City of La Center

FINAL DRAFT
General Sewer Plan

March 2013

WE #1203B

wallis engineering

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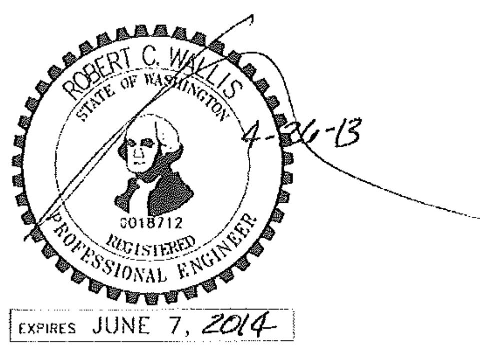

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City of La Center
General Sewer Plan

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GENERAL SEWER PLAN SECTION 1

EXECUTIVE SUMMARY

1.1 BACKGROUND

State law (WAC 173-240-050) requires all cities to have an adopted General Sewer Plan addressing all planned wastewater system upgrades or expansion, or an approved engineering report for each individual project proposed. The City of La Center adopted such a plan in 2001 [1], which was updated in 2006 by Wallis Engineering [2]. This document is an updated version of the 2006 general sewer plan, and includes information from the 2008 *City of La Center Wastewater Facility Plan* [3] as well as information from the 2011 *La Center Junction Sewer Study* [4].

1.2 STUDY AREA

The study area generally includes the area within and adjacent to the existing city limits, plus the future growth area extending west along La Center Road to the area around the junction of La Center Road and I-5. The growth area is shown in Figure 3.2 in Section 3.

1.3 EXISTING SEWERAGE SYSTEM

The existing sewer system consists of a network of gravity sewers along with a few pump stations. This network discharges to a wastewater treatment plant located on the north shore of the East Fork Lewis River floodplain.

1.4 PROPOSED SEWER PLAN

This General Sewer Plan was prepared primarily for the wastewater collection system. For details regarding the wastewater treatment plant see the *City of La Center Wastewater Facility Plan* dated July 2008.

Proposed collection system improvements include approximately 2.75 miles of gravity sewer ranging in size from 8-inch to 30-inch diameter, the upsizing of three existing pump stations, the construction of three new pump stations, approximately 1.5 miles of force main ranging in size from 6-inch to 10-inch diameter, and approximately 1 mile of sewer siphons ranging in size from 6-inch to 12-inch diameter.

1.5 CAPITAL IMPROVEMENT PLAN

The following capital improvement plan identifies the improvements proposed for the 20-year planning period. With each is a cost estimate based upon 2012 construction dollars. See Figure 7.1 for locations of recommended improvements.

Table 1.1
Capital Improvement Plan

Proposed Construction Year	Capital Improvement	Cost ($)
6-Year Capital Improvement Plan		
2013 to 2015	LCR Sewer Phase 1	6,470,000
	Wastewater Treatment Plant Expansion Phase 1B	1,950,000
	Wastewater Treatment Plant Expansion Phase 2	3,930,000*
	Pump Station #6 – 1,100 gpm capacity	1,593,000
	Force Main #6 – 980' of 8-inch force main	357,000
	Sewer Main F – 2,160' of 27-inch gravity sewer	1,589,000
	Sewer Main E – 4,200' of 27-inch gravity sewer	2,964,000
	Pump Station #5 – 200 gpm capacity	531,000
	Force Main #5 – 2,900' of 6-inch force main	976,000
	Sewer Main G – 1,760' of 10-inch gravity sewer	534,000
2016 to 2018	Pump Station #1 Capacity Upgrade to 1,400 gpm	1,640,000
	Pump Station #2 Capacity Upgrade to 550 gpm	224,000
	Force Main #2 Capacity Upgrade – 750' of 6-inch force main	138,000
	Pump Station #3 Capacity Upgrade to 450 gpm	201,000
	Force Main #3 Capacity Upgrade – 1650' of 6-inch force main	304,000
2019 to 2032 Improvements		
2019 to 2032	LCR Sewer Phase 2	1,021,000
	Sewer Main C Capacity Upgrade – 600' of 15-inch gravity sewer	217,000
	Sewer Main D Capacity Upgrade – 500' of 15-inch gravity sewer	182,000
	LCR Sewer Phase 3	165,000
	Wastewater Treatment Plant Expansion Phase 3	9,711,000

* This price estimate has been updated since the completion of the 2008 Facility Plan.

SECTION 2

INTRODUCTION

2.1 BACKGROUND

After completion of the 2006 General Sewer Plan, two important documents related to La Center's sewer system were developed. In 2008, the *City of La Center Wastewater Facility Plan* was completed, providing the design basis for ongoing treatment plant expansions which are expected to be completed in 2018 and provide treatment capacity through 2027. In 2011, the *La Center Junction Sewer Study* was completed, providing sewerage options for future development west of the Lewis River. This 2012 General Sewer Plan updates the 2006 General Sewer Plan to include information provided in the aforementioned documents. Additionally, this 2012 General Sewer Plan includes changes related to an updated urban growth area (UGA) boundary.

For the purposes of this update, the prior planning horizon of 2024 has been extended to 2032. Due to a slower than expected growth since 2006 (3.3% per year compared to the expected 8.7% per year), this plan has assumed that the 2024 population of 9,827, shown in the *La Center Urban Area Comprehensive Plan* [5], will not be reached until the year 2032. It was also assumed that the 2024 UGA would remain unchanged through 2032. Since the design populations have not changed, the system modeling completed in 2006 was not re-calculated for this 2012 sewer plan.

2.2 AUTHORIZATION

In July of 2012, the City of La Center authorized Wallis Engineering to complete this General Sewer Plan update.

2.3 STUDY PURPOSE

The objective of this General Sewer Plan is to develop comprehensive long-range plans for the orderly development of adequate wastewater collection and treatment facilities for the City of La Center and its urban growth area. The Plan has been written to meet the requirements of the Washington Administrative Code (WAC) 173-240-050.

2.4 SCOPE

Included within the scope of the General Sewer Plan are the following objectives:

1. Evaluation and review of the existing sewer system and wastewater treatment plant.

2. Population determination and projections for the service area as defined by the La Center Urban Growth Area.

3. Forecast of future flows and wasteloads.

4. Establishment of planning criteria for sewer facilities and wastewater treatment plant, including water quality standards for receiving stream.

5. Determination of a general plan for sewer facilities required to satisfy existing and future needs of the service area.

6. Determination of cost effective treatment facilities to handle the proposed flows and wasteloads and meet required water quality standards.

7. Development of cost estimates for proposed sewer facilities identified in the General Sewer Plan.

8. Addressing the financial and administrative issues related to the General Sewer Plan and its implementation.

9. Providing general planning information to assist the City in finalizing growth management planning efforts.

SECTION 3

STUDY AREA CHARACTERISTICS

3.1 STUDY AREA

Figure 3.1 displays a vicinity map for the City of La Center. The primary study area includes the area within the incorporated city limits as well as the UGA designated by the Growth Management Act. The UGA was established by the City and represents the area in which growth is expected to occur through the planning period ending in year 2024 (2032 for this plan). A secondary study area was identified as the City's potential 50-year (2062) growth boundary for the purpose of identifying 50-year flows that would be conveyed into the primary study area. The secondary study area limits are shown in Figure A-1 of Appendix A.

3.2 ENVIRONMENTAL CONDITIONS

Topography

Topography of the study area is shown in Figure 3.2. The topography of the area is dominated by the East Fork Lewis River (the River), which essentially splits the study area into distinct north and south sections. The study area is well defined by drainageways flowing to the River. In general, the area north of the River is less fragmented by these drainageways, the most significant of which is Breeze Creek. The area on the south side of the River is extremely fragmented by McCormick Creek and its side drainageways.

Flood Plains

The existing treatment plant is located just above the 100-year floodplain of the River. The 100-year flood elevation for the River is at an elevation 30.0 feet above mean sea level.

Climate

La Center has the mild climate typical of the valleys between the Coast Range and Cascade Range in Oregon and Washington. Local weather is occasionally influenced by the effects of the Columbia River Gorge, bringing in extreme heat and cold from the East. Precipitation averages approximately 35 inches annually, most of which falls in the 6-month period between November through April.

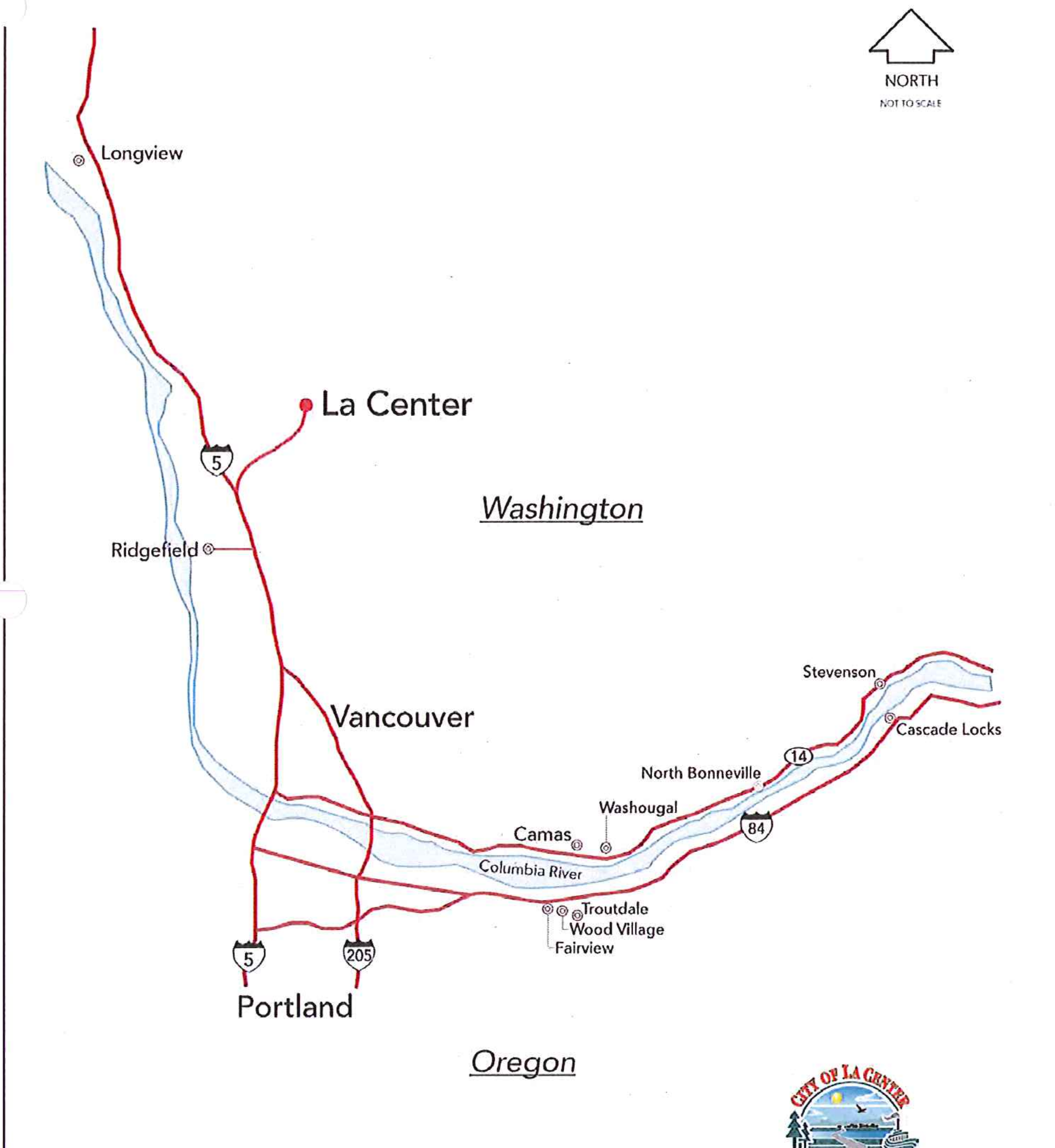

Figure 3.1
Vicinity Map

City of La Center
General Sewer Plan
March 2013

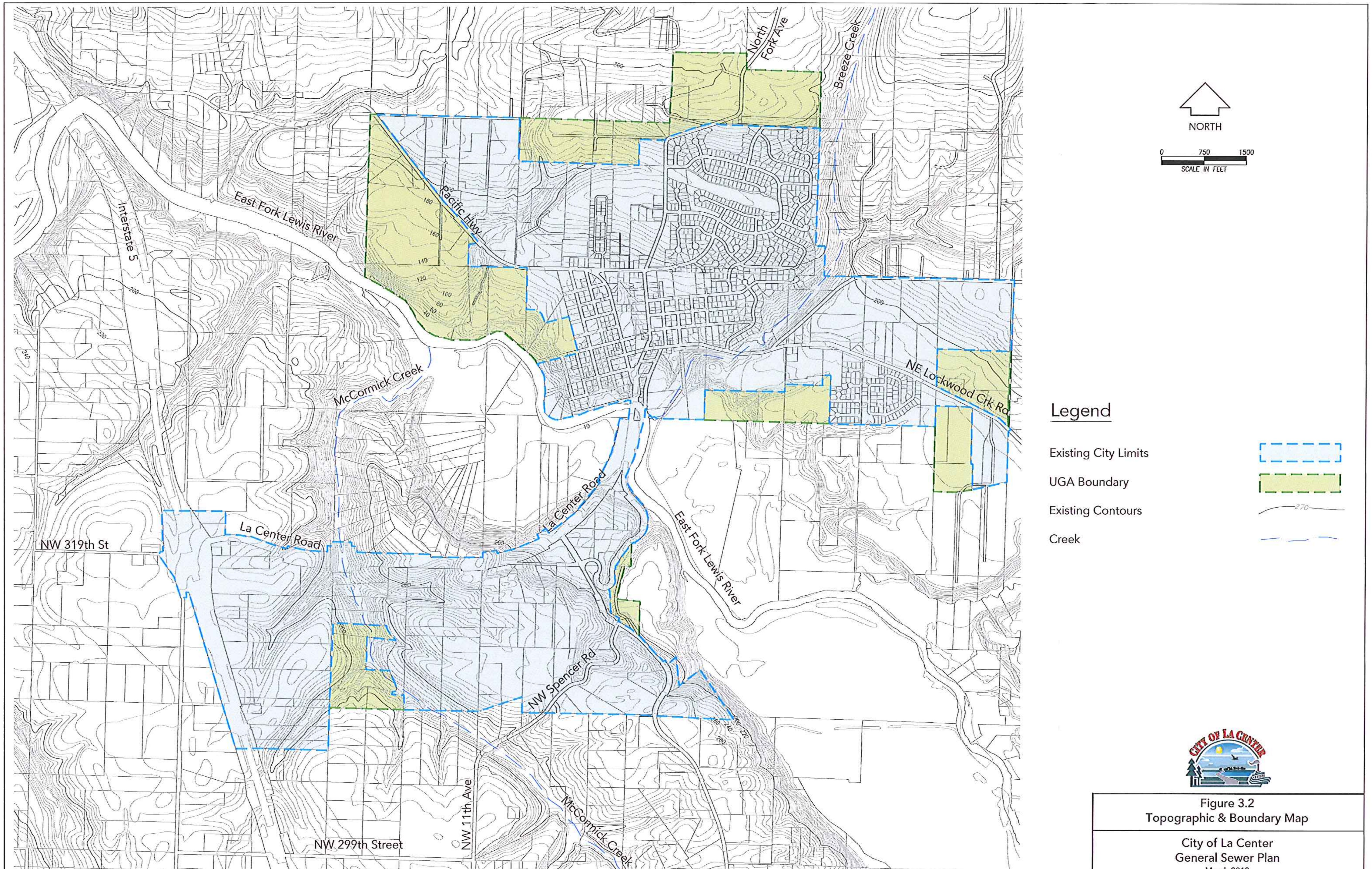

Figure 3.2
Topographic & Boundary Map

City of La Center
General Sewer Plan
March 2013

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Soils

Alluvial deposits composed of sand and gravel have been identified in the Columbia and East Fork Lewis River floodplain and represent the majority of the soil conditions within the study area. The soils in the upland areas are predominantly silt.

Groundwater

Groundwater levels in the study area are very high. During wet weather, groundwater elevation is only a few feet below the ground surface. As a result, numerous springs discharge throughout the drainageways.

Surface Water

The City of La Center and its UGA are located in the East Fork Lewis River Drainage Basin. Two perennial streams flow through the study area. One of the creeks, Breeze Creek, is located on the north side of the River. The second, McCormick Creek, is located on the south side of the River.

The East Fork Lewis River and its tributaries are listed on the 303(d) list of impaired water bodies for high instream temperatures and fecal coliform bacteria problems.

3.3 LAND USE

Land use within the City boundaries is established by a zoning ordinance. The majority of the area is residential, with commercial activity concentrated in the downtown core area and industrial development concentrated along I-5.

Land use within the La Center UGA is addressed in the *La Center Urban Area Comprehensive Plan*. The Comprehensive Plan defines the types and distribution of land uses within the UGA. Land use conforms to the Washington State Growth Management Act. A land use map is shown in Figure 3.3.

Land use outside of La Center's UGA is currently governed by the City of Ridgefield's UGA to the south and the Clark County Comprehensive Plan to the north, east, and west.

3.4 PUBLIC WATER SYSTEM

La Center's water system is shown in Figure 3.4. Since 1992, Clark Public Utilities has owned and operated the City's water system. The water source for the system is groundwater obtained from well fields located outside of the City's UGA. Residents in the rural areas surrounding La Center also rely upon private wells for their water supply. No known incidences of groundwater or well contamination have been recorded at the time of this document.

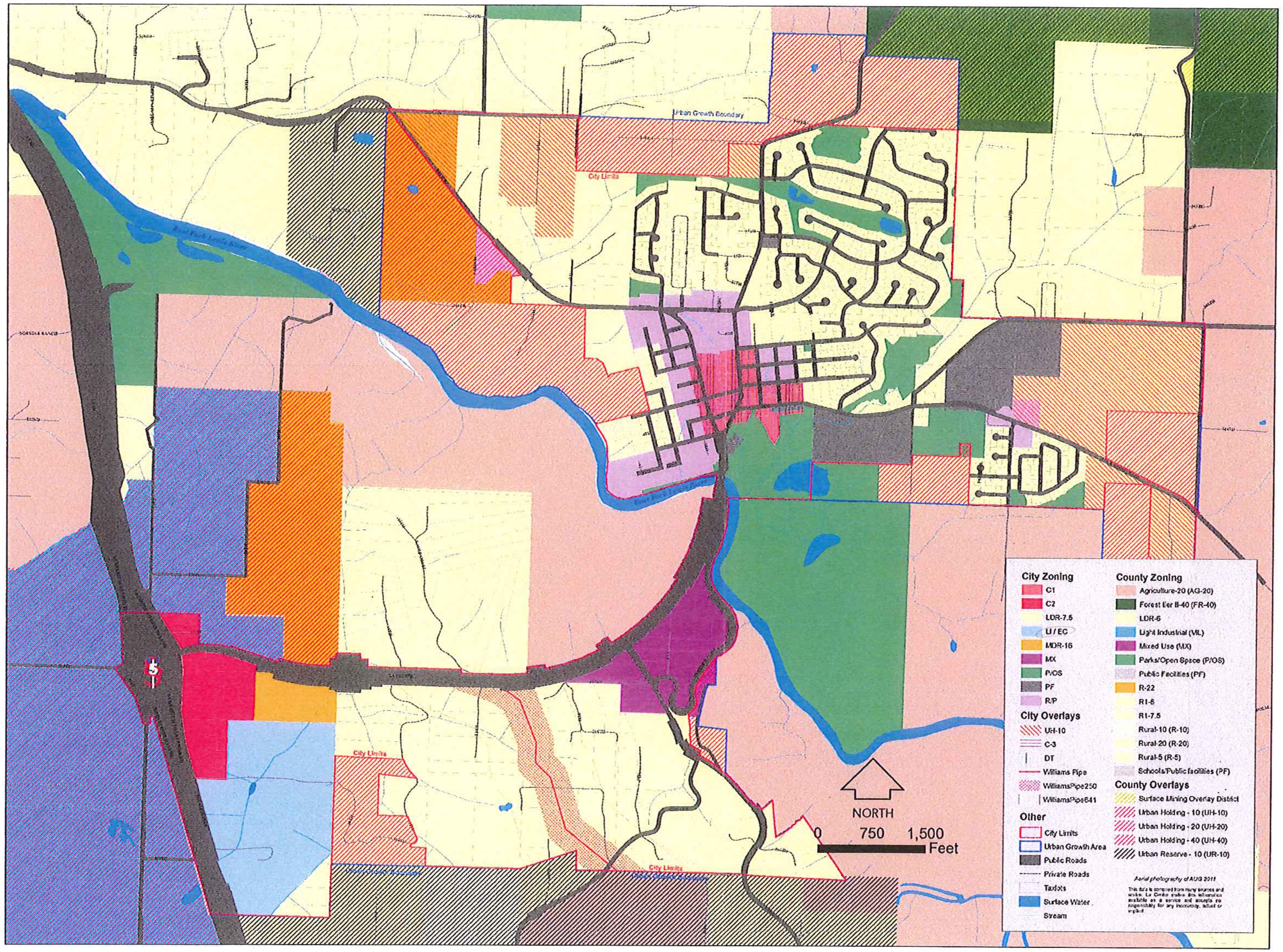

Figure 3.3
General Land Use Map

City of La Center
General Sewer Plan
August 2012

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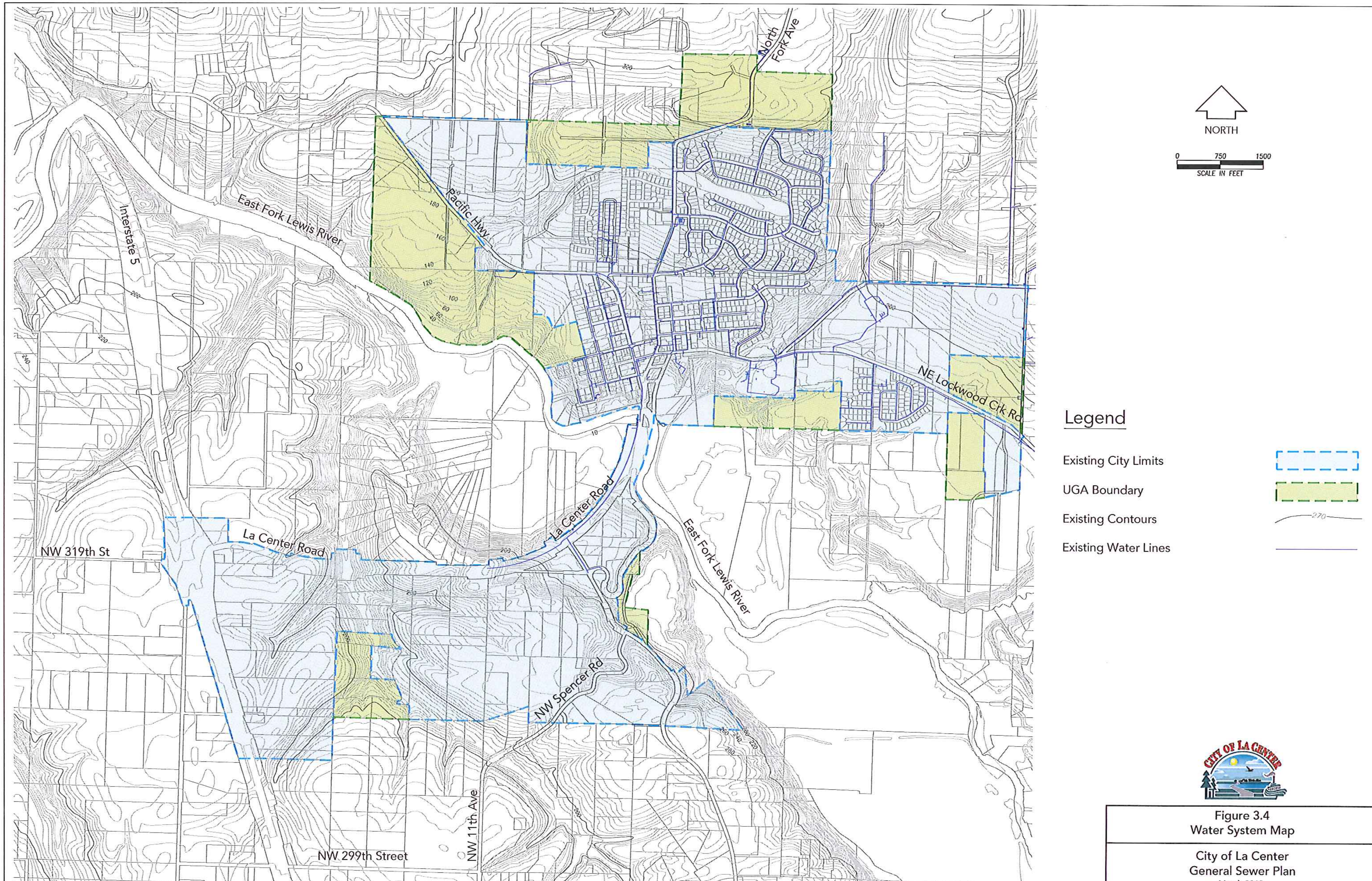

Figure 3.4
Water System Map

City of La Center
General Sewer Plan
March 2013

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SECTION 4

EXISTING FACILITIES

4.1 HISTORY OF THE SEWERAGE SYSTEM

The existing collection system serving the oldest portion of the City, south of 10th Street, was constructed in the 1950's. During the 1990's, several major collection system expansions were made to serve subdivisions constructed north and east of the City.

4.2 CURRENT SERVICE AREA

The current service area comprises the La Center UGA, shown in Figure 3.1.

4.3 COLLECTION SYSTEM

The City of La Center operates and maintains approximately 5 miles of sanitary sewer collection lines and mains within the city limits. The majority of the collection system consists of 8-inch diameter pipe, though a few short sections of main are sized at 6-inch diameter. Figure 4.1 shows the existing collection system. A more detailed map is included in Appendix B.

The system utilizes gravity flow as much as possible, with the majority of lines sloping toward the treatment facility located on the north bank of the River. The collection system utilizes three sewage pump stations and approximately 2,000 feet of force mains. Table 4.1 summarizes the data for the three pump stations.

Table 4.1
Sewage Pump Station Data Summary

Pump Station No.	Location	Pumps	Approximate Capacity (each pump)
1	Treatment Plant	Two – 10 hp, Flygt	950 gpm
2	4th Street and Stonecreek Drive	Two – 5 hp, Flygt	100 gpm
3	NE John Storm Avenue and E 1st Circle	Two – 6.5 hp, Paco	100 gpm

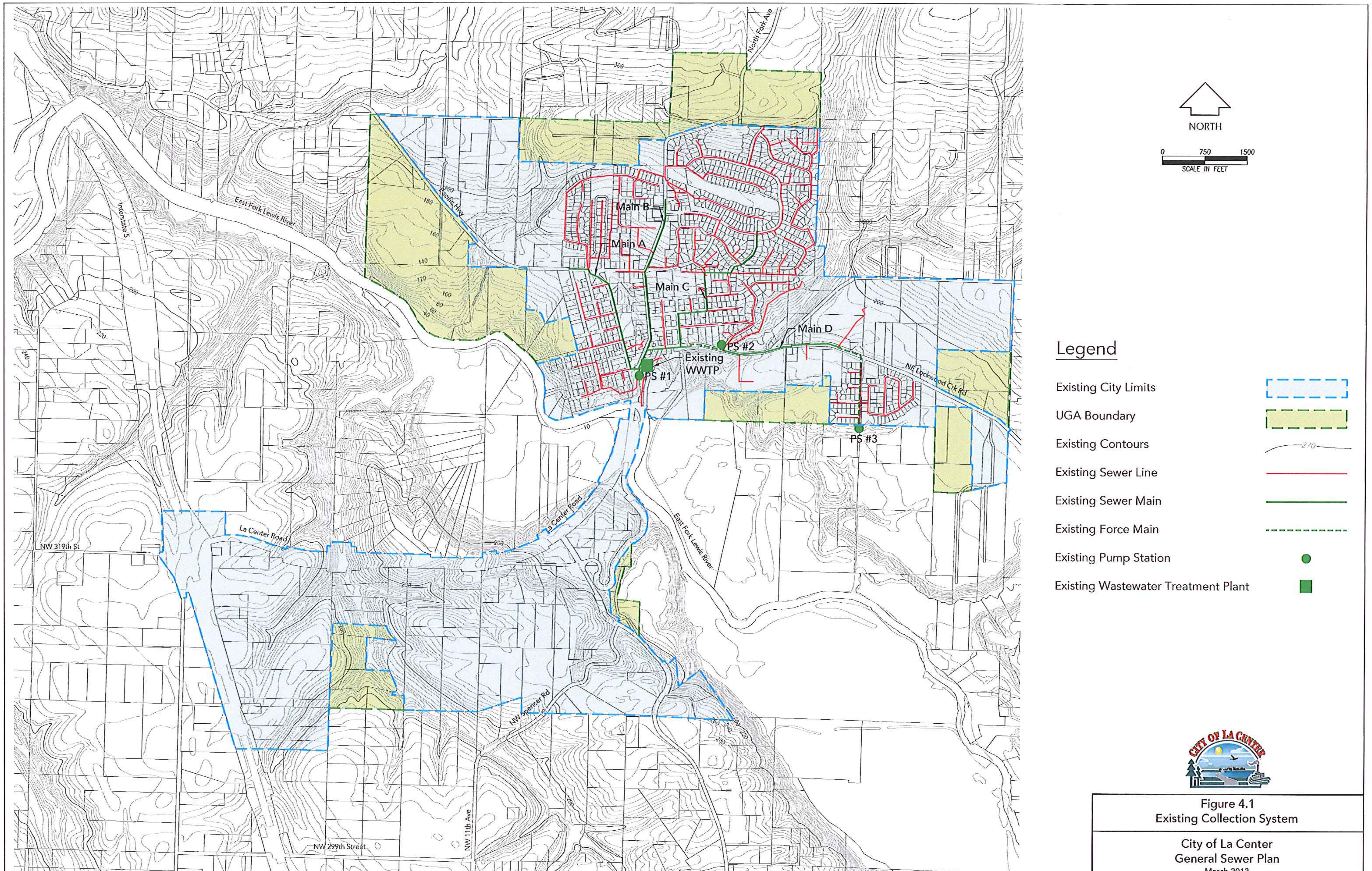

Figure 4.1
Existing Collection System

City of La Center
General Sewer Plan
March 2013

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4.4 TREATMENT AND DISPOSAL FACILITIES

Description

The *City of La Center Wastewater Facility Plan* describes expected treatment plant upgrades, which are expected to take place during three phases of construction. Currently, a portion of Phase 1A has been constructed. Figure 4.2 shows the Phase 1 treatment plant site plan. Detailed treatment plant design information is included in Appendix C.

Administrative Building

The administrative building is located on the west side of the facility. This building contains the training/conference room, supervisory office, operators stations, controls and electrical equipment.

Laboratory Building

The laboratory building is located to the south of the administrative building. This building houses the lab, laundry, lunch area, showers, and restroom.

Headworks

Influent wastewater is conveyed by gravity sewers to the facility headworks where it passes through two rotary drum fine screen (3 mm) units. Wastewater then flows through a Parshall flume with an ultrasonic flow meter before reaching the membrane bioreactor (MBR) process basins.

Secondary Treatment

Biological treatment is provided by a membrane bioreactor sludge process. The system includes two anoxic and two aerobic process basins and two MBR membrane basins. The anoxic process basins provide denitrification, and the downstream aerobic process basins provide BOD removal and nitrification.

Disinfection

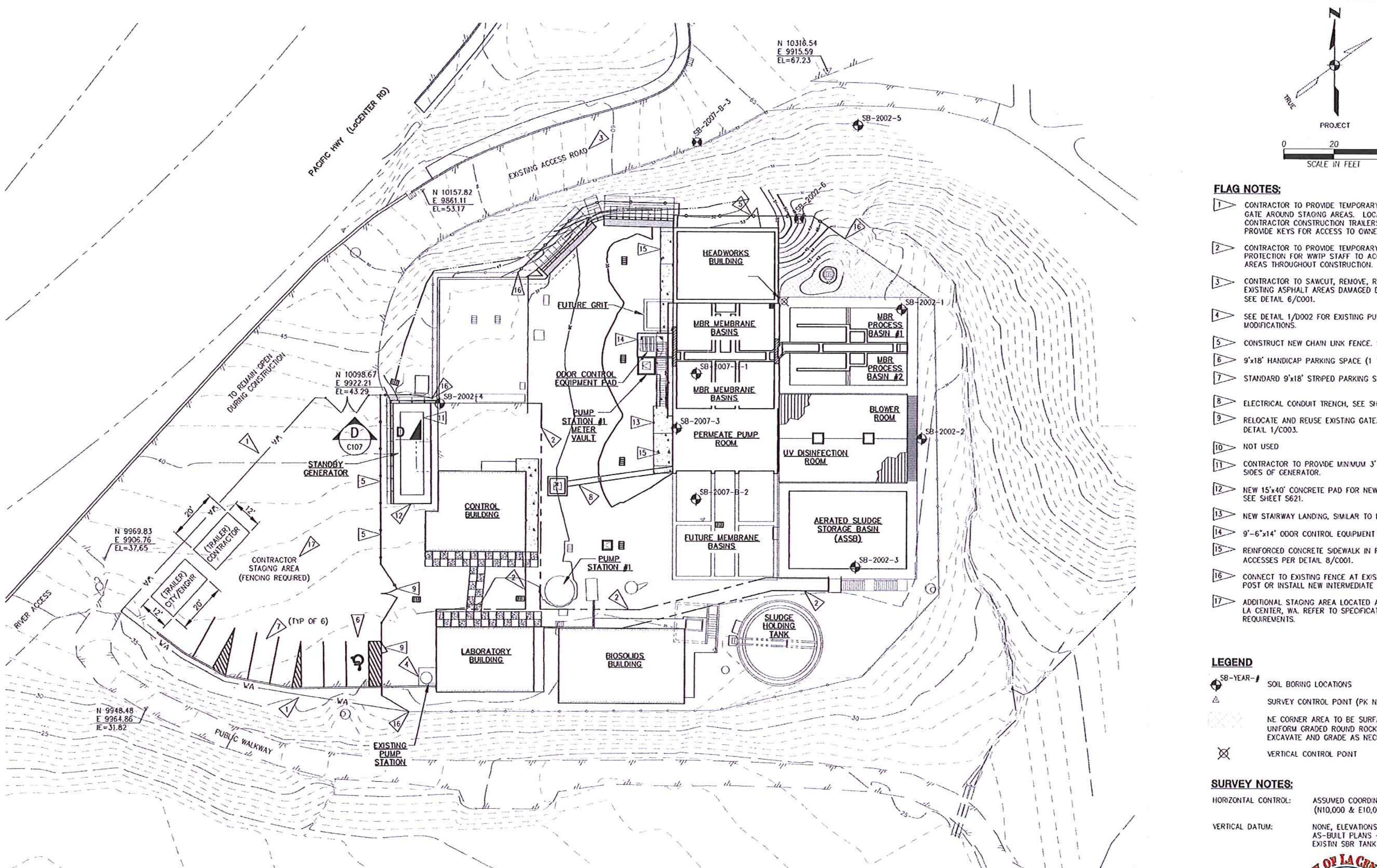
Effluent from the plant undergoes ultraviolet radiation disinfection prior to discharge. Ultraviolet radiation has proven to be an effective bactericide and virucide for wastewater, without contributing to the formation of toxic disinfection byproducts.

Outfall

Disinfected secondary effluent is discharged from the facility via a 10-inch outfall and multiport diffuser into the East Fork Lewis River. The end of the outfall diffuser is about 15 feet into the river. The diffuser is a rectangular box with 28 ~ 6-inch by 2-inch ports with 14 of the ports facing upstream, and 14 of the ports facing downstream.

Solids Treatment

Treatment of waste solids is accomplished by a sludge rotary fan press and sludge dryer. An aerated sludge holding tank receives waste sludge from the MBR so that the rotary fan press and sludge dryer can be operated intermittently.



FLAG NOTES:

1. CONTRACTOR TO PROVIDE TEMPORARY FENCING AND ACCESS GATE AROUND STAGING AREAS. LOCATE OWNER/ENGINEER AND CONTRACTOR CONSTRUCTION TRAILERS IN STAGING AREA AND PROVIDE KEYS FOR ACCESS TO OWNER.
2. CONTRACTOR TO PROVIDE TEMPORARY FENCING AND PROTECTION FOR WWTP STAFF TO ACCESS ALL EXISTING PLANT AREAS THROUGHOUT CONSTRUCTION.
3. CONTRACTOR TO SAWCUT, REMOVE, REPLACE AND SEAL ALL EXISTING ASPHALT AREAS DAMAGED DURING CONSTRUCTION. SEE DETAIL 6/C001.
4. SEE DETAIL 1/D002 FOR EXISTING PUMP STATION MODIFICATIONS.
5. CONSTRUCT NEW CHAIN LINK FENCE. SEE DETAIL 1/C003.
6. 9'x18' HANDICAP PARKING SPACE (1 TOTAL).
7. STANDARD 9'x18' STRIPED PARKING STALL (6 TOTAL).
8. ELECTRICAL CONDUIT TRENCH, SEE SHEET E101.
9. RELOCATE AND REUSE EXISTING GATE. INSTALLATION PER DETAIL 1/C003.
10. NOT USED
11. CONTRACTOR TO PROVIDE MINIMUM 3' CLEARANCE AROUND ALL SIDES OF GENERATOR.
12. NEW 15'x40' CONCRETE PAD FOR NEW STANDBY GENERATOR, SEE SHEET S621.
13. NEW STAIRWAY LANDING, SIMILAR TO DETAIL 8/C001.
14. 9'-6"x14' ODOR CONTROL EQUIPMENT PAD. SEE SHEET S502.
15. REINFORCED CONCRETE SIDEWALK IN FRONT OF UTILITY ACCESSES PER DETAIL 8/C001.
16. CONNECT TO EXISTING FENCE AT EXISTING END OR CORNER POST OR INSTALL NEW INTERMEDIATE POST.
17. ADDITIONAL STAGING AREA LOCATED AT 525 E BIRCH AVENUE, LA CENTER, WA. REFER TO SPECIFICATION 01010 FOR REQUIREMENTS.

LEGEND

SB-YEAR-#	SOIL BORING LOCATIONS
△	SURVEY CONTROL POINT (PK NAIL)
	NE CORNER AREA TO BE SURFACED WITH 6" OF 1" UNIFORM GRADED ROUND ROCK, 6" DEPTH. EXCAVATE AND GRADE AS NECESSARY.
⊠	VERTICAL CONTROL POINT

SURVEY NOTES:

HORIZONTAL CONTROL:	ASSUMED COORDINATE SYSTEM (N10,000 & E10,000)
VERTICAL DATUM:	NONE, ELEVATIONS BASED ON AS-BUILT PLANS – NW CORNER EXISTIN SBR TANK AT EL 50.00.

CITY OF LA CENTER

NOTE:
THIS DRAWING PREPARED BY
KENNEDY/JENKS CONSULTANTS

Figure 4.2
Existing WWTP Site Plan

City of La Center
General Sewer Plan
March 2013

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Reliability Classification

The La Center Wastewater Treatment Facility meets the criteria for a reliability classification of Class III. Ecology's criteria for Class III reliability are as follows:

> "These are works not otherwise classified as Reliability Class I or Class II"

This facility qualifies for Class III reliability because it must achieve ammonia limits meeting "tertiary" treatment requirements. Tertiary treatment works with design flows less than 5 MGD are classified as Class III facilities according to WAC 173-230-140. In general, Class III reliability requirements stipulate that there shall be at least two sedimentation basins, and at least two blowers providing aeration to maintain sufficient DO to maintain the biota. In addititon to the Class III process requirements, Ecology requires this treatment plant to maintain Class II back-up power. Reliability Class II requires the facility to maintain sufficient back-up power to operate critical lighting, ventilation, and all vital components at sufficient levels to maintain the biota during peak wastewater flow conditions. The facility has a 1 megawatt diesel generator for back-up power supply.

NPDES Permit

General

La Center's wastewater NPDES permit was issued May 26, 2004 and officially expired June 30, 2009; however, the City continues to operate under this expired permit until the Washington State Department of Ecology approves the most recent permit application. The 2004 NPDES and the draft NPDES design criteria and effluent limitations are described in Tables 4.2 and 4.3. Copies of the 2004 NPDES permit and the most recent draft NPDES permit are included in Appendix D.

The draft permit has two separate sets of requirements corresponding to two phases of wastewater treatment plant construction. The phases are designated as Phase 1A and Phase 1B. Currently, Phase 1A has been constructed with Phase 1B to be completed as flows require. Phase 1B will include outfitting two empty membrane basins with membranes and updating several of the aeration blowers.

NPDES Design Criteria

Shown in Table 4.2 are the 2004 and draft NPDES permit design criteria.

Table 4.2
NPDES Permit - Design Criteria

Parameter	2004 Permitted Value	Draft Permitted Value (Phase 1A)	Draft Permitted Value (Phase 1B)
Maximum Monthly Average Wet Weather Flow	0.56 mgd	0.69	1.04
Instantaneous Peak Flow	1.0 mgd	1.29	1.94
BOD_5 Influent Loading for Maximum Month	841 lbs/day	1,297	1,804
TSS Influent Loading for Maximum Month	902 lbs/day	1,070	1,581

Effluent Limitations

Table 4.3 details the current and tentative effluent limitations as outlined in the 2004 and draft NPDES permits.

Table 4.3
NPDES Permit - Effluent Limitations

	Parameter	Monthly Average	Weekly Average
2004 NPDES Permit	Biochemical Oxygen Demand (5 day)	30 mg/L, 173 lbs/day	45 mg/L, 260 lbs/day
	Total Suspended Solids	30 mg/L, 161 lbs/day	45 mg/L, 242 lbs/day
	Fecal Coliform Bacteria	100/100 mL	200/100 mL
	Chlorine Residual	0.15 mg/L	0.23 mg/L
	Ammonia (NH_3-N)	3.6 mg/L (June – Oct.)	8.1* mg/L (June – Oct.)
	PH	Shall not be outside the range of 6.0 - 9.0	
Draft NPDES Permit (Phase 1A)	Biochemical Oxygen Demand (5 day)	30 mg/L, 173 lbs/day	45 mg/L, 260 lbs/day
	Total Suspended Solids	30 mg/L, 161 lbs/day	45 mg/L, 242 lbs/day
	Fecal Coliform Bacteria	100/100 mL	200/100 mL
	Ammonia (NH_3-N)	3.6 mg/L (June – Oct.)	8.1* mg/L (June – Oct.)
	PH	Shall not be outside the range of 6.0 - 9.0	
Draft NPDES Permit (Phase 1B)	Biochemical Oxygen Demand (5 day)	30 mg/L, 260 lbs/day	45 mg/L, 390 lbs/day
	Total Suspended Solids	30 mg/L, 237 lbs/day	45 mg/L, 356 lbs/day
	Fecal Coliform Bacteria	100/100 mL	200/100 mL
	Ammonia (NH_3-N)	3.0 mg/L (June – Oct.)	6.8* mg/L (June – Oct.)
	PH	Shall not be outside the range of 6.0 - 9.0	

* The ammonia limit is not average weekly, but maximum daily.

Monitoring Schedule

The monitoring schedules are included in the NPDES permits, included in Appendix D. Most parameters are tested twice weekly.

4.5 TREATMENT FACILITIES IN NEARBY CITIES

There are currently six other municipal wastewater treatment plants (WWTPs) within a 20-mile radius of La Center: the City of Kalama WWTP, the City of St. Helens WWTP, the City of Ridgefield WWTP, the Clark County Salmon Creek WWTP, the City of Vancouver WWTP and the City of Portland WWTP. None of these treatment facilities are located near the City of La Center's likely ultimate growth area.

SECTION 5

PLANNING CRITERIA AND SEWERAGE SYSTEM REGULATIONS

5.1 PLANNING PERIOD

For the purpose of this plan, the collection system planning period ends in the year 2032, while the treatment facility planning period ends in the year 2027. As discussed in subsection 2.1, the 2006 General Sewer Plan collection system planning period was selected to correspond with the comprehensive planning process, which utilized a 2024 UGA. Due to a slower than expected growth rate since 2006, this General Sewer Plan utilizes the 2024 UGA and population projection as the 2032 sewer planning area and population estimate.

5.2 SERVICE AREA

The City of La Center's sewer system currently serves the majority of the City's residents. The service area addressed in this plan is the current UGA shown in Figure 3.2.

5.3 COLLECTION SYSTEM DESIGN CRITERIA

DOE Design Standards

Standard textbook design criteria were used in the conceptual design of the collection facilities presented in the plan along with guidelines presented in the Washington State Department of Ecology's (DOE) *Criteria for Sewage Works Design* [6].

Gravity Sewer Service Policy

The City of La Center has an informal policy of requiring new growth areas to be served by gravity sewers (as opposed to pump stations) whenever possible. Pump stations are discouraged due to their high cost of operation and maintenance. As discussed in Section 10, it is recommended that this policy issue be formalized.

Design Period

This plan addresses collection system improvements to serve the current UGA. While capacity has been assessed for a 20-year period, proposed trunk sewers and permanent pump station wetwells are sized to accommodate either build-out or 50-year flow estimates. In other words, the planning period is 20 years, while the design period is 50 years.

Sewer System Sizing

Gravity Sewer Sizing. All sewers were sized assuming minimum slope to provide a velocity of 2 feet per second. A Manning's Roughness Coefficient of n = 0.013 was used in the calculations of pipe capacities. Proposed trunk sewers were designed with capacity to accommodate either build-out (if their basin does not extend beyond the UGA) or 50-year flow estimates.

Sizing Proposed Pump Stations. Because pump stations can be upgraded by increasing pump capacity and the normal life cycle of a pump is 10 to 15 years, it is not necessary to size pump stations for flows beyond the 20-year projections. For the purpose of this Plan, pump station mechanical equipment and pipes were sized to accommodate the 20-year flow conditions. The primary consideration for pump station and force main design is that they should provide a velocity of flow in the force main between 2 and 7 feet per second, based on a Hazen-Williams Coefficient of 130. The pump station wetwells were sized for either basin build-out, or 50-year growth in those basins that can be extended beyond the 20-year growth boundary. In all cases, they were sized large enough to provide adequate cycle time for the pumps.

Peaking Factors. The value of the peaking factor was based on the area served, and determined by the following equation:

$$\text{Peaking Factor} = 14 / (4 + P) + 1 \qquad (P = \text{population in thousands})$$

Peaking factors varied from 4.0 to 3.1, depending on the service area. In general, the larger the service area, the smaller the peaking factor.

Trunk Sewer and Pump Station Siting

Collection system improvements are sited to limit the use of pump stations. The fact that so much of the study area is fragmented by steep ravines and environmentally sensitive lands will require that the City exercise strict control over the location of both trunk sewers and pump stations. This will likely be very challenging in light of the fact that most trunk sewers are designed and constructed by developers who do not have the resources or time to site trunk sewers and pump stations to serve regional needs. Failure by the City to exercise strict control over siting of these facilities will result in a large number of pump stations and force mains, with the end result a burden upon the ratepayers. See Section 10 for recommended actions by the City in regards to the siting of these facilities.

5.4 TREATMENT CRITERIA

Receiving Water Quality

The treatment plant currently discharges to an outfall in the East Fork Lewis River. As part of the planning effort prior to the 2004 wastewater treatment plant expansion, a mixing zone study was completed in 2002 by Gibbs and Olson to address receiving water quality issues. That mixing zone study is summarized in the 2004 NPDES permit in Appendix D.

Effluent Limitations

The following table lists the expected future effluent limitations used as a basis for the design of the long term treatment facilities.

Table 5.1
Effluent Limitations
for Long Term Treatment Facilities

Parameter	Monthly Average	Weekly Average
Total BOD_5 (mg/L)	10	15
Total Suspended Solids (mg/L)	10	15
Total Ammonia-N (June – October) (mg/L)	2.0	3.9*
Total Ammonia-N (November – May) (mg/L)	6.2	12.3*
Fecal Coliform (organisms/ml)	100/100	200/200
pH	Between 6 - 9	

* These ammonia limits are not weekly, but maximum daily.

Federal Biosolids Regulations

In selecting the appropriate methods of solids processing, consideration must be given to the appropriate regulations. The treatment and reuse of biosolids requires the adherence to federal 40 CFR Part 503 requirements and State Chapter 173-308 requirements.

<u>Federal 40 CFR PART 503 Requirements</u>

In the United States, regulations (40 CFR Part 503) were implemented in 1993 by the U.S. Environmental Protection Agency, which established pollutant limits and management practices for the reuse and disposal of solids generated from the processing of municipal wastewater and septage. These regulations were designed to protect public health and the environment from any reasonably anticipated adverse effects of pollutants contained in the biosolids.

The regulations addressed by 40 CFR Part 503 cover specifically: 1) land application of biosolids; 2) surface disposal of biosolids; 3) pathogen and vector reduction in treated biosolids; and 4) incineration.

1. Land Application

Land application relates to biosolids reuse and includes all forms of applying bulk or bagged biosolids to land for beneficial use at agronomic rates (rates designed to provide the amount of nitrogen needed by crop or vegetation while minimizing the amount that passes below the root zone). The regulations establish two levels of biosolids quality with respect to heavy metals, two levels of quality with respect to pathogen densities and two types of approaches for meeting vector attraction.

2. Surface Disposal

The surface disposal part of the Part 503 regulations applies to: 1) dedicated surface disposal sites; 2) monofills, i.e. solids-only landfills; 3) piles or mounds; and 4) impoundments or lagoons. Disposal sites and solids placed on those sites for final disposal are addressed in the surface disposal rules. Surface disposal does not include placement of solids for storage or treatment purposes. Where surface disposal sites do not have a liner or leachate collection system, limits are established for pollutants such as arsenic and nickel, and vary based on the distance of the active surface disposal site boundary from the property line.

3. Pathogen and Vector Attraction Reduction

The 40 CFR Part 503 regulations divide the quality of biosolids into two categories, referred to as Class A and Class B. Class A biosolids must meet specific criteria to ensure they are safe to be used by the general public and for nurseries, gardens, and golf courses. Class B biosolids have lesser treatment requirements than Class A, and typically are used for application to agricultural land or disposed of in a landfill.

Class B pathogen requirements are the minimum level of pathogen reduction for land application and surface disposal. The only exception to achieving at least Class B level occurs when the solids are placed in a surface disposal facility that is covered daily. Biosolids that do not qualify as Class B cannot be land applied. To meet Class B requirements, biosolids must be treated by a process that reduces but does not eliminate pathogens, or that must be tested to meet fecal coliform limits.

To meet pathogen and vector reduction requirements, two levels of preapplication treatment are required, and have been defined by the EPA as Processes to Further Reduce Pathogens (PFRP) and Processes to Significantly Reduce Pathogens (PSRP). Because PFRPs reduce but do not eliminate pathogens, PFRPs still have the potential to transmit disease. Because PSRPs reduce pathogens below detectable levels, there are no pathogen related restrictions for land application. Minimum frequency of monitoring, record-keeping, and reporting requirements are required to be met, however.

4. Incineration

The Part 503 regulations establish requirements for wastewater biosolids-only incinerators. The regulations cover incinerator feed solids, the furnace itself, operation of the furnace, and exhaust gases from the stack. The rule indirectly limits emissions of heavy metals and directly limits total hydrocarbon emissions from incinerator stacks. Pollutant limits for wastewater solids fired in an incinerator are established for beryllium, mercury, lead, arsenic, cadmium, chromium, and nickel. Incinerators must also meet a monthly average limit for total hydrocarbons. Monitoring and reporting are also required.

State Biosolids Regulations (WAC-173-308)

EPA allows states the ability to enforce their own version of biosolids regulations. Under 40 CFR 503, these state biosolids regulations must be at least as stringent as the federal 503 regulations. The State of Washington has adopted the 503 requirements in its own regulations governing the use or disposal of biosolids, as WAC 173-308. These regulations became effective in March 1998 and are enforced by the Department of Ecology. The requirements in WAC 173-308 pertaining to pollutant limits, vector attraction reduction, pathogen reduction, operational standards and management practices are very similar to the requirements of the federal 503 regulations.

Compliance with the State Environmental Policy Act

Treatment works treating domestic sewage must also comply with requirements of the State Environmental Policy Act (SEPA). Generally, compliance involves completing an environmental checklist to be reviewed by the lead SEPA agency, which makes a threshold determination of environmental impacts and carries out a public notice of the determination. Potential outcomes are a Determination of Nonsignificance, Mitigated Determination of Nonsignificance, or Determination of Significance. The latter leads to preparation of an Environmental Impact Statement.

It is expected that most biosolids related proposals will not result in significant adverse environmental impacts, and in most cases a Determination of Nonsignificance will likely be issued. Mitigation may be appropriate in some cases, but alternatively can probably be addressed as a condition of permit coverage or approval of a general or site specific land application plan.

DOE is promulgating new federal regulations for the treatment and disposal of wastewater sludge through a manual entitled the *Biosolids Management Guidelines for Washington State* [7]. The primary purpose of these guidelines is to assist biosolids managers in developing proper requirements for biosolids management programs, and to assist regulatory officials in developing proper requirements for biosolids permits. These regulations will be followed by the City during the expansion of their biosolids management program.

5.5 CAPACITY, MANAGEMENT, OPERATIONS, AND MAINTENANCE (CMOM) REGULATIONS

CMOM stands for "Capacity, Management, Operations, and Maintenance". These regulations were created by the EPA in order to reduce the occurrence of Sanitary Sewer Overflows (SSOs) nationwide. It was created as a framework for municipalities to identify and incorporate widely accepted wastewater industry practices in order to:

- Better manage, operate, and maintain collection systems
- Investigate capacity constrained areas of the collection system
- Respond to sanitary sewer overflow (SSO) events

In CMOM planning, the utility selects performance goal targets, and designs CMOM activities to meet the goals. Information collection and management practices are used to track how well each CMOM activity is meeting the performance goals, and whether overall system efficiency is improving.

Status of CMOM Regulations

The CMOM regulations are currently waiting for finalization and publication, which was initially expected in mid-2004. The EPA continues to develop guidance and information to encourage the implementation of the Combined Sewer Overflow (CSO) policy. State and federal NPDES permitting authorities are working with permittees to incorporate CSO conditions into NPDES permits and other enforceable mechanisms, such as administrative and judicial orders.

CMOM Requirements and Program Elements

There are four major documentation requirements of the CMOM permit. These requirements vary based on the size and complexity of the municipal wastewater collection system and include a written summary of the CMOM Program; an Overflow Emergency Response Plan; a Program Audit Report; and a System Evaluation and Capacity Assurance Plan.

For municipalities to meet CMOM requirements, the following legal, administrative, and management elements will be required:

Legal Authority. Adopt a sewer use ordinance that requires proper design installation, testing and inspection (including service lines) and includes pretreatment standards for fats, oils, and greases.

Information Management. Maintain up-to-date mapping of the collection system and establish a process to update maps with new development; maintain a database on pipes including size,

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material and date constructed; maintain overflow data, three years of work order history, complaint records, performance and implementation measures, and a list of system components with inadequate capacity.

Overflow Response Plan. Develop and implement an SSO response plan to stop and mitigate impacts as soon as possible. The plan must outline staff training in SSO response procedures, a process for plan review and updating, a public notification program, and steps for immediate notification of health officials and the National Pollutant Discharge Elimination System (NPDES) authority.

Condition Assessments. Conduct periodic video pipe inspections and smoke testing to identify structural deficiencies and illicit connections. Update information management systems as needed based on the condition assessment.

Capacity Assurance. Identify deficient components of the system for both existing and future conditions through system modeling. Develop a master plan that includes a capital improvement plan to address deficiencies. Budget for capital improvements.

Construction Standards. Adopt and enforce defined design criteria that include evaluation of downstream impacts for new development, capital improvements, and rehabilitation. Require proper review of construction drawings as well as acceptance tests and inspection, including laterals.

Staff Training. Provide a training program for operation and administrative personnel that includes all elements of the CMOM program. Develop a mandatory certification program.

Compliance Audits. Assign responsible staff to complete the CMOM program audit report based on interviews with staff, observations of crews, SSO data records, and work order records. The audit review report is to identify apparent deficiencies, steps taken to address problems, and additional measures needed.

Implications for the City of La Center

The City of La Center already has many elements of the CMOM program currently in place or in the process of being developed. The adoption of this General Sewer Plan will meet many of the requirements of these regulations. It is recommended that the City assign staff to monitor the EPA's final adoption of CMOM regulations, and eventually oversee the City's compliance.

SECTION 6

EXISTING AND PROJECTED SEWER FLOWS

6.1 LAND USE PROJECTIONS

In response to the requirements of the State of Washington Growth Management Act, the City of La Center updated its Comprehensive Plan in 2008. The Comprehensive Plan establishes the UGA, the area in which growth is expected to occur to the year 2024. The 2024 UGA is utilized as the 20 year (2032) sewer planning area for this plan. The objective of the UGA is to encourage growth in areas where public services can be effectively and efficiently provided and in a manner that is compatible with the needs of the community.

Residential population and equivalent residential unit (ERU) projections were made using information available from the Comprehensive Plan [5]. Historically residential population growth has varied between 0.5% and 10% per year. The Comprehensive Plan establishes the projected population at 2024 based on the historical growth rate.

6.2 POPULATION PROJECTIONS

20-Year Population and ERU Projections

Wastewater flows are contributed by both residential land uses, and non-residential land uses, which include industrial and commercial uses. For purposes of sewer planning, flow and wasteload projections are based upon ERUs. An ERU represents the equivalent flow and wasteload from a single family household. ERU values were calculated based upon the following assumptions:

1. Average household size is 2.7 persons per unit (1 ERU = 2.7 people), the target value from the Comprehensive Plan.

2. Nonresidential ERU values were estimated by evaluating water meter billing records.

These assumptions and the population projections in the Comprehensive Plan were used to create Table 6.1, which represents projected growth within the 20-year UGA planning area. Due to lower than expected growth over the past several years, population at the end of the 20-year sewer planning period (2032) was assumed to equal the 20-year UGA population projection (2024).

Table 6.1
Population and ERU Projections

		ERUs					
Year	Population*	Residential	Downtown Comm.	Junction Comm./ Industrial	Public	Total	Population Equivalent
2012	3,101	1,153	308	0	44	1,504	4,047
2013	3,392	1,261	317	5	48	1,631	4,387
2014	3,710	1,379	326	23	57	1,786	4,803
2015	4,058	1,509	336	41	62	1,948	5,240
2016	4,439	1,650	346	59	67	2,123	5,709
2017	4,856	1,805	357	77	73	2,312	6,218
2018	5,311	1,974	367	95	80	2,517	6,770
2019	5,809	2,160	378	113	86	2,737	7,363
2020	6,354	2,362	390	131	93	2,976	8,005
2021	6,951	2,584	401	149	102	3,236	8,706
2022	7,603	2,826	413	167	110	3,517	9,460
2023	8,316	3,092	426	185	120	3,823	10,282
2024	9,827	3,653	439	203	123	4,418	11,883
2032**	9,827	3,653	439	203	123	4,418	11,882

* Populations in this table derived by assuming a constant growth rate between 2010 (Census population of 2,800) and 2024 (Comprehensive Plan population projection of 9,827).

** 2032 sewer planning population estimate is assumed to equal the 2024 population projection, as discussed in subsection 5.1.

*** The vast majority of downtown commercial wastewater discharge is from the four cardrooms. Downtown commercial ERU growth projections assumed that growth in cardroom wastewater would parallel the average Clark County growth rate of the past 20 years, which has been approximately 3%.

**** Junction commercial/industrial ERU estimates were estimated by taking projected employment data from the comprehensive planning process, and estimating ERU's based upon an assumed 35 gallons per-job flow estimate.

50-Year ERU Projections

A 50-year ERU projection was made by assuming that the 2062 ERU population would equal 300% of the ERU growth from year 2006 to 2032. This equates to an annual growth rate of just less than 4% for the period between 2032 and 2062. With this assumption, the year 2062 ERU projection is 12,672.

6.3 EXISTING FLOW AND WASTELOADS

Population, wastewater flows, and wastewater loadings were provided by the City. Table 6.2 summarizes this data for the period of 2007 to 2011. It includes influent flows and loadings for wastewater entering the treatment plant.

Table 6.2
Summary of Influent Wastewater Characteristics

Parameter	2007	2008	2009	2010	2011
Actual Population	2440	2510	2545	2800	2835
Population Equivalent	3190	3272	3347	3074*	2939*
Population Equivalent less Cardrooms	2676	2744	2820	2601	2454
Total Annual Average Daily Flow (mgd)	0.27	0.25	0.25	0.27	0.30
Unit Average Daily Flow (gpcd)	109	100	100	96	105
Total Average Wet Weather Flow (mgd)	0.32	0.29	0.28	0.28	0.35
Unit Wet Weather Flow (gpcd)	131	116	108	99	125
Total Average Dry Weather Flow (mgd)	0.21	0.21	0.22	0.22	0.25
Unit Dry Weather Flow (gpcd)	87	85	87	79	87
Total Peak Monthly flow (mgd)	0.37	0.34	0.35	0.39	0.41
Unit Peak Monthly Flow (gpcd)	152	134	136	138	145
Total Peak Daily Flow (mgd)	0.64	0.49	0.72	0.49	0.62
Unit Peak Daily flow (gpcd)	262	194	284	175	220
Total Annual Average BOD (lb/dy)	639	654	668	615	605
Cardrooms Annual Average Daily BOD (lb/dy)*	103	106	105	95	97
Annual Average Daily BOD less Cardrooms	536	548	563	520	508
Unit Annual Average BOD (lb/capita/dy)	0.22	0.22	0.22	0.19	0.18
Maximum Month BOD (lb/dy)	722	696	718	739	739
Max Month BOD less Cardrooms (lb/dy)	619	590	613	644	642
Unit Max Month BOD (lb/capita/dy)	0.25	0.24	0.24	0.23	0.23
Total Annual Average TSS (lb/dy)	442	432	452	446	444
Cardrooms Annual Average Daily TSS (lb/dy)*	38	39	39	35	36
Annual Average Daily TSS less Cardrooms (lb/dy)	404	393	413	411	408
Unit Annual Average TSS (lb/capita/dy)	0.17	0.16	0.16	0.15	0.14
Maximum Month TSS (lb/dy)	497	476	514	599	525
Max Month TSS less Cardrooms (lb/dy)	459	437	475	564	489
Unit Max Month TSS (lb/capita/dy)	0.19	0.17	0.19	0.20	0.17

* Cardroom BOD and TSS was estimated assuming typical concentrations from gambling casinos.

6.4 COMMERCIAL AND INDUSTRIAL WASTEWATER

Currently, there are no industries discharging wastewater to the City. There are however, four cardroom casinos that discharge particularly high BOD/TSS loadings.

The City has calculated wastewater loadings from these establishments based on average water use and assumed loading data. The Orange Book assumes restaurants open 16 hours will contribute a flow of 50 gpd per seat, and 0.2 lbs./day of BOD and TSS per seat. Assuming the cardrooms are open for 24 hours per day, restaurant loading values were extrapolated to a flow of 50 gpd per seat, and 0.3 lbs./day of BOD and TSS per seat. These assumed values fit well with the population equivalent loadings received at the plant.

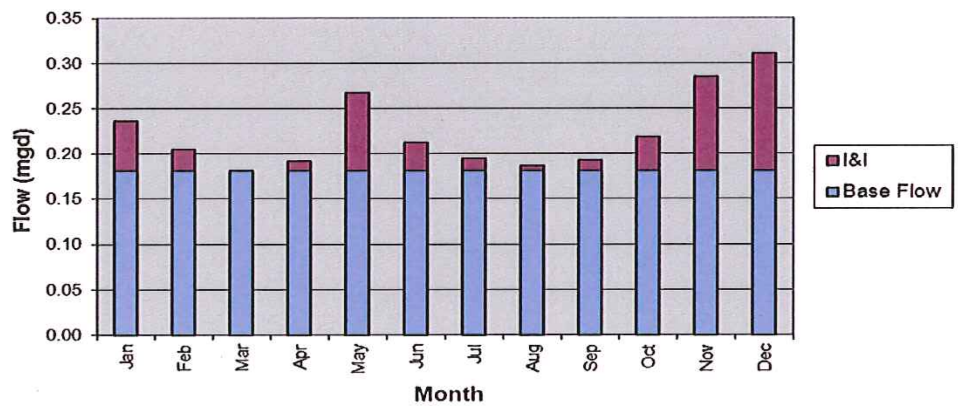
6.5 INFILTRATION AND INFLOW (I/I)

Infiltration is defined as subsurface water which enters the wastewater collection system through cracks, joints, or other deficiencies in the collection system. It is directly influenced by the local groundwater table and the structural integrity of the collection system. All collection systems experience some degree of infiltration. Each system must plan and allow for additional capacity to accommodate this flow contribution.

Inflow is the component of I/I that is attributed to surface water, mainly stormwater runoff, entering the system through roof drains, storm drains, manhole covers, and other direct conduits to the sewer system. Inflow is directly influenced by storm events and usually occurs over a short period, during and after a storm event. Inflow is usually preventable by eliminating non-sewerage connections to the system. With older systems, however, identifying illegal sewer connections can be difficult.

The majority of the wastewater collection system was constructed in 1968. Because it was mostly constructed with concrete sewer pipe, it is prone to infiltration. In recent years, the City has replaced 160 feet and slip-lined 25 percent of the concrete sewer pipe. The City also adopted high quality standards for new sewer main construction, and has been diligent in their inspection services. The impact of I/I on La Center sewage flows is illustrated in the following Figure 6.1.

Figure 6.1
2005 Average Daily Influent Composition



The following Table 6.3 summarizes the infiltration and inflow related values for the wet months of each year from 2007-2011.

Table 6.3
Infiltration and Inflow Reduction
2007-2011 (Wet Weather Months)

Year	Wet Month Influent Flows (mgd) Daily Average	Peak Month	Peak Day	Total Rainfall (in)
2007	0.32	0.37	0.64	49.94
2008	0.29	0.34	0.49	32.62
2009	0.28	0.35	0.72	35.30
2010	0.28	0.39	0.49	41.87
2011	0.35	0.41	0.62	35.89

Infiltration

EPA guidelines define 120 gallons per capita per day (GPCD) as the threshold of excessive infiltration, based on influent flow of a 7 to 14 day low rainfall period during the season of high ground water. Two periods of no rainfall during the wet season during the period of 2001 through April 2004 were identified to evaluate the La Center collection system. No data after April of 2004 was evaluated due to a lack of rainfall data caused by the removal of the rain gauge at the La Center WWTP.

One fourteen day rainy period in March-April 2002 was evaluated using a 2002 population equivalent of 1,898; the average influent flow was calculated to be 95 gpcd. A second thirteen day rainy period in March-April 2004 was evaluated using a 2004 population equivalent of 2,210; the average influent flow for this period was calculated to be 75 gpcd. Both of these weeks followed at least a month of wet weather which would have increased the groundwater levels. Because the average GPCD flows are below the EPA limit no further infiltration studies are required.

Inflow

EPA guidelines define 275 GPCD as the threshold of excessive inflow, based on influent flow during storm events that create surface runoff. For the purposes of this analysis a rainfall of 0.5 inches per day or greater was used. There were several storm events with a rainfall large enough to cause runoff during the period of 2001 through April 2004. No data after April of 2004 was evaluated due to a lack of rainfall data caused by the removal of the rain gauge at the La Center WWTP.

The maximum 24-hour flow in the study period was 263 GPCD in January 2003. This value is below the EPA guidance for assessing excessive flow, therefore no further inflow studies are required.

6.6 FLOWS AND WASTELOAD FORECAST

Flow Projections

Future per capita waste contributions were estimated based on existing per capita waste contribution and the DOE guidelines. Table 6.4 contains the per capita average contribution from 2000-2005, DOE recommended design values for new wastewater treatment facilities [6], and the value used for future population loading. DOE guidelines base loadings on direct population, which assumes a higher per capita flow contribution as compared to population equivalents. The per capita values in Table 6.4 are based upon population equivalents as opposed to direct populations, using lower flow contribution values.

Table 6.4
Population Equivalent Per Capita Wastewater Loadings

Parameter		Historical* Values	DOE Guideline	Future (2032)
Flow (gal/day)	Average Annual	102	100	110
	Dry Average	85	n/a	90
	Wet Average	116	n/a	120
	Max Month	152	n/a	175
	Peak Day	284	n/a	300
BOD** (lb/d)	Average Annual	0.24	0.20	0.20
	Maximum Month	0.28	n/a	0.32
	Peak Day	0.36	n/a	0.45
Total Suspended Solids** (lb/d)	Average Annual	0.17	0.20	0.17
	Maximum Month	0.22	n/a	0.29
	Peak Day	0.35	n/a	0.40

* The information in this table is based on average, maximum, and minimum values taken from data gathered between 2007-2011.

** Historical per capita BOD and TSS loadings shown would be slightly increased if the assumed loadings from the four cardrooms were included.

Population projections contained in Table 6.1 and future loading rates contained in Table 6.4 were used to develop projected wastewater loadings shown in Table 6.5. The future loading values presented in Table 6.5 were developed by calculating a direct projection of population equivalent times the "future" unit values from Table 6.4.

It is important to note that a major gambling casino is currently being considered for siting within the study area. Estimates for BOD and suspended solids loadings from that facility are very high compared to the projected loadings under current zoning. If that casino is approved and elects to discharge to the City's wastewater system, the BOD and TSS projections listed above will likely be too low. On the other hand, if the facility sites and elects to build its own treatment plant (which has been discussed as an option) it could reduce the loadings from the cardrooms in town. In light of these issues, the BOD and suspended solids loadings should be carefully evaluated during the predesign efforts for any wastewater treatment plant expansions.

Table 6.5
Projected Wastewater Loadings

		Year:	2006	2016	2032
		Population Equivalent:	**2,526**	**5,709**	**11,882**
Flow (mgd)	*Average Annual*	110*	0.28	0.63	1.31
	Dry Average	90*	0.23	0.51	1.07
	Wet Average	120*	0.30	0.69	1.43
	Max Month	175*	0.44	1.00	2.08
	Peak Day	300*	0.76	1.71	3.56
BOD (lb/d)	*Average Annual*	0.20**	505	1,142	2,376
	Maximum Month	0.32**	808	1,827	3,802
	Peak Day	0.45**	1,137	2,569	5,347
Total Suspended Solids (lb/d)	*Average Annual*	0.17**	429	971	2,020
	Maximum Month	0.29**	733	1,656	3,446
	Peak Day	0.40**	1,010	2,284	4,753

* Units of gallons per capita per day.
** Units of pound per capita per day.

SECTION 7

COLLECTION SYSTEM EVALUATION

7.1 OVERVIEW OF EVALUATION PROCESS

The collection system evaluation was completed by a seven-step process as follows:

1. Three conditions of analysis were established: 1) existing, 2) 20-year, and 3) 50-year. ERU projections for each condition were calculated.
2. A preliminary layout of trunk sewers was established to serve the 20-year and 50-year sewer planning areas.
3. Drainage basins were developed for each trunk sewer.
4. ERUs were allocated to each basin for the three conditions of analysis (existing, 20-year, and 50-year).
5. Existing sewers were evaluated for their capacity to accommodate existing and 20-year flows.
6. For those components of the existing system that were found to be under-capacity within the 20-year sewer planning period, bypass or upsizing improvement options were evaluated and a preferred option selected.
7. The improvements identified in step #6 above, along with the improvements necessary to serve the drainage basins within the future growth area of the 20-year sewer planning area, were sized for 50-year (or build-out) flow conditions.

7.2 LAYOUT OF PROPOSED COLLECTION SYSTEM IMPROVEMENTS

Locations of proposed trunk sewers, pump stations, and force mains for the future growth areas were established with two goals: 1) to limit the number of pump stations; and 2) to minimize the length of force mains in order to reduce the potential for sulfide generation.

Ideally, gravity sewers would be extended through the low points of the drainageways. For most of the major drainage basins, the extension of gravity sewers through the low areas of the drainageway was not practical due to severe sideslopes and environmental constraints. For these basins, trunk sewers were assumed to extend along the top of the drainageways. Doing so requires more sewers (one on each side of the drainageway); however, it allows gravity sewer service to most of the service areas.

7.3 BASIN ERU ALLOCATION OF YEAR 2032 FLOWS

ERUs for the year 2032 sewer planning period were projected as discussed in Section 6. The allocation of these ERUs was based upon a number of factors, including the existing ERU count per basin (from aerial photographs), build-out capacity of the basin, platted undeveloped lots in the basin, zoning, topography, and sensitive land area.

As mentioned previously, this plan identifies only those collection system improvements necessary to serve the 20-year sewer planning area; however, the gravity sewers that are proposed are sized for build-out, or for 50 years if the basins served could be extended beyond the currently proposed UGA.

7.4 BASIN ERU ALLOCATION OF 50-YEAR FLOWS

The 50-year ERU allocation was made as follows:

1. Total 50-year ERU estimates were obtained by assuming that the 2062 ERU population would equal 300% of the ERU growth from year 2006 to 2032.
2. Build-out ERU estimates for the basins within the UGA were estimated assuming the basins would increase in density by 10% over the year 2032 projections.
3. The 50-year ERU estimate, less that allocated to the 20-year sewer planning area, was allocated to areas outside the 20-year sewer planning area on an average arial basis.
4. The 50-year UGA was estimated by first assuming that the 50-year UGA would be approximately 200% larger than the 2024 UGA expansion area. The boundary for the 50-year UGA was estimated by assuming the City would grow primarily west and north.

Estimates of ERUs for each of the basins for existing, 20-year, and 50-year design periods are summarized by basin in Table A-2 of Appendix A. The basin locations are shown in Figure A-1 of Appendix A.

7.5 EXISTING SEWER SYSTEM EVALUATION UNDER EXISTING CONDITIONS

The existing sewer system was evaluated at existing conditions as follows:

1. Existing sewer mains to be modeled were selected as those whose contributory (upstream) service area produced flows in excess of the flows that could be accommodated by an 8-inch diameter sewer at minimum slope.
2. For those existing mains, drainage basins were established for each sewer main to be evaluated.
3. Existing ERUs were allocated to each basin based on the 2006 population (939 ERUs). These were utilized to project flows to each basin.
4. Capacity of each sewer main was evaluated against the estimated flows.

7.6 MODELING ASSUMPTIONS

The sewer system was modeled for existing, 20-year, and 50-year flow conditions. These models have been included as Tables A3, A4, and A5 of Appendix A.

Existing conditions were assumed to be equal to 2006 conditions, due to little growth between 2006 and 2012. For existing conditions, sewer mains selected for modeling were those whose upstream capacity at 20-year design flow conditions exceeded the capacity of an 8-inch main at minimum slope.

For the 20-year and 50-year flow conditions, sewer main extensions and pump stations were located to fit topographic conditions. Upon final selection of the preferred siting option, proposed sewers were modeled using flow projections from Section 6, design assumptions from Section 5, proposed sewer and pump station siting and basin allocations as outlined above.

7.7 EXISTING COLLECTION SYSTEM OVERVIEW

The existing facilities were evaluated by estimating existing and 20-year flow conditions within the existing service area and comparing those flows to the capacity of existing mains. Appendix A contains information regarding system capacities for the existing mains and projected flows in 20 years. 50-year flow projections have been included as a basis for sizing 20-year improvements. The scope of this evaluation only addressed the main sewer lines in the existing service area, as represented in Figure 4.1.

7.8 EXISTING COLLECTION SYSTEM EVALUATION

The collection system is generally adequate to meet current conditions. Although the majority of the existing collection system has the capacity to accommodate the anticipated 20-year flow conditions, portions will require upsizing.

7.9 PROPOSED COLLECTION SYSTEM IMPROVEMENTS

As a result of the evaluations of the collection system outlined above, several improvements to the collection system are proposed. These are listed as follows, and are shown in Figure 7.1. A more detailed description of the proposed collection system improvements is included in Section 9.

- Pump Station #1 Upgrade
- Pump Station #2 Upgrade and Force Main #2 Capacity Upgrade
- Pump Station #3 Upgrade and Force Main #3 Capacity Upgrade
- Pump Station #5 and Force Main #5
- Pump Station #6 and Force Main #6
- Sewer Main C Capacity Upgrade
- Sewer Main D Capacity Upgrade
- Sewer Main E
- Sewer Main F
- Sewer Main G
- LCR Sewer Phase 1:
  - Force Main LCR-A
  - Sewer Main LCR-A
  - Force Main LCR-B
  - Sewer Main LCR-B
  - Sewer Main LCR-C
  - Siphon LCR-D
  - LCR Pump Station
- LCR Sewer Phase 2:
  - Siphon LCR-D Capacity Upgrade
- LCR Sewer Phase 3:
  - LCR Pump Station Capacity Upgrade

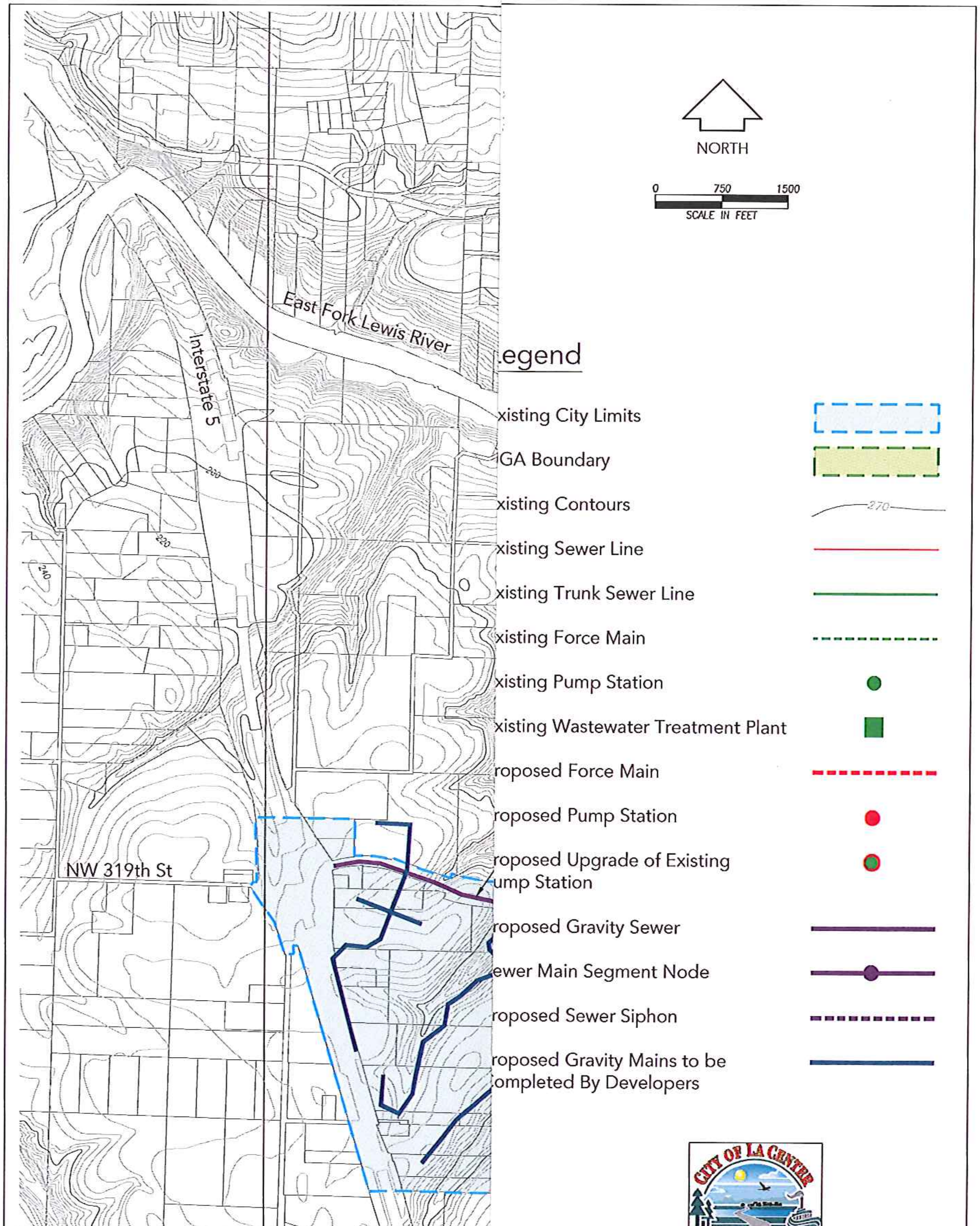


Figure 7.1
Proposed Collection System Improvements

City of La Center
General Sewer Plan
March 2013

SECTION 8

TREATMENT PLANT EVALUATION

8.1 BACKGROUND

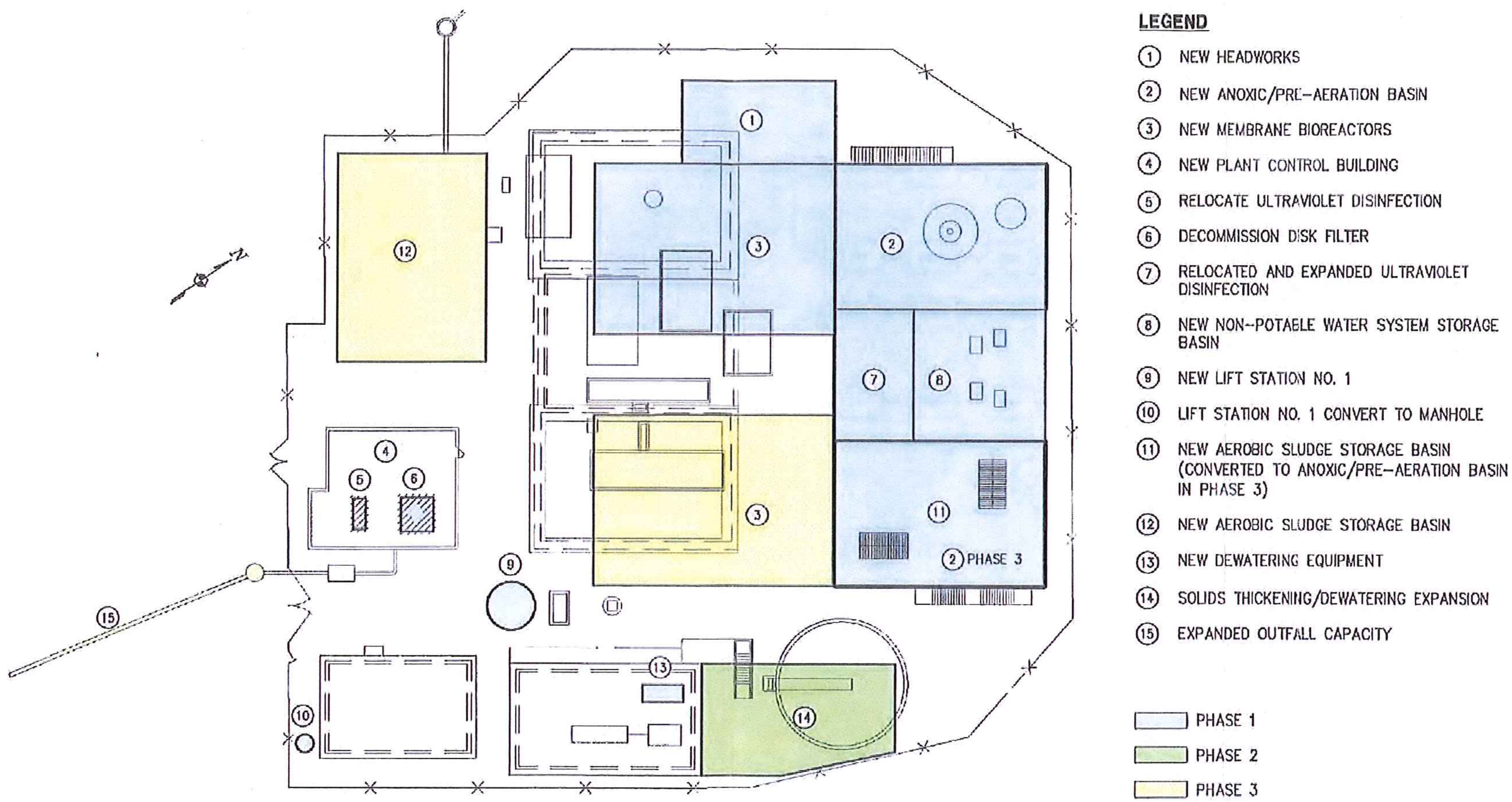
Originally constructed in 1965, the wastewater treatment plant underwent upgrades in 1994, 1995 and 1998. In 2004, the plant was completely rebuilt and included two sequencing batch reactors. Due to rapid growth, the plant was updated in 2011. The 2011 plant update was part of a three phase plant expansion process outlined in the 2008 *City of La Center Wastewater Facility Plan*. The Facility Plan recommends an ultimate plant capacity of 2.25 MGD maximum monthly wet-weather flow, 4.20 MGD peak daily flow, and 6.22 MGD peak hourly flow.

8.2 TREATMENT PLANT EXPANSION

The Facility Plan divided treatment plant upgrades into three phases. Subsequently, the first phase was divided into Phase 1A and Phase 1B. Currently, Phase 1A has been completed.

The Phase 1A expansion, completed in 2011, converted the plant from a sequence batch reactor system to a membrane bioreactor system. Currently the plant is capable of handling maximum monthly flow of 0.69 MGD and a peak day flow of 1.29 MGD. Phase 1B will upgrade the blower system and add membrane units, increasing capacity to 1.04 MGD maximum monthly flow and 1.94 MGD peak day flow.

Phase 2, which will increase sludge flow capacity, is planned for completion by 2017. Phase 3, which will increase liquid stream flow to meet capacity through 2027, is expected to be completed by 2018. Figure 8.1 shows the expected construction phasing. For more details associated with the design and phasing of the treatment plant, see the 2008 *City of La Center Wastewater Facility Plan*.



NOTE:
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Figure 8.1
WWTP Improvements Plan

City of La Center
General Sewer Plan
March 2013

010464

SECTION 9

RECOMMENDED PLAN

9.1 PLAN SUMMARY

A number of collection and wastewater treatment facility improvements are proposed to meet the sewer needs of the City for the 20 year planning period. The schedule for the proposed collection system improvements will depend upon growth within the individual basins. The treatment plant has already undergone a portion of the first phase of a three phase expansion process as described in the Facility Plan.

Proposed collection system improvements include approximately 2.75 miles of gravity sewer ranging in size from 8-inch to 30-inch diameter, the up-sizing of three existing pump stations, the construction of three new pump stations, approximately 1.5 miles of force main ranging in size from 6-inch to 10-inch diameter, and approximately 1 mile of sewer siphons ranging in size from 6-inch to 12-inch diameter.

9.2 PROPOSED COLLECTION SYSTEM IMPROVEMENTS

The recommended collection system improvements are presented in Figure 7.1. Proposed collection system improvements include:

- Pump Station #1 Upgrade
- Pump Station #2 Upgrade and Force Main #2 Capacity Upgrade
- Pump Station #3 Upgrade and Force Main #3 Capacity Upgrade
- Pump Station #5 and Force Main #5
- Pump Station #6 and Force Main #6
- Sewer Main C Capacity Upgrade
- Sewer Main D Capacity Upgrade
- Sewer Main E
- Sewer Main F
- Sewer Main G
- LCR Sewer Phase 1:
    - Force Main LCR-A
    - Sewer Main LCR-A
    - Force Main LCR-B
    - Sewer Main LCR-B
    - Sewer Main LCR-C
    - Siphon LCR-D
    - LCR Pump Station
- LCR Sewer Phase 2:
    - Siphon LCR-D Capacity Upgrade

LCR Sewer Phase 3:
LCR Pump Station Capacity Upgrade

This plan incorporates the improvements recommended in the *La Center Junction Sewer Study,* which includes the majority of the lines included in LCR Sewer Phase 1, 2, and 3. However, this plan recommends the addition of force main LCR-A in order to provide service to the west side of Interstate 5. Force main LCR-A is sized to convey the buildout flow from the Cowlitz Development shown in Appendix A of the *La Center Junction Sewer Study.*

9.3 PROPOSED TREATMENT SYSTEM IMPROVEMENTS

See the 2008 *City of La Center Wastewater Facility Plan* for a detailed list of proposed improvements.

9.4 COLLECTION SYSTEM AND WASTEWATER TREATMENT PLANT IMPROVEMENTS COST ESTIMATE

Collection system costs summarized in Table 9.1 are in 2012 dollars, and include a 40% markup for engineering, tax, and contingencies. La Center Road sewer improvement cost estimates were performed in 2011 by OTAK in the *La Center Junction Sewer Study*, and were updated to 2012 dollars. However, this plan adds the cost for force main LCR-A to the La Center Road Phase 1 cost estimate included in the *La Center Junction Sewer Study.*

Wastewater treatment plant cost estimates shown in Table 9.2 were performed by Kennedy Jenks for the 2008 Wastewater Facility Plan, and were updated to 2012 dollars.

Table 9.1
Proposed Collection System Improvements Cost Estimates

Item		Cost ($)
1.	Pump Station #1 Capacity Upgrade to 1,400 gpm	1,640,000
2.	Pump Station #2 Capacity Upgrade to 550 gpm	224,000
3.	Force Main #2 Capacity Upgrade – 750' of 6-inch force main	138,000
4.	Pump Station #3 Capacity Upgrade to 450 gpm	201,000
5.	Force Main #3 Capacity Upgrade – 1650' of 6-inch force main	304,000
6.	Pump Station #5 – 200 gpm capacity	531,000
7.	Force Main #5 – 2,900' of 6-inch force main	976,000
8.	Pump Station #6 – 1,100 gpm capacity	1,593,000
9.	Force Main #6 – 980' of 8-inch force main	357,000
10.	Sewer Main C Capacity Upgrade – 600' of 15-inch gravity sewer	217,000
11.	Sewer Main D Capacity Upgrade – 500' of 15-inch gravity sewer	182,000
12.	Sewer Main E – 4,200' of 27-inch gravity sewer	2,964,000
13.	Sewer Main F – 2,160' of 27-inch gravity sewer	1,589,000
14.	Sewer Main G – 1,760' of 10-inch gravity sewer	534,000
15.	LCR Sewer Phase 1 Force Main LCR-A – 950' of 10-inch force main Sewer Main LCR-A – 2,293' of 10-inch gravity sewer Force Main LCR-B – 2,065' of 12-inch force main Sewer Main LCR-B – 2,000' of 12-inch gravity sewer Sewer Main LCR-C – 1,200' of 12-inch gravity sewer Siphon LCR-D – 1,947' of 6-inch siphon sewer and 1,477' of 8-inch siphon sewer LCR Pump Station – 1,278 gpm capacity	6,850,000
16.	LCR Sewer Phase 2 Siphon LCR-D – 2,100' of 12-inch siphon sewer	1,021,000
17.	LCR Sewer Phase 3 LCR Pump Station Capacity Upgrade to 2,103 gpm	165,000
Collection System Improvements Total		**19,486,000**

Table 9.2
Proposed Wastewater Treatment Plant Improvements Cost Estimates

Item		Cost ($)
1.	Wastewater Treatment Plant Expansion Phase 1B	1,950,000
2.	Wastewater Treatment Plant Expansion Phase 2	3,930,000*
3.	Wastewater Treatment Plant Expansion Phase 3	8,700,000
	Wastewater Facilities Phases 2, and 3 Total	**14,580,000**

* This price estimate has been updated since the completion of the 2008 Facility Plan.

SECTION 10

IMPLEMENTATION AND FINANCING

10.1 GENERAL

The implementation of the General Sewer Plan is necessary to accommodate projected growth. In making the necessary expansions, financing will be a critical issue. Because of that, detailed financial planning is necessary. This section provides an overview of financing issues, but is not meant to be a substitute for the financial planning that will be necessary to implement the plan.

10.2 INSTITUTIONAL RESPONSIBILITY

The City of La Center currently owns the wastewater collection and treatment systems serving the area within the City. The system was transferred to Clark Public Utilities ownership by agreement on October 30, 1992, and back to City ownership by agreement on August 1, 2006. The City now has sole responsibility for the operation, maintenance and improvement activities associated with the system. It is logical to assume that the City will continue to own and be responsible for the sewer system and its growth throughout the planning period. Monthly sewer service charges and sewer connection fees were established by the City when ownership transfer was completed.

10.3 IMPLEMENTATION SCHEDULE

The following Table 10.1 presents a tentative schedule for proposed improvements. The schedule was based on a constant growth rate through the sewer planning period. The schedule was estimated by comparing the capacity of the proposed improvements with the estimated growth in their respective basins. Most of the proposed collection system improvements are needed to serve residential growth in areas with large subdivisions under construction. Due to uncertainties regarding the time it will take for homes to be constructed and connected, close monitoring of the growth in the various basins is recommended. As mentioned previously, close monitoring of the growth rate is also recommended for the proposed treatment plant expansion.

Table 10.1
Proposed Project Implementation Schedule

Proposed Construction Year	Capital Improvement	Cost ($)
6-Year Capital Improvement Plan		
2013 to 2015	LCR Sewer Phase 1	6,850,000
	Wastewater Treatment Plant Expansion Phase 1B	1,950,000
	Wastewater Treatment Plant Expansion Phase 2	3,930,000*
	Pump Station #6 – 1,100 gpm capacity	1,593,000
	Force Main #6 – 980' of 8-inch force main	357,000
	Sewer Main F – 2,160' of 27-inch gravity sewer	1,589,000
	Sewer Main E – 4,200' of 27-inch gravity sewer	2,964,000
	Pump Station #5 – 200 gpm capacity	531,000
	Force Main #5 – 2,900' of 6-inch force main	976,000
	Sewer Main G – 1,760' of 10-inch gravity sewer	534,000
2016 to 2018	Pump Station #1 Capacity Upgrade to 1,400 gpm	1,640,000
	Pump Station #2 Capacity Upgrade to 550 gpm	224,000
	Force Main #2 Capacity Upgrade – 750' of 6-inch force main	138,000
	Pump Station #3 Capacity Upgrade to 450 gpm	201,000
	Force Main #3 Capacity Upgrade – 1650' of 6-inch force main	304,000
2019 to 2032 Improvements		
2019 to 2032	LCR Sewer Phase 2	1,021,000
	Sewer Main C Capacity Upgrade – 600' of 15-inch gravity sewer	217,000
	Sewer Main D Capacity Upgrade – 500' of 15-inch gravity sewer	182,000
	LCR Sewer Phase 3	165,000
	Wastewater Treatment Plant Expansion Phase 3	9,711,000

* This price estimate has been updated since the completion of the 2008 Facility Plan.

10.4 FUNDING OPTIONS FOR CAPITAL IMPROVEMENTS

Funding issues regarding the City's sewerage facilities have historically been addressed in an independent rate study. Connection fees have been utilized to fund new capital improvements that increase system capacity, while monthly rate revenues have been utilized to fund operation and maintenance costs. While this funding structure will likely continue, additional funding options are summarized in the following paragraphs.

Local Improvement District (LID)

For wastewater collection system expansions, a local improvement district (LID) can be formed for the area to be served. In the LID method of financing, a benefit area is established, and those parcels of property within that area share the cost of improvements constructed to serve the area. Revenue bonds finance the improvements, and property owners within the LID benefit area share in the cost of bond retirement.

Bonds

Wastewater facilities typically require a large one-time expenditure, such as a wastewater treatment plant expansion. These improvements can be financed by a general obligation or revenue bond that is repaid during the life of the new facility. The bond is normally repaid from revenues derived from monthly service charges. Normally, all customers share in the bond repayment. If bond payments are made from monthly utility charges, the existing citizens effectively finance a proportionate share of the growth. If bond payments are made from future impact fees, then growth pays for itself. Where system development charges are used to retire the bond, these charges should be set sufficiently high to also pay for other system capacity upgrades that will be needed to restore the capacity lost as a result of that development.

Connection Charges

Revenues have historically been generated for utility system improvements through the collection of connection charges. As connections to the system are made, a connection fee is charged. Although some of the connection fee may be used to recover costs associated with making the service connection, most of the fee is used to finance capacity upgrades. The rationale behind these fees is that the existing system has a limited amount of excess capacity and that new demands upon the system should pay the cost of providing new capacity. In La Center, connection fees are classified as System Development Charges (SDCs). When charging SDCs, it is important that they be used exclusively for capacity expansions, as opposed to maintenance upgrades.

Revolving Loan Fund Program

The State of Washington has a program whereby the City can obtain low interest loans to finance utility system improvements. The loan could be paid back with a funding program similar to that used to retire bonds.

Developer Financing

Utility distribution, collection, or even treatment facility improvements could be developer financed. Currently, eligible utility projects by developers may be reimbursed via latecomer agreements, as outlined in Chapter 13 LCMC.

State and Federal Funding Programs

There are a number of State and Federal funding programs available to finance sewerage facility expansions. The nature of these programs varies with the political climate. The recent trend has been for the availability of funds from these programs to decrease. Another recent trend has been for the funds to be limited to current needs and environmental improvement projects, rather than to finance expansions for future growth.

10.5 POLICY ISSUES ASSOCIATED WITH FINANCING

Policy Issue #1 – Paying the Cost of Growth

This Plan recommends that elected officials, through a public process, formally adopt a policy in regards to the cost of growth – how the cost of growth should be proportioned between existing taxpayers (ratepayers in the case of sewerage facilities) and new development.

Historically, federal and state funds have been utilized to finance major sewer system expansions. The recent trend has been towards a decreasing availability of federal and state funds. When federal and state grants were utilized for sewer system expansions, the end result was that existing residents helped to finance growth. Often, given the nature of the tax structure, people were unaware that they were financing growth. In many cases, the issue was viewed as one of "water quality" rather than "paying for growth." Now that state and federal funds are limited, there is sensitivity to the question of who pays for growth. It is becoming very important to address sewer funding issues so that the public can distinguish between those expenditures which benefit all citizens equally, and those expenditures that exclusively serve new growth.

Operation and maintenance costs clearly benefit all ratepayers, as do capital expenditures for repairs and maintenance-related replacement of existing facilities. The benefit of capital expenditures for capacity upgrades of existing facilities, and collection system expansions into new service areas, is clearly limited to the new ratepayers being served by those expansions. The issue of who pays for growth is clearly a "policy" issue. Although policies vary from one community to next, the most common one is to have growth pay for itself. In such cases, revenue from monthly sewer bills is used to pay for operation and maintenance costs, and utility extensions are funded by either LID, or developer financed with over-sizing for regional needs reimbursed by latecomer agreements.

As stated previously, for sewer planning purposes, implementation of the proposed facilities will be dependent upon financing. The method of financing selected by the City largely depends upon two fundamental policy issues associated with the City's role in financing growth: 1) how much, if any, should existing ratepayers pay for the cost of growth; and 2) if a policy of growth paying for itself is adopted by the City, how much risk are existing ratepayers willing to take regarding debt financing?

If elected officials adopt the policy of having growth pay for itself, the issues are simplified. If elected officials adopt a policy of having existing ratepayers finance growth, the issue becomes more complicated when considering the question of the share existing ratepayers should pay.

The method by which existing ratepayers pay for the cost of growth is quite simple – through monthly service charges. Capital improvements are either funded directly through accumulated revenue from service charges, or debt financed with debt retirement from monthly service charges.

Funding programs meeting the requirements of a policy of having growth pay for itself are much more complicated, particularly for collection system improvements. The simplest method of having growth pay for itself is to calculate the improvements necessary to accommodate growth, to calculate the growth in terms of equivalent residential units, and to set a system development fee equal to the cost divided by the ERUs. If other methods of financing such as LID or developer financing are utilized, the developer can be credited the proportional amount of system development charge.

Where a policy of growth paying for itself using system development charges is adopted, and a community is faced with a very rapid rate of growth, the issue of "debt" risk becomes important. High growth rates often mean that major expenditures must be made for capital improvements, which results in significant debt. Commonly, the intent is to have that debt retired from revenue generated by future system development fees. If growth and SDC revenue slows, the debt payments must be paid through monthly service charges. Faced with raising monthly sewer fees to help with debt payments, elected officials tend to take action to encourage growth. In such cases, it is often difficult for a community to impose strict development standards. This is why the issue of risk is an important policy issue. If a community adopts a policy of having growth pay for itself, said policy should also address the debt load a community is willing to accept.

Policy Issue #2 – Temporary Pump Stations

This Plan recommends that elected officials, through a public process, formally adopt a policy in regards to the use of temporary pump stations to serve new growth areas.

Wastewater can be either conveyed by gravity sewer, or pump station and force main. Conveyance by gravity sewer is highly preferred, due to the fact that it avoids the high cost of operating and maintaining a pump station and its force main. Considering the cost of operation, maintenance, and equipment replacement, a small pump station costs the City about $20,000 per year. If the force main is long, which requires sulfide control, the cost can approach $50,000 per year. Larger pump stations cost even more.

In some cases, pump stations cannot be avoided. This Plan identifies those pump stations that cannot be reasonably replaced by gravity sewers. It also identifies the location of force mains. The City will almost certainly be faced with developers wanting to serve their developments with temporary pump stations. Given the topography of the area, and the fact that so much of the growth area is currently developed in 5 to 10 acre large lots, allowing temporary pump stations could very easily result in a situation where the City must maintain up to 30 temporary pump stations at an annual cost in excess of $500,000. Therefore, one option is to allow temporary pump stations to facilitate development at the expense of ratepayers. The other option is not to allow temporary pump stations at the expense of landowners wanting to develop their property.

10.6 FUNDING CAPITAL FACILITIES

La Center has recently established a plan to finance capital improvements associated with capacity expansion with SDC revenue. The current SDC for the collection system is $7,800 per ERU.

10.7 FINANCING SYSTEM OPERATION AND MAINTENANCE

La Center has recently completed a rate study to determine monthly rates. The current monthly sewer charge for residential connections is $51 per month. This rate is currently being subsidized by the City general fund by approximately $25 per ERU per month.

SECTION 11

ENVIRONMENTAL ASSESSMENT

11.1 GENERAL

The environmental impacts associated with this Plan will primarily be those related to construction of the proposed collection system. Environmental impacts associated with treatment plant improvements are discussed in the Facility Plan.

11.2 SEPA REQUIREMENTS

The requirements of the State Environmental Policy Act (SEPA) have been fulfilled. An environmental checklist has been prepared along with related figures and sent to the proper governmental agencies. A copy of the SEPA information is included in Appendix E.