

ENVIRONMENT COMMITTEE AGENDA

April 21, 2016 – North Conference Room

21630 11th Avenue South – Des Moines 98198

6:00P – 6:50P

1. Approve minutes of the 2.18.2016 meeting

2. LID Preliminary Assessment of Code and Policies

(Discussion Item – 20 min)

Parametrix will be presenting their preliminary assessment of the City's codes and policies relating to the required integration of Low Impact Development.

3. Update on CMP Pipe Replacement Inventory

(Informational Item – 5 min)

Staff will brief the Committee on the status of the CMP Pipe Condition Assessment.

4. Highline Water District Comprehensive Water Plan

(Discussion Item – 15 min)

Staff will provide a summary of the draft 2016 Highline Water District Comprehensive Plan. Comments will be forwarded to the District for incorporation into the final draft.

5. WRIA 9 Update

(Informational Item – 10 min)

- *Staff will brief the Committee on the proposed Saltwater State Park Shoreline Restoration Project.*
- *Action Item – motion to appoint Loren Reinhold as second alternate to represent Des Moines at the WRIA 9 Watershed Ecosystem Forum.*

Draft MINUTES - ENVIRONMENTAL COUNCIL COMMITTEE MEETING 2.18.2016

The meeting was called to order @ 5:30 PM, Thursday, February 18, 2016, in the North Conference room @ 21630 11th Avenue South, Des Moines with the following in attendance:

Council Members

Robert Back, Chair

Melissa Musser

Matt Pina

City Staff

Tony Piasecki, City Manager

Dan Brewer, PBPW Director

Loren Reinhold, SWM Utility Manager

Denise Lathrop, CD Manager

Peggy Volin, Admin Asst II

Consultant: Stan May, AHBL

AGENDA:

1. Approve minutes of the 1.21.2016 meeting
2. CAO/SMP/Frequently Flooded Areas Code Update
3. Methanol Proposal in Tacoma

MEETING:

1. Approve the minutes of the January 21, 2016 meeting: Unanimously approved.
2. CAO/SMP/Frequently Flooded Areas Code Update: Community Development Manager Denise Lathrop introduced AHBL Consultant, Stan May who was hired to assist with the regulatory review and update process. Together they briefed the Committee on the GAP Analysis of Des Moines Critical Areas Ordinance (CAO), Shoreline Master Program, (SMP) and Frequently Flooded Areas in light of the changes to the Washington Department of Ecology wetland classification and rating system and the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMS) and designations.
3. Methanol Proposal in Tacoma: PBPW Director Dan Brewer briefed the Committee on the City of Tacoma's proposal to develop and operate a natural gas-to-methanol production plant in Tacoma. He provided a draft resolution in opposition of the proposal as requested by the Council, some articles on the dynamics of how the Methanol Plant

would operate along with a copy of the resolution recently passed by the City of Federal Way opposing the development of the plant in Tacoma.

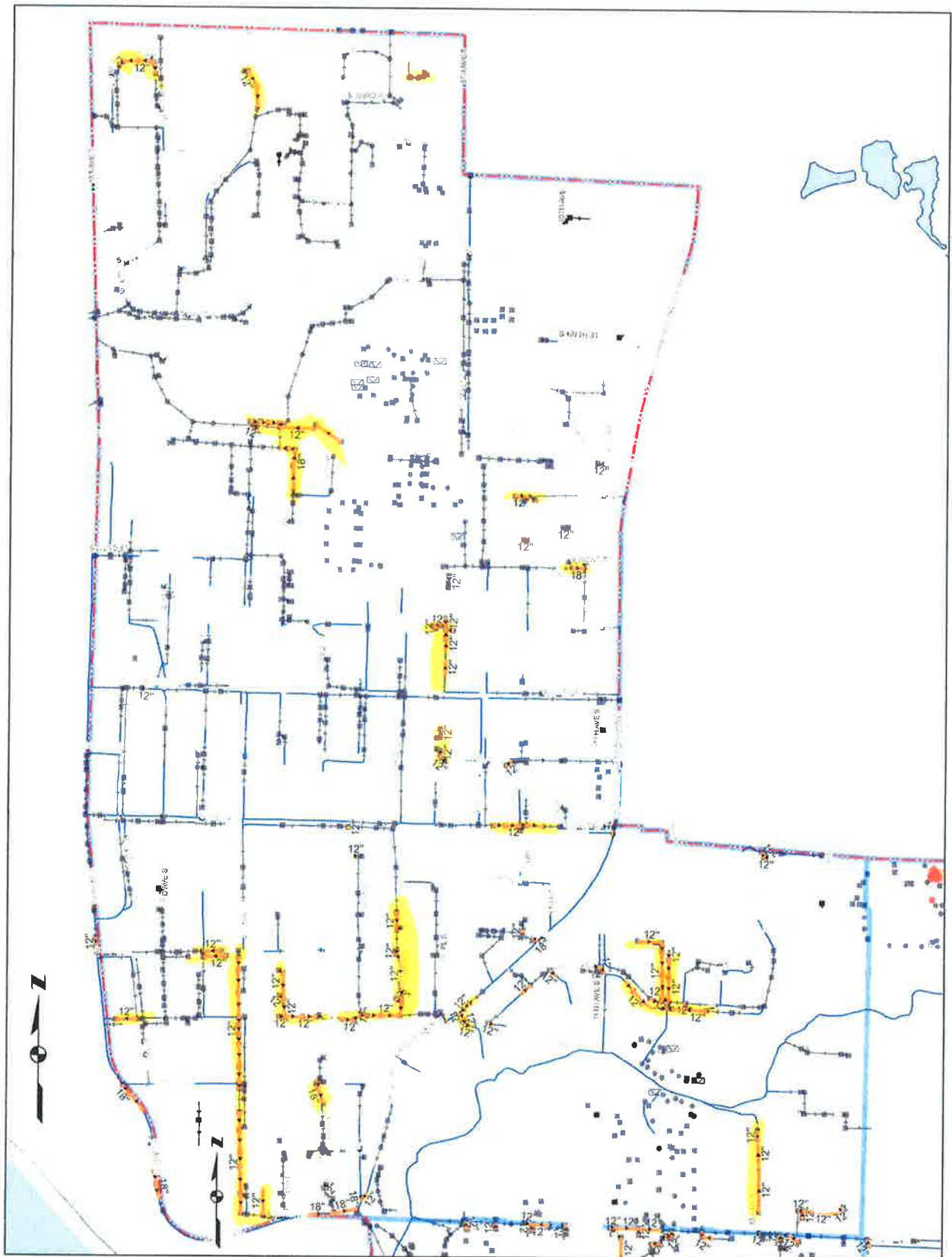
Committee recommended bringing this resolution forward to Council at the February 25, 2016 meeting.

Meeting adjourned at 6:05 pm

Minutes respectfully Submitted by: Peggy Volin, Admin Asst II







PW camera Inspection Mapbook
CMP PIPE STATUS

Zone No/Page: 1

Map Generated: Nov 20, 2013

File: InspectionMapbook.mxd

Conveyance Type

— CMP Main Pipe

Storm Catchments

● Other Catchments

Catchment Subtype, Structure Type

■ CB Type 1-1L

● CB Type 2-3

□ CB Curb Inlet

⊕ Manhole

⊗ Slot or Yard Drain

Storm Conveyances

Conveyance Type

— Main Pipe

— Other

0 215 430 860 1,290 1,720

Feet



For mapping Questions Call
 Tim Kissler
 GIS specialist
 Phone: (206) 870-6565





HIGHLINE WATER DISTRICT

WATER SYSTEM PLAN

March 2016

AGENCY REVIEW DRAFT



EXECUTIVE SUMMARY

ES.1 INTRODUCTION

This Water System Plan (Plan) has been prepared to update the 2008 *Highline Water District Comprehensive Water System Plan* in accordance with Washington Administrative Code (WAC) 246-290-100 and the Washington State Department of Health (DOH) requirements. The Plan was developed as a team effort by Highline Water District (District) staff, Carollo Engineers, and FCS Group. The District owns and operates a water system located in south King County, Washington that serves a population of approximately 70,000 residents and 28,000 employees. The District's retail water service area (RWSA) encompasses approximately 18 square miles and shares borders with eight adjacent water utilities as shown in Figure ES.1.

The District's Mission Statement is:

"Our mission is to provide high quality water and excellent customer service while effectively managing District infrastructure for a reliable water system today and for future generations."

ES.2 PLANNING DATA AND WATER DEMANDS

Chapter 2 presents a demographic analysis, historical water production and consumption trends, as well as water demand forecasts for the six- (2020), ten- (2024), and twenty-year (2034) planning periods for the District's RWSA. Projecting realistic future water demands is necessary for evaluating the capability of the water system to meet future water service requirements, planning for infrastructure projects, and securing adequate water supply. Future water demands are used as input conditions for the analyses of the water system that are used to develop the capital improvement program (CIP).

Puget Sound Regional Council (PSRC) growth forecasts predict that throughout the 20-year planning period, the number of households within the District's RWSA will increase by approximately 1 to 1.4 percent annually while employment will grow by 1.8 to 3.4 percent annually.

The Highline Water District purchases approximately two-thirds of its water from Seattle Public Utilities (SPU). The remaining water is produced almost evenly by the District's four operational wells. In total, the District's supply has been approximately 2.2 million gallons (MG) annually from 2010 through 2013. From 2005 through 2013 the District's average day demand was 6.3 million gallons per day (mgd) and its maximum day demand (MDD) was 11.2 mgd. The typical water consumption per single-family unit in the District is 171 gallons per day (gpd).

By 2034 the District's average day demand (ADD) is projected to reach 7.8 mgd with an MDD of 13.5 mgd. Projected ADD and MDD is shown in Figure ES.2.

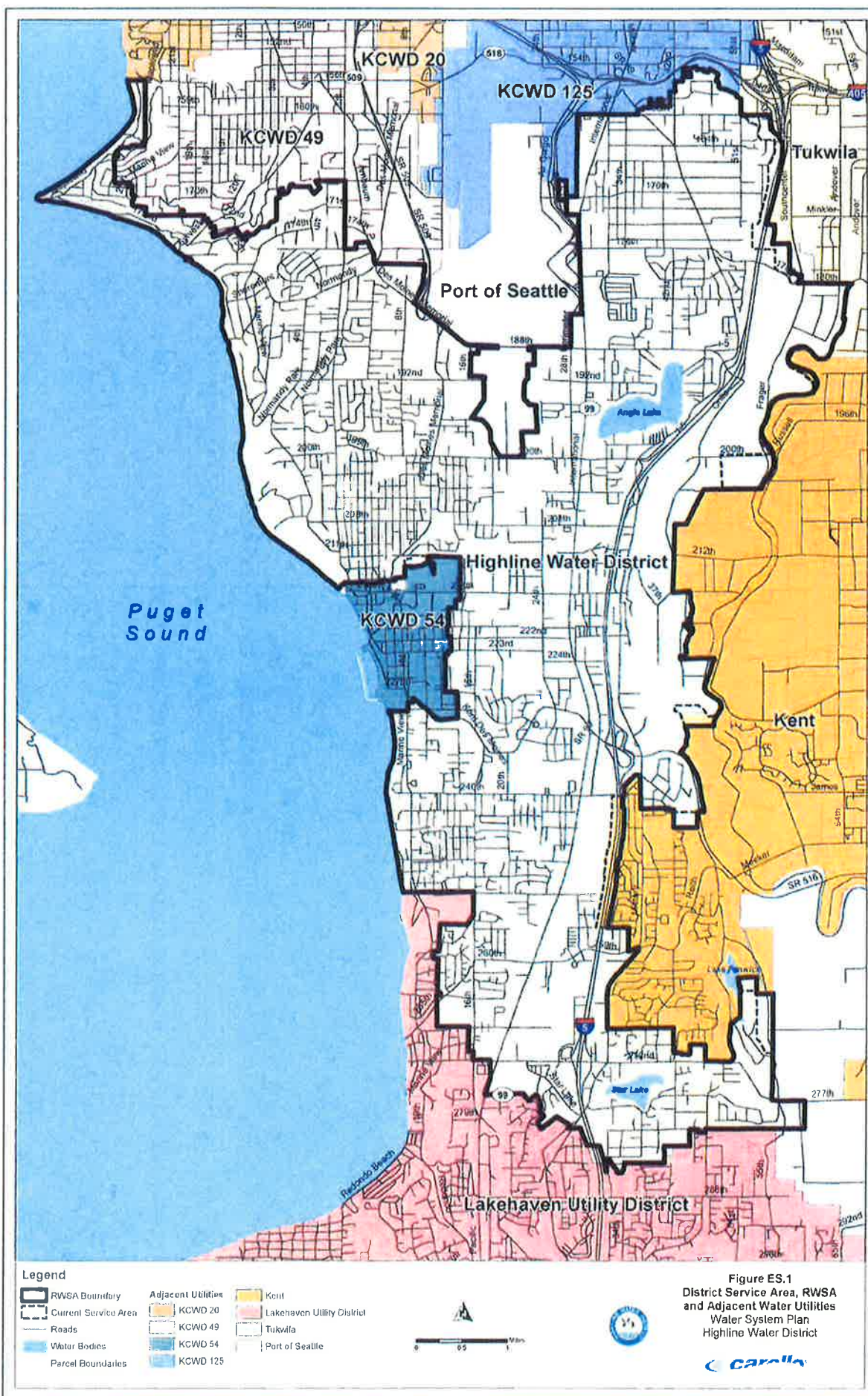
ES.3 DESCRIPTION OF WATER SYSTEM

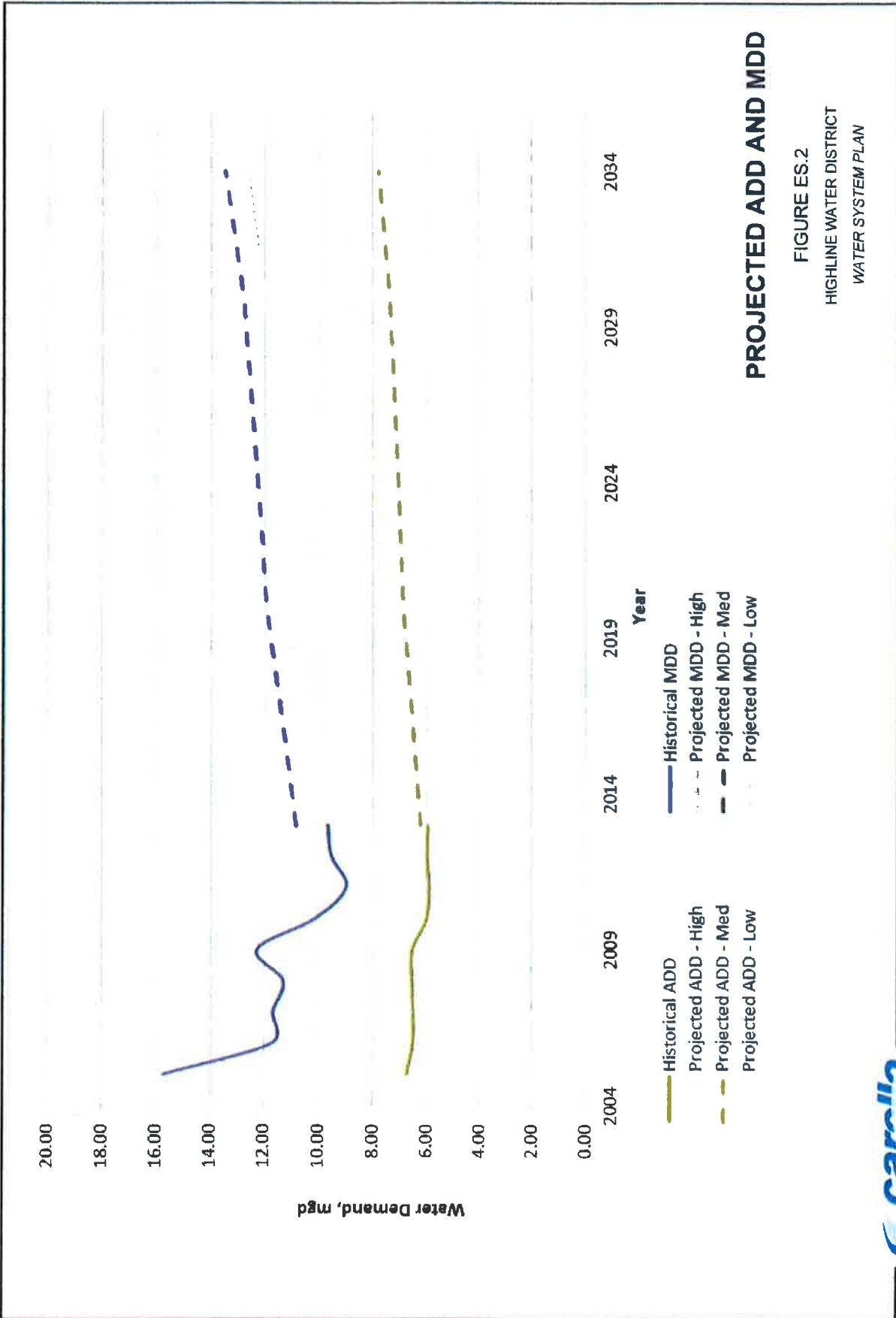
The District operates an extensive distribution system supplying water to approximately 18,200 customer accounts. Figure ES.3 shows the District's pressure zones and major facilities. The hydraulic profile portrayed in Figure ES. 4 shows the inter-relationship between pressure zones, wells, pump stations, reservoirs, pressure reducing valves (PRVs), and interties.

The District has two primary pressure zones, the 560 Zone and 490 Zone that in turn supply smaller pressure zones through booster pumps and PRVs. The 560 Zone is supplied from the SPU Cedar River Pipeline #4 (CRPL 4) and the Crestview Reservoir through Pump Station #6, which is also supplied by the CRPL 4. The 560 Zone serves customers in the eastern portion of the District. The 560 Zone supplies the 365 Zone (Segale), 345 Zone (Kentview), and 365 Zone (Lake Fenwick) through PRVs. Water is also pumped from the 560 Zone to the McMicken Heights 600 Zone through Pump Station #4. In addition, the McMicken well supplies the 560 zone.

The 490 Zone is supplied from SPU's Des Moines Way Feeder through Pump Stations #2 and #3 and the District's Des Moines, Angle Lake, and Tyee wells. The 490 Zone serves the western portion of the District. Water is pumped from the 490 Zone to the 530 Zone through Pump Station #7. The 295 Zone (Three Tree Point), 370 Zone (Normandy Park), and the 360 Zone (old Water District 56) are supplied from the 490 Zone through PRVs. The 490 Zone can also provide water to the 560 Zone through Pump Station #1.

All water purchased from SPU flows into the Highline system through the 60-inch CRPL 4 transmission main and the 24-inch Des Moines Way Feeder transmission main.

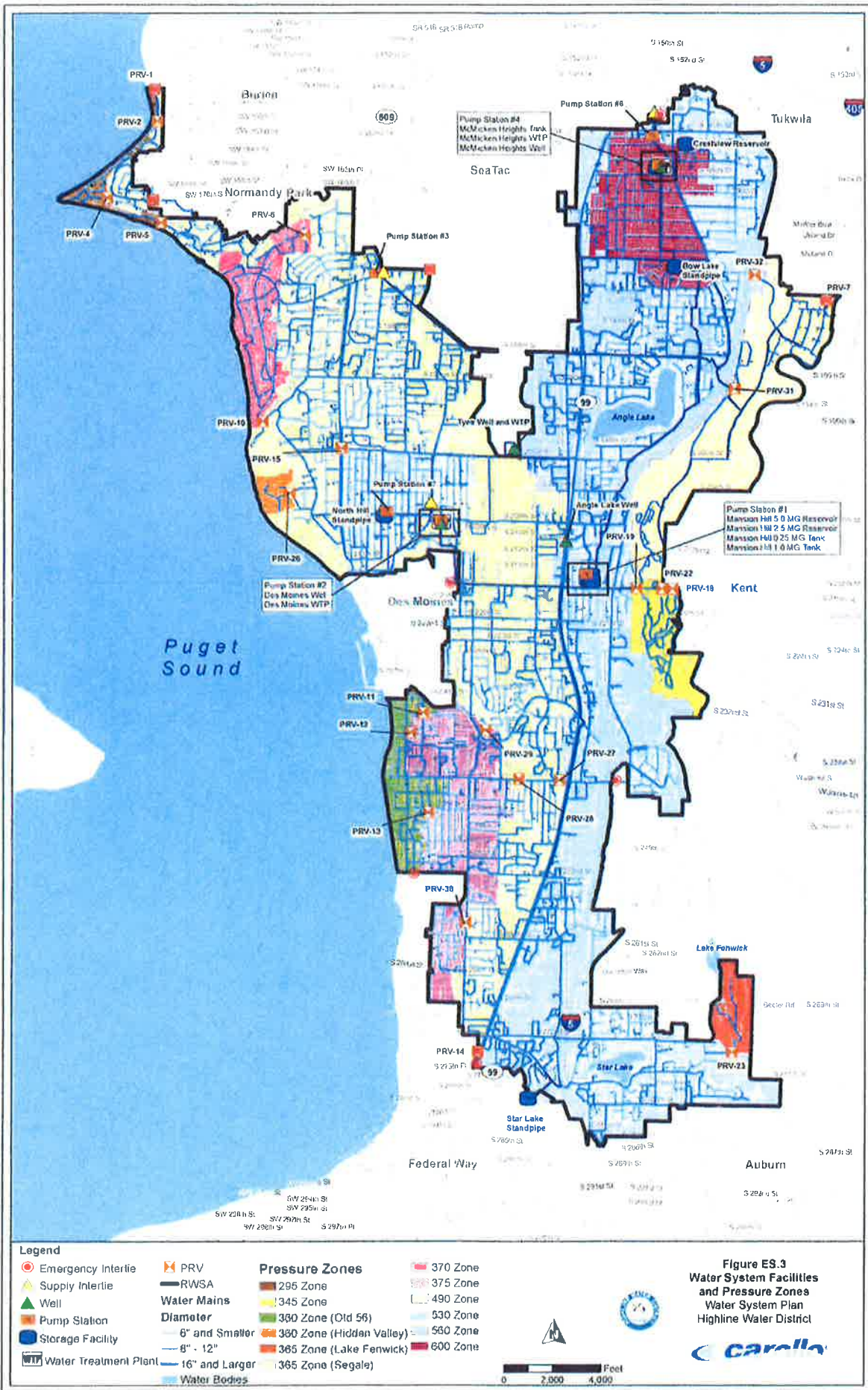


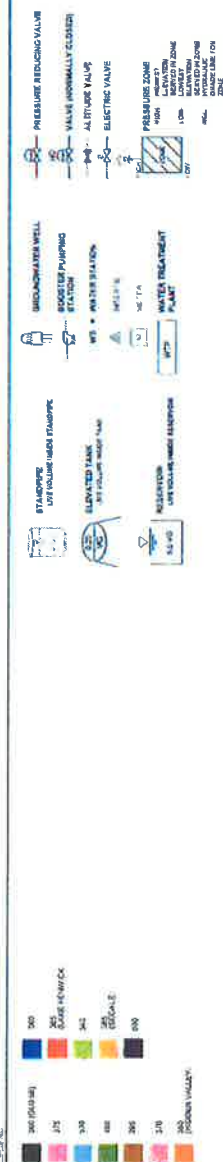


PROJECTED ADD AND MDD

FIGURE ES.2
HIGHLINE WATER DISTRICT
WATER SYSTEM PLAN





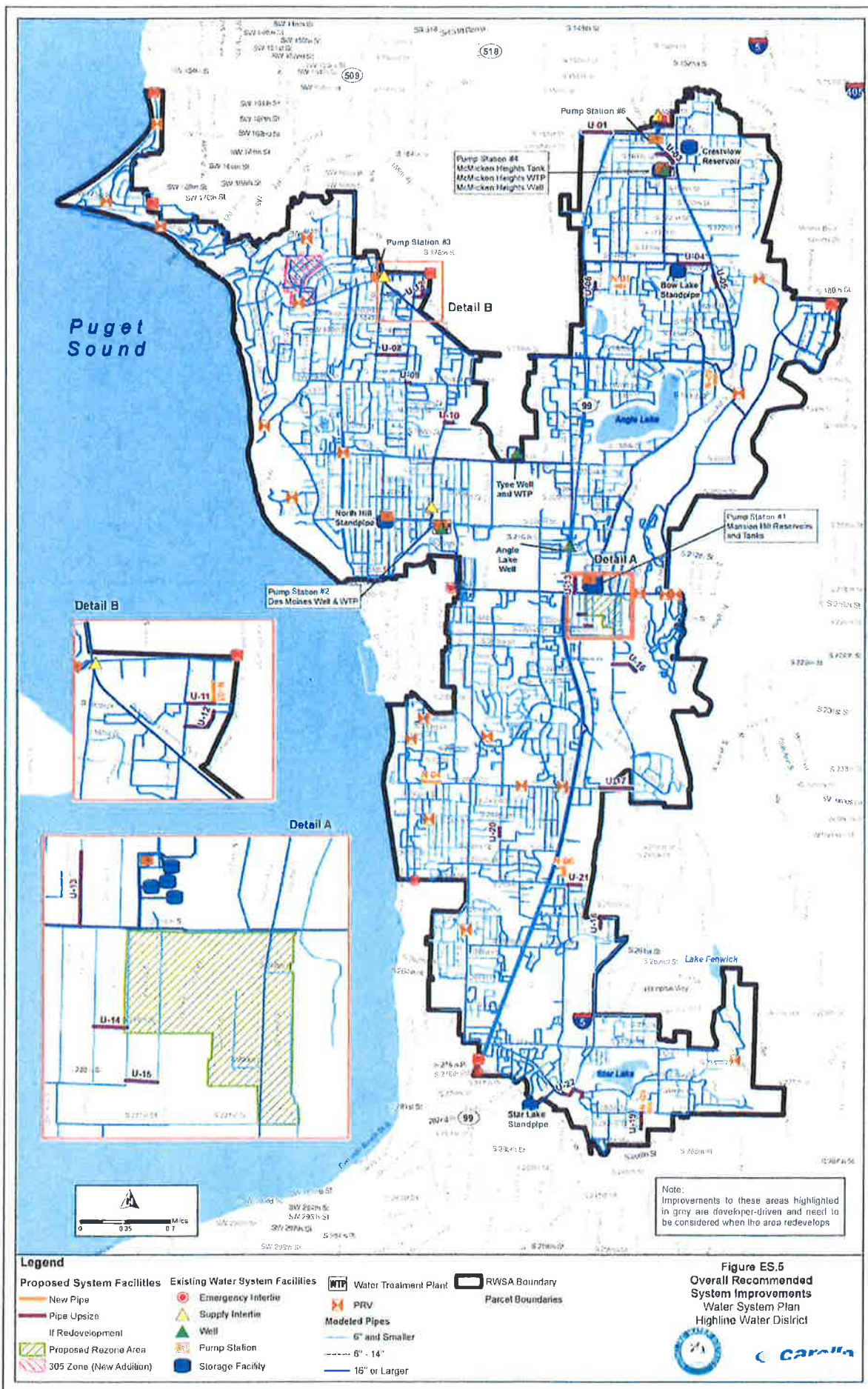


ES.4 WATER SYSTEM ANALYSIS

Carollo evaluated the District's water distribution system for its ability to meet the District's reliability criteria under 2020, 2024, and 2034 future conditions using the medium demand projection scenario. The distribution system was evaluated for its supply and pumping capacity and reliability, the capacity of its storage facilities, and for adequate pressures and fire flow capacity using the District's updated hydraulic model.

The analysis of the Highline Water District's water system identified several future system deficiencies and recommends the following improvements to eliminate these deficiencies. These recommendations form the basis of the District's CIP outlined in Chapter 7.

1. Install a new 4,000 gpm pump station to feed the 560 Zone from the CRPL 4 to provide improved supply redundancy to the 560 Operating Area.
2. Study operational changes that can be implemented to provide sufficient pressures and fire flows to customers near the intersection of Highway 5 and S. 216th St. Creating a new pressure zone at a hydraulic grade line (HGL) of approximately 630 feet may be required.
3. Eliminate fire flow and pressure deficiencies by implementing the pipeline improvement projects shown on Figure ES.5.
4. Install loop N-06 shown in Figure ES.5 that would prevent the valve located at Highway 99 and 250th St to improve redundancy in the southern portion of the system.



ES.5 WATER RESOURCE ANALYSIS

Chapter 5 reviews the District's supply sources, water rights, and water use efficiency program. The District's water supply comes from two sources: SPU and groundwater within the District. In 2013 the District purchased approximately 65 percent of its water supply from SPU under the terms of a contract that began in 2001 and remains in effect until 2062. Water from SPU is delivered to the District from the 60-inch CRPL 4 through Pump Station #6 and the 24-inch Des Moines Way Feeder through Pump Stations #2 and #3. The remainder of the water supply is pumped from the Des Moines, Angle Lake, Tyee, and McMicken wells. The McMicken Well came online in 2012. At this time, the District holds 21 certificated groundwater rights, which can be found in Appendix J. In addition to these sources of supply, the District maintains nine emergency interties that allow for occasional water exchanges or purchases from neighboring purveyors under limited conditions. The District is pursuing an interlocal agreement with the Lakehaven Utility District (LUD) for supply to supplement the regular supply of the SPU and groundwater sources.

The District collaborates with SPU and 17 other water utilities in King County that purchase water from SPU to conserve water through the Saving Water Partnership (SWP). The SWP aims to promote long-term water use efficiency within its customer base.

The SWP has adopted a 6-year regional water use efficiency goal, which is to reduce per capita use from current levels so that the SWP's total average annual retail water use is less than 105 mgd from 2013 through 2018 despite population growth. So far SWP has met the goal with 93.1 mgd consumed in 2013 and 93.8 mgd consumed in 2014.

ES.6 OPERATIONS AND MAINTENANCE PROGRAM

Chapter 6 outlines the District's operation and maintenance program. Highline Water District is authorized under RCW Title 57 to operate and maintain a public water utility system. The District operates under a Commissioner system in which the citizens of the District elect five Commissioners. The District employs 29 staff members to manage and operate the system.

Chapter 6 describes normal operation of the system. Also included are lists of District equipment, supplies and chemicals. Chapter 6 also outlines the District's Emergency Procedures, Cross Connection Control Program and Customer Service Program.

ES.7 IMPROVEMENT PROGRAM

The recommended supply, storage, pipeline, and other ongoing projects are compiled into a comprehensive CIP for the water utility. The CIP consists of schedule and cost estimates for each project. Project phasing is described as either short-term (2015-2020), mid-term (2021-2024) or long-term (2025-2034).

The total Water CIP cost over the next 20 years is \$103.9 million, which equates to \$5.2 million annually, as presented in Table ES.1. Of the total cost, \$29 million is budgeted for the short-term phase, \$21 million is budgeted for the mid-term phase, and \$54 million is budgeted for the long-term phase.

The Water CIP is split into six categories: general, supply, storage, booster pumping, piping, and rezone. Throughout the 20-year planning period, \$19.4 million (19 percent) is budgeted for general projects, \$4.5 million (4 percent) is budgeted for supply projects, \$5.3 million (5 percent) is budgeted for storage projects, \$3.4 million (3 percent) is budgeted for booster pumping projects, \$70.9 million (68 percent) is budgeted for pipeline projects, and \$0.5 million (1 percent) is budgeted for rezone projects.

ES.8 FINANCIAL PROGRAM

The last chapter of the Plan presents a financial program that allows the water utility to remain financially viable during the planning period. The financial viability analysis considers the historical financial condition, current and identified future financial and policy obligations, operation and maintenance needs, and the ability to support the financial impact related to the completion of the capital projects identified in this Water System Plan. Furthermore, Chapter 8 provides a review of the utility's current rate structure with respect to rate adequacy and customer affordability.

The financial analysis indicates that rate increases are necessary to cash fund the capital plan while still meeting fund balances in the maintenance and construction funds and achieving system reinvestment funding at annual depreciation levels. Implementation of the proposed rate increases should provide for continued financial viability while maintaining generally affordable rates.

4.8.3.5 South Area Proposed Improvements

Deficiencies in the South area were addressed with the piping improvements shown in Figure 4.23. A few pipe upsize projects and new pipes that improve looping are necessary to improve residual pressures during fire and meet the pressure criteria of 20 psi.

The District has a valve located on the 16-inch pipe in the 560 Zone east of Highway 99 at around 250th St. If this valve is inadvertently closed, the south part of the 560 Zone becomes isolated and cannot be supplied without opening interties. Improvement N-06 creates a new redundant loop in the system that would prevent this situation.

4.8.3.6 Result of Project Implementation

When fully implemented, the recommended projects listed in Table 4.13 will enhance the distribution of water during maximum demand condition to existing and future customers, and meet the District's service criteria. If all of the recommended distribution system improvements are implemented, the model predicts minimum pressures will be met at all nodes as presented in Figure 4.24, and that adequate fire flow will be available to all hydrants as presented in Figure 4.25. These results assume that improvements are made as needed when redevelopment occurs.

4.9 SUMMARY OF RECOMMENDATIONS

The analysis of the Highline Water District's water system identified several future system deficiencies and recommends the following improvements to eliminate these deficiencies.

1. Install a new 4,000 gpm pump station to feed the 560 Zone from the CRPL to provide improved supply redundancy to the 560 Operating Area.
2. Study operational changes that can be implemented to provide sufficient pressures and fire flows to customers near the intersection of Highway 5 and S. 216th St. Creating a new pressure zone at an HGL of approximately 630 may be required.
3. Eliminate fire flow and pressure deficiencies by implementing the pipeline improvement projects listed in Table 4.13 and Figure 4.18.
4. Install loop N-06 shown in Figure 4.18 that would prevent the valve located at Highway 99 and 250th St to improve redundancy in the southern portion of the system.

Table 8.9 6-Year Proposed Rates Water System Plan Highline Water District						
Monthly Rates	Existing	2016	2017	2018	2019	2020
Residential						
Base Rate						
5/8"	\$14.40	\$14.40	\$14.77	\$15.16	\$15.55	\$15.96
3/4"	\$14.40	\$14.40	\$14.77	\$15.16	\$15.55	\$15.96
1"	\$25.61	\$25.61	\$26.28	\$26.96	\$27.66	\$28.38
1 1/2"	\$43.47	\$43.47	\$44.60	\$45.76	\$46.95	\$48.17
2"	\$66.72	\$66.72	\$68.45	\$70.23	\$72.06	\$73.93
Usage Charge (per ccf)						
Winter (all usage)	\$3.55	\$3.55	\$3.64	\$3.74	\$3.83	\$3.93
Summer (0-5 ccf)	\$3.55	\$3.55	\$3.64	\$3.74	\$3.83	\$3.93
Summer (6+ ccf)	\$4.20	\$4.20	\$4.31	\$4.42	\$4.54	\$4.65
Comm./MF/Irrigation						
Base Rate						
5/8"	\$21.90	\$21.90	\$22.47	\$23.05	\$23.65	\$24.27
3/4"	\$21.90	\$21.90	\$22.47	\$23.05	\$23.65	\$24.27
1"	\$44.25	\$44.25	\$45.40	\$46.58	\$47.79	\$49.03
1 1/2"	\$80.67	\$80.67	\$82.77	\$84.92	\$87.13	\$89.39
2"	\$126.27	\$126.27	\$129.55	\$132.92	\$136.38	\$139.92
3"	\$263.28	\$263.28	\$270.13	\$277.15	\$284.35	\$291.75
4"	\$399.15	\$399.15	\$409.53	\$420.18	\$431.10	\$442.31
6"	\$772.49	\$772.49	\$792.57	\$813.18	\$834.32	\$856.02
8"	\$1,219.2 8	\$1,219.2 8	\$1,250.9 8	\$1,283.5 1	\$1,316.8 8	\$1,351.1 2
Usage Charge (per ccf)						
Winter (all usage)	\$3.55	\$3.55	\$3.64	\$3.74	\$3.83	\$3.93
Summer (0-5 ccf)	\$3.55	\$3.55	\$3.64	\$3.74	\$3.83	\$3.93
Summer (6+ ccf)	\$4.20	\$4.20	\$4.31	\$4.42	\$4.54	\$4.65
Irrigation (all usage)	\$4.20	\$4.20	\$4.31	\$4.42	\$4.54	\$4.65

Table 8.10 Monthly Bill Comparisons Water System Plan Highline Water District						
Residential	Existing	2016	2017	2018	2019	2020
Monthly Bill	\$35.70	\$35.70	\$36.63	\$37.58	\$38.56	\$39.56
\$ Difference		\$ -	\$0.93	\$0.95	\$0.98	\$1.00
Rate Increase		0.00%	2.60%	2.60%	2.60%	2.60%
Notes:						
(1) Assumes 6 ccf winter usage.						

\$4.5M annually beginning 2019

7.7.3 P-3: Asbestos Cement and 4-inch Main Replacement Program

The District has found that small diameter (4-inch and 6-inch) asbestos cement (AC) mains are more susceptible to rupture than larger diameter (greater than 8-inch) pipes. The District desires to replace all AC mains prior to 80 years of service. Mains were installed in years ranging from 1953 to 1969.

The system also has many hydrants located on 4-inch dead-end pipes. Many of these pipelines are AC and the replacement of all 4-inch pipe with larger pipe is included in this replacement program.

Figure 7.3 locates all AC pipe remaining in the distribution system. The District used GIS analyses to locate critical AC mains based on three physical characteristics:

- Mains located in high pressure areas
- Mains located in erosion areas
- Mains located in slide areas

These characteristics are highlighted in Figure 7.3. Table 7.2 also shows the total linear feet of pipes based on diameter and physical characteristics.

The District will emphasize replacement in these critical areas, aiming to replace all 90,000 LF (17 miles) of critical AC main prior to 60 years of service, or by 2029 (1.2 miles/year). Other criteria, for example, partnering opportunities with other agencies and frequency of previous rupture, may determine priority of projects. To replace the remaining 61 miles of AC by 2049 requires a replacement rate of approximately 3.1 miles/year from 2030 to 2049.

7.7.4 P-4: SR 509 Relocation Evaluation

The future SR 509 expansion from I-5 to SR 509 at S. 188th St necessitates that the District relocate a 30-inch transmission main and other distribution components. The specifics of the project are unknown at this time. \$50,000 is budgeted in the short-term to plan for this project.

7.7.5 P-5: SR 509 Relocation Project Implementation

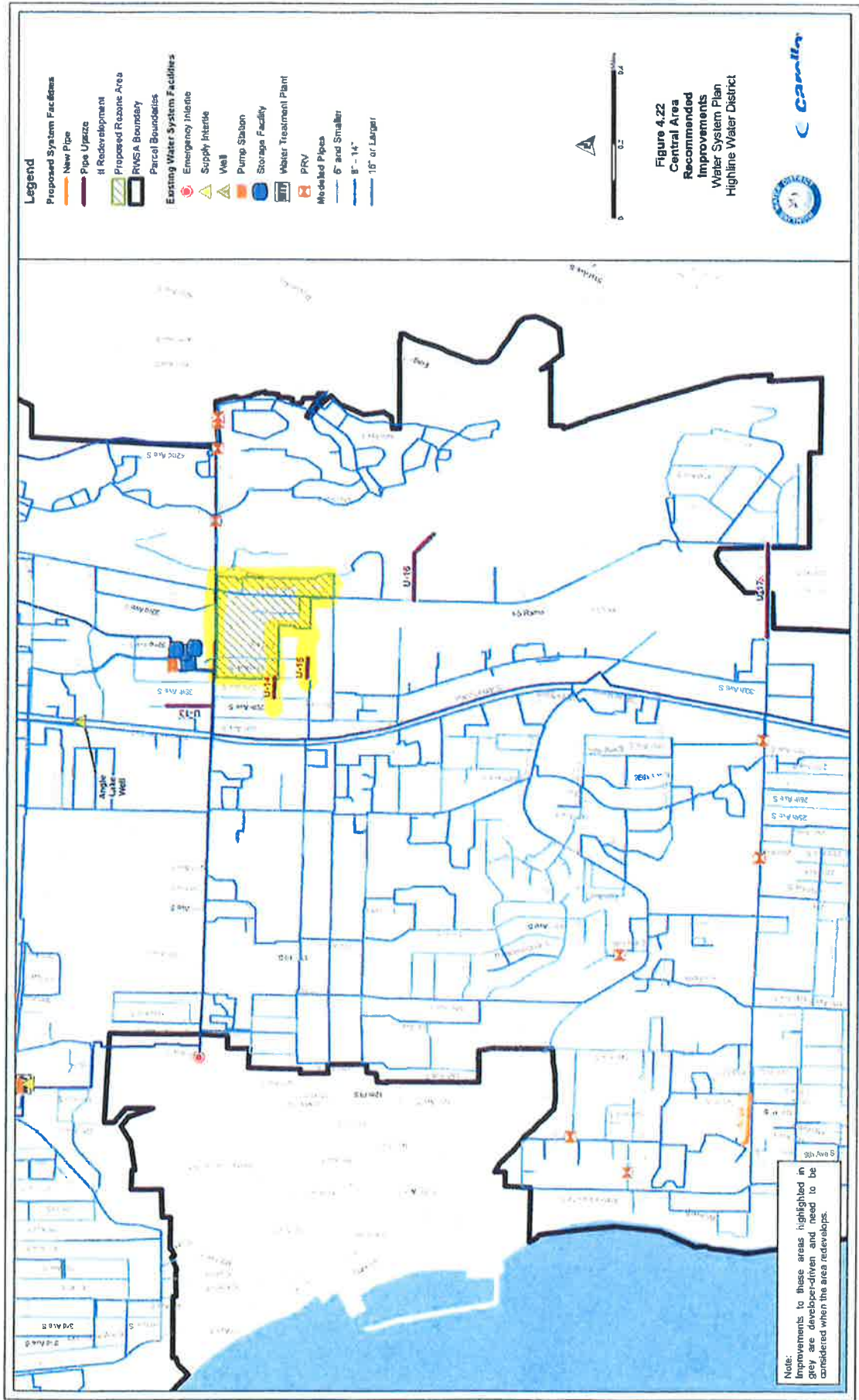
\$5 million is budgeted in the short-term for relocating the 30-inch transmission main and other distribution components as required by the SR 509 expansion.

7.7.6 P-6: Sound Transit 30-Inch Transmission Main Relocation

A 30-inch transmission main will need to be relocated in conjunction with the Mansion Hill reservoir relocation project (ST-2). The project is projected to cost \$1,036,000 in the short-term period and will be implemented by the District, but funded by Sound Transit.

Table 7.3 Capital Improvements Program Water System Plan Highline Water District						
Project ID	Description	Total Capital Cost (\$)	Capital Improvement Phasing			
			Short-Term (2015-2020)	Mid-Term (2021-2024)	Long-Term (2025-2034)	
General Projects						
G-1	Water System Plan Updates	\$430,000	\$180,000	-	\$250,000	
G-2	Asset Management Plan Update	\$100,000	\$50,000	-	\$50,000	
G-3	Mitigation Improvements	\$625,000	\$205,000	\$120,000	\$300,000	
G-4	Meters/Hydrants/Services	\$13,696,000	\$5,296,000	\$2,400,000	\$6,000,000	
G-5	Capital Asset Purchases	\$4,541,000	\$1,321,000	\$920,000	\$2,300,000	
Total		\$19,392,000	\$7,052,000	\$3,440,000	\$8,900,000	
Supply Projects						
S-1	LUD South Source of Supply Project	\$600,000	\$600,000	-	-	
S-2	Tyee Well Redevelopment	\$880,000	\$280,000	\$300,000	\$300,000	
S-3	Standby Power - Angle Lake and Des Moines Wells	\$585,000	\$585,000	-	-	
S-4	Source Pump Station Rehabilitation Projects	\$1,666,000	-	-	\$1,666,000	
S-5	Treatment Plant Rehabilitation Projects	\$780,000	-	\$780,000	-	
Total		\$4,511,000	\$1,465,000	\$1,080,000	\$1,966,000	
Storage Projects						
ST-1	Storage Facility Recoating Projects	\$5,200,000	-	\$3,900,000	\$1,300,000	
ST-2	Mansion Hill Reservoir Relocation	\$6,750,000	\$6,750,000	-	-	
Total		\$11,950,000	\$6,750,000	\$3,900,000	\$1,300,000	
Booster Pumping Projects						
BP-1	New PS #8 to 560 Zone	\$1,794,000	\$1,794,000	-	-	
BP-2	Pump Station Rehabilitation Projects	\$1,568,000	-	-	\$1,568,000	
Total		\$3,362,000	\$1,794,000	-	\$1,568,000	

Table 7.3 Capital Improvements Program Water System Plan Highline Water District					
Project ID	Description	Total Capital Cost (\$)	Capital Improvement Phasing		
			Short-Term (2015-2020)	Mid-Term (2021-2024)	Long-Term (2025-2034)
Piping Projects					
P-1	Pipeline Improvement Projects	\$5,020,000	\$4,815,000	-	\$205,000
P-2	Pipe Capacity Improvements for Redevelopment Areas	-	-	-	-
P-3	AC and 4-inch Main Replacement Program	\$67,350,000	\$15,250,000	\$12,100,000	\$40,000,000
P-4	SR 509 Relocation Project Evaluation	\$50,000	\$50,000	-	-
P-5	SR 509 Relocation Project Implementation	\$5,000,000	\$2,500,000	\$2,500,000	-
P-6	Sound Transit 30" Transmission Main Relocation	1,036,000	1,036,000	-	-
Total		\$78,456,000	\$23,651,000	\$14,600,000	\$40,205,000
Rezone Projects					
R-1	305 Pressure Zone Expansion	\$430,000	-	\$430,000	-
R-2	Rezone Study for Proposed 630 Pressure Zone	\$50,000	\$50,000	-	-
Total		\$480,000	\$50,000	\$430,000	-
All CIP Projects					
Total Cost		\$118,151,000	\$40,762,000	\$23,450,000	\$53,939,000
Annual Cost		\$5,908,000	\$6,794,000	\$5,863,000	\$5,394,000



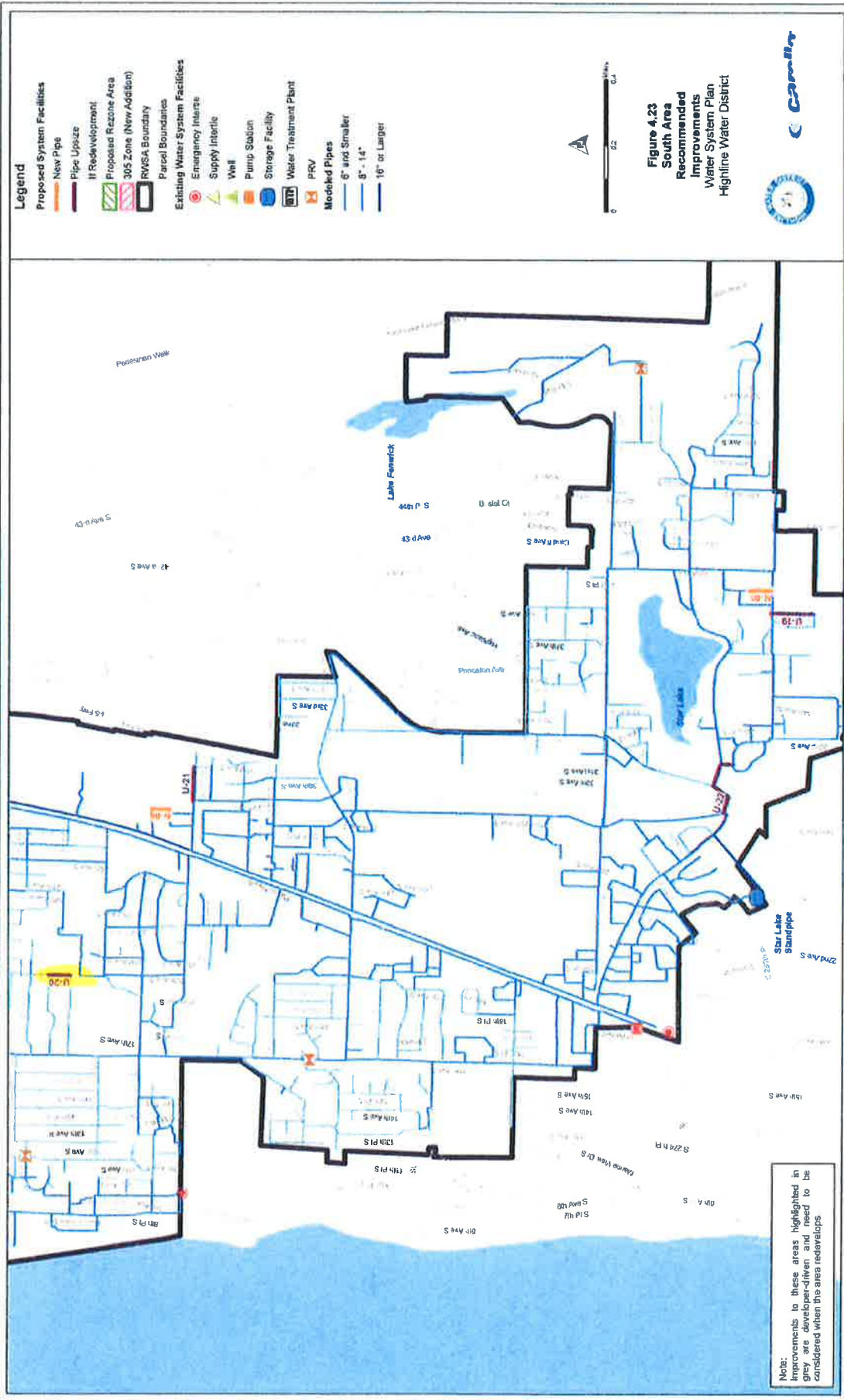
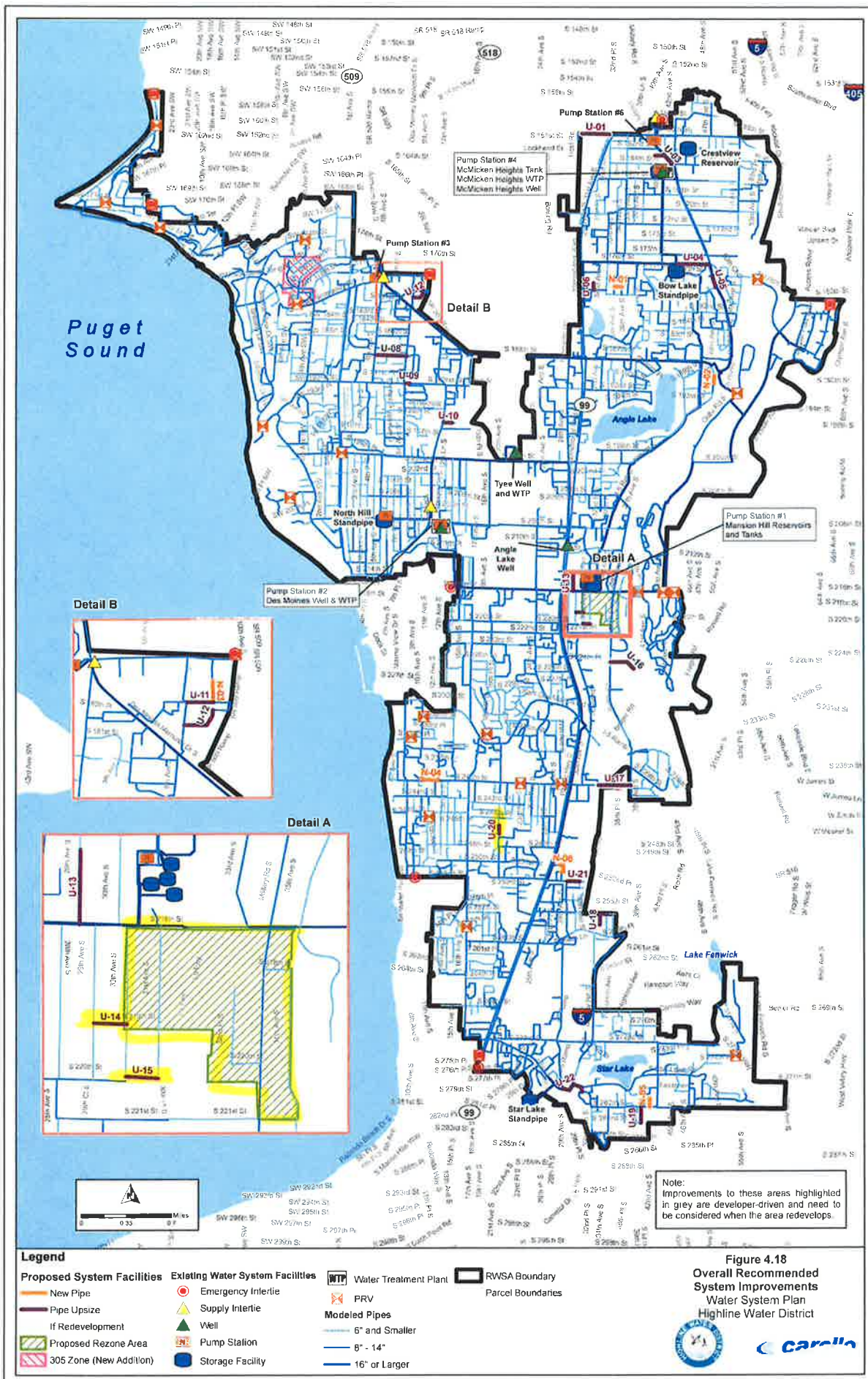


Table 8.4 6-Year Detailed CIP (2015\$) Water System Plan Highline Water District									
Project	2015	2016	2017	2018	2019	2020	TOTAL		
Military Road/Angle Lake Water Main Replacement	\$220,561						\$220,561		
Angle Lake Water Main Replacement	1,173,259	1,455,000					2,628,259		
City of Seatac 24th/28th Ave S Extension	33,713	281,500					315,213		
Comprehensive Water System Plan Update	145,000	35,000					180,000		
LUD South Source of Supply		125,000	475,000				600,000		
Manhattan View Water Main Replacement	70,569	3,037,150					3,107,719		
AC and 4-inch Water Main Replacement					4,500,000	4,500,000	9,000,000		
40th Avenue South Water Main Replacement	37,000	255,000					292,000		
Tyee Well Redevelopment	140,000	140,000					280,000		
Mitigation Improvements	45,000	40,000	30,000	30,000	30,000	30,000	205,000		
Meters/Hydrants/Services	695,580	1,000,000	1,000,000	1,000,000	1,000,000	600,000	5,295,580		
Capital Asset Purchases	222,734	188,231	225,000	225,000	230,000	230,000	1,320,965		
Asset Management Plan Update				50,000			50,000		
Standby Power - Angle Lake and Des Moines Wells			100,000	485,000			585,000		
Mansion Hill Reservoir Relocation		200,000	3,000,000	3,500,000			6,700,000		

Table 8.4 6-Year Detailed CIP (2015\$) Water System Plan Highline Water District								
Project	2015	2016	2017	2018	2019	2020	TOTAL	
Sound Transit 30" Transmission Main Relocation				1,036,000			1,036,000	
New PS #8 to 560 Zone		2,500,000	1,544,000				1,794,000	
Pipeline Improvements Projects			2,500,000	2,000,000			4,500,000	
SR 509 Relocation Project Evaluation			50,000				50,000	
SR 509 Relocation Project Implementation						2,500,000	2,500,000	
Rezone Study for Proposed 630 Pressure Zone						50,000	50,000	
Mansion Hill Reservoir Relocation (District Share)		50,000					50,000	
Total	\$2,783,416	\$7,056,881	\$8,924,000	\$8,326,000	\$5,760,000	\$7,910,000	\$40,760,297	

March 2016

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Saltwater State Park

Habitat restoration project

King County, in collaboration with Washington State Parks, is currently in the "preliminary design" planning stage of a stream and shoreline restoration project at Saltwater State Park.



Mouth of McSorley Creek.

The mouth of McSorley Creek, which flows through the park, is currently bulkheaded with rip-rap. This project will examine removing the rip-rap at the creek's mouth to make the creek more accessible for fish and the beach more accessible to people. The project may also include shoreline restoration, such as removing the bulkhead along part of the shoreline, while improving recreational amenities.

Why are we doing this project?

Removing the bulkhead at the creek's mouth and restoring some of its ability to flow naturally will help bring back natural processes that create juvenile Chinook salmon habitat and improve nearshore baitfish spawning. The WRIA 9 Salmon Habitat plan identifies McSorley Creek as a high priority project for restoration of natural beach feeding (sediment) processes. Additionally, recent high tides have flooded the Saltwater Café, and the café is at risk of flooding more frequently in the future. Designing a project that addresses these issues provides a great opportunity to enhance the recreational amenities at the same time.

Your input

We held a public meeting on March 23rd to introduce the proposed project and receive input. State Parks staff, the consultant team, and County staff were on hand to present the information and answer questions. **We will be taking comments on this phase of the project through April 6.** Please send your comments to the County's Project Manager: jennifer.vanderhoof@kingcounty.gov. And note the documents below that we continue to add to the page.

Related information

Salmon and trout topics
Central Puget Sound Watershed

Related agencies

Department of Natural Resources and Parks
Water and Land Resources Division

Your input will ultimately improve the park for both people and fish. With the help of your ideas, this project will:

- create a more natural shoreline that is better for wildlife.
- improve fish access to the creek and improve habitat for salmon and other important fish, birds, and other wildlife by creating a saltwater marsh "pocket estuary."
- reduce flooding risk at the Saltwater Café.
- enhance recreation opportunities at the park.

Additionally, in July 2015, we conducted an online survey and received 145 responses. Those responses helped shape the evaluation criteria used to determine restoration and enhancement options for the project.

Project location

Saltwater State Park is located along Puget Sound within the City of Des Moines.



Location of Saltwater State Park.

Project partners

King County is partnering with Washington State Parks in a project supported by WRIA 9 and funded through grants from the RCO.



Project documents

Project-related documents are posted here as they are completed.

- The [Draft Feasibility Report](#), March 2016.
- Appendix A: [Analysis of Shoreline Geomorphic Processes](#)

- Appendix B: [McSorley Creek Sediment Trend Analysis – Technical Memorandum](#)
- Appendix C: [Technical Memorandum: Engineering Geologic Evaluation of Proposed Improvements at Saltwater State Park, Des Moines, Washington](#)
- Appendix D: [Archaeological Resources/Built Environment Assessment and Monitoring Results from the Geotechnical Exploration at Saltwater State Park, King County, Washington](#)
- Appendix E: [Historic Building Relocation Cost and Construction Details](#)
- [Progression of possible new designs for lower parking and recreation areas](#)

For more information about the proposed restoration project at Saltwater State Park, please contact [Jennifer Vanderhoof](#), Senior Ecologist/Project Manager, [King County Watershed and Ecological Assessment Team](#).



**REVISED DRAFT
McSORLEY CREEK ESTUARY RESTORATION
FEASIBILITY STUDY**

Prepared for:

**King County
Department of Natural Resources and Parks
and**

Washington State Parks

March 2016

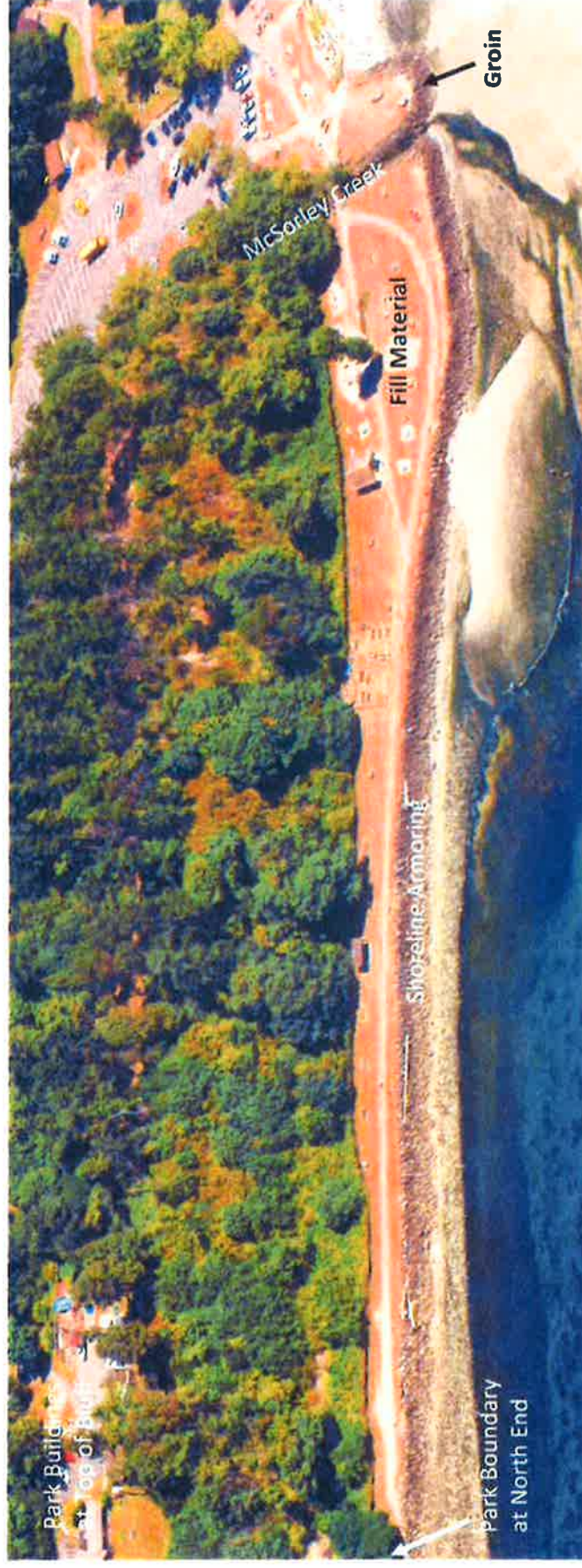


Figure 1. Aerial Photo of Saltwater Park Shoreline and Mouth of McSorley Creek

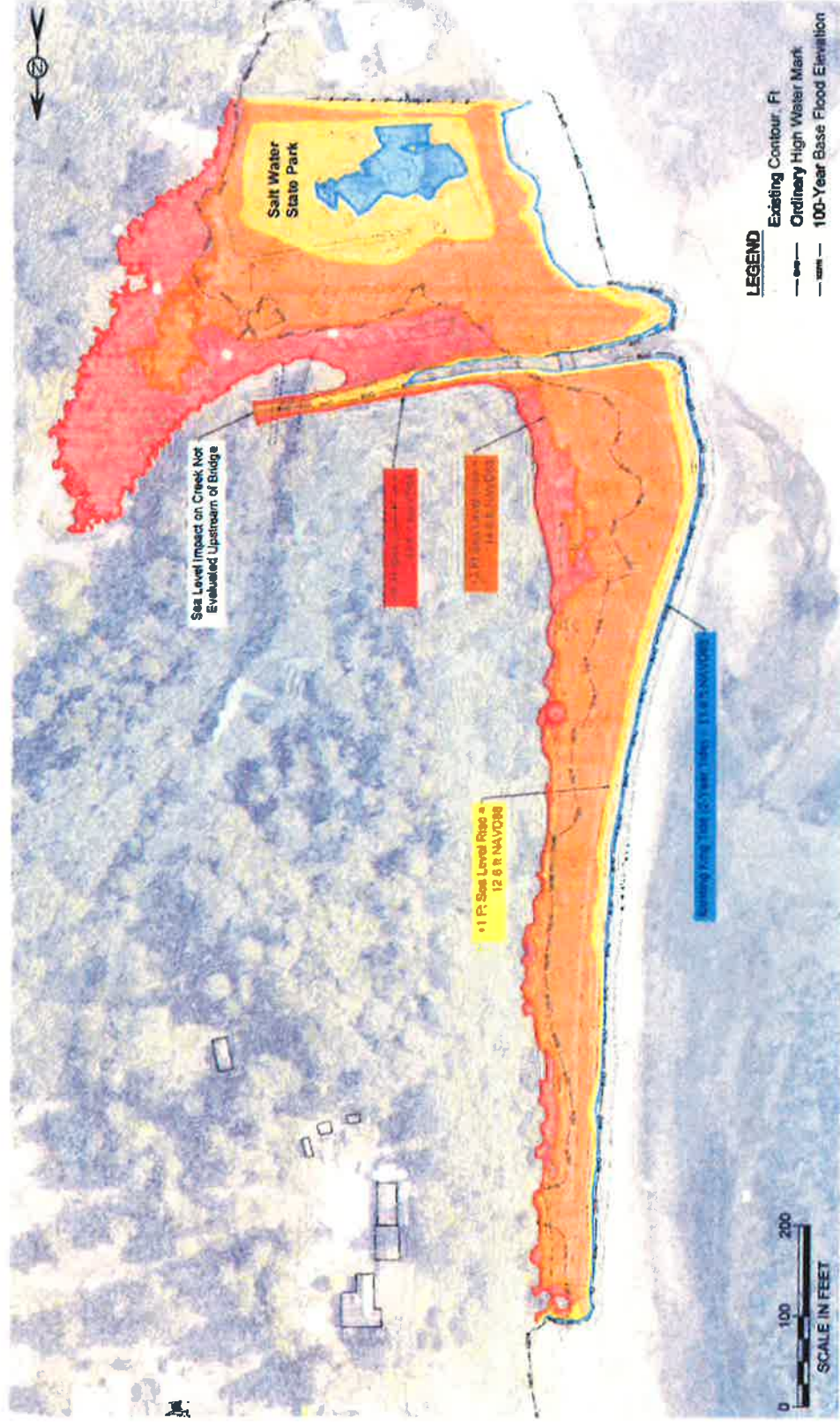


Figure 6. Sea Level Rise Analysis Showing Potential Inundation Areas with 1, 3, or 5 Feet of Sea Level Rise

The two approaches to maintaining existing levels of shoreline stabilization to protect Parks buildings at the top of the bluff were evaluated to identify the benefits and drawbacks. These benefits and drawbacks are described in Table 1.

The target material for the toe stabilization feature is soft-shore armoring such as large wood, but is subject to additional analysis. The stabilization feature would be partially or fully buried at the toe of the slope. It would be designed to preclude wave action from causing erosion of the bluff toe. Top elevation of the toe protection would be designed in a later phase of the project and would consider storm waves, tides, SLR, and the proposed beach profile. The toe

Table 1. Summary of Benefits and Risks of Bluff Protection Techniques Considered

Technique	Benefits	Risks/Drawbacks
Install New Bluff Toe Stabilization Structure	- Provides comparable bluff toe stability as existing conditions - Removes impediments to sediment transport along the beach - Increases aquatic habitat, including forage fish spawning habitat - Restores natural shoreline shape - Allows slide material from upper bluff to reach beach (although the geologic analysis indicates little input from the upper bluff in recent decades) - Long-term sediment budget rate similar to existing conditions	- May have perceived impact on neighboring properties due to a change in bluff toe protection type - Though likely better for bluff toe conditions on neighboring properties, the end effects are less predictable than existing conditions - Requires placement of beach material to balance short-term sediment budget
Retain a Portion of Existing Shoreline Armoring	- Provides comparable bluff toe stability as existing conditions - Most similar to existing boundary conditions - Lowest perceived impact to park structures and neighboring land - Most predictable end effects at park boundary - May retain upland picnic area	- Requires construction of additional protection to tie the remaining shoreline armoring to the toe of slope (to prevent head-cutting or erosion behind shoreline armoring) - Requires placement of beach material to balance short-term sediment budget - Retain impediments to sediment transport along the beach caused by fill and shoreline armoring extending into the intertidal zone - Does not allow slide material from upper bluff to reach beach (although the geologic analysis indicates little input from the upper bluff in recent decades) - Long-term sediment budget rate may be less than the toe stabilization structure - Retains shoreline armoring and fill in northern portion of park found to have greatest maintenance need for shoreline armoring due to rock fracturing and erosion



Figure 16. Two Shoreline Stabilization Approaches for Protecting Parks Buildings at Top of Bluff

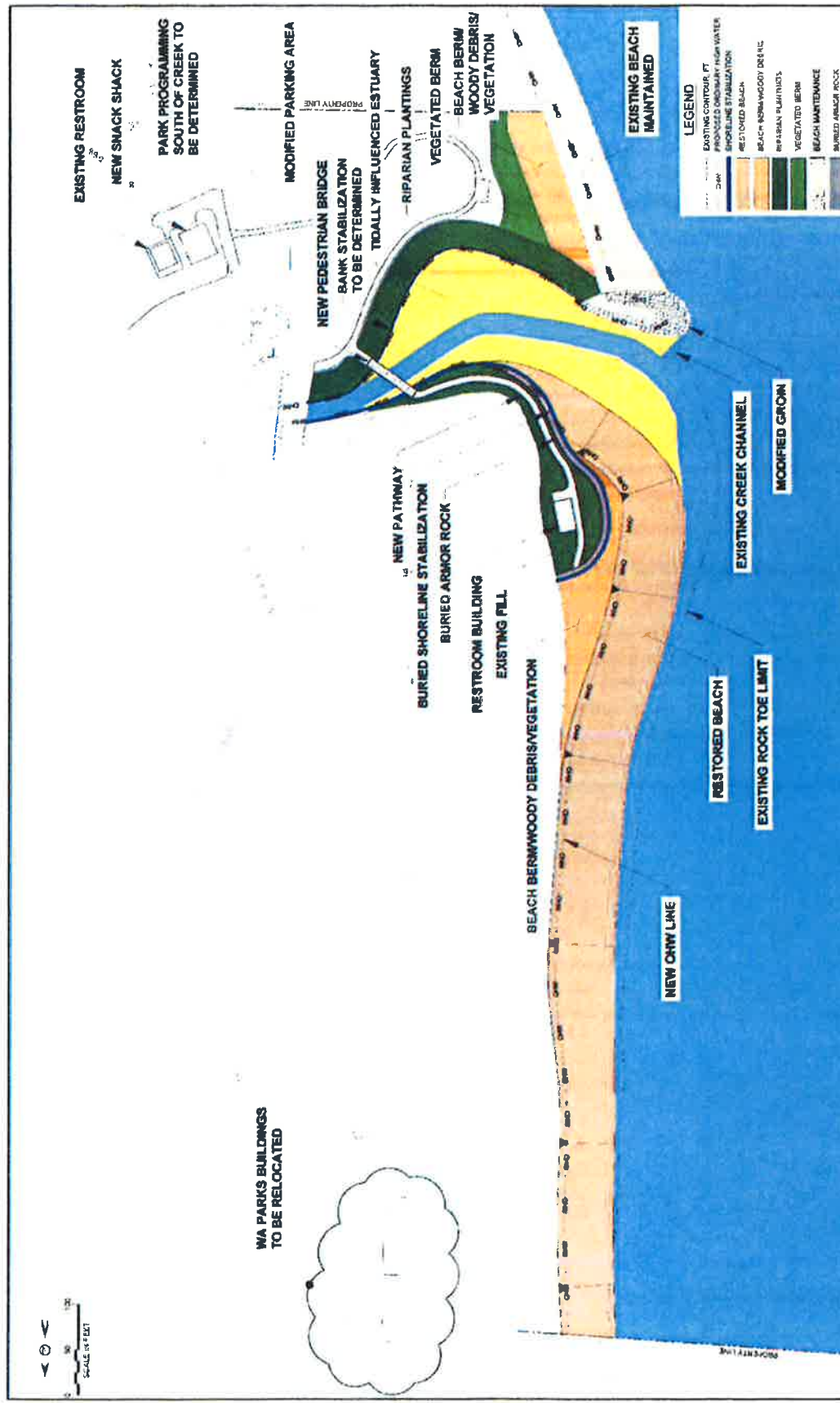


Figure 17. Full Bluff Reconnection Alternative

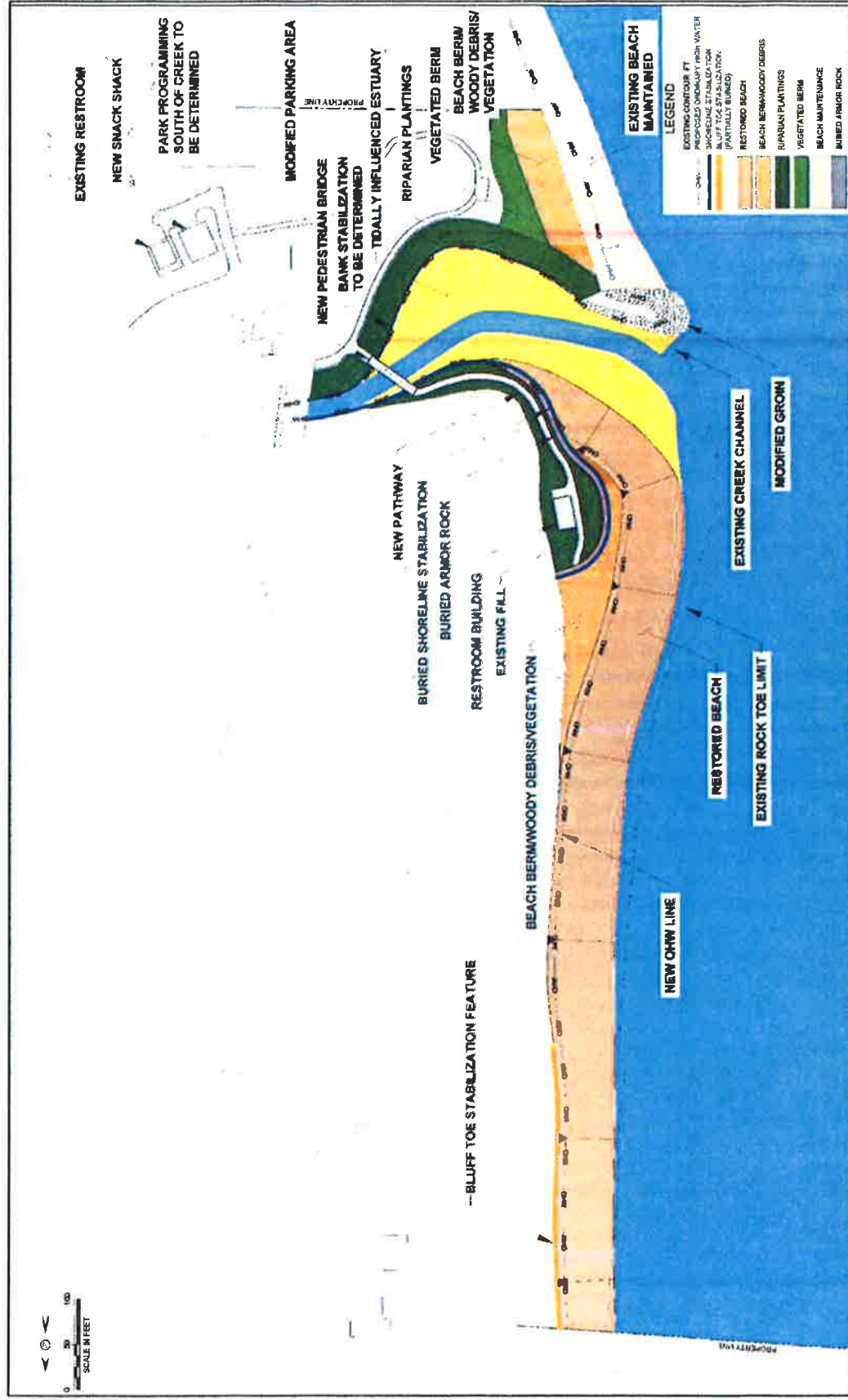
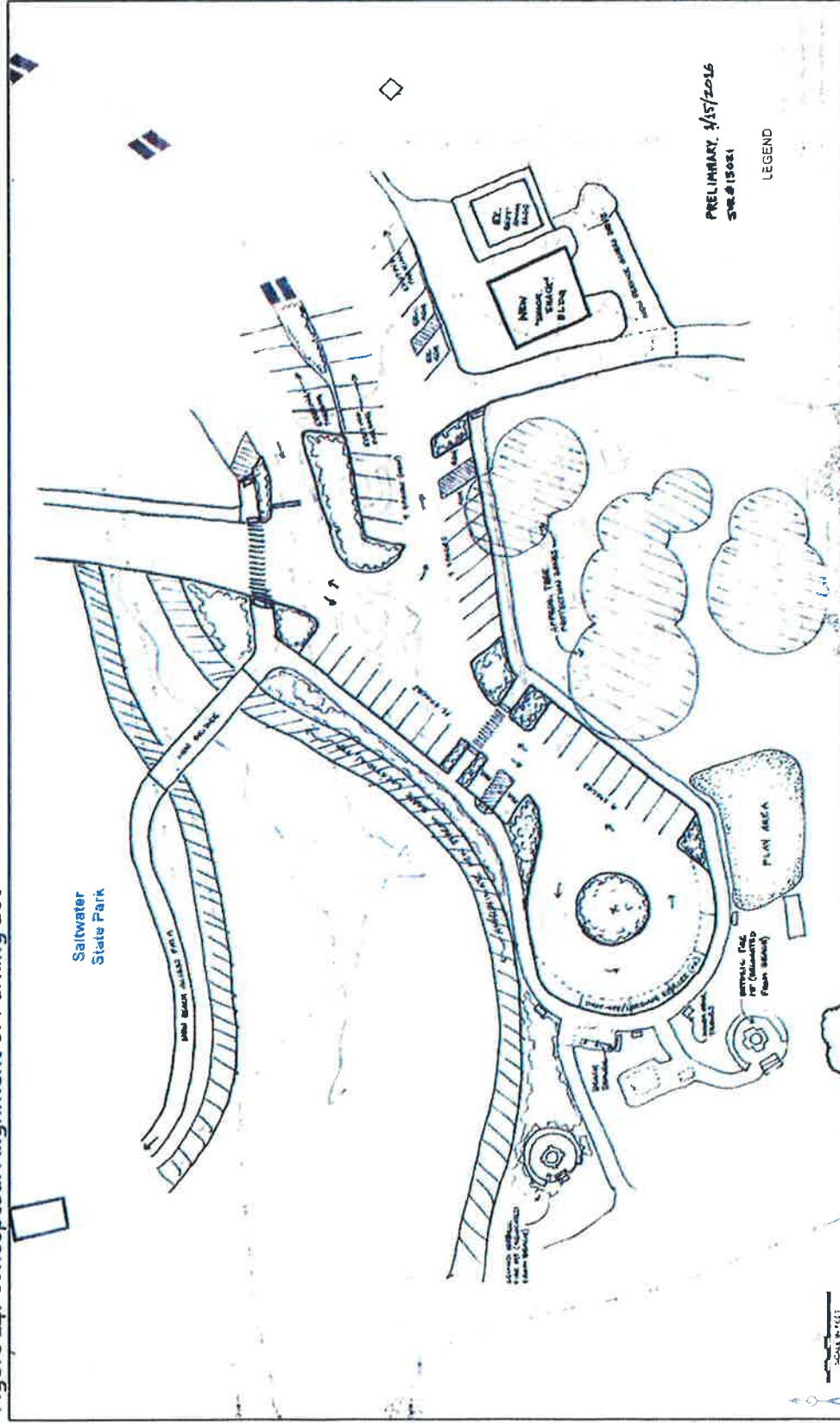


Figure 15. Partial Bluff Reconnection Alternative

Figure 14. Conceptual Alignment of Parking Lot



TECHNICAL MEMORANDUM

DATE: April 20, 2016
TO: Loren Reinhold, P.E., City of Des Moines
FROM: Julie Brandt, P.E.
SUBJECT: Preliminary Assessment of Codes and Policies
CC: Austin Fisher, P.E., Parametrix
PROJECT NUMBER: 213-1792-015 (01/01)
PROJECT NAME: Low Impact Development Integration into City Code and Design Guidelines

INTRODUCTION

Purpose

The City of Des Moines is integrating low impact development (LID) into their local development-related codes, rules, standards, and other enforceable documents (collectively referred to as the “code and policies”) pursuant to the 2013-2018 Western Washington Phase II Municipal Stormwater Permit (Permit), Section S5.C4 (f). Revisions to the code and policies will be designed to minimize impervious surfaces, retain native vegetation, and reduce stormwater runoff in all types of development situations. This memorandum documents the general findings of a preliminary, high-level code and policy review.

Approach

A preliminary review of the code and policies has been conducted as follows:

- Initial meeting with key City staff conducted on March 28, 2016, to identify potential challenges and opportunities of the code and policy revisions
- High-level review of relevant sections of the Des Moines Municipal Code (DMMC) and other applicable documents to identify key elements that currently support the use of LID practices and potential barriers or conflicts that may inhibit the use of LID practices
- The review is based on *Integrating LID into Local Codes: a Guidebook for Local Governments* (Prepared by AHBL for the Puget Sound Partnership, July 2012), *Low Impact Development Code Update and Integration Toolkit* (Washington State Department of Ecology, July 2014), and the 2013-2018 Western Washington Phase II Municipal Stormwater Permit.

FINDINGS

Definitions

Relevant definitions used throughout the DMMC include:

- Curbing – update to include flow-through curb structures

- Impervious surfaces – update definition to include permeable pavements and vegetated roofs. Clarify how these areas are included in impervious area threshold totals.
- Lighter use – currently includes possibility of greater required yards, open spaces, and floor area within dwellings compared to other zones; considering updating to include possibility of greater preserved existing vegetation
- Mitigation – currently only applies to environmentally critical areas; consider expanding term applicability to other watershed resources such as soil and vegetation
- Paved surfaces – not defined, add definition
- Public utility facilities – update to include stormwater facilities
- Required open space – currently required to remain open and unobstructed from the ground to the sky; consider updating to allow vegetation
- Stormwater facility – update definition to broaden and include spectrum of LID technologies
- Best Management Practices (BMPs) – currently adequate; references list in most recent version of King County Surface Water Design Manual

Title 11 Utilities

- This title generally contains thorough stormwater provisions and technical standards
- Incorporates by reference the most recent version of the *King County Stormwater Pollution Prevention Manual* (most recent version prepared by King County Department of Natural Resources and Parks Water and Land Resources Division Stormwater Services Section, April 2016) - **no change recommended**
- Incorporates by reference the BMPs in the most recent version of the *King County Surface Water Design Manual* (most recent version prepared by King County Department of Natural Resources and Parks, Water and Land Resources Division, Stormwater Services Section, April 2016) - **no change recommended**
- Update to reference most recent version of Ecology manual; currently incorporates by reference the discharge guidelines in the 2005 version of the *Ecology Stormwater Management Manual for Western Washington* (prepared by the Washington State Department of Ecology Water Quality Program, February 2005, Publication Numbers 05-10-029 through 05-10-033);

Title 12 Streets, Sidewalks, and Public Places

- This title incorporates by reference the most recent version of the City of Des Moines Street Development Standards (most recently updated in February 2004)
- Current parking stall configuration requirements generally allow for scenarios that minimize impervious surface
- Consider reducing required road widths, redefining or reassigning road classifications
- Update pavement structural layer requirements to include permeable pavements

- Update street tree standards to include those compatible with LID facilities.
- Consider reducing requirements for sidewalks on both sides of several road types
- Set required road widths at minimum fire code widths
- Modify road standards to minimize the amount of curb required
- Modify curb standards to allow flow-through curbs
- Modify planting standards to allow recessed planting strips

Title 14 Buildings and Construction

- Title generally does not include provisions for identifying and protecting soils with high infiltration capacity; consider revision

Title 16 Environment

- Title 11 regulates stormwater discharges to wetlands – *no change recommended*
- Current development regulations for hillsides require minimization of impervious lot coverage through use of understructure parking and multilevel structures where feasible; consider applying this requirement to broader areas
- BMP use is currently required to protect trees and vegetation; update to also include protection of soil

Title 17 Subdivisions

- Lot standards currently require 20 feet minimum width for vehicular access; consider reducing
- Update surface water utilities requirements to include infiltration as a surface water control system option
- Update description of valuable natural features to include soil
- Preservation of significant vegetation currently states "No more than one tree for each 2,400 sf of lot area shall be required to be preserved on any lot" (17.35.210(3)(c)); consider eliminating or increasing the minimum number of preserved tree(s) per lot.

Title 18 Zoning

- Update public utility facilities land use category and requirements to include stormwater facilities
- Consider modifying required residential lot widths and lengths to allow for staggered lot configurations
- Consider modifying single-family side yard requirements
- Consider modifying allowed distance between buildings to allow for vegetation preservation and LID facility placement

- Update landscaping and screening requirements to include allowances for LID technologies and compatible vegetation, and require setback from buildings of any stormwater infiltration facilities

Other

Does the City want to consider separate requirements for preservation in specific geographic areas with unique natural resources (existing dense vegetation, significant areas of outwash soils, etc.)?

NEXT STEPS

Next steps in the code and policy revisions will include:

- City staff review of the preliminary code and policy review findings (this Memo)
- Parametrix will begin the DRAFT code revisions and will incorporate City input and comments into the applicable City code, development policies, and/or public works design standards. The DRAFT code revisions will consist of red-lined strike through revisions to the City's code and a table identifying the existing code language, proposed new language and why we are proposing to change the code.
- Following City staff review of the DRAFT Code Revisions we will seek committee, council and public input prior to finalization of the code revisions.

Low Impact Development

27TH AVENUE RECONSTRUCTION | THE TULALIP TRIBES, TULALIP, WA



LID ELEMENTS: RAINGARDEN, NARROW TRAVEL LANES

SALISHAN REDEVELOPMENT AREAS 1, 2 AND 3 |TACOMA HOUSING AUTHORITY, TACOMA, WA



LID ELEMENTS: RAINGARDENS, REDUCED BUILDING FOOTPRINTS, MINIMIZED LAWN AREA

VIKING AVENUE IMPROVEMENTS AND STORMWATER RETROFIT | CITY OF POULSBO, WA



LID ELEMENTS: RAINGARDENS, PERVIOUS SIDEWALK, CURB INLETS

VALLEY AVENUE IMPROVEMENTS | CITY OF SUMNER, WA



LID ELEMENTS: CURB INLETS, RAINGARDENS, CURB BULBS WITH PARKING, CENTER ISLAND LANDSCAPING

39TH AVENUE SW | CITY OF PUYALLUP, WA



LID ELEMENTS: PERVIOUS CEMENT CONCRETE PAVEMENT, PERVIOUS CEMENT CONCRETE SIDEWALK

CATCHING RAIN:

Low Impact Development — Protecting Our Waters

1

Low Impact Development (LID) is one way we can help keep our waterways, as well as the surrounding land, healthy and safe. This is a beautiful place to live, so it is no wonder that an additional 1.9 million people are expected to move here by 2040. As we grow, we replace forests and prairies with rooftops and pavement, thereby increasing stormwater runoff and the associated pathogens and chemicals it carries to our waterways. The health of humans and our ecosystems is threatened.

What's the problem with stormwater?

Stormwater is created by precipitation (rain or snowmelt) that doesn't soak into the earth but instead creates puddles and runs off. This stormwater can pick up pollution and carry it directly into storm drains, streams, rivers, lakes, inlets, and bays.

Some consequences of stormwater pollution and increased surface runoff include:

- Pollutants such as motor oil, yard chemicals, and pet wastes contaminate local waterways, threatening human health and wildlife health.
- Numerous beaches are too polluted to harvest shellfish.
- Several fish species face the threat of extinction.
- Groundwater is not replenished, decreasing drinking water supplies and drying out streambeds.
- Winter rain quickly runs off paved surfaces and into streams, leading to the scouring of stream channels.

What is Low Impact Development and how can it help?

LID seeks to manage stormwater onsite—either by encouraging it to soak into the ground or using plants to transpire it back to the atmosphere. LID helps keep pollution out of our waterways. It focuses on recreating or protecting existing natural landscape features to minimize the amount of impervious (hard) surfaces. Stormwater is then treated with soils that have been amended with compost, vegetation, and other techniques.

LID strategies can be used in virtually every situation—residential homes or commercial businesses, in rural or urban settings. Some benefits include:

- Creates more beautiful and easily managed landscapes.
- Encourages water to soak into the ground, replenishing drinking water supplies.
- Reduces contamination of local waterways, including recreational and shellfish growing areas.
- Preserves or restores trees and other vegetation, attracting birds, butterflies and other wildlife.
- Can reduce development costs (decreased infrastructure and land clearing costs) as well as stormwater management costs.

Vegetation Preservation and Restoration

During site development, clearing and grading should be minimized as much as possible. This will protect native soils and vegetation while also preventing compacted soils that do not allow water to soak in as readily. Mature trees are not easy to replace and their contribution to managing stormwater run off and preventing erosion is invaluable. When clearing land, small native plants can be removed and saved for replanting once development is complete.

Reducing lawn sizes and replacing that space with native or water-wise plants reduces maintenance and watering needs and may reduce the need for fertilizers and pesticides.

Look for the other helpful fact sheets in this series:

- ✓ 1. Low Impact Development
- 2. LID Stormwater Regulations
- 3. LID Development Process
- 4. Pavement Maintenance
- 5. Rain Garden Maintenance
- 6. Rain Garden Construction Checklist
- 7. Rain Garden Construction Sequencing



Green roof, Portland, OR. Photo: Erica Cuttman

Amending Soils

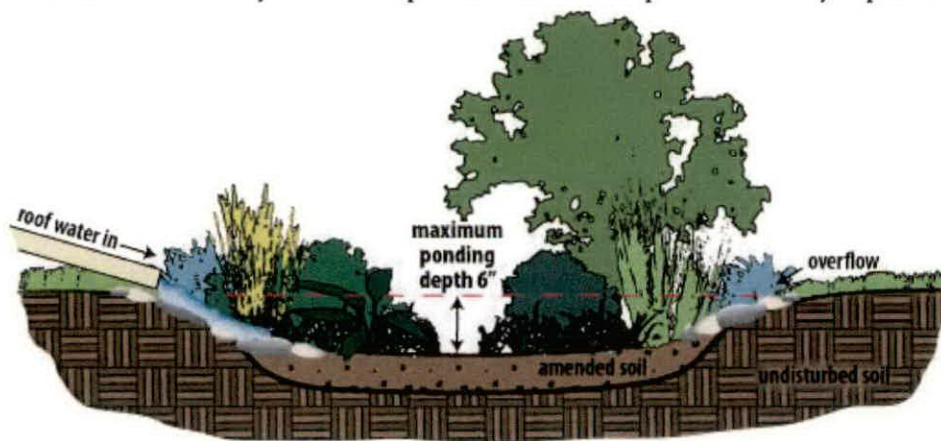
Healthy soil grows healthier plants, allows stormwater to soak in, stores water for plants in the summer, and reduces the need for chemicals such as pesticides and fertilizers.

Where soil must be disturbed, breaking up compaction, replacing topsoil or tilling in compost is very beneficial.

Rain Gardens

Rain gardens are a landscape amenity that also serves to treat polluted runoff and manage drainage by using natural processes: plants and soils work together to filter and absorb water from streets, rooftops, driveways and other hard surfaces.

This landscaping technique is beautiful and inviting to birds and butterflies. Using native plants and amended soils can reduce maintenance needs. Rain gardens can be constructed in many different shapes and can be landscaped with a variety of plants.



Managing Water on Roofs

Green Roofs:

Green roofs are a great way to absorb and slow down roof runoff. They improve aesthetics to the residence or business as well as reduce noise and lower heating and cooling costs. Unlike conventional roofs, green roofs have less UV degradation, so they last much longer—it is recommended that after 50 years the waterproof membrane be replaced, but all other components can be reused on the same roof!

Directing Downspouts:

If green roofs are not an option, water can be directed from downspouts to areas such as a rain garden or planted area (versus pavement), where it can soak into the ground.

Rainwater Harvesting:

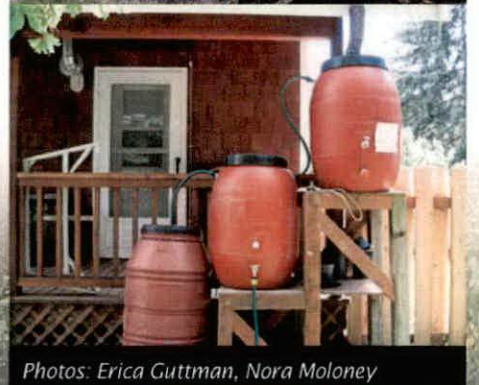
Rainwater harvesting combines two important LID goals: reduce flows from rooftops, and conserve water that comes from drinking-water supplies. Rainwater can be collected in rain barrels or cisterns where it can be stored. The collected water can then be used for a variety of things such as watering and cleaning jobs around the outside of homes.



Compost in landscapes filters and slows rainwater and results in healthier soils and plants. Photo: Erica Guttman



A rain garden is an attractive way to manage polluted runoff on site. Photo: Erica Guttman



Photos: Erica Guttman, Nora Moloney





Ribbon driveway, steppable plants with stones, permeable concrete & permeable pavement.
Photos: Curtis Hinman, Erica Guttman, Interlocking Concrete Pavement Institute

Options to Reduce Hard Surfaces

Driveways and walkways often account for a large amount of impervious area surrounding homes. Several LID solutions allow stormwater runoff to soak into the earth, preventing pollution from entering waterways and decreasing possible flooding risks.

Driveways and Parking Lots:

Many beautiful and functional materials and strategies allow rainwater to soak into driveways and parking lots. Reducing the length and width of driveway and parking areas is a perfect way to start reducing impermeable surfaces. Some style and material alternatives include the ribbon driveway, broken-concrete mosaic, permeable pavers, grid aggregate containment systems, pervious concrete and porous asphalt.

Walkways, Patios, and Decks:

Traditional concrete or mortared patios and walkways can be replaced with a variety of LID options. Raised decks made from recycled plastics are an excellent alternative. Walkways and patios can be constructed using stones or broken concrete with plantings in the gaps between stones to absorb water. Pervious systems, including stone pavers and interlocking plastic grids are great options as well.

Foundations

When planning new construction or an addition to a home or business, a key strategy is to disturb soils as little as possible. Two LID techniques include:

Small Footprint:

A building's footprint can be reduced by decreasing the amount of space taken up all together or by creating two stories instead of a large one-story.

Minimal-excavation Foundation:

A minimal-excavation foundation dramatically limits soil disturbance over traditional grading and foundation installation.



Photo: PIN Foundations



CATCHING RAIN: Low Impact Development — Protecting Our Waters

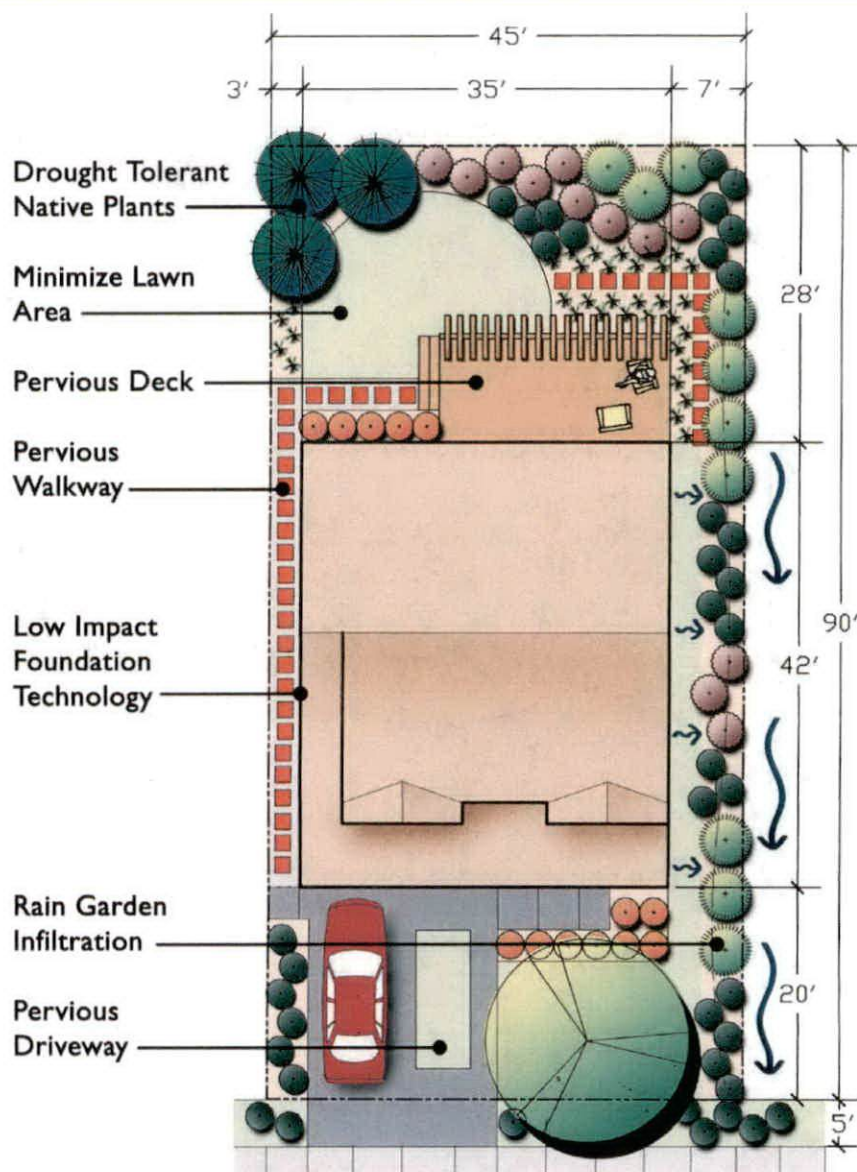
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Residential Area with LID Features

LID practices may be incorporated around homes and businesses in countless ways. Just a few methods can be used or an entire lot can be designed and developed using LID techniques for everything from building design to landscape design. These techniques create beautiful homes and yards, keeping the sites safer from flooding risks. Utilizing LID methods helps to absorb polluted water into the earth, which protects water bodies, wildlife, and human health.



Pervious pavers filter and manage water on site.
Photo: Interlocking Concrete Pavement Institute.



Resources:

Washington Stormwater Center: <http://www.wastormwatercenter.org/>
 Washington Department of Ecology: <http://www.ecy.wa.gov/programs/wq/stormwater/>
 Puget Sound Partnership: <http://www.psp.wa.gov/stormwater.php>
 Municipal Research and Services Center of Washington: Local Stormwater Programs and Regulations
<http://www.mrsc.org/subjects/environment/water/sw-local.aspx>
 EPA Low Impact Development: <http://water.epa.gov/polwaste/green/>
 WSU Rain Garden Website: <http://raingarden.wsu.edu>

Online Publications and Videos:

2012 Stormwater Management Manual for Western Washington
<http://www.ecy.wa.gov/programs/wq/stormwater/manual.html>
 Low Impact Development Technical Guidance Manual for Puget Sound
http://www.psp.wa.gov/LID_manual.php
 Building a Raingarden: Keeping our Pacific Northwest Waters Clean Video: <http://vimeo.com/21474307>
 Raingarden Handbook for Western Washington Homeowners
http://county.wsu.edu/mason/nrs/water/Documents/Raingarden_handbook.pdf



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