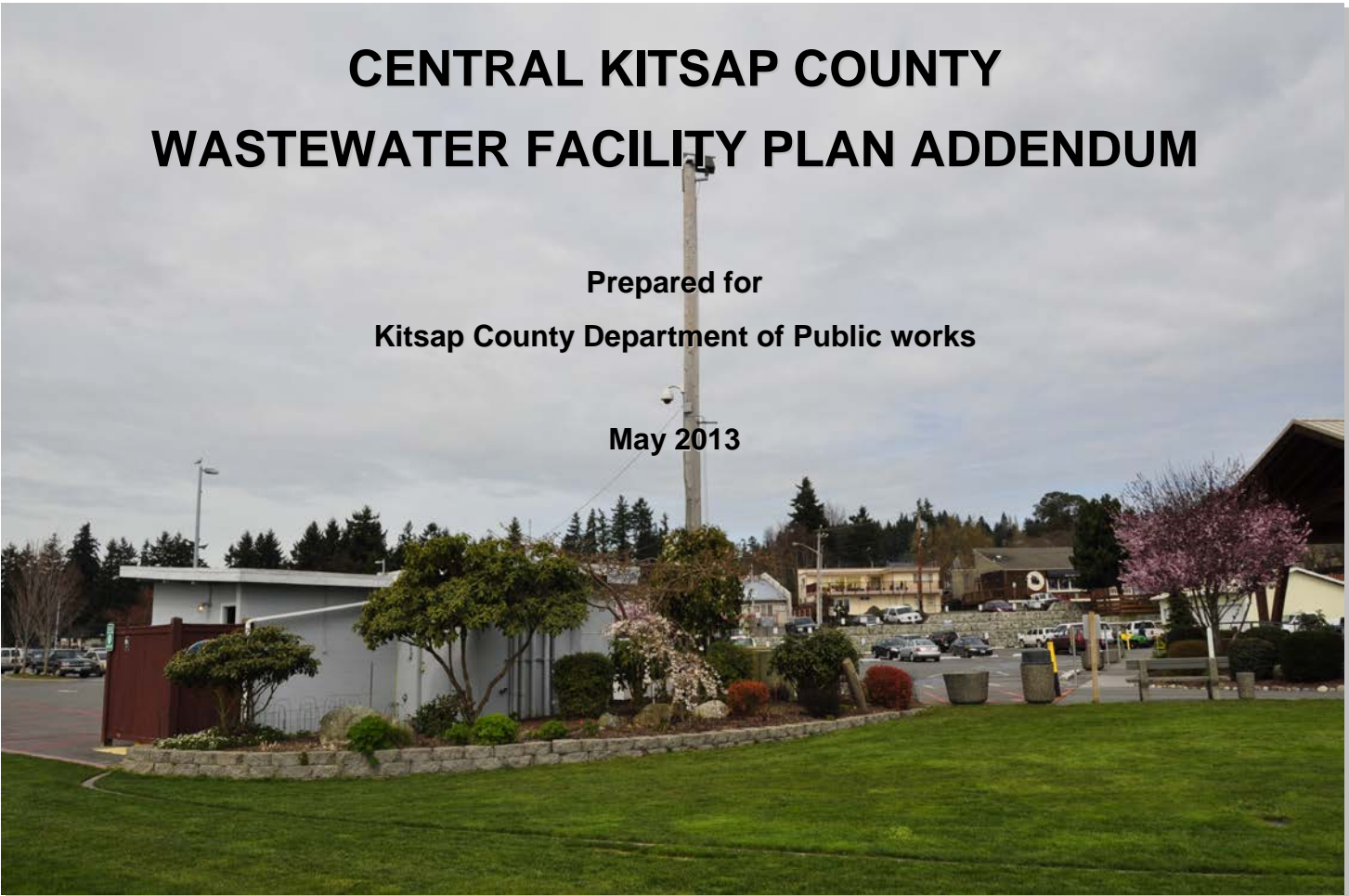




CENTRAL KITSAP COUNTY WASTEWATER FACILITY PLAN ADDENDUM

Prepared for
Kitsap County Department of Public works

May 2013



Prepared by:



Central Kitsap County Wastewater Facility Plan Addendum

Prepared for Kitsap County Public Works

May 2013



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TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION

1.1	Purpose of Addendum	1-1
1.2	Overview of Addendum Contents.....	1-1
1.3	Environmental Review and Adoption of the Capital Improvement Program.....	1-2

CHAPTER 2: PLANNING AREA CHARACTERISTICS

2.5	Population Estimates and Projections.....	2-1
2.8	Sewered Equivalent Population Projections.....	2-1

CHAPTER 3: WASTEWATER CHARACTERISTICS REVISIONS

3.2.3.4	Overall Projected Flows at the CKWWTP	3-1
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CHAPTER 7: COLLECTION SYSTEM IMPROVEMENTS

7.1	Overview of Chapter Contents	7-1
7.2	Project Identification.....	7-1
7.2.1	Existing Lift Station Projects.....	7-2
7.2.2	Existing Piping System Projects.....	7-2
7.2.3	Future Conveyance System Projects	7-7
7.3	Project Evaluation	7-7
7.3.1	Existing Lift Station Projects.....	7-7
7.3.2	Existing Piping System Projects.....	7-8
7.3.3	Future Conveyance Systems	7-9
7.4	Project Ranking and Prioritization	7-10
7.4.1	Existing Lift Station Projects.....	7-11
7.4.2	Existing Piping System Projects.....	7-12

CHAPTER 9: RECOMMENDED WASTEWATER SYSTEM CAPITAL IMPROVEMENTS

9.1	Overview of Chapter Contents	9-1
9.2	Collection System Improvements.....	9-1
9.2.1	6-Year CIP: Collection System.....	9-1
9.2.2	2019-2025 Collection System CIP	9-3
9.3	CKWWTP Improvements.....	9-6
9.3.1	6-Year CIP for CKWWTP.....	9-6
9.3.2	2019-2025 CKWWTP CIP.....	9-9
9.4	Project Cost Summary	9-11

References

APPENDIX

Kitsap County, 2012, Kitsap County UGA Sizing & Composition Remand, Final Comprehensive Plan & Development Regulation Amendments, Final Capital Facilities Plan

LIST OF TABLES

Table 2-3	Population Projections for CKWWTP Service Area and Poulsbo	2-1
Table 2-4	Equivalent Sewered Populations for CKWWTP Service Area and Poulsbo	2-2
Table 3-6	Summary of Projected Wastewater Flows	3-1
Table 7-1	Summary of Projects for Existing Collection System Piping Improvements.....	7-3
Table 7-2	Existing Lift Station Projects	7-8
Table 7-3	Summary of Future Lift Station Costs	7-9
Table 7-4	Summary of Improvements and Project Costs for Future UGA Collection System Piping	7-10
Table 7-5	Summary of Total Collection System Improvements and Project Costs	7-10
Table 9-1	6-Year Collection System Projects.....	9-2
Table 9-2	Summary of Collection System 6-Year CIP Project Costs.....	9-3
Table 9-3	Summary of Existing Lift Station Improvements for 2019-2025.....	9-4
Table 9-4	Summary of Existing Collection System Pipeline Projects for 2018-2025	9-5
Table 9-5	Summary of Future Sewer Systems project Costs	9-5
Table 9-6	Summary of Collection and Conveyance System 20-Year CIP	9-6
Table 9-7	Summary of CKWWTP 6-Year CIP Improvement Project Costs	9-9
Table 9-8	Summary of 2013-2025 CKWWTP Improvement Project Costs.....	9-11
Table 9-9	Summary Total Infrastructure Improvement Project Costs	9-11

LIST OF FIGURES

Figure 7-1 Central Kitsap UGA Conveyance System 2013-2025 CIP	After 7-15
Figure 7-2 Silverdale UGA Conveyance System 2013-2025 CIP	After 7-15
Figure 7-3 Central Kitsap UGA Existing Lift Station Capacity and Future 2025 Peak Flows	After 7-15
Figure 7-4 Silverdale UGA Existing Lift Station Capacity and Future 2025 Peak Flows	After 7-15
Figure 7-5 Central Kitsap UGA New Future Lift Station Capacity Requirements for 2025 Flows	After 7-15
Figure 7-6 Silverdale UGA New Future Lift Station Capacity Requirements for 2025 Flows	After 7-15
Figure 9-1 Central Kitsap UGA Conveyance System 2013-2018 CIP	After 9-11
Figure 9-2 Silverdale UGA Conveyance System 2013-2018 CIP	After 9-11
Figure 9-3 Central Kitsap UGA Conveyance System 2019-2025 CIP	After 9-11
Figure 9-4 Silverdale UGA Conveyance System 2019-2025 CIP	After 9-11

CHAPTER 1

INTRODUCTION

1.1 Purpose of Addendum

The Central Kitsap Wastewater Facility Plan (Brown and Caldwell, 2011) was prepared using urban growth area (UGA) boundaries and land use developed in 2006 for the Central Kitsap UGA and Silverdale UGA by Kitsap County (Kitsap County, 2006). Kitsap County also developed population forecasts through year 2025 based on the 2010 census that were allocated to each of the UGAs. However, the UGA boundaries were challenged and the Growth Management Hearings Board found in 2011 that the UGA boundaries and associated land use densities were inconsistent with Growth Management Act requirements. As a result, Kitsap County undertook a UGA Remand Process analysis that resulted in revisions to the UGA boundaries, development densities and associated population forecasts for the Central Kitsap and Silverdale UGAs.

Part of the UGA Remand Process analysis included the identification of wastewater collection and conveyance systems to serve all areas within the revised UGA boundaries by year 2025. This analysis differs from the 2011 Facility Plan in that the connection of individual on-site wastewater treatment systems was limited to five percent of the systems existing in 2010. Thus, the Remand Process resulted in revisions to the following factors that affect wastewater collection and conveyance systems:

- The size of the Central Kitsap and Silverdale UGAs were reduced
- The locations of the UGA boundaries changed, particularly on the perimeters of the 2006 UGAs
- Population densities were increased to be consistent with GMA requirements
- Population forecasts for 2025 were revised based on the new UGA boundaries and population densities
- All existing individual on-site wastewater treatment systems were assumed to be connected to the Kitsap County sewer system by 2025.

The purpose of this addendum is to revise the 2011 Facility Plan to be consistent with the revisions resulting from the UGA Remand Process. There are a limited number of sections in the 2011 Facility Plan that change as described in the following section.

1.2 Overview of Addendum Contents

Revisions to four chapters in the 2011 Facility Plan are provided in this addendum. These chapters and sections are:

- Chapter 2, Section 2.5 Population Estimates and Projections
- Chapter 2, Section 2.8 Sewered Equivalent Population Projections
- Chapter 3, Section 3.2.3.4 Overall Projected Flows at the CKWWTP
- Chapter 7, all sections
- Chapter 9, all sections

Each of the revised chapters and sections are provided in subsequent chapters of this addendum.

1.3 Environmental Review and Adoption of the Capital Improvement Program

The environmental review for the recommended CIP was undertaken as part of the GMA Remand effort. The environmental documents and CIP presented in this addendum were adopted by the Kitsap County Board of County Commissioners on August 29, 2012 (see Appendix). Kitsap County was found in compliance with GMA requirements by the Growth Management Hearings Board on November 6, 2012 (Order Finding Compliance Re: Ordinance Nos. 493-496, Case No. 07-3-0019c).

CHAPTER 2 REVISIONS

PLANNING AREA CHARACTERISTICS

2.5 Population Estimates and Projections

In 2006, through the process of amending their Comprehensive Plan, Kitsap County expanded the Urban Growth Area (UGA) and performed a land use and development capacity analysis. The 2011 Central Kitsap County Wastewater Facility Plan was based on the geographic extent of the 2006 UGA and the results of the capacity analysis. In 2012, following a five-year legal challenge to the UGA expansion, Kitsap County Department of Community Development (DCD) again proposed Comprehensive Plan amendments which were:

“...the result of a remand by the Central Puget Sound Growth Management Hearings Board requiring the County to revisit its urban growth areas to ensure that the County’s residential land capacity assumptions reflect local conditions and Growth Management Act goals for the future. As a result of reviewing UGA capacities and sizing, the County is proposing consistency amendments with its adopted Comprehensive Plan Elements, including land use, capital facilities, and others.”

Kitsap County UGA Sizing & Composition Remand, Final Supplemental Environmental Impact Statement (FSEIS, 2012).

As a part of the UGA remand efforts, and in accordance with GMA requirements, DCD prepared the data used for population estimates in this report based on updated land use and zoning information within the revised Urban Growth Boundaries (UGBs). Baseline populations are estimated based on the 2010 Census and adapted to the remand-adjusted UGBs, shown on page 2-3 of the Land Use Chapter in the County’s August 2012 Final Comprehensive Plan & Development Regulation Amendments. Populations projections are based on total residential capacity developed by DCD for 2010 through 2025 and projected through 2030 by extending straight-line interpolation from the DCD-generated 2010-25 population growth.

The population data used to estimate future flows are provided in Table 2-3. In summary, the service area population is projected to increase by nearly 22,000 people in the 15-year planning period, which represents an increase of about 30 percent. It is important to recognize, however, that some of the 2010 population is served by individual, onsite wastewater systems, so the 2010 population served by the CKWWTP is less than the total 2010 population shown in Table 2-3. The DCD remand projections, however, assume that 100% of the population will be sewered by 2025.

Table 2-3. Population Projections for CKWWTP Service Area and Poulsbo ^a

Year	Central Kitsap UGA	Silverdale UGA	City of Poulsbo & UGA	Total
2010	22,669	17,468	9,702	49,839
2025	29,169	25,236	11,854	66,259
2030	31,336	27,825	12,571	71,732

a. No population data are available for Bangor and Keyport bases. Minimal growth is projected for the Keyport community

2.8 Sewered Equivalent Population Projections

Future population estimates are a necessary component for projecting wastewater flows. For the Northern Service Area, future sewered populations for the Navy bases are unknown so set-aside flows are based on the assumption that the existing flows will remain the same in the future. The City of Poulsbo reports that 100 percent of the population is sewered and that future customers will be generated by growth in Poulsbo and the UGA.

Future sewered ERU populations in the Southern Service Area include existing populations on septic tanks within UGA boundaries that will become sewered within the planning period. The future incoming populations and growing commercial areas within the service areas are assumed to become connected to the system by 2025 as well. Existing sewered and unsewered developed properties are identified on Figure 2-4.

As of December 2006, approximately 62 percent of the existing population within the Southern Service Area was connected to the wastewater system. It is assumed that the remaining 38 percent of the existing population will be connected to the sewer system by 2025.

A future commercial growth component is also added. This value is approximated based on the existing commercial-to-residential ratio of 11 percent for the Central Kitsap UGA and 37 percent for Silverdale. Without specific information to indicate otherwise, the use of existing commercial-to-industrial ratios is considered appropriate for facilities planning purposes. On this basis, the Silverdale commercial projections may appear to be high; however, the net effective commercial portion for the combined areas would be 22 percent, which is considered a reasonable collective value.

The City of Poulsbo equivalent population estimates are based on projected flows and estimated per capita flow rates. Projected average annual flows are estimated to increase from 0.66 mgd to 1.34 mgd in 2030 while average per capita flows are predicted to decrease from 90 gpcd to 76 gpcd in the same period (City of Poulsbo Comprehensive Sanitary Sewer Plan 2008 Update and Appendix 7B). As a result, the equivalent sewered population is calculated to increase from about 7,300 in 2005 to 17,600 in 2030.

These four components are added to provide estimates for the 2025 and 2030 total Equivalent Populations that will be sewered. The equivalent sewered population for the entire service area is projected to increase from about 44,500 in 2005 to 98,141 in 2030, which represents a 120% increase. (Table 2-4).

Table 2-4. Equivalent Sewered Populations for CKWWTP Service Area and Poulsbo

Year	Central Kitsap UGA	Silverdale UGA	Southern Service Area total ^a	Poulsbo	Bangor	Keyport (base)	Northern Service Area total	Total system
2005	14,069	16,912	30,981	7,295	4,800	1,400	13,495	44,476
2025	33,081	35,676	68,757	15,263	4,800	1,400	21,463	90,220
2030	35,486	38,823	74,309	17,632	4,800	1,400	23,832	98,141

a. Includes special connections that are permitted outside of UGA boundaries such as schools.

CHAPTER 3 REVISIONS

WASTEWATER CHARACTERISTICS

3.2.3.4 Overall Projected Flows at the CKWWTP

Table 3-6 summarizes wastewater flows projected for 2025 and 2030 in this section. These values will be used as the most probable flow projections for this Facility Plan.

Table 3-6. Summary of Projected Wastewater Flows						
Flow parameter	Central Kitsap UGA (mgd)	Silverdale UGA (mgd)	Southern Service Area total ^a (mgd)	Poulsbo total ^b (mgd)	Navy set-aside ^b (mgd)	CKWWTP influent (mgd)
2025 projected flows						
AAF	2.51	2.51	5.22	1.16	0.61	6.99
ADWF	NC	NC	NC	NC	NC	6.22
ADF, max month	3.04	3.28	6.32	1.59	0.80	8.71
Peak day flow	NC	NC	NC	NC	NC	18.9
Peak hour flow	8.28	8.94	17.22	4.20	2.69	24.1
2030 projected flows						
AAF	2.70	2.95	5.65	1.34	0.61	7.60
ADWF	NC	NC	NC	NC	NC	6.76
ADF, max month	3.26	3.56	6.82	1.84	0.80	9.46
Peak day flow	NC	NC	NC	NC	NC	20.6
Peak hour flow	8.90	9.74	18.64	4.75	2.69	26.1

- a. Southern Service Area flows include flows for served populations outside the UGA and are calculated by difference (CKWWTP – Navy – Poulsbo). The flows are split equally between Central Kitsap UGA and Silverdale UGA as per the equal split shown in Table 6 of the August 1, 2008, technical memorandum “Central Kitsap Wastewater Facilities Plan Wastewater Flow Projections 2005–25” (in Appendix 7B-1).
- b. The Poulsbo and Navy flows for 2025 are documented in Table 4 of the January 10, 2011, technical memorandum Revisions to “Central Kitsap Wastewater Facilities Plan Wastewater Flow projections 2005–25” (in Appendix 7B-2).
- c. ADWF and peak day flow are estimated based on the ratios in Table 3-5.
NC = Not calculated.

REVISED CHAPTER 7

COLLECTION SYSTEM IMPROVEMENTS

This chapter applies the selection methodologies explained in Chapter 6 to identify and evaluate the collection system projects for the 20-year planning period. These projects are required for the existing sewer system and for new infrastructure to provide sewer service to the four areas of concern located in the Silverdale and Central Kitsap UGAs. Wastewater flows from the cities of Poulsbo and Bangor will continue to be conveyed by the collection system through the Keyport area.

These projects are for major pumping and collection facilities only. Local collector sewers and pumping facilities, such as those used for individual households and residential developments, are excluded from this analysis as the details for these local facilities would be determined when an investigation for serving a local area is undertaken.

The projects presented in this chapter are required to serve projected growth in the areas currently served by the County sewer and the four areas of concern identified by the Kitsap Health District, due to failing septic systems. In addition, collection system improvements were identified to provide sewer service within the Silverdale and Central Kitsap UGAs to all existing and future residences through 2025, including all existing onsite sewage systems. The projects recommended for this “full service” development scenario are presented in Appendix 7F.

7.1 Overview of Chapter Contents

As described in Chapter 6, the following methodologies are applied to collection system improvements. Application of these methodologies is reflected in the structure and contents of this chapter:

1. Project identification
 - a. Existing lift station projects
 - b. Existing piping system projects
 - c. Future conveyance system projects to serve areas of concern
2. Project evaluation
 - a. Existing lift station projects
 - b. Existing piping system projects
 - c. Future conveyance system projects to serve areas of concern
3. Project ranking and prioritization
 - a. Existing lift station projects
 - b. Existing piping system projects

7.2 Project Identification

Collection system projects identified for the lift stations and collection system piping in the existing sewer system and the areas currently not served by the existing system are presented in this section. The details of the projects are provided in subsequent sections.

A sewer system model was developed to help identify and evaluate projects (Appendix 7C). Future wastewater flows were estimated for sewer sub-basins throughout the Silverdale UGA and Central Kitsap

UGA and used in the model to identify peak flow conditions. Lift station and sewer system piping improvements were determined to convey future peak flows (Chapter 3) throughout the existing system with unrestricted flow conditions. The future peak flows were also used to determine the sizes of future lift stations and major collection piping beyond the existing sewer system.

7.2.1 Existing Lift Station Projects

Eighteen lift station projects have been identified for construction during the 13-year planning period as shown in Figure 7-1 for the Central Kitsap UGA and Figure 7-2 for the Silverdale UGA.. Thirteen of these projects are based on capacity increases determined by comparing existing firm pumping capacities with projected 2025 flows. The firm pumping capacities of the existing lift stations compared to projected peak hour flows are shown in Figure 7-3 for the Central Kitsap UGA and Figure 7-4 for the Silverdale UGA. Ten of twenty lift stations in the Central Kitsap UGA have adequate capacity for future flows while thirteen of nineteen lift stations in the Silverdale UGA have adequate capacity for future flows.

In addition, LS-6 and LS-8, both in the Central Kitsap UGA, have inadequate capacity for existing peak hour flows. Additionally, LS-4 and LS-22 in the Silverdale UGA have existing peak hour flows greater than the 85 percent threshold of firm capacity.

Improvements to two existing lift stations were also identified based on the condition of existing pumping equipment. These lift stations are LS-1 in the Silverdale UGA and LS-16 in the Keyport LAMIRD. Because of significant site constraints limiting the ability to expand it, LS-16 will be converted to a local lift station serving only the Keyport area. Wastewater flows from the city of Poulsbo conveyed through the Lemolo siphon will be diverted to LS-67, which will be expanded for the increased flows. These issues are factors for prioritization of projects and the development of the 6-year CIP.

In summary, the eighteen existing lift stations projects identified for the 13-year planning period are as follows by UGA and LAMIRD:

- Central Kitsap UGA: LS-6, LS-8, LS-10, LS-32, LS-33, LS-34, LS-36, LS-62, LS-65 and LS-69.
- Silverdale UGA: LS-1, LS-3, LS-4, LS-12, LS-21, and LS-22.
- Keyport LAMIRD: LS-16 and LS-67.

7.2.2 Existing Piping System Projects

Twenty projects are identified as improvements to the existing collection and conveyance piping system. Nine collection system piping projects, listed in Table 7-1, will address problem areas identified for existing flows with eleven projects addressing problems associated with future flows. Eight of the projects are in the Central Kitsap UGA, twelve in the Silverdale UGA and one project on Lemolo Peninsula. The locations of Central Kitsap UGA and Silverdale UGA piping projects are shown in Figures 7-1 and 7-2, respectively. In summary, over 13.6 miles of pipes are scheduled for replacement in the existing collection and conveyance system.

Table 7-1. Summary of Projects for Existing Collection System Piping Improvements

Project name	UGA/Problem area	Existing problems	Future problems	Recommended project	Comments	Estimated project cost
LS-6 Forcemain / So. Military Rd. Pipe Replacement	<u>Central Kitsap</u> From LS-6 to the intersection of Old Military Rd. NE and NE Fairgrounds Rd.; north on Old Lilitary Rd. NE to Foster Rd. NE	Surcharging in 30" forcemain along Old Military Rd.	Excessive flow velocities when LS-6 is upgraded	1,150 lf of 16" forcemain from LS-6 to Old Military Rd; 3,250 lf of 30" forcemain from Fairgrounds Rd to Foster Rd NE.	Project in final design in 2013 and tied to LS-6 upgrade project	\$4,640,000
Bayshore Pipe Replacement	<u>Silverdale</u> Old Town, along shoreline from NW Bucklin Hill Rd. to LS-3	Significant settling of solids requiring frequent cleaning.	1,865 lf of 8" pipe & MH surcharging	1,865 lf of 10" gravity sewer	High priority based on comments from Public Works O&M staff; project to begin in 2103	\$1,340,000
LS-8 Downstream Conveyance Improvements	<u>Central Kitsap</u> Conveyance pipes from LS-8 to LS-7	1,865 lf of 8" pipe and MH surcharging.	More surcharging as flows increase and LS-8 is upgraded	New alignment for conveyance system consisting of 5,680 lf of 12' forcemain and 3,000 lf of 15" gravity sewer	Project in final design in 2013 and tied to LS-8 upgrade project	\$5,710,000
Silverdale Way Pipe Replacement	<u>Silverdale</u> 8-inch and 10-inch gravity sewer along Silverdale Way from NW Misty Ridge Ln. south to Waaga Way	Surcharging of approximately 1,000 lf of 8" pipe and 7 MH.	Pipe surcharging increases; more MH surcharging with 7 MH overtopped	2,840 lf of 15" and 15" gravity sewer	High priority due to existing MH surcharging. Project in final design in 2013	\$1,830,000

Table 7-1. Summary of Projects for Existing Collection System Piping Improvements

Project name	UGA/Problem area	Existing problems	Future problems	Recommended project	Comments	Estimated project cost
LS-65 Forcemain Replacement	<u>Central Kitsap</u> 6-inch forcemain from LS-65	675 lf of 4" force main with flow velocity > 7 fps.	Higher excessive velocities after LS-65 is upgraded	6,400 lf of 10" forcemain	Project timing tied to LS-65 upgrade project	\$3,500,000
LS-69 Forcemain and Gravity Sewer Replacement	<u>Central Kitsap</u> 4-inch forcemain and 8-inch gravity pipe from LS-69	None	Excessive velocities as flows increase after LS-69 upgrade	2,730 lf of 6' forcemain and 1,100 lf of 12' gravity sewer	Project timing tied to LS-69 upgrade project sometime after 2018	\$ 2,100,000
LS-18 Conveyance System Improvements	<u>Central Kitsap</u> 8-inch gravity sewer from LS-18 along NE John Carlson Rd.	None	Excessive velocities as flows from LS-18 increase	1,825 lf of 12' gravity sewer	Project timing tied to flow increases from growth	\$1,310,000
LS-32 Gravity Sewer Replacement	<u>Central Kitsap</u> 8-inch gravity sewer receiving flows from LS-32 forcemain	None	Excessive velocities after LS-32 is upgraded	900 lf of 12' gravity sewer	Project timing tied to LS-32 upgrade project sometime after 2018	\$600,000
LS-36 Forcemain Replacement	<u>Central Kitsap</u> 4-inch forcemain along Auklet Place NE south of LS-6	None	Excessive velocities after LS-36 is upgraded	675 lf of 8" force main; begin project	Project timing related to LS-36 upgrade sometime after 2018	\$400,000
Provost Rd. Pipe Replacement	<u>Silverdale</u> 8-inch gravity sewer in west-central Silverdale area	None	Surcharging as flows increase due to growth	3,750 lf of 12' gravity sewer upstream of LS-12	Timing depends on growth in service area; sometime after 2018	\$3,100,000

Table 7-1. Summary of Projects for Existing Collection System Piping Improvements

Project name	UGA/Problem area	Existing problems	Future problems	Recommended project	Comments	Estimated project cost
Levin Road Pipe Replacement	<u>Silverdale</u> 8-inch gravity sewer upstream of LS-1 along Levin Rd., Bucklin Hill Rd., and Mickelberry Rd.	Some pipe surcharging.	Increased pipe surcharging; 3 MH surcharging at projected flows	2,030 lf of 12" gravity sewer	Lower priority; minimal MH surcharging at existing flows; sometime after 2018	\$1,700,000
Fredrickson Road NW Pipe Replacement	<u>Silverdale</u> 15-inch gravity sewer along Fredrickson Rd. NW, upstream of LS-4	Some pipe surcharging.	Increased pipe surcharging	1,330 lf of 21" gravity sewer	Lower priority due to minimal MH surcharging; sometime after 2018	\$1,100,000
Lower Anderson Hill Rd to LS-3 Pipe Replacement	<u>Silverdale</u> 8-inch gravity sewer in Old Town area upstream of LS-3 through the intersection of Silverdale Way NW and NW Anderson Hill Rd. to High School	Some pipe surcharging; inverse slope near Silverdale Way.	Increased pipe surcharging and MH surcharging	3,700 lf of 12' and 15" gravity sewer	High priority due to maintenance issues. Remainder of upstream pipe in Anderson Hill Rd will be replaced after 2018	\$2,500,000
LS-4 Forcemain Replacement	<u>Silverdale</u> 14-inch and 20-inch forcemain from LS-4 in Silverdale along Waaga Way	None	Excessive velocities after LS-4 is upgraded	8,700 lf of 24' forcemain	Project timing ties to LS-4 upgrade project; sometime after 2020	\$6,700,000
Silverdale Way to LS-1 Pipe Replacement	<u>Silverdale</u> 15-inch and 18-inch gravity sewer from Waaga Way to LS-1 in Silverdale	None	Surcharging of pipes and manholes as flows increase	1,650 lf of new 15" gravity sewer and 3,200 lf of 15' and 21' replacement gravity sewer	Project timing tied to increasing flows; sometime after 2018	\$3,750,000
Washington Avenue Pipe Replacement	<u>Silverdale</u> 8-inch and 15-inch gravity sewer upstream of LS-3 in Silverdale	None	Surcharging of pipes and manholes as flows increase	680 lf of 12' and 120' of 18' gravity sewer	Project timing tied to increasing flows; sometime after 2018	\$1,000,000

Table 7-1. Summary of Projects for Existing Collection System Piping Improvements

Project name	UGA/Problem area	Existing problems	Future problems	Recommended project	Comments	Estimated project cost
Lemolo Peninsula Pipeline Replacement	<u>Lemolo Peninsula</u> Lemolo Dr. NE, Brauer Dr. NE and Tukwila Rd. NE north of Lemolo siphon	Some MH surcharging near low end of pipeline.	Surcharging at all MH; limited hydraulic capacity below future requirement	4,450 lf of 18" force main; project to begin in 2017	Project timing after LS-16 and LS-67 upgrades; sometime after 2018	\$7,900,000
Upper Anderson Hill Road Pipe Replacement	<u>Silverdale</u> 8-inch gravity sewer along Anderson Hill Rd. west of High School to Frontier Rd NW	None	Surcharging and MH overtopping as flows increase	2000 lf of 12" gravity sewer	LS-3 capacity improvements and Old Town Silverdale Pipe Replacement must be completed first. Sometime after 2018	\$1,510,000
Northern Old Military Road Force Main Replacement	<u>Central Kitsap</u> 16-inch forcemain along Old Military Rd. from Foster Rd. to Waaga Way; Waaga Way to NE Paulson	None	Excessive velocities at future flows	7,780 lf of 30" gravity sewer and forcemain	Required after LS-6 upgrade; sometime after 2018	\$7,710,000
LS-22 Force Main Replacement	<u>Silverdale</u> 6-inch forcemain from LS-22 to the intersection of Ridgepoint Dr. NW and Quail Run Dr. NW	None	Excessive velocities at future flows	1,050 lf of 8" force main	Required after LS-22 upgrade; sometime after 2018	\$600,000
Total Projects						\$59,000,000

7.2.3 Future Conveyance System Projects

Thirty-eight new lift stations may potentially be needed to serve the unsewered areas within the Central Kitsap and Silverdale UGAs. The general locations of the new lift stations are shown in Figure 7-1 for the Central Kitsap UGA and Figure 7-2 for the Silverdale UGA. The schematic location and estimated design capacity of the new lift stations in the Central Kitsap UGA and Silverdale UGA are shown in Figures 7-5 and 7-6, respectively.

These future lift stations, which will serve the areas beyond the existing sewer system, are located at the lowest elevations in the sewer service sub-basins. The force mains from these lift stations will generally be located in public rights-of-way or along land parcel boundaries to connect with new downstream facilities or existing sewer system infrastructure.

7.3 Project Evaluation

Projects are evaluated based on the key criteria presented in Chapter 6 with emphasis placed on the following:

- nature and extent of problem corrected by the project
- capacity or size of the facility, which is used to prioritize the project in the subsequent section
- increase in flows at the facility to indicate project need relative to growth
- condition of existing equipment and O&M issues addressed by the project
- total project cost.

7.3.1 Existing Lift Station Projects

The eighteen projects for existing lift stations are listed in Table 7-2 with the future firm pumping capacity required, estimated project cost, and the year when the implementation project is recommended to begin. The recommended date for implementation of projects is generally based on the existing condition of pumping equipment or when the inflows to the lift stations are projected to reach 85 percent of firm pumping capacity. The estimated dates were determined assuming that the projected 2025 flows increase linearly from existing flows. This assumption may be somewhat conservative as population increase is expressed as geometric growth.

The future capacities of lift stations range from less than 100 gpm to 6,600 gpm. Eight of the lift stations will be major facilities with firm pumping capacities greater than 1,000 gpm. Two lift stations will be medium-sized facilities having pumping capacity between 500 and 1,000 gpm with the remaining eight having capacities less than 500 gpm.

The total project cost for the existing lift station projects is approximately \$49.1 million. The largest projects are LS-4 in Silverdale, estimated at \$9.7 million and the combined LS-16/67 project in the Keyport LAMIRD with a combined project cost of \$4.81 million. The project costs for all of the remaining lift station projects are each under \$4 million.

LS-16, which is located on a challenging site, is recommended for conversion to a local lift station to serve the Keyport area with LS-67 being upgraded and expanded to serve as the primary lift station receiving wastewater from the city of Poulsbo through the Lemolo siphon. The Lemolo siphon and related collection system improvements are discussed in more detail in Appendix 7H.

Table 7-2. Existing Lift Station Projects				
Lift station	Future firm capacity (gpm)	Total project cost	Year project implementation begins	Comment on Condition or Capacity
LS-1	2,800	\$1,980,000	2013	Existing pump condition poor; need replacement
LS-3	2,800	\$3,760,000	2017	FPC exceeded by 2022
LS-4	6,600	\$9,700,000	2017	FPC exceeded by 2022
LS-6	3,000	\$2,090,000	2013	FPC exceeded in 2013
LS-8	1,300	\$1,980,000	2013	FPC exceeded in 2013
LS-10	300	\$2,340,000	2019	FPC exceeded after 2019
LS-12	1,400	\$3,760,000	2019	FPC exceeded after 2019
LS-16	100	\$1,430,000	2013	Existing pump condition poor; need replacement
LS-21	440	\$2,340,000	2019	FPC exceeded after 2019
LS-22	800	\$2,340,000	2019	FPC exceeded after 2019
LS-32	250	\$2,340,000	2019	FPC exceeded after 2019
LS-33	95	\$1,060,000	2019	FPC exceeded after 2019
LS-34	1,300	\$3,760,000	2019	FPC exceeded after 2019
LS-36	155	\$1,060,000	2019	FPC exceeded after 2019
LS-62	80	\$1,060,000	2019	FPC exceeded after 2019
LS-65	800	\$2,340,000	2019	FPC exceeded after 2019
LS-67	4,000	\$3,380,000	2013	Tied to LS-16 project
LS-69	230	\$2,340,000	2019	FPC exceeded after 2019
Total		\$49,060,000		

Note: FPC is firm pumping capacity.

7.3.2 Existing Piping System Projects

Each of the existing collection system projects was developed using a model of the sewer system to identify hydraulic problems and determine the improvements required to mitigate the problems. The nature and extent of the hydraulic problems caused by existing and future flows are listed in Table 7-1. The problems are presented in terms of pipe or manhole surcharging, excessive velocity, condition of the pipe material, or excessive maintenance based on the key criteria given in Chapter 6.

The recommended timing of implementation of the collection system projects is also provided in Tables 7-1. Project timing is related either to upstream lift station project construction or to when the pipe and manhole surcharging and velocity criteria will be exceeded. The specific lift station project or criteria for priority collection piping projects are discussed in Section 7.4.2.

Estimated project costs to correct problems total \$59 million. The estimated cost for each specific project is presented in Table 7-1.

7.3.3 Future Conveyance Systems

All thirty-eight of the new lift stations are either small, with a capacity lower than 200 gpm, or medium sized, with a capacity between 200 and 500 gpm. The number and sizes of lift stations located in each of the UGA areas are as follows:

- **Central Kitsap UGA:** sixteen lift stations with firm pumping capacity from 5 to 400 gpm with three lift stations having capacity greater than 200 gpm.

Three new medium sized pump stations will be required to serve areas beyond the existing Central Kitsap sewer system as the areas develop. One facility will be located in the southeast Central Kitsap area having a design capacity of about 340 gpm and will discharge to the existing system upstream of Pump Station #65. The other two facilities will be located in the southwest Central Kitsap area and will discharge to the existing system upstream of Pump Station #34.

Thirteen new small pump stations will be required to serve the remainder of the Central Kitsap UGA as these areas develop. These facilities will have design pumping capacities less than 200 gpm and will generally be located either along the Port Orchard Bay shoreline or the Dyes Inlet shoreline.
- **Silverdale UGA:** twenty-two lift stations; capacity from 10 to 500 gpm with six lift stations having capacity greater than 200 gpm

Six new medium sized pump stations will be required to provide sewer service beyond the existing system in the Silverdale UGA. Two new facilities with design capacities of 240 gpm and 275 gpm will be located in the northeast Silverdale area to convey flows around Island Lake to Pump Station #22. One new pump station with design capacity of about 500 gpm will be required in the north-central Silverdale area and discharge to the PS #1 collection system. Two pump stations each with design capacities of about 200 gpm will serve the southeast area and discharge to the PS#12 system. The sixth new pump station with design capacity of about 300 gpm will serve the area northeast of Dyes Inlet and will discharge to the PS #4 collection system.

Sixteen new small pump stations will be required to serve the remainder of the Silverdale UGA as the area develops. These facilities will have design pumping capacities less than 200 gpm and will generally located along the boundary of the Silverdale UGA.

The estimated project costs for future lift stations required beyond the existing Kitsap County sewer system totals about \$31.4 million (Table 7-3). The cost estimates for future lift stations were made based on firm pumping capacity required for projected 2025 peak hour flows. A breakdown of the costs by lift station size is shown in Table 7-3.

Lift station size	Peak daily inflow (gpm)	No. of lift stations	Construction cost/station	Total project cost ^a
Small	< 200	29	\$600,000	\$17,400,000
Medium	200–500	9	\$1,550,000	13,950,000
Total		38		\$31,350,000

a. Costs include 30% contingency for allied costs but no land acquisition costs.

The wastewater collection pipeline facilities (gravity sewers and force/pressure mains) to serve areas of future growth are estimated to total 50 miles in length. Seventy-five percent of the new lines are 8-inch gravity sewers. The pipelines are generally located in public rights-of-way or along land parcel boundaries to connect with new downstream facilities or existing sewer system infrastructure.

These pipelines approximately consist of the following:

- 45,000 feet of 2-inch and 4-inch forcemain (29,000 feet in the Silverdale UGA and 16,000 feet in the Central Kitsap UGA)
- 21,000 feet of 6-inch and 8-inch diameter forcemain (1,600 feet in the Silverdale UGA and 19,200 feet in the Central Kitsap UGA)
- 198,000 feet of 8-inch-diameter gravity sewer (122,000 feet in the Silverdale UGA and 76,000 feet in the Central Kitsap UGA)

New piping system project costs are estimated to total approximately \$80 million (Table 7-4). These costs were based on average per-linear-foot construction costs of similar piping system project costs developed for the existing system improvements. The unit costs used for the estimates are presented in Table 7-4.

Pipe diam. (in.)	Type of pipe	Lf of pipe	Construction cost/lf	Total project cost ^a
2-4	Force main	45,000	\$75-120	\$3,600,000
6-8	Force main	21,000	\$210-320	5,500,000
8	Gravity pipe	198,000	\$350	8,783,000
Total		264,000		\$80,100,000

a. Project costs include a 30% contingency for allied costs but no land acquisition costs. Costs represent total project costs, not just the portion of cost to be the responsibility of the County.

Total project costs for all recommended collection system improvements are about \$220 million, as summarized in Table 7-5. The costs of these projects are split about one-third for lift stations and two-thirds for conveyance system piping.

Project category	Total project cost
Existing piping system improvements	\$59,000,000
Existing lift stations	49,060,000
Future lift stations	31,350,000
Future piping	80,100,000
Total	\$219,510,000

7.4 Project Ranking and Prioritization

The projects are ranked and prioritized by groups based on differing levels of criticality. Existing sewer system projects are prioritized for implementation based on a qualitative assessment of several criteria. New sewer system infrastructure beyond the existing system is not prioritized but would be developed in response to actual population growth and resulting development patterns.

The eighteen lift station and twenty collection system piping projects for the existing collection/conveyance system are ranked by prioritizing them into groups based on differing levels of criticality. The assignment to a particular group depends on the nature, extent, and severity of the problem corrected or projected to be avoided by the project. The assessment of the problem is qualitative and inherently imprecise. Thus, the assignment of a particular project to a specific priority tier has no bearing on the relative priority to other projects within that tier, but rather suggests the priority of that project relative to projects in the other tiers.

It is extremely difficult, if not impossible, to rank and prioritize the lift station and collection facility projects identified to provide service in the Silverdale UGA and Central Kitsap UGA beyond the existing sewer system. Decisions about which facilities should be constructed and when depend on actual development patterns and growth in the future. Thus, only projects within the existing sewer system are prioritized and ranked as described in Chapter 6.

7.4.1 Existing Lift Station Projects

Seven lift station projects have the highest priority for implementation in the 6-year CIP based on O&M issues, firm capacity criteria, and relative importance in the collection system. These projects are as follows:

- **LS-1:** Pump Station #1 is a major facility serving the northern Silverdale area. Wastewater flows are projected to exceed 85% of design capacity (2,100 gpm) by 2013. It also is a high priority project due to the age and poor condition of existing controls and pump motors. Replacement of the pumps and motors, installation of new electrical components and a larger generator will increase pumping capacity to 3,200 gpm and improve reliability of the station. A design report for these improvements was completed in 2012 with final design work on this project scheduled for completion in late 2013.
- **LS-3:** Pump Station #3 is a major conveyance facility serving the western Silverdale service area. Existing wastewater flows exceed design pumping capacity (1,800 gpm) and are projected to increase significantly due to population growth in the service area. The pump station improvements will include new pumps and motors to increase the design capacity to 3,600 gpm and related electrical upgrades. The project is scheduled to begin in 2017.
- **LS-4:** Pump Station #4 is a major conveyance facility serving the northern Silverdale service area as well as receiving flows from Pump Station #3. Existing wastewater flows exceed 85% of design pumping capacity (3,000 gpm) that may be exceeded when Pump Station #1 is upgraded. In addition, flows are projected to increase significantly due to population growth in the service area. The pump station improvements will include new pumps and motors to increase the design capacity to 7,500 gpm and related electrical upgrades. The project is scheduled to begin in 2017.
- **LS-6:** Pump Station #6 is the major station serving the west Central Kitsap area. It is an older pump station that is currently exceeding design capacity of 1,400 gpm. It is regarded as a high priority project due to the age and poor condition of existing controls and pump motors. Replacement of the pumps with new pumps and motors, installation of new electrical components and a larger generator will increase pumping capacity to 3,200 gpm and increase the reliability of the station. A design report for these improvements was completed in 2012 and final design work on this project is scheduled for completion in late 2013.
- **LS-8:** Pump Station #8 serves the southeastern area of Central Kitsap area. Existing flows currently exceed design capacity of 400 gpm and the existing equipment has outlived its 30-year life. Replacement of the pumps and motors, installation of new electrical components and a larger generator will increase pumping capacity to 1,800 gpm and increase reliability of the station. A design report for these improvements was completed in 2012 and final design work on this project is scheduled for completion in late 2013.
- **LS-16 and LS-67:** Pump stations #16 and #67 are located in the Keyport area. This project is designed to increase the capacity of the wastewater conveyance system from the City of Poulsbo to the Central Kitsap Wastewater Treatment Plant. Pump Station #16 has a design capacity of 2,500 gpm and currently conveys the wastewater from Poulsbo while Pump Station #67 (design capacity of 1,300 gpm) serves the Keyport area, including the Navy facilities. This project consists of diverting the Poulsbo flows around Pump Station #67 and increasing the capacity at Pump Station # 67 (4,000 gpm) for the higher flows. Pump Station #16 would be a smaller facility to serve the local Keyport community. This project is considered a high priority project due to the age and poor condition of Pump Station #16. Preliminary engineering for the project began in 2013.

A second tier of priority projects consists of the upgrade and expansion of eleven existing lift stations based on projected flows exceeding the 85 percent threshold after 2018 and the 100 percent of firm pumping capacity threshold before 2025. The following lift stations are in this category and are recommended for implementation to begin in 2019 depending on actual increases in future flows:

- **LS-10:** Pump Station #10 is a small pump station with a design capacity of 270 gpm serving the Meadowdale west area. An upgrade is required after 2018 due to flows projected to increase to 500 gpm during the planning period.
- **LS-12:** Pump Station #12 is a medium sized facility with an existing design capacity of 850 gpm serving the south Silverdale area, including receiving wastewater flows from Pump Station #13. Wastewater flows to the pump station are projected to increase to 1,800 gpm during the planning period which will require an upgrade after 2018.
- **LS-21:** Pump Station #21 serves the north Silverdale area and has an existing design capacity of 240 gpm. Wastewater flows are projected to increase to 450 gpm during the planning period and a facility upgrade will be required after 2018.
- **LS-22:** Pump Station #22 is a medium sized facility receives flows from PS-21 and also serves the north Silverdale area. Wastewater flows are projected to increase to 850 gpm which will require a facility upgrade after 2018.
- **LS-32:** This small lift station is located at the southern edge of the Central Kitsap service area serving the area around SR 303. Flows are projected to exceed 100 percent of firm pumping capacity shortly after 2010 and more than double by 2030, but it will continue to be a small lift station.
- **LS -33:** Pump Station #33 is a small pump station with a design capacity of 90 gpm serving the south-central area of the UGA. Wastewater flows are projected to increase to about 95 gpm by the end of the planning period requiring an upgrade after 2018.
- **LS-34:** This medium sized pump station with a design capacity of 900 gpm serves the southwest Central Kitsap area. It will become a major pump station with design pumping capacity of 1,700 gpm requiring an upgrade after 2018.
- **LS-36:** Pump Station # 36 is a small pump station with a design capacity of 150 gpm serving the area immediately south of Pump Station 6. Wastewater flows are projected to increase to 155 gpm by the end of the planning period and would require an upgrade after 2018.
- **LS-62:** Pump Station #62 is a small pump station with a design capacity of 50 gpm serving the northeast Central Kitsap area. An upgrade is required after 2018 due to projected flows increasing to 80 gpm during the planning period.
- **LS-65:** Pump Station #65 is a medium-sized facility with a design capacity of 300 gpm serving the Illahee area and southeast Central Kitsap UGA. It will require an upgrade after 2018 due to projected flows increasing to 800 gpm during the planning period.
- **LS-69:** Pump Station #69 is small facility with a design capacity of 160 gpm serving the south Central Kitsap area. Flows are projected to increase to 250 gpm during the planning period requiring an upgrade after 2018.

7.4.2 Existing Piping System Projects

Five existing collection system projects have the highest priority and are recommended for implementation in the 6-year CIP. These projects ranked highest based on pipe material condition, maintenance issues, and excessive manhole surcharging associated with priority lift station projects.

- **Bayshore Pipe Replacement:** Project replaces 1,865 feet of gravity sewer. The project is high-priority due to excessive cleaning required by Public Works. This project replaces about 1,865 feet of existing

gravity sewer that serves the area immediately north of Pump Station #3. The project is high priority due to excessive cleaning required by Public Works staff and is scheduled to start in 2013.

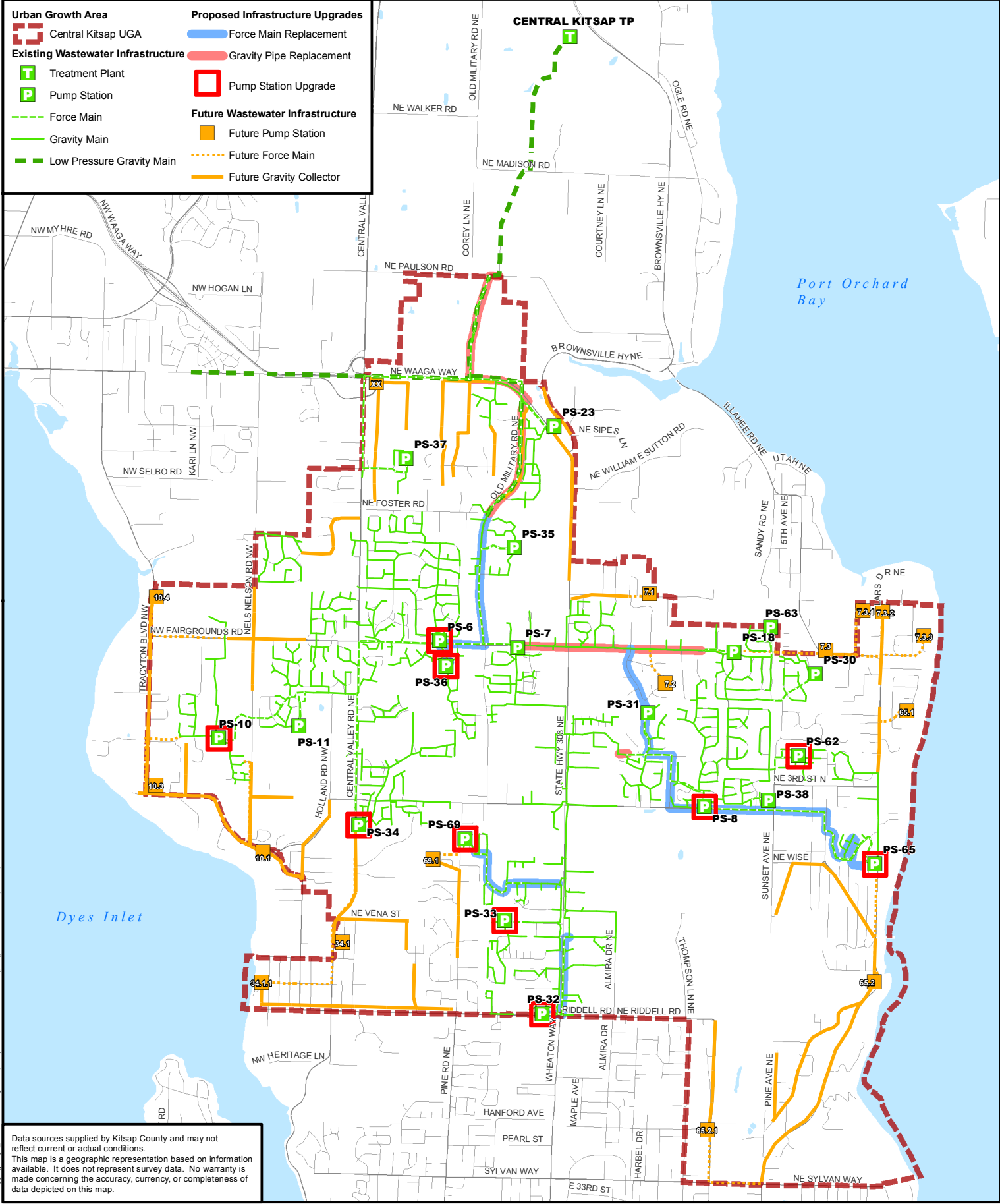
- **LS-8 Downstream Conveyance Improvements:** When Pump Station #8 is upgraded, the higher flows will increase existing surcharging problems experienced in the interceptor pipes immediately upstream of Pump Station #7. These problems will be alleviated by the construction of approximately 5,680 feet of new 12-inch force main and about 3,000 feet of new 15-inch gravity sewer. The alignment for the new force main will run from PS-8 along NE McWilliams Road NE, north along Johnson Road NE through an existing easement to Clover Blossom Lane NE and then extend to NE John Carlson Road. The new gravity sewer will replace the existing 8-inch sewer from the intersection of Clover Blossom Lane NE and NE John Carlson Road west along NE John Carlson Road/NE Fairground Road to PS-7. A design report for these improvements was completed and final design is scheduled for completion in 2013.
- **Lower Anderson Hill Road to LS-3 Pipe Replacement:** This project is also a pipe replacement project designed to correct flow surcharging and cleaning problems experienced by Public Works staff. Approximately 3,700 feet of 8-inch gravity sewer will be replaced with 12 and 15-inch pipe from Pump Station #3, upstream through Old Town Silverdale, across Silverdale Way and continuing up Anderson Hill Road past the high school. The project is high priority and is scheduled to start in 2015.
- **Silverdale Way Pipe Replacement:** Existing flow surcharging conditions are experienced in the interceptor upstream of Pump Station #1 due to inadequate pipe size and backwater conditions from Pump Station #1. This project is the replacement of about 2,840 feet of existing 8 and 10-inch pipe with 12 and 15-inch pipe north of Waaga Way along Silverdale Way. A design report for these improvements was completed in 2012 and final design is scheduled for completion in late 2013.
- **LS-6 Force Main Replacement/South Old Military Road Pipe Replacement:** Replacement of the force main with about 1,150 feet of 16-inch pipe is required to avoid excessive flow velocities when the pumping capacity of Pump Station #6 is increased. This project also includes the construction of about 3,250 feet of 24-inch new force main located on South Old Military Road, parallel to the existing 30-inch force main, to convey the flows from Pump Station #6 force main to mitigate current surcharging problems in the sections of the existing pipe where manholes are accessed for cleaning the pipe. A design report for these improvements was also completed in 2012 with final design scheduled for completion in 2013.

A second tier of priority projects for the existing collection system is developed based on the estimated timing of excessive surcharging problems as flows increase or is related to lift station improvements. The following fifteen projects in this category are recommended for implementation after 2018:

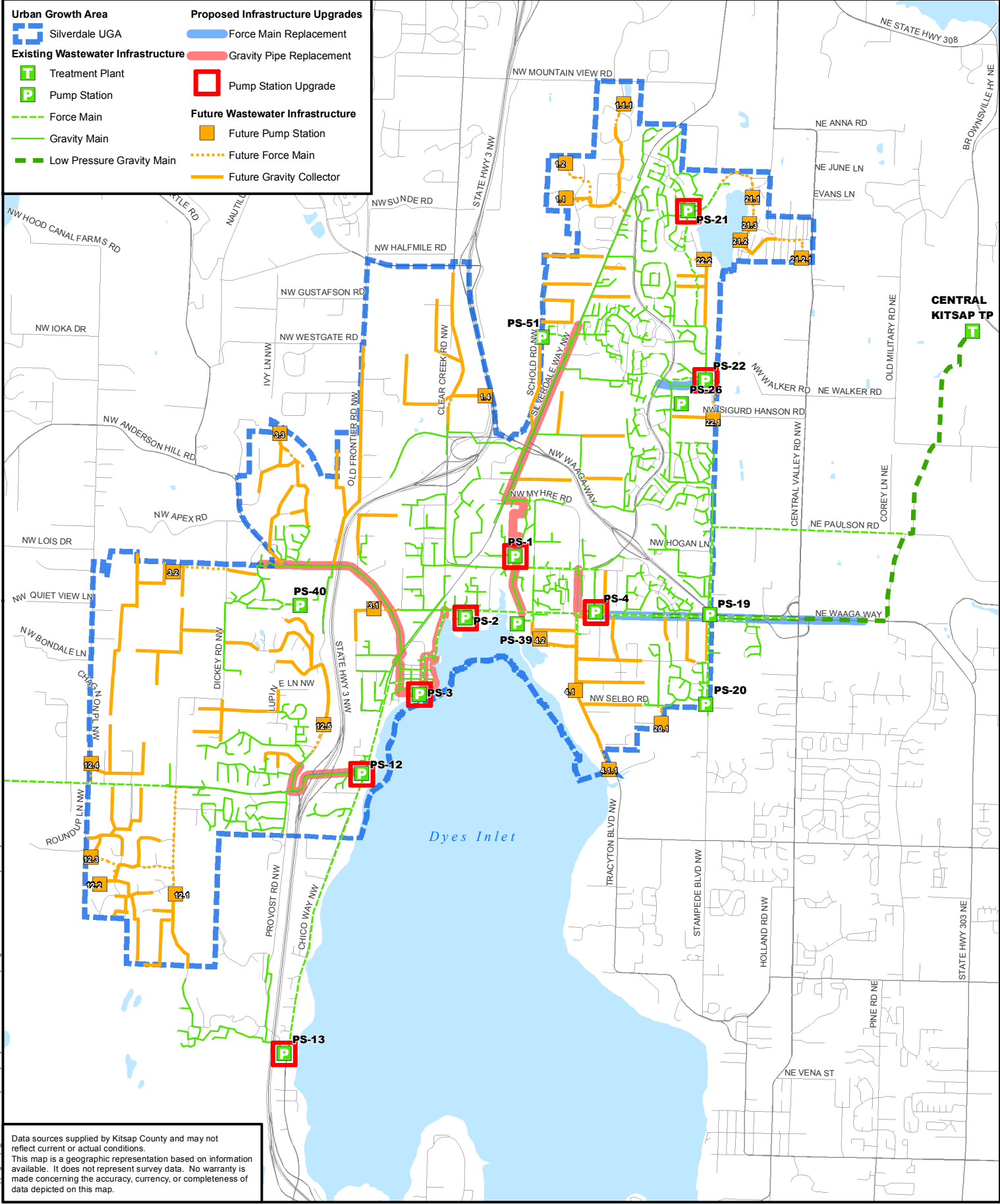
- **Levin Road Pipe Replacement:** This project consists of replacing about 2,030 feet of 8-inch gravity sewer with 12-inch pipe along Levin Road in downtown Silverdale. The larger pipe is required after 2018 to eliminate surcharging conditions that would occur due to higher wastewater flows projected during the planning period.
- **Fredrickson Road Pipe Replacement:** This project consists of replacing the gravity conveyance pipe upstream of PS #4 to eliminate surcharging conditions that would be caused by increased flows from PS #1 and additional local flow projected during the planning period. Approximately 1,330 feet of 15-inch gravity sewer will be replaced with 21-inch diameter pipe. This project is required after 2018.
- **LS-36 Force Main Replacement:** The existing force main from PS-36 experiences excessive flow velocities that will worsen when PS-36 is upgraded. Approximately 700 feet of 4-inch pipe will be replaced with 8-inch diameter pipe when the PS-36 upgrade project is undertaken.
- **LS-18 Conveyance System Improvements:** As the flows from Pump Station #18 continue to increase during the planning period, the gravity sewer that receives flow from PS #18 force main must be replaced due to surcharging in the existing 8-inch pipe. The replacement gravity sewer will consist of about 1,825 feet of new 12-inch pipe along NE John Carlson Road from the discharge manhole for the force main to Clover Blossom Lane NE. This project will be required after 2018.

- **LS-65 Force Main Replacement:** The existing 6-inch force main from PS-65 will experience high flow velocities and cause significant head loss when PS-65 is upgraded and has a higher pumping capacity. Approximately 6,400 feet of existing force main will be replaced with 10-inch diameter pipe after 2018.
- **LS-69 Force Main Replacement:** The existing force main and gravity pipe downstream from PS-69 must be replaced when PS-69 is upgraded. Approximately 2730 feet of 4-inch force main will have high flow velocities and be replaced with 6-inch diameter pipe after 2018. The force main discharges to an 8-inch gravity sewer that will become surcharged when PS-69 is upgraded and the gravity sewer replacement project will consist of about 1,110 feet of 12-inch diameter pipe.
- **LS-32 Gravity Sewer Replacement:** The existing gravity sewer receiving the flows from PS-32 force main will experience excessive flow velocities after PS-32 is upgraded. Approximately 900 feet of 8-inch pipe will be replaced with 12-inch pipe when the PS-32 upgrade project is undertaken.
- **Washington Avenue Pipe Replacement:** Approximately 800 feet of existing gravity sewer located in Washington Avenue north of PS #3 needs to be replaced to eliminate surcharging conditions caused by projected wastewater flows. The project will consist of replacing about 680 feet of 8-inch pipe with 12-inch diameter pipe and about 120 feet of 15 and 16-inch gravity sewer with 18-inch pipe. This project will be required after 2018.
- **Provost Road Pipe Replacement:** This conveyance system project is required due to increased wastewater flows projected to occur during the planning period in the west-central Silverdale area upstream of PS #12. The project consists of replacing about 3,750 feet of 8-inch gravity sewer with 12-inch diameter pipe and is required after 2018.
- **Lemolo Peninsula Pipeline Replacement:** The existing Lemolo Peninsula pipeline consists of 4,450 feet of 14-inch low pressure/gravity pipe that currently has some manhole surcharging. As wastewater flow increases from the City of Poulsbo during the planning period, the surcharging will become significant and the pipe will be replaced with 18-inch pipe. This replacement pipe will function as a force main along its entire length to provide the head necessary to convey flows around PS #16 to PS #67 in Keyport after those pump station upgrades have been completed. This project is scheduled to start after 2018.
- **LS-22 Force Main Replacement:** After LS-22 is upgraded, the increased pumping rates will cause excessive flow velocities in the existing force main. This project consists of replacing about 1,050 feet of 6-inch force main with 8-inch diameter pipe and about 450 feet of 8-inch gravity sewer with 12-inch diameter pipe after 2018.
- **Silverdale Way to LS-1 Pipe Replacement:** This project involves the replacement of about 4,800 feet of conveyance pipe downstream from the Silverdale Way Pipe Replacement Project described above. Projected flows for the northwestern Silverdale service area will cause surcharging of the conveyance system between the CFP Project #4 improvements and PS #1. These improvements will consist of constructing about 1,640 feet of new 15-inch gravity sewer and upsizing an additional 3,200 feet of existing 15-inch and 18-inch gravity sewer to 18-inch and 21-inch diameter pipe, respectively. This project is required after 2018.
- **LS-4 Force Main Replacement:** Once PS #4 is upgraded, the higher pumping rates will cause excessive flow velocities and significant head loss in the force main. This project consists of replacing about 8,700 feet of 14-inch and 20-inch force main with 24-inch diameter pipe from PS #4 to the connection with the North Old Military Road force main along Waaga Way.
- **North Old Military Road Force Main Replacement:** Increasing flows projected for the Central Kitsap during the planning period will require the replacement of the force main extending the South Old Military Road Pipe Replacement improvements (CFP Project #7) from Foster Road NE north along NE Old Military Road, west along NE Waaga Way, then north along County Road NE to Paulson Road. This project will consist of replacement of about 7,780 feet of existing 16-inch force main with 24-inch force main and will be required after 2018.

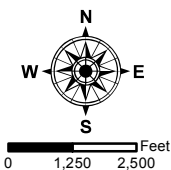
- **Upper Anderson Hill Road Pipe Replacement:** This project is a continuation of the pipe replacement project along Anderson Hill Road from PS #3 to the high school to eliminate surcharging that would be caused by projected higher wastewater flows. It will consist of replacing about 2,000 feet of 8-inch pipe with 12-inch diameter pipe after 2018.



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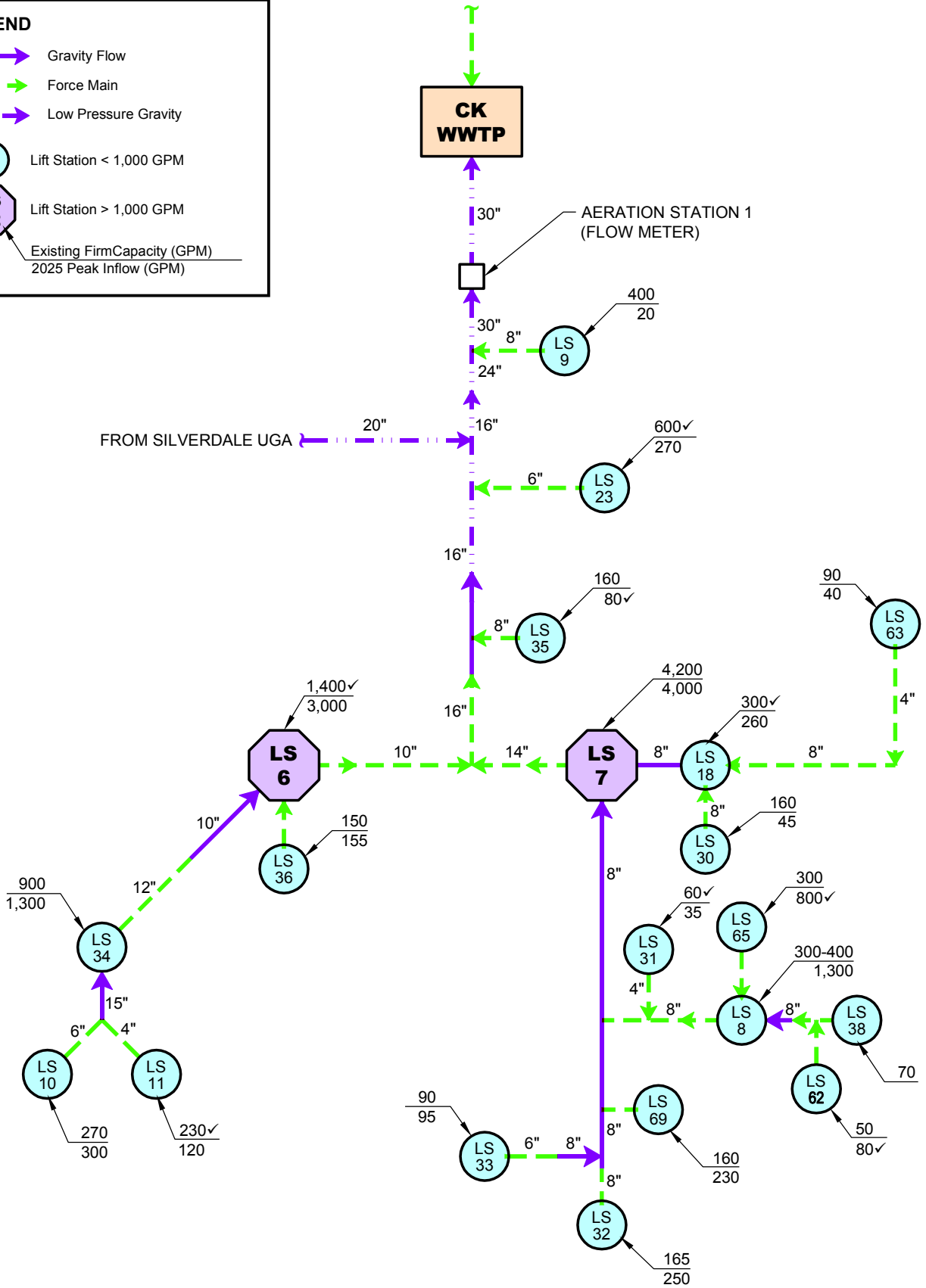
LEGEND

- Gravity Flow
- Force Main
- Low Pressure Gravity

Lift Station < 1,000 GPM

Lift Station > 1,000 GPM

Existing Firm Capacity (GPM)
2025 Peak Inflow (GPM)



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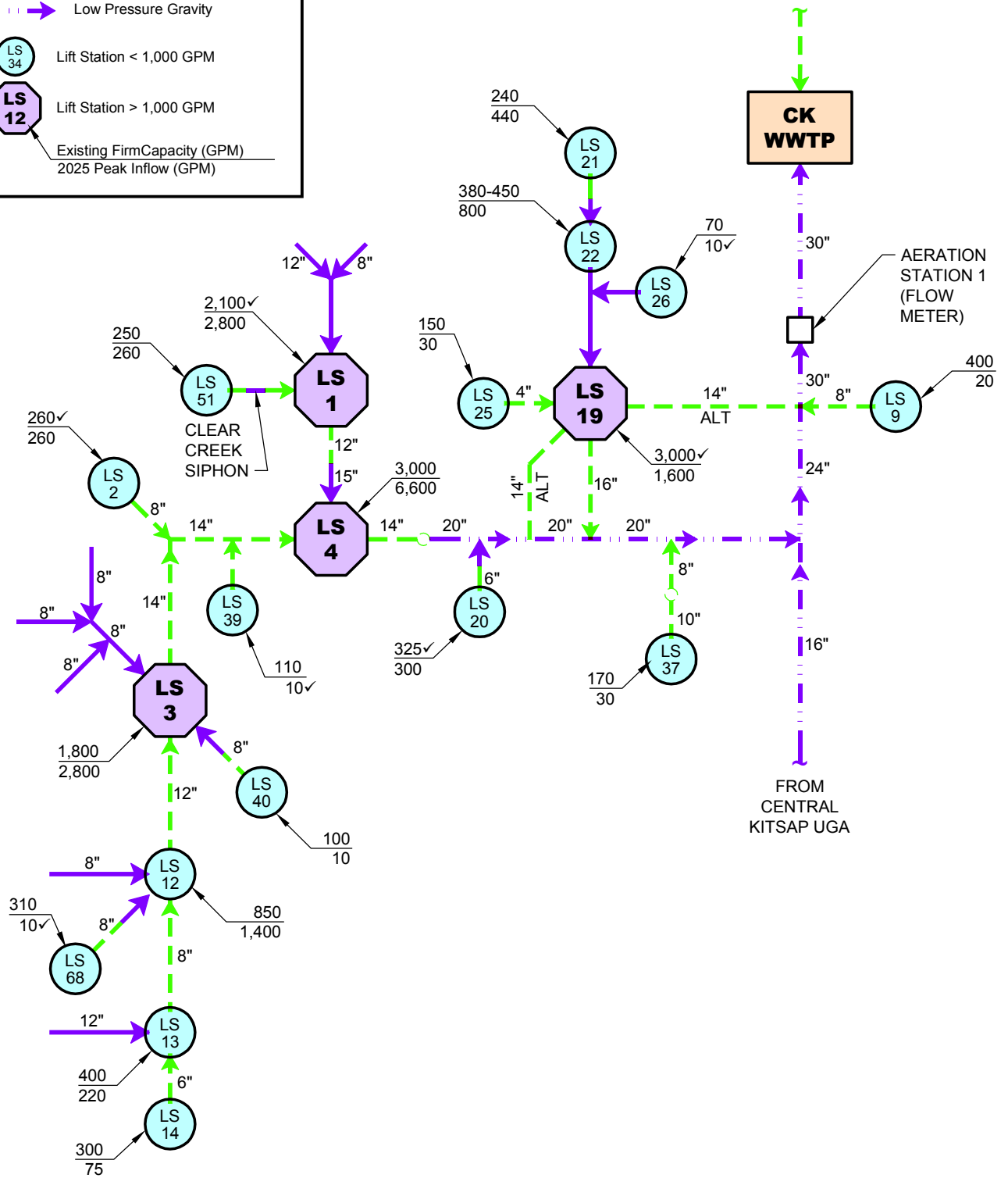
LEGEND

- Gravity Flow
- Force Main
- Low Pressure Gravity

LS 34 Lift Station < 1,000 GPM

LS 12 Lift Station > 1,000 GPM

Existing Firm Capacity (GPM)
2025 Peak Inflow (GPM)



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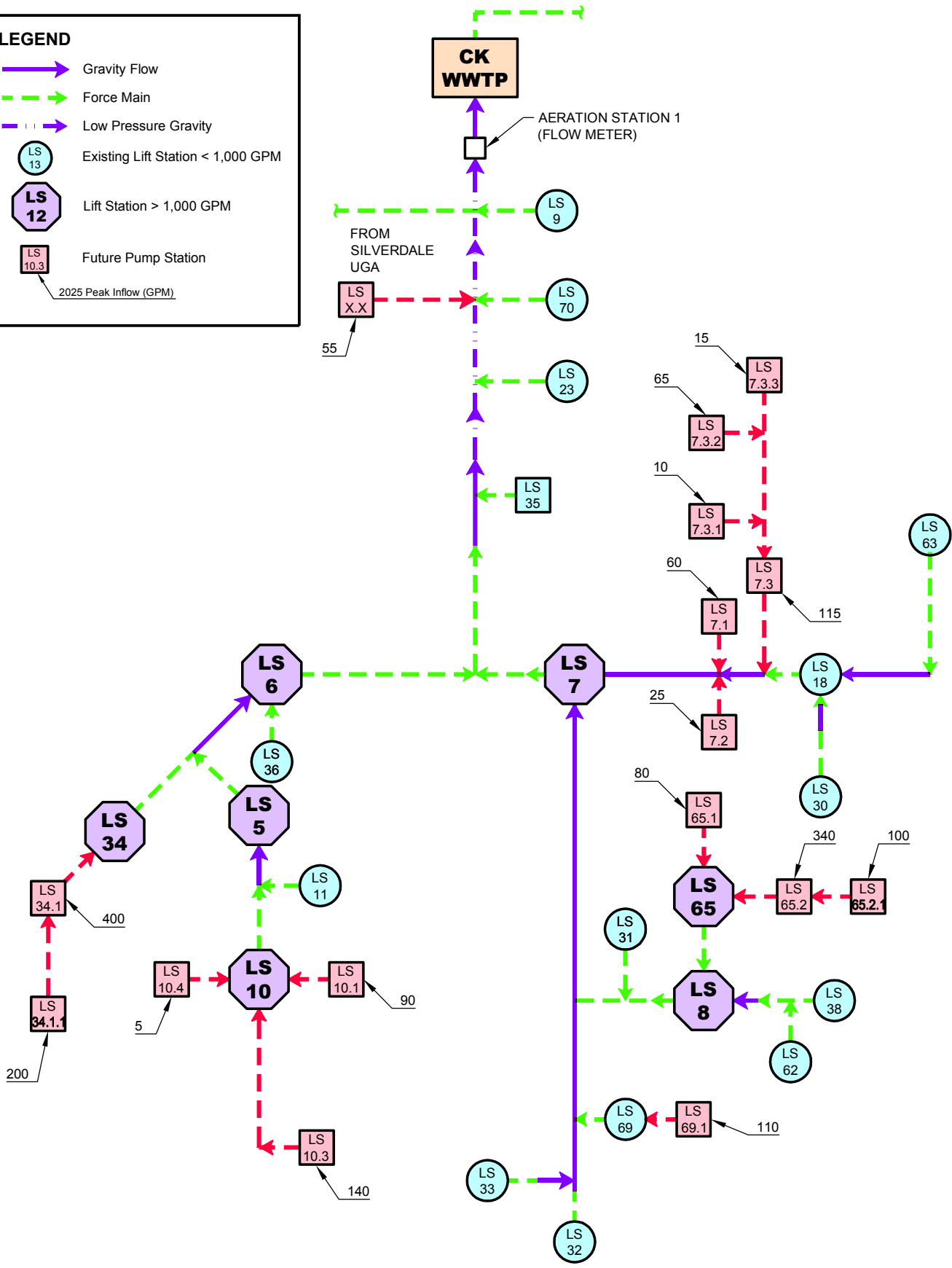
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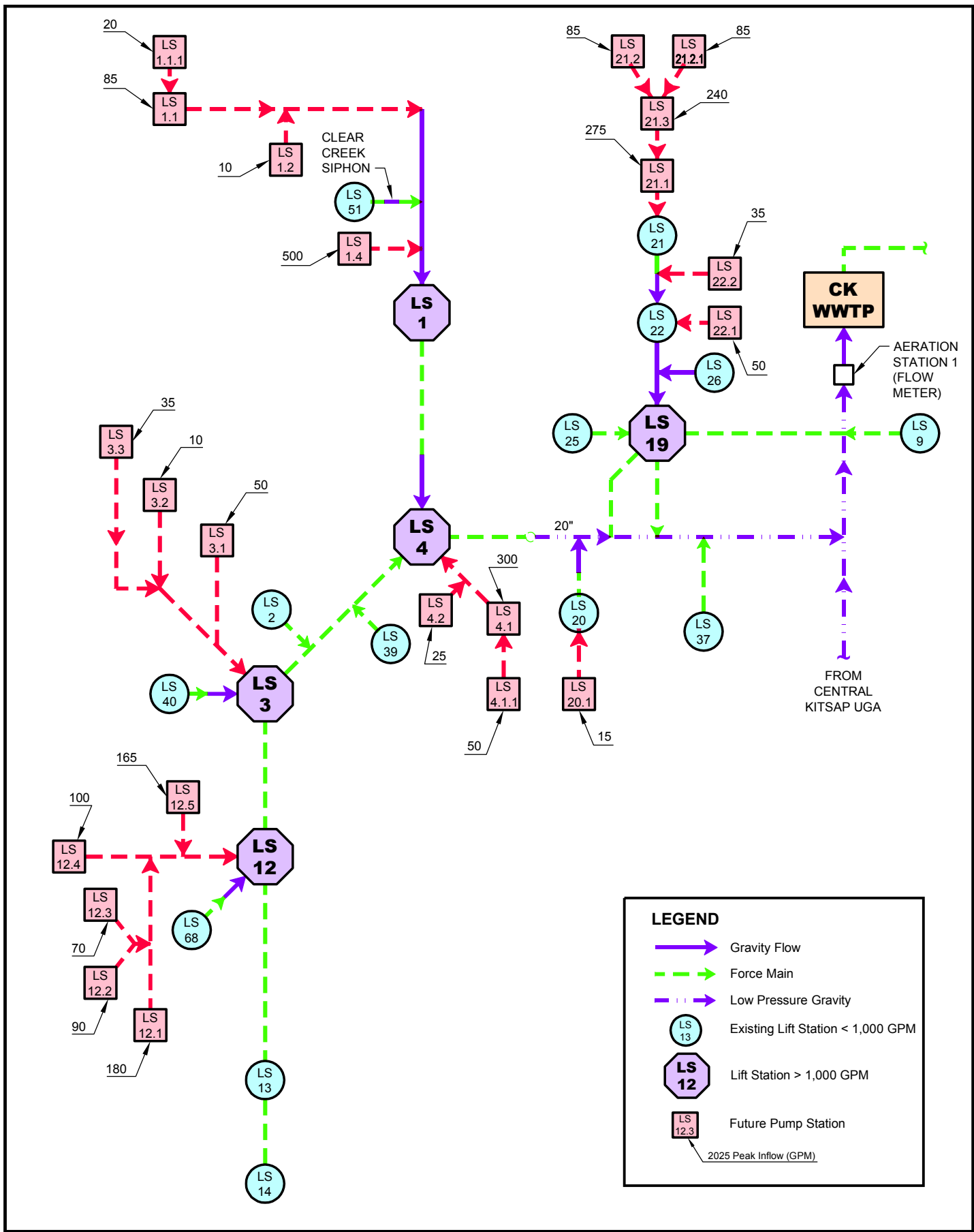
- Gravity Flow
- Force Main
- Low Pressure Gravity
- Existing Lift Station < 1,000 GPM
- Lift Station > 1,000 GPM
- Future Pump Station

2025 Peak Inflow (GPM)



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LEGEND

- Gravity Flow
- Force Main
- Low Pressure Gravity
- Existing Lift Station < 1,000 GPM
- Lift Station > 1,000 GPM
- Future Pump Station
- 2025 Peak Inflow (GPM)

REVISED CHAPTER 9

RECOMMENDED WASTEWATER SYSTEM CAPITAL IMPROVEMENTS

9.1 Overview of Chapter Contents

Alternatives for upgrading the Central Kitsap wastewater collection system are presented and evaluated in Revised Chapter 7, along with a brief description of the recommended capital improvement projects and their costs. Likewise, alternatives for upgrades to the CKWWTP wastewater treatment system are presented in Chapter 8. This chapter summarizes the key elements of these specific wastewater system capital improvement recommendations and provides a schedule for suggested project implementation. This information is subdivided into 6-year CIP and subsequent CIP for the period 2019-2025.

Funding needs are generally set for 6-year planning windows. Beyond that time, it is understood that the CIP will be reevaluated periodically to reflect changes in growth patterns, regulations affecting wastewater infrastructure construction and treatment, alternative means of funding, changes in project costs, and advances in wastewater technology and treatment priorities. The projects identified in the 6-year CIP form a subset of the 2013-2025 CIP project list.

For this reason, the project list beyond the upcoming 6-year period should be viewed as the most likely scenario, given the parameters currently known. The 6-year CIP projects will be designed in a manner to provide the most flexibility to accommodate changing future conditions.

9.2 Collection System Improvements

The following section presents recommendations for the 6-year CIP and 2019-2025 CIP for the Central Kitsap collection system improvements.

9.2.1 6-Year CIP: Collection System

The 2013–18 capital improvements for the collection and conveyance system consist of seven lift station projects and five pipeline projects as described in Table 9-1 and shown in Figures 9-1 and 9-2 for Central Kitsap UGA and Silverdale UGA, respectively..

All of the lift stations are major facilities in the conveyance system. Three of the projects are located in the Silverdale UGA, two in the Central Kitsap UGA and two in the Keyport LAMIRD. The projects address the necessary rehabilitation of aging pumps and control equipment. Replacement equipment will be sized to accommodate future growth to avoid having to replicate work at the stations within the design life of the new equipment.

The pipeline projects consist of three projects in the Silverdale UGA and two projects in the Central Kitsap UGA. Three of the pipeline projects involve replacement of pipes that have existing flow capacity and maintenance issues or will have significant hydraulic issues when upstream pump stations are upgraded.

Table 9-1. 6-Year Collection System Projects

Service area	Project name	Project scope	Justification	Benefit
Silverdale UGA	LS-1	Lift Station 1 improvements	Age and poor condition of controls and pump motors	Improve efficiency of pump, motor, and controls; reduce possibility of failure in downtown Silverdale, reduce maintenance costs
Silverdale UGA	LS-3	Lift Station 3 improvements	Near firm pumping capacity in service area projected to experience significant growth	Improved efficiency of pump, motor and controls; increased pumping capacity to convey increased flows
Silverdale UGA	LS-4	Lift Station 4 improvements	Firm pumping capacity will be exceeded when LS-1 is upgraded and service area projected to experience significant growth	Improved efficiency of pump, motor and controls; increased pumping capacity to convey increased flows
Central Kitsap UGA	LS-6	Lift Station 6 improvements	Near firm pumping capacity and original 30-year equipment that has outlived its lifespan and is inefficient	Improve efficiency of pump, motor, and controls; reduce possibility of failure in central Silverdale, reduce maintenance costs
Central Kitsap UGA	LS-8	Lift Station 8 improvements	Near firm pumping capacity and original 30-year equipment that has outlived its life span and is inefficient	Improve efficiency of pump, motor, and controls; reduce possibility of failure in central Silverdale, reduce maintenance costs
Keyport LAMIRD	LS-16	Lift Station 16 improvements	Near firm pumping capacity and original 30-year equipment that has outlived its life span and is inefficient	Convert LS-16 to a local pump station serving only Keyport and replace aged equipment
Keyport LAMIRD	LS-67	Lift Station 67 improvements	Simplify conveyance system for flow from Poulsbo and Keyport to the treatment plant	Move the major pumping facility out of the shoreline area, improve effectiveness of system, reduce maintenance costs
Silverdale UGA	Silverdale Way Pipe Replacement	Replace 2,840 lf of 8' and 10' pipe with 12' and 15' pipe along Silverdale Way	Eliminate existing surcharging and backwater flow conditions upstream of LS-1	Increased flow capacity and improved flow conditions to reduce maintenance
Silverdale UGA	Bayshore Pipe Replacement	Replace 1,865 lf of pipe to 10" pipe along Bayshore	Increase capacity and reduce maintenance	Reduce the possibility of a spill in Dyes Inlet due to overcapacity; reduce maintenance
Silverdale UGA	Lower Anderson Hill Rd. to LS-3 Pipe Replacement	Replace 3,700 lf of 8" pipe with 12' and 15' pipe from LS-3 though Old Town Silverdale to the high school	Correct surcharging and velocity issues	Reduce odors, improve system function, eliminate surcharging and reduce maintenance
Central Kitsap	LS-6 Force Main/So. Military Rd. Pipe Replacement	Replace 1,150 lf of 10' force main from LS-6 to 16' force main along Fairgrounds Rd. and 3,250 lf of 16' gravity pipe to 30' north of fairgrounds Rd. along Old Military Rd.	Correct excessive velocity in force main after LS-6 upgrades and reduce potential for surcharging in gravity pipe	Improved flow conditions, reduce maintenance and reduce the possibility of a spill due to pipe surcharging

Table 9-1. 6-Year Collection System Projects				
Service area	Project name	Project scope	Justification	Benefit
Central Kitsap UGA	LS-8 Downstream Conveyance Improvements	Construct 5,680 lf of 12' force main and 3,000 lf of 15' gravity sewer through a new alignment to replace the existing conveyance piping from LS-8	Correct high velocity in force main when LS-8 is upgraded and to avoid construction along State Highway 303	Increased pumping capacity, reduce odors and improve system function

9.2.1.1 Project Costs for the 6-Year CIP

Table 9-2 summarizes the collection system project costs for the 6-year plan.

Table 9-2. Summary of Collection System 6-Year CIP Improvement Project Costs	
Project Name	Project costs (2010\$)
Lift stations	
LS-1	\$1,980,000
LS-3	3,760,000
LS-4	9,700,000
LS-6	2,090,000
LS-8	1,980,000
LS-16	1,430,000
LS-67	3,380,000
Lift stations subtotal	\$24,320,000
Conveyance system	
Silverdale Way Pipe Replacement	\$1,830,000
Bayshore Pipe Replacement	1,340,000
Lower Anderson Hill Rd. to LS-3 Pipe Replacement	2,500,000
LS-6 Force Main/So. Old Limitary Rd. Pipe Replacement	4,640,000
LS-8 Downstream Conveyance Improvements	5,710,000
Conveyance System subtotal	\$16,020,000
Total 6-Year CIP Cost	\$40,340,000

9.2.2 2019-2025 Collection System CIP

Capital improvements for the collection and conveyance system for the period from 2019 through 2025 include projects for existing lift stations, existing conveyance systems and for new facilities to serve areas within the Central Kitsap UGA and Silverdale UGA that currently have onsite sewer systems.

9.2.2.1 Existing Collection and Conveyance System

The improvements to the existing system involve both lift station projects and pipeline projects as shown in Figure 9-3 for the Central Kitsap UGA and Figure 9-4 for the Silverdale UGA. Eleven lift stations must have pumping capacity increases to accommodate increased flows due to population growth. All of the lift stations are located adjacent to surface waters so the lift station improvements will mitigate the potential for overflows. These lift stations also have aging pumps and control systems that should be replaced during the planning period. The total project cost for the eleven lift stations is about \$24.7 million, with the largest projects being LS-12 in the Silverdale UGA and LS-34 in Central Kitsap UGA (Table 9-3).

Table 9-3. Summary of Existing Lift Station Improvements for 2019-2025				
Lift station	Ex. firm capacity (gpm)	2025 future flow (gpm)	Project costs (2010\$)	Year to begin upgrade project
10	270	300	\$2,340,000	2019
12	850	1,400	3,760,000	2019
21	240	440	2,340,000	2019
22	450	800	2,340,000	2019
32	165	250	2,340,000	2019
33	90	95	1,060,000	2019
34	900	1,300	3,760,000	2019
36	150	155	1,060,000	2019
62	50	80	1,060,000	2019
65	300	800	2,340,000	2019
69	160	230	2,340,000	2019
Total Existing Lift Station Projects			\$24,740,000	

Twelve pipeline projects have also been identified to address existing and future surcharging and scouring issues with a total project cost of nearly \$43 million. Nine of the projects are shown in Table 9-4 as required to address existing surcharging and scouring problems. Although the magnitude of these problems is currently less than those identified for the 6-year CIP projects, O&M issues will worsen with time as flows increase. The timing for implementation of several pipeline projects is linked to upstream lift station improvements; that is, when a lift station capacity is increased, the downstream force main and gravity sewers must be increased in size to accommodate the higher pumped flows. Three additional projects are identified to correct future problems of surcharging and high scouring velocities in the pipes as flows increase due to population growth.

Table 9-4. Summary of Existing Collection System Pipeline Projects for 2018-2025			
Service Area	Project name	Project cost (2010\$)	Implementation date
Silverdale	Washington Ave. Pipe Replacement	\$1,000,000	2019
Silverdale	Silverdale Way to LS-1 Pipe Replacement	3,750,000	2019
Silverdale	Levin Rd. NW Pipe Replacement	1,700,000	2019
Silverdale	Provost Rd. Pipe Replacement	3,100,000	2019
Silverdale	LS-4 Force Main Replacement	6,700,000	2019
Silverdale	Fredrickson Rd. NW Pipe Replacement	1,100,000	2019
Silverdale	Upper Anderson Hill Rd Pipe Replacement	1,510,000	2019
Silverdale	LS-22 Force Main Replacement	600,000	2019
Poulsbo	Lemolo Peninsula Pipe Replacement	7,900,000	2019
Central Kitsap	No. Old Military Rd. Pipe Replacement	7,710,000	2019
Central Kitsap	LS-65 Force Main Replacement	3,500,000	2019
Central Kitsap	LS-69 Force Main and Gravity Sewer Replacement	2,100,000	2020
Central Kitsap	LS-18 Conveyance System Improvements	1,310,000	2017
Central Kitsap	LS-32 Force Main Replacement	600,000	2020
Central Kitsap	LS-36 Force Main Replacement	400,000	2017
Total Existing Conveyance System - Future Projects		\$42,980,000	

9.2.2.2 Future Collection and Conveyance Systems

Future collection and conveyance systems are required to serve the areas currently not served by the existing sewer system within the UGAs (Figure 9-3 and 9-4). These areas would be served by a series of local lift stations, smaller force mains, and gravity pipes that would connect to the existing Kitsap County system. A summary of these future lift station and future pipeline projects is shown in Table 9-5. This information is taken from Tables 7-3 and 7-4, respectively.

Table 9-5. Summary of Future Sewer Systems Project Costs (2010\$)	
Future collection system facility	Total project cost
Lift stations	\$31,350,000
Gravity sewers and force mains	80,100,000
Total project cost	\$111,450,000

9.2.2.3 Summary of Collection and Conveyance System 2013-2025 CIP

The total cost for collection and conveyance system improvements for 2013-2025 is more than \$219 million (Table 9-6).

Table 9-6. Summary of Collection and Conveyance System 20-Year CIP		
Project Category	6-Year CIP (2010\$)	2019-2025 CIP (2010\$)
Existing lift stations	\$24,320,000	\$24,740,000
Existing conveyance piping	16,020,000	42,980,000
Future lift stations	-	31,350,000
Future piping	-	80,100,000
Subtotal	\$40,340,000	\$179,170,000
Grand total		\$219,510,000

9.3 CKWWTP Improvements

The following section presents recommendations for the 6-year CIP and 2019-2025 CIP for the CKWWTP improvements.

9.3.1 6-Year CIP for CKWWTP

The following improvements are recommended for the 6-year CIP at the CKWWTP and are divided into two general categories based on the project's primary drivers: (1) need for additional treatment capacity, and (2) enhanced functionality for resource reclamation:

- additional treatment capacity:
 - primary sedimentation tanks
 - secondary clarifiers
 - gravity belt thickener
 - plant water system upgrade
- resource reclamation and reuse:
 - reclaimed water production
 - aeration basin addition/modifications (nitrogen removal)
 - blower replacement with high-efficiency blowers
 - aeration diffuser upgrade
 - digester gas cogeneration system.

The following sections provide a brief description of each of these improvements. Additional information on these improvements is provided in Chapter 8.

9.3.1.1 Primary Sedimentation Tanks

The existing primary sedimentation tanks are projected to reach their maximum month flow design capacity of 6.3 mgd in 2016. New primary sedimentation tanks will be required by then to provide treatment for higher flows. However, because two new aeration basins (basins 5 and 6) will be constructed to provide TN

removal for water reclamation, the existing primary sedimentation tanks will need to be demolished to provide the space for these aeration basins. Therefore, new primary sedimentation tanks will need to be constructed at that time. Three new tanks will be built adjacent to the new headworks. The settled primary sludge will continue to be pumped to the existing gravity thickeners.

9.3.1.2 Secondary Clarifier

The existing secondary clarifiers are projected to reach their maximum month flow design capacity of 7.3 mgd in 2020. One new secondary clarifier will be required to meet the peak hydraulic and solids loading requirements associated with the projected 2025 plant flows and loadings. Design of the new secondary clarifier will occur in the 6-year CIP.

9.3.1.3 Gravity Belt Thickener

The CKWWTP is approaching the hydraulic retention time (HRT) capacity in the existing digestion system to meet Class B biosolids production requirements. The minimum HRT criterion for mesophilic anaerobic digestion is 15 days. The CKWWTP currently operates two gravity thickeners, which co-thicken primary sludge, secondary sludge, and hauled septage and sludges from Kingston, Manchester, and Suquamish prior to digestion. Because of the relatively thin sludge produced by the gravity thickeners when operated to co-digest primary and secondary sludges, the 15-day HRT limit for the digesters will be reached before 2015. By improving the sludge thickening performance, which increases the thickened sludge concentrations, the corresponding HRT can be increased and the available existing digester capacity can be extended. This will allow the County to delay the construction of a third digester.

The sludge thickening system will be upgraded by adding a GBT for WAS thickening and a thickened sludge blend tank, while retaining the existing gravity thickeners for primary sludge thickening. Only one GBT unit will be installed, but the new GBT building will be sized to house a total of two GBT units to provide room for future expansion. Septage will continue to be thickened in the gravity thickeners, while the thickened waste activated sludges from the other plants will be sent directly to the blend tank.

9.3.1.4 Plant Water System Upgrade

A portion of the disinfected secondary effluent is used as process water for the screenings compactor, scum sprays in the primary and secondary clarifiers, grit classifiers, centrifuge flushing and polymer usage, biofilter irrigation, and in the seal water and utility maintenance systems throughout the plant. In the existing system, process water pumping is provided by three pumps located in the existing utilidor. The existing pumps do not have adequate capacity for the future process water requirements. This project will include removal of those pumps and installation of three new pumps at the UV disinfection effluent channel. The existing process water piping network will be expanded to service the new facilities. The new process water system will be designed to optimize energy efficiency.

9.3.1.5 Reclaimed Water Production

At the CKWWTP, water reuse is currently limited to in-plant process uses. In order to produce reclaimed water for applications outside of the treatment plant, the liquid-stream treatment will need to be enhanced to meet specific criteria for Class A reclaimed water, plus additional criteria related to applications involving indirect groundwater recharge and stream flow augmentation. These criteria include limits on turbidity, TN, total coliform, BOD, and TSS.

To produce Class A reclaimed water at the CKWWTP, a tertiary effluent filtration system will be installed to treat secondary effluent. Initially, the system will be sized to treat 3.5 mgd, the annual average plant flow. The system would consist of rapid sand filters, chemical coagulation equipment, and chlorination. During peak

flow events, secondary effluent exceeding 3.5 mgd will be disinfected in the existing UV system and discharged through the plant outfall.

9.3.1.6 Aeration Basin Addition/Modifications

The existing activated sludge secondary treatment system will be expanded and modified to provide the TN removal required for reclaimed water production. The target effluent TN level is typically 10 mg/L for groundwater recharge and stream flow augmentation. In order to achieve this level of nitrogen removal, two new aeration basins (basins 3 and 4) will be added initially, doubling the aeration basin capacity. A supplemental carbon addition system will also be added to achieve the required level of denitrification.

Besides the two new basins and other modifications described above to achieve nitrogen removal, new DO sensors and air flow control valves will be installed in each basin to facilitate automatic DO control, which in conjunction with the new blowers described below will provide a more energy-efficient aeration system. The existing activated sludge system occasionally experiences excessive biological foaming that negatively impacts effluent quality. A classifying selector, consisting of a surface skimming system designed for foam and scum removal, will be installed. Other improvements include a new RAS mixing box, new WAS pumps, and new coarse-bubble diffusers in the aeration basin inlet and mixed liquor channels for channel air mixing.

9.3.1.7 High-Efficiency Blowers

The three existing aeration blowers used to supply air to the aeration basins in the activated sludge system are multi-stage centrifugal blowers installed in 1996 as part of the Contract I upgrade. Although the three existing blowers still function relatively well from a mechanical perspective, they operate with variable volume inlet valve control, which results in low efficiencies at reduced air flow rate operating scenarios. One new blower will be needed to meet the higher aeration requirements associated with year-round TN removal described above.

This project will consist of replacing the three existing blowers with high-efficiency turbo blowers and adding a new additional high-efficiency turbo blower as the fourth blower. The new turbo blowers and control system will result in reduction in the energy requirements associated with the aeration air blowers.

9.3.1.8 Aeration Diffuser Upgrade

The existing aeration diffusers were installed in 1996. Over the years, the oxygen transfer efficiency has deteriorated significantly due to the fouled, aging membranes on the diffusers such that the system has at times not been able to maintain adequate DO concentrations in the aeration basins. The system back-pressure requirement has also increased, exceeding the original design operating pressures for the aeration blowers. Because the existing air piping system still appears to be in good condition, it is recommended that the existing diffuser system be upgraded by replacing the membranes with new membranes, but retaining the existing diffuser grids and piping. With the new membranes, the plant will be able to maintain the DO concentration at higher overall oxygen transfer efficiencies and thus decrease energy requirements associated with the blowers.

9.3.1.9 Digester Gas Cogeneration System

Digester gas, generated in the plant's anaerobic digesters, is a by-product of the biological processes taking place in the anaerobic digester. Most of the digester gas produced is methane, which has a high heating value and is a significant GHG. Currently, all of the biogas is burned and wasted through an existing flare, and fuel oil must be purchased to heat the tanks.

This project would furnish the plant with an engine-generator that would use digester gas as its fuel source. The engine-generator, which would be housed in a manufacturer’s enclosure, would generate electricity to either be used throughout the plant or supplied to the local electrical power grid. The waste heat from the engine-generator would be used to heat the digesters and the CKWWTP buildings. In this manner, the engine-generator would perform two functions (hence the term cogeneration): generate electricity from the digester gas and generate waste heat to be used to heat the digesters and the plant buildings. By using biogas to generate heat, process and space heating demands can be met by the engine-generator, potentially reducing or eliminating the need for expensive fuel oil.

9.3.1.10 Project Costs for the 6-Year CIP

Table 9-7 below summarizes the project costs for the 6-year CIP.

Table 9-7. Summary of CKWWTP 6-Year CIP Improvement Project Costs	
Project	Project costs (2010\$)
Primary sedimentation tanks	\$15,750,000
Secondary clarifier	1,956,000
Reclaimed water filters	14,725,000
Aeration basin addition/modifications	13,806,000
High-efficiency blowers	1,251,000
Aeration diffuser upgrade	94,000
Gravity belt thickener	7,637,000
Digester gas cogeneration system	1,300,000
Plant water system upgrade	186,000
Total	\$56,706,000

9.3.2 2019-2025 CKWWTP CIP

The CIP for the remainder of the planning period from 2019 through 2025 includes the following recommended improvements at the CKWWTP:

- new aeration basin addition
- new secondary clarifier
- expansion of reclaimed water filtration system
- existing digester improvements
- new administration building
- laboratory expansion
- new storage and maintenance building

The following sections provide a brief description of each of these improvements.

9.3.2.1 Aeration Basin Addition

Two more aeration basins, resulting in a total of six basins, will be required to provide year-round TN removal for water reclamation by around 2017. As described above, the new basins 5 and 6 will be constructed at the site of the existing primary sedimentation tanks.

9.3.2.3 Secondary Clarifier

One new secondary clarifier will be constructed to meet the peak hydraulic and solids loading requirements associated with the projected 2025 plant flows and loadings. The new clarifier will have the same diameter as each of the two existing clarifiers. New RAS pumps will also be added to increase the total sludge recycling capacity.

9.3.2.4 Expansion of Reclaimed Water Filtration System

As described above, the plant will initially be able to produce up to 3.5 mgd of reclaimed water as part of the 6-year CIP. In order to increase the reclaimed water production capacity as plant flows increase, new filter modules can be added. To reclaim the full plant flow for up to the 2025 condition, two new filter modules must be added. In addition, a reclaimed water equalization tank will be constructed to equalize the secondary effluent flows going to the tertiary filtration system. This eliminates the need to size the filters for peak hour flow condition and thus reduces the sizing of the system.

9.3.2.5 Existing Digester Improvements

The sludge withdrawal, heating, and mixing systems for the two existing digesters will be upgraded and their respective covers will be repaired. New boilers will be added that can utilize either digester gas or heating oil as the fuel source. Other new mechanical equipment includes new pumps for digester heating and as part of the pump mix system and new heat exchangers. One of the existing digesters will be converted into a digested sludge storage tank and backup digester. A third digester will be added to provide the necessary hydraulic detention time of 15 days to produce a Class B biosolids product.

9.3.2.6 Administration Building

Placeholder estimates for all new campus buildings have been used, assuming conventional building types. Alternative building scenarios using various approaches to combining functions within existing or smaller buildings, as well as evaluating alternative building materials, will be investigated to explore means of minimizing these costs.

A new administration building will be constructed on the site of the existing chlorine building. This new building will include administrative offices and a new control room for the entire plant.

9.3.2.7 Laboratory Expansion

The existing administrative offices will be demolished and the laboratory will be extended into this area.

9.3.2.8 Storage and Maintenance Building

Because the expanded digester complex will require demolition of the existing shop and maintenance building, a new storage and maintenance building will be constructed on the south side of the plant site. The new building will include an equipment maintenance area, vehicle bay, and office.

9.3.2.9 Project Costs for the 2013-2025 CIP

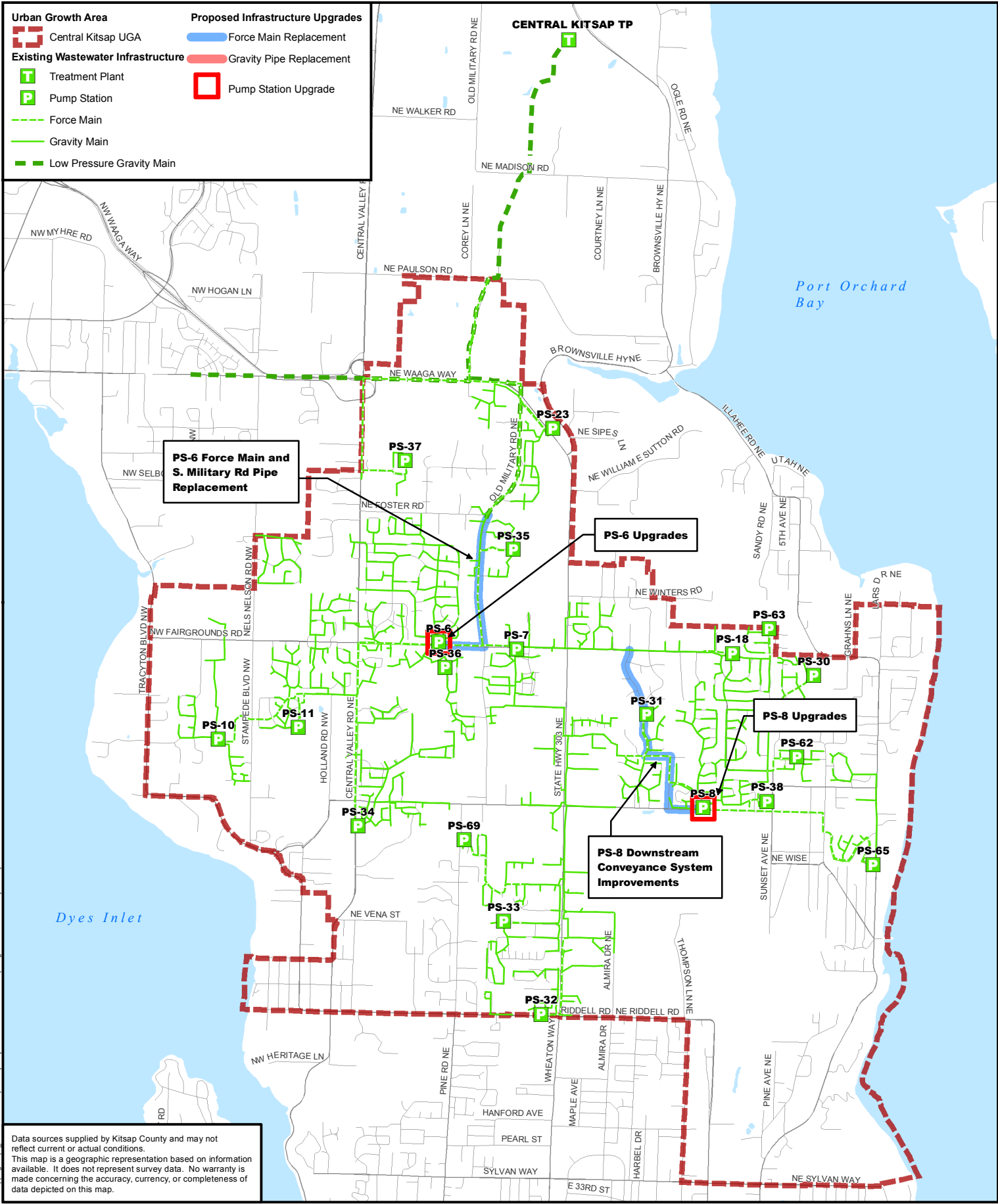
Table 9-8 below summarizes the project costs for the current 20-13-2025 CIP. This table includes improvements that will be implemented in the current 6-year CIP. For the effluent filters, the cost associated with full flow treatment is included. Note that these costs reflect projects for a design year of 2025.

Table 9-8. Summary of CKWWTP 2013-2025 CKWWTP Improvement Project Costs (2010\$)		
Project	6-year CIP project costs: design year 2025	20-year CIP subsequent project costs: design year 2025
Primary sedimentation tanks	\$15,750,000	0
Aeration basin addition/modifications	13,806,000	0
High-efficiency blowers	1,251,000	0
Aeration diffuser upgrade	94,000	0
Secondary clarifier	1,956,000	\$7,826,000
Reclaimed water filters	14,726,000	21,439,000
Gravity belt thickener	7,637,000	0
Existing digester improvements	0	23,311,000
Digester gas cogeneration system	1,300,000	0
Plant water system upgrade	186,000	0
New administration building	0	3,822,000
Laboratory expansion	0	2,504,000
Storage and maintenance building	0	2,960,000
Grand total	\$56,706,000	\$61,862,000

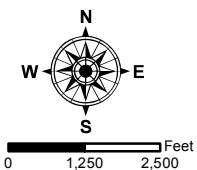
9.4 Project Cost Summary

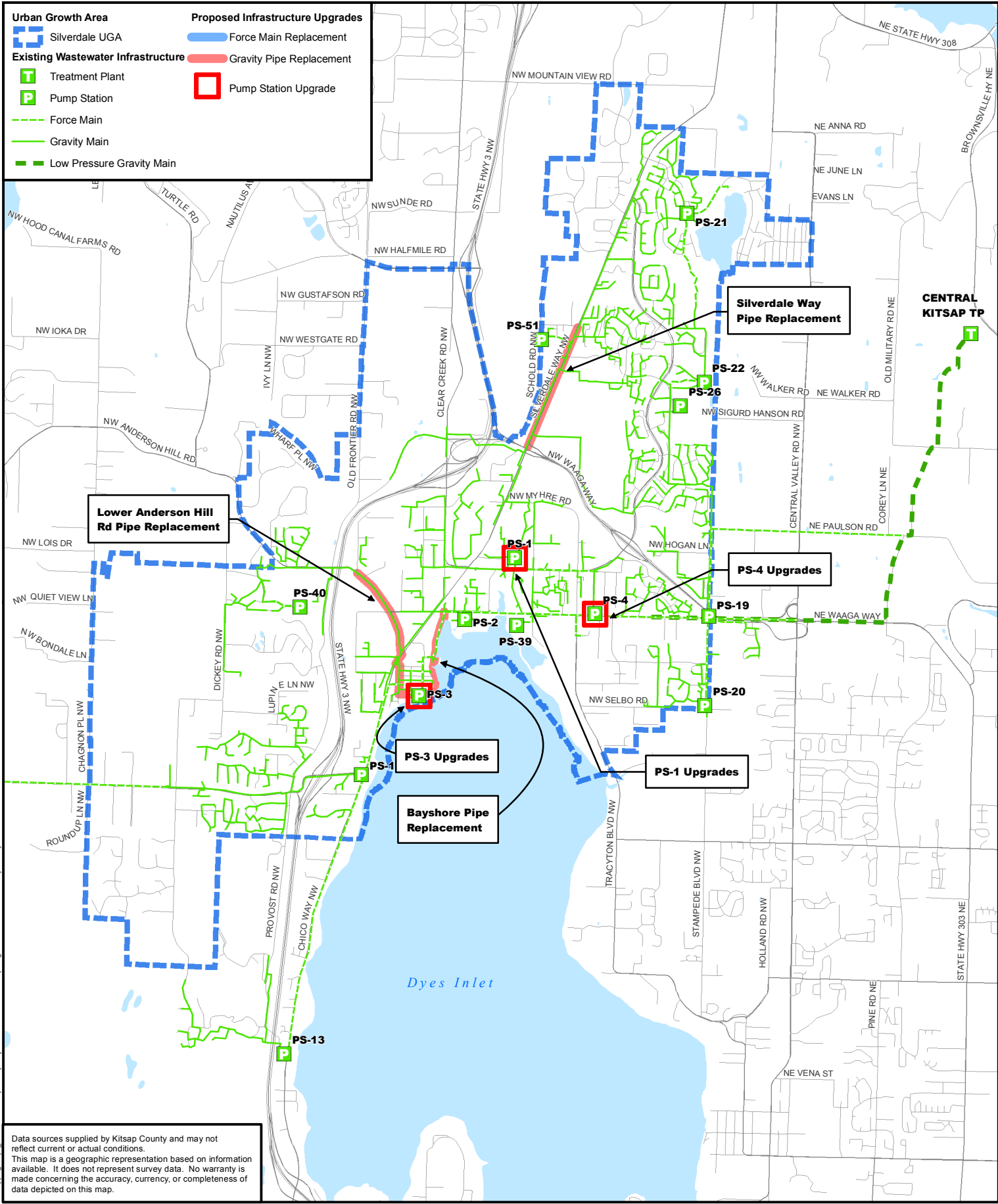
This section provides complete cost estimates for recommended collection and treatment system projects. The total costs for recommended wastewater infrastructure projects for the Central Kitsap planning area for the 2013-2025 planning period are shown in Table 9-9.

Table 9-9. Summary of Total Infrastructure Improvement Project Costs (2010\$)			
Project category	6-year CIP project costs: design year 2025	2019-2025 CIP project costs: design year 2025	Overall total
Collection system:			
Existing conveyance flows	\$40,340,000	\$67,720,000	\$108,060,000
Future conveyance flows	0	111,450,000	111,450,000
Collection system subtotal	\$40,340,000	\$179,170,000	\$219,510,000
Treatment system:			
Additional treatment capacity	\$25,529,000	\$40,423,000	\$65,952,000
Resource reclamation and reuse	31,177,000	21,439,000	52,616,000
Treatment subtotal	\$56,706,000	\$61,862,000	\$118,568,000
Grand total	\$97,046,000	\$241,032,000	\$338,078,000



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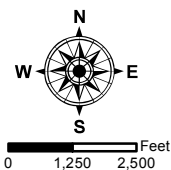




P:\Mapping\Maps_Generated\KitsapCounty\Projects\12-10250_01000\1maps\Fig 9-2 Silverdale UGA Conveyance System 2013-2018 8.0x11.mxd 3/28/2013 cdoehino

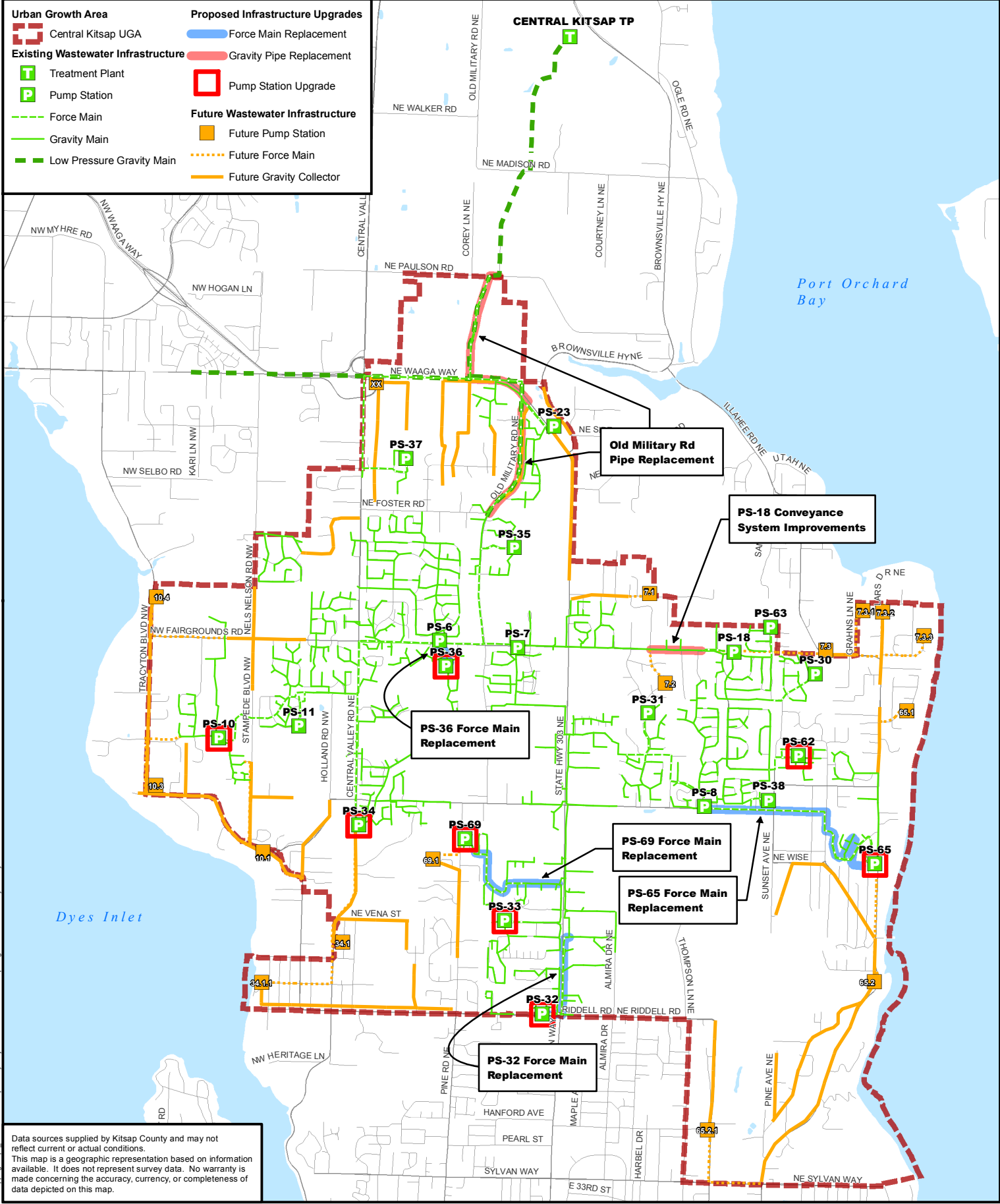
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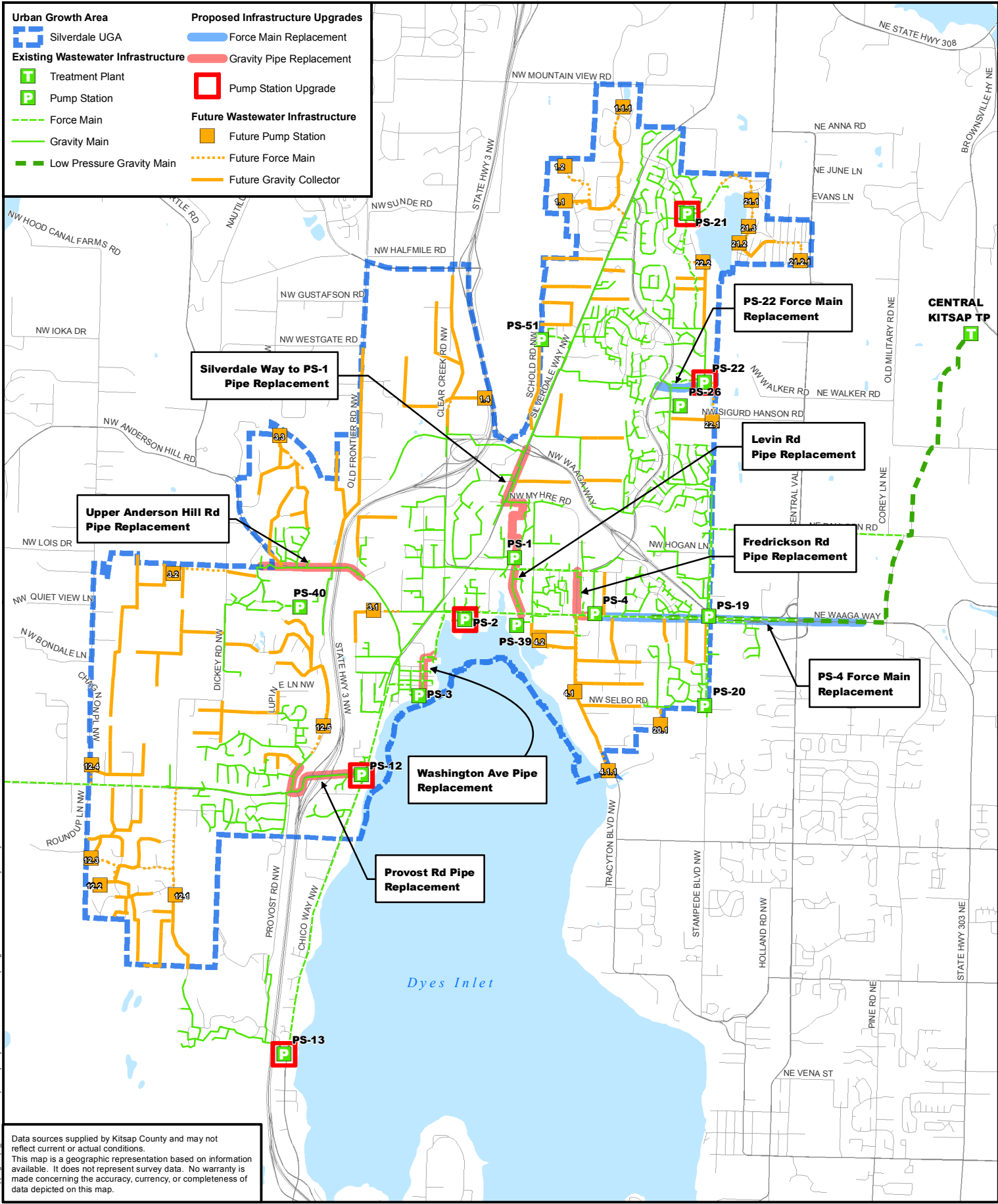


Silverdale UGA
Conveyance System
2013-2018 CIP
 Kitsap County Public Works
 March 2013

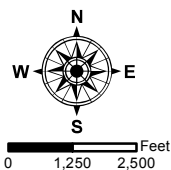
Figure
9-2



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Growth Management Hearings Board, November 6, 2012, "Order Finding Compliance Re: Ordinances Nos. 493-496" Case No. 07-3-0019c (Suquamish II)

Kitsap County Board of County Commissioners, 2012, www.kitsapgov.com/dcd/community-plan/remand%202011/remand.htm

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APPENDIX

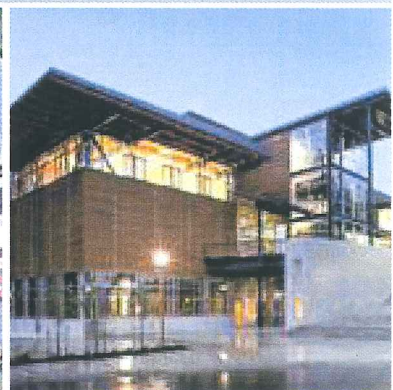
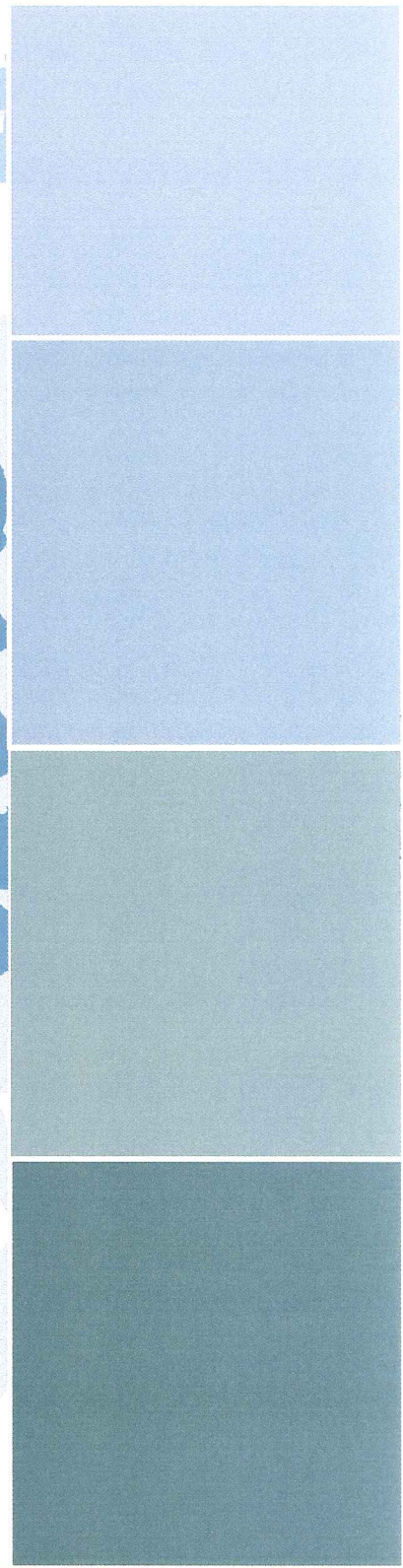


KITSAP COUNTY UGA SIZING & COMPOSITION REMAND

Final Comprehensive Plan & Development Regulation Amendments

Final Capital Facilities Plan

AUGUST 2012



KITSAP COUNTY UGA SIZING & COMPOSITION REMAND

Preferred Comprehensive Plan & Development Regulation Amendments Preferred Final Capital Facilities Plan

August 2012

INTRODUCTION

Based on an August 2011 decision¹ by the CPSGMHB, Kitsap County is re-examining eight of ten UGAs expanded during the 2006 Comprehensive Plan update process. This decision followed a five-year legal challenge that the Court of Appeals ultimately remanded back to the CPSGMHB for decision. As part of the remand process, the CPSGMHB found Kitsap County out of compliance with GMA in the following areas:

- **Urban Density/Minimum Densities.** The CPSGMHB found local circumstances did not support the County's reduction of minimum densities in its UGAs from five to four dwelling units per acre in the Urban Low and Urban Cluster Residential designations. The Board concluded the reduction and resultant UGA expansion created inconsistencies with the comprehensive plan, did not comply with RCW 36.70A. 110, and was not guided by GMA Goals 1 and 2 on Urban Growth and Reducing Sprawl, respectively.
- **Land Capacity Analysis - Accounting for Environmentally Critical Areas Twice.** The CPSGMHB determined the County "double-dipped" when it discounted twice for constrained lands in its Urban Restricted designation. Specifically, the County's use of a zoning density minimum after critical areas were already discounted understates the actual capacity for development of Urban Restricted designated lands.
- **Land Capacity Analysis – Minimum Density.** The CPSGMHB found four dwelling units per acre was not an appropriate capacity multiplier in the County's Urban Low and Urban Cluster designations; it is not a supportable measure of capacity based on local circumstances; and is not consistent with the GMA Goals, the Buildable Lands Report (BLR) and the County's Comprehensive Plan.

Based on the Remand Order, the UGAs requiring evaluation include:

- Kingston
- Silverdale
- Central Kitsap
- East Bremerton
- West Bremerton
- Gorst
- McCormick Woods/ULID#6, and

¹ *Suquamish Tribe et al. v. Kitsap County*; CPSGMHB No. 07-3-0019c. Final Decision & Order on Remand (8/31/2011) (Order on Remand).

- Port Orchard/South Kitsap.

This UGA evaluation must be completed by August 31, 2012 per the Remand Order.

UGA remand issues primarily apply to the low-density residential zones. However, due to the revisiting of land supply and appropriate UGA boundaries in the listed UGAs, the County is also voluntarily reviewing the density trends and assumptions in medium density, high density, and mixed use residential zones located in the UGAs listed above.

Further, as a result of revisiting UGA sizing, the County is undertaking Comprehensive Plan amendments that are necessary for consistency, such as land use and capital facilities policy amendments, as well as a Capital Facilities Plan (CFP) update. The County's 2007-2012 CFP requires update to a new six-year period (2013 to 2018) and must demonstrate an ability to serve growth with urban services through the year 2025 within newly reconfigured UGA boundaries.

Two unincorporated UGAs are not included in this remand effort: the Poulsbo and South Kitsap Industrial Area (SKIA) UGAs. The Poulsbo UGA is not included as it was not expanded in the 2006 Comprehensive Plan update process, does not include the three designations subject to the order (Urban Restricted, Urban Low and Urban Cluster) and was not subject to legal challenge during appeals since 2006. Additionally, the SKIA UGA is not included because it was predominantly annexed by the City of Bremerton in 2008 and contains no residential zoning as it is a commercial and industrial UGA.

PREFERRED ALTERNATIVE

As part of the Remand effort, Kitsap County considered three alternatives: No Action, Alternative 1, and Alternative 2. The No Action Alternative is the continuation of the current Comprehensive Plan adopted in 2006. Alternatives 1 and 2 review different UGA capacities and boundaries. The Preferred Alternative was developed by Kitsap County in response to public comments on the three draft alternatives, and is the basis for the proposed Comprehensive Plan, Development Regulation, and CFP amendments.

The Preferred Alternative addresses the following policy and regulatory changes that are elements of the proposed action.

- **Land Capacity Method.** The Preferred Alternative considers land capacity assumptions and proposes changes based on local circumstances observed from 2000-2010. Primarily, the achieved densities found in unincorporated residential zones are considered. In addition, the Preferred Alternative includes modifications to discount factors such as public facilities based on observed trends.
- **Land Use and Zoning Maps.** The following revisions to the Land Use and Zoning Maps governing future land uses are proposed.
 - Eight UGAs were under consideration for boundary changes SEIS to accommodate population growth targets based on a new land capacity method that recognizes local circumstances. Due to the evaluation of land supply and demand not all UGAs require reduction in territory under the Preferred Alternative. Specifically, East Bremerton, West Bremerton, and Gorst boundaries would not require reduction. Kingston, Silverdale, Central Kitsap, and Port Orchard would be reduced. McCormick Woods would be slightly increased but only to include utility lands provide service only to the adjacent UGA and have no development capacity.
 - UGA changes and land use redesignations are proposed in the Preferred Alternative. These changes would remove territory from the current UGAs and redesignate them with appropriate rural classifications in place of urban classifications.

- **Plan policies.** The Preferred Alternative proposes amendments to the goals and policies of the Comprehensive Plan based on the revised Land Use Map and for purposes of maintaining internal consistency. Policies regarding UGAs and population would be amended. Further, policies regarding capital facilities would be changed based on the balance of land use growth, needed improvements, and funding. A new CFP is proposed for the Preferred Alternative.
- **Implementing regulations.** Development regulations, such as zoning, implement the Comprehensive Plan. In the Preferred Alternative, the County is considering amendments to Title 17 that would require sewer hookup when in proximity to a sewer line to be consistent with County health and sewer codes. Additional amendments to Title 17 Zoning are to ensure consistency with the proposed land use alternative. Amendments to KCC 18.04.100 - Categorical Exemptions for Infill Development - are proposed due to changes in residential or infill capacity anticipated in the Silverdale Mixed Use Infill Trip Bank.

COMMENT OPPORTUNITIES

Kitsap County prepared draft amendments that address the alternatives under study, and issued them for a 30-day comment period from May 7, 2012 to June 6, 2012. The County now issues the Preferred Comprehensive Plan and Development Regulation Amendments for review at a Board of County Commissioner's hearing.

- Date and Time: August 27, 2012, 5:30 p.m.
- Location: Kitsap County Board of Commissioner's Chambers at 619 Division Street Port Orchard, WA 98366

This compilation of Comprehensive Plan, Development Regulations, and Capital Facilities Plan amendments is posted on the County's website at

http://www.kitsapgov.com/dcd/community_plan/remand%202011/remand.htm.

CONTENTS OF AMENDMENT PACKAGE

This document contains proposed policy, regulatory and capital plan amendments.

All regular text is existing. Text changes in underline and ~~strikethrough~~ is proposed with the Preferred Alternative.

Kitsap County Comprehensive Plan Element Amendments

- Title Page
- Chapter 1 Introduction
- Chapter 2 Land Use Element
- Chapter 8 Transportation Element
- Chapter 11 Capital Facilities Element
- Chapter 12 Kingston Sub-Area Plan
- Chapter 13 Port Orchard/South Kitsap Sub-Area Plan
- Chapter 14 Silverdale Sub-Area Plan
- Chapter 15 Urban Sub-Area Plans

Kitsap County Comprehensive Plan – Appendix A Capital Facilities Plan Update

- Amendments to the 2007-2012 Capital Facilities Plan to update it to a 2013-2025 period and to address the Preferred Alternative

Kitsap County Code Titles 13, 17 and 18 Amendments

- Title 13 Amendments clarifying circumstances of sewer hookup
- Title 17 Amendments regarding density and dimensions and sewer hook up
- Title 18 Categorical exemptions for infill development