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City of Columbia City
Wastewater Collection System
Facility Plan

5 March 2013

This Project was funded in part by financial awards from the State of Oregon Infrastructure Finance Authority and the State of Oregon Department of Land Conservation and Development

Prepared for

City of Columbia City
P.O. Box 189
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K/J Project No. 1091029.00

Table of Contents

List of Tables

List of Figures

List of Appendices

List of Acronyms

°F	degrees Fahrenheit
ADF	Average dry flow
BETC	Business Energy Tax Credits
BO-IFA	Business Oregon Infrastructure Finance Authority
CDBG	Community Development Block Grants
CIP	Capital Improvement Plan
City	City of Columbia City
Ct.	Court
CWSRF	Clean Water State Revolving Fund
DEQ	Oregon Department of Environmental Quality
EPA	U.S. Environmental Protection Agency
ETO	Energy Trust of Oregon
ft.	feet
ft/sec	feet per second
GO	General Obligation
gpcd	gallons per capita per day
gpd	gallons per day
gpd/EDU	gallons per day per equivalent dwelling unit
gpm	gallons per minute
HDPE	High-density polyethylene
hp	Horsepower
HUD	U.S. Department of Housing and Urban Development
Inflow and Infiltration	I/I
Kennedy/Jenks	Kennedy/Jenks Consultants
kWh	Kilowatt hour
M	million dollars
MG	million gallons
MGD	million gallons per day
MHI	median household income
NPDES	National Pollution Discharge Elimination System
O&M	operations and maintenance
OAR	Oregon Administrative Rules
ODOE	Oregon Department of Energy
OET	Oregon Energy Trust
PHF	Peak hourly flow
PVC	polyvinyl chloride
RCE	River Club Estates
RTU	remote telemetry unit
SCADA	supervisory control and data acquisition
SDC	System Development Charges
SPWF	Special Public Works Fund
St.	Street
St. Helens	City of St. Helens
TDH	Total dynamic head
UGB	Urban Growth Boundary
USDA-RUS	United States Department of Agriculture Rural Utilities Service

Executive Summary

ES-1 Introduction

ES 1.1 Background

The last wastewater master plan was completed in 1997 by Crane & Merseth Engineering and does not reflect the City of Columbia City's (City) current planning needs, especially with regards to the industrial lands in the City.

Columbia City does not have any treatment facilities. All wastewater is pumped to the City of St. Helens (St. Helens) system for treatment and disposal.

ES 1.2 Authorization

Kennedy/Jenks Consultants (Kennedy/Jenks) was authorized in February of 2012 by the City to provide a wastewater collection system facility plan. This Project was funded in part by financial awards from the State of Oregon Infrastructure Finance Authority and the State of Oregon Department of Land Use and Conservation, and the Port of St. Helens.

ES 1.3 Purpose for Study

The purpose of the Facility Plan is to summarize the City's current and future needs over a 20 year planning period including a projection of future flows, an options analysis, recommended facility improvements, and a Capital Improvement Plan (CIP).

ES 1.4 Acknowledgements

Kennedy/Jenks appreciates the input, many hours of work, and support from City staff, including Leahnette Rivers, Micah Rogers, Andrew Nollette, Randall Christophersen, and Micah Olson. This Project was funded in part by financial awards from the State of Oregon Infrastructure Finance Authority and the State of Oregon Department of Land Conservation and Development. The City would also like to thank the Port of St. Helens for contributing to the funding of this planning document.

ES-2 Study Area Characteristics

ES 2.1 General

The City of Columbia City is located 30 miles northwest of Portland and is adjacent to the City of St. Helens (2010 population of 12,900). The City is characterized by hills on the west transitioning to relatively flatter ground on the east side. The City is bisected by Highway 30. The Columbia River forms the eastern boundary of the City.

The service area includes the area within the Urban Growth Boundary (UGB) including residential, commercial and industrial facilities. The service area is entirely within the UGB. A few connections are outside the City limits. There are approximately 93 acres of underdeveloped

industrial zoned lands within the service area. Columbia City has an Intergovernmental Agreement with the City of St. Helens to receive and treat Columbia City's Sewage.

Figure 2-1 shows the service area of the existing sewer system, City limits, the UGB, elevation contours, and property lines, vacant lands inventory, and zoning.

Columbia City is primarily a commuter community. There is relatively little industry or commercial employment within the City.

ES-3 Existing System Description

ES 3.1 General

The conveyance system is composed of gravity sewer lines, pump stations, and forcemains encompassing over 16 miles of pipeline. The system is relatively new with the majority of piping installed in the1992 initial City wide sewering effort and followed by additional improvements to serve new land developments. The original sewer system was designed to be a septic tank effluent system with small diameter mainlines laid at minimum depth of 4 feet and shallower grades than is typically used for sewers that receive direct flow. As shown on Figure 3-1, some areas of town do not have septic tanks and are serviced by direct flow of the sewage to the collection system. Currently, there are approximately 811 sewer connections; 283 of these connections are direct flow into the sewer collection system, while the remaining 528 connections share 475 septic tanks (418 concrete and 57 steel). Of these, 452 are septic tank effluent gravity systems, or STEG systems. There are also 23 small sewer pumps (aka STEP, septic tank effluent pumped systems) to overcome elevation problems. The term "direct flow" is commonly used by City staff (and in this report) to describe sewage received by the collection system that does not pass through septic tanks. The City's responsibility begins at the inlet to the septic tank, so the City is responsible for the maintenance and replacement of the septic tanks and any pumps, if present. The City is also responsible for pumping the septic tanks. All wastewater is pumped to the City of St. Helens for treatment via a 6-inch diameter forcemain. Two pump stations, the K Street (St.) and the River Club Estates (RCE) pump stations, are connected to this forcemain. The two other pump stations, the Pixie Park and Forest Park pump stations, pump flows from lower elevations to points in the system where it then flows by gravity to the RCE Pump Station.

ES 3.2 Gravity Sewer

The collection system is composed of 4-inch, 6-inch, 8-inch and 10-inch piping totaling about 84,400 feet.

ES 3.3 Pump Stations and Forcemains

There are currently four public pump stations. Table 3-2 summarizes the pump station and forcemain information. The pumps in each pump station are able to accept raw sewage.

The existing forcemain to St. Helens is about a mile long and receives flows from the K St. Pump Station and RCE Pump Station as well as backwash water from the St. Helens water treatment plant.

ES 4 Population Projections

ES 4.1 Historical and Project Service Area Population

Table ES-1 presents the historical and projected population for Columbia City through the 20-year planning period.

Table ES-1: Historical and Projected Population of Columbia City

Year	Population within City Limits	% Change per Year
1990	1003	-
2000	1571	4.6%
2010	1979	2.3%
2012	2053	1.9%
2022	2346	1.9%
2032	2580	1.5%

ES 5 Flow Analysis

ES 5.1 Introduction

In order to assess the future needs of the wastewater collection system, an investigation into the historical wastewater flows, historical population, rainfall, and expected population has been conducted.

ES 5.2 Regulatory Review

Since all wastewater is pumped to the City of St. Helens, the treatment, disposal, and reuse of wastewater effluent is the responsibility of City of St. Helens. The City must meet all regulations set forth by Oregon Department of Environmental Quality (DEQ) regarding sanitary sewer collection systems.

ES 5.3 Inflow and Infiltration (I/I)

Inflow is defined as surface water entering the sanitary sewer system from direct connections such as illicit storm drain connections, roof drains, and similar items that directly flow surface water into the system. Infiltration is defined as groundwater that enters the system through cracks in the pipes or manholes. The flow rates are lower during dry months of summer and higher during the wetter months. The system's response to rainfall is typical for cities in Western Oregon.

The system produces an estimated additional 4.75 million gallons (12%) a year from I/I sources. Put in terms of sewer fees paid to St. Helens, the I/I represents roughly $10,000 per year.

ES 5.4 Entire System Flow Projections

Flow projections used in this study are based on the year 2011. The calculated per capita flow rate of 56 gallons per capita per day (gpcd) is quite low compared to other systems, as would be expected in a largely commuter community.

Table ES-2: City Wide Historical and Projected Flow Rates

Year	Population	Flow (MG)	Average Daily Flow (MGD)	Per Capita Flow (gpcpd)
2007	1,847	36.1	0.099	54
2008	1,890	37.9	0.104	55
2009	1,934	36.7	0.101	52
2010	1,979	34.3	0.094	48
2011	2,025	41.4	0.113	56
Average (excluding 2010)	1,924	38.0	0.104	54
2012	2053	40.6	0.111	54
2022	2346	46.4	0.127	54
2032	2580	51.0	0.140	54

Abbreviations:

gpcpd - gallons per capita per day
MG – million gallons
MGD – million gallons per day

ES 6 Conveyance System Analysis

ES 6.1 Introduction

In order to evaluate the condition of the existing sewers, three episodes of field work were conducted, including: flow mapping, video inspection, and smoke testing. The work and results for each are discussed below. The capacity of the existing system to meet current and future flows is also presented.

ES 6.2 Flow Mapping

Flow Mapping consists of measuring flows in selected manholes at night during or immediately after rain events to identify parts of the system that experience relatively high amounts of Inflow and Infiltration (I/I). Flow Mapping was conducted on 15 March 2012.

The flows observed identified several areas of infiltration with significant I/I as well as areas of town that showed very little I/I. The most significant area found was in the K St. Pump Station Basin north of K St. Other areas of suspected I/I included the southern portion of the west side of town south of C St. and relatively minor amounts on the east side of the Highway. The north part of the west side of town, north of C St. had negligible observed infiltration.

ES 6.3 Video Inspection

The areas identified by the flow mapping as having high I/I were prioritized for video inspection which was performed in May of 2012. The video inspection consisted of running cameras inside the sewer pipes to visually assess and record the condition of the pipe. Overall, the system appeared in good condition. Figure 6-1 shows the areas selected for video inspection as well as the type of defects found. Most defects were related to service connections to the sewer main and are likely sources of I/I.

ES 6.4 Smoke Testing

Smoke testing was conducted in August and September of 2012 by City staff. The entire collection system was smoke tested. Smoke testing consisted of blowing smoke into the sewer lines to detect sources of I/I such as illicit connections of storm sewers, roof drains, and cracks in piping and other sources of infiltration. With the exception of one residential roof drain, the results showed no illicit connections and no other significant system deficiencies. It should be noted that in areas with septic tanks, it is likely that the smoke stopped at the septic tanks and did not continue to the houses, thus not testing the piping all the way to the houses.

ES 6.5 Future Development Areas

As shown on Figure 6-2, additional collection piping will be needed to accommodate new developments. The significant vacant areas of the City are discussed below.

ES 6.5.1 South Area

The majority of this area can be served by gravity sewer to the K-St. Pump station. The exception to this is approximately 2.5 acres in lower elevation portion on the extreme south end that will require a pump station or individual pumps. The area should be designed as a direct flow area without septic tanks.

ES 6.5.2 West Area

The majority of this area slopes to the northeast and could be serviced by existing piping to accommodate septic tank effluent flows. To allow this area to be developed without septic tanks, a new sewer main would need to be constructed by the City down E St. from 6th St. to the existing sewer on the west side of the Highway. The portion of this area that slopes to McBride Creek will need to be served by pumps.

ES 6.5.3 Industrial Area

Sewer service to the industrial lands area will be largely dependent on the location and type of facilities proposed. Due to topography, providing sewer service to the industrial lands will most likely require one or more pump stations. Options for connecting a forcemain to the existing gravity sewer system include the sewer lines on E St. or boring underneath the Highway.

ES 6.6 Capacity Analysis

ES 6.6.1 Pump Station Capacities

Existing and future sewage flows for each pump station basin were estimated. The Pixie Park, Forest Park and K St. Pump station were found to be able to meet both existing and future peak hourly flow rates. The RCE Pump station, while not having a history of overflows due to capacity, was found to be deficient in capacity to meet the current peak hourly flow by 88 gpm and the future peak hourly flow by 110 gallons per minute (gpm). If there are additional flows from the industrial lands, the 4-inch diameter portion of the forcemain will need to be replaced.

ES 6.6.2 Gravity Sewer Capacities

The capacity of two critical sections of the gravity sewer system was evaluated. The two segments checked were the 6-inch pipe going under the Highway and the 8-inch trunk line at E and 2nd St. Both lines were shown to have adequate capacity through the planning period and have some capacity available for additional flows from the undeveloped industrial lands.

ES-7 Septic Tank Replacement and Abandonment Analysis

ES 7.1 Replacement of Steel Tanks

The City has 57 steel septic tanks. The locations are shown on Figure 7-1. The steel tanks are over twenty years old. Several of the tanks viewed by City staff contain numerous holes. It could be reasonably assumed that the rest are also in poor condition. The abandonment of the tanks, as discussed in the next section, will affect the number of steel tanks that will need to be replaced.

ES 7.2 Abandonment of Septic Tanks

A cost analysis was conducted comparing the ongoing operations and maintenance (O&M) costs of the septic tanks with the costs to abandon the tanks and connect services to a direct flow system with no septic tanks. The existing system was broken down into 20 project areas to look at the feasibility of converting each area to a direct flow system. The project areas are shown on Figure 7-1.

The annual cost per tank was estimated at $370 with a 20-year net present worth of $5,500 over the 20-year planning period using an interest rate of 3%.

For the Columbia City system, the most common improvement required to convert to a direct flow system is upsizing the mainlines from 4-inch to a minimum size of 6-inch. For most areas, it was assumed that this could most cost effectively be done by pipe bursting the 4-inch lines to a 6-inch. Some areas already have piping in place and all that is needed is to bypass the septic tanks. The payback period ranged from 5 to 44 years and averaged about 16 years. Table 7-2 presents costs and payback period for each area. A description of the work required in each project area can be found in Section 7.3. An engineer's opinion of probable costs for each area is included in the appendices.

ES-8 General Recommendations

ES 8.1 Constructing a Wastewater Treatment Facility

A simple cost analysis of building a wastewater treatment plant was conducted as part of this study. The analysis showed that the 20-year net present worth (cost) including O&M of a new treatment plant would be roughly $13 million dollars (M) versus a 20-year net present worth of roughly $1.6 M in fees to St. Helens. Although the analysis is based on very preliminary planning-level costs and included many assumptions, the cost difference is great and therefore, it is not recommended at this time that the City pursue constructing its own wastewater treatment plant.

ES 8.3 New Developments

It is recommended that new developments be direct flow systems where feasible to minimize the number of septic tanks. At a minimum, the interior piping infrastructure of any new subdivision or industrial development should be designed to accommodate direct flow raw sewage.

The addition of a large sewage producing industry will require looking carefully at the capacities presented in this report for the gravity sewer lines as well as the capacity of the RCE pump station and forcemain. It is assumed that if system capacity improvements are needed, they will be paid for and completed by the developer.

ES 8.2 Maintenance

It is recommended that the City continue video inspecting sewer lines, perform smoke testing, visually inspecting flows during high flow storm events, and pigging of the forcemains on a regular basis.

ES-9 Capital Improvement Projects

ES 9.1 RCE Pump Station Upgrade

The RCE Pump Station is in need of a capacity upgrade of 82 gallons per minute (gpm) to meet theorized current maximum day peak hourly flows of 282 gpm as well as future flows. An upgrade of the pumps from 25 horsepower (hp) to 35 hp as well as associated electrical improvements to accommodate the additional horsepower is needed.

ES 9.2 Telemetry

A cellular and internet based system is recommended for each of the four pump stations for recording data and providing notification of alarms as well as remote control operation.

ES 9.3 Manhole Lining

This project would consist of lining approximately 25 manholes to reduce infiltration in the southwest area of town in the K-St. Pump station basin to reduce the high level of I/I observed in this area.

ES 9.4 I/I Spot Repairs

Spot repairs are required at the 19 locations identified by the video inspection of the gravity collections system.

ES 9.5 Future E St. Line

If the City wishes for the vacant lands between west of 6th St. between H St. and E St. to be developed without septic tanks, then the City will need to construct an 8-inch sewer line on E St. from 6th St. to Highway 30.

ES 9.6 Septic Tank Abandonment

The septic tank abandonment project areas were combined into three categories based on estimated economic payback period. The City may choose to start with the areas with the lowest payback period and proceed to those with a longer payback period. Areas having an estimated payback period over 20 years are not included in the CIP.

ES 9.7 Replacing Steel Tanks

Replacing the steel tanks should be done as soon as funding is available. The number of tanks to be replaced will be contingent upon the number of tanks the City chooses to abandon in the septic tank abandonment project. Budget is for 16 tanks in septic tank abandonment areas having over a 20 year payback

Table ES-3: Capital Improvement Plan (CIP)

Project	Schedule (Fiscal Years)	Total Project Cost	Existing Needs		Future Need	
			%	Cost	%	Cost
RCE Pump Station Upgrade	2014-2019	$ 113,000	80%	$ 90,400	20%	$ 22,600
Telemetry System	2014-2019	$ 23,000	100	$ 23,000		
Manhole Lining	2014-2019	$ 58,000	100	$ 58,000		
I/I Reduction Spot Repairs	2014-2019	$ 26,000	100	$ 26,000		
E St. Sewer Line	Pending Development	$ 110,000	0	$ -	100%	$ 110,000
Replace Steel Tanks	2014-2019	$ 67,200	100	$ 67,200		
Septic Tank Abandonment 0-10 Year Payback	2014-2024	$ 501,000	100%	$ 501,000		
Septic Tank Abandonment 11-20 Year Payback	2014-2034	$ 1,031,000	100%	$ 1,031,000		
Septic Tank Abandonment 20+ Year Payback	Not included (Project cost of $1,577,000					
Total		**$1,929,200**		**$1,796,600**		**$ 132,600**

ES-10 Funding

This section summarizes the City's available options for financing the CIP. A more detailed Financial Plan including a Wastewater Rate and SDC Study will be completed by the City immediately after completion of this Wastewater Collection System Facility Plan. The likely next step is for the City to attend a "one stop" meeting with multiple funding agencies.

Section 1: Introduction

1.1 Background

The last wastewater master plan was completed in 1997 by Crane & Merseth Engineering and does not reflect the City of Columbia City's (City) current planning needs, especially with regards to the industrial lands in the City.

Columbia City does not have any treatment facilities. All wastewater is pumped to the City of St. Helens (St. Helens) system.

Typically, a wastewater planning document without a treatment facility would normally be called a collection system master plan by Oregon Department of Environmental Quality (DEQ); however, concerns over the term "master plan" from the funding agencies require us to use the term facility plan. Due to not planning for a wastewater treatment facility, some of the items listed in the document, "Guidelines for the Preparation of Facilities Plans and Environments Reviews for Community Wastewater Projects" are not relevant and, therefore, are not included in this report.

1.2 Authorization

Kennedy/Jenks Consultants (Kennedy/Jenks) was authorized in February of 2012 by the City to provide a sanitary sewer facility plan.

1.3 Purpose for Study

The purpose of the facility plan is to summarize Kennedy/Jenks' evaluation of current and future needs over a 20-year planning period, including a projection of future flows, an options analysis, recommended facility improvements, and a Capital Improvement Plan (CIP). The goal in developing this sanitary sewer facility plan is to give the City a usable, living document that addresses the collection system needs. Upon completion of this plan, a User Rate and System Development Charges (SDC) will be conducted.

1.4 Acknowledgements

Kennedy/Jenks appreciates the input, many hours of work, and support from City staff, including Leahnette Rivers, Micah Rogers, Andrew Nollette, Randall Christophersen, and Micah Olson. This Project was funded in part by financial awards from the State of Oregon Infrastructure Finance Authority and the State of Oregon Department of Land Conservation and Development. The City would also like to thank the Port of St. Helens for contributing to the funding of this planning document.

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Section 2: Study Area Characteristics

2.1 General

The City of Columbia City is located 30 miles northwest of Portland and is adjacent to the City of St. Helens (2010 population of 12,900). The City is characterized by hills on the west transitioning to relatively flatter ground on the east side. The City is bisected by Highway 30. The Columbia River forms the eastern boundary of the City.

2.2 Planning Area Characteristics

The service area includes the area within the Urban Growth Boundary (UGB) including residential as well as commercial and industrial facilities. The service area is entirely within the UGB. A few connections are outside the City limits.

Residential growth areas of the town include limited infilling, the area on the south side of town west of Highway 30, and the area west of 6th Street (St.), between H St. and E St. There are approximately 93 acres of underdeveloped industrial zoned lands with within the service area. Commercial developments are limited to one minimart/service station, a fitness club, a museum, a church, and a pizza parlor that is currently closed. The school which is part of the St. Helens School District, was closed down in 2012, but was not eliminated from the flow projections as it is anticipated that, with growth in the future, the school could reopen.

Figure 2-1 shows the service area of the existing sewer system, City limits, the UGB, elevation contours, and property lines, vacant lands inventory, and zoning.

2.2.1 Topography

The study area is situated in the Columbia River Valley. Elevations range from 325 feet above sea level on the southeast side of the City down to approximately sea level along the Columbia River. The north and northeast side of the City is bordered by the steep valley of McBride Creek.

2.2.2 Geology/Soils

The City is predominately underlain by alluvial deposits associated with the Columbia River. The deposits are thick bedded, silt, sand and gravel deposits, including the Deer Island Terrace and the Troutdale Formation. The alluvial deposits pinch out to the west and are thicker (up to 200 feet (ft.) thick) at lower elevations closer to the Columbia River. Underlying the alluvium and exposed in the hills west of town are Columbia River Basalts.

Soils within the study area are predominately Latourell and Multnomah Associations with smaller amounts of the Aloha, Qautama Phicuk, Wollent, and Xerochrepts groupings. The soil associations are predominately soil capability classes I-IV. In general, the soils are well draining.

There are no known significant geologic hazards within the study area. Steep slopes areas are of concern for slope stability.

2.2.3 Climate

The climate is typical of the Pacific Northwest – moderate seasons with few temperature extremes. Columbia City has a temperate climate with dry, moderately warm summers and wet, mild winters. Average annual precipitation in the County is slightly less than 50 inches. Prevailing winds up and down the Columbia River provide some circulation in local air sheds and assist in dilution of air pollutants. Snow or freezing weather is usually limited to only a few days, and 100 degrees Fahrenheit (°F) is seldom reached in the summer.

2.2.4 Air Quality and Noise

Columbia City experiences prevailing winds along the Columbia River. Air quality is not a concern, and no noise issues are present.

2.2.5 Surface Waters

As previously noted, the town is bounded in the east by the Columbia River and on the north and east sides by McBride Creek. No historical flooding within Columbia City is reported. McBride Creek sits in a steep and deep valley below developed areas.

2.2.6 Socio-Economic Environment

Columbia City is primarily a commuter community. There is very little industry or commercial employment within the City. Many residents work in neighboring towns or commute to the greater Portland metropolitan area for employment.

2.2.7 Intergovernmental Agreements

Columbia City has an Intergovernmental Agreement with the City of St. Helens to receive and treat Columbia City's Sewage. This agreement is included in the appendices.

Section 3: Existing System Description

3.1 General

The conveyance system is composed of gravity sewer lines, pump stations, and forcemains encompassing over 16 miles of pipeline. Table 3-1 summarizes the piping system by size. All piping is polyvinyl chloride (PVC). The system is relatively new with the majority of piping installed in the1992 initial City wide sewering effort and followed by additional improvements to serve new land developments. The initial sewering was initiated, in part, due to concerns over water quality in City owned wells and the City of St. Helens drinking water wells located by the Columbia River.

The original sewer system was designed to be a septic tank effluent system with small diameter mainlines laid at minimum depth of 4-feet and shallower grades than is typically used for sewers that receive direct flow. As shown on Figure 3-1, some areas of town do not have septic tanks and are serviced by direct flow of the sewage to the collection system.

There are currently approximately 811 sewer connections; 283 of these connections are direct flow into the sewer collection system, while the remaining 528 connections share 475 septic tanks (418 concrete and 57 steel). There are also 23 small sewer pumps to overcome elevation problems. The City's responsibility begins at the inlet to the septic tank, so the City is responsible for the maintenance and replacement of the septic tanks and any pumps, if present. The City is also responsible for pumping the septic tanks. All wastewater is pumped to the City of St. Helens for treatment via a 6-inch diameter forcemain. Two pump stations, the K St. and the River Club Estates (RCE) pump stations, are connected to this line. The two other pump stations, the Pixie Park and Forest Park pump stations pump flows from lower elevations to points in the system were it then flows by gravity to the RCE Pump Station.

3.2 Gravity Sewer

Table 3-1 presents the inventory of the gravity sewer lines.

Table 3-1: Gravity Piping Inventory

Size (inches)	Length (ft)
4" Service lines	26,000
4 Mainlines	23,400
6	13,200
8	20,400
10	1,500
Total Gravity Mains	84,500

Also, as part of the collection system is a 640 ft. long, 2-inch forcemain that serves homes with pumps located on 1st St. between K and L St.

3.3 Pump Stations and Forcemains

There are currently four public pump stations. Table 3-2 summarizes the pump station and forcemain information. The pumps in each pump station are able to accept raw sewage.

Table 3-2: Pump Station Inventory

	Pixie Park	Forest Park	K St.		RCE		
Location	Tahoma and Mattie St.	The Strand and I St.	K St., E. of 6th St.		2nd St. and Spinnaker Way		
Service Area (acres)	20	51	38		360		
ADF (gpm)	4	14	9		72		
Year Built	1992	1992	1997		1991		
Number of Pumps	2	2	2		2		
Type	Submersible	Submersible	Submersible		Submersible		
Horse Power	2	2	3		25		
Capacity (gpm)	70	125	114/118		172/177		
TDH (ft)	39	11	3		148		
Alarm	Autodialer	Flashing light	Audible Alarm		Autodialer		
FORCEMAINS:							
Size (inches)	4	6	8	6	5.03 (ID)	4	6
Length (ft)	470	1,630	140	5,840	125	683	3700
Type	PVC	PVC	PVC	PVC	6" HDPE DR 9	C900 DR 14	PVC (after tee)

Abbreviations:
ADF = Average dry flow
PVC = Polyvinyl chloride
gpd = Gallons per day
gpm = Gallons per minute
TDH = Total dynamic head

The pump stations are not connected to a supervisory control and data acquisition (SCADA) network. The Pixie Park and RCE pump stations are connected to an autodialer for high level and low level alarms and for power failure. Standby power for all the pump stations is provided by City owned portable generators.

The K St. pump station actually has a negative static head of approximately 10 ft., as it sits at an elevation of approximately 10 ft. higher than the discharge point located in front of the Columbia County Animal Control facility. The forcemain to St. Helens was originally designed as a siphon across the Highway to drain a 23,500 gallon septic tank equipped with a flushing valve that would drain the tank and flush the line. The velocity in the 6-inch forcemain with a flow of 90 gallons per minute (gpm) from the K St. pumps prior to connecting with flows from the RCE pump station is only about 1 foot per second (ft/sec) which is inadequate for self cleaning of the

line. Velocities of 3.5 ft/sec are considered by DEQ as the minimum for self cleaning of the lines. To flush this line, City crews have connected the discharge piping to fire hoses. This has only been needed to be performed once since it was built in 1997 and is not a major operational issue. It is likely that the solids have settled out in low points, constricting the diameter down causing an increase in velocity and resulting scouring. These processes have likely reached an equilibrium point. The overflow to the K St. pump station is connected to the forcemain and provides flow by gravity. A check valve prevents the pumped flow from returning via the overflow. Pumping tests conducted in the fall of 2012 by City staff showed one pump providing 114 gpm and the other providing 118 gpm.

The pumps in the RCE pump station were upgraded when the City of St. Helens water treatment plant was built in 2007. The RCE forcemain was replaced in 2011 due to frequent breaks due to the type of piping used. Sulfide control in the forcemain is provided by injection of calcium nitrate at the RCE pump station. Pumping tests conducted in the fall of 2012 by City staff showed one pump providing 172 gpm and the other providing 177 gpm

The St. Helens Water Treatment Plant also discharges filter backwash water and sewage from a small grinder pump serving from a restroom and a lunchroom into the 6-inch forcemain close to the connection point with the RCE forcemain. Flows from the plant into the forcemain are reportedly about 106 gpm. The frequency of the discharge varies from 2-6 minutes every 4-6 hours to 2-6 minutes once a day in the winter time when the demand for drinking water is less and flows into the RCE and K St. pump stations are higher.

The combined flows into the 6-inch forcemain to St. Helens are summarized in Table 3-3:

Table 3-3: Pump Station Flows and Velocity in the St. Helens Forcemain

Pump Station	Flow (gpm)	Velocity (ft/sec)
K St.	114	1.
RCE	172	2.3
St. Helens Water Treatment Plant	106	1.2
Total	496	4.4

Abbreviations:

ft/sec – feet per second
gpm – gallons per minutes

Section 4: Population Projections

4.1 Historical and Projected Service Area Population

Historical population figures and future growth rates were obtained from the Population Research Center at Portland State University (PSU), publication, Population Forecasts for Columbia County Oregon, its Cities & Unincorporated Area 2010 to 2030, and as adopted by the City amending the Comprehensive Plan in Ordinance No.10-661. An updated buildable lands inventory was supplied by the City and showed that within the UGB, there was approximately 196 dwelling unit sites available. Applying 2.5 people per dwelling unit results in a buildout population of 2,543. This correlates within 1.4% of the projected population of 2,580 in 2032. For the purposes of this study, the population estimate from PSU of 2,580 will be utilized. Table 4-1 and Figure 4-1 present the historical and projected population for Columbia City through the 20-year planning period.

Table 4-1: Historical and Projected Population of Columbia City

Year	Population within City Limits	% Change per Year
1990	1003	-
2000	1571	4.6%
2010	1979	2.3%
2012	2053	1.9%
2022	2346	1.9%
2032	2580	1.5%

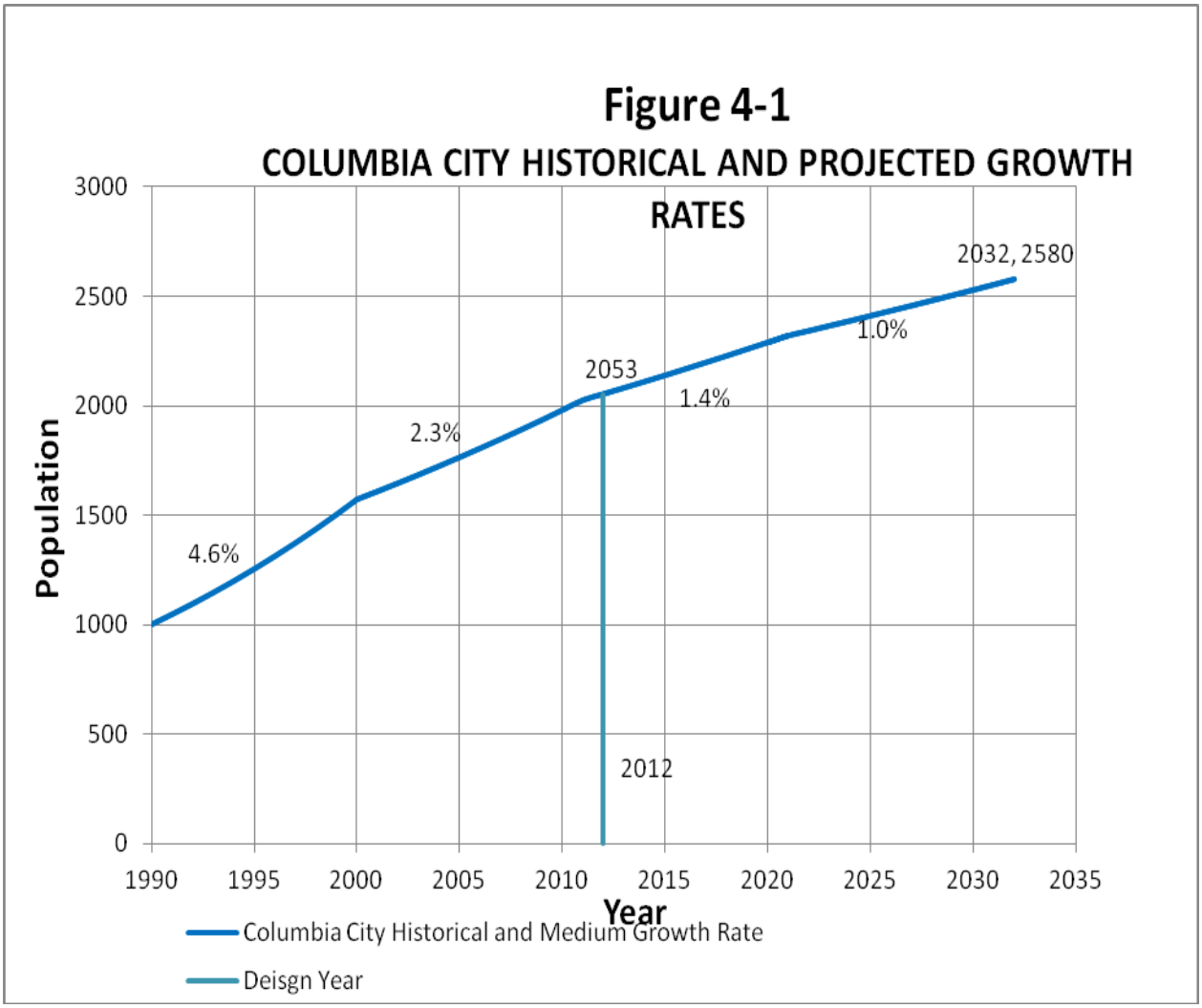


Figure 4-1: Columbia City Historical and Projected Growth Rates

Section 5: Flow Analysis

5.1 Introduction

In order to assess the future needs of the wastewater collection system, an investigation into the historical wastewater flows, historical population, rainfall, and expected population has been conducted. Historical flow information was provided by the City in the form of master meter records taken monthly. Also provided was flow and pump run time data collected every three to five days by City personnel.

5.2 Regulatory Review

Since all wastewater is pumped to the City of St. Helens, the treatment, disposal, and reuse of wastewater effluent is the responsibility of the City of St. Helens. Subsequently, the treatment process, regulated by the U.S. Environmental Protection Agency (EPA) and administered in the State of Oregon by the DEQ, is not a requirement pertinent to the City. Rather, the City must meet all regulations set forth by DEQ regarding sanitary sewer application and design. Additionally, any private development must meet all requirements prescribed by the City. Under the agreement with the City of St. Helens, Columbia City is allowed unlimited residential and small commercial hookups within the UGB.

All improvements to the City's sanitary system are impacted by numerous regulations. The key applicable regulations are as follows. Sanitary system overflow criteria are detailed in the Oregon Administrative Rules (OARs) OAR 340-041-0009, sections 6 and 7. These sections specify that domestic waste collection facilities are prohibited from discharging raw sewage to waters of the State. Discharges are allowed during the winter season (November 1 through May 21) during a storm event larger than a 5-year 24-hour storm and during the summer season (May 22 through October 31) during a 10-year 24-hour storm event. It is worth noting that these elements of the OAR were not approved by EPA and are likely to change in the near future. These guidelines define the minimum criteria that must be met by the City's collection system without overflow events.

5.3 Inflow and Infiltration (I/I)

Inflow is defined as surface water entering the sanitary sewer system from direct connections like illicit storm drain connections, roof drains, and similar items that directly flow surface water into the system. Infiltration is defined as groundwater that enters the system through cracks in the pipes or manholes. As shown in Figure 5-1, the flow rates are lower during dry months of summer and higher during the wetter months. The system's response to rainfall is typical for cities in Western Oregon.

Figure 5-2 shows the relationship of Average Daily flow verses average precipitation for the Columbia City system. Using the trend line of Figure 5-2, the estimated daily average flow rate without any rain would be approximately 91,000 per day. Comparing that flow rate to the average daily annual flow rate with rain of 104,000 and applying it to 365 days per year results

in approximately an additional 4.75 million gallons (or 12%) a year from I/I sources. Put in terms of sewer fees paid to St. Helens, the I/I represents roughly $10,000 per year.

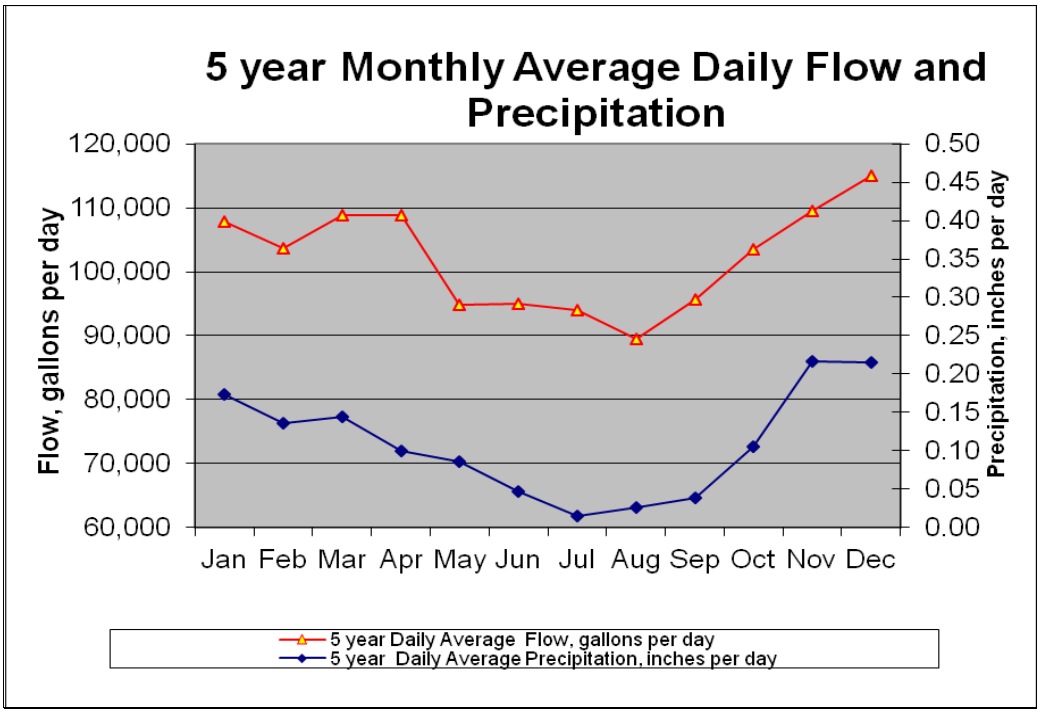


Figure 5-1: Five-year Monthly Average Daily Flow and Precipitation

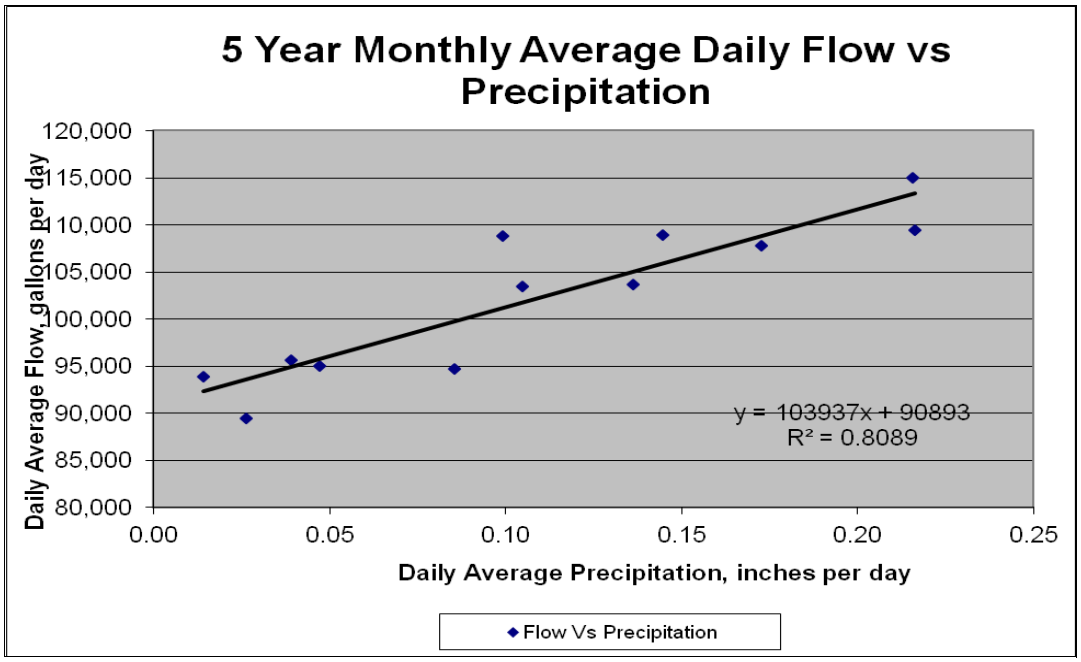


Figure 5-2: Five-year Monthly Average Daily Flow versus Precipitation

5.4 Entire System Flow Projections

Historical and projected flow rates for the entire City are shown in Table 5-2. The master flow meter at the St. Helens connection point was replaced in September of 2010 and it is believed that it was slightly under reporting flows. For the purposes if this study, flow projections will be based in 2011 data.

A per capita flow rate of 56 gallons per capita per day (gpcd) is quite low compared to other systems, and could be reflective of the fact that most residents commute to jobs outside the City. The 1997 Wastewater Master Plan reported 60 gpcd. Typical design values are usually around 100 gpcd. The DEQ range for design flows of gravity pipelines is between 50 and 100 gpcd.

Due to the lack of daily flow data and local rainfall data, the standard DEQ method of determining flow rates could not be performed. Since, for this study, we are not proposing a treatment plant and are evaluating the collection system only, peak hourly flow rates are the only parameter needed to be estimated to evaluate the capacity of pump stations and key pipelines.

Table 5-2: City Wide Historical and Projected Flow Rates

Year	Population	Flow (MG)	Average Daily Flow (MGD)	Per Capita Flow (gpcpd)
2007	1,847	36.1	0.099	54
2008	1,890	37.9	0.104	55
2009	1,934	36.7	0.101	52
2010	1,979	34.3	0.094	48
2011	2,025	41.4	0.113	56
Average (excluding 2010)	1,924	38.0	0.104	54
2012	2053	40.6	0.111	54
2022	2346	46.4	0.127	54
2032	2580	51.0	0.140	54

Section 6: Conveyance System Analysis

6.1 Introduction

In order to evaluate the condition of the existing sewers, three episodes of field work were conducted, including: flow mapping, video inspection, and smoke testing. The work and results for each are discussed below. The capacity of the existing system to meet current and future flows is also presented.

6.2 Flow Mapping

Flow Mapping consists of measuring flows in selected manholes at night during or immediately after rain events to identify parts of the system that experience relatively high amounts of I/I. Flow Mapping was conducted on 15 March 2012 starting at 11:30 PM and concluding at 5:00 AM on 16 March 2012. Several inches of rain had fallen on the previous days and over an inch of rain had fallen during the day but it was not actually raining during the mapping; thus, flow contribution from sources of direct inflow of surface waters into the system was limited or nonexistent. It appeared that groundwater flows were still quite high during the mapping event and flow contributions from sources of infiltration were present.

Although the mapping provided limited quantifiable results of flow rates, the flows observed identified several areas of infiltration with significant I/I, and conversely, the areas of town that showed very little I/I. The most significant area found was in the K St. Pump Station Basin north of K St. (Riverview Heights Subdivision) where significant flows of up to 44 gpm were reported. Many of the manholes had visible leaks. The high amount of I/I observed in the K St. Basin correlates well with observations over the years of City Staff. Other areas of suspected I/I included the southern portion of the west side of town south of C St. and relatively minor amounts on the east side of the Highway. The north part of the West side of town had very little, if any, observed infiltration.

6.3 Video Inspection

The video inspection consisted of running cameras inside the sewer pipes to visually assess and record the condition of the pipe. Overall, the system appeared in good condition.

The areas identified by the flow mapping as having high I/I were prioritized for video inspection. Due to limited budget, the entire town was not video inspected. Figure 6-1 shows the areas selected for video inspection as well as the type of defects found. A tabulation of the defects is included in the appendices. Video inspection was performed in May of 2012. Due to the relatively dryer weather during the testing, the spotting of visible water leaking into the pipes was limited, but visible cracks and other defects were successfully noted. Nineteen locations were found that are likely causing infiltration, with most associated with the connection of service laterals.

6.4 Smoke Testing

Smoke testing was conducted in August and September of 2012 by City staff. The entire collection system was smoke tested. Smoke testing consisted of blowing smoke into the sewer lines to detect sources of I/I such as illicit connections of storm sewers, roof drains, and cracks in piping and other sources of infiltration. With exception of one roof drain connection that would be the property owners responsibility to correct, the smoke testing effort found no illicit connections and no other significant system deficiencies. It should be noted that in areas with septic tanks, it is likely that the smoke stopped at the septic tanks and did not continue to the houses, thus not testing the piping all the way to the houses.

6.5 Future Development Areas

As shown on Figure 6-2, additional collection piping will be needed to accommodate new developments. The significant vacant areas of the City are discussed below.

6.5.1 South Area

The majority of this area can be served by gravity sewer to the K-St. pump station. The exception to this is approximately 2.5 acres in lower elevation portion on the extreme south end that will require a pump station or individual pumps. The area should be designed as a direct flow area without septic tanks.

6.5.2 West Area

The vacant land located between H St. and I St. and west of 6th St. contains approximately 28 acres and has the potential for 33 additional homes. Since most of this area slopes to the northeast, this area could initially be most easily served by connecting to the existing 4-inch lines located on G St. and at 6th St. and E St.; however, if the City does not want this area to be developed with septic tanks, then an 8-inch gravity sewer line that could accommodate direct flow sewage would need to be constructed by the City on E St. from 6th St. down to the existing 6-inch sewer line, west of Highway 30.

For areas on the west facing slopes towards McBride Creek, a pump station will be required. It is currently recommended that flows from this pump station be pumped to the gravity sewer system at the corner of I St. and 9th St. so that no additional septic tanks are needed since that part of the existing sewer system is already able to accommodate direct flow sewage.

6.5.3 Industrial Area

Sewer service to the industrial lands area will be largely dependent on the location and type of facilities proposed. As shown on Figure 6-2, the area that could be served by gravity sewers connecting to the existing 8-inch trunk line on 2nd St. at E St. is limited by topography to a small area in the southwest portion of the industrial lands. Gravity sewer service could also be provided for most of the site by connecting to the Pixie-Park Pump station; however, this line would need to be deep along Strand St. and would be quite costly to build and still would not serve the area in the far northeast portion. Due to topography, providing sewer service to the

industrial lands will most likely require one or more pump stations. Options for connecting a forcemain to the existing gravity sewer system include the sewer lines on E St. or boring underneath the Highway.

6.6 Capacity Analysis

6.6.1 Pump Station Capacities

Existing and future sewage flows for each pump station basin were estimated. Average Daily flows were estimated using the 2011 calculated average flow rate of 140 gallons per day per equivalent dwelling unit (gpd/EDU). Table 6-1 presents the existing and future Average Daily flow rates for each basin. Pump station capacities are for only one pump running at a time.

Table 6-1: Existing and Future Pump Station Basins – Average Daily Flow Rates

	Existing EDU's	Future EDU's	% Increase	Current flow/EDU (gpd)	Existing Average Daily Flow (gpm)	Future Average Daily Flow (gpm)
Pixie Park Pump Station	40	48	20%	140	3.9	4.7
Forest Park Pump Station	140	140	0%	140	14	14
RCE Pump Station	739	808	9%	140	72	78
K St. Pump Station	95	208	119%	140	9	20
Entire System	834	1016	22%	140	81	99

The peaking factor to obtain the peak hourly flow rate from the average daily flow for this study is from the State of Washington's publication, "Criteria for Sewage Works Design" (Orange Book). The peaking factor varies with population, as larger systems typically have lower peaking factors due to the lower likelihood that all users in a larger system will be using the system at the same time. The factor also includes an allowance for I/I. Table 6-2 presents the existing peak hourly flow (PHF) for each basin along with the existing reported capacity of each pump station.

Table 6-2: Existing Pump Station Basins - Peak Hourly Flow Rates

	Number of Residential Connections	Estimated Population	Peaking Factor*	Existing Average Daily Flow (gpm)	Existing Peak Hourly Flow* (gpm)	Current Pump Capacity	Capacity Surplus (+) Deficiency (-)
Pixie Park Pump Station	40	102	4.24	3.9	16	70	54
Forest Park Pump Station	140	355	4.05	13.6	55	125	70
RCE Pump Station	703	1784	3.62	71.7	260	172	(88)
K St. Pump Station	95	241	4.12	9.2	38	114	76
Entire System	798	2025	3.58	81.0			

Note:

*From Washington Design Manual, includes a factor for I/I. PF = $(18+P^{0.5})/(4+P^{0.5})$

The capacity of the Pixie Park, Forest Park, and K St. pump stations are adequate to meet current flows. Using this methodology, it appears that the RCE pump station's capacity is deficient to handle current flows by approximately 88 gpm. It should be noted that City staff have not reported any overflows from this pump station since it was built in 1992 that were the result solely of the capacity of the pumps. It could be assumed that in the 20 years since it was built, the contributing basin has experienced several storms equivalent to the DEQ recommended design capacity to meet the 5-year, 24-hour storm event. It is also possible that during these events, both pumps were running at the same time, therefore, the pump station was able to convey flow without an overflow, but did not have any redundancy. It should be noted that on 19 November 2012, after a severe rain event, both pumps at the K St. and RCE pump stations were running (four pumps total) and the total reported flow in the forcemain was only 228 gpm. This is an indication that there may be some kind of constriction in the 6-inch forcemain to St. Helens, possibly due to air binding at high points or sediment collection at low points. City Staff are currently working on a solution to this issue.

It appears that the flow estimating methodology used may slightly over estimate the peak hourly flow and results in a conservative (over sizing) design of the pump station. This could be due, at least in part, to a system with few leaks resulting with a lower I/I factor than other communities with older pipes and more leak prone non-PVC pipe materials. As the system ages, there may be an increase in the amount of I/I. With an aging system and a preference for conservative design that will prevent overflows, it is recommended that the flow estimating methodology applied be utilized for planning and design purposes.

Future average daily and peak hourly flow rates for each basin are presented in Table 6-3. The gpd/EDU capacity of the Pixie Park, Forest Park, and K St. pump stations are adequate to meet future flows through the planning period. The RCE pump station is forecasted to receive an

additional 82 gpm during peak hourly flow. This does not include any additional future flows from the available industrial lands.

Table 6-3: Future Flow Rates by Basin

	Number of Residential Connections	Estimated Population	Peaking Factor*	Future Average Daily Flow (gpm)	Future Peak Daily Hourly* (gpm)	Current Pump Capacity	Capacity Surplus (+) Deficiency (-)
Pixie Park Pump Station	48	122	4.22	4.7	20	70	50
Forest Park Pump Station	140	355	4.05	14	55	125	70
RCE Pump Station	769	1952	3.59	78	282	172	(110)
K St. Pump Station	140	355	4.05	20	82	114	32
Entire System	909	2580	3.50	99			

Note:

*From Washington Design Manual, includes a factor for I/I. PF = $(18+P^{0.5})/(4+P^{0.5})$

6.6.2 Gravity Piping Capacities

The capacity of two critical sections of the gravity sewer system was evaluated for capacity. The same flow estimating methodology as used above for the pump station basins was applied to each contributing upstream basin.

The 6-inch pipe going under the Highway at E St. must accommodate all flows from the west side of the Highway except for the K St. Pump Station Basin. The other line is the 8-inch trunk line in the east side of town. The shallowest grade on this line occurs south of E St. Capacity was determined using Manning's equation with a Manning's "n" value of 0.013 and no allowance for manhole surcharging. Both lines were shown to have adequate capacity through the planning period and have some capacity available for additional flows from the undeveloped industrial lands. Table 6-4 presents the capacity results.

Table 6-4: Capacity of Selected Gravity Sewers

Line Segment	Number of Residential Connections	Estimated Population	Peaking Factor*	Average Daily Flow (gpm)	Peak Daily Hourly (gpm)	Current Line Capacity	Capacity Surplus (+) Deficiency (-)
6" Under Highway, Existing	442	1122	3.77	43.7	164	303	139
6" Under Highway, Future	488	1238	3.74	48	178	303	125
8" Trunk Line at E St., Existing	448	1137	3.76	46.0	173	343	170
8" trunk line at E St., Future (Without Industrial)	494	1254	3.73	50	187	343	156

Section 7: Septic Tank Replacement and Abandonment Analysis

7.1 Replacement of Steel Tanks

The City has 57 steel septic tanks located as shown in Figure 7-1. The steel tanks are over twenty years old. Several of the tanks viewed by City staff contain numerous holes. It could be reasonably assumed that the rest are also in poor condition. The City wishes to replace or abandon these tanks as soon a funding is available. This is considered an existing need. The abandonment of the tanks as discussed in the next section will affect the number of steel tanks that will need to be replaced.

7.2 Abandonment of Septic Tanks

A cost analysis was conducted for comparing the ongoing operation and maintenance costs (O&M) of the septic tanks verses the costs to abandon the tanks and connect services to a direct flow system with no septic tanks. As shown in Figure 7-1, the existing service area was broken down into 20 project areas to look at the feasibility of areas with similar requirements. Some areas only require abandoning the septic tanks in place, while others require substantial pipe replacement to accommodate raw sewage flows instead of septic tank effluent.

Most of the tanks are over twenty years old. Given a 40-year life of the concrete tanks and assuming 20 years of remaining life, the net present worth of replacing the 475 tanks over the next 20 years of the planning period was estimated. A replacement cost of $2,900 (assumed done by City crews) and an interest rate of 3% was used resulting in a total net present worth over the 20-year panning period at a cost of $5,500 per tank and an annual cost per tank of $370. The 20-year net present worth of the cost of all the tanks is approximately 2.6 million dollars (M). The annual O&M costs are shown in Table 7-1

Table 7-1: Septic Tanks Annual O&M Costs

Pumping Costs	$22,200
Responding to Homeowner Calls	$10,500
Checking Tanks for Pumping Lists	$1,300
Misc.	$600
Annualized Replacement Cost	$125,000
Contingency (10%)	$15,960
Total Annual Costs	$175,560
20 Year NPW of O&M i=3%	$2,612,000
Annual Cost Per Tank	$370.00
20 Year NPW Per Tank	$ 5,500.00

7.3 Septic Tank Abandonment Project Descriptions

The following are brief project description requirements of the different project areas for abandonment of the septic tanks. Cost breakdowns and quantities for each project are included in the appendices. Table 7-2 provides a summary of the estimated costs and payback period for each project area.

If the area contained steel tanks in need of replacement, a credit was applied to the net cost per tank for not having to replace the steel tanks in the economic analysis since replacement would not be needed if the tank was bypassed and abandoned.

Table 7-2: Septic Tank Abandonment Project Areas Summary

Project #	Area	Total Cost	# of Tanks Eliminated	Number of Steel tanks	Credit for not Replacing Steel Tanks	Net Cost Per Tank	Payback Period (years)
1a	Tahoma St. & Tahoma Ct.	$ 357,000	39	-	$ -	$ 9,154	25
1b	Tahoma St. Only - Burst 6 to 8"	$ 199,000	31	-	$ -	$ 6,419	17
1c	Tahoma St. Only - Use Exist 6"	$ 135,000	31	-	$ -	$ 4,355	12
1d	Tahoma Ct. Only	$ 130,000	8	-	$ -	$ 16,250	44
2	Mattie, 5th St. and Park St.	$ 100,000	57	-	$ -	$ 1,754	5
3	Park & 6th, Pacific to Lincoln	$ 266,000	47	21	$ 88,200	$ 3,783	10
4	Pacific St.	$ 38,000	8	-	$ -	$ 4,750	13
5	Metalko Ct.	$ 92,700	21	-	$ -	$ 4,414	12
6	5th St., A St. to Pacific	$ 135,000	36	-	$ -	$ 3,750	10
7	Weown Ct.	$ 43,000	6	-	$ -	$ 7,167	19
8	6th and 7th St., Calvin to A St.	$ 361,000	31	9	$ 37,800	$ 10,426	28
9	A St., 6th St. to Hwy	$ 72,000	13	4	$ 16,800	$ 4,246	12
10	B St. and Belle Ct.	$ 150,000	21	-	$ -	$ 7,143	19
11	West A & B St.	$ 117,000	17	2	$ 8,400	$ 6,388	17
12	C St.(East end)	$ 34,000	4	-	$ -	$ 8,500	23
13	B to E St. Steel Tank Area	$ 132,000	19	11	$ 46,200	$ 4,516	12

Project #	Area	Total Cost	# of Tanks Eliminated	Number of Steel tanks	Credit for not Replacing Steel Tanks	Net Cost Per Tank	Payback Period (years)
14	6th and 7th St., C to E St.	$ 155,000	23	1	$ 4,200	$ 6,557	18
15	5th and 6th St., D-G St.	$ 96,000	12	2	$ 8,400	$ 7,300	20
16	5th and 6th St. G-K St.	$ 337,000	42	4	$ 16,800	$ 7,624	21
17	Pixie Park Basin	$ 298,000	34	1	$ 4,200	$ 8,641	23
18	1st St., K-L St.	$ 97,000	9	1	$ 4,200	$ 10,311	28
19	3rd and 4th St., I-L St.	$ 228,000	28	1	$ 4,200	$ 7,993	22
20	4th St., L-M St.	$ 92,000	10	-	$ -	$ 9,200	25
	Totals (excludes options 1a and 1b)	$ 3,108,700	477	57	$ 239,400	6,015	16

For the Columbia City system, the most common need to convert to a direct flow system is upsizing the mainlines from 4-inch to a minimum size of 6-inch. Much of the City's system was installed with smaller diameter piping and flatter pipe slopes for handling septic tank effluent, which typically contains only a minor amount of solids. Sewer systems having direct flow require larger pipe sizes and steeper slopes to prevent clogging from the higher amount solids. For most areas, it was assumed that this could most cost effectively be done by pipe bursting the 4-inch lines to a 6-inch. Bursting the 4-inch diameter pipes to 8-inch diameter would be preferred and in agreement with the DEQ recommendation that mains be 8-inch in diameter except for the upper reaches of a basin where 6-inch may be allowed if the line is less than 250 ft. and the line is nonextendable; however, due to the difficulties and increased costs of bursting a 4-inch line out to an 8-inch line and the increased likelihood of the ground surface heaving during bursting, it was assumed, for the purposes of this study, that 6-inch sewer mains would be utilized in most situations.

Fortunately, almost all of the 4-inch lines are reported in the "as-built" drawings as having enough slope to allow for the DEQ recommended minimum velocity of 2 feet per second (ft/sec) for a 6-inch line to allow for self cleaning. If the lines have too shallow a grade, then open cut methods need to be utilized to re-grade the pipe.

Bursting pits would be needed at changes in direction and at the start and end of the lines. High-density polyethylene (HDPE) pipe would be pulled or pushed using the smaller line as a guide hole. Sewer services would then need to be connected to the new pipe by excavating and making the connection. Manholes and cleanouts would also need to be installed as needed at changes in direction and connection of mainlines. Since the new manhole locations are typically within the bursting pits, a cost saving is realized.

The slope of the individual service lines from the septic tanks to the main lines was not determined as part of this study. These will need to be determined by surveying during design. If the slopes of the service lines are too shallow, then they will need to be replaced by open cut methods. In some situations, it may not be economically or even physically possible to connect a service to the main with sufficient slope. In the cost estimates, an estimate is included, but will need to be verified. Replacing service lines across streets, curbs, sidewalks, and landscaping, can be quite costly and will vary at each location.

In some cases, conversion of an area will be dependent on upgrading the downstream pipes in an adjacent area.

The replacement of the 6-inch sewer main along the Highway from A St. to Pacific will be needed as the reported grade of 0.3% is too shallow for a 6-inch line to accept raw sewage. Videotaping revealed the line is in relatively good condition compared to a line immediately downstream that was recently replaced with a 10-inch line due to numerous construction defects. The costs of replacement of this line are distributed to the seven upstream project areas (Areas 1 through 7) based on the percentage of septic tanks served. Replacement of this line will also allow for the future connections to be direct flow from the large vacant parcel located at the east end of Penn St. and north of the gas station. Estimated cost is $138,000.

As part of this study, an inventory was conducted by City Staff. In cases where there is an existing solids handling grinder pump that pumps up to a septic tank that then flows by gravity to the main, no pump replacement is needed. In situations where the existing pump is only an effluent pump or located in the septic tank, then a complete packaged grinder pump and pump basin would be needed to accommodate raw sewage. Due to the high expense and resulting long payback period of installing new pumps, the City may wish to replace these when the existing pumps or septic tanks need to be replaced.

7.3.1 Project Area 1, Tahoma St. & Tahoma Court (Ct.)

Conversion of the whole project area is identified in Table 7-2 as Project area 1A and includes conversion of Tahoma St. by pipe bursting the existing 6-inch line on Tahoma St. to an 8-inch line and piping needed to convert Tahoma Ct.. Due to the higher costs for converting Tahoma Ct., this area was broken out into a separate area (Project Area 1D).

The existing sewer main on Tahoma St. is a 6-inch line with a reported slope of 0.4% and a calculated velocity flowing half full of 1.81 fps which is slightly below the DEQ guidelines of 2 fps. A slope of 0.6% is considered a minimum slope by DEQ for a 6-inch line. A slope of 0.4% is considered the minimum slope by DEQ for an 8-inch line. Pipe bursting this line to an 8-inch line would be desirable but expensive (Project Area 1B). In the DEQ guidelines titled, *Sanitary Sewer Design Notes*, and dated September 1994 states, “At its discretion, a City may waive minimum slope requirements to avoid arbitrary upsizing, provided sewer service can be maintained through the City’s commitment to periodic flushing, rodding, etc.” Additionally, since this line will likely never see flows at half full or higher, lower velocity flows will be the norm regardless of pipe diameter. With these thoughts in mind, a possible approach would be to bypass the existing septic tanks and connect to the existing 6-inch line with the anticipation that this line may require additional maintenance. If problems are persistent, then the City could consider bursting the line out to 8-inch diameter at a later date. Approximately six manholes

would need to be installed as the existing 6-inch line only has a few cleanouts and no manholes. This option is identified as Project Area 1C and excludes Tahoma Ct..

Abandoning the septic tanks on Tahoma Ct. is problematic and expensive (Project Area 1D). The existing 4-inch line flowing west on Tahoma Ct. to the sewer main in Tahoma St. is reported to be at the very shallow grade of 0.1%, making it not capable to handle raw sewage and ineligible for pipe bursting. The line would need to be replaced by open cut methods. Additionally, due to inadequate depth of the connection point at the existing sewer main in Tahoma St. to the west, a new 6-inch line would need to be constructed easterly down Tahoma Ct. then southward and easterly through lawns, and then southward along the Highway and connect to the sewer line on Pacific Ave.

7.3.2 Project Area 2, Mattie St. and North End of 5th St. and Park St.

Since the sewer mains in this area are of adequate size and slope for raw sewage, all that is needed to convert this area is to bypass the existing septic tanks.

7.3.3 Project Area 3, Park and 6th St., Pacific to Lincoln

This area will require bursting the 4-inch sewer pipes. This area is attractive for conversion because it contains 21 steel tanks.

7.3.4 Project Area 4, Pacific St.

Since the sewer mains in this area are of adequate size and slope for raw sewage, all that is needed to convert this area is to bypass the existing septic tanks. Note that this does not include the houses on the north side Pacific St.

7.3.5 Project Area 5, Metlako Ct.

This area is a manufactured home park. No as-builts of the sewer system are available and there are only a couple of cleanouts visible where the line size shows 6-inch mainlines. Generally, two homes share one septic tank. The slope of the main lines is unknown and will need to be verified by surveying to determine if they are adequate for raw sewage. Costs presented assume that slopes are adequate for raw sewage and just bypassing the septic tanks and installing manholes and cleanouts for access are needed to convert to direct flow.

7.3.6 Project Area 6, 5th St., A St. to Pacific Ave.

Since the sewer mains in this area are of adequate size and slope for raw sewage, all that is needed to convert this area is to bypass the existing septic tanks.

7.3.7 Project Area 7, 6th & 7th St., A St. to Calvin St.

Along with pipe bursting of 4-inch lines, this area would also require the open cut replacement of the 1225 ft. of the sewer line located in the backyards between 5th and A St., from A St., all the way to Calvin. This line was designed at 0.2% slope which is inadequate for raw sewage. The

slope would need to be increased and the additional depth made up by connecting to the A .St. mainline further to the north of the current connection.

7.3.8 Project Area 8, Weown Ct.

Work includes bursting the 4-inch line that connects with 5th St. The slope of the sewer line servicing this area is borderline for a 6-inch pipe at 0.5% slope and a survey should be done to verify the slopes.

7.3.9 Project Area 9, A St., Highway to 6th St.

Since the sewer mains in this area are of adequate size and slope for raw sewage, all that is needed to convert this area is to bypass the existing septic tanks. This area includes the apartments, the service station, and the health club.

7.3.10 Project Area 10, B St. and Belle Ct.

Due to borderline and inadequate slopes and the curvilinear nature of the lines in this area, it is not a good candidate for pipe bursting, so more expensive open cut replacement of the sewer mains are needed for this area.

7.3.11 Project Area 11, West A & B St.

Work would include pipe bursting the 4-inch mainlines.

7.3.12 Project Area 12, C St.

Work in this area would include the bursting of the about 300 of 4-inch mainline down to the Highway that only eliminates four tanks.

7.3.13 Project Area 13, B to E St. Steel Tank Area.

Work in this area would consist of bursting the 4-inch-mains to 6-inch and the portion from D St. to past C St. should be burst out to 8-inch due to having a reported slope of only 0.4%. This is also an area of suspected high I/I by City staff, the source of which has not been determined.

7.3.14 Project Area 14, 6th and 7th St., C to E St.

Work in this area would include bursting the existing 4-inch pipes. This area has a high footage of pipe for relatively few septic tanks.

7.3.15 Project Area 15, 5th and 6th St., D to G St. and H St.

Work would include pipe bursting the 4-inch mainlines. The area has a high footage of main line for relatively fewer septic tanks, resulting in a high cost to convert.

7.3.16 Project Area 16, 5th and 6th St., G to K St. and H St.

Conversion of this area would require replacing the 4-inch lines all the way down to E St. and the Highway. The area has a high footage of main line for relatively fewer septic tanks, resulting in a high cost to convert. With additional survey information, the feasibility of connecting H St. above 6th St. to the end (20 tanks) of the 8-inch line by I St. on 6th St. could be evaluated.

7.3.17 Project Area 17, Pixie Park Pump Station Basin

Conversion of this area would include the bursting of the 4-inch mains and installation of five new grinder pumps and pumping chambers to replace the effluent pumps that are unsuitable for the solids in raw sewage. One existing private grinder pump and three existing City owned grinder pumps are assumed suitable to pump raw sewage up to the main and will just require abandonment of the septic tank.

7.3.18 Project Area 18, 1st St., K-L St.

This area is served by individual septic tank effluent pumps that feed into a shared 2-inch forcemain on 3rd St. and one residence on the corner of J St. and 1st St. that pumps to an 8-inch gravity main. To convert this area to direct flow, all the pumps in this area would need to be replaced with solids handling raw sewage grinder pumps.

7.3.19 Project Area 19, 3rd and 4th St., I-L St.

Conversion of this area would include the bursting of the 4-inch pipes. There are six private grinder pumps in this area located along 3rd St., but since they pump up to the septic tank, all that would be needed is to bypass the septic tank and connect to the new main. Also, in this area are seven septic tank effluent pumps that would need to be replaced with solids handling grinder pumps to abandon the septic tanks.

7.3.20 Project Area 20, 4th St., St. L-M St.

Conversion of this area would include bursting the existing 4-inch pipes including those that are currently receiving direct flow on 3rd St. There is one grinder pump system in this area that would just require abandonment and bypassing of the septic tank.

Section 8: General Recommendations

8.1 Construction of a New Treatment Plant

A simple cost analysis of building a wastewater treatment plant was conducted as part of this study. A new treatment plant would cost between 6 and 10 million dollars (M) to construct including permitting to get a new National Pollution Discharge Elimination System (NPDES) for the Columbia River, land acquisition, and engineering. Assuming a construction cost of $8 M and annual operation and maintenance and labor costs are each 2% of the capital cost, this results in an annual expense of $352,000 with a 10% contingency and a net present worth of $13.7 M. It should be noted that there is an inherent assumption that a new NPDES discharge permit could be obtained in the Columbia River, but that we have had no discussions with any regulatory agencies at this time. An interest rate of 3% is assumed. Comparing this to the cost of paying the City of St. Helens, using a rate of $1.57/100 cubic ft and an average of 47.3 million gallons per year over the 20-year planning period, results in an annual cost of $109,122 and a total net present worth of $1.6 M. Although many assumptions are included in this analysis, it shows that, assuming that St. Helens sewer rates are reasonable, the City should not consider building its own wastewater treatment plant. Table 8-1 presents the financial breakdown.

Table 8-1: Cost Analysis of Building a New Wastewater Treatment Facility

		WWTP		St. Helens
Annual Operations and Maintenance / St. Helen's Charges	$	160,000	$	99,202
Annual Labor Costs	$	160,000		
Contingency 10%	$	32,000	$	9,920
Total Annual Cost	**$**	**352,000**	**$**	**109,122**
20 Year NPW i=3%	**$**	**5,237,000**	**$**	**1,623,000**
Capital Cost	$	8,000,000		
Total Net Present Worth	$	13,237,000	$	1,623,000

8.2 New Developments

It is recommended that new developments be direct flow systems where possible or reasonably feasible to minimize the number of septic tanks. At a minimum, the interior infrastructure of any new subdivision should be designed to accommodate direct flow raw sewage.

The addition of a large sewage producing industry will require looking carefully at the capacities presented in this report for the gravity sewer lines as well as the capacity of the RCE pump station and forcemain. It is assumed that if system capacity improvements are needed, they will be paid for and completed by the developer.

Shared connections should be avoided unless the shared piping is owned and maintained by the City.

8.3 Maintenance

It is recommended that the City continue to video inspect sewer lines on a regular basis such as once every 10 years, especially in areas that are suspect for I/I. As defects are noted, the video inspection frequency should increase to monitor conditions and determine when rehabilitation or repair is required. During rain events, it is suggested that City staff visually check flows in different areas of town to identify future areas of I/I.

Smoke testing should be conducted about every 10 years to check for illicit storm drain connections.

Pigging of the forcemains is also recommended and should be conducted at least once every five years.

As a priority, replacing leaking and deteriorating septic tanks should be removed or replaced before they impact the surrounding ground.

Additional work to identify sources of I/I occurring between the sepcitce tank and the homes or business is also recommended.

Section 9: Capital Improvement Projects

9.1 CIP Projects

A descriptive breakdown of each CIP project is presented below, and a summary of the CIP projects is shown in Table 9-1. Itemized project cost estimates and quantities are included in the appendices.

It is assumed that the improvements shown on Figure 7-1 that are needed to serve future developments will, for the most part, be done by developers so these projects are not included in the City's CIP Plan. The exception to this is the E St. Sewer Project discussed below.

All costs presented assume work is to be done by a contractor with prevailing wages with plans and specifications prepared by an engineer. Costs are in 2012 dollars and reflect a planning level of accuracy (e.g., -30% to +50%).

9.1.1 RCE Pump Station Upgrade

As presented above, the RCE pump station needs additional firm capacity of 110 gpm to serve current and future needs. An upgrade of the pumps from 25 hp to 35 hp as well as associated electrical improvements to accommodate the additional horsepower would be needed. It is assumed that the current wet well and the chemical injection system would not need to be replaced. If pumping capacity needs to be greater than 282 gpm required, such as might come from new industrial developments, then 685 ft. of the 4-inch diameter portion of the forcemain should be replaced with a 5 or 6-inch inside diameter pipe. The recommended capacity upgrade to 282 gpm happens to coincide with the DEQ recommended upper velocity limit of 7 fps for forcemains. An overflow alarm also needs to be installed.

The existing and future needs percentages shown in the CIP summary table for this project are based on the respective percentages of the required increase in capacity.

9.1.2 Telemetry

A cellular and internet based system is recommended for each of the four pump stations. The cellular systems can be installed at a fraction of the price as traditional radio based systems. The recording of data such as flow rates, pump run times, as well as alarms, and call outs can all be monitored and the data accessed on any computer connected to the internet. Simple controls can also be conducted remotely, often preventing unneeded trips to the pump station when an alarm goes off. The ability to store daily data can provide City staff and engineers with more valuable data than the current system of physically going to each site and manually recording data every few days. This project would consist of installing a remote telemetry unit (RTU), a transmitter, and depth sensors at each pump station. Depending on options selected, there is an annual fee of approximately $1,600 to $2,800 for the service. The more expensive option provides real time data, whereas the less expensive options only provide data at set intervals such as once per day. The real time data option is recommended so operators can immediately know what the situation is when an alarm is signaled.

9.1.3 Manhole Lining

This project would consist of lining approximately 25 manholes to reduce infiltration in the southwest area of town in the K-St. pump station basin. The as-builts for this area are highly unreliable with regard to manhole depths. The depths of each manhole will need to be measured during design to refine the cost estimate included in this report since manhole lining costs are established on a vertical linear foot basis. The project would consist of lining the inside of the manholes with an epoxy type grout. No earthwork will be needed.

9.1.4 I/I Spot Repairs

This project is aimed at reducing I/I by performing spot repairs of the 19 locations identified by the video inspection of the gravity collection system.

9.1.5 Future E St. Sewer Line

As discussed in section 6.5.2, a sewer line down E St. from 6th St. to the existing sewer west of Highway 30 could be built to provide direct flow capabilities for servicing the vacant lands identified on Figure 7-1 as the West Area. Assuming that 25 of the 33 homes in this area would be served by this line, the payback period of avoiding the O&M costs of septic tanks would be about 10 years. Since this project would serve future uses, it would be eligible for SDC funding. This CIP project would consist of installing 750 feet of 8-inch sewer and two manholes.

9.1.6 Septic Tank Abandonment

The septic tank abandonment project areas were combined into three categories based on estimated economic payback period. The City may choose to start with the areas with the lowest payback period and proceed to those with a longer payback period. This would facilitate gaining experience and refining cost estimating as we progress towards the more marginal areas. Individual project descriptions are included in Section 7. Areas having over a 20 year payback period are not included in the CIP.

9.1.7 Replace Steel Tanks

Replacing the steel tanks should be done as soon as funding is available. The number of tanks to be replaced will be contingent upon the number of tanks the City chooses to abandon in the septic tank abandonment project. the CIP budget is only for replacing 16 steel tanks that are in septic tank abandonment areas with over a 20 year payback period.

Table 9-1: Capital Improvement Plan

Project	Schedule (Fiscal Years)	Total Project Cost	Existing Needs		Future Need	
			%	Cost	%	Cost
RCE Pump Station Upgrade	2014-2019	$ 113,000	80%	$ 90,400	20%	$ 22,600
Telemetry System	2014-2019	$ 23,000	100	$ 23,000		
Manhole Lining	2014-2019	$ 58,000	100	$ 58,000		
I/I Reduction Spot Repairs	2014-2019	$ 26,000	100	$ 26,000		
E St. Sewer Line	Pending Development	$ 110,000	0	$ -	100%	$ 110,000
Replace Steel Tanks	2014-2019	$ 67,200	100	$ 67,200		
Septic Tank Abandonment 0-10 Year Payback	2014-2024	$ 501,000	100%	$ 501,000		
Septic Tank Abandonment 11-20 Year Payback	2014-2034	$ 1,031,000	100%	$ 1,031,000		
Septic Tank Abandonment 20+ Year Payback	Not included (Project cost of $1,577,000					
Total		**$1,929,200**		**$1,796,600**		**$ 132,600**

Section 10: Funding

This section summarizes the City's available options for financing the CIP. A more detailed Financial Plan including a Wastewater Rate and SDC Study will be completed by the City immediately after completion of this wastewater Facility Plan; therefore, a user rate impact analysis is not included in the study. One note is that funding for conversion of areas to get rid of septic tanks may rate lower in some funding sources than communities with higher needs.

10.1 Existing City of Columbia City Wastewater Rates and SDCs

There are two basic revenue streams used by communities to pay for wastewater system upgrades:

- Monthly wastewater utility usage fees
- Wastewater system development charges (SDCs).

10.1.1 Columbia City Monthly Wastewater Utility Rates

The City's current monthly minimum wastewater utility rate is $34.50 per household connection. It is anticipated that much of the recommended WWTP upgrades will be financed through grants or loans backed by wastewater rate increases.

10.1.2 Columbia City Wastewater SDC

System development charges (SDCs) are connection fees for new connections levied by cities to offset the costs for serving growth in a community. Wastewater SDCs in Oregon range from no charge to as high as $12,000 per residential connection, with a median wastewater SDC of approximately $4,000 per residential connection.

The City intends to update its SDCs utilizing information included in this Facility Plan. The City's current total sanitary sewer SDC for a typical residential connection is $3,492 which is composed of $1,869 for the City of St. Helens SDC and a Columbia City portion of $1,623 that includes a reimbursement fee of $951 and an improvement fee of $391. The St. Helens SDC is currently set at 50% of regular rates during calendar year 2012 in an effort to stimulate growth. The regular St. Helens SDC rate is $3738, which would bring Columbia City's total combined rate up to $5,361.

The actual amount of the SDC must be supported by actual costs attributable to growth and should also include an estimate of commercial and industrial connections over the planning horizon, in addition to residential growth. Funds collected by SDC may only be used for growth related projects such as increasing capacity to accommodate additional connections.

10.2 Preliminary Funding Options

Preliminary options available to the City for funding the Recommended Plan include:

- General Obligation Bonds
- Revenue Bonds
- Federal Appropriations (Earmarks)
- State and Federal Programs.

Loans would be repaid with City revenues collected through wastewater utility rates, SDCs, or property taxes, depending on the funding option or through a combination of options selected by the City. Grants available from some State and Federal programs would not be repaid, but may have other requirements that the City would need to comply with for eligibility.

10.2.1 General Obligation Bonds

Oregon communities have taxing authority, which allows projects to be funded through General Obligation (GO) Bonds. Security for GO Bonds approved by a public vote is provided by the full faith and authority of the taxing entity. A city utilizing GO bonds may collect funds to make annual payments of principal and interest solely from taxes, solely from user fees, or from a combination of taxes and user fees. Since GO Bonds are backed by the power of ad valorem taxation, they inherently present less risk and offer more favorable interest rates. GO bonds issued by cities in Oregon enjoy good competition at public sale, obtaining a favorable interest rate because of their high degree of security, tax-exempt status, and history in the marketplace.

No limitation is placed on the amount of GO Bonds a city may issue. Generally speaking, the financial capability of the residents in a community limits funding authority for GO bonds to 30% of the city's true cash value. Oregon Revised Statutes limit the maximum term of GO bonds to 40 years, but many communities elect to limit the term of approved GO bonds to approximately 25 to 30 years to obtain the most favorable terms and interest rates.

10.2.2 Wastewater Revenue Bonds

Revenue bonds are backed by user fees, rather than by property taxes as in the case of GO bonds. For wastewater revenue bonds, the user fee is monthly wastewater utility rates. Unlike a GO bond, no funds levied from taxes can be used to make annual payments of principal and interest. While revenue bonds do lack the security of taxation provided by voter-approved GO bonds, they are backed by rate increases and, potentially, SDCs that are typically a very stable investment. As such, terms and interest rates for typical revenue bonds are just slightly higher than GO bonds. The stability and financial performance history of a community are key to providing an assurance of repayment for revenue bonds.

10.3 Federal Appropriations (Earmarks)

Federal appropriations or “earmarks” are funds designated for a specific project or community in an approved piece of federal legislation. Earmarks are acquired through lobbying and are not constrained by population, income, or need. In order to obtain the funding, a City typically hires a lobbyist to work with Oregon’s Federal delegation as well as others in Washington D.C. There is no guarantee that funds would be obtained by the City, but if successful, the earmark funds would likely be available without additional requirements and could be spread out over several years.

Earmarks are virtually impossible to get these days, and the kind of improvements that Columbia City needs are very unlikely to be funded by this mechanism.

10.4 State and Federal Programs

There are three state and federal agencies that administer five funding programs for wastewater improvement projects in Oregon. These include Clean Water State Revolving Fund (CWSRF), United States Department of Agriculture Rural Utilities Service (USDA-RUS), Business Oregon Infrastructure Finance Authority (BO-IFA), and Oregon Energy Trust (OET). Funding programs are the standard programs outlined for all communities in Oregon. Other region-specific funding programs and financing options may be available.

10.4.1 Oregon Clean Water State Revolving Fund

Oregon's CWSRF program is administered by DEQ, providing long-term low-interest loans for planning, design, and construction of water pollution control facilities like the Columbia City WWTP. The program is focused on providing funding for projects to communities with wastewater facilities that have NPDES Permits for surface water discharges to Waters of the United States. Any public agency within the state is eligible for a CWSRF loan provided that agency is publicly owned. Applicants are prioritized in terms of relative project need during a pre-application process.

CWSRF Planning Loans are repaid over five years at an annual interest rate of 1.10% with no annual fee. CWSRF Design and Construction Loans can be repaid over 5, 10, 15, or 20 years. Most communities elect a 20-year repayment period, for which the annual interest rate is 2.85% with an annual fee of 0.50% (3.35% total annual interest rate).

More information on the DEQ CWSRF loan program is available at:

Oregon Department of Environmental Quality
811 SW Sixth Avenue
Portland, OR 97204-1390
http://www.deq.state.or.us/wq/wqgrant/wqgrant.htm

10.4.2 USDA Rural Utilities Services

USDA-RUS provides water and waste disposal loans and grants to rural municipalities, counties, special districts, Indian tribes, and non-profit organizations to construct, enlarge, or modify water treatment and distribution systems and wastewater collection and treatment systems. Preference is given to projects in low-income communities with populations below 10,000. Grant and loan assistance is based on a tiered schedule, with the loan rate calculated using the percent of the median household income (MHI). Lowest loan rates require that the City MHI be less than 80% of Oregon MHI. Eligibility for grants is also based on the user rate, which must fall within a "similar system cost" for communities served by the program that have completed improvements – currently about $45 per month.

Information on USDA-RUS loan and grant programs is available at:

Oregon Rural Development
Water and Environmental Programs
101 SW Main, Suite 1410
Portland, OR 97204-3222
http://www.usda.gov/rus/water/programs.htm

10.4.3 Business Oregon -Infrastructure Finance Authority

Business Oregon-Infrastructure Finance Authority (BO-IFA) offers a number of funding programs including the Community Development Block Grant, Special Public Works Fund, and the Water/Wastewater Financing Program.

More information on BO-IFA programs is available at:

Business Oregon-Infrastructure Finance Authority
775 Summer St., NE
Suite 200
Salem, OR 97301-1280
http://www.econ.state.or.us/index.htm

10.4.3.1 Community Development Block Grant Program

The rules of the program are established by the U.S. Department of Housing and Urban Development (HUD) and include compliance with Davis-Bacon Wage Rates. Federal eligibility standards are also established for implementation by BO-IFA. These standards take the form of "national policy objectives," such as assisting low- and moderate-income families, prevention or elimination of slums and blight, etc. To meet the national policy objective for low and moderate income, 51% of the people served by the project must fall in this income range. According to the 2006-2010 American Community Survey, Columbia City reportedly has a MHI is $63,723 and 25.8% of the population is low/moderate income.

Community Development Block Grants (CDBGs) of up to $750,000 are available for planning, design, and construction of wastewater system improvements. An eligible project must demonstrate need by achieving compliance with the Safe Drinking Water Act, the Clean Water Act, and/or compliance requirements established by the Oregon Health Department or DEQ.

10.4.3.2 Special Public Works Fund

The Special Public Works Fund (SPWF) program was created in 1985 by the Oregon State Legislature. It is capitalized through the issuance of state revenue bonds and through Oregon State lottery proceeds. The SPWF is intended to promote the creation of jobs for Oregonians. Loans and grants are issued through this program to facilitate the construction of public infrastructure to support industrial/manufacturing and eligible commercial development. Eligible commercial development is defined as activity that is marketed nationally or internationally and attracts business from outside of Oregon.

The program is open to municipalities as described in the SPWF *Applicant's Handbook* and generally includes cities, counties, water supply districts, water and wastewater authorities, sanitary districts, port authorities, water control districts, county service districts, and tribal councils of Indian tribes. It does not appear that the Columbia City WWTP expansion would be eligible for funding under this program, because the upgrade would not bring new industries or jobs to the City.

10.4.3.3 Water/Wastewater Financing Program

The Water/Wastewater Financing Program was created by the Oregon State Legislature in 1993. It is capitalized via the sale of state revenue bonds and a portion of Oregon's State lottery proceeds. The primary purpose of the program is to provide financing for the construction of public infrastructure required to ensure compliance with the Safe Drinking Water Act or the Clean Water Act. Specifically, it is intended to assist local governments facing state and federal mandates pertaining to public drinking water systems and wastewater systems.

The program is available to cities, counties, water supply districts, water and wastewater authorities, sanitary districts, port authorities, water control districts, county service districts, and tribal councils of Indian tribes. Funding levels awarded to qualified applicants are determined by a financial analysis based on demonstrated need and an inability to afford additional loans. Communities exhibiting low and moderate income receive priority. The maximum grant from this program is approximately $500,000; the maximum available loan amount is $10 M.

10.4.4 Summary of Loan and Grant Programs

Table 10-1 contains a summary of the City's eligibility for loan and grant programs based on conversations with the above-listed contacts.

Table 10-1: Preliminary Funding Eligibility Summary

Program	Eligibility
Oregon Department of Environmental Quality (DEQ)	
Clean Water State Revolving Fund	**Eligibility: Yes - Loans Only**.
U.S. Department of Agriculture Rural Utilities Services (USDA-RUS)	
Water and Waste Disposal Loans and Grants:	**Eligibility: Loans - Uncertain; Grants - Uncertain**. While meeting the upper population limit of 10,000 residents, it is reported by City Staff to not be eligible due to too high of MHI. Interest rates are determined by MHI.
Business Oregon-Infrastructure Finance Authority	
Community Development Block Grant Program	**Eligibility: No**. Columbia City reportedly has a MHI of $63,723 and 25.8% of the population is low/moderate income
Special Public Works Fund	**Eligibility: Unlikely**. Funding of projects is linked to creation of jobs in the private sector. Wastewater improvements are not typically eligible for this type of funding unless they provide for private sector business growth.
Water/Wastewater Financing Program	**Eligibility: Loans - Yes; Grants - Uncertain**. User rates on the order of $45/mo are required before the City would be eligible for grant funding. Evaluate after completion of the User Rate Study.

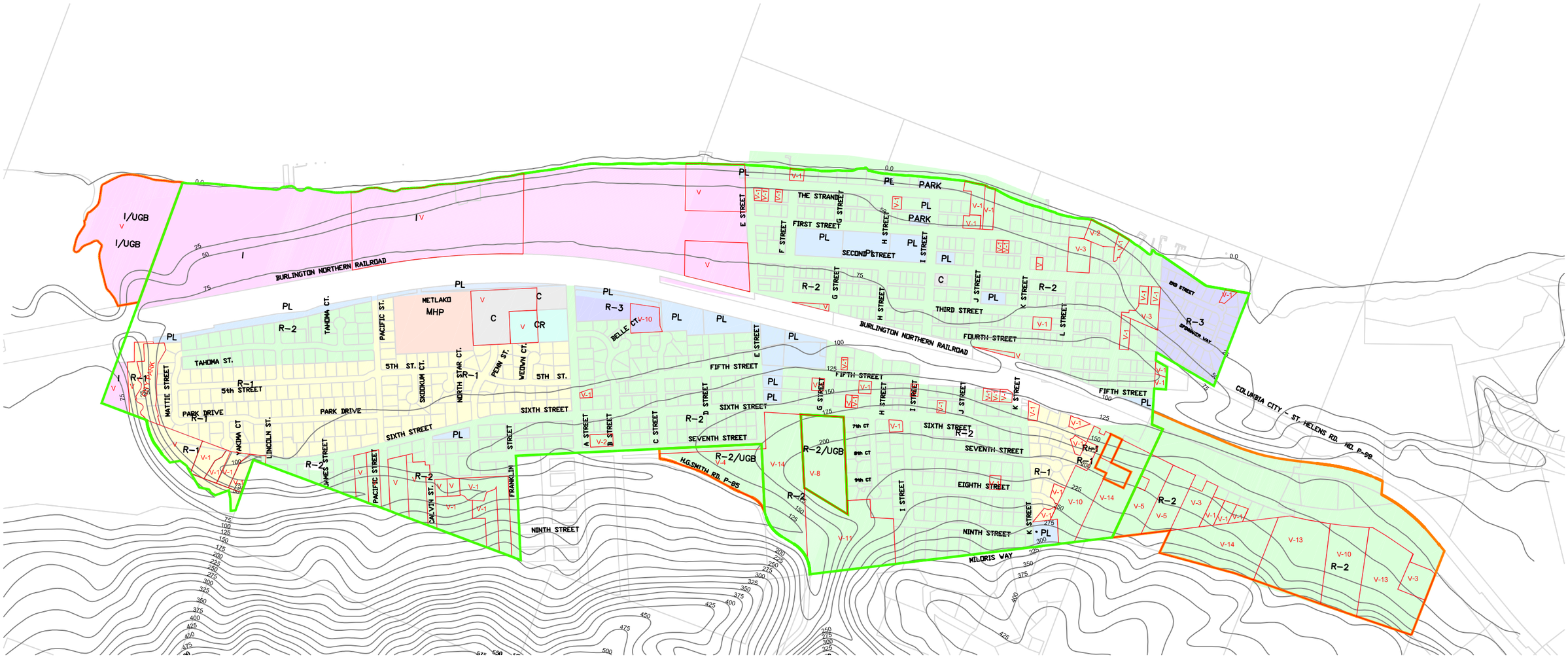
10.5 Preliminary Financial Plan & Next Steps

The following next steps are recommended to finalize the project financial plan for recommended collections system upgrades:

- Set up and attend a “one stop” meeting of funding agencies, which is typically held at the Oregon Division of State Lands headquarters in Salem

- Complete a Wastewater Utility Rate Study to establish anticipated wastewater rates for Phases 1 and 2, and develop a Wastewater Utility System Development Charge.

Figures



LEGEND

CITY OF COLUMBIA CITY LIMITS			500.87 ACRES
URBAN GROWTH BOUNDARY (UGB)			584.59 ACRES
25 FT ELEVATION CONTOURS			
(R-1)	SINGLE-FAMILY RESIDENTIAL	NEWER PLATTED AREAS	67.5 ACRES
(R-2)	GENERAL RESIDENTIAL	DUPLEX/SFD	298.49 ACRES
(R-3)	MULTI-FAMILY RESIDENTIAL	3-10 DU/AC	14.05 ACRES
(MHP)	MANUFACTURED HOME PARK	MANUFACTURED HOMES ONLY	6.77 ACRES
(C)	COMMERCIAL	RETAIL/SERVICES (BUSINESS)	5.19 ACRES
(CR)	COMMERCIAL RECREATION	COLUMBIA RIVER ATHLETIC CLUB	2.81 ACRES
(I)	INDUSTRIAL	"OLD MILL SITE"	101.80 ACRES
(PARK) (PL)	PUBLIC LANDS, PARK		21.96 ACRES

NOTE:

THIS MAPPING IS BASED ON ELECTRONIC FILE INFORMATION PROVIDED BY COLUMBIA CITY AND HAS BEEN MODIFIED BY KENNEDY/JENKS CONSULTANTS

AREA:

V-1 BUILDABLE LAND

DESIGNATES POTENTIAL NUMBER OF BUILDABLE LOTS

0 400 800

APPROXIMATE SCALE IN FEET

N

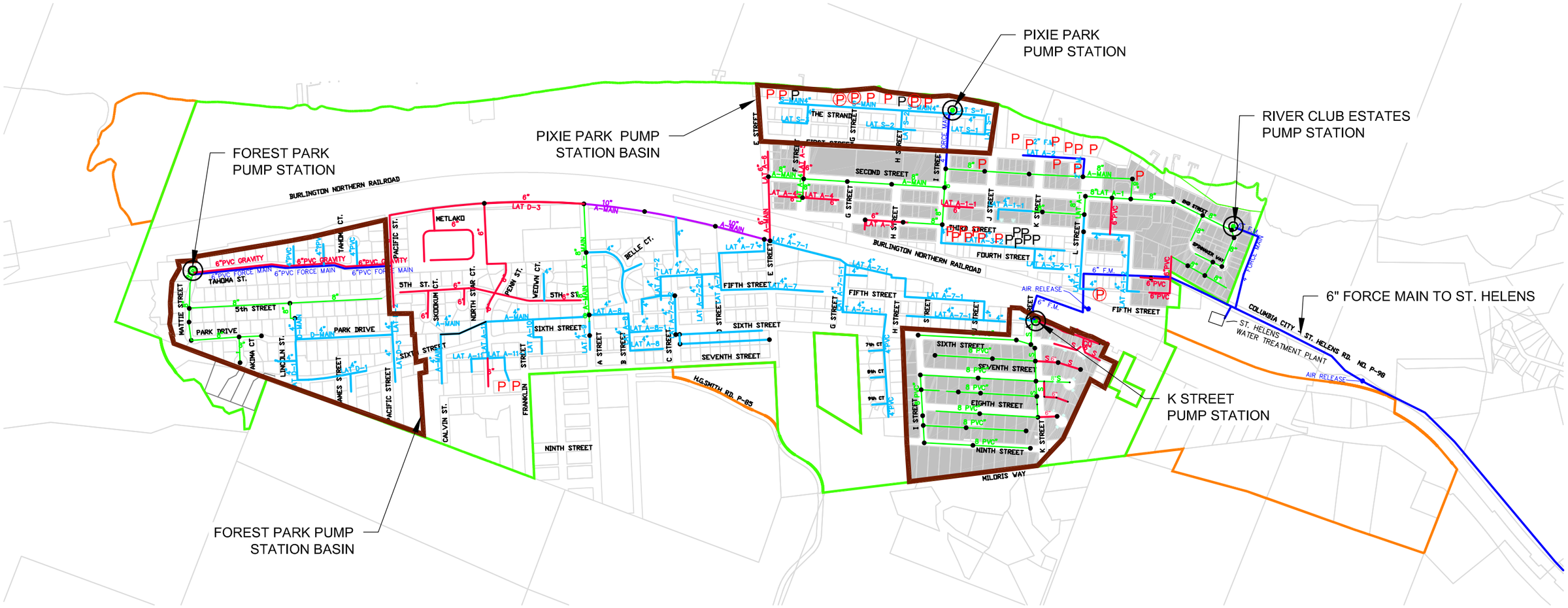
Kennedy/Jenks Consultants

CITY OF COLUMBIA CITY
COLUMBIA CITY, OREGON
WASTEWATER FACILITIES PLAN

SERVICE AREA AND ZONING WITH BUILDABLE LAND DESIGNATION

1091029.00
NOVEMBER 2012

FIGURE 2-1



LEGEND

EXISTING SANITARY SEWER	LAT A–8
EXISTING PUMP STATION	◎
DIRECT FLOW	
CITY SEPTIC TANK EFFLUENT PUMP	P
PRIVATE SEPTIC TANK EFFLUENT PUMP	P
PUMP STATION BASIN BOUNDARY	
CITY OF COLUMBIA CITY LIMITS	500.87 ACRES
URBAN GROWTH BOUNDARY (UGB)	584.59 ACRES

NOTE:

THIS MAPPING IS BASED ON ELECTRONIC FILE INFORMATION PROVIDED BY COLUMBIA CITY AND HAS BEEN MODIFIED BY KENNEDY/JENKS CONSULTANTS

EXISTING 4" SEWER	4"
EXISTING 6" SEWER	6"
EXISTING 8" SEWER	8"
EXISTING 10" SEWER	10"
EXISTING FORCE MAIN	FM

0 400 800
APPROXIMATE SCALE IN FEET

N

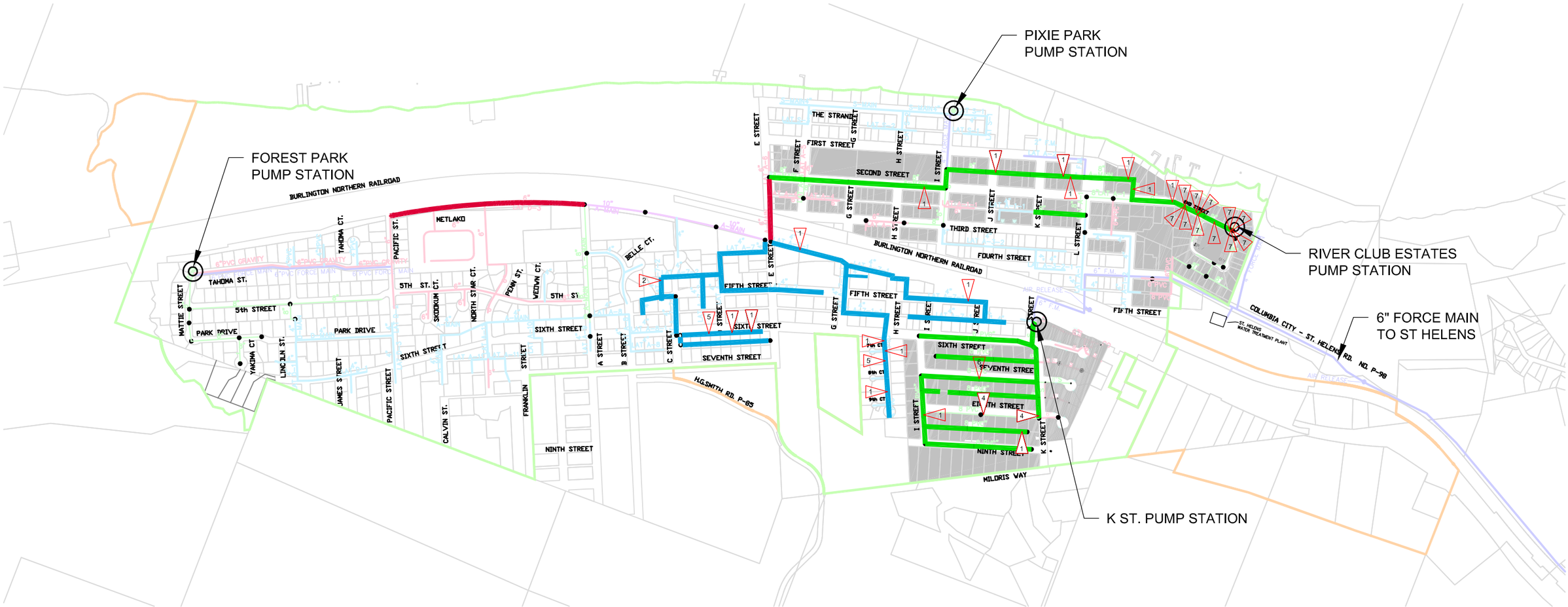
Kennedy/Jenks Consultants

CITY OF COLUMBIA CITY
COLUMBIA CITY, OREGON
WATER MASTER PLAN

EXISTING SYSTEM MAP

1091029.00
NOVEMBER 2012

FIGURE 3-1



LEGEND

EXISTING SANITARY SEWER — LAT A–8

EXISTING PUMP STATION

EXISTING MH

DIRECT FLOW

CITY OF COLUMBIA CITY LIMITS — 500.87 ACRES

URBAN GROWTH BOUNDARY (UGB) — 584.59 ACRES

DEFECTIVE SERVICE CONNECTION: LEAKS, CRACKS, JOINT OFFSETS — 1

DEBRIS — 2

SUSPECTED LATERAL INFILTRATION — 3

MAIN LINE JOINT OFFSET — 4

CRUSHED PIPE — 5

MANHOLE LEAK — 6

ROCKS IN SERVICE LATERAL — 7

EXISTING 4" SEWER — 4"

EXISTING 6" SEWER — 6"

EXISTING 8" SEWER — 8"

EXISTING 10" SEWER — 10"

EXISTING FORCE MAIN — FM

INSPECTED 4" SEWER — 4"

INSPECTED 6" SEWER — 6"

INSPECTED 8" SEWER — 8"

NOTE:

THIS MAPPING IS BASED ON ELECTRONIC FILE INFORMATION PROVIDED BY COLUMBIA CITY AND HAS BEEN MODIFIED BY KENNEDY/JENKS CONSULTANTS

0 400 800

APPROXIMATE SCALE IN FEET

N

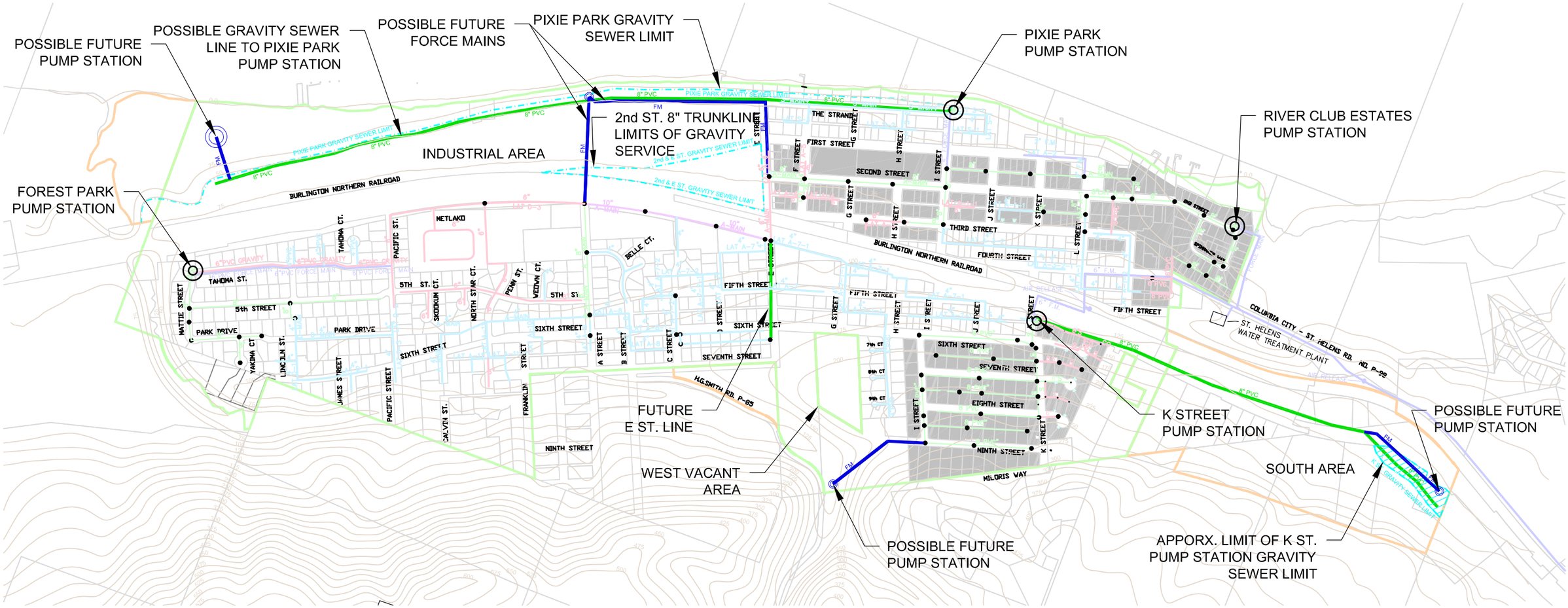
Kennedy/Jenks Consultants

CITY OF COLUMBIA CITY
COLUMBIA CITY, OREGON
WASTEWATER FACILTIES PLAN

TV PIPE INSPECTION AND DEFECTS

1091029.00
NOVEMBER 2012

FIGURE 6-1



LEGEND

EXISTING SANITARY SEWER — LAT A–8

EXISTING PUMP STATION

PROPOSED PUMP STATION

DIRECT FLOW

EXISTING 4" SEWER — 4"

EXISTING 6" SEWER — 6"

EXISTING 8" SEWER — 8"

EXISTING 10" SEWER — 10"

EXISTING FORCE MAIN — FM

EXISTING MANHOLE

PROPOSED 6" SEWER — 6"

PROPOSED 8" SEWER — 8"

PROPOSED FORCE MAIN — FM

PROPOSED GRAVITY SEWER LIMIT

CITY OF COLUMBIA CITY LIMITS — 500.87 ACRES

URBAN GROWTH BOUNDARY (UGB) — 584.59 ACRES

0 400 800

APPROXIMATE SCALE IN FEET

N

NOTE:

THIS MAPPING IS BASED ON ELECTRONIC FILE INFORMATION PROVIDED BY COLUMBIA CITY AND HAS BEEN MODIFIED BY KENNEDY/JENKS CONSULTANTS

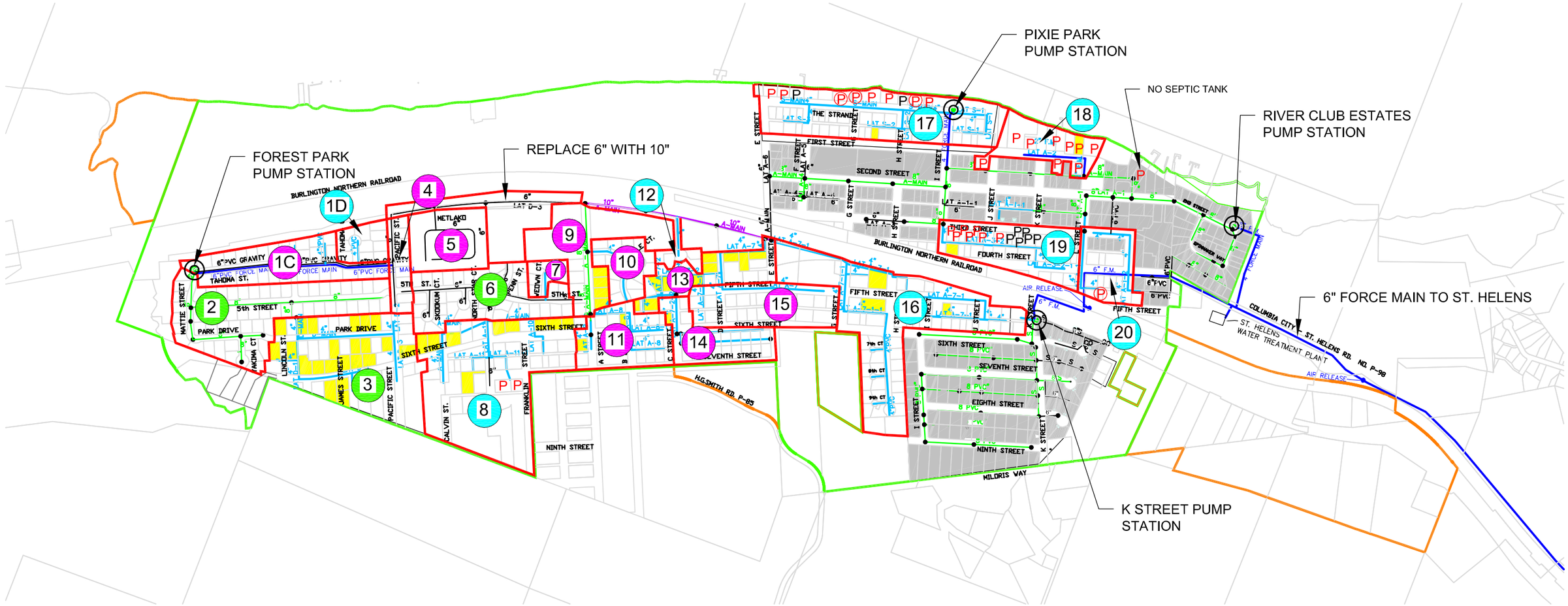
Kennedy/Jenks Consultants

CITY OF COLUMBIA CITY
COLUMBIA CITY, OREGON
WASTEWATER FACILITIES PLAN

FUTURE SYSTEM MAP

1091029.00
NOVEMBER 2012

FIGURE 6-2



LEGEND

EXISTING SANITARY SEWER — LAT A–8

EXISTING PUMP STATION

EXISTING STEEL SEPTIC TANK SYSTEMS

EXISTING DIRECT FLOW AREAS

CITY SEPTIC TANK EFFLUENT PUMP — P
CITY RAW SEWAGE GRINDER PUMP — Ⓟ
PRIVATE RAW SEWAGE GRINDER PUMP — P

PROJECT AREA NUMBER — 1

PAYBACK PERIOD (YEARS)

0–10

11–20

20+

EXISTING 4" SEWER — 4"

EXISTING 6" SEWER — 6"

EXISTING 8" SEWER — 8"

EXISTING 10" SEWER — 10"

EXISTING FORCE MAIN — FM

CITY OF COLUMBIA CITY LIMITS — 500.87 ACRES

URBAN GROWTH BOUNDARY (UGB) — 584.59 ACRES

PROJECT AREA BOUNDARY

NOTE:

THIS MAPPING IS BASED ON ELECTRONIC FILE INFORMATION PROVIDED BY COLUMBIA CITY AND HAS BEEN MODIFIED BY KENNEDY/JENKS CONSULTANTS

0 400 800

APPROXIMATE SCALE IN FEET

N

Kennedy/Jenks Consultants

CITY OF COLUMBIA CITY
COLUMBIA CITY, OREGON
WASTEWATER FACILITIES PLAN

SEPTIC TANK ABANDONMENT PROJECT AREAS

1091029.00
NOVEMBER 2012

FIGURE 7-1

Appendix A

Sewer Video Inspection Tabulation

Columbia City Wastewater Collection System Facility Plan
CCTV Summary

Legend

Defect	Description
1	Service connection problem: leaks, cracks, joint offsets
2	Debris
3	Suspected lateral infiltration
4	Main line and joint offset
5	Crushed pipe
6	MH leak
7	Rocks in service lateral

Location									
	Between								
Street	Street2	Street3	Upstream ID	Downstream ID	Cam. Start	FT	Defect	Description	Comment
HWY 30	G St	E St	CO 10	MH 30	CO 10	395.9	1	Service Top	Leak?
5th St	J St	H St	CO 16	CO 18	CO 16	139.7	1	Leak	Leak?
6th St	E St	D St	CO 21	MH 45	CO 21	90.8	1	Leak	Leak @ the joint
6th St	E St	D St	CO 21	MH 45	Co 21	247.7	1	Service Top	Leak @ up this lat
N. of C St	5th	C St E. Terminus	CO 22	CO 23	CO 22	164.2	2	Debris	Heavy muck blocking the flow of the line
H St	H St W. Terminus	7th Ct	CO 3	CO 6	CO 3	211.9	1	Service Left	Crack in this (T) @ 12:00
H St	H St W. Terminus	7th Ct	CO 3	CO 6	CO 3	461.7	5	Pipe Deflected	Crush Point 95%
H St	8th Ct	4th St	CO 6	CO 8	CO 6	1	1	Service Left	Busted 12:00?
H St	8th Ct	4th St	CO 6	CO 8	CO 6	80.2	1	Service Left	May have a crack @ 12:00

Location									
	Between								
Street	Street2	Street3	Upstream ID	Downstream ID	Cam. Start	FT	Defect	Description	Comment
6th St	D St	C St	MH 45	MH 46	MH 45	103	2	Debris	Looks like this line is blocked by rock and we can't push through past this point
8th St	I St	K St	MH 10	MH 11	MH 11	7.7	4	Joint Offset	We can't get the cam past this joint
K St	9th St	7th St	MH 11	MH 12	MH 11	6	4	Joint Offset	
7th St	I St	K St	MH 15	MH 13	MH 15	0	6	Leak	
2nd St	G St	I St	MH 34	35	MH 34	257	1	Service Right	Busted (T)
N. of 2nd St	J St	K St	MH 37	MH 38	MH 37	81	1	Service Right	Busted (T)
N. of 2nd St	K St	L St	MH 38	MH 39	MH 38	267	1	Joint Offset, Service Offset	Erik's Note: Tee
N. of 2nd St	K St	L St	MH 38	MH 39	MH 38	325.9	1	Service Right	Busted (T)
N. of 2nd St	L St	M St S. Terminus	MH 39	MH 40	MH 40	43.6	1	Service Left, Pipe Deflected	Blocking the main line & we can't get the cam past the lat/ and a bad gasket
N. of 2nd St	1st St	2nd St	MH 40	MH 41	MH 40	77	1	Joint Offset Service Right	
2nd St	M St	Spinnaker Way	MH 41	MH 42	MH 41	339	1	Service Left	Rolled gasket
2nd St	M St	Spinnaker Way	MH 42	MH 43	MH 42	86.1	7	Service Left	Rock up in this lat
2nd St	M St	Spinnaker Way	MH 42	MH 43	MH 42	91.8	7	Service Right	Rock up in this lat
2nd St	M St	Spinnaker Way	MH 42	MH 43	MH 42	96.6	7	Service Left	Rock up in this lat
2nd St	M St	Spinnaker Way	MH 42	MH 43	MH 42	196.7	7	Service Right	Rock up in this lat

Location									
	Between								
Street	Street2	Street3	Upstream ID	Downstream ID	Cam. Start	FT	Defect	Description	Comment
2nd St	M St	Spinnaker Way	MH 42	MH 43	MH 42	207.8	7	Service Left	Rock up in this lat
2nd St	M St	Spinnaker Way	MH 42	MH 43	MH 42	217.9	7	Service Left	Rock up in this lat
2nd St	Spinnaker Way N.	Spinnaker Way S.	MH 43	MH 44	MH 43	95.9	7	Service Right	Rock in this lat
2nd St	Spinnaker Way N.	Spinnaker Way S.	MH 43	MH 44	MH 43	233	7	Service Right	Rock in this lat
2nd St	Spinnaker Way N.	Spinnaker Way S.	MH 43	MH 44	MH 43	242.5	7	Service Right	Rock in this lat
2nd St	Spinnaker Way N.	Spinnaker Way S.	MH 43	MH 44	MH 43	252.6	7	Service Left	Rock in this lat
2nd St	Spinnaker Way N.	Spinnaker Way S.	MH 43	MH 44	MH 43	262.3	7	Service Left	Rock in this lat
E. of 9th St	K St	I St	MH 5	MH 6	MH 5	42.5	1	Service Left	Intrud. Tap
I St	9th St	7th St	MH 7	MH 8	MH 7	7.7	1	Service Right	Under the lat. Leak.

Appendix B

Engineer's Opinion of Probable Costs

Columbia City Collection System Facility Plan

Engineer's Opinion of Probable Cost
Project
RCE Pump Station

Non-real time option:

Item	Quantity	Units		Unit Cost		Cost
35 Hp Pumps, gudes, cables, and connections, etc.	2	EA	$	28,000.00	$	56,000
Installation and markups, 20%	1	LS	$	5,600.00	$	5,600
Electrical	1	LS	$	6,000.00	$	6,000
Overflow Alarm	1	LS	$	1,000.00	$	1,000
Contractor Mobilization, Bonds, General Requirements	10%				$	7,000
Subtotal					$	75,600
Contingency	20%				$	15,120
Subtotal					$	90,720
Engineering, Surveying, Admin	25%				$	22,680
Total					$	113,400
			USE		**$**	**113,000**

Columbia City Collection System Facility Plan

Engineer's Opinion of Probable Cost
Project:
Telemetry

Item	Quantity	Units	Unit Cost	Cost
Real time option:				
Cellular Based RTU Unit, and Transmitter	4	EA	$ 2,100.00	$ 8,400
Installation	4	EA	$ 1,000.00	$ 4,000
Depth Sensor	4	EA	$ 1,200.00	$ 4,800
Annual Fee	5	EA	$ 560.00	$ 2,800
Mobilization	0%			$ -
Subtotal				$ 20,000
Contingency	10%			$ 2,000
Subtotal				$ 22,000
Engineering, Surveying, Admin	5%			$ 1,100
Total				$ 23,100
			USE	**$ 23,000**

Non-real time option:

Item	Quantity	Units	Unit Cost	Cost
Cellular Based RTU Unit, and Transmitter	4	EA	$ 1,300.00	$ 5,200
Installation	4	EA	$ 1,000.00	$ 4,000
Depth Sensor	4	EA	$ 1,200.00	$ 4,800
Annual Fee	5	EA	$ 350.00	$ 1,750
Contractor Mobilization, Bonds, General Requirements	0%			$ -
Subtotal				$ 15,750
Contingency	10%			$ 1,575
Subtotal				$ 17,325
Engineering, Surveying, Admin	5%			$ 866
Total				$ 18,191
			USE	**$ 18,000**

Columbia City Collection System Facility Plan

Engineer's Opinion of Probable Cost
Project:
Line Manholes in the Riverwiew Estates Area

Non-real time option:

Item	Quantity	Units	Unit Cost	Cost
Line Manholes, Assumes 8 ft. average depth. $190 per vertical foot. (As-builts not useful for depths)	25	MH	$ 1,520.00	$ 38,000
Contractor Mobilization, Bonds, General Requirements	5%			$ 2,000
Subtotal				$ 40,000
Contingency	20%			$ 8,000
Subtotal				$ 48,000
Engineering, Surveying, Admin	20%			$ 9,600
Total				$ 57,600
			USE	**$ 58,000**

Columbia City Collection System Facility Plan

Engineer's Opinion of Probable Cost
Project:
I/I Spot Repairs - Correct deficiencies found during CCTV Testing.

Item	Quantity	Units	Unit Cost	Cost
19 Spot repairs, service connections, or other defects	19	EA	$ 800.00	$ 15,200
Contractor Mobilization, Bonds, General Requirements	10%			$ 2,000
Subtotal				$ 17,200
Contingency	20%			$ 3,440
Subtotal				$ 20,640
Engineering, Surveying, Admin	25%			$ 5,160
Total				$ 25,800
			USE	**$ 26,000**

Columbia City Collection System Facility Plan

Engineer's Opinion of Probable Cost
Project:
E St. Sewer Line

Item	Quantity	Units	Unit Cost	Cost	
8" Open-cut Sewerline, Paving Area	750	LF	$ 80.00	$ 60,000	
Manholes	2	EA	$ 3,200.00	$ 6,400	
Contractor Mobilization, Bonds, General Requirements	10%			$ 7,000	
Subtotal				$ 73,400	
Contingency	20%			$ 14,680	
Subtotal				$ 88,080	
Engineering, Surveying, Admin	25%			$ 22,020	
Total				$ 110,100	
			USE	**$ 110,000**	
Estimate of Number of Tanks Eliminated	25			$ 4,400	$/Tank
Credit for Not Replacing Steel Tanks	0	EA	$ 4,200.00	$ -	
				$ 110,000	
			Project Cost per Tank	**$ 4,400**	$/Tank
			Average NPW of O&M per Tank	**$ 5,478**	$/Tank
			Return on Investment	$ 12	years

Columbia City Collection System Facility Plan

Engineer's Opinion of Probable Cost
Project Area
Replace Steel Tanks
Assumes 16 tanks outside of areas to be converted to direct flow. 57 steel tanks total.

Item	Quantity	Units	Unit Cost	Cost	
Replace Steel Tanks, (City crew cost)	16	EA	$ 2,900.00	$ 46,400	
Contractor , Overhead and Profit, Mobilization, Bonds, General Requirements	15%			$ 6,960	
Subtotal				$ 53,360	
Contingency	10%			$ 5,336	
Subtotal				$ 58,696	
Engineering, Surveying, Admin	14.5%			$ 8,511	
Total				$ 67,207	
			USE	**$ 67,200**	
Total Number of Tanks Eliminated	16			$ 4,200	$/Tank
			USE	**$ 4,200**	
				$ 67,200	

Columbia City Collection System Facility Plan

Engineer's Opinion of Probable Cost
Project Area:
Replcae Existng 6-inch Pipe Along Highway Pacitic to A St.

Item	Quantity	Units	Unit Cost	Cost	
10" Open Cut Sewer line, Natural Area	1,500	LF	$ 46.00	$ 69,000	
10" Open Cut Sewer line,Paving Area, Streets and bike/Ped Path	75	LF	$ 76.00	$ 5,700	
Manholes	2	EA	$ 3,200.00	$ 6,400	
AC Bike/Ped Path Restoration	1	LS	$ 3,000.00	$ 3,000	
Contractor Mobilization, Bonds, General Requirements	10%			$ 8,000	
Subtotal				$ 92,100	
Contingency	20%			$ 18,420	
Subtotal				$ 110,520	
Engineering, Surveying, Admin	25%			$ 27,630	
Total				$ 138,150	
			USE	**$ 138,000**	
Total Number of Tanks Eliminated	214			$ 645	$/Tank
Credit for Not Replacing Steel Tanks	0	EA	$ 4,200.00	$ -	
				$ 138,000	
			Project Cost per Tank	**$ 645**	$/Tank
			Average NPW of O&M per Tank	**$ 5,478**	$/Tank

Columbia City Collection System Facility Plan

Engineer's Opinion of Probable Cost
Project Area 1A

Convert to Direct Flow, Tahoma St. and Tahoma Ct.

Item	Quantity	Units		Unit Cost		Cost	
% of Replacement of 6 Inch with 10" line along Highway	16%	LS	$	84,100.00	$	13,387	
Tahoma St.							
Abandon and Bypass Septic Tanks	39	EA	$	1,100.00	$	42,900	
Pipe Burst, 6" to 8"	1,550	LF	$	20.00	$	31,000	
Potholing Utility Crossings	2	EA	$	500.00	$	1,000	
Start Bursting Pit-Natural Area		EA	$	250.00	$	-	
Start Bursting Pit-Paving Area	3	EA	$	500.00	$	1,500	
Combination Burst/Receiving Pits Natural Area		EA	$	350.00	$	-	
Combination Burst/Receiving Pits Paving Area		EA	$	800.00	$	-	
End Receiving Pit-Natural Area		EA	$	250.00	$	-	
End Receiving Pit-Paving Area	1	EA	$	500.00	$	500	
Manholes in Bursting Pits	4	EA	$	2,400.00	$	9,600	
Cleanout in Bursting Pit		EA	$	200.00	$	-	
Service Line Connections (Includes restoration)	30	EA	$	1,100.00	$	33,000	
Regrade/replace Service Lines (Assumes 5 lines @50 ft. ea)	250	LF	$	60.00	$	15,000	
Tahoma Ct. (New Line to Pacific)							
6" Sewer Line, Open Cut (Native backfill)	330	LF	$	36.00	$	11,880	
6" Sewer Line Open Cut (Granualar backfill, paving restoraton)	230	LF	$	64.00	$	14,720	
Manholes	3	EA	$	2,800.00	$	8,400	
Abandon and Bypass Septic Tanks	9	EA	$	1,100.00	$	9,900	
Cleanout Assembly	2	EA	$	200.00	$	400	
Service Line Connections -open cut, new pipe (Includes restoration)	8	EA	$	200.00	$	1,600	
Easement	1	LS	$	3,000.00	$	3,000	
Regrade/replace Service Lines (Assumes 3 lines @100 ft. ea)	300	LF	$	60.00	$	18,000	
Contractor Mobilization, Bonds, General Requirements	10%				$	22,000	
Subtotal					$	237,787	
Contingency	20%				$	47,557	
Subtotal					$	285,345	
Engineering, Surveying, Admin	25%				$	71,336	
Total					$	356,681	
				USE	**$**	**357,000**	
Total Number of Tanks Eliminated	39				$	9,154	$/Tank
Credit for Not Replacing Steel Tanks	0	EA	$	4,200.00	$	-	
					$	357,000	
				Project Cost per Tank	**$**	**9,154**	$/Tank
				Average NPW of O&M per Tank	**$**	**5,478**	$/Tank
				Return on Investment	$	25	years

Columbia City Collection System Facility Plan

Engineer's Opinion of Probable Cost
Project Area 1B
Convert to Direct Flow, Tahoma St. only-Burst to 8"

Item	Quantity	Units	Unit Cost	Cost	
% of Replacement of 6 Inch with 10" line along Highway Tahoma St.	13%	LS	$ 84,100.00	$ 10,641	
Abandon and Bypass Septic Tanks	31	EA	$ 1,100.00	$ 34,100	
Pipe Burst, 6" to 8"	1,550	LF	$ 20.00	$ 31,000	
Potholing Utility Crossings	2	EA	$ 500.00	$ 1,000	
Start Bursting Pit-Natural Area		EA	$ 250.00	$ -	
Start Bursting Pit-Paving Area	3	EA	$ 500.00	$ 1,500	
Combination Burst/Receiving Pits Natural Area		EA	$ 350.00	$ -	
Combination Burst/Receiving Pits Paving Area		EA	$ 800.00	$ -	
End Receiving Pit-Natural Area		EA	$ 250.00	$ -	
End Receiving Pit-Paving Area	1	EA	$ 500.00	$ 500	
Manholes in Bursting Pits	4	EA	$ 2,400.00	$ 9,600	
Cleanout in Bursting Pit		EA	$ 200.00	$ -	
Service Line Connections (Includes restoration)	21	EA	$ 1,100.00	$ 23,100	
Regrade/replace Service Lines (Assumes 3 lines @50 ft. ea)	150	LF	$ 60.00	$ 9,000	
Contractor Mobilization, Bonds, General Requirements	10%			$ 12,000	
Subtotal				$ 132,441	
Contingency	20%			$ 26,488	
Subtotal				$ 158,929	
Engineering, Surveying, Admin	25%			$ 39,732	
Total				$ 198,662	
			USE	**$ 199,000**	
Total Number of Tanks Eliminated	31			$ 6,419	$/Tank
Credit for Not Replacing Steel Tanks	0	EA	$ 4,200.00	$ -	
				$ 199,000	
			Project Cost per Tank	**$ 6,419**	$/Tank
			Average NPW of O&M per Tank	**$ 5,478**	$/Tank
			Return on Investment	$ 17	years

Columbia City Collection System Facility Plan

Engineer's Opinion of Probable Cost
Project Area 1C
Convert to Direct Flow, Tahoma St. and Tahoma Ct.

Item	Quantity	Units	Unit Cost	Cost	
% of Replacement of 6 Inch with 10" line along Highway	13%	LS	$ 84,100.00	$ 10,641	
Tahoma St.					
Abandon and Bypass Septic Tanks	31	EA	$ 1,100.00	$ 34,100	
Manholes	6	EA	$ 3,200.00	$ 19,200	
Regrade/replace Service Lines (Assumes 4 lines @ 75 ft. ea)	300	LF	$ 60.00	$ 18,000	
Contractor Mobilization, Bonds, General Requirements	10%			$ 8,000	
Subtotal				$ 89,941	
Contingency	20%			$ 17,988	
Subtotal				$ 107,929	
Engineering, Surveying, Admin	25%			$ 26,982	
Total				$ 134,912	
			USE	**$ 135,000**	
Total Number of Tanks Eliminated	31			$ 4,355	$/Tank
Credit for Not Replacing Steel Tanks	0	EA	$ 4,200.00	$ -	
				$ 135,000	
			Project Cost per Tank	**$ 4,355**	$/Tank
			Average NPW of O&M per Tank	**$ 5,478**	$/Tank
			Return on Investment	$ 12	years

Columbia City Collection System Facility Plan

Engineer's Opinion of Probable Cost
Project Area 1D
Convert to Direct Flow, Tahoma Ct.

Item	Quantity	Units	Unit Cost	Cost	
% of Replacement of 6 Inch with 10" line along Highway Tahoma St.	3%	LS	$ 84,100.00	$ 2,746	
Abandon and Bypass Septic Tanks	8	EA	$ 1,100.00	$ 8,800	
Regrade/replace Service Lines (Assumes 3 lines @50 ft. ea)	150	LF	$ 60.00	$ 9,000	
Tahoma Ct. (New Line to Pacific)					
6" Sewer Line, Open Cut (Native backfill)	330	LF	$ 36.00	$ 11,880	
6" Sewer Line Open Cut (Granualar backfill, paving restoraton)	230	LF	$ 64.00	$ 14,720	
Manholes	3	EA	$ 2,800.00	$ 8,400	
Cleanout Assembly	1	EA	$ 200.00	$ 200	
Service Line Connections -open cut, new pipe (Includes restoration)	8	EA	$ 200.00	$ 1,600	
Easement	1	LS	$ 3,000.00	$ 3,000	
Regrade/replace Service Lines (Assumes 3 lines @100 ft. ea)	300	LF	$ 60.00	$ 18,000	
Contractor Mobilization, Bonds, General Requirements	10%			$ 8,000	
Subtotal				$ 86,346	
Contingency	20%			$ 17,269	
Subtotal				$ 103,615	
Engineering, Surveying, Admin	25%			$ 25,904	
Total				$ 129,519	
			USE	**$ 130,000**	
Total Number of Tanks Eliminated	8			$ 16,250	$/Tank
Credit for Not Replacing Steel Tanks	0	EA	$ 4,200.00	$ -	
				$ 130,000	
			Project Cost per Tank	**$ 16,250**	$/Tank
			Average NPW of O&M per Tank	**$ 5,478**	$/Tank
			Return on Investment	$ 44	years

Columbia City Collection System Facility Plan

Engineer's Opinion of Probable Cost
Project Area 2
Convert to Direct Flow, Matte St. and north End of 5th and Park St.

Item	Quantity	Units	Unit Cost	Cost	
% of Replacement of 6 Inch with 10" line along Highway	23%	LS	$ 84,100.00	$ 19,566	
Abandon and Bypass Septic Tanks	57	EA	$ 1,100.00	$ 62,700	
Contractor Mobilization, Bonds, General Requirements	10%			$ 6,000	
Subtotal				$ 68,700	
Contingency	20%			$ 13,740	
Subtotal				$ 82,440	
Engineering, Surveying, Admin	25%			$ 20,610	
Total				$ 103,050	
			USE	**$ 100,000**	
Total Number of Tanks Eliminated	57			$ 1,754	$/Tank
Credit for Not Replacing Steel Tanks	0	EA	$ 4,200.00	$ -	
				$ 100,000	
			Project Cost per Tank	**$ 1,754**	$/Tank
			Average NPW of O&M per Tank	**$ 5,478**	

Columbia City Collection System Facility Plan

Engineer's Opinion of Probable Cost
Project Area 3

Convert to Direct Flow, Park & 6th, Lincoln to Pacific

Item	Quantity	Units	Unit Cost	Cost	
% of Replacement of 6 Inch with 10" line along Highway	19%	LS	$ 84,100.00	$ 16,133	
Abandon and Bypass Septic Tanks	47	EA	$ 1,100.00	$ 51,700	
Park St.					
Pipe Burst, 4" to 6",	780	LF	$ 15.00	$ 11,700	
Pothole Utility Crossings	2	EA	$ 500.00	$ 1,000	
Combination Bursting Pits	2	EA	$ 800.00	$ 1,600	
Manholes in Bursting Pits	2	EA	$ 2,000.00	$ 4,000	
Service Line Connections (Includes paving restoration)	7	EA	$ 1,100.00	$ 7,700	
Line down to 5th St.					
Pipe Burst, 4" to 6"	170	LF	$ 15.00	$ 2,550	
Bursting Pit (natural area)	1	EA	$ 250.00		
Service Line Connections (In lawn)	1	EA	$ 1,000.00	$ 1,000	
Open Cut 6" Sewer Across Penn St.	45	LF	$ 64.00	$ 2,880	
Lat D-1, Park to 6th St. and along 6th St.					
Pipe Burst, 4" to 6", (Includes pits and restoration)	862	LF	$ 15.00	$ 12,930	
Combination Receiving and Bursting Pit	3	EA	$ 800.00	$ 2,400	
Pothole Utility Crossings	2	EA	$ 500.00	$ 1,000	
Manholes in Bursting Pit	3	EA	$ 2,000.00	$ 6,000	
Cleanout Assembly in Bursting Pit	1	EA	$ 200.00	$ 200	
Service Line Connections (Includes paving restoration)	8	EA	$ 1,100.00	$ 8,800	
Regrade/replace Service Lines (Assumes 5 lines @100 ft. ea)	500	LF	$ 60.00	$ 30,000	
Contractor Mobilization, Bonds, General Requirements	10%			$ 16,000	
Subtotal				$ 177,593	
Contingency	20%			$ 35,519	
Subtotal				$ 213,112	
Engineering, Surveying, Admin	25%			$ 53,278	
Total				$ 266,390	
			USE	**$ 266,000**	
Total Number of Tanks Eliminated	47			$ 5,660	$/Tank
Credit for Not Replacing Steel Tanks	21	EA	$ 4,200.00	$ 88,200	
				$ 177,800	
			Project Cost per Tank	**$ 3,783**	$/Tank
			Average NPW of O&M per Tank	**$ 5,478**	$/Tank
			Return on Investment	$ 10	years

Columbia City Collection System Facility Plan

Engineer's Opinion of Probable Cost
Project Area 4
Convert to Direct Flow, West Side Pacific St, 5th to Highway, East side

Item	Quantity	Units	Unit Cost	Cost	
% of Replacement of 6 Inch with 10" line along Highway	3%	LS	$ 84,100.00	$ 2,746	
Abandon and Bypass Septic Tanks	8	EA	$ 1,100.00	$ 8,800	
Regrade/replace Service Lines (Assumes 2 lines @100 ft. ea)	200	LF	$ 60.00	$ 12,000	
Contractor Mobilization, Bonds, General Requirements	10%			$ 2,000	
Subtotal				$ 25,546	
Contingency	20%			$ 5,109	
Subtotal				$ 30,655	
Engineering, Surveying, Admin	25%			$ 7,664	
Total				$ 38,319	
			USE	**$ 38,000**	
Total Number of Tanks Eliminated	8			$ 4,750	$/Tank
Credit for Not Replacing Steel Tanks	0	EA	$ 4,200.00	$ -	
				$ 38,000	
			Project Cost per Tank	**$ 4,750**	$/Tank
			Average NPW of O&M per Tank	**$ 5,478**	$/Tank
			Return on Investment	$ 13	years

Columbia City Collection System Facility Plan

Engineer's Opinion of Probable Cost

Project Area 5

Convert to Direct Flow, Metlako, Manufactured Home Park

Need to verify Depth and slope of pipes., Assumes mainline is 6" diameter.

Item	Quantity	Units	Unit Cost	Cost	
% of Replacement of 6 Inch with 10" line along Highway	2%	LS	$84,100.00	$ 1,373	
Manholes	4	EA	$ 2,800.00	$ 11,200	
Abandon and Bypass Septic Tanks (42 connections, 2 per tank	21	EA	$ 1,100.00	$ 23,100	
Install cleanouts at Y's on service lines	42	EA	$ 250.00	$ 10,500	
Regrade/replace Service Lines (Assumes 4 lines @40 ft. ea)	160	LF	$ 60.00	$ 9,600	
Contractor Mobilization, Bonds, General Requirements	10%			$ 6,000	
Subtotal				$ 61,773	
Contingency	20%			$ 12,355	
Subtotal				$ 74,128	
Engineering, Surveying, Admin	25%			$ 18,532	
Total				$ 92,660	
			USE	**$ 92,700**	
Total Number of Tanks Eliminated	21			$ 4,414	$/Tank
Credit for Not Replacing Steel Tanks	0	EA	$ 4,200.00	$ -	
				$ 92,700	
			Project Cost per Tank	**$ 4,414**	$/Tank
			Average NPW of O&M per Tank	**$ 5,478**	$/Tank
			Return on Investment	$ 12	years

Columbia City Collection System Facility Plan

Engineer's Opinion of Probable Cost
Project Area 6
Convert to Direct Flow, 5th St., A St. to Pacific St.

Item	Quantity	Units	Unit Cost	Cost	
% of Replacement of 6 Inch with 10" line along Highway	15%	LS	$ 84,100.00	$ 12,358	
Abandon and Bypass Septic Tanks	36	EA	$ 1,100.00	$ 39,600	
Regrade/replace Service Lines (Assumes 5 lines @100 ft. ea)	500	LF	$ 60.00	$ 30,000	
Contractor Mobilization, Bonds, General Requirements	10%			$ 8,000	
Subtotal				$ 89,958	
Contingency	20%			$ 17,992	
Subtotal				$ 107,949	
Engineering, Surveying, Admin	25%			$ 26,987	
Total				$ 134,936	
			USE	**$ 135,000**	
Total Number of Tanks Eliminated	36			$ 3,750	$/Tank
Credit for Not Replacing Steel Tanks	0	EA	$ 4,200.00	$ -	
				$ 135,000	
			Project Cost per Tank	**$ 3,750**	$/Tank
			Average NPW of O&M per Tank	**$ 5,478**	$/Tank
			Return on Investment	$ 10	years

Columbia City Collection System Facility Plan

Engineer's Opinion of Probable Cost
Project Area 7
Convert to Direct Flow, Weown Ct

Item	Quantity	Units	Unit Cost	Cost	
% of Replacement of 6 Inch with 10" line along Highway	2%	LS	$ 84,100.00	$ 2,060	
Pipe Burst, 4" to 6",	247	LF	$ 15.00	$ 3,705	
Bursting Pits	2	EA	$ 500.00	$ 1,000	
Service Line Connections, (Includes paving restoration)	6	EA	$ 1,100.00	$ 6,600	
Abandon and Bypass Septic Tanks	6	EA	$ 1,100.00	$ 6,600	
Regrade/replace Service Lines (Assumes 2 lines @50 ft. ea)	100	LF	$ 60.00	$ 6,000	
Contractor Mobilization, Bonds, General Requirements	10%			$ 3,000	
Subtotal				$ 28,965	
Contingency	20%			$ 5,793	
Subtotal				$ 34,758	
Engineering, Surveying, Admin	25%			$ 8,689	
Total				$ 43,447	
			USE	**$ 43,000**	
Total Number of Tanks Eliminated	6			$ 7,167	$/Tank
Credit for Not Replacing Steel Tanks	0	EA	$ 4,200.00	$ -	
				$ 43,000	
			Project Cost per Tank	**$ 7,167**	$/Tank
			Average NPW of O&M per Tank	**$ 5,478**	$/Tank
			Return on Investment	$ 19	years

Columbia City Collection System Facility Plan
Engineer's Opinion of Probable Cost
Project Area 8
Convert to Direct Flow,6th and 7th St., Calvin to A St.

Item	Quantity	Units	Unit Cost	Cost	
% of Replacement of 6 Inch with 10" line along Highway	13%	LS	$ 84,100.00	$ 10,641	
Abandon and Bypass Septic Tanks (One shared by 2 homes)	31	EA	$ 1,100.00	$ 34,100	
Pothole Utility Crossings	2	EA	$ 500.00	$ 1,000	
A St. to Penn St.:					
Open Cut 6" Sewer, through Lawns	840	LF	$ 46.00	$ 38,640	
Bursting Pits	2	EA	$ 500.00	$ 1,000	
Open Cut 8" sewer in A St.	60	LF	$ 69.00	$ 4,140	
Open Cut 6" sewer in Penn St.	60	LF	$ 64.00	$ 3,840	
Connections	5	EA	$ 1,100.00	$ 5,500	
MHs in Bursting Pits	2	EA	$ 2,000.00	$ 4,000	
Penn St. to Calvin					
Open Cut 6" Sewer, through Lawns	385	LF	$ 46.00	$ 17,710	
Manholes	2	EA	$ 2,800.00	$ 5,600	
Service Line Connections,	3	EA	$ 300.00	$ 900	
Calvin					
Pipe Burst, 4" to 6", (Includes pits and restoration)	394	LF	$ 15.00	$ 5,910	
Bursting Pits	2	EA	$ 500.00	$ 1,000	
Service Line Connections, Includes paving restoration)	5	EA	$ 1,100.00	$ 5,500	
Cleanout Assembly in Burstng Pit	1	EA	$ 200.00	$ 200	
Penn St.					
Pipe Burst, 4" to 6", (Includes pits and restoration)	293	LF	$ 15.00	$ 4,395	
Bursting Pits	1	EA	$ 500.00	$ 500	
Lat A-11 and A-11-1, Open cut 6" replacement	270	LF	$ 46.00	$ 12,420	
Manholes, Open Cut	2	LF	$ 2,800.00	$ 5,600	
Lat A-10, Lawns,Street, and landscaping	345	LF	$ 64.00	$ 22,080	
Manholes, Open Cut	2	EA	$ 2,000.00	$ 4,000	
Regrade/Replace Service Lines (Assumes 5 lines @100 ft. ea)	500	LF	$ 60.00	$ 30,000	
Contractor Mobilization, Bonds, General Requirements	10%			$ 22,000	
Subtotal				$ 240,676	
Contingency	20%			$ 48,135	
Subtotal				$ 288,811	
Engineering, Surveying, Admin	25%			$ 72,203	
Total				$ 361,014	
			USE	**$ 361,000**	
Total Number of Tanks Eliminated	31			$ 11,645	$/Tank
Credit for Not Replacing Steel Tanks	9	EA	$ 4,200.00	$ 37,800	
				$ 323,200	
			Project Cost per Tank	**$ 10,426**	$/Tank
			Average NPW of O&M per Tank	**$ 5,478**	$/Tank
			Return on Investment	$ 28	years

Columbia City Collection System Facility Plan

Engineer's Opinion of Probable Cost
Project Area 9
Convert to Direct Flow, A St. Highway to 6th St.

Item	Quantity	Units	Unit Cost	Cost	
Abandon and Bypass Septic Tanks	13	EA	$ 1,100.00	$ 14,300	
Regrade/replace Service Lines (Assumes 5 lines @100 ft. ea)	500	LF	$ 60.00	$ 30,000	
Contractor Mobilization, Bonds, General Requirements	10%			$ 4,000	
Subtotal				$ 48,300	
Contingency	20%			$ 9,660	
Subtotal				$ 57,960	
Engineering, Surveying, Admin	25%			$ 14,490	
Total				$ 72,450	
			USE	**$ 72,000**	
Total Number of Tanks Eliminated	13			$ 5,538	$/Tank
Credit for Not Replacing Steel Tanks	4	EA	$ 4,200.00	$ 16,800	
				$ 55,200	
			Project Cost per Tank	**$ 4,246**	$/Tank
			Average NPW of O&M per Tank	**$ 5,478**	$/Tank
			Return on Investment	$ 12	years

Columbia City Collection System Facility Plan

Engineer's Opinion of Probable Cost
Project Area 10
Convert to Direct Flow, B St. and Bell Ct.

Item	Quantity	Units	Unit Cost	Cost	
Abandon and Bypass Septic Tanks	15	EA	$ 1,100.00	$ 16,500	
B St.					
Open Cut 8" sewer in B St.	360	LF	$ 69.00	$ 24,840	
Open Cut 6" sewer in Penn St.	181	LF	$ 64.00	$ 11,584	
Service Line Connections,	7	EA	$ 300.00	$ 2,100	
MHs	2	EA	$ 2,800.00	$ 5,600	
Cleanout Assembly	1	EA	$ 200.00	$ 200	
Belle Ct.					
Open Cut 8" sewer in B St.	165	LF	$ 69.00	$ 11,385	
Manholes	0	EA	$ 2,800.00	$ -	
Service Line Connections	2	EA	$ 300.00	$ 600	
Cleanout Assembly	1	EA	$ 200.00	$ 200	
Regrade/replace Service Lines (Assumes 3 lines @100 ft. ea)	300	LF	$ 60.00	$ 18,000	
Contractor Mobilization, Bonds, General Requirements	10%			$ 9,000	
Subtotal				$ 100,009	
Contingency	20%			$ 20,002	
Subtotal				$ 120,011	
Engineering, Surveying, Admin	25%			$ 30,003	
Total				$ 150,014	
			USE	**$ 150,000**	
Total Number of Tanks Eliminated	21			$ 7,143	$/Tank
Credit for Not Replacing Steel Tanks	0	EA	$ 4,200.00	$ -	
				$ 150,000	
			Project Cost per Tank	**$ 7,143**	$/Tank
			Average NPW of O&M per Tank	**$ 5,478**	$/Tank
			Return on Investment	$ 19	years

Columbia City Collection System Facility Plan

Engineer's Opinion of Probable Cost
Project Area 11
Convert to Direct Flow,West A &B St.

Item	Quantity	Units	Unit Cost	Cost	
Abandon and Bypass Septic Tanks (3 tanks are shared by 2)	17	EA	$1,100.00	$ 18,700	
Pipe Burst, 4" to 6"	1,369	LF	$ 15.00	$ 20,533	
Start Bursting Pit-Natural Area	0	EA	$ 250.00	$ -	
Start Bursting Pit-Paving Area	0	EA	$ 500.00	$ -	
Combination Burst/Receiving Pits Natural Area	0	EA	$ 350.00	$ -	
Combination Burst/Receiving Pits Paving Area	4	EA	$ 800.00	$ 3,200	
End Receiving Pit-Natural Area	1	EA	$ 250.00	$ 250	
End Receiving Pit-Paving Area	2	EA	$ 500.00	$ 1,000	
Manholes in Bursting Pits	5	EA	$2,000.00	$ 10,000	
Cleanout in Bursting Pit	3	EA	$ 200.00	$ 600	
Service Line Connections (Includes restoration)	10	EA	$1,100.00	$ 11,000	
ıde/replace Service Lines (Assumes 2 lines @50 ft. ea)	100	LF	$ 60.00	$ 6,000	
Contractor Mobilization, Bonds, General Requirements	10%			$ 7,000	
Subtotal				$ 78,283	
Contingency	20%			$ 15,657	
Subtotal				$ 93,939	
Engineering, Surveying, Admin	25%			$ 23,485	
Total				$ 117,424	
			USE	**$ 117,000**	
Total Number of Tanks Eliminated	17			$ 6,882	$/Tank
Credit for Not Replacing Steel Tanks	2	EA	$4,200.00	$ 8,400	
				$ 108,600	
			Project Cost per Tank	**$ 6,388**	$/Tank
			Average NPW of O&M per Tank	**$ 5,478**	
			Return on Investment	$ 17	years

Columbia City Collection System Facility Plan

Engineer's Opinion of Probable Cost
Project Area 12
Convert to Direct Flow, C St.

Item	Quantity	Units	Unit Cost	Cost	
Abandon and Bypass Septic Tanks	4	EA	$ 1,100.00	$ 4,400	
Pipe Burst, 4" to 6"	298	LF	$ 15.00	$ 4,470	
Start Bursting Pit-Paving Area	1	EA	$ 250.00	$ 250	
Combination Burst/Receiving Pits Natural Area		EA	$ 350.00	$ -	
Combination Burst/Receiving Pits Paving Area		EA	$ 800.00	$ -	
End Receiving Pit-Natural Area	1	EA	$ 250.00	$ 250	
Manholes in Bursting Pits	1	EA	$ 2,000.00	$ 2,000	
Cleanout in Bursting Pit		EA	$ 200.00	$ -	
Service Line Connections (Includes restoration)	3	EA	$ 1,100.00	$ 3,300	
Regrade/replace Service Lines (Assumes 2 lines @50 ft. ea)	100	LF	$ 60.00	$ 6,000	
Contractor Mobilization, Bonds, General Requirements	10%			$ 2,000	
Subtotal				$ 22,670	
Contingency	20%			$ 4,534	
Subtotal				$ 27,204	
Engineering, Surveying, Admin	25%			$ 6,801	
Total				$ 34,005	
			USE	**$ 34,000**	
Total Number of Tanks Eliminated	4			$ 8,500	$/Tank
Credit for Not Replacing Steel Tanks	0	EA	$ 4,200.00	$ -	
				$ 34,000	
			Project Cost per Tank	**$ 8,500**	$/Tank
			Average NPW of O&M per Tank	**$ 5,478**	$/Tank
			Return on Investment	$ 23	years

Columbia City Collection System Facility Plan

Engineer's Opinion of Probable Cost
Project Area 13
Convert to Direct Flow, B to E St. Steel Tank Area

Item	Quantity	Units	Unit Cost	Cost
Abandon and Bypass Septic Tanks	19	EA	$ 1,100.00	$ 20,900
Pipe Burst, 4" to 6"	1,061	LF	$ 15.00	$ 15,915
Pipe Burst, 4" to 8" (D to C St.)	484	LF	$ 20.00	$ 9,680
Start Bursting Pit-Natural Area	1	EA	$ 250.00	$ 250
Combination Burst/Receiving Pits Natural Area	4	EA	$ 350.00	$ 1,400
Combination Burst/Receiving Pits Paving Area	2	EA	$ 800.00	$ 1,600
End Receiving Pit-Natural Area	1	EA	$ 250.00	$ 250
Manholes in Bursting Pits	6	EA	$ 2,000.00	$ 12,000
Cleanout in Bursting Pit	1	EA	$ 200.00	$ 200
Service Line Connections (Includes restoration)	11	EA	$ 1,100.00	$ 12,100
Regrade/replace Service Lines (Assumes 2 lines @50 ft. ea)	100	LF	$ 60.00	$ 6,000
Contractor Mobilization, Bonds, General Requirements	10%			$ 8,000
Subtotal				$ 88,295
Contingency	20%			$ 17,659
Subtotal				$105,954
Engineering, Surveying, Admin	25%			$ 26,489
Total				$132,443
			USE	**$132,000**
Total Number of Tanks Eliminated	19			$ 6,947
Credit for Not Replacing Steel Tanks	11	EA	$ 4,200.00	$ 46,200
				$ 85,800
			Project Cost per Tank	**$ 4,516**
			Average NPW of O&M per Tank	**$ 5,478**
			Return on Investment	$ 12

Columbia City Collection System Facility Plan

Engineer's Opinion of Probable Cost
Project Area 14
Convert to Direct Flow,7th St Area

Item	Quantity	Units	Unit Cost	Cost	
Abandon and Bypass Septic Tanks	23	EA	$ 1,100.00	$ 25,300	
Pipe Burst, 4" to 6"	1,750	LF	$ 15.00	$ 26,254	
Start Bursting Pit-Natural Area	0	EA	$ 250.00	$ -	
Start Bursting Pit-Paving Area	0	EA	$ 500.00	$ -	
Combination Burst/Receiving Pits Natural Area	0	EA	$ 350.00	$ -	
Combination Burst/Receiving Pits Paving Area	3	EA	$ 800.00	$ 2,400	
End Receiving Pit-Natural Area	1	EA	$ 250.00	$ 250	
End Receiving Pit-Paving Area	1	EA	$ 500.00	$ 500	
Manholes in Bursting Pits	4	EA	$ 2,000.00	$ 8,000	
Cleanout in Bursting Pit	2	EA	$ 200.00	$ 400	
Service Line Connections (Includes restoration)	23	EA	$ 1,100.00	$ 25,300	
Regrade/replace Service Lines (Assumes 2 lines @50 ft. ea)	100	LF	$ 60.00	$ 6,000	
Contractor Mobilization, Bonds, General Requirements	10%			$ 9,000	
Subtotal				$ 103,404	
Contingency	20%			$ 20,681	
Subtotal				$ 124,085	
Engineering, Surveying, Admin	25%			$ 31,021	
Total				$ 155,107	
			USE	**$ 155,000**	
Total Number of Tanks Eliminated	23			$ 6,739	$/Tank
Credit for Not Replacing Steel Tanks	1	EA	$ 4,200.00	$ 4,200	
				$ 150,800	
			Project Cost per Tank	**$ 6,557**	$/Tank
			Average NPW of O&M per Tank	**$ 5,478**	
			Return on Investment	$ 18	years

Columbia City Collection System Facility Plan

Engineer's Opinion of Probable Cost
Project Area 15
Convert to Direct Flow, 5th & 6th D-G St.

Item	Quantity	Units	Unit Cost	Cost	
Abandon and Bypass Septic Tanks (4 homes share one tank)	12	EA	$ 1,100.00	$ 13,200	
Pipe Burst, 4" to 6"	1,223	LF	$ 15.00	$ 18,352	
Start Bursting Pit-Natural Area	0	EA	$ 250.00	$ -	
Start Bursting Pit-Paving Area	1	EA	$ 500.00	$ 500	
Combination Burst/Receiving Pits Natural Area	1	EA	$ 350.00	$ 350	
Combination Burst/Receiving Pits Paving Area	2	EA	$ 800.00	$ 1,600	
End Receiving Pit-Natural Area	0	EA	$ 250.00	$ -	
End Receiving Pit-Paving Area	1	EA	$ 500.00	$ 500	
Manholes in Bursting Pits	2	EA	$ 2,000.00	$ 4,000	
Cleanout in Bursting Pit	2	EA	$ 200.00	$ 400	
Service Line Connections (Includes restoration)	9	EA	$ 1,100.00	$ 9,900	
Regrade/replace Service Lines (Assumes 3 lines @50 ft. ea)	150	LF	$ 60.00	$ 9,000	
Contractor Mobilization, Bonds, General Requirements	10%			$ 6,000	
Subtotal				$ 63,802	
Contingency	20%			$ 12,760	
Subtotal				$ 76,562	
Engineering, Surveying, Admin	25%			$ 19,140	
Total				$ 95,702	
			USE	**$ 96,000**	
Total Number of Tanks Eliminated	12			$ 8,000	$/Tank
Credit for Not Replacing Steel Tanks	2	EA	$ 4,200.00	$ 8,400	
				$ 87,600	
			Project Cost per Tank	**$ 7,300**	$/Tank
			Average NPW of O&M per Tank	**$ 5,478**	
			Return on Investment	$ 20	years

Columbia City Collection System Facility Plan

Engineer's Opinion of Probable Cost
Project Area 16
Convert to Direct Flow, 5th & 6th G-K St.

Item	Quantity	Units	Unit Cost	Cost	
Abandon and Bypass Septic Tanks	42	EA	$ 1,100.00	$ 46,200	
Pipe Burst, 4" to 6"	4,658	LF	$ 15.00	$ 69,864	
Start Bursting Pit-Natural Area	1	EA	$ 250.00	$ 250	
Start Bursting Pit-Paving Area		EA	$ 500.00	$ -	
Combination Burst/Receiving Pits Natural Area	7	EA	$ 350.00	$ 2,450	
Combination Burst/Receiving Pits Paving Area	6	EA	$ 800.00	$ 4,800	
End Receiving Pit-Natural Area	2	EA	$ 250.00	$ 500	
End Receiving Pit-Paving Area	1	EA	$ 500.00	$ 500	
Manholes in Bursting Pits	12	EA	$ 2,000.00	$ 24,000	
Cleanout in Bursting Pit	3	EA	$ 200.00	$ 600	
Service Line Connections (Includes restoration)	37	EA	$ 1,100.00	$ 40,700	
Regrade/replace Service Lines (Assumes 5 lines @50 ft. ea)	250	LF	$ 60.00	$ 15,000	
Contractor Mobilization, Bonds, General Requirements	10%			$ 20,000	
Subtotal				$ 224,864	
Contingency	20%			$ 44,973	
Subtotal				$ 269,836	
Engineering, Surveying, Admin	25%			$ 67,459	
Total				$ 337,296	
			USE	**$ 337,000**	
Total Number of Tanks Eliminated	42			$ 8,024	$/Tank
Credit for Not Replacing Steel Tanks	4	EA	$ 4,200.00	$ 16,800	
				$ 320,200	
			Project Cost per Tank	**$ 7,624**	$/Tank
			Average NPW of O&M per Tank	**$ 5,478**	$/Tank
			Return on Investment	$ 21	years

Columbia City Collection System Facility Plan

Engineer's Opinion of Probable Cost
Project Area 17
Convert to Direct Flow, 3rd & 4th I-L St.

Item	Quantity	Units	Unit Cost	Cost	
Abandon and Bypass Septic Tanks	34	EA	$ 1,100.00	$ 37,400	
Pipe Burst, 4" to 6"	2,856	LF	$ 15.00	$ 42,838	
Start Bursting Pit-Natural Area		EA	$ 250.00	$ -	
Start Bursting Pit-Paving Area	1	EA	$ 500.00	$ 500	
Combination Burst/Receiving Pits Natural Area	2	EA	$ 350.00	$ 700	
Combination Burst/Receiving Pits Paving Area	4	EA	$ 800.00	$ 3,200	
End Receiving Pit-Natural Area	3	EA	$ 250.00	$ 750	
End Receiving Pit-Paving Area	2	EA	$ 500.00	$ 1,000	
Manholes in Bursting Pits	7	EA	$ 2,000.00	$ 14,000	
Cleanout in Bursting Pit	5	EA	$ 200.00	$ 1,000	
Service Line Connections (Includes restoration)	34	EA	$ 1,100.00	$ 37,400	
Grinder Pump Replacment, Inlcudes New Pumping Chamber.	5	EA	$ 5,400.00	$ 27,000	
ıde/replace Service Lines (Assumes 5 lines @50 ft. ea)	250	LF	$ 60.00	$ 15,000	
Contractor Mobilization, Bonds, General Requirements	10%			$ 18,000	
Subtotal				$ 198,788	
Contingency	20%			$ 39,758	
Subtotal				$ 238,546	
Engineering, Surveying, Admin	25%			$ 59,636	
Total				$ 298,182	
			USE	**$ 298,000**	
Total Number of Tanks Eliminated	34			$ 8,765	$/Tank
Credit for Not Replacing Steel Tanks	1	EA	$ 4,200.00	$ 4,200	
				$ 293,800	
			Project Cost per Tank	**$ 8,641**	$/Tank
			Average NPW of O&M per Tank	**$ 5,478**	$/Tank
			Return on Investment	$ 23	years

Columbia City Collection System Facility Plan

Engineer's Opinion of Probable Cost
Project Area 18
Convert to Direct Flow, 1st St., K-L St.

Item	Quantity	Units	Unit Cost	Cost	
Abandon and Bypass Septic Tanks	9	EA	$ 1,100.00	$ 9,900	
Grinder Pump Replacment, Inlcudes New Pumping Chamber.	9	EA	$ 5,400.00	$ 48,600	
Contractor Mobilization, Bonds, General Requirements	10%			$ 6,000	
Subtotal				$ 64,500	
Contingency	20%			$ 12,900	
Subtotal				$ 77,400	
Engineering, Surveying, Admin	25%			$ 19,350	
Total				$ 96,750	
			USE	**$ 97,000**	
Total Number of Tanks Eliminated	9			$ 10,778	$/Tank
Credit for Not Replacing Steel Tanks	1	EA	$ 4,200.00	$ 4,200	
				$ 92,800	
			Project Cost per Tank	**$ 10,311**	$/Tank
			Average NPW of O&M per Tank	**$ 5,478**	$/Tank
			Return on Investment	$ 28	years

Columbia City Collection System Facility Plan

Engineer's Opinion of Probable Cost
Project Area 19
Convert to Direct Flow, 3rd & 4th I-L St.

Item	Quantity	Units	Unit Cost	Cost	
Abandon and Bypass Septic Tanks (1 shared)	28	EA	$ 1,100.00	$ 30,800	
Pipe Burst, 4" to 6"	1,531	LF	$ 15.00	$ 22,965	
Start Bursting Pit-Natural Area		EA	$ 250.00	$ -	
Start Bursting Pit-Paving Area	1	EA	$ 500.00	$ 500	
Combination Burst/Receiving Pits Natural Area	1	EA	$ 350.00	$ 350	
Combination Burst/Receiving Pits Paving Area	2	EA	$ 800.00	$ 1,600	
End Receiving Pit-Natural Area	1	EA	$ 250.00	$ 250	
End Receiving Pit-Paving Area	1	EA	$ 500.00	$ 500	
Manholes in Bursting Pits	3	EA	$ 2,000.00	$ 6,000	
Cleanout in Bursting Pit	2	EA	$ 200.00	$ 400	
Service Line Connections (Includes restoration)	28	EA	$ 1,100.00	$ 30,800	
Grinder Pump Replacment, Inlcudes New Pumping Chai	7	EA	$ 5,400.00	$ 37,800	
Regrade/replace Service Lines (Assumes 2 lines @50 ft. ea)	100	LF	$ 60.00	$ 6,000	
Contractor Mobilization, Bonds, General Requirements	10%			$ 14,000	
Subtotal				$ 151,965	
Contingency	20%			$ 30,393	
Subtotal				$ 182,358	
Engineering, Surveying, Admin	25%			$ 45,590	
Total				$ 227,948	
			USE	**$ 228,000**	
Total Number of Tanks Eliminated	28			$ 8,143	$/Tank
Credit for Not Replacing Steel Tanks	1	EA	$ 4,200.00	$ 4,200	
				$ 223,800	
			Project Cost per Tank	**$ 7,993**	$/Tank
			Average NPW of O&M per Tank	**$ 5,478**	$/Tank
			Return on Investment	$ 22	years

Columbia City Collection System Facility Plan

Engineer's Opinion of Probable Cost
Project Area 20
Convert to Direct Flow, 5th & 6th G-K St.

Item	Quantity	Units	Unit Cost	Cost	
Abandon and Bypass Septic Tanks (two are shared)	10	EA	$1,100.00	$ 11,000	
Pipe Burst, 4" to 6"	1,585	LF	$ 15.00	$ 23,774	
Open cut	0	LF	$3,200.00		
Start Bursting Pit-Natural Area		EA	$ 250.00	$ -	
Start Bursting Pit-Paving Area	3	EA	$ 500.00	$ 1,500	
Combination Burst/Receiving Pits Natural Area		EA	$ 350.00	$ -	
Combination Burst/Receiving Pits Paving Area	2	EA	$ 800.00	$ 1,600	
End Receiving Pit-Natural Area		EA	$ 250.00	$ -	
End Receiving Pit-Paving Area	2	EA	$ 500.00	$ 1,000	
Manholes in Bursting Pits	2	EA	$2,000.00	$ 4,000	
Cleanout in Bursting Pit	2	EA	$ 200.00	$ 400	
Service Line Connections (Includes restoration)	8	EA	$1,100.00	$ 8,800	
Regrade/replace Service Lines (Assumes 1 line @50 ft. ea)	50	LF	$ 60.00	$ 3,000	
Contractor Mobilization, Bonds, General Requirements	10%			$ 6,000	
Subtotal				$ 61,074	
Contingency	20%			$ 12,215	
Subtotal				$ 73,288	
Engineering, Surveying, Admin	25%			$ 18,322	
Total				$ 91,610	
			USE	**$ 92,000**	
Total Number of Tanks Eliminated	10			$ 9,200	$/Tank
Credit for Not Replacing Steel Tanks	0	EA	$4,200.00	$ -	
				$ 92,000	
			Project Cost per Tank	**$ 9,200**	$/Tank
			Average NPW of O&M per Tank	**$ 5,478**	$/Tank
			Return on Investment	$ 25	years

Appendix C

St. Helens Sewer Agreement

Adopted by Res 491

SEWER CONNECTION AGREEMENT

WHEREAS, Columbia City has constructed a sewer line that connects the Columbia City sewers to the St. Helens City sewers so that the sewage of Columbia City will be treated by the Primary and Secondary Treatment facilities owned by the City of St. Helens; and

WHEREAS, it is the desire of both cities to provide for a fair and equitable distribution of the cost of providing said sewers, together with the cost of maintaining the sewer lines and the treatment facilities; and

WHEREAS, the original agreement of 1979 is outdated, and needs to be revised to reflect changes; and

WHEREAS, the two cities desire to continue their relationship and modify the old agreement;

NOW THEREFORE, it is hereby mutually agreed and covenanted as follows:

1. The City of St. Helens continues permission for the City of Columbia City to connect a pressure sewer main line to the City of St. Helens main line near the Columbia County Dog Pound.

2. In consideration of such connection, Columbia City does hereby promise and agree to pay to St. Helens a Systems Development Charge; such charge to be set in accordance with ORS 223.297, et seq. The Systems Development Charge shall be paid at such times as the hookups are actually made.

3. Columbia City is allowed unlimited hookups within Columbia City and its existing Urban Growth Boundary (1991). All connections will comply with the St. Helens Pre-Treatment Ordinance and the St. Helens NPDES Permit requirements.

4. As consideration for permission to connect to the St. Helens sewer line, Columbia City does hereby promise and agree to pay to St. Helens each month, as a user charge, a sum of money for each connection in Columbia City at cost of service. St. Helens will bill Columbia City once each month for the number of residences using the sewer system. Columbia City will be responsible for individually billing each resident user within the Columbia City sewer system.

5. The sewer line between the two cities is a pressure line with pump stations. It is understood and agreed that the Columbia City shall maintain said pressure sewer main line up to the point of connection referred to in Section 1. All sewer lines located with the Columbia City Urban Growth Boundary owned by Columbia City shall be maintained by Columbia City.

6. Columbia City shall notify the City of St. Helens in writing within ten days of each new sewer connection.

7. This agreement will continue in effect during the life of the existing pressure line to St. Helens. It is the parties' intention to renegotiate this contract if and when the pressure line is increased in size.

DATED this 6th day of June, 1991.

CITY OF ST. HELENS

By: Mayor

By: City Recorder

CITY OF COLUMBIA CITY

By: Cheryl A. Young
Mayor

By: Jean M. LeMont
City Recorder

jb835

Adopted by Res #524

ADDENDUM NO. 1

Currently, the City of St. Helens and Columbia City have an agreement on sewer service, and both parties desire to make a temporary modification to that agreement in the following manner:

Whereas, Columbia City is near completion of a major construction project for new sewer lines; and

Whereas, over 300 residential hook ups will occur over a period of time, up to April 1; and

Whereas, both parties desire this to be an orderly process;

Now, therefore, both parties agree that:

1. Columbia City will pay all new system development charges, at one time, not later than April 1, 1993.

2. Columbia City will provide a list of new hook ups at the end of each month. City will add such customers, and compute sewer costs to start in the following month.

DATED this 10th day of November, 1992.

Cheryl A. Young
Mayor
City of Columbia City

Mayor
City of St. Helens

jb1803

Adopted by Res #532

ADDENDUM NO. 2

WHEREAS, Columbia City and the City of St. Helens entered into a sewer connection agreement in June, 1991; and

WHEREAS, the agreement for hookups was only for unlimited residential hookups, and not for commercial or industrial connections; and

WHEREAS, the Columbia City sewer project is nearly completed and there are small commercial businesses that desire to connect;

NOW, THEREFORE, both parties agree that:

1. Small commercial connections are allowed to be made to the Columbia City sewer system.

2. Each business upon connection will pay a monthly sewer charge that equates their usage to residential dwelling units (EDU) and be charged the wholesale residential rate.

DATED this 15th day of April, 1993.

Cheryl A. Young
Mayor
City of Columbia City

Howard L. Kallberg
Mayor
City of St. Helens

jb2035

Adopted by Res #552

SEWER CONNECTION AGREEMENT
Addendum No. 3

WHEREAS, the City of Columbia City and the City of St. Helens have most recently entered into a Sewer Connection Agreement on June 6, 1991; and

WHEREAS, Item 3 of the Sewer Connection Agreement allows Columbia City unlimited hook-ups within the City limits and Urban Growth Boundary as it existed in 1991; and

WHEREAS, the City of Columbia City has added 6.80 acres to its Urban Growth Boundary after the Sewer Connection Agreement was adopted and Columbia City would like to have the ability to provide service to the additional acreage; and

WHEREAS, it is in the best public interest and safety of both Columbia City and St. Helens to have sewer service to all lands within Urban Growth Boundaries;

NOW, THEREFORE, it is hereby mutually agreed and covenanted that Item 3 is amended to read:

> 3. Columbia City is allowed unlimited hookups within Columbia City, its existing Urban Growth Boundary (1991) and two additional properties that were added to the Urban Growth Boundary after 1991 (referred to as the Thorpe Estate and Takemoto properties off of K Street) and more precisely shown on the map marked Exhibit A and by this reference included herein.

DATED THIS 18th day of May, 1994.

CITY OF ST. HELENS

By: Donald L. Kaulberg
Mayor

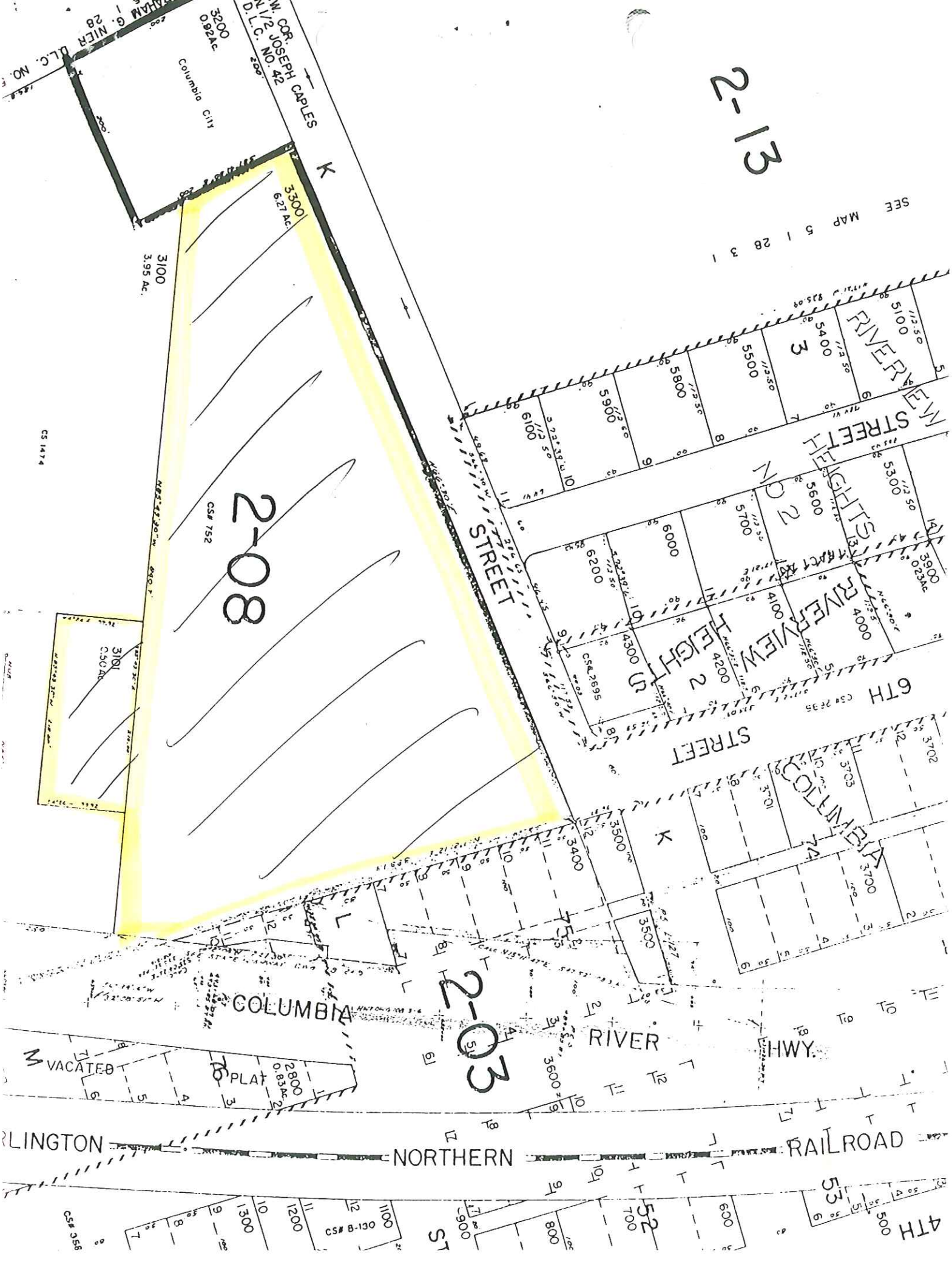
By: Roseline L. Mallory
City Recorder

CITY OF COLUMBIA CITY

By: Cheryl A. Young
Mayor

By: Jean M. LeMont
City Recorder

jb2786


2-13
SEE MAP 5 1 28 3 1
2-08
2-03
3300
6.27 Ac.
3100
3.95 Ac.
3200
0.92Ac.
3101
0.50 Ac.
Columbia City
N.W. COR. JOSEPH CAPLES D.L.C. NO. 42
N 1/2 D.L.C. NO. 42
CS# 752
CS# 1474
CS# 2695
CS# 2935
CS# B-130
CS# 358
K
L
M
N
STREET
RIVERVIEW HEIGHTS
RIVERVIEW HEIGHTS NO 2
RIVERVIEW HEIGHTS NO 3
6TH STREET
4TH ST
COLUMBIA
RIVER
HWY.
VACATED PLAT
NORTHERN
RAILROAD
3900
0.23Ac.
2800
0.83Ac.

Adopted by Res. 602

SEWER CONNECTION AGREEMENT
Addendum No. 4

WHEREAS, the City of Columbia City and the City of St. Helens have entered into a Sewer Connection Agreement on June 6, 1991; and

WHEREAS, federal law requires that St. Helens and Columbia City have the legal authority to implement the requirements of the Clean Water Act;

NOW, THEREFORE, it is hereby mutually agreed that the following is added to the Sewer Connection Agreement of 1991:

8. All connections within the jurisdicton of Columbia City will comply with the St. Helens' Pretreatment Ordinance and the City of St. Helens' NPDES permit requirements. Columbia City shall notify St. Helens of all new commercial and industrial connections, and otherwise comply with all terms and conditions of the Memorandum of Understanding.

DATED: March 20, 1997.

CITY OF ST. HELENS

By: Donald L. Lambert
Mayor

By: Brian D. Little
City Recorder

CITY OF COLUMBIA CITY

By: Cheryl A. Young
Mayor

By: Jean M Lemon
City Recorder

jb4246

MEMORANDUM OF UNDERSTANDING

1. The intent of this Memorandum of Understanding is to define the respective roles and responsibility between Columbia City and the City of St. Helens for management of Columbia City's industrial pretreatment program in coordination with the responsibilities of the City of St. Helens and its own NPDES permit.

2. The City of St. Helens operates a publicly owned treatment works which includes primary and secondary treatment. The system discharges its treated effluent into the Columbia River.

3. There are industrial dischargers into the St. Helens publicly owned treatment works. The City is required to and has obtained an NPDES permit from the State of Oregon, Department of Environmental Quality.

4. The permit requires the City to develop pretreatment regulations, which serve as the method of compliance with state and federal laws governing the discharge treated effluent into state waters.

5. One of the requirements of the City of St. Helens NPDES permit is the development of agreements with other jurisdictions which discharge effluent into the City of St. Helens publicly owned treatment works. Columbia City is such a jurisdiction.

6. Columbia City discharges its effluent through a pressurized line into the City of St. Helens POTW.

7. Columbia City lies several miles to the north of the City of St. Helens, and has a population of approximately 1,400 (1995). The city is primarily residential, with several small parcels of commercially zoned land as well as the 95-acre industrial park.

8. Columbia City represents that there is no industrial effluent discharged into its system and thereby into the St. Helens system, and all current sewer hookups are only domestic waste.

9. Columbia City and the City of St. Helens have a sewer connection agreement which in part requires all of its connections to be in compliance with the St. Helens NPDES permit (Section 8). The agreement is attached hereto and by this reference incorporated herein.

10. The agreement also requires Columbia City to notify St. Helens in writing of each new connection.

11. Columbia City agrees to notify the City of St. Helens of any existing or new connection, or change in land use designation, for any property, within its service

area which would result in a change from residential use to commercial or industrial use.

12. Columbia City agrees to notify the City of St. Helens of any new connections made in the industrial park or any connection changing any domestic waste stream to an industrial waste stream.

13. Should any change in the waste stream from domestic to industrial waste result, Columbia City and the City of St. Helens will modify this agreement to provide for accommodation between both cities to continue to allow the City of St. Helens in its administration of its federal pretreatment programs and regulations of industrial users to meet its permit.

14. St. Helens shall have responsibility for notification of commercial users of the RCRA notification requirement as set out in 40 CFR 403.12(p).

15. In the event that this modification becomes necessary, a modified MOU shall be developed and authorized prior to the issuance of a sewer connection permit for any commercial or industrial development which would result in an industrial waste stream where such connection is located within the service area of Columbia City.

16. The City of St. Helens has the right to take legal action to enforce pretreatment provisions of the City of St. Helens' sewer use ordinance or to impose and enforce pretreatment standards and requirements directly against non-compliant industrial users in Columbia City in the event Columbia City fails to notify the City of St. Helens, or is otherwise unaware of, an industrial discharge that is subject to pretreatment standards or requirements, or in the event Columbia City is otherwise unable or unwilling to take such action.

DATED:

Cheryl A. Young
Mayor
City of Columbia City

Donald L. Kawley
Mayor
City of St. Helens

SEWER CONNECTION AGREEMENT
ADDENDUM NO. 5

WHEREAS, the City of Columbia City and the City of St. Helens have entered into a Sewer Connection Agreement on June 6, 1991; and

WHEREAS, the sewage discharge from the Columbia City sanitary sewage collection system has been identified as having the potential to contain sulfides in concentration sufficient to cause damage to the City of St. Helens sanitary collection system and/or constitute a hazard to City employees or residents; and

WHEREAS, Section 5.4 of the City of St. Helens Ordinance No. 2570 specifically prohibits the discharge of pollutants into the sanitary collection system in a concentration that may damage the system or that may constitute a hazard to City employees or residents; and

WHEREAS, the sewage discharge from the Columbia City sanitary sewage collection system is accepted into the City of St. Helens sewer collection system under the specific conditions of the Sewer Connection Agreement, and as such, the Columbia City sanitary collection system must be maintained and operated in a manner providing compliance with requirements in the City of St. Helens NPDES Permit; and

WHEREAS, the pretreatment requirements and the General Conditions of the City of St. Helens NPDES Permit require timely reporting of collection system activities.

NOW, THEREFORE, it is mutually agreed that the following is added to the Sewer Connection Agreement of 1991:

9. Columbia City shall establish adequate sulfide control mechanisms to maintain the dissolved sulfide concentration in the discharge of the Columbia City sanitary sewage collection system as follows:

   Daily Maximum: 0.25 mg/L

   Calendar Monthly Average: 0.15 mg/L

   Columbia City shall provide routine monitoring of dissolved sulfide concentrations in the discharge of the sanitary sewage collection system at the following minimum frequency:

   May – October: Weekly

   November – April: Monthly

Sampling shall be conducted at the point of discharge of the Columbia City sewer system into the City of St. Helens sewer manhole on Oregon Street.

Columbia City shall notify the City of St. Helens within 24 hours of any exceedence of the dissolved sulfide limits or the failure to comply with the minimum sampling frequencies. Such notification will identify the cause of the exceedence and proposed corrective actions to be taken. Corrective actions shall include prompt additional testing as necessary to document the effectiveness of actions taken and compliance with established limits.

10. Reporting:

Wastewater Overflows:

Columbia City shall document all overflows of the sanitary sewer conveyance system and associated pump stations and provide notification to the City of St. Helens within 24 hours of becoming aware of an overflow. Unless specifically waived by the City of St. Helens a written report shall be submitted within 5 days. The written report shall contain the following information:

- A description of the overflow including volumes and its cause; and
- The duration of the overflow including exact dates and times; and
- Corrective actions taken to stop the overflow and to prevent recurrence.

Monthly Reports:

Columbia City will provide a written monthly report on a calendar basis to the City of St. Helens. The report shall be submitted on or before the 10th of the month following the report period. The report shall contain the following information:

- The report period and name and Collection Certification of the operator supervising the Columbia City collection system; and
- The dates and volumes of water use and sewer discharge for the month in both gallons and cubic feet; and
- A summary of all collection system overflows that occurred during the month; and

- Results of all sulfide testing conducted at the discharge point of the Columbia City sanitary sewer system to the St Helens system; and

- Information as to any applications for sewer connections for new industrial or commercial facilities.

The report must contain the following statement and shall be signed by an authorized representative of Columbia City meeting the signatory requirements of 40 CFR 122.22.

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

DATED: December 15, 2004

CITY OF ST. HELENS

By: Randy Peterson
Randy Peterson, Mayor

By: Brian D. Little
Brian D. Little, City Recorder

CITY OF COLUMBIA CITY

By: Cheryl A. Young
Cheryl Young, Mayor

By: Leahnette Rivers
Leahnette Rivers, City Recorder

ADDENDUM NO. 6
SEWER CONNECTION AGREEMENT

THIS AGREEMENT is made by and between the City of Columbia City and the City of St. Helens.

RECITALS

WHEREAS, the City of Columbia City and the City of St. Helens entered into a Sewer Connection Agreement dated June 6, 1991; and

WHEREAS, paragraph 3 of the Sewer Connection Agreement permits Columbia City to have unlimited hookups to the City of St. Helens sewer for those properties within the Columbia City Limits and the Columbia City Urban Growth Boundary as they existed in 1991; and

WHEREAS, following its execution, the Sewer Connection Agreement has been amended on five separate occasions, to-wit:

Addendum No. 1 dated November 10, 1992;
Addendum No. 2 dated April 15, 1993;
Addendum No. 3 dated May 18, 1994;
Addendum No. 4 dated March 20, 1997;
Addendum No. 5 dated December 15, 2004; and

WHEREAS, the City of Columbia City added 71.37 acres to its UGB expansion area in 2003 and 6.04 acres to its UGB expansion area in 2010; neither of which have been formally added to the Sewer Connection Agreement; and

WHEREAS, it is the intention of the two cities to amend the original Sewer Connection Agreement in order to include the 2003 (71.37 acres) and 2010 (6.04 acres) UGB expansion area to the property being served with sewers pursuant to the Sewer Connection Agreement.

WITNESSETH

IN CONSIDERATION of the mutual covenants hereinafter contained, it is mutually agreed as follows:

SECTION 1: Paragraph 3 of the Sewer Connection Agreement, as previously amended, is further amended to grant to the City of Columbia City unlimited sewer hookups within the 2003 UGB expansion area and the 2010 UGB expansion area as more precisely shown on the maps marked **EXHIBITS A, B, C, D, E and F**, all of which are attached hereto and by this reference incorporated herein.

SECTION 2: All of the other terms and conditions contained in the Sewer Connection Agreement, together with all amendments thereto, are hereby ratified and confirmed without any modification thereto except as contained in this Addendum No. 6.

OLSEN, HORN L.L.C.
1510 St. Helens Street, Suite B • St. Helens, Oregon 97051
Telephone: (503) 397-4222 • FAX: (503) 397-4224
E-mail: olsenhrn@opusnet.com

WHEREFORE, the parties have hereunto set their hands this 14th day of April, 2011.

CITY OF ST. HELENS

By _____
Mayor

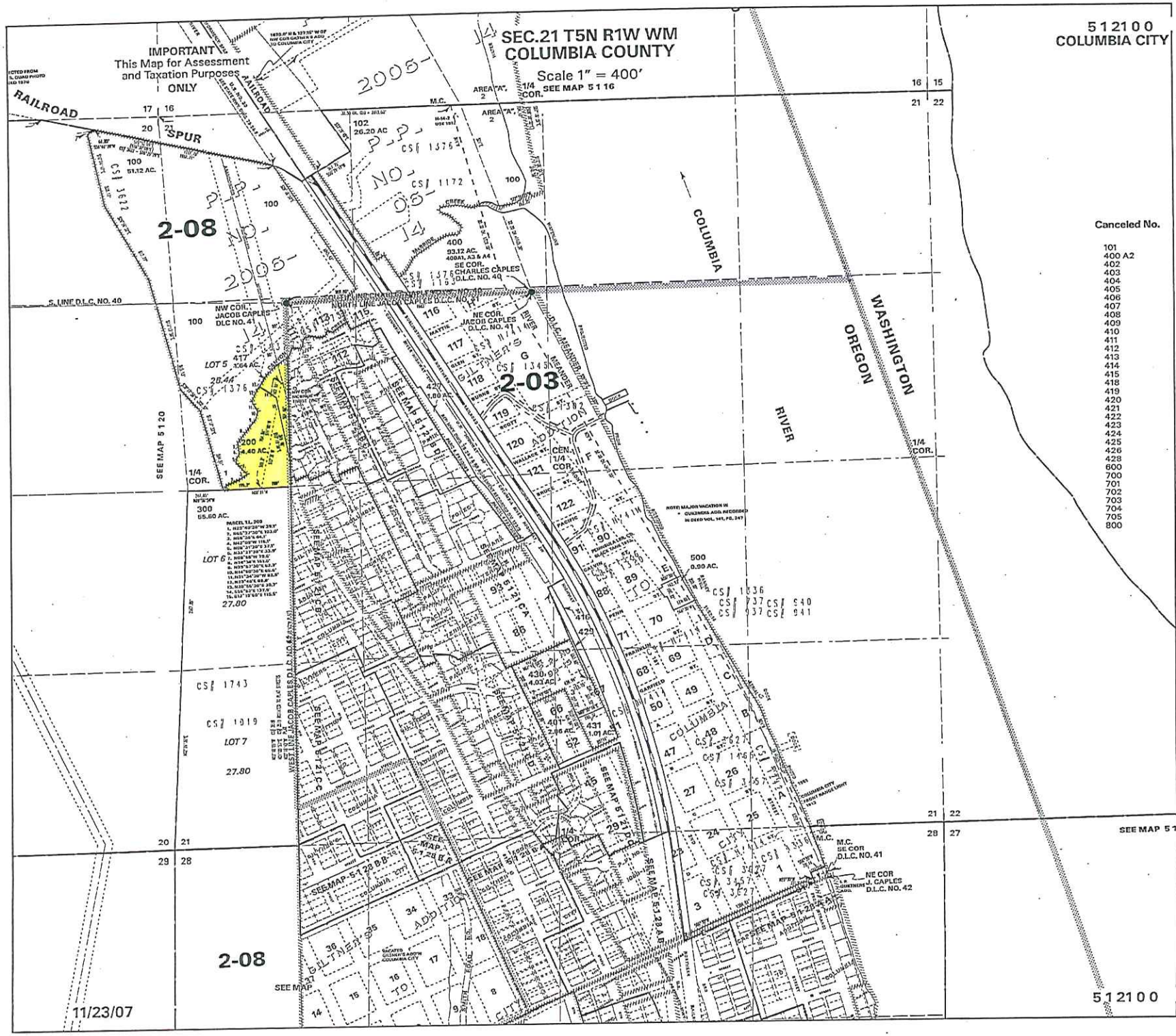
By _____
City Recorder

CITY OF COLUMBIA CITY

By _____
Mayor

By _____
City Recorder

OLSEN, HORN L.L.C.
1510 St. Helens Street, Suite B • St. Helens, Oregon 97051
Telephone: (503) 397-4222 • FAX: (503) 397-4224
E-mail: olsenhrn@opusnet.com


IMPORTANT
This Map for Assessment and Taxation Purposes ONLY
SEC.21 T5N R1W WM
COLUMBIA COUNTY
Scale 1" = 400'
512100
COLUMBIA CITY
EXHIBIT
A
Canceled No.
101
400 A2
402
403
404
405
406
407
408
409
410
411
412
413
414
415
418
419
420
421
422
423
424
425
426
428
600
700
701
702
703
704
705
800
RAILROAD
SPUR
2-08
2-03
COLUMBIA
RIVER
WASHINGTON
OREGON
S. LINE D.L.C. NO. 40
NW COR. JACOB CAPLES DLC NO. 41
NE COR. JACOB CAPLES D.L.C. NO. 41
SE COR. CHARLES CAPLES D.L.C. NO. 40
NORTH LINE JACOB CAPLES D.L.C. NO. 42
WEST LINE JACOB CAPLES D.L.C. NO. 42
1/4 COR.
CEN. 1/4 COR.
M.C.
M.C. SE COR D.L.C. NO. 41
NE COR J. CAPLES D.L.C. NO. 42
SEE MAP 5116
SEE MAP 5120
SEE MAP 5121
SEE MAP 5128 A
SEE MAP 5128 B
SEE MAP 5128 C
SEE MAP 5128 D
SEE MAP 5129 A
SEE MAP 5129 B
SEE MAP 5129 C
SEE MAP 5129 D
SEE MAP 51
11/23/07
512100

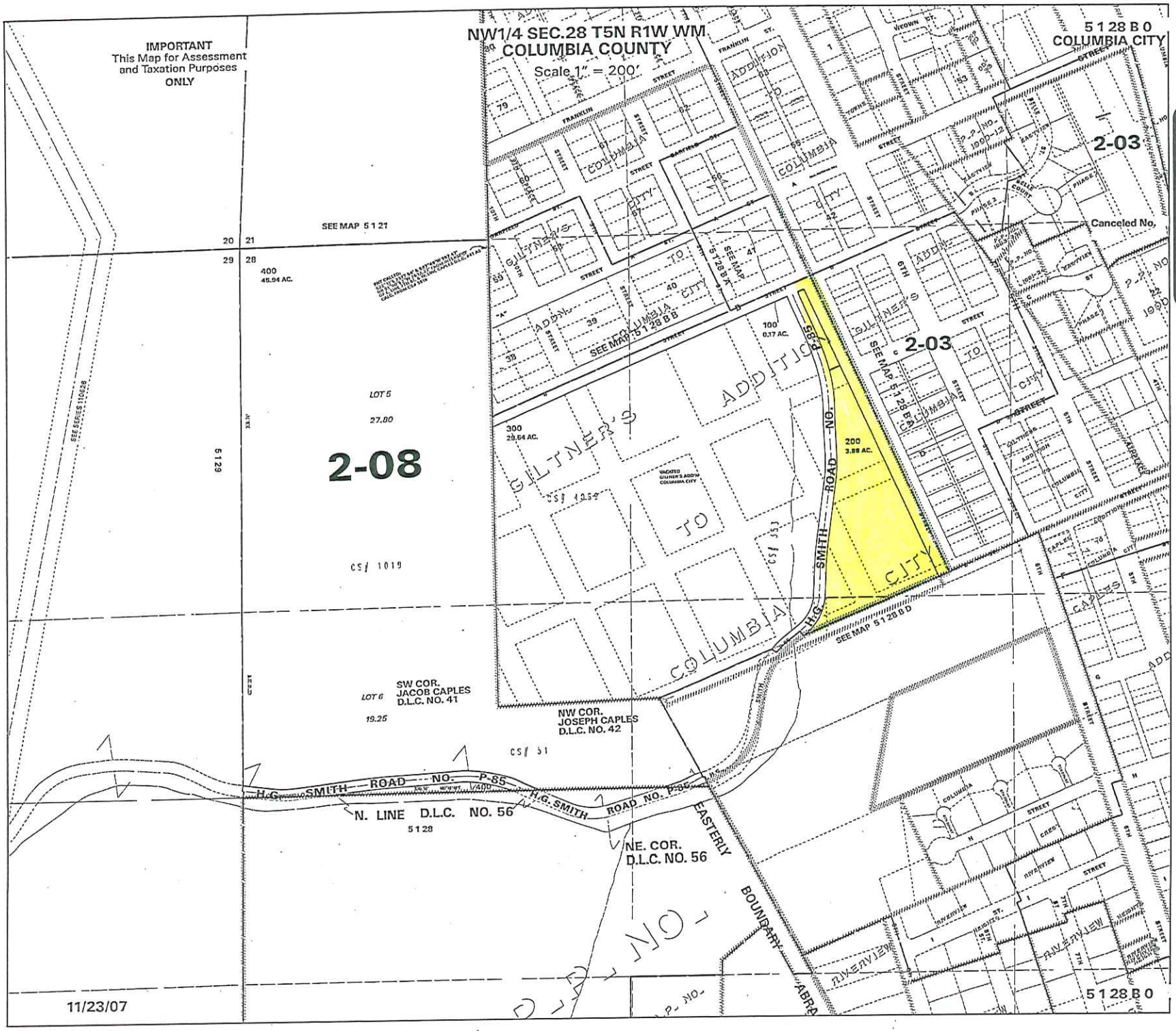

IMPORTANT
This Map for Assessment and Taxation Purposes ONLY
NW1/4 SEC.28 T5N R1W WM
COLUMBIA COUNTY
Scale 1" = 200'
5128B0
COLUMBIA CITY
2-08
2-03
SEE MAP 5121
SEE MAP 5128BB
SEE MAP 5128BA
SEE MAP 5128BD
Canceled No.
400
45.94 AC.
LOT 5
27.00
LOT 6
19.25
100
0.17 AC.
300
29.64 AC.
200
3.88 AC.
GILTNER'S ADDITION TO COLUMBIA CITY
VACATED GILMER'S ADD'N COLUMBIA CITY
H.G. SMITH ROAD NO.
SW COR. JACOB CAPLES D.L.C. NO. 41
NW COR. JOSEPH CAPLES D.L.C. NO. 42
N. LINE D.L.C. NO. 56
5128
NE. COR. D.L.C. NO. 56
EASTERLY BOUNDARY
CAPLES ADD'N
RIVERVIEW
5128B0
11/23/07

EXHIBIT B

THIS MAP WAS PREPARED FOR ASSESSMENT PURPOSE ONLY

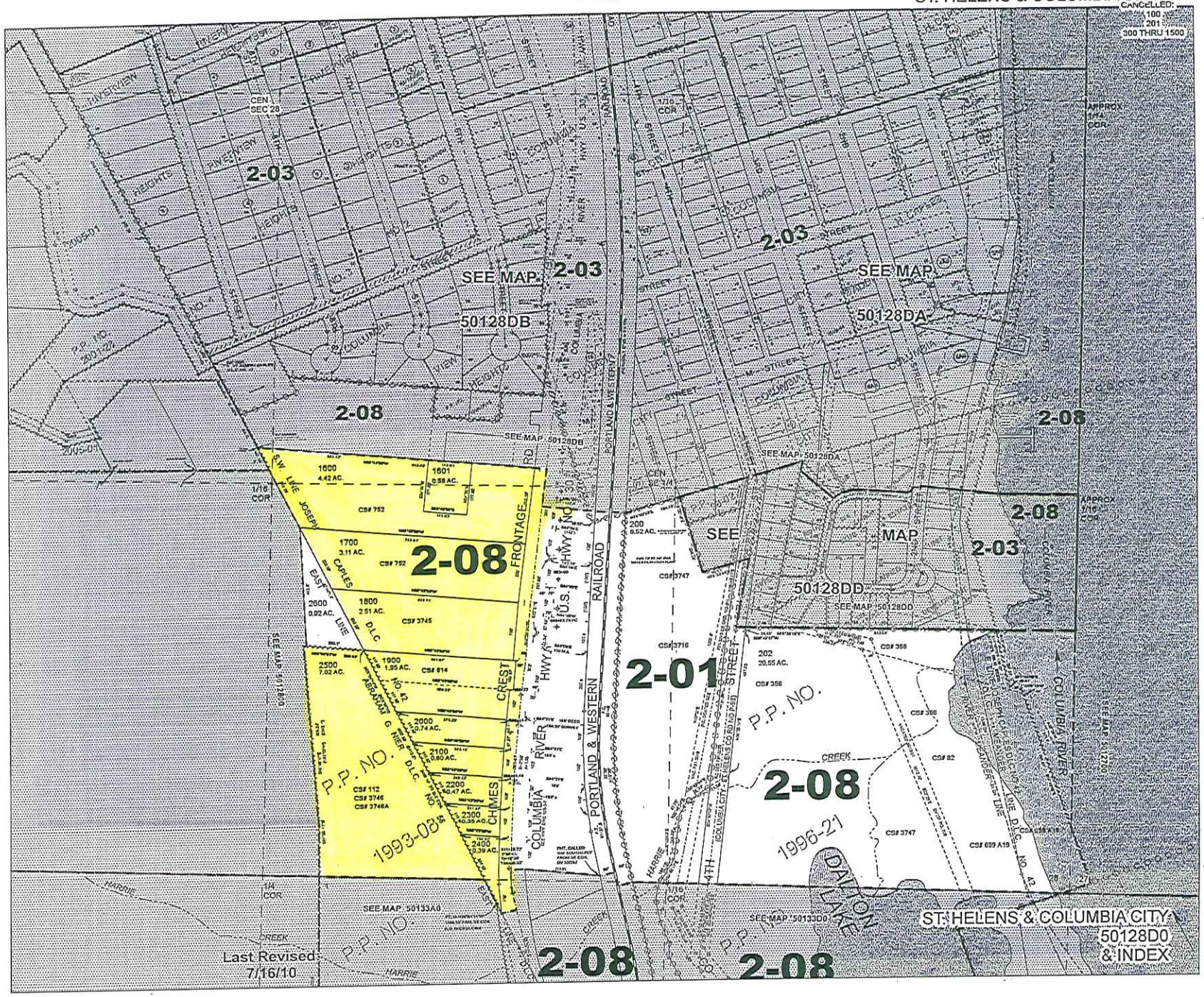
0 50 100 200 Feet

S.E.1/4 SEC.28 T.5N. R.1W. W.M.
COLUMBIA COUNTY
1" = 200'

50128D0
& INDEX
ST. HELENS & COLUMBIA CITY

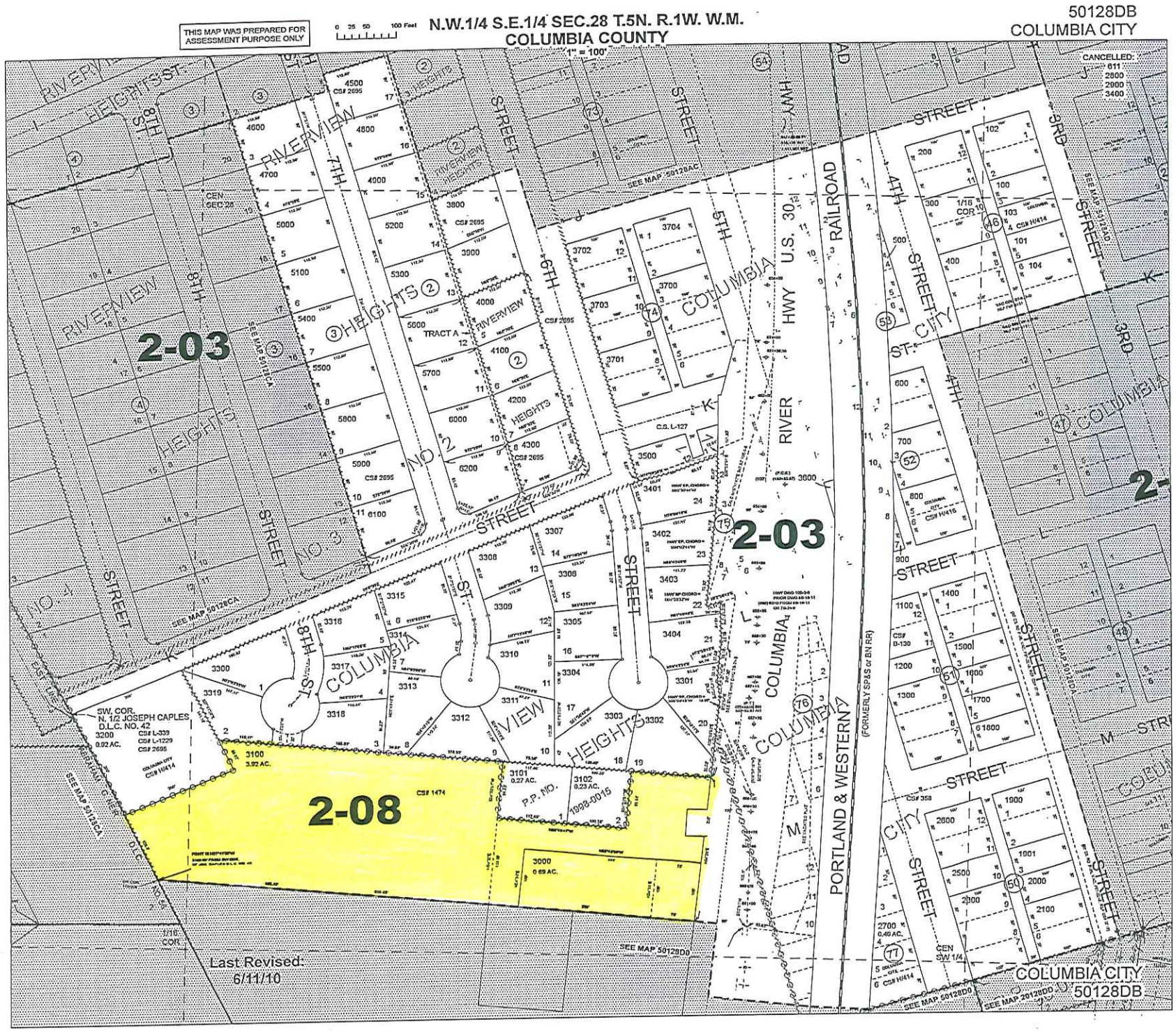
CANCELLED:
100 THRU 200
201
300 THRU 1500

EXHIBIT C



Last Revised
7/16/10

ST. HELENS & COLUMBIA CITY
50128D0
& INDEX


THIS MAP WAS PREPARED FOR ASSESSMENT PURPOSE ONLY
0 25 50 100 Feet
1" = 100'
N.W.1/4 S.E.1/4 SEC.28 T.5N. R.1W. W.M.
COLUMBIA COUNTY
50128DB
COLUMBIA CITY
CANCELLED:
611
2800
2900
3400
EXHIBIT
D
2-03
2-08
2-03
2-
RIVERVIEW HEIGHTS
RIVERVIEW HEIGHTS NO 2
RIVERVIEW HEIGHTS NO 3
RIVERVIEW HEIGHTS NO 4
COLUMBIA VIEW HEIGHTS
COLUMBIA RIVER HWY
U.S. 30
PORTLAND & WESTERN RAILROAD
(FORMERLY SP&S or BN RR)
4TH STREET
5TH STREET
6TH STREET
7TH STREET
8TH STREET
3RD STREET
COLUMBIA CITY ST.
SW. COR. N. 1/2 JOSEPH CAPLES D.L.C. NO. 42
3200 0.92 AC.
CS# L-339
CS# L-1229
CS# 2695
3100 3.92 AC.
CS# 1474
P.P. NO. 1998-0015
3101 0.27 AC.
3102 0.23 AC.
3000 0.69 AC.
2700 0.46 AC.
CEN SEC 28
CEN SW 1/4
1/16 COR
SEE MAP 50126CA
SEE MAP 50128D0
SEE MAP 50128DD
Last Revised: 6/11/10
COLUMBIA CITY
50128DB

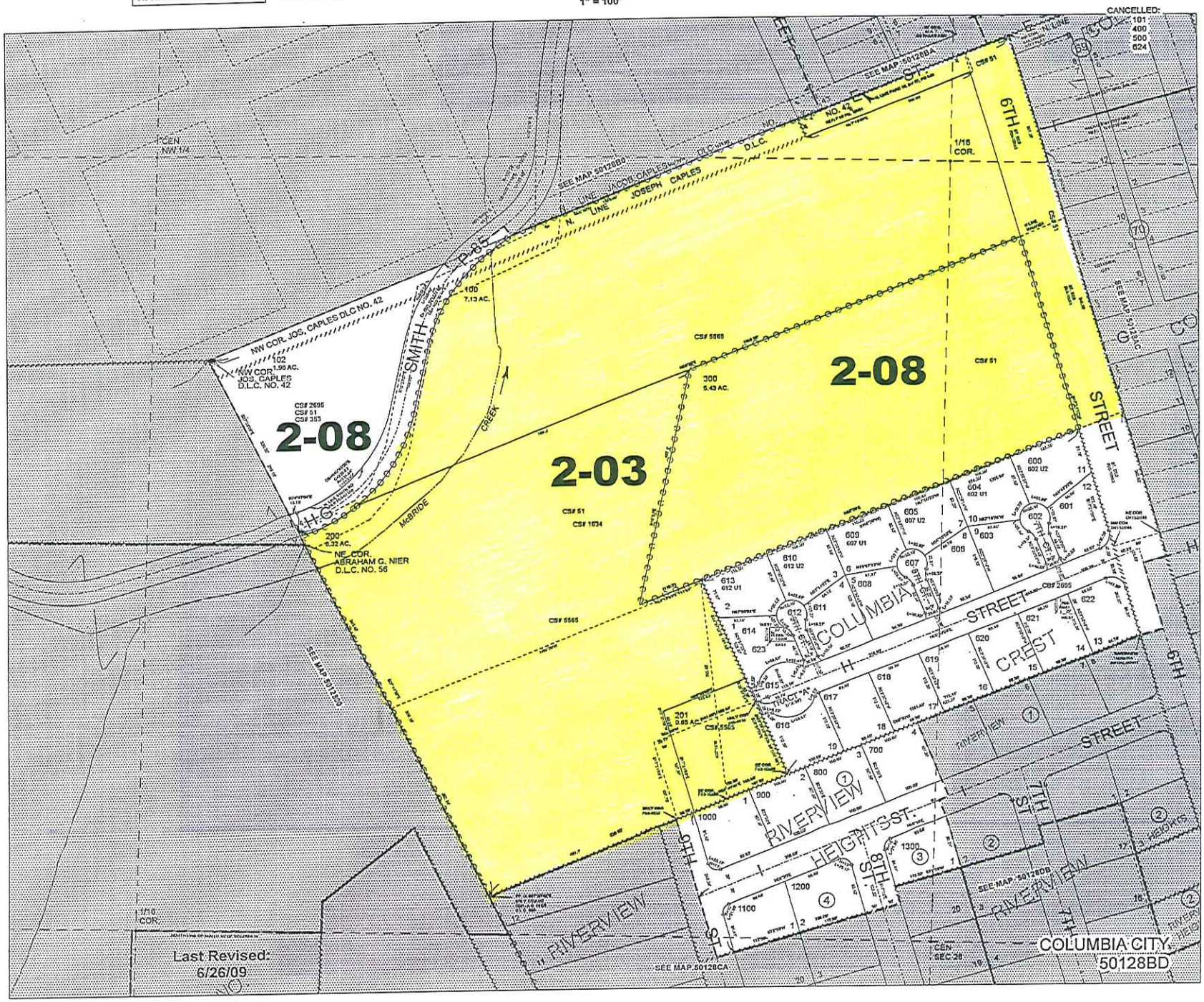
THIS MAP WAS PREPARED FOR ASSESSMENT PURPOSE ONLY

0 25 50 100 Feet

S.E.1/4 N.W.1/4 SEC.28 T.5N. R.1W. W.M.
COLUMBIA COUNTY
1" = 100'

50128BD
COLUMBIA CITY

EXHIBIT E



THIS MAP WAS PREPARED FOR ASSESSMENT PURPOSE ONLY

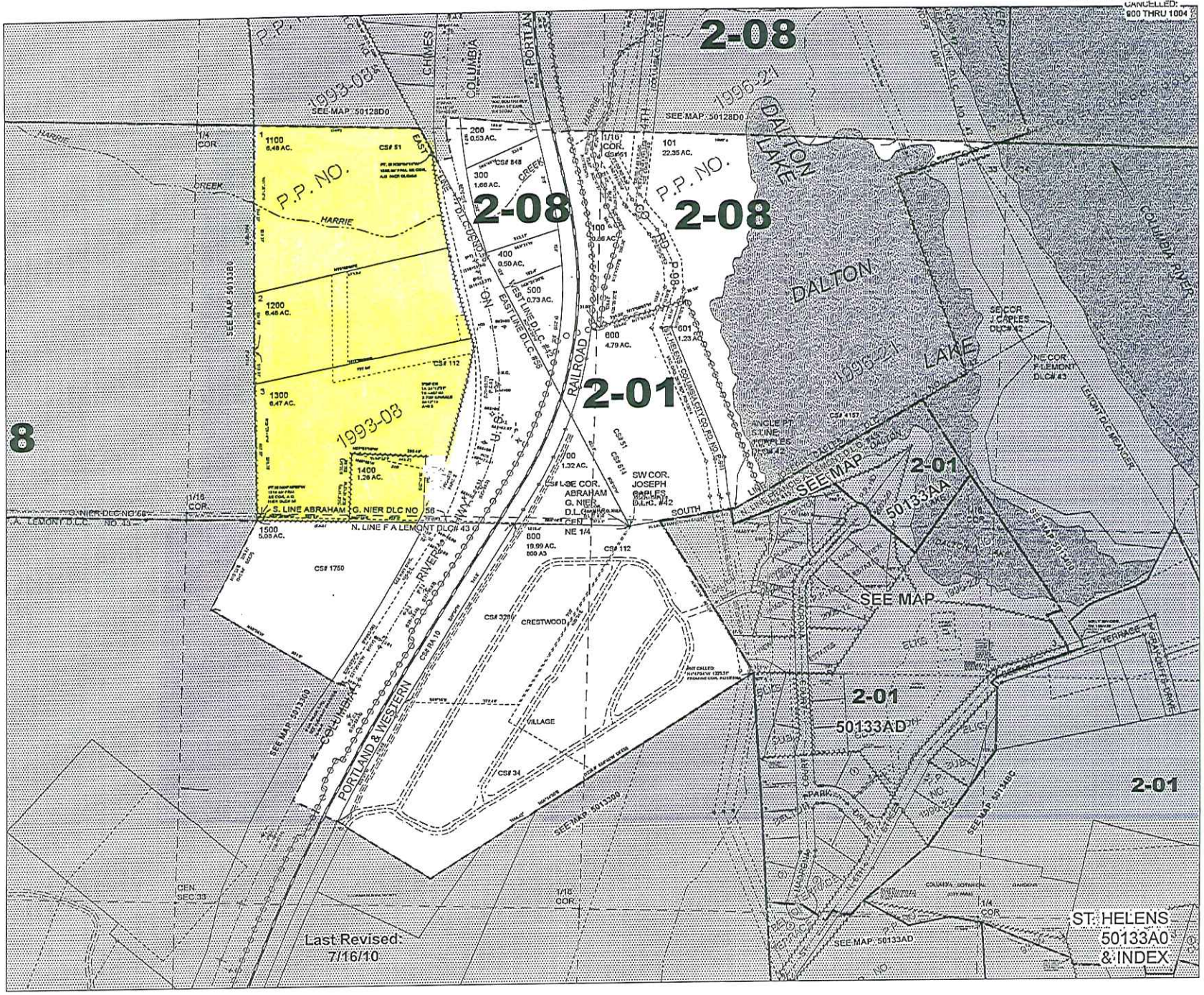
0 50 100 200 Feet

N.E.1/4 SEC.33 T.5N. R.1W. W.M.
COLUMBIA COUNTY
1" = 200'

50133A0
& INDEX
ST. HELENS

CANCELLED:
900 THRU 1004

EXHIBIT
F



Last Revised:
7/16/10