATE & TIME MAR 09 2016 11:36:30

FILE NAME (UPDATED BY) S:\CAD\ENUMCLAW\14-10362-013 SEWER PLAN\DWGS\F14-10362_D-4.DWG (MTC)

XREFS: X14-10362_Align3-4-5, X14-10362_City Map, X14-10362_Ex Sewer, X14-10362_Parcels GIS 07-14, X14-10362_Prop Sewer

BHC CONSULTANTS

Legend

- Potential Sewer Extensions
- Potential Manhole
- Existing Sewer Main
- Existing Sewer Force Main
- Existing Manholes
- LS Existing Lift Stations

CITY OF Enumclaw

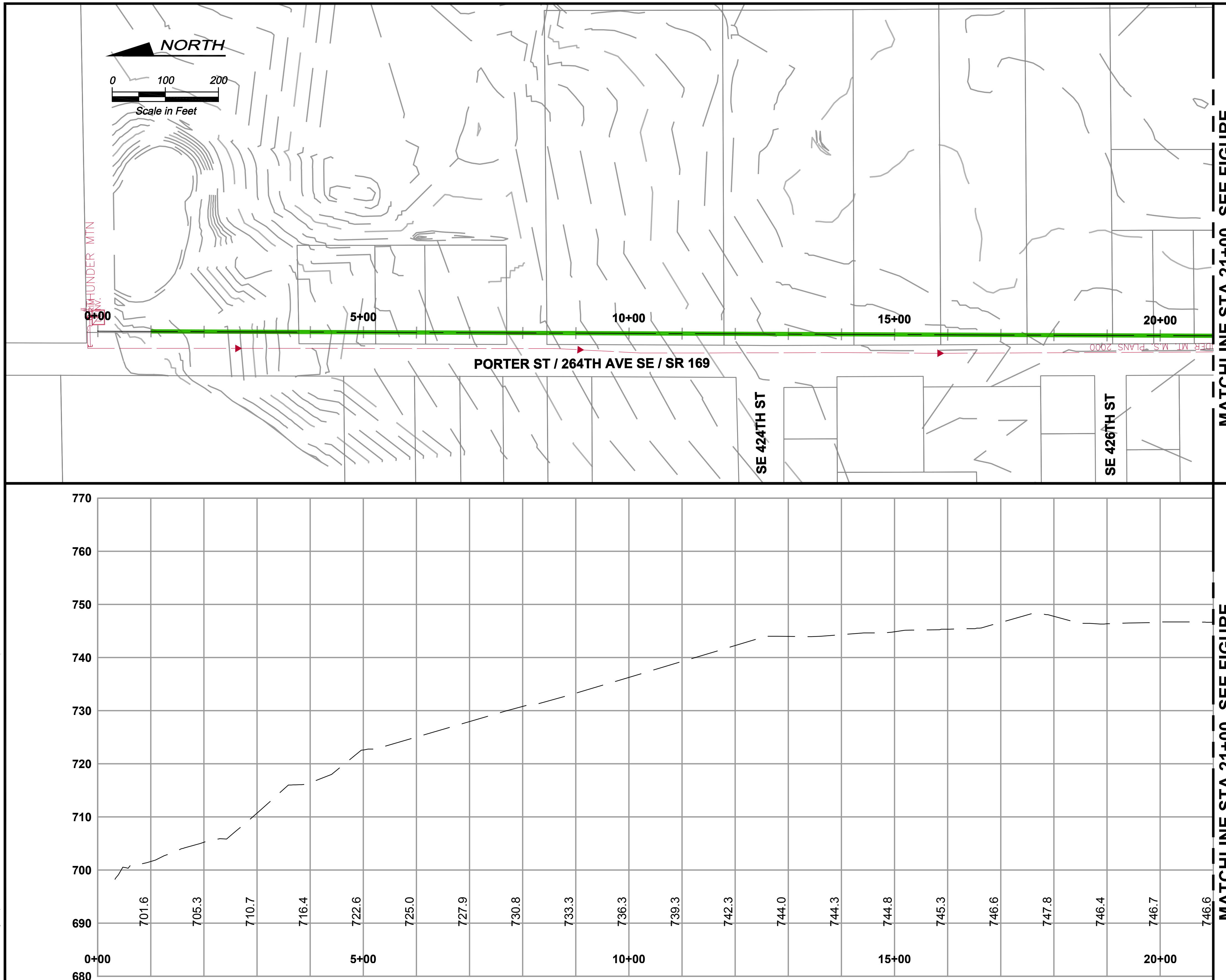
Potential Sewer Extension 4
Plan and Profile

Sewer Collection System Improvements

March 2016

Figure

D-4



FILE NAME (UPDATED BY)	PLOT DATE & TIME
S:\CAD\ENUMCLAW\14-10362-PR\DWGS\F14-10362_D-5.DWG (SO)	AUG 06 2015 08:15:03

XREFS: X14-10362_Align3-4-5, X14-10362_City Map, X14-10362_Ex Sewer, X14-10362_Parcels GIS 07-14, X14-10362_Prop Sewer

BHC CONSULTANTS

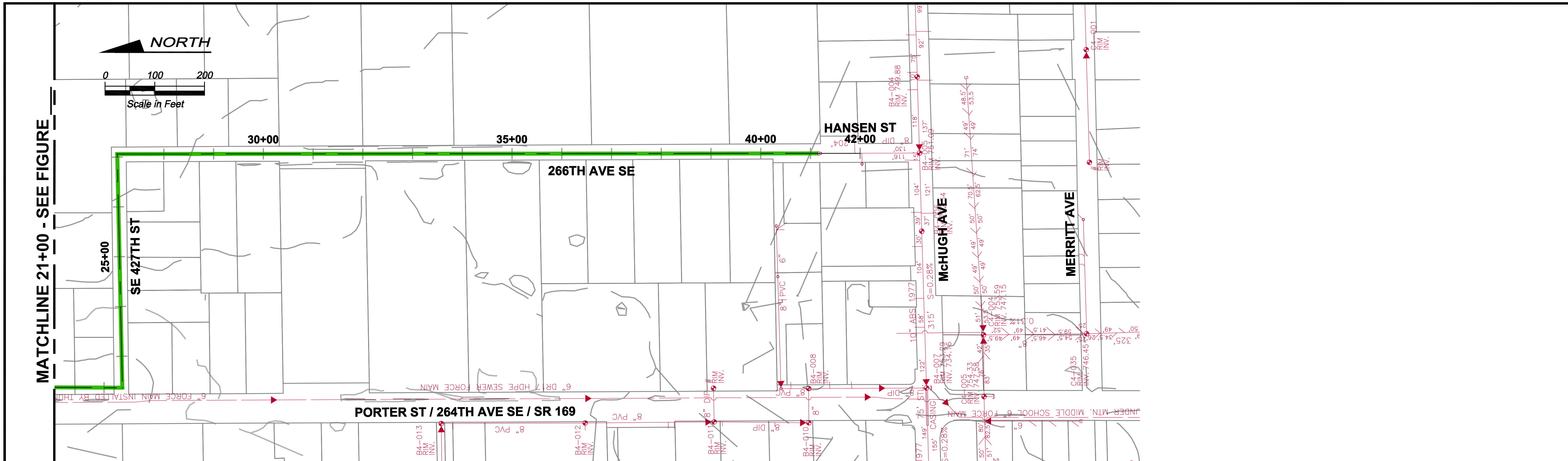
Legend

Potential Sewer Extensions	Existing Sewer Force Main
Potential Manhole	Existing Manholes
Existing Sewer Main	Existing Lift Stations

CITY OF Enumclaw

Potential Sewer Extension 5A
Plan and Profile
Sewer Collection System Improvements
March 2016

Figure
D-5A



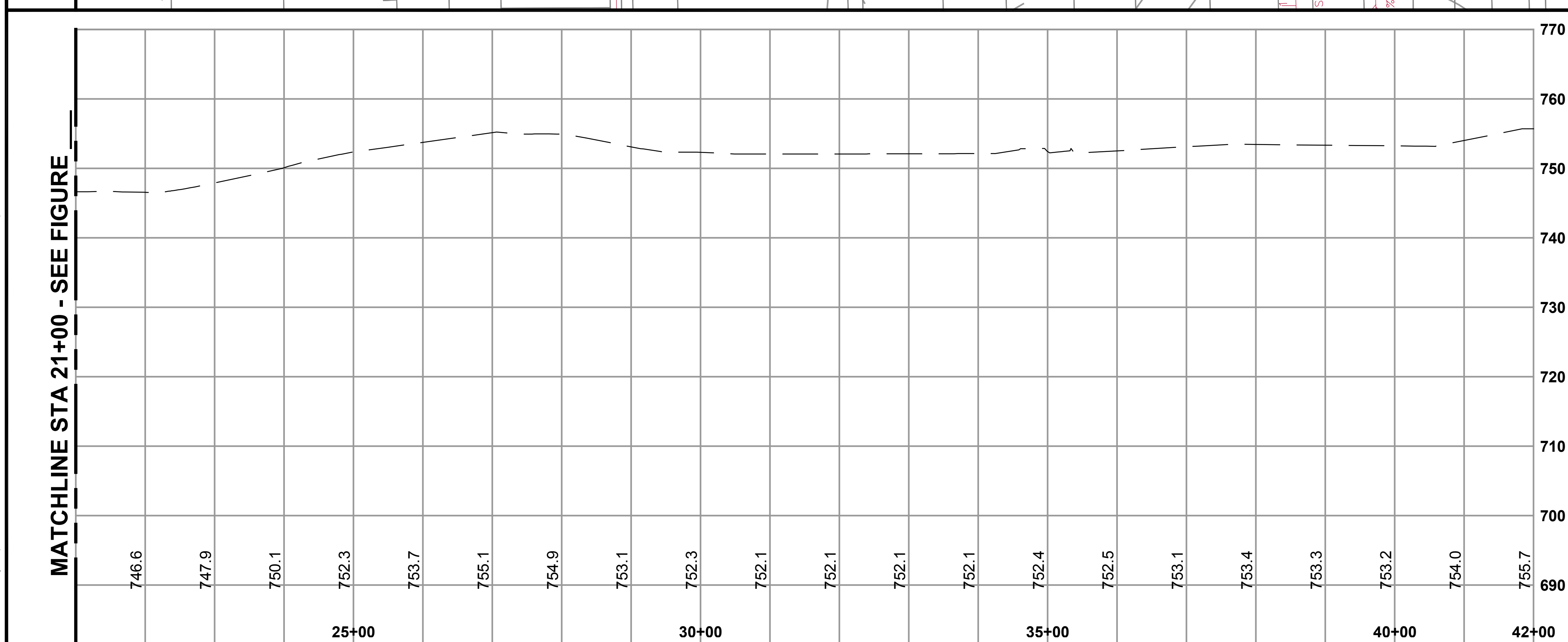


FIGURE TEXT HEGIHT = .08
FIGURE TEXT STYLE = ARIAL

PLOT DATE & TIME AUG 06 2015 08:15:03
FILE NAME (UPDATED BY) S:\CAD\ENUMCLAW\14-10362-PR\DWGS\F14-10362_D-5.DWG (SO)
XREFS: X14-10362_Align3-4-5, X14-10362_City Map, X14-10362_Ex Sewer, X14-10362_Parcels GIS 07-14, X14-10362_Prop Sewer

BHC CONSULTANTS

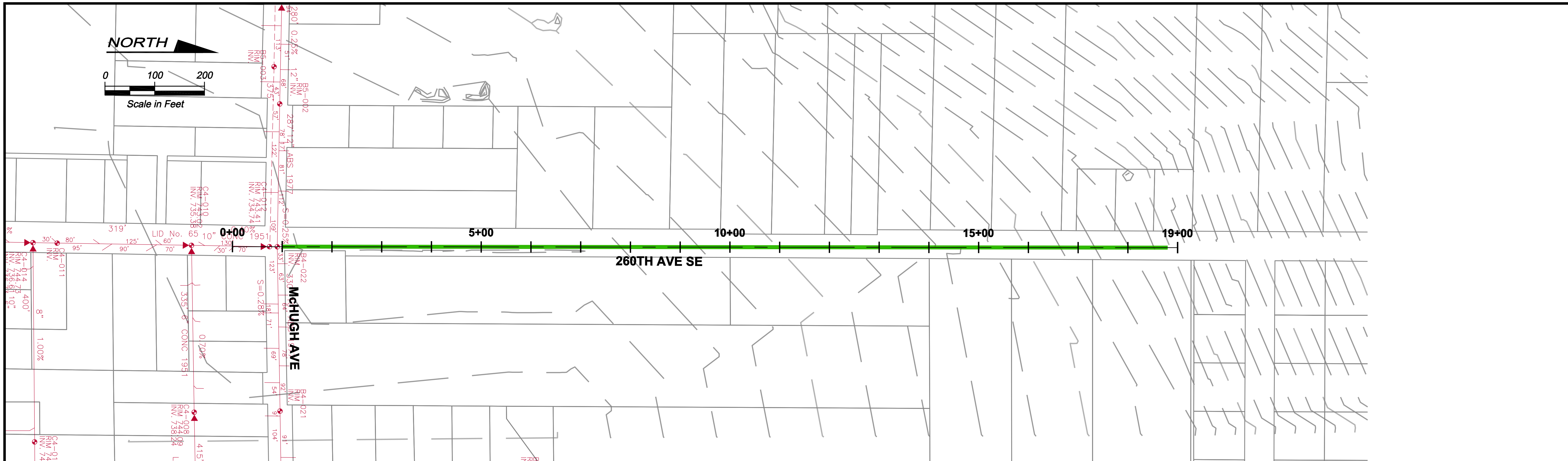
Legend

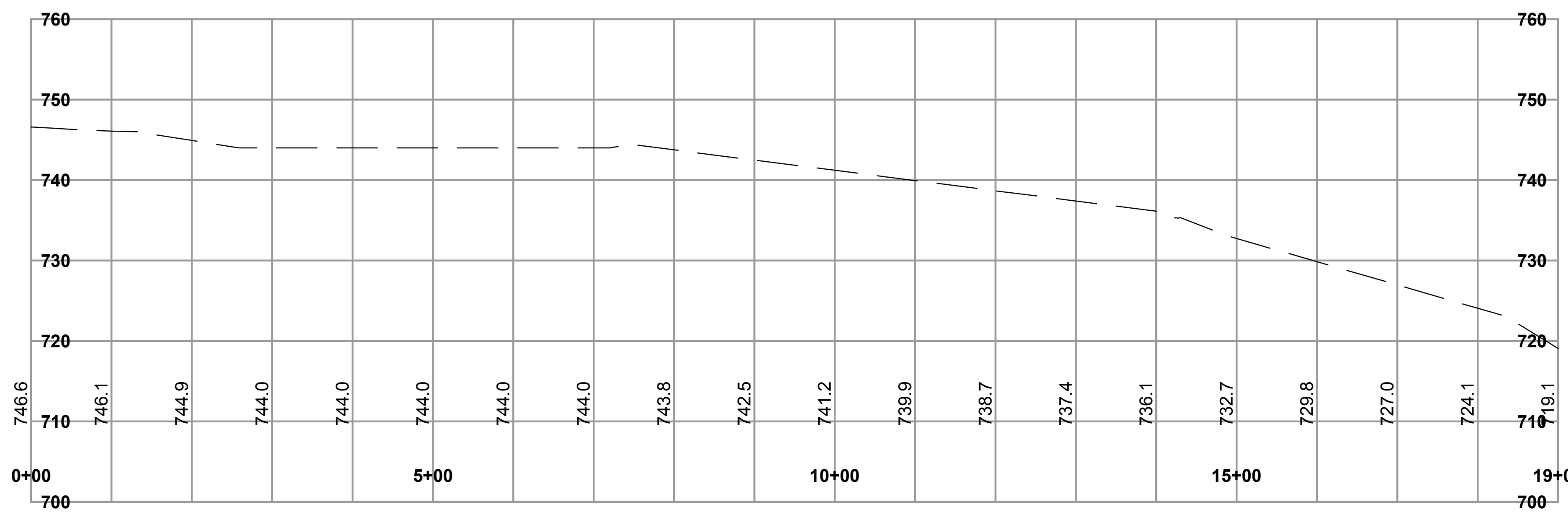
- Potential Sewer Extensions
- Potential Manhole
- Existing Sewer Main
- Existing Sewer Force Main
- Existing Manholes
- LS Existing Lift Stations

CITY OF Enumclaw

Potential Sewer Extension 5B
Plan and Profile
Sewer Collection System Improvements
March 2016

Figure
D-5B





BHC CONSULTANTS

Legend

Potential Sewer Extensions	Existing Sewer Force Main
Potential Manhole	Existing Manholes
Existing Sewer Main	Existing Lift Stations

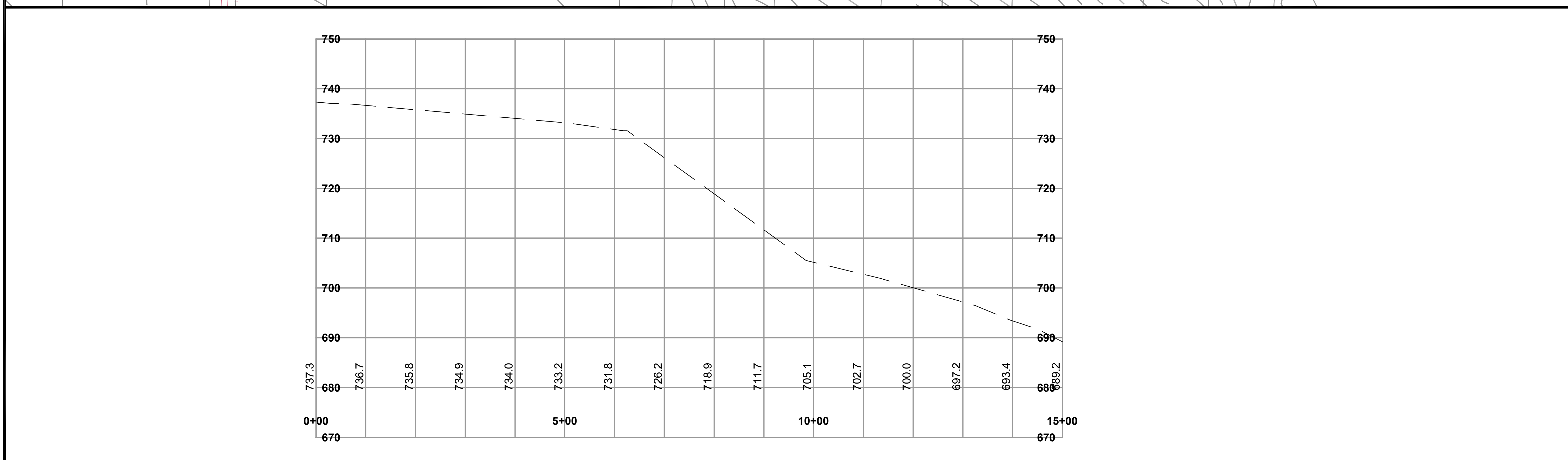
CITY OF Enumclaw

Potential Sewer Extension 6
Plan and Profile
Sewer Collection System Improvements
March 2016

Figure
D-6

PLOT DATE & TIME AUG 06 2015 15:08:50

FILE NAME (UPDATED BY)



PLOT DATE & TIME
AUG 06 2015 15:10:38

FILE NAME (UPDATED BY)
S:\CAD\ENUMCLAW\14-10362-013 SEWER PLAN\DWGS\F14-10362_D-7.DWG (PLS)
XREFS: X14-10362_Align6-7, X14-10362_City Map, X14-10362_Ex Sewer, X14-10362_Parcels GIS 07-14, X14-10362_Prop Sewer

BHC CONSULTANTS

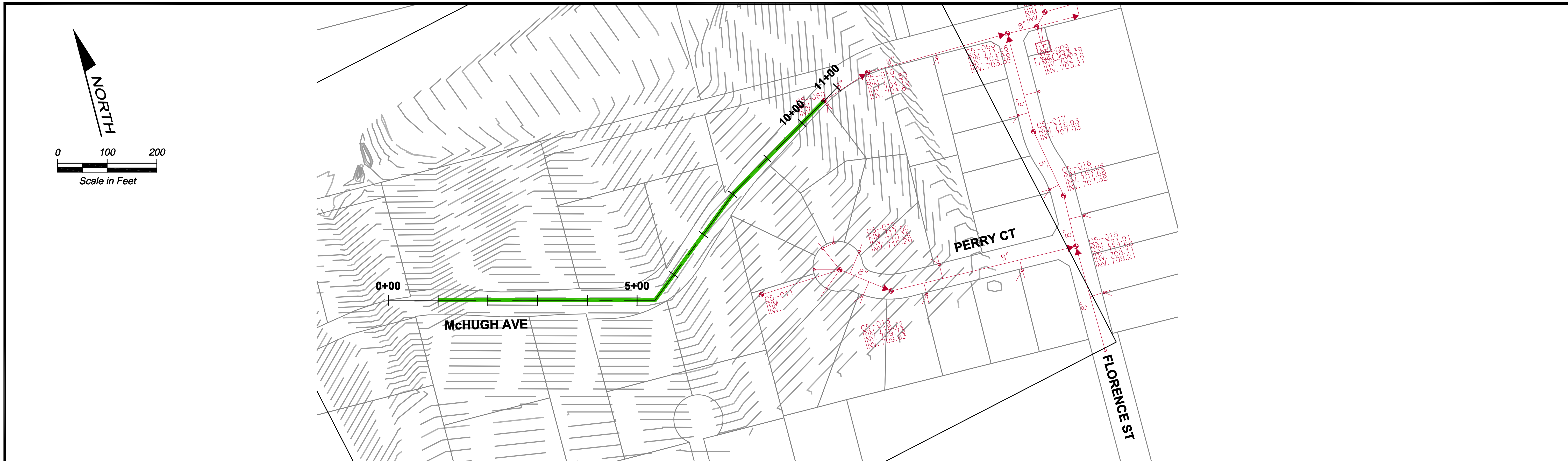
Legend

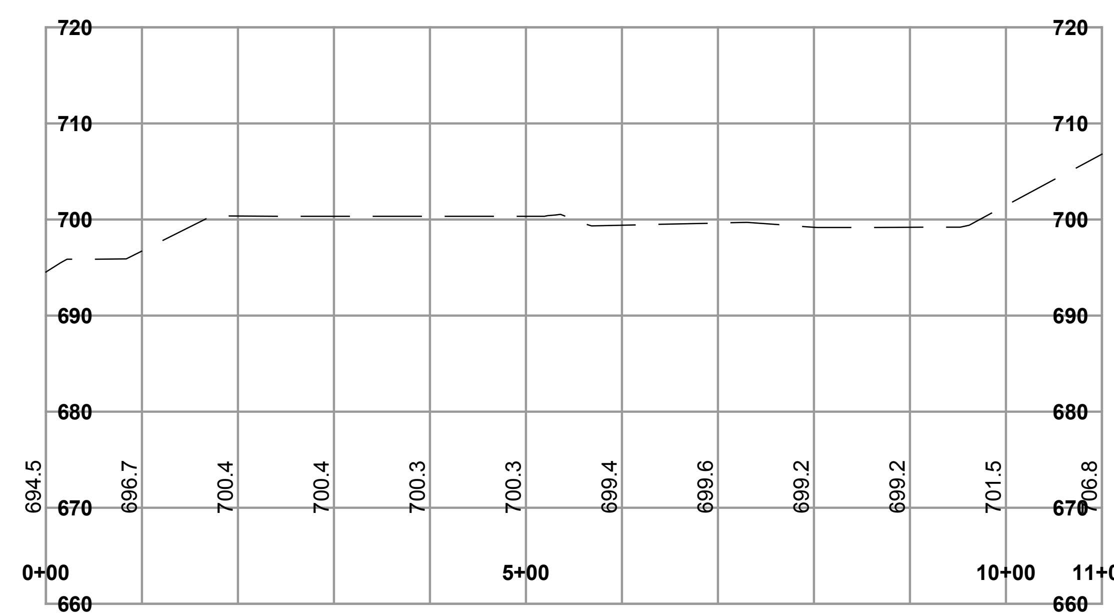
- Potential Sewer Extensions
- Potential Manhole
- Existing Sewer Main
- Existing Sewer Force Main
- Existing Manholes
- Existing Lift Stations

CITY OF Enumclaw

Potential Sewer Extension 7
Plan and Profile
Sewer Collection System Improvements
March 2016

Figure
D-7





PLOT DATE & TIME
AUG 06 2015 15:12:56

FILE NAME (UPDATED BY)
S:\CAD\ENUMCLAW\14-10362-013 SEWER PLAN\DWGS\14-10362_D-8.DWG (PLS)
XREFS: X14-10362_Align8, X14-10362_City Map, X14-10362_Parcels GIS 07-14, X14-10362_Ex Sewer, X14-10362_Prop Sewer

BHC CONSULTANTS

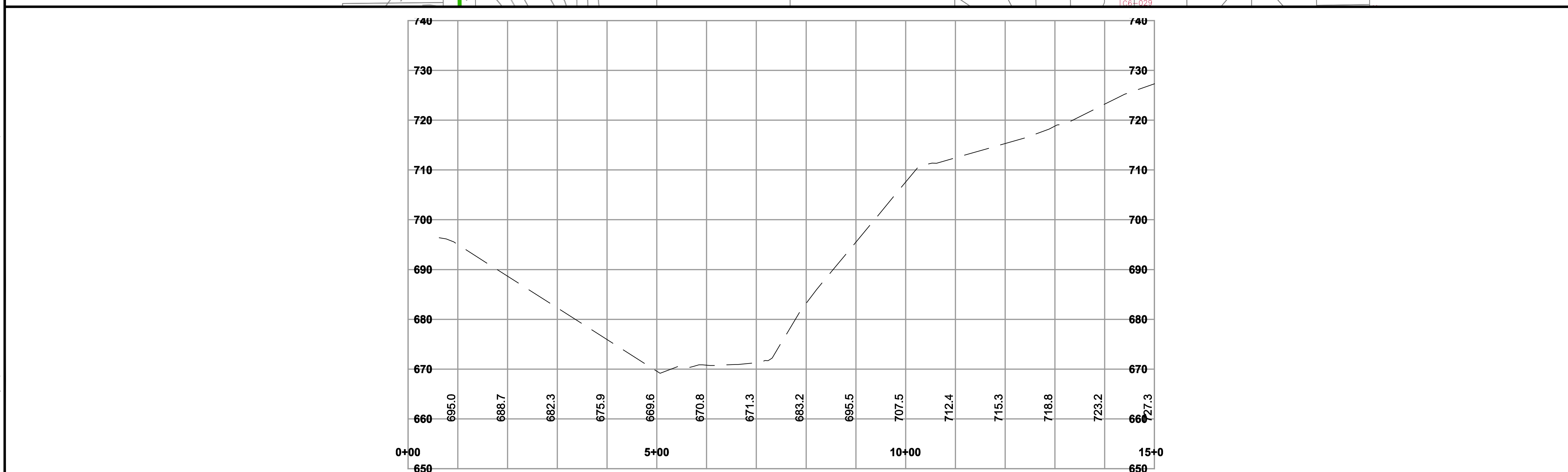
Legend

- Potential Sewer Extensions
- Potential Manhole
- Existing Sewer Main
- Existing Sewer Force Main
- Existing Manholes
- LS Existing Lift Stations

CITY OF Enumclaw

Potential Sewer Extension 8
Plan and Profile
Sewer Collection System Improvements
March 2016

Figure
D-8



FILE NAME (UPDATED BY) S:\CAD\ENUMCLAW\14-10362-013 SEWER PLAN\DWGS\F14-10362_D-9.DWG (PLS)
XREFS: X14-10362_Align9-10-11-12-13, X14-10362_City Map, X14-10362_Ex Sewer, X14-10362_Parcels GIS 07-14, X14-10362_Prop Sewer
PLOT DATE & TIME AUG 06 2015 15:20:58

BHC CONSULTANTS

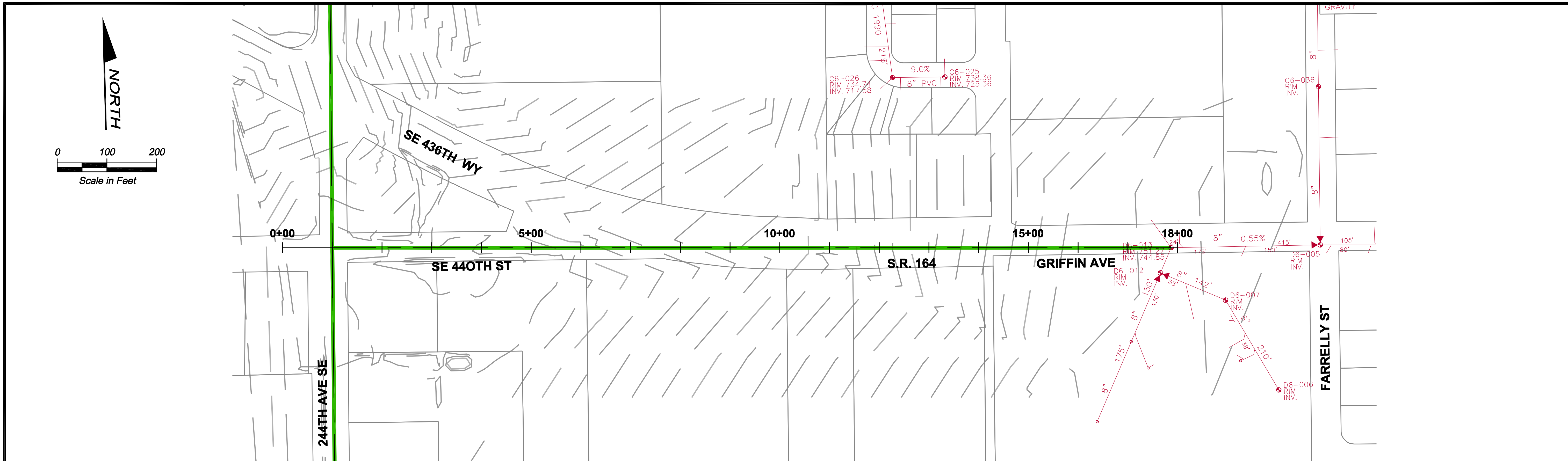
Legend

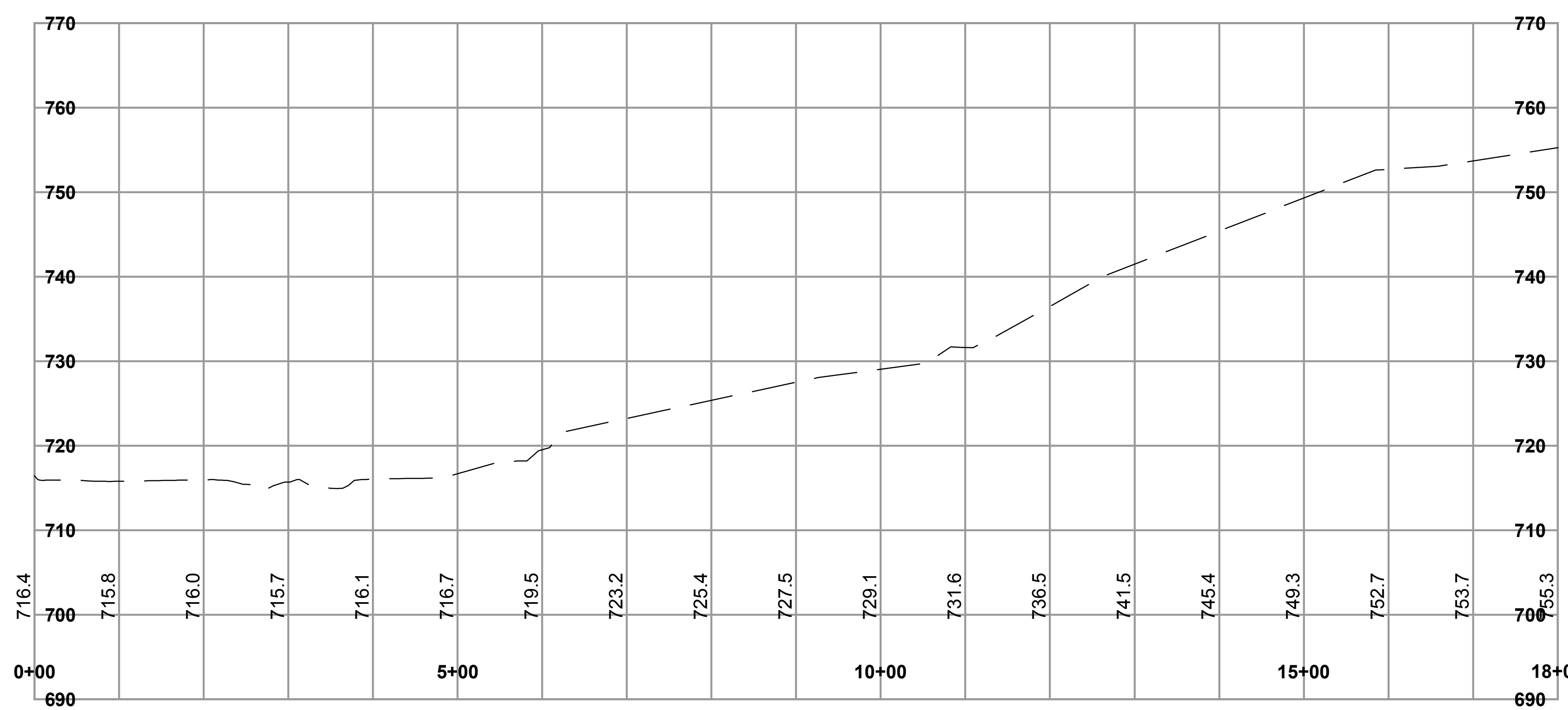
- Potential Sewer Extensions
- Potential Manhole
- Existing Sewer Main
- Existing Sewer Force Main
- Existing Manholes
- Existing Lift Stations

CITY OF Enumclaw

Potential Sewer Extension 9
Plan and Profile
Sewer Collection System Improvements
March 2016

Figure
D-9





FILE NAME (UPDATED BY)
S:\CAD\ENUMCLAW\14-10362-PR\DWGS\F14-10362_D-10.DWG (SO)
XREFS: X14-10362_Align9-10-11-12-13, X14-10362_City Map, X14-10362_Parcels GIS 07-14, X14-10362_Ex Sewer, X14-10362_Prop Sewer
PLOT DATE & TIME
AUG 06 2015 08:20:07

BHC CONSULTANTS

Legend

Potential Sewer Extensions	Existing Sewer Force Main
Potential Manhole	Existing Manholes
Existing Sewer Main	Existing Lift Stations

CITY OF Enumclaw

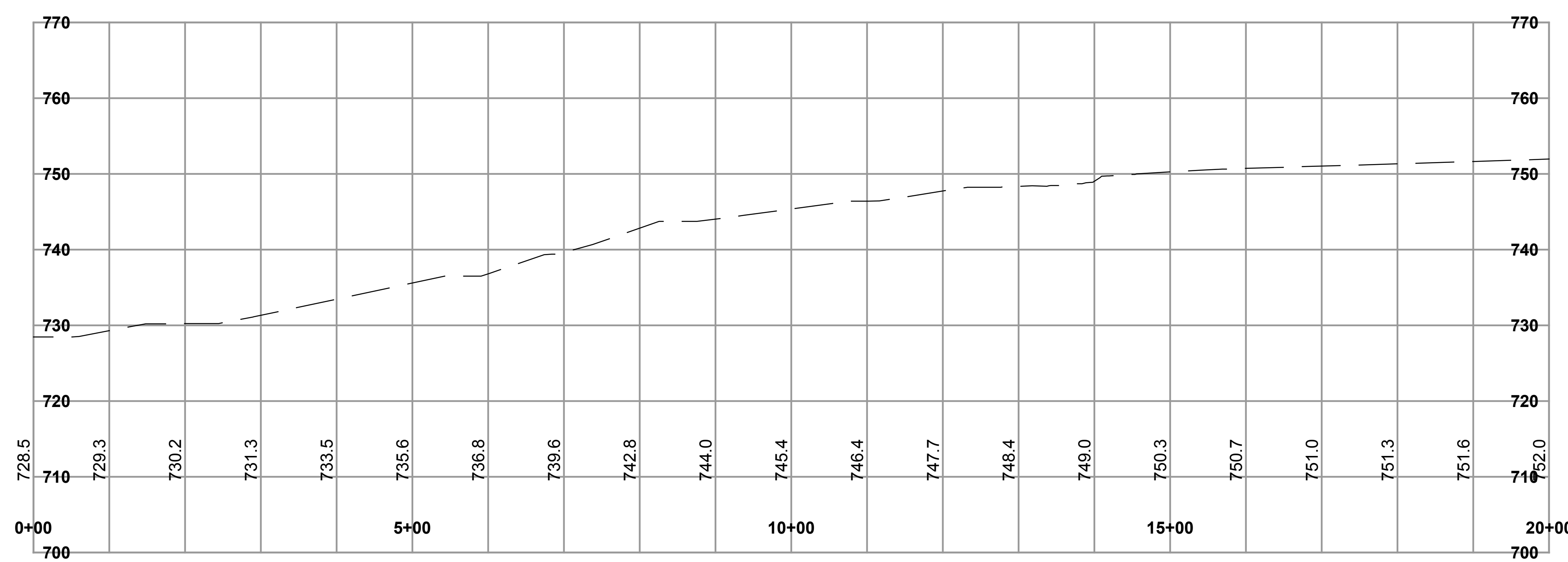
Potential Sewer Extension 10
Plan and Profile

Sewer Collection System Improvements

March 2016

Figure

D-10



FILE NAME (UPDATED BY) S:\CAD\ENUMCLAW\14-10362-013 SEWER PLAN\DWGS\F14-10362_D-11.DWG (PLS)
PLOT DATE & TIME AUG 06 2015 15:25:14
XREFS: X14-10362_Align9-10-11-12-13, X14-10362_City Map, X14-10362_Parcels GIS 07-14, X14-10362_Ex Sewer, X14-10362_Prop Sewer

BHC CONSULTANTS

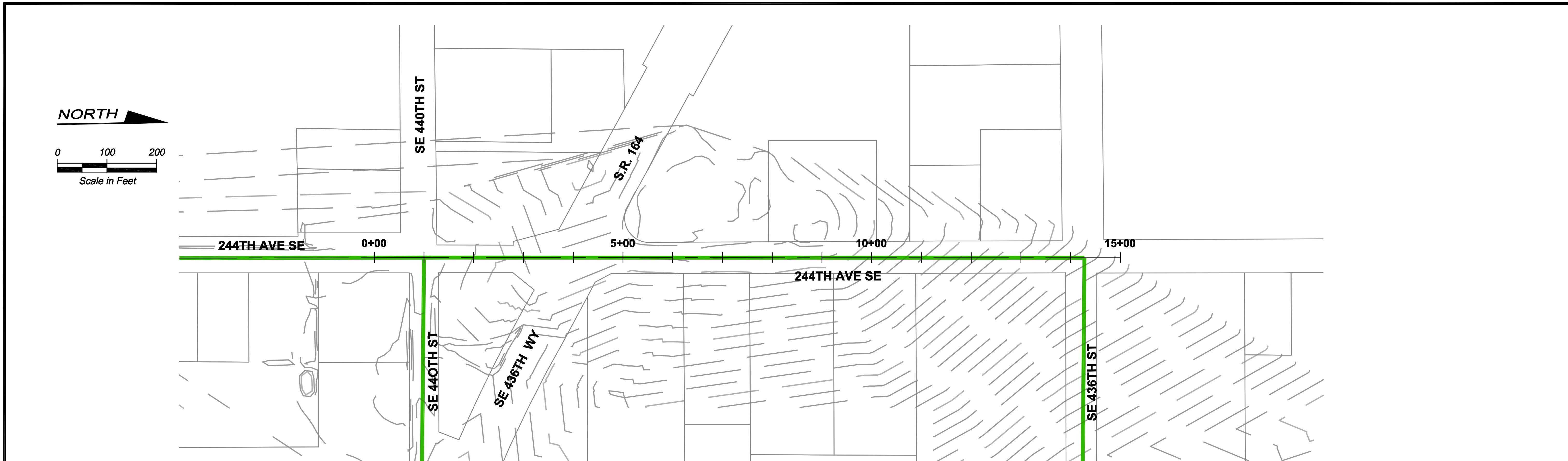
Legend

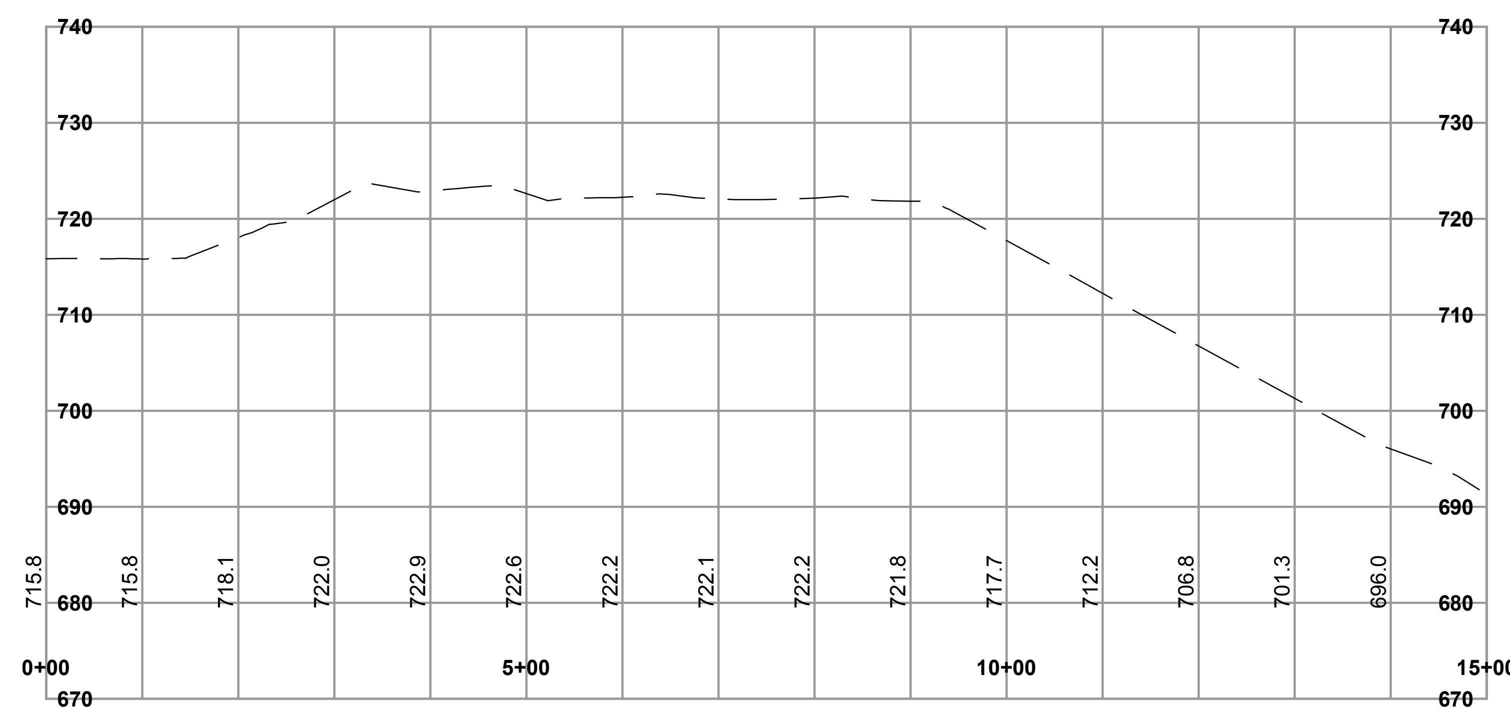
- Potential Sewer Extensions
- Potential Manhole
- Existing Sewer Main
- Existing Sewer Force Main
- Existing Manholes
- LS Existing Lift Stations

CITY OF Enumclaw

Potential Sewer Extension 11
Plan and Profile
Sewer Collection System Improvements
March 2016

Figure
D-11





FILE NAME (UPDATED BY) | PLOT DATE & TIME
S:\CAD\ENUMCLAW\14-10362-013 SEWER PLAN\DWGS\F14-10362_D-12.DWG (PLS) | AUG 06 2015 15:29:34
XREFS: X14-10362_Align9-10-11-12-13, X14-10362_City Map, X14-10362_Ex Sewer, X14-10362_Parcels GIS 07-14, X14-10362_Prop Sewer

BHC CONSULTANTS

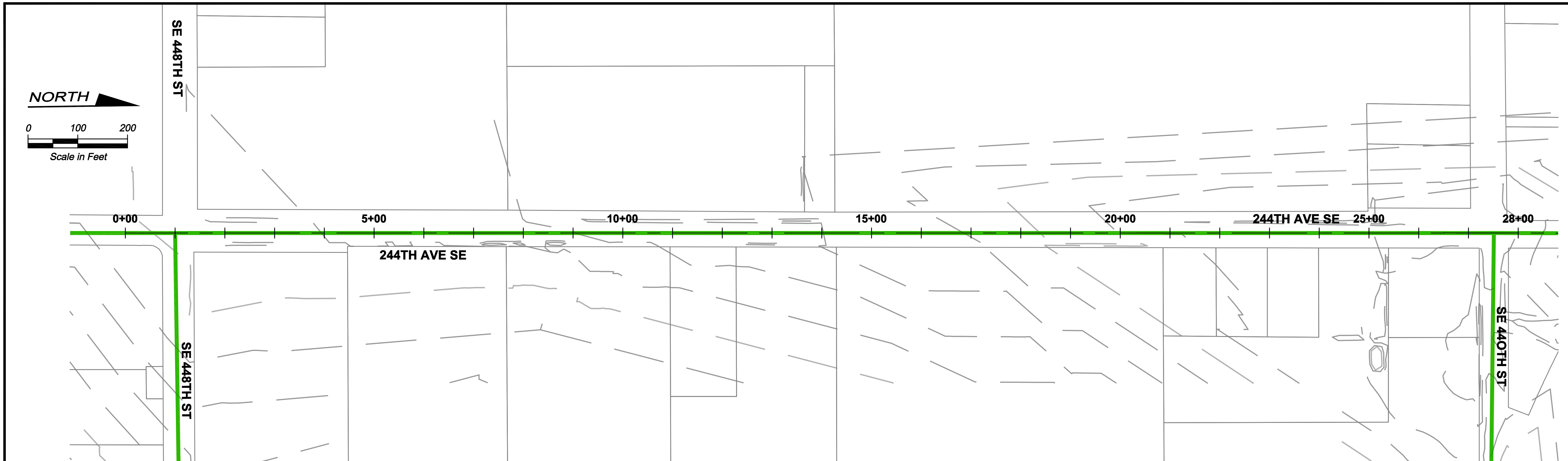
Legend

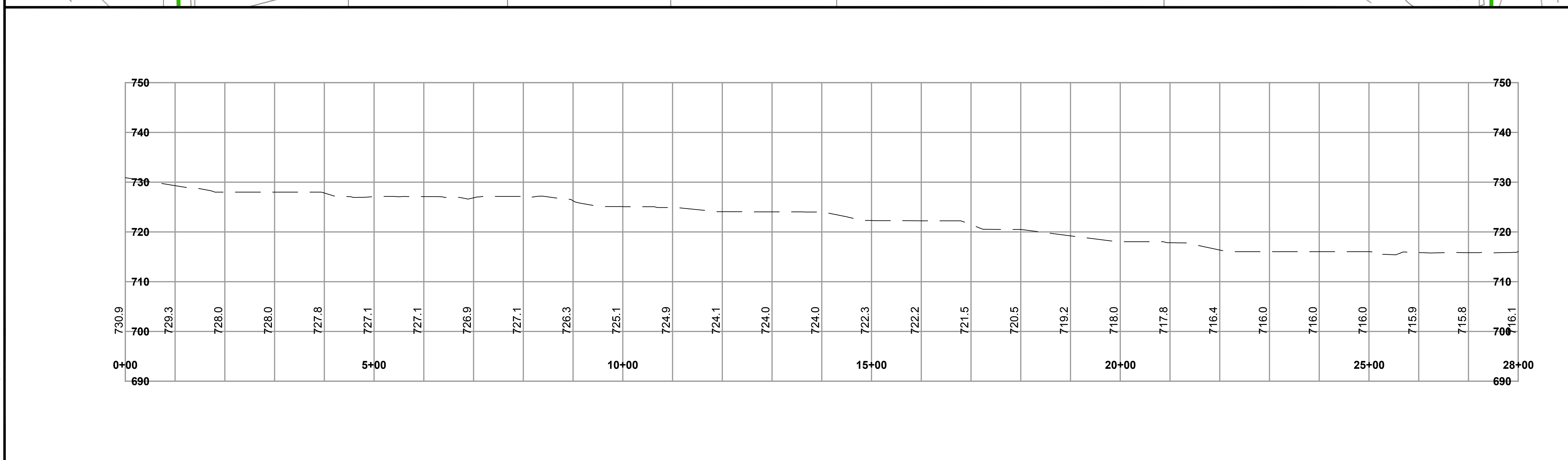
- Potential Sewer Extensions
- Potential Manhole
- Existing Sewer Main
- Existing Sewer Force Main
- Existing Manholes
- LS Existing Lift Stations

CITY OF Enumclaw

Potential Sewer Extension 12
Plan and Profile
Sewer Collection System Improvements
March 2016

Figure
D-12





BHC CONSULTANTS

Legend

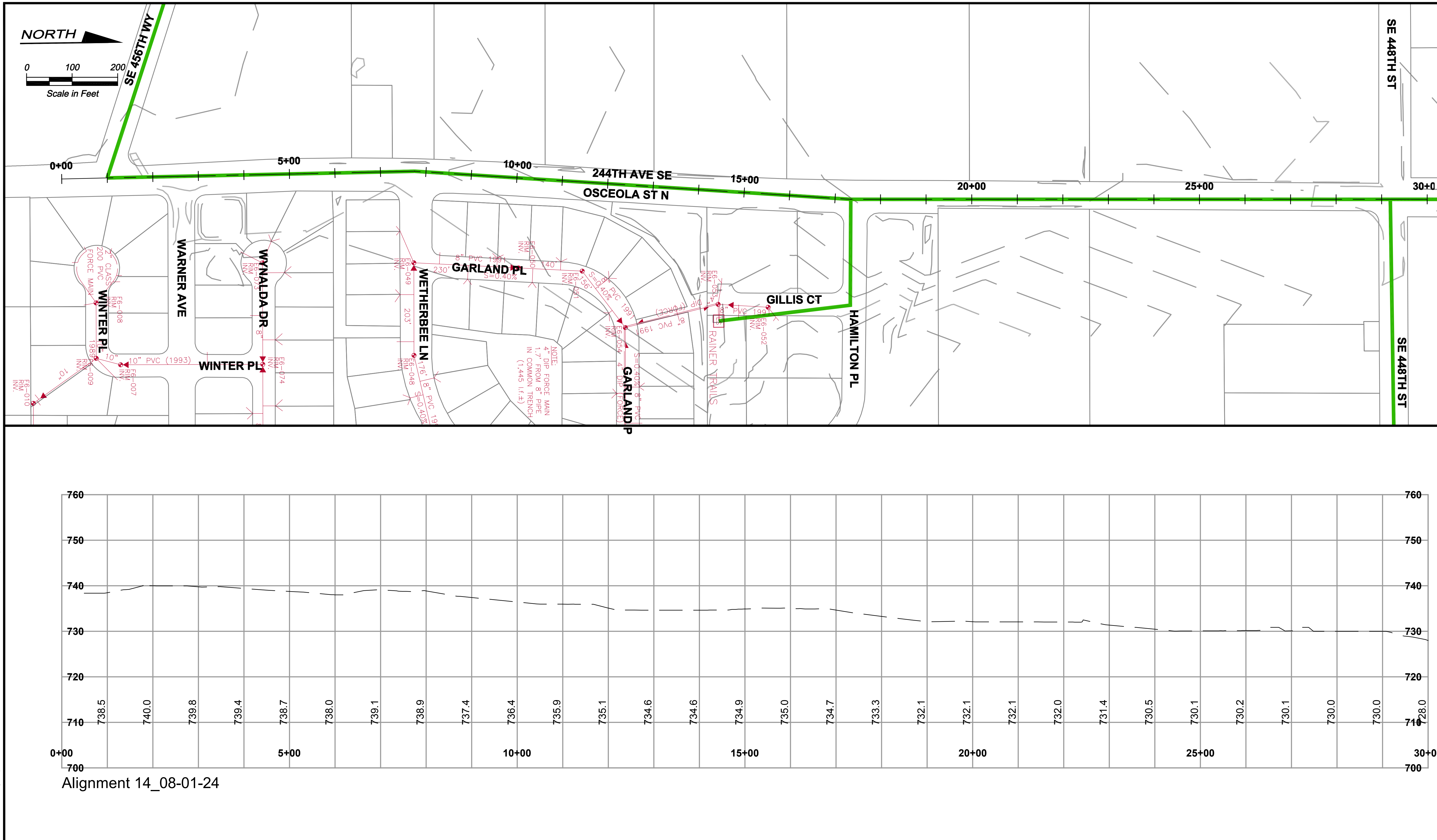
- Potential Sewer Extensions
- Potential Manhole
- Existing Sewer Main
- Existing Sewer Force Main
- Existing Manholes
- LS Existing Lift Stations

CITY OF Enumclaw

Potential Sewer Extension 13
Plan and Profile
Sewer Collection System Improvements
March 2016

Figure
D-13

PLOT DATE & TIME AUG 07 2015 06:06:28
FILE NAME (UPDATED BY) S:\CAD\ENUMCLAW\14-10362-013 SEWER PLAN\DWGS\F14-10362_D-13.DWG (PLS)
XREFS: X14-10362_Align9-10-11-12-13, X14-10362_City Map, X14-10362_Ex Sewer, X14-10362_Parcels GIS 07-14, X14-10362_Prop Sewer



Legend

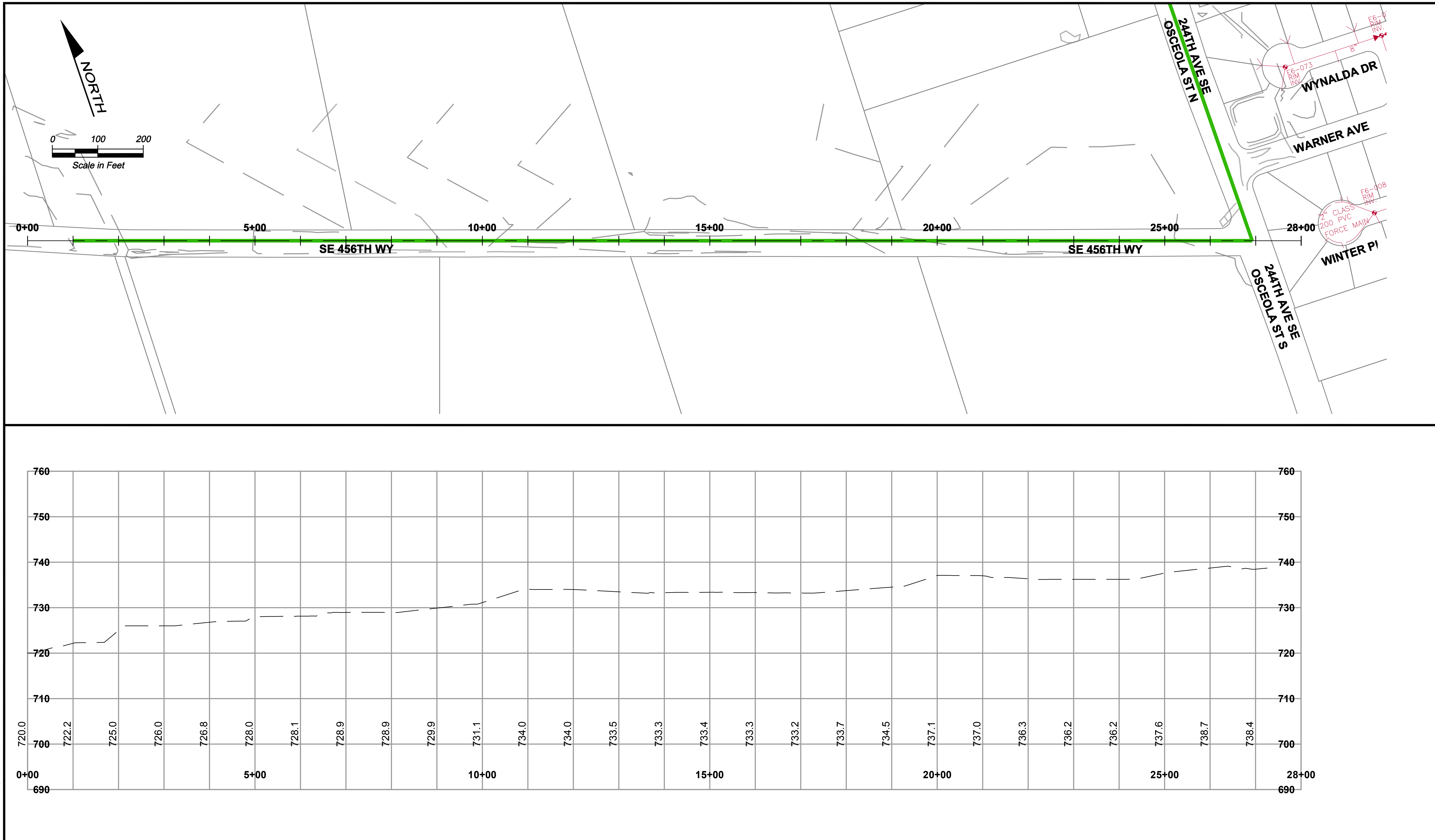
- Potential Sewer Extensions
- Potential Manhole
- Existing Sewer Main
- Existing Sewer Force Main
- Existing Manholes
- LS Existing Lift Stations

BHC CONSULTANTS

CITY OF Enumclaw

Potential Sewer Extension 14
Plan and Profile
Sewer Collection System Improvements
March 2016

Figure
D-14



PLOT DATE & TIME
AUG 07 2015 06:13:50
FILE NAME (UPDATED BY)
S:\CAD\ENUMCLAW\14-10362-013 SEWER PLAN\DWGS\F14-10362_D-15.DWG (PLS)
XREFS: X14-10362_Align14-15-16, X14-10362_City Map, X14-10362_Parcels GIS 07-14, X14-10362_Ex Sewer, X14-10362_Prop Sewer

BHC CONSULTANTS

Legend

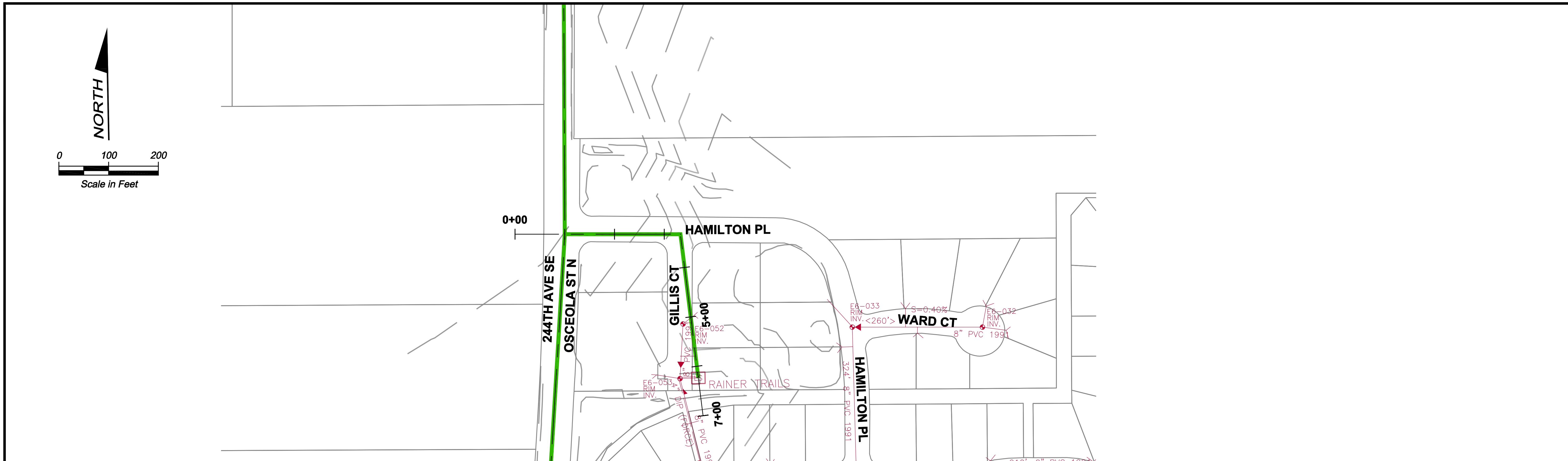
Potential Sewer Extensions	Existing Sewer Force Main
Potential Manhole	Existing Manholes
Existing Sewer Main	Existing Lift Stations

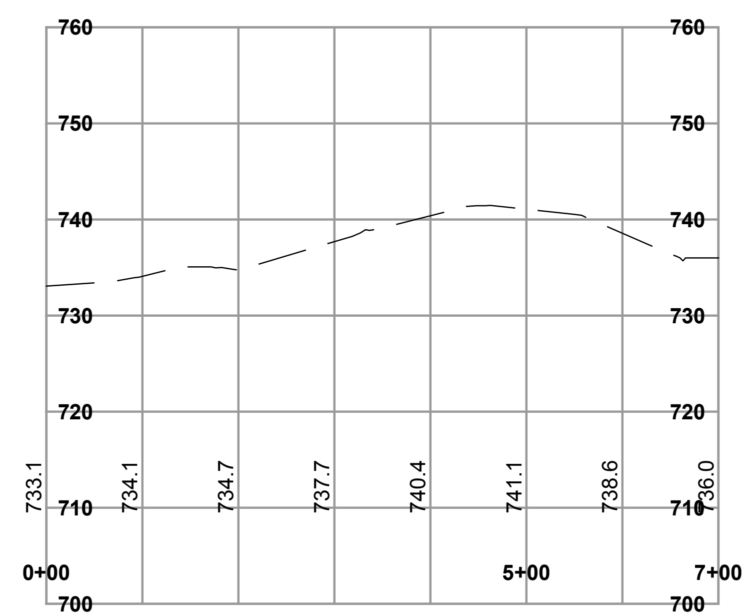
LS

CITY OF Enumclaw

Potential Sewer Extension 15
Plan and Profile
Sewer Collection System Improvements
March 2016

Figure
D-15





BHC CONSULTANTS

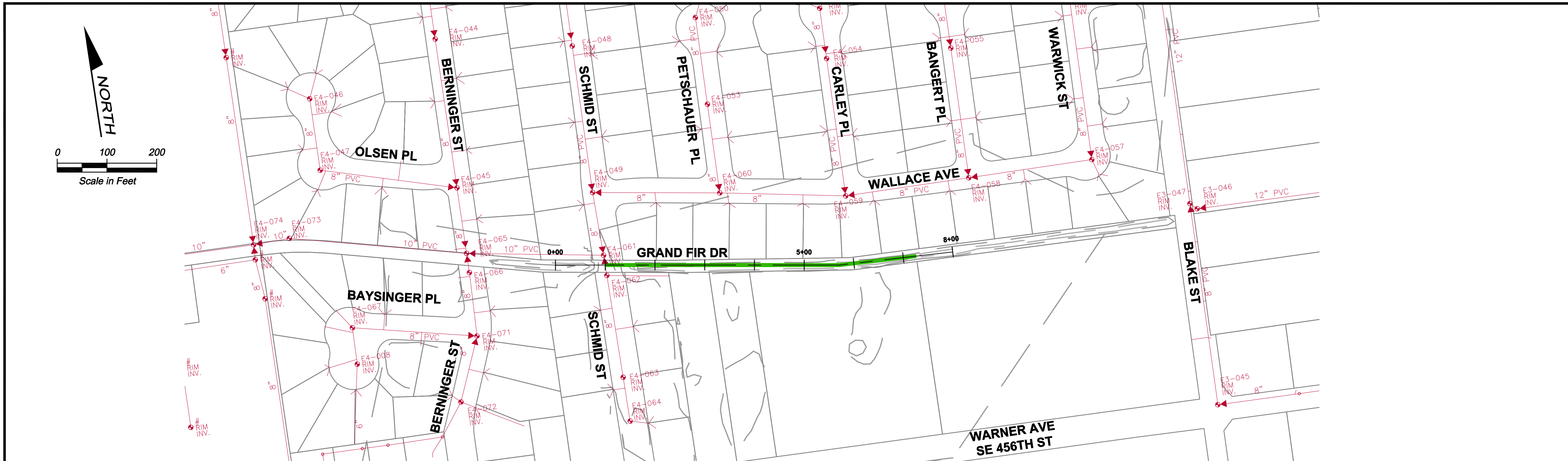
Legend

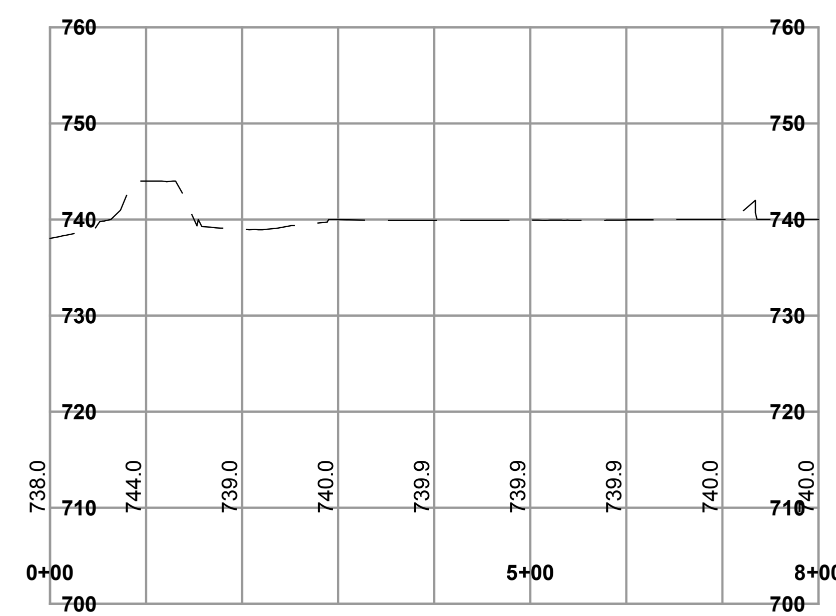
Potential Sewer Extensions	Existing Sewer Force Main
Potential Manhole	Existing Manholes
Existing Sewer Main	Existing Lift Stations

CITY OF Enumclaw

Potential Sewer Extension 16
Plan and Profile
Sewer Collection System Improvements
March 2016

Figure
D-16





PLOT DATE & TIME
AUG 07 2015 06:21:01

FILE NAME (UPDATED BY)
S:\CAD\ENUMCLAW\14-10362-013 SEWER PLAN\DWGS\F14-10362_D-17.DWG (PLS)
XREFS: X14-10362_Align17, X14-10362_City Map, X14-10362_Parcels GIS 07-14, X14-10362_Ex Sewer, X14-10362_Prop Sewer

BHC CONSULTANTS

Legend

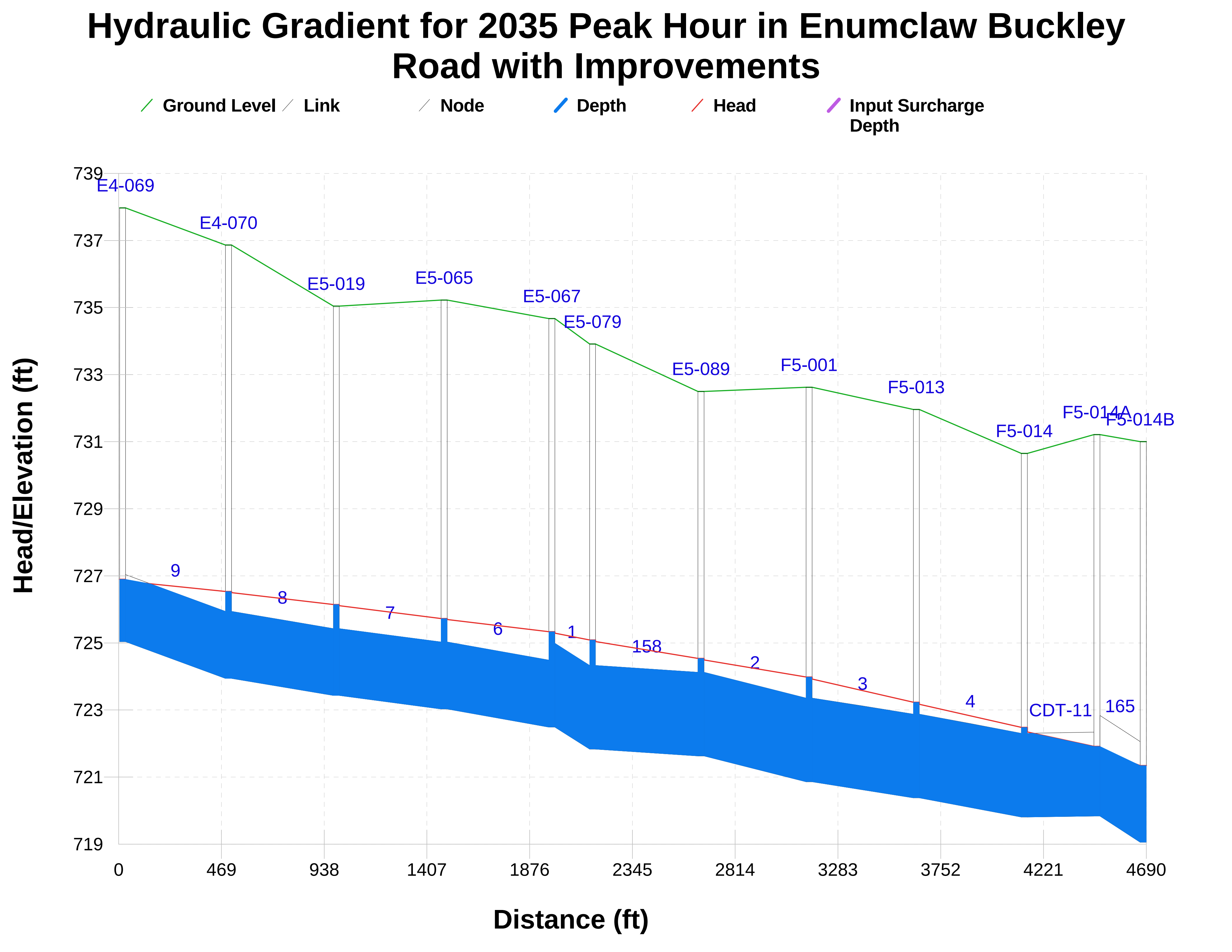
- Potential Sewer Extensions
- Potential Manhole
- Existing Sewer Main
- Existing Sewer Force Main
- Existing Manholes
- LS Existing Lift Stations

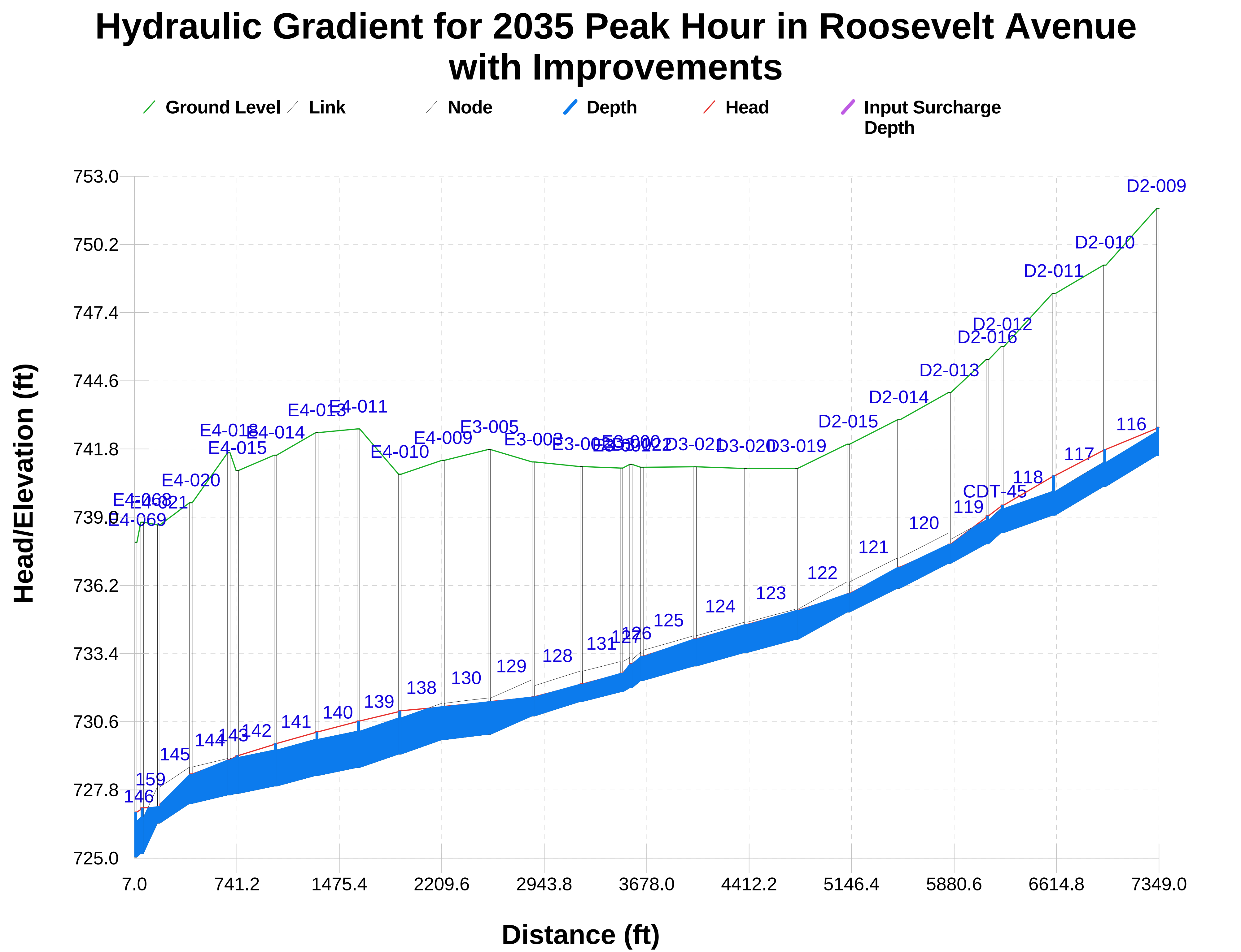
CITY OF Enumclaw

Potential Sewer Extension 17
Plan and Profile
Sewer Collection System Improvements
March 2016

Figure
D-17

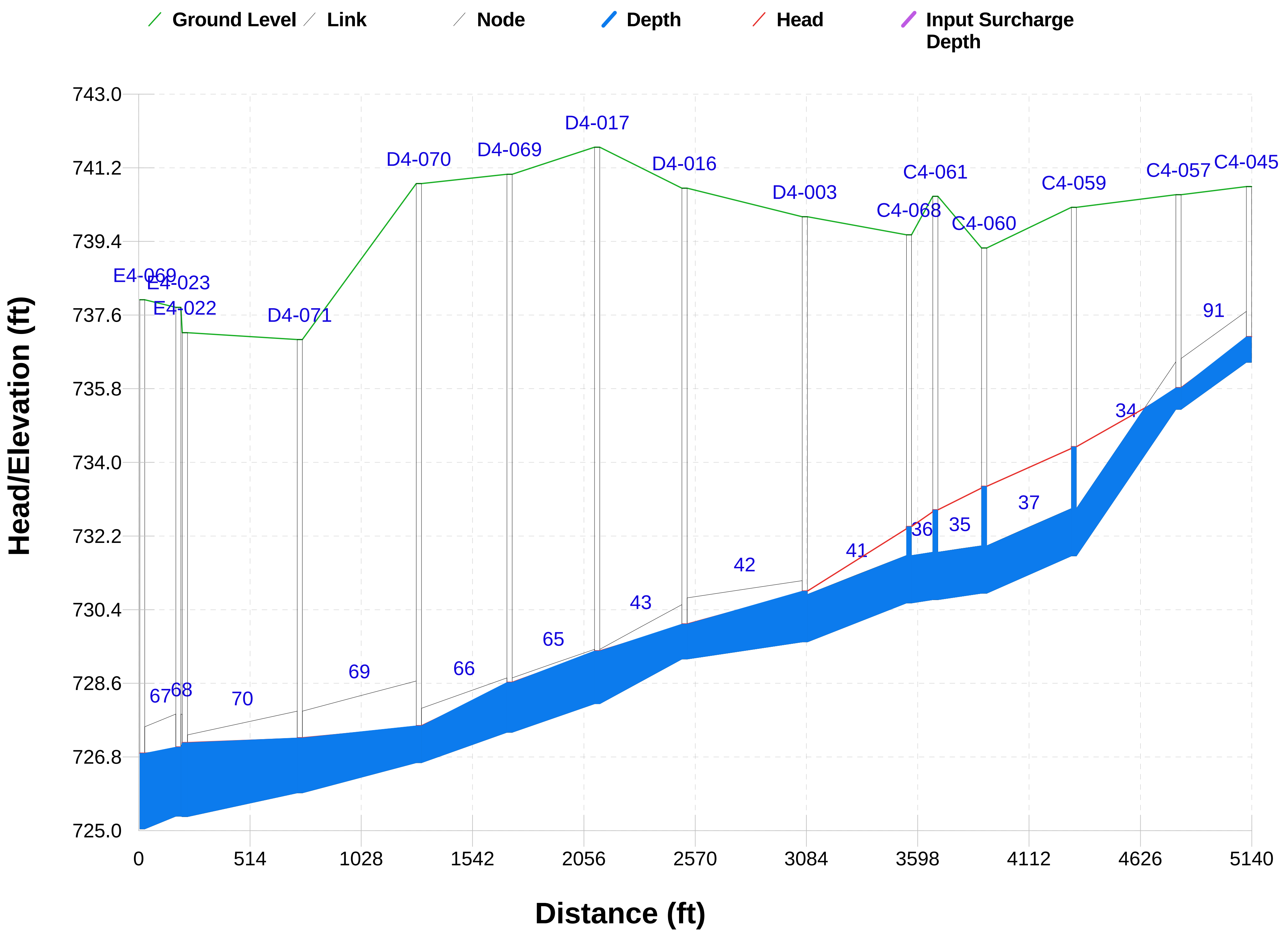
Appendix E – Hydraulic Profiles of Collections Improvements


Hydraulic Gradient for 2035 Peak Hour in Enumclaw Buckley Road with Improvements
Ground Level
Link
Node
Depth
Head
Input Surcharge Depth
Head/Elevation (ft)
Distance (ft)
739
737
735
733
731
729
727
725
723
721
719
0
469
938
1407
1876
2345
2814
3283
3752
4221
4690
E4-069
E4-070
E5-019
E5-065
E5-067
E5-079
E5-089
F5-001
F5-013
F5-014
F5-014A
F5-014B
9
8
7
6
1
158
2
3
4
CDT-11
165

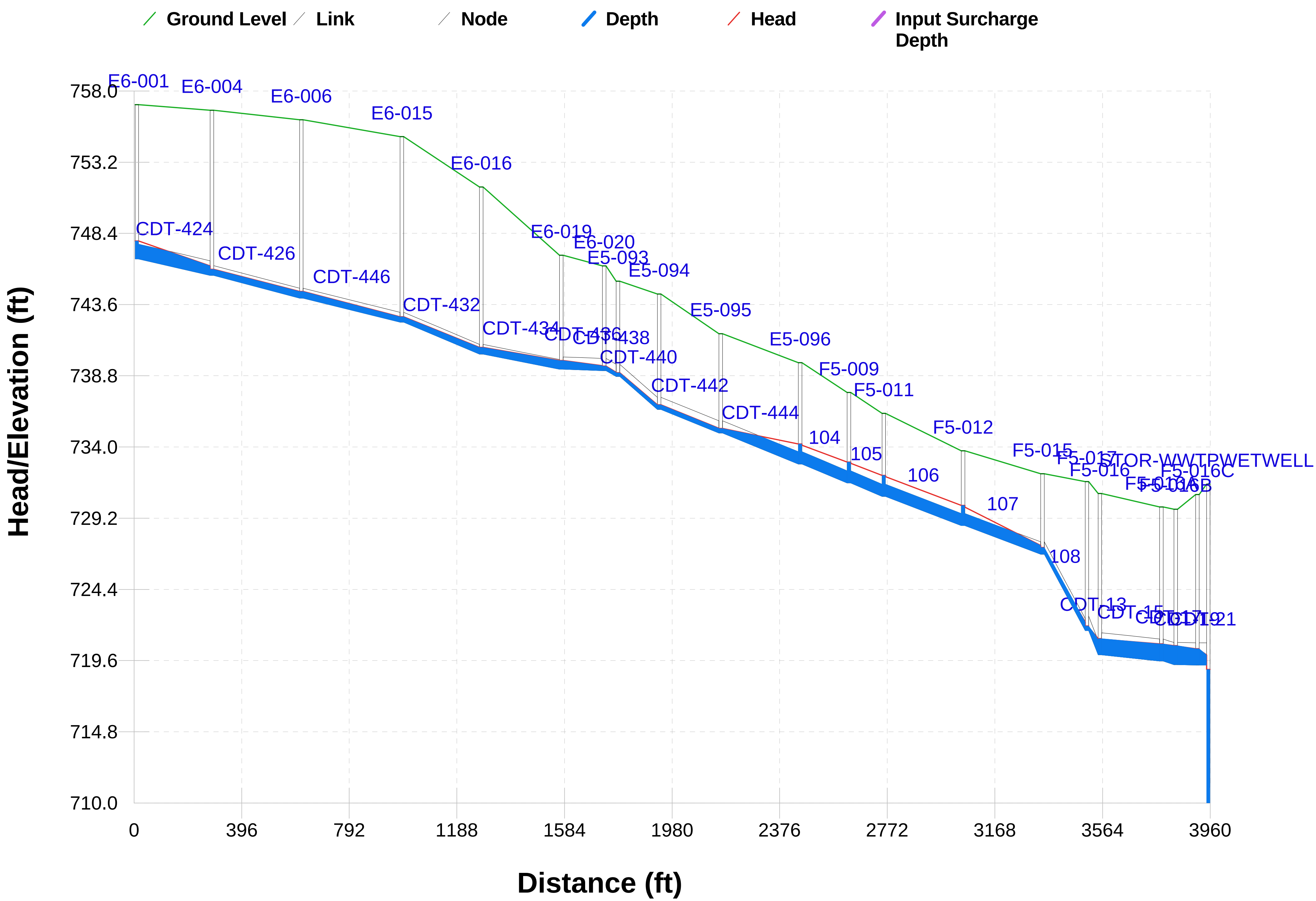


Hydraulic Gradient for 2035 Peak Hour in Roosevelt Avenue with Improvements
Ground Level
Link
Node
Depth
Head
Input Surcharge Depth
Head/Elevation (ft)
Distance (ft)
753.0
750.2
747.4
744.6
741.8
739.0
736.2
733.4
730.6
727.8
725.0
7.0
741.2
1475.4
2209.6
2943.8
3678.0
4412.2
5146.4
5880.6
6614.8
7349.0
D2-009
D2-010
D2-011
D2-012
D2-016
D2-013
D2-014
D2-015
CDT-45
E4-011
E4-010
E4-009
E3-005
E4-014
E4-015
E4-020
E4-069
116
117
118
119
120
121
122
123
124
125
128
129
130
138
139
140
141
142
144
145
159
146

Hydraulic Gradient for 2035 Peak Hour in Railroad Avenue with Improvements



Hydraulic Gradient for 2035 Peak Hour in Semanski Street with Improvements



Appendix F – Agency & Public Review
with Comments & Responses

Comments Matrix

#	Comment	Current Comp Plan Policy?	A policy in the DRAFT Comp Plan?	Staff Proposed Policy	Necessary Code change (Y or N)	Planning Commission Discussion/ Recommendation
	Written Comments					
1	Renewable Energy for solar panels on SFR homes.	No	No	"Consider incentives for solar and renewable energy installations on homes and businesses"	Yes	PSE offers incentives. The Commission feels those incentives are adequate (i.e., no need for City to create programs that 'compete' with PSE programs). No change recommended.
2	Sewer Extension clause 14.08.010	No	NA	NA	No	Current code is adequate. No change recommended.
3	Gated Community's/Private Street	No	Yes	LU 6.1 & 6.2	Yes	Commission is in favor of gated communities and private streets. No change recommended.
	April 4 –Council work shop					
4	Planned Senior Community	No	Yes	LU 6.1	Yes	No change recommended.
5	Allow farming (agricultural use) in Big West	Yes	Yes	LU 14	No	Farming is permitted in residential zones as an accessory use. No change recommended.
6	PUD Designation (Holdener Farm Area and in UGA)	Yes	Yes	LU 5.6	Yes – Land Use and Zoning Map change	DRAFT Land Use and Zoning maps are amended to reflect the proposed changes for areas that do not have any active

						permits. No change recommended.
7	Design standards for all buildings including Industrial	N	Yes	CDD Goal 1, 1.1, 1.7	Yes	No change recommended.
8	Accessory Dwelling Unit (ADU sizes)	N	Yes	LU 1.2 & 5.3; HE 3.2	Yes - Code Change needed	Commission recommends Staff and Council consider municipal code changes to accommodate this goal.
9	Annexation	Yes	Yes	LU	N/A	No change recommended.
10	Habitat/Stream Protection	Yes	Yes	NE (Chapt 8) and Critical Areas Ordinance	No	No change recommended.
11	“Rural” Atmosphere (DOC skeptical / Resident supportive)	Yes	Yes	Vision, plus most Chapters.	No	No change recommended.
12	Single Family attached homes (aka Zero Lot Line)	No	Yes	LU 5.3, MFR	Yes	No change recommended.

DATE RECEIVED
JAN 12 2016
CITY OF ENUMCLAW

12 January, 2016

City of Enumclaw
Planning Division
Community Development Department
1309 Myrtle Avenue
Enumclaw, WA 98022

Gentlemen:

This letter is in response to the City's Public Notice soliciting amendment requests to the Comprehensive Plan & Development regulations.

I request the following amendments:

1. Special Treatment of Solar and Renewable Energy Projects

In view of climate change and air quality issues, I request that the City's Comprehensive Plan and Development Regulations include language that encourages projects which add renewable energy-generating apparatus and structure to properties within the City of Enumclaw.

Specifically, This letter requests the City's Building Code to provide that Building Permits issued for such improvements as photovoltaic solar panels, solar-thermal collectors and similar renewable energy-generating devices, be issued for a flat fee, covering just the cost of paperwork, but excluding any charges based on valuation of the devices and their installation.

Rationale:
Solar energy can significantly reduce the volume of greenhouse gasses generated in the production of electricity. They distribute the means of electricity production over a greater number of sources, so that interruptions of power have less impact on the community.

Solar-thermal collectors improve local air quality wherever they displace wood-burning heating systems. They reduce the sources of home fires caused by combustion-based heating systems. And like photovoltaic panels, they reduce greenhouse gasses.

Giving renewable energy-generating projects preferential treatment as requested herein, will facilitate and encourage their introduction, thus fostering "quality of life" improvements for Enumclaw citizens.

2. <u>Valuation of Improvements Proposed in Building Permit Applications</u>

There is an issue arising from the City's current method of valuing home improvements proposed on City Building Permit Applications. Currently, the value of improvements is not based on the actual cost of the improvements, but on the City's assessment of their probable value. I request that the City Attorney review this matter, and that the City amend the procedure for valuing improvements proposed on Building Permit Applications. My sense of what is fair and just as regards the valuation of home improvements, is that they be based first and foremost on their actual cost, if this is clearly presented to the City.

<u>Rationale</u>:
The probable value used by the City, is derived from national average costs for similar construction, plus some adjustments coming from the judgment of the Building Permit reviewer.

What happens when such a method is applied, can cause inequities in how taxes and fees are levied against the property owner. For example, a shop addition which I paid Alpha Steel Buildings $41,000 for, was assessed at $61,000.00, a $20,000.00 difference between its actual cost, and its assessed value. This instant appreciation does not seem reasonable or equitable.

When the improved property is sold, its cost basis can only include the original cost, plus the cost of capital improvements made to it for which receipts exist. There is no receipt for the $20,000.00 instant appreciation. So from the date of the Building Permit signoff until the property is sold, the property is assessed at $20,000.00 more than what it cost.

This is not how a new home, purchased in the same year as the example improvement, is assessed. Rather, the home is assessed, principally upon the actual purchase price--what a willing buyer paid a willing seller for that property. County property assessments only go up or down when selling prices go up or down, and they need to be based on actual, current selling prices to be fair and equitable.

If the cost of all materials and labor for a home improvement are stated in a contract between a property owner and a contractor, then this should be the basis for its valuation on the City Building Permit, because it is what a willing buyer has actually paid a willing seller for the improvement.

A national average cost for similar improvements, if it includes their cost in California or New York homes, does not accurately capture their cost in Enumclaw. Such a valuation should not trump a clearly stated contract price, for home improvements to Enumclaw homes.

3. Sewer Regulations and further Clarification of the "200 Foot" Clause

On 9 January last year, I submitted requested changes to the Sewer Regulations and Rates Chapter 14.08, which according to Scott Woodbury, are still under review. Hereunder is an additional amendment request concerning that regulation:

For purposes of measuring the distance between the existing sewer line and a residential property, the starting point of the measurement shall be the nearest existing sewer line in a public street or alley, and not the nearest point of any sewer lines located on private property. The end point shall be the point farthest away from this starting point, that the sewer line is to be extended to, in satisfaction of Chapter 14.08.

Rationale:
The starting point--As currently written, if the nearest sewer line is on private property, a prospective customer who wishes to connect, is made responsible for digging up and restoring existing improvements on that private property as part of extending the sewer line to a point where he can connect to it. This can involve digging up and restoring driveways, sprinkler systems, gas, water and electric utilities, fences, trees and other landscaping. Imagine the private property owner's feeling about having his driveway bisected by a trench, his lawn torn up by digging machines, and his prize rose bushes, Japanese maple, and stone wall torn out. Imagine what it would cost to satisfy him as to their satisfactory restoration!

In the case where the existing sewer line is across a public street from the prospective customer, he is also responsible for a street cut and manholes on either side of the street, where the sewer extension jogs.

Street cuts entail traffic control which, again, becomes a burden upon the prospective customer. And if the sewer extension runs adjacent to a line of utility poles, the prospective customer is responsible for paying Puget Sound Energy to come out and support the poles during excavation.

Clearly, all of this is prohibitively expensive. A sewer line extension made in a public street is expensive enough, but at least it does not pit one property owner against his neighbors.

The end point--To clarify the "200 foot rule, "Chapter 14.08 needs to define the end point of the sewer extension in a fair and equitable manner. As currently written, it does not fairly account for the total length of sewer extension that a prospective customer is responsible for providing, at his expense. The regulation requires him to extend the line up to his property and then completely by it, to the next parcel. The portion of this extension going by his property is not included in the computation of the "200 feet." So for example, if his property is 50 feet from the nearest sewer line in the street, but his street frontage is 175 feet, he is required to put in 225 feet of sewer line, and only credited with 50 feet of it.

To be fair, the sewer Code should be amended to state that calculations made to test the "200 foot rule" are based on the total length of sewer line extension which the prospective customer is required to install and pay for.

Thank you for your consideration of these amendments.

Very Truly Yours,

Jonathan D. Lazarus

Jonathan D. Lazarus
24909 S.E. 448th St.
Enumclaw, WA 98022

File: City of Enumclaw Comprehensive Plan Changes

9 January, 2015

To: The city of Enumclaw Planning Division
Community Development Department
1309 Myrtle Ave
Enumclaw, WA 98022

From: Jonathan D. Lazarus
24909 S. E. 448th St
Enumclaw, WA 98022

Subject: Requested Amendments to Sewer Regulations and Rates, Chapter 14.08 As per Public Notice of "Annual Comprehensive Plan and Development Regulation Update"

Gentlemen:

Please consider amending the Sewer Regulations as follows:

Notwistanding the "200 foot" clause in section 14.08.010,
If the City sewer system does not currently exist in a street or alley abutting a residential property, and if the cost of extending the City Sewer line by that property pursuant to a lateral connection exceeds $40, 000.00, then either

a). Such property and any alterations or improvements to it are not required to connect to the sewer line, but may use or continue to use a septic system which meets the King county requirements for septic systems, irrespective of the property's proximity to any existing or planned sewer system.

b). If the owner of said property elects to bear the cost of extending the City sewer system pursuant to a lateral connection, then his account with the City shall be credited with this cost, which credit he may use to offset all future City utility bills, taxes and fees from the time that the costs are incurred and presented to the city, until the costs are reimbursed by the City to him.

I request that both options a) and b) above, be added to the sewer regulations for the following reasons:

1. The 200 foot rule is arbitrary and defective in instances where the sewer extension is not straightforward and too expensive for a private property owner to bear. The rule needs a reasonable dollar limit as well, to be fair and operative..

2. In instances where the cost exceeds $40,000.00, and therefore is too expensive for a residential customer to bear, it is unreasonable to require him to

connect to the City sewer, and unreasonable to deny him permission to alter or improve his property in a manner which relies on a septic system.

3. In those instances where the property owner can afford to extend the City sewer system at his expense, on behalf of the City, it seems fair to reimburse him. By doing so via credit towards his utility bills, City taxes and fees, the City can benefit from an interest-free form of financing which does not materially increase its budget. Such an arrangement enables the City to add customers to its sewer system, and eventually, to add revenue to its coffers

The so-called "Latecomers agreement " does not accomplish such reimbursement in a fair and consistent manner. In locations where no other residential customers elect to connect to the portion of the city sewer system paid for by just one customer, no such reimbursement occurs. So if for instance, a residential customer pays for extending the City's sewer line 200 feet by his property, and no other customers on either side of the street or alley connect, he will not be reimbursed. This is true even though the City may elect to extend the sewer another 200 feet to serve 8 more customers on the same sewer line..

4. As currently prescribed by City regulations, the remarkably high cost of connecting to the City sewer system is apparently a major stumbling block to the system's use. From talking with Scott Woodbury, I understand that extremely few private residential customers have connected since the system was available.

The proposed amendments would enable both growth of the sewer system where it is economically feasible for its customers, as well as growth of the community housing, in spite of the truncated sewer system, where sewer extension and connection are prohibitively expensive for both the City and its customers/residents.

Please acknowledge receipt of these requested amendments, and please let me know of their ultimate disposition. I would like to participate in any public meetings which are scheduled to discuss sewer regulations as they apply to residential properties in Enumclaw.

Thank you for your consideration of this matter.

Very Truly Yours,

Jonathan D Lazarus

Jonathan D. Lazarus
(408) 338-9481

File: CitySewerAmentment

All my immediate neighbors are strongly opposed to both the high cost of connection and the high monthly usage fees.

They have no incentive to pay a huge connection fee to the City, stand the costs of making a lateral connection to their house and then the cost of decommissioning their septic tank,. All this to start paying monthly usage fees which continue to rise.

Let me recommend that either the connection fee be drastically reduced (to, Say, $500 or $1000 dollars), or the monthly connection fees be kept at a lower level.

By doing one or the other, there will be at least some incentive for home owners to connect, and start paying usage fees that will reimburse the system's cost.

File: CitySewerAmentment

DATE RECEIVED

JAN 12 2016

CITY OF ENUMCLAW

Desire for Gated Community in Enumclaw

RECEIVED MARCH 14, 2016

We, the current/future residents of Enumclaw, WA are interested in having a gated community in our town.

Some of the reasons we feel that a gated community in Enumclaw will be beneficial:

1) There are many homebuyers of all ages who desire the peace and sense of security that is provided by living in a gated community. Some buyers have purchased homes in other towns which have gated communities or on land with gates because there is currently not a gated community in Enumclaw.
2) Crime would be cut down due to the homes being less convenient to thieves and a gate will limit the access to thieves, making it harder or less convenient for them to case out the community for crime.
3) Traffic and speeding cars will be reduced, making for a quieter neighborhood and safer place for children to play and ride bicycles.
4) Soliciting will be cut down in the neighborhood.
5) Property values will be higher due to the desire to own in a gated community.

We hope that you can see the benefit and desire to allow gated communities in Enumclaw.

First Name DOUGLAS Last Name JOHNSON
Street Address 2744 GRIFFIN AVE
City Enumclaw, WA
Comment [signature]

First Name Tom Kittelman Last Name
Street Address 38912 244th ave SE
City Enumclaw, WA
Comment [signature]

First Name Helen Last Name Boisjolie
Street Address 935 Martin WAY
City Enumclaw, WA Helen J. Boisjolie
Comment

First Name Steve Last Name Parker
Street Address 2740-C Warner Ave Enumclaw
City Enumclaw, WA
Comment Steve Parker

Desire for Gated Community in Enumclaw

We, the current/future residents of Enumclaw, WA are interested in having a gated community in our town.

Some of the reasons we feel that a gated community in Enumclaw will be beneficial:

1) There are many homebuyers of all ages who desire the peace and sense of security that is provided by living in a gated community. Some buyers have purchased homes in other towns which have gated communities or on land with gates because there is currently not a gated community in Enumclaw.
2) Crime would be cut down due to the homes being less convenient to thieves and a gate will limit the access to thieves, making it harder or less convenient for them to case out the community for crime.
3) Traffic and speeding cars will be reduced, making for a quieter neighborhood and safer place for children to play and ride bicycles.
4) Soliciting will be cut down in the neighborhood.
5) Property values will be higher due to the desire to own in a gated community.

We hope that you can see the benefit and desire to allow gated communities in Enumclaw.

First Name Noel Last Name Argo
Street Address 24514 Sumner Buckley Hwy E
City Buckley, WA 98321 Noel Argo
Comment I live in Buckley but work in Enumclaw.

First Name Angelena B Last Name Bowen
Street Address 39417 246th Ave SE Angelena Bowen
City Enumclaw, WA
Comment Lifelong Enumclaw resident.

First Name ANITA Last Name CARLSON
Street Address 42821 260th AVE SE.
City ENUMCLAW WA Anita Carlson
Comment

First Name Laurie Last Name Rittelman
Street Address 38912 244th Ave SE
City Enumclaw WA 98022
Comment I would love to live in a gated community

Desire for Gated Community in Enumclaw

We, the current/future residents of Enumclaw, WA are interested in having a gated community in our town.

Some of the reasons we feel that a gated community in Enumclaw will be beneficial:

1) There are many homebuyers of all ages who desire the peace and sense of security that is provided by living in a gated community. Some buyers have purchased homes in other towns which have gated communities or on land with gates because there is currently not a gated community in Enumclaw.
2) Crime would be cut down due to the homes being less convenient to thieves and a gate will limit the access to thieves, making it harder or less convenient for them to case out the community for crime.
3) Traffic and speeding cars will be reduced, making for a quieter neighborhood and safer place for children to play and ride bicycles.
4) Soliciting will be cut down in the neighborhood.
5) Property values will be higher due to the desire to own in a gated community.

We hope that you can see the benefit and desire to allow gated communities in Enumclaw.

First Name Ruth Last Name Richards
Street Address 1033 Semanski
City Enumclaw, WA Ruth Richards
Comment

First Name Timi Last Name Brooks
Street Address 41430 305th Ave SE
City Enumclaw WA Timi Brooks
Comment I feel gated communities would be greatly beneficial to our community.

First Name SHANNON Last Name CAMPBELL
Street Address 24815 SE 372ND ST
City ENUMCLAW WA
Comment

First Name Carol Last Name Meeks Carol Meeks
Street Address 48633 282nd Ave SE
City Enumclaw, WA
Comment

Desire for Gated Community in Enumclaw

We, the current/future residents of Enumclaw, WA are interested in having a gated community in our town.

Some of the reasons we feel that a gated community in Enumclaw will be beneficial:

1) There are many homebuyers of all ages who desire the peace and sense of security that is provided by living in a gated community. Some buyers have purchased homes in other towns which have gated communities or on land with gates because there is currently not a gated community in Enumclaw.
2) Crime would be cut down due to the homes being less convenient to thieves and a gate will limit the access to thieves, making it harder or less convenient for them to case out the community for crime.
3) Traffic and speeding cars will be reduced, making for a quieter neighborhood and safer place for children to play and ride bicycles.
4) Soliciting will be cut down in the neighborhood.
5) Property values will be higher due to the desire to own in a gated community.

We hope that you can see the benefit and desire to allow gated communities in Enumclaw.

First Name Dennis Last Name Anderson
Street Address ~~2~~ 27008 SE Mud Mountain Rd.
City Enumclaw, WA 98022 Dennis Anderson
Comment

First Name Paula Last Name Anderson
Street Address 27008 SE Mud Mt Rd
City Enumclaw, WA WPAnder
Comment

First Name Brian Last Name McIntosh
Street Address 3058 Elmont Ave
City Enumclaw, WA
Comment

First Name
Last Name
Street Address
City , WA
Comment

Desire for Gated Community in Enumclaw

We, the current/future residents of Enumclaw, WA are interested in having a gated community in our town.

Some of the reasons we feel that a gated community in Enumclaw will be beneficial:

1) There are many homebuyers of all ages who desire the peace and sense of security that is provided by living in a gated community. Some buyers have purchased homes in other towns which have gated communities or on land with gates because there is currently not a gated community in Enumclaw.
2) Crime would be cut down due to the homes being less convenient to thieves and a gate will limit the access to thieves, making it harder or less convenient for them to case out the community for crime.
3) Traffic and speeding cars will be reduced, making for a quieter neighborhood and safer place for children to play and ride bicycles.
4) Soliciting will be cut down in the neighborhood.
5) Property values will be higher due to the desire to own in a gated community.

We hope that you can see the benefit and desire to allow gated communities in Enumclaw.

First Name Tami Last Name Harris

Street Address 28118 SE 456th St.

City Enumclaw, WA Tami Harris

Comment I currently have clients looking for gated and/or retirement type community in Enumclaw with nothing to show them. Also have a parent looking for same - struggling to find her anything as wel

First Name Todd Last Name Huizenga

Street Address 28930 SE 392ND St.

City Enumclaw, WA [signature]

Comment MUCH NEEDED! to provide diversity in our town. Growth is all around Enumclaw and we need to support our "Bedroom community" status.

First Name________________ Last Name________________

Street Address________________

City________________, WA

Comment________________

First Name________________ Last Name________________

Street Address________________

City________________, WA

Comment________________

March 11, 2016

Dear Juanita

I would like to share my views in regards to gated communities in Enumclaw. I am a Realtor that has been selling properties in Enumclaw for over 30 years. One thing that has been consistent over the years is the requests for homes in a gated senior living community. Seniors are looking for the small ramblers 1000-1200 sq. ft. on small lots. A place they feel safe and secure. When my clients could not find a place to call home in Enumclaw they went to other communities.

In my opinion it is not just about the loss of revenue to the city, it reflects the City of Enumclaw's refusal to see the bigger picture. Having gated communities in Enumclaw does not have to be a bad thing unless we make it a bad thing. It is time to step up and "See the bigger picture". Our world is changing whether we like it or not. As a community we should be able to meet the needs of

Please feel free to share my views with your fellow council members.

I will be at the meeting on Monday.

Paula Anderson

Windermere RE/Enumclaw

Chris Pasinetti

From: CORNEL and TRACI WHITFIELD <tlwhitfield1@msn.com>
Sent: Wednesday, April 13, 2016 1:46 PM
To: Chris Pasinetti
Subject: Re: Public Open House for the 2015/2016 Comprehensive Plan

Thanks Chris.

I am not sure of the correct forum to discuss my concerns, so I will tell you and you can let me know. I see a lot of documentation around the need for housing our seniors, but nothing about ADUs. My husband and I need to start caring for my parents full time and the ADU requirements are so strict that we are going to be forced to sell our house and buy a new one that has an existing ADU (in another city) because with our main house square footage we cannot accommodate an ADU (with the 40% sq ft restriction). We have lived in our house 11 years and it is very disappointing to have to leave it. It seems that if the community plan is seriously concerned with housing our senior population, we should be encouraging ADUs as one of the best options. I believe providing onsite multi-generational family care is a much better option than building new elder homes. That is what city of Seattle is encouraging and King County ADU/ALQ rules allow much more flexibility than our City.

Is this something for the upcoming meeting?

Thanks,

Traci

Sent from my iPhone

On Apr 13, 2016, at 1:00 PM, Chris Pasinetti <CPasinetti@ci.enumclaw.wa.us> wrote:

> Sorry about that! The website went through an update and the link should be working now!
>
> Thank you!! If you have any questions you are welcome to call anytime!
>
> **Chris Pasinetti, AICP**
> Interim Community Development Director
> City of Enumclaw
>
> cpasinetti@ci.enumclaw.wa.us
> tel. (360) 615-5726
> fax (360) 825-7232
>
> ---
>
> **From:** CORNEL and TRACI WHITFIELD [mailto:tlwhitfield1@msn.com]
> **Sent:** Tuesday, April 12, 2016 12:46 PM
> **To:** Chris Pasinetti <CPasinetti@ci.enumclaw.wa.us>
> **Subject:** Re: Public Open House for the 2015/2016 Comprehensive Plan
>
> The link to additional details below- second bullet is not working. Takes you to an error page on the city of Enumclaw site.

Looking forward to learning more.

Thank you,
Traci Whitfield

Sent from my iPhone

On Apr 12, 2016, at 11:20 AM, Chris Pasinetti <CPasinetti@ci.enumclaw.wa.us> wrote:

Hello,

You are invited to a Public Open House for the City of Enumclaw 2015/2016 Comprehensive Plan Amendments on April 18, 2016 from 6:00 pm to 8:00 pm at the City Hall Council Chambers located at 1339 Griffin Avenue, Enumclaw. The Comprehensive Plan contains the community's vision for its future and sets policy and guidance to achieve that vision. In addition to the future vision, the plan also includes "Elements" that address a wide range of topics including land use, housing, transportation, capital facilities and utilities, parks and recreation and economic development. The Open House is an informal opportunity to review the proposed changes to the City's Comprehensive Plan, the materials, make comments and get information on how you can participate in the process.

Here are some links to learn more about the Comprehensive Plan, the amendment process and other relevant information.

- Open House Public Notice ***here*:** http://cityofenumclaw.net/DocumentCenter/Home/View/1970
- 2015/2016 Comprehensive Plan Amendment Page. This page includes back ground information on the Growth Management Act, Update Schedule, Public Participation Program and DRAFT Comprehensive Plan Amendments ***here*:** http://cityofenumclaw.net/479/3857/2015-Comprehensive-Plan-Update

If you have comments, you can email those to compplan@ci.enumclaw.wa.us or they can be mailed to 1309 Myrtle Avenue, Enumclaw WA, 98022. ATTN: Chris Pasinetti.

Thank you! We look forward to seeing you at the open house!

Chris Pasinetti, AICP
Interim Community Development Director
City of Enumclaw

cpasinetti@ci.enumclaw.wa.us
tel. (360) 615-5726
fax (360) 825-7232

Linda Marie Rude
311 Florence Street
Enumclaw, WA 98022
April 25, 2016

Mayor Liz Reynolds
1309 Myrtle Avenue
Enumclaw, WA 98022

Dear Mayor Liz Reynolds,

I attended the Comprehensive Planning meeting on April 18, 2016 and you expressed the importance of creating a long-term vision for the community of Enumclaw. I concur with you and believe that the city of Enumclaw is at a critical junction in terms of housing development within the city limits. It is not possible for Enumclaw to retain its charming character if housing developments are not well-conceived to reflect existing homes and neighborhoods. Large, uninspired housing developments do not reflect the character of Enumclaw and certainly do not support the stated vision and goals of the council.

The council's strategic plan declares two important goals as a vision for Enumclaw. The first is "to attract one or more senior communities with high quality housing amenities." The second is "to encourage and attract upper middle income residential development." My husband and I seriously looked in Enumclaw for seven years until a rambler in a quiet well-maintained neighborhood within walking distance of downtown came on the market; a home in which we could hopefully live independently for the next twenty years. There is a need for quality homes on one level for seniors who are down-sizing and have a desire to live in a small, safe and charming community.

We have heard that the property for sale at 26XX Kibler Avenue MLS# 865124 is being considered for 30 homes on 7.0706 acres. It is apparent that the R2 zoning regulations are not consistent with the stated goals of the council. It appears that the intent of the builder is to construct the maximum number of two-story homes that zoning will allow. This proposal does not align with the council's declared goal and "long-term vision". In order to appreciate the impact that 30, two-story, uninspired homes would have on the existing neighborhoods, I urge you to walk the quiet streets of McHugh, Garfield/Loraine, Florence (both sides), Perry Court, Kibler, and Gossard. These are some of the charming neighborhoods that make Enumclaw so desirable and it would be a big mistake to repeat a development very similar to Sun Top in the center of these neighborhoods. It is critical to retain the character of Enumclaw by setting standards that are compatible with existing neighborhoods and are consistent with the image and vision for Enumclaw. There are quality builders who share your vision.

Another concern is that Florence Street was not designed for high volume traffic that 30 additional homes (60+ cars) would generate between McHugh and Griffin. Harding Street currently safely supports traffic between McHugh to Griffin. Harding is appreciatively wider than Florence Street and has curbs and sidewalks to protect pedestrians. Florence Street on the south end does not have curbs and sidewalks that run the length of the street. McHugh is very narrow with no curbs or sidewalks. The route west or north from the north end of Florence Street leads to McHugh down a very narrow one-lane country road with no shoulder. The safety hazard and negative impact to the homes that closely hug McHugh should be considered. These are important facts to be evaluated when deciding the number of new homes to be built in this area.

The development of the Kibler property offers the council the potential to demonstrate that you support your vision statement. Enumclaw is still a town where people say hello and wave, a community where families go back generations. I am asking the council for careful and thoughtful consideration as to the size and quality of the project. It is your responsibility to take into consideration the concerns of the citizens who are already contributing members of the community. If a 30- home development for Kibler is approved, the council will be responsible for destroying the character of the surrounding neighborhoods. Enumclaw is experiencing growth and what Enumclaw will look like in the future is your individual decision and that of the council as a whole. The desirable charm and livability of Enumclaw could easily disappear if this and similar housing projects are not planned to protect existing homes and the essence that makes Enumclaw so special. A vision statement is meaningless words on paper if not supported with commitment.

Sincerely,

Linda Marie Rude

Linda Marie Rude

cc: Morgan Irwin, Council Member
cc: Kimberly Lauk, Council Member
cc: Mike Sando, Council Member
cc: Chance La Fleur, Council Member
cc: Juanita Carstens, Council Member
cc: Jan Molinaro, Council Member
cc: Hoke Overland, Council Member
cc: Chris Pasinetti, Community Development

Chris Pasinetti

From: Karen Walter <KWalter@muckleshoot.nsn.us>
Sent: Thursday, March 31, 2016 7:15 AM
To: Chris Pasinetti
Subject: FW: SEPA Notice for the 2015/2016 Comprehensive Plan Amendments, Project No. 16097
Attachments: image002.jpg

Chris,
With respect to Enumclaw's 2015/2016 Comprehensive Plan Amendments and the associated SEPA notice, we have some questions and comments as noted below in the interest of protecting and restoring the Tribe's treaty protected fisheries resources:

1. There appears to be some discrepancies between the stream/habitat; fish and wildlife; and stormwater maps. Over the years, we have noted to the City via various projects that several of the ditches in the City likely support salmon due to their proximity to streams, low gradient, and bankfull width and a lack of natural barriers. Coho salmon, in particular, use ditches throughout WRIAs 8, 9 and 10 during flood events and high flows because these areas have lower velocities and provide refuge. The City should consider any ditch, modified stream or channelized wetland with flow that is at least 2 feet wide at bankfull and less than 16% gradient to be potential fish bearing waters based on WAC 222-16-031.

2. What version of Ecology's Surface Water Management Design Manual is the City using? How has LID been incorporated into the City's stormwater regulations?

We appreciate the opportunity to review this proposal and look forward to the City's responses.

Thank you,
Karen Walter
Watersheds and Land Use Team Leader

Muckleshoot Indian Tribe Fisheries Division Habitat Program
39015 172nd Ave SE
Auburn, WA 98092
253-876-3116

From: Cathy Burbank [CBurbank@ci.enumclaw.wa.us]
Sent: Wednesday, March 16, 2016 9:12 AM
To: Century Link-Network Real Estate West; City of Buckley; Comcast, Bill Walker; Department of Archaeology & Historic Preservation (sepa@dahp.wa.gov); Department of Fish & Wildlife; Dept of Ecology SEPA; DFW - Larry Fisher; DNR; DOE; Enumclaw School District; Randy Fehr; Fred Brune; King Co Housing & Community Development; King Co Road Services Div; King Co Road Services Div; King Co Road Services Div; King Co Road Services Div; King County Historic Preservation Program; King County Metro Transit; Laura Murphy; Karen Walter; Mike Middleton; PSCE; PSE; Puget Sound Regional Council; WA State Dept of Commerce; Washington State DSHS Lands and Building; WS Parks and Recreations Commission; WSDOT; WSDOT NWR
Cc: Chris Pasinetti
Subject: SEPA Notice for the 2015/2016 Comprehensive Plan Amendments, Project No. 16097

Notification for the City of Enumclaw SEPA DNS for the 2015/2016 Comprehensive Plan Amendments. You can download the document on the city's website here: http://cityofenumclaw.net/435/Public-Notice

If you have any questions or comments please email Chris Pasinetti at
cpasinetti@ci.enumclaw.wa.us<mailto:cpasinetti@ci.enumclaw.wa.us> “

[cid:image002.jpg@01D17F63.F8433920]

Cathy Burbank
Community Development
cburbank@ci.enumclaw.wa.us
360-825-3593 ext 5720

Chris Pasinetti

From: Julia Fluss Ubbenga <jjjjjseclaw@yahoo.com>
Sent: Tuesday, April 19, 2016 2:55 PM
To: Chris Pasinetti
Subject: Great Meeting!

Hi Chris,
That was a great format in the Open House last night. It answered my questions. Now I have more.
What could be done to not allow gated communities here? I think that goes against the sense of community we have here. If outer lying areas have them, fine. In the city limits we need traffic options and no gated communities.

Thanks,
Julia Ubbenga
Sent from my Verizon Wireless 4G LTE DROID

STATE OF WASHINGTON

DEPARTMENT OF COMMERCE

1011 Plum Street SE • PO Box 42525 • Olympia, Washington 98504-2525 • (360) 725-4000

www.commerce.wa.gov

April 20, 2016

Mr. Chris Pasinetti
Interim Community Development Director
1309 Myrtle Avenue
Enumclaw, Washington 98022

RE: Proposed amendment to the City of Enumclaw's Comprehensive Plan

Dear Mr. Pasinetti:

Thank you for sending Growth Management Services the proposed amendments to Enumclaw's comprehensive plan that we received on March 17, 2016, and processed with Material ID No. 22183. We appreciate you completing and submitting Commerce's Update Checklist as it makes our review much more efficient. We are impressed with the overall quality and organization of the comprehensive plan. Please consider the following comments as you proceed with the adoption process.

We especially like the following:

- The document includes an informative history of Enumclaw.
- Tables, graphics and maps are clear and easy to understand.
- The Capital Facilities Element provides a thorough review of available financial resources and establishes clear criteria to help prioritize proposed projects. The plan includes an analysis of facility needs beyond the first six years.
- The Housing Element provides excellent housing and demographic data.

We have concerns about the following that you should consider before you adopt your plan amendments:

- The comprehensive plan describes Enumclaw as a "rural community" where the "rural quality of life" is expressed as being very important to its residents. The Land Use Element addresses this view by supporting large lot zoning along the north and west perimeter of the city's urban growth area (Policy 3.1) and zoning standards with lower densities and larger setbacks (Policy 3.2).

  We encourage the City to carefully consider these policy decisions, in particular how they relate to the cost of providing facilities and services. Lower density development results in lower property tax receipts without a corresponding decrease in the cost of providing services. Prior to adopting these policies we suggest conducting a simple fiscal analysis comparing various development densities. Further, we recommend looking beyond the 20-

year time frame of the comprehensive plan to consider where growth will occur. Allowing rural development on the fringe of the existing urban growth area may create a rural/urban "leap-frog" development pattern in the future.

Congratulations to you and your staff for the good work these amendments represent. If you have any questions or concerns about our comments or any other growth management issues, please contact me at 509.795.6884. We extend our continued support to the City of Enumclaw in achieving the goals of growth management.

Sincerely,

Scott Kuhta

Scott Kuhta
Senior Planner
Growth Management Services

SK:lw

cc: Jeffrey Wilson, AICP, Senior Managing Director, Growth Management Services
David Andersen, AICP, Eastern Region Manager, Growth Management Services
Ike Nwankwo, Western Region Manager, Growth Management Services

COMMENTS

? SINGLE FAMILY ATTACHED CLASSIFICATION
VS
Condo CLASSIFICATION

EASIER & higher VALUE w/ SINGLE FAMILY ATTACHED

How does promoting gated communities fit in with the idea of "building community"

- Good transportion plan - connecting the community
- Is this inconsistent with a reversal of the "no private streets" policy? And gated communities
- Why the requirement in the gated communi for 3-Car garages, big lots, big houses? Prescribed landscap
Is this what the community wants or the developers?

John Anderson
24921 SE 448th St.

Comments

- Affordable housing for young families

COMMENTS / Questions?

Private Streets?

Gated Communities?

Traffic & Street Connectivity?

Housing Affordability? ? WHATS $ AFFORDABLE

272 K IS MEDIAN FO Enumcla

- HIGH END HOUSING = $? WHAT IS THAT?
- SR. HOUSING
  - subsidized
  - COTTAGE
  - ASSISTED
  - ACTIVE RETIREMENT

Chris Pasinetti

From:	John and Doreen Anderson <enumclaw@eskimo.com>
Sent:	Wednesday, May 18, 2016 9:40 AM
To:	Chris Pasinetti; _Council Members; Liz Reynolds
Subject:	Re: Enumclaw Comprehensive Plan--Gated Community Section

To: City of Enumclaw Planning Commission members and staff

CC: City of Enumclaw City Council members, mayor, and staff

From: John Anderson
24912 SE 448th St, Enumclaw
enumclaw@eskimo.com

RE: Enumclaw Comprehensive Plan--Gated Community Section

I have read the proposed update for the Enumclaw Comprehensive Plan and want to thank the members of the Planning Commission, staff, and others who have put so much thought and effort into this document. I am aware it is a difficult task to integrate the wishes of a community having diverse viewpoints with Washington's Growth Management Act.

I am particularly impressed with the plan for transportation, including sections that promote connectivity among neighborhoods and the downtown core with a network of trails and sidewalks. These infrastructure developments make the town inviting to residents, visitors, and new homeowners.

The one area of concern I have with the plan is with the gated developments. Here are the issues I see:

1. Gated developments appear to thwart the goal of connecting the community.

In fact, they isolate rather than connect. Insiders have their own neighborhoods, recreational facilities, and parks. Outsiders must route themselves around these enclaves to travel about the city.

2. Required three-car garages and minimum house and lot sizes obviously target only high-income buyers and thwart the goal of a mixed community.

A number of enclosed, homogeneous complexes are not a mixed community.

3. Enumclaw is a unique town with a unique history. One of the city policies that has fostered interaction among diverse neighbors is the "No private streets" ordinance.

It was enacted for a purpose. Obviously, that policy will have to be abandoned if gated developments are permitted.

4. As part of the city's plan for connectivity, it has a grid system for its streets. A patchwork of gated developments will wreak havoc with the grid.

5. A market-driven approach is the antithesis of a plan.

A plan is a method of creating a preferred future, based upon the desires of the townspeople. The market-driven approach takes Enumclaw in directions based on what happens to be selling a particular time, and leaves permanent structural changes.

The proposed Comprehensive Plan dealing with gated developments assumes that the kind of new housing the City promotes should be market driven. That high-end buyers (the stated target group of this section) willing to live this far from upper-level employment would be seeking a housing tract, gated or not, is a questionable assumption. But even if they would, that is not the point. We should be creating the kind of town we want, not one they want. We can choose to be an open or closed community, and others who would be happy with our plan would be welcome to move here.

I am very supportive of the proposed revisions to the Enumclaw Comprehensive Plan but would suggest deleting the section on gated communities.

Chris Pasinetti

From: k J <Jensen-sg@hotmail.com>
Sent: Tuesday, May 24, 2016 11:34 AM
To: Chris Pasinetti
Subject: Re: Mobile Home zoning change

We respectfully request to keep our RMHP zoning on our property.
The property is off of Mountain View Drive.
Karen Jensen

From: Chris Pasinetti <CPasinetti@ci.enumclaw.wa.us>
Sent: Monday, May 23, 2016 8:12 AM
To: k J
Cc: Scott Woodbury; Jeff Lincoln
Subject: RE: Mobile Home zoning change

Hello,

I'm replying in regard to your email and wanted to ask is this comment is referring to the Comprehensive Plan? Also, which Mobile home park are you referring too?

Currently, at this moment the proposed zoning map does not show a change from the Residential Mobile Home Park (RMHP), however there is a policy in the plan that states: "*Since manufactured homes are no longer restricted to the RMHP zone, Residential Manufactured Home Park zoning should be applied only to existing parks, not vacant properties." Policy 5.5*

So existing parks would remain zoned for such uses.

Thank you, please call if you have any questions.

Chris Pasinetti, AICP
Interim Community Development Director
City of Enumclaw

cpasinetti@ci.enumclaw.wa.us
tel. (360) 615-5726
fax (360) 825-7232

From: k J [mailto:Jensen-sg@hotmail.com]
Sent: Saturday, May 21, 2016 12:39 PM
To: Scott Woodbury <SWoodbury@ci.enumclaw.wa.us>; Chris Pasinetti <CPasinetti@ci.enumclaw.wa.us>; Jeff Lincoln <JLincoln@ci.enumclaw.wa.us>
Subject: Mobile Home zoning change

We do not want nor did we ask for change of zoning for our mobile home park. Please do not change this zoning.
Respectfully,
Karen Jensen

Chris Pasinetti

From: k J <Jensen-sg@hotmail.com>
Sent: Saturday, May 21, 2016 12:48 PM
To: Scott Woodbury; Jeff Lincoln; Chris Pasinetti
Subject: Vacate road

We are requesting that you change the road from public to private.
The road is not in and we have access from both sides and prefer it not be a public roadway.
The public does not benefit in making it public in the future.
It is all on our industrial property and has always been gated.
The parcels are: 192007-9133, 9144 & 9145
Thank you,
Karen Jensen

Comp Plan

From: John and Wendy Santamaria <santamariajw@gmail.com>
Sent: Wednesday, May 25, 2016 1:13 PM
To: Comp Plan
Subject: Zoning Change

We propose that the CB2 zone be extended to include the building located at 1110 Marshall Ave.

CB1 zoning is prohibitive to revitalizing downtown as it restricts new business from being created in existing buildings because it requires them to provide off street parking where none existed before.

The building located at 1110 Marshall Ave. was built in 1927 and is included in the Historic Property Inventory Report from the WA State Dept. of Archaeology and Historic Preservation and is considered eligible for the National Historic Register.

There are four public parking lots along Railroad Street, between Marshall and Stevenson, and all are within walking distance of 1110 Marshall Ave. These lots have hundreds of parking spaces and are under utilized during daytime and evening business hours.

We are in the process of restoring the building and plan to put a craft brewery and tasting room in this location so that the citizens of Enumclaw can finally enjoy this much loved historic building that had been neglected for over 20 years.

Thank you for your consideration,
John and Wendy Santamaria

Enumclaw Comprehensive Plan Comment
Planning Commission Meeting, 5/26/2016
John Anderson

I am John Anderson from Enumclaw. We have the rhododendron garden on Roosevelt. There is a link to the garden website on the City site.

The citizens of Enumclaw should be grateful for your work on the proposed changes to the Comprehensive Plan. I do have reservations about the section on gated developments and have already emailed you some of my concerns, primarily that the enclosed housing tracts would thwart a stated goal of the Comprehensive Plan to enhance connections across the town, and because a market-driven approach is not a plan but the absence of one.

That email is in the your packet, but I would like to make a further point. One of the comments supporting the gated developments argues that our neighbors are doing it and we shouldn't be left behind. I would counter that we are a unique community. We should capitalize on our own assets and not try to imitate neighbors whose circumstances are very different from ours. What we have is a distinct downtown surrounded by nearby neighborhoods. What we don't have are proximity to major employment clusters and vast tracts of land inside the city limits.

Compare our situation to two of our neighbors, Bonney Lake and Black Diamond. Practically speaking, Bonney Lake is an area, not a town. It is a suburban housing region with a highway through the center, but no real downtown. What they do have is ample acreage for mega-development. And commute times are considerably shorter than in Enumclaw.

Black Diamond also has the shorter commute and the land for mega-development. Like Enumclaw, Black Diamond had a central core and a real sense of community. But that community has been divided by the prospect of market-driven development. I am sure you are aware of the turmoil there among both citizen and government factions.

Enumclaw should not try to replicate our neighbors. We cannot shorten the commute from here, and the scale of our developments will certainly be dwarfed by what see or will see in these other places. What we can do is take advantage of a unique asset--a downtown core connected to adjacent neighborhoods. Why would people want to drive the extra distance and move to Enumclaw to live behind a gate when they could find the same thing much closer to work? But many would choose Enumclaw because it offered something very different, something they couldn't find elsewhere.

A goal of the Comprehensive Plan is to build connections across Enumclaw neighborhoods and with the city center. Targeting high-end homebuyers and enclosing them in exclusive locations would run counter to the goal of connecting the community. Such a strategy would create insiders and outsiders and divide our unique town instead.

You have worked hard to create a forward looking plan. Except for one paragraph, the 162-page document offers a coherent vision for the future of a special town. I urge you to drop the gated development section of an otherwise well-crafted Comprehensive Plan.

CITY OF Enumclaw

Leave a comment: I WOULD LIKE TO REGISTER MY SUPPORT FOR THE ANNEXATION OF "BIG WEST." THANKS!

Optional:

Name: JOE NANAVICH

Address: 23332 SE 448th ST

Email: jnanavich@gmail.com

Return to:

Chris Pasinetti
Community Development
1309 Myrtle Ave
Enumclaw, WA 98022

Or email comments to: compplan@ci.enumclaw.wa.us

CITY OF Enumclaw

Leave a comment:

I would like to just see Enumclaw remain as Enumclaw. It has the historic, rural, and community atmosphere that draws people such as myself.
(No agenda!)

Optional:

Name: Julia Fluss Ubbenga

Address: 1286 McKinley St. Enumclaw

Email:

Return to:

Chris Pasinetti
Community Development
1309 Myrtle Ave
Enumclaw, WA 98022

Or email comments to: compplan@ci.enumclaw.wa.us

June 6, 2016

Chris Pasinetti, Director
Department of Community Development
City of Enumclaw
Stevenson/Yerxa Building
1309 Myrtle Avenue
Enumclaw, WA 98022

Subject: PSRC Comments on Draft Enumclaw Comprehensive Plan Update

Dear Mr. Pasinetti,

Thank you for providing an opportunity for the Puget Sound Regional Council (PSRC) to review a draft of the City of Enumclaw 2016 Comprehensive Plan update. We recognize the substantial amount of time and effort invested in this plan, and appreciate the chance to review it while in draft form. This timely collaboration helps to ensure certification requirements are adequately addressed and certification action can be taken by PSRC boards after adoption.

We would like to note the many outstanding aspects of the draft plan. Several particularly noteworthy aspects include:

- The plan supports VISION 2040's Environmental Stewardship policies with a Natural Environment chapter that addresses an integrated set of goals and actions around the issues of open space preservation and enhancement, water quality, and wildlife habitat. The plan establishes environmental quality as a core aspect of the community vision as a small city surrounded and enriched by rural and resource lands.
- The plan furthers VISION 2040's support for centers in all jurisdictions by identifying downtown Enumclaw as a focus for development and investment, building on a historic core that serves the city and surrounding area. Policies encourage new mixed-use and infill development and strategic expansion of the commercial core into adjacent areas, complemented by investments to improve walkability and policies to encourage compatible design in new development and a master planned approach to development that links the CBD to the SR 410 corridor.
- The plan furthers several key economic development initiatives that advance the VISION 2040's economic goals and are tailored well to the city's size, historic role, and rural setting, and were identified in a recently adopted Enumclaw Strategic Plan for Economic Development. These economic priorities include boosting employment in local-serving retail and services, in light industrial activities, and in tourism. Policy LU-14 is notable in supporting agro-tourism in the designated agricultural protection district.
- Goals and policies in the Community Development and Design, Land Use, and Transportation chapters support VISION 2040's emphasis (see MPP-T-23 and 24) on promoting options for travel other than the single-occupant vehicle. Improving the built environment for walking and bicycling is an emphasis of policy and implementation actions across several plan chapters,

especially expanding the network of high quality pedestrian routes in and around the downtown, as well as extending multi-use trail facilities.

The draft comprehensive plan advances regional policy in many important ways. There are some items, however, that should be addressed before the plan is finalized:

- VISION 2040 calls for local plans to include a context statement that describes how the plan addresses regional policies and provisions in VISION 2040. The Enumclaw draft plan does not currently discuss the relationship of local planning to regional policies and strategies. The plan should be revised to include a full context statement and reference key provisions of regional plans, including the Regional Growth Strategy and the role of Enumclaw as a Small City. Examples of context statements are provided in PSRC's Plan Review Manual, page 2-1.
- VISION 2040 (see MPP-DP-49) calls for local policies that promote development that is "built at higher performing energy and environmental standards." MPP-En-5 promotes development that is located, designed, and constructed to reduce impact on natural features and environmental quality. To further this regional direction, the draft plan includes policies on the environment that should be strengthened to address MPP-En5 and DP-49 and include provisions to encourage low-impact development practices.
- VISION 2040 sets as a goal that the region will achieve future air quality that is better than exists today. MPPs En-17 through En-19 call on regional and local policies to support or exceed existing air quality standards, promote actions to reduce toxins, fine particulates, and greenhouse gases, and pursue a full range of approaches to further clean transportation. Additionally, page 42 of VISION 2040 provides an overview of climate change and related policies and page 34 in Transportation 2040 for information on the four-part greenhouse gas reduction strategy (land use, user fees, choices, and technology).The draft plan does not explicitly address air quality standards and only a limited reference to climate change policy is included in a single policy, T-4.8. The final adopted plan should include one or more policies stating support for actions to meet or exceed federal and state air quality standards. The draft plan should also be revised to more fully incorporate policies and actions to mitigate climate change impacts. One recommended approach is to add an air quality and climate change goal with policies to the Natural Environment chapter, including language incorporating Enumclaw Resolution No. 1399 (Greenhouse Gas Emissions Reduction Policy).
- Under the GMA and pursuant to VISION 2040 and the growth targets adopted in the King County Countywide Planning Policies, the City of Enumclaw is required to plan for 20 years of housing and employment growth. Consistent with the Regional Growth Strategy set forth in VISION 2040 and implemented by Transportation 2040, the King County targets for Small Cities, like Enumclaw, reflect modest amount of growth in new households and economic activity to meet local needs. Local plans are expected to align with the adopted targets. With adjustments to fit the targets to a 2010-2035 planning period, Enumclaw is expected to grow by 1,551 housing units and 853 jobs. The draft plan documents well the countywide targets and development capacity accommodated by planned land uses. The plan also includes assumptions for future households and jobs for the purpose of estimating future transportation demand, which are based on data provided by the PSRC, including future growth forecasts that are somewhat higher than the adopted targets. In order to clarify the plan's alignment with adopted targets and the Regional Growth Strategy, the follow revisions are recommended:
    - Address future growth assumptions, targets, and forecasts consistently throughout the plan. Specifically, pages 14 and 15 in the Introduction correctly provide background on the targeted growth levels, but also present additional trend data as a basis for arriving at a "forecast for this plan" that results in greater population in the year 2035 than indicated in either the growth targets or in the land use assumptions documented in the

Transportation chapter. Since it is not apparent that the forecast population of 15,996 in 2035 is used to guide land use and investments in the plan, including this information creates some confusion about how much growth the city is planning for. We recommend removing it from the document or re-characterizing the trend analysis as background rather than policy.

  - Pages 58-59 in the Transportation chapter documents land use assumptions used in forecasting future transportation demand resulting from implementation of the plan. Based on documentation provided by city staff, the source of these figures is the Land Use Targets Maintenance Release 1(PSRC, 2014). The data indicate future residential growth that generally aligns with the adopted housing targets for the city. The data on future employment reflects modestly higher growth that indicated in the targets. This difference appears larger in the text on page 58 and in Table 7, due to the inclusion of jobs in the construction/resources sector which are not included in the growth targets nor used to model future transportation demand. This section should be revised to 1) cite the source of the forecast data, 2) report consistent jobs totals that are consistent with the model inputs shown in Figure 3, and 3) adding text that indicates the city's intention to continue to work with PSRC and King County to improve alignment of future employment forecasts with adopted targets.

- The Housing chapter of the draft plan includes appropriate housing needs information and important policies that promote housing supply, diversity, and affordability. However, the plan should fully address housing goals and policies in the King County Countywide Planning Policies, especially policy H-1 stating goals for countywide and local provision of housing for low-income households. In addition, the plan could also address how the city intends to balance policies under Goal LU-6, calling for "upper middle income" housing with the plan's other housing goals and policies, including meeting the affordability needs of existing cost-burdened renters and seniors.

- GMA requires local comprehensive plans to include a bicycle and pedestrian component detailing existing conditions and future planned improvements. The draft plan should include a mapped inventory of pedestrian and bicycle facilities. Figure 6 on page 72 of the draft plan indicates the location of transportation system improvements, including "nonmotorized" improvements. The map and/or accompanying tables should be made more complete to indicate clearly the project name, description, and cost in an accompanying table.

- RCW 36.70A.070 requires local comprehensive plans, particularly the transportation element, to include a multiyear transportation finance strategy, complete with a 20-year project list, estimates of costs for new transportation infrastructure, estimated revenues to meet the costs of needed improvements over the life of the plan, and a reassessment strategy should revenues fall short of costs. Pieces of this requirement are addressed separately in the draft Transportation and Capital Facilities chapters, but the plan does not communicate clearly how the costs and revenues for transportation improvements compare nor does it identify what gaps in financial capacity may need to be addressed in the future. The plan should be revised to break out the transportation related components of all steps in this analysis, either through a redesign of how the information is presented in the Capital Facilities chapter, or by adding summary tables of the findings for transportation project costs and revenues, along with a discussion of reassessment steps, to the Transportation chapter.

PSRC has resources available to assist the city in addressing these comments. We have provided links to online documents in this letter, and additional resources related to the plan review process can also be found at http://www.psrc.org/growth/planreview/resources/.

Thank you again for working with us through the plan review process. There is a lot of excellent work in the draft and we are available to continue to provide assistance and additional reviews as the plan moves through the development process. If you have questions or need additional information, please contact me at 206-971-3289 or mhubner@psrc.org.

Sincerely,

Michael Hubner, AICP
Principal Planner
Growth Management Planning

cc: Review Team, Growth Management Services, Department of Commerce

Chris Pasinetti

From: Maureen Burwell
Sent: Friday, June 10, 2016 8:04 AM
To: _Council Members; Liz Reynolds
Cc: Chris Pasinetti; Chris Searcy
Subject: Comp Plan Communication

Council & Mayor Liz – a gentleman phoned me late yesterday (6/9) afternoon and asked that I send an e-mail to all of you as he is older and does not have a computer. So here are his (Greg Sender's) thoughts:

He expressed concern about allowing gated communities in Enumclaw. He is a senior citizen and walks throughout Enumclaw and noted many people of his age do the same – they do not want to go out of their way to walk around these developments. He feels that Enumclaw is already safe and secure and there is no need for gated communities in that regard. He also referred to a letter that he had just read in the Courier Herald by John Anderson and asked that you all read that letter. He expressed his thanks to all of you.

Maureen J. Burwell
City Clerk
City of Enumclaw
1339 Griffin Avenue
Enumclaw, WA 98022
360-615-5608

City Council Meeting 6.13.16

Public Comment Notes (Ryan Lundeen)

Commercial properties owned:	**1540 Cole Street, 1608 Cole Street, 1616 Cole Street, 1628 Third Street, 1633 Garrett Street**
Residential properties owned:	**1854 Hillcrest Ave, 1236 Wells Street, xxxx 266th Ave SE (1.7 ac)**
Primary residence:	**40130 292nd Ave. SE, Enumclaw, WA**
Businesses owned in Enumclaw:	**SPS (Stanley Patrick Striping Co.), Lundeen Properties LLC, The Historic Mint Restaurant & Ale House, The Local, Enumclaw Mint LLC**

WHY IT'S IMPORTANT TO HAVE THE RIGHT "MIX" ON COLE STREET & THE DOWNTOWN AREAS

- The "restaurant" business is very tough, and not everyone makes it (look at the statistics)
- The "retail" business is very tough; people struggle to stay open and compete with the big stores
- Other businesses bring people to restaurants & retail (ie. License agency, DDS offices, etc.)
- You want folks to come downtown to do "all" of their business- Enumclaw has a good mix of this

WHY A POTENTIAL CHANGE TO RETAIL/RESTAURANT ONLY WOULD 'NOT' PLEASE PEOPLE

- The private sector does not like government stepping in
- Trust your business owners - this is why Enumclaw is succeeding now. Not because of government
- Building owners being forced to lease to only qualified tenants will not be good for the City
- The potential for a lawsuit opens up for the City
- We have only been "thriving" downtown for a couple of years
- If a business is bad for downtown, it will fail and another will try
- Our business owners are smart
- Owners of several buildings may be forced to put in competition for their other businesses or tenants in other buildings (this would be terrible)
- Investors buy buildings with short-term and long term plans (the City doesn't know what those are) If the City wants to change things, the city should buy properties and lease to restaurants and retail only
- How many restaurants can our downtown support?
- More government is NEVER good
- How many building owners, downtown, would agree to this. Answer = none
- New building owners put their own money into revitalization projects and follow City standards and local building codes
- A historical district is a route the City should go
- Business owners and Citizens are growing tired of the City's ideas (downtown signage, the equestrian theme, the fairgrounds, the group that we paid for those studies - - nothing done)
- Business owners and Citizens do not trust the City's ideas on what Enumclaw needs

- Where do a majority of your sales tax revenues come from? I can tell you that a very, very large majority of your tax dollars come from "non-restaurant" & "non-retail" businesses.

CURRENT "NON-RETAIL" DOWNTOWN (COLE STREET ONLY)

- Greg Vesey Insurance (been established in Enumclaw for years)
- The Post Office
- The Courier Herald (built the building & cleaned up downtown; well established on the Plateau)
- Station 82 (where a lot of parents take their kids when they are having dinner or shopping)
- Tae Kwon Do Connection (established business, good clientele, good building owners)
- Dick's Barber shop (been in Enumclaw at different locations as long as I can remember)
- Enumclaw Chamber of Commerce
- Enumclaw Visitors Center
- The Shop (well established hair salon)
- Youth Center
- Senior Center
- Valley Cities (established business, just moved into Enumclaw; great building)
- Key Bank
- Bank of America
- Carl J. Sanders Construction (very established business owner and developer)
- James Johnson DDS
- Mike Reynolds, Attorney at Law (well established building & business owner & attorney)
- Enumclaw Vet Hospital (been there for years)
- Scott Decker DDS (well established business; prior owner also a dentist- been here for years)
- Tony Truax State Farm Insurance (been there as long as I can remember)
- HDGA Land Surveying (been there a long time; prior owner was also a land surveyor)
- EYFS (Enumclaw Youth & Family Services)
- Enumclaw License Agency (well established- brings a ton of people downtown)
- Farr Law Group (preparing to really clean up the corner of Cole & Myrtle)
- Rainier Foothills Wellness Foundation (well established; extremely important to Enumclaw)
- Dr. Harding DDS (very well established; currently expanding his practice)
- Edward Jones
- American Heritage Insurance (very established business man & community supporter)
- Enumclaw Medical Center

IDEAS FOR AN EVEN MORE VIBRANT DOWNTOWN

Close down streets for special events, directing visitors into city shops, restaurants & service providers

- Street fairs & wine walks do very well (last wine walk had record turn-outs)
- The Parades have always done great
- Ideas: downtown markets, street fair, carnival, festival, brew fest, pub crawl, block party

Allow & encourage summertime alley shutdowns. Create events, run by restaurants & bars

- Strings of lights between buildings, food and beverages outside, an Italian side street feel
- Permits currently available- businesses need to know it is possible

Create more land for development (properties review, remove land from unusable, take back land, etc.)

Make under-utilized public land available for private sector development

- Teaming with builders on mixed-use
- Ground leases

Create a permanent public market

Create a great downtown playground to make your downtown more kid-friendly and family-friendly

- Our parks are some of the most well-maintained in the state
- Ideas for a spray park, by the City, are good

Create a branded downtown entertainment district or "historical district"

- New signage; white signs, black lettering
- Painted downtown light poles, flower pots & trash cans (black)
- Stricter standards on remodels and new building development

Establish parking standards for new downtown developments & build a parking garage on City property

- The city should be worried about the parking downtown
- More businesses in retail and restaurants have created a greater need for parking

Set up a downtown bike share program

Perform a "downtown" S.W.O.T. Analysis (strengths, weaknesses, opportunities & threats)

Thank you, all for taking the time to consider a business-owners point of view on this. I strongly believe that the City would be making a huge mistake by limiting the types of businesses allowed in the downtown area. Essentially, we would be punishing our current business leaders for their success. I would ask that the council strongly consider their positions. One of the best traits of a successful business leader is to know when to let go; to know when to say "ok, that idea didn't work- we tried, but it's time to move on". We have all had poor business ideas. It's the ones that cut their losses that are still standing.

Yours truly,

Ryan P. Lundeen

20+ year Business Owner & Proud Enumclaw Resident

June 27, 2016

DATE RECEIVED
JUN 27 2016
CITY OF ENUMCLAW

Chris Pasinetti, AICP
Community Development Director
City of Enumclaw
1309 Myrtle Avenue
Enumclaw, WA 98022

Comp Plan Update – Cardoza Property at 24328 SE 440th Street

Dear Chris,

Thank you for the information regarding the City Comp. Plan update as it affects our property at 24328 SE 440th Street.

Our property is located at the SW corner of the intersection of 244th and Hwy 164 Auburn Enumclaw Hwy.

In addition, our property is fronted by 440th Street so there are major regional arterials that intersect on two sides and a County Street on a 3rd side of the subject property.

As a result, the property is impacted by high vehicle traffic patterns and is no longer highest and best use as residential property, due to traffic and other regional growth impacts that will increase in the future.

I am writing to express gratitude to you and the other City staff, Planning Commission, as well as the City Council regarding the proposed GO designation of our property in the proposed City Comprehensive Plan Update.

The letter is a request to please reconsider the proposed zoning for our property in the Plan to Neighbor Business (NB). We would like to utilize the property in the future as a Bakery and/or Tea Shop *which is allowed under the NB zoning designation but not permitted in the General Office (GO) zone.*

We appreciate this letter and request be made part of the record and support the Plan update as proposed with this requested change.

In the event the change from GO to NB is not possible, we would support the Comp. Plan update as proposed showing the subject property as GO zone in the update.

Thank you,

Rick Cardoza
24328 SE 440th
Enumclaw, WA 98022

Jamie Cardoza

CITY OF
Enumclaw

TO: the City Councle 20 years on plan Develoment

Leave a comment: I Feel that gated comuntys Are obsolete in this Digle Age we live in, our city is low crime. * We are around 7,800 now, will grow to 15,00 in 20 years. Home Alarms are very good. Our Police Deparment Respond very Rapidly in our town They are the Best Along with our medic care, as well as Fire Dep.

If we are 300,000 Then maby

3 car garages are fine if they fit on the lot, I have some whare I live.

Snow Birds cane use Alarms & safty Deposit

Optional: Boxes As they have ~~Befor~~ in the past

Name: Richard Smith

Address: 537 Borger Pl. Enumclaw

Email: None

Return to:

Chris Pasinetti
Community Development
1309 Myrtle Ave
Enumclaw, WA 98022

Or email comments to: compplan@ci.enumclaw.wa.us

City of Tacoma
Public Works Department

June 27, 2016

Mr. Chris Pasinetti
Community Development Director
City of Enumclaw
1309 Myrtle Avenue
Enumclaw, WA 98022

RE: Rezone of Parcel Number 2620060904

Dear Mr. Pasinetti,

The City of Tacoma respectfully requests that the City of Enumclaw consider a rezone of its property located at 560 State Highway 410 from Public Use District to Single Family Residential (SFR).

The 2005 comprehensive plan land use designation for this parcel (Parcel # 2620060904) is Single Family Residential. The 2011 and 2012 zoning maps also reflect SFR zoning. Therefore it has been our understanding that Tacoma Water's use, which was in support of its water utility operations, was a permitted non-conforming use. However, the 2015 zoning map reflects a Public Use District zoning.

Tacoma Water no longer has an operational need for this property, and has had it listed for nearly two years. The primary difficulty with selling it has been the zoning is inconsistent with the land use designation, and prospective buyers have been unwilling to accept the risk of a rezone and/or comprehensive plan amendment. We have reached out to other public entities, including the City of Enumclaw and the Enumclaw School District. We have also attempted to locate a buyer who would fit the criteria for public use, but have been unsuccessful. We currently have an offer from a buyer who would use it as a single family residence, and therefore are making this request in an effort to allow this property to be put to a higher economic use.

Thank you for your consideration of this request. Please feel free to contact me if you need any further information.

Sincerely,

Jennifer Hines
Assistant Division Manager

cc: Gloria Fletcher, Senior Real Estate Officer
Greg Volkhardt, Environmental Programs Manager
Linda McCrea, Tacoma Water Superintendent

Enumclaw Area Chamber of Commerce

Change Recommendations to the City of Enumclaw Comprehensive Plan

The Board of Directors of the Enumclaw Area Chamber of Commerce appreciates and supports the work of City Administration, Council and Staff on the City of Enumclaw Comprehensive Plan. The Chamber Board met on July 7, 2016, to formally endorse the latest draft of the Comprehensive Plan and approve the following fourteen change recommendations and one point of emphasis for consideration by the City Council.

Page 151 - The following goals and policies are those adopted in the Enumclaw Strategic Plan for Economic Development 2014-2018. The plan recognizes that a successful effort requires partnerships and collaboration with the private sector, the Chamber of Commerce, educational providers and other local organizations. The City will work with partners to implement these strategies. Some strategies will be implemented with City resources and it is expected that others will be led by other community organizations with City participation. This is intended to be a living document that the City will revisit and update annually to ensure that it continues to reflect the preferences of the citizens.

Chamber Recommendation: Detail out every tactic from the Enumclaw Strategic Plan for Economic Development Plan with a time table of completion.

Buy Local Campaign – 2014 *(Mentioned in Comprehensive Plan) 1.1*
Business Mentor List – 2015 *(Mentioned in Comprehensive Plan) 1.2*
Economic Development Website – 2015 *(Mentioned in Comprehensive Plan) 1.7*
Impact Fee Deferral – 2015 *(Mentioned in Comprehensive Plan) 1.4 and 2.2*
Construction Sales Tax Refund – 2015 *(Mentioned in Comprehensive Plan) 1.5 and 2.1*
Commercial and Industrial Zoning Code Amendment – 2014 *(Mentioned in Comprehensive Plan) 1.8*
Senior Community Zoning Code Amendment – 2016 *(Mentioned in Comprehensive Plan) 2.3*
Commercial Real Estate Marketing – 2016 *(Mentioned in Comprehensive Plan) 1.6*
Marketing to Hotel/Motel Developer – 2015 *(Mentioned in Comprehensive Plan) 4.1*
Marketing to Senior Community Developer – 2017 *(Mentioned in Comprehensive Plan) 2.4*
Small Business Counseling – 2014 *(Mentioned in Comprehensive Plan) 1.3*
Bed and Breakfast Zoning Code Amendment – 2015 *(Mentioned in Comprehensive Plan) 4.2*
Expo Center Events – 2014 *(Mentioned in Comprehensive Plan) 4.3*
Feasibility Study – Agricultural Food Product Incubator – 2016 *(Mentioned in Comprehensive Plan) 1.9 and 4.4*
Business Incubator – 2016 *(Mentioned in Comprehensive Plan)*
Support Art and Cultural Activities – 2018 *(Mentioned in Comprehensive Plan) 4.5*
Mt Rainier/Enumclaw Visitor Highway Signage – 2015 *(Mentioned in Comprehensive Plan) 4.7*
Food and Beverage Committee – 2015 *(Mentioned in Comprehensive Plan) 4.8*
EB-5 Immigrant Investor Program – 2014
***Note:* Chamber Board would like to know why this item was left out of the comprehensive plan?**
Mt Rainier National Park Schedule – 2014 *(Mentioned in Comprehensive Plan) 4.9*
Chinook Pass Schedule – 2014 *(Mentioned in Comprehensive Plan) 4.10*
Upper Middle Income Housing – 2015 *(Mentioned in Comprehensive Plan) 3.1*
Welcome Center – 2014 *(Mentioned in Comprehensive Plan) 4.11*
SR 410 Aesthetics – 2015 *(Mentioned in Comprehensive Plan) 4.12*
Tourism Marketing and Branding – 2015 *(Mentioned in Comprehensive Plan) 4.13*

Chamber Recommendation: The Comprehensive Plan should have updated timelines for the items identified in the Enumclaw Strategic Plan for Economic Development.

Page 23 – Paragraph 9.4 - Promote a walkable tourist friendly environment in the Downtown by requiring retail and restaurants uses at the street level of buildings and employment and housing to locate on upper stories
Chamber Recommendation: Provide clarification of the word RETAIL.

Page 21 – Paragraph 5.5 - 5.5 - Since manufactured homes are no longer restricted to the RMHP zone, Residential Manufactured Home Park zoning should be applied only to existing parks, not vacant properties.
Chamber Recommendation: Remove this paragraph from the Comprehensive Plan.

Page 34 – Paragraph 2.3 B - Master plan the area between the CBD and SR 410, identifying opportunity sites and creating a pronounced visual corridor between SR 410 and the CBD.
Chamber Recommendation: Clarify this paragraph.

Page 36 – Paragraph 4.3 C - Consider zoning or regulations that will allocate developer fees directly to walk and bike pathways.
Chamber Recommendation: Remove this paragraph from the Comprehensive Plan.

Page 36 – Paragraph - It may eventually become difficult to support our driving habits. Gasoline, insurance and other costs of automobile ownership may make it increasingly difficult to afford driving. If driving less is the rule, then urban landscapes will need to adapt to accommodate an increasingly pedestrian public. Empty parking lots would give way to more intense use of the land, surrendering to a more compact urban form. 4.4 A - Consider reducing or eliminating parking requirements, while balancing the needs of commuters, tourists and local businesses.
Chamber Recommendation: Remove this paragraph and 4.4A from the Comprehensive Plan.

Page 125 - Paragraph 5.5 and 5.6 –

5.5 - When avoiding wetland impacts is not feasible, safeguard the long-term biological function and value of the wetland through effective mitigation or wetland mitigation banking.

5.6 - In cases of small isolated, low-quality wetlands, consider opportunities for development flexibility, provided that mitigation can be provided to ensure no cumulative impacts to wetland quality and function
Chamber Recommendation: Reword 5.5 and 5.6 or remove from Comprehensive Plan. We believe that 5.8 gives enough clarification.

Page 125 - 5.8 - Consider allowing alterations to wetlands or buffers as needed to allow public agency or utility development projects that avoid, minimize and mitigate impacts to wetland functions to the maximum extent feasible (Make it match what is good for city in 5.8)
Chamber Recommendation: To preserve and protect our precious views, the Chamber supports a view tree ordinance.

Page 141 - Paragraph 1.5D - Development of a Community Center.
Chamber Recommendation: The City of Enumclaw should look to develop a community center with a private party.

Page 144 - EXPO Center
Chamber Recommendation: The entirety of the Expo Center facilities and acreage should be listed as both an existing local park (Table 9.2) and as an existing city recreational facility (Table 9.3).

Page 148-49 – Spray Park
Chamber Recommendation: The Chamber opposes a downtown spray park within the CBD.

Other Issue – High Traffic Areas
Chamber Recommendation: The Chamber opposes both roundabouts and meridians in high traffic areas.

Other Issue – Traffic Capacity of White River Bridge
Chamber Recommendation: A goal should be added to the Comprehensive Plan that encourages expansion of traffic capacity on the HW 410 Bridge over the White River.

Page 21. 6.1 - 6.2 - Gated Communities
Chamber Point of Emphasis: The Chamber is in support of the provisions for gated communities (Goal LU-6 and Policies 6.1 and 6.2) as written in the Comprehensive Plan.

Comp Plan

From: Terry Parker <terry_parker@enumclaw.wednet.edu>
Sent: Tuesday, May 24, 2016 9:59 AM
To: Comp Plan
Subject: Public Comment - City of Enumclaw Comprehensive Plan 2016

Hi Chris!

Thanks for the opportunity to discuss and review information about the City of Enumclaw Comprehensive Plan 2016 at the Open House event on May 16!

As a long-time citizen of Enumclaw, I would like to share my thoughts about Chapter 3 - Land Use Element.

I am particularly supportive of proposed Policy 6.1 "Define and create development standards and siting criteria for master planned senior communities for those age 55+ that include the following:..."

In short, we have so many active seniors in our community who are willing to give much back to Enumclaw in terms of time, expertise and resources. They need a network of (retired) friends and a secure neighborhood (gated) that provides a home base for their active lifestyle which often includes them being gone for weeks at a time. We need to keep these citizens in our town rather than losing them to other communities that may have their unique lifestyle/housing needs. As these citizens age, we need further transition to various types of medically assisted living facilities and service. This spectrum of services and housing from active, independent senior living to more intensive medically assisted support need not occur within the same facility.

I believe we have a number of other community leaders who similarly support the idea of master planned senior communities. A few years ago, I testified in favor of this issue to the Economic Development Plan Committee on behalf of the Enumclaw Rotary while serving as President of this service group.

I am also in support of proposed Policy 6.2 "Define and create development standards that allow gated communities as follows:..."

In my view, the opportunity for high-end development in our community is also much-needed and will attract new citizens to our beautiful South King County location. In addition, such development becomes an important economic driver that allows us to better support a wide variety of community services.

Again, thanks so much for this opportunity to comment in support of proposed Policies 6.1 and 6.2 as outlined in the City of Enumclaw Comprehensive Plan 2016.!

Sincerely,

Terry Parker

DATE RECEIVED

JUL 11 2016

CITY OF ENUMCLAW

Hello Chris Pasinetti,

My name is Robert (Bob) Martinson. I am the legal owner of the property at 23904 SE 436Th Street Enumclaw, Wa. 98022.

I am writing this letter per our telephone conversation on Thursday July 7th 2016.

My concern is, why my property was not included in the Comprehensive Plan. You seemed to agree that it seemed odd that my property, and I believe you said two others, were not included, while the rest of the street was. Was this a mistake? As of yet there are no answers as to why.

Other questions that come to mind are, 1. If sewer and other services from the city are extended to the rest of the street, will I be able to hook up? 2. Law enforcement. Would we still have County law enforcement, while people next door will have City Police. The response time for the City would probably be faster than the current County response. There has already been an issue where he Fire Dept. was wrong on outdoor burning laws between the addresses.

I would prefer to be included in the Comprehensive Plan, so I ask to amend the Comprehensive Plan to include my property in becoming part of the City of Enumclaw.

I ask you to please forward this letter to the proper parties, if need be, that can move this request forward.

Thank You,

Robert Martinson
Robert Martinson
360-825-2133
253-261-7834
7/10/2016

Chris Pasinetti

I am Helen Boisjolie. I own the property located at 2054 Roosevelt Ave. This property is presently zoned R-3, Mixed Residential, which does not allow for Multifamily Residences.

On this property are three building housing 14 rental units, a building equipped with a laundry facility and workshop and a 4 unit metal storage being used by 4 of tenants for storage. The tax records show that the land use of this property is Apartment.

I feel that this zoning should be changed to R4, Multifamily Res, which would allow these units to be legally on this property.

This property is not conducive to single family units as the property bordering on the South has the Enumclaw Wellness Center and another building housing a Chiropractor, a Dentist and a Physical Therapist. To the East is Cole Street. Located across the street on Cole is US Bank and Auto Zone. Roosevelt Ave borders the property on the North. On the first block to the West on Roosevelt, the corner lot is a 4-plex, then Runland Convenience Store, a duplex is next and across the street is a 10 unit rental building. On the second block you have 2 houses that are not zoned R3, a business housing Roosevelt Automotive & Exhaust, DC Sidecar and 2 other businesses, a six-plex is next and 3 other multi units. This brings us to Martin Way which is all Multi-units.

I have had several people approach me who are interested in purchasing the property but have withdrawn when they find that the zoning is R3.

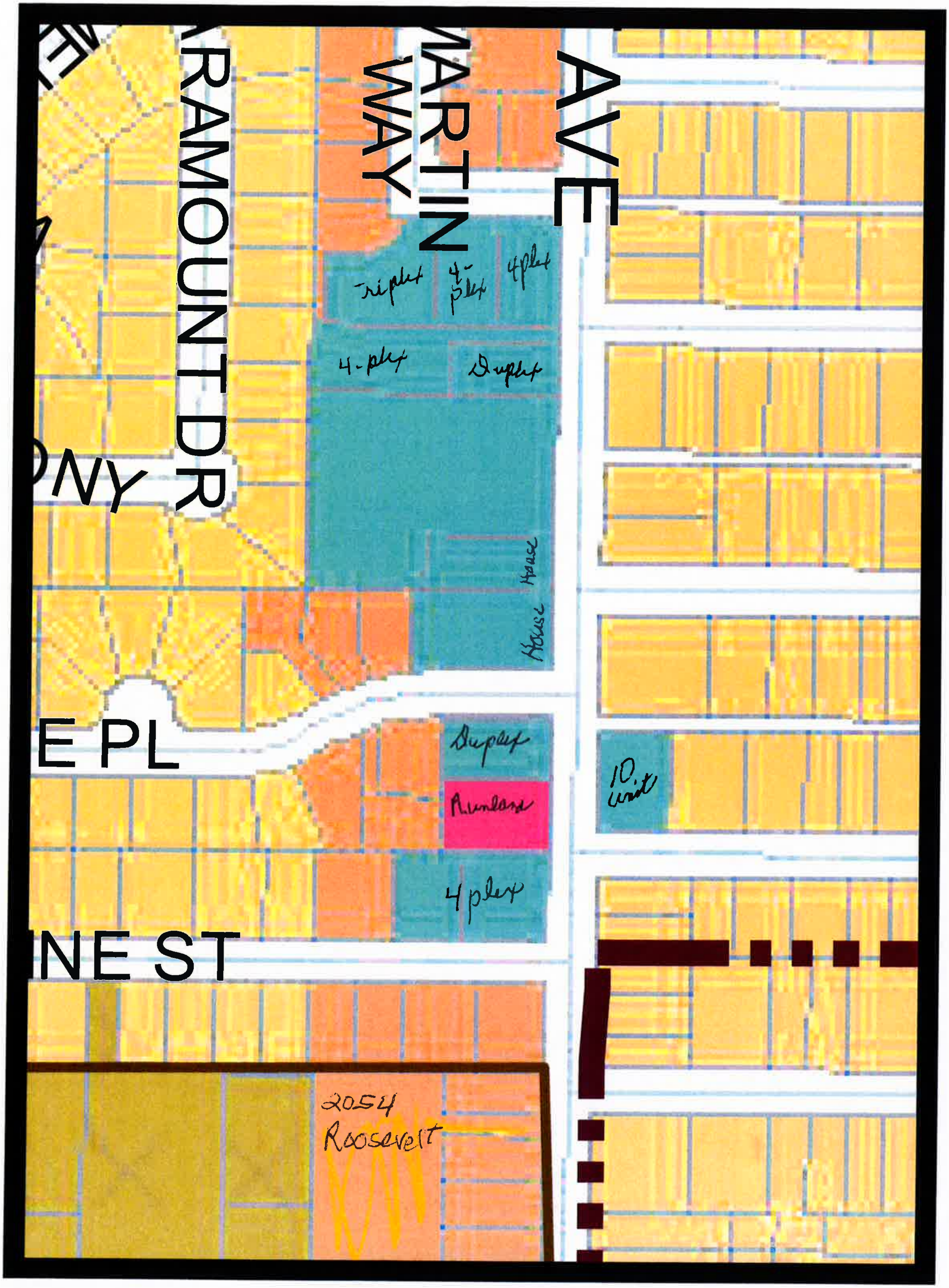
I feel that a change in the zoning from R3 to R4 would better suit the use of the property and make the units already there legal.

DATE RECEIVED
JUL 11 2016
CITY OF ENUMCLAW

Helen J. Boisjolie
935 Martin Way
Enumclaw WA 98022
253-740-1685

City of
Enumclaw
1309 Myrtle Avenue
Enumclaw, WA 98022

July 11, 2016


AVE
MARTIN WAY
RAMOUNT DR
ONY
E PL
NE ST
Triplex
4-plex
4plex
4-plex
Duplex
House
House
Duplex
10 unit
4plex
2054 Roosevelt

Appendix G – Amendments 2 and 3 (Amendment 2 Superseded Amendment 1) Amendment 2 Includes Standards for Sanitary Sewer Systems

City of Enumclaw

2016 GENERAL SEWER PLAN
AMENDMENT 2

August 2023

Prepared by

Scott Woodbury, P.E.
Assistant Public Works Director
City of Enumclaw
1309 Myrtle Ave
Enumclaw, WA 98022

2016 GENERAL SEWER PLAN
AMENDMENT 2

INTRODUCTION

This amendment updates the City of Enumclaw 20-year Sewer Capital Improvement Program (CIP) for the 2024-2043 planning period. Projects prioritization is based on many factors including regulatory requirements, system benefit, coordination with other projects and projected growth, likelihood and consequence of failure, redundancy and reliability, and financial considerations. Project descriptions are included below along with a review of projects identified in the 2016 General Sewer Plan (GSP) that were completed or not carried forward into this 20-year projection.

Other projects may arise that are not identified as part of the City's CIP and/or projects may be rescoped and/or reprioritized as part of the City's annual budget process. Many projects are multi-year efforts due to complex design, financing, supply, and permitting issues and must be initiated well in advance of the planned construction.

This amendment also includes:

- growth assumptions and sewer use projections for planning period.
- an update to the City's GSP Standards for Sewer Systems Appendix G.

PROJECTS COMPLETED SINCE 2016 GSP

Larger projects completed since 2016 include the following:

- Wastewater Treatment Plant (WWTP) O&M Manual Update (2016).
- Rainier Lift Station Pump Replacement (2017).
- Extended a gravity sewer that allowed the Clovercrest lift station to be retired (2018).
- Replaced WWTP UV treatment system and other WWTP upgrades (2018).
- Replaced WWTP sludge pumps (2019).
- Installed Mission SCADA system in all lift stations (2019).
- Installed generators at the Berilla and Takoba lift stations (2019).
- Cleared 300-foot section of 30" sewer with severe root intrusion (2021). The 30" sewer conveys wastewater from 86% of the system.
- Replaced the Berilla Lift Station force main to redirect the discharge from an existing
- sewer line with surcharging issues to a sewer main with no surcharging (2021).
- Replaced 3200 feet of 24" and 30" sewer main with 30" and 36" sewer due to concerns with integrity of the existing pipe (2022).

Table 1 shows the costs incurred to complete these projects.

TABLE 1 – CIP COSTS 2016-2022

Year	Costs
2016	$257,561
2017	$430,768
2018	$2,073,578
2019	$262,468
2020	$54,966
2021	$223,680
2022	$2,528,817
Total	$5,831,838

Other non-CIP work accomplished during this period that is useful in CIP planning and design efforts included sewer flow monitoring in 2017 and 2018 and installation of four permanent flow monitors in the collection system in 2019 to monitor long-term flow trends. Cleaning and video inspection of 67% of the sewer system was completed in 2020 and 2021 and smoke and dye testing to find sources of inflow and infiltration (I/I) into the sewer system is on-going. Additional staff have also been hired to assist with the effort to reduce I/I. The City also continues to make significant investments in its sewer video inspection equipment, vactor truck, sewer GIS software, and computerized work order and asset management systems.

PROJECTS NOT CARRIED FORWARD FROM 2016 GSP

Projects identified in 2016 GSP Chapter 9 that are not carried forward in the 2024-2043 CIP include:

- Dickson & Watson sewer oversizing. The 2016 GSP assumed I/I in the sewer basins contributing to this sewer to be more than later flow monitoring has indicated.
- Warner Basin, Semanski, and Semanski Influent to WWTP sewer oversizing. These projects were based on development in the western urban growth area (UGA) discharging to the Semanski sewer via the Pinnacle lift station. Improvements in the 2024-2043 CIP are based on the western UGA discharging into the gravity sewer at Florence St and Griffin Ave instead.
- Railroad St sewer oversizing. The trunk line replacement project completed in 2022 significantly reduced surcharging in the Railroad St sewer. This project will be re-evaluated and possibly reintroduced into the CIP but presently the completion of additional downstream oversizing and a reduction in I/I are planned to avoid the need for improvements to the Railroad sewer.
- Construct third UV channel and increase capacity of influent pumping. The maximum flow through the WWTP will be designed at 15 MGD. These improvements were intended to increase capacity above 15 MGD but will be far more costly than originally estimated because there are other hydraulic and equipment improvements that would be

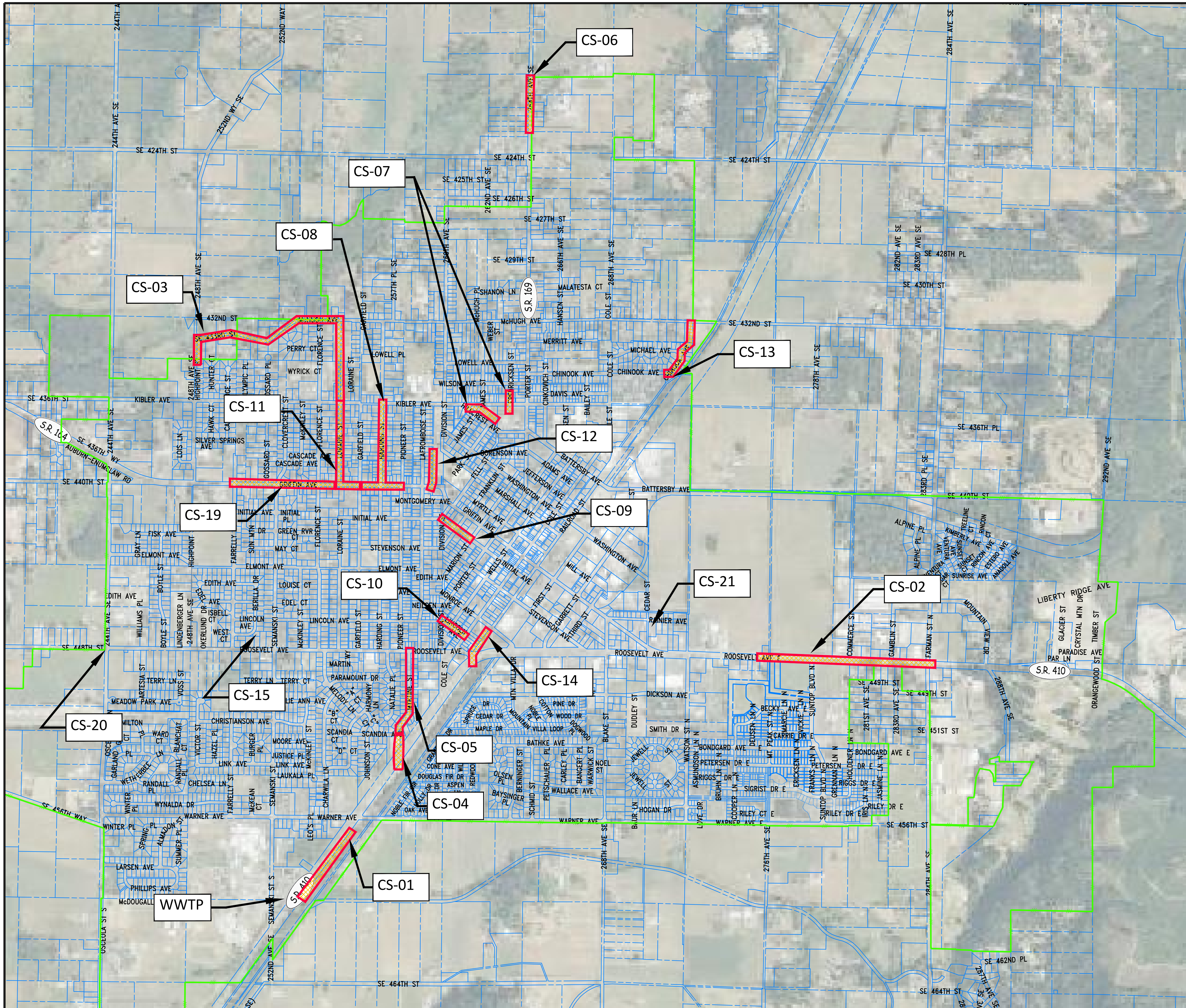
needed to achieve more than 15 MGD. More intensive efforts will be made to reduce I/I so that the flows to the WWTP will not exceed 15 MGD.

2024-2043 CAPITAL IMPROVEMENT PLAN

Table 2 summarizes the proposed capital improvement projects for the 10-year and 20-year planning periods for the collection system (CS) and WWTP, including project costs. Project location are shown in Figure 1. Detailed cost estimates are included in Exhibit 1. Many projects contain a 35 percent contingency factor and 35 percent planning, engineering, and administration costs. Descriptions of the projects are included following Figure 1.

TABLE 2 – CIP List

CIP#	Project	Cost
CS-01	Buckley Road - Gravity Sewer	$1,998,700
CS-02	Roosevelt Avenue East Gravity Sewers	$2,532,800
CS-03	248th Lift Station	$6,830,000
CS-04	24-in From Myrtine-Scandia to Across SR410	$798,800
CS-05	24-in on Myrtine - Scandia to Roosevelt	$2,768,400
CS-06	264th Ave Extension at TMMS	$1,055,200
CS-07	Garret Park- Gravity Sewer	$56,900
CS-08	Harding St - Kibler to Griffin	$1,965,500
CS-09	Initial & Franklin - Remove Double Sewer	$179,200
CS-10	Lincoln Avenue Gravity Sewer - Division to Cole	$820,000
CS-11	Loraine St Kibler to Griffin and E on Griffin to Garfield	$2,323,000
CS-12	Laframboise Alley Sewer Improvements	$569,900
CS-13	Chinook LS (Based on Alt 2 provided by City)	$3,060,400
CS-14	Roosevelt Avenue & SR410 (Design Only)	$100,000
CS-15	Berilla LS Pumping Upgrade	$82,800
CS-16	Misc Sewer Improvements	$1,500,000
CS-17	Sewer Model Update and Analysis	$150,000
CS-18	I & I Reduction / System Rehab	$7,000,000
CS-19	Griffin Ave - Loraine to Farrelly	$2,515,100
CS-20	244th Ave / Roosevelt Ave Sewer Extension	$150,000
CS-21	Rainier LS Upgrade	$82,800
WWTP-01	RBC Building Upgrade	$2,523,000
WWTP-02	Headworks Screen Repl	$1,000,000
WWTP-03	Centrifuge Dewatering System	$1,600,000
WWTP-04	Equipment and Control Replacements	$2,400,000
WWTP-05	Asset Mgmt System	$250,000



SCALE: 1"=800'

800 0 800 1600

SCALE IN FEET

LEGEND

- CS-01: Buckley Road - Gravity Sewers
- CS-02: Roosevelt Avenue East Gravity Sewers
- CS-03: 248th Lift Station
- CS-04: 24-in From Myrtine-Scandia to Across SR410
- CS-05: 24-in on Myrtine - Scandia to Roosevelt
- CS-06: 264th Ave Extension at TMMS
- CS-07: Garret Park- Gravity Sewer
- CS-08: Harding St - Kibler to Griffin
- CS-09: Initial & Franklin - Remove Double Sewer
- CS-10: Lincoln Avenue Gravity Sewer - Division to Cole
- CS-11: Loraine St Kibler to Griffin and E on Griffin to Garfield
- CS-12: Laframboise Alley Sewer Improvements
- CS-13: Chinook LS
- CS-14: Roosevelt Avenue & SR410 (Design Only)
- CS-15: Berilla LS Pumping Upgrade
- CS-16: Misc Sewer Improvements
- CS-17: Sewer Model Update and Analysis
- CS-18: I & I Reduction / System Rehab
- CS-19: Griffin Ave - Loraine to Farrelly
- CS-20: 244th Ave / Roosevelt Ave Sewer Extension
- CS-21: Rainier LS Upgrade
- WWTP-01: RBC Building Upgrade
- WWTP-02: Headworks Screen Repl
- WWTP-03: Centrifuge Dewatering System
- WWTP-04: Equipment and Control Replacements
- WWTP-05: Asset Mgmt System

NO.	REVISIONS DESCRIPTION	BY	DATE
1			
2			
3			
4			
5			
6			

City of Enumclaw
DEPARTMENT OF PUBLIC WORKS
1309 MYRTLE AVENUE, ENUMCLAW, WASHINGTON 98022

CITY OF ENUMCLAW
CAPITAL PROJECTS
SANITARY SEWER SYSTEM

PROJECT NO:
SURVEYED BY:
DESIGNED BY: KW
DRAWN BY: SW
CHECKED BY:
DATE: 06/13/2023

FIG. 1

CS-01 Buckley Road – Gravity Sewer (2016 GSP)

This project would replace and enlarge 1300 feet of 30” concrete sewer trunk line that serves 85% of the city sewer system. This was part of a larger project in the 2016 GSP. The northerly 3200 feet of the original GSP project was replaced in 2022 with a significant hydraulic benefit to the collection system.

CS-02 Roosevelt Ave E Gravity Sewer (2016 GSP)

The 2016 GSP identified approximate 2640 feet of existing 12” and 10” sewer main that would need be upsized to 15” and 12” to accommodate full buildout of the sewer basins tributary to this segment. The segment is located on Roosevelt Ave E between 276th Ave and 284th Ave.

CS-03 248th Lift Station (2016 GSP)

This 2016 GSP project includes construction of a new sewer lift station at the SE 433rd St / 248th Ave intersection. The project would replace three existing lift stations (Willowgate, Takoba, and McHugh) and install 2,900 feet of gravity sewer, and 3,860 feet of new force main along SE 433rd St (McHugh Ave) and the Loraine St corridor between McHugh Ave and Kibler Ave. Approximately 1,300 feet of 8” asbestos cement force main and 350 of 6” ductile iron force main would be replaced.

CS-04 24” From Myrtine-Scandia Crossing of SR410

The 24” sewer crossing SR410 from Myrtine-Scandia is unreinforced concrete from 1949 that serves 52% of the city sewer system. The age of the sewer, service area, and the potential impact of failure of a crossing under a major arterial are key considerations, but the timing of replacement also depends on the hydraulic benefits of replacing this segment with a larger pipe.

CS-05 24” on Myrtine From Roosevelt Ave to SR410

This project would replace 1,750 feet of 24” sewer installed in 1949 which, when combined with other projects proposed in this CIP and prior projects, would complete the replacement of the entirety of one of the city’s major trunk lines, extending from the WWTP north to the Loraine-Kibler intersection. This trunk line has a history of surcharging and increasing pipe sizes along its length would reduce the severity of the surcharging and accommodate additional future flows from the city’s western UGA.

CS-06 264th Ave Extension at Thunder Mt Middle School (TMMS)

This project includes 900 feet of 8” gravity sewer along the 264th Ave (SR169) frontage of the TMMS property that the school district was allowed an exception from extending along the TMMS frontage. The sewer would have already been over 20 years old and it may still be many years before development occurs in this sewer basin, triggering a need for this segment. It is assumed that this segment would be developer extended and eligible for connection charge credits as allowed under Ordinance 2754 for CIP projects completed by a developer.

CS-07 Garrett Park Sewer Abandonment

This project would abandon segments of two existing sewers stubbed to Garrett Park that are no longer being used. This would reduce potential for I/I into the sewer.

CS-08 Harding St – Kibler to Griffin

The nearly 1,700-foot gravity sewer main and its side sewers would be replaced along Harding St from Kibler Ave to Griffin Ave and along Griffin Ave for one block each direction east and west of Harding St. Records are unclear when the sewer was constructed but sewer inventory mapping indicates it may have been in the 1930s. This project is planned as a pilot project to assess the benefit of replacing side sewers in addition to a sewer main to eliminate I/I from an entire sewer subbasin.

CS-09 Remove Double Sewer at Initial & Franklin

This project would transfer side sewers to a single sewer main on the west half of the block on Initial Ave between Franklin St and Marion St and abandon the duplicate sewer main.

CS-10 Lincoln Ave – Division St to Half Block East of Cole St

This project would transfer side sewers to a single sewer main and abandon the duplicate sewer main.

CS-11 Loraine St - Kibler Ave to Griffin Ave and East on Griffin Ave to Garfield St

This project would replace 1,630 feet of 18" sewer installed in the late 1940s with a 21" main. This major trunk line has had a history of surcharging and smoke testing of this segment made its way out of the sewer and through the soil cover in one location. On Griffin Avenue a couple monitoring wells for an adjoining gas station were found to be drilled through the sewer. A repair was made in 2009 by placing metal sheeting over the holes and backfilling a portion of the trench with control density fill. This was done rather than replacing the damaged segments due to the presence of hydrocarbons in the excavation.

CS-12 Lafromboise Alley Along JJ Smith School

Sewer flows from the northern end of the Division sewer basin empty into a sewer in the Lafromboise alley along the JJ Smith school. Interconnected gravity sewers for the Division and Kibler sewer basins allows flows to go either north into the Kibler basin or south into the Division basin. This project would plug the sewer line to the north so the option to flow north is eliminated. The northerly route is a much longer route to the WWTP and contributes to a sewer trunk line that has experienced frequent surcharging. Approximately 570 feet of 8" sewer in the Division basin downstream of the interconnection would be replaced with 10" sewer.

CS-13 Chinook Lift Station

The 2016 GSP shows the Chinook sewer basin extending north to SE 424th St. However, the depth of the existing Chinook lift station is too shallow to extend gravity service to reach that distance. Rather than construct a new separate lift station in addition to the existing station, a plan has been developed as shown in Exhibit 2 that would replace the existing station with a new station constructed on SE 432nd St. It is assumed that this project would be completed by a developer but a portion of the cost would be eligible for connection charge credits as allowed under Ordinance 2754 for CIP projects completed by a developer. The justification for allowing the credits is that the city avoids the costs it would have incurred to replace aging equipment within the existing station that was constructed in 1990 and instead receives a new asset to replace the largely depreciated asset.

CS-14 Roosevelt Ave & SR410

The 24" sewer crossing SR410 at Railroad St was installed in 1949 and serves 19% of the city sewer system, including the city downtown. This project would be a design project only to identify how the existing SR410 crossing and the sewers within about 100 feet upstream would be replaced while also eliminating duplicate, parallel pipes that also run under buildings, and reducing the number of manholes in the area while not affecting other nearby utilities.

CS-15 Berilla Lift Station Pumping Upgrade

The Berilla lift station has the capability for pumping at a higher rate of flow but the electrical system must be upgraded to allow more horsepower to be applied to the pumps. There are times when both pumps must operate to keep up with inflows so if one pump were inoperable it could result in a sewage overflow.

CS-16 Miscellaneous Sewer Improvements

Annual funding needs to be provided for completing small projects that are planned for or that may arise during the year. These may include lift station improvements such as pump replacement or control upgrades and other capital project needs for the wastewater collection system, such as small projects to eliminate I/I.

CS-17 Sewer Model Update and Analysis

Modeling analysis performed for the 2016 GSP was based on 2013 WWTP flow data to calibrate the model. Since 2013 the City has conducted several sewer system evaluations and collected much more detailed hydraulic data than was available to the 2016 GSP effort. In addition, nearly 800 new homes have been added to the City since 2013 along with non-residential development that increased flows in the collection system. The model will be calibrated to the new data and used to re-examine available capacity in the collection system under existing and future growth scenarios and identify projects to mitigate any deficiencies.

CS-18 I/I Reduction / System Rehabilitation Program

Recent data shows a peak day wet weather flows to summertime dry day flow ratio in the collection system of approximately 13:1 as measured at the WWTP. Sewer overflows have occurred in the collection system in the Takoba basin and flows in excess of around 12 MGD bypass the WWTP to flow directly to the White River. With the planned headworks screen replacement a total of 15 MGD will be able to be taken through the WWTP, reducing the likelihood of a WWTP bypass. Regular funding must be provided for projects that reduce I/I from entering the collection system, including lining or replacing existing sewer mains and side sewers and continuing to detect and eliminate direct storm water connections. The goal of the program is to reduce the wet to dry weather flow ratio by one-third to one-half of the current ratio. In 2024 a prioritized long-term plan of I/I reduction projects will be developed to guide program implementation and identify funding needs and options.

CS-19 Griffin Ave - Loraine St to Farrelly St

This project would replace 1,700-foot of 8” to 12” gravity sewer main with an 18” main. This project increases capacity in this segment so that flows pumped from the western UGA can empty into the gravity system at Farrelly St and Griffin Ave to then flow to the WWTP. It is assumed that this segment would be developer extended with a portion of the costs eligible for connection charge credits as allowed under Ordinance 2754 for CIP projects completed by a developer. The credits would be intended to reimburse the cost of replacing side sewers in their entirety along this segment as an I/I reduction measure.

CS-20 244th Ave / Roosevelt Ave Sewer Extension

A new roundabout improvement is planned for 2024 at the 244th / Roosevelt Ave intersection. In order to avoid cutting through the new roundabout soon after its construction, the gravity sewers planned within the limits of this intersection improvement would be installed as part of the roundabout project.

CS-21 Rainier LS Upgrade

Much of the electrical equipment for this station is from the original construction in 1965 and is due for replacement. Access to this wetwell/drywell station could also be upgraded. Prior to designing these improvements, a preliminary design report would be prepared to further define needed improvements but to also assess whether constructing a new submersible pump station to replace the existing station would be a better solution.

WWTP-01 RBC Building Upgrade

The project is a proactive measure to prepare the city WWTP to meet a lowered phosphorous discharge limit that will be imposed as a result of Total Maximum Daily Loading (TMDL) rule that is in the process of being promulgated by the State Department of Ecology (DOE). The project proposes to remodel an existing unused RBC building so that bulk chemical storage tanks and the related pumping and piping systems needed to inject alum and sodium hydroxide into the waste stream can be installed. The remodeling work will be done inside a building that is nearly entirely concrete and formerly used for rotating biological contactor (RBC) units. The project also includes remodeling work inside the WWTP's second RBC building to partially prepare the north half of that building for the future installation of centrifuge dewatering equipment.

WWTP-02 Headworks Screen Replacement

The 2016 GSP identified replacing the WWTP headworks influent screens to increase their capacity. The existing equipment has been in operation for over 15 years and is nearing the end of its useful life. The new screens will be designed to achieve a minimum of 15 MGD, the revised WWTP maximum design flow. This is an increase of 3 MGD over the existing screens capacity.

WWTP-03 Centrifuge Dewatering System

The existing belt filter press has been operational for nearly 15 years. While it has been carefully maintained it is used regularly and has needed numerous components replaced as they wear out or fail. Staff keep a stock of repair parts on-hand but if a major component failed that can only be ordered from the manufacturer and the press were out of service until it was received then sludge would have to be hauled by truck for disposal at the King County Renton facility. Sludge was hauled for a 55-day period in 2009 at a cost of nearly $120,000 in 2009 dollars. Significant delays in supply chains are becoming common and to ensure that the WWTP can continue dewatering operations uninterrupted, it is recommended that a second dewatering system be installed. The plan is to install a centrifuge in the north half of the dewatering building that would become the primary dewatering system with the existing press as a backup.

WWTP-04 Equipment and Control Replacements

The last major upgrade of the WWTP was completed in 2009. Electrical, mechanical, and control systems wear out and/or become obsolete or no longer supported. Regular funding must be provided for replacement of these systems before they become a problem for the proper operation of the WWTP.

WWTP-05 Asset Management System

The WWTP is the most complex facility that the city owns. In order to more effectively operate and maintain the WWTP and plan for and prioritize future replacements a computerized maintenance management system is recommended.

HISTORIC AND CURRENT SEWER USAGE

Table 3 shows influent flows at the WWTP for 2014-2022. Maximum day flows are higher for 2019 and later due to improvements to the UV treatment system that allowed flows higher than 8 MGD to be taken through the WWTP rather than bypassing to the White River.

TABLE 3 – Influent Flows at the WWTP 2014-2022 (MGD)

Year	Avg	Max Month	Max Day	Min Day
2014	1.7	3.2	5.7	0.7
2015	1.5	3.5	8.0	0.6
2016	1.6	2.6	4.8	0.7
2017	1.8	3.3	8.1	0.7
2018	1.4	2.8	5.8	0.7
2019	1.4	2.5	8.5	0.8
2020	1.7	3.1	11.4	0.8
2021	1.7	3.1	9.3	0.7
2022	1.8	3.0	11.7	0.8

Total flows to the WWTP as measured by customer water meter usage is shown in Table 4. Single family residential flows are based on average water used from November to April so as to not include outside water use. The flows are similar to the minimum day flows shown in Table 2 measured at the headworks of the WWTP.

TABLE 4 – Flows to WWTP Based on Water Use

Year	Flows (MGD)
2015	0.74
2016	0.76
2017	0.75
2018	0.75
2019	0.76
2020	0.74
2021	0.79
2022	0.80

Flows to the WWTP are predominantly residential. Table 5 shows the percentage of flows based on customer class for 2022.

TABLE 5 – Percentage of Flows to WWTP by Customer Class

Class	% Contribution
SF Residential (SFR)	52.0
Commercial	16.6
City	0.5
School	2.5
Multifamily (MF)	18.0
Mobile Home Park (MHP)	8.5
Senior/Low Income	1.9

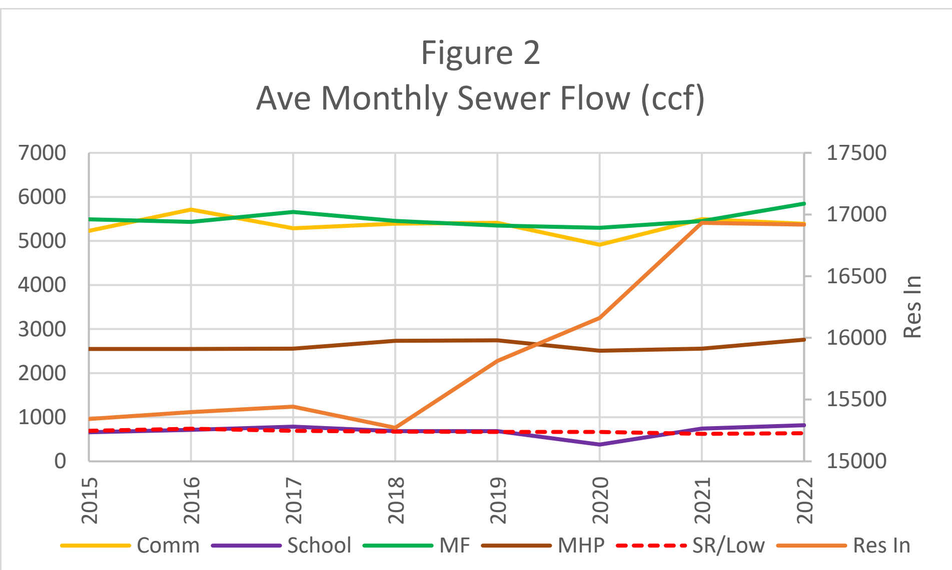
Review of recent usage data for several customer classes indicates the usage per unit shown in Table 6. The multifamily estimate was based on an analysis of larger apartment complexes within the City and shows the ratio of multifamily to single family residential usage is similar to the 67% ratio codified in the Enumclaw Municipal Code, so the prior ratio will continue to be used. The overall multifamily class usage average is very close to that calculated for the mobile home park class, but the difference between that calculated using apartment complexes is believe due to outside water usage since only the larger complexes have separate irrigation or deduct meters to account for outside water usage.

TABLE 6 – Usage per Unit

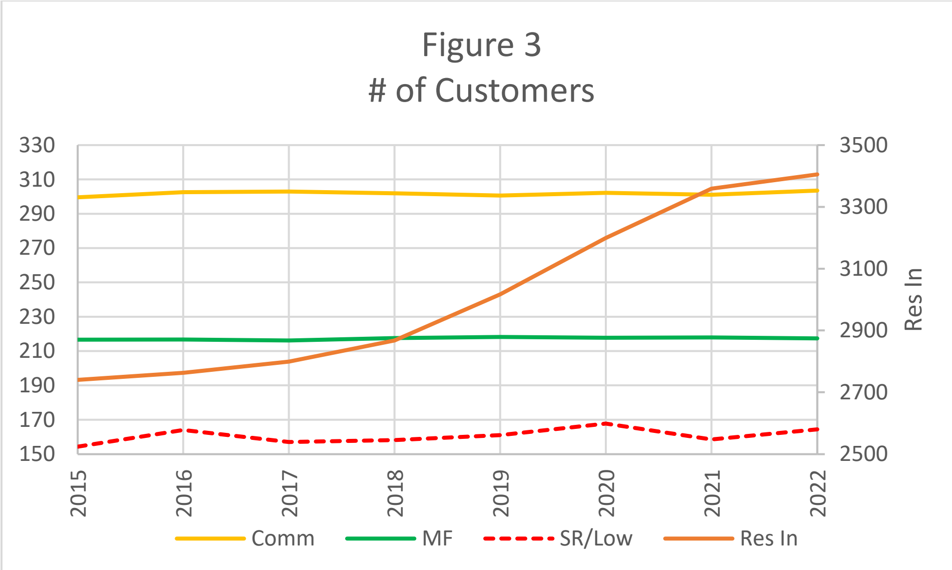
Class	GPD / CCF Per Month	% of SFR
SFR	122 / 5.0	100%
MF	84 / 3.4	69%
MHP	102 / 4.1	84%

An ERU has been defined in the city municipal code since 2005 as 9.0 ccf/month. Usage has declined to 5.0 ccf/month in 2022, largely due to the increase in sewer rates needed to pay for the WWTP upgrade in 2009. Since 2005 sewer rates have increased a cumulative 350%.

As shown in Figure 2, average monthly sewer usage has changed little since 2015 for all city sewer customer classes except for single family residential where most of the city's growth has occurred.



The change in the number of customers in each class from 2015 is shown in Figure 3. Schools and mobile home parks are excluded from the table since school accounts have ranged from 15 to 17 and only 3 mobile home parks exist within the city, although a 4th is nearing completion.



GROWTH ASSUMPTIONS FOR 2024-2043

Table 7 includes the projected population within the City for the planning period using the same estimates used for the water system planning process for consistency. It is assumed that all equivalent residential units (ERUs) within the sewer service area will be subject to the same growth rate, and that non-residential water use will generally increase at a similar pace as residential development and water use.

TABLE 7 – Projected Population

Year	Annual Growth	City Population
2022	2.9%	13,200
2023	2.9%	13,590
2024	2.9%	13,980
2025	2.9%	14,390
2026	2.9%	14,810
2027	0.3%	14,860
2028	0.3%	14,910
2029	0.3%	14,970
2030	0.3%	15,020
2031	0.3%	15,070
2032	0.3%	15,120
2038	0.4%	15,470
2043	0.4%	15,800

SEWER USE PROJECTIONS

Table 8 shows the estimated number of ERUs per customer class for 2015-2022 based on 5 ccf/ERU usage. A total of 8527 ERUs is estimated in 2022.

TABLE 8 – # of ERUs per Class Based on 5 ccf/ERU

Year	Res In	Comm	City	School	MF	MHP	SR/Low	Total ERUs
2015	3068	1045	41	131	1098	509	138	8048
2016	3080	1143	35	142	1086	509	147	8159
2017	3088	1057	38	156	1132	511	138	8139
2018	3054	1079	37	137	1091	546	134	8098
2019	3163	1082	38	137	1070	549	133	8192
2020	3232	983	24	76	1060	502	133	8030
2021	3387	1099	25	148	1090	511	124	8406
2022	3384	1077	31	164	1170	552	127	8527

Table 9 computes the growth in total ERUs using the annual growth projection from Table 6 and indicates a total of 10171 ERUs in 2043.

TABLE 9 – ERU Growth Projection

Year	Total ERUs
2022	8527
2023	8775
2024	9029
2025	9291
2026	9560
2027	9589
2028	9618
2029	9647
2030	9676
2031	9705
2032	9734
2038	9970
2043	10171

UPDATE TO CITY STANDARDS FOR SEWER SYSTEMS APPENDIX G

A revised Appendix G is attached that replaces the prior version adopted in 2018. Changes to Appendix G include incorporating a complete update of the lift station requirements originally in Section 1.3 of the 2016 GSP.

Exhibit 1 – Cost Estimates

City of Enumclaw
Sewer Comprehensive Plan
Planning Level Opinion of Probable Project Costs
Buckley Road - Gravity Sewer
Reference Folder: Dickson & Watson (from 2016 GSP)
Prepared by: A. Dunwoody 4/7/2023
Reviewed by: Tony Fisher 4/7/2023

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$100,000	1	ls	$100,000
2	Temporary Erosion & Sediment Control	$20,000	1	ls	$20,000
3	Dewatering	$30,000	1	ls	$30,000
4	24-inch PVC Gravity Sewer	$435	1,300	lf	$565,500
5	48-inch Manhole	$12,000	7	ea	$84,000
6	HMA Trench Patch	$250	230	tn	$57,500
7	Half-Width Grind and HMA Overlay	$250	210	tn	$52,500
8	Crushed Surfacing	$40	260	tn	$10,400
9	Sheeting, Shoring, Bracing	$10	1,300	lf	$13,000
10	Bypass	$15,000	1	ls	$15,000
11	Traffic Control	$40,000	1	ls	$40,000
12	General Restoration	$20,000	1	ls	$20,000
	Subtotal				$1,007,900
	Sales Tax	8.8%			$88,695
	Total				$1,096,595

TOTAL OPINION OF PROBABLE CONSTRUCTION COST		$1,096,600
Planning	5%	$54,900
Design and Permitting	15%	$164,500
Services During Construction	15%	$164,500
TOTAL OPINION OF PROBABLE ALLIED COST		$383,900
Contingency	35%	$518,200
TOTAL OPINION OF PROBABLE PROJECT COST		**$1,998,700**

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Mobilization assumed to be 10% of construction costs
4. Temporary Erosion Control and General Restoration assumed to be 2% of construction costs
5. Traffic Control assumed to be 4% of construction costs
6. Pipe costs includes all excavation, pipe, fittings, bedding, imported backfill, and haul
7. Costs are in 2023 dollars

The opinion of probable cost herein is based on our perception of current conditions at the project location. This opinion reflects our professional opinion of costs at this time and is subject to change as the project design progresses. BHC Consultants has no control over variances in the cost of labor, materials, equipment; nor services provided by others, contractor's means and methods of executing the work or of determining prices, competitive bidding or market conditions, practices or bidding strategies. BHC Consultants cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the costs presented as shown.

City of Enumclaw
Sewer Comprehensive Plan
Planning Level Opinion of Probable Project Costs
Dickson Ave - Gravity Sewer
Reference Folder: Dickson & Watson (from 2016 GSP)
Prepared by: A. Dunwoody 4/7/2023
Reviewed by: Tony Fisher 4/7/2023

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$246,000	1	ls	$246,000
2	Temporary Erosion & Sediment Control	$50,000	1	ls	$50,000
3	Dewatering	$75,000	1	ls	$75,000
4	15-inch PVC Gravity Sewer	$269	4,540	lf	$1,221,260
5	48-inch Manhole	$12,000	23	ea	$276,000
6	HMA Trench Patch	$250	650	tn	$162,500
7	Half-Width Grind and HMA Overlay	$250	710	tn	$177,500
8	Crushed Surfacing	$40	660	tn	$26,400
9	Sheeting, Shoring, Bracing	$10	4,540	lf	$45,400
10	Bypass	$35,000	1	ls	$35,000
11	Traffic Control	$99,000	1	ls	$99,000
12	General Restoration	$50,000	1	ls	$50,000
	Subtotal				$2,464,100
	Sales Tax	8.8%			$216,841
	Total				$2,680,941

TOTAL OPINION OF PROBABLE CONSTRUCTION COST		$2,681,000
Planning	5%	$134,100
Design and Permitting	15%	$402,200
Services During Construction	15%	$402,200
TOTAL OPINION OF PROBABLE ALLIED COST		$938,500
Contingency	35%	$1,266,900
TOTAL OPINION OF PROBABLE PROJECT COST		**$4,886,400**

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Mobilization assumed to be 10% of construction costs
4. Temporary Erosion Control and General Restoration assumed to be 2% of construction costs
5. Traffic Control assumed to be 4% of construction costs
6. Pipe costs includes all excavation, pipe, fittings, bedding, imported backfill, and haul
7. Costs are in 2023 dollars

The opinion of probable cost herein is based on our perception of current conditions at the project location. This opinion reflects our profess

City of Enumclaw
Sewer Comprehensive Plan
Planning Level Opinion of Probable Project Costs
Warner Basin Gravity Sewer
Reference Folder Warner Basin Project
Prepared by: A. Dunwoody 4/7/2023
Reviewed by: Tony Fisher 4/7/2023

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$100,000	1	ls	$100,000
2	Temporary Erosion & Sediment Control	$20,000	1	ls	$20,000
3	Dewatering	$30,000	1	ls	$30,000
4	12-inch PVC Gravity Sewer	$236	2,000	lf	$472,000
5	48-inch Manhole	$12,000	10	ea	$120,000
6	HMA Trench Patch	$250	280	tn	$70,000
7	Half-Width Grind and HMA Overlay	$250	320	tn	$80,000
8	Crushed Surfacing	$40	270	tn	$10,800
9	Sheeting, Shoring, Bracing	$10	2,000	lf	$20,000
10	Bypass	$15,000	1	ls	$15,000
11	Traffic Control	$40,000	1	ls	$40,000
12	General Restoration	$20,000	1	ls	$20,000
	Subtotal				$997,800
	Sales Tax	8.8%			$87,806
	Total				$1,085,606

TOTAL OPINION OF PROBABLE CONSTRUCTION COST		$1,085,700
Planning	5%	$54,300
Design and Permitting	15%	$162,900
Services During Construction	15%	$162,900
TOTAL OPINION OF PROBABLE ALLIED COST		$380,100
Contingency	35%	$513,100
TOTAL OPINION OF PROBABLE PROJECT COST		**$1,978,900**

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Mobilization assumed to be 10% of construction costs
4. Temporary Erosion Control and General Restoration assumed to be 2% of construction costs
5. Traffic Control assumed to be 4% of construction costs
6. Pipe costs includes all excavation, pipe, fittings, bedding, imported backfill, and haul
7. Costs are in 2023 dollars

The opinion of probable cost herein is based on our perception of current conditions at the project location. This opinion reflects our profess

City of Enumclaw
Sewer Comprehensive Plan
Planning Level Opinion of Probable Project Costs
Semanski - Gravity Sewer
Reference Folder Semanski (from 2016 GSP)
Prepared by: A. Dunwoody 4/7/2023
Reviewed by: Tony Fisher 4/7/2023

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$81,000	1	ls	$81,000
2	Temporary Erosion & Sediment Control	$16,000	1	ls	$16,000
3	Dewatering	$30,000	1	ls	$30,000
4	12-inch PVC Gravity Sewer	$236	1,610	lf	$379,960
5	48-inch Manhole	$12,000	9	ea	$108,000
6	HMA Trench Patch	$250	220	tn	$55,000
7	Half-Width Grind and HMA Overlay	$250	260	tn	$65,000
8	Crushed Surfacing	$40	220	tn	$8,800
9	Sheeting, Shoring, Bracing	$10	1,610	lf	$16,100
10	Traffic Control	$32,000	1	ls	$32,000
11	General Restoration	$16,000	1	ls	$16,000
	Subtotal				$807,860
	Sales Tax	8.8%			$71,092
	Total				$878,952

TOTAL OPINION OF PROBABLE CONSTRUCTION COST		$879,000
Planning	5%	$44,000
Design and Permitting	15%	$131,900
Services During Construction	15%	$131,900
TOTAL OPINION OF PROBABLE ALLIED COST		$307,800
Contingency	35%	$415,400
TOTAL OPINION OF PROBABLE PROJECT COST		**$1,602,200**

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Mobilization assumed to be 10% of construction costs
4. Temporary Erosion Control and General Restoration assumed to be 2% of construction costs
5. Traffic Control assumed to be 4% of construction costs
6. Pipe costs includes all excavation, pipe, fittings, bedding, imported backfill, and haul
7. Costs are in 2023 dollars

The opinion of probable cost herein is based on our perception of current conditions at the project location. This opinion reflects our profess

City of Enumclaw
Sewer Comprehensive Plan
Planning Level Opinion of Probable Project Costs
Semanski Influent -Gravity Sewer
Reference Folder Semanski (from 2016 GSP)
Prepared by: A. Dunwoody 4/7/2023
Reviewed by: Tony Fisher 4/7/2023

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$43,000	1	ls	$43,000
2	Temporary Erosion & Sediment Control	$8,500	1	ls	$8,500
3	Dewatering	$15,000	1	ls	$15,000
4	18-inch PVC Gravity Sewer	$337	650	lf	$219,050
5	48-inch Manhole	$12,000	4	ea	$48,000
6	HMA Trench Patch	$250	110	tn	$27,500
7	Half-Width Grind and HMA Overlay	$250	110	tn	$27,500
8	Crushed Surfacing	$40	110	tn	$4,400
9	Sheeting, Shoring, Bracing	$10	650	lf	$6,500
10	Bypass	$5,000	1	ls	$5,000
11	Traffic Control	$17,000	1	ls	$17,000
12	General Restoration	$8,500	1	ls	$8,500
	Subtotal				$429,950
	Sales Tax	8.8%			$37,836
	Total				$467,786

TOTAL OPINION OF PROBABLE CONSTRUCTION COST		$467,800
Planning	5%	$23,400
Design and Permitting	15%	$70,200
Services During Construction	15%	$70,200
TOTAL OPINION OF PROBABLE ALLIED COST		$163,800
Contingency	35%	$221,100
TOTAL OPINION OF PROBABLE PROJECT COST		**$852,700**

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Mobilization assumed to be 10% of construction costs
4. Temporary Erosion Control and General Restoration assumed to be 2% of construction costs
5. Traffic Control assumed to be 4% of construction costs
6. Pipe costs includes all excavation, pipe, fittings, bedding, imported backfill, and haul
7. Costs are in 2023 dollars

The opinion of probable cost herein is based on our perception of current conditions at the project location. This opinion reflects our professional opinion of costs at this time and is subject to change as the project design progresses. BHC Consultants has no control over variances in the cost of labor, materials, equipment; nor services provided by others, contractor's means and methods of executing the work or of determining prices, competitive bidding or market conditions, practices or bidding strategies. BHC Consultants cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the costs presented as shown.

City of Enumclaw
Sewer Comprehensive Plan
Planning Level Opinion of Probable Project Costs
Roosevelt Avenue East Gravity Sewers
Reference Folder Roosevelt Ave E (from 2016 GSP)
Prepared by: A. Dunwoody 4/7/2023
Reviewed by: Tony Fisher 4/7/2023

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$128,000	1	ls	$128,000
2	Temporary Erosion & Sediment Control	$25,000	1	ls	$25,000
3	Dewatering	$45,000	1	ls	$45,000
4	12-inch PVC Gravity Sewer	$236	1,870	lf	$441,320
5	15-inch PVC Gravity Sewer	$269	770	lf	$207,130
6	48-inch Manhole	$12,000	8	ea	$96,000
7	HMA Trench Patch	$250	370	tn	$92,500
8	Half-Width Grind and HMA Overlay	$250	420	tn	$105,000
9	Crushed Surfacing	$40	370	tn	$14,800
10	Sheeting, Shoring, Bracing	$10	2,640	lf	$26,400
11	Bypass	$20,000	1	ls	$20,000
12	Traffic Control	$51,000	1	ls	$51,000
13	General Restoration	$25,000	1	ls	$25,000
	Subtotal				$1,277,150
	Sales Tax	8.8%			$112,389
	Total				$1,389,539

TOTAL OPINION OF PROBABLE CONSTRUCTION COST		$1,389,600
Planning	5%	$69,500
Design and Permitting	15%	$208,500
Services During Construction	15%	$208,500
TOTAL OPINION OF PROBABLE ALLIED COST		$486,500
Contingency	35%	$656,700
TOTAL OPINION OF PROBABLE PROJECT COST		**$2,532,800**

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Mobilization assumed to be 10% of construction costs
4. Temporary Erosion Control and General Restoration assumed to be 2% of construction costs
5. Traffic Control assumed to be 4% of construction costs
6. Pipe costs includes all excavation, pipe, fittings, bedding, imported backfill, and haul
7. Costs are in 2023 dollars

City of Enumclaw
Sewer Comprehensive Plan
Planning Level Opinion of Probable Project Costs
Railroad St - Gravity Sewer
Reference Folder: Railroad St (from 2016 GSP)
Prepared by: A. Dunwoody 4/7/2023
Reviewed by: Tony Fisher 4/7/2023

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$137,000	1	ls	$137,000
2	Temporary Erosion & Sediment Control	$27,000	1	ls	$27,000
3	Dewatering	$30,000	1	ls	$30,000
4	10-inch PVC Gravity Sewer	$193	160	lf	$30,880
5	18-inch PVC Gravity Sewer	$337	580	lf	$195,460
6	24-inch PVC Gravity Sewer	$435	1,120	lf	$487,200
7	48-inch Manhole	$12,000	9	ea	$108,000
8	Side Sewer Connections	$4,400	22	ea	$96,800
9	HMA Trench Patch	$250	310	tn	$77,500
10	Half-Width Grind and HMA Overlay	$250	290	tn	$72,500
11	Crushed Surfacing	$40	340	tn	$13,600
12	Sheeting, Shoring, Bracing	$10	1,860	lf	$18,600
13	Bypass	$15,000	1	ls	$15,000
14	Traffic Control	$55,000	1	ls	$55,000
15	General Restoration	$27,000	1	ls	$27,000
	Subtotal				$1,391,540
	Sales Tax	8.8%			$122,456
	Total				$1,513,996

TOTAL OPINION OF PROBABLE CONSTRUCTION COST		$1,514,000
Planning	5%	$75,700
Design and Permitting	15%	$227,100
Services During Construction	15%	$227,100
TOTAL OPINION OF PROBABLE ALLIED COST		$529,900
Contingency	35%	$715,400
TOTAL OPINION OF PROBABLE PROJECT COST		**$2,759,300**

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Mobilization assumed to be 10% of construction costs
4. Temporary Erosion Control and General Restoration assumed to be 2% of construction costs
5. Traffic Control assumed to be 4% of construction costs
6. Pipe costs includes all excavation, pipe, fittings, bedding, imported backfill, and haul
7. Costs are in 2023 dollars

The opinion of probable cost herein is based on our perception of current conditions at the project location. This opinion reflects our professional opinion of costs at this time and is subject to change as the project design progresses. BHC Consultants has no control over variances in the cost of labor, materials, equipment; nor services provided by others, contractor's means and methods of executing the work or of determining prices, competitive bidding or market conditions, practices or bidding strategies. BHC Consultants cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the costs presented as shown.

City of Enumclaw
Sewer Comprehensive Plan
Planning Level Opinion of Probable Project Costs
248th Lift Station
Reference Folder: 248th Lift Station Preliminary Design
Prepared by: A. Dunwoody 5/16/2023
Reviewed by: Tony Fisher 5/16/2023

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization and Demobilization	$173,000	1	LS	$173,000
2	Minor Changes	$50,000	1	EST	$50,000
3	Construction Surveying, Staking, and As-Builts	$35,000	1	LS	$35,000
4	Site and Trench Safety	$50,000	1	LS	$50,000
5	Dewatering	$50,000	1	LS	$50,000
6	Shoring	$30,000	1	LS	$30,000
7	Temporary Erosion and Sediment Control	$35,000	1	LS	$35,000
8	Site Grading	$20,000	1	LS	$20,000
9	Demolition	$10,000	1	LS	$10,000
10	Water Service & Yard Piping	$10,000	1	LS	$10,000
11	PVC Sanitary Sewer 8-inch Diameter	$110	395	LF	$43,450
12	PVC Sanitary Sewer 12-inch Diameter	$170	2,517	LF	$427,890
13	Type 1 48-inch Diameter Manhole	$20,000	20	EA	$400,000
14	HDPE Force Main 10-inch Diameter	$100	3,860	LF	$386,000
15	Temporary Sewer Bypassing	$40,000	1	LS	$40,000
16	Hot Mix Asphalt (HMA)	$200	1,900	TN	$380,000
17	Bank Run Gravel for Trench Backfill	$30	8,820	TN	$264,600
18	Crushed Surfacing	$40	530	TN	$21,200
19	Foundation Gravel	$52	460	TN	$23,920
20	Submersible Pump Station	$750,000	1	LS	$750,000
21	Pump Station Electrical, Instrumentation, and Controls	$500,000	1	LS	$500,000
22	Pump Station Emergency Power Generation	$85,000	1	LS	$85,000
23	Facility Startup and Testing	$40,000	1	LS	$40,000
24	Final Cleanup and Restoration	$35,000	1	LS	$35,000
	Subtotal				$3,860,060
	Construction Contingency	25%			$965,015
	Sales Tax	8.8%			$424,607
	Total				$5,250,000

TOTAL OPINION OF PROBABLE CONSTRUCTION COST		$5,250,000
ALLIED COSTS		
Final Design Engineering	10%	$525,000
Administration/Legal	2%	$105,000
Construction Services	7%	$367,500
Property/Easement Acquisition	5%	$262,500
Power Service Extension		$300,000
Annual Operation and Maintenance Costs		$20,000
TOTAL OPINION OF PROBABLE ALLIED COST		$1,580,000
TOTAL OPINION OF PROBABLE PROJECT COST		**$6,830,000**

Notes
1. OPPC based on Preliminary OPPC developed under a separate project with the City.
2. Costs are in 2023 dollars

The opinion of probable cost herein is based on our perception of current conditions at the project location. This opinion reflects our professional opinion of costs at this time and is subject to change as the project design progresses. BHC Consultants has no control over variances in the cost of labor, materials, equipment; nor services provided by others, contractor's means and methods of executing the work or of determining prices, competitive bidding or market conditions, practices or bidding strategies. BHC Consultants cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the costs presented as shown.

City of Enumclaw
Sewer Comprehensive Plan
Planning Level Opinion of Probable Project Costs
24-in From Myrtine-Scandia to Across SR410
Reference Folder Semanski (from 2016 GSP)
Prepared by: A. Dunwoody 4/7/2023
Reviewed by: Tony Fisher 4/7/2023

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$50,000	1	ls	$50,000
2	Temporary Erosion & Sediment Control	$10,000	1	ls	$10,000
3	Dewatering	$15,000	1	ls	$15,000
4	30-inch PVC Gravity Sewer	$624	275	lf	$171,600
5	60-inch Manhole	$18,000	2	ea	$36,000
6	Bypass	$40,000	1	ls	$40,000
7	Traffic Control	$40,000	1	ls	$40,000
8	General Restoration	$40,000	1	ls	$40,000
	Subtotal				$402,600
	Sales Tax	8.8%			$35,429
	Total				$438,029

TOTAL OPINION OF PROBABLE CONSTRUCTION COST		$438,100
Planning	5%	$22,000
Design and Permitting	15%	$65,800
Services During Construction	15%	$65,800
TOTAL OPINION OF PROBABLE ALLIED COST		$153,600
Contingency	35%	$207,100
TOTAL OPINION OF PROBABLE PROJECT COST		**$798,800**

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Mobilization assumed to be 10% of construction costs
4. Temporary Erosion Control and General Restoration assumed to be 2% of construction costs
5. Traffic Control assumed to be 4% of construction costs
6. Pipe costs includes all excavation, pipe, fittings, bedding, imported backfill, and haul
7. Costs are in 2023 dollars

The opinion of probable cost herein is based on our perception of current conditions at the project location. This opinion reflects our profess

City of Enumclaw
Sewer Comprehensive Plan
Planning Level Opinion of Probable Project Costs
24-in on Myrtine - Scandia to Roosevelt
Reference Folder: 24-in on Myrtine - Scandia to Roosevelt
Prepared by: A. Dunwoody 4/7/2023
Reviewed by: Tony Fisher 4/7/2023

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$140,000	1	ls	$140,000
2	Temporary Erosion & Sediment Control	$28,000	1	ls	$28,000
3	Dewatering	$30,000	1	ls	$30,000
4	8-inch PVC Gravity Sewer	$185	255	lf	$47,175
5	24-inch PVC Gravity Sewer	$435	1,500	lf	$652,500
6	48-inch Manhole	$12,000	7	ea	$84,000
7	Side Sewer Connections	$4,400	30	ea	$132,000
8	HMA Trench Patch	$250	330	tn	$82,500
9	Half-Width Grind and HMA Overlay	$250	280	tn	$70,000
10	Crushed Surfacing	$40	330	tn	$13,200
11	Sheeting, Shoring, Bracing	$10	1,755	lf	$17,550
12	Bypass	$15,000	1	ls	$15,000
13	Traffic Control	$56,000	1	ls	$56,000
14	General Restoration	$28,000	1	ls	$28,000
	Subtotal				$1,395,925
	Sales Tax	8.8%			$122,841
	Total				$1,518,766

TOTAL OPINION OF PROBABLE CONSTRUCTION COST		$1,518,800
Planning	5%	$76,000
Design and Permitting	15%	$227,900
Services During Construction	15%	$227,900
TOTAL OPINION OF PROBABLE ALLIED COST		$531,800
Contingency	35%	$717,800
TOTAL OPINION OF PROBABLE PROJECT COST		**$2,768,400**

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Mobilization assumed to be 10% of construction costs
4. Temporary Erosion Control and General Restoration assumed to be 2% of construction costs
5. Traffic Control assumed to be 4% of construction costs
6. Pipe costs includes all excavation, pipe, fittings, bedding, imported backfill, and haul
7. Costs are in 2023 dollars

The opinion of probable cost herein is based on our perception of current conditions at the project location. This opinion reflects our profess

City of Enumclaw
Sewer Comprehensive Plan
Planning Level Opinion of Probable Project Costs
264th Ave Extension at TMMS
Reference Folder: 264th Ave Extension at TMMS
Prepared by: A. Dunwoody 4/7/2023
Reviewed by: Tony Fisher 4/7/2023

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$53,000	1	ls	$53,000
2	Temporary Erosion & Sediment Control	$10,500	1	ls	$10,500
3	Dewatering	$15,000	1	ls	$15,000
4	8-inch PVC Gravity Sewer	$185	891	lf	$164,835
5	48-inch Manhole	$12,000	9	ea	$108,000
6	Side Sewer Connections	$4,400	7	ea	$30,800
7	HMA Trench Patch	$250	240	tn	$60,000
8	Half-Width Grind and HMA Overlay	$250	140	tn	$35,000
9	Crushed Surfacing	$40	110	tn	$4,400
10	Sheeting, Shoring, Bracing	$10	891	lf	$8,910
11	Bypass	$10,000	1	ls	$10,000
12	Traffic Control	$21,000	1	ls	$21,000
13	General Restoration	$10,500	1	ls	$10,500
	Subtotal				$531,945
	Sales Tax	8.8%			$46,811
	Total				$578,756

TOTAL OPINION OF PROBABLE CONSTRUCTION COST		$578,800
Planning	5%	$29,000
Design and Permitting	15%	$86,900
Services During Construction	15%	$86,900
TOTAL OPINION OF PROBABLE ALLIED COST		$202,800
Contingency	35%	$273,600
TOTAL OPINION OF PROBABLE PROJECT COST		**$1,055,200**

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Mobilization assumed to be 10% of construction costs
4. Temporary Erosion Control and General Restoration assumed to be 2% of construction costs
5. Traffic Control assumed to be 4% of construction costs
6. Pipe costs includes all excavation, pipe, fittings, bedding, imported backfill, and haul
7. Costs are in 2023 dollars

The opinion of probable cost herein is based on our perception of current conditions at the project location. This opinion reflects our profess

City of Enumclaw
Sewer Comprehensive Plan
Planning Level Opinion of Probable Project Costs
Garrett Park- Gravity Sewer
Reference Folder: Garrett Park (from 2016 GSP)
Prepared by: A. Dunwoody 4/7/2023
Reviewed by: Tony Fisher 4/7/2023

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$2,900	1	ls	$2,900
2	Temporary Erosion & Sediment Control	$600	1	ls	$600
3	Abandon Existing Sewer	$20	350	lf	$7,000
4	Install Cleanout	$1,000	2	ea	$2,000
5	Controlled Density Fill	$330	5	cy	$1,708
6	Existing Manhole Channel Modifications	$2,140	1	ea	$2,140
7	Plug Existing Sewer	$4,250	2	ea	$8,500
8	Abandon Existing Manhole	$1,000	2	ea	$2,000
9	Traffic Control	$1,100	1	ls	$1,100
10	General Restoration	$600	1	ls	$600
	Subtotal				$28,548
	Sales Tax	8.8%			$2,512
	Total				$31,060

TOTAL OPINION OF PROBABLE CONSTRUCTION COST		$31,100
Planning	5%	$1,600
Design and Permitting	15%	$4,700
Services During Construction	15%	$4,700
TOTAL OPINION OF PROBABLE ALLIED COST		$11,000
Contingency	35%	$14,800
TOTAL OPINION OF PROBABLE PROJECT COST		**$56,900**

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Mobilization assumed to be 10% of construction costs
4. Temporary Erosion Control and General Restoration assumed to be 2% of construction costs
5. Traffic Control assumed to be 4% of construction costs
6. Pipe costs includes all excavation, pipe, fittings, bedding, imported backfill, and haul
7. Costs are in 2023 dollars

The opinion of probable cost herein is based on our perception of current conditions at the project location. This opinion reflects our profes

City of Enumclaw
Sewer Comprehensive Plan
Planning Level Opinion of Probable Project Costs
Harding St - Kibler to Griffin
Reference Folder: Harding St-Kibler to Griffin and E-W for 1 Block (from 2016 GSP)
Prepared by: A. Dunwoody 4/7/2023
Reviewed by: Tony Fisher 4/7/2023

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$99,000	1	ls	$99,000
2	Temporary Erosion & Sediment Control	$20,000	1	ls	$20,000
3	Dewatering	$30,000	1	ls	$30,000
4	8-inch PVC Gravity Sewer	$185	1,670	lf	$308,950
5	48-inch Manhole	$12,000	5	ea	$60,000
6	Side Sewer Connections	$4,400	45	ea	$198,000
7	HMA Trench Patch	$250	440	tn	$110,000
8	Half-Width Grind and HMA Overlay	$250	260	tn	$65,000
9	Crushed Surfacing	$40	210	tn	$8,400
10	Sheeting, Shoring, Bracing	$10	1,670	lf	$16,700
11	Bypass	$15,000	1	ls	$15,000
12	Traffic Control	$40,000	1	ls	$40,000
13	General Restoration	$20,000	1	ls	$20,000
	Subtotal				$991,050
	Sales Tax	8.8%			$87,212
	Total				$1,078,262

TOTAL OPINION OF PROBABLE CONSTRUCTION COST		$1,078,300
Planning	5%	$54,000
Design and Permitting	15%	$161,800
Services During Construction	15%	$161,800
TOTAL OPINION OF PROBABLE ALLIED COST		$377,600
Contingency	35%	$509,600
TOTAL OPINION OF PROBABLE PROJECT COST		**$1,965,500**

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Mobilization assumed to be 10% of construction costs
4. Temporary Erosion Control and General Restoration assumed to be 2% of construction costs
5. Traffic Control assumed to be 4% of construction costs
6. Pipe costs includes all excavation, pipe, fittings, bedding, imported backfill, and haul
7. Costs are in 2023 dollars

The opinion of probable cost herein is based on our perception of current conditions at the project location. This opinion reflects our profess

City of Enumclaw
Sewer Comprehensive Plan
Planning Level Opinion of Probable Project Costs
Initial & Franklin - Remove Double Sewer
Reference Folder: Initial & Franklin (from 2016 GSP)
Prepared by: A. Dunwoody 4/7/2023
Reviewed by: Tony Fisher 4/7/2023

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$9,000	1	ls	$9,000
2	Temporary Erosion & Sediment Control	$1,800	1	ls	$1,800
3	Dewatering	$15,000	1	ls	$15,000
4	8-inch PVC Gravity Sewer	$185	50	lf	$9,250
5	Plug Existing Sewer Main & Abandon Ex. Pipe	$4,250	2	ea	$8,500
6	Side Sewer Connections	$4,400	2	ea	$8,800
7	48-inch Manhole	$12,000	2	ea	$24,000
8	HMA Trench Patch	$250	20	tn	$5,000
9	Half-Width Grind and HMA Overlay	$250	10	tn	$2,500
10	Crushed Surfacing	$40	10	tn	$400
11	Sheeting, Shoring, Bracing	$10	50	lf	$500
12	Traffic Control	$3,600	1	ls	$3,600
13	General Restoration	$1,800	1	ls	$1,800
	Subtotal				$90,150
	Sales Tax	8.8%			$7,933
	Total				$98,083

TOTAL OPINION OF PROBABLE CONSTRUCTION COST		$98,100
Planning	5%	$5,000
Design and Permitting	15%	$14,800
Services During Construction	15%	$14,800
TOTAL OPINION OF PROBABLE ALLIED COST		$34,600
Contingency	35%	$46,500
TOTAL OPINION OF PROBABLE PROJECT COST		**$179,200**

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Mobilization assumed to be 10% of construction costs
4. Temporary Erosion Control and General Restoration assumed to be 2% of construction costs
5. Traffic Control assumed to be 4% of construction costs
6. Pipe costs includes all excavation, pipe, fittings, bedding, imported backfill, and haul
7. Costs are in 2023 dollars

The opinion of probable cost herein is based on our perception of current conditions at the project location. This opinion reflects our profess

City of Enumclaw
Sewer Comprehensive Plan
Planning Level Opinion of Probable Project Costs
Lincoln Avenue Gravity Sewer - Division to Cole
Reference Folder: Lincoln Ave - Division to mid-Block S of Cole
Prepared by: A. Dunwoody 4/7/2023
Reviewed by: Tony Fisher 4/7/2023

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$41,500	1	ls	$41,500
2	Temporary Erosion & Sediment Control	$8,200	1	ls	$8,200
3	Dewatering	$15,000	1	ls	$15,000
4	12-inch PVC Gravity Sewer	$236	600	lf	$141,600
5	48-inch Manhole	$12,000	6	ea	$72,000
6	Side Sewer Connections	$4,400	11	ea	$48,400
7	HMA Trench Patch	$250	90	tn	$22,500
8	Half-Width Grind and HMA Overlay	$250	100	tn	$25,000
9	Crushed Surfacing	$40	90	tn	$3,600
10	Sheeting, Shoring, Bracing	$10	600	lf	$6,000
11	Bypass	$5,000	1	ls	$5,000
12	Traffic Control	$16,500	1	ls	$16,500
13	General Restoration	$8,200	1	ls	$8,200
	Subtotal				$413,500
	Sales Tax	8.8%			$36,388
	Total				$449,888

TOTAL OPINION OF PROBABLE CONSTRUCTION COST		$449,900
Planning	5%	$22,500
Design and Permitting	15%	$67,500
Services During Construction	15%	$67,500
TOTAL OPINION OF PROBABLE ALLIED COST		$157,500
Contingency	35%	$212,600
TOTAL OPINION OF PROBABLE PROJECT COST		**$820,000**

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Mobilization assumed to be 10% of construction costs
4. Temporary Erosion Control and General Restoration assumed to be 2% of construction costs
5. Traffic Control assumed to be 4% of construction costs
6. Pipe costs includes all excavation, pipe, fittings, bedding, imported backfill, and haul
7. Costs are in 2023 dollars

The opinion of probable cost herein is based on our perception of current conditions at the project location. This opinion reflects our profes

City of Enumclaw
Sewer Comprehensive Plan
Planning Level Opinion of Probable Project Costs
Loraine St Kibler to Griffin and E on Griffin to Garfield
Reference Folder: Loraine St-Kibler to Griffin
Prepared by: A. Dunwoody 4/7/2023
Reviewed by: Tony Fisher 4/7/2023

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$117,000	1	ls	$117,000
2	Temporary Erosion & Sediment Control	$23,000	1	ls	$23,000
3	Dewatering	$30,000	1	ls	$30,000
4	21-inch PVC Gravity Sewer	$346	1,630	lf	$563,980
5	48-inch Manhole	$12,000	5	ea	$60,000
6	Side Sewer Connections	$4,400	30	ea	$132,000
7	HMA Trench Patch	$250	270	tn	$67,500
8	Half-Width Grind and HMA Overlay	$250	260	tn	$65,000
9	Crushed Surfacing	$40	290	tn	$11,600
10	Sheeting, Shoring, Bracing	$10	1,630	lf	$16,300
11	Bypass	$15,000	1	ls	$15,000
12	Traffic Control	$47,000	1	ls	$47,000
13	General Restoration	$23,000	1	ls	$23,000
	Subtotal				$1,171,380
	Sales Tax	8.8%			$103,081
	Total				$1,274,461

TOTAL OPINION OF PROBABLE CONSTRUCTION COST		$1,274,500
Planning	5%	$63,800
Design and Permitting	15%	$191,200
Services During Construction	15%	$191,200
TOTAL OPINION OF PROBABLE ALLIED COST		$446,200
Contingency	35%	$602,300
TOTAL OPINION OF PROBABLE PROJECT COST		**$2,323,000**

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Mobilization assumed to be 10% of construction costs
4. Temporary Erosion Control and General Restoration assumed to be 2% of construction costs
5. Traffic Control assumed to be 4% of construction costs
6. Pipe costs includes all excavation, pipe, fittings, bedding, imported backfill, and haul
7. Costs are in 2023 dollars

The opinion of probable cost herein is based on our perception of current conditions at the project location. This opinion reflects our profess

City of Enumclaw
Sewer Comprehensive Plan
Planning Level Opinion of Probable Project Costs
Laframboise Alley Sewer Improvements
Reference Folder: 17_1800 Block Laframboise Alley
Prepared by: A. Dunwoody 4/7/2023
Reviewed by: Tony Fisher 4/7/2023

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$28,700	1	ls	$28,700
2	Temporary Erosion & Sediment Control	$5,800	1	ls	$5,800
3	Dewatering	$15,000	1	ls	$15,000
4	10-inch PVC Gravity Sewer	$193	570	lf	$110,010
5	Plug Existing Sewer Pipe at SSMH	$4,250	1	ea	$4,250
6	Side Sewer Connections	$4,400	7	ea	$30,800
7	48-inch Manhole	$12,000	2	ea	$24,000
8	HMA Trench Patch	$250	80	tn	$20,000
9	Half-Width Grind and HMA Overlay	$250	90	tn	$22,500
10	Crushed Surfacing	$40	80	tn	$3,200
11	Sheeting, Shoring, Bracing	$10	570	lf	$5,700
12	Traffic Control	$11,500	1	ls	$11,500
13	General Restoration	$5,800	1	ls	$5,800
	Subtotal				$287,260
	Sales Tax	8.8%			$25,279
	Total				$312,539

TOTAL OPINION OF PROBABLE CONSTRUCTION COST		$312,600
Planning	5%	$15,700
Design and Permitting	15%	$46,900
Services During Construction	15%	$46,900
TOTAL OPINION OF PROBABLE ALLIED COST		$109,500
Contingency	35%	$147,800
TOTAL OPINION OF PROBABLE PROJECT COST		**$569,900**

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Mobilization assumed to be 10% of construction costs
4. Temporary Erosion Control and General Restoration assumed to be 2% of construction costs
5. Traffic Control assumed to be 4% of construction costs
6. Pipe costs includes all excavation, pipe, fittings, bedding, imported backfill, and haul
7. Costs are in 2023 dollars

The opinion of probable cost herein is based on our perception of current conditions at the project location. This opinion reflects our profess

City of Enumclaw
Sewer Comprehensive Plan
Planning Level Opinion of Probable Project Costs
Chinook LS (Based on Alt 2 provided by City)
Reference Folder: Chinook LS Repl (432nd St Sewer LID)
Prepared by: A. Dunwoody 4/7/2023
Reviewed by: Tony Fisher 4/7/2023

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$124,000	1	ls	$124,000
2	Temporary Erosion and Sediment Control	$31,000	1	ls	$31,000
3	Clearing and Grubbing	$5,000	1	ls	$5,000
4	Dewatering	$30,000	1	ls	$30,000
5	Project Temporary Traffic Control	$62,000	1	ls	$62,000
6	Removal of Structures and Obstructions	$50,000	1	ls	$50,000
7	Shoring or Extra Excavation Cl. B	$30,000	1	ls	$30,000
8	Crushed Surfacing	$40	400	ton	$16,000
9	HMA Trench Patch	$250	281	ton	$70,231
10	Half-Width Grind and HMA Overlay	$250	254	ton	$63,588
11	CDF Backfill	$300	22	cy	$6,597
12	8-inch PVC Gravity Sewer	$185	2,186	lf	$404,410
13	4-inch C900 PVC SSFM	$134	1,030	lf	$138,020
14	Manhole 48 In. Diam. Type 1	$5,500	10	ea	$55,000
15	Side Sewer Connections	$4,400	6	ea	$26,400
16	Smith and Loveless Lift Station	$400,000	1	ls	$400,000
17	Final Cleanup	$31,000	1	ls	$31,000
	Subtotal				$1,543,247
	Sales Tax	8.8%			$135,806
	Total				$1,679,053

TOTAL OPINION OF PROBABLE CONSTRUCTION COST		$1,679,100
Planning	5%	$84,000
Design and Permitting	15%	$251,900
Services During Construction	15%	$251,900
TOTAL OPINION OF PROBABLE ALLIED COST		$587,800
Contingency	35%	$793,500
TOTAL OPINION OF PROBABLE PROJECT COST		**$3,060,400**

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Mobilization assumed to be 8% of construction costs
4. Temporary Erosion Control and General Restoration assumed to be 2% of construction costs
5. Traffic Control assumed to be 4% of construction costs
6. Pipe costs includes all excavation, pipe, fittings, bedding, imported backfill, and haul
7. Costs are in 2023 dollars

The opinion of probable cost herein is based on our perception of current conditions at the project location. This opinion reflects our profes

City of Enumclaw
Sewer Comprehensive Plan
Planning Level Opinion of Probable Project Costs
Griffin Ave - Loraine to Farrelly
Reference Folder: 20_Griffin Ave - Loraine to Farrelly
Prepared by: A. Dunwoody 4/7/2023
Reviewed by: Tony Fisher 4/7/2023

Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization	$128,000	1	ls	$128,000
2	Temporary Erosion & Sediment Control	$27,000	1	ls	$27,000
3	Dewatering	$30,000	1	ls	$30,000
4	18-inch PVC Gravity Sewer	$337	1,850	lf	$623,450
5	48-inch Manhole	$12,000	7	ea	$86,400
6	Side Sewer Connections	$4,400	24	ea	$105,600
7	HMA Trench Patch	$250	290	tn	$72,500
8	Half-Width Grind and HMA Overlay	$250	290	tn	$72,500
9	Crushed Surfacing	$40	310	tn	$12,400
10	Sheeting, Shoring, Bracing	$10	1,850	lf	$18,500
11	Bypass	$15,000	1	ls	$15,000
12	Traffic Control	$50,000	1	ls	$50,000
13	General Restoration	$27,000	1	ls	$27,000
	Subtotal				$1,268,350
	Sales Tax	8.8%			$111,615
	Total				$1,379,965

TOTAL OPINION OF PROBABLE CONSTRUCTION COST		$1,380,000
Planning	5%	$69,000
Design and Permitting	15%	$207,000
Services During Construction	15%	$207,000
TOTAL OPINION OF PROBABLE ALLIED COST		$483,000
Contingency	35%	$652,100
TOTAL OPINION OF PROBABLE PROJECT COST		**$2,515,100**

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Mobilization assumed to be 10% of construction costs
4. Temporary Erosion Control and General Restoration assumed to be 2% of construction costs
5. Traffic Control assumed to be 4% of construction costs
6. Pipe costs includes all excavation, pipe, fittings, bedding, imported backfill, and haul
7. Costs are in 2023 dollars

The opinion of probable cost herein is based on our perception of current conditions at the project location. This opinion reflects our professional opinion of costs at this time and is subject to change as the project design progresses. BHC Consultants has no control over variances in the cost of labor, materials, equipment; nor services provided by others, contractor's means and methods of executing the work or of determining prices, competitive bidding or market conditions, practices or bidding strategies. BHC Consultants cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the costs presented as shown.

City of Enumclaw
Sewer Comprehensive Plan
Planning Level Opinion of Probable Project Costs
Berilla & Rainier LS Upgrade
Reference Folder:
Prepared by: A. Dunwoody 4/7/2023
Reviewed by: Scott Woodbury 7/15/2023

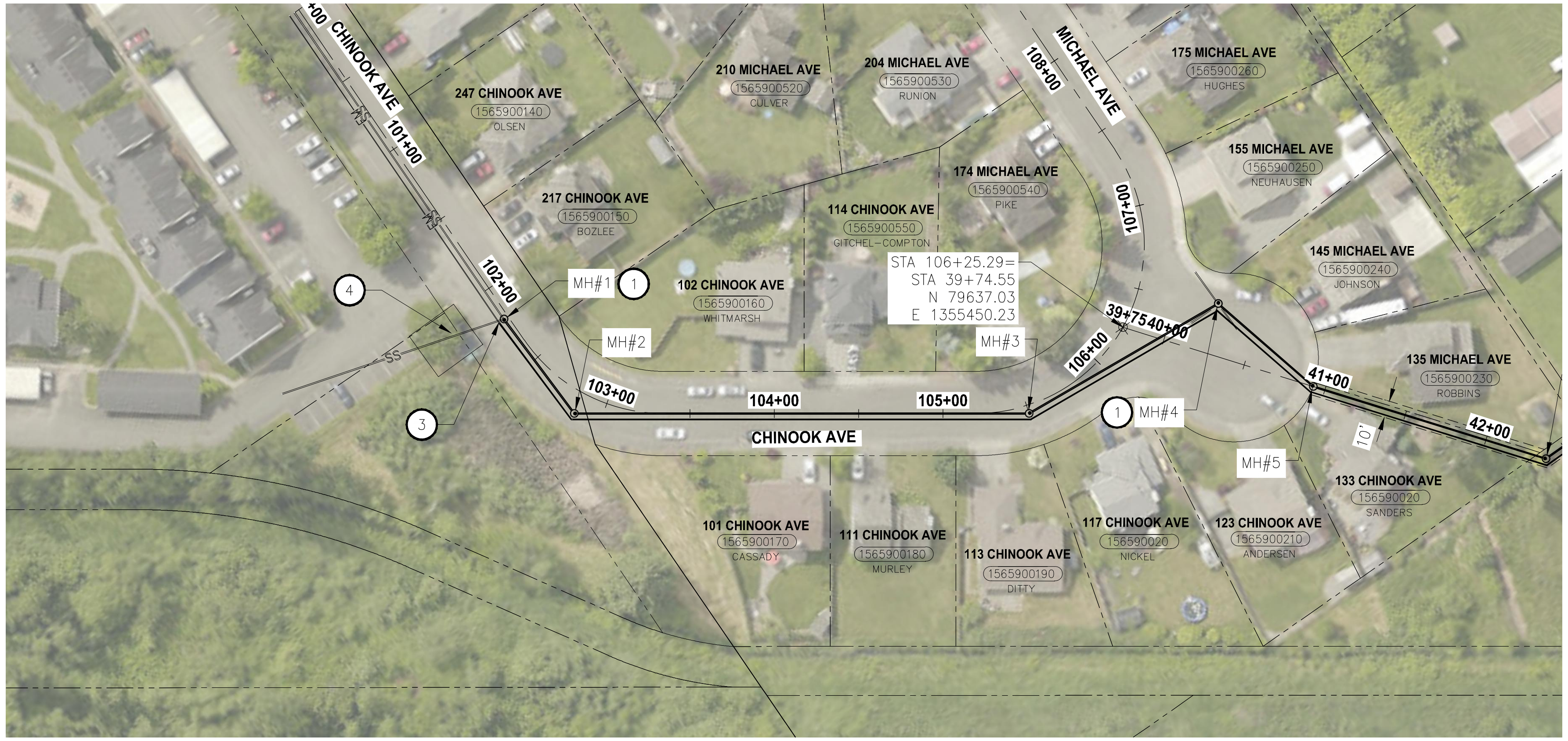
Bid Item No.	Bid Item Description	Unit Bid Price	Quantity	Unit	Total
1	Mobilization		1	ls	$0
2	Electrical Service & Control System Replacement	$15,000	1	ls	$15,000
3	Control Panel Replacement & Telemetry	$30,000	1	ls	$30,000
	Subtotal				$45,000
	Sales Tax	8.8%			$3,960
	Total				$48,960

TOTAL OPINION OF PROBABLE CONSTRUCTION COST		$49,000
Planning	0%	$0
Design and Permitting	15%	$7,400
Services During Construction	10%	$4,900
TOTAL OPINION OF PROBABLE ALLIED COST		$12,300
Contingency	35%	$21,500
TOTAL OPINION OF PROBABLE PROJECT COST		**$82,800**

Notes
1. Import backfill assumed to be 100%
2. Foundation Gravel assumed to be 100%
3. Mobilization assumed to be 10% of construction costs
4. Temporary Erosion Control and General Restoration assumed to be 2% of construction costs
5. Traffic Control assumed to be 4% of construction costs
6. Pipe costs includes all excavation, pipe, fittings, bedding, imported backfill, and haul
7. Costs are in 2023 dollars

The opinion of probable cost herein is based on our perception of current conditions at the project location. This opinion reflects our professional opinion of costs at this time and is subject to change as the project design progresses. BHC Consultants has no control over variances in the cost of labor, materials, equipment; nor services provided by others, contractor's means and methods of executing the work or of determining prices, competitive bidding or market conditions, practices or bidding strategies. BHC Consultants cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the costs presented as shown.

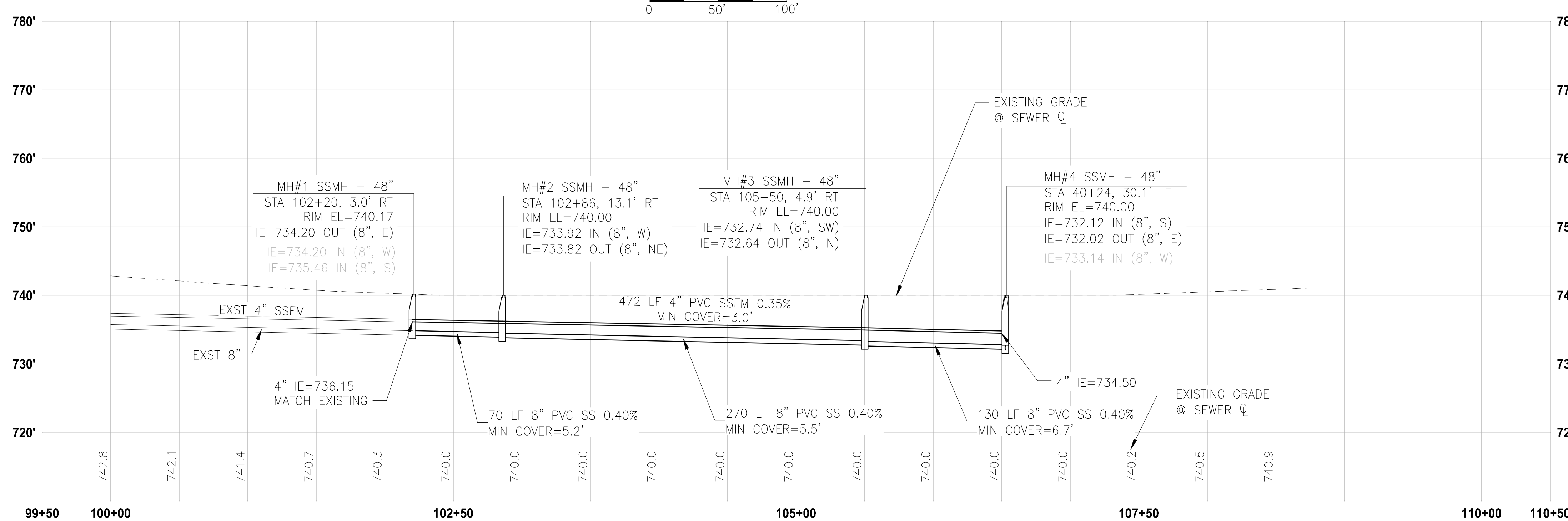
Exhibit 2 – Chinook Lift Station Preliminary Plan



PLAN

SCALE IN FEET

0 50' 100'



PROFILE

HORIZ: 1"=50'
VERT: 1"=10'

CONSTRUCTION NOTES:

1. CONNECT TO EXISTING GRAVITY SEWER PIPE
2. CONSTRUCT NEW SMITH AND LOVELESS LIFT STATION
3. CONNECT TO EXISTING FORCE MAIN
4. REMOVE EXISTING LIFT STATION AFTER NEW STATION IS OPERATIONAL

LEGEND:

– – – – – – – SANITARY SEWER EASEMENT

PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

PRELIMINARY

MALLORY KRISTINE ... STATE OF WASHINGTON ... REGISTERED PROFESSIONAL ENGINEER

REVISIONS	DATE	BY

DESIGNED MKW
DRAWN MKW
CHECKED JLW
APPROVED

ONE INCH AT FULL SCALE. IF NOT, SCALE ACCORDINGLY
FILE NAME PU2497005P01T13-UT02
JOB No. 214-2497-005 01/13
DATE DECEMBER 2016

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES
1019 39TH AVENUE SE, SUITE 100 | PUYALLUP, WA 98374
P 253.604.6600
WWW.PARAMETRIX.COM

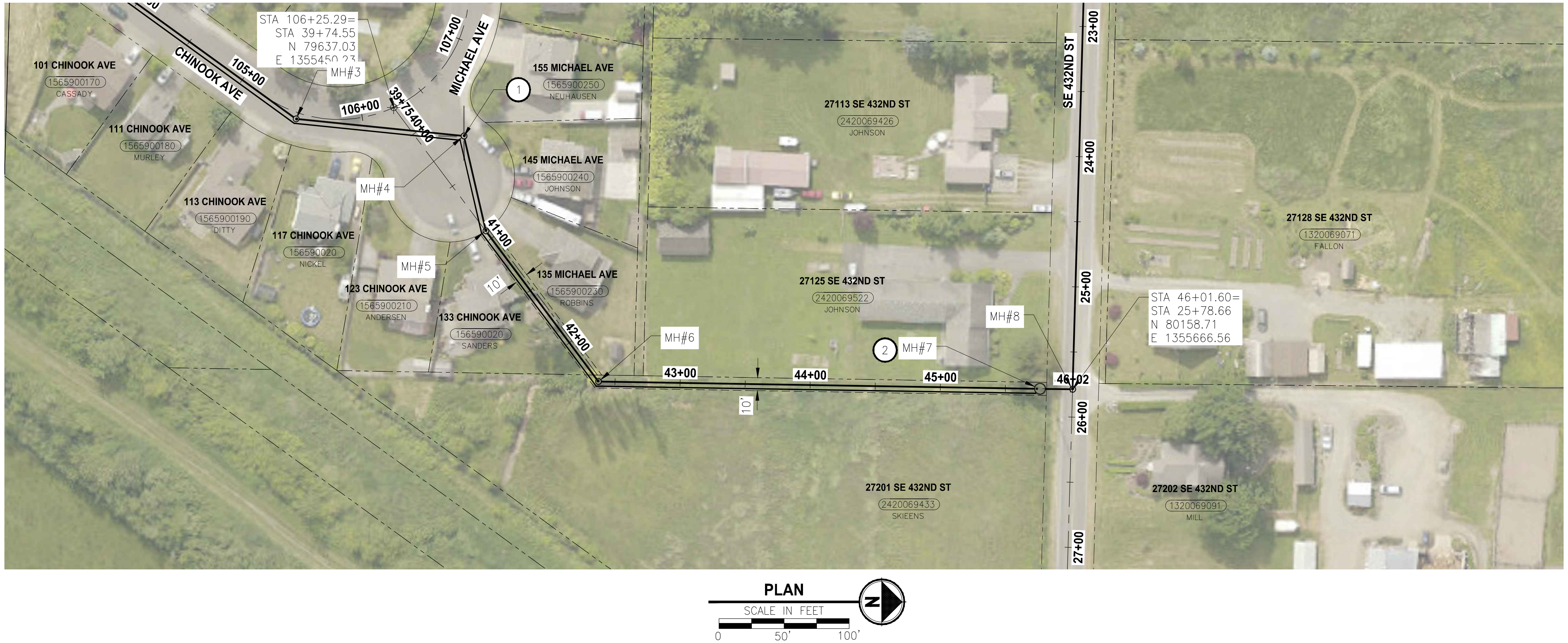
PROJECT NAME
432ND ST UTILITY LOCAL IMPROVEMENT DISTRICT
ENUMCLAW, WA

SANITARY SEWER PLAN AND PROFILE ALTERNATIVE 2

DRAWING NO. 1 OF 3

UT1

LAYOUT: UT1 PATH: U:\PSO\Projects\Clients\2497-CityOfEnumclaw\214-2497-005 2014OCGeneralEngSvcs\99Svcs\CADD\DWG\T13\ PLOTTED BY: wildemol DATE: Friday, December 30, 2016 11:13:55 AM



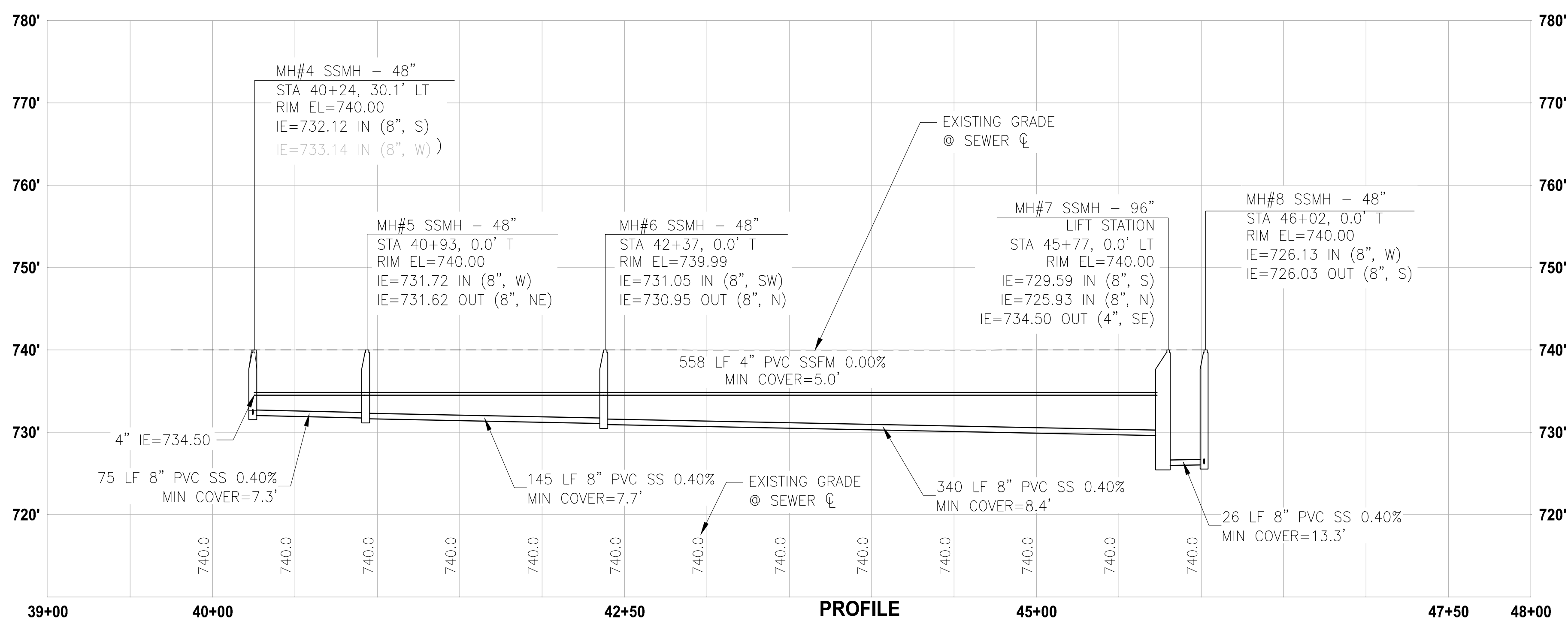
PLAN

CONSTRUCTION NOTES:

1. CONNECT TO EXISTING GRAVITY SEWER PIPE
2. CONSTRUCT NEW SMITH AND LOVELESS LIFT STATION
3. CONNECT TO EXISTING FORCE MAIN
4. REMOVE EXISTING LIFT STATION AFTER NEW STATION IS OPERATIONAL

LEGEND:

- - - - - - - SANITARY SEWER EASEMENT



PROFILE

HORIZ: 1"=50'

VERT: 1"=10'

PRELIMINARY

MALLORY KRISTINE ... STATE OF WASHINGTON ... REGISTERED PROFESSIONAL ENGINEER

PRELIMINARY DESIGN

NOT FOR CONSTRUCTION

REVISIONS	DATE	BY	
			DESIGNED MKW
			DRAWN MKW
			CHECKED JLW
			APPROVED

ONE INCH AT FULL SCALE. IF NOT, SCALE ACCORDINGLY

FILE NAME PU2497005P01T13–UT02

JOB No. 214–2497–005 01/13

DATE DECEMBER 2016

Parametrix

ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

1019 39TH AVENUE SE, SUITE 100 | PUYALLUP, WA 98374

P 253.604.6600

WWW.PARAMETRIX.COM

PROJECT NAME

432ND ST UTILITY LOCAL IMPROVEMENT DISTRICT

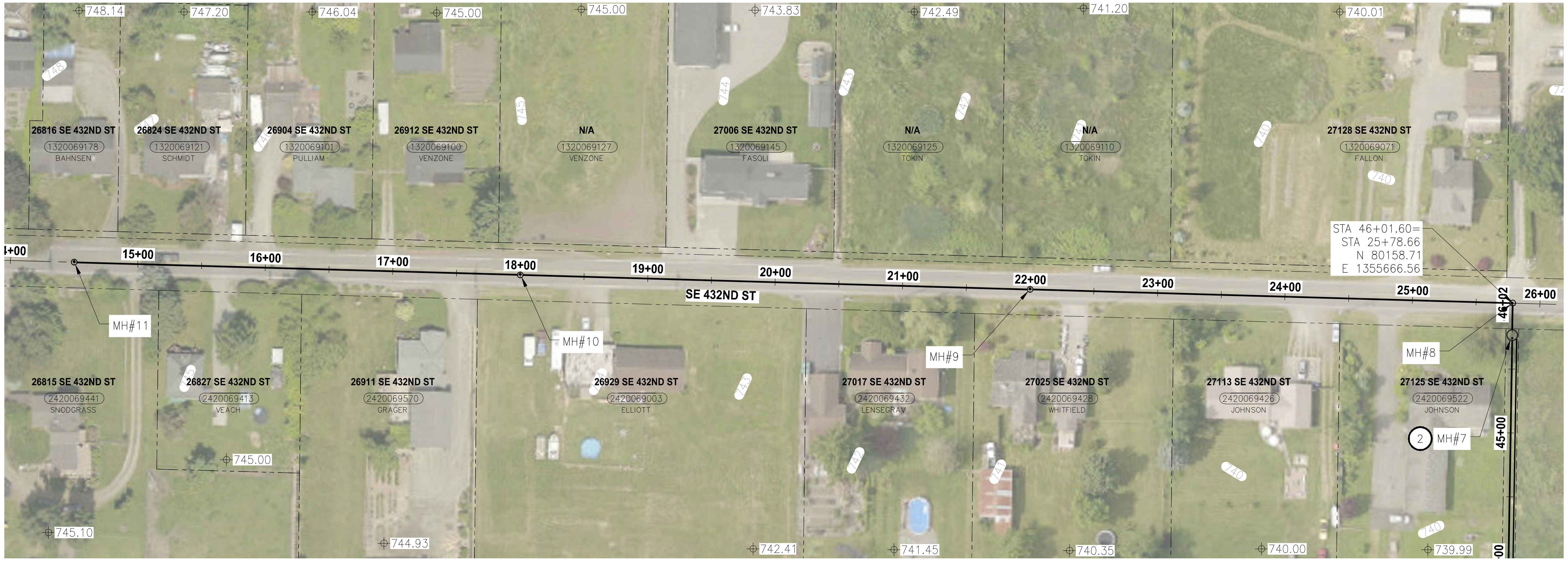
ENUMCLAW, WA

SANITARY SEWER PLAN AND PROFILE ALTERNATIVE 2

DRAWING NO. 2 OF 3

UT2

LAYOUT: UT2 PATH: U:\PSO\Projects\Clients\2497–CityOfEnumclaw\214–2497–005 2014OCGeneralEngSvcs\99Svcs\CADD\DWG\T13\ PLOTTED BY: wildemol DATE: Friday, December 30, 2016 11:14:20 AM



PLAN

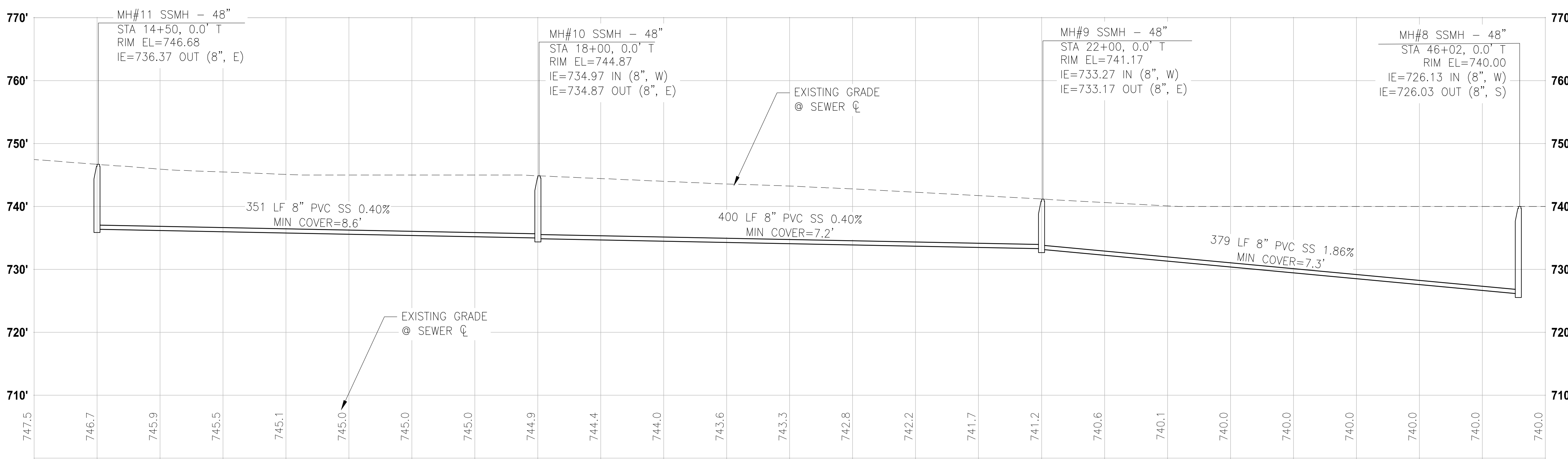
SCALE IN FEET
0 50' 100'
N

CONSTRUCTION NOTES:

1. CONNECT TO EXISTING GRAVITY SEWER PIPE
2. CONSTRUCT NEW SMITH AND LOVELESS LIFT STATION
3. CONNECT TO EXISTING FORCE MAIN
4. REMOVE EXISTING LIFT STATION AFTER NEW STATION IS OPERATIONAL

LEGEND:

– – – – – – SANITARY SEWER EASEMENT



PROFILE

HORIZ: 1"=50'
VERT: 1"=10'

PRELIMINARY

MALLORY KRISTINE ... STATE OF WASHINGTON ... REGISTERED PROFESSIONAL ENGINEER

PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

REVISIONS	DATE	BY	
			DESIGNED MKW
			DRAWN MKW
			CHECKED JLW
			APPROVED

ONE INCH AT FULL SCALE. IF NOT, SCALE ACCORDINGLY

FILE NAME PU2497005P01T13-UT02
JOB No. 214-2497-005 01/13
DATE DECEMBER 2016

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES
1019 39TH AVENUE SE, SUITE 100 | PUYALLUP, WA 98374
P 253.604.6600
WWW.PARAMETRIX.COM

PROJECT NAME
432ND ST UTILITY LOCAL IMPROVEMENT DISTRICT
ENUMCLAW, WA

SANITARY SEWER PLAN AND PROFILE ALTERNATIVE 2

DRAWING NO. 3 OF 3

UT3

LAYOUT: UT3 PATH: U:\PSO\Projects\Clients\2497-CityOfEnumclaw\214-2497-005 2014OGeneralEngSvcs\99Svcs\CADD\DWG\T13\ PLOTTED BY: wildemol DATE: Friday, December 30, 2016 11:14:38 AM

Appendix G – Standards for Sanitary Sewer Systems
August 2023

STANDARDS FOR SANITARY SEWER SYSTEMS

1.1 GENERAL

The City has developed a General Sewer Plan to allow the orderly and cost effective development of sewerage facilities to serve existing and future users of the Enumclaw sewer system. The General Sewer Plan indicates the location and configuration of major components of the existing and proposed sanitary sewer collection system, lift stations, and treatment plant.

These standards contain the design criteria and improvement specifications for the extension of or connection to the City of Enumclaw's Sanitary Sewer System. These improvements may include the following:

- Sewer main extensions, modifications, and replacements.
- Side sewer connections to City mains.

1.2 REFERENCES

The design and installation of all sewer mains, laterals, and appurtenances shall be in accordance with these standards, and applicable provisions of the following in the order listed as to precedence with regard to conflicts:

- Enumclaw Municipal Code (EMC) Title 14, Utilities.
- EMC Title 17, Subdivisions
- Enumclaw General Sewer Plan, latest edition, including any amendment.
- Enumclaw General Construction Notes and Right-of-Way Permit Requirements.
- WSDOT *Standard Specifications for Road, Bridge, and Municipal Construction*, latest edition.
- Ecology *Criteria for Sewage Works Design*, latest edition.

The manufacturer's recommended installation procedures shall be adhered to.

1.3 SEWER MAIN EXTENSION DESIGN REQUIREMENTS

1.3.1 General

All sewer main extensions shall conform to the requirements of the City, the most current WSDOT *Standard Specifications for Road, Bridge, and Municipal Construction*, and the Ecology *Criteria for Sewage Works Design.*

1.3.2 Sewer Plan Requirements

At a minimum, the following items shall be included/addressed on a sewer plan:

- Stationing and reference points to all manholes, laterals, and cleanouts.
- Detail all new connections to an existing sewer main.
- Sewer line profile, including the vertical orientation of all existing and proposed utilities to identify possible utility conflicts.
- Minimum separation requirements between sewer lines and all other utilities.
- Sewer line extension information, including manhole type, location, size, invert elevations, rim elevations, pipe type, location, slope, diameter, and cleanout location.
- Locations and design details of lift stations and grinder pumps, as applicable.
- Permanent easements for sewer lines and structures.
- General location of pipe shall be three feet south and west of street centerline.
- Reference to applicable City sewer system standard details.

1.3.3 Sewer Design Standards

The minimum diameter sanitary gravity sewer main shall be 8 inches. Larger diameters may be required for systems requiring increased capacity. All sewers shall be designed and constructed in straight alignment and at continuous grade between manholes.

All sanitary sewers shall be designed and constructed to provide a minimum velocity of 2 feet per second (fps) flowing full, and a maximum velocity of 10 fps. Where velocities are greater than 10 fps, or where pipe slopes are greater than 20 percent, pipe anchors shall be required. Pipe anchors shall be designed by a professional civil or geotechnical engineer licensed in the state of Washington and submitted to the City Engineer or designee for review and approval prior to implementation.

Minimum slopes for sewers shall be as shown in the City Standard Details. The minimum slope on dead-end runs shall be 1%.

Sewer Main Location

Sanitary sewers shall be installed to provide a minimum of 18-inch-vertical and 10-foot-horizontal separation, measuring edge to edge, from any existing or proposed water main. Any deviation from this requirement shall meet Ecology, Washington State Department of Health, and City of Enumclaw standard detail requirements; and will be allowed only at the discretion of the City Engineer or designee.

Easements and Rights-of-Way

Utility extensions shall be installed within City right-of-way whenever possible. Work inside county and state right-of-way requires special permits from applicable agencies. All applicable permits must be obtained by the Developer/Owner.

Permanent on-site easements for access, maintenance, and construction are required for all sanitary sewer extensions located outside of public right-of-way. If an easement or right-of-way is fenced, a gate shall be installed for the width of the easement and an approved City lock installed to allow access by City personnel.

Private improvements such as buildings, garages, carports, utilities, signs, mailbox stands, light standards, etc., are not allowed in public easements and rights-of-way. Where an encroachment occurs, the Contractor/Property Owner shall immediately remove and relocate the conflicting private improvement when directed by the City Engineer or designee.

Easement Requirements

Unless otherwise allowed, the minimum easement widths and access requirements are as follows:

- Sanitary Sewers (under 6 feet deep): 15 feet wide.
- Sanitary Sewers (over 6 feet deep): 20 feet wide.
- Access roads are required to each sanitary sewer manhole for maintenance. Access roads shall be 15 feet wide, with an approved all-weather surface, and shall be designed to support an H-20 vehicle load.

Note: Large diameter, deep sewers, or special conditions may require greater easement widths. Final easement width shall be at the discretion of the City Engineer or designee.

1.3.4 Gravity Sewer System Components

Sanitary Sewer Manholes

Sanitary sewer manholes are required at the following locations:

- At the termination of all sewer mains 8 inches in diameter and larger.
- Where the sewer main changes diameter.
- Where there are connections to an 8-inch-diameter, or larger, main.
- Where there is a horizontal or vertical change in sewer main alignment.
- At 400-foot intervals, minimally unless otherwise allowed.

Minimum sewer manhole diameter shall be 48 inches for sewer pipes up to 18 inches in diameter. For incoming pipe larger than 18 inches or for special configurations, manhole diameter shall be 54 inches or greater.

All standard City manholes shall have precast eccentric cones except special shallow manholes less than 5 feet deep (from rim to invert). Flat slabs shall not be used unless approved in writing by the City Engineer or designee.

Outside drop connections shall be required at all locations where the sewer pipe invert entering is 18 inches or more above the outfall invert elevation. Inside drop connections may be considered in special cases at the discretion of the City Engineer or designee. A 0.1-foot drop from invert to invert across the manhole is required.

Manholes installed outside the traveled City right-of-way shall have watertight locking frames and covers.

Side Sewer Laterals

The minimum diameter of a side sewer within the public right-of-way shall not be less than 6 inches. A service lateral to a single-family residence shall not be less than 4 inches in diameter from right-of-way or easement line to the building.

The maximum 6-inch lateral length shall be 150 feet with a cleanout required no farther than 100 feet from the connection to the main. Cleanouts shall be fitted with a watertight cap to prevent inflow to the sanitary sewer system.

1.4 SEWER SYSTEM COMPONENTS, MATERIALS, AND INSTALLATION

The Contractor/Developer shall provide the City, for their review and approval, shop drawings, and certifications for all materials being used in the construction of sewer mains, side sewers, and appurtenances. All materials and equipment shall be installed in accordance with the manufacturer's recommendations and procedures and the City standards.

Materials used to construct sewer mains, side sewers, and appurtenances shall be new and undamaged and are subject to inspection by the City before use.

1.4.1 Pump Stations

Updated sewer pump station requirements are included as Attachment 4 and replace the station requirements originally in Section 1.3 of the 2016 GSP.

~~1.4.1~~1.4.2 Force Mains

Force mains shall be Driscoplex 4000/4100 Service HDPE pipe or equal. Standard dimension ratio shall be 11 (160 psi rating) unless otherwise allowed by the City. Pipe shall be marked as prescribed by AWWA C906 or ASTM F714. Pipe and fittings shall be joined by heat fusion (butt fusion) welding only. Heat fusion welders shall be certified by the pipe manufacturer. Limited use of ductile iron pipe and fittings may be allowed conforming to AWWA C151 Class 52 and AWWA C110 or C153 with polyethylene or epoxy lining of minimum 40 mils and exterior asphaltic coating. Joints shall conform to AWWA C111. Fittings for connecting HDPE to ductile iron pipe shall be heat fusion welded flanged fittings with stainless steel backing ring to bolt to flanged ductile iron pipe and/or fittings. Connections to flanged ductile iron pipe and/or fittings may require the use of adapter flanges, Maskell-Robbins Uni-Ring Adapter Flange or approved equal. Electrofusion couplings shall not be used unless otherwise allowed by the City on a case-by-case basis.

~~1.4.2~~1.4.3 Gravity Sewer Mains

The minimum diameter for all new sanitary sewer mains shall be 8 inches. The City reserves the right to increase the size of the sewer trunk line over and above the diameter specified. The minimum sewer main depth shall be as indicated in the City General Sewer Plan.

Sewer Main Pipe and Fittings

The following materials are acceptable for sewer main construction.

- Pipe: SDR 35 PVC meeting ASTM 3034 for pipe up to 15-inch diameter and ASTM F 679, Type 1, for pipes 18 through 27 inches in diameter per WSDOT Section 9-05.12 or ductile iron pipe, thickness Class 50, with epoxy lining.

- Pipe Joints: Bell and spigot joints with elastomeric gaskets conforming to AWWA C111 for ductile iron pipe and ASTM F 477 for SDR 35 PVC.

- Fittings: Gasketed fittings in conformance with AWWA C110 or AWWA C153 for ductile iron. Ductile iron fittings shall be epoxy lined. PVC fittings shall be constructed of the same material as the pipe.

New sewer pipe shall be clearly marked with the type, class, thickness, and manufacturer. The lettering shall be legible and factory printed.

Manholes

Sanitary sewer manholes shall be precast reinforced cement concrete units constructed in accordance with the WSDOT Section 9-05.50. Manhole frames and lids shall be per City Standard Details. Manhole covers shall be installed to ensure a nonrocking fit.

Sanitary sewer manholes shall be fully channeled from invert to spring line as needed to provide a smooth transition from pipe flow line to manhole channel. Channeling shelves shall be sloped 2 percent towards the channel. A 0.1-foot drop from invert to invert across the manhole channeling is required.

Joints between precast manhole sections shall be rubber gasketed. All manhole section joints, pickholes, and adjustment rings shall be sealed with nonshrink grout and shall be watertight. Grout shall be smooth finished outside and inside after installation. Castings shall be seated in nonshrink grout placed on the adjustment ring or brick. A $^{3}/_{8}$-inch mortar lining shall be installed on the inside and outside of the adjustment section to form a smooth watertight finish.

Care must be taken to ensure that the pressures exerted on soils beneath the manholes and the adjacent mains are approximately uniform. Unequal soil pressures may result in excessive manhole settlement. A spread foundation or other measures may be required to reduce the unit load imposed by the manhole. All manholes shall be provided with KOR-N-SEAL type flex joints or approved equivalent to allow slight differential movement.

Ladder rungs shall be grouted in precast manhole walls. Rungs shall be vertically aligned with a uniform 12-inch separation to allow access to the bottom of the structure.

~~1.4.3~~1.4.4 Sanitary Service Laterals

Sewer laterals within the City right-of-way shall be 6 inches, minimally. Sanitary sewer laterals servicing a single domestic premise may be 4 inches in diameter from the property line to the structure. Private laterals servicing a duplex or a commercial/industrial business shall be 6 inches in diameter, minimally. Where possible, the sewer service shall be 4 feet, 6 inches deep at the property line.

Cleanouts shall be installed at the right-of-way line and within 2 feet of the premises. Cleanouts shall be of the same material and diameter as the service lateral.

Service lateral connections to new sewer mains shall be made with a tee fitting. Connections to existing sanitary sewer mains shall be made with a stainless steel sewer saddle. The City Engineer or designee shall approve sewer saddles prior to installation in the field.

Sanitary service laterals from the main to the right-of-way line shall be 6-inch diameter, minimally. The lateral from the right-of-way line to the structure shall be 4-inch diameter, minimally.

Service lateral materials shall be:

- Pipe: ASTM 3034, SDR 35 PVC meeting per WSDOT Section 9-05.12 or ductile iron pipe, thickness Class 50 with epoxy lining.

- Pipe Joints: Bell and spigot joints with elastomeric gaskets conforming to AWWA C111 for ductile iron pipe and ASTM F 477 for SDR 35 PVC.

- Fittings: Gasketed fittings in conformance with AWWA C110 or AWWA C153 for ductile iron. Ductile iron fittings shall be epoxy lined. PVC fittings shall be gasketed, push-on types and be constructed of the same material as the pipe.

Locate Wire

A 12-gauge solid copper single strand continuous locating wire with plastic insulation shall be wound on the outside of all sanitary services. The wire shall be looped around the sanitary main and brought to the surface with the right-of-way cleanout. No splices will be allowed in the locate wire.

Cleanouts

Cleanouts shall be installed per City standard detail.

Sewer Service Saddles

Sewer saddles used to install new sanitary sewer laterals on an existing sewer main shall be as manufactured by Romac or approved equivalent. Approved saddle components shall be as follows:

- Saddle Body: Protective coated ductile iron in conformance with ASTM 5436.

- Gasket: Virgin styrene-butadiene rubber (SBR) compounded for sewer service per ASTM D 2000 MBA 710.

- Adjustable Strap: Type 304 stainless steel per ASTM A 240.

- Accessories:

  - Bolts: UNC rolled thread, Type 304 stainless steel per ASTM A 193.

  - Washers: Type 304 stainless steel per ASTM A 240.

  - Nuts: Type 304 stainless steel per ASTM A 194.

~~1.4.4~~1.4.5 Appurtenances

Detectable Marking Tape

Green marking tape made of inert polyethylene with a metal core in conformance with WSDOT Section 9-15.18 shall be installed in sewer main and sewer lateral trenches approximately 18 inches below final grade. Marking tape shall be stamped “SEWER”.

Pipe Foundation Material

When deemed necessary, the City Engineer or designee shall require that the trench be overexcavated, and pipe foundation material be placed and compacted in the trench beneath the bedding material elevation as needed to provide a firm and unyielding pipe foundation.

Foundation material type, depth, installation methods, and compaction requirements shall be determined by a professional engineer licensed to practice in the state of Washington. Pipe foundation materials and installation methods shall be approved by the City Engineer or designee prior to implementation in the field.

Pipe Bedding Material

Sewer pipe trench backfill shall be per City standard detail.

Sewer Pipe Trench Backfill

Sewer pipe trench backfill shall be per City standard detail. Pavement patching materials and courses shall match the existing roadway section unless the current road section is out of compliance with current City standards or directed otherwise by the City Engineer or designee. The asphalt concrete pavement thickness shall not be less than 3 inches of HMA Class 1/2-inch PG 64-22.

1.5 WASTE DISCHARGE

Pretreatment of sanitary sewer discharges may be required for those users who do not conform to the standards established by the federal, state, and local authorities as required by the Clean Water Act and the General Pretreatment Regulations. No user shall introduce or cause to be introduced into the waste stream any pollutant or wastewater which causes pass-through or interference problems. Discharge pretreatment, metering, and authorization shall be determined and approved by the City Engineer or designee.

Oil/Water Separators

The applicant shall be responsible for compliance with the Washington State Water Pollution Control Act and applying for and obtaining all necessary permits, including a State Waste Discharge Permit from the Washington State Department of Ecology.

Risers for API or CP type oil/water separators shall be equipped with gas tight rings and covers in conformance with WSDOT Section 9-05.15(1).

Separators shall be installed so that the separators are easily accessible for maintenance, cleaning, and removal. Separators shall be filled with water following final inspection and acceptance by the City Engineer or designee.

Separators shall be owned and maintained by the property owner.

Grease Interceptors and Traps

Grease interceptors or traps shall be installed for all commercial facilities involving food preparation or that will discharge liquid waste containing grease, any flammable liquids, sand, or other harmful components. Grease interceptor design shall be accordance with the Plumbing Code, as adopted by the EMC.

Grease interceptors and traps shall be owned and maintained by the property owner. Grease traps shall not be installed as an alternative to grease interceptors unless approved.

Grease interceptors or traps shall be installed at a location where it is easily accessible for sample collection, inspection, and cleaning and removal of retained grease. The grease interceptor may not be installed inside any part of the building and the location must meet the approval of the City. Grease traps may be located within the building subject to approval by the City provided that the trap shall always be readily accessible for maintenance.

Grease interceptors or traps shall be located in the sewer lateral line between all fixtures which may introduce grease into the sanitary sewer and the connection to the sanitary sewer collection system. Such fixtures shall include, but not be limited to sinks, floor drains for food preparation and storage areas, mop sinks, and any other fixture which is determined to be a potential source of grease.

Under no condition is any commercial, non-commercial establishment, or residential property allowed to discharge liquid waste containing grease, or any flammable wastes, or other harmful ingredients, in the opinion of the City Engineer or designee, into a sanitary sewer system.

Grease interceptors shall be equipped with a sampling port at the outlet of the interceptor. Inspection tees and manholes must enable the City to monitor and test the discharge for compliance with the EMC.

Each property that has a grease interceptor or trap shall provide:

A. A written program documenting management and corporate support for the plan and a commitment to implement planned activities and achieve established goals through the implementation and enforcement of Best Management Practices;

B. A description of the facility type and a summary of the products made and/or service provided;

C. Quantities of fats, oils, and grease brought into the facility; amounts contained in the product; and quantities discharged to the sanitary sewer;

D. A description of current FOG reduction, recycling, and treatment activities;

E. Schematics of the process areas illustrating drains, interceptors, and discharge points connected to the sanitary sewer;

F. Specific performance goals and implementation schedule.

1.6 TESTING REQUIREMENTS

Gravity sanitary sewer cleaning and testing requirements shall be as outlined in WSDOT Section 7-17.3(2). Sanitary sewer cleaning and testing shall be completed to the satisfaction of the Public Works Department prior to final acceptance. All testing shall be completed and accepted by the City prior to starting surface improvement construction. Sewer lines shall be re-mandrelled and videoed prior to final project approval. Sewer lines shall be mandrelled and videoed for a third time at the end of the two-year Maintenance and Defect Bond period to verify that the lines conform to City standards prior to bond release.

Cleaning

Physical connection to the existing City sewer system shall not be allowed until all sewer pipes have been thoroughly cleaned by jetting or pigging to remove any solids or construction debris that may have entered the pipe.

The Contractor shall arrange to have the water accumulated during construction and sanitary system cleaning operations removed from the sewer system by a Vactor truck. Water from the new sewer extension shall not be permitted to enter the existing City system until final project approval. Sediment or debris introduced to existing City sewers as a result of any construction activity shall be removed immediately by the Contractor in conformance with WSDOT Section 7-17.

City water used for cleaning sewer lines shall be metered and shall pass through an approved double check valve and meter assembly. The Contractor will be charged for water used during cleaning activities.

Deflection Testing

Gravity sanitary sewers installed over 10 feet deep shall be tested for deflection prior to visual inspection. Deflection testing shall be conducted by pulling a rigid, nonadjustable mandrel with a diameter not less than 95 percent of the normal diameter of the pipe being tested. Mandrel testing shall be conducted in conformance with WSDOT Section 7-17.3(2)G.

Leakage Testing

All new gravity sanitary sewer mains and right-of-way laterals shall be subject to a low-pressure air test per WSDOT Section 7-17.3(2)F. Low pressure air testing shall be conducted after backfilling is completed and the backfill material has been compacted in conformance with the approved plans. Conforming compaction shall be verified by nuclear gauge testing and/or proof rolling at the discretion of Public Works staff. The City Engineer or designee shall observe all testing to verify satisfactory completion. The City Engineer or designee may require that air test pressure be maintained at 4.0 psig with no drop for 15 minutes for a passing leakage test where groundwater pressure is deemed negligible, or at the City Engineer or designee discretion.

The Contractor shall furnish all necessary equipment and personnel for conducting the pressure test. The Contractor shall provide certification from a City-approved laboratory that testing equipment is accurate. All equipment and personnel shall be subject to approval by the City Engineer or designee.

The Contractor shall have all the equipment and labor present and ready for the leakage test and shall have successfully completed a leakage test on the entire system to verify that the lines are in satisfactory condition prior to calling the City out to witness the testing.

If any portion of the sanitary system fails to meet the testing requirements, the Contractor shall determine, at his own expense, the source of leakage and shall repair or replace all defective materials or workmanship. The completed pipe installation shall meet the minimum testing requirements before being considered acceptable.

Television Inspection

All new gravity sanitary sewer extensions shall be visually inspected in conformance with WSDOT Section 7-17.3(2)H, following satisfactory trench compaction testing, flushing, low pressure air testing, and deflection testing. All manholes shall be channeled and grade rings set in place prior to sewer video inspection.

The remote camera used in sewer visual inspection shall be one specifically designed for such an application, with the ability to rotate the camera 180 degrees and lighting suitable to allow a clear picture of the entire periphery of the pipe. The camera shall proceed through the pipe at a sufficiently slow velocity to allow adequate inspection of all pipe joints. All sewer lateral fittings and joints and suspect pipe joints shall be closely inspected by rotating the camera as needed to provide a clear view. Video inspection shall be conducted "against the flow."

The Contractor shall introduce water to the new sewer system immediately prior to the visual inspection by adding water to the upstream manhole until water is seen flowing in the lowest manhole. Video inspection of the line shall begin when flow in the lowest manhole has stopped. A 1-inch sewer ball shall be attached to the front of the camera to provide a basis for estimating the depth of ponding within the sewer pipe. Allowable sewer pipe ponding shall be per the table below.

Sanitary Sewer Pipe Allowable Ponding

Pipe Diameter (inches)	Allowable Ponding (inches)
6	0.5
8	0.75
10 and above	1.0

The Contractor shall bear all costs for the correction of any deficiencies found during TV inspection, including the costs for additional TV inspection needed to verify the deficiencies were corrected and additional leakage testing. All components of the video and recording equipment shall be sufficient to provide picture quality to the satisfaction of the City Engineer or designee.

Upon completion of the video inspection, the DVD and a written inspection report shall be submitted to the City for review. At a minimum, the inspection report shall contain the following information:

- Size, length, and material type of sewer main.
- Location of all lateral connections.
- Estimated depth and location of all ponding over $^{1}/_{4}$ inch in depth.
- Manhole numbers that correspond to the approved plans.
- Street name and/or location of sewer main.

A video recording (DVD) and paper inspection report of the visual inspection shall be provided to the City Engineer or designee for further review within two (2) working days of performing the video inspection.

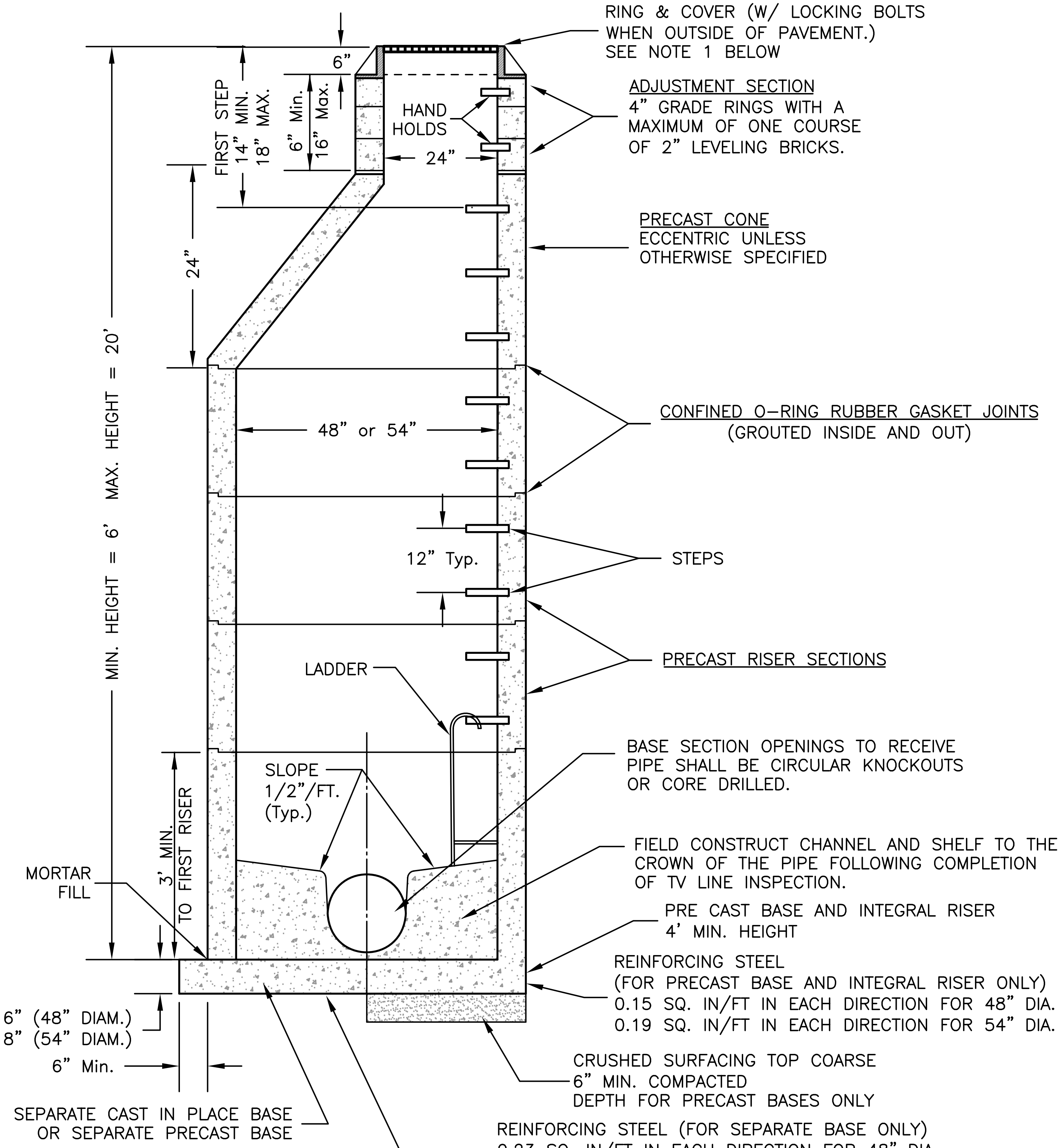
1.7 Attachments

Attachment 1 – Standard Details

Attachment 2 – Plan Review Checklist

Attachment 3 – Construction Plan Notes

Attachment 4 – Sewer Pump Station Requirements



NOTES:

1. RING & COVER SHALL BE OLYMPIC FOUNDRY MH30A, OR EQUAL. LOCKING RING & COVER SHALL BE OLYMPIC FOUNDRY MH30AD/T OR EQUAL.

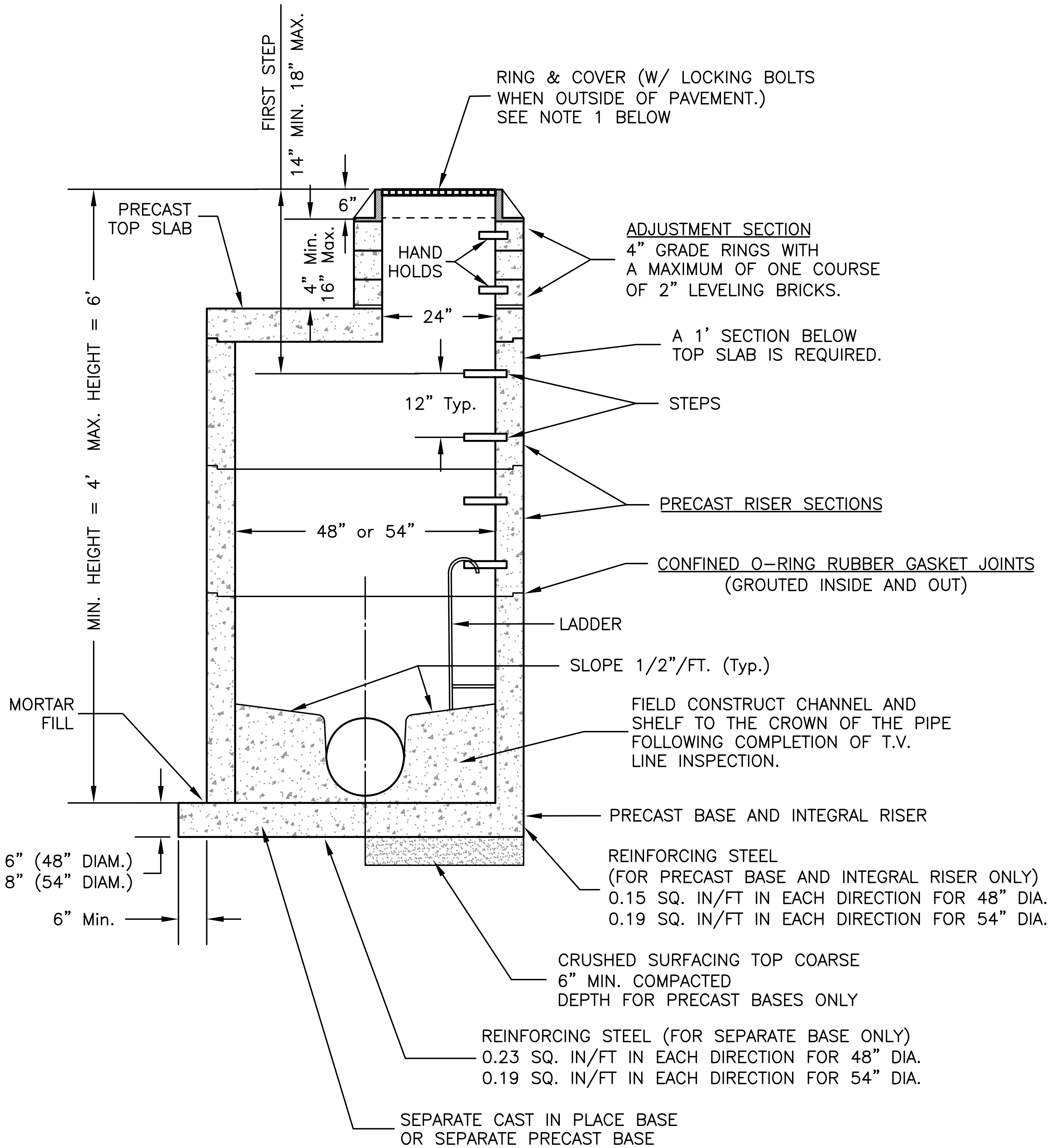
REVISIONS	DATE:
CHECKPRINT	03/09/98

DRAWN BY: MRB CHECKED BY: LCW

City of Enumclaw

SANITARY SEWER MANHOLE-TYPE 1

DWG. NO. SS 001



NOTES:

1. RING & COVER SHALL BE OLYMPIC FOUNDRY MH30A, OR EQUAL.
   LOCKING RING & COVER SHALL BE OLYMPIC FOUNDRY MH30AD/T
   OR EQUAL.

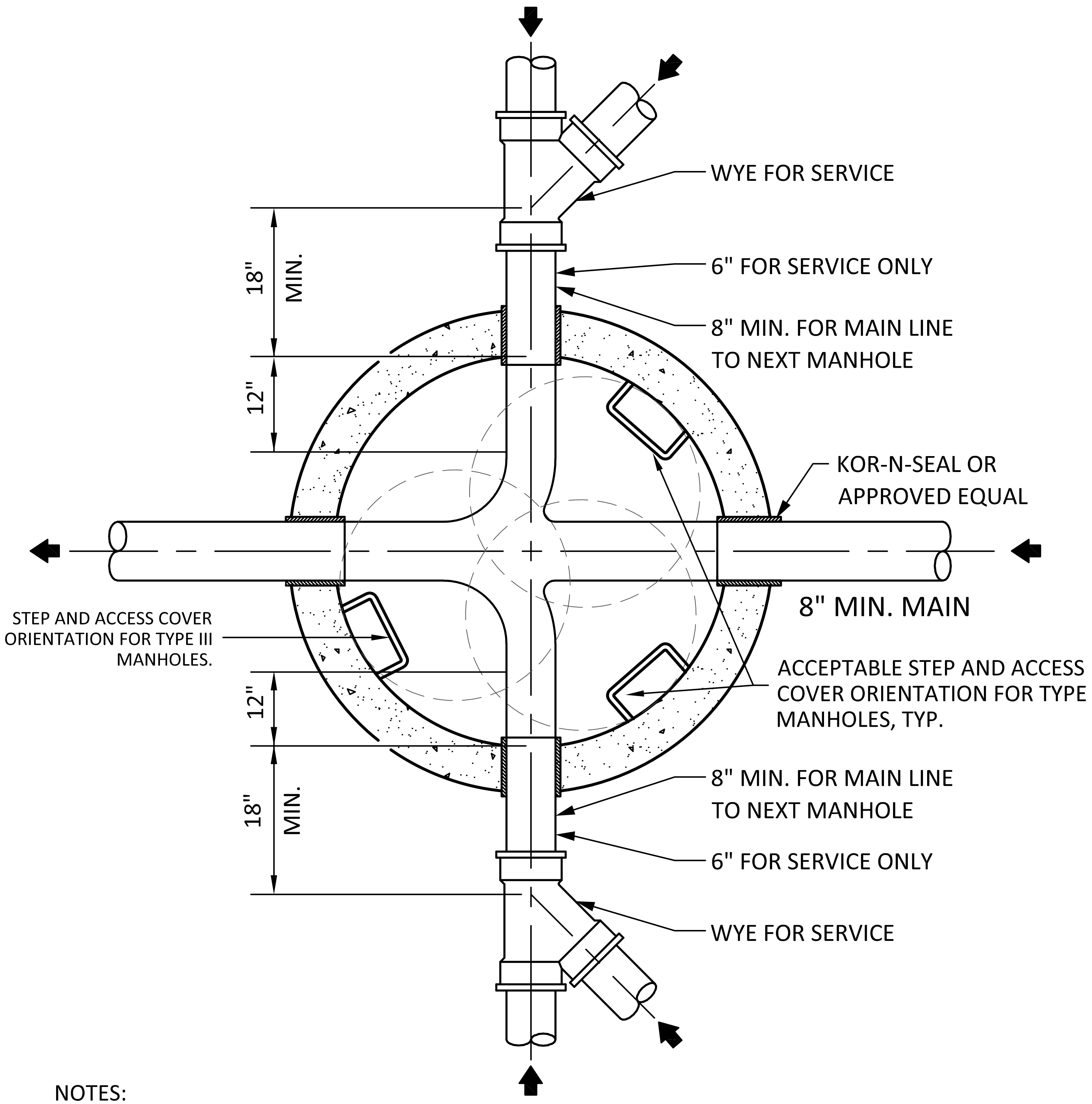
REVISIONS	DATE:
CHECKPRINT	11/19/97
CORRECTIONS COMPLETED	01/14/98

DRAWN BY: MRB CHECKED BY: LCW

City of Enumclaw

SANITARY SEWER MANHOLE-TYPE 3

DWG. NO. SS 002



NOTES:

1. MINIMUM DROP THROUGH MANHOLE SHALL BE 0.10 FOOT.
   MAXIMUM DROP SHALL BE 1.0 FOOT.

2. A T.V. INSPECTION ON THE SEWER MAINS SHALL BE
   COMPLETED PRIOR TO CHANNELING MANHOLES.

REVISIONS	DATE:
CHECKPRINT	03/09/98
EDITS	06/11/2020
EDITS	06/11/2021

DRAWN BY: MRB CHECKED BY: LW

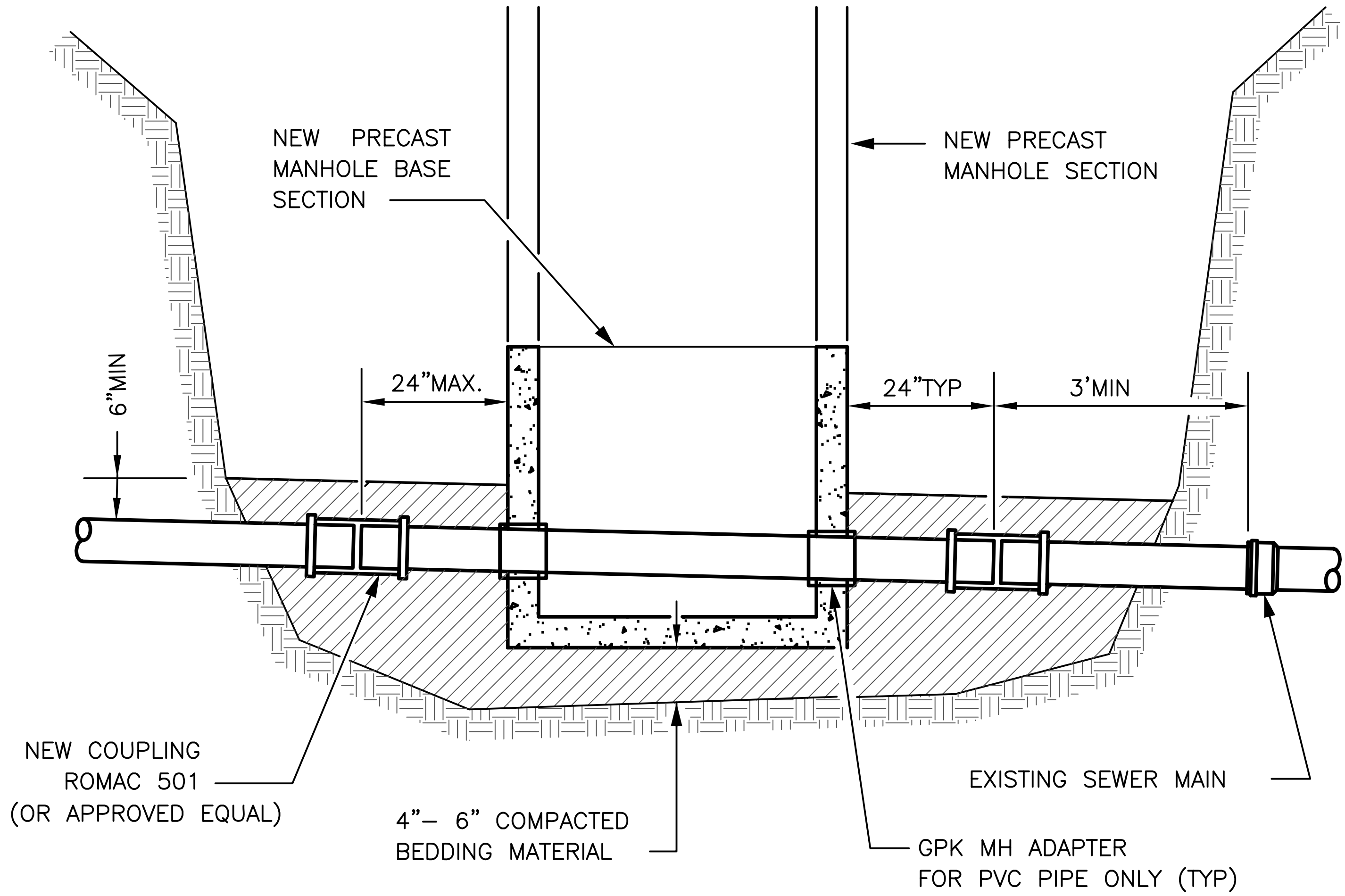
City of Enumclaw

SANITARY SEWER MANHOLE-PLAN VIEW

DWG. NO.

SS

003



ELEVATION

INSTALLATION PROCEDURES:

1. THE CONTRACTOR WILL TEMPORARILY PLUG LINE AT UPSTREAM MANHOLE WITH CITY INSPECTOR'S APPROVAL AND IN THE PRESENCE OF THE INSPECTOR.
2. EXPOSE AND REMOVE EXISTING PIPE.
3. PLACE EXISTING PIPE WITH NEW GPK COLLARS THROUGH NEW MANHOLE BASE SECTION. IF CUT PIPE SECTION CONTAINS A PIPE BELL, REPLACE PIPE WITH A NEW STRAIGHT SECTION OF PIPE, OR AS DIRECTED BY THE CITY.
4. SET MANHOLE AND PIPE IN PLACE TO PROPER ALIGNMENT AND GRADE.
5. RECONNECT PIPE WITH COUPLINGS (ROMAC, MJ SLEEVE, OR PVC SLIP COUPLING.)
6. REMOVE LINE PLUG AND REESTABLISH FLOW. CHECK FOR LEAKS AT COUPLINGS.
7. CHANNEL MANHOLE PER CITY OF ENUMCLAW STANDARDS.
8. REMOVE PIPE INSIDE MANHOLE. PROVIDE ADDITIONAL GROUT IN CHANNEL AS NECESSARY TO REMOVE ANY LIPS OR OFFSET JOINTS. PLUG LINE AS DESCRIBED UNDER ITEM 1 ABOVE AS NECESSARY.

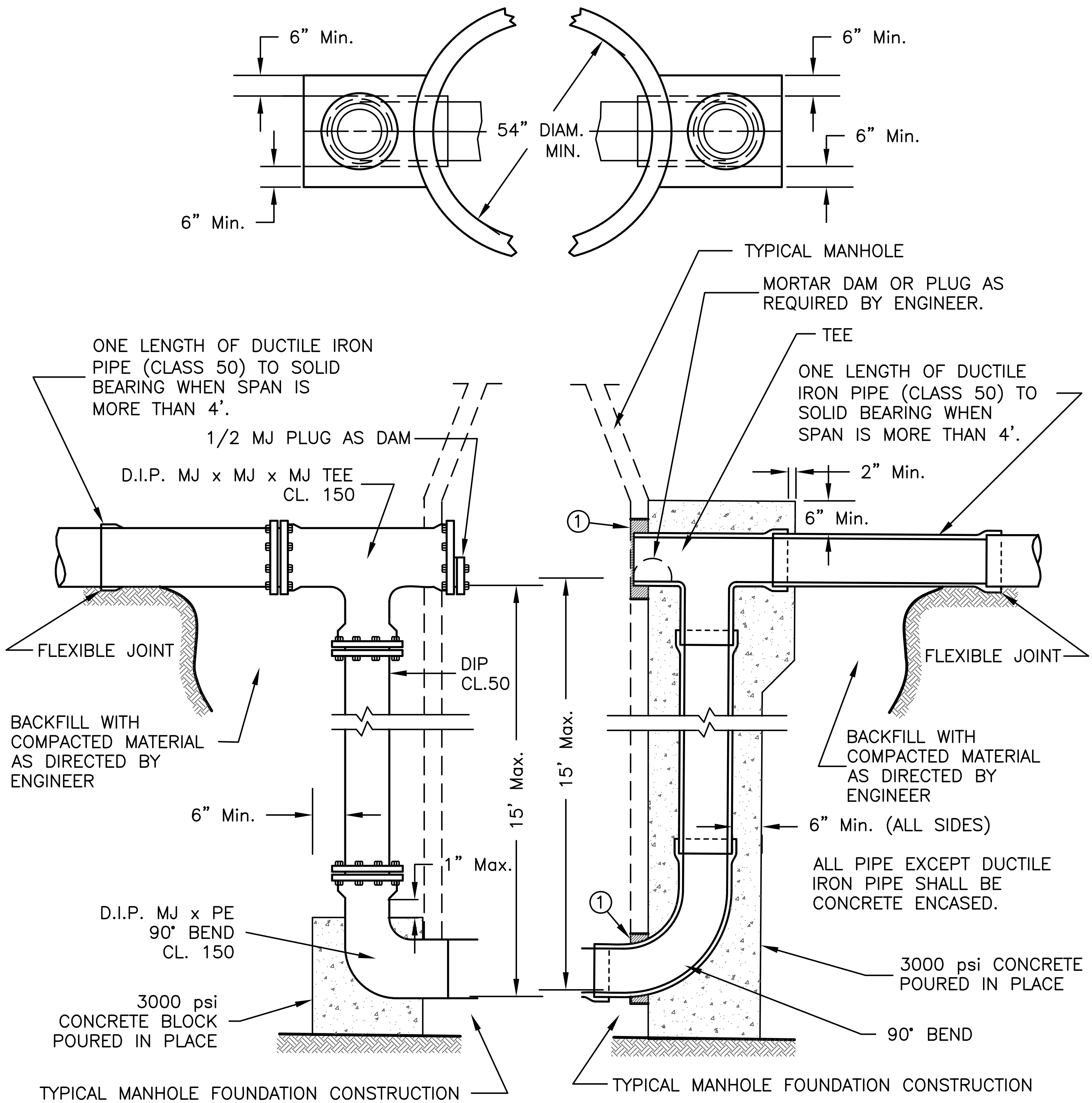
REVISIONS	DATE:
CHECKPRINT	11/07/97
CORRECTIONS COMPLETED	01/14/97

DRAWN BY: MRB CHECKED BY: LCW

City of Enumclaw

MANHOLE INSTALLATION ON EXISTING LINE CUT-IN DETAILS

DWG. NO. SS 004



DUCTILE IRON DROP CONNECTION

CONCRETE ENCASED DROP CONNECTION

TO BE USED WHERE DROP IS NOT GREATER THAN 15'.
(DETAIL NOT TO SCALE)

1 GPK MH ADAPTERS FOR PVC PIPE

REVISIONS	DATE:
CHECKPRINT	11/07/97
CORRECTIONS COMPLETED	01/15/98
DRAWN BY: MRB CHECKED BY: LCW	

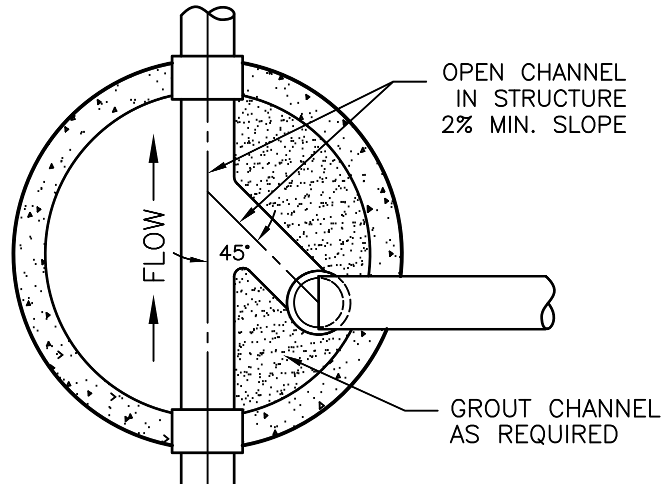
City of Enumclaw

OUTSIDE MANHOLE DROP

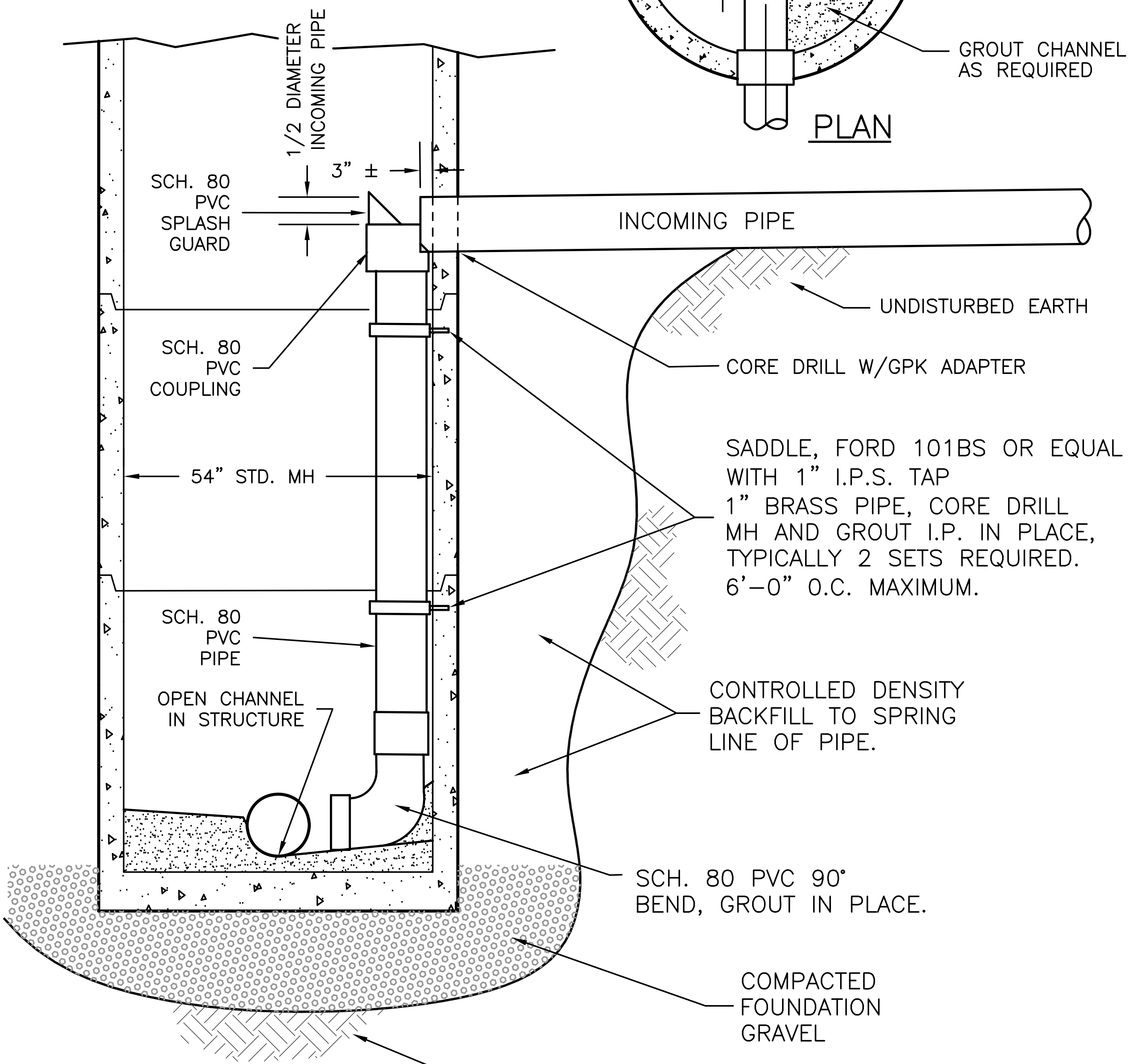
DWG. NO. SS 005

NOTES:

1. DROP PIPE SHALL MATCH THE INFLOW PIPE SIZE.
2. INSIDE DROP MANHOLES WILL BE ALLOWED ONLY WITH THE SPECIFIC APPROVAL OF THE CITY ENGINEER.
3. DROP SHALL NOT INTERFERE WITH MANWAY ACCESS. CONNECTIONS TO EXISTING MANHOLE MAY REQUIRE ROTATING THE ECCENTRIC CONE AND RELOCATING THE LADDER AND STEPS.



PLAN



ELEVATION

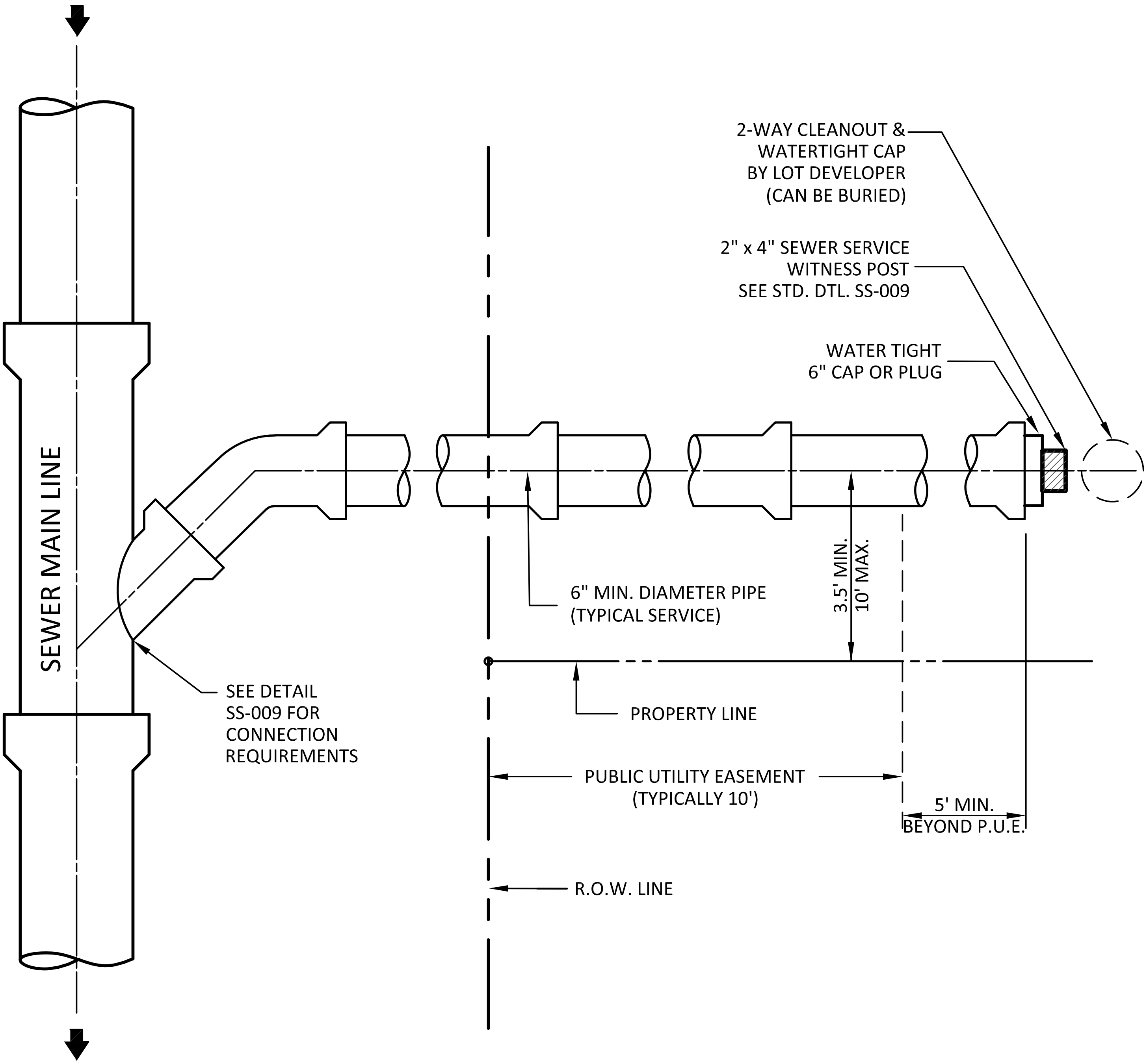
REVISIONS	DATE:
CHECKPRINT	11/07/97
CORRECTIONS COMPLETED	01/15/98
UPDATES	02/01/2006
DRAWN BY: MRB CHECKED BY: LCW	

City of Enumclaw

INSIDE DROP SEWER MANHOLE

DWG. NO.

SS 006



NOTES:

1. SEE STANDARD DETAIL SS-009 FOR ELEVATION VIEW.
2. SEE WATER/SEWER SEPARATION DETAIL SS-013.
3. MAXIMUM DISTANCE FROM SEWER MAIN TO BUILDING PLUMBING SHALL BE 150 FEET, UNLESS OTHERWISE APPROVED BY THE CITY.
4. CLEAN OUT REQUIRED FOR EVERY 135° OF DEFLECTION.

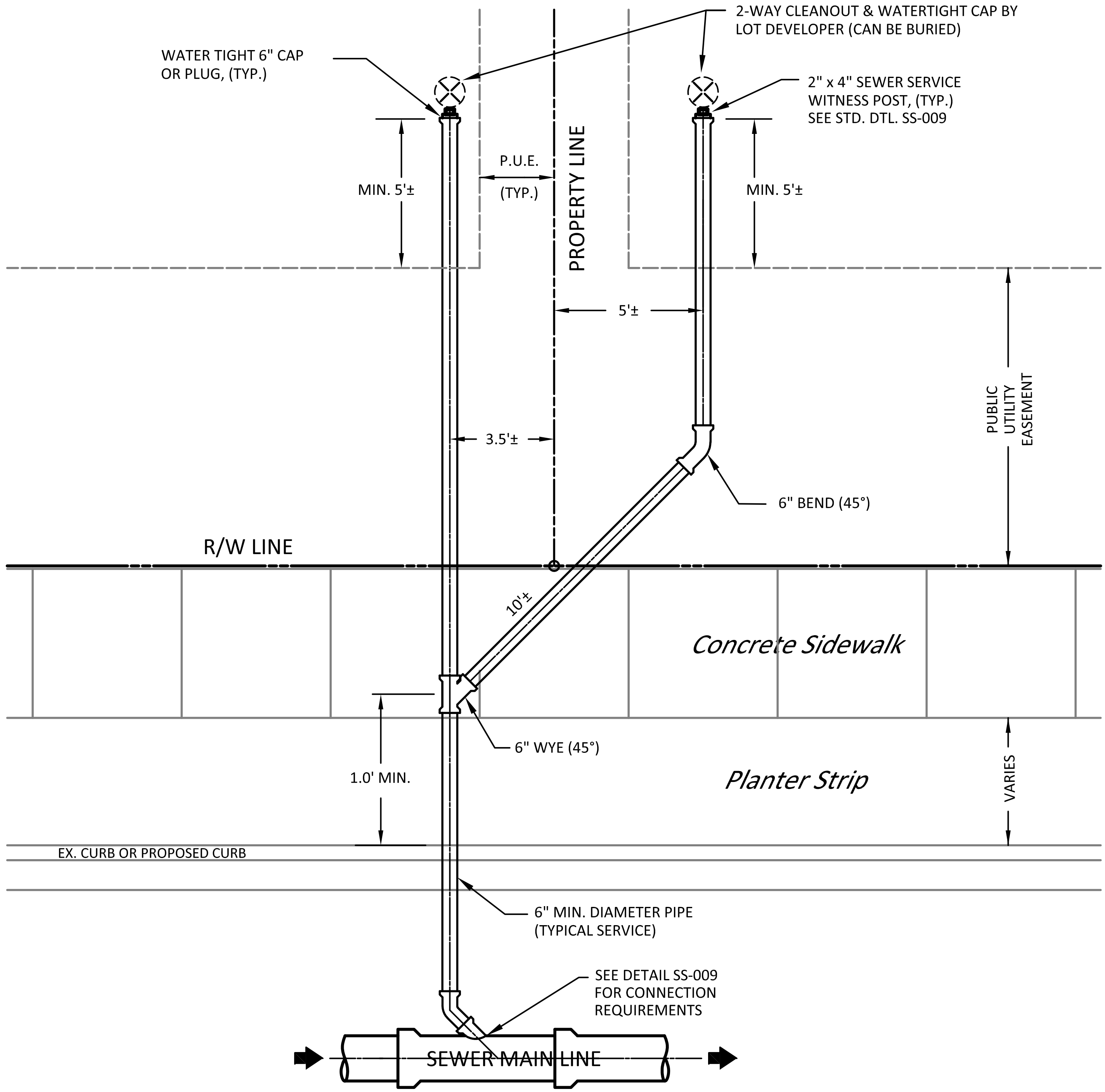
REVISIONS	DATE:
CHECKPRINT	03/09/98
EDITS	12/07/2009
EDITS	06/11/2020
EDITS	03/09/2022

DRAWN BY: KW CHECKED BY: LW

City of Enumclaw

SINGLE SEWER SERVICE STUB

DWG. NO. SS 007



NOTES:

1. SEE STANDARD DETAIL SS-009 FOR ELEVATION VIEW.
2. SEE WATER/SEWER SEPARATION DETAIL SS-0013.
3. MAXIMUM DISTANCE FROM SEWER MAIN TO BUILDING PLUMBING SHALL BE 100 FEET, UNLESS OTHERWISE APPROVED BY THE CITY.

REVISIONS	DATE:
CHECKPRINT	11/07/97
CORRECTIONS COMPLETED	01/15/98
REDESIGN & APPROVAL	04/12/2005
EDITS	06/11/2020

DRAWN BY: MRB CHECKED BY: LCW

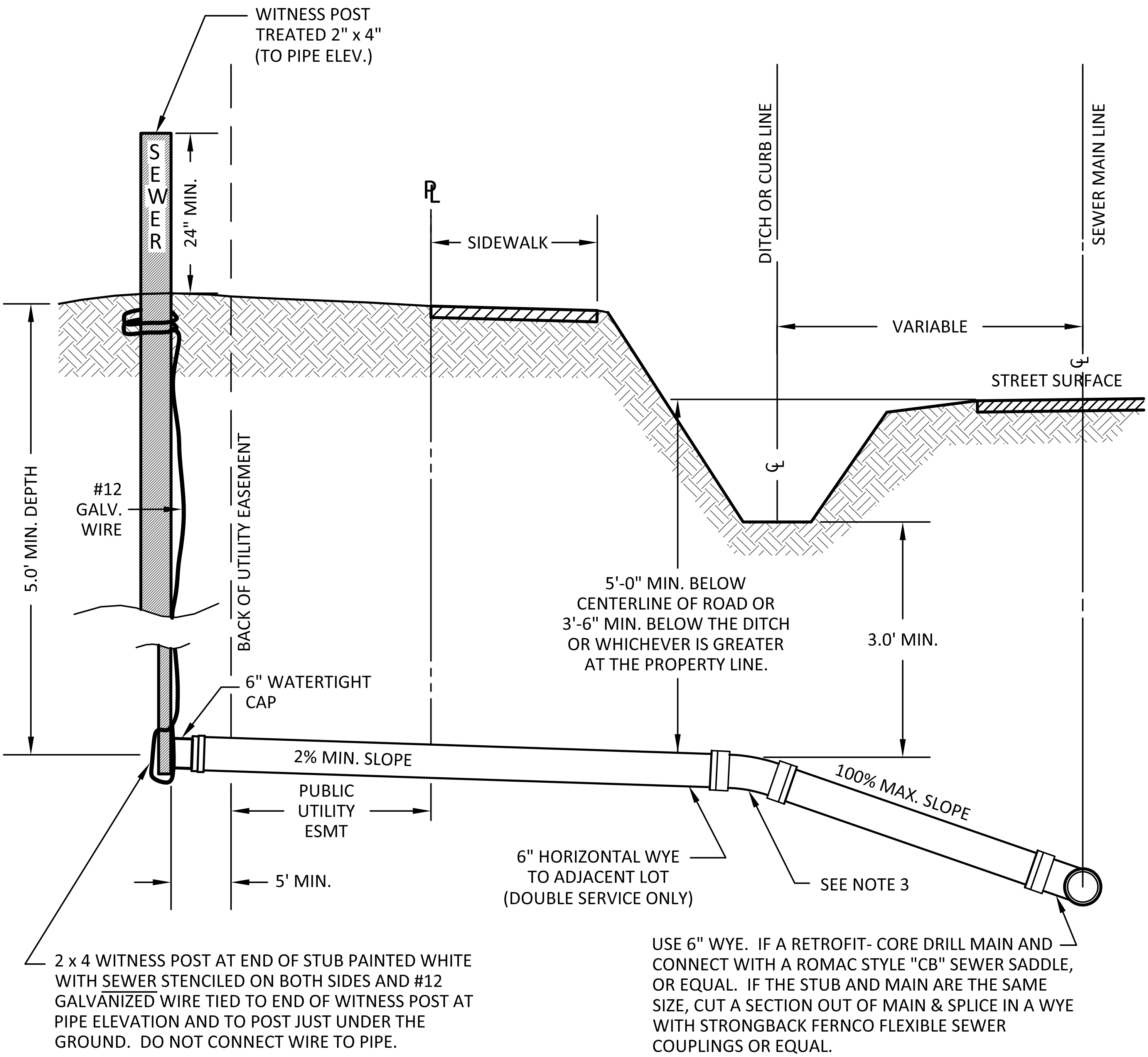
City of Enumclaw

DOUBLE SEWER SERVICE STUB

DWG. NO.

SS

008



NOTES:

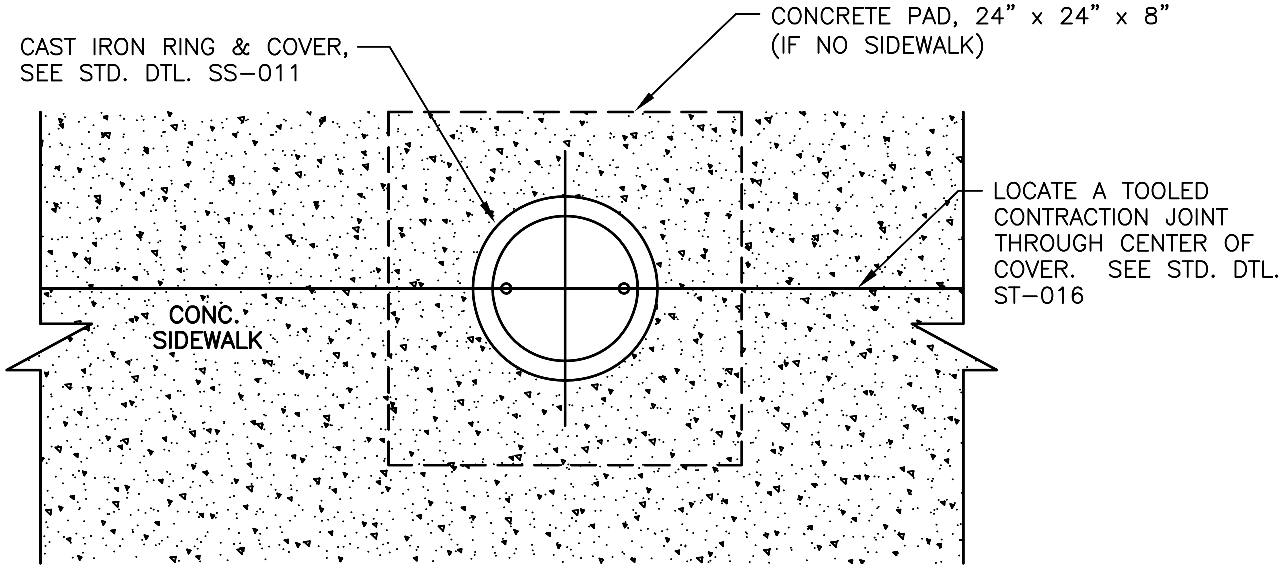
1. SEE STANDARD DETAIL SS-007 OR SS-008 FOR PLAN VIEW.
2. PIPE SHALL BE SDR 35 PVC IN ACCORDANCE WITH ASTM D3034.
3. MAXIMUM NUMBER OF BENDS ALLOWED IS ONE - 11 1/4°, 22 1/2°, OR 45° MANUFACTURED BEND.
4. FOR DISCONTINUED SIDE SEWER USE, ABANDON THE SIDE SEWER AT THE MAIN BY CUTTING THE SIDE SEWER AND CAPPING OR PLUGGING ITS TEE CONNECTION AT THE MAIN WITH A WATER TIGHT CAP OR PLUG.

REVISIONS	DATE:
EDITS	04/28/2015
EDITS	06/11/2020
DRAWN BY: KW CHECKED BY: LW	

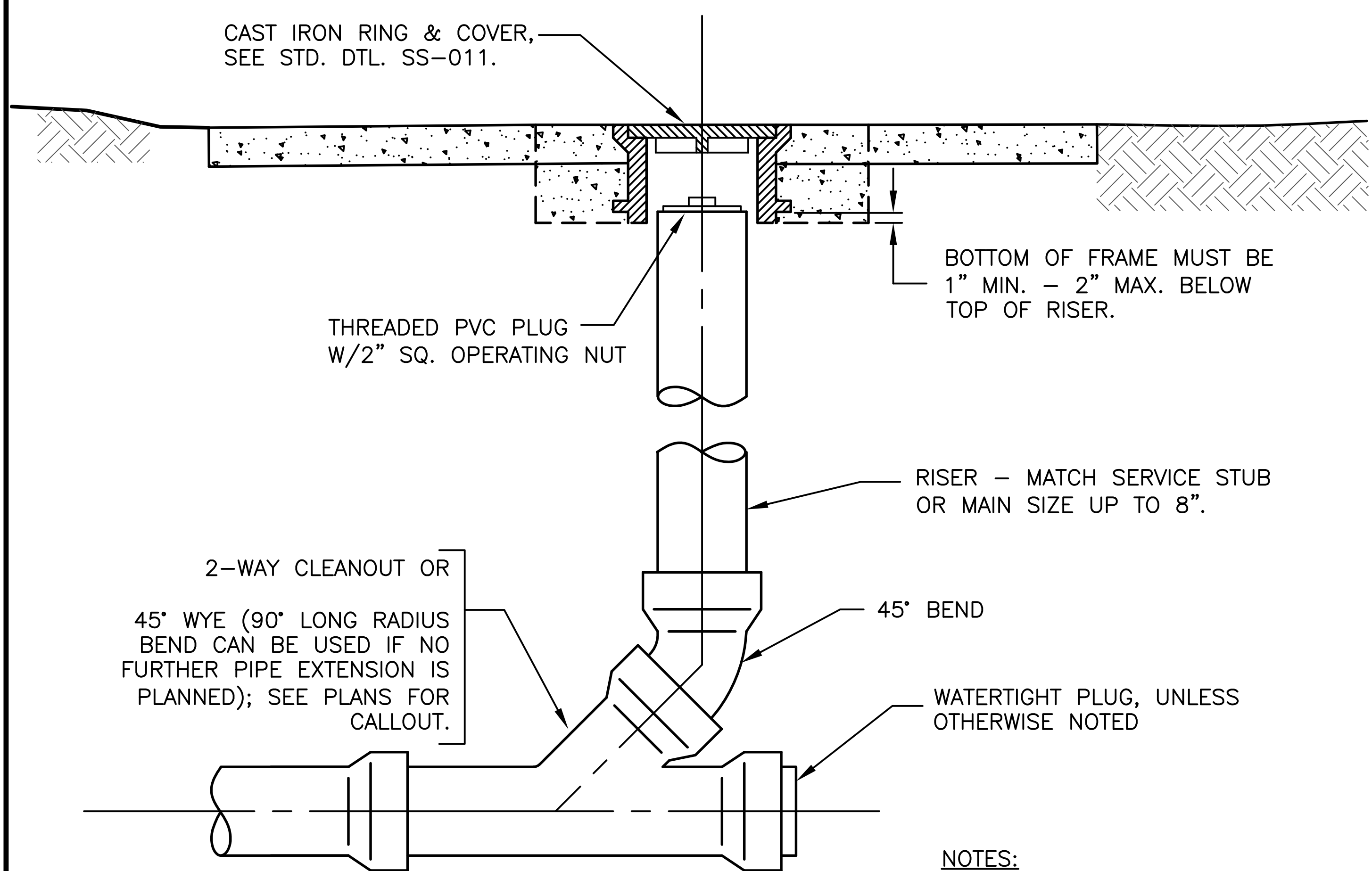
City of Enumclaw

ELEVATION VIEW
PVC PIPE
SERVICE STUB

DWG. NO.
SS
009



PLAN



ELEVATION

NOTES:

1. PIPE SHALL BE SDR 35 PVC IN ACCORDANCE WITH ASTM D3034.

REVISIONS	DATE:
CHECKPRINT	03/12/98
EDITS	12/07/09
EDITS	11/18/10
EDITS	02/25/2016

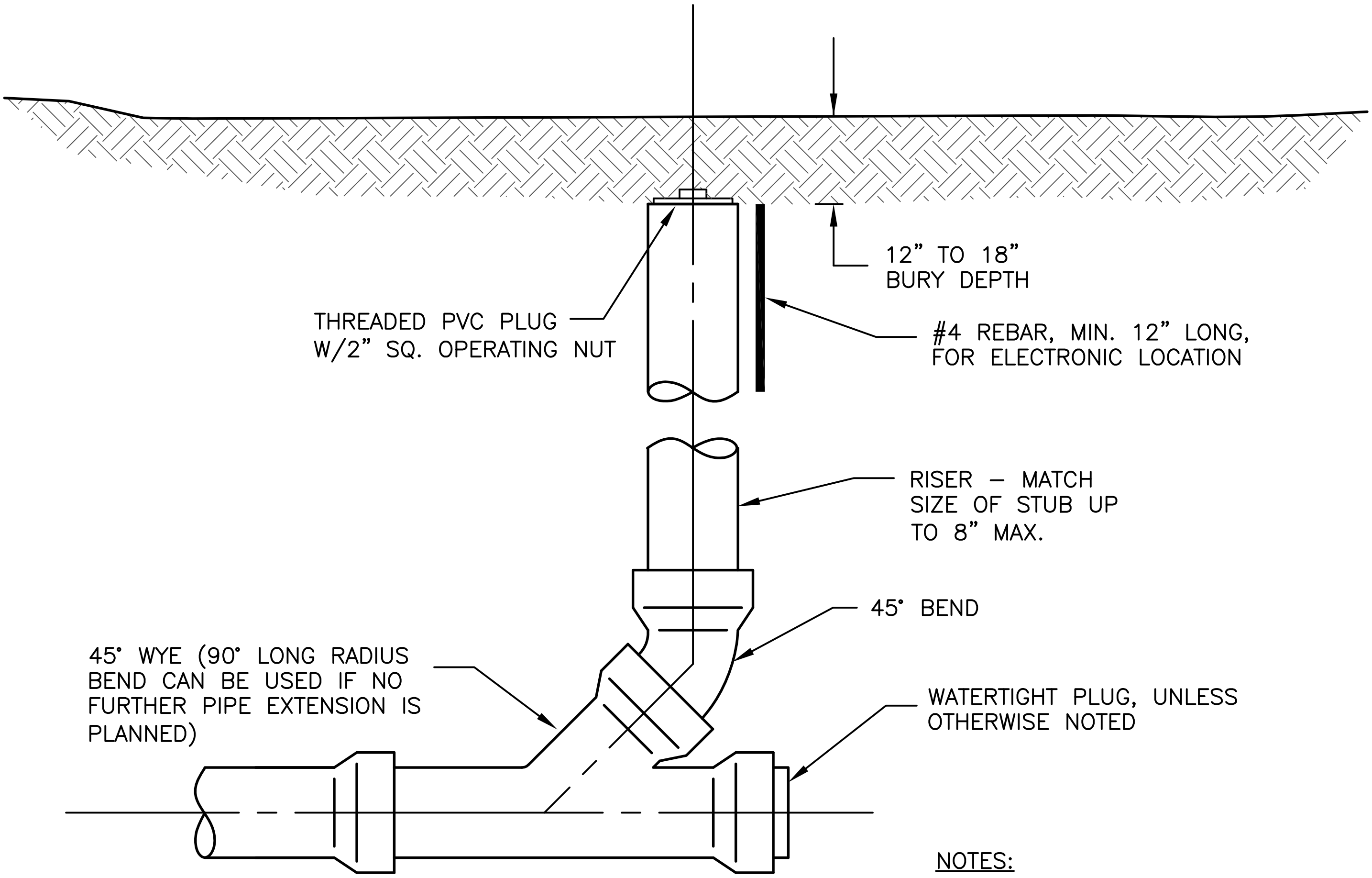
DRAWN BY: MRB CHECKED BY: LCW

City of Enumclaw

SURFACE CLEAN-OUT

DWG. NO.

SS 010



ELEVATION

NOTES:

1. PIPE SHALL BE SDR 35 PVC IN ACCORDANCE WITH ASTM D3034.

2. PROVIDE AS–BUILT LOCATION.

REVISIONS	DATE:
CHECKPRINT	03/12/98
EDITS	12/07/09
EDITS	12/15/15

DRAWN BY: MRB CHECKED BY: LCW

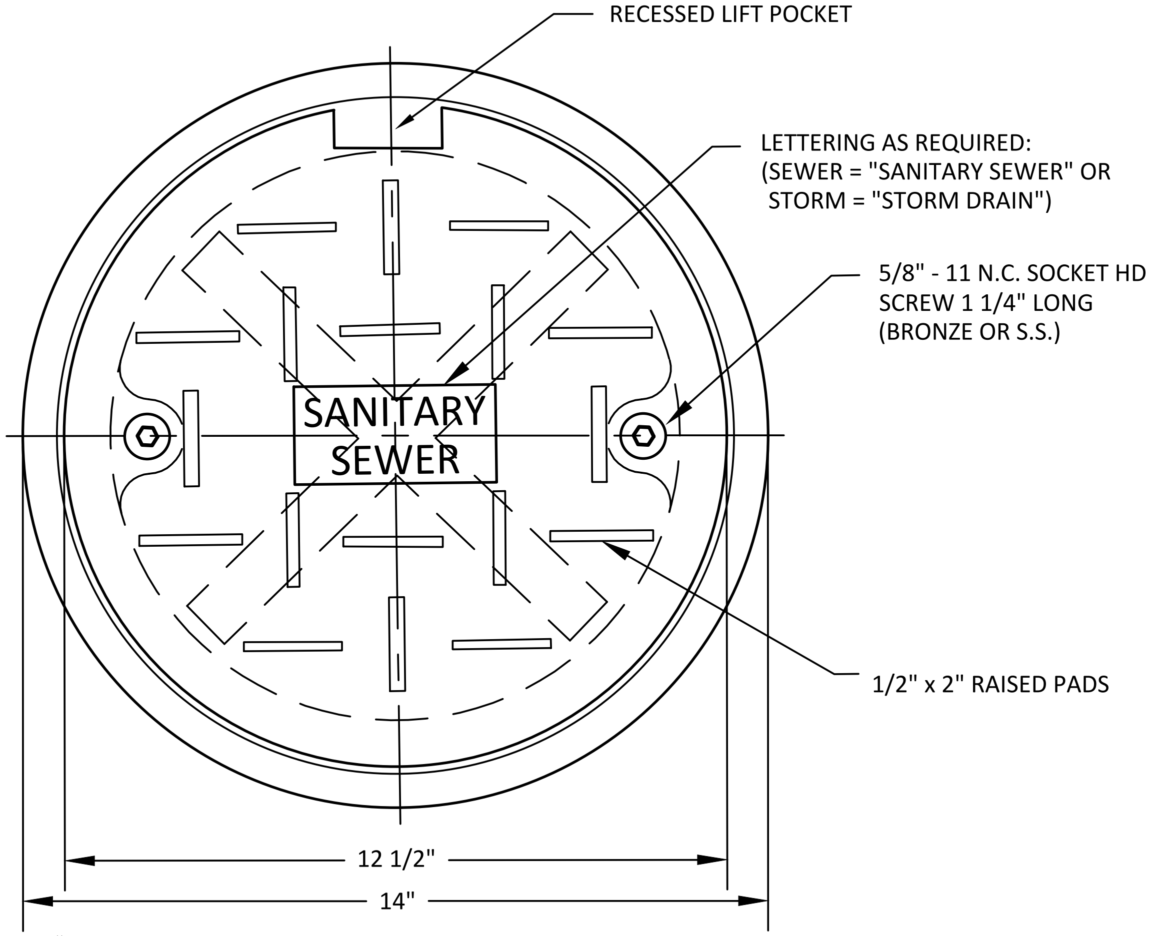
City of Enumclaw

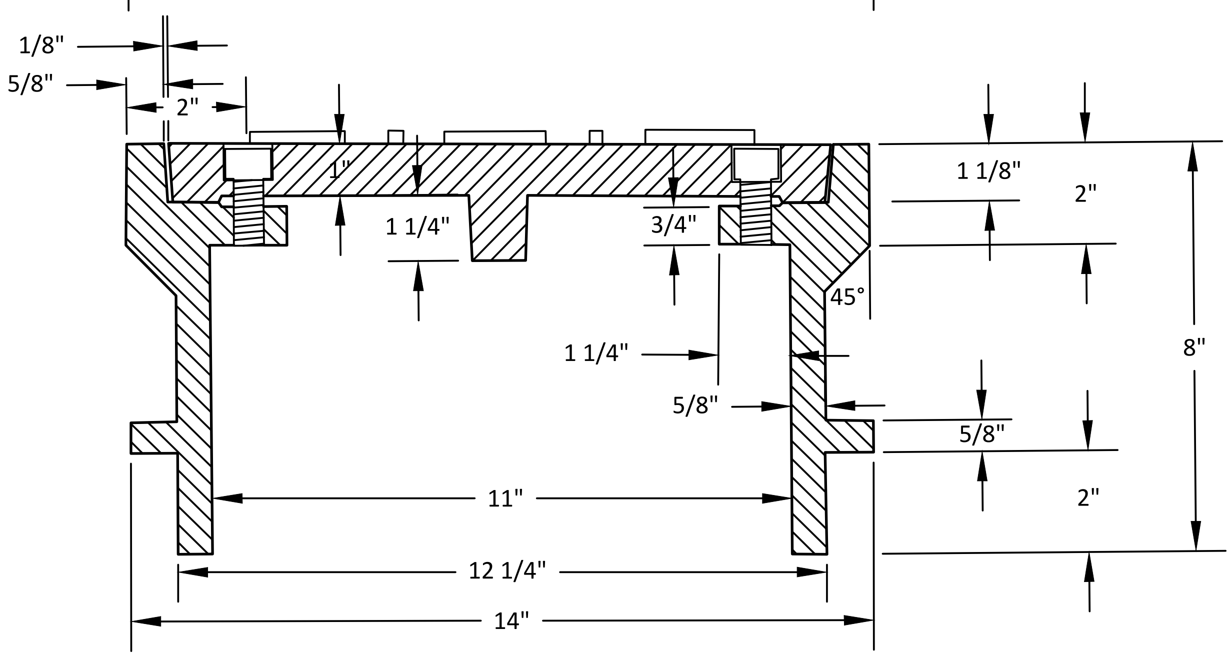
BURIED SANITARY SEWER CLEAN-OUT

DWG. NO.

SS

010a





OLYMPIC FOUNDRY
PART NO. M 1025
- OR APPROVED EQUAL -

APPROX. WEIGHT

FRAME 70 LBS.
COVER 40 LBS.
110 LBS.

11" x 8" LOCKING CLEANOUT

REVISIONS	DATE:
CHECKPRINT	03/09/98
EDITS	11/25/09
EDITS	03/07/2022

DRAWN BY: MRB CHECKED BY: LCW

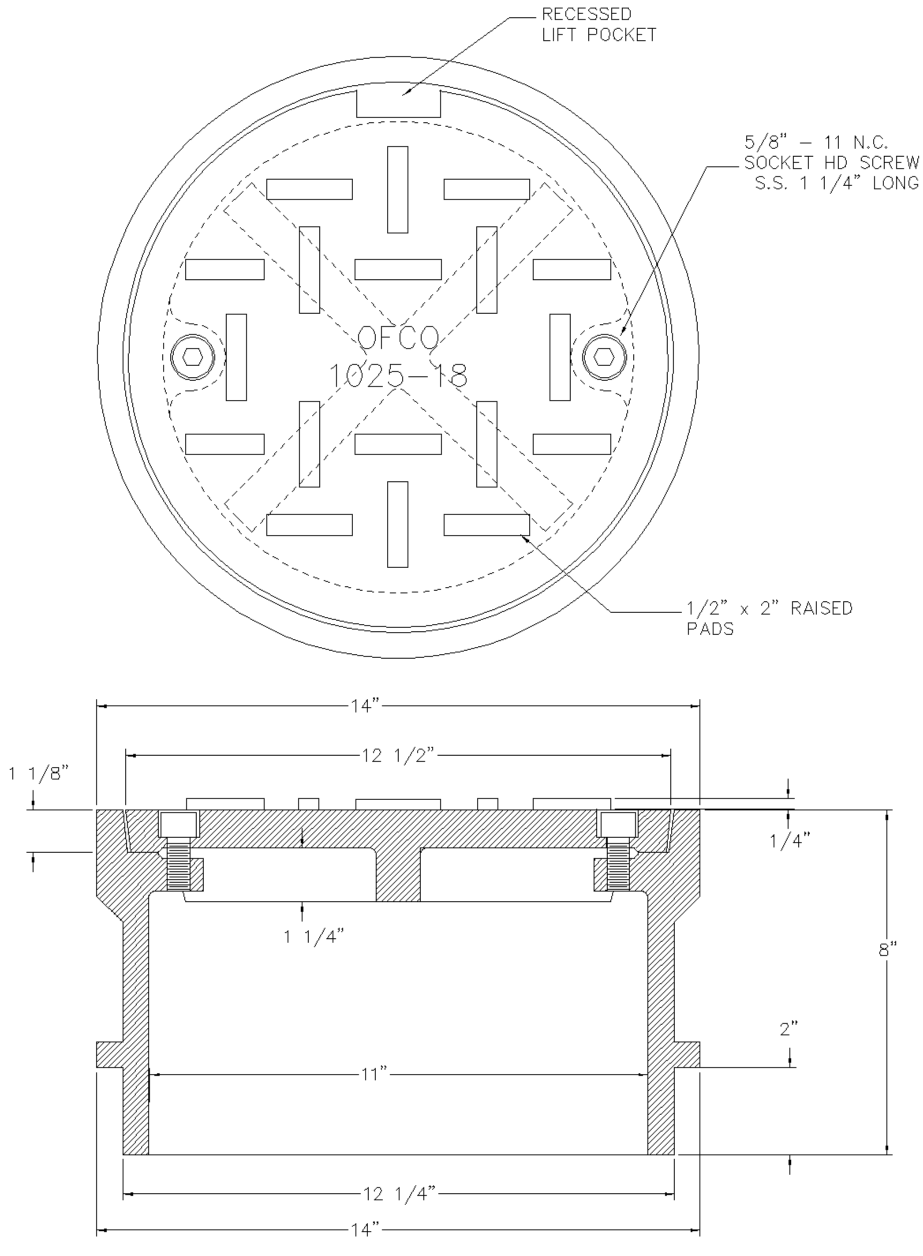
City of Enumclaw

CLEANOUT WITH LOCKING RING & COVER

DWG. NO.

SS

011



NOTES:			OLYMPIC FOUNDRY INC.		
			11" X 8" LOCKING CLEAN-OUT RING & COVER		
MATL: Cast Iron ASTM, A48, CL30			RATING: H-20	PART NO. M1025	
APPROX WT: Ring 70 Lbs, Cover 40 Lbs			REV: A DATE: 7/16/2003 New border		REV A
DOCUMENT APPROVED BY: DATE:	DWN: CL DATE: 7/16/2003	TOLERANCE XX +- .1 XXX +- .06 XXXX +- .030 < +- 2 DEG	REV: DATE:		
	CHKD: CL DATE: 7/16/2003		DWG #: M1025	SCALE: N/A	SHEET: 1 OF 1

ROUGHNESS COEFFICIENT:

AN "N" VALUE OF 0.013 SHALL BE USED IN MANNING'S FORMULA FOR THE DESIGN OF ALL SEWER FACILITIES, (REGARDLESS OF PIPE MATERIAL) EXCEPT INVERTED SIPHONS, WHERE AN "N" VALVE OF UP TO 0.015 CAN BE USED.

SLOPE:

ALL SEWERS SHALL BE DESIGNED AND CONSTRUCTED TO GIVE MEAN VELOCITIES, WHEN FLOWING FULL, OF NOT LESS THAN 2.0 FEET PER SECOND. REFER TO THE CHART BELOW FOR MINIMUM SLOPE VALUES; SLOPE VALUES GREATER THAN THE MINIMUM ARE DESIRABLE UNDER LOW FLOW CONDITIONS:

SEWER SIZE	MIN. SLOPE '/'	MIN. SLOPE %
8"	.004	0.400
10"	.0028	0.280
12"	.0022	0.220
14"	.0017	0.170
15"	.0015	0.150
16"	.0014	0.140
18"	.0012	0.120
21"	.0010	0.100
24"	.0008	0.080
27"	.0007	0.070
30"	.0006	0.060
36"	.0005	0.050

SEWERS SHALL BE LAID WITH UNIFORM SLOPE BETWEEN MANHOLES.

NOTE:
SEE ALSO THE DEPT OF ECOLOGY'S "CRITERIA FOR SEWAGE WORKS DESIGN", LATEST EDITION, FOR ADDITIONAL DESIGN CRITERIA.

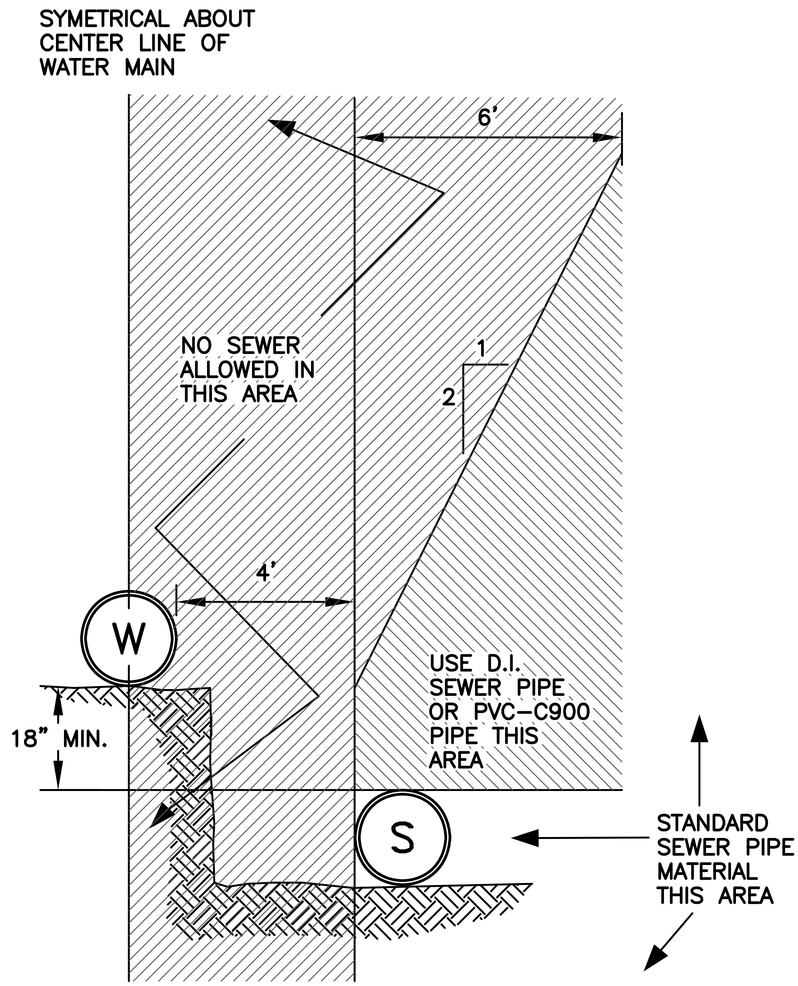
REVISIONS	DATE:
CHECKPRINT	11/07/97
CORRECTIONS COMPLETED	01/15/98
CORRECTIONS COMPLETED	08/20/2018

DRAWN BY: MRB CHECKED BY: LCW

City of Enumclaw

SANITARY SEWER DESIGN CRITERIA

DWG. NO. SS 012



INSTALLER SHALL MEET ALL APPLICABLE STATE OF WASHINGTON DEPARTMENT OF HEALTH REQUIREMENTS.

1. PARALLEL CONSTRUCTION AND HORIZONTAL SEPARATION:

   MAINTAIN 10' HORIZONTAL SEPARATION (EDGE OF PIPE TO EDGE OF PIPE) WHENEVER POSSIBLE.

2. VERTICAL SEPARATION (PERPENDICULAR):

   LAY SEWER LINES BELOW WATER LINES WITH A MINIMUM 18" SEPARATION WHENEVER POSSIBLE.

   IF NOT POSSIBLE, THEN:

   A. GRAVITY SEWERS PASSING OVER OR UNDER WATER LINES SHALL BE:

      1. CONSTRUCTED OF DUCTILE IRON PIPE, 18' MINIMUM SECTION, WITH PIPES CENTERED TO MAXIMIZE JOINT SEPARATION.

      2. CONSTRUCTION OF STANDARD GRAVITY SEWER PIPE MATERIAL ENCASED IN 1/4" THICK CONTINUOUS STEEL CASING, 18' MINIMUM SECTION LENGTH, WITH PIPES CENTERED TO MAXIMIZE JOINT SEPARATION AND ALL VOIDS PRESSURE GROUTED.

   B. WATER LINES PASSING UNDER GRAVITY SEWER LINES IN ADDITION SHALL BE PROTECTED BY PROVIDING:

      1. A VERTICAL PIPE SEPARATION OF 18".

      2. STRUCTURAL SUPPORT OF SEWER LINE TO PREVENT DEFLECTION OF SEWER OR BREAKING OF SEWER OR BREAKING OF WATER LINE.

3. PRESSURE SEWERS:

   PRESSURE SEWERS SHALL ONLY BE CONSTRUCTED UNDER WATER LINES WITH DUCTILE IRON PIPE OR STANDARD SEWER PIPE IN STEEL CASING FOR A DISTANCE OF AT LEAST 10' ON EACH SIDE OF THE CROSSING.

REVISIONS	DATE:
CHECKPRINT	11/19/97
CORRECTIONS COMPLETED	01/12/98
DRAWN BY: MRB CHECKED BY: LCW	

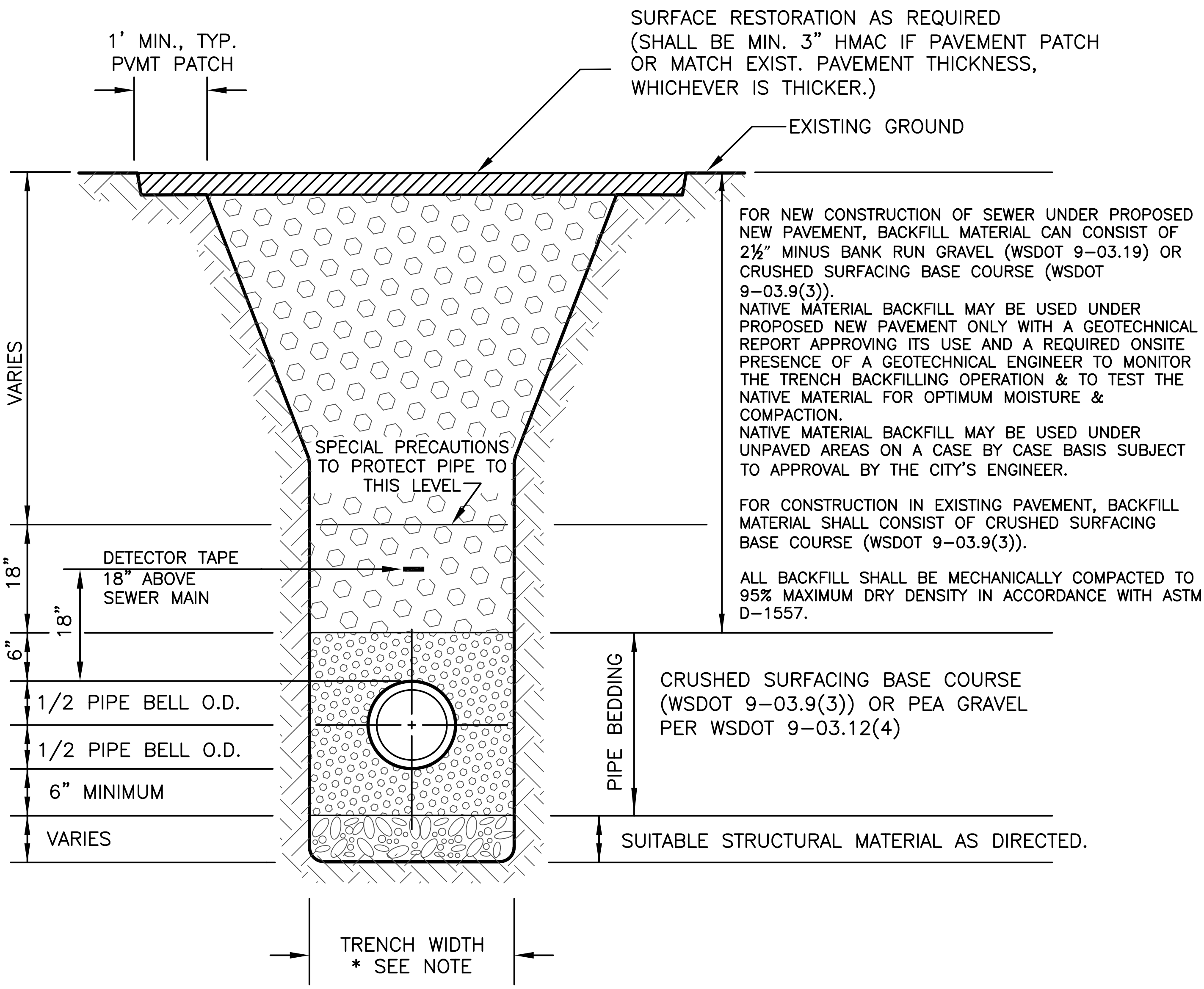
City of Enumclaw

WATER - SEWER SEPARATION DETAIL

DWG. NO.

SS

013



NOTES:

1. MINIMUM TRENCH WIDTH SHALL BE THE PIPE O.D. + 12" (6" EACH SIDE OF PIPE.)

2. MAXIMUM TRENCH PAY WIDTH:
   15" DIAMETER AND SMALLER: 40" UNLESS OTHERWISE AUTHORIZED BY THE ENGINEER.
   18" DIAMETER AND LARGER 1 1/2 times I.D. + 18" UNLESS OTHERWISE AUTHORIZED BY THE ENGINEER.

3. SHORING SHALL BE PROVIDED IN ACCORDANCE WITH O.S.H.A. & W.I.S.H.A. REQUIREMENTS WHEN NECESSARY.

4. PROVIDE A BENTONITE OR OTHER APPROVED WATERSTOP IN THE BEDDING ZONE EVERY 150 LF MAXIMUM IF PEA GRAVEL IS USED FOR BEDDING.

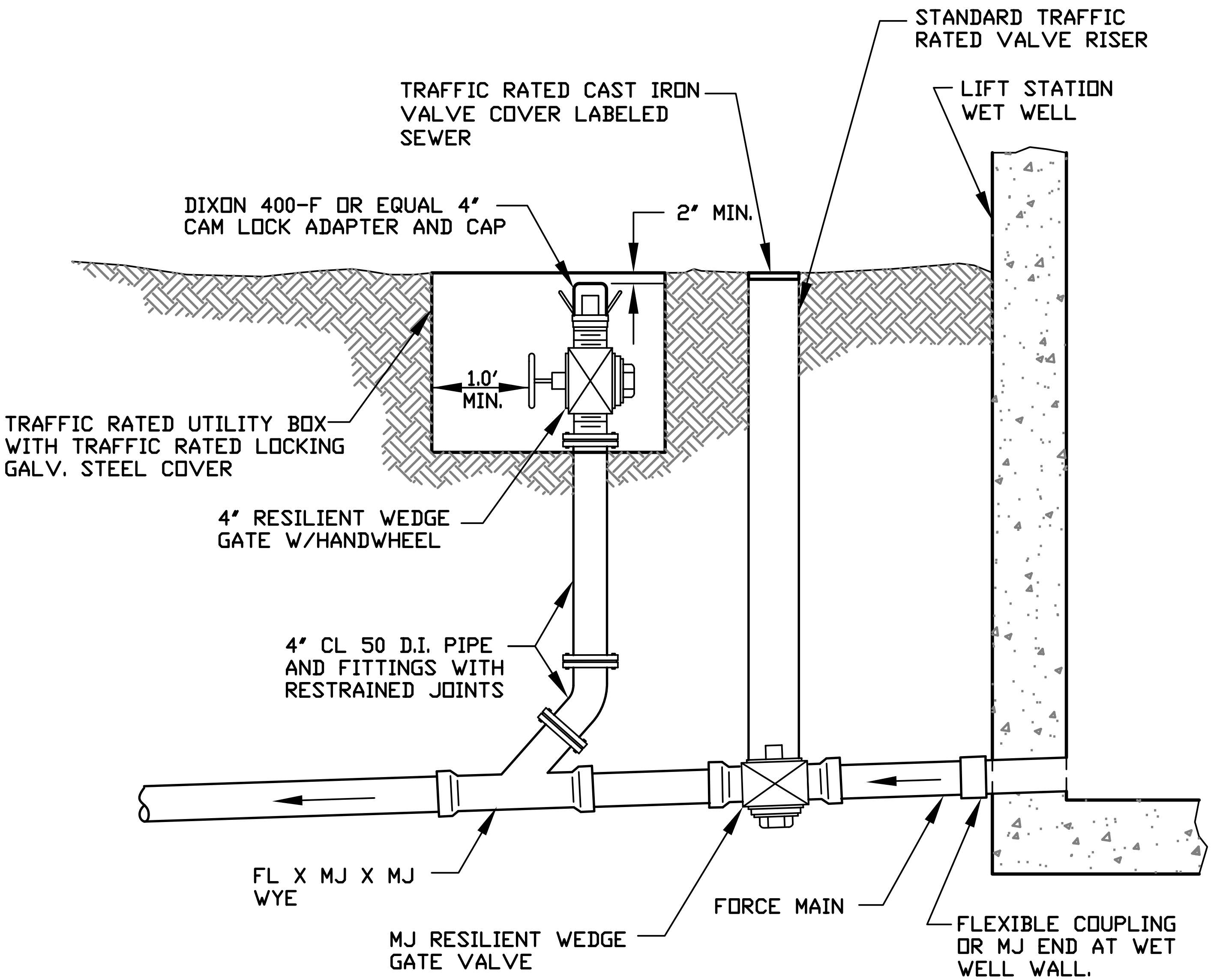
REVISIONS	DATE:
EDITS	05/03/2022

DRAWN BY: KW CHECKED BY: LCW

City of Enumclaw

SEWER TRENCH DETAIL

DWG. NO. SS 014



NOTE: DEPTH AND SIZE OF FORCE MAIN VARIES. EXACT LOCATION OF ADAPTER AND VALVE IS SUBJECT TO CITY'S APPROVAL.

REVISIONS	DATE:
CHECKPRINT	11/17/98

DRAWN BY: **KKW** CHECKED BY: **LCW**

City of Enumclaw

WET WELL/DRY WELL LIFT STATION-EMERGENCY PUMP CONNECTION

DWG. NO.

SS

015

SANITARY FACILITIES PLAN REVIEW CHECKLIST

Project: 0
Engineer: 0

Date: 1/0/1900
Plan Approval Date: 1/0/1900
Type: Residential Subdivision
City Project or Permit No(s).: 0

Item #	N/A	OK or approved	*See redlines or comments here*	Passed inspection		Staff Comments
1					Certificate of Wastewater Availability	
2					Line maintenance crew plan check.	
3					Plan showing stationing and offsets required; typically 5 feet on the south or east side of street centerline (or located out of the potential wheel path) and min. 5 feet from an easement boundary.	
4					Profile showing slope shown.	
5					i) Extend to upstream property boundary for future extension or connection. Sewer shall be constructed as deep as necessary to serve adjacent properties as well as future service area(s) with a future extension.	
6					ii) Extend SS a minimum of 10-feet beyond pavement area for easier connection for a future extension.	
7					iii) Get an easement for any proposed extension onto or through an offsite property. If not possible, end water at property line even if under new pavement.	
8					Verify proposed size is sufficient for service area including future flow from an extension to serve a future service area. Min. main size is 8-inch diameter; Min. velocity is design flow is 2 feet/sec.; Max. design depth is 0.8 times the diameter.	
9					Min. PVC pipe slopes %: 4"=2.0 6"=1.0 8"=0.4 10"=0.28 12"=0.22	
10					Minimum slope on dead-end run = 1.0%	
11					Install manholes at all changes of line or grade, at each end of all mainline sewers, and with maximum spacing of 400 LF per DOE SS manual unless equipment can handle longer.	
12					Show MH numbering sequence.	
13					Make effort to minimize the number of MH's.	
14					Length, material & size shown.	
15					Construct bentonite or CDF check dams along SS main at maximum 150 foot spacing if pea gravel is to be used as bedding material.	
16					Existing & proposed sanitary sewer easements shown. Minimum proposed width is 15 feet.	
17					Connect to existing downstream main(s) stub with a MH. A Strong-Back Fernco coupler can be used only when there is no change in horz. or vert. direction or size change at the connection and the max. MH spacing requirement is not exceeded.	
18					Minimum depth to SS invert is 4-feet based on type III MH min. depth (average depth is around 8 feet in order to reduce conflicts with other utilities, mainly storm).	
19					Where warranted, have plan note to contractor to position manway away from a gutter or low point.	
20					Where warranted, a drop MH(s) can be used to reduce an excessive depth of SS main in order to provide for easier maintenance. This would be allowed on a case by case basis. (A drop manhole is not disirable due to line access difficulty for out crew through the drop connection. This has been a problem in the past.)	
21					Detail drop manholes. Inside drops are not allowed for new manholes. For existing MH's, inside drops are allowed on a case by case basis.	
22					MH type shown; if rim to inv. is less than 6.0' specify Type III M.H. with manway over invert. *Type 1 detail shown in plans. All SS mains are at least 8 feet deep.*	
23					Show MH rim & invert elevations; show 0.1 foot drop through MH.	
24					Check that MH's are not located within limits of parking lot ponding areas.	
25					Show stub locations; see COE detail. For subdivisions, maximize double stubs for better efficiency & minimum number of mainline connections. A maximum of 4 single-family residences are allowed on 6-inch side sewer.	
26					Provide capped stubs to vacant properties for potential future connection.	
27					Location and detail of sanitary sewer service backflow preventer(s); typically, for basement connections.	

Sanitary Sewer Notes

1. Sanitary sewer pipe and fittings shall be solid wall SDR 35 PVC in accordance with ASTM D 3034. Joints for solid wall PVC pipe shall conform to ASTM D 3212 using elastomeric gaskets conforming to ASTM F 477.

2. Prior to construction, contractor to verify existing sewer elevations.

3. Contractor shall coordinate with the city when constructing side sewer stubs. Stub ends should be constructed only deep enough to serve its associated lot(s), but in no case be constructed less than 5' deep.

4. Type 3 sanitary manholes are required when rim to invert elevation difference is 6 feet or less, otherwise Type 1 manholes are required; see Enumclaw standard details. Concentric cone manholes are not allowed. Orient manway & ladder directly over sewer main invert.

5. Grout all manhole joints, inside and outside.

6. Construct bentonite or CDF check dams along SS main at maximum 150 foot spacing if pea gravel is to be used as bedding material.

7. All sewer mains and side sewers shall be pressure tested per the Standard Specifications. Mains shall be tested for deflection by pulling a mandrel between manholes as per the Standard Specifications.

8. Prior to final acceptance, all sewer mains shall be video inspected along their entire lengths by a camera mounted on a crawler. Side sewer stubs shall also be video inspected along their entire lengths by a camera mounted on a crawler or a push camera. All inspections shall be recorded and a copy of the video given to the Public Works department for review.

9. For newly installed sanitary sewer mains, no connection shall be made to the city's facilities until project acceptance. This can be achieved either by mechanically plugging the new sewer at the downstream manhole(s) or by not making a connection(s) until project end (This precludes the possibility of illicit stormwater and debris discharge into the existing system).

ATTACHMENT 4
CITY OF ENUMCLAW
SEWER PUMP STATION STANDARDS
Table of Contents

Sewer Pump Stations

This document covers the design and construction of sewage pump stations. General requirements such as location, flows, reliability, and other special design details for pump stations are included.

1-1 General Requirements

1-1.1 Introduction

Except where otherwise indicated, the following sections are intended to be consistent with Ecology's "Criteria of Sewage Works Design."

Except where provided otherwise, construction details, workmanship, and materials shall be in accordance with the latest edition of "Standard Specifications for Road, Bridge, and Municipal Construction" prepared by the Washington State chapter of the American Public Works Association.

The developer shall submit information from the material manufacturer or fabricator showing that the materials meet the requirements of the design and pertinent specifications. The developer shall provide submittals to the City on all materials to be used.

Equipment manufacturers or their authorized representatives shall submit a manufacturers installation affidavit (certificate) with respect to their equipment certifying that:

1. the equipment has been properly installed and lubricated;
2. the equipment is in accurate alignment;
3. the manufacturer was present when the equipment was placed in operation;
4. the manufacturer has checked, inspected and adjusted the equipment as necessary;
5. the equipment is free from any undue stress imposed by connecting piping or anchor bolts;
6. the equipment is not imposing any undue stress on any connecting members;
7. vibration of the complete pump assemblies shall be within the limits recommended by the applicable standards of the Hydraulic Institute.
8. the equipment has been operated satisfactorily under full load conditions;
9. the manufacturer has inspected their equipment during the operational demonstrations and system validation tests to the extent specified; and
10. the equipment is fully covered under the terms of the guarantee.

Any extension of the City sanitary sewer shall be completed in accordance with City requirements.

Prior to construction, the City shall have an approved set of plans from Washington State Department of Ecology (Ecology) on file in the City offices.

1-1.1.1 Operation and Maintenance (O&M Manuals):
Provide complete O&M Manuals to the City Sewer Utility for review and approval as follows:

1. Draft O&M Manual – One electronic copy in Adobe PDF, bookmarked and searchable a minimum of 30-days prior to station start up.
2. Final O&M Manual – Two complete hardcopy sets of the approved O&M Manual, along with one electronic copy on CD in Adobe PDF, bookmarked and searchable for approval. Final manuals will be bound in identical hardcover three-ring binders with the pump station name, volume number, and set number clearly shown. Approved Final O&M Manuals shall be submitted to the City Sewer Utility prior to final acceptance of the Sewer Pump Station.
3. Final Program Files – Two electronic copies of all final programming for all installed Program Logic Controllers (PLC), Human Machine Interfaces (HMI), Flow Meters, Variable Frequency Drives (VFD) or other programmed devices. Electronic copies shall be provided on two labeled CDs or USB flash drives.

The manuals will be divided into sections and subsections as necessary to describe each component of the complete pump station and organized in a manner similar to this specification. An overall table of contents will be provided.

All information shall be specifically for the installed components. Data sheets which cover multiple equipment or list options shall be marked to indicate the installed equipment, including provided options. All other equipment or options shall be crossed out. Each item in the submittal shall include, but not be limited to the following information:

1. Fly sheet indicating: description of equipment; manufacturer’s name, address, and telephone number; and local supplier/ representative’s name, address, and telephone number.
2. Detailed index indicating submittal contents, with major headings related to table dividers.
3. Disassembly and assembly drawings.
4. Parts list and/or bill of materials.
5. Wiring diagrams.
6. Lubrication instructions, including type and frequency.
7. Preventative and periodic maintenance summary.
8. Operating instructions.
9. Overhaul and parts replacement instructions.
10. Source for parts.
11. Testing and troubleshooting procedures.
12. Performance curves.

13. Factory test data.
14. Manufacturer/Vendor Startup & Testing Reports.
15. Manufacturer's Installation Affidavit (Certificate).
16. List of recommended spare parts.
17. List of expendable parts (i.e., air or oil filters).
18. Warranty.

1-1.1.2 Record Drawings

Provide pump station record drawings as noted below. In addition to these requirements, provide as constructed panel and interconnection drawings for all control, telemetry, and electrical cabinets and panels.

1. Each sheet of the Record drawing plans shall include the following statement along with the engineer's professional stamp, signed and dated, located at the bottom right-hand corner of the sheet when possible: "These plans are Record Drawings and the information shown accurately reflects existing field conditions as of this date: ________"
2. The Record Drawing Plans should consist of the design plans submitted, approved, and permitted for the construction project. The information shown shall reflect the actual construction completed under the permit with any and all deviations from the design plans. All changes shall be annotated with a cross-out and/or a cloud. This information shall be provided by the engineer of record.
3. One electronic PDF set is to be submitted to the Public Works.

1-1.1.3 Location, Site Selection, and Site Layout

Site Requirements: The size of a proposed pump station site will vary depending on the facility configuration and access requirements. Design criteria includes the following:

1. A minimum of 30 ft separation from the pump station structure (i.e., wet well/dry well) should be provided to the property line and/or adjacent facilities.
2. The maximum longitudinal slope for access roads should be 10%.
3. Vaults should be designed to avoid designation as a confined space. Vaults that are six feet or deeper should have stairways or installed ladders with extensions per OSHA standards. A concrete pad should be placed around vaults which is suitable for confined space personnel retrieval equipment.
4. Facilities should be oriented according to prevailing wind direction and to minimize potential for hydrogen sulfide gases entering control building intake grills or electrical panels whenever possible.

1-1.1.4 Flood Protection

The station's operational components shall be located at an elevation that is not subjected to the 100-year frequency flood. All electrical controls, connection boxes, disconnects, and motor drives shall be located above grade and not subject to flooding.

1-1.1.5 Access for Maintenance Vehicles

Access to pump stations is critical for the City maintenance and operations (M&O) personnel. Pump station site design must include space to facilitate service equipment. This is in addition to the permanent on-site equipment including an emergency generator.

1. Space for a standby generator should be reserved.
2. Access should be provided around the entire perimeter of the pump station for required maintenance equipment.
3. The driving, parking, and access areas for the pump station shall be paved with a minimum of 3 inches of compacted asphalt and shall support vehicles with a gross vehicle weight of 50,000 pounds. Other areas shall receive a 6-inch thickness of crushed surfacing top course material where required.
4. All maintenance vehicles anticipated to service the station must be able to park on-site. No street parking off-site for maintenance vehicles should be assumed.
5. Adequate clearance from overhead power lines to allow for the safe operation of a crane must be provided.
6. Above-grade equipment and piping are to be protected by bollards where required.
7. All hatches in access area shall have no less than H-30 rating.

1-1.1.6 Fire Protection

Number and location of fire extinguishers shall meet all appropriate fire and safety codes and the requirements of the Fire Marshal.

Fire extinguishers shall meet the following requirements:

1. Steel bodied, all metal top (head) and valves.
2. Multi-purpose dry chemical, UL Rated, 2A-10BC.
3. Provide hose and horn on each.
4. Red with epoxy finish coat.

Provide "FIRE EXTINGUISHER" sign for each extinguisher meeting requirements of NFPA 10.

Fire extinguishers and cabinets shall be obtained from a single manufacturer.

1-1.1.7 Site Piping Layout

Pump station may discharge to a manhole or directly to a mainline pipe depending on the application at the discretion of the Director.

1-1.1.8 Fencing

A 6-foot black vinyl coated chain link fence with sight obscuring slats shall be provided around the pump station site with a 16-foot wide double swing access gate located for optimal access to the wetwell unless otherwise approved in writing by the City. The fence must be designed to meet a wind loading of 120 mph with 3 second gust.

1-1.1.9 Lighting

All pump station sites shall have a minimum of one LED equivalent 75-watt bulb in adjustable outdoor floodlights for night visibility. No lighting shall be installed inside the pump station wetwell.

In addition, the pump station building shall have a minimum of one manually controlled externally mounted floodlight for night visibility over each entrance door. All lighting shall be LED. No lighting shall be installed inside the pump station wetwell.

No automatic controlled lights shall be installed, only manual switch lights shall be installed.

1-1.1.10 Water Supply

A 3/4-inch non-freeze post hydrant shall be provided on site along with a hose bib on the pump station building. Non-freeze post hydrants shall be Zurn, Model Z-1385 (3/4-inch), or approved equal. A reduced pressure backflow assembly shall be provided on the water service upstream of these fixtures.

1-1.1.11 Landscaping

Landscaping shall be on the outside of the fence to screen the site. All plantings shall be low maintenance.

1-1.2 Building Requirements

Permanent pump station support buildings shall be of a concrete and masonry construction with metal roofing designed by an Engineer or Architect licensed in the State of Washington.

All buildings shall meet requirements of current the City Building Codes.

All pump station buildings shall be heated and ventilated with a separate dedicated circuit for a dehumidifier. Interior ceiling height shall be a minimum of 10 feet, finished with 5/8” gypsum green board painted white. Ceiling shall have minimum 2’x2’ access hatch and R19 batt insulation.

Gable ends shall be masonry. Louver vents shall be provided in the gable ends with insect screen. Eaves shall have a 24” overhang and be finished with horizontal soffits with venting as required by code fitted with insect screen.

Floors and concrete entry pads shall be a minimum 8” thick reinforced concrete. Concrete entry pads shall be provided at doors as directed.

Double exterior doors shall be provided as the main entry. Other doors may be required by the City.

1-1.2.1 Masonry Walls
All masonry units shall be split face, grouted solid and reinforced. Block shall be laid in running bond, unless otherwise approved.

Masonry units shall be nominal 8” high and 8” high by 16” long as manufactured by Mutual Materials Co, or approved equal.

Exterior masonry units shall be colored. Color shall be approved by the City.

Masonry units shall be manufactured with an integral water repellent additive during production such as “Dry-Block” by W.R. Grace & Co.

Exterior masonry unit faces and exposed unpainted faces shall receive a clear water repellent sealer installed over cleaned surfaces in accordance with manufacturer’s recommendations. Coating shall extend from masonry sill cap down to top of concrete footing.

Exterior masonry units shall be treated with PROSOCO Blok-Guard® & Graffiti Control II. Provide one gallon of PROSOCO Eraser® Graffiti Wipe to the City.

Mortar shall contain an integral water repellent admixture such as “Dry-Block” mortar admixture by W.R. Grace & Co. Follow manufacturer’s published recommendations for preparation and use.

1-1.2.2 Doors and Frames
Exterior doors and frames shall be steel and certified by the Steel Door Institute. Door threshold shall be 5-inches in width by length of door. Bottom of all doors shall be provided with door shoes as manufactured by Pemko. The door manufacturer supplying the doors shall supply the appropriate 14 gauge galvanized door jamb to accommodate minimum 16 gauge doors. The hinges shall be minimum 4.5-inch, heavy duty type. The doors shall have a soundproofing polystyrene insulated core and heavy duty deadbolt lock and heavy duty mortise with 1" stainless steel throw deadbolt. Recessed top and bottom flush bolts shall be provided for inactive doors. Thresholds, door stops, and projection-type door holders shall be provided for each door. Hinges, thresholds, doorstops, and other accessories shall be furnished by the door manufacturer or certified by the manufacturer to be compatible with the respective door.

All doors shall be caulked and sealed both inside and outside with a top quality sealant. The sealant shall be mildew resistant; nonhardening, nonsagging and shall accept paint. Color shall be complimentary to the finished door color. The finished epoxy door color shall be similar to the approved metal roof of the building.

Door hardware shall be as listed below or approved equal.

Description	Item	Finish	Brand
Lockset	8205 LNJ less cylinder	US26D	Sargent
Cylinder	1E74 x C208 Cam	US26D	Best Lock
Exit Device	4501 SVR	US26D	Hager
Pr Hinges	BB 1199 4.5 x 4.5 NRP	US32D	Hager
Closer	1601 x Hold Open Arm	Aluminum	Nortan
Threshold	271A	Aluminum	Pemko
Sweep	315CN	Aluminum	Pemko
Kick Plate	10” x 34”	US32D	Tice

Hardware shall be suitable and adapted for its required use and shall fit its designated location. Hardware supplier shall meet with the City to determine the keying requirements for the project.

1-1.2.3 Metal Roofing and Accessories

Metal roofing shall be a structural standing seam metal roof system by AEP Span, Design Span® hp, ASA Pacific or approved equal. The City will be the sole judge of what qualifies as an “equal” system.

Color shall be approved by the City.

Provide components approved by roof panel manufacturer and required for a complete weather tight panel system including trim, copings, fascia, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels.

Continuous eave gutters shall be installed with fasteners at minimum 12 inch centers.

1-1.2.3.1 Metal Roofing Warranty

Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Structural failures including rupturing, cracking, or puncturing.
   b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
2. Warranty Period: Two years from date of Substantial Completion.

Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
   a. Color fading more than 5 Hunter units when tested according to ASTM D

2244.
    b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Finish Warranty Period: 10 years from date of Substantial Completion.

Special Weather tightness Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that fail to remain weather tight, including leaks, within specified warranty period.

1. Warranty Period: 20 years from date of Substantial Completion.

1-1.2.4 Color Scheme
Typical exterior color scheme for pump stations is rose brown colored masonry with tan metal roofing, doors, flashing, gutters and downspouts.

Typical interior color is white.

1-1.3 Developer Requirements

1-1.3.1 General
The developer shall complete the proposed sanitary sewer construction in accordance with the approved construction drawings, details, specifications, state requirements, and local regulatory requirements. The developer shall implement the runoff and erosion control plan that was approved by the City.

The developer shall provide all materials, labor, and equipment necessary to shore trenches to protect the work, existing property, utilities, pavement, etc., and to provide safe work conditions in the trench. The developer may elect to any combination of shoring and overbreak, tunneling, boring, sliding trench shield, or other method of accomplishing the work consistent with applicable local, state and federal safety codes.

1-1.3.2 Site Work
The developer shall furnish, install, and operate all necessary equipment to keep excavation above the foundation level free from water during construction, and shall dewater and dispose of the water so as not to cause injury to public or private property or nuisance to the public. Sufficient pumping equipment in good working condition shall be available at all times for emergencies, including power outage, and shall have available at all times competent workers for the operation of the pumping equipment. Equipment is to be refueled by the Developer prior to weekends, holidays, or any work stoppage longer than 1 day.   the City reserves the right to take any/all corrective action during equipment failure or emergency.

All existing sewer lines shall be kept in service at all times. Provision shall be made for disposal of sewage flow if any existing sewers are damaged. The developer shall repair damage to existing sewers to a condition equal to or better than their condition prior to the damage. Water accumulating during construction shall be removed from the new sewers but shall not be permitted to enter the existing system. The developer shall be responsible for flushing out and cleaning any existing sewers, into which gravel, rocks, or other debris has entered as a result of the work, and shall repair lift stations or other facilities damaged by the work at the developer's expense.

The physical connection to an existing manhole or sewer shall not be made until authorized by the City. Such authorization will not be given until all upstream lines have been completely cleaned and tested.

Excavation for a precast concrete wetwell shall be sufficient to leave 1-foot clearance between the wetwell outer surface and the earth bank. Excavation for a cast in place concrete wetwell shall allow enough space for formwork.

The developer shall provide all materials, labor, and equipment necessary to shore excavations to protect the work, existing property, utilities, pavement, etc., and to provide safe working conditions in the excavation.

1-1.3.3 Materials and Equipment
The material manufacturer or fabricator shall furnish appropriate certification, based on manufacturer's routine quality control tests, that the materials meet the requirements of the specifications. The developer shall provide submittals to the City on all materials to be used including pump performance curves indicating pump efficiency, horsepower, and head capacity relationships; structural details including wetwell wall thickness and reinforcing; and all mechanical and electrical details for this lift station.

1-1.4 Design Flow Rates, Hydraulics, and Number of Pump Units

1-1.4.1 General
The design of the submersible pump station shall provide for a "lead pump" cycle time of no more than six cycles per hour during peak wet weather flow design conditions, and no less than one cycle per hour during minimum dry weather flow design conditions.

1-1.4.2 System Hydraulics
The design capacity of a pump station shall be computed on the basis of the total area and projected population that can be served by the pump station (based on the most current zoning projections). Method of calculation shall be consistent with the DOE Criteria for Sewage Works Design Section C1-1.2.

1-1.4.3 Number of Pumps
At least two pump units shall be provided. The pumps shall be designed to fit actual flow conditions and each must be capable of handling the expected maximum peak sewage flow.

1-1.4.4 Pump Removal and Replacement

Submersible pumps shall be readily removable (including power and control cables from a termination box) and replaceable without dewatering the wetwell or requiring personnel to enter the wetwell. The termination box shall be located external to the well. Other pump units at the same station shall continue to be operable while one pump is (removed) maintained. Pump unit lifting devices shall be included in the design.

1-1.4.5 Pump Selection

1-1.4.5.1 Submittals

Submit the following:

1. Technical literature, bulletins, and/or catalog cuts of the equipment.
2. Performance curves.
3. Quality control test results.
4. Materials of construction.
5. Complete installation instructions, including electrical and mechanical requirements.
6. Operations and Maintenance Manuals.

1-1.4.5.2 Warranty

The pump manufacturer shall warrant the pumps, including components and motor, against defects in workmanship and materials for a period of five (5) years under normal use and service.

The pump manufacturer shall warrant the guide system (including guide, cables or rails, and brackets) against defects in workmanship and materials for a period of ten (10) years under normal use and service.

The pump manufacturer shall fully warrant the impeller against clogging for a period of one year under normal use and service.

Pump manufacturer warranties shall be in published form and shall apply to all similar units.

1-1.4.5.3 Quality Control

Perform equipment tests in accordance with the Hydraulic Institute's - Submersible Pumps for Hydraulic Performance, Hydrostatic Pressure, Mechanical and Electrical Acceptance Tests.

Tests shall be performed on the actual assembled pumps to be supplied; prototype model tests are not acceptable.

Tests shall cover a range from shut-off to a minimum 20 percent beyond specified design capacity.

Conduct test per above on all supplied pumps, generating a curve showing actual flow, head, BHP, and hydraulic efficiency.

Obtain the submersible sewage pumps from one source and a single manufacturer.

1-1.4.5.4 Products
The pumps specified herein are the product of Xylem Flygt Corporation, NP-3000 series, and explosion proof, there is no known equal.

Local Supplier: Whitney Equipment Company, 21222 30th Drive SE, Suite 110, Bothell, WA 98021, (425) 486-9499.

Performance and Conditions of Service: Pumps shall operate over the range of flows and heads specified and approved. Motor horsepower shall not exceed the values specified, and the hydraulic efficiency shall be equal to or higher than 50%.

Pumps shall operate without cavitation or vibration within the specified flow range, with a submergence of one (1) foot above the impeller centerline.

1-1.4.5.4.1 Pump Design
The pumps shall be submersible non-clog type that is suitable for the application, each connected to a discharge connection of a minimum diameter of 4 inches.

Sealing of the pumping unit to the discharge connection shall be accomplished by a machined metal-to-metal watertight contact.

1-1.4.5.4.2 Pump Construction
Provide pumps fabricated of the following materials:

Pump Components	Material
Pump Case	Cast Iron, ASTM A48, Class 35B
Motor Housing	Cast Iron, ASTM A48, Class 35B
Impeller	Hard Iron, ASTM A532 (Alloy III A, 25% chrome cast iron)
Intermediate Housing (Backplate)	Cast Iron, ASTM A48, Class 35B
Discharge Base Elbow	Cast Iron, ASTM A48, Class 35B
Pump/Motor Shaft	Stainless Steel, AISI 431
Shaft Sleeve	Stainless Steel, ASTM A276, Type 420
Wear Ring, Case	Cast Iron, ASTM A48, minimum 200 Brinell
Impeller	Hard Iron, ASTM A532 (Alloy III A, 25% chrome cast iron)

O-Rings	Nitrile Rubber (NBR)
Fasteners	Stainless Steel, Type 316TI
Mechanical Seal – Lower	Tungsten Carbide
Mechanical Seal – Upper	Tungsten Carbide
Guide Rails	Stainless Steel, ASTM A276 Type 316L
Lifting Chains	Stainless Steel, ASTM A276 Type 316L
Oil – All Uses (Seal Lubrication, Motor Cooling, etc.)	FDA Approved, Ecologically Safe
Power/Control Cable Jacket	Chlorinated Polyethylene Rubber

Furnish pump case, impeller, intermediate housing, and motor housing with smooth surfaces devoid of blow holes and other irregularities.

All metal surfaces coming into contact with the pumpage, other than stainless steel or brass, shall be protected by a factory-applied polyamidoamine epoxy protective spray coating on the exterior of the pump.

Sealing design shall incorporate metal-to-metal contact between machine surfaces.

All major castings shall be produced in the manufacturer's own foundry, under the manufacturer's direct supervision.

1-1.4.5.4.3 Components
General:

Provide pumps capable of handling raw, unscreened sewage.

Where watertight sealing is required, machine and fit mating surfaces with O-rings.

Provide with heavy duty lift lugs or hoisting bail designed for lifting the entire pump and motor assembly.

1. Impeller and Wear Rings:
    a. Provide enclosed, non-clog type impeller of Hard Iron.
    b. Statically and dynamically balance impeller.
    c. For enclosed impeller pumps, provide wear rings on case and impeller of material and Brinell hardness specified to ensure maximum pump/impeller life and continuing high efficiencies. Soft metals (e.g., bronze) or elastomers as wear ring material are not acceptable.

2. Shaft
    a. Pump and motor shaft shall be the same unit. The pump shaft is an extension of the motor shaft. Couplings are not acceptable.

b. Machine the shaft of Type 420 stainless steel; or, Gr 1045 carbon steel with a replaceable Type 420 stainless steel shaft sleeve under the lower mechanical seal to isolate the shaft from the pumped media.
c. Carbon steel as shaft material without a stainless steel sleeve is not acceptable.

3. Mechanical Seal
    a. Provide two totally independent mechanical shaft seals, installed in tandem, each with its own independent spring system acting in a common direction.
    b. Install the upper seal in an oil-filled chamber with drain and inspection plug (with positive anti-leak seal) for easy access from external to the pump.
    c. Provide seals requiring neither routine maintenance nor adjustment, but capable of being easily inspected and replaced.
    d. Do not provide seals with the following characteristics:
        i. Conventional double mechanical seals with single or multiple springs acting in opposed direction.
        ii. Cartridge-type mechanical seals.
        iii. Seals with materials other than those specified.
        iv. Seals using the impeller hub as a mounting surface.

4. Bearings
    a. Furnish upper and lower bearings, single row (preferred) or double row as needed to provide a B10 life of, at minimum, 50,000 hours at anticipated axial and radial loadings.
    b. Provide sealed, shielded (permanently lubricated) bearings.

5. Motor
    a. Provide a motor that is squirrel cage, induction in design, housed in completely water-tight and air-filled chamber, with a minimum 1.15 service factor.
    b. Insulate the motor stator and stator leads with, at minimum, Class H insulation rated for 180 degrees C total temperature.
    c. Provide motor cooling by providing an adequately rated motor with sufficient surface area for ambient only cooling.
    d. Provide motors that are capable of operating for at least 2 hours in a dry mode without damage to motor or seals.
    e. Provide motors that are designed, rated, and warranted for continuous operation at 40 degrees C, temperature rise not to exceed 80 degrees C, capable of 30 evenly spaced starts per hour.
    f. Do not provide motors that contain in excess of 2 gallons of oil (combined total for cooling and seals), or that contain other than an FDA approved, ecologically safe oil.
    g. Pump and motor package to be FM approved, Class 1, Division 1, Group C & D service for hazardous locations as defined by the National Electric Code (NEC).

   h. All motors shall be 3 phase, 480 volts and power supply to station should be the same.

6. Thermal/Leakage Relay
   a. Provide an ITT Flygt MiniCAS thermal/leakage relay with mounting socket for each pump installed.

7. Protection
   a. All stators shall incorporate thermal switches in series to monitor the temperature of each phase winding. Set temperature monitors at levels recommended by pump manufacturer. When activated, switches shall activate an alarm and the pump shall shut down. The pump control panel shall send the activated alarm signal to the Radio Telemetry Unit (RTU) and the front panel. Power disconnect breaker to be installed on the outside of control Panel.
   b. Leak detection sensors shall be provided to detect water in the stator chamber, cable entry chamber, and mechanical seal oil chamber. The leak sensors shall utilize a float switch to detect the presence of water. When activated, the sensors shall activate an alarm illuminating an amber warning light on the pump control panel only. The pump shall not be shut down.

1-1.4.5.4.4 Appurtenances

1-1.4.5.4.4.1 Guide System
Pumps to allow for removal and reinstallation without the need to enter the wetwell and without removal of bolts, nuts, or other fasteners.

Pumps shall connect to permanently mounted discharge connections by simple downward motion, without rotation; guided by at least two (per pump) non-load-bearing, Type 316L stainless steel, non-sparking, guide rails permanently installed in the wetwell extending from the top of the station to the discharge connection. Final connection shall ensure zero leakage between the pump and discharge connection flange.

Pumps shall automatically connect to the discharge elbow when lowered and sealed by a profile gasket or machined metal-to-metal watertight contact.

Discharge connection/guide system shall be such that no part of the pump bears directly on the floor of the wetwell.

Each pump shall be fitted with a Flygt Pump Lift™ pump lifting system consisting of the following minimum components:

1. Minimum 3-foot length of Type 316L stainless steel chain of adequate strength for raising and lowering pumps.
2. Type 316 stainless steel shackles of adequate strength for raising and lowering

pumps.
3. Spectra cord guide rope of adequate length to reach from top of pump to minimum 6-feet above wetwell opening.
4. Flygt Grip-Eye pump lifting assembly.

Chain holder with safety hook for each pump to be Type 316L stainless steel. Anchors, fasteners and other connecting hardware shall be Type 316 stainless steel.

1-1.4.5.4.4.2 Power and Control Cable
Combined power cable and control cable of adequate length to allow a unit to be wired without splicing. Cables should be suitable for the application, sized in accordance with NEC requirements.

Cable entry sealing system:
1. Cable terminal box on side of motor housing, with cable entry sealed to ensure that no entry of moisture is possible into the motor terminal area even if the cable is damaged or severed below water level.
2. Control cable shall contain the required conductors for the temperature and seal leak detection systems.

1-1.4.5.4.4.3 Spare Parts
Supply the following spare parts:
1. One Pump Basic Repair Kit (Seals, Bearings, and O-Rings) for each pump type and/or size
2. One Impeller and Insert Ring for each pump provided.
3. One Sleeve Assembly (Sleeves, Washers, and Impeller Bolts) for each pump provided.

1-1.4.5.5 Execution

1-1.4.5.5.1 Installation
Equipment shall be installed in accordance with the equipment manufacturer's written installation instructions and the requirements of the design. The Contractor/Developer shall provide and pay for the services of a manufacturer's service engineer to review the installation and make final adjustments to the equipment.

Manufacturer installation affidavits (certificates) shall be provided in accordance with Section 1-1.1.

Pumps shall be set plumb with no stresses on the pump discharge.

Equipment shall not be subject to electrical or mechanical shock. Damaged, dented or marred equipment shall be replaced or repaired in a manner satisfactory to the City, at the option of the City, at no cost to the City.

1-1.4.5.5.2 Start-up and Training Service

The Developer shall provide for the services by the equipment manufacturer for a qualified factory-trained field service engineer site visit to inspect, check, service, adjust and make corrections to the installation. Additionally, after the pumps have been completely installed and wired, the equipment manufacturer's qualified factory-trained field service engineer shall do the following:

1. Megger stator and power cables.
2. Check seal lubrication.
3. Check for proper rotation.
4. Check power supply voltage.
5. Measure motor operating load and no-load current.
6. Check level control operation and sequence.

A written report by the manufacturer's service engineer shall be submitted to the City certifying that the equipment has been properly installed and checked.

Field test all pumps, generators, and supporting equipment after installation to demonstrate satisfactory operation. See Section 1-1.9 Final Testing and Acceptance.

1. Furnish all labor, materials, tools, equipment, incidentals and services for developing a sufficient supply of potable water for functional testing. Sufficient quantities of water shall be available to test the full range of the equipment.
2. Testing shall be done in the presence of the City.
3. Any equipment that fails to meet the requirements, will be modified, repaired or replaced.

Instruct the City's personnel on the operation and maintenance of the equipment.

1-1.4.5.5.3 Cleaning

All materials and equipment shall be new and, therefore, shall require only a minimum amount of routine cleaning during or after installation.

All debris, grit, petroleum products, rust scale, construction by-products, and foreign matter shall be removed, and damaged coatings shall be repaired prior to final acceptance. All cleaning regimen suggested by the manufacturer shall be done.

1-1.5 Wetwells and Vaults

1-1.5.1 System Fabrication

Wetwells and vaults shall be precast reinforced concrete, cast-in-place reinforced concrete, or stainless steel construction. Wetwell floors shall be sloped to the pump suction to minimize grit accumulation. Vault floors shall be sloped to integral floor drain. Wetwells and vaults shall be watertight.

Precast assemblies shall be manufactured to meet the requirements of ASTM C-478, and the following minimum design requirements:

1. Normal weight concrete.
2. Minimum concrete cover over reinforcement shall not be less than that required by ACI 318, if greater than ASTM C858.

1-1.5.1.1 Minimum Loading Requirements:
Loading assumptions shall conform to ASTM C857 except as follows:

1. Top slabs shall be designed for A-16 (HS20-44) Loading or 250 PSF Live Loading, whichever is greater.
2. Wall and bottom slab design and uplift calculations shall include hydrostatic pressure from groundwater.
3. For structures designed using groundwater pressures, buoyancy calculations shall have a minimum factor of safety equal to 1.5.
4. Live loads and weights for post-installed items such as internal piping, pumps, valves, sewage, concrete grout fill, etc. shall not be included in the buoyancy calculations.

All precast assembly sections shall utilize a round rubber gasket meeting ASTM C-443 specifications. All joints shall be watertight and will be mudded with non-shrink grout. All wetwell and vault components, including, but not limited to, access hatches, pump bases, ladders, and supports will be securely fastened to the precast sections in a watertight manner.

Cast-in-place wetwell and vaults designs shall be stamped by a registered engineer, licensed in State of Washington.

All penetrations in wetwells and vaults shall be sealed utilizing one or both of the following methods:

1. Modular Mechanical Seal - Expanding rubber seal with 316 stainless steel hardware installed in accordance with the manufacturer's recommendations to provide a watertight seal. Modular seals shall be PSI/Thunderline Link-Seal® or approved equal.
2. Rubber Flexible Connector – Kor-N-Seal Boot with 316 stainless steel pipe pipe clamp assembly, 316 stainless steel Korband assembly, cavity O-Ring, and non-shrink grout, or approved equal.

All miscellaneous metal parts in wetwell shall be 316L stainless steel. Metal outside the wetwell shall be aluminum, stainless steel or hot dipped galvanized following fabrication.

No lights or intrusion alarms shall be installed in the wetwell.

1-1.5.2 Coating System

Surface coatings shall be semi-gloss, except that ceilings shall be coated with flat coatings.

Surfaces to be coated and coating systems to be used are described below. The final coat shall be applied only after all other work, including punch list items, has been completed.

Surface			Coating System
1.	Metal Work: Equipment, including metal base and guards; conduits, piping; appurtenances, including grilles and louvers; doors; electrical, pneumatic, and instrumentation control panels and stations, including supports. Refer to equipment specifications for exceptions.		
	a.	Iron and steel (includes galvanized) (except non-ferrous and stainless), exposed above ground or in vault structures (not buried)	B (except as indicated under b. & c.)
	b.	Iron and steel piping and appurtenances located in the wetwell	D (except as indicated under c.)
	c.	Submersible pumps	E
2.	Concrete, Grout, and Masonry:		
	a.	Exterior concrete exposed slabs and surfaces	Unpainted
	b.	Exterior concrete buried surfaces of wetwells, manholes, valve vaults	A
	c.	Interior concrete/grouted surfaces of wetwell	C
	d.	Interior concrete/grouted surfaces of manholes	C
	e.	Interior concrete surfaces of valve vault	A or C
3.	Materials Not Requiring Paint		
	a.	Rubber, stainless steel, copper pipe, PVC pipe, and fiberglass fabrications.	—
	b.	Labels and Nameplates: Do not paint over Underwriters Laboratories Factory Mutual, or other code-required labels or equipment name, identification, performance rating, nomenclature plates.	—
	c.	Pre-Finished Items, except as damaged, including: (1) acoustic materials (2) finished mechanical and electrical equipment (3) light fixtures (4) switchgear (5) distribution cabinets (6) operating louvers	—

Surface		Coating System
d.	Metal Surfaces, including: (1) aluminum railing, ladders, hatlines, light poles (2) stainless steel (3) chromium plate (4) copper (5) bronze (6) brass (7) aluminized and galvanized (and vinylized) chainlink fabric fences, gates, and closures (8) Duct silencers and motor-operated dampers	—
e.	Moving Parts of Operating Equipment such as the following: (1) valve and damper operators (2) linkages (3) sensing devices (4) motor and fan shafts (5) gears	—

Coating System	**A**
Coating Material:	Modified Polyamine Epoxy
Surfaces:	Concrete
Surface Preparation:	Allow new cast-in-place concrete to cure a minimum of 28 days at 75°F (24°C). Verify concrete dryness and prepare concrete surfaces in accordance with NACE 6/SSPC-SP13 Joint Surface Preparation Standards and ICRI Technical Guidelines. Moisture vapor transmission should not exceed three lbs per 1,000 sq ft in a 24-hour period (Reference ASTM F 1869 "Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride"). Relative humidity should not exceed 80% (Reference ASTM F 2170 "Standard Test Method for Determining Relative Humidity in Concrete using in situ Probes"). Abrasive blast, shot-blast, water jet or mechanically abrade concrete surfaces to remove laitance, curing compounds, hardeners, sealers and other contaminants and to provide a minimum ICRI-CSP 3 surface profile. Large cracks, voids and other surface imperfections should be filled with a recommended filler or surfacer.
Application:	Factory – Exterior Surfaces Field – Interior Surfaces

Coating System:

Primer/Finish:	Tnemec Series 141 Epoxoline One coat, 16 mils DFT

Coating System	**B**
Coating Material:	Modified Polyamidoamine Epoxy and Aliphatic Acrylic Polyurethane
Surfaces:	Metal

Surface Preparation:

1. Bare ferrous metal surfaces shall be prepared in accordance with SSPC SP-6 (Commercial Blast Cleaning).

2. Shop primed surfaces which are to be incorporated in the work shall be prepared in the field by cleaning all surfaces in accordance with SSPC SP-2 (Hand Tool Cleaning).

3. Galvanized or nonferrous surfaces shall be treated with a passivator and vinyl wash primer as recommended by the coating system manufacturer.

4. If smoothing of rough metalwork is necessary, a smoothing cement acceptable to the paint system material manufacturer shall be used.

Application: Field

Coating System:

Primer:	Tnemec Series 135 Chembuild One coat, 4.0 to 6.0 mils DTF Color: Off-White
Finish:	Tnemec Series 73 Endura-Shield Two coats, 2.0 to 3.0 mils DFT per coat Color: See Paragraph 3.05

Coating System	**C**
Coating Material:	100% Solids High Build Epoxy
Surfaces:	Concrete
Surface Preparation:	Surfaces must be sound and contaminant-free with a surface profile equivalent to a minimum CSP3 to CSP5 in accordance with ICRI Technical Guideline No. 310.2R-2013. Dry abrasive sand with water blast to surface profile as recommended by the manufacturer.
Application:	Field
Coating System:	
Primer:	As recommended by coating system manufacturer
Finish:	Raven 405 Spray apply two coats, 125 mils DFT total Allowed tolerances of plus 40 miles DFT to minus 0 mils DFT Color: Light Blue

Coating System	**D**
Coating Material:	100% Solids Modified Polyamine Epoxy
Surfaces:	Metal
Surface Preparation:	As recommended by coating system manufacturer.
Application:	Field
Coating System:	
Primer:	As recommended by coating system manufacturer
Finish:	Tnemec Series 435 Perma-Glaze Two coats, 12 to 15 mils DFT per coat Color: See Paragraph 3.05

Coating System	**E**
Coating Material:	Epoxy (per Flygt/Xylem)

Surfaces:	Metal
Surface Preparation:	In accordance with SSPC SP-10 (Near white metal blast)
Application:	Factory Curing as required by coating manufacturer
Coating System:	Xylem Standard Code 08 Coating System
Primer:	Temanyl PVB, one coat 1.6 Mil DFT
Finish:	Duasolid 50, 3 coats 4-5 Mil DFT per coat

1-1.5.3 Hatches

The hatch opening shall be sized and located to allow unobstructed removal of the pumps.

Hatches shall be rectangular aluminum, Bilco style or equal. Hatches shall work with the pump rails in the wetwell to provide unobstructed removal of pumps.

Hatches shall be a dual leaf type with a hold open arm that automatically locks the cover in the open position and have hasp type locking mechanism for the City provided padlock.

All hatches shall contain a safety cage for secondary fall prevention system that is powder coated safety orange or safety yellow with an automatic lock to keep gratings in the open position.

Hatches for vaults shall contain a ladder with safety extension posts with spring balanced mechanisms to provide smooth, easy, controlled operation when raising and lowering the post. Vault 6-foot deep or greater shall be equipped the City approved davit receiver.

Hatches shall be H-30 rated with 316 stainless steel compression spring tubes that are constructed of anti-corrosive material. All hatch and safety grate hardware and fasteners shall be 316 stainless steel.

1-1.5.4 Station Valve Vault

The valve vault will be placed adjacent to the wetwell.

All pipes, valves and check valves shall be connected via bolted FL x FL except between wetwell and valve vault.

1-1.5.5 Wetwell Flushing Line and Valve

Provide 4” wetwell back flushing line and gate valve between valve vault and wetwell. Back flushing line and associated gate valve shall be configured to allow the redirection of one pump's discharge back into the wetwell while a second pump discharges into the forcemain. Back flushing line shall be routed into the wetwell to an elevation equal to 1-foot above the lead pump on setpoint. Provide a Groove End (GE) x Plain End (PE) 45-degree bend connected to end of back flushing line with a grooved coupling inside wetwell.

1-1.5.6 Pump Station Isolation Gate Valves

Provide a pump station isolation gate valve outside the wetwell on all influent lines into wetwell.

Provide a pump station isolation gate valve on the forcemain side of the valve vault outside of the valve vault.

Isolation valves will be provided with operating wrench of sufficient length to extend from the surface to the operator nut. A cast iron valve box with cover marked sewer is required.

1-1.5.7 Gate Valves

Resilient Wedge Gate Valves, 2 to 18 IN (Water, Wastewater Application):

1. Comply with AWWA C509 or AWWA C515.
2. Materials:
    a. Stem and stem nut: Bronze:
        i. Wetted bronze parts in low zinc bronze.
        ii. Aluminum bronze components: Heat treated.
    b. Body, gate: Ductile iron.
    c. Resilient wedge: Fully encapsulated rubber wedge per ASTM D429.
    d. Seating rubber: EPDM elastomer.
    e. Nuts and bolts for connecting bonnet and body shall Type 304 stainless steel. Bolts may be regular square or hexagonal heads confirming to ANSI B18.2.1. Metric size socket head cap screws are not allowed.
    f. Interior lining and exterior coating shall be fusion bonded epoxy meeting the requirements of AWWA C550.
3. Design requirements:
    a. Minimum 150 psig cold water working pressure.
    b. Buried: NRS, O-ring stem seal, 2 IN square operating nut.
    c. Exposed: NRS, O-ring, stem seal, handwheel.
    d. Counter-clockwise open rotation.
    e. Fusion bonded epoxy coating interior and exterior except stainless steel and bearing surfaces:
        i. Comply with AWWA C550.
        ii. Wetted bronze parts in low zinc bronze.
        iii. Aluminum bronze components: Heat treated.
    f. Ends to match connecting piping.
4. Acceptable manufacturers:

a. Kennedy.
b. M&H.

1-1.5.8 Check Valves

Swing Check Valves (Wastewater):

1. Comply with AWWA C508.
2. Acceptable manufacturers:
    a. M&H.
    b. Kennedy.
    c. Clow.
3. Materials:
    a. Body and cover: Cast iron, ASTM A126, Class B.
    b. Seat ring, hinge: Bronze, AWWA C508.
    c. Disc: Cast iron, ASTM A126, Class B with rubber face.
    d. Hinge shaft: Stainless Steel, ASTM 276, type 304.
    e. Stuffing box, follower and gland: Bronze, AWWA C508.
    f. Interior lining and exterior coating shall be fusion bonded epoxy meeting the requirements of AWWA C550.
4. Design requirements:
    a. Integral flanged ends, flat faced and drilled per ANSI B16.1 Class 125.
    b. 175 psig working pressure and 350 psig hydrostatic pressure.
    c. Valves shall be provided with one outside lever and spring. Spring tension shall be adjustable. The valve design shall permit mounting levers and springs on either side of the valve body.
    d. Valve shall be provided with a clear opening equal to or greater than the connection piping, with no raised seating surface. Seats shall be threaded onto the body and shall be replaceable.
    e. Constructed to permit top entry for complete removal of internal components without removing the valve from the line.
    f. Inspection lid shall have minimum 1/4-inch NPT tap for pressure gauge.

1-1.5.9 Pipe, Fittings, and Gaskets

Ductile Iron Pipe:

1. AWWA/ANSI C111.
2. AWWA/ANSI C115.
3. AWWA/ANSI C150.
4. AWWA/ANSI C151.
5. Line pipe with 40 mils nominal dry film thickness: Protecto 401 Ceramic Epoxy or accepted equal.

Fittings and Flanges:

1. AWWA/ANSI C110.

2. AWWA/ANSI C115.
3. Flanges drilled and faced per ASME B16.1 for both 125 and 250 psi applications.
4. Line fittings with 40 mils nominal dry film thickness: Protecto 401 ceramic epoxy or accepted equal.

Flanges: Unless otherwise specified, comply with AWWA C115 with the following restrictions:

1. Flange material: Meeting the requirements of AWWA 207 with the following restrictions:
    a. Ductile iron or gray iron for Pipe Size up to 12 IN.
    b. Ductile iron for Pipe Size greater than 12 IN.
2. Flange finish: Flat faced.
3. Flange Type: Solid.

Gaskets:

1. Gasket Materials: Gasket Materials shall meet the requirements AWWA C115 and the following:
    a. Rubber: Red Rubber (SBR) per ASTM D1330, Grade I & II:
        i. Hardness (Shore A Value) per ASTM D2240: 80±5.
        ii. Minimum Gasket Yield Pressure: 200 psi.
        iii. Suitable for Maximum Seating Pressure: 1,200 psi.
    b. Non-asbestos Synthetic: Shall be a blend of synthetic fibers, fillers, and elastomeric binders {suitable for potable water service}:
        i. Minimum Gasket Yield Pressure (1/16 IN thick Gasket) 3000 psi.
        ii. Minimum Gasket Yield Pressure (1/8 IN thick Gasket) 4000 psi.
        iii. Suitable for Maximum Seating Pressure: 15,000 psi.
    c. Neoprene:
        i. Hardness (Shore A Value) per ASTM D2240: 80±5.
    d. EPDM:
        i. Hardness (Shore A Value) per ASTM D2240: 60±5.
2. Gaskets for Flanged Joints:
    a. Gasket materials shall meet the requirements of AWWA C115 with the following restrictions:
        i. Design Internal Pressure ≤ 150 psi:
            1. Pipe Size 3 IN through 12 IN: Rubber, Full faced, 1/8 IN thick.
            2. Pipe Size 14 IN through 64 IN: Rubber, Ring, 1/8 IN thick.

ii. Design Internal Pressure > 150 psi and ≤250 psi:
1. Pipe Size 3 IN through 64 IN: Rubber, Ring, 1/8 IN thick

3. Gaskets for Mechanical Joints: Comply with AWWA/ANSI C111/A21.11:
   a. Gasket material: Vulcanized Styrene Butadiene Rubber (SBR) meeting the physical property requirements per Table 4, AWWA/ANSI C111/A21.11 and the following:
      i. Hardness (Shore A Value) per ASTM D2240: 75±5.
      ii. Min Ultimate Tensile Strength per ASTM D412: 1,500 psi.
      iii. Min Ultimate Elongation (based on original length) per ASTM D412: 150%.
      iv. Minimum Aging per ASTM D572: 60%.
      v. Maximum Compression Set per ASTM D395, Method B: 20%.
      vi. Resistance to Surface Ozone per ASTM D1149: No Cracking.
4. Gaskets for Push-on Joints: Comply with AWWA/ANSI C111/A21.11:
   a. Gasket material: Vulcanized Styrene Butadiene Rubber (SBR) meeting the physical property requirements per Table 8, AWWA/ANSI C111/A21.11.
5. Gaskets for Grooved Type Mechanical Coupling (AWWA C606) Joints: Rubber meeting ASTM D2000 meeting the physical property requirements per Table 1, AWWA C606.

1-1.5.10 Basin Wall Pipes

All pipes passing through concrete basin walls shall be proved with Link Seal™ Modular Seals, installed in accordance with the manufacturer’s recommendations, to provide a watertight, non-shrinkable seal.

1-1.5.11 Wet Well Drop Bowl Assembly

Provide a drop bowl assembly inside wet well that facilitates the controlled drop of wastewater and prevents cascading.

The drop bowl shall be a plastic composite collection device with a hood designed for higher velocity flows. Hood shall be removable and attach to drop bowl with 316 stainless steel fasteners in accordance with manufacturer’s instructions. Drop bowl and hood manufacturer shall be RELINER/Duran Inc. or accepted equal.

Drop pipe shall be SDR 35 PVC, Schedule 40. Bevel cut outlet of drop pipe at 45-degree angle. Drop pipe shall extend a minimum of 3-feet below bottom of sewer inlet. Connect drop pipe to drop bowl assembly with flexible coupler, Fernco type coupling with stainless steel hardware, or accepted equal.

Drop bowl and drop pipe size shall be based on inlet sewer size as recommended by the manufacturer.

Attach and support drop bowl assembly to concrete wall with 316 stainless steel hardware, fasteners and anchors in accordance with manufacturer's instructions. Drop pipe shall be provided a minimum of two supports. If required, additional supports for drop bowl assemblies in the wet wells shall be provided and installed as field directed by the City.

1-1.6 Noise Control
All constructed facilities and equipment must the requirements of the City Code Title 8 Health and Sanitation Chapter 8.20 Noise Control. Maximum permissible noise levels shall not exceed those defined by the City Code.

1-1.7 Odor Control
All pump stations shall make provision for odor control. Odor control requirements shall be evaluated by the design engineer and approved by the City. A minimum of an un-obstructed 12' by 12' area will set aside for future odor control equipment.

Odor control equipment shall be enclosed in an above grade structure within the pump station site.

1-1.8 Reliability

1-1.8.1 Equipment Redundancy
Where two or more pump units are provided, they shall have the capacity that with any one unit out of service the remaining units will have capacity to handle the maximum peak sewage flows.

1-1.8.2 Emergency Power

1-1.8.2.1 Portable Engine Generators

Where 20 or less equivalent units are to be connected to a pump station, a power transfer switch (double throw disconnect) and receptacle compatible with the City's portable generator shall be provided.

1-1.8.2.2 Permanent Engine Generators
When 21 or more equivalent residential units are served by the pump station an emergency power source shall be provided to ensure continuous operability for a minimum of 48 hours. Generators shall be equipped with an automatic load transfer switch. See 1-2.1.4 Electrical Design for generator and transfer switch requirements.

Generator fuel shall be City natural gas unless otherwise directed by the Public Works Director.

1-1.8.2.3 Fuel Storage

The Developer shall be responsible to coordinate the fuel system requirements with the local building and fire codes for installation. The Developer shall verify all necessary space, containment, alarming and monitoring requirements are met. The Developer shall provide all necessary equipment, raceway, wiring etc. to meet the requirements of the local codes, Fire Marshall, NEC, and as recommended by the generator manufacturer.

1-1.8.3 Bypass Capability

All pump stations shall be provided with provisions to bypass pump directly from the wetwell using the City provided portable pumps directly into the forcemain.

1-1.8.4 Overflow Storage Capability

Overflow storage capacity may be required at the discretion of the City depending upon the potential environmental impact of an overflow.

1-1.8.5 Alarms and Telemetry

1-1.8.5.1 Telemetry Equipment and Alarms

The RTU shall monitor, log, control, and generate alarms for the following I/O Terminations from the control panel:

1. Power Fail.
2. High Wetwell.
3. Low Wetwell.
4. Pump Fail.
5. Generator Fail (if equipped).
6. Intruder.
7. VFD Fail.
8. Pump 1 Run.
9. Pump 2 Run.
10. Pump 3 Run (if equipped).
11. Effluent Flow.
12. Discharge Pressure.
13. Spare.

The RTU provider shall be:

S&B Inc.
13200 SE 30th ST
Bellevue, WA 98005
(425) 644-1700

All alarms shall be transmitted from the station to the City Telemetry System. The control panel shall be equipped with an exterior alarm light and audible alarm. The audible alarm shall have an "Alarm Silence" switch inside the control panel door.

The High Wetwell alarm shall activate an externally mounted rotating or flashing red light with a placard instructing to call 911.

1-1.9 Final Testing and Acceptance

The following describes the responsibilities of the Developer and/or Contractor to perform testing and startup of the pump station:

1-1.9.1 General

Developer will be provided a startup and testing checklist that will indicate all items that will be verified by the City personnel.

Based on the section requirements, the Contractor shall submit 30-days prior to expected field testing a Master Test Plan for approval by the City. This plan shall be a step-by-step compilation of the specific tests to be performed in the facility test sequence, and the sample forms to be submitted documenting the results of the tests and test information. During the step-by-step testing, these forms will require signing off by specified the City representative(s) and the contractor's test representative(s) prior to continuation of the test sequence. All tests shall be successfully completed and signed-off by the City.

Factory representatives will inspect and certify in writing the proper installation of their equipment a minimum of 5 working days prior to startup, witness the startup, and make any necessary adjustments to the equipment for satisfactory operation. These representatives will also be responsible for instructing the City's personnel as to the proper operation and maintenance of the pump station.

The completed pump station shall be given an operational field test of all equipment for leaks in all piping and seals, and for correct operation of the automatic control system and all auxiliary equipment. Developer shall conduct preliminary tests and be assured that the section to be tested is in an acceptable condition before requesting the City to witness the test.

The Contractor is responsible for all utility costs including power, fuel, potable water, testing/training specialists, and other testing costs, such as generator fuel, communication costs, etc. associated with the facility test sequence until such time that the station is accepted by the City.

Operational field tests shall be conduct under both normal and emergency power.

1-1.9.2 Field Testing

The Contractor / Developer will notify the City 10-days prior to scheduled beginning of field testing. The City will witness all field testing activities as agreed to in the approved Master Test Plan.

1. All equipment shall be tested and demonstrated to the City's representative that proper operation and capacity have been fully complied with. For pumps, this shall include measurement of discharge pressure at the valve box and measurement of pumping rate by volumetric means, or through a suitably calibrated meter for two points on the performance curve. Any test equipment or measuring devices required which are not part of the permanent installation shall be furnished by the Contractor.

2. The contractor will demonstrate continuous 8-hour operation of each pump system installed.

3. The Work shall be demonstrated to be in full operating order prior to acceptance. Should any equipment or part thereof fail to operate as intended, it shall be immediately removed and replaced at no expense to the City.

1-1.9.3 Acceptance by the City

The Contractor/Developer shall obtain Final Inspection for all required building, fire, electrical, stormwater, and other permits issued for construction of the pump station from the Authority Having Jurisdiction prior to acceptance by the City.

Final testing for the City acceptance is required after backfill has been completed and all other utilities have been installed.

Prior to acceptance by the City, developer shall correct all irregularities.

Prior to final acceptance the Developer shall provide to the City all required facility operation and maintenance manuals, and spare parts.

Provide one set of spare parts for each set of two or less pumps of the same model and other mechanical and electrical equipment. Except as specified herein, spare parts shall be as recommended by the manufacturer. The spare parts shall be packed in a hinged wooden box with hasp or other approved storage cabinet and clearly labeled for contents.

Only after final testing and acceptance by the City is the pump station allowed to pump sanitary sewage into the City system.

1-1.9.4 Guarantee/Warranty

The Developer will guarantee for one year, from the final acceptance date that the entire station and all equipment is free from defects in design, material, and workmanship.

In addition, a printed guarantee will be supplied by the pump manufacturer concerning the pumps and motors only. This guarantee will provide an additional 4 years, or 48 months, with a prorated sliding scale rate, covering the mechanical shaft seals, bearings, rotors, stators, volutes and impellers within the pump and motor.

A printed copy of this guarantee, showing the 60-month total will be provided as a part of the submittal data.

1-2 Electrical and Control

1-2.1 General
Pump motors and any electrical equipment installed within the wetwell area will have been designed and listed for use therein.

All electrical and controls shall be furnished and installed in accordance with the applicable Federal, State, and local codes and standards including:

1. National Electrical Code (NEC)
2. Occupational Safety & Health Act (OSHA)
3. National Electrical Safety Code (NESC)
4. National Electrical Manufactures Association (NEMA)
5. Underwriters Laboratory (UL)
6. Insulated Power Conductor Engineering Association (IPCEA)
7. American National Standards Institute (ANSI)
8. Institute of Electrical & Electronic Engineers (IEEE)

The Developer shall submit shop drawings and product data for all electrical and control cabinets, and other devices for approval the Developer's Project Engineer and the City prior to fabrication. No fabrication shall commence until written approval is received by the Developer's Project Engineer and the City.

1-2.1.1 Standards and Codes
Permits, licenses, approvals and other arrangements for work shall be obtained.

Electrical work shall be executed in strict accordance with the latest edition of the National Electrical Code and local ordinances and regulations.

All electrical equipment, materials, construction methods, tests and definitions shall be in strict conformity with the established standards of the following in their latest adopted revision:

1. Underwriters' Laboratories, Inc. (UL)
2. National Electrical Manufacturers Association (NEMA)
3. Canadian Standards Association (CSA)
4. Electrical Testing Laboratories (ETL)
5. Factory Mutual (FM)
6. All applicable Washington State Codes and local the City Codes.

All materials and equipment permanently incorporated into the work shall, within the scope of UL Examination Services, be approved by the Underwriter's Laboratories for the purpose for which they are used and shall bear the UL label.

All materials shall be new, free from defects, of current manufacture, and of good quality. Each type of material shall be of the same manufacturer throughout the work.

1-2.1.2 Electrical Design

Provide service entrance equipment with a separate compartment for installation and wiring of the underground service entrance loop and metering equipment for the panel. The meter base and related accessories will be in strict accordance with Puget Sound Energy requirements for the area site location.

Power supply voltage shall be 460 volt, 3-phase, 60 cycle, four wire. This is an operating voltage, not a static or net source.

A step down transformer, with a 460 VAC primary, and 120 VAC secondary winding is required. The transformer will be appropriately sized for the anticipated site conditions.

Circuit breakers will be appropriately sized for the transfer and protection of the power and control circuits, per NEC.

All electrical conductors shall be stranded copper.

All exposed conduits shall be rigid aluminum and all buried conduit shall Schedule 40 PVC.

A minimum of one 120V 120 amp GFI service receptacle is to be provided.

For each pump there shall be:

1. Combination circuit breaker/overload unit providing overload protection.
2. Short circuit protection.
3. Reset and disconnect for all phases.
4. Across the line magnetic contactor.
5. 120 volt AC control power transformer.
6. Overload relay to be pre-calibrated to match motor characteristics.
7. Thermal overtemp relay and thermal overtemp reset push-button, each factory sealed to ensure trip setting is tamperproof.
8. Elapse time meter that will count the time pump magnetic starter is engaged. The timer shall count in hours and tenth of an hour.
9. One 120 volt receptacle (15 amp) in the control panel.

No electrical devices, controls, or connection boxes are permitted in a wetwell.

All components within the pump station system, including both internally and face-mounted instrumentation and devices, shall be clearly identified with phenolic nameplates of black background with white letters. Controls, resets, and displays shall be readily accessible without exposing personnel to electrical hazards.

1-2.1.3 Control Panel

The control panel cabinet breaker should have remote operators with lockout devices.

1-2.1.3.1 Control Panel Lighting

Function lights mounted on the front panel door and appropriately labeled will light and show the following functions:

1. Pump run light, green lens, two required, one per pump.
2. Power on light, amber or white lens, one required.
3. Seal failure lights, red lens, two required, one per pump.
4. Motor temperature trip, red lens, two required, one per pump.
5. High wetwell level, blinking red lens, one required.
6. Low wetwell level, steady red lens, one required.
7. Amperage gauges, one per pump, and external circuit breakers

Panel function lights will be the low voltage LED type and supplied with "push-to-test" function and will be manually reset.

1-2.1.3.2 Panel Heaters

Each panel compartment will be supplied with a 115 VAC area strip heater with thermostat control for moisture and freeze control. Each heater will be sized appropriately for its compartment.

1-2.1.3.3 Elapsed Time Meters

Elapsed time meters are required and will be mounted on the front of the panel marked with phenolic labels showing equipment name and number. All meters will be the non-resettable seven-digit type. One meter is required for each pump, to totalize individual pump run time.

1-2.1.3.4 Enclosures

Enclosures are to be free standing of NEMA 4X construction (weather tight) for installation outdoors and made of 316L stainless steel. The enclosures will be of sufficient size to meet all design and space needs as determined in the most recent editions of the NEC and OSHA handbooks. Enclosures will be of door behind door construction, with dead front covers, and of ample size to accept the power distribution circuits, control and instrumentation circuits, service entrance equipment and all accessories specified. This enclosure will also be supplied with drip shield above the outer doors and hinge pins shall be 316L stainless steel. A window shall be provided in the door to view the RTU display.

1-2.1.3.5 Wetwell Junction Boxes

Two wetwell junction boxes shall be provided that are located a minimum of 36” horizontal and 18” vertical from the wetwell, in accordance with current Washington State L&I standards.

Junction boxes shall be provided with an air gap between the junction box and wetwell. Air gaps shall be on the bottom of the junction box and cords held in place by a stainless steel or PVC cord grip. Seal-offs are to be located between wetwell junction box and system control panel.

The junction boxes are to be of NEMA 4X construction, 316L stainless steel, and mounted on stainless steel supports.

One junction box will receive the float wires from the wetwell and will be supplied and installed with a "Y" type gas seal off, above grade, between the junction box and the system control panel in this conduit run, allowing float change without "chico" removal. A second junction box will receive the power and sensor cords from both pump motors, with "seal offs" between the junction box and the control panel. Prior to final acceptance by the City, the "Y" type gas seal off fittings will be filled with a sealing compound approved by the State of Washington, Electrical Inspection Division.

All power and control wiring splices shall be made utilizing an insulated tap.

It shall be the contractor's responsibility to obtain any and all electrical permits from Labor & Industries, along with an approved installation.

1-2.1.3.6 Hand-Off-Automatic (HOA) Switches
Hand-Off-Automatic (HOA) switches will be provided, one for each pumping unit. These switches will provide continuous run in the HAND position and a controlled or logic function in the AUTOMATIC position.

1-2.1.3.7 Motor Starter Units/Contactors
Motor starter units shall be of the combination type with components as required to provide a fully functioning system. Magnetic contactors shall be heavy duty NEMA rated, Square-D Type S, Allen Bradley Bulletin 509, Furnas Innova, Cutler Hammer Freedom, or approved equal. All contactors shall be provided with two field convertible auxiliary contacts. An auxiliary switch shall be provided to indicate the circuit breaker is in the "ON" position. Switch shall be open when the CB is open. Motor starters and associated equipment shall be provided to match the load being served.

1-2.1.3.8 Variable Frequency Drives (VFD)
Pump stations designed for a capacity of 100 or greater equivalent residential units shall be provided variable frequency drive (VFD) units for each pump. VFDs shall be Allen-Bradley PowerFlex with full function HIM module, or approved equal. VFDs and associated equipment shall be provided to match the load being served. VFDs shall be arranged to control the pumps such that the pumping rate will match the in-flow rate.

1-2.1.4 Electrical Design

1-2.1.4.1 Automatic Transfer Switch

The acceptable Automatic Transfer Switch Manufacturer is Onan Cummins.

An Automatic Transfer Switch (ATS) shall transfer from normal service to a standby generator in the event of power failure. The switch shall transfer the system back to normal power after power has been restored. The switch shall include all controls and accessories. The switch shall be UL labeled, shall meet the requirements of UL standard 108 and shall be suitable for total system transfer including motor and lighting loads. ATS shall have a separate mechanism with regular throw transfer switch. Commercial power disconnect is to be between meter and transfer switch.

The automatic transfer switch shall include the following controls and accessories:

1. Three-Phase Relay Protection
2. Test Switch: Start, Transfer, Re-Transfer, etc., for simulating power outage.
3. Override Switch
4. Indicating Lights: Normal and Standby
5. Engine Starting Delay: Adjustable up to 2 minutes (set at 5 seconds)
6. Transfer Relay: Set to prevent transfer to standby until the standby power voltage and frequency are 90% of rated values.
7. Retransfer Delay: Adjustable from 1 up to 25 minutes (minimum range)

1-2.1.5 Engine-Generator Set

The acceptable engine-generator manufacturer is Onan Cummins, no exceptions.

1-2.1.5.1 General

The engine-generator shall be a factory fabricated and assembled package of new and current equipment, and shall consist of an engine, generator, automatic transfer switch, controls, engine block heater, fuel tank and engine mounted fuel pump if applicable, and other accessories as required for a complete and operable assembly, capable of automatic startup and shutdown. The engine-generator shall be permanently installed on a welded steel base for anchoring to a concrete base with vibration isolators provided between the engine-generator and welded base.

The engine-generator shall have only one source of supply and responsibility. The assembly and complete installation shall comply with the current NFPA 70 National Electrical Code (NEC) and the State of Washington Electrical Laws (RCW) and Rules (WAC).

Manufacturer installation affidavits (certificates) shall be provided in accordance with Section 1-1.1.

1-2.1.5.2 Engine

The engine shall be a water-cooled, in-line or V-type, four-stroke cycle, have a maximum of six cylinders, and include a mounted radiator with duct flange and pusher-type fan. The engine shall be fully and completely capable of and equipped for driving electrical generators at a governed speed of 1800 rpm to operate all the features of the pump station.

Engine Controls – All engine controls, signal lights, gauges, and generator instruments shall be housed in one control panel for simplicity and convenience of operation. All meters will be p anel mounted with sweep needle indicators. The following items shall be provided:

1. Oil Pressure Gauge
2. Water Temperature Gauge.
3. Transfer Sensor Circuits
4. Three Position Selector Switch (Hand-off-Automatic)
5. High Water Temperature Cutoff and Alarm Light
6. Low Engine Temperature Alarm Light
7. Low Oil Pressure Cutoff and Alarm Light
8. Engine Overspeed Stop and Alarm Light
9. Individual Dry Contacts, Normally Open, and Fault Lights to operate in the Event of Shutdown of any Alarm above.
10. Interior Panel Light
11. Volt Meter, internally connected, dual range
12. Frequency meter, internally connected
13. Engine Elapsed Time Meter

Engine Fuel System – Shall be as directed by the City Sewer Utility Senior Program Manager. The Contractor/Developer shall be responsible to coordinate the fuel system requirements with the local building and fire codes for installation. The Contractor/Developer shall verify all necessary space, containment, alarming and monitoring requirements are met. The Contractor/Developer shall provide all necessary equipment, raceway, wiring etc. to meet the requirements of the local codes, Fire Marshall, NEC, and as recommended by the generator manufacture. Specific requirements are as follows:

1. Natural Gas Fuel System: Provide the following:
    a. Carburetor.
    b. Secondary Gas Regulator. Coordinate with the natural gas utility and provide regulators and adjustments as needed.
    c. Fuel-Shutoff Solenoid Valve.
    d. Flexible Fuel Connector.
2. Diesel Fuel System: Provide the following:
    a. Fuel tank system shall be double walled, have 48-hour gallon capacity at 75% load and shall be mounted integral to the enclosure base. The fuel tank system shall include:

    i. Dry contacts wired to terminals in the control panel for a low-level fuel alarm.
    ii. Critical low fuel alarm which shall also cause the generator engine to shut down.
    iii. Manual fuel fill cap.
    iv. Level gage.
    v. Fuel strainer.
    vi. Plastic sight glass.
    vii. Interstitial monitoring, leak detection, and alarming per local requirements
  b. Provide a fuel tank monitoring, indicating and alarming system for tank gauging and non-discriminating leak detection. The monitor shall operate on a 120v power and shall be microprocessor based, have 4 programmable relay outputs, selectable level indication in inches or gallons, programmable overfill and low-level alarms. The console display shall display level and have status indicators for alarms and leak detection.
  c. The low-level fuel alarm shall be set to trip when the fuel tank quantity reaches 33% of capacity.
  d. Fuel tank venting per local codes – Discharge point at least 12 feet above grade.
  e. Overfill protection – Device shall meet local code requirements and IFC 340.2.9.6. Fill port spill container shall be a minimum of 5-gallon capacity and made of non-combustible materials.
  f. Signs for filling procedures, NO SMOKING or OPEN FLAMES WITHIN 25 FT, and contents and as required by the local authority.
  g. Emergency vents shall terminate outside of weather housing.

3. Engine Cooling System – The engine cooling shall be accomplished with a skid mounted radiator, provide sheet metal cowling between the generator and exhaust louver. Provide all equipment associated with the radiator for a complete operating system. Provide level switch in radiator for low coolant level alarm. Radiator shall be sized per manufacturer recommendations.

4. Engine Exhaust System –The exhaust system shall include a flexible stainless-steel bellows exhaust pipe connection to the engine exhaust manifold, exhaust piping, silencer, exhaust pipe flashing, collar and rain cap, and support system. Silencer shall be a critical rated unit, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.

5. Air-Intake Filtration System – The air-intake filtration system shall consist of a heavy-duty, engine-mounted air cleaner with replaceable dry-filter(s) element and "blocked filter" indicator.

6. Lubrication System – The engine shall be equipped with a pressurized oil lubricating system which shall include threaded, spin-on type, full flow lubricating oil filters which are located for easy removal. The lubricating system shall be equipped with spring-loaded bypass valves which will allow oil circulation if the filters are plugged. The crankcase drain shall be arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.

7. Jacket Water Heater – The engine shall be equipped with single-phase water jacket heater(s) with one thermostat. Heaters shall be sized to maintain the coolant temperature at 100 degrees F at 20 degrees F ambient. Heaters having a total wattage of 1,200 or less shall be 120-volts; larger shall be 208-volt or 240-volt. Operation of the heater(s) shall be stopped while the engine is turning.

8. Batteries – Starting batteries shall be provided and mounted in attached battery racks with non- conducting floor. Batteries shall be guaranteed for two years or more. Batteries shall be the AGM type, selected to provide engine break-away current for one second at a battery temperature of 20 degrees F and to 1-1/2 minutes total cranking without recharging.

9. Battery Charger – Provide fully automatic constant voltage, current limiting battery charger sized for the generator starting batteries. Charger shall have the following features: Protection fuses, DC ammeter, temperature compensating voltage regulator LED alarm lamps indicating AC power fail, Low battery voltage, High battery voltage. Form C contacts for alarm indication, high and low battery alarm adjust pots, float voltage adjustment pot. Charger shall monitor battery voltage and control the SCR to deliver the optimum current level to the battery. The battery shall be permanently connected and when the battery approaches full charge preset voltage, the charging current shall automatically taper to zero amperes or to the steady state load on the battery.

1-2.1.5.3 Generator

The generator shall be four-pole and of revolving field design with temperature compensated solid state voltage regulator and high speed brushless rotating rectifier exciter system. The stator shall be directly connected to the engine flywheel housing and the rotor shall be driven through semi-flexible driving flanges to ensure permanent alignments. The insulation system shall be Class F with Class B temperature rise. The three-phase, broad range generator shall be 12-lead, reconnectable, and shall meet the requirements of NEMA Standard MG-1.

1-2.1.5.3.1 General Performance

1. Frequency regulation shall be mechanical or isochronous ±3% nominal, ±5% maximum from no-load to rated load.
2. Steady - state voltage regulation shall be within ±2% of rated voltage, from no load to full rated load. Rheostats shall provide a minimum ±5% voltage adjustment from rated value. Voltage regulator shall be of the silicon-controlled rectifier type. Stable voltage shall be reestablished within 2 seconds following sudden application or removal of 25% increments of rated load.
3. The maximum allowable short-term voltage dip shall not exceed 18% of rated voltage (for a total of 20% voltage dip including the steady state allowance).

1-2.1.5.3.2 Control Panel

The alternator control panel shall be wired, tested, and shock mounted on the generating set by the manufacturer. It shall contain panel lighting (with ON/OFF switch), manual reset circuit breaker, frequency meter, running time meter, voltage adjusting rheostat, wattmeter, ac voltmeter, ac ammeter (which includes current each phase), and voltmeter-ammeter phase selector switch with OFF position. Frequency meter, wattmeter, ammeter and voltmeter shall be 250-degree circular switchboard type, 2% accuracy class. The control panel shall include engine controls.

1-2.1.5.3.3 Generator Main Power Circuit Breaker

The circuit breaker shall be sized to match the generator in accordance with all applicable codes. The breaker shall be housed in a NEMA 1 gasketed enclosure mounted on the generator set. The breaker shall be quick make, quick-break type with wiping contacts and arc chutes for each pole. Breaker shall be trip free and have trip indication independent of on-off positions. Breaker lugs shall be front accessible and shall be UL listed for either copper or aluminum cables. A battery and charger shall be provided for shunt trip circuit.

1-2.1.5.4 Testing and Training

1-2.1.5.4.1 General

Tests shall be performed to determine proper operation and capacity of the equipment and to demonstrate compliance with these Standards and the engineered design. All field testing shall be performed by an authorized manufacturers field representative. All equipment that fails any test will be rejected, and complete re-testing will be required after the Contractor/Developer makes corrections or modifications to equipment which has previously failed any test. All tests shall be witnessed by the City.

1-2.1.5.4.2 Factory Tests

Test the engine-generator in the factory to assure compliance with these Standards, the engineered design, NEMA MG-1, and the manufacturer's quality control provisions. Copies of all factory tests shall be submitted to the City for review.

1-2.1.5.4.3 Field Tests

1. Fully field test the engine-generator to demonstrate that all components are in compliance with these Standards, the engineered design and are ready for service. Refer to section 1-1.9 Final Testing and Acceptance.
2. Installation of the engine-generator shall be complete and the unit shall be serviced, tested, adjusted, and ready for use before the field tests are scheduled.
3. Provide written notice to the City of the scheduled dates for field test at least ten (10) working days prior to the field test date. The notice shall include a written test schedule listing the tests, the test procedure, the criteria for a satisfactory test, and ratings of the load bank to be used, and description of special measurement equipment to be employed.
4. Provide load banks, fuel, test equipment, labor, materials, and all other equipment and services required for all tests.
5. Make repairs and adjustments as required to achieve satisfactory performance of the engine-generator unit. If repairs or adjustments are made during the tests, additional testing shall be performed as required by the City.
6. Make written records of the tests and, within ten (10) days after completion of the field test, submit three (3) copies of the test record to the City. The test record shall indicate the test criteria and arrangement, the time of the test, the results, and pertinent data such as voltage, frequency, kilowatts, power factor, load current, oil pressure, water temperature, and ambient temperature. Pertinent data shall be recorded for each test, and at least every thirty minutes when the test requires more than thirty minutes.

1-2.1.5.4.4 Alarm, Control, and Equipment Tests

Demonstrate each alarm and safety shutdown provision by the abnormal condition, unless an alternative test condition has been approved by the City prior to scheduling of the tests. Operate each control circuit and device to demonstrate its proper operation. Demonstrate the battery charger and jacket water heater operation.

1-2.1.5.4.5 Operational Tests

1. Simulate power failure to demonstrate the proper operation of the automatic transfer switch and engine generator.

2. Demonstrate motor starting capability by starting and running at the specified motor loads. Measure and record voltage dip to demonstrate conformity to these Standards and the engineered design.
3. Show that phase rotation of the engine-generator and the existing power are compatible at the site.

1-2.1.5.4.6 Endurance (Load Bank) Tests

1. Operate the engine-generator for 1/2 hour at one-half its kW rating.
2. Operate the engine-generator for four (4) hours continuously at 100% of its kW or kVA ratings.
3. Measure the temperature rise of the windings of the generator using the resistance method.

1-2.1.5.4.7 Training

The manufacturer's field representative will be made available to provide at least 4-hours of on-site training for the maintenance and operation of the generator and associated equipment.

The Contractor/Developer will provide written notice to the City of the scheduled date(s) for training at least ten (10) working days prior to the scheduled training date.

1-2.1.5.5 Generator Enclosure

Enclosure shall be provided for standby generators to be installed outdoors.

Generator shall be enclosed in a sound attenuating housing which shall be totally weatherproof. The unit shall be skid mounted and the walls and roof shall be adequately reinforced to carry all dead and live loads. The enclosure shall be sized to contain the generator set, fuel tank, batteries and allow adequate room to service the entire unit.

The enclosure shall be a Level 2 sound attenuating protective housing as manufactured by the generator manufacturer.

Doors shall be provided on each side of the enclosure and a control panel access door shall be provided on the end. All doors shall be equipped with handles and latches which are keyed. Each door or opening shall have prewired magnetic type intrusion switch for alarming unauthorized entry. All magnetic switches shall be wired to a common terminal at the main control panel.

The unit shall be primed and finished in accordance with manufacturer's standards. Color shall be approved by Owner.

The operating louver assembly, including the louver, motor and guard shall be completely factory assembled. Size per generator manufacturer's recommendations. The louver shall be equipped with a motor which shall be spring loaded to open the louver when the generator is called to start, and electrically operated to close the louver when the generator is called to stop.

The generator set shall be mounted in the enclosure using spring type vibration isolators between the generator set mounting skids and the enclosure.

1-2.1.6 Instrumentation and Controls

1-2.1.6.1 Instrumentation

1-2.1.6.1.1 Pressure Sensors and Gauges
Provide annular pressure sensor with gauge on the pump side of the check valve for each pump.

Provide annular pressure sensor with gauge and transmitter on the discharge side of the pump isolation valves. Only one sensor assembly is required in this location for remote monitoring of force main pressure.

1-2.1.6.1.2 Flow Measurement
Provide pump stations with a magnetic flow meter. The device for measuring sewage flow shall be a Siemens SITRANS F M MAG 5000 with remote wall or panel mounted transmitter.

1-2.1.6.1.3 Liquid Level Sensors
Pump stations are to be connected and constant speed or variable frequency drive (VFD) driven pumps shall be provided a Siemens A1000i Submersible Level Transducer/Transmitter, no equal.

All pump stations must be provided a high-high, high-, and low-level backup float system meeting the following requirements:

1. Float-type level switches used for wastewater applications shall be non-mercury tilt switch type with a minimum 1.22 pounds zinc plated cast iron external weight. Floats shall be of a polypropylene construction with a solid polyurethane foam interior, hermetically sealed. Switches shall be Normally Open (N.O.) or Normally Closed (N.C.) rated at 10A at 120V. Cable shall be #18 AWG 2, Type SJOOW - 300, stranded, with chlorinated polyethylene jacket, integral to float with a minimum 30-feet length or longer as required to meet requirements of the design.
2. Floats shall be mounted on a stainless steel mounting bracket with individual hooks and a float cord wedge clamp (for easy level adjustment) for each float. Wire grip type supports/cord grips are not allowed. Floats shall be easily accessible from outside the wetwell for maintenance and replacement. All mounting hardware shall be type 316 stainless steel or cast aluminum.
3. Float switches shall be Conery NTG Inc. 2900-B8SIC1 (N.O.) or 2901-B8SIC1 (N.C.).

1-2.1.6.2 Controls
All pump stations shall be provided with programmable control equipment.

All pump stations with VFD driven pumps, PLC and an analog level controller shall have a selector switch to by-pass automatic electronic control and go straight to floats and starters for control in case of failure. This shall be both automatic and selectable.

1-2.1.6.2.1 Control Cabinets
Pump control panels for pump stations with control room enclosure shall be NEMA 12 powder coated steel construction.

Pump control panels for pump stations with no control room enclosure shall be a 316L stainless steel NEMA 4X enclosure mounted on a 316L stainless steel pedestal above ground inside a secondary 316L stainless steel vented cabinet. Panel door shall face away from prevailing winds to minimize water entering the enclosure and shall be a minimum of 10 feet from the fence to minimize vandalism. There shall be a heater strip to prevent condensation accumulation in the enclosure. A 120 volt (15 amp) outlet shall be provided in the control panel.

Door latches on all enclosures shall be stainless steel fast operating type 3-point latch door handle. Where a 3-point latch will not meet enclosure rating requirements and for enclosures that are too small for a 3 point latch use fast operating stainless steel clamp assembles, Hoffman Bulletin A-80 or approved equal. The latch handle shall operate toward the center of the panel to open the door, and be pointing down when closed.

Cabinets shall be hinged with stainless steel pins.

Provide all control cabinets with a data pocket and insert the cabinet drawings in the pocket when shipped to the site.

Provide all control cabinets which house PLC equipment with a 12x12” folding shelf HOFFMAN A-CSHELF12 or approved equal.

Provide corrosion inhibitors in all control cabinets prior to shipping. Amount of inhibitor shall be provided for the volume of the enclosure for one year.

1-2.1.6.2.2 Pump Station Controller
Pump stations shall be provided a Siemans Programmable Logic Controller (PLC), no equal.

END OF SECTION

City of Enumclaw

2016 GENERAL SEWER PLAN
AMENDMENT 3

January 2025

Prepared by

Scott Woodbury, P.E.
Assistant Public Works Director
City of Enumclaw
1309 Myrtle Ave
Enumclaw, WA 98022

2016 GENERAL SEWER PLAN
AMENDMENT 3

INTRODUCTION

The 2016 General Sewer Plan (GSP) and 2023 Amendment 2 capital improvement plan update included a project to construct a new sewer lift station at the SE 433rd St / 248th Ave intersection to replace three existing lift stations (Willowgate, Takoba, and McHugh). The purpose of this Amendment 3 is to address county requirements for issuance of a franchise for locating city sewer improvements in county right-of-way and to locate a new wastewater facility on a rural zoned property adjacent to but outside of the city's urban growth area. This amendment is formatted into sections corresponding to the review letter dated 9/19/24 provided by the King County Utilities Technical Review Committee and included in Appendix A.

General Comment 1

Comment
The Plan includes a project (CS-03 248th Lift Station) that is proposed to be located on a rural zoned parcel in unincorporated King County. Per King County Code (KCC) 13.24.132 (New sewer facilities in rural areas), the facility must not allow for neighboring rural zoned properties to connect, and it has to be identified in a King County-approved comprehensive sewer system plan upon a finding by the UTRC that the project's location is technically necessary. While the City has provided justification for the location of the project through correspondence to the UTRC chair, *please acknowledge that the project's location will be on a Rural designated parcel and provide the justification/technical necessity of locating the project on the subject property (King County Parcel No. 2320069066) in the text of the Plan.*

Response
The new sewer lift station is proposed on a rural zoned property adjacent to but outside of the city's urban growth area, situated within an easement measuring less than 4,300 square feet in area. A letter justifying locating the station on the rural property is included in Appendix B.

General Comment 2

Comment
Prior to the UTRC acting on a recommendation, a signed checklist and the issued threshold determination must be provided related to the changes requested under comment #1.

Response
The requested SEPA documentation is included in Appendix C.

General Comment 3

<u>Comment</u>
The City Council must adopt the text changes as requested under comment #1 prior to sending it to King County Council for final review and approval.

<u>Response</u>
The Council adoption of this GSP Amendment 3 is included in Appendix D.

General Comment 4

<u>Comment</u>
King County Code (13.24.010 H. Water and sewer system comprehensive plans) requires wastewater system plans to identify and describe areas of concern with respect to corrosion and odor control and steps being taken to reduce their occurrence. It does not appear that the 2016 Plan or either of the amendment packages address odor or corrosion concerns and resulting recommended actions. *Please include additional text in the Plan to address odor and corrosion concerns and the steps the City plans to take.*

<u>Response</u>
There have been no documented problems with odor and corrosion within the Enumclaw wastewater system. The WWTP when upgraded in 2007-2009 included the installation of an odor control scrubber on the headworks ventilation system as a precautionary measure. Even when the scrubber has been temporarily inoperable there have been no odor complaints, despite the proximity of school facilities, the Enumclaw pool, and apartments to the WWTP. If odor and/or corrosion become a problem in the future, a solution would be implemented in coordination with the state Department of Ecology (DOE) and in accordance with the DOE Criteria for Sewage Works Design manual.

Specific Comments/Questions 5

<u>Comment</u>
Page 1-2, Service Policy 1.2.2 Service Area - 1. The policy prohibits expansion of sewer outside of the Urban Growth Area (UGA) unless addressing specific health and safety problems threating existing structures or for school siting, per King County Countywide Planning Policies (CPPs). *Please include text in the Plan that states approval by King County through a sewer plan amendment is required to allow sewer facilities or service outside of the UGA*

<u>Response</u>
GSP Section 1.2.2 is replaced with the revised section included in Appendix E. The requested text has been added to 1.2.2.1.

Specific Comments/Questions 6

Comment

Page 1-2, Service Policy 1.2.2 Service Area - 2. The policy prohibits sewer service outside of the City's corporate limits unless specific criteria is met. This policy does not recognize King County provisions (KCC 13.24.136) and King County CPPs which requires all developments within the UGA to be served by a public sewer system unless an on-site system is temporarily allowed. *Please provide an explanation of how the City's service policy is consistent with King County Countywide Planning Policies*.

Response

GSP Sections 1.2.2 is replaced with the revised section included in Appendix E.

APPENDIX A

King County
Utilities Technical Review Committee
Department of Local Services
201 S Jackson Street
KSC-LS-0815
Seattle, WA 98104
www.kingcounty.gov

City of Enumclaw, Comprehensive General Sewer Plan (September 2016) with Amendments (2018 and 2023)

The City of Enumclaw ("City") submitted its 2016 Comprehensive General Sewer Plan and 2 amendments ("Plan") for review by the King County Utilities Technical Review Committee (UTRC) on August 18, 2024.

Staff has reviewed the Plan for local statutory requirements and impacts on service to residents in the unincorporated county.

On September 18, 2024, the UTRC held a meeting to review the Plan and provide comments to the applicant on the Plan and associated amendments. The UTRC has the following comments:

General Comments

1) The Plan includes a project (CS-03 248th Lift Station) that is proposed to be located on a rural zoned parcel in unincorporated King County. Per King County Code (KCC) 13.24.132 (New sewer facilities in rural areas), the facility must not allow for neighboring rural zoned properties to connect, and it has to be identified in a King County-approved comprehensive sewer system plan upon a finding by the UTRC that the project's location is technically necessary. While the City has provided justification for the location of the project through correspondence to the UTRC chair, *please acknowledge that the project's location will be on a Rural designated parcel and provide the justification/technical necessity of locating the project on the subject property (King County Parcel No. 2320069066) in the text of the Plan.*

2) Prior to the UTRC acting on a recommendation, a signed checklist and the issued threshold determination must be provided related to the changes requested under comment #1.

3) The City Council must adopt the text changes as requested under comment #1 prior to sending it to King County Council for final review and approval.

4) King County Code (13.24.010 H.) Water and sewer system comprehensive plans) requires wastewater system plans to identify and describe areas of concern with respect to corrosion and odor control and steps being taken to reduce their occurrence. It does not appear that the 2016 Plan or either of the amendment packages address odor or corrosion concerns and resulting recommended actions. *Please include additional text in the Plan to address odor and corrosion concerns and the steps the City plans to take.*

Specific Comments/Questions

5) Page 1-2, Service Policy 1.2.2 Service Area - 1. The policy prohibits expansion of sewer outside of the Urban Growth Area (UGA) unless addressing specific health and safety problems threating existing structures or for school siting, per King County Countywide Planning

Policies (CPPs). *Please include text in the Plan that states approval by King County through a sewer plan amendment is required to allow sewer facilities or service outside of the UGA.*

6) Page 1-2 , Service Policy 1.2.2 Service Area - 2. The policy prohibits sewer service outside of the City's corporate limits unless specific criteria is met. This policy does not recognize King County provisions (KCC 13.24.136) and King County CPPs which requires all developments within the UGA to be served by a public sewer system unless an on-site system is temporarily allowed. *Please provide an explanation of how the City's service policy is consistent with King County Countywide Planning Policies.*

The King County UTRC thanks you for the opportunity to review and comment. Please contact me at (206)263-3733 or dcardwell@kingcounty.gov if you have any questions.

Dan Cardwell 9/19/24

Dan Cardwell, Chair of the King County Utility Technical Review Committee Date

APPENDIX B

CITY OF ENUMCLAW
DEPARTMENT OF PUBLIC WORKS

August 22, 2024

Dan Cardwell
King County UTRC Chair
201 S Jackson St, Rm 503
KSC-NR-0503
Seattle, WA 98104-3855

RE: Justification for Enumclaw Sewer Lift Station Location

Dear Mr. Cardwell:

As required by KCC 13.24.132, I am following up my email transmittal of Enumclaw's 2016 General Sewer Plan (GSP) and amendments to submit for the utilities technical review committee review a justification as to why Enumclaw is proposing a new sewer lift station on the property of 24818 SE 433rd Street in the county rural RA-5 zone.

While the subject property is in the RA-5 zone, the attached Exhibit A shows the adjacent right-of-way is within the Enumclaw Urban Growth Area (UGA), not the rural area. The lift station will not serve the rural parcel on which it will be located, a fact the property owner understood when granting an easement to the city for the station. Also, no connections will be allowed to the gravity sewer installed to the station within the UGA until such time as the area is annexed into the city.

The 2016 GSP identified the new lift station to be constructed at the 248th Ave / SE 433rd St intersection because it was the topographic location that would allow a single station to replace three existing lift stations. This is illustrated in the excerpt from Figure 4-1 of the GSP attached as Exhibit B with the new lift station then labeled as Willowgate. The existing Willowgate, Takoba, and McHugh lift stations that will be eliminated are also shown in Exhibit B. Exhibit C shows one-foot contours at the intersection, with proposed lift station site at the northeast corner of the intersection being the lowest in elevation.

An additional factor in the site selection was that critical areas were identified in a 2022 study on the west side of the intersection as shown in the attached Exhibit D.

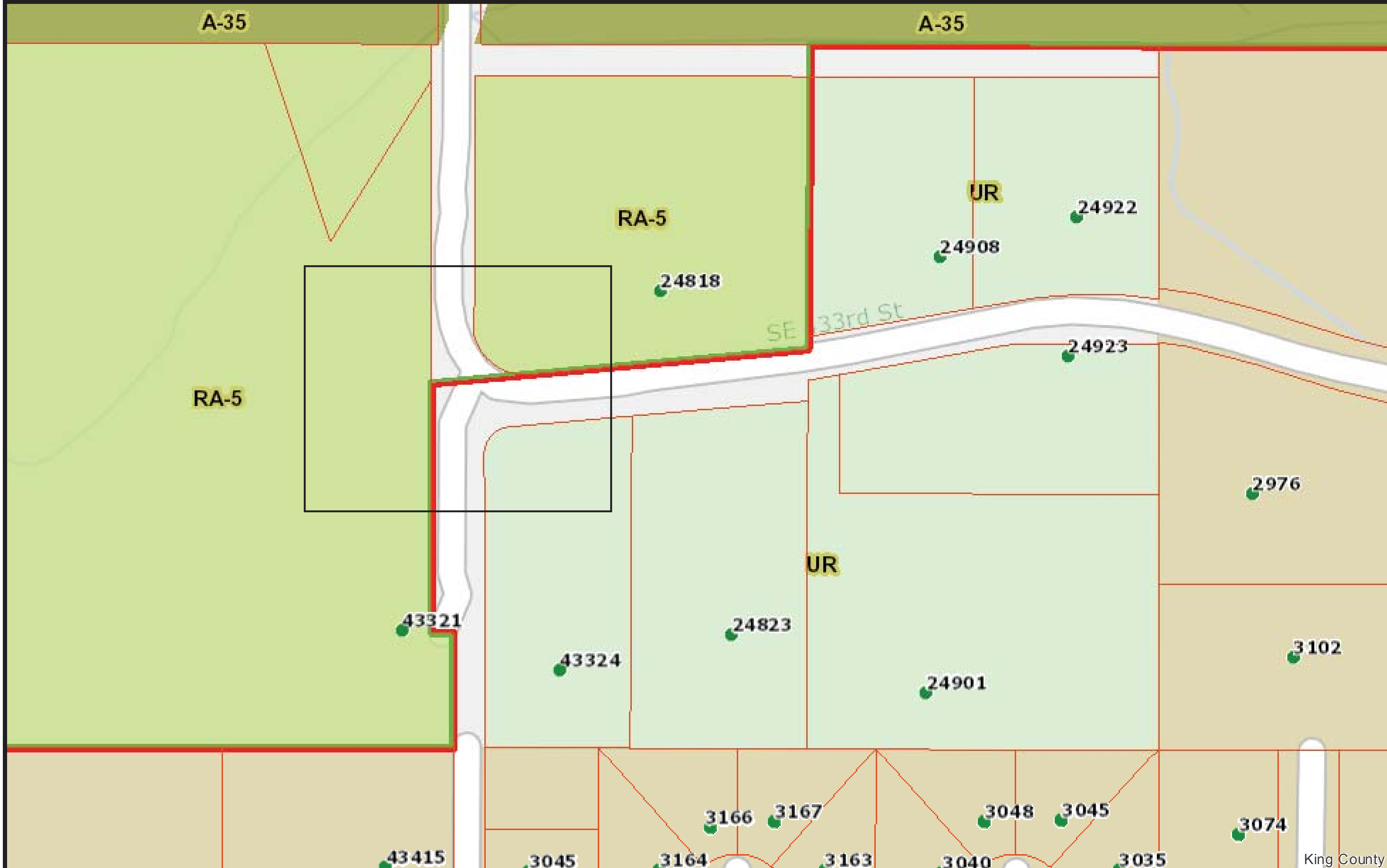
Please let me know if you need anything else. I appreciate your assistance. If you have any questions, please contact me at 360-615-5728.

Sincerely,

Scott Woodbury

Scott Woodbury, P.E.
Assistant Public Works Director

Exhibit A

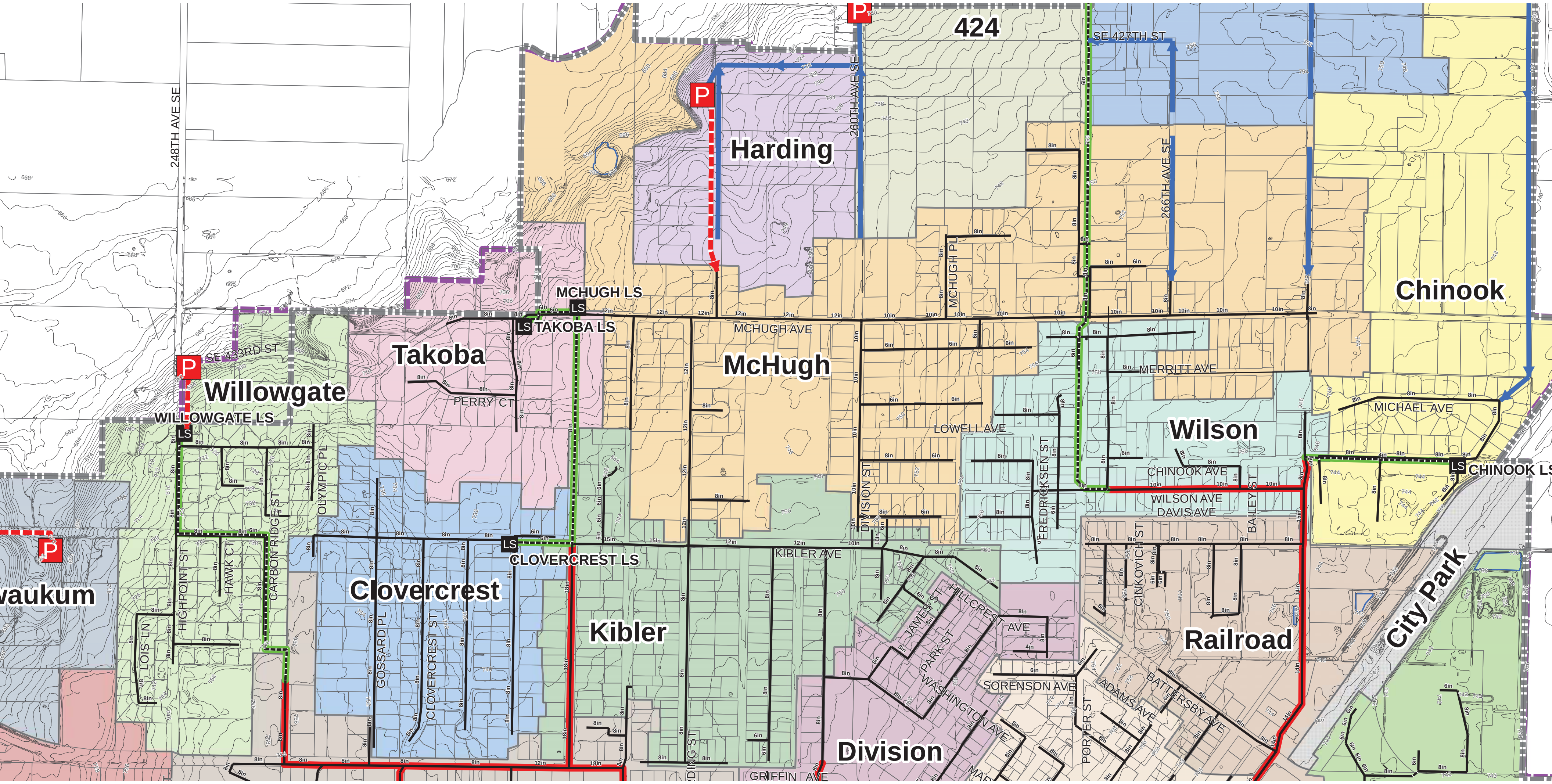


Date: 4/21/2021 Notes:

N

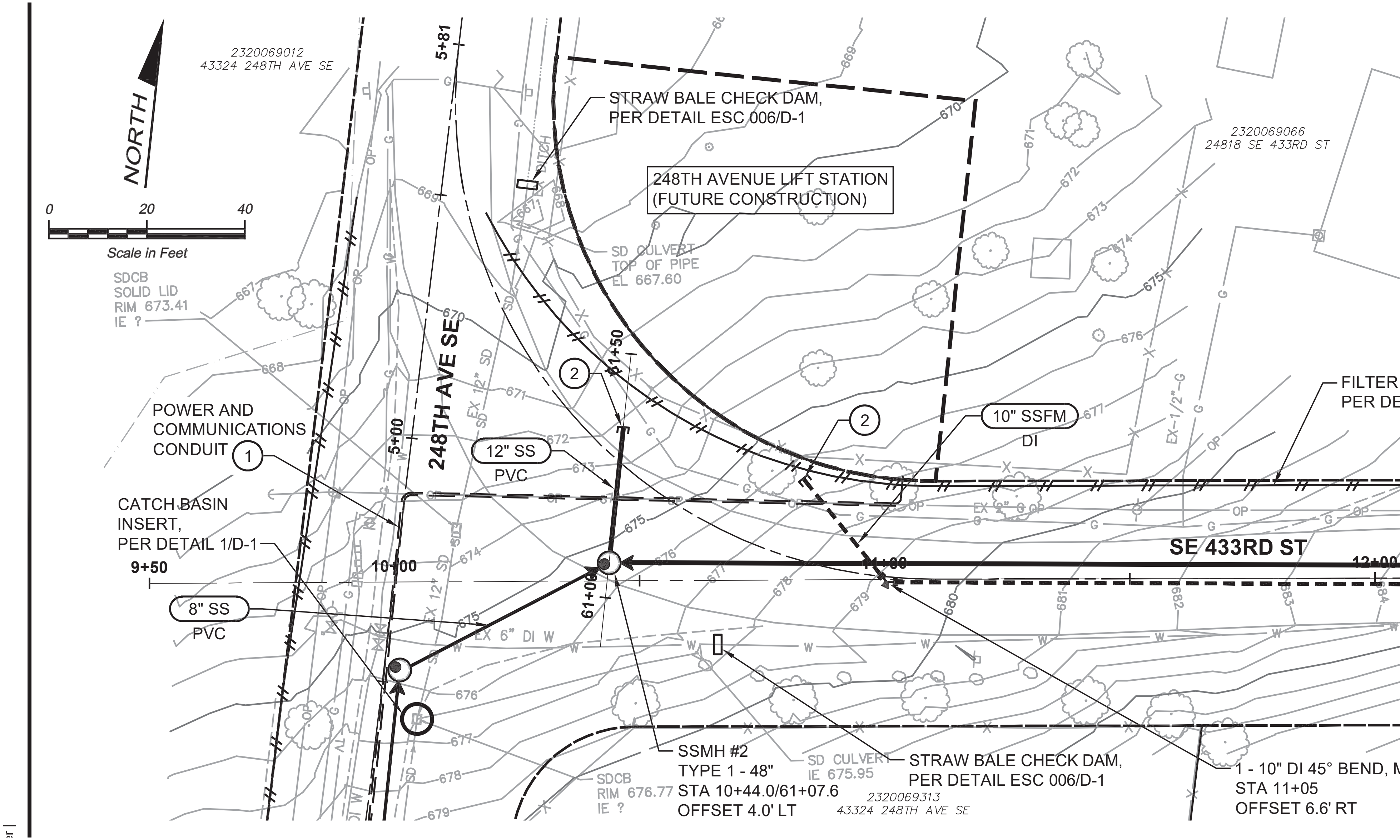
King County

Exhibit B



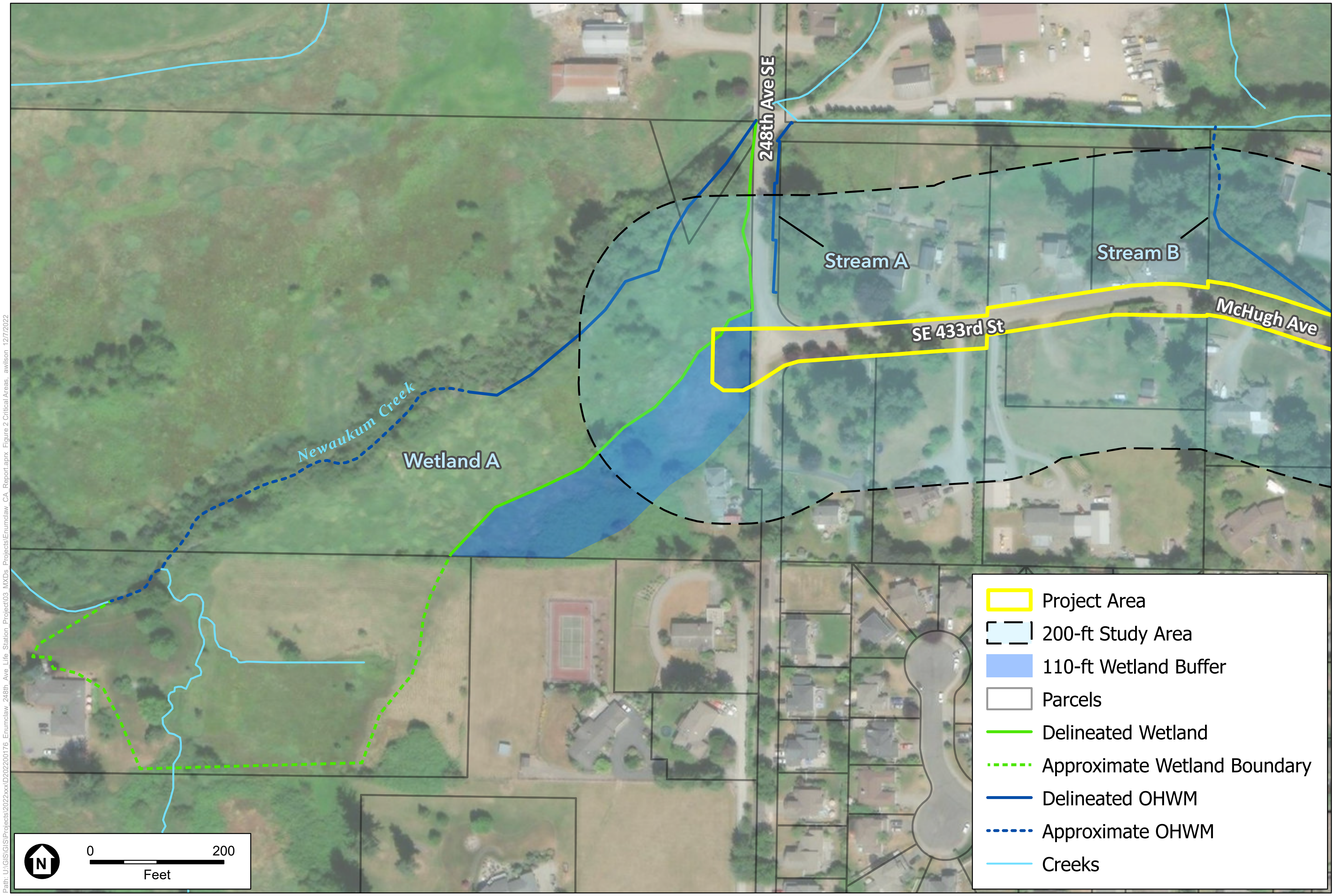
424
Harding
Chinook
MCHUGH LS
TAKOBA LS
Takoba
McHugh
Willowgate
WILLOWGATE LS
Wilson
CHINOOK LS
CLOVERCREST LS
Clovercrest
Kibler
Railroad
City Park
Division
waukum
SE 427TH ST
SE 433RD ST
248TH AVE SE
260TH AVE SE
266TH AVE SE
MCHUGH AVE
MCHUGH PL
MERRITT AVE
MICHAEL AVE
LOWELL AVE
PERRY CT
CHINOOK AVE
WILSON AVE
DAVIS AVE
KIBLER AVE
HILLCREST AVE
SORENSON AVE
WASHINGTON AVE
ADAMS AVE
BATTERSBY AVE
GRIFFIN AVE
DIVISION ST
FREDRICKSEN ST
BAILEY ST
CINKOVICH ST
PORTER ST
JAMES ST
PARK ST
GOSSARD PL
CLOVERCREST ST
HIGHPOINT ST
HAWK CT
CARBON RIDGE ST
OLYMPIC PL
LOIS LN

Exhibit C



NORTH
0 20 40
Scale in Feet
2320069012
43324 248TH AVE SE
STRAW BALE CHECK DAM,
PER DETAIL ESC 006/D-1
248TH AVENUE LIFT STATION
(FUTURE CONSTRUCTION)
2320069066
24818 SE 433RD ST
SDCB
SOLID LID
RIM 673.41
IE ?
SD CULVERT
TOP OF PIPE
EL 667.60
248TH AVE SE
POWER AND
COMMUNICATIONS
CONDUIT
12" SS
PVC
10" SSFM
DI
FILTER
PER DE
CATCH BASIN
INSERT,
PER DETAIL 1/D-1
9+50
10+00
11+00
12+00
SE 433RD ST
8" SS
PVC
EX 6" DI W
SSMH #2
TYPE 1 - 48"
STA 10+44.0/61+07.6
OFFSET 4.0' LT
SDCB
RIM 676.77
IE ?
SD CULVERT
IE 675.95
STRAW BALE CHECK DAM,
PER DETAIL ESC 006/D-1
2320069313
43324 248TH AVE SE
1 - 10" DI 45° BEND, M
STA 11+05
OFFSET 6.6' RT

Exhibit D



SOURCE: Imagery: Maxar, 2022; Approximate Wetland Boundary: USFWS; Parcels: King County, 2022; Creeks: King County, 2013; ESA, 2022

Enumclaw 248th Avenue Lift Station

Figure 2
Critical Areas Map

ESA

APPENDIX C

Department of Community Development
1309 Myrtle Ave, Enumclaw, WA 98022
Phone: (360) 825-3593 Fax: (360) 825-7232

WASHINGTON STATE ENVIRONMENTAL POLICY ACT (SEPA) ADDENDUM TO DETERMINATION OF NON-SIGNIFICANCE (DNS) FOR 2024 DRAFT COMPREHENSIVE PLAN PERIODIC UPDATE AND MUNICIPAL CODE AMENDMENTS

(LUA2024-0018) APPLICATION
#LUA2024-0026

APPLICANT:
City of Enumclaw
c/o Scott Woodbury
1309 Myrtle Ave
Enumclaw, WA 98022

CITY STAFF CONTACT:
Wynstan Larsen
Senior Planner
wlarsen@ci.enumclaw.wa.us
(360) 615-5725

BACKGROUND:

On August 1, 2024, the City of Enumclaw (Lead Agency) issued a SEPA Determination of Nonsignificance (DNS) for the 2024 Draft Comprehensive Plan Periodic Update and Municipal Code Amendments (File Number: LUA2024-0018). The comprehensive plan update and municipal code amendments is a non-project action which will include amendments to the zoning code pertaining to middle housing allowance, critical area ordinance revisions, adoption of a new airport zoning district and airport overlay district and overall revisions to the city's comprehensive plan.

The SEPA DNS issued under LUA2024-0018 determined that the non-project action as proposed does not have a probable significant adverse impact. An environmental impact statement (EIS) is not required under RCW 43.21C.030(2)(c). This decision was made after reviewing the submitted environmental checklist and other information on file with the lead agency.

No appeal was submitted by any party for the SEPA DNS (LUA2024-0018); therefore, the SEPA DNS is now final. This SEPA Addendum applies to the SEPA DNS issued on August 1, 2024, for the 2024 Draft Comprehensive Plan Periodic Update and Municipal Code Amendments.

PROPOSAL:

On October 2, 2024, the City of Enumclaw ("Applicant") submitted a SEPA checklist and associated documents for a revised proposal (LUA2024-0026). The applicant submitted a request for an amendment (GSP Amendment 3) to the city's General Sewer Plan (GSP) (LUA2024-0026). The sewer improvements will replace three existing lift stations (Willowgate, Takoba, and McHugh) by constructing a new lift station near the intersection of SE 433rd Street and 248th Ave SE. The new lift station will be constructed in an easement located on Parcel #2320069066 and associated sewer lines will be installed within existing public rights-of-way. The purpose of GSP Amendment 3 is to address county requirements for issuance of a franchise for locating city sewer improvements in county right-of-way and to locate a new wastewater facility on a rural zoned property adjacent to, but outside of the city's urban growth area (UGA).

ENVIRONMENTAL ANALYSIS AND ADDITIONAL INFORMATION:
Based on the information in the original case file (LUA2024-0018) and a review of the current proposal (LUA2024-0026), the impacts resulting from the current proposal are not anticipated to be different from those analyzed in connection with the previous SEPA issued and should not result in any adverse environmental impacts. Therefore, an addendum is appropriate based on the following:

a. The General Sewer Plan governs the provision of reliable sanitary sewer service and strives to reduce sewer overflows and aims to reduce impacts to the environment posed by the community's sewage generation. The proposed sewer project and the need for the GSP Amendment 3 would add to the mitigation efforts to reduce and respond to increased demand on public services and utilities.

b. Public Comments:

   The city received zero (0) public or agency comments during the original project's required 15-day Notice of Application Comment period for the SEPA DNS.

c. Washington Administrative Code (WAC) 197-11-706 defines an "Addendum" as,

   "Addendum" means an environmental document used to provide additional information or analysis that does not substantially change the analysis of significant impacts and alternatives in the existing environmental document. The term does not include supplemental EISs. An addendum may be used at any time during the SEPA process."

   Further, the Washington State Department of Ecology SEPA Handbook states, in part, that "Modifying revising, and supplementing existing SEPA documents can be done for the same proposal.

   If a DNS or mitigated determination of non-significance (MDNS) was previously issued and new information warrants additional analysis, the lead agency can withdraw or modify the DNS and issue a Revised DNS with additional supporting information such as a new staff report, or a new or revised checklist or addendum."

d. As provided for in WAC 197-11-706, the revisions to the proposal do not substantially change the analysis of significant impact. No new adverse environmental impacts resulting from the revised proposal have been identified. Adopted city code and policies address probable significant adverse environmental impacts.

COMMENT/APPPEAL PERIOD:
In accordance with the Washington Administrative Code (WAC) 197-11-625(5) an addendum need not be circulated. No comment period or appeal period is required.

Administrator of Development Regulations and Responsible SEPA Official

Digitally signed by Chris Pasinetti
DN: cn=Chris Pasinetti, o=City of Enumclaw, ou=Community Development, email=cpasinetti@ci.enumclaw.wa.us, c=US
Date: 2024.10.22 14:22:28 -07'00'

10-30-2024

Chris Pasinetti, AICP — Date
Community Development Director

DATE OF ADDENDUM:
This SEPA Addendum was prepared on October 30, 2024, pursuant to WAC 197-11-600(4)(c), WAC 197-11-625 and Enumclaw Municipal Code Chapter 15.14.

COMPARISON OF THE CURRENT PROPOSAL AND THE ORIGINAL PROPOSAL:
The original project included the flowing items:

- SEPA Environmental Checklist, by Wynstan Larsen, dated May 21, 2024

The applicant submitted additional documentation including:

- SEPA Environmental Checklist, by Scott Woodbury, received October 2, 2024

Attachments:

- SEPA DNS issued on August 1, 2024

Project Documents: Digital versions of the project's SEPA environmental checklist, environmental studies, and related project documents can be reviewed on the City Public Notice webpage (https://www.cityofenumclaw.net/435/Public-Notice) or by emailing the Community Development Department at permits@ci.enumclaw.wa.us. Hardcopies of the documents can also be reviewed in the Stevenson / Yerxa Building (1309 Myrtle Ave, Enumclaw, WA 98022).

For Applicant | **For City Use**

A. Background [Find help answering background questions]

1. Name of proposed project, if applicable:

General Sewer Plan (GSP) Amendment 3

2. Name of applicant:

City of Enumclaw

3. Address and phone number of applicant and contact person:

- Contact Person: Scott Woodbury
- Address: 1309 Myrtle Ave
Enumclaw, WA 98022
- Phone #: 360-615-5728
- Email: swoodbury@ci.enumclaw.wa.us

4. Date checklist prepared:

October 2024

5. Agency requesting checklist:

City of Enumclaw

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

Oct/Nov 2024

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

Future GSP amendments possible, but none proposed at this time. Project specific actions to implement the projects identified in the GSP are on-going.

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

The City completed a State Environmental Policy Act (SEPA) checklist and issued a SEPA determination for the 2016 Plan and each of the plan amendments:
• 2016 Plan – The City completed a SEPA checklist and subsequently issued a Determination of Nonsignificance (DNS) on March 16, 2016. There were no appeals.
• Amendment #1 - The City completed a SEPA checklist and subsequently issued a DNS on September 18, 2019. An addendum was issued on October 16, 2019. There were no appeals.
• Amendment #2 – The City completed a SEPA checklist and subsequently issued a DNS on September 6, 2023. There were no appeals.

For Applicant **For City Use**

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

King County sewer franchise

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

City of Enumclaw Council ordinance adopting the amendment
King County Council ordinance approving the Enumclaw GSP

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

The purpose of GSP Amendment 3 is to address county requirements for issuance of a franchise for locating city sewer improvements in county right-of-way and to locate a new wastewater facility on a rural zoned property adjacent to but outside of the city's urban growth area.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

- Address: N/A for non-project action
- Parcel #: N/A for non-project action
- Legal Description

N/A for non-project action

For Applicant **For City Use**

16. Utilities Find help answering utilities questions

a. 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 which might be needed.

C. Signature Find help about who should sign

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Scott Woodbury

____

Type name of signee:

Position and agency/organization:

Date submitted:

For Applicant **For City Use**

D. Supplemental sheet for nonproject actions [Find help for the nonproject actions worksheet](#) IT IS NOT REQUIRED to use this section 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?

    - Proposed measures to avoid or reduce such increases are:

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

    - Proposed measures to protect or conserve plants, animals, fish, or marine life are:

3. How would the proposal be likely to deplete energy or natural resources?

    - Proposed measures to protect or conserve energy and natural resources are:

For Applicant | **For City Use**

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?

    - Proposed measures to protect such resources or to avoid or reduce impacts are:

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?

    - Proposed measures to avoid or reduce shoreline and land use impacts are:

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

    - Proposed measures to reduce or respond to such demand(s) are:

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

APPENDIX D

RESOLUTION NO. 1824

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF ENUMCLAW, KING COUNTY, WASHINGTON ADOPTING GENERAL SEWER PLAN AMENDMENT 3.

Whereas, the 2016 General Sewer Plan (GSP) and 2023 Amendment 2 capital improvement plan update included a project to construct a new sewer lift station at the SE 433rd St / 248th Ave intersection to replace three existing lift stations, and

Whereas, due to topographic constraints the lift station is proposed on a rural zoned property adjacent to, but outside of the city's urban growth area (UGA), and a portion of the new gravity sewer and force main connecting to the station will be in county right-of-way within the UGA, and

Whereas, approval by King County through a sewer plan amendment is required for the county to allow sewer facilities outside of the UGA and to issue a franchise for improvements within county right-of-way, and

Whereas, GSP Amendment 3 is intended to address county requirements so that the sewer franchise may be issued, and

Whereas, SEPA has been conducted on the amendment and the amendment has also been presented to the planning commission.

Now, therefore, the City Council of the City of Enumclaw, King County, Washington do hereby resolve as follows:

Section 1: General Sewer Plan Amendment 3 as submitted to the City Council is hereby adopted.

RESOLVED IN REGULAR AND OPEN SESSION this 13 day of January, 2025.

Mayor Jan Molinaro

INTRODUCED 1-13-25
PASSED 1-13-25
APPROVED 1-14-25
PUBLISHED NA

Attested:

Jessica Rose
City Clerk

Approved as to form:

Brett C. Vinson
City Attorney

APPENDIX E

1.2.2 Service Area

1. The City comprehensive planning includes the provision for future sewer service to all properties located within its current city limits and Urban Growth Area (potential annexation area). Sewer expansions or connections shall not occur outside the Urban Growth Area (UGA) except where needed to address specific health and safety problems threatening existing structures, or as allowed by King County Countywide Planning Policy (KCCPP) DP-49, or as provided in Appendix 5 to the KCCPPs related to school siting. Approval by King County through a sewer plan amendment is required to allow sewer facilities or service outside of the UGA.

2. All development within the UGA outside of the city limits shall be served by public sewer service except on-site sewage systems may be allowed temporarily in some parts of the UGA in accordance with King County Code 13.24.

   As a condition of sewer service by the City, the property owner(s) shall execute a covenant to annex for each parcel served within the UGA.

3. The owners of private sewerage collection and/or disposal systems shall operate and maintain the facilities in a sanitary manner at all times at no expense to the City.

Deleted: 7

Deleted: Sanitary sewer service to properties outside the City's corporate limits will not be permitted except under the following conditions:…

Deleted: <#>Public Facility: The applicant is a governmental or quasi-governmental corporation including a school, hospital or fire district, or similar public facility; or¶
<#>Necessary Service: Service is necessary to convert from a failed or failing septic system; or¶
<#>In the City's Sewer Service Area, Existing Legal Lot(s) Desiring to Construct One Single-Family Residence or Connect One Existing Single Family Residence: The Administration may approve the connection of one single family residence on an existing legal lot.¶
In any case, a

1.2.3 Terms of Service and Responsibilities

1. Adequate sewer service capacity should be assured prior to the approval of any new development application.

2. All new development within the City shall be connected to the City sanitary sewer system except under the following conditions:

   a. Development of a single family residence on an existing lot of record where sewer service is not within 200 feet of a property may be served by an individual onsite system on an interim basis if the individual lots are large enough to accommodate onsite systems per the requirements of the King County Department of Health. However, these properties will be required to sign an agreement that shall be a permanent condition on the property running with the land to connect to sewer once it becomes available and pay all costs of the connection, and to not protest formation of a local improvement district for extension of sewers.

   b. Development served by alternative technology other than septic systems in areas specifically designated on the City's current adopted service area map that:

      i. Provide equivalent performance to sewers, including the same provisions for storage or back-up systems in the event of a power failure as exists in the City system; and

      ii. Provide capacity to achieve the planned densities as designated in the City's Comprehensive Plan; and

      iii. Will not create a barrier to the extension of sewer service within the UGA.

3. Existing development served by on on-site septic system (OSS) that is within two hundred feet (200') of a public sewer shall connect to the public sewer when any of the following conditions exist:

   a. Repair, modification, or replacement of the system is necessary, or the existing OSS has failed.