Wastewater Facilities Planning Study

CITY OF WILLAMINA

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TABLE OF CONTENTS

EXECUTIVE SUMMARY 1
ES.1. Planning Criteria 1
ES.2. Design Conditions 1
ES.2.1. Study Area and Land Use 1
ES.2.2. Demographics 3
ES.2.3. Wastewater Flows 4
ES.2.4. Wastewater Composition 5
ES.3. Existing Deficiencies 5
ES.3.1. Collection Facilities 5
ES.3.2. WWTP Facilities 5
ES.3.3. Alternatives 7
ES.4. Capital Improvement Plan and Financing 7
ES.4.1. Summary of Costs 7
ES.4.2. Budget and Rate Impacts 8
ES.4.3. Other Annual Costs 9
ES.4.4. SDCs 9
ES.4.5. Financing Options 9
Chapter 1 - PROJECT PLANNING 1
1.1. Location 1
1.2. Enviromental Resources Present 2
1.2.1. Land Use/Prime Farmland/Formally Classified Lands 2
1.2.2. Floodplains 2
1.2.3. Soils 3
1.2.4. Wetlands 3
1.2.5. Cultural Resources 3
1.2.6. Biological Resources 3
1.2.7. Water Resources 3
1.2.8. Coastal Resources 4
1.2.9. Socio-Economic Conditions 4
1.2.10. Miscellaneous Issues 4
1.2.11. Climate 5
1.3. Population Trends 7

1.4. Community Engagement 10
Chapter 2 - EXISTING FACILITIES 1
2.1. Location Map 1
2.2. History 3
2.3. Condition Of Existing Facilities 4
2.3.1. Pump Stations Overview 4
2.3.1. E Street Pump Station (North Pump Station) 7
2.3.2. Washington Street Pump Station (South Pump Station) 8
2.3.3. Collection System Piping 9
2.3.4. Smoke Testing 9
2.3.5. WWTP Operations 12
2.3.6. Headworks 14
2.3.7. Aerated Lagoons #1 and #2 15
2.3.8. Lagoons #3 and #4 16
2.3.9. Chlorination and Dechlorination Systems 17
2.3.10. Yamhill River Outfall 18
2.3.11. Solids Handling 18
2.3.12. SCADA 18
2.3.13. Emergency Power 18
2.4. Financial Status of any Existing Facilities 18
2.5. Water/Energy/Waste Audits 21
Chapter 3 - NEED FOR PROJECT 1
3.1. Health, Sanitation, Environmental Regulations and Security 1
3.1.1. Current Regulatory Requirements 1
3.1.2. Known Future Regulatory Requirements 2
3.1.3. Potential Future Regulatory Requirements 2
3.2. Aging Infrastructure 5
3.2.1. Treatment Performance 5
3.2.2. Equipment Useful Life 10
3.3. Reasonable Growth 11
3.3.1. Influent Flows 11
3.3.2. Observed Historical Inflow and Infiltration (I/I) 15
3.3.3. Future Flow Projections 17
3.3.4. Future Load Projections 17
3.3.5. Capacity Limitations 20

3.3.6. Collection System Evaluation....24
3.3.7. WWTP Capacity Evaluation....32
Chapter 4 - Alternatives Considered....1
4.1. Collection System Alternatives....1
4.1.1. Alternative 1 – Upsize Existing Infrastructure....1
4.1.2. Alternative 2 – Divert Flows to SW Hill Drive....3
4.1.3. Alternative 3.1 – Moderate I/I Reduction....3
4.1.4. Alternative 3.2 – Aggressive I/I Reduction....5
4.2. Collection System Environmental Impacts....6
4.2.1. Land Use / Prime Farmland / Formally Classified Lands....7
4.2.2. Floodplains / Wetlands....7
4.2.3. Cultural, Biological, and Water Resources....7
4.2.4. Socio-Economic Conditions....7
4.3. Collection System Land Requirements....7
4.4. Collection System Potential Construction Problems....7
4.5. Collection System Sustainability Considerations....8
4.5.1. Water and Energy Efficiency....8
4.5.2. Green Infrastructure....8
4.5.3. Other....8
4.6. Collection System Cost Estimates....8
4.7. Treatment And Storage Alternatives....8
4.7.1. Design Criteria....8
4.7.2. Regionalization....9
4.7.3. Optimization of Existing Facilities....9
4.7.4. Reuse....9
4.7.5. New Storage Lagoon....9
4.7.6. Mechanical Treatment (Year-Round Discharge)....11
4.8. WWTP Environmental impacts....13
4.8.1. Land Use / Prime Farmland / Formally Classified Lands....13
4.8.2. Floodplains / Wetlands....13
4.8.3. Cultural, Biological, and Water Resources....13
4.8.4. Socio-Economic Conditions....13
4.9. WWTP Land Requirements....14
4.10. WWTP Potential Construction Problems....14
4.11. WWTP Sustainability Considerations....14

4.11.1. Water and Energy Efficiency....14
4.11.2. Green Infrastructure....14
4.11.3. Other....14
4.12. Cost Estimates....15
Chapter 5 - Selection of an Alternative....1
5.1. Collection System Alternatives....1
5.1.1. Collection System Cost Estimates....1
5.1.2. Collection System Non-Monetary Factors....2
5.1.3. Collection System Recommendation....3
5.2. Treatment and Storage Alternatives....3
5.2.1. Life Cycle Cost Analysis....3
5.2.2. Non-Monetary Factors....4
5.2.3. Treatment and Storage Recommendation....5
5.2.4. I/I Mitigation Impacts on WWTP....5
5.3. Combined I/I Alternative Recommendations....6
Chapter 6 - PROPOSED PROJECT (RECOMMENDED ALTERNATIVE)....1
6.1. Preliminary Project Design....1
6.1.1. Collection System Preliminary Project Design....1
6.1.2. WWTP Preliminary Project Design....5
6.2. Project Schedule....6
6.3. Permit Requirements....7
6.4. Sustainability Considerations....7
6.4.1. Water and Energy Efficiency....7
6.4.2. Green Infrastructure....7
6.5. Total Project Cost Estimate (Engineer's Opinion of Probable Cost)....7
6.6. Annual Operating Budget....8
6.7. Income....8
6.7.1. Revenue....8
6.8. Annual Operations and Maintenance Costs....9
6.9. Debt Repayments....11
6.10. Reserves....11
6.10.1. Debt Service Reserve....11
6.10.2. Short-Lived Asset Reserve....11
6.10.3. Financing Options....13

Chapter 7 - Conclusions and Recommendations......1

7.1. Other Considerations......1

TABLE OF CONTENTS......1

LIST OF FIGURES......5

LIST OF TABLES......6

LIST OF FIGURES

Figure ES-1: Study Area......2
Figure ES-2: Willamina Topographic Map......3
Figure ES-3: Population History and Projections......4
Figure ES-4: Existing WWTP Map......6
Figure ES-5: WWTP Process Schematics......6
Figure 1-1: Willamina Topographic Map......1
Figure 1-2: Outfall to south yamhill river......4
Figure 1-3: WRCC Average Max. Temperature......5
Figure 1-4: WRCC Average Min. Temperature......6
Figure 1-5: WRCC Average Total Precipitation......6
Figure 1-6: WRCC Average Total Snowfall......7
Figure 1-7: Population History and Projections......8
Figure 1-8: Zoning and Projected Areas......9
Figure 2-1: Existing Collection System Map......2
Figure 2-2: Existing WWTP Map......3
Figure 2-3: Smoke Testing......10
Figure 2-4: WWTP Process Schematics......12
Figure 2-5: WWTP existing Hydraulic Profile......13
Figure 3-1: Effluent BOD_5 Concentration......5
Figure 3-2: Effluent BOD_5 Loading......6
Figure 3-3: Effluent BOD_5 and TSS Percent Removal......6
Figure 3-4: Effluent TSS Concentration......7
Figure 3-5: Effluent TSS Loading......8
Figure 3-6: Effluent E. coli Bacteria......8
Figure 3-7: Effluent pH......9
Figure 3-8: Effluent Total Residual Chlorine......10
Figure 3-9: Flow Vs. Rainfall ($MMDWF_{10}$ and $MMWWF_5$)......12
Figure 3-10: Flow Vs. Rainfall ($PDAF_5$)......13
Figure 3-11: Flow Vs. Probability (Pif_5)......14
Figure 3-12: Daily Flow and Precipitation......15
Figure 3-13: Annual Rainfall Vs Per Capita Flow......16
Figure 3-14: WWTP Effluent Temperatures......20
Figure 3-15: Flow Monitoring Locations......25
Figure 3-16: Sample Base Flow Calibration Site 2......27
Figure 3-17: Sample Wet Weather Calibration Site 3, Jan 2nd - 4th......28

Figure 3-18: Existing PIF d/D 30
Figure 3-19: Growth Areas 31
Figure 4-1: Alternative 1 Improvements 2
Figure 4-2: Alternative 2 Improvements 3
Figure 4-3: Alternative 3.1 Improvements 5
Figure 4-4: Alternative 3.2 Improvements 6
Figure 4-5: New Storage Lagoon #5 10
Figure 4-6: WWTP Schematic with Storage Lagoon #5 11
Figure 4-7: Mechanical Treatment Schematic..12
Figure 4-8: Oxidation Ditches and Secondary Clerifiers 12
Figure 4-9: Sand Filters 13
Figure 6-1: CS.2.1 Project Extent..4
Figure 6-2: CS.3.1 Project Extent..5

LIST OF TABLES

Table ES-1: Projected Flows 4
Table ES-2: 20-Year Capital Improvement Plan..8
Table ES-3: 6-Year Capital Improvement Plan..8
Table ES-4: Potential Monthly User Rate Impact to Fund Priority Improvements 9
Table 1-1: Summary of Willamina Land Use..2
Table 1-2: Western Regional Climate Center Information...5
Table 1-3: Population and Projected Areas 8
Table 2-1: Pump Station Inventory...5
Table 2-2: Measured Pump Flow Rates..6
Table 2-3: Record of Smoke Testing Problem Locations 11
Table 2-4: 2023 Fiscal Year Adopted Sewer Budget 19
Table 2-5: Sewer Rate Summary...19
Table 2-6: Sewer SDC and Connection Fees 20
Table 2-7: Land Use Area Density 20
Table 2-8: Equivalent Dwelling Unit Summary Table...21
Table 3-1: Sanitary Sewer Violations...1
Table 3-2: Existing NPDES Permit Limits..2
Table 3-3: Monthly Average Flow Vs. Rainfall ($MMDWF_{10}$ and $MMWWF_5$)...........................12
Table 3-4: pif_5/$PDAF_5$ Peaking factors..14
Table 3-5: Observed Historical Flows 15
Table 3-6: Wet-Weather Peaking Factors Comparison 16
Table 3-7: Annual Peak Day Flow/Average Base Flow..17
Table 3-8: Projected Planning Flows..17
Table 3-9: Observed Historical BOD_5 Loading...18
Table 3-10: Observed Historical TSS Loading...18
Table 3-11: May 2023 Sampling Results 19
Table 3-12: Projected BOD_5, TSS, and TKN Loads 19
Table 3-13: Unit Process Reliability Evaluation 22
Table 3-14: EPA Requirements for Reliability 23

Table 3-15: Model Calibration Results..26
Table 3-16: Planning Criteria Vs. Modeled Peak Flows 28
Table 3-17: Existing PIF Vs. Pump Station Capacity 29
Table 3-18: 20-Year Projected Flows by Zone..31
Table 3-19: WWTP Capacity Summary..34
Table 4-1: Alternatives 1 and 2 Design Flows (2045)...2
Table 4-2: Alternative 3.1 Design Flows..4
Table 4-3: Alternative 3.2 Design Flows..5
Table 4-4: Collection Alternatives General Impact Summary 7
Table 4-5: WWTP Alternatives General Impact Summary...14
Table 5-1: Collection System Alternative Costs 1
Table 5-2: Convayence System Advantages and Disadvantages 2
Table 5-3: Treatment and Storage Alternatives Cost Comparison...4
Table 5-4: Treatment and Storage Alternatives evaluation 5
Table 5-5: Collection and Treatment I/I Summary..6
Table 6-1: CS1.1 Preliminary Design Flows..1
Table 6-2: I/I Reduction Program Outline..3
Table 6-3: 6-Year Capital Improvement Plan 6
Table 6-4: 20-Year Capital Improvement Plan 8
Table 6-5: User Rate Impact..9
Table 6-6: Annual Operations and Maintenance Costs 10
Table 6-7: Annual Operations and Maintenance Costs (Cont.)..11
Table 6-8: Short-Lived Asset Replacement..12
Table 6-9: Long Life Asset Replacement..13

EXECUTIVE SUMMARY

The City of Willamina contracted with Keller Associates, Inc. to complete a wastewater facilities planning study for the City's sanitary sewer. This chapter summarizes the major findings of the facilities plan, including brief discussions of alternatives considered and final recommendations. This wastewater facilities planning study aims to create a financial plan to guide the City's wastewater decisions.

Keller Associates has worked with key city staff to understand the system's current challenges and develop practical, cost-effective solutions. Keller Associates gratefully recognizes the Mayor and City Council, the Public Works Director, the Public Works Department, the city administrative support staff, and all others involved for their support and assistance in completing this study.

ES.1. PLANNING CRITERIA

Regulatory requirements, engineering best practices, and City-defined goals and objectives form the basis for planning and design. Applicable regulatory requirements include the National Pollutant Discharge Elimination System (NPDES) permit, Total Maximum Daily Loads (TMDLs), State Water Quality Standards, Recycled Water (Reuse) Regulations, and Land Use and Comprehensive Plan Requirements.

ES.2. DESIGN CONDITIONS

ES.2.1. Study Area and Land Use

The study area comprises all areas within the City of Willamina Urban Growth Boundary (UGB). Figure ES-1 on the next page shows the study area, existing service areas, and zoning areas. The Topography with Flood Plains map is shown in Figure ES-2 below. The study area sits between Willamina Creek and the South Yamhill River.

FIGURE ES-1: STUDY AREA

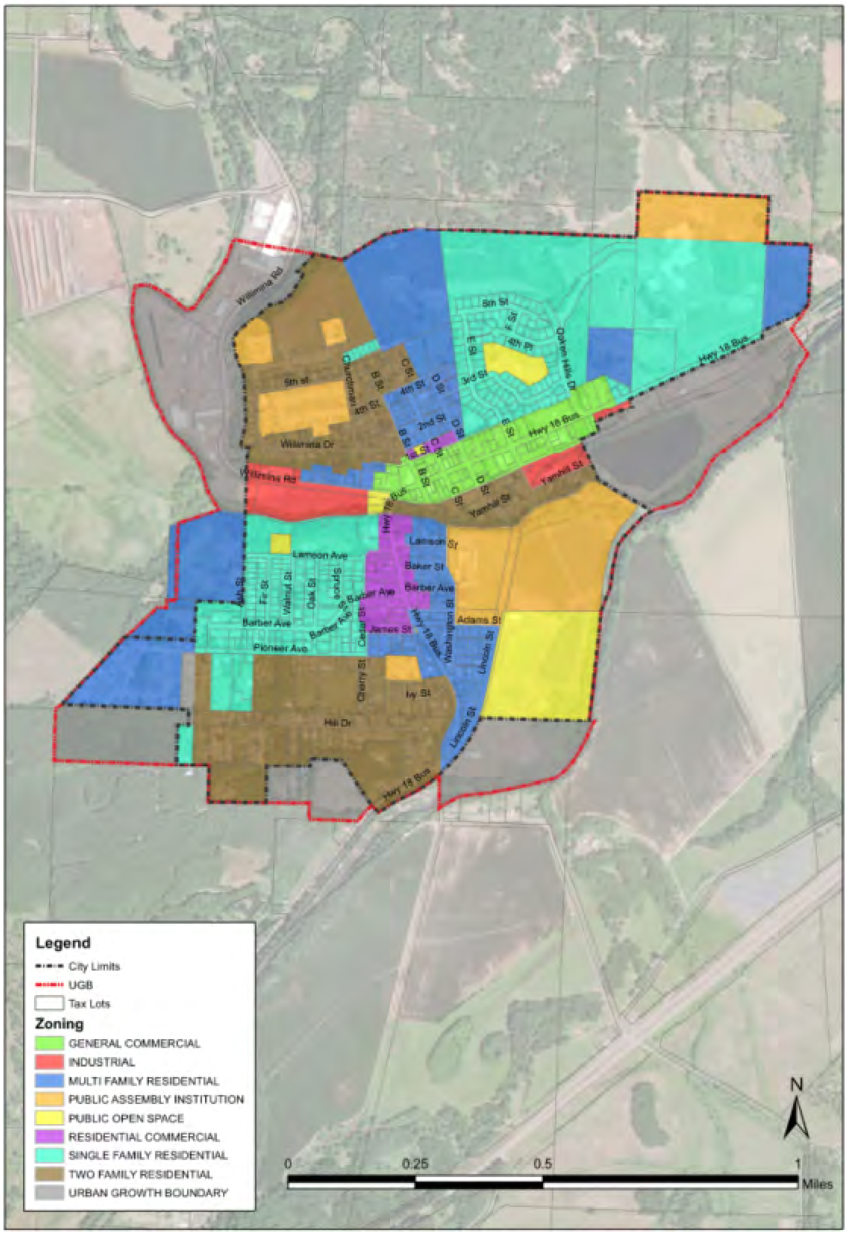
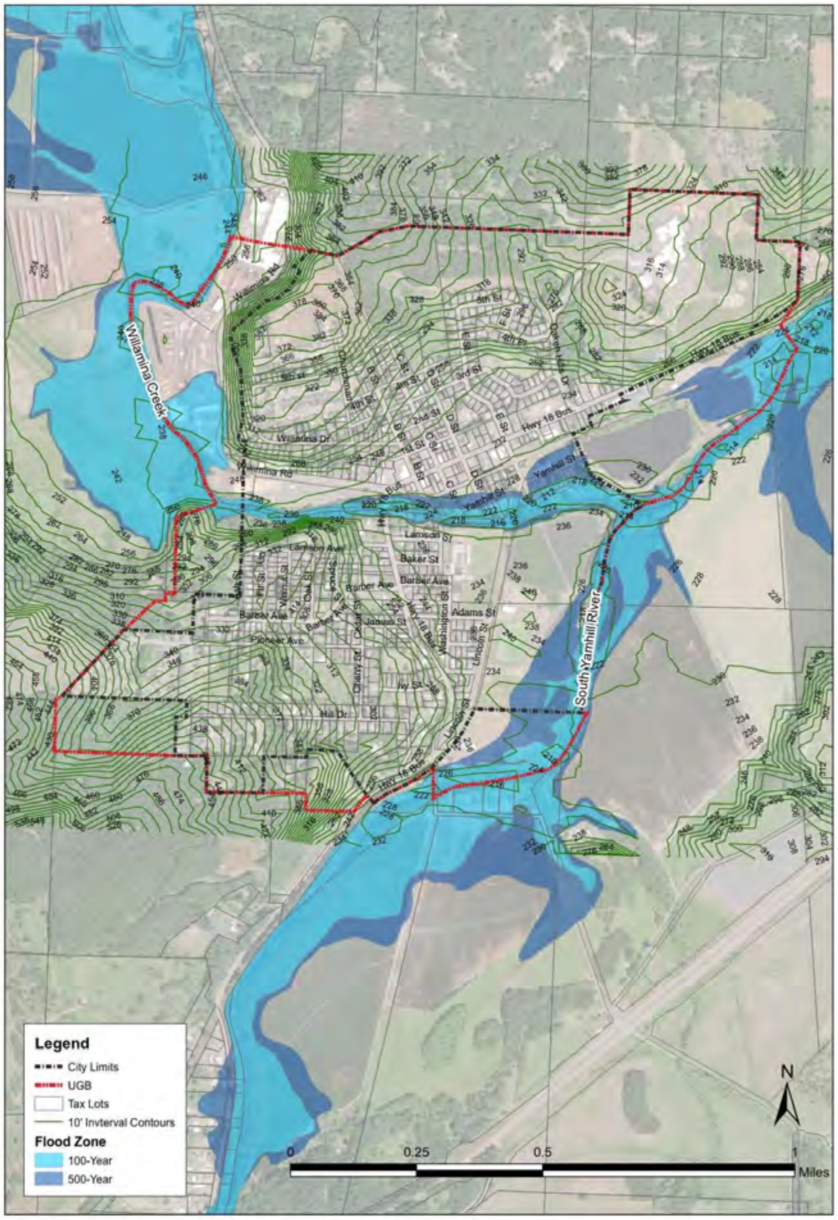


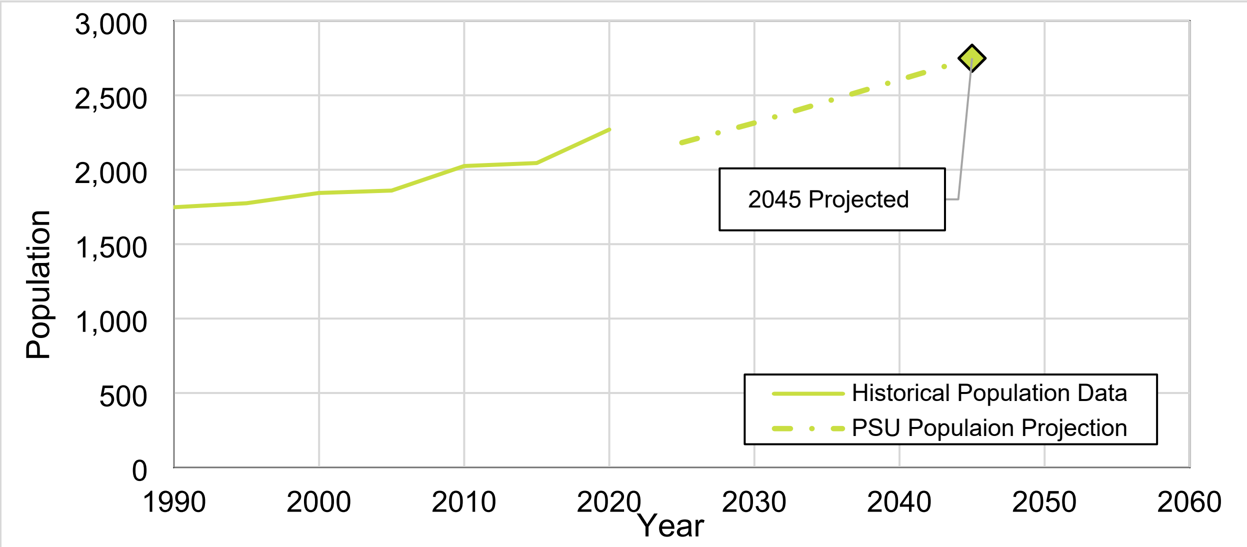
FIGURE ES-2: WILLAMINA TOPOGRAPHIC MAP



ES.2.2. Demographics

The City's population has been increasing over the past few decades. Historical populations were obtained from the U.S. Census, Polk County, and Yamhill County in cooperation with Portland State University (PSU). PSU analyzes historical trends and anticipates growth patterns to develop growth rates for 5-year increments. The most current certified population estimate from the U.S. Census was 2,270 in 2020. Growth calculation details can be found in Figure ES-3 below.

FIGURE ES-3: POPULATION HISTORY AND PROJECTIONS



ES.2.3. Wastewater Flows

Data on daily and monthly treatment plant flows from 2018 to 2022 were provided by the City for analysis. The design influent flows listed in Table ES-1 were calculated from this information using methods recommended by the Oregon DEQ. Refer to Section 3.3 for additional details regarding the methodology and data used.

TABLE ES-1: PROJECTED FLOWS

	Planning Flow (MGD)	Planning Unit Flow (gpcd)	Projected Design Flow (MGD)					
Year	---	---	2025	2030	2035	2040	2045	2065
Population	2,282	2,282	2,182	2,314	2,459	2,604	2,749	3,384
ADWF	0.22	96	0.21	0.22	0.23	0.25	0.26	0.32
$MMDWF_{10}$	0.64	280	0.61	0.65	0.69	0.73	0.77	0.95
AADF	0.47	205	0.45	0.47	0.50	0.53	0.56	0.69
AWWF	0.76	332	0.72	0.77	0.82	0.87	0.91	1.12
$MMWWF_5$	1.24	542	1.18	1.25	1.33	1.41	1.49	1.83
PWkF	2.20	964	2.10	2.23	2.37	2.51	2.65	3.26
$PDAF_5$	3.35	1,470	3.21	3.40	3.61	3.83	4.04	4.97
PIF_5	4.79	2,100	4.58	4.86	5.16	5.47	5.77	7.11

* MGD – million gallons per day, gpcd – gallons per capita per day, ADWF – Average Dry-Weather Flow, $MMDWF_{10}$ – Max Month Dry-Weather Flow, AADF – Average Annual Daily Flow, AWWF – Average Wet-Weather Flow, $MMWWF_5$ – Max Month Wet-Weather Flow, PWkF – Peak Week Flow, $PDAF_5$ – Peak Daily Average Flow, PIF_5 – Peak Instantaneous Flow.

ES.2.4. Wastewater Composition

The influent Five-Day Biochemical Oxygen Demand (BOD_5) and Total Suspended Solids (TSS) data from 2018 through 2022 was evaluated to determine the annual average, dry weather average, dry weather maximum month, wet weather average, and wet weather maximum month loads (pounds per day). The pounds per day BOD_5 and TSS loading data were used to calculate the pounds per capita per day (ppcd) for the various flows; these values were used to estimate future loadings. The City also sampled Total Kjeldahl Nitrogen (TKN) in 2023. A detailed summary of the data and projections is provided in Chapter 3.

ES.3. EXISTING DEFICIENCIES

ES.3.1. Collection Facilities

The City's collection system includes approximately 9.7 miles of gravity sewer mains, 1,900 feet of force main, and two pump stations. Sewage flows from the gravity collection system to the North (E Street) and South (Washington Street) pump stations. These two pump stations convey influent to the wastewater treatment plant (WWTP).

The collection system has the following deficiencies:

E Street Pump Station – The flow meter and electrical components should be replaced during the planning period. Fall protection is needed. The City is also replacing the pumps to achieve the required additional capacity during the planning period.

Washington Street Pump Station – The flow meter and electrical components should be replaced during the planning period, especially the level controller display. Fall protection, signs, and a fence with a gate are needed. The pumps need to be replaced to achieve the required capacity.

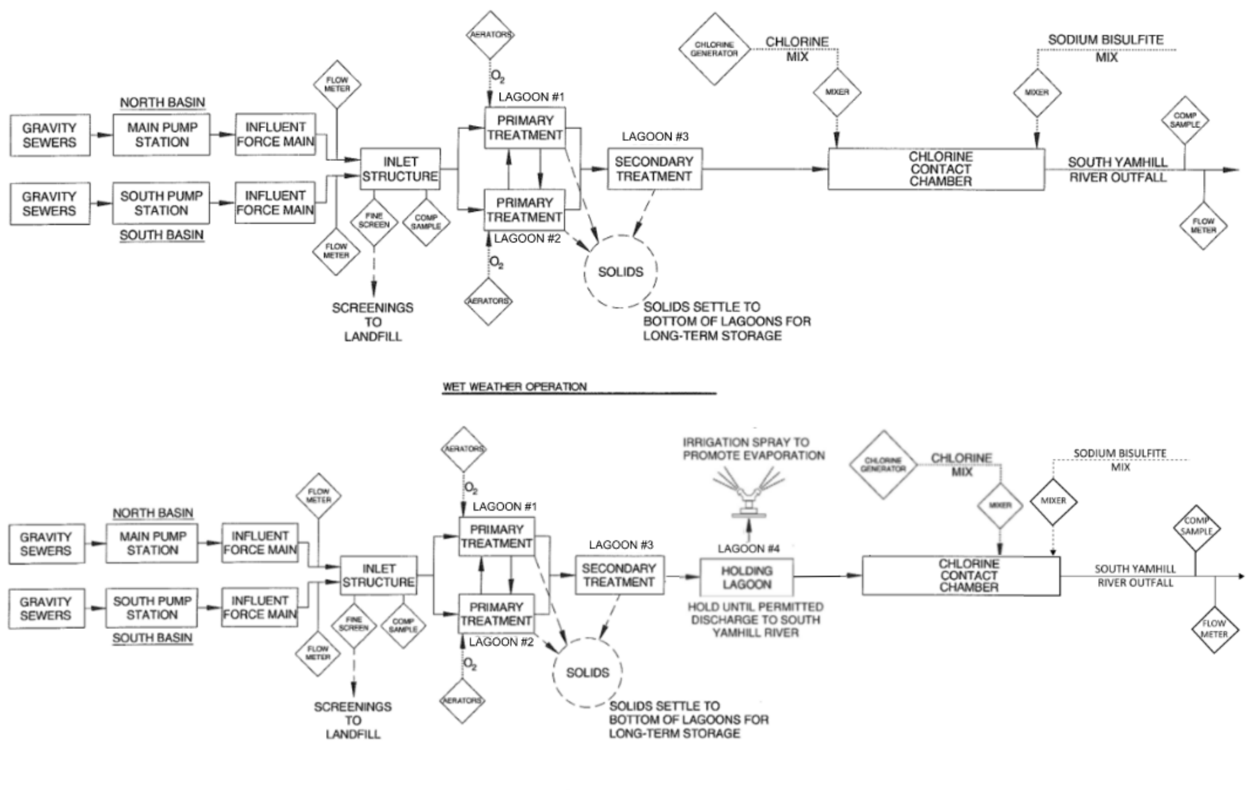
Collection System Piping – There is a large amount of infiltration and inflow (I/I), likely due to the asbestos cement pipe. Smoke testing also identified several problematic locations. Modeling showed some areas of the collection system that will be beyond capacity during the planning period.

ES.3.2. WWTP Facilities

The Willamina WWTP consists of two aerated lagoons, two effluent storage lagoons, and chlorine disinfection. Figure ES-4 illustrates the layout and Figure ES-5 provides a general schematic. The influent wastewater is monitored and screened adjacent to the aerated lagoons. Following the influent screening, the wastewater flows by gravity into the lagoons, where it undergoes treatment. Following treatment and storage in the lagoons, the water flows by gravity through a magnetic flow meter, past a modulating flow control valve, and enters a chlorine contact basin. The water is chlorinated and dechlorinated in the basin before being discharged into the South Yamhill River.

FIGURE ES-4: EXISTING WWTP MAP

FIGURE ES-5: WWTP PROCESS SCHEMATICS



Following the disinfection process the flow is sampled from November 1st to April 30th. During the non-release months (May 1st to October 31st), the City promotes evaporation using sprayers that discharge back into Lagoon #4. Solids generated in the aerated lagoons settle to the bottom of the lagoons for long-term storage.

Deficiencies of the existing WWTP include:

Headworks – The headworks screen stopped working back in 2018, so the backup bar screen is used and is manually raked. The screen is also not rated for future flows. The influent flow measurement is not sufficient for the planning period. Also, the channel to Lagoon #1 is hydraulically limited during high flow events.

Aerated Lagoons – There are cracks in the aeration system piping and the system is insufficient for the planning period. The liner in Lagoon #1 floats if the level drops too low and both lagoon liners have rips. The City has not removed solids since 2005, and the current sludge levels are unknown.

Effluent Storage Lagoons – The effluent storage lagoons are past their storage capacity. The liner in Lagoons #3 floats if the water level gets too low. The effluent BOD_5 and TSS have approached the permit limits, especially the percent removal requirement when the influent is diluted during storm events. The spray guns are not rotating as they should.

Disinfection Systems – The City has electrical issues with the sodium hypochlorite system. Overall, the disinfection system is near the end of its useful life. Additionally, the chlorine contact basin will not have enough contact time based on the future planning flows.

Electrical and SCADA – The operators do not receive information in the alarms but must go to the facility to see what triggered the alarm. There is no backup power at the WWTP.

ES.3.3. Alternatives

Several alternatives were considered in this facility planning study to address the deficiencies. A summary of the alternatives and the selected alternatives are discussed in Chapters 4 and 5.

ES.4. CAPITAL IMPROVEMENT PLAN AND FINANCING

ES.4.1. Summary of Costs

Table ES-2 presents the 20-year capital improvement plan (CIP). Projects are organized by priority. Costs reflect planning-level estimates and should be refined in the pre-design and design phases of implementation. Priority 1 improvement expenses are anticipated to occur over the next six years. Priority 2 improvements are items targeted as funds become available. An I/I reduction program should also be implemented but is not shown as a specific capital improvement project. It is a program that should be funded annually and is incorporated into the 6-year CIP schedule shown in Table ES-3. Additional details on the CIP are discussed in Chapter 6.

TABLE ES-2: 20-YEAR CAPITAL IMPROVEMENT PLAN

Project ID#	Project Name	Total Estimated Cost (2024)	SDC Growth Apportionment		City's Estimated Portion
Total Priority 1 Improvements (0-6 years)					
CS.1.1	Lift Station Improvement \ Forcemain	$7,355,000	18%	$1,336,000	$6,019,000
T.1.1	Headworks Improvements	$1,448,000	21%	$299,000	$1,149,000
T.1.2	Lagoon 5	$2,883,000	18%	$528,000	$2,355,000
T.1.3	Aeration System and Blowers	$3,767,000	21%	$784,000	$2,983,000
T.1.4	Disinfection System and Chlorine Contact Basin	$1,453,000	21%	$300,000	$1,153,000
T.1.5	Discharge Piping to Outfall	$449,000	18%	$82,000	$367,000
T.1.6	Miscellaneous Plant Priority 1 Improvements	$1,131,000	21%	$232,000	$899,000
	Total Priority 1 Improvements (rounded)	$18,486,000	-	$3,561,000	$14,925,000
Total Priority 2 (6-13 years)					
CS.2.1	Upsizing Gravity Trunklines	$4,447,000	21%	$914,000	$3,533,000
T.2.1	Combine Lagoon 3 & 4	$3,887,000	21%	$799,000	$3,088,000
T.2.2	Lagoon Liner Improvements	$3,460,000	21%	$711,000	$2,749,000
	Total Priority 2 Improvements (rounded)	$11,794,000	-	$2,424,000	$9,370,000
Total Priority 3 Improvements (13-20 years)					
CS.3.1	Upsizing Gravity Mains	$2,704,000	21%	$556,000	$2,148,000
T.3.1	Facility Planning Study Update	$150,000	21%	$31,000	$119,000
	Total Priority 3 Improvements (rounded)	$2,854,000	-	$587,000	$2,267,000
	TOTAL SYSTEM IMPROVEMENTS COSTS (ROUNDED)	$33,134,000	-	$6,572,000	$26,562,000

The cost estimate herein is concept level information only based on our perception of current conditions at the project location and its accuracy is subject to variation depending upon project definition and other factors. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. This cost opinion is in 2024 dollars and does not include escalation to time of actual construction.

Table ES-3 illustrates how the Priority 1 improvement expenses are anticipated over the next several years. This 6-year CIP should be used by the City's financial consultant to complete a more detailed rate study.

TABLE ES-3: 6-YEAR CAPITAL IMPROVEMENT PLAN

ID#	ITEM	COST	Opinion of Probable Costs (2024 Dollars)					
			2025	2026	2027	2028	2029	2030
CS.1.1	Lift Station Improvements \ Forcemain	$ 7,355,000		$ 1,103,250	$ 3,125,875	$ 3,125,875		
T.1.1	Headworks Improvements	$ 1,448,000				$ 724,000	$ 724,000	
T.1.2	Storage Lagoon	$ 2,883,000			$ 1,441,500	$ 1,441,500		
T.1.3	Aeration System and Blowers	$ 3,767,000				$ 565,050	$ 1,600,975	$ 1,600,975
T.1.4	Disinfection System and Chlorine Contact Basin	$ 1,453,000		$ 726,500	$ 726,500			
T.1.5	Discharge Piping to Outfall	$ 449,000		$ 449,000				
T.1.6	Micellaneous Plant Priority 1 Improvements	$ 1,131,000						$ 1,131,000
	Total Capital Cost	*$ 18,486,000*	*$ -*	*$ 2,279,000*	*$ 5,294,000*	*$ 5,857,000*	*$ 2,325,000*	*$ 2,732,000*
	I/I Reduction Program	-	$159,000	$159,000	$159,000	$159,000	$159,000	$159,000
	Short-Lived Asset Replacement	-	$124,000	$124,000	$124,000	$124,000	$124,000	$124,000
	Total FY Cost	-	*$ 283,000*	*$ 2,562,000*	*$ 5,577,000*	*$ 6,140,000*	*$ 2,608,000*	*$ 3,015,000*

The cost estimate herein is concept level information only based on our perception of current conditions at the project location and its accuracy is subject to variation depending upon project definition and other factors. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. This cost opinion is in 2024 dollars and does not include escalation to time of actual construction.

ES.4.2. Budget and Rate Impacts

Funding for the recommended system improvements may come from any number of sources. The potential user rate impacts if all priority improvements are funded through a low-interest loan with debt service payments (30 years, 1.5%) made through a user rate increase are shown below. Table ES-4 outlines the potential impacts of residential user rates and assumes a flat rate increase for all 1,118 sewer Equivalent Dwelling Units (EDUs). As shown in Table ES-4, actual rate impacts can vary depending on the City's available System Development Charge (SDC) funds, the rate structure, existing budget surplus, funding source(s), potential grants, and terms of the loan. A separate user rate study is recommended to complete a more detailed evaluation of potential user rate impacts. Details about budget and rate impacts can be found in Chapter 6.

TABLE ES-4: POTENTIAL MONTHLY USER RATE IMPACT TO FUND PRIORITY IMPROVEMENTS

	Annual Payment (30 year, 1.5%)	Monthly User Rate without SDCs	Monthly User Rate Including SDCs
Existing User Rates (2023)	-	$81.03	$81.03
Priority 1 Improvements[1]	$769,742	$159.26	$101.87
1) Assumes $10,000,000 in grants are secured.			

ES.4.3. Other Annual Costs

In addition to the capital improvement costs presented in the previous section, Keller Associates recommends including additional annual operation and maintenance costs associated with the Capital Improvement Plan (additional aerators, aerobic digestion, grit removal, etc.) in setting annual budgets. It is anticipated that this cost may be close to twice the current amount by 2045, most of which is associated with increased power usage.

ES.4.4. SDCs

The scope of this study included estimating the SDC eligibility for each identified capital improvement. It is the intent that this information will be utilized by the City's financial consultant to update the City's SDCs. The estimated SDC eligibility (%) for each identified capital improvement is shown in Table ES-2. The SDC percentage was calculated using the capacity that can be utilized for future connections divided by the future capacity in 2045. For projects that did not have an increase in flows, the percent SDC eligible is derived from the percent growth in population over the 20-year planning period.

ES.4.5. Financing Options

Financing and incentive options that may assist with offsetting costs associated with implementing the CIP include but are not limited to user rate increases, SDCs, DEQ State Revolving Fund Loan Program, Oregon Infrastructure Finance Authority grants and loans, USDA Rural Utilities Services loans and grants, direct state loans appropriations, revenue bonds, general obligation bonds, US Economic Development Administration grants, and Energy Trust of Oregon. Additional financing options are discussed in Chapter 6.

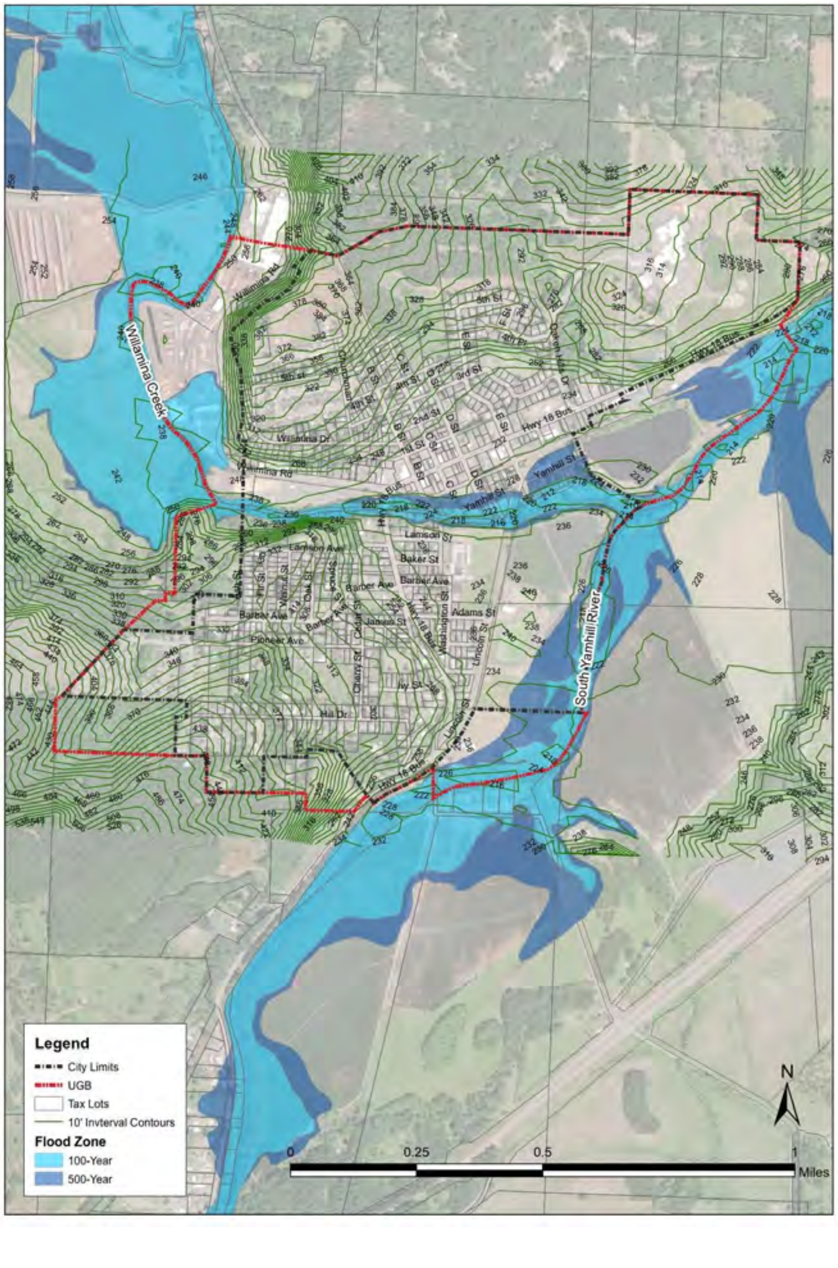
CHAPTER 1 - PROJECT PLANNING

The City of Willamina (City) owns and operates a municipal wastewater collection system and wastewater treatment plant (WWTP). This study aims to determine the City's wastewater needs, evaluate if the existing collection system and WWTP can meet those needs, and provide a long-term plan to implement improvements, if necessary, to meet the City's future needs.

1.1. LOCATION

The study area is shown on the topographical map in Figure 1-1 (Figure 3 in Appendix A) and consists of all areas within the City of Willamina Urban Growth Boundary (UGB).

FIGURE 1-1: WILLAMINA TOPOGRAPHIC MAP



The City of Willamina is in the foothills of the Oregon Coast Mountain Range, approximately 30 miles east of the Pacific Ocean. The City is located within both Polk and Yamhill Counties. Willamina Creek divides the City into northern and southern portions, with a bridge crossing the river on State Highway 18. The South Yamhill River borders the City Limits to the east. The City's topography generally slopes downward towards Willamina Creek.

1.2. Enviromental Resources Present

An inventory of existing environmental resources is needed, as any improvements must consider the environmental impacts. The factors discussed in this section include land use/prime farmland, floodplains, wetlands, cultural resources, coastal resources, and socio-economic conditions.

1.2.1. Land Use/Prime Farmland/Formally Classified Lands

Zoning in the study area is shown in Figure 1 in Appendix A. Table 1-1 provides a detailed breakdown for each zoning category by acre and percent of total area. The Farmland designation as presented in the United States Department of Agriculture (USDA) Web Soil Survey (WSS) is shown in Figure 2 in Appendix A. Much of the City is designated by the USDA WSS as prime farmland or farmland of statewide importance, although it is currently zoned and used for other purposes.

TABLE 1-1: SUMMARY OF WILLAMINA LAND USE

Zone/Designation	Acres	Percent of Total
Residential	**417**	**57%**
Multi Family Residential	118	16%
Single Family Residential	164	22%
Two Family Residential	135	18%
Non-Residential	**152**	**21%**
General Commercial	28	4%
Industrial	17	2%
Public Assembly Institution	74	10%
Public Open Space	34	5%
Other	**166**	**23%**
Residential Commercial	15	2%
Urban Growth Boundary	151	21%
Total	**735**	**100%**

1.2.2. Floodplains

The Federal Emergency Management Agency (FEMA) publishes flood insurance studies that classify land into different flood zone designations. Figure 3 in Appendix A presents the topography and floodplains in the study area. Some portions of the study area, including portions of the WWTP, are inside the 100-year and 500-year floodplains of the South Yamhill River. Both pump stations are located on the edge of the 500-year floodplain of Willamina Creek. The record drawings do not indicate the flood elevations or the vertical datum; therefore, it is unknown whether the pump station rims and the top bank of the treatment lagoons are above the 100-year and 500-year flood plain elevations. Operation and Maintenance Manuals from upgrades to the pump stations and WWTP indicate that the facilities are designed to remain fully operational during a 25-year flood event and to be protected from physical damage during a 100-year flood event. The 100-year base flood elevation during the 100-year flood near the Washington Street Pump Station and E Street Pump

Station are 227.0 feet and 226.3 feet according to the FEMA Flood Insurance Rate Maps. This is above both of the pump station wetwell rim elevations. Improvements at the pump stations should include confirming the base flood elevations and other flood protection measures. The 100-year high water line around the lagoons between 226 and 229 feet according to the FEMA Flood Insurance Rate Maps. This is below the lagoon rim elevations which are 235.6, 235.6, 235.6, and 242.6 Improvements at the lagoons should include confirming the base flood elevations and other flood protection measures.

1.2.3. Soils

Soil data retrieved from the USDA WSS is presented in Figure 4 in Appendix A. There are a variety of soils in the area; however, the majority of the soils are silty clay loams.

1.2.4. Wetlands

The Oregon Department of State Lands (ODSL) keeps an inventory of the local wetlands in Oregon. Currently, the City of Willamina is not included in any completed or pending local wetland inventories. Wetland delineation was not within this project's scope, so the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory was used to determine the wetland areas that could be impacted. The map of delineated wetlands from the National Wetlands Inventory is shown in Figure 5 in Appendix A. The National Wetlands Inventory mapping designates the WWTP lagoons and the Huddleston Pond as freshwater ponds. Small sections of land near the WWTP lagoons are designated freshwater forested/shrub wetlands.

1.2.5. Cultural Resources

The State Historic Preservation Office (SHPO) maps above-ground cultural resources on its website. According to the SHPO website, six structures are listed as “not eligible,” and one is “eligible/listed” cultural resources within the UGB. The map from the SHPO website can be found in Figure 6 in Appendix A. The SHPO also keeps track of underground cultural resources. They only provide information from their database to professional archaeologists, with one exception. They will provide information for small project areas if provided the complete legal description of the project location, a United States Geological Survey (USGS) map of the project area, and a description of the project and ground disturbance. The SHPO should be consulted as part of the design process of any proposed recommendation.

1.2.6. Biological Resources

The USFWS produces a database that lists endangered and threatened plants throughout the country. Results of a search for the study area in the database can be found in Appendix B. The species documented in Polk and Yamhill Counties that are listed as endangered, threatened, proposed, and candidate species by USFWS are listed below:

- Threatened: Pacific Marten, Marbled Murrelet, Northern Spotted Owl, Streaked Horned Lark, Kincaid’s Lupine, Nelson’s Checker-mallow
- Endangered: Fender’s Blue Butterfly, Willamette Daisy
- Candidate: Monarch Butterfly.

1.2.7. Water Resources

There are no wild or scenic rivers in the study area. The South Yamhill River forms a portion of the eastern City Limits of the City of Willamina. Willamina Creek, a tributary of the South Yamhill River, divides the City roughly in half as it flows west to east through the study area. There are three assessment units near Willamina. These include the South Yamhill River from Agency Creek to

Willamina Creek where the outfall is located, Willamina Creek from East Creek to the South Yamhill River, and the South Yamhill River from Willamina Creek to Salt Creek. Willamina Creek is 303(d) listed for turbidity, biocriteria, fecal coliform, phosphorous, and temperature. The South Yamhill River at the outfall include fecal coliform, E. coli, phosphorus, and temperature. The South Yamhill downstream of the outfall is 303(d) listed by DEQ for fecal coliform, E. coli, phosphorus, ammonia, temperature, alkalinity, and dissolved oxygen. The downstream impaired parameters of the outfall might be considered pollutants of concern during permit renewal. The Willamette Basin TMDL applies to both of these surface waters. The oufall and nearby assessment units are shown below in Figure 1-2.

FIGURE 1-2: OUTFALL TO SOUTH YAMHILL RIVER

1.2.8. Coastal Resources

There are no coastal areas within the study area.

1.2.9. Socio-Economic Conditions

According to an American Community Survey (ACS) 5-Year Estimates Data Profiles (2019) published by the U.S. Census Bureau, the population in the 97396 zip code is primarily (88.7%) Caucasian. Hispanic or Latino comprises 3.3% of the population. The median household income is $48,244, which is lower than the state average of $62,818.

All areas of the City have equal access to the City wastewater system. Recommended improvements presented in this plan are to be designed to achieve and maintain an equal level of service for all users. The City Council holds public meetings to review the plan.

1.2.10. Miscellaneous Issues

Another environmental resource considered was air quality. The City of Willamina is not located in an area designated as an air maintenance or nonattainment area by DEQ.

1.2.11. Climate

Existing climate trends are shown in Table 1-2 with a plotted representation shown in Figure 1-3 through Figure 1-6 below. The information was provided by Western Regional Climate Center (WRCC).

TABLE 1-2: WESTERN REGIONAL CLIMATE CENTER INFORMATION

DALLAS 2 NE, OREGON (352112), Period of Record Monthly Climate Summary, Period of Record : 08/15/1928 to 05/31/2016													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temp (F°)	45.7	50.6	55.3	61.3	68.4	74	82.2	82.3	77.6	65.2	52.4	46.2	63.4
Average Min. Temp (F°)	32.8	34.4	35.9	38.3	42.8	47.1	49.5	49.1	46.6	41.5	36.9	33.9	40.7
Average Total Precipitation (in.)	7.96	6.19	5.31	2.98	2.13	1.31	0.35	0.6	1.33	3.52	7.49	8.94	48.12
Average Total SnowFall (in.)	3.4	1.9	0.8	0	0	0	0	0	0	0	0.3	1.8	8.2
Average Snow Depth (in.)	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent of Possible Observations for Period of Record	Max. Temp.: 97.9%		Min. Temp.: 98.3%		Precipitation: 98.4%		Snowfall: 94.8%		Snow Depth: 93.3%				

*Dallas is the closest weather point with sufficient data

FIGURE 1-3: WRCC AVERAGE MAX. TEMPERATURE

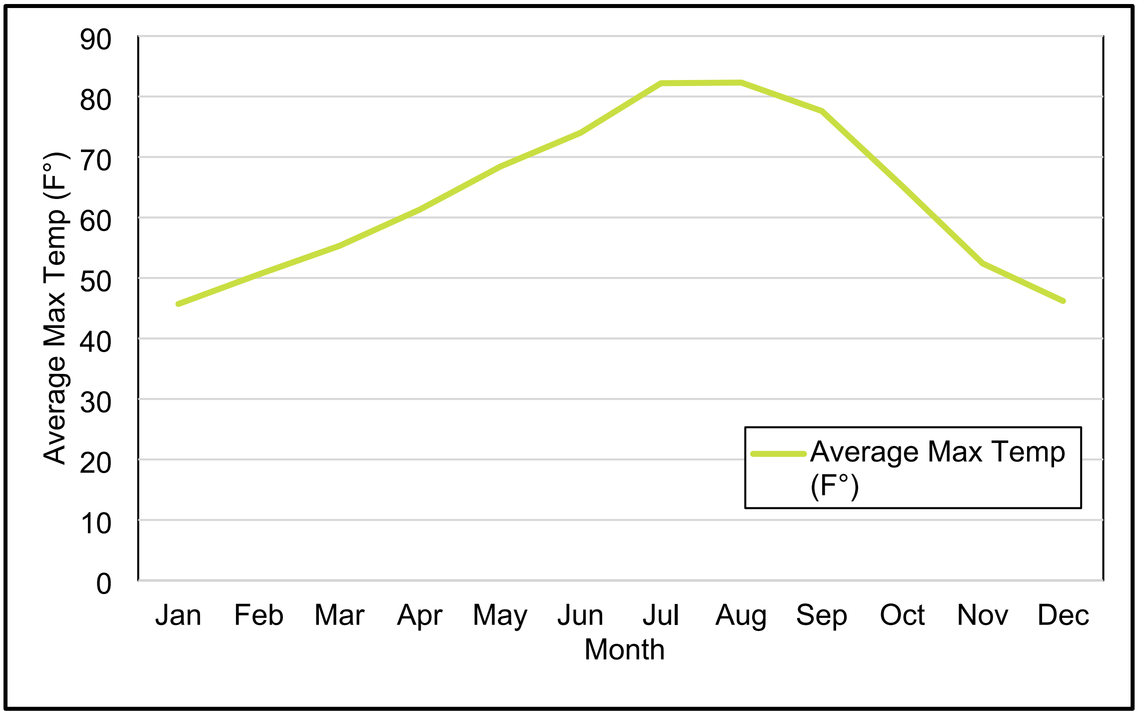


FIGURE 1-4: WRCC AVERAGE MIN. TEMPERATURE

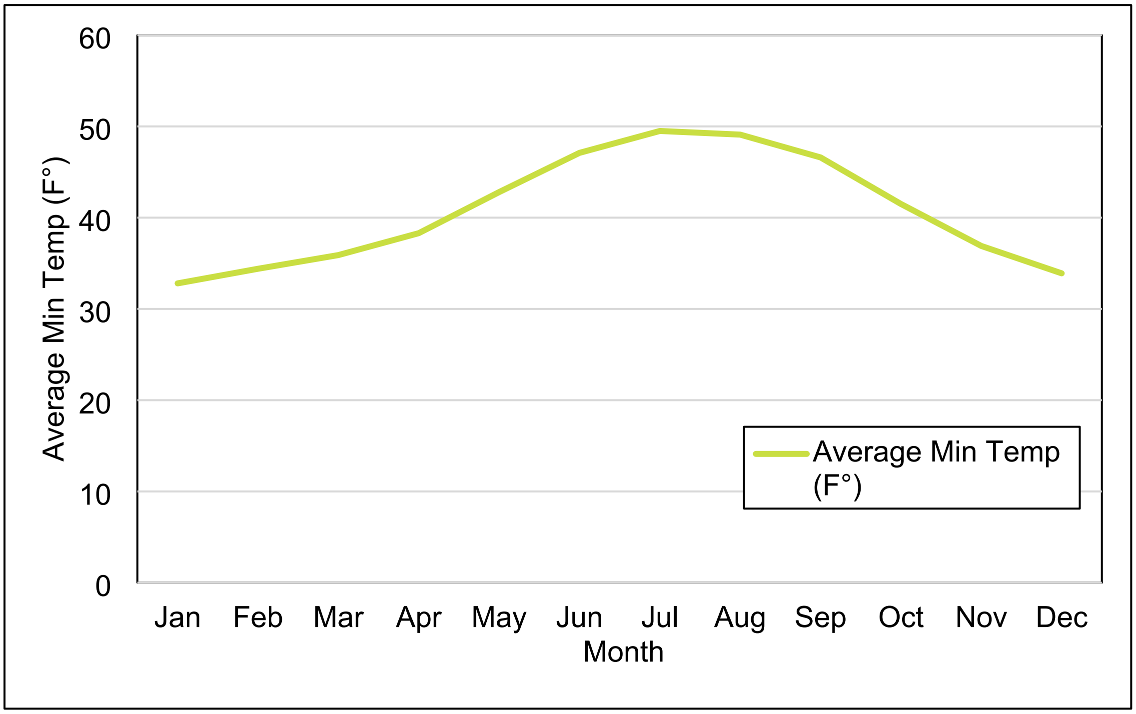


FIGURE 1-5: WRCC AVERAGE TOTAL PRECIPITATION

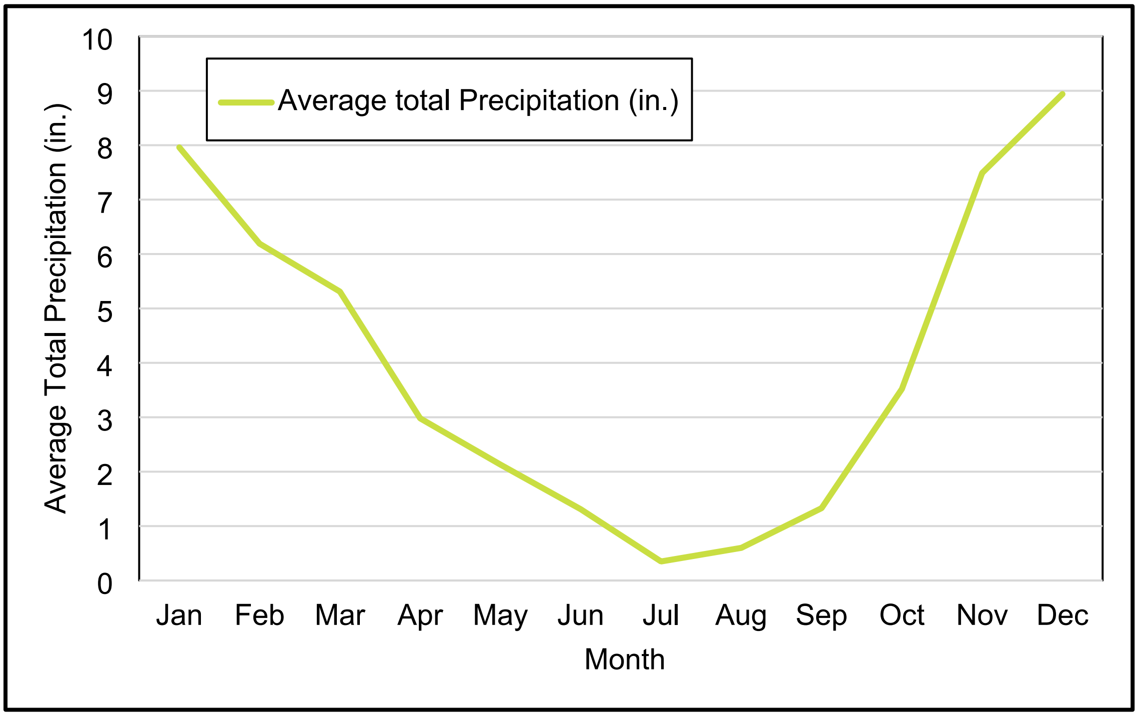
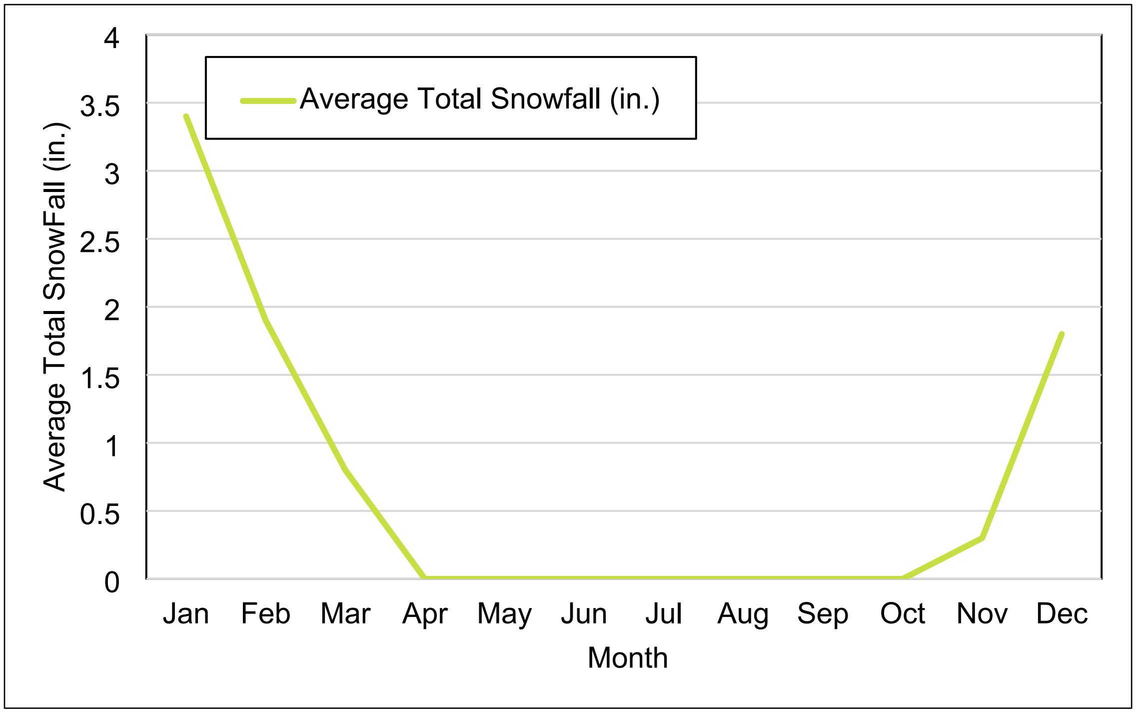


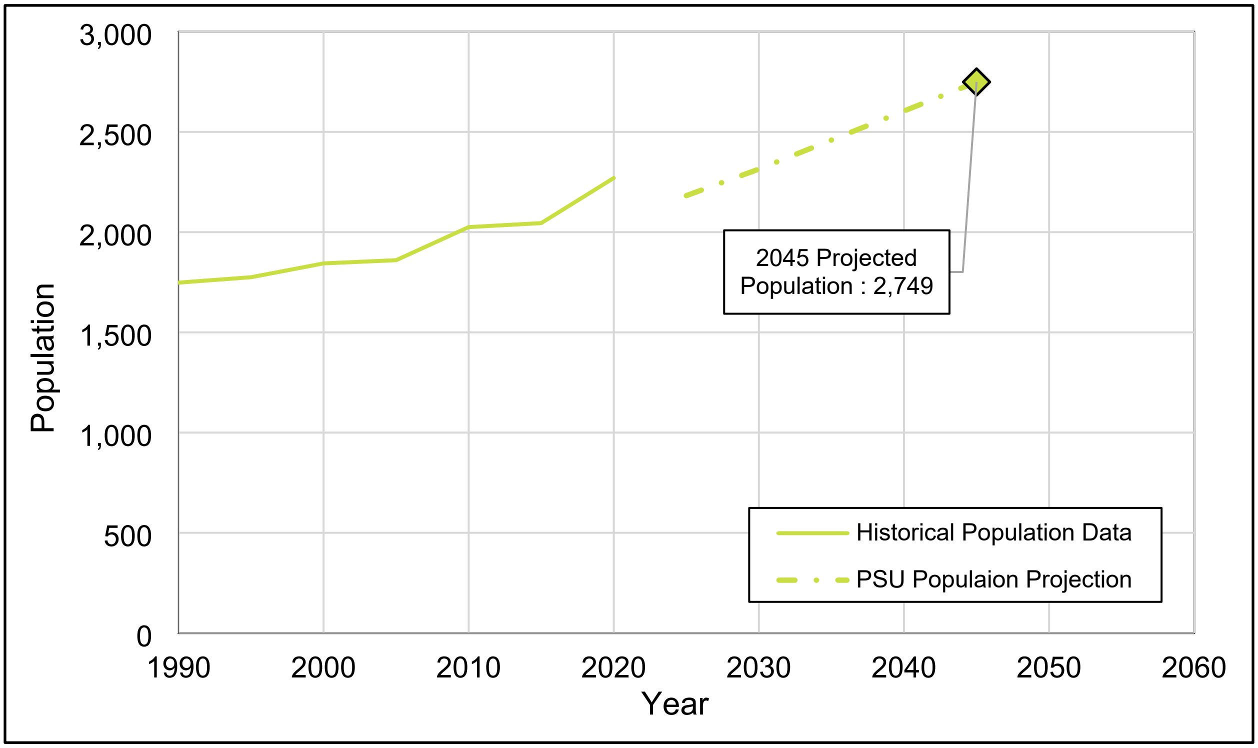
FIGURE 1-6: WRCC AVERAGE TOTAL SNOWFALL



1.3. POPULATION TRENDS

The official population projections for the City of Willamina reflect the collaborative efforts of Yamhill County, Polk County, and Portland State University (PSU). PSU published a document in July 2022 establishing the official population forecast. Historical population reports from PSU and the U.S. Census were retrieved to collect historical population data. Population projections for this planning study were copied directly from the July 2022 PSU population forecasts. As described above, the population estimates are shown in Figure 1-7.

FIGURE 1-7: POPULATION HISTORY AND PROJECTIONS



For the projected City expansion, Table 1-3 shows a breakdown of the number of people and housing type allocated by zoning. The information is based on 2.03 people per household and a population increase of 544 people.

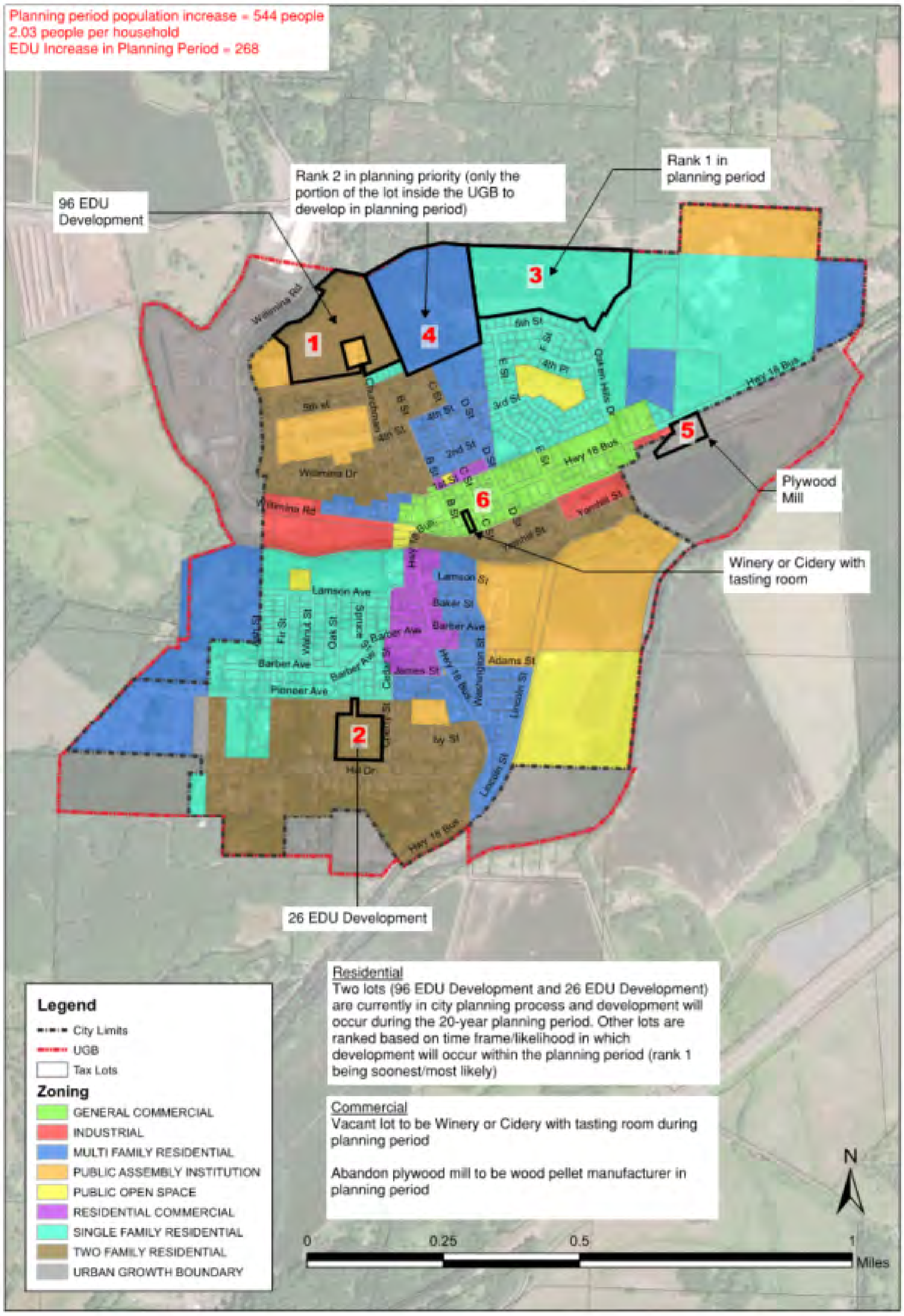
TABLE 1-3: POPULATION AND PROJECTED AREAS

Planned	Area (ft^2)	Acres	Type	EDUs	People
EDU's Approved	1,010,970	23	Two Family	122	248
Rank 1	978,831	22	Single Family	90	182
Rank 2	307,544	7	Multi-Family	56	115
Totals	2,297,345	53		268	544

*Willamina, as of 2022, has 1124 EDU's

Figure 1-8 shows the locations where future expansion will take place. The rank indicates what priority it will have. Rank 1 is anticipated to be where the first future expansion will occur, and Rank 2 is anticipated to follow.

FIGURE 1-8: ZONING AND PROJECTED AREAS



1.4. COMMUNITY ENGAGEMENT

The City provided opportunities for the community to engage in the planning process and provide comments or ask questions by participating in a City Council meeting held before the City Council voted to approve the planning study. No additional community engagement opportunities are anticipated.

CHAPTER 2 - EXISTING FACILITIES

This chapter describes the existing wastewater system for the City of Willamina. The WWTP is classified as a Class I treatment system. The collection system is also classified as a Class I system. The City currently employs three operators with Class I treatment and one with Class 2 collection system certifications. The wastewater collection system comprises approximately 9.7 miles of gravity sewer mains, 1,900 feet of force main, and two pump stations. A map of the collection system can be found in Figure 8 in Appendix A. The pipelines range from 8 to 15 inches in diameter. Figure 9 in Appendix A illustrates the pipe diameters, and Figure 10 in Appendix A illustrates the pipe material in the City's collection system. There are over 200 manholes in the City's collection system. Sewage flows from the gravity collection system to the North (E Street) and South (Washington Street) pump stations. These two pump stations convey influent to the wastewater treatment plant (WWTP).

The pumped flows are metered in vaults just prior to the headworks structure. A spiral screen, which is no longer operational, is mounted on the headworks inlet structure. A bypass around the spiral screen diverts flow around the inoperable screen. Flow from the headworks enters either of the aerated primary lagoons (Lagoons #1 and #2). Solids settle to the bottom of Lagoons #1 and #2 and remain there for long-term storage. Generally, the best treatment will occur if the flow enters Lagoon #1 first and runs in series to Lagoon #2. The pipeline downstream of the screen, into Lagoon #1, is hydraulically limiting during high-flow events, so the influent is split between Lagoons #1 and #2. The piping is set up to allow temporary bypassing of a lagoon for repairs or cleaning.

A fine bubble diffused aeration system is at the bottom of each primary lagoon. Blowers (located in the blower building) provide air to the diffusers in the lagoons to enhance treatment. The water gravity drains from Lagoon #2 to Lagoon #3. Lagoon #3 provides additional treatment and storage of the effluent. From Lagoon #3, effluent can be pumped to Lagoon #4 for additional storage, spray irrigation/evaporation, or sent to the chlorine contact chamber and discharged to the South Yamhill River. Effluent from Lagoon #3 or Lagoon #4 can drain by gravity to the chlorine contact chamber. Sodium hypochlorite is injected at the beginning of the chamber and is mixed with a chemical induction mixer. At the end of the 350-foot chamber, sodium bisulfate is added to remove the chlorine residual.

The WWTP does not currently accept septage. Also, the WWTP does not treat a significant amount of industrial wastewater, as no major industrial facilities are connected to the collection system. Septage and industrial discharges can be significant sources of load to a plant, so the City should carefully consider each case before allowing septage or industrial discharge into the WWTP.

2.1. LOCATION MAP

Maps of the existing collection system and the WWTP are shown in Figure 2-1 and Figure 2-2, respectively.

FIGURE 2-1: EXISTING COLLECTION SYSTEM MAP

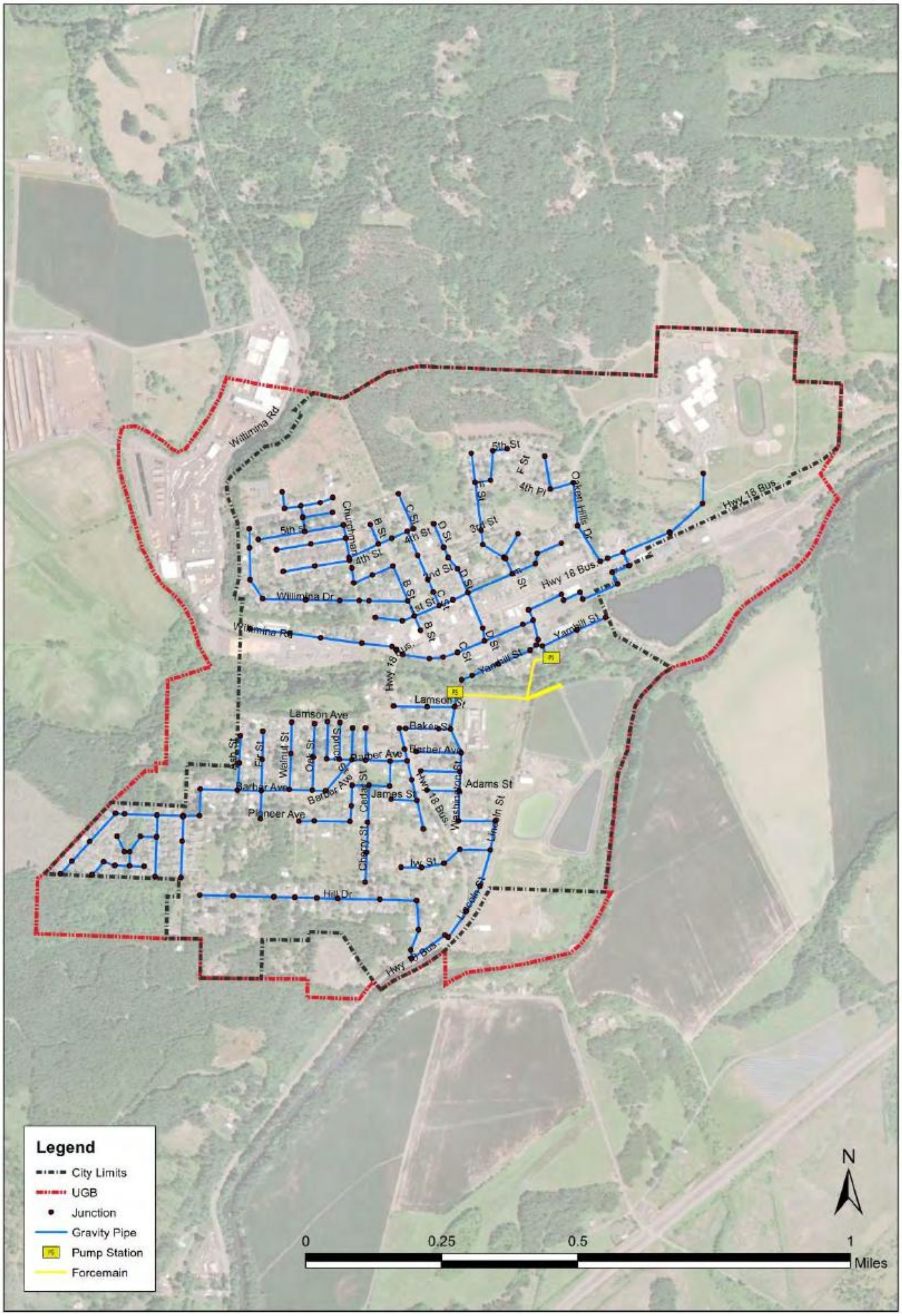


FIGURE 2-2: EXISTING WWTP MAP

2.2. HISTORY

The City of Willamina has been providing wastewater collection for parcels within Willamina city limits since the 1960s. The original collection system consisted of asbestos cement gravity lines (6" to 15" in diameter), an inverted siphon across the Willamina Creek, and the E Street (North) pump station. Flows from the portion of town south of Willamina Creek were conveyed north, across the creek, via the inverted siphon. E Street Pump Station pumped flows back across the creek to the WWTP. In 1979, a bypass pump station was added to supplement the 8" siphon. A wastewater collection system improvements project constructed in the 1990s abandoned the inverted siphon and installed a new pump station in its place at the north end of Southeast Washington Street. The Washington Street Pump Station pumps flow directly to the WWTP. In the early 2000s, an improvement project abandoned the existing E Street Pump Station and built a new pump station on the same site. The E Street Pump Station pumps flow directly to the WWTP. Pipe and manhole inflow and infiltration (I/I) abatement work was also performed as part of the improvements done in the early 2000s. Since the construction of the municipal sewer system, new residential development in the northeast, northwest, and southwest corners of City limits has prompted an expansion of the municipal sewer service area. Much of the newer collection system pipes are polyvinyl chloride (PVC). At the time of this study, it was estimated that 87% of the pipe is the original asbestos cement piping and the remainder is newer PVC piping.

The original WWTP as-built drawings were not available, but by 1995, the WWTP consisted of Lagoons #1, #2, and #3. Improvements in 1998 provided a new headworks structure at the WWTP, modified lagoon inlet piping downstream of the new headworks structure, provided an automatic sampler, added floating outlets to the lagoons to reduce TSS, and added a chemical induction mixer to the existing disinfection system to increase the deactivation of pathogens. Improvements in 2005 replaced the chlorine contact basin, replaced the effluent outfall piping, installed a screw screen at the headworks structure, added high-density polyethylene (HDPE) liners to the lagoons, converted an existing fishing pond to a Lagoon #4, and added a dechlorination system.

The current pump stations have a history of being overburdened during high rain events. This can be seen with a violation letter on December 27, 2023. During this time, a reported rainfall of 2.0 inches within 24 hours caused a spill that was reported to the DEQ (Appendix E)

2.3. CONDITION OF EXISTING FACILITIES

Facility evaluations were completed with City operations personnel in November and December of 2020 to review the conditions of the facilities, maintenance activities, and known operational problems encountered by City staff. Pump drawdown tests were conducted with help from City wastewater operators to observe the pump operation. A follow-up meeting was held in November 2023 to document current conditions.

2.3.1. Pump Stations Overview

E Street and Washington Street Pump Stations are each equipped with duplex submersible pumps. Each pump station alternates pumps between lead/lag/standby (duplex systems) to target equal runtime between pumps. The level control for the E Street pump station is through a Hydroranger ultrasonic level controller with the Washington Pump station being operated by Mercury floats. A backup Hydroranger is available for the Washington Pump station but is not in use. Float switches are used for high-level alarms. The floats are a redundant system to the main level control and provide a reliable system for the high-level alarm. Table 2-1 contains summary information for the two pump stations evaluated. Appendix C includes pump curves for the two pump stations.

TABLE 2-1: PUMP STATION INVENTORY

Item	Washington Street Pump Station	E Street Pump Station
Pump Stations		
Pump Station Type	Duplex wet well	Duplex wet well
Pump Type	Submersible, non-clog, centrifugal	Submersible, non-clog, centrifugal
Capacity (GPM)	770 GPM at 41 ft TDH	700 GPM at 45 ft TDH
Pump (Each)	15 HP	15 HP
Level Control Type	Mercury float switches	Hydroranger ultrasonic level controller with backup mercury float switches
Overflow Elevation	223 feet	220 feet
Overflow Discharge	Willamina Creek	Willamina Creek
Auxiliary Power Type	Permanent generator	Permanent generator
Location	On-Site	On-site
Output (kW)	30 kW	30 kW
Transfer Switch	Automatic (not operational)	Automatic
Alarm Telemetry Type	Autodialer to contact list and pager	Autodialer to contact list and pager
Originally Constructed	1979	1968
Year Upgraded	1999	2005
Wet Well Diameter (Feet)	7	7
Wet Well Depth (Feet)	18.4	22.8
Time to Overflow	61 minutes at ADF	61 minutes at ADF
Force Main		
Length, Type	1,050, 8-inch C900 PVC	800, 8-inch C900 PVC and 8-inch ductile iron
Profile, Continuously Ascending	No	No
Discharge Location	WWTP Inlet Structure	WWTP Inlet Structure
Combination Air Release/Vacuum Valves?	Yes	Yes

During site visits to the pump stations, drawdown pump tests were completed to determine approximate pump flow rates. Each pump was tested individually, and pump combinations (both pumps on) were tested at each pump station. Depths were measured with a laser and noted at equal time intervals to calculate an approximate flow rate. Flow rates from the flow meters, displayed via a screen at the wastewater treatment plant, were also noted during testing for comparison. The estimated calculated flow rates, meter readings, and rated capacities for each pump station are shown in Table 2-2.

TABLE 2-2: MEASURED PUMP FLOW RATES

		Washington Street (South)	E Street (North)
Pump #1 (East)	Field Measure (GPM)	912	480
	Flow Meter Measure (GPM)	391	367
	Pump Rating (GPM)	770	700
Pump #2 (West)	Field Measure (GPM)	720	504
	Flow Meter Measure (GPM)	402	366
	Pump Rating (GPM)	770	700
Both Pumps	Field Measure (GPM)	1128	696
	Flow Meter Measure (GPM)	660	542
	Pump Rating (GPM)	---	---

Record drawings for the Washington Street Pump Station report a design pump capacity of 770 gallons per minute at 41 feet TDH. During field testing, flow meters on the Washington Street Pump Station force main showed an average flow rate of 391 gallons per minute and 402 gallons per minute for pumps #1 and #2, respectively. Lift station pump calculations using time and depth measured in the manhole yielded an average flow rate of 912 gallons per minute and 720 gallons per minute for pumps #1 and #2, respectively.

Record drawings for the E Street Pump Station report a design pump capacity of 700 gallons per minute at 45 feet TDH. During field testing, flow meters on the E Street Pump Station force main showed an average flow rate of 367 gallons per minute and 366 gallons per minute for pumps #1 and #2, respectively. Lift station pump calculations using time and depth measured in the manhole yielded an average flow rate of 480 gallons per minute and 504 gallons per minute for pumps #1 and #2, respectively.

2.3.1. E Street Pump Station (North Pump Station)

E Street Pump Station

The E Street Pump Station is located at the south end of E Street, on the north bank of Willamina Creek. The lift station was originally installed in the 1960s as part of the original collection system. Major improvements were made to the E Street Pump Station in 2005 (Wastewater Improvements, Phase 2). The dry well/wet well configuration was abandoned and replaced with a wet well housing two submersible pumps. Site improvements, accompanying electrical and control upgrades, and a generator housed outdoors in a weatherproof enclosure were installed with the upgrades.

The improved pump station has two constant-speed submersible wastewater pumps in a seven-foot diameter wet well. From each pump, 4-inch ductile iron discharge piping passes through a valve vault with backflow prevention and a pressure gauge. Discharge piping combines into an 8-inch PVC force main that is approximately 800 linear feet. Flow in the force main is measured with a Doppler flow meter before discharging at the wastewater treatment plant headworks. The station's design capacity was 770 gallons per minute. The station has a redundant pump in the event that one pump becomes overrun with excess flow. The pump station operates duplex submersible pumps through an alternating lead/lag configuration to target equal runtime between pumps under normal operation. The wet well overflows to Willamina Creek through an 8-inch PVC pipe.

The concrete wet well appears to be in fair to good condition. When looking into the wet well from the rim, there was no visible evidence of spawling, exposed rebar, or other structural deficiencies in the concrete. There was also minimal buildup of grease and debris in the wet well. City staff indicate that grease and debris buildup is generally not an issue, and regular maintenance prevents significant buildups. A hose bib provides washdown water. Pump station pumps are pulled for maintenance every other year unless problems arise, prompting increased service frequency. Daily run hours are recorded multiple times a week.

Electrical systems and instrumentation were generally in good condition, although the equipment would become obsolete in the 20-year planning period, requiring replacement with new equipment. Standby power is controlled through a permanent diesel generator and automatic transfer switch. The station will alarm to an Autodialer tied to a leased phone line. Two level sensing transducers are in the wet well with a float backup. The transducer is set for the pump settings, while the float is set for the overflow alarm.

Four timber posts with a shingled roof cover a power meter, an automatic transfer switch, and the pump station control panels. Steel framing over the wet wells is used with a portable crane, kept at the City shop, to pull equipment from the wet wells. The pump station site is easily accessible from the street via a well-maintained gravel road. Chain link fencing with barbwire and a gate locked via a padlock secures the site. Video security provides a deterrent to vandalism, improved public safety, and a higher confidence level in the system's reliability. Permanent outdoor lighting is present at the site. The pump station does not have fall protection installed underneath the wet well or valve vault hatches. There are no first aid kits or fire extinguishers; however, operators carry first aid and fire extinguishers in their vehicles.

Deficiencies:

- Nylon netting fall protection on the wet well was removed. A fall protection system is not currently installed.
- The calibration status of the discharge piping pressure gauge is not known.
- The inlet piping, discharge piping, and valve vault appurtenances show signs of corrosion and rust.
- The force main flow meter is inaccurate.
- The field recorded pumping rate is 200 gpm less than the design point.

2.3.2. Washington Street Pump Station (South Pump Station)

The Washington Street Pump Station is located at the north end of Southeast Washington Street, on the south bank of Willamina Creek. The original collection system featured a sewer siphon at this site, which was used to convey flows from the southern portion of town across Willamina Creek and eventually to the E Street Pump Station. In the early 2000s, the Washington Street Pump Station was constructed to eliminate the need for the sewer siphon to the wastewater treatment plant. The current status of the pump station is mostly unchanged from its original construction.

Washington Street Pump Station

The Washington Street Pump Station features two constant-speed submersible wastewater pumps in a seven-foot diameter wet well. From each pump, four-inch ductile iron discharge piping passes through a valve vault with backflow prevention and a pressure gauge. Discharge piping combines into an 8-inch PVC force main that is approximately 1,050 linear feet. Flow in the force main is measured with a Doppler flow meter before discharging at the wastewater treatment plant headworks. The station was designed to handle 770 gallons per minute. The station has a redundant pump in the event that one pump becomes overrun with excess flow. The pump station operates duplex submersible pumps through an alternating lead/lag configuration to target equal runtime between pumps under normal operation. The wet well overflows to Willamina Creek through an 8-inch PVC pipe.

Similar to the North (E Street) Pump Station, the concrete wet well appears to be in fair to good condition and has minimal grease and debris buildup in the wet well. City staff indicate that grease and debris buildup is generally not an issue, and regular maintenance and washdown with the hose bib prevents significant buildups. A similar maintenance schedule of pulling the pumps each year is observed. Daily run hours are recorded multiple times a week.

Again, like the North Pump Station, the electrical systems and instrumentation appear in good condition. Standby power is controlled through a permanent diesel generator and automatic transfer switch. The station alarms to an Autodialer, which is tied to a leased phone line. Two level sensing transducers are in the wet well with a float backup. The transducer is set for the pump settings, while the float is set for the overflow alarm.

The shingled roof over the power meter, automatic transfer switch, and pump station control panels are similar to the North Pump Station. The pump station site is easily accessible from the street via a well-maintained gravel road. Green privacy slats are included in the chain link fencing. The fence also has barbwire, and the gate is secured by a padlock. The pump station is not equipped with an intrusion alarm system or video equipment; however, there is outdoor lighting. The pump station does not have fall protection installed underneath the wet well or valve vault hatches.

Deficiencies:

- Nylon netting fall protection on the wet well was removed and never replaced with adequate fall protection.
- The digital display on the Hydroranger level controller is not operational.
- The calibration status of the discharge piping pressure gauge is not known.
- The force main flow meter is inaccurate.
- The fence and gate do not have any “No Trespassing” or “No Parking” signs.

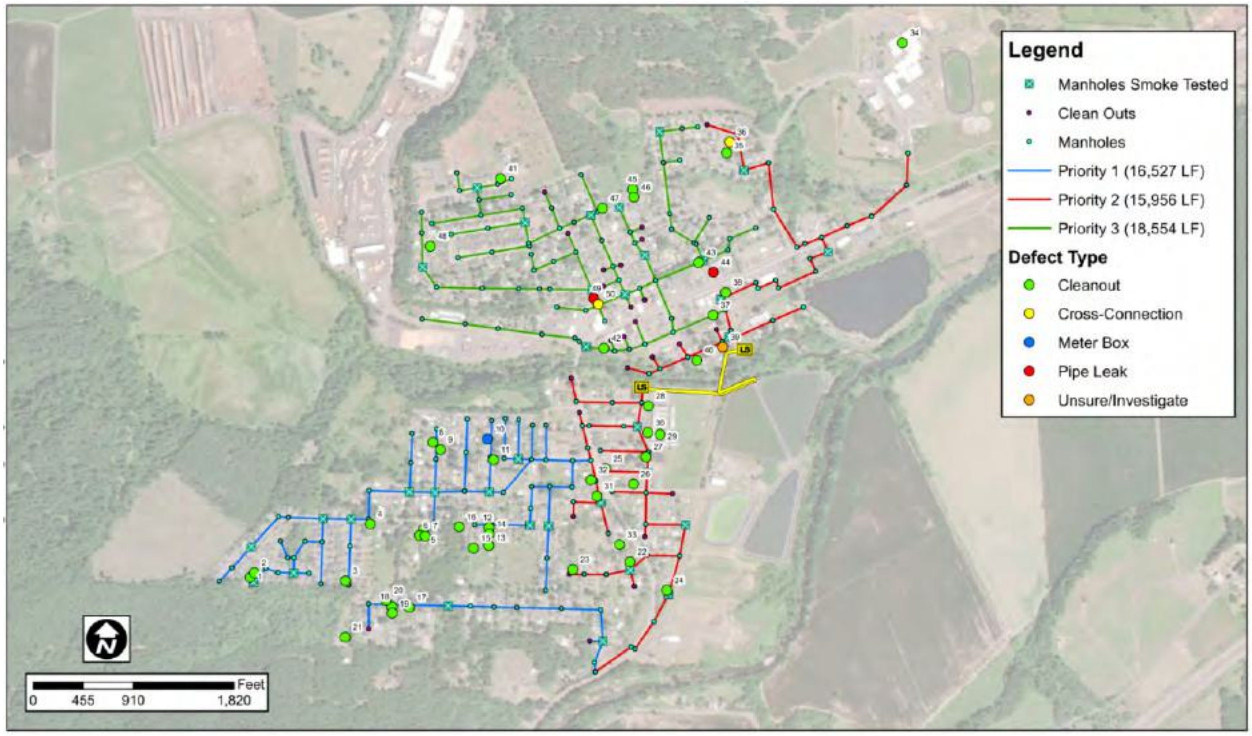
2.3.3. Collection System Piping

Reviewing closed circuit television (CCTV) inspection reports was not included in the scope of work for this facilities planning study. During future CCTV inspections, Keller Associates recommends that the City use the National Association of Sewer Service Companies (NASSCO) pipeline assessment certification program (PACP) to record defects and grade pipe condition during CCTV inspection. This program creates a comparable baseline for the pipelines studied and allows for tracking pipe conditions over time. The program creates specific codes for the various defects found in pipelines. Theoretically, if multiple operators were to inspect the same pipeline, they would generate similar, if not identical, PACP reports. While this may not be exact, it is a method of standardizing CCTV inspections.

2.3.4. Smoke Testing

Keller Associates smoke tested approximately 40,000 linear feet of the sanitary sewer mainlines system on August 12 - 17, 2022 (Figure 2-3). The City of Willamina notified all property owners within the smoke testing area one week before testing. City staff sent out notifications via water bills and posted the message on their website before August 12, 2022. Emergency services and dispatch were notified one week before and again each day with updates on the daily location of smoke testing.

FIGURE 2-3: SMOKE TESTING



Keller Associates provided the smoke testing equipment, which consisted of one Hurco Power Smokers, LiquiSmoke, and road signs. The smoker introduces smoke into the sanitary sewer system through the top of a manhole. Smoke introduced into the sanitary system should only be released from nearby manholes, cleanout pick holes, and building plumbing vents; smoke emitted anywhere else indicates a potential source of I/I.

Throughout the 7.58 miles of pipe smoke tested, 49 problem locations were noted. There were no illegal vents, but two cross-connections with the stormwater system, 44 broken or open cleanouts, two possible leaking laterals, and one new manhole were noted during smoke testing. These sites and concerns are summarized in Table 2-3. Photos and field notes of each problem are also presented in Appendix G. The main issues found and the reason for concern are listed below:

- Broken or open cleanouts (C/O)
  - It can collect localized stormwater, especially if located near a low point. Recommend notifying property owner and sealing C/O.
- Leaking laterals
  - It can allow high infiltration into the sewer system. Recommend notifying the property owner. The City is not responsible for replacement of the sewer laterals. The City could consider working with the property owners to replace the lateral to reduce I/I.
- Cross-connections
  - It consists of direct connections to the sewer system that should be connected to the stormwater system instead, such as roof drains and stormwater catch basins. For cross-connections on private property, we recommend notifying the property owner and having the cross-connection removed. For cross-connections on City property, investigate to confirm cross-connection and remove.

TABLE 2-3: RECORD OF SMOKE TESTING PROBLEM LOCATIONS

Picture ID	MH Tested	Address	Defect Type	Recommended Action	Photo
1	D15	925 SW Pine Street	CO	Cap Cleanout	Y
2	D15	935 SW Pine Street	CO	Cap Cleanout	Y
3	D4	925 Bale Ave	CO	Cap Cleanout	Y
4	D4	975 Pioneer Avenue	CO	Cap Cleanout	Y
5	D4	Field behind 875 Pioneer Avenue	CO	Cap Cleanout	Y
6	D4	Field behind 875 Pioneer Avenue	CO	Cap Cleanout	Y
7	D4	Field behind 875 Pioneer Avenue	CO	Cap Cleanout	Y
8	C-11	393 Fir Street	CO	Cap Cleanout	Y
9	C-11	394 Fir Street	CO	Cap Cleanout	Y
10	C3-3	385 Oak Street	Meter Box	Investigate	Y
11	C3-3	398 Oak Street	CO	Cap Cleanout	Y
12	C3-3	398 Oak Street	CO	Cap Cleanout	Y
13	C5-2	643 Pioneer Avenue	CO	Cap Cleanout	Y
14	C5-2	643 Pioneer Avenue	CO	Cap Cleanout	Y
15	C5-2	635 Pioneer Avenue	CO	Cap Cleanout	Y
16	C5-2	653 Pioneer Avenue	CO	Cap Cleanout	Y
17	C5-2	686 Pioneer Avenue	CO	Cap Cleanout	Y
18	A-30	875 Hill Drive	CO	Cap Cleanout	Y
19	A-30	945 Hill Drive	CO	Cap Cleanout	Y
20	A-30	945 Hill Drive	CO	Cap Cleanout	Y
21	A-30	960 Hill Drive	CO	Cap Cleanout	Y
22	A-30	1075 Hill Drive	CO	Cap Cleanout	Y
23	A12-2	130 Ivy Street	CO	Cap Cleanout	Y
24	A12-2	320 Ivy Street	CO	Cap Cleanout	Y
25	A-17	880 Lincoln Street	CO	Cap Cleanout	Y
26	A-11	452 Main Street (Willamina Automotive)	CO	Cap Cleanout	Y
27	A-11	253 Polk Street	CO	Cap Cleanout	Y
28	A-11	281 Barber Avenue	CO	Cap Cleanout	Y
29	A-9	West Valley Community Campus (266 Washington Street)	CO	Cap Cleanout	Y
30	A-9	West Valley Community Campus (266 Washington Street)	CO	Cap Cleanout	Y
31	A-9	West Valley Community Campus (266 Washington Street)	CO	Cap Cleanout	Y
N/A	A-9	143 Baker Street	CO	Cap Cleanout	N
32	C2-2	575 Main Street	CO	Cap Cleanout	Y
33	C2-2	551 Main Street	CO	Cap Cleanout	Y
34	C2-2	South End of Lincoln Street	CO	Cap Cleanout	Y
N/A	C2-2	216 Main Street	CO	Cap Cleanout	N
35	##	North Entrance of Elementary School	Cross-Connection	Reroute storm drain	Y
36	KA5	780 F Street	CO	Cap Cleanout	Y
37	KA5	820 F Street	CO	Cap Cleanout	Y
38	B1-1	371 Main Street	Unsure/Investigate	Cap Cleanout	Y
N/A	B1-1	391 Main Street (Slow Train Coffee)	CO	Cap Cleanout	N
39	B1-1	421 Main Street	CO	Cap Cleanout	Y
N/A	B1-7	750 5th Street	CO	Cap Cleanout	N
40	A-2	435 Yamhill Street	CO	Cap Cleanout	Y
41	A-2	337 Yamhill Street	CO	Cap Cleanout	Y
42	J5	350 6th Street	CO	Cap Cleanout	Y
43	B2-5	115 Main Street (City of Willamina)	CO	Cap Cleanout	Y
44	B4-1	420 E Street	Pipe Leak	Investigate	Y
45	B4-1	E Street and Valley Highway (Scrub It Up Carwash)	CO	Cap Cleanout	Y
46	B5-4	318 D Street	CO	Cap Cleanout	Y
47	B5-4	318 D Street	CO	Cap Cleanout	Y
48	B8-4	212 4th Street	CO	Cap Cleanout	Y
49	B-10	1st Street and B Street	Pipe Leak	Investigate	Y
50	B-10	1st Street and B Street	Cross-Connection	Reroute storm drain	Y

2.3.5. WWTP Operations

During wet weather (November 1st – April 30th) and dry weather (May 1st - October 31st) seasons the City changes how the WWTP is operated. During wet weather, the WWTP bypasses Lagoon #4 and discharges effluent to the South Yamhill River. During dry weather, the effluent is held within the lagoons. Figure 2-4 and Figure 2-5 show the WWTP process schematics and existing hydraulic profile, respectively.

FIGURE 2-4: WWTP PROCESS SCHEMATICS

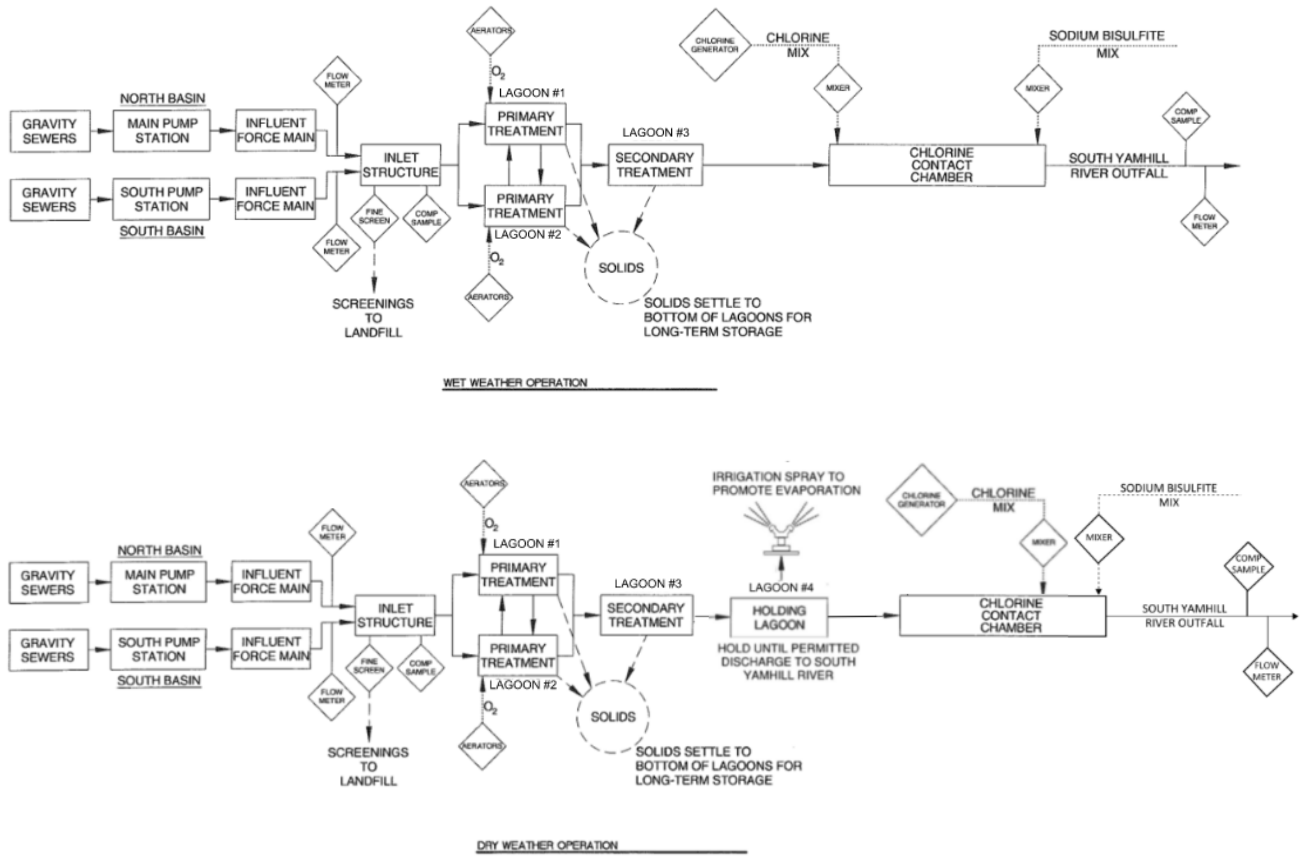
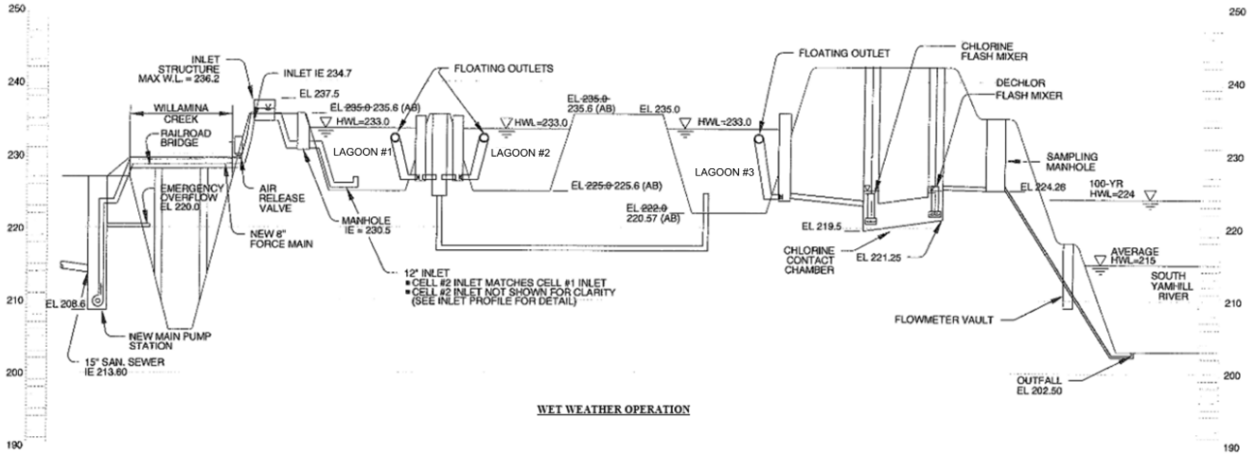
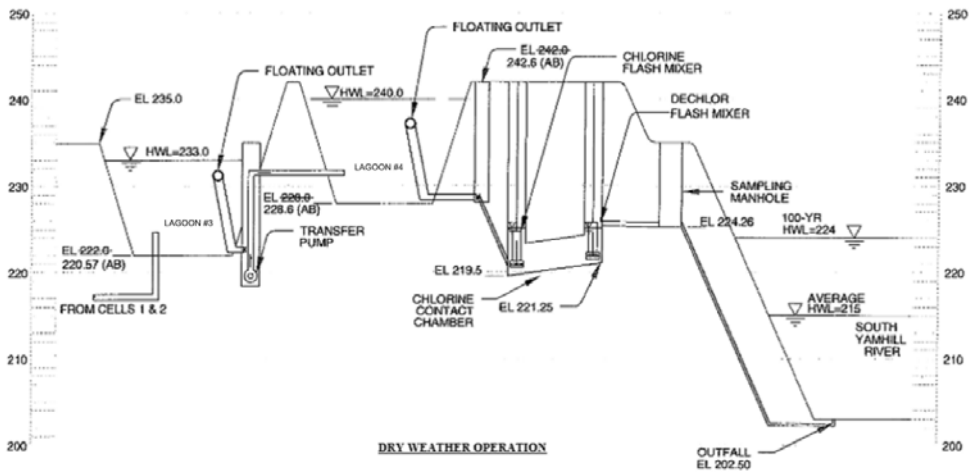


FIGURE 2-5: WWTP EXISTING HYDRAULIC PROFILE





2.3.6. Headworks

Wastewater flows into the WWTP through two 8-inch force mains. The influent is measured with a Doppler flow meter on each forcemain. The flow meters are housed in a vault outside of the WWTP fence. Since their original installation, the meters have not been regularly maintained or calibrated. The flow meter output screens are housed inside the headworks building. A comparison of influent and effluent flows suggests that the influent flow meters underreport the actual influent flows. A SIGMA 900 All Weather refrigerated sampler is inside the headworks building. The sampler pulls samples from the concrete chamber of the influent screen, and it is programmed to collect influent samples every 30 minutes. Samples are collected using a peristaltic pump. The headworks building currently houses electrical panels and the sampler.


Influent Screen

A Vulcan ESS influent screw screen was installed in 2005. The City began experiencing issues with the screen a few years after it was installed, as the screw atop the screen's auger would not stay in place. The Vulcan screen and associated control panel have been out of commission since 2018, and the City currently uses a manually cleaned bar screen rather than the Vulcan screen. The screen was retrofitted by the operator. The screen is approximately 6 feet by 20 feet. The diversion structure following the screen contains two discharge channels to Lagoon #1 and Lagoon #2. The diversion structure is equipped with a level sensor. The channel to Lagoon #2 can be manually isolated via the stop gate. The bypass channel to Lagoon #2 is normally used during high-flow events but is currently more frequently used because the pipe leading to Lagoon #1 is hydraulically limited. The WWTP does not have a grit removal system, which would provide additional protection to the lagoon system. The influent screen is not covered, so freezing can be a problem.

<u>Deficiencies</u>

- There is currently no automatic mechanical screening of influent flows due to the existing screw screen being inoperable. The backup bar screen has to be manually raked.
- The influent flow meters appear to be inaccurate.
- The headworks channel has cracks.

2.3.7. Aerated Lagoons #1 and #2

Lagoons #1 and #2 were originally constructed in 1966 and then deepened and lined with HDPE in 2005. There are several tears in the liner above grade at the anchor trench, and the liner in Lagoon #1 can float when lagoon levels are low. The lagoons are separated by an earthen dyke with a gravel road on top. Lagoon #1 has a surface area of approximately 5.98 acres at the normal operating level. The total volume of Lagoon #1 is 12.5 million gallons (MG) and the usable storage volume is 3.9 (MG). Lagoon #2 has a surface area of approximately 5.91 acres at the normal operating level. The total volume of Lagoon #2 is 12.3 MG and the usable storage volume is 3.9 MG.


Lagoon Aeration Piping

Both lagoons have floating outlets. Two 10-inch HPDE pipes (north side of the lagoons and the south side of the lagoon) are hydraulically connecting the two lagoons. The transfer piping is reportedly undersized, and flows cannot transfer between Lagoons #1 and #2 fast enough during high-flow events. The liner features a rough surface for traction. Paint markings on the lagoon liners measure the water levels in the lagoons.

There are currently two ROOTS Rotary Lobe Blowers, each with a 40-horsepower (HP) Baldor Industrial Motor, mounted in the control building blower room. The blowers were installed in 2019 and replaced the original 19.7-HP blowers. Each blower is equipped with a PROGENTEX silencer. The two blowers operate in a lead/lag configuration. The blowers send compressed air through a filter, silencer, manifold, and then into each lagoon through a 10-inch HDPE pipe. The diffuser pipe is butt-fused welded and attached to fence posts with U-bolts. The header pipe is routed around the exterior of Lagoons #1 and #2. Each pipe contains 1-inch weighted tubes with air release openings spaced 1½-inch apart. There are PVC ball valves at the connection to the header pipe. Lagoon #1 contains 50 lines of aeration tube (12,500 feet), and Lagoon #2 contains 16 lines (5,250 feet).

The exposed HDPE aeration lines around Lagoons #1 and #2 are leaking and beyond their useful life. Expansion and contraction from sun exposure have caused the lines to weave up/down and left/right of the stakes holding it up, which created low points where moisture can gather within the piping. The underground header from the blower building and above-ground fittings are cracked and damaged. There have been some repairs to the aeration lines above grade, but not in the lagoons. The only maintenance to the aeration lines in the lagoons that have been completed is flushing the lines with hydrochloric acid to clean the diffusers.

ROOTS rotary lobe blowers with an ADS fine bubble aeration system of flexible diffusion pipes provide oxygen for the aerated lagoons. The blowers do not have variable frequency drives (VFD) and cannot be turned down for process control.

Deficiencies

- The liners have tears and can float in Lagoon #1 when the lagoon level gets too low.
- The air lines are cracking and leaking so the diffusers are not currently adding air to the lagoons.
- The aeration system is beyond its useful life.

2.3.8. Lagoons #3 and #4

There are two (2) polishing/storage lagoons, Lagoons #3 and #4. These lagoons are directly south of Lagoons #1 and #2. Lagoon #3 was originally constructed in 1966, then reshaped and deepened in 2005. Lagoon #4 was built in 2005. Both lagoons, similar to Lagoons #1 and #2, have a 3:1 side slope and are lined with an HDPE liner. The lagoons are separated by an earthen dyke and have a sediment control fence along the perimeter. Lagoon #3 has a surface area of approximately 5.49 acres at the normal operating level. The total volume of Lagoon #3 is 15.6 million gallons (MG) and the usable storage volume is 13.2 (MG). Lagoon #4 has a surface area of approximately 3.58 acres at the normal operating level. The total volume and usable storage volume of Lagoon #4 is 11.8 MG.


Lagoon #3


Lagoon #4

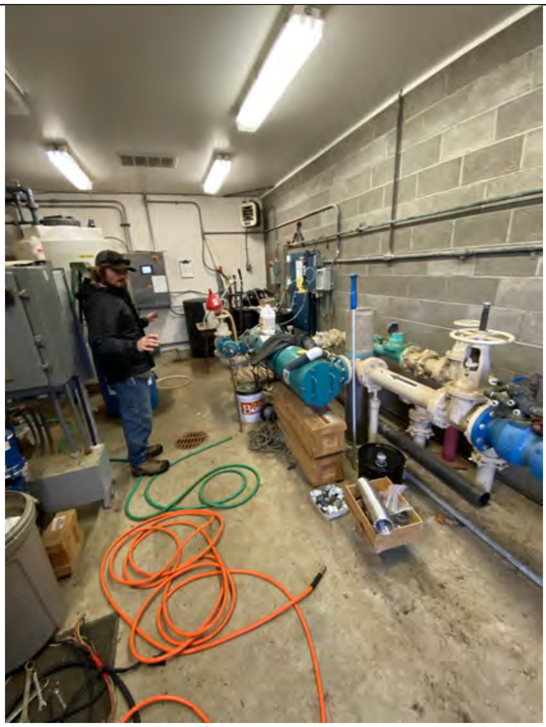
Flow is transferred between the two lagoons via the transfer pump station, where the 12.5 hp submersible transfer pump hydraulically connects the lagoons. The pump is controlled by level floats inside the wet well with above-grade external valves encased in a fiberglass enclosure. Both lagoons have floating outlets to control the water level. The floating outlets for Lagoon #3 and Lagoon #4 are located at the normal high water elevation of 2,320 ft. Paint markings on the lagoon liners measure the water levels in the lagoons. It is reported that a portion of the liner in Lagoon #3 floats when the water level is below 7 ft. Two pump spray guns are used between Lagoons #3 and #4 to aid in evaporation during the dry weather period. The spray irrigation guns are Nelson SR75 Big Gun. The rated capacity of the spray guns is 30-100 gpm each. The guns are only utilized during summer months during the non-discharge period. The guns are currently not rotating as they should. The 10 HP vertical turbine pumps have a capacity of 220 gpm and are controlled by a timer. The pumps send effluent through a 3-inch common header to the spray guns. The 2005 improvements project included the design of an effluent reuse (irrigation) area of approximately 4.1 acres which was not constructed.

<u>Deficiencies</u>

- Lagoon #3 liner floats when the water is too low.
- There is no pump redundancy for the transfer pump station
- The spray guns are not currently able to rotate as they should.

2.3.9. Chlorination and Dechlorination Systems

The chlorine contact basin and onsite sodium hypochlorite generation system were constructed in 2005, which means the onsite sodium hypochlorite generation system is nearing the end of its useful life. The basin consists of 350 feet of 48-inch HDPE pipe between Lagoons #3 and #4. Both Lagoons #3 and #4 have a discharge valve vault, allowing effluent from either lagoon into the basin. The 1.7% sodium hypochlorite solution is generated on-site using a ClorTec system inside the control building. The solution is introduced into the effluent via a 1½ HP high-speed induction mixer connected to a sodium hypochlorite chemical feed line from the control building. The original metering pump has been replaced with a FLEXFLO Blue White peristaltic metering pump. The sodium hypochlorite tank has been replaced once, and the system has recently experienced electrical issues. There is a backup drum containing a 12.5% sodium hypochlorite solution used as needed for backup chlorination or to super chlorinate.


Control Building

Dechlorination is achieved via a 1½ HP CHLOR-A-VAC chemical induction mixer connected to a sodium bisulfite chemical feed line from the control building. The City samples at the beginning and end of the basin to measure chlorine residual and actual dosing. Effluent is discharged through a 10-inch outlet to a sampling manhole.

Deficiencies

- The sodium hypochlorite system needs a new PLC and is near the end of its useful life.
- The chlorine contact basin is undersized.

2.3.10. Yamhill River Outfall

The outfall was reconstructed in approximately 2005. Before the outfall, a 10-inch pipe is routed from a sampling manhole following disinfection to an effluent flow meter vault. The vault consists of a 10-inch submersible McCrometer UltraMag flow meter with a remote reader. The operators altered the submergence of the effluent flow meter and reconfigured it to a gooseneck to reduce fluctuations in the meter readings. The effluent flow meter outlet is an anchored 10-inch HDPE pipe traversing approximately 65 feet down the river embankment to an 8-inch single port diffuser. The City noted that if the flowmeter needed to be removed to be recalibrated, they would have difficulty getting it off and back on.


WWTP Outfall

Deficiencies

- The effluent flow meter needs to be replaced due to calibration issues.

2.3.11. Solids Handling

Solids settle to the bottom of lagoons for long-term storage. The solids have not been removed since the improvements were completed in 2005. The sludge levels have not been measured since being lined; however, the operator has not reported issues with solids built up inside the lagoons.

2.3.12. SCADA

The SCADA system is minimal and provides little control and opportunity for data collection. The current SCADA system allows for monitoring of the hypochlorite tank levels only. The operators receive auto-dialer alerts if an alarm is triggered. However, operators must go to the site physically and inspect equipment to identify the specific alarm and problem.

2.3.13. Emergency Power

The WWTP does not have emergency power provisions to maintain operations for the headworks and blower building in the event of a power outage.

2.4. FINANCIAL STATUS OF ANY EXISTING FACILITIES

The financial information for the City of Willamina sewer utility is located in Appendix J. Sewer revenue during the 2022-2023 fiscal year was $791,500.00. The annual costs to operate and maintain the wastewater system, separated by type of expense, are also shown in Appendix J. In the 2022-2023 fiscal year, the total spent from the sewer fund was $557,358 (excluding transfers). Table 2-4 below shows the 2023 fiscal year adopted sewer budget.

TABLE 2-4: 2023 FISCAL YEAR ADOPTED SEWER BUDGET

Recource	Fiscal Year 2023 Adopted
Wastewater	
Recource	$2,618,819.00
Fund Balance	$1,812,319.00
Revenue	$791,500.00
Transfer In	$15,000.00
Requirement	$2,618,819.00
Wastewater Operation	$557,358.00
Capital Outlay	$85,000.00
Debt Service	$175,000.00
Transfer Out	$115,371.00
Contingency	$1,686,090.00
Wastewater SDC	
Resource	$91,140.00
Fund Balance	$56,140.00
Revenue	$35,000.00
Requirement	$91,140.00
Capital Outlay	$0.00
Transfer Out	$15,000.00
Contigency	$76,140.00

Current sanitary sewer rate schedules are in the City of Willamina Master Fee Schedule (2022). Sanitary rates are summarized in Table 2-5.

TABLE 2-5: SEWER RATE SUMMARY

Description	Base Amount	15% Surcharge
Single Family (S1)	$70.46	$10.57
Car Wash – Sewer (SCW)	$134.10	$20.12
Grocery Store (SF)	$170.80	$25.62
Vacation Rate (SH)	$22.11	$3.32
Laundry Sewer (SL)	$351.84	$52.78
Willamina Lumber (SLW)	$851.43	$127.72
House/Cabins (SPS)	$202.92	$30.44
Café/Restaurant (ST1)	$168.85	$25.33
Café/Restaurant (ST3)	$225.20	$33.78
Café/Restaurant (ST4)	$107.00	$16.05
Willamina Lumber New	$3,644.11	$546.62

Sewer System Development Charges (SDCs) are on the City of Willamina Master Fee Schedule. SDCs are summarized in Table 2-6.

TABLE 2-6: SEWER SDC AND CONNECTION FEES

Meter Size	Total SDC Charge
0.625” x 0.75” – Displacement Multi-Jet	$5,128
0.75” x 0.75” – Displacement Multi-Jet	$5,128
1.00 inch – Displacement Multi-Jet	$8,547
1.50 inch – Displacement Class I Turbine	$17,093
2.00 inch – Displacement or Class I & II Turbine	$27,349
3.00 inch – Displacement	$51,280
4.00 inch – Displacement or Compound	$85,467
6.00 inch – Displacement or Compound	$170,933
8.00 inch – Compound	$273.493

The City of Willamina’s Land Use Area Density (Table 2-7) can be found in the City of Willamina’s Development Code Section 2.103.4 below.

TABLE 2-7: LAND USE AREA DENSITY

Land Use Designation	Land Use Area	Design Density
R-1	Single Family	4-6 Dwellings / Acre
R-2	1-3 Family	5-7 Dwellings / Acre
R-3	Subdivisions and Manufactored Home parks	6-8 Dwellings / Acre
R-3	Multi-Family	8-14 Dwellings / Acre

Table 2-7 was used to determine the area required for expansion for the 20-year projected planning. This information was then used to allocate loads to predict future expansion and growth of sewer trunks and mains.

TABLE 2-8: EQUIVALENT DWELLING UNIT SUMMARY TABLE

Type of User	Number of Users Before and After		Total Usage (Gal. / yr)	Usage Per User (Gal. / yr)
Residential	735	1,003	5,652,000	8,000
Commercial	27	29	457,000	17,000
Industial	3	3	213,000	71,000
Community Services	9	9	49,000	5,000
Church / School	15	15	182,000	12,000
Willamina Lumber Mill	1	1	2,382,000	2,382,000
Totals	790	1,060	8,935,000	

Table 2-8 was determined using the current Water Usage Data from the City. There is no current data on the connection from the residence and buildings to the sewer line.

2.5. WATER/ENERGY/WASTE AUDITS

No water, energy, or waste audits have been created at this time.

CHAPTER 3 - NEED FOR PROJECT

3.1. HEALTH, SANITATION, ENVIRONMENTAL REGULATIONS AND SECURITY

The Clean Water Act of 1972 provides the primary regulations for waters of the United States. It requires that point source contributions to surface waters obtain a discharge permit (currently, permits are issued from Oregon DEQ as National Pollutant Discharge Elimination System (NPDES) permits). These permits outline the conditions for discharging into surface waters. Willamina's WWTP has followed the NPDES effluent limits, with a few exceptions, since at least 2015, according to the records provided. The City has not reported any lasting compliance issues.

Other public health, sanitation, and security issues involve when untreated or undertreated effluent overflows onto the ground or is discharged to surface waters. There have not been any recent overflows at the Willamina WWTP.

The wastewater treatment plant property is secured with a chain link fence with locked gates. The power gate on the front-facing side of the treatment plant property is controlled by a keypad and is remotely controlled. The east side of the treatment plant property has a gate with a padlock. The office has a locked door and an intrusion alarm. All the lift stations are secured with chain link fence.

The current lift station and pumps are under capacity, and this is shown as the wastewater operator has to take additional pumps to the lift stations to avoid overflows during high rain events. However, overflows have occurred, as shown in Table 3-1.

TABLE 3-1: SANITARY SEWER VIOLATIONS

Violation Date	Gallons Discharged	Rainfall 24 Hours Proir (in)	Reason	Location
1/19/2012	500	2.24	Excess Rainfall Event	Washington Pump Station
1/27/2012	5,500	N/A	Excess Rainfall Event	E Street Pump Station
2/5/2017	Unknown	1.64	Excess Rainfall Event	Washington Pump Station
1/14/2021	242,627	1.88	Excess Rainfall Event	E Street Pump Station
11/12/2021	216,000	2.76	Excess Rainfall Event	E Street Pump Station
1/5/2022	73,800	2.37	Excess Rainfall Event	E Street Pump Station
12/27/2022	168,800	0.35	Mechanical Failure	E Street Pump Station
12/29/2022	62,856	2.55	Excess Rainfall Event	E Street Pump Station
12/13/2023	257,606	2	Excess Rainfall Event	E Street Pump Station

3.1.1. Current Regulatory Requirements

The City of Willamina discharges treated effluent under NPDES Permit No. 101070 to the South Yamhill River at River Mile 41.9 (Outfall 001). The permit allows discharges from November 1st to April 30th. The NPDES permit the City is currently operating under had an expiration date of November 30, 2015, but it has been administratively extended. The permit and permit fact sheet are included in Appendix B. Table 3-2 summarizes the existing effluent limits.

TABLE 3-2: EXISTING NPDES PERMIT LIMITS

Parameter	Unit	Effluent Requirements				
		Monthly Average Limit	Monthly Geometric Mean Limit	Weekly Average Limit	Daily Maximum Limit	Instantaneous Maximum Limit
Outfall 001 (South Yamhill River)						
May 1 - October 31	No discharge to waters of the State					
November 1 - April 30						
BOD_5	mg/L	30	--	45	--	--
	ppd	120	--	180	240	--
	% removal	85%	--	--	--	--
TSS	mg/L	30	--	45	--	--
	ppd	120	--	180	240	--
	% removal	65%	--	--	--	--
E. coli	#/100 mL	--	126	--	--	406
pH	Standard Units	Range of 6.0 - 9.0				
Total Residual Chlorine	mg/L	0.08	--	--	0.21	--

3.1.2. Known Future Regulatory Requirements

No new future regulatory requirements (excluding those currently on the Willamina permit) are known.

3.1.3. Potential Future Regulatory Requirements

Keller Associates communicated with the DEQ regarding future permit conditions. DEQ is currently planning to issue a renewed permit to the City in 2025. DEQ will verify the outfall location during mixing zone review and dilution determination.

The South Yamhill River is in the Willamette Basin and Yamhill Subbasin (Hydraulic Unit Code (HUC) 17090008). There are two monitoring stations: 50 feet upstream of the outfall and 100 feet downstream of the outfall. The assessment unit (AU) on the South Yamhill River from Agency Creek to Willamina Creek, and the watershed where the outfall is located is listed below:

- South Yamhil River: OR_SR_1709000802_02_104603
- Gold Creek-South Yamhill River: OR_WS_170900080205_02_104430

TMDL stands for Total Maximum Daily Load (TMDL), and it is a water quality improvement plan for water bodies that do not meet water quality standards. Section 303(D) of the Clean Water Act requires states and tribal entities to establish beneficial uses for the bodies of water within their respective jurisdictions and develop improvement plans referred to as TMDLs in the event of an observed impairment. The TMDL establishes a total pollutant load that a given waterway can accept without exceeding applicable water quality standards and impairing its identified beneficial use.

According to the 2022 Integrated Report Assessment, the South Yamhill River AU has several impaired beneficial uses, including fish and aquatic life, fishing, and water contact recreation. The South Yamhill River AU is listed as Category 5 impaired (303(D) listed) for E. coli, fecal coliform, and temperature. A TMDL was created in 1991 for phosphorous in the Yamhill and South Yamhill Rivers, and 2006 for the Willamette Basin for bacteria, mercury, and temperature. However, no waste load allocations (WLA) were noted for Willamina in the TMDL. The current permit was written after the implementation of the TMDLs and did not include special requirements based on the TMDLs. The Willamette Basin Mercury TMDL was revised in 2019 and is discussed in more detail in this section.

The DEQ Water Quality Permitting Program Monitoring Matrix was evaluated for determining additional pollutants or modifications in monitoring frequencies for the future permit. It is not anticipated that frequencies for monitoring existing permit parameters will be changed. However, it is possible that water quality regulations could become more stringent during the planning period. The following are a few items that might be included in future permits.

- Five-Day Biochemical Oxygen Demand (BOD_5) and Total Suspended Solids (TSS)

Permit limits for BOD_5 and TSS will be calculated based on average dry weather design flow and maximum monthly wet weather design flow. Changes to these design flows as a result of plant improvements could result in permit limits becoming more difficult to achieve. A potential change could be if the plant increased its average dry weather flow and the City requested a mass load limit increase for either of these parameters. The DEQ would then expect the City to conduct an antidegradation study. It may be challenging to receive a mass load increase due to downstream limitations.

- Ammonia

Ammonia is sometimes found in wastewater treatment plant effluent at levels that exceed the state of Oregon water quality standards for toxicity. Currently, ammonia is not regulated at the WWTP. DEQ will conduct a reasonable potential analysis (RPA) during the permit renewal process. However, since the City's effluent ammonia samples have been non-detect for the past five years (2018-2023), the RPA will likely show that an effluent ammonia limit is unnecessary.

- Phosphorous

The Yamhill River is listed as Category 4a impaired for phosphorous. There is already an EPA-approved TMDL plan in place and implemented. The TMDL determined no wastewater may be discharged to the Yamhill River or its tributaries, without special authorization, that causes the monthly median concentration of total phosphorus to exceed 70 µg/L during the low flow period of May 1 through October 31. Therefore, phosphorous is not regulated at the WWTP because discharge only occurs from November 1 through April 30.

- Chlorine

Chlorine toxicity is highly dependent on dilution. When the City starts the permit renewal, the DEQ will re-evaluate the dilutions. The City will continue using the current chlorine limit and the South Yamhill Flows for the analysis to see if the current permit limit is protective enough.

- Temperature

A temperature RPA will be completed during the permit renewal. There may be a temperature limit based on any applicable migration or spawning criteria. The fish use maps show Salmon and Trout Rearing and Migration as well as Salmon and Steelhead Spawning from September 1 through May 15. The spawning criteria is 13ºC; however, the maximum effluent temperature has historically been less than 16ºC; therefore, the RPA may determine that a temperature limit is not needed. Additionally, since no large industries are discharging to the treatment plant, it is not likely that a thermal plume limit will be needed.

- Other Toxic Pollutants

Discharges must be evaluated for toxic pollutants of concern (POCs) that might cause an exceedance of the water quality standard in the receiving water body. The current water quality criteria for aquatic toxicity are listed in OAR 340-41 pollutant Tables 20, 33A, and 33B, and for human health water quality criteria in OAR 340-41 pollutant Table 40.

Mercury is a contaminant of concern throughout the Willamette Basin. The DEQ Final Revised Willamette Basin Mercury Total Maximum Daily Load (TMDL) and Water Quality Management Plan (WQMP) was published in November 2019. This plan outlines needed mercury reductions from nonpoint and point sources throughout the Willamette Basin and the DEQ's plan for implementation. It is understood from discussions with DEQ that minor WWTPs (<1 MGD average flows), such as Willamina, are not likely to receive a WLA in the TMDL. Similarly, DEQ noted that since the City is a minor discharger, it is not likely that copper or other toxic pollutants will be included in a permit soon.

➢ PFAS and Personal Care Products

Within the general wastewater industry, a class of 'emerging contaminants' has been discussed increasingly as regulators' attention has turned from nutrient pollutants to other constituents. The DEQ noted that they would follow EPA's lead for per and poly-fluoroalkyl substances (PFAS), and they do not expect to see that included soon, other than in pretreatment requirements for affected industries.

There are currently thousands of known PFAS chemicals used in everyday products, such as non-stick cookware and waterproof clothing. These substances have become prevalent as emerging contaminants due to their ability to bioaccumulate and persist in the environment. The EPA specifically calls out point source dischargers and municipally generated biosolids as sources of PFAS contamination; however, the principal parties responsible for these compounds are those industries involved in their manufacture and use. The EPA has identified a strategic roadmap that will lead to future regulatory guidance regarding PFAS within the next several years. The most significant impact on municipal wastewater treatment plants will likely be biosolids handling.

Personal care products are becoming more common in surface waters because of societal changes and advancements in medical technologies. As the relative concentration of these compounds increases, there is concern regarding the impacts these products may have on aquatic life and communities located downstream of where they are introduced. Municipal wastewater discharge is a known mechanism by which these personal care product chemicals are introduced into the environment. Many of the chemicals that persist after wastewater treatment are included in a class of compounds referred to as endocrine disruptors (EDCs). EDCs are compounds that alter the normal function of organisms' endocrine (hormonal) system and can result in various adverse health impacts. Because of the nature of these compounds, negative health impacts are chronic rather than acute, and traditional toxicity tests do not adequately predict nor detect their effects. The EPA is working to update current ambient water quality protections to better accommodate these emerging pollutants. No imminent regulations regarding personal care products are anticipated.

➢ Biosolids

The City does not have a Biosolids Management Plan or Land Application Plan. If the City wants to land apply biosolids at any point in the future, DEQ will require the City to produce a Biosolids Management Plan and Land Application Plan that DEQ approves, obtain written site authorization from each land application site before land application, and apply the biosolids that meet the pathogen and vector attraction reduction standards under 40 CFR 503.

It is worth noting that future EPA guidance on PFAS compounds could have implications for the handling and disposing biosolids. No known modifications due to PFAS are known at this time, but will be based on EPA guidance scheduled to be released after 2024.

➢ Mixing Zone

Due to the lack of ambient water quality data available on the South Yamhill River for the dissolved oxygen, ammonia, temperature, total Kjeldahl nitrogen (TKN), pH, and alkalinity, DEQ will issue to the City a request for additional sampling in a few months. The comments provided by DEQ indicate that they would request the city sample the South Yamhill River upstream of the City's outfall. DEQ may also request specifications on the outfall.

The current permit provides for a mixing zone consisting of the portion of the South Yamhill River contained within a band extending twenty-five feet from the Northwest Bank of the river and extending from a point ten feet upstream of the outfall to a point one hundred feet downstream from the outfall. The Zone of Immediate Dilution (ZID) is defined as that portion of the regulatory mixing zone within ten feet of the discharge point. A mixing zone study was completed in 2010 and can be found in Appendix B. The DEQ noted that they will evaluate the existing mixing and dilution of the discharge at permit renewal. DEQ may request mixing zone information up to and including a a new mixing zone study prior to renewal but likely during the next permit cycle if needed.

3.2. AGING INFRASTRUCTURE

3.2.1. Treatment Performance

This section evaluates the effluent quality from the existing plant relative to current effluent limits for BOD_5, TSS, E. coli bacteria, pH, and total residual chlorine. The current permit limits are shown in red.

- BOD_5

Monthly and weekly average effluent BOD_5 concentrations from October 2019 to April 2023 are shown in Figure 3-1, along with the corresponding discharge limits. Figure 3-2 shows the effluent BOD_5 loading (samples are taken weekly, so the daily maximum and weekly average are the same). The percent removal is shown in Figure 3-3. The effluent BOD_5 concentrations and loadings complied with the permit during this period, except for December 2019, when the weekly loading was slightly greater than the permit limit. Similarly, the 85% BOD_5 removal requirement was consistently met except for January 2020. During this month, the influent BOD_5 was extremely dilute, so even though the effluent BOD_5 concentration was typical, the plant could not achieve the percent removal. Recent data also showed the BOD_5 removal requirement was not met in January 2024 (77%).

FIGURE 3-1: EFFLUENT BOD_5 CONCENTRATION

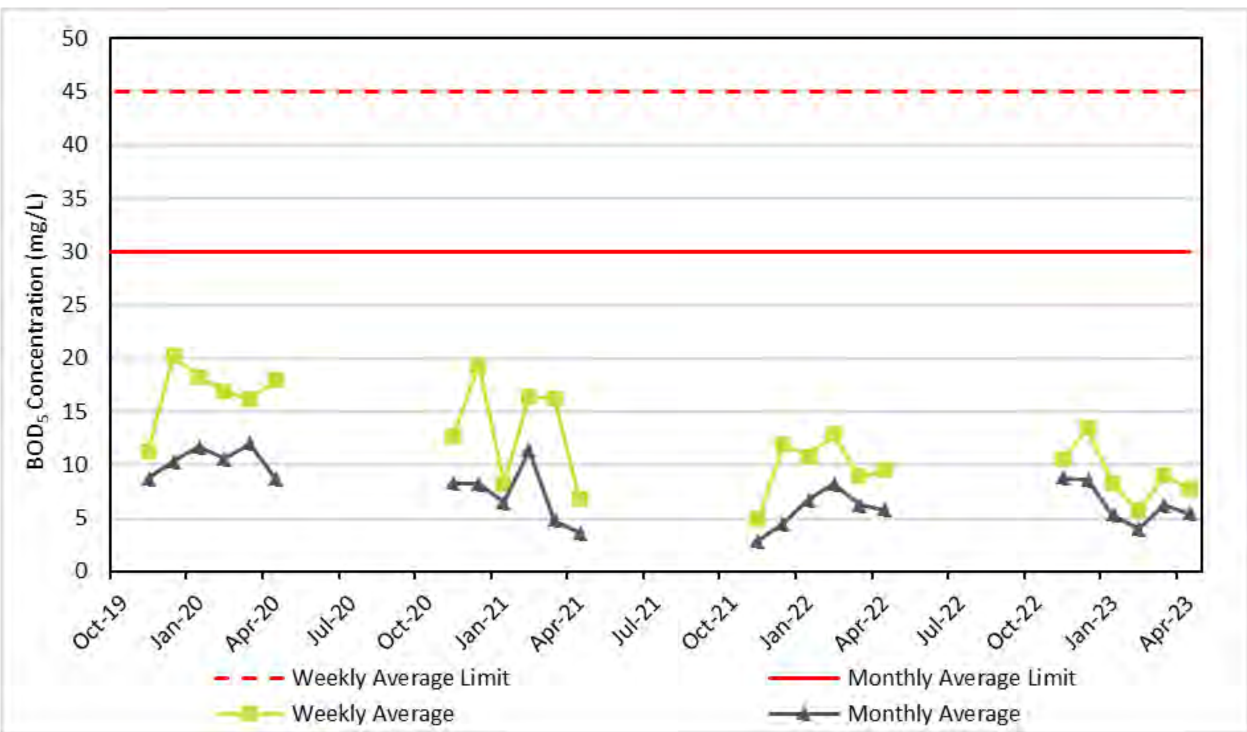


FIGURE 3-2: EFFLUENT BOD_5 LOADING

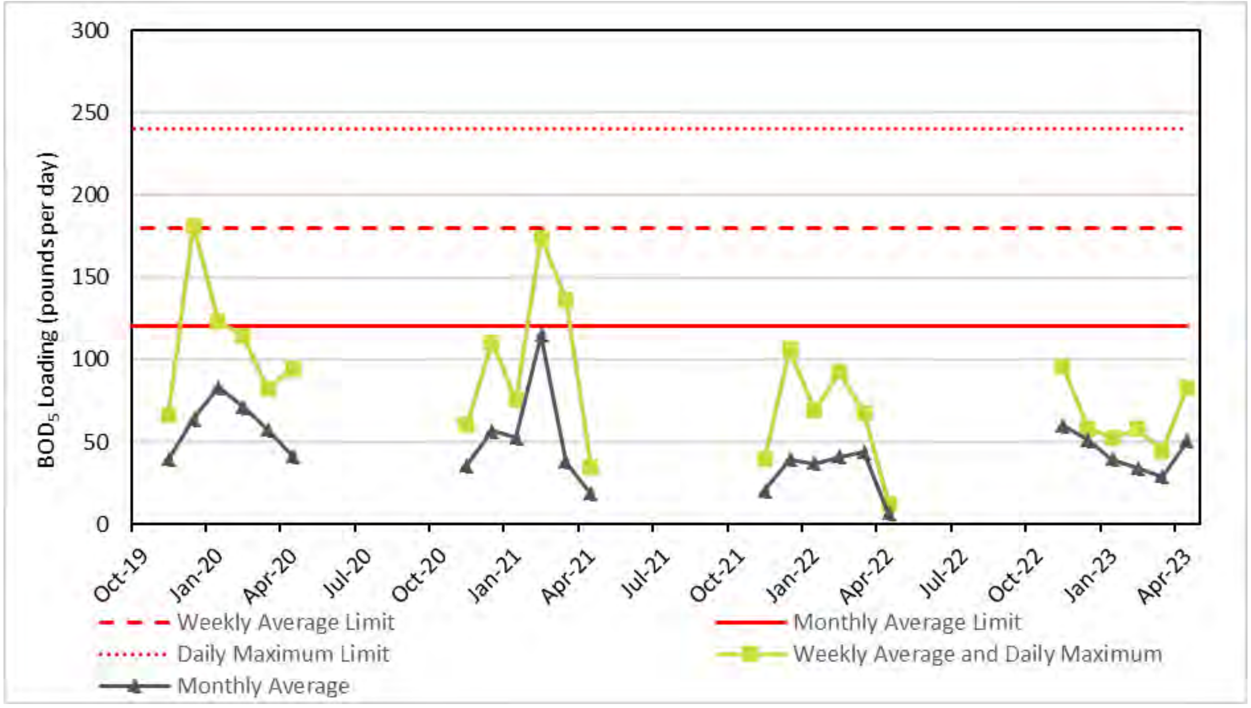
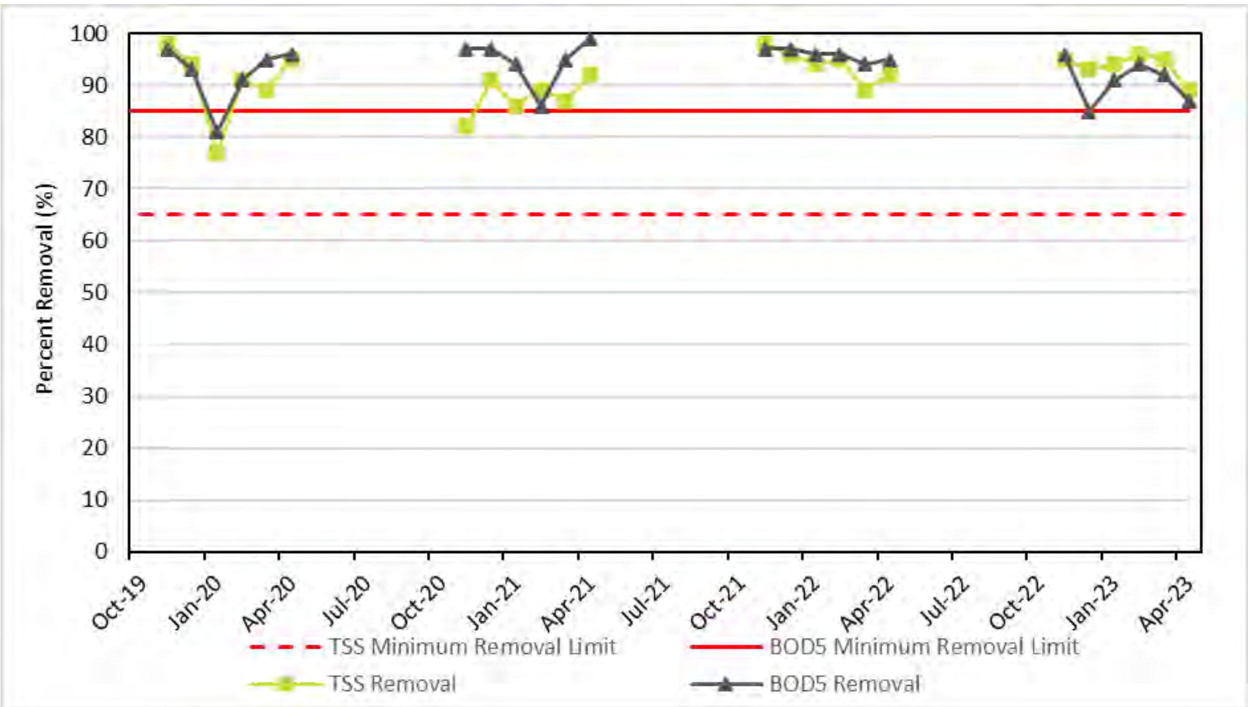


FIGURE 3-3: EFFLUENT BOD_5 AND TSS PERCENT REMOVAL



- TSS

Monthly and weekly effluent TSS concentrations from October 2019 to April 2023 are shown in Figure 3-4, and the effluent TSS loadings are shown in Figure 3-5. Like BOD_5, the TSS samples are taken weekly, so the daily maximum and weekly average are the same. The TSS percent removals are shown in Figure 3-3. The figures show that the effluent TSS results complied with the permit limits during this period.

FIGURE 3-4: EFFLUENT TSS CONCENTRATION

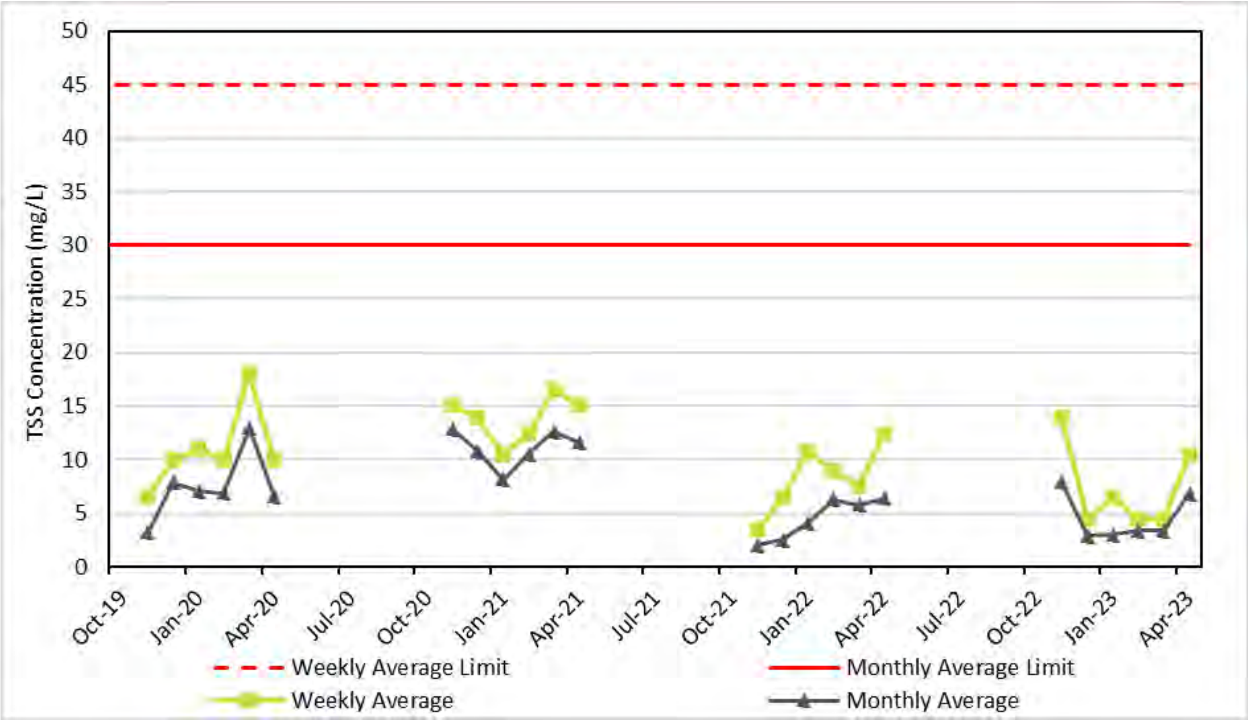
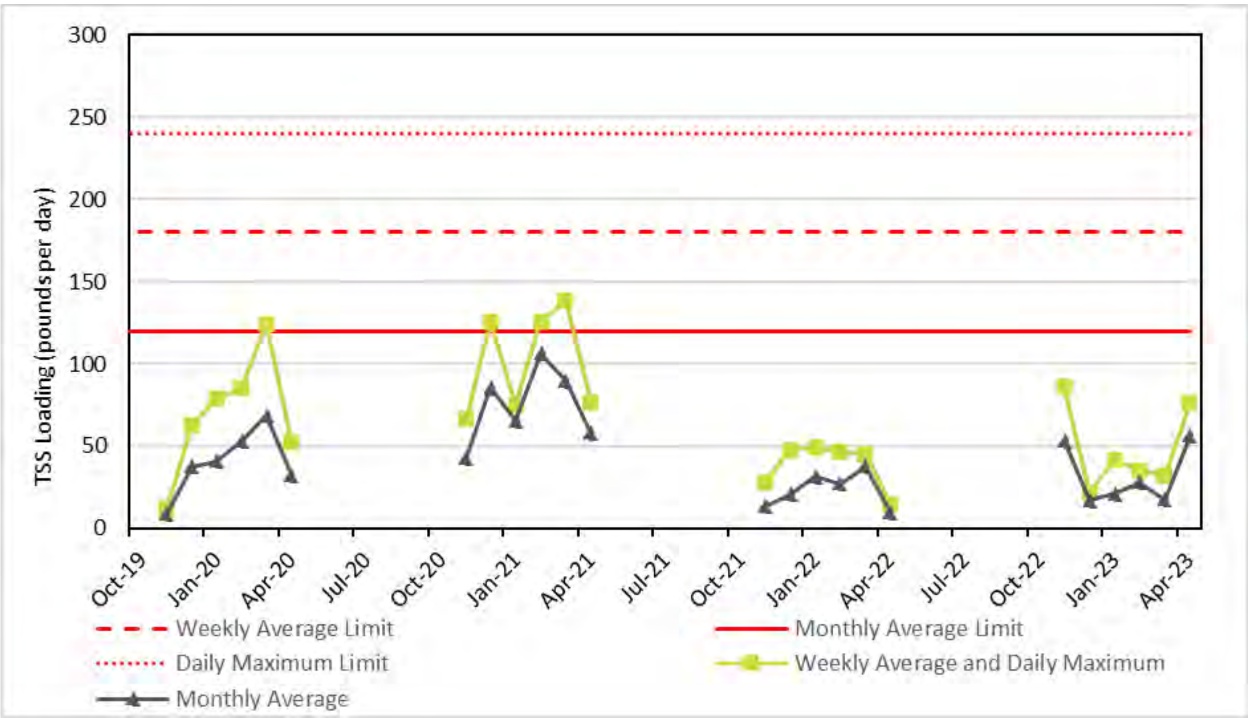


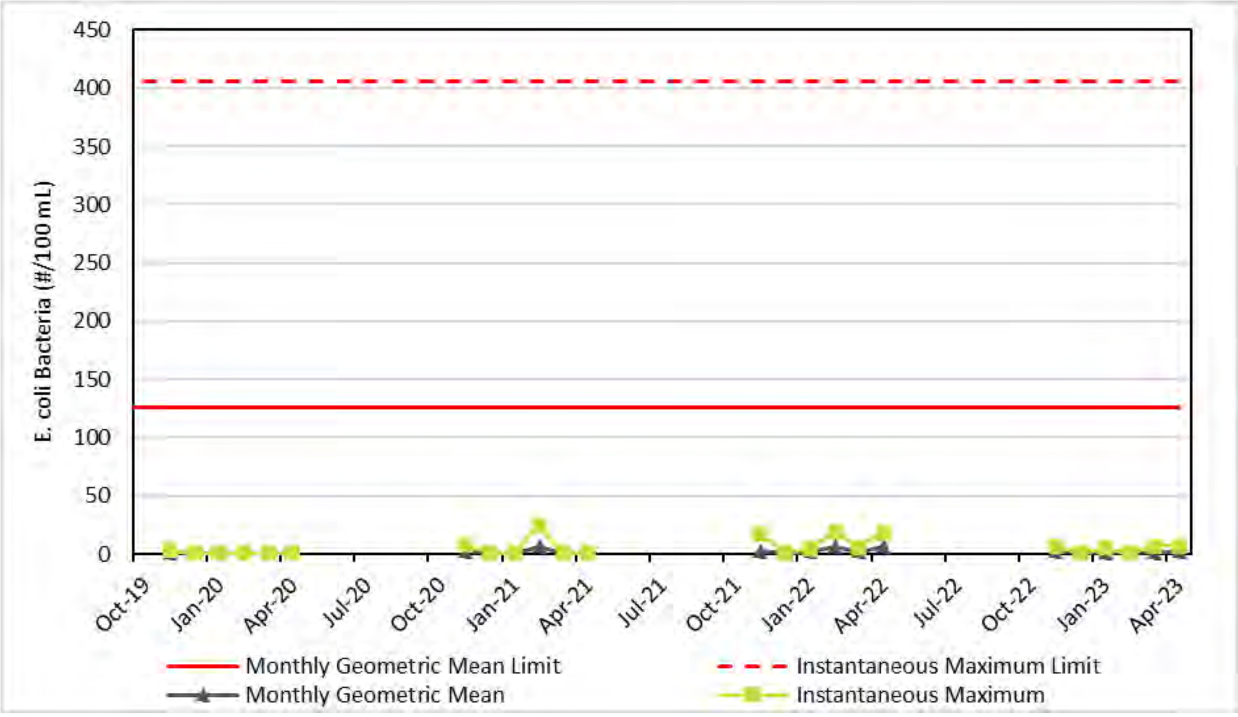
FIGURE 3-5: EFFLUENT TSS LOADING



- E. coli Bacteria

E. coli bacteria data is shown in Figure 3-6. No violations were noted during this period.

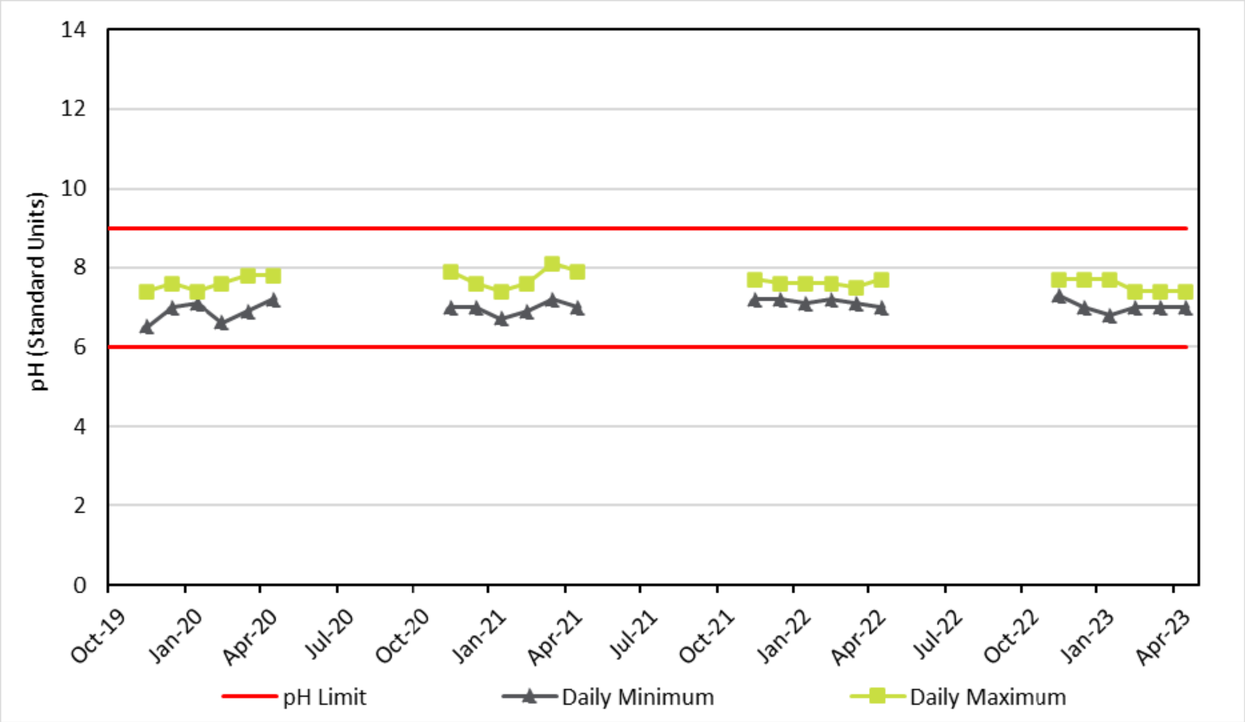
FIGURE 3-6: EFFLUENT E. COLI BACTERIA



- pH

The daily maximum and minimum pH are shown in Figure 3-7. No violations were noted.

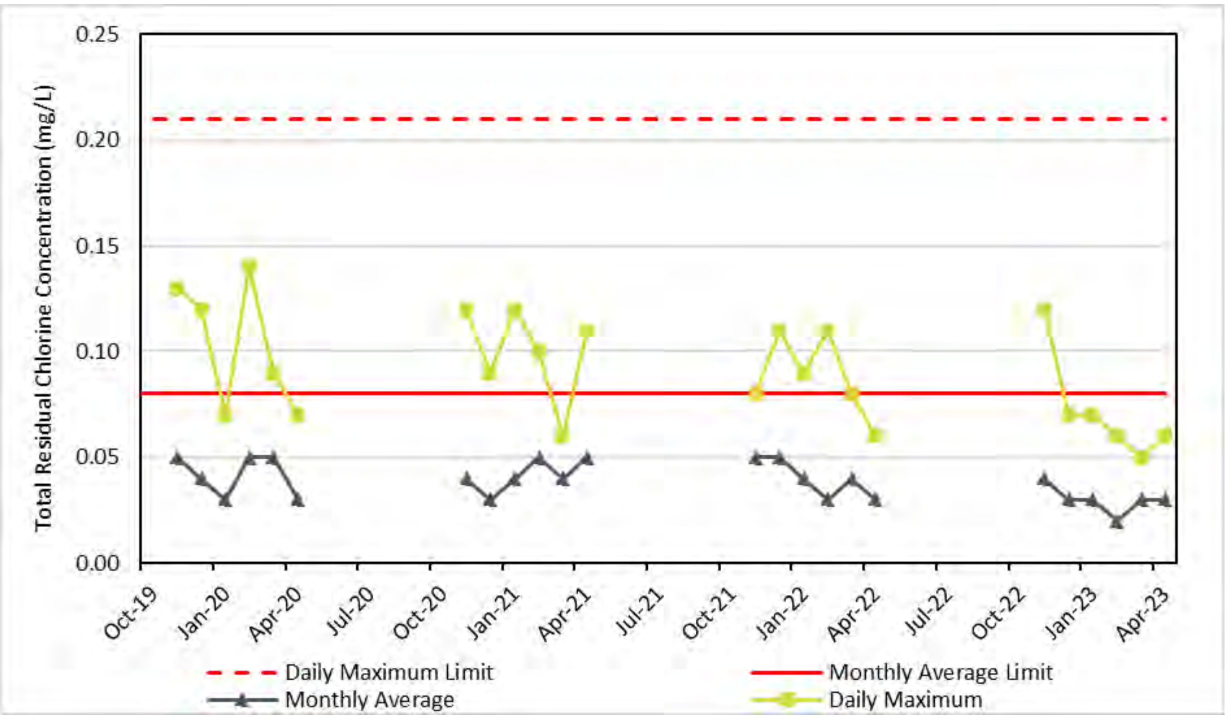
FIGURE 3-7: EFFLUENT pH



- Total Residual Chlorine

Chlorine residual data is shown in Figure 3-8. No violations occurred during this period.

FIGURE 3-8: EFFLUENT TOTAL RESIDUAL CHLORINE



3.2.2. Equipment Useful Life

Most of the existing collection system is the same asbestos cement pipes originally installed, but some areas are PVC. (Appendix A Figure 10) Degradation of these pipes allows large amounts of rainwater (inflow and infiltration) into the system. Once rainwater has entered the sanitary sewer system, it is treated as normal wastewater, which has resulted in occasional overflows. The City's two lift stations have generally been updated and maintained satisfactorily since their construction.

The wastewater treatment plant was last updated in 2005. The City operators indicate that the plant is operating satisfactorily except for the issues listed below:

- The headworks screen stopped working back in 2018, so the backup bar screen is used and is manually raked.
- Liners in Lagoons #1 and #3 float when the water level gets too low.
- Tear in the liner of Lagoons #1 and #2.
- The diffusers are not currently providing air to the lagoons as there are cracks in the system. The air lines also have a break at the elbow from the blower building to the lagoons. In general, the system is beyond its useful life.
- The pump spray guns used for evaporation are not rotating as they should.
- The City is having electrical issues with the sodium hypochlorite system. Overall, the disinfection system is near the end of its useful life.
- The City notes that if the gooseneck flowmeter needed to be removed to be recalibrated, they would have difficulty getting it off and back on.

3.3. REASONABLE GROWTH

Wastewater facility improvements are needed to stay ahead of growth due to the potential increased population and new construction. Chapter 1 discussed population growth projections, including customers served. The wastewater system must accommodate growth in the planning period. The new growth should proportionately fund necessary improvements using system development charges (SDCs).

Keller Associates conducted a Future Growth Meeting with the City of Willamina staff. This meeting aimed to identify and discuss areas of potential future growth for the 20-year planning period. The future growth discussed during the meeting is summarized in Table 1-3.

3.3.1. Influent Flows

The influent flow analysis looks at daily historical wastewater flows and provides flow projections for the planning period. This section summarizes the results of the flow analysis in accordance with DEQ's "Guidelines for Making Wet-Weather and Peak Flow Projections for Sewage Treatment in Western Oregon" for determining design flows in the City's system. Due to concerns with the integrity of flow data reported at the WWTP, flow data was obtained from the pump station run time data. WWTP influent flow was calculated by multiplying the individual pump run times by the measured pump flows measured in the field and summing the calculated flows for a given day.

- Average Annual Daily Flow (AADF)

  The average annual daily flow (AADF) is the average daily flow for the entire year. An AADF was calculated for each year of data from 2018-2022. The AADF for each of these years was then averaged to obtain the AADF for the planning criteria.

- Average Dry-Weather Flow (ADWF)

  The average dry-weather flow (ADWF) is the average daily flow from May through October. An ADWF was calculated for each year of data and then averaged.

- Average Wet-Weather Flow (AWWF)

  The AWWF was calculated as the average daily flow for the period encompassing January-April and November-December for each year of data. Five years' worth of data (2018-2022) was averaged to obtain the AWWF.

- Max Month Dry-Weather Flow ($MMDWF_{10}$)

  The maximum monthly dry-weather flow ($MMDWF_{10}$) represents the month with the highest flow during the summer. DEQ's method for calculating the $MMDWF_{10}$ is to graph the January through May monthly average flows for the most recent year against the total precipitation for each month. DEQ states that May is typically the maximum monthly flow for the dry-weather period (May through October). Selecting the May 90% precipitation exceedance most likely corresponds to the maximum monthly flow during the dry-weather period for a 10-year event. The May 90% precipitation exceedance value (4.14 inches) was extrapolated from the National Oceanic and Atmospheric Administration (NOAA) Summary of Monthly Normals from 1981 to 2010 using a NOAA station in Willamina. Data from 2018–2022 was used to produce Figure 3-9. Table 3-3 summarizes the data points illustrated in the chart.

- Max Month Wet-Weather Flow ($MMWWF_5$)

  The maximum monthly wet-weather flow ($MMWWF_5$) represents the highest monthly average during the winter. DEQ's method for calculating the $MMWWF_5$ is to graph the January through May average daily flows against the monthly precipitation. DEQ states that January is typically the maximum monthly flow for wet weather (November through April). Selecting the January 80% precipitation exceedance value most likely corresponds to the maximum monthly flow during the wet-weather period for a 5-year event. The January 80% precipitation exceedance value (10.90 inches) was extrapolated from the NOAA Summary of Monthly Normals from 1981 to 2010 using a NOAA station in Willamina. The DEQ method and $MMWWF_5$ result are illustrated in Figure 3-9 and summarized in Table 3-3.

FIGURE 3-9: FLOW VS. RAINFALL ($MMDWF_{10}$ AND $MMWWF_5$)

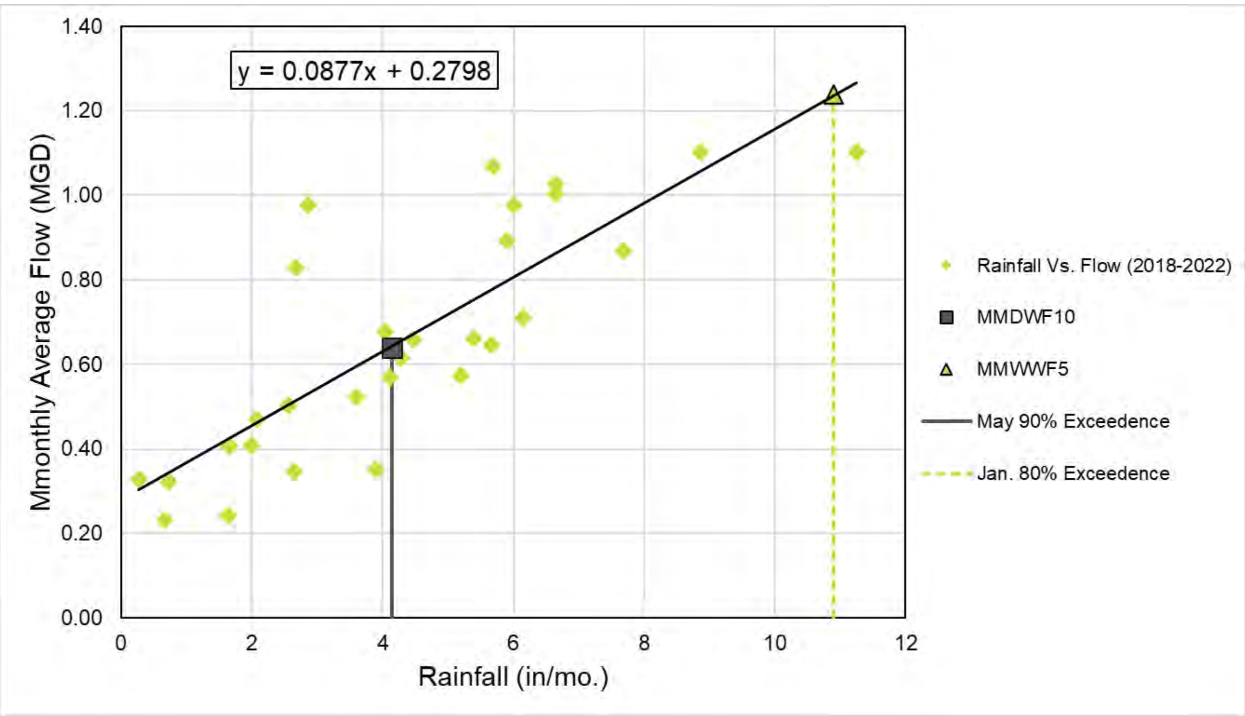


TABLE 3-3: MONTHLY AVERAGE FLOW VS. RAINFALL ($MMDWF_{10}$ AND $MMWWF_5$)

Month	Monthly Average Flow (MGD)					Rainfall (in/mo.)				
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022
January	0.87	0.66	1.10	1.10	0.89	7.7	5.4	11.3	8.9	5.9
February	0.52	0.83	0.98	0.98	0.50	3.6	2.7	2.9	6.0	2.6
March	0.57	0.41	0.35	0.47	0.66	5.2	2.0	2.7	2.1	4.5
April	0.61	0.65	0.41	0.32	No Data	4.3	5.7	1.7	0.7	6.2
May	0.33	0.24	0.35	0.23	No Data	0.3	1.6	3.9	0.7	4.1
$MMDWF_{10}$	0.64 MGD					4.14 in/mo.				
$MMWWF_5$	1.24 MGD					10.90 in/mo.				

A 30-day rolling average of the available dry weather flow data (May 1, 2018 through October 31, 2022) was reviewed to confirm the validity of the DEQ method. The maximum observed dry weather 30-day rolling average flow was 0.45 MGD (May 25, 2018 through June 23, 2018). The precipitation during these 30 days was 0.81 inches. Since this is lower than the value predicted by DEQ's method, 0.64 MGD was selected as the $MMDWF_{10}$. Similarly, a 30-day rolling average of the available wet weather flow data was evaluated to compare with the $MMWWF_{10}$ calculated by the DEQ method. The maximum observed wet weather 30-day rolling average flow was 1.41 MGD (December 18, 2020 through January 16, 2021). The precipitation during this 30-day rolling average was 13.15 inches. The observed event of 1.41 MGD was selected as the $MMWWF_{10}$.

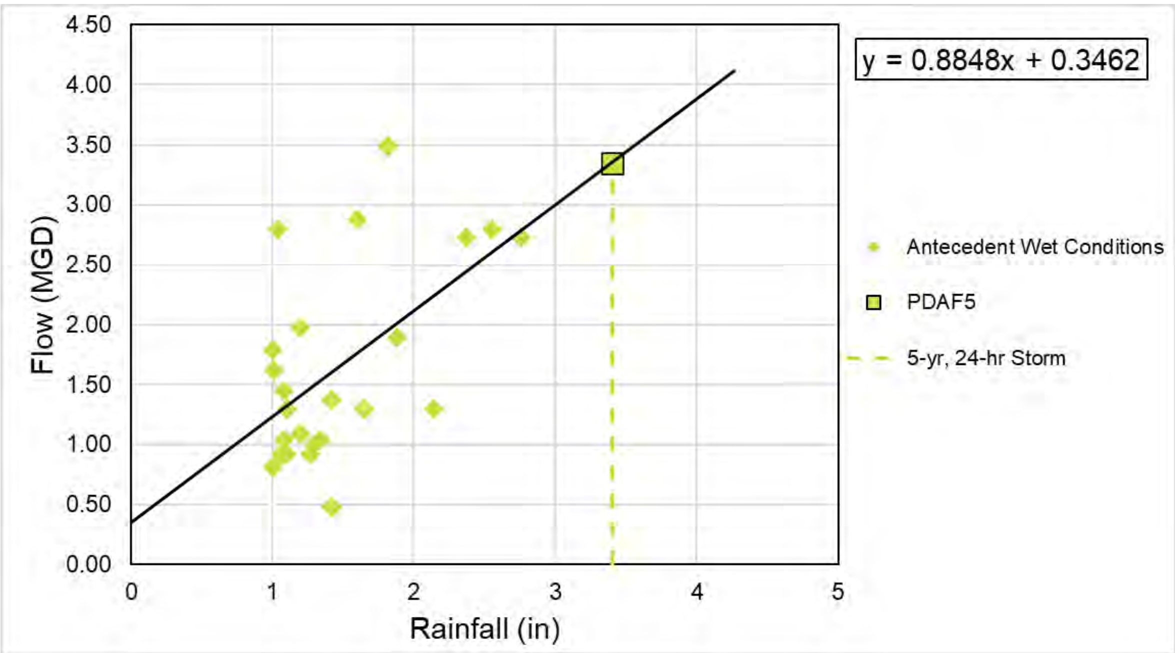
- Peak Week Flow (PWkF)

The PWkF was calculated using a 7-day rolling average for each year.

- Peak Daily Average Flow (PDAF5)

As outlined by the DEQ, the peak daily average flow ($PDAF_5$) corresponds to a 5-year storm event. DEQ's method for determining $PDAF_5$ is plotting daily plant flow against daily precipitation for significant storm events, using data only for wet-weather seasons when groundwater is high. The $PDAF_5$ is the 5-year, 24-hour storm event (3.4 inches per the NOAA isopluvial maps for Oregon) from a trend line fitted to the data. A significant storm event was considered more than 0.5 inches of rainfall in 24 hours. Antecedent conditions were evaluated on a case-by-case basis, and wet conditions were assumed if any day in the preceding three had a storm event of 0.5 inches or larger. Data was also considered based on cumulative rainfall for 30 days before the storm event. The cutoff for 30-day cumulative rainfall (for purposes of this analysis) was 1.5 inches. Figure 3-10 below shows the results of the analysis.

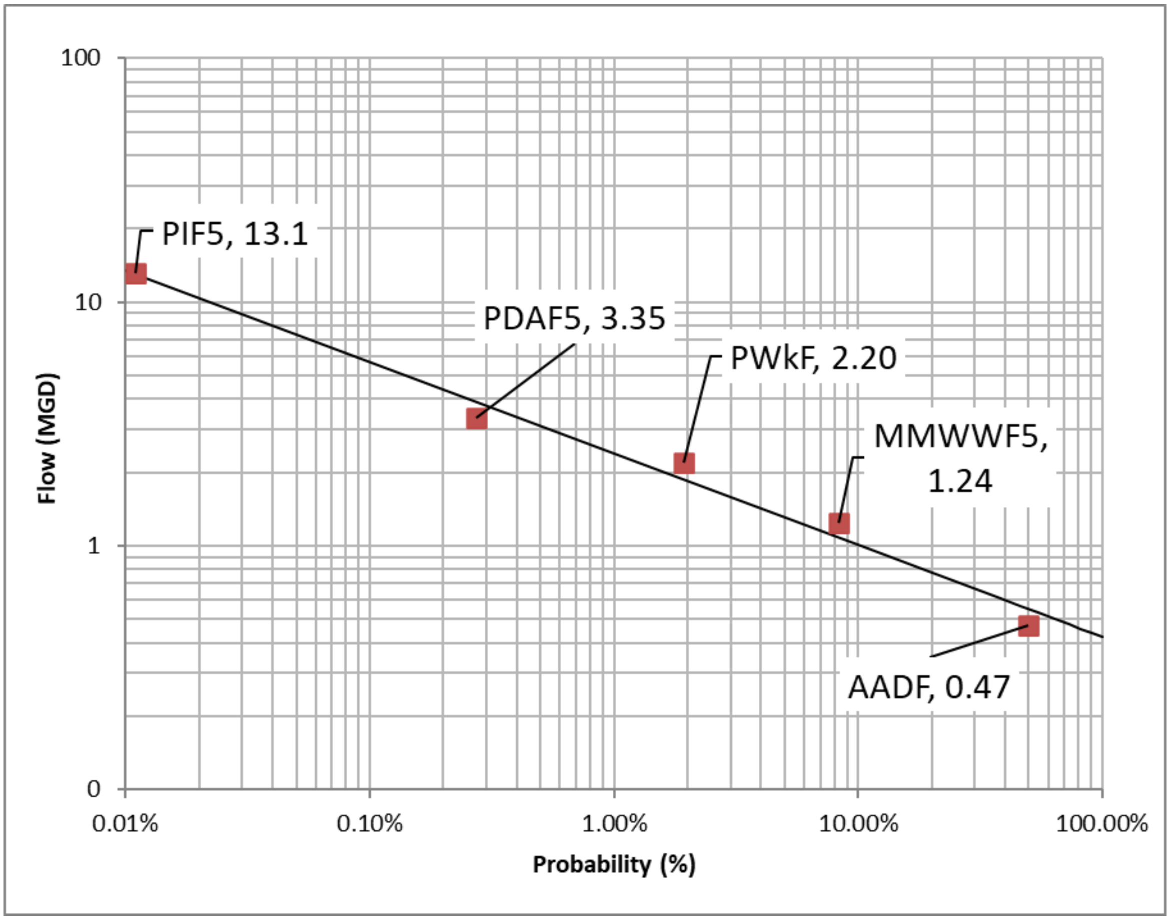
FIGURE 3-10: FLOW VS. RAINFALL ($PDAF_5$)



- Peak Instantaneous Flow (PIF5)

The peak instantaneous flow (PIF_5) represents the peak flow recorded at the WWTP. If available, the DEQ recommends evaluating hourly or instantaneous flow data for high-flow days. The City does not record instantaneous flow data. As an alternative, DEQ recommends estimating PIF_5 by extrapolation. A probability graph was produced, where the PIF_5 was extrapolated from a known $PDAF_5$. Figure 3-11 (next page) shows the results.

FIGURE 3-11: FLOW VS. PROBABILITY (PIF_5)



The PIF_5 was found to be 13.1 MGD using the DEQ extrapolation method. This PIF_5 appears unreasonable compared to the population served, operator knowledge of the system, and other Oregon cities with similar systems. Table 3-4 presents the PIF_5 to $PDAF_5$ peaking factor of several reference cities in Oregon. Using DEQ's extrapolation method, the PIF_5 to $PDAF_5$ peaking factor would be 3.91.

TABLE 3-4: PIF_5/$PDAF_5$ PEAKING FACTORS

City	PIF_5/$PDAF_5$
Newberg, Oregon	1.30
Amity, Oregon	1.54
Sheridan, Oregon	1.46
Average	1.43

Applying a peaking factor of 1.43 to the Willamina $PDAF_5$ yields a PIF_5 of 4.79 MGD for 2022.

- Observed Historical Flows

Table 3-5 summarizes the observed flows for each year from 2018-2022. The historical flows were derived as described in the preceding paragraphs. The total rainfall in inches per year (in/yr) and the total flow in million gallons per year (MGY) are summarized.

TABLE 3-5: OBSERVED HISTORICAL FLOWS

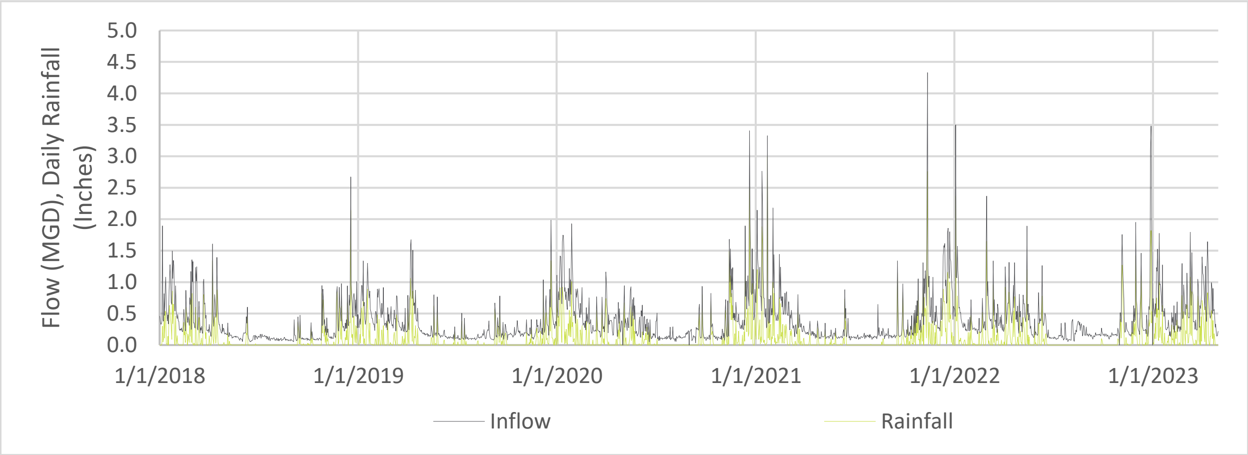
Historical Flows (MGD)						Planning Flow (MGD)
Year	2018	2019	2020	2021	2022	---
Population	2,160	2,250	2,270	2,276	2,282	2,282
ADWF	0.21	0.20	0.22	0.24	0.22	0.22
$MMDWF_{10}$	0.58	0.30	0.53	0.31	0.64	0.64
AADF	0.39	0.36	0.43	0.54	0.47	0.47
AWWF	0.57	0.53	0.64	1.37	0.68	0.76
$MMWWF_5$	1.04	1.04	1.17	1.41	1.24	1.24
PWkF	1.25	1.46	1.6	2.03	2.20	2.20
$PDAF_5$	1.5	2.48	2.68	2.88	3.35	3.35
PIF_5	2.16	3.55	3.84	4.13	4.79	4.79
Total Rainfall (in/yr)	37	33	47	46	47	---
Total Flow (MGY)	142	133	157	197	179	---

3.3.2. Observed Historical Inflow and Infiltration (I/I)

Inflow refers to stormwater that enters the sewer system through several sources, including the holes in manhole lids and cross-connections. Infiltration refers to groundwater that enters the wastewater collection system through leaks in pipes and manholes. Excessive I/I can contribute to overwhelming the collection, conveyance, and treatment systems.

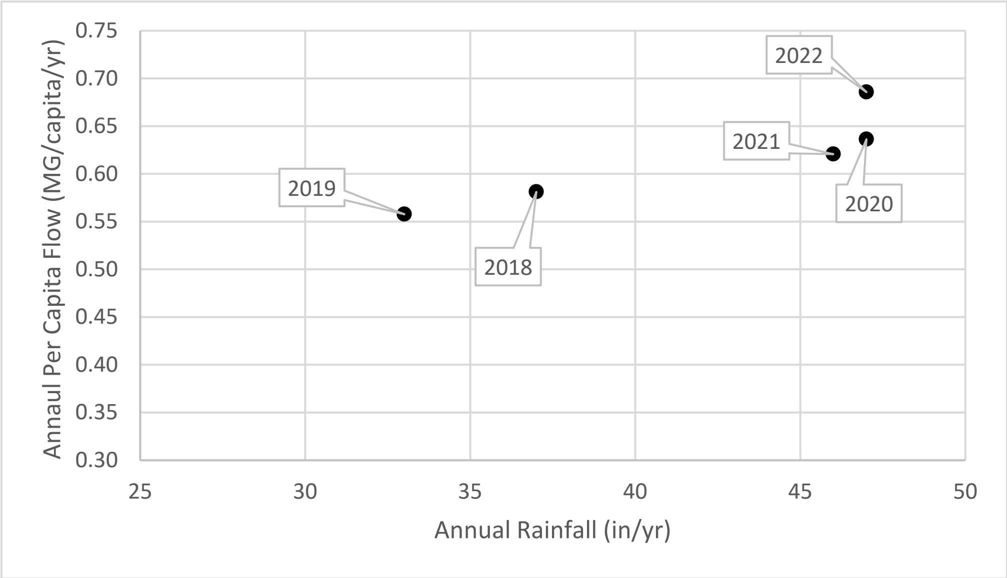
Evidence of I/I can be seen when plotting flow and rainfall on the same graph. Rapid increases in flow following precipitation events suggest a high influence from inflow. A slower, sustained increase in flow following precipitation events would suggest a high amount of infiltration. Rapid increases in flow and large tails that slowly taper down suggest strong influence from both inflow and infiltration. Figure 3-12 illustrates the observed I/I data for the study years provided.

FIGURE 3-12: DAILY FLOW AND PRECIPITATION



Evidence of I/I can be further demonstrated by comparing annual rainfall against annual per capita flow. Figure 3-13 shows a positive linear relationship between rainfall and average annual flow.

FIGURE 3-13: ANNUAL RAINFALL VS PER CAPITA FLOW



Several peaking factors were calculated to compare wet-weather flows against average flows from 2018 through 2022. Table 3-6 summarizes these peaking factors and compares them to other nearby communities. Stayton and Newberg both have documented challenges with high I/I influence. Aurora is a newer system, and for a gravity collection system in western Oregon, it has low I/I

TABLE 3-6: WET-WEATHER PEAKING FACTORS COMPARISON

Peaking Factors	Willamina, Oregon						Stayton, OR	Newberg, OR	Aurora, OR	Amity, OR
	2018	2019	2020	2021	2022	Planning Criteria	Planning Flows	Planning Flows	Planning Flows	Planning Flows
$PIF_5/ADWF$	10.29	17.75	17.45	17.21	21.77	**21.77**	7.8	12.3	3.1	16.8
$PDAF_5/ADWF$	7.14	12.4	12.18	12	15.23	**15.23**	6.7	9.5	2.4	10.9
$MMWWF_{10}/ADWF$	4.95	5.2	5.32	5.88	5.64	**5.64**	1.8	2.0	1.0	1.4

- I/I Mitigation Techniques

The City may use various techniques to identify sources of I/I and rehabilitate pipes to decrease I/I. Chapter 6 includes a discussion of I/I mitigation techniques. A pump run time analysis and CCTV system inspection can also be beneficial. The City conducted a nighttime I/I analysis to identify potential locations for sources of I/I. The results from this analysis are shown in Appendix F.

Table 3-7 summarizes the annual average base flow and the ratio of peak flow to the base flow for the 2018-2022 data sets. The peak flow compared to the base flow indicates the I/I influence in the system. In 2018-2022, the peak flow ranged from approximately 1.44 to 2.70 times the base flow. Some communities experience peak flows more than ten times the base flow.

TABLE 3-7: ANNUAL PEAK DAY FLOW/AVERAGE BASE FLOW

Year	Average Base Flow (MGD)	Peak Flow (MGD)	Peak Flow/Average Base Flow
2018	1.04	1.5	1.44
2019	1.04	2.48	2.38
2020	1.17	2.68	2.29
2021	1.41	2.88	2.04
2022	1.24	3.35	2.70

In addition, future new construction should reduce I/I due to newer, more watertight sewer components.

3.3.3. Future Flow Projections

A projected flow per capita (reported in gallons per capita per day, gpcd) was developed to project the planning flows. Table 3-8 summarizes the projected planning flows. Actual future flows depend on several factors and could decrease through aggressive I/I reduction efforts. Flow should be measured and reviewed periodically, and future capital projects should be phased where practical. The 2045 projected flows will be used for treatment system design.

TABLE 3-8: PROJECTED PLANNING FLOWS

	Planning Flow (MGD)	Planning Unit Flow (gpcd)	Projected Design Flow (MGD)					
Year	---	---	2025	2030	2035	2040	2045	2065
Population	2,282	2,282	2,182	2,314	2,459	2,604	2,749	3,384
ADWF	0.22	96	0.21	0.22	0.23	0.25	0.26	0.32
$MMDWF_{10}$	0.64	280	0.61	0.65	0.69	0.73	0.77	0.95
AADF	0.47	205	0.45	0.47	0.50	0.53	0.56	0.69
AWWF	0.76	332	0.72	0.77	0.82	0.87	0.91	1.12
$MMWWF_5$	1.24	542	1.18	1.25	1.33	1.41	1.49	1.83
PWkF	2.20	964	2.10	2.23	2.37	2.51	2.65	3.26
$PDAF_5$	3.35	1,470	3.21	3.40	3.61	3.83	4.04	4.97
PIF_5	4.79	2,100	4.58	4.86	5.16	5.47	5.77	7.11

3.3.4. Future Load Projections

The wastewater influent loading analysis follows a methodology similar to that of influent flows. The historical wastewater loading data was used to develop future loading projections for the planning period. This section summarizes the results of the influent BOD_5 and TSS load analysis. The City is not required to record effluent nitrogen levels. However, the City sampled Total Kjeldahl Nitrogen (TKN) in May 2023. The result of this sampling is discussed below. Dry weather (May 1 – October 31) and wet weather (November 1 – April 30) loads were evaluated. The following definitions summarize the terminology of the loading conditions:

- Average Daily Load (ADL)

The average daily load (ADL) was calculated for both dry weather (DWADL) and wet weather (WWADL) for each year of data. Data from 2018-2022 were averaged to obtain the ADLs.

- Maximum Month Load (MML)

The maximum month load (MML) was calculated for both dry weather (DWMML) and wet weather (WWMML) for each year of data. The maximum month data is from the discharge monitoring reports (DMRs) from 2018 to 2022 and represents the samples taken during the month rather than a 30-day rolling average.

- BOD_5, TSS, and TKN Loading

The BOD_5 and TSS loadings are summarized in Table 3-9 and Table 3-10, respectively.

TABLE 3-9: OBSERVED HISTORICAL BOD_5 LOADING

Year	2018	2019	2020	2021	2022	Avg.	Max.	Planning Criteria
Population	2,160	2,250	2,270	2,276	2,282	---	---	2,282
BOD_5 (ppd)								
DWADL	523	806	655	727	536	649	806	---
DWMML	885	1,010	1,220	1,000	790	981	1,220	---
WWADL	397	657	787	782	668	658	787	---
WWMML	468	1,088	1,166	1,150	968	968	1,166	---
BOD_5 (ppcd)								
DWADL	0.242	0.358	0.289	0.319	0.235	0.289	0.358	0.358
DWMML	0.410	0.449	0.538	0.440	0.346	0.436	0.538	0.538
WWADL	0.184	0.292	0.347	0.344	0.293	0.292	0.347	0.347
WWMML	0.216	0.483	0.514	0.505	0.424	0.429	0.514	0.514

TABLE 3-10: OBSERVED HISTORICAL TSS LOADING

Year	2018	2019	2020	2021	2022	Avg.	Max.	Planning Criteria
Population	2,160	2,250	2,270	2,276	2,282	---	---	2,282
TSS (ppd)								
DWADL	309	418	295	305	302	326	418	---
DWMML	741	479	393	406	480	500	741	---
WWADL	316	457	392	520	417	420	520	---
WWMML	532	789	634	873	532	672	873	---
TSS (ppcd)								
DWADL	0.143	0.186	0.130	0.134	0.132	0.145	0.186	0.186
DWMML	0.343	0.213	0.173	0.178	0.210	0.224	0.343	0.343
WWADL	0.146	0.203	0.173	0.229	0.183	0.187	0.229	0.229
WWMML	0.246	0.351	0.279	0.383	0.233	0.299	0.383	0.383

The City sampled TKN, TSS, and BOD_5 in May 2023, and the results are provided in Table 3-11 below.

TABLE 3-11: MAY 2023 SAMPLING RESULTS

Parameter	mg/L	ppd	ppcd
BOD_5	183	405	0.178
TSS	156	345	0.151
TKN	34.2	76	0.033

The sampling results revealed a BOD_5:TKN ratio of approximately 5.35. Future TKN loadings to the plant were projected based on the future projected BOD_5 loadings and a BOD_5 to TKN ratio of 5.35.

Unit loadings in pounds per capita per day (ppcd) were calculated for each year of data analyzed. Projected unit loadings are the maximum of the individual 2018-to-2022-unit loads. The projected loads in pounds per day are the product of the projected unit load (ppcd) and the population. The projected BOD_5, TSS, and TKN loads are summarized in Table 3-12.

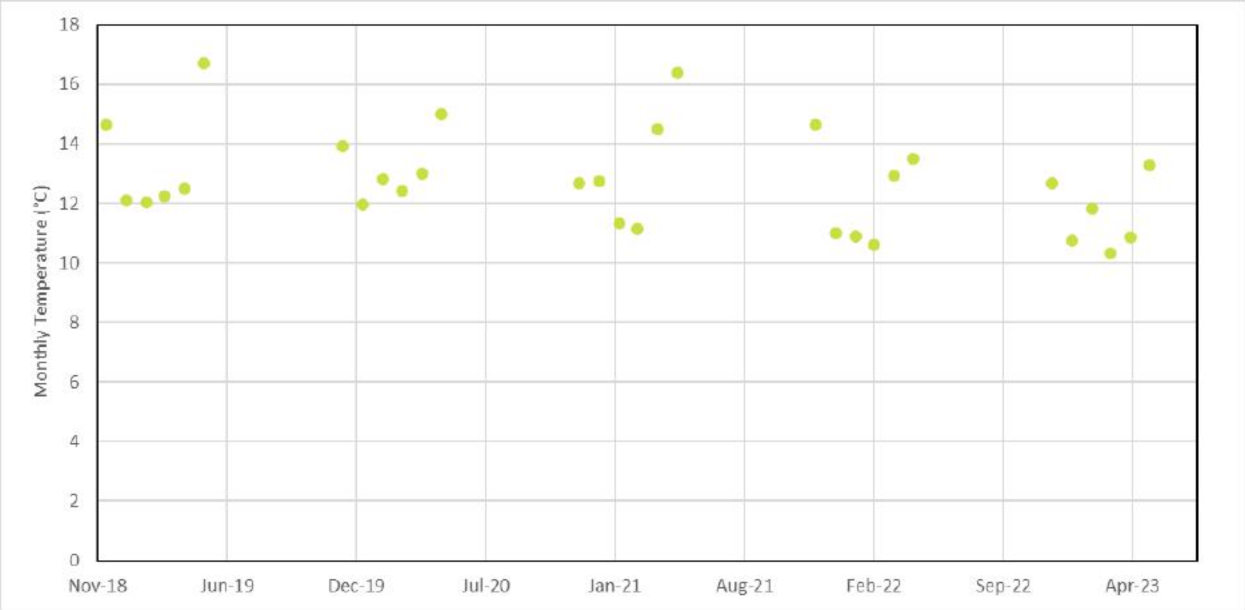
TABLE 3-12: PROJECTED BOD_5, TSS, AND TKN LOADS

Parameter	Year	2025	2030	2035	2040	2045
	Population	2,182	2,314	2,459	2,604	2,749
	BOD (ppcd)	BOD (ppd)				
WWADL	0.35	756	802	852	903	953
WWMML	0.51	1,121	1,189	1,264	1,338	1,413
DWADL	0.36	782	829	881	933	985
DWMML	0.54	1,173	1,244	1,322	1,400	1,478
Parameter	TSS (ppcd)	TSS (ppd)				
WWADL	0.23	500	530	563	596	630
WWMML	0.38	836	886	942	997	1,053
DWADL	0.19	406	430	457	484	511
DWMML	0.34	748	794	843	893	943
Parameter	TKN (ppcd)	TKN (ppd)				
WWADL	0.06	141	150	159	169	178
WWMML	0.10	209	222	236	250	264
DWADL	0.07	146	155	165	174	184
DWMML	0.10	219	232	247	261	276

- Temperature

The City has also collected effluent temperature readings during the discharge period. The monthly average effluent temperatures are shown in Figure 3-14. The minimum monthly temperature was approximately 10°C. The maximum monthly temperature was approximately 17°C.

FIGURE 3-14: WWTP EFFLUENT TEMPERATURES



3.3.5. Capacity Limitations

The EPA Technical Bulletin EPA-430-99-74-001: Design Criteria for Mechanical, Electric, and Fluid System and Component Reliability (1973) requires new or expanding wastewater treatment plants that discharge to a receiving stream to meet minimum standards for mechanical, electrical, and component reliability. Redundancy and reliability refer to the level of protection required for the environment and receiving stream. The standards are divided into three increasingly stringent classes of reliability:

Reliability Class I: Works that discharge or potentially discharge (1) into the public water supply, shellfish, or primary contact recreation waters, or (2) as a result of its volume or character, could permanently or unacceptably damage or affect the receiving waters or public health if normal operations were interrupted. For example, they discharge near drinking water intakes or into shellfish waters.

Reliability Class II: Works that discharge, or potential discharge, as a result of its volume or character, would not permanently or unacceptably damage or affect the receiving waters or public health during periods of short-term operations interruptions but could be damaging if continued interruption of normal operations were to occur (on the order of several days). For example, it is discharging into recreational waters.

Reliability Class III: Works not otherwise classified as Class I or Class II.

- Pump Station

Pump stations lift wastewater and convey it to a discharge point. Pump stations must meet the DEQ's requirements, such as the following:

Redundant Pumping Capacity – The DEQ design criteria require the pump station's firm capacity to convey the larger of the 10-year dry-weather or 5-year wet-weather event. For Willamina, the pump stations must pump the 5-year, 24-hour storm event peak instantaneous flows with the largest pump out of service.

Hydrogen Sulfide Control – Hydrogen sulfide can be corrosive (especially to concrete materials) and lead to odor problems. Where septic conditions may occur, provisions for addressing hydrogen sulfide should be in place.

Alarms – The alarm system should include high-level, overflow, power, and pump fail conditions. The DEQ also requires an alarm condition when all pumps are called on (loss of redundancy alarm) to keep up with inflow into the pump station.

Standby Power – Standby power is required for every pump station because extended power outages may lead to wastewater backing up into homes and sanitary sewer overflows. Mobile generators or portable trash pumps may be acceptable for pump stations, depending on the risk of overflow, available storage in the wet well and pipelines, alarms, and response time.

- Pipeline

CMOM refers to the Capacity Management, Operation, and Maintenance of the entire wastewater conveyance system. The vast majority of sanitary sewer overflows originate from three sources in the collection system: 1) I/I, 2) roots, and 3) fats, oil, and grease (FOG). I/I problems are best addressed through a program of regular flow monitoring, T.V. monitoring, and pipeline rehabilitation and replacement. Blockages from roots or FOG are also addressed via a routine cleaning program. A FOG control program may also involve public education and City regulations (e.g., requirements for installing and regularly maintaining grease interceptors). All new facilities believed to contribute FOG should be equipped with grease interceptors.

The DEQ prohibits all sanitary sewer overflows. The Oregon sanitary sewer overflow rules include both wet-weather and dry-weather design criteria. The DEQ has indicated that they have enforcement discretion and that fines will not occur for overflow resulting from storm events that exceed the DEQ design criteria (i.e., greater than a winter 5-year storm event or a summer 10-year storm event).

In December 2009, the DEQ developed a Sanitary Sewer Overflow Enforcement Internal Management Directive to provide guidance for preventing, reporting, and responding to sanitary sewer overflows. The DEQ updated this document in November 2010. The City's discharge permit also includes requirements for an Emergency Response and Public Notification Plan.

- Excessive Infiltration and Inflow

EPA defines excessive I/I as the quantity that can be economically eliminated from a sewer system by rehabilitation. Some guidelines for determining excessive I/I were developed in 1985 by EPA based on a survey of 270 standard metropolitan statistical area cities (EPA Infiltration/Inflow Analysis and Project Certification, 1985). Non-excessive numeric criteria for infiltration were defined as average daily dry-weather flows below 120 gpcd. Similarly, a below 275 gpcd average wet-weather flow guideline was established for non-excessive stormwater inflow.

- Pipeline Surcharging

Pipeline surcharging occurs as flows exceed the capacity of a full pipe, causing wastewater to back up into manholes and service laterals. Surcharging of gravity pipelines is generally discouraged because of 1) the increased potential for backing up into residents' homes, 2) the increased potential of exfiltration, and 3) health risks associated with sanitary sewer overflows.

- Illicit Cross Connections

Any illicit cross-connections from the City's stormwater system should be removed. The DEQ has indicated that all WWTPs within the Willamette Valley are Class I facilities. Class I and Class II requirements are outlined in Table 3-13. In addition to these standards, unit operations must be designed to pass the peak hydraulic flow with one unit out of service. Also, mechanical components in the facility must be designed to enable repair or replacement without violating the effluent limitations or causing control diversion.

TABLE 3-13: UNIT PROCESS RELIABILITY EVALUATION

Equipment	Backup Rating	Criticality Rating	Equipment Condition Rating
Influent Screen	5	S/H, EQ, PF, CC	R
Aerated Lagoon	4	S/ H, EQ, PF, CC	M
Aerated Lagoon Aeration	1	S/H, EQ, PF, CC	R
Effluent Storage Lagoon	4	S/ H, EQ, PF	M
Sodium Hypochlorite Generation System	5	EQ, PF	R
Chlorine Feed Pump	**1**	**S/H, EQ, PF**	**LN**
Declorination Feed Pump	1	S/H, EQ, PF	M
Chlorine Contact Basin	**5**	**EQ, PF**	**M**
River Pump	1	EQ, PF	M
Backup rating			
1	**One level of "in kind" redundancy** (identical peice of equipment is available to		
2	**Two of more levels of "in kind" redundancy** (More than one piece of equipment is		
3	**Equipment alternative** (An alternative piece of equipment is provided)		
4	**Procedural alternative** (An alternative operating procedure is required to provide		
5	**No Backup** (Failure of equipment will shut entre process down)		
Criticality Rating			
S/ H	**Safty and Health Risk** (Loss would create risk to saftey and health of plant		
EQ	**Effluent Quality Risk** (Loss would create risk to WWTP effluent quality and could		
PF	**Process Functionality Risk** (Loss would affect the function and/ or efficiency of the affected process		
CC	**Cost Critical** (Loss would have significant cost imact in short term or long term)		
Equipment Condition Rating			
N	**New** (equipment is new, or replaced in last 12 months)		
LN	**Like New** (Equipment is operated very little or recently overhauled to a condition like new)		
M	**Used but Maintainted** (Equipment showing expected wear, but is adequately maintained and functions well)		
W	**Heavily Worn** (Equipment close to end of useful life, needs overhaul, difficulty in preforming intended functions)		
R	**Needs Replacement** (Equipment does not acceptably preform, beyond cost-effective repair)		

TABLE 3-14: EPA REQUIREMENTS FOR RELIABILITY

Component	Reliability Class I	Reliability Class II
Raw sewage pumps, lift stations	Peak flow with the largest unit out of service. Peak flow is the maximum wastewater flow expected during the design period.	
Mechanical Bar Screens	One backup with either manual or mechanical cleaning shall be provided. Facilities with only two screens shall have at least one manually cleaned bar screen.	
Grit Removal	Overflow shall be sufficient to pass peak flow with all grit units out of service.	
Primary sedimentation	50% of design flow capacity with the largest unit out of service. Design flow is the flow used as the design basis of the component.	
Activated sludge process	A minimum of two equal-volume basins shall be provided. No backup basin is required.	
Aeration blowers	Supply the design air capacity with the largest unit out of service shall be provided. A minimum of two units.	
Air diffusers	With the largest section of diffusers isolated or out of service, oxygen transfer capacity shall not be measurably impaired	
Secondary sedimentation	The units shall be sufficient in number and size so that, with the largest unit out of service, the remaining units have capacity for at least 75% of the design flow.	The units shall be sufficient in number and size so that, with the largest unit out of service, the remaining units have capacity for at least 50% of the design flow.
Filters/advanced treatment	The units shall be sufficient in number and size so that, with the largest unit out of service, the remaining units have capacity for at least 75% of the design flow.	No backup is required.
Disinfection basins	50% of design flow capacity with the largest unit out of service. Design flow is the flow used as the design basis of the component.	
Effluent pumps	Peak flow with the largest unit out of service. Peak flow is the maximum wastewater flow expected during the design period.	
Electrical power	Provisions of two separate and independent sources of electrical power, either from two separate utility substations or from a single substation and a works-based generator shall be provided. The designated backup source shall have sufficient capacity to operate all vital components, critical lighting, and ventilation during peak flow conditions.	
	The provisions of backup power capacity for secondary treatment, final clarification, and advanced treatment are required. The provisions of capacity for degritting and sludge handling and treatment are optional.	The provisions of backup power capacity for secondary treatment, final clarification, and advanced treatment are optional. The provision of capacity for degritting and sludge handling and treatment is not required.
Sludge holding tanks	The volume of the holding tank shall be based on the expected time necessary to perform maintenance and repair of the component in question.	
Anaerobic digestion	At least two digestion tanks shall be provided. Backup sludge mixing equipment shall be provided, or the system shall be flexible enough to not lose total mixing capacity with one piece of equipment out of service. Backup equipment may be uninstalled.	
Aerobic digestion	A backup basin is not required. At least two blowers or mechanical aerators shall be provided. Isolation of largest section diffusers without measurably impairing oxygen transfer is allowed.	
Sludge pumping	Pumps sized to pump peak sludge quantity with one pump out of service. The backup pump may be uninstalled.	

3.3.6. Collection System Evaluation

This section summarizes the construction of the wastewater collection system model with the calibration process and documents identified deficiencies. Alternatives to address these deficiencies are discussed in Chapter 4.

- Model Construction

An accurate computer model of the wastewater system is an important planning tool and provides the basis for identifying existing and future collection system deficiencies. No previous hydraulic model was available; therefore, the model inputs, including elevations, pipe diameters, alignment, connectivity, pump station characteristics, etc., were input based on information provided by the City. InfoSWMM Suite 14.7 Update #2 was selected as the modeling software for this project. InfoSWMM is a fully dynamic model that operates in conjunction with Esri ArcGIS and allows for evaluating complex hydraulic flow patterns.

A survey of approximately 100 manholes was completed as a part of this master plan to check the ground surface and pipe invert elevations throughout the collection system. The survey data was used in conjunction with record drawings of the collection system to assign elevations for the pipes and manholes in the model. The two lift stations in the collection system were included in the hydraulic model. Pump station wet well dimensions and operational set points were provided by the system operators or taken from the operations and maintenance (O&M) manuals and record drawings. Field pump tests were completed for both the lift stations as described in Section 2.3. The lift stations were modeled with design points equal to the flows observed in the pump tests.

It is important to note that one of the basic assumptions of the hydraulic model is that all pipelines are free from physical obstructions such as roots and accumulated debris. Such maintenance issues, which certainly exist, must be discovered and addressed through consistent maintenance efforts. The modeled capacities discussed in this chapter represent the capacities assuming the wastewater collection lines are in good working order.

- Flow Monitoring

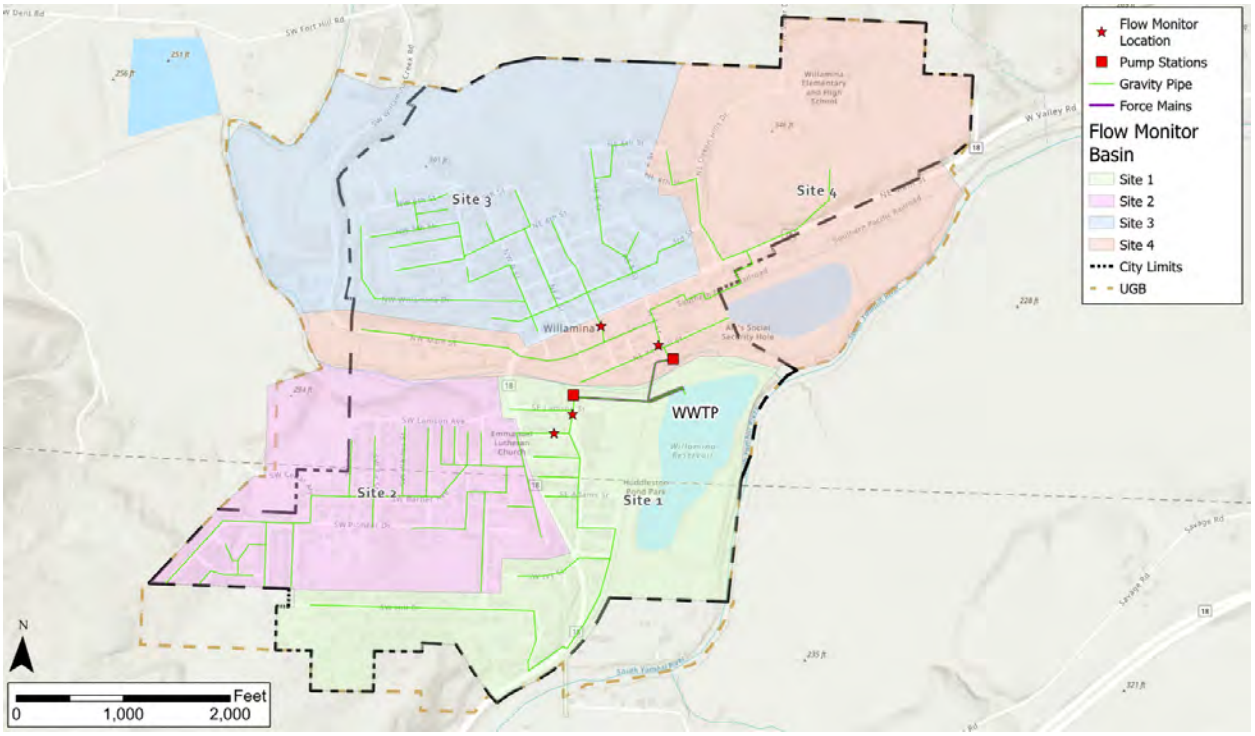
Flow monitoring for this study was conducted for several weeks in the winter, from January 12 to March 22, 2022. Temporary flow monitoring sensors were installed at four locations throughout the collection system, as shown in Figure 3-15. The sensors measure the depth of water in the pipe, and the velocity of the wastewater flows to calculate the flow through the pipe. The flow monitors were programmed to record data points every 15 minutes to capture fluctuations in system flows. While flow monitoring is an effective way of measuring sewer flows, there is a potential error in the data. Malfunctioning equipment and debris accumulation on the sensor are the most common errors encountered during the flow monitoring process. The flow data was checked a minimum of once per week to identify poor data quality and address issues if possible.

Scattergraphs were developed by plotting velocity on the x-axis and depth on the y-axis to evaluate the data quality and identify potential issues. The theoretical Manning Equation was also plotted on the scattergraph to indicate if the observed data matches the theoretical values. Tightly clustered data points along the Manning curve indicate good quality data. Where the Manning Equation did not match well, an adjusted version of the Manning Equation called the Stevens-Schutzbach Method was used. This method applies to pipes with downstream obstructions, offset joints, debris, or other related conditions that cause standing water in the pipe even if there is no flow. This method was used when the scattergraph showed no velocity but a depth greater than zero. A brief description of the flow monitoring results is provided below:

- Site 1 was installed upstream of the Washington Pump Station. The data quality at this site was particularly good with tightly clustered data points in the scattergraph. The average flows were around 220 gpm, showing a clear diurnal pattern, which is relatively consistent each day. There were no significant concerns with the data gathered at this site.

- Site 2 was installed upstream of Site 1. The data quality at this site was poor for the first couple of weeks; therefore, the sensor was replaced and recalibrated during one of the site visits. After recalibrating the sensor, the data quality was good, with average flows of around 30 gpm. Once the equipment was replaced, there were no major concerns with the data gathered at this site.
- Site 3 was installed to capture flows in the E Street Pump Station Basin and was installed upstream of Site 4. The data quality at this site was reasonably good, with tightly clustered data points in the scattergraph and only some outliers. The average daily flows were around 50 gpm. The diurnal pattern was clear, and there were no major concerns with the data gathered from this site.
- Site 4 was installed just upstream of the E Street Pump Station. The scattergraph indicates very good data quality with an average daily flow of around 180 gpm. There were no major concerns with the data gathered at this site.

FIGURE 3-15: FLOW MONITORING LOCATIONS



- Model Calibration

Model loads refer to the wastewater flows that enter the wastewater collection system and comprise wastewater collected from individual services (base flows), groundwater infiltration (GWI), and stormwater I/I. The four monitoring sites divided the system into four areas. The collected data was analyzed along with continuous precipitation data to establish typical diurnal patterns, average base flows, GWI, and gauge rainfall influence at each site. Both dry weather and wet weather periods were used for loading and calibration efforts. Loads for the model were developed and calibrated in several stages, as described below.

The model calibration results are summarized in Table 3-15, and details are provided in Appendix D. The green values represent flows calibrating within +10% or -5%. The red values indicate flows outside of this range. In summary, the model was calibrated well, and most peak flows were matched within the targeted ranges.

Calibrating the hydraulic model is critical to building confidence in the output model results. The calibration process aims to adjust the model inputs to match the observed data points from the flow monitoring. Two flow monitor periods were selected for the calibration scenario. First is the DWF calibration scenario, which used data from March 10, 2022. The DWF scenario is to establish the base flows and adjust the diurnal patterns from each flow monitor basin. This date was selected because there was minimal rainfall before and after, which resulted in less I/I influence. The second calibration scenario is the WWF scenario, which utilized data from February 28 through March 4. There was approximately three inches of cumulative rainfall during this period. This represents a wet weather flow event, and model inputs can be adjusted to match the I/I observed during this time. A rain gauge was installed in Willamina during the flow monitoring period, and the rainfall distribution was also input into the model.

Diurnal curves were developed for the four flow monitor sites based on the observed flows. These diurnal curves were assigned to the junctions in their respective basins to simulate the flow changes throughout the day. The base flows were adjusted globally up or down from the initial flow allocation based on the water meters, so the average flows matched the system flows observed on the calibration day. The model was then exercised, and the output results were compared to the observed data from the monitoring period. The base flows, diurnal patterns, and other model inputs were adjusted with each model run until the outputs matched the observed data. The model peak flows were targeted to be within -5% to +10% of the observed flows to be considered calibrated. It should be noted that matching the peak flows was given more weight than the daily volume because the peak flows are the primary evaluation criteria to determine if there are capacity deficiencies.

TABLE 3-15: MODEL CALIBRATION RESULTS

Location[1]	Observed Daily Flow Volume (gal)	Modeled Daily Flow Volume (gal)	Percent Difference		Observed Peak Flow (gpm)	Modeled Peak Flow (gpm)	Percent Difference
Site 1 DWF	348,724	354,283	1.6%		284	277	-2.5%
Site 2 DWF[2]	30,215	30,227	0.0%		47	46	-1.2%
Site 3 DWF	55,347	57,666	4.2%		55	60	8.7%
Site 4 DWF	213,105	230,490	8.2%		203	204	0.5%
Site 1 WWF #1	549,026	417,443	-24.0%		945	1030	9.0%
Site 2 WWF #1	252,147	227,169	-9.9%		335	366	9.4%
Site 3 WWF #1	115	118	3.0%		476	521	9.5%
Site 4 WWF #1	358	299	-16.5%		780	839	7.6%

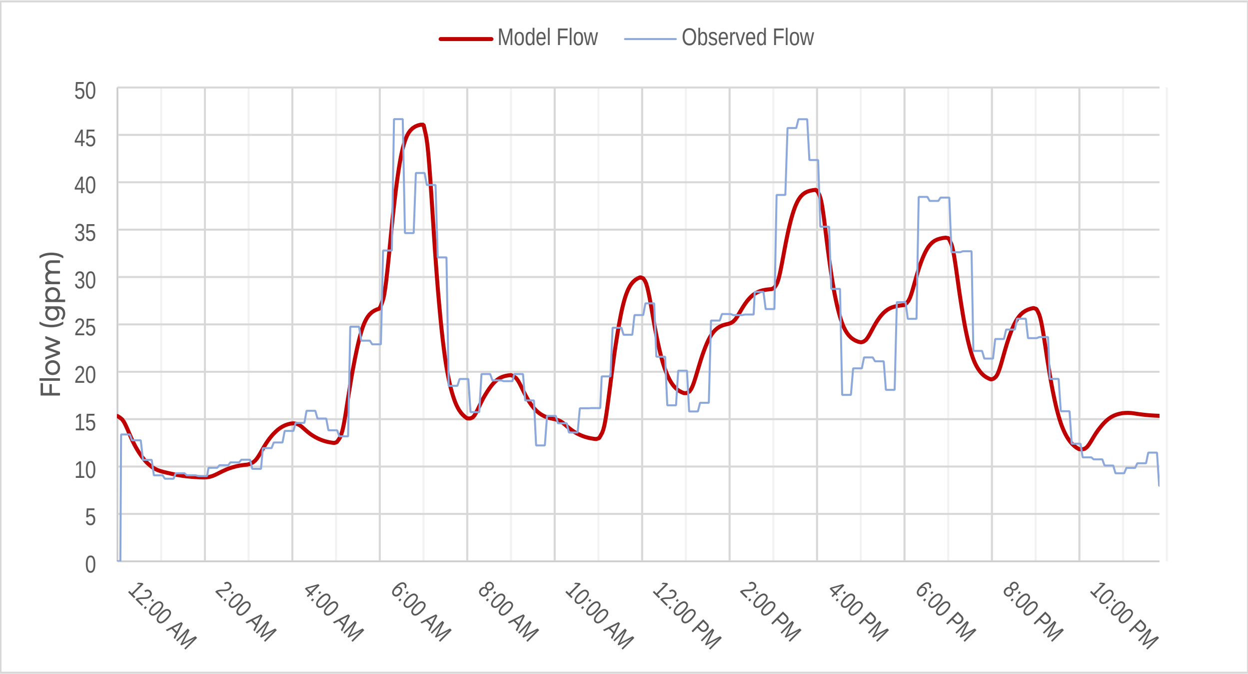
1) Calibration scenarios consisted of one dry weather flow period (DWF) and two wet weather rainfall events. Emphasis was given to the wet weather flow (WWF) event #1 because it was a larger rainfall event. The second WWF event was used as a check.

2) Site 2 DWF flow event had very volatile readings that were not representative of actual flows. A rolling 1-hour average was used to calibrate to this event at this site.

- Base Flow Calibration

Potable water consumption data was used to establish a base flow for the existing sewer system. The total residential consumption was divided by the number of residential connections to establish the residential base flows. These residential base flows were then allocated based on the location of residential parcels. The non-residential areas were allocated based on where commercial zone areas were located and the percentage of total consumption that was non-residential. Additionally, the top ten largest water users were manually assigned to the nearest junction. The original base flows allocated in the model resulted in much lower flows than observed during the flow monitor DWF event. This is likely because flow monitoring was conducted during the wet season, and although there was no rainfall during this period, infiltration was likely occurring. The DWF scenario was exercised in the model, and the base flows were adjusted up or down to match the flow monitoring data. Figure 3-16 illustrates an example calibration from Site 2.

FIGURE 3-16: SAMPLE BASE FLOW CALIBRATION SITE 2

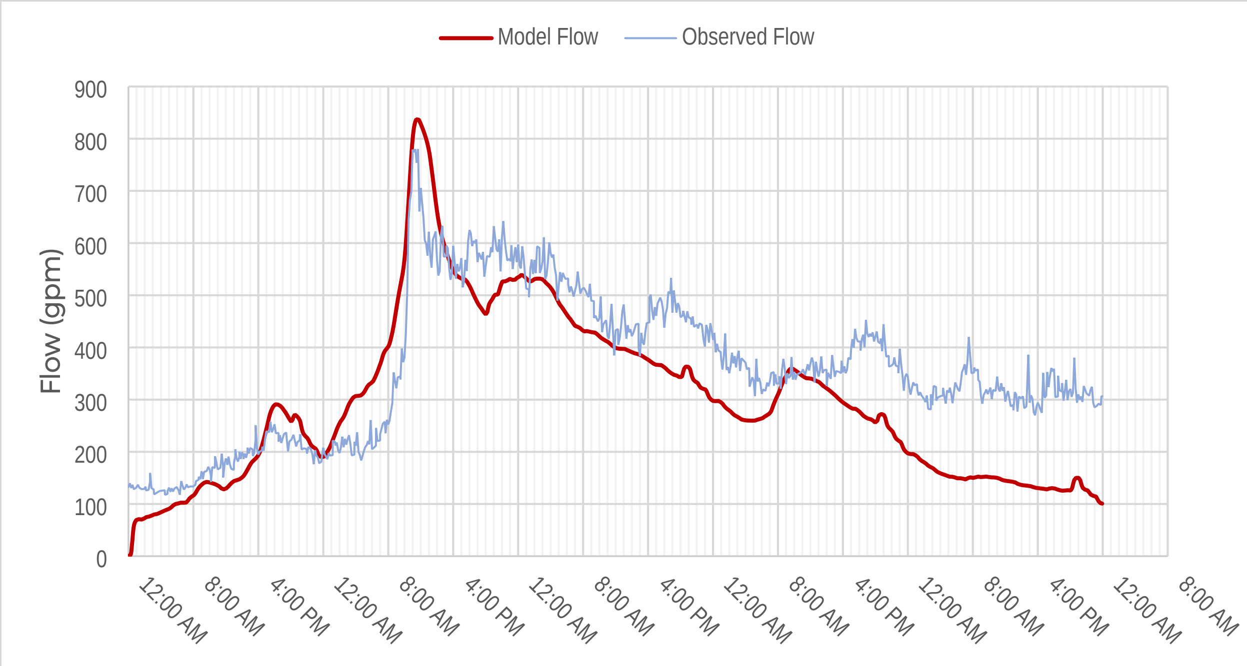


- Wet Weather Flow (WWF) Calibration

The RTK method was used to predict rainfall-derived infiltration and inflow (RDII). Rainfall data with the highest cumulative rainfalls during the period of flow monitoring was utilized to calibrate wet weather flows (February 28 through March 4th with 3.0 inches). The storm event rainfall was entered into InfoSWMM, and RTK parameters were then adjusted to calibrate the model with flow monitoring data. Again, total modeled flows at the WWTP were compared to the targeted average daily flow and WWTP influent flow data, in addition to calibrating the model at various locations within the collection system. An example of wet weather flow calibration results is shown below in Figure 3-17. RTK values were adjusted to calibrate the model to meet the highest peaks observed.

In general, the modeled peaks could be matched within 10% of the observed peaks; however, some total volumes were less in the model than were observed. This indicates the presence of infiltration, which rises and falls with rainfall events. While the total volume is less in the model, the critical measure is to match the peak flows.

FIGURE 3-17: SAMPLE WET WEATHER CALIBRATION SITE 3, JAN 2ND - 4TH



➢ Design Storm

The design storm used for model evaluation was the 5-year, 24-hour storm event. A standard 24-hour Natural Resources Conservation Service rainfall distribution for a Type 1A storm was used. The rainfall for the 5-year, 24-hour storm event from National Oceanic and Atmospheric Administration isopluvial maps is 3.4 inches. This was used as the multiplier for the Type 1A storm hyetograph. The calibrated model was run with the design storm event.

The modeled PIF_5 and $PDAF_5$ at the WWTP were compared to the modified PIF_5 and $PDAF_5$ planning criteria in Table 3-16. The modeled PIF and $PDAF_5$ at the plant were lower than the planning criteria when run with the existing pipe diameter. The lower flows result from constrained flow due to undersized pipes that cause surcharging and flooding within the system. The model was also run in an unconstrained condition where the pipe sizes were increased to eliminate surcharging and bottlenecks. Under this scenario, the flows were about 7% lower for the peak day volume but only 1% lower for the peak instantaneous flow. Additional discussion and details of existing system capacity limitations are summarized in the following section.

TABLE 3-16: PLANNING CRITERIA VS. MODELED PEAK FLOWS

Flow Criteria	Planning	Constrained Model Outflow	Unconstrained Model Outflow	Difference
Peak Day Volume (MG)	3.35	2.6	3.12	-6.8%
PIF (gpm)	3,326	2,407	3,289	-1.1%

➢ Existing System Evaluation

The calibrated model was used to assess the existing system capacity during a 5-year, 24-hour design storm event.

below and Figure 12a in Appendix A illustrate the potential overflow sites and pipe capacity limitations identified during the existing system peak instantaneous flow model evaluation. The figure shows the maximum depth divided by the system's full depth (d/D) during a $PDAF_5$ event. The d/D is a ratio of how full the pipe is during the highest flow period. For example, an 8-inch pipe with 6 inches of water at its max depth would have a 75% d/D. The figure is color-coded to show a gradation of pipes based on utilized capacity (e.g., red = flowing at >100% of its depth, orange = flowing at 85-99% of its depth, yellow = flowing at 75-84% of its depth, etc.). The planning criteria for undersized pipelines is if the flow is equal to or greater than 85% of full capacity based on maximum flow depth (d/D). As stated in Chapter 2, the Department of Environmental Quality prohibits sanitary sewer overflows, and surcharging in wastewater systems is generally discouraged.

Figure 12b in Appendix A illustrates the maximum flow divided by full flow (q/Q) during the existing system peak instantaneous flow model evaluation. q/Q shows the maximum flow experienced by the pipe segment divided by the theoretical maximum flow based on Manning's equation. The figure is color-coded to show a gradation of pipes based on utilized capacity (e.g., red = flowing at >100% capacity, orange = flowing at 85-99% of capacity, yellow = flowing at 75-84% capacity, etc.). This study does not establish a trigger for maximum q/Q in the collection system, but the figure does illustrate which pipes may cause bottlenecks in the future.

The existing system evaluation shows a significant portion of the modeled pipelines operating at or above capacity. This primarily observed pipelines lower in the sewer basins near the lift stations. Bottlenecks in this part of the system cause surcharging and flooding in the upstream manholes. In summary, the main trunkline conveying flows to the lift stations is undersized and will require improvements to reduce the risk of overflows and allow for growth within the City. Additional discussion of each deficiency location and alternatives to address the issue are discussed in Chapter 4.

Table 3-17 compares the PIF to the pump station measured firm capacities. As noted previously, the E Street Pump Station's measured capacity is less than the reported capacity; however, the unconstrained PIF is greater than both the measured and reported capacity. The City has experienced overflows at this lift station, indicating the pumps are insufficient. The Washington Pump Station had a slightly higher measured flow than was reported, but again, the unconstrained PIF is greater than both recorded flow rates. It is recommended that the City complete improvements at both of these lift stations to be able to handle the PIF and reduce the risk of overflows.

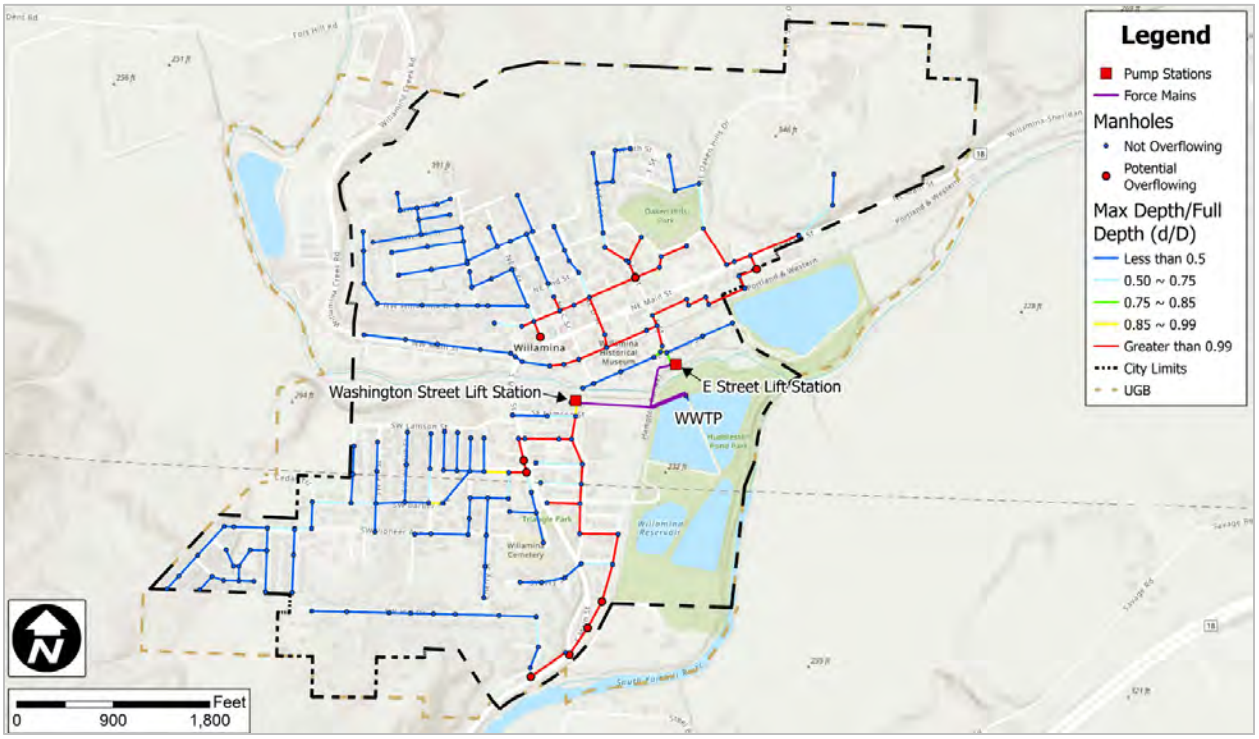
TABLE 3-17: EXISTING PIF VS. PUMP STATION CAPACITY

Pump Station	Reported Firm Capacity (gpm)	Field Measured Firm Capacity (gpm)[1]	Constrained PIF (gpm)	Uncsontrained PIF (gpm)	Sufficient Capacity (yes/no)[2]
E Street PS	700	500	1,250	1,400	No
Washington St PS	770	820	1,155	1,890	No

1) Field measured firm capacity based on average measurement from the two pumps.

2) Sufficient capacity based on field measured firm capacity comapred with unconstrained PIF

FIGURE 3-18: EXISTING PIF D/D



➢ Pipeline Conditions

In-field pipeline material condition inspection and review were not included as part of this report. However, it is important to note that one of the basic assumptions of the hydraulic model is that all lines are free from physical obstructions such as roots and accumulated debris. Such maintenance issues, which certainly exist, must be discovered and addressed through consistent maintenance efforts. The modeled capacities discussed in this chapter represent the capacity assuming the sewer lines are in good working order.

➢ Future Flow Projections and Model Scenarios

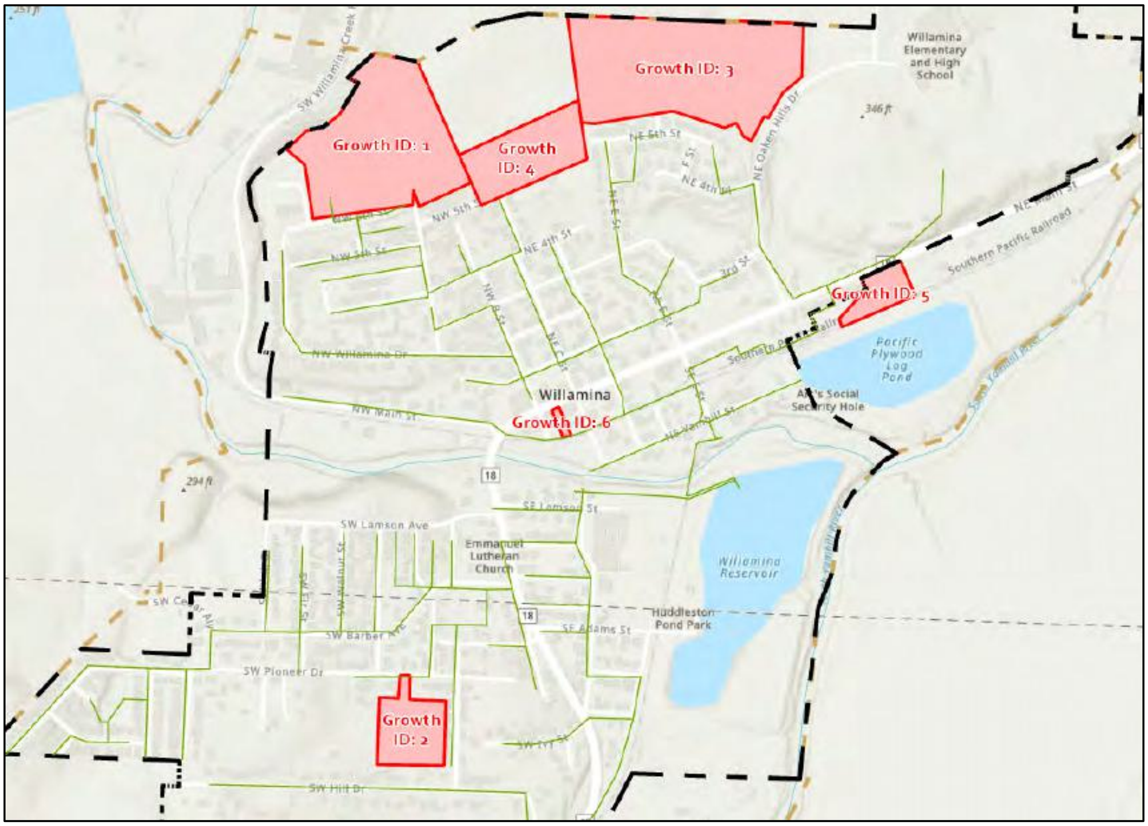
Future flows were distributed based on the EDUs assigned during the Future Growth Meeting. The topography within each growth area was reviewed, and the associated flows were assigned to the nearest existing manhole where the growth area could gravity flow. The total number of EDUs corresponds to the total projected population increase (Chapter 2). After identifying areas where growth is anticipated, 268 EDUs (545 person population increase) and the flows based on the density of the areas were distributed to the model accordingly. The City anticipates some commercial and industrial growth by adding one winery and one plywood mill within the E Street Basin. Flows per capita for projected population growth were assumed to be like existing flows per capita. Projected flows per zoning designation for the 20-year planning period are presented in Table 3-18.

TABLE 3-18: 20-YEAR PROJECTED FLOWS BY ZONE

Growth Area ID	Area (ac)	Type	#EDUs[1]	People	Flow (GPD)	Flow (GPM)	Model Load Junction
1	18.6	Single Family Residential	96	195	286,474	199	1/2 flow to J3, 1/2 flow to J7
2	4.7	Single Family Residential	26	53	77,587	54	C4-2
3	22.1	Single Family Residential	88.44	180	263,914	183	1/3 KA4, 1/3 KA12, 1/3 KA10
4	7.3	Multi-Family Residential	58	118	173,078	120	B5-4
5	2.3	Commercial (Plywood Mill)	n/a	-	5,750	4	M4
6	0.3	Commercial (Winery / Cidery)	n/a	-	2,572	2	B2-2
Total			268	545	809,374	562	-

1) EDUs from growth areas 1 and 2 are based on reported EDUs by the City. Growth Area 3 is based on 4 EDUs/gross acre. Growth Area 4 is based on 8 EDUs/gross acre and the total number of EDUs was adjusted to match the projected populations in 2045. Growth Area 5 is based on 2,500 PGD/acre. Growth Area 6 flows are based on the maximum month water consumption from Coyote Joes Restaurant in 2020.

FIGURE 3-19: GROWTH AREAS



During the future planning meeting with the City, they provided the number of EDUs allowed within the first two Growth Area ID Items. This correlated to an increase of 245 people or 122 EDU's. These growths can be seen in Figure 3-19 above.

- 20-Year Capacity Limitations

The model was run to evaluate the effects of a 2045 peak day flow event on the existing system. Like the Existing Capacity Limitations section, Figures 13A and 13B (Appendix A) are color-coded to show a gradation of pipes based on d/D_{full} and q/Q_{max}, respectively, and potential overflow manholes.

The capacity limitations in the 20-year projected scenario are similar to the deficiencies described in the existing system evaluation. Alternatives to alleviate these deficiencies are described in the next chapter.

3.3.7. WWTP Capacity Evaluation

Capacities of each treatment process were evaluated to assess WWTP limitations. Evaluations assume all components were online and functioning. For each process, hydraulic or biological limitations are identified.

- Headworks

The capacity limitation of the headworks process is based on its ability to pass the peak instantaneous flow. The current headworks screen provided by the City was rated for the capacity that the City required; however, the screen malfunctioned and is unusable. The City has been using a backup screen and manually raking its surface. The capacity of the original automatic mechanical influent screen (according to the screen manufacturer) is 4.32 MGD (3,000 gpm). The capacity of the City's magnetic influent flow meter is approximately 4.06 MGD (2,820 gpm). The headworks is insufficient for the existing and future 2045 instantaneous flow rates of 4.79 and 5.77 MGD, respectively.

The operator has reported that the pipe into Lagoon #1 from the diversion structure is hydraulically limited and experiences surcharging during high-flow events, causing the flow to be distributed to Lagoon #1 and Lagoon #2 concurrently.

- Aerated Lagoons #1 and #2

The capacity limitation of the aerated lagoons is based on their ability to biologically treat the organic loading into the WWTP. A minimum of two lagoons is required for reliability. The lagoons need to be able to treat the maximum month loading during the coldest influent temperatures (where the microbiological activity is slowest). While there is no current ammonia discharge limit, it is important to maintain low or non-detectable readings. For this reason, the ability of the WWTP to continually achieve nitrification was evaluated.

The lagoons were designed for a residence time of 18.2 days within Lagoon #1 and 17.9 days within Lagoon #2 at a MMWWF of 0.688 MGD. Based on the future loadings, the estimated treatment capacity of the aerated lagoons, assuming a working aeration system, is 1.3 MGD to meet permit requirements for BOD_5 removal of 85% between the two lagoons.

The firm capacity of the lagoons is sufficient for existing and future flow conditions. This capacity is based on Lagoon #1 and #2 operating at average water elevations. When temperatures are higher, operating the lagoons at maximum water depth may not be necessary. Additional detention time and facultative treatment can be obtained through Lagoons #3 and #4.

The 10-inch transfer pipe capacity is estimated to be 1.8 MGD, which is inadequate for the existing and future conditions. The limitation of this piping is based on hydraulic capacity to pass the peak day flow (it is assumed that peak instantaneous flows are buffered out in Lagoon #1). No redundancy is required in this piping. The maximum flow through the piping assumes average water depth in the lagoons.

- Aeration System

The capacity of the blowers is based on their ability to provide adequate oxygen to support the growth of the microorganisms responsible for wastewater treatment. Redundancy is required in aeration blowers and is provided with two units (one duty, one standby). While the treatment objective is to reduce BOD_5, both autotrophic and heterotrophic bacteria exist in the lagoons, and it is assumed that sufficient oxygen must be provided for both carbon and nitrogen oxidation.

The blowers can deliver 480 SCFM each and have a combined firm capacity (with one of the 40 HP blowers out of service) of approximately 1,270 lbs. oxygen per day. The aeration system was designed for an influent flow of 0.3 MGD and a BOD_5 loading of 488 lbs/day. The original aeration system was not designed with additional oxygen requirements for total Kjeldahl nitrogen (TKN). Based on the BOD_5 and TKN loading criteria discussed in this chapter, the required oxygen requirements for treating the 2045 MMWWF of 1.49 MGD is 3,240 SCFM. The current aeration system is undersized to provide sufficient oxygen for oxidation, which limits the treatment that can occur.

- Effluent Storage Lagoons #3 and #4

Two processes are evaluated for capacity. First, the capacity of the transfer pumps to move water from Lagoon #3 to Lagoon #4, and second, the volume of these lagoons. As noted above, the two lagoons are hydraulically connected via a pump station. The capacity limitation of the transfer pumps is based on their hydraulic capacity to move water into Lagoon #4. Redundancy is required with two pumps (one duty, one standby). The pump has a firm capacity of 1.30 MGD (900 gpm). The as-built drawings show a 6-inch discharge pipe to Lagoon #4 from the transfer pump. Based on a pumping rate of 900 gpm, a velocity of 10 ft/s is developed in the discharge pipe. Typical designs intend to keep velocities in piping between 2-8 ft/s. The transfer pump does not have firm capacity for the existing and future peak day average flow.

A theoretical water balance was used to evaluate the adequacy of the storage volume. The water balance shows how much water must be held in the lagoons during the non-disposal seasons. The water balance is calculated using the influent flow to the lagoons plus precipitation and less evaporation. To be conservative, losses from spray gun evaporation or seepage through the liners were not considered. The precipitation data is taken from City rain gauges. Evaporation data is taken from local evaporation station averages (Agricultural Waste Management Field Handbook, 1998). The net loss in volume in the existing lagoons is 3.96 MG during the non-discharge period. The City should consider performing a seepage test of the lagoons and factoring the seepage volume into the water balance.

The volume of water contained in Lagoons #3 and #4 is 25 MG. This assumes Lagoon #3 operates at the maximum water depth of 8 feet which is the difference between the maximum water depth of 11 feet and the minimum water depth of 3 feet, and all 12 feet of available storage in Lagoon #4 can be utilized. Storage within the aerated lagoons were also incorporated into the water balance. It is assumed the lagoons will operate at the minimum water level which provides 2 feet of available storage between the maximum water depth of 8 feet and minimum water depth of 6 feet. This results in a storage volume of 7.9 MG. Based on the water balance, the total storage volume available within all lagoons is approximately 33 MG. This storage volume is insufficient for the current and future wastewater flows during the non-discharge season. While some excess water is likely lost due to seepage and utilization of the spray guns, the WWTP has had occasions of nearly exceeding available storage in the lagoons, and additional storage is necessary.

- Disinfection

The capacity limitation of the disinfection process is associated with the contact time of chlorine with the wastewater, as well as the capacity of the chlorine pumps. The capacity limitation of the dechlorination system is based on the capacity of the dechlorination pumps. Redundancy in the chlorine contact basin or with the chlorine mixer is not required. However, redundancy in chemical pumping is needed to ensure an identical piece of equipment is available for replacement.

The estimated chlorine contact basin volume is approximately 26,600 gallons. The basin was originally designed for a contact time for MMWF and PDWWF of 56 minutes and 28 minutes, respectively. With a volume of 26,600 gallons, the chlorine contact chamber has a capacity of up to 0.64 MGD AADWF. The required contact times by Oregon guidelines are 20 minutes at the peak daily flow, 15 minutes at peak hourly flow, or 60 minutes at average dry-weather flow, whichever results in the largest basin. The lagoons have a significant amount of storage, and it is assumed high flow events can be equalized between the lagoons to maintain contact time through the chlorine contact basin. Therefore, a contact time of 30 minutes at MMWWF was chosen for the design criteria as to not oversize the basin. The 2045 peak daily flow rate is 4.04 MGD, the peak instantaneous flow rate is 5.77 MGD, and the average dry-weather flow is 0.56 MGD. At these future design flows, the chlorine contact basin can meet the 60-minute contact time at average dry-weather flow but cannot meet the 20-minute or 15-minute requirement.

The maximum generation of sodium hypochlorite is 36 pounds per day, and the existing system was designed for a solution flow rate of 22 gph (540 gpd). The capacity of the sodium bisulfite generation is 26 pounds per day, and the existing system was designed for 0.24 gph (5.76 gpd).

Since being replaced, both the existing sodium hypochlorite chemical feed pump and sodium bisulfite chemical feed pump are rated to a maximum pump rate of approximately 5.60 gph (134 gpd). The operator reports using an average of 10 pounds of chlorine per day during the discharge period. Some issues may limit the disinfection capacity as the flows increase and detention time within the lagoons and chlorine contact basin decreases. Baffles or mixer modifications may also be recommended for future flows.

- Outfall Discharge

The capacity limitation of the outfall is based on the hydraulic capacity of the outfall piping. There are no redundancy requirements. The flow is discharged from the chlorine contact basin to a vault containing a gooseneck flow meter. The discharge from the flow meter to the river is a single port 8-inch HDPE pipe with a diffuser. Given the size and slope of the outfall, the estimated capacity is 1.39 MGD, which is insufficient.

- Summary

A summary of the existing hydraulic and treatment capacity for the unit processes at the plant is provided in Table 3-19. Alternatives to address the lagoon deficiencies and capacity limitations are discussed in Chapter 4.

TABLE 3-19: WWTP CAPACITY SUMMARY

Equipment	Governing Flow	Firm Capacity Provided (MGD)	Current Capacity Needed (MGD)	2045 Capacity Needed (MGD)	Limiting Factor
Headworks Screen/Compactor	PIF_5	4.32	4.58	5.77	Hydraulic
Aerated Lagoons (#1 and #2)	$MMWWF_5$	1.30	1.18	1.49	Detention Time, Treatment (BOD_5 removal)
Aeration System	$MMWWF_5$	0.22	1.18	1.49	Aeration requirements for treatment
Pipe between Lagoons #1 and 2	$PDAF_5$	1.80	3.21	4.04	Hydraulic
Transfer Pumps	$PDAF_5$	1.30	3.21	4.04	Hydraulic
Effluent Storage	ADWF	19.3	40.1	49.1	Non-discharge period (May 1 - Oct 30)
Chlorine Disinfection	PIF_5	2.55	4.58	5.77	Hydraulic retention time of 15 minutes

CHAPTER 4 - ALTERNATIVES CONSIDERED

There are many different alternatives to meet the wastewater facility deficiencies discussed in this facility planning study. Keller and the City discussed several options, and the alternatives evaluated are discussed in this chapter.

4.1. COLLECTION SYSTEM ALTERNATIVES

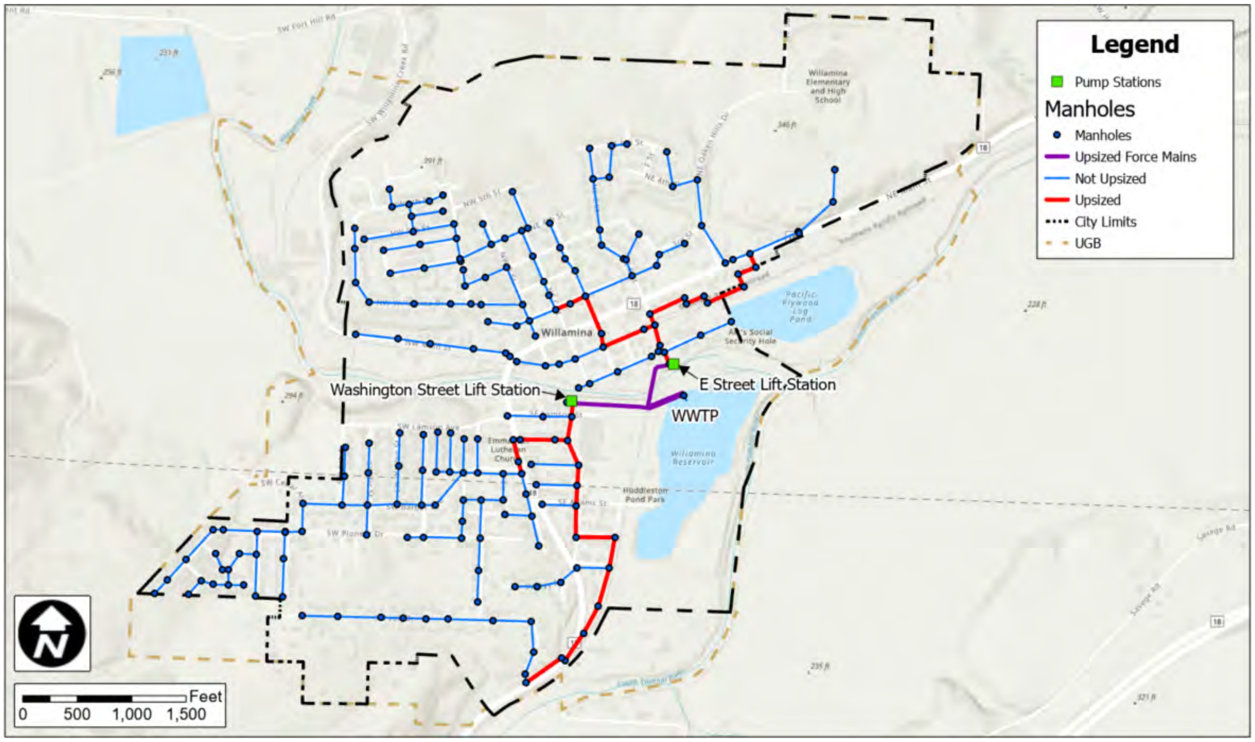
As documented in Chapters 2 and 3, there are capacity deficiencies within the collection system during the current design flow events. Improvements to correct the identified deficiencies could be addressed by implementing several improvement alternatives. This section describes alternatives which could be implemented to eliminate surcharging in the existing gravity pipes, upsize the capacity of the lift stations to meet the peak instantaneous flow, and reduce the likelihood of sanitary sewer overflows. Environmental impacts, land requirements, sustainability considerations, water and energy efficiency, green infrastructures, or other impacts are documented in this chapter. Cost comparisons and a recommended alternative selection are detailed in Chapter 5. A brief description of the alternatives is provided below.

- Alternative 1 – Upsize existing pipes in their current alignment and upgrade the two lift stations and force mains to pass the future peak instantaneous events without surcharging or overflows.
- Alternative 2 – Divert flows from SW Hill Drive to SW Cherry Street to reduce flows in the trunkline along S Main Street. This alternative does still require upsizing existing pipes in their current alignment, upsizing the force mains, and upgrading the two lift stations.
- Alternative 3 – Implement I/I reduction efforts consisting of CCTV and smoke testing, cured-in-place pipe lining (CIPP) or mainline replacement, manhole rehabilitation, and service lateral replacements. The I/I reduction efforts will reduce the length and size of pipe required to be upsized to pass the peak instantaneous events. This alternative considers two I/I target reduction scenarios:
  - Alternative 3.1 – Assumes CCTV and smoke testing to identify and repair sources of direct inflow. Install CIPP for all pipes installed in the original collection system in 1966 and lining the connected manholes. This alternative assumes a 20% reduction in PDF_5 and PIF_5 flows due to the reduced I/I achieved by the improvements.
  - Alternative 3.2 – Assumes the same improvements as Alternative 3.1; as well as replacement of all service laterals from the sewer main to the property boundary. This alternative assumes a 50% reduction in PDF_5 and PIF_5 flows due to the reduced I/I achieved by the improvements.

4.1.1. Alternative 1 – Upsize Existing Infrastructure

The hydraulic model was used to identify the required pipe upsizing required to pass the design flow event without surcharging. The pipes requiring upsizing are summarized in Figure 4-1. In general, it consists of approximately 7,300 LF of upsized pipe within the system.

FIGURE 4-1: ALTERNATIVE 1 IMPROVEMENTS



The design criteria for the lift stations under Alternatives 1 and 2 are provided in Table 4-1. These flows assume no reduction in flows from the projections in Chapter 3.

TABLE 4-1: ALTERNATIVES 1 AND 2 DESIGN FLOWS (2045)

Scenario (gpm)	E Street	Washington Street
AADF	210	170
ADWF	100	80
AWWF	340	280
PDF_5	1,510	1,220
PIF_5	2,060	1,960

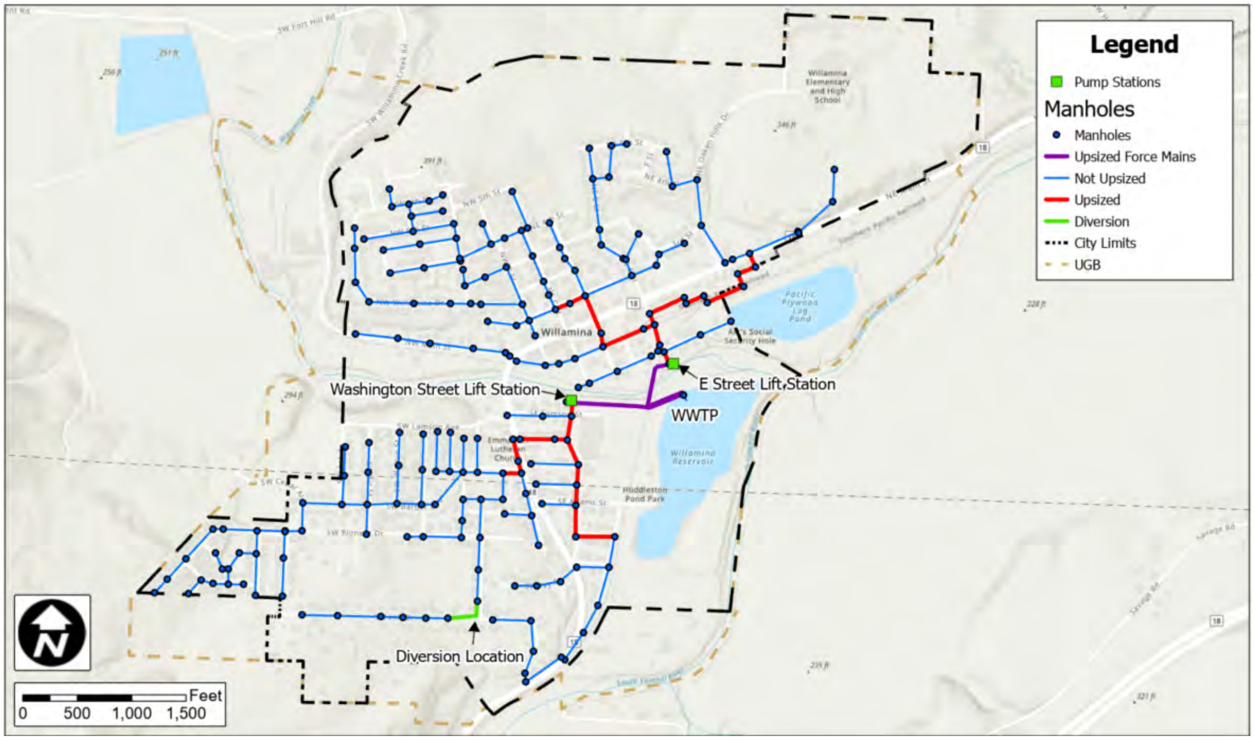
The lift stations and their force mains require additional capacity to convey the future peak flows. The current capacity of the E Street and Washington Street lift stations is 700 gpm and 770 gpm respectively. The anticipated peak flows in each basin are approximately two times greater than the existing capacity. Due to the large increase in capacity and for budgeting purposes, it was assumed both lift stations will require a complete replacement consisting of new wetwells, valve vaults, pumps, electrical components, controls, valves, and piping. For the force main upgrades, it was assumed a parallel 12-inch pipe would be constructed to the WWTP from each lift station. Due to the large fluctuation in seasonal flows, a single upsized pipe could have issues with achieving scour velocity during low flow periods. A parallel pipe would allow the City to use the existing 8-inch during low flow periods and the 12-inch during high flows. A parallel line also provides resiliency to the system and would allow the lift station to still operate in the event one of the force mains is damaged. The specific force main sizing and configuration should be evaluated further during the pre-design stage.

4.1.2. Alternative 2 – Divert Flows to SW Hill Drive

The design flows for this alternative are the same as presented in Table 4-1. The hydraulic model was used to identify the required pipe upsizing under Alternative 2 which diverts flows from SW Hill Drive to SW Cherry Street. The required pipe upsizing associated with this alternative is illustrated in Figure 4-2. In general, it consists of approximately 6,400 LF of upsized pipe within the system.

This alternative does not reduce the system flows and therefore the same improvements to the lift station and force mains are required.

FIGURE 4-2: ALTERNATIVE 2 IMPROVEMENTS



4.1.3. Alternative 3.1 – Moderate I/I Reduction

The design criteria for the lift stations under Alternative 3.1 are provided in Table 4-2. These flows assume a 20% reduction in flows from the projections included in Chapter 3. This alternative assumes a reduction in systemwide flows as a result of moderate I/I reduction activities. The assumed 20% I/I reduction was established based on studies for other collection systems in Oregon which evaluated the effectiveness of I/I reduction activities. The information was found from the EPA Seminar Publications on the National Conference on Sanitary Sewer Overflows (SSOs), 1995. (Page 6 & 475) as well as through consultation with Leeway Engineering.

TABLE 4-2: ALTERNATIVE 3.1 DESIGN FLOWS

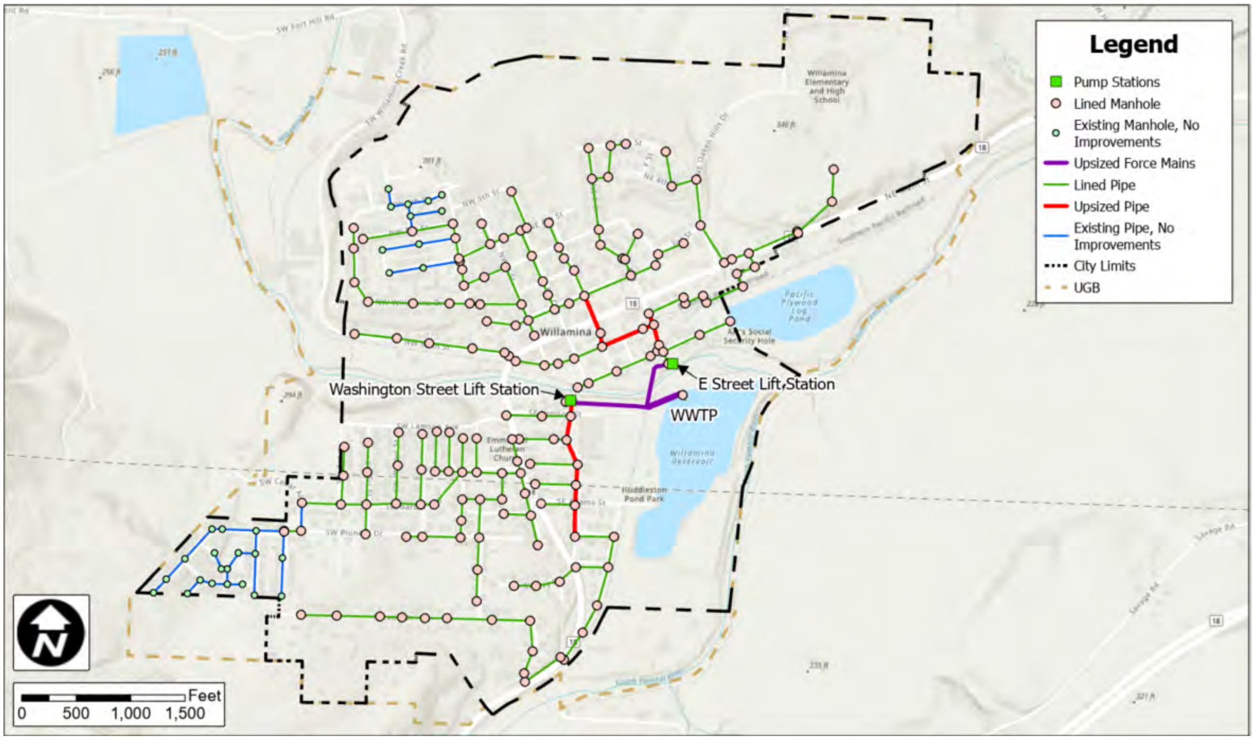
Scenario (gpm)	E Street	Washington Street
AADF	186	152
ADWF	100	80
AWWF	272	224
PDF_5	1,208	976
PIF_5	1,648	1,568

The I/I reduction efforts to achieve a 20% reduction were assumed to consist of completing CCTV and smoke testing of the entire collection system to identify sources of I/I within the collection system. Sources of I/I may include root intrusion, cracked pipes, gaps between pipes and manholes, or other defects that would allow I/I to enter the collection system. While specific improvements to reduce I/I should be identified by reviewing CCTV results and repairing primarily pipes identified with defects, the CCTV evaluation was not completed as part of this facility plan. For this study, it was assumed that the pipe installed during the construction of the original collection system in 1966 will require lining with cured-in-place pipe and lining the connected manholes. This consists of approximately 87% of the total collection system by length. It was assumed sewer pipes constructed more recently have less I/I due to the newer materials and more watertight construction. I/I reduction efforts in the new areas would have less of an impact compared to the other parts of the system and are not likely worth the effort.

The hydraulic model was used to identify the required pipe upsizing under the 20% flow reduction scenario. The extent of the I/I improvements and pipe upsizing are illustrated in Figure 4-3. In general, this alternative consists of 37,000 LF of cured-in-place pipe, 180 lined manholes, and 6,000 LF of upsized pipe.

While flows are reduced in this alternative, lift station and force main upgrades are still required in this alternative.

FIGURE 4-3: ALTERNATIVE 3.1 IMPROVEMENTS



4.1.4. Alternative 3.2 – Aggressive I/I Reduction

The design criteria for the lift stations under Alternative 3.2 are provided in Table 4-3. These assume a 50% reduction in I/I flows from the projections included in Chapter 3 as a result of aggressive I/I reduction activities. The assumed 50% I/I reduction was established based on studies for other collection systems in Oregon which evaluated the effectiveness of I/I reduction activities. The information was found from the EPA Seminar Publications on the National Conference on Sanitary Sewer Overflows (SSOs), 1995. (Page 20 & 475)

TABLE 4-3: ALTERNATIVE 3.2 DESIGN FLOWS

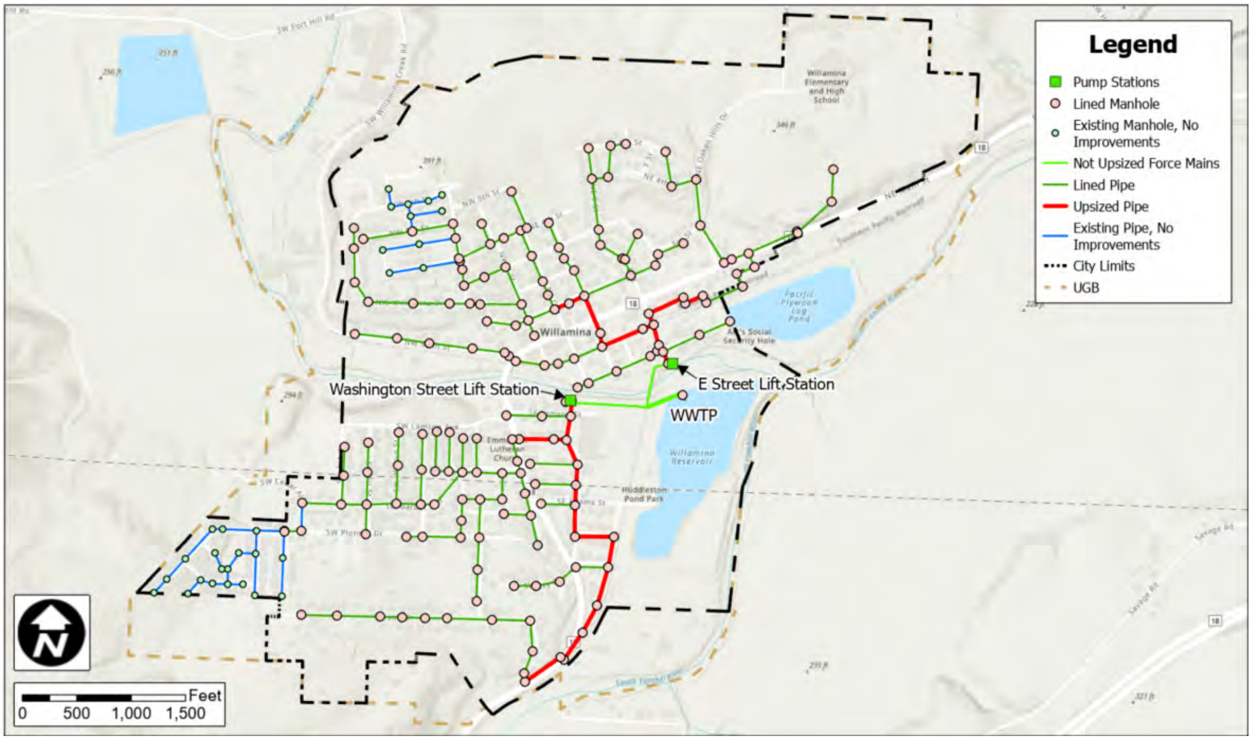
Scenario (gpm)	E Street	Washington Street
AADF	135	110
ADWF	100	80
AWWF	170	140
PDF_5	755	610
PIF_5	1,030	980

The I/I reduction efforts were assumed to consist of the same activities described in Alternative 3.1, but also include the replacement of sewer service laterals from the sewer main to the property boundary for areas included in the original collection system.

The hydraulic model was used to identify the required pipe upsizing under the 50% flow reduction scenario. The extent of the I/I improvements and pipe upsizing is illustrated in Figure 4-4. In general, this alternative consists of 41,000 LF of cured-in-place pipe, 180 lined manholes, and 2,500 LF of upsized pipe.

The flows are significantly reduced under this alternative and the extent of the lift station upgrades is less than the other alternatives. This alternative assumes the existing wetwells, vaults, valves, and piping can be used with the upgrades consisting of new pumps and electrical equipment. The existing 8-inch force mains are sufficient due to the decreased flows and therefore this alternative does not include any force main improvements.

FIGURE 4-4: ALTERNATIVE 3.2 IMPROVEMENTS



4.2. COLLECTION SYSTEM ENVIRONMENTAL IMPACTS

The potential environmental impacts of the alternatives are summarized in the following sections. A summary of the impacts is presented in Table 4-4.

TABLE 4-4: COLLECTION ALTERNATIVES GENERAL IMPACT SUMMARY

Impact Criteria	Alt. 1: Upsize Existing Infrastructure	Alt. 2: Divert Flows and Upsize Existing Infrastructure	Alt. 3.1: Moderate I/I Reduction	Alt 3.2: Aggressive I/I Reduction
Land Use/ Important Farmland/ Formally Classified Lands	No impact	No impact	No impact	No impact
Floodplains/ Wetlands	Lift stations are in the 500-year floodplain. If moved, the lift station elevations will be higher than the floodplain.	Lift stations are in the 500-year floodplain. If moved, the lift station elevations will be higher than the floodplain.	Lift stations are in the 500-year floodplain. If moved, the lift station elevations will be higher than the floodplain.	No impact
Cultural, Biological, and Water Resources	No impact	No impact	No impact	No impact
Socio-Economic/ Environmental Justice Issues	Economic Costs	Economic Costs	Economic Costs	Economic Costs

4.2.1. Land Use / Prime Farmland / Formally Classified Lands

None of the alternatives are anticipated to change land use, impact prime farmland, or disturbed significant new land. The improvements are expected to occur within the existing pipe alignment and right-of-way.

4.2.2. Floodplains / Wetlands

The two existing lift stations are located within the mapped Willamina Creek 500-year floodplain. Improvements to the lift stations will include provisions for flood protection if they are moved into the floodplain. Some of the existing pipe alignments cross wetlands but construction techniques will be used to avoid impacting the wetlands and no new obstructions to the flood plain or wetland areas are anticipated.

4.2.3. Cultural, Biological, and Water Resources

The improvements being evaluated are on previously disturbed lands and it is not anticipated that any of the alternatives will interfere with cultural, biological, or water resources.

4.2.4. Socio-Economic Conditions

Alternatives are not anticipated to have a disproportionate effect on any segment of the population (economic, social, or cultural status). The main economic impact is the cost of the alternatives.

4.3. COLLECTION SYSTEM LAND REQUIREMENTS

The alternatives do not likely require the purchase of additional land. The lift station upgrades were assumed to be completed within the existing City-owned property. The pipeline improvements are assumed to be within the right-of-way.

4.4. COLLECTION SYSTEM POTENTIAL CONSTRUCTION PROBLEMS

Potential construction problems associated with the alternatives are summarized below.

- Subsurface Bedrock – Unforeseen ground conditions such as rocky terrain, unstable soil, or groundwater can complicate excavation and trenching processes, leading to delays and increased construction costs. Specifically, if the existing trenches are not large enough for the upsized gravity pipes.

- High Groundwater – High groundwater during construction would require dewatering.
- Crossing Willamina Creek – Force main improvements from the E Street Lift Station would require crossing Willamina Creek. Construction would likely consist of boring or directional drilling underneath the creek.
- Conflicting Utilities – One of the most common issues is encountering existing utility lines like water pipes, gas lines, or electrical cables. Accidentally damaging these lines can cause disruptions to essential services and pose safety hazards.
- Traffic Disruption – Construction activities may disrupt traffic flow in urban areas, leading to congestion, detours, and safety hazards for motorists and pedestrians.

4.5. COLLECTION SYSTEM SUSTAINABILITY CONSIDERATIONS

Sustainable utility management practices include environmental, social, and economic benefits that aid in creating a resilient utility.

4.5.1. Water and Energy Efficiency

Reducing I/I leads to smaller pumps in the lift stations and lower power usage. Additionally, there may be less power consumption at the WWTP due to the decreased flows. The lift station upgrades could include soft starts, VFDs, and energy efficient pumps.

4.5.2. Green Infrastructure

Pipeline improvements could be coordinated with local stormwater improvements. Reducing I/I flows leads to less volume discharged from the WWTP.

4.5.3. Other

System resiliency and simplicity will be optimized with the updated SCADA required to complement the alternatives.

4.6. COLLECTION SYSTEM COST ESTIMATES

The advantages, disadvantages, and comparative costs of the alternatives are presented in Chapter 5. The cost estimates are a Class 5 cost opinion, as defined by the Association for the Advancement of Cost Engineering (AACE). The costs are provided in Appendix I. Lift-cycle cost estimates were not completed for the collection system alternatives because each of the alternatives will have similar costs for O&M, useful life, and labor. There will be less power usage for the I/I reduction alternatives; however, the capital costs are the most influential factor when evaluating the costs.

4.7. TREATMENT AND STORAGE ALTERNATIVES

Alternative solutions to address the insufficient storage capacity within the lagoons are discussed below. Each alternative would also require specific treatment improvements to address the additional deficiencies discussed in Chapter 3. I/I reduction from collection system improvements would mainly improve the treatment in the lagoons by increasing the retention time during wet weather. The impact on the storage requirements would not be as dramatic since the storage period (non-discharge) is from late spring to early fall, and I/I is already reduced during this period.

4.7.1. Design Criteria

The characteristics of the wastewater that form the basis for sizing the wastewater facilities are summarized in Chapter 3. Design criteria that will be used for sizing various potential components are summarized in several parts in the following sections.

4.7.2. Regionalization

Due to the political complexity, physical distance, and pipeline cost between Willamina and a city with larger wastewater facilities, developing a partnership with another community to share wastewater facilities is not currently of interest to the City.

4.7.3. Optimization of Existing Facilities

This option is to continue to dispose of the water as is currently done without incorporating new construction changes (no-action). As mentioned in Chapter 3, there is inadequate lagoon storage and treatment deficiencies with the headworks, aeration, and disinfection system. Water would continue to be stored in the effluent storage lagoons during the summer until it can be discharged to the South Yamhill River. However, as flows increase, there will not be enough storage available within the lagoons for the entire non-discharge period, and the City could face overflow events or non-permitted discharge, violating the current NPDES permit. As part of this alternative, the City can choose to conduct a sludge depth survey and re-evaluate the existing storage capacities of the lagoons following sludge removal.

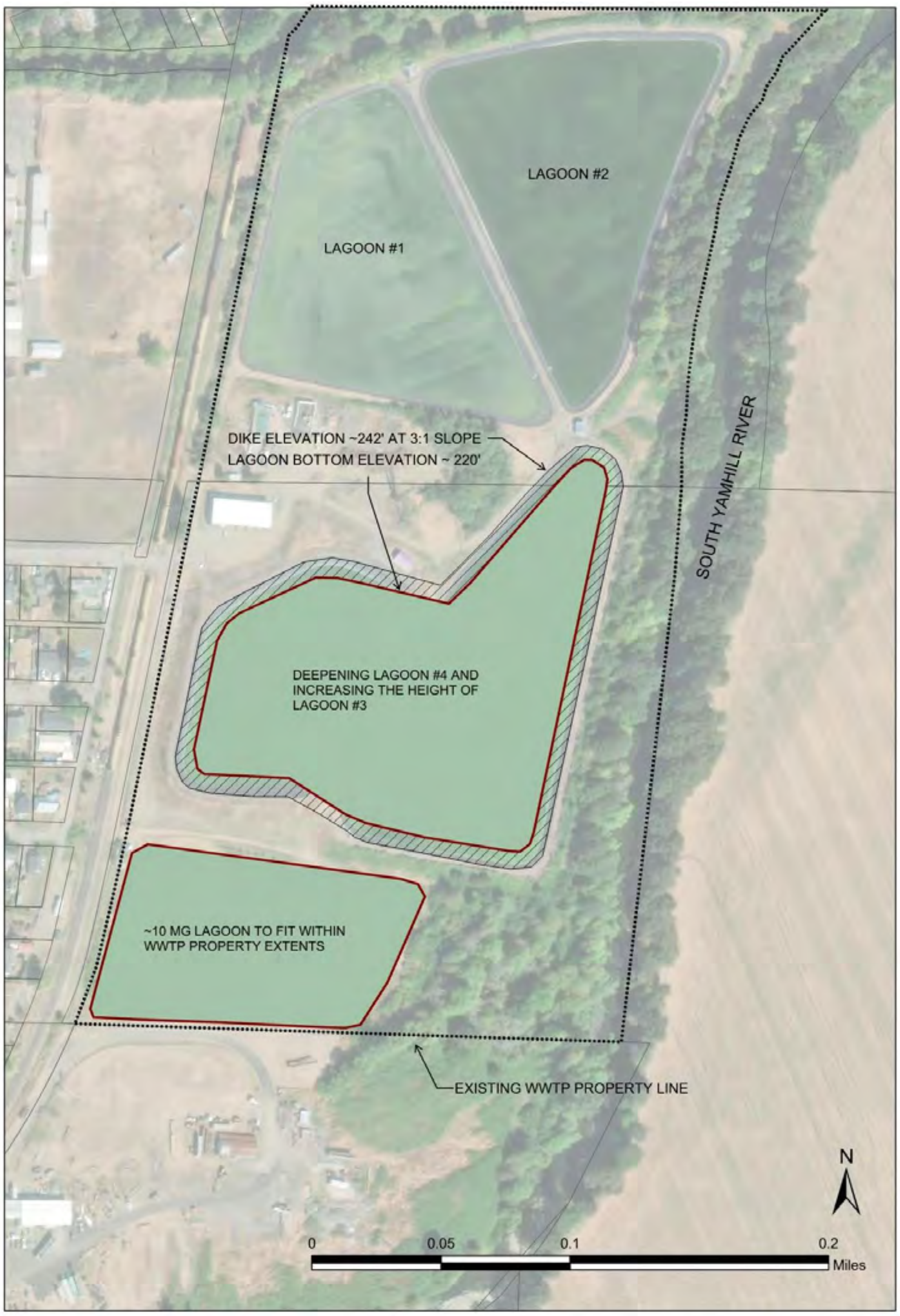
4.7.4. Reuse

To decrease the storage needed during the non-discharge period, the City previously evaluated reuse of the water on poplar trees within the available land at the WWTP. However, the reuse design was never executed due to the difficulty in operating the reuse system and removing the trees. For similar reasons, the City is not currently interested in evaluating reuse further.

4.7.5. New Storage Lagoon

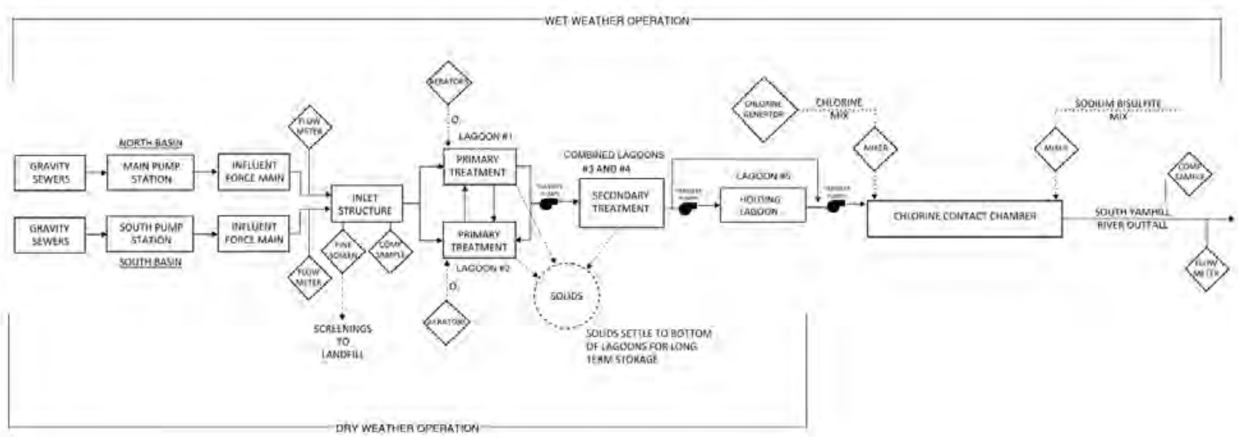
This option would add storage capacity with a new storage lagoon to supplement the storage provided in Lagoons #3 and #4. This alternative would allow the City to maintain the current permit requirements and have sufficient storage during the non-discharge period. A map showing the proposed location of the new lagoon is shown in Figure 4-5.

FIGURE 4-5: NEW STORAGE LAGOON #5



Based on the future conditions, it is expected that up to a total of 49 MG of wastewater flow must be stored during the 20-year planning period. With the existing lagoons having a volume of 33 MG, an additional 17 MG of storage volume is required. This alternative would construct a new Lagoon #5 with approximately 10 MG capacity south of Lagoons #3 and #4. To meet future storage requirements, Lagoons #3 and #4 would also need to be combined. Additional WWTP improvements included as part of this alternative are headworks improvements (including a new mechanical screen, flow measurement, and larger diversion box and piping), new aeration system and blowers in Lagoons #1 and #2, disinfection system improvement (including a larger chlorine contact basin and increased capacity chlorine disinfection system), a new SCADA system and backup power, the combination of Lagoon #3 and Lagoon #4, and larger piping between the lagoons and from the chlorine contact basin to the outfall. The pump station would be modified to transfer water between Lagoon #3 and the new storage lagoon (Lagoon #5). The projects as part of this alternative are discussed in more detail in Chapter 6. The schematic for this alternative is shown in Figure 4-6.

FIGURE 4-6: WWTP SCHEMATIC WITH STORAGE LAGOON #5

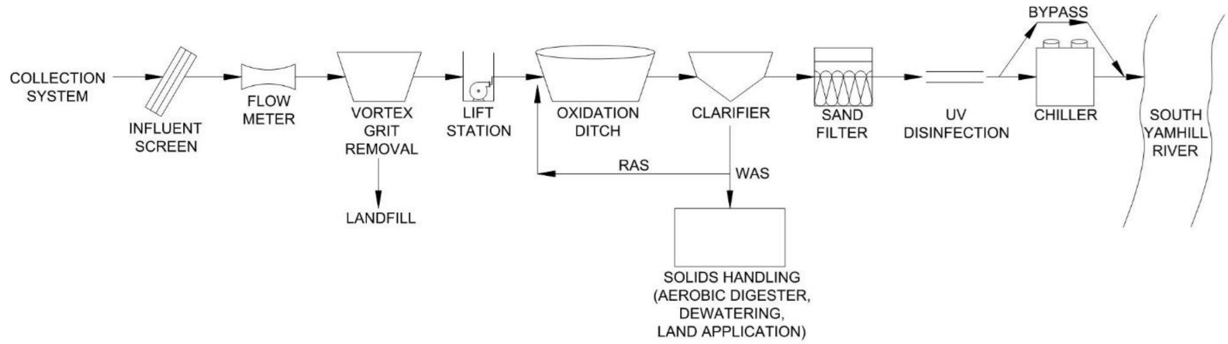


4.7.6. Mechanical Treatment (Year-Round Discharge)

Year-round discharge to the South Yamhill River would eliminate the need to increase the storage; however, more stringent permit limits may be required to protect the river during the dry season (currently the non-discharge season). These permit limits might include ammonia, phosphorus, and temperature. The cost for the additional treatment facilities to achieve ammonia, phosphorus, and temperature limits would be very significant. A sophisticated mechanical plant was chosen for this alternative to meet the required treatment levels consistently, including tertiary treatment and cooling.

For this alternative, we have included a new headworks with screening and grit removal to protect the downstream treatment equipment, oxidation ditches with secondary clarifiers (mechanical secondary treatment system) for ammonia, BOD_5, and TSS removal, followed by sand filters for phosphorus removal, ultraviolet light (UV) disinfection to meet the total residual chlorine and E. coli requirements, and mechanical cooling (cooling towers or chillers) for temperature reduction. With this alternative, there would be more biosolids production than with a lagoon system. The biosolids would be aerobically digested, dewatered, and land applied by farmers. It was assumed that the new treatment facilities could be constructed within the footprint of Lagoon #1. A schematic of the alternative is shown in Figure 4-7.

FIGURE 4-7: MECHANICAL TREATMENT SCHEMATIC



Due to the expected hydraulic loss through the treatment process, a lift station is anticipated to be required before the oxidation ditch. The oxidation ditch process uses activated sludge (a concentrated mixture of microorganisms) to remove biodegradable organics and ammonia to comply with effluent requirements. The incoming wastewater is mixed with activated sludge that is settled and returned from secondary clarifiers (return activated sludge (RAS)). Aeration is added to some sections of the oxidation ditch and DO probes would be used to ensure adequate DO is present and initiate automatic process control. An example of oxidation ditches and secondary clarifiers is shown in Figure 4-8.

FIGURE 4-8: OXIDATION DITCHES AND SECONDARY CLERIFIERS

Chemical addition and filtration would be used downstream of the secondary clarifiers to polish the water further by removing small particles and phosphorus that did not settle in the clarifiers. Upflow sand filters are included in this alternative. The water enters near the bottom of the filter tanks and flows up through layers of granular media, filtering out solids in the water. When the water reaches the top of the filter, it passes over the effluent weir. A backwash system operates to remove the solids that are collected on the sand. The backwash water is recycled back to the WWTP influent lift station. An example of sand filters is shown in Figure 4-9.

FIGURE 4-9: SAND FILTERS

Following filtration, the treated water would next be disinfected. For this alternative, UV disinfection was included. UV can be very effective with the high quality of treated water coming from the filters. Mechanical cooling (cooling towers or chillers) would be used for temperature reduction.

Mechanical secondary treatment requires routine disposal of biosolids. For this alternative, it was assumed that the biosolids would be stabilized in aerobic digesters and mechanically dewatered at the WWTP. The treated biosolids would then be hauled to farmers' fields for land application. The sludge is pumped from the secondary clarifiers to the dewatering equipment, mixed with a polymer and dewatered. The filtrate (water that is removed from the biosolids) is sent to the new lift station.

4.8. WWTP ENVIRONMENTAL IMPACTS

The potential environmental impacts of the alternatives are summarized in the following section. A summary of the impacts is shown in Table 4-5.

4.8.1. Land Use / Prime Farmland / Formally Classified Lands

The improvements would be on already disturbed land at the WWTP.

4.8.2. Floodplains / Wetlands

None of the alternatives would create new obstructions to the flood plain or be located in wetland areas.

4.8.3. Cultural, Biological, and Water Resources

The improvements being evaluated are on previously disturbed lands and it is not anticipated that any of the alternatives will interfere with cultural, biological, or water resources.

4.8.4. Socio-Economic Conditions

Alternatives are not anticipated to have a disproportionate effect on any segment of the population (economic, social, or cultural status). The main economic effect is the cost of the alternatives.

TABLE 4-5: WWTP ALTERNATIVES GENERAL IMPACT SUMMARY

Impact Criteria	Alt. 1: New Storage Lagoon	Alt. 2: Mechanical Treatment
Land Use/ Important Farmland/ Formally Classified Lands	No impact. City owns the land required for the lagoon.	No impact. City would construct mechanical treatment at existing treatment plant site.
Floodplains/ Wetlands	No Impact	No Impact
Cultural, Biological, and Water Resources	No Impact	Undetermined - changing to discharge during current non-discharge period.
Socio-Economic/ Environmental Justice Issues	Economic Costs for Construction and O&M	Economic Costs for Construction and O&M

4.9. WWTP LAND REQUIREMENTS

The alternatives can be completed on the remaining available land that the City owns. Potential expandability is also available in land to the west of the current WWTP for storage requirements beyond the 20-year planning period. This land has the potential to be converted into reuse land application or stormwater improvements.

4.10. WWTP POTENTIAL CONSTRUCTION PROBLEMS

The depth of the water table and subsurface rock may affect the construction of the alternatives. However, subsurface investigations were not within the scope of this project. The project area's soil is typical for the area and would require construction techniques normally used to effectively manage excavation, dewatering, and sloughing issues that may arise. Construction plans for any of the alternatives would also include provisions to control dust and runoff.

4.11. WWTP SUSTAINABILITY CONSIDERATIONS

Sustainable utility management practices include environmental, social, and economic benefits that aid in creating a resilient utility. Additional treatment at the WWTP would require additional energy but improve the effluent water quality.

4.11.1. Water and Energy Efficiency

A mechanical treatment system is more efficient and has less footprint than the current aerated lagoon system. However, the additional treatment needed for discharge during the current non-discharge period results in significantly more energy usage. Also, the mechanical treatment will generate additional biosolids that must be removed. Biosolids treatment with land application, because of the nutrients, would be beneficial to the farmland.

4.11.2. Green Infrastructure

Any pump station and blowers will consider VFDs and energy-efficient pumps.

4.11.3. Other

System resiliency and simplicity will be optimized with the updated SCADA required to complement the alternatives.

4.12. COST ESTIMATES

The advantages, disadvantages, and comparative costs of the WWTP alternatives are presented in Chapter 5. The cost estimates are a Class 5 cost opinion, as defined by the AACE. In addition to project capital costs, annual O&M costs are compared to arrive at a more complete picture of the alternative costs. A 20-year life-cycle cost analysis is provided for most of the alternatives, based on a real discount rate (inflation removed) of 2.5%. The equipment (unless a short-lived asset) is assumed to have a 20-year useful life, so no depreciation or salvage value is included when comparing the alternatives. An average rate of $0.09 per kWh was used to estimate power costs, and an average labor cost of $50 per hour was used to estimate maintenance costs. A full breakdown of costs for each collection system alternative can be found in Table 5-1 and each breakdown of costs for each treatment system alternative can be found in Table 5-3.

CHAPTER 5 - SELECTION OF AN ALTERNATIVE

This chapter evaluates the alternatives from Chapter 4. The advantages, disadvantages, and comparative costs (where applicable) are presented.

5.1. COLLECTION SYSTEM ALTERNATIVES

5.1.1. Collection System Cost Estimates

The capital costs for each of the alternatives is summarized in Table 5-1 and the detailed costs are provided in Appendix I. The costs for Alternative 1 consist of the upsized pipe in the system to convey the projected 20-year peak flows. The costs also include two new lift stations, service line reconnections, new force main piping, and replacement manholes. Alternative 2 consists of similar elements included in Alternative 1 but reflect the different lengths of pipe to be upsized due to the diverted flows.

The I/I reduction alternative costs include flow monitoring, CCTV, and lining sewer mains and manholes. Alternative 3.1 also still includes upsizing pipes, lift stations, and force mains to pass the 20-year peak flow event assuming a 20% reduction in I/I flows. Alternative 3.2 includes similar elements to Alternative 3.1, but also the service laterals would be replaced. However, due to the reduction in I/I flows, the existing lift stations and force mains can continue to be used and costs only include upsized pumps and electrical equipment.

TABLE 5-1: COLLECTION SYSTEM ALTERNATIVE COSTS

Item	Alt 1	Alt 2	Alt 3.1	Alt 3.2
Lift Station Replacement	$ 2,552,000	$ 2,552,000	$ 2,552,000	$ 1,640,000
Gravity Pipe Upsizing	$ 4,005,000	$ 3,372,000	$ 3,212,000	$ 1,328,000
I/I Reduction Efforts	$ -	$ -	$ 4,952,000	$ 6,623,000
Force Main Capacity	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ -
Improvements Subtotal	$ 7,557,000	$ 6,924,000	$ 11,716,000	$ 9,591,000
Mobilization and General Conditions	$ 1,520,000	$ 1,410,000	$ 2,370,000	$ 1,920,000
Subtotal	$ 9,077,000	$ 8,334,000	$ 14,086,000	$ 11,511,000
Construction Contingency	$ 1,589,000	$ 1,456,000	$ 2,464,000	$ 2,016,000
Subtotal	$ 10,666,000	$ 9,790,000	$ 16,550,000	$ 13,527,000
Market Contingency	$ 681,000	$ 624,000	$ 1,056,000	$ 864,000
Subtotal	$ 11,347,000	$ 10,414,000	$ 17,606,000	$ 14,391,000
Contractor Overhead & Profit	$ 760,000	$ 700,000	$ 1,180,000	$ 960,000
Total Construction Cost	$ 12,107,000	$ 11,114,000	$ 18,786,000	$ 15,351,000
Engineering, Legal, and Administative	$ 3,412,675	$ 3,137,850	$ 5,259,650	$ 4,303,775
Total Project Cost	$ 15,520,000	$ 14,260,000	$ 24,050,000	$ 19,660,000
Personnel	$ 10,000	$ 10,000	$ 75,000	$ 75,000
Administrative Costs	$ 5,000	$ 5,000	$ 10,000	$ 10,000
Energy Costs	$ 17,000	$ 17,000	$ 10,000	$ 10,000
Monitoring & Testing	$ 4,000	$ 4,000	$ 7,000	$ 7,000
Miscellaneous	$ 3,000	$ 3,000	$ 1,000	$ 1,000
Estimated Annual O&M	$ 39,000	$ 39,000	$ 103,000	$ 103,000
20-Year Life Cycle Cost	$ 15,559,000	$ 14,299,000	$ 24,153,000	$ 19,763,000

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids or actual construction costs will not vary from the costs presented herein.

5.1.2. Collection System Non-Monetary Factors

In the section below, Table 5-2 shows the overall advantages and disadvantages of each alternative. Additional information for these alternatives is provided below.

TABLE 5-2: CONVAYENCE SYSTEM ADVANTAGES AND DISADVANTAGES

Alternatives	Advantages	Disadvantages
Alternative 1: Upsize Existing Infrastructure	• Sizes facilities for worst-case scenario • Low risk for future sanitary sewer overflows (SSOs)	• Does not address current I/I issues • Higher capital costs
Alternative 2: Divert Flows and Upsize Existing Infrastructure	• Less pipe to be upsized than Alternative 1 • Lower costs than Alternative 1 • Utilizes additional capacity in other trunklines	• Does not address current I/I issues
Alternative 3.1: Moderate I/I Reduction	• Requires less pipe to be upsized • Reduces I/I flows • Benefits at the WWTP due to lowered flows	• Does not fully relieve the system of I/I • Complex implementation • Higher risk for SSOs • Reduction in flows is not guaranteed
Alternative 3.2: Aggressive I/I Reduction	• Requires the least amount of pipe to be upsized. • Reduces I/I flows • Benefits at the WWTP due to lowered flows	• Complex implementation • Higher risk for SSOs • Reduction in flows is not guaranteed

Alternatives 1 and 2 are the most straight-forward approaches and sizes the infrastructure for the worst-case flow scenario. There is less uncertainty with this alternative and the upsized infrastructure results in the lowest potential for future sanitary sewer overflows (SSOs). Alternatives 3.1 and 3.2 have more risk involved because I/I mitigation efforts do not have guaranteed reduction in flows. The effectiveness of I/I mitigation varies significantly from system to system and the actual reduction in flows may vary from the values assumed in this study. Additionally, Implementation of Alternatives 3.1 and 3.2 would be complex and would require a detailed phased approach to balance the need to upsize infrastructure today and plan for reduction in flows in the future. The first phased item would consist of data collection including CCTV, smoke testing, and flow monitoring. Sizing pipes and pumps for the improvements to reduce the risk of SSOs would be difficult because the impact of the I/I reduction efforts cannot be observed until the efforts are complete. Whether Alternatives 3.1 or 3.2 are selected or not, an ongoing I/I reduction program should be implemented in the City. Typically, I/I reduction projects see the highest reduction in flows during the first couple years following the improvements; however, if an active program to continue with the efforts is not implemented, the flows would increase over time (as the collection system continues to age) and could exceed the infrastructure capacity.

5.1.3. Collection System Recommendation

A combination of the alternatives described above is recommended and should be implemented in a phased approach. The capital improvement plan in chapter 6 describes the recommended phasing and costs in further detail. The City's recent SSOs have occurred at the lift stations. For this reason, the highest priority should consist of upgrading the lift stations and force mains with the criteria described in Alternatives 1 and 2. While these projects are occurring, a I/I reduction program consisting of CCTV and pipeline repair of observed sources of inflow should be done. If SSOs are still occurring after the lift station and force main upgrades, upsizing gravity pipelines should be completed either concurrently or prior to the I/I reduction efforts. As a part of the I/I reduction effort a subsequent study to review the updated flows should be completed. Additional flow monitoring and modeling should be a part of this study to determine if there is a significant reduction in flows. This analysis should include a re-evaluation of the pipe sizes required to pass the peak flows without surcharging. Unless long-term decreases in the flows are observed, it is not recommended that the upgrades be sized assuming a significant reduction in flows. Following the lift station improvements, the next highest priority capital improvement project should consist of upsizing the gravity pipelines as described in Alternative 2 or as updated in the I/I reduction study. The last recommended improvement should include the upsizing of the additional gravity sewer piping to allow for unconstrained flow in the system if the I/I reduction does not cover any reduction in flows.

5.2. TREATMENT AND STORAGE ALTERNATIVES

The alternatives for effluent disposal presented in Chapter 4 include continued winter discharge with a new storage lagoon and year-round discharge with upgrading to a mechanical treatment plant.

5.2.1. Life Cycle Cost Analysis

Cost estimates for the Chapter 4 treatment and storage alternatives are presented in Table 5-3.

TABLE 5-3: TREATMENT AND STORAGE ALTERNATIVES COST COMPARISON

Item	Alt 1: New Storage Lagoon	Alt 2: Mechanical Treatment
Headworks	$ 651,000	$ 3,100,000
Lagoon Improvements	$ 2,294,000	$ -
New Storage Lagoon	$ 1,358,000	$ -
Combining Lagoon #3 and #4	$ 1,852,000	
Secondary Treatment	$ -	$ 9,200,000
Filtration	$ -	$ 3,700,000
Disinfection Systems	$ 656,000	$ 2,500,000
Effluent Cooling	$ -	$ 5,000,000
Solids Handling	$ -	$ 7,200,000
Discharge	$ 161,000	$ 161,000
Improvements Subtotal	$ 6,972,000	$ 30,861,000
Mobilization & General Conditions	$ 697,000	$ 3,086,000
Subtotal	*$ 7,669,000*	*$ 33,947,000*
Market Contingency	$ 767,000	$ 3,390,000
Subtotal	*$ 8,436,000*	*$ 37,337,000*
Construction Contingency	$ 2,531,000	$ 11,200,000
Subtotal	*$ 10,967,000*	*$ 48,537,000*
Contractor Overhead & Profit	$ 1,097,000	$ 4,850,000
Total Construction Cost	$ 12,064,000	$ 53,387,000
Engineering, Legal, and Administrative	$ 3,020,000	$ 13,350,000
Total Project Cost	$ 15,084,000	$ 66,737,000
Electricity and Fuel	$ 50,000	$ 140,000
Chemicals	$ 15,000	$ 40,000
Disposal	$ 1,000	$ 30,000
Parts	$ 17,000	$ 40,000
Personnel	$ 20,000	$ 130,000
Estimated Annual O&M	$ 103,000	$ 380,000
20-Year Life Cycle Cost	$ 16,770,000	$ 72,670,000

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids or actual construction costs will not vary from the costs presented herein.

5.2.2. Non-Monetary Factors

Table 5-4 presents an evaluation of the effluent disposal alternatives.

TABLE 5-4: TREATMENT AND STORAGE ALTERNATIVES EVALUATION

Alternative	Advantages	Disadvantages
Alt. 1: New Storage Lagoon	• Lowest capital cost. • Lowest life-cycle cost. • Less sludge production. • Same discharge permit requirements. • Same operator license.	• Large storage required. • Additional operation considerations. • Larger construction footprint than other alternative. • Future expansion may be more difficult. • Chlorine safety hazards.
Alt. 2: Mechanical Treatment (Year-Round Discharge)	• Higher quality water. • Provides flexibility for water reuse. • Easier to add advanced treatment to remove emerging contaminants of concern (e.g., PFAS). • Eliminates the need for increasing the effluent storage.	• Higher capital and O&M than other alternative. • Likely more stringent effluent limits. • More frequent biosolids removal. • Entirely new treatment process to learn. • Higher operator license (estimate Class II).

5.2.3. Treatment and Storage Recommendation

The recommended alternative is Alternative 1 - New Storage Lagoon. Alternative 1 upgrades the WWTP treatment while requiring the lowest capital and O&M costs. The treatment facility would remain Class I, and additional permitting would not be necessary. The new storage lagoon is a large capital investment. However, this alternative avoids the complications that come with upgrading to a mechanical treatment process, such as frequent biosolids handling and higher electricity costs.

5.2.4. I/I Mitigation Impacts on WWTP

Collection system improvement alternatives to reduce I/I have potential impacts on capital improvement costs associated with the WWTP. Both 20% and 50% flow reductions from I/I improvements were compared (Collection System Alternatives 3.1 and 3.2, respectively); however, actual results will vary. The potential impacts to the WWTP Alternative 1 improvement costs from I/I reductions are discussed below.

- Headworks

The governing flow condition for headworks equipment is the peak flow into the plant. I/I improvements would reduce the 2045 peak instantaneous flow from 5.77 MGD to 4.63 MGD at 20% reduction and down to 2.89 MGD at 50% reduction.

At 20% flow reduction, transfer piping size to the lagoons can be reduced. This would result in a reduction of the total project costs by approximately $113,000.

At 50% flow reduction, a slightly smaller screen and channel could be installed as well as reduced transfer piping size to the lagoons. This would result in a reduction of the total project costs by approximately $188,000.

- Lagoon Improvements

I/I improvements would also reduce the 2045 maximum month wet weather flow from 1.49 MGD to 1.24 MGD at 20% reduction and 0.88 MGD at 50% reduction. These reductions would impact both transfer piping and transfer pumping station capacity as well as treatment capacity. New transfer piping and a new pump station would still be required.

At 20% flow reduction, the transfer piping between Lagoons #1 and #2, as well as the discharge to Lagoon #3 can be reduced, and smaller pumps can be used for the transfer pump station. This would result in a reduction of the total project costs by approximately $64,000.

At 50% flow reduction, the transfer piping between Lagoons #1 and #2, as well as the discharge to Lagoon #3 can be reduced, and smaller pumps can be used for the transfer pump station. This would result in a reduction of the total project costs by approximately $195,000.

The reduced flows would not result in any capital savings for the aeration system as the loads would not change, but the reduced flows would provide greater flexibility in operations for the water levels within the lagoons. Reducing the I/I would increase the concentration of BOD and TSS into the treatment plant, which would in turn make it easier to achieve the target percent removal of these constituents required in the permit (i.e., not as low of an effluent concentration would be required to meet the percent removal requirement).

- Disinfection Improvements

I/I improvements would make it easier to meet the required chlorine contact times. The reduction in flow would minimize the size needed for the contact basin.

A 20% reduction in flows would require a smaller chlorine contact basin. Upsizing the contact basin would still be required but could be reduced from 100 feet to 80 feet. This would result in cost savings of approximately $50,000.

A 50% flow reduction would reduce the length of the basin to 60 feet. This would result in cost savings of approximately $91,000.

- Outfall Improvements

I/I improvements would impact the piping from the chlorine contact basin to the discharge sampling manhole. A 20% reduction in flows would not have an impact on the costs. New transfer piping would still be required but could be reduced in diameter. A 50% flow reduction would result in a reduction of the total project costs by approximately $32,000.

5.3. COMBINED I/I ALTERNATIVE RECOMMENDATIONS

While I/I reduction activities result in reducing the need for upsized infrastructure in the collection system as well as cost savings at the WWTP, the savings at the WWTP are minimal in comparison to the collection system capital costs as shown in Table 5-5 below. Additionally, the potential flow reduction the WWTP will experience as part of I/I mitigation efforts could vary significantly. As mentioned previously, the City should begin implementing an I/I reduction program that targets the largest sources of I/I. These can be addressed more economically than lining and replacing services as summarized in the descriptions of Alternatives 3.1 and 3.2.

TABLE 5-5: COLLECTION AND TREATMENT I/I SUMMARY

Item	Alternative 2	Alternative 3.1	Alternative 3.2
Collection System Improvements	$ 14,260,000	$ 24,050,000	$ 19,660,000
WWTP Savings	$ -	$ 227,000	$ 506,000
Total Capital Costs	$ 14,260,000	$ 23,830,000	$ 19,160,000

CHAPTER 6 - PROPOSED PROJECT (RECOMMENDED ALTERNATIVE)

This chapter consists of the recommended improvements to address the wastewater treatment and collection system deficiencies. The chapter also includes a description of the preliminary project design and schedule, anticipated permit requirements, sustainability considerations, cost estimates, and annual operating budgets. A location map showing the changes to the wastewater treatment plant is included in Figure 15 (Appendix A).

6.1. Preliminary Project Design

Detailed project summary sheets are included in Appendix K. Each project summary sheet provides the objective, key issues, cost estimate, and project location map. The project improvements are summarized in the sections below.

6.1.1. Collection System Preliminary Project Design

This section discusses the preliminary project design of the recommended alternative.

- CS.1.1 – Lift Station and Force Main Improvements: Capacity improvements in a collection system should begin at the most downstream location in the system. For the City's system, this includes the two existing lift stations and forcemain. This project will consist of replacing the Washington Street and E Street Lift Stations as well as installing a parallel force main from each lift station to the WWTP. The project assumes complete replacement of the lift station including the wetwell, mechanical equipment, electrical equipment, and controls. Additionally, a parallel 12-inch force main should be constructed from each lift station to the WWTP. The lift station design flows are summarized in Table 6-1.

  The pump selection should consider both high and low flow pumping scenarios. This may result in a 3 to 4 pump configuration with one smaller pump for low flow and larger pumps to convey the peak flows. The improvements should also consider only installing pumps to convey existing peak instantaneous flows with provisions for additional pumping capacity if flows increase with new development. A phased approach provides the City with flexibility if their I/I reduction efforts reduce flows and future PIF is not ever reached. The specific pumping selection and operation should be assessed during the predesign phase of the project.

TABLE 6-1: CS1.1 PRELIMINARY DESIGN FLOWS

Lift Station Name	Existing PIF (gpm)[1]	Future PIF (gpm)[1]
E Street	1,400	2,060
Washington Street	1,890	1,960

1) Based on unconstrained flows (i.e., no upstream surcharging or flooding).

- I/I Reduction Program: This project does not consist of a single capital project, but is a recommended program to target I/I reduction within the system. The general goals of the program are outline below in Table 6-2. The goals for this program include CCTV of the entire collection system every 5 years and smoke testing every 10 years. Flow monitoring, cured in place pipe lining or pipe replacement, manhole lining, and spot repairs should be completed as needed and the CCTV inspections should advise where to complete these activities.

The first general step in this program is to begin an active CCTV program to document the condition of the gravity pipes and identify large sources of inflow. The City could complete this in-house or contract a third party to complete the inspections. The City could consider implementing a CCTV program that rates the condition of pipe based on the National Association of Sewer Service Companies (NASSCO) Pipe Assessment and Certification Program (PACP) which is a standardized approach that scores pipes based on defects and conditions such as cracks, corrosion, deformation, and structural integrity. This requires a certified inspector to review the CCTV footage. Results from the CCTV analysis can be used to develop a pipeline and manhole lining program. It was assumed that all AC pipes would be lined within the next 50 years because the CCTV analysis was not completed at the time of this study. In addition to I/I reduction efforts on the mainlines, it is also recommended to complete smoke testing in the systems every 10 years. Smoke testing was completed on the majority of the existing system as a part of this facility plan and identified several items which could be addressed to reduce I/I. These items include notifying property owners regarding open/broken cleanouts and leaking sewer laterals. Also, two cross connections with the storm system were identified and should be removed so stormwater does not enter the sewer system. Flow monitoring should be completed as needed to track the progress of I/I reduction activities. Flow monitors can be placed in the system during the wet season to isolate basins and locate which sewer lines have more I/I.

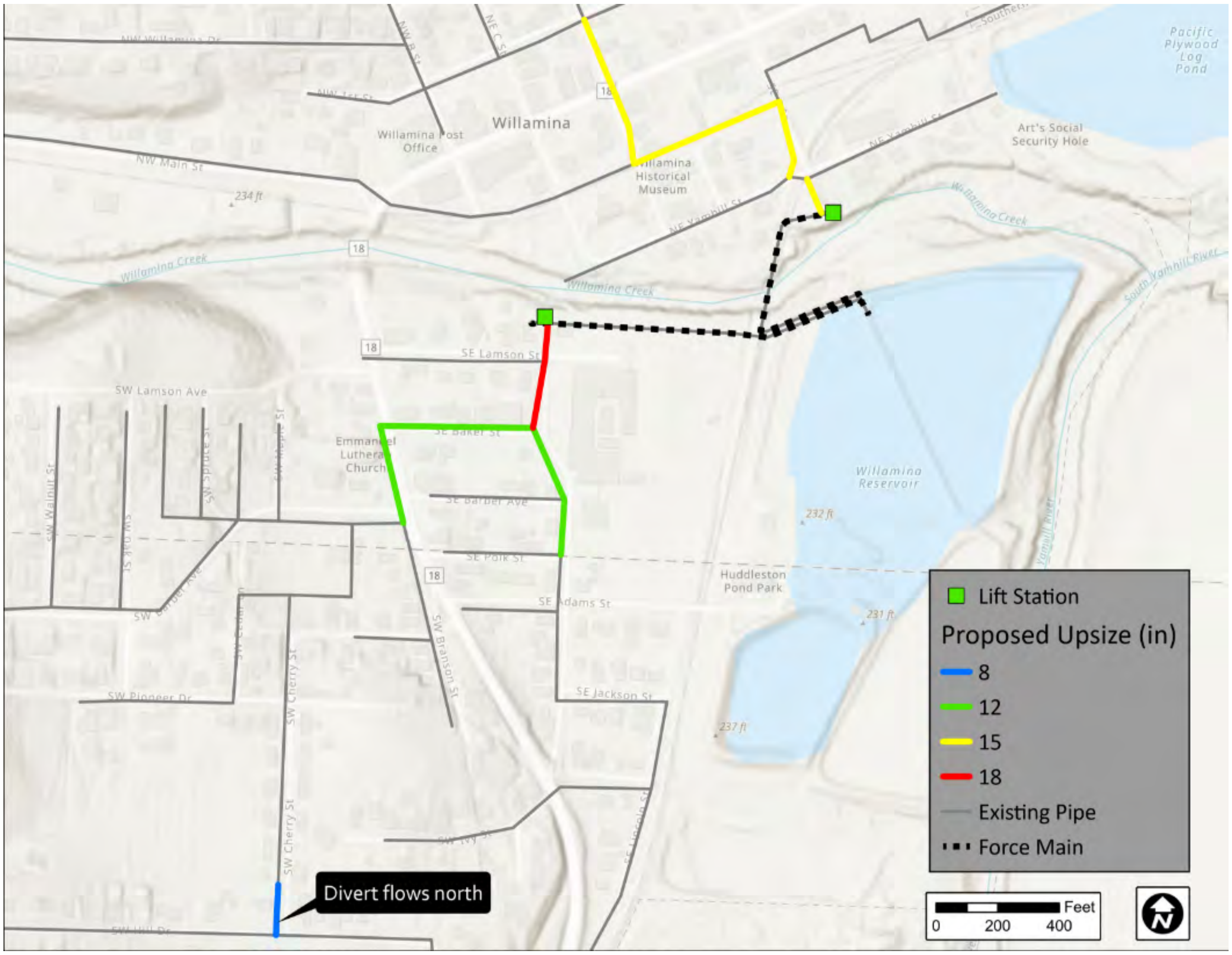
TABLE 6-2: I/I REDUCTION PROGRAM OUTLINE

	Frequency	Target Quantity	Cost
CCTV	Every year (20% annually)	10,000 LF / Year	$30,000
Smoke Testing	Every 10 years (10% annually)	20 manholes / year or entire system every 10 years	$2,000
Flow Monitoring	As needed; After completion of CIPs	Assumed every 5 years	$2,000
Cured-in-Place Pipe Lining or Replace	As needed based on CCTV inspection	Line or replace all AC Pipe within 50-years as needed, (1000 LF per year)	$100,000
Manhole Lining	As needed based on CCTV inspection	Line or replace all AC Manholes within 50-years as needed (5 Manholes per year)	$25,000
Spot Repairs	As needed based on CCTV inspection	As needed	-
		Target Annual I/I Program Funding	**$159,000**

- CS.2.1 – Upsize Gravity Trunklines: This project consists of upsizing the gravity sewer pipes so that no flooding is shown in the model during the existing peak day flows. Note, the proposed pipes are sized for future flow conditions. This project consists of 400 LF of 8-inch pipe, 1,200 LF of 12-inch pipe, 1,300 LF of 15-inch pipe, and 400 LF of 18-inch pipe, and is illustrated in Figure 6-1.

  The extent of the gravity pipe upgrades should be re-assessed as a part of the predesign phase of the project. Additional flow data from the lift stations and WWTP should be available with the improvements which can be used to confirm the recommended pipe upsizing in this facility plan. The City's future I/I reduction efforts are anticipated to reduce overall flows and may result in less pipe upsizing being required. For the sake of this capital improvement plan, it was assumed there was no reduction in the flows.

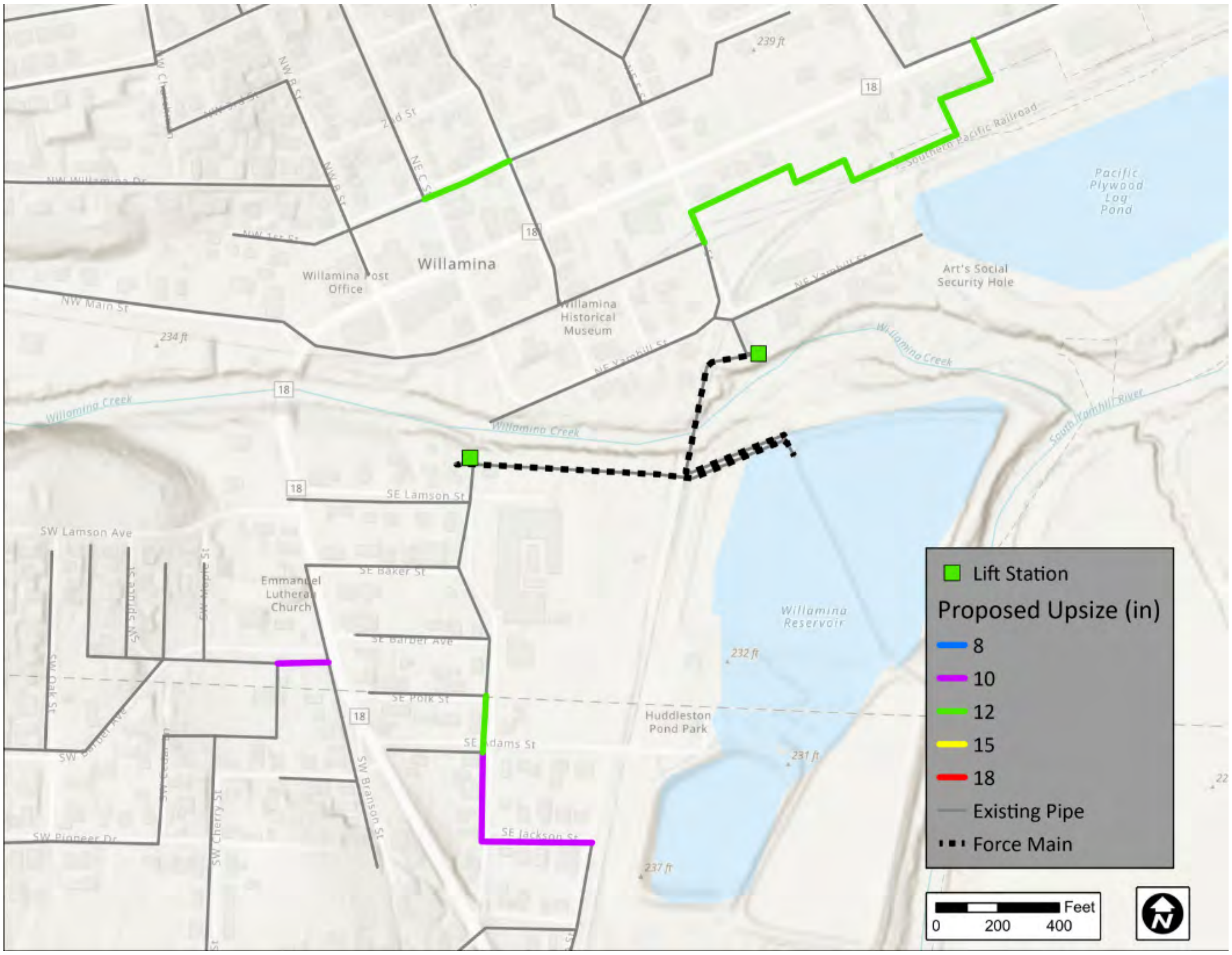
FIGURE 6-1: CS.2.1 PROJECT EXTENT



- CS.3.1 – Additional Gravity Pipe Upsizing: This project consists of additional gravity pipe upsizing to eliminate surcharging in the system under future flows. This project was assumed to consist of 1,200 LF of 10-inch pipe and 1663 LF of 12-inch pipe, and is illustrated in Figure 6-2.

  Similar to CS.2.1, the extent of the upsizing should be re-evaluated after the lift stations are replaced and after I/I reduction activities have been implemented. For the sake of this capital improvement plan, it was assumed there was no reduction in the flows.

FIGURE 6-2: CS.3.1 PROJECT EXTENT



6.1.2. WWTP Preliminary Project Design

In summary, the following modifications are recommended to address the WWTP deficiencies:

- <u>T.1.1 – Headworks Improvements:</u> This project consists of replacing the existing headworks to provide a new mechanical and manual bar screen, increasing the size of the headworks channel and diversion structure, and upsizing the transfer piping from the headworks to the lagoons to increase pipe capacity and allow for proper lagoon operation in series during high flow events. It is recommended the influent flow meters be replaced and properly calibrated.
- <u>T.1.2 – New Storage Lagoon and Pump Station:</u> This project focuses on increasing the available storage during the non-discharge period by constructing a fifth lagoon and pump station. As discussed in Chapter 4, the footprint of the lagoon will be within the available land at the WWTP providing approximately 10 MG of storage. The existing pump station used to transfer water from Lagoon #3 to Lagoon #4 will be reconstructed to have appropriate pumps and valving to transport water to the new lagoon as well.
- <u>T.1.3 – Aeration System and Blowers:</u> To continue to meet permit requirements with the increased flows and loadings, additional aeration is needed within the two existing aerated lagoons. To achieve this, the existing aeration system, including the blowers and mechanical components, will be replaced and additional diffusers will be added.

- T.1.4 – Chlorine Disinfection and Contact Basin: The purpose of this project is to increase the capacity of the disinfection system by constructing a new basin to achieve longer contact times during higher flow events and resolve deficiencies related to the existing sodium hypochlorite generator. The new chlorine contact basin will be a buried concrete vault in the area north of Lagoon #4. A new pump station will also be constructed to pump up to the contact basin. This allows for the contact basin to be higher in elevation than it is currently to achieve greater separation from the 100-year South Yamhill River flood elevation.

- T.1.5 – Discharge Piping to the Outfall: This project is to address deficiencies identified in Chapter 3 by replacing the existing effluent piping to the outfall to increase the hydraulic capacity and replace the existing effluent flow meter.

- T.1.6 – Miscellaneous WWTP Improvements: The purpose of this project is to address components of the WWTP that have deficiencies to improve overall operations. This includes upsizing the transfer piping between lagoons for adequate capacity, SCADA improvements, backup power at the WWTP, lagoon depth measurement devices, irrigation spray guns, and effluent flow meter.

- T.2.1 – Combine Lagoons #3 and #4: The water balance and storage analysis resulted in a storage deficiency of approximately 17 MG. Based on the evaluation, the construction of Lagoon #5 will not result in sufficient capacity. Combining the two existing lagoons was determined to be a Priority 2 project to allow for the City to monitor flows and water levels within the lagoons during the non-discharge period to assess the additional storage required. If additional storage is required, Lagoons #3 and #4 can be combined to achieve approximately 10 MG of additional storage and meet the 2045 storage requirements.

- T.2.2 – Lagoon Liner Replacement: This project addresses the deficiencies identified with the existing lagoon liners. In addition to the deficiencies with the liner in Lagoons #1 and #3, lagoon liners should be replaced after 20-30 years.

- T.3.1 – Facility Planning Study Update: The purpose of this project is to re-evaluate the WWTP and collection system after completing the Priority 1 and 2 improvements for the impact on I/I.

6.2. PROJECT SCHEDULE

The specific schedule for each project will be determined by the City during the predesign phase of each proposed improvement. Table 6-3 presents an estimated schedule for CIP projects for the next six years. Actual costs may vary depending on market conditions and shall be updated as projects are further refined in the pre-design and design phases.

TABLE 6-3: 6-YEAR CAPITAL IMPROVEMENT PLAN

ID#	ITEM	COST	Opinion of Probable Costs (2024 Dollars)					
			2025	2026	2027	2028	2029	2030
CS.1.1	Lift Station Improvements \ Forcemain	$ 7,355,000		$ 1,103,250	$ 3,125,875	$ 3,125,875		
T.1.1	Headworks Improvements	$ 1,448,000				$ 724,000	$ 724,000	
T.1.2	Storage Lagoon	$ 2,883,000			$ 1,441,500	$ 1,441,500		
T.1.3	Aeration System and Blowers	$ 3,767,000				$ 565,050	$ 1,600,975	$ 1,600,975
T.1.4	Disinfection System and Chlorine Contact Basin	$ 1,453,000		$ 726,500	$ 726,500			
T.1.5	Discharge Piping to Outfall	$ 449,000		$ 449,000				
T.1.6	Micellaneous Plant Priority 1 Improvements	$ 1,131,000						$ 1,131,000
	Total Capital Cost	*$ 18,486,000*	*$ -*	*$ 2,279,000*	*$ 5,294,000*	*$ 5,857,000*	*$ 2,325,000*	*$ 2,732,000*
	I/I Reduction Program	-	$159,000	$159,000	$159,000	$159,000	$159,000	$159,000
	Short-Lived Asset Replacement	-	$124,000	$124,000	$124,000	$124,000	$124,000	$124,000
	Total FY Cost	-	*$ 283,000*	*$ 2,562,000*	*$ 5,577,000*	*$ 6,140,000*	*$ 2,608,000*	*$ 3,015,000*

The cost estimate herein is concept level information only based on our perception of current conditions at the project location and its accuracy is subject to variation depending upon project definition and other factors. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. This cost opinion is in 2024 dollars and does not include escalation to time of actual construction.

6.3. PERMIT REQUIREMENTS

The City's NPDES discharge permit expired November 30, 2015 and is administratively extended. It is anticipated the permit will be renewed in 2025 with updated requirements.

Collection system improvements will also likely require some permits to be acquired prior to construction. Primarily CS.1.1 which includes the force main crossing Willamina Creek and the railroad. Permits from Army Corps of Engineer (404 Permit), Oregon Department of State and Land, and local city and county permits should be acquired as part of the pre-design process.

6.4. SUSTAINABILITY CONSIDERATIONS

6.4.1. Water and Energy Efficiency

Lagoon improvements and the construction of additional storage will result in more balanced flows and improve treatment reliability and quality. The proposed alternatives also include incorporation of a SCADA system. This allows for better system resiliency and operation simplicity, as well as improved system optimization. Overall, the proposed projects seek to be environmentally conscious, economically feasible, and socially beneficial. Replacing and relining the collection system reduces the risk of leaks or seepage, which protects groundwater sources. The new lift stations will also utilize energy-efficient pumps and motors with VFDs.

6.4.2. Green Infrastructure

The following were considered and recommended for implementing green infrastructure.

- Construct upgrades at the existing lift stations to include pervious surfaces such as gravel, native plants, or pervious pavers.

6.5. TOTAL PROJECT COST ESTIMATE (ENGINEER'S OPINION OF PROBABLE COST)

Costs shown are planning-level estimates and can vary depending on market conditions; they shall be updated as the project is further refined in the pre-design and design phases. Appendix K contains separate summary sheets for each capital improvement. Table 6-4 shows costs with the percent SDC eligibility, which represents the increased capacity required for future connections. Treatment project SDC eligibility is estimated as a function of existing and future design flows. For the SCADA improvements, which are not associated with an increase in flows, the percent SDC eligible is derived from the percent growth in population over the 20-year planning period. Lift station growth was estimated based on current and projected EDUs in the sewer basin of interest. Existing SDCs are summarized in Chapter 2.

TABLE 6-4: 20-YEAR CAPITAL IMPROVEMENT PLAN

Project ID#	Project Name	Total Estimated Cost (2024)	SDC Growth Apportionment		City's Estimated Portion
Total Priority 1 Improvements (0-6 years)					
CS.1.1	Lift Station Improvement \ Forcemain	$7,355,000	18%	$1,336,000	$6,019,000
T.1.1	Headworks Improvements	$1,448,000	21%	$299,000	$1,149,000
T.1.2	Lagoon 5	$2,883,000	18%	$528,000	$2,355,000
T.1.3	Aeration System and Blowers	$3,767,000	21%	$784,000	$2,983,000
T.1.4	Disinfection System and Chlorine Contact Basin	$1,453,000	21%	$300,000	$1,153,000
T.1.5	Discharge Piping to Outfall	$449,000	18%	$82,000	$367,000
T.1.6	Miscellaneous Plant Priority 1 Improvements	$1,131,000	21%	$232,000	$899,000
	Total Priority 1 Improvements (rounded)	$18,486,000	-	$3,561,000	$14,925,000
Total Priority 2 (6-13 years)					
CS.2.1	Upsizing Gravity Trunklines	$4,447,000	21%	$914,000	$3,533,000
T.2.1	Combine Lagoon 3 & 4	$3,887,000	21%	$799,000	$3,088,000
T.2.2	Lagoon Liner Improvements (Lagoons #1 and #2)	$3,460,000	21%	$711,000	$2,749,000
	Total Priority 2 Improvements (rounded)	$11,794,000	-	$2,424,000	$9,370,000
Total Priority 3 Improvements (13-20 years)					
CS.3.1	Upsizing Gravity Mains	$2,704,000	21%	$556,000	$2,148,000
T.3.1	Facility Planning Study Update	$150,000	21%	$31,000	$119,000
	Total Priority 3 Improvements (rounded)	$2,854,000	-	$587,000	$2,267,000
	TOTAL SYSTEM IMPROVEMENTS COSTS (ROUNDED)	$33,134,000	-	$6,572,000	$26,562,000

The cost estimate herein is concept level information only based on our perception of current conditions at the project location and its accuracy is subject to variation depending upon project definition and other factors. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. This cost opinion is in 2024 dollars and does not include escalation to time of actual construction.

6.6. ANNUAL OPERATING BUDGET

An itemized annual operating budget for the fiscal year 2020-2021 is provided in Appendix J. Additional information on budget specifics can be found in the following sections.

6.7. INCOME

6.7.1. Revenue

➢ Potential User Rate Impacts

The existing sewer rate schedule consists of a monthly flat rate fee of $70.46 per equivalent dwelling unit (EDU). The Sewer Operating Fund generates approximately $1,565,000 in revenue for use to offset short-term asset replacement and O&M costs. The portion of the existing budget that can be used for capital improvement projects varies from year to year. With this in mind, the rate impacts assume that none of the existing revenue/budget can be used annually to offset future capital improvements.

Table 6-5 shows the existing and potential charges for sewer services every month for one EDU. The user rate impacts can vary depending on the amount of SDC funds available, as shown in the table. City staff periodically update a Capital Improvement Plan (CIP) for wastewater treatment, pump stations, and collection systems.

Funding for the recommended system improvements may come from any number of sources. This section presents potential user rate impacts if priority improvements are funded only through a low interest loan with debt service payments (30 year, 1.5%) made through a user rate increase. The amounts shown in the table also assume that there is no surplus in the annual budget contributing to the annual debt service payment. Grant funds, lower interest loans, or principal forgiveness may also be available which could further lessen the user rate impacts shown in Table 6-5. Keller Associates recommends that the City actively pursue these opportunities that would mitigate user rate impacts. A separate user rate study is recommended to complete a more detailed evaluation of potential user rate impacts.

TABLE 6-5: USER RATE IMPACT

	Annual Payment (30 year, 1.5%)	Monthly User Rate without SDCs	Monthly User Rate Including SDCs
Existing User Rates (2023)	-	$81.03	$81.03
Priority 1 Improvements[1]	$769,742	$159.26	$101.87
1) Assumes $10,000,000 in grants are secured.			

It should be noted that all costs are in 2024 dollars, and that the City should plan on annual increases in user rates of 2-5% to account for cost-of-living adjustments. This table assumes $10,000,000 of grant funds are secured to offset the amount of costs that the city is expected to have to make to account for the current deficits in the system. Currently, the City increases the sewer rate at a rate of 5% annually with the current structure being adopted in June 2018.

- System Development Charge

The scope of this study included estimating the SDC eligibility for each identified capital improvement. The estimated SDC eligibility for each identified capital improvement is shown in Table 6-5.

6.8. ANNUAL OPERATIONS AND MAINTENANCE COSTS

The City of Willamina adopted budget document for fiscal year 2024 is shown in Table 6-6 and Table 6-7 below.

TABLE 6-6: ANNUAL OPERATIONS AND MAINTENANCE COSTS

ANNUAL OPERATIONS AND MAINTENANCE COSTS FOR THE CITY OF WILLAMINA'S WASTEWATER				
Budget	**Sum of FY25 Adopted**	**FY22 Actual**	**FY23 Actual**	**FY24 Adopted**
40 Wastewater				
1 Resource	$ 2,851,615	$ 745,750	$ 806,500	$ 2,557,690
1 Fund Balance	$ 1,937,015	-	-	$ 1,686,090
1 Revenue	$ 899,600	$ 730,750	$ 791,500	$ 856,600
40-10-Wastewater	-	-	-	-
40-10-4340 Wastewater Revenue	$ 898,000	$ 730,000	$ 790,000	$ 855,000
40-10-4342 New Connection Fee	$ 1,500	$ 750	$ 1,500	$ 1,500
40-10-4905 Sale of City Assets	$ 100	-	-	$ 100
8 Transfer In	$ 15,000	$ 15,000	$ 15,000	$ 15,000
40-90-Transfer	-	-	-	-
40-90-9241 Debt Service Transfer	$ 15,000	$ 15,000	$ 15,000	$ 15,000
2 Requirement	$ (2,851,615)	$ (816,645)	$ (695,911)	$ (2,557,690)
2 Wastewater Operation	$ (643,910)	$ (501,650)	$ (477,749)	$ (559,199)
40-11-Wastewater	-	-	-	-
40-11-5000 Salary - Wages	$ (70,000)	$ (50,000)	$ (46,000)	$ (60,000)
40-11-5001 PW Allocated Payroll	$ (191,126)	$ (134,754)	$ (181,310)	$ (172,748)
40-11-5002 Admin Allocated Payroll	$ (79,864)	$ (105,151)	$ (98,758)	$ (109,570)
40-11-5020 Payroll Tax	$ (5,500)	$ (4,600)	$ (5,000)	$ (5,000)
40-11-5040 Benefits	$ (11,000)	$ (10,000)	$ (11,000)	$ (11,000)
40-11-5060 PERS	$ (4,000)	$ (3,800)	$ (4,000)	$ (4,000)
40-11-5090 Workers Comp	$ (200)	$ (3,000)	$ (200)	$ (200)
40-11-5105 Bad Debt	$ (2,500)	$ (1,000)	$ (2,000)	$ (2,000)
40-11-5108 Chemicals	$ (15,000)	$ (10,000)	$ (10,000)	$ (10,000)
40-11-5120 Gas - Oil	$ (4,000)	$ (3,000)	$ (2,500)	$ (3,000)
40-11-5123 Merchant Fees	$ (8,000)	$ (4,000)	$ (4,300)	$ (5,000)
40-11-5137 Supplies	$ (3,000)	$ (2,500)	$ (2,000)	$ (2,500)
40-11-5140 Uniforms - Towels	$ (2,500)	$ (2,800)	$ (2,000)	$ (2,200)
40-11-5200 Contract Services	$ (37,000)	$ (15,000)	$ (15,000)	$ (37,000)
40-11-5204 Engineering Services	$ (20,000)	$ (10,000)	$ (15,000)	$ (15,000)
40-11-5230 Printing and Publishing	$ (6,000)	$ (3,500)	$ (3,500)	$ (5,000)
40-11-5233 Technology Services	$ (4,500)	$ (2,000)	$ (1,000)	$ (2,500)
40-11-5250 System Analysis	$ (7,500)	$ (4,000)	$ (3,000)	$ (3,500)
40-11-5320 Dues, License, Permits	$ (4,000)	$ (4,000)	$ (2,000)	$ (2,000)
40-11-5342 Conference/Seminar/Training	$ (2,500)	$ (2,000)	$ (1,500)	$ (1,500)
40-11-5344 Travel	-	$ (200)	-	-
40-11-5413 Telephone	$ (4,800)	$ (4,600)	$ (4,600)	$ (4,600)
40-11-5415 Utilities	$ (35,000)	$ (35,000)	$ (35,000)	$ (35,000)
40-11-5504 Repairs - Maintenance	$ (20,000)	$ (20,000)	$ (5,000)	$ (10,000)
40-11-5540 Treatment System Maintenance	$ (30,000)	$ (15,000)	$ (25,000)	$ (25,000)
40-11-5541 Infrastructure Improvements	$ (25,000)	-	-	-
40-11-5600 Equipment	$ (8,000)	$ (26,000)	$ (26,000)	-
40-90-9615 PW Expense Allocation	$ (42,920)	$ (25,745)	$ 27,919	$ (30,881)
6 Capitol Outlay	$ (65,000)	$ (35,000)	$ (85,000)	$ (105,000)
40-80 Capital	-	-	-	-
40-80-6000 Capital Outlay	$ (50,000)	$ (35,000)	$ (10,000)	$ (80,000)
40-80-6005 Capital - Master Plan	$ (15,000)	-	$ (75,000)	$ (25,000)
7 Debt Service	$ (128,000)	$ (175,000)	$ (175,000)	$ (180,000)
40-82-Debt	-	-	-	-
40-82-8040 Debt Pricipal	$ (100,000)	$ (120,000)	$ (120,000)	$ (125,000)
40-80-8045 Debt Interest	$ (28,000)	$ (55,000)	$ (55,000)	$ (55,000)
8 Transfer Out	$ (124,839)	$ (104,995)	$ 41,838	$ (122,853)
40-90 Transfer	-	-	-	-
40-90-9110 In Lieu of Franchise Fee	$ (44,975)	$ (36,538)	$ (24,729)	$ (40,500)
40-90-9610 Overhead Allocation	$ (79,864)	$ (68,457)	$ 66,567	$ (82,353)
9 Contingency	$ (1,889,866)	$ -	$ -	$ (1,590,638)
40-99 Fund Balance	-	-	-	-
40-99-9900 Contingency	$ (1,889,866)	-	-	$ (1,590,638)

TABLE 6-7: ANNUAL OPERATIONS AND MAINTENANCE COSTS (CONT.)

Budget	Sum of FY25 Adopted	FY22 Actual	FY23 Actual	FY24 Adopted
41 Wastewater SDC				
1 Resource	$ 117,164	$ 15,000	$ 35,000	$ 111,140
1 Fund Balance	$ 82,164	-	-	$ 76,140
1 Revenue	$ 35,000	$ 15,000	$ 35,000	$ 35,000
41-10-Resources	-	-	-	-
41-10-4441 System Development Charges	$ 35,000	$ 15,000	$ 35,000	$ 35,000
2 Requirement	$ (117,164)	$ (19,000)	$ (15,000)	$ (111,140)
6 Capital Outlay	$ (15,000)	$ (4,000)	-	-
41-10-Capital	-	-	-	-
41-80-6000 Capital Outlay	$ (15,000)	$ (4,000)	-	-
8 Transfer Out	$ (15,000)	$ (15,000)	$ (15,000)	$ (15,000)
41-91-Transfer	-	-	-	-
41-90-9750 Debt Service Transfer	$ (15,000)	$ (15,000)	$ (15,000)	$ (15,000)
9 Contingency	$ (87,164)	-	-	$ (96,140)
41-99-Fund Balance	-	-	-	-
41-99-9900 Contingency	$ (87,164)			$ (96,140)

6.9. DEBT REPAYMENTS

The Wastewater Fund pays for expenditures for the City's sewer collection, treatment, and disposal system, including daily operations, maintenance, regulatory compliance, facility expansion, replacement, and capital reserves. The primary revenue source for the Wastewater Fund is user's fees. The 2022 fiscal year adopted sewer budget is presented in Table 2-5.

6.10. RESERVES

6.10.1. Debt Service Reserve

There is currently no outstanding debt for the City of Willamina wastewater department.

6.10.2. Short-Lived Asset Reserve

A table of short-lived assets is shown in Table 6-8 and long-lived assets are shown in Table 6-9. These tables show an idealized replacement budget which accounts for replacement of existing infrastructure based on its assumed useful life. Fully funding this replacement budget would provide the City with the necessary funding to replace infrastructure as it reaches the end of its useful life. Fully funding an asset replacement program may not be feasible for the City. It is recommended, at a minimum, that the City begin by funding the short-lived assets at the lift stations and WWTP to have adequate funds to replace lift station and WWTP assets. Asset replacement for equipment with a longer life can be ramped up over time as the system ages, and replacement is more needed. CIP lining of pipes associated with the I/I reduction activities will extend the useful life of the AC piping, essentially acting as a pipeline replacement program.

TABLE 6-8: SHORT-LIVED ASSET REPLACEMENT

Short Lived Assets	Quantity	Unit	Unit Cost	Total Replacement Cost	Typical Useful Life / Frequency (years)	Annualized Replacement Cost
Washington Lift Station						
Submersible Pump & Motor (200hp)	3	EA	$115,000	$350,000	20	$17,500
Routine Pump Inspection	1	LS	$3,000	$3,000	5	$600
Impeller Replacement	3	EA	$10,000	$30,000	10	$3,000
Instrumentation / HVAC	1	LS	$100,000	$100,000	15	$6,700
Control Panel & Electrical	1	LS	$100,000	$100,000	15	$6,700
Total River Lift Station				$583,000	-	$34,500
E Street Lift Station						
Submersible Pump & Motor (200 hp)	3	EA	$115,000	$350,000	20	$17,500
Routine Pump Inspection	1	LS	$3,000	$3,000	5	$600
Impeller Replacement	3	EA	$10,000	$30,000	10	$3,000
Instrumentation / HVAC	1	LS	$100,000	$100,000	15	$6,700
Control Panel & Electrical	1	LS	$100,000	$100,000	15	$6,700
Total Spring Street Lift Station				$583,000	-	$34,500
Wastewater Treatment Plant						
Headworks Screens	2	EA	$50,000	$100,000	10	$10,000
Lagoons Blowers	2	EA	$75,000	$150,000	20	$7,500
Transfer Pumps	2	EA	$10,000	$20,000	15	$1,400
Chlorination/Dechlorination pumps	2	EA	$10,000	$20,000	10	$2,000
Instrumentation / HVAC	1	LS	$100,000	$100,000	15	$6,700
Control Panel & Electrical	1	LS	$100,000	$100,000	15	$6,700
Total Wastewater Treatment Plant				$490,000	-	$34,300
Total Material Costs				$1,166,000	-	$103,300
Subtotal					-	$103,300
Contingency					20%	$20,700
Total Construction Cost					-	$124,000
Total Short-Lived Asset Replacement (rounded)					-	$124,000

TABLE 6-9: LONG LIFE ASSET REPLACEMENT

Long Lived Assets	Quantity	Unit	Unit Cost	Total Replacement Cost	Typical Useful Life (years)	Annualized Replacement Cost
Pipelines / Cleanouts						
8" Diameter Gravity Sewer Pipe Fully Installed (PVC)	42,521	LF	$330	$14,030,000	75	$188,000
10" Diameter Gravity Sewer Pipe Fully Installed (PVC)	2,115	LF	$350	$740,000	75	$10,000
12" Diameter Gravity Sewer Pipe Fully Installed (PVC)	2,872	LF	$390	$1,120,000	75	$15,000
15" Diameter Gravity Sewer Pipe Fully Installed (PVC)	1,396	LF	$410	$570,000	75	$8,000
18" Diameter Gravity Sewer Pipe Fully Installed (PVC)	377	LF	$450	$170,000	75	$3,000
36" Diameter Gravity Sewer Pipe Fully Installed (PVC)	47	LF	$480	$20,000	75	$1,000
12" Diameter Force Main Sewer Pipe Fully Installed (PVC)	2,000	LF	$350	$700,000	75	$10,000
Manhole	209	EA	$12,000	$2,510,000	50	$51,000
Total Pipelines / Cleanouts				$19,860,000	-	$286,000
Washington Lift Station						
Valves / Meters	1	LS	$140,000	$48,000	30	$1,600
Onsite Diesel Generator (70kW)	1	EA	$70,000	$50,000	30	$1,700
Site paving, fencing, landscaping, etc.	1	LS	$100,000	$10,000	30	$400
Building	1	LS	$384,000	$380,000	40	$9,500
Total River Lift Station				$488,000	-	$13,200
E Street Lift Station						
Valves / Meters	1	LS	$140,000	$140,000	30	$4,700
Onsite Diesel Generator (70kW)	1	EA	$70,000	$70,000	30	$2,400
Site paving, fencing, landscaping, etc.	1	LS	$100,000	$100,000	30	$3,400
Building	1	LS	$384,000	$380,000	40	$9,500
Total Spring Street Lift Station				$690,000	-	$20,000
Total Collection System Replacement Costs				$21,038,000		$319,200
Mobilization					10%	$31,920
Subtotal					-	$351,120
Contingency					20%	$70,200
Total Construction Cost					-	$421,300
Engineering					20%	$84,300
Total Long-Lived Asset Replacement (rounded)					-	$506,000

6.10.3. Financing Options

Financing and incentive options that may assist with offsetting costs associated with implementing the CIP include, but are not limited to user rate increases, SDCs, DEQ State Revolving Fund Loan Program, Oregon Infrastructure Finance Authority grants and loans, USDA Rural Utilities Services loans and grants, direct state loans or appropriations, revenue bonds, general obligation bonds, US Economic Development Administration grants, and Energy Trust of Oregon.

A "One-Stop" funding meeting is recommended for the City where funding packages can be developed using the various funding sources described below:

- Oregon Department of Environmental Quality (Clean Water State Revolving Fund).
- Oregon Economics and Community Development Department (Community Development Block Grant Program). Availability is dependent on the median household income and user rates. Priority given to cities with compliance infractions.
- U.S. Department of Agriculture (Rural Development Program). Grant and loans are available to communities with less than 10,000 people. Eligibility based on user rates, average household income, and compliance issues.
- U.S. Economic Development Administration. Grant and loan funds available based on economic development potential.
- Oregon Economics and Community Development Department (Water/Wastewater Financing Program). State funded program (Oregon Lottery). Grant and loan funds are generally provided on a 50/50 basis. Eligibility based on average household income and compliance issues.

- Oregon Economics and Community Development Department (Special Public Works Program). State funded program (Oregon Lottery). Loan funds only. Eligibility based on average household income and compliance issues.

There are no funding sources that have been collected or allocated towards the projects outlined.

CHAPTER 7 - CONCLUSIONS AND RECOMMENDATIONS

The City Council adopted the Willamina WWFPS on August 13th, 2024. The Capital Improvement Plan presented in Chapter 6 outlines the recommended improvements for the wastewater system.

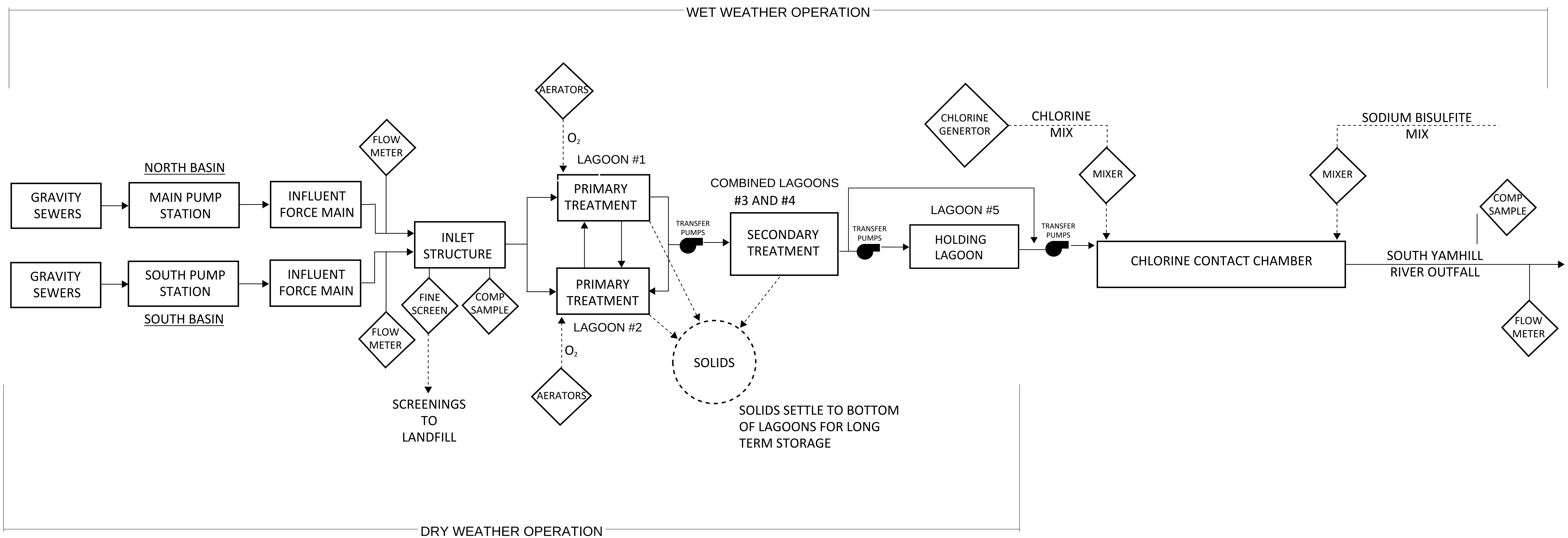
7.1. OTHER CONSIDERATIONS

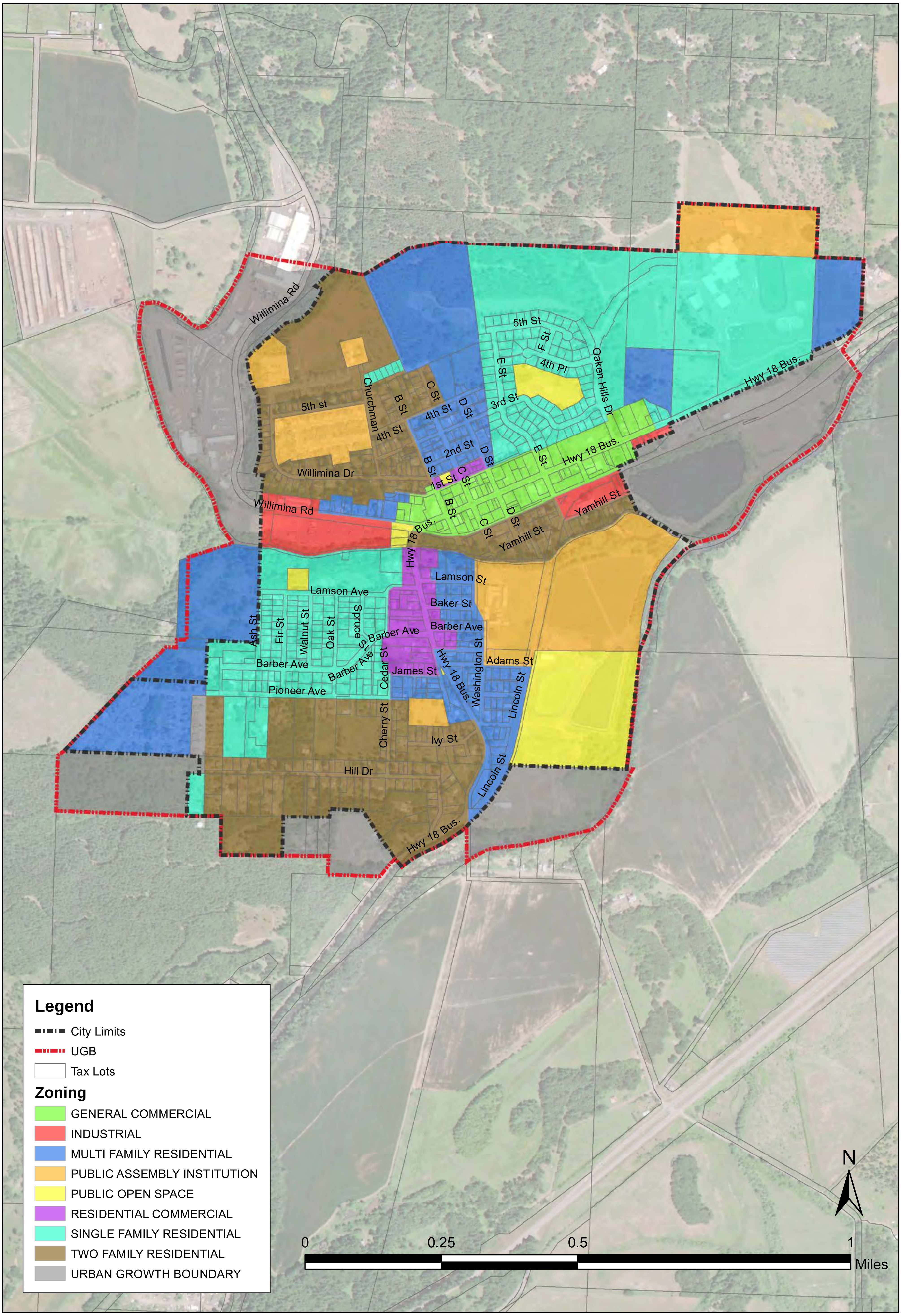
A geotechnical analysis may be required in certain areas when construction begins due to unknown field conditions. Depending on project costs, a value engineering study may also be needed to improve the project during the predesign phase. It is also recommended that the City updates its mixing zone study when any projects may impact the flow out of the outfall.

Further flow monitoring should occur at the WWTP. This will assist in the design of the proposed Lagoon #5 and evaluate the success of the I/I reduction program.

Appendix A

FIGURES


WET WEATHER OPERATION
AERATORS
O2
LAGOON #1
FLOW METER
NORTH BASIN
GRAVITY SEWERS
MAIN PUMP STATION
INFLUENT FORCE MAIN
INLET STRUCTURE
PRIMARY TREATMENT
COMBINED LAGOONS #3 AND #4
TRANSFER PUMPS
SECONDARY TREATMENT
CHLORINE GENERTOR
CHLORINE MIX
LAGOON #5
HOLDING LAGOON
MIXER
SODIUM BISULFITE MIX
MIXER
COMP SAMPLE
CHLORINE CONTACT CHAMBER
SOUTH YAMHILL RIVER OUTFALL
FLOW METER
GRAVITY SEWERS
SOUTH PUMP STATION
SOUTH BASIN
INFLUENT FORCE MAIN
FLOW METER
FINE SCREEN
COMP SAMPLE
PRIMARY TREATMENT
LAGOON #2
O2
AERATORS
SOLIDS
SCREENINGS TO LANDFILL
SOLIDS SETTLE TO BOTTOM OF LAGOONS FOR LONG TERM STORAGE
DRY WEATHER OPERATION



KELLER ASSOCIATES

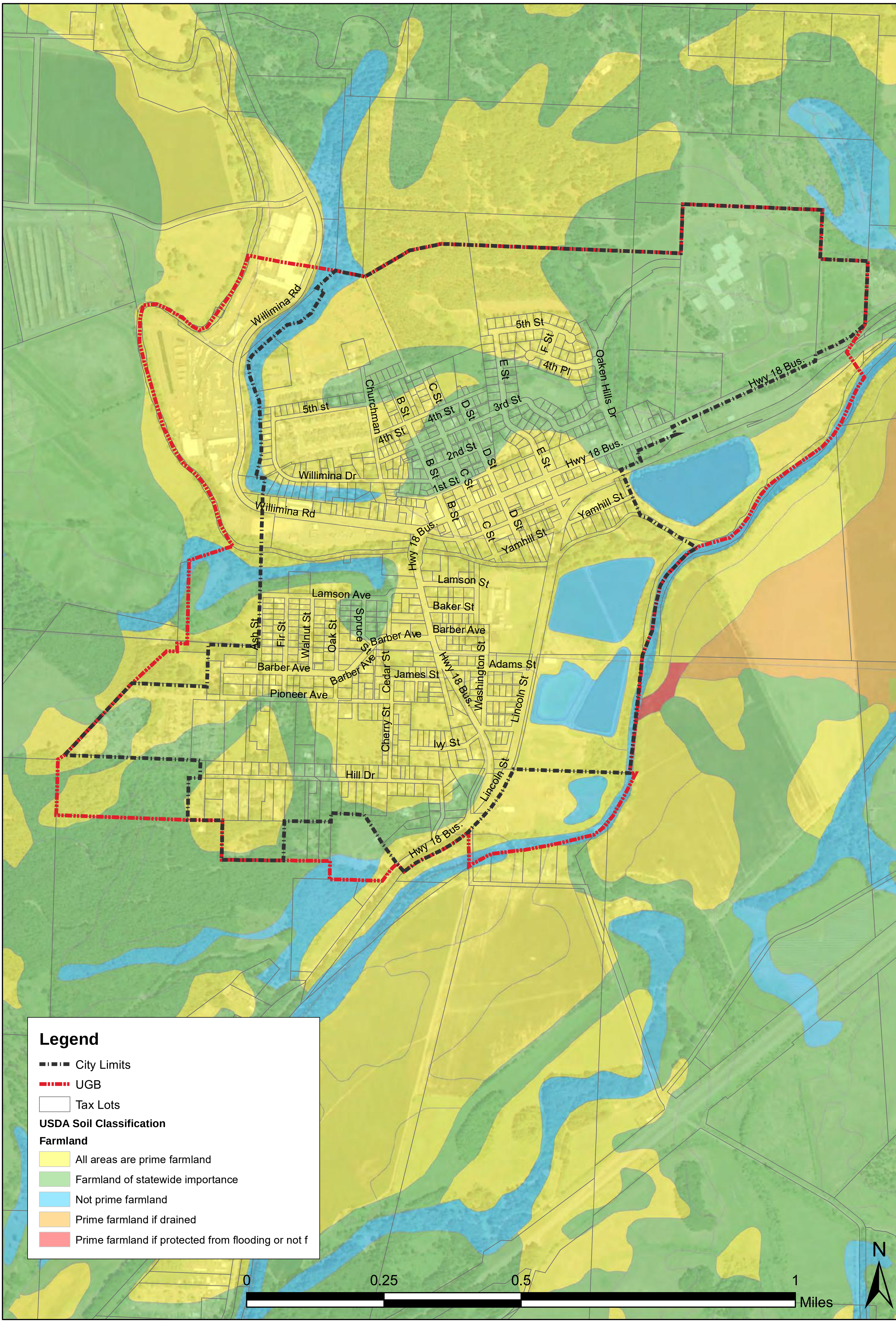
Study Area with Zoning

Wastewater Facilities Planning Study

CITY OF Willamina TIMBERTOWN U.S.A.

Figure 1

City of Willamina, OR



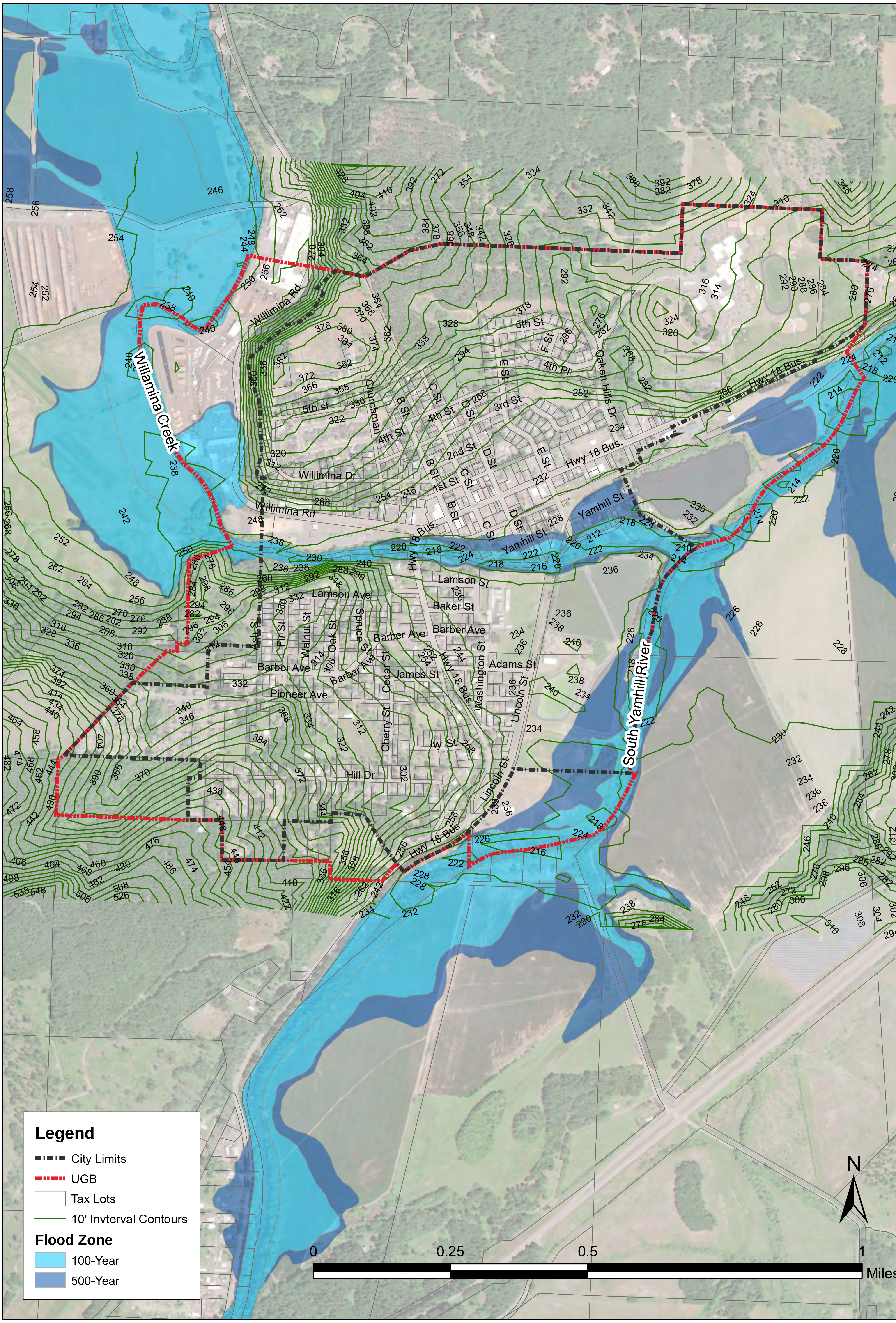
KELLER ASSOCIATES

USDA Farmland Designation

Wastewater Facilities Planning Study

Figure 2

City of Willamina, OR

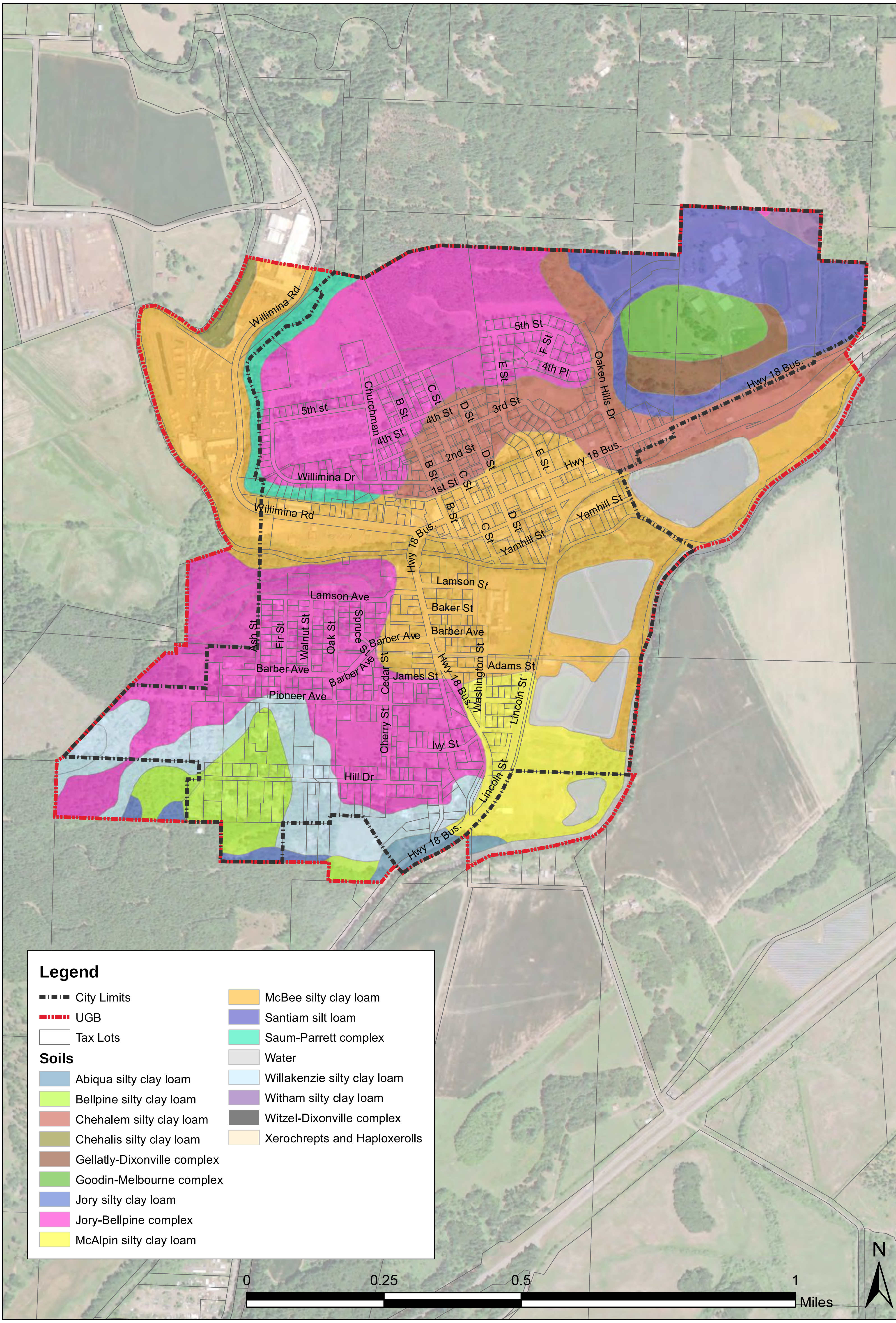


Topography and Floodplains

Wastewater Facilities Planning Study

Figure 3

City of Willamina, OR

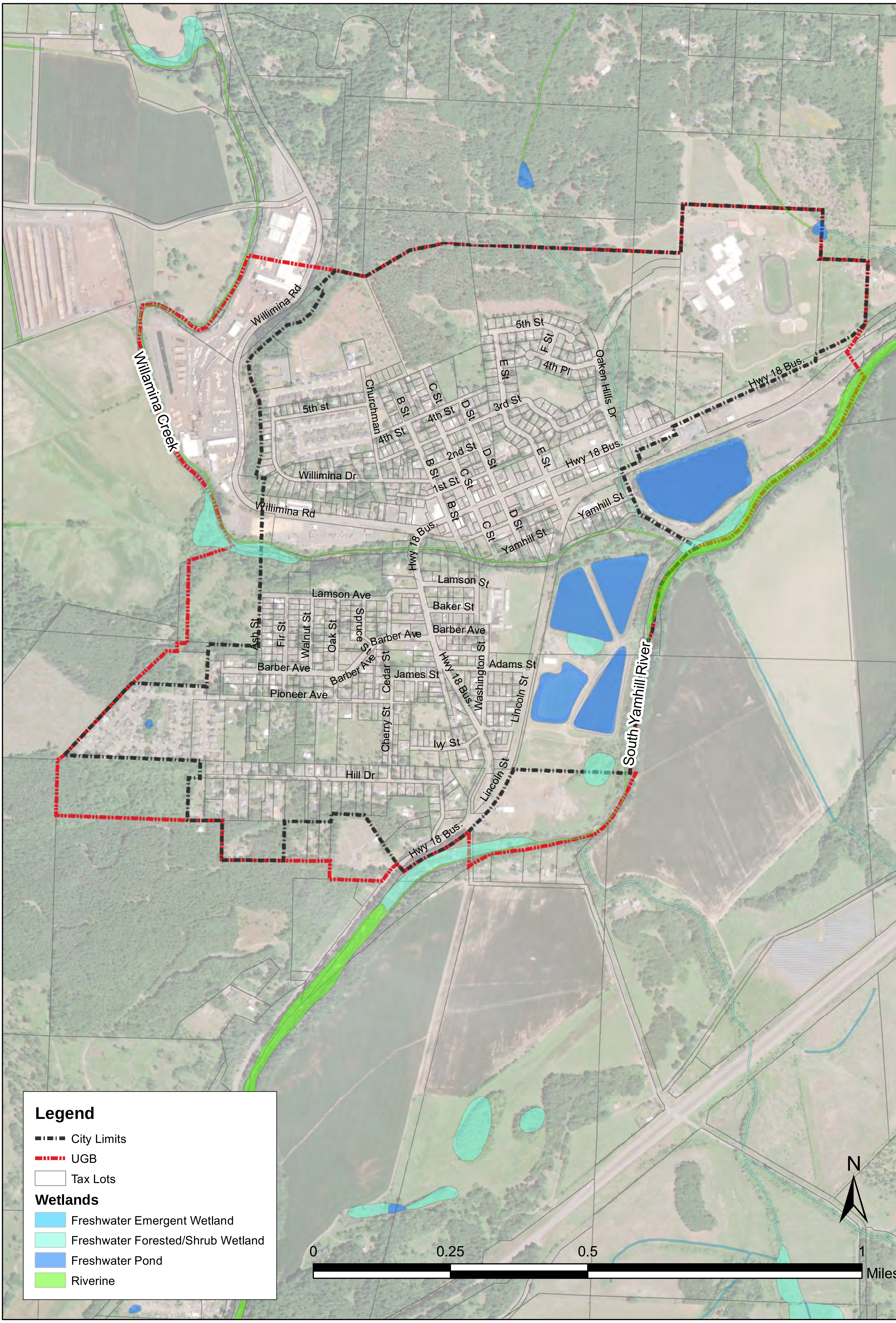


Soils

Wastewater Facilities Planning Study

Figure 4

City of Willamina, OR



KELLER ASSOCIATES

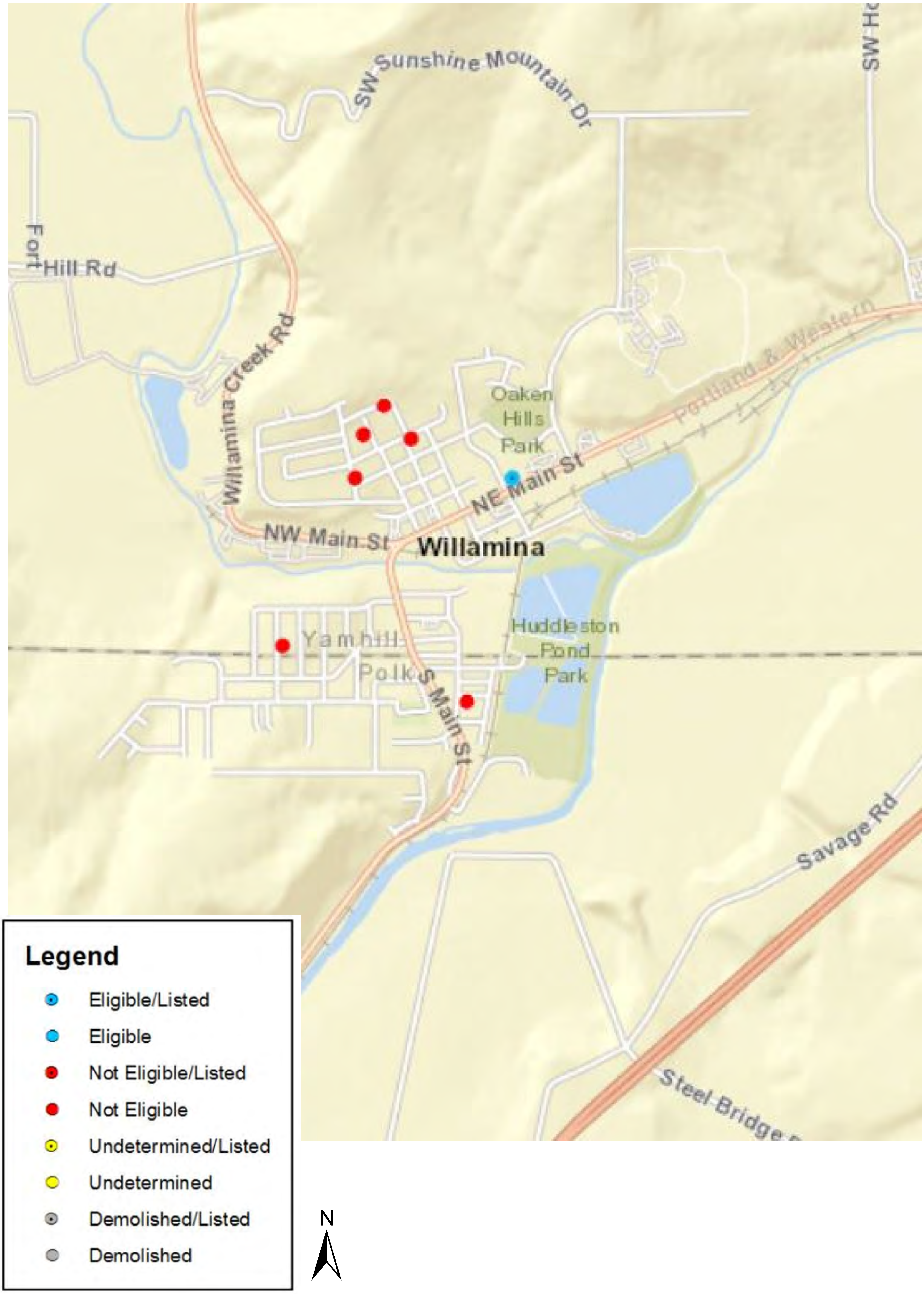
Wetlands and Rivers

Wastewater Facilities Planning Study

CITY OF Willamina INCORPORATED 1903 TIMBERTOWN U.S.A.

Figure 5

City of Willamina, OR



KELLER ASSOCIATES

Above Ground Cultural Resources

Wastewater Facilities Planning Study

Figure 6

City of Willamina, OR

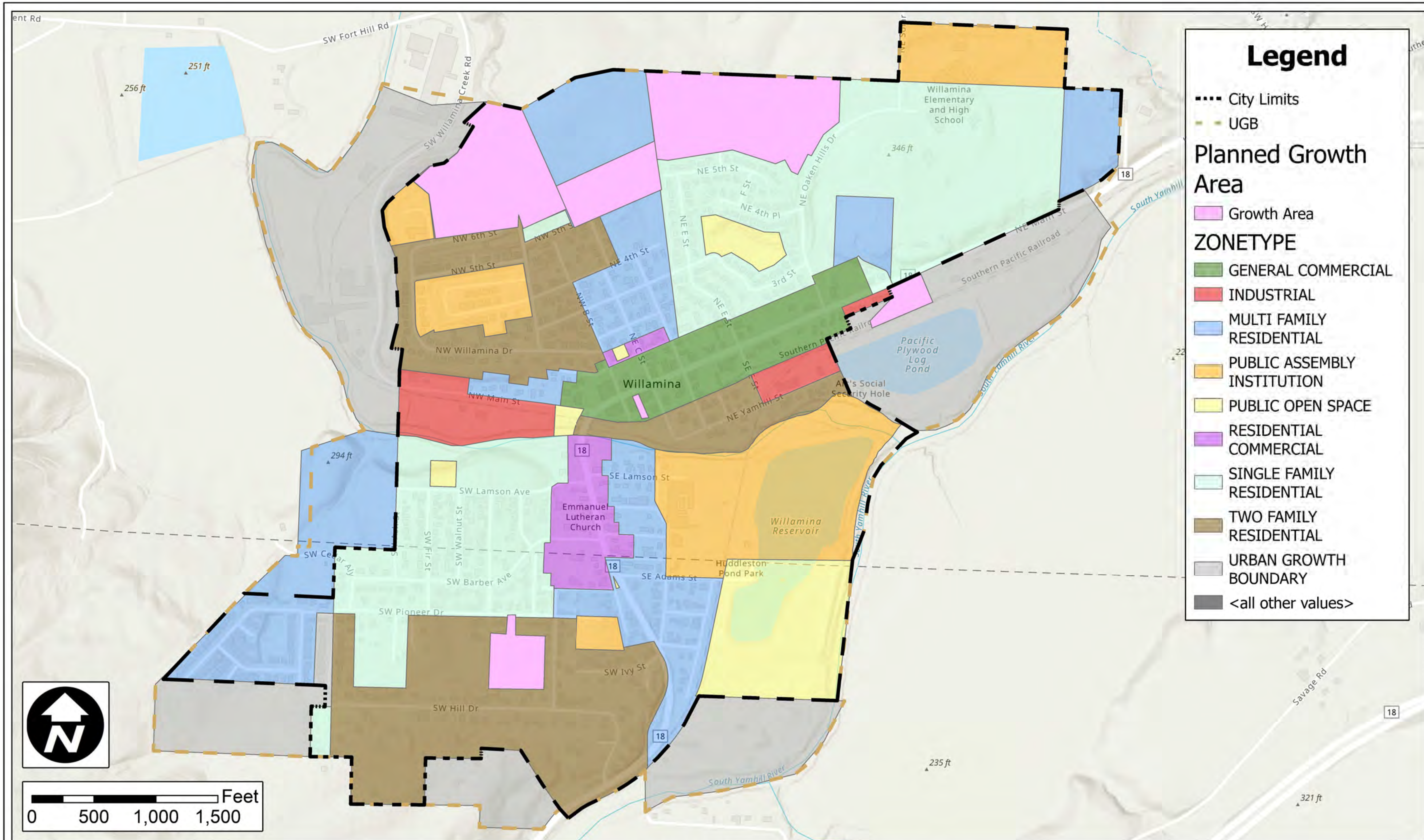


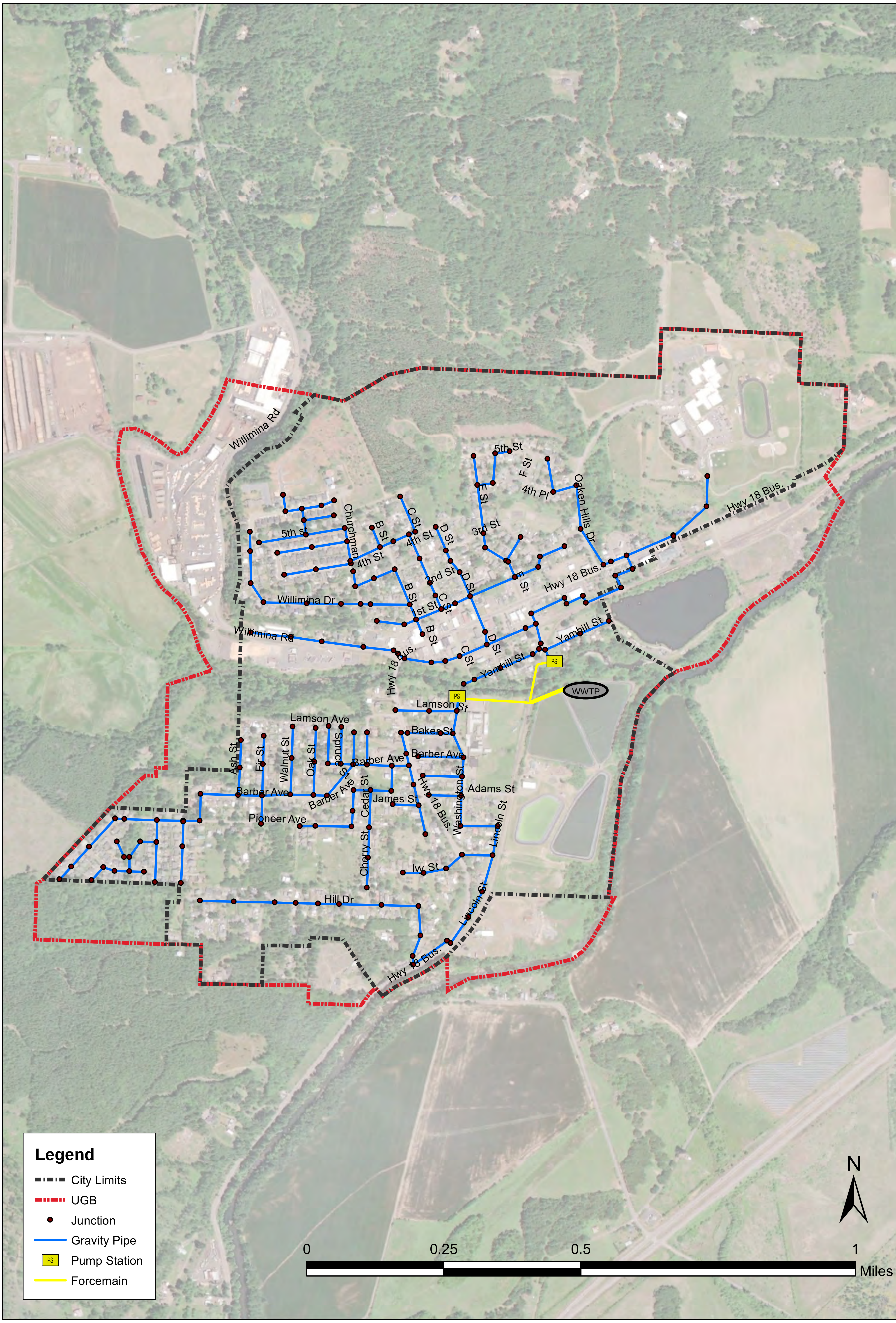
Figure 7

City of Willamina

Projected (2045): Future Growth

Willamina Figures

KELLER ASSOCIATES



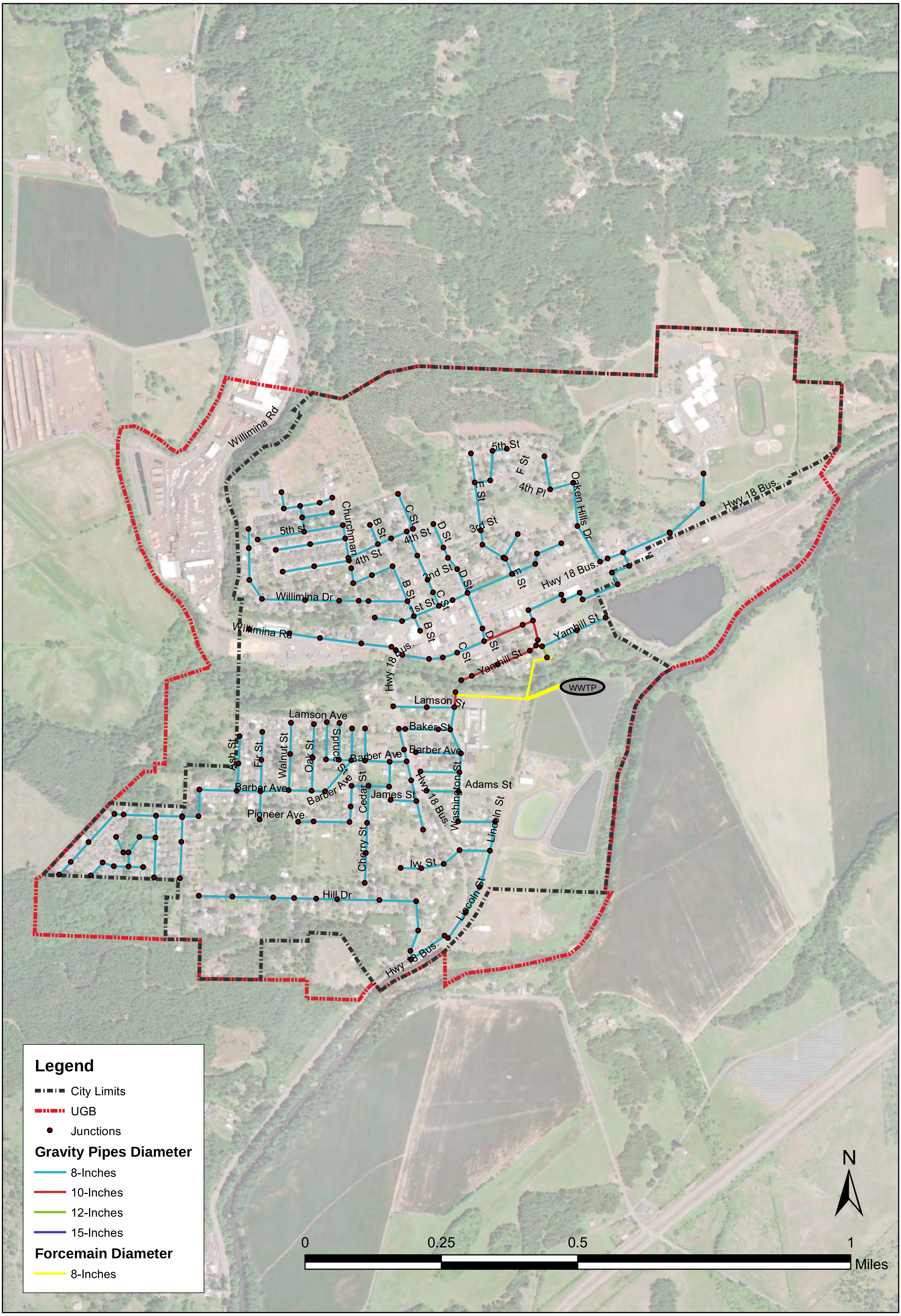
KELLER ASSOCIATES

Collection System Map

Wastewater Facilities Planning Study

Figure 8

City of Willamina, OR



KELLER ASSOCIATES

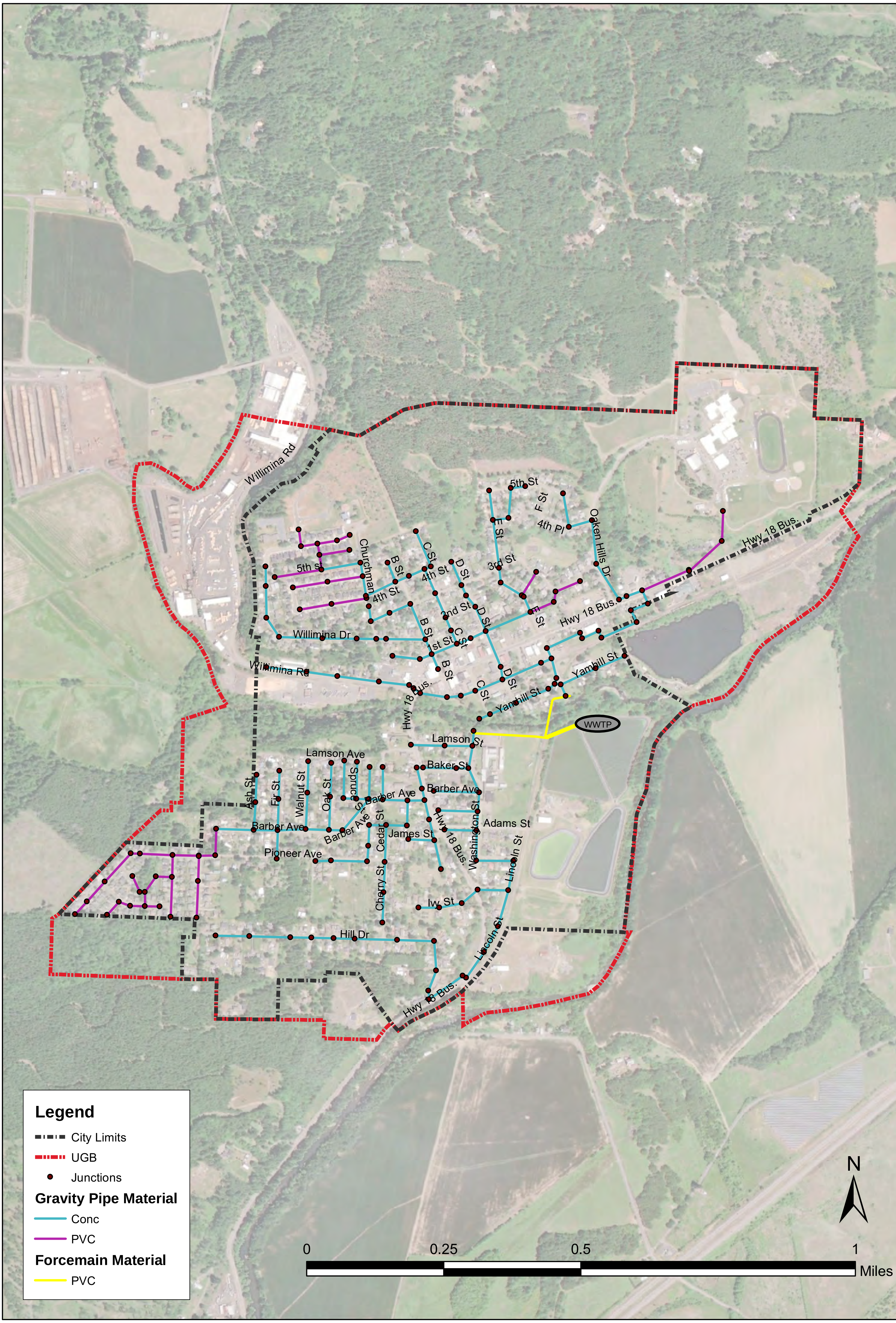
Pipeline Diameters

Wastewater Facilities Planning Study

CITY OF Willamina INCORPORATED 1903 TIMBERTOWN U.S.A.

Figure 9

City of Willamina, OR



KELLER ASSOCIATES

Pipeline Materials

Wastewater Facilities Planning Study

CITY OF Willamina TIMBERTOWN U.S.A.

Figure 10

City of Willamina, OR

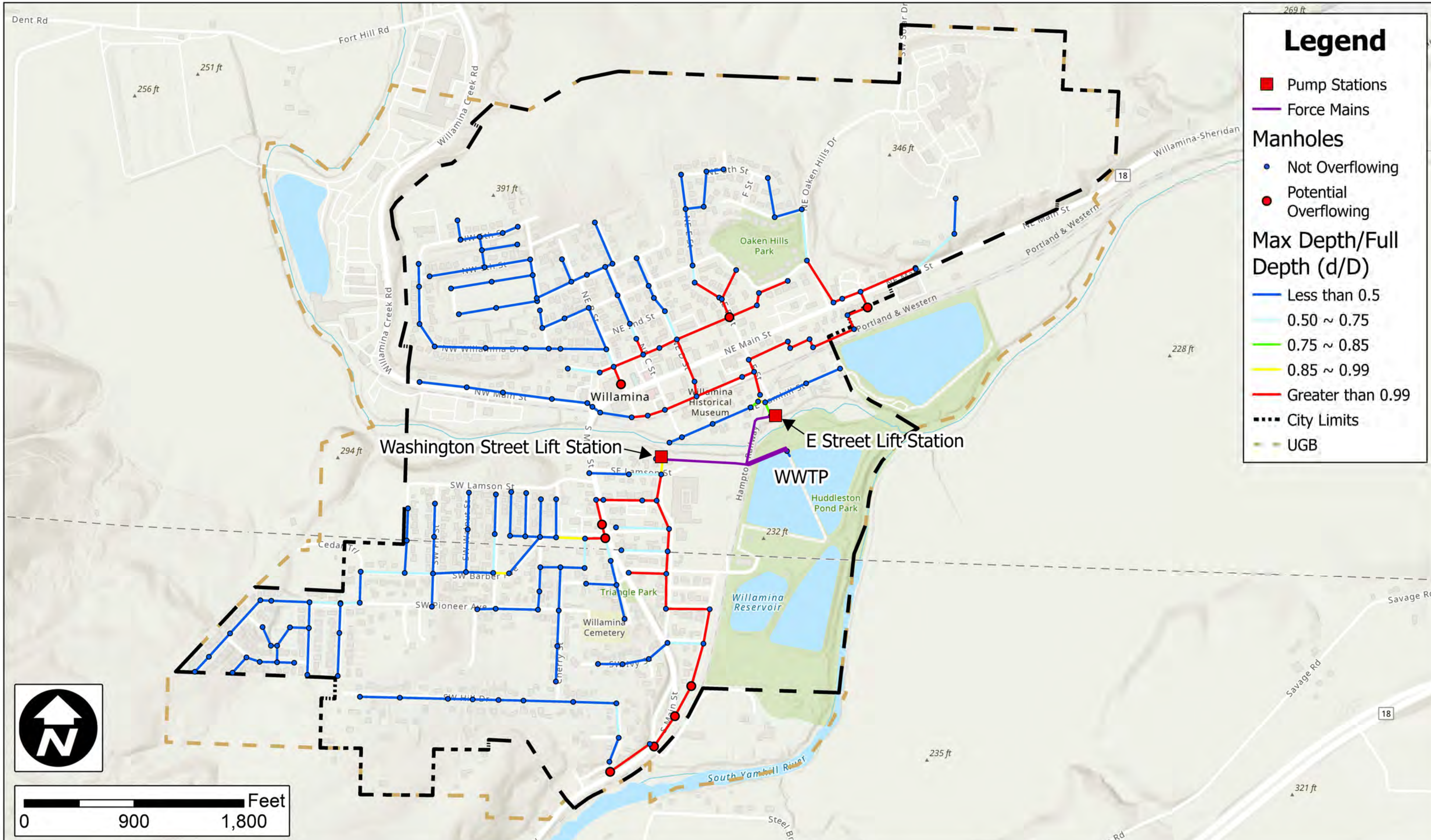


Figure 12a

City of Willamina

Existing (2020) System Evaluation: Maximum Depth of Flow

Willamina Figures

KELLER ASSOCIATES

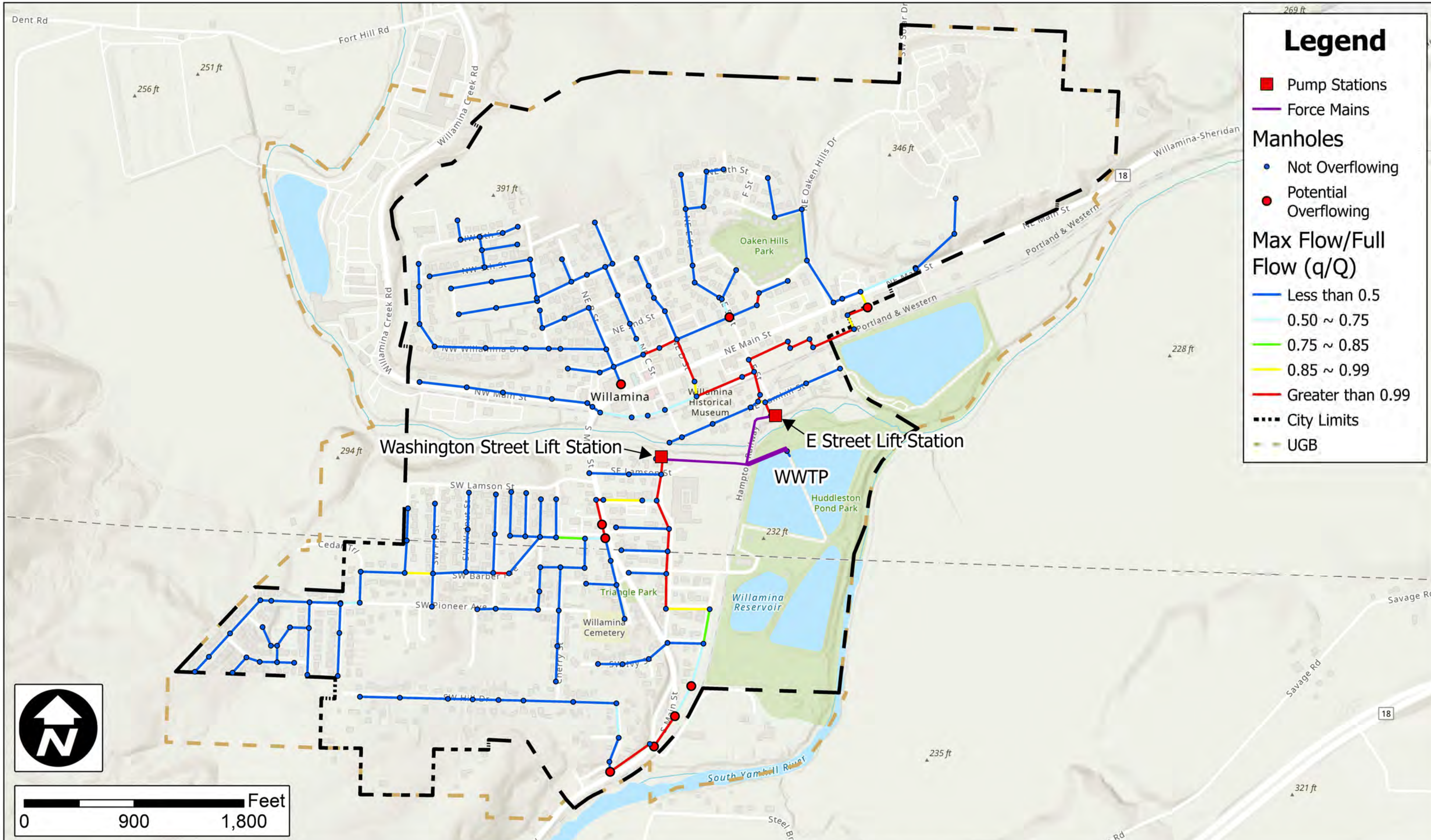


Figure 12b

City of Willamina

Existing (2020) System Evaluation: Maximum Flow

Willamina Figures

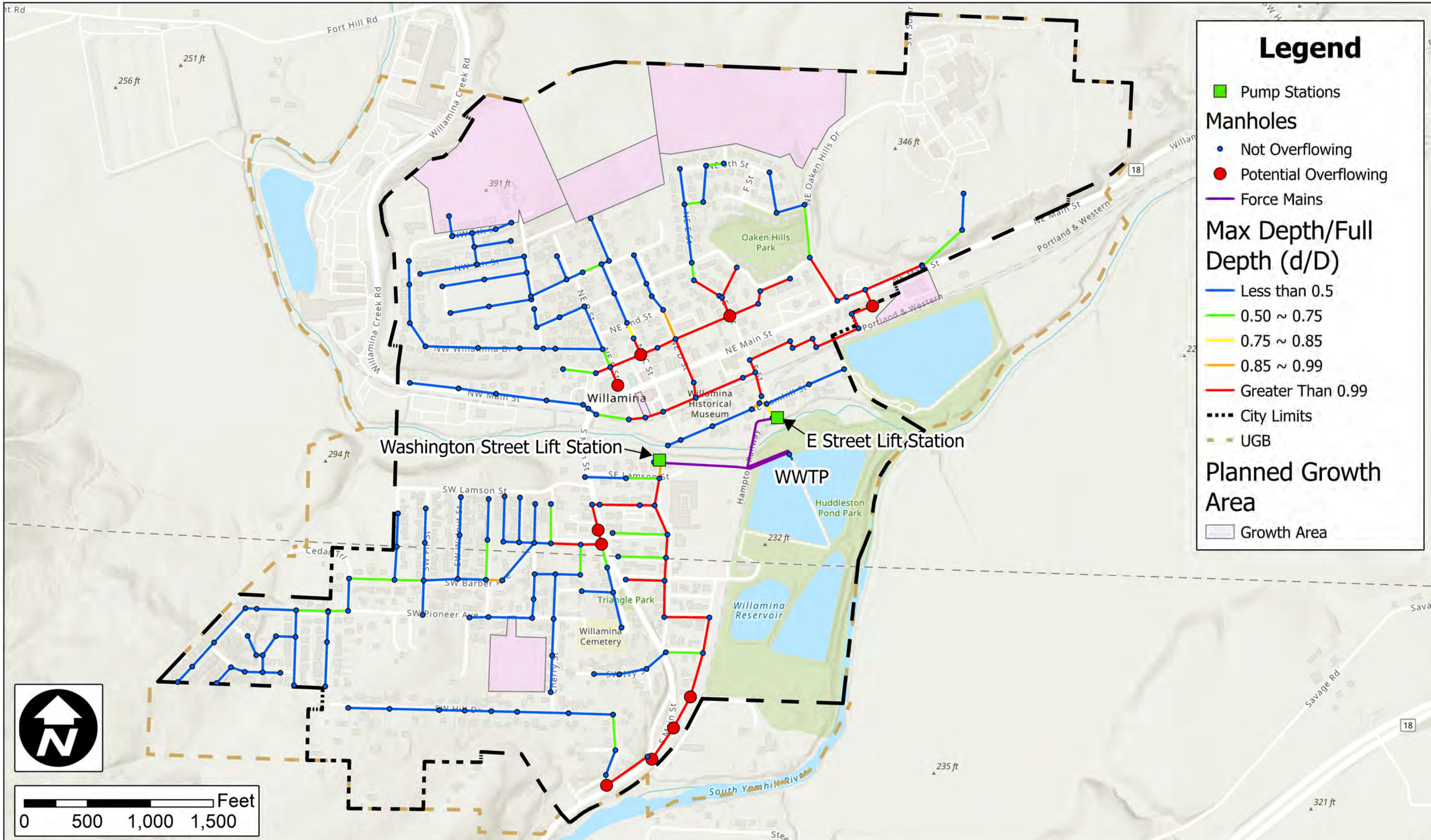


Figure 13a

City of Willamina

Projected (2045) System Evaluation: Maximum Depth of Flow

Willamina Figures

KELLER ASSOCIATES

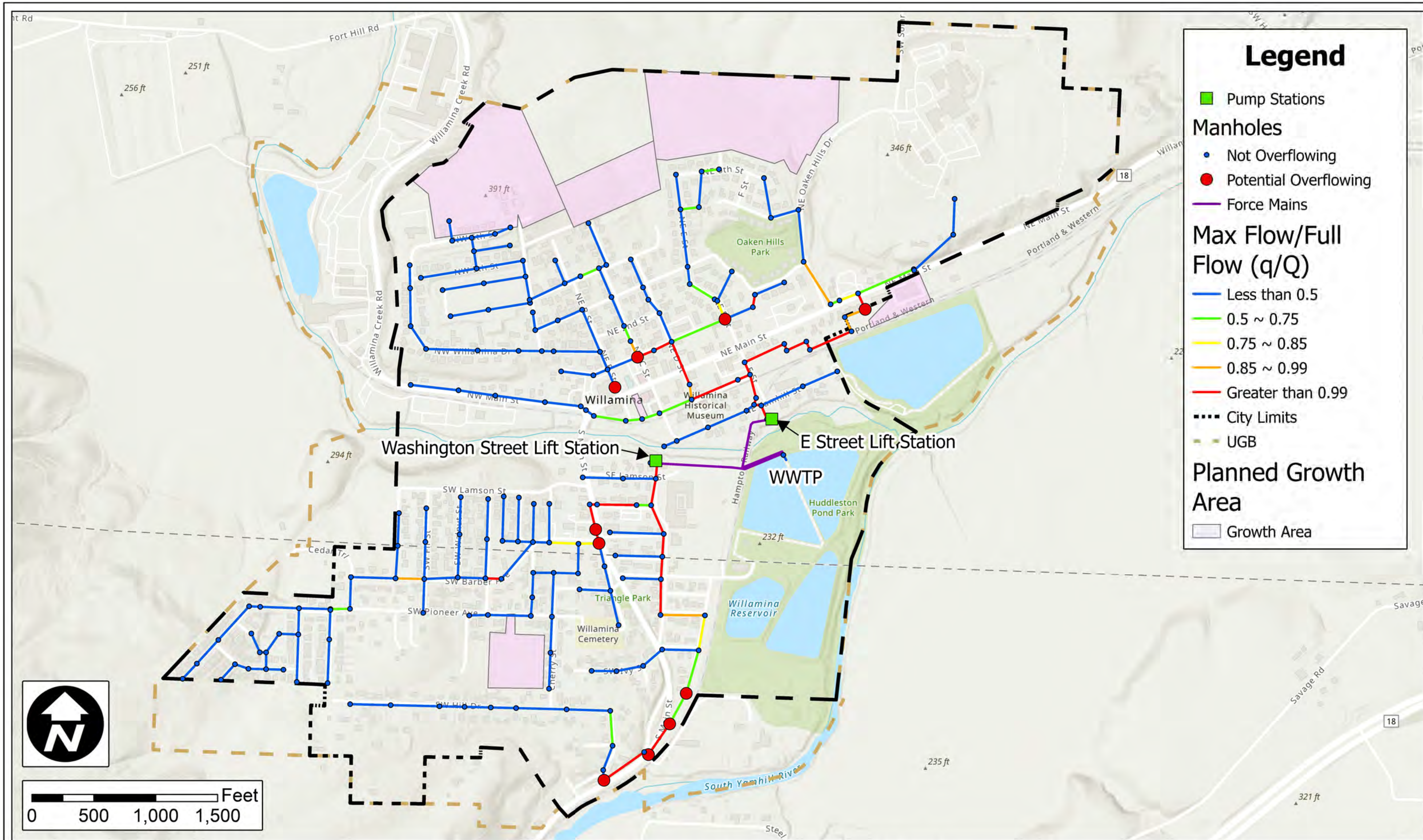


Figure 13b

City of Willamina

Projected (2045) System Evaluation: Maximum Flow

Willamina Figures

KELLER ASSOCIATES

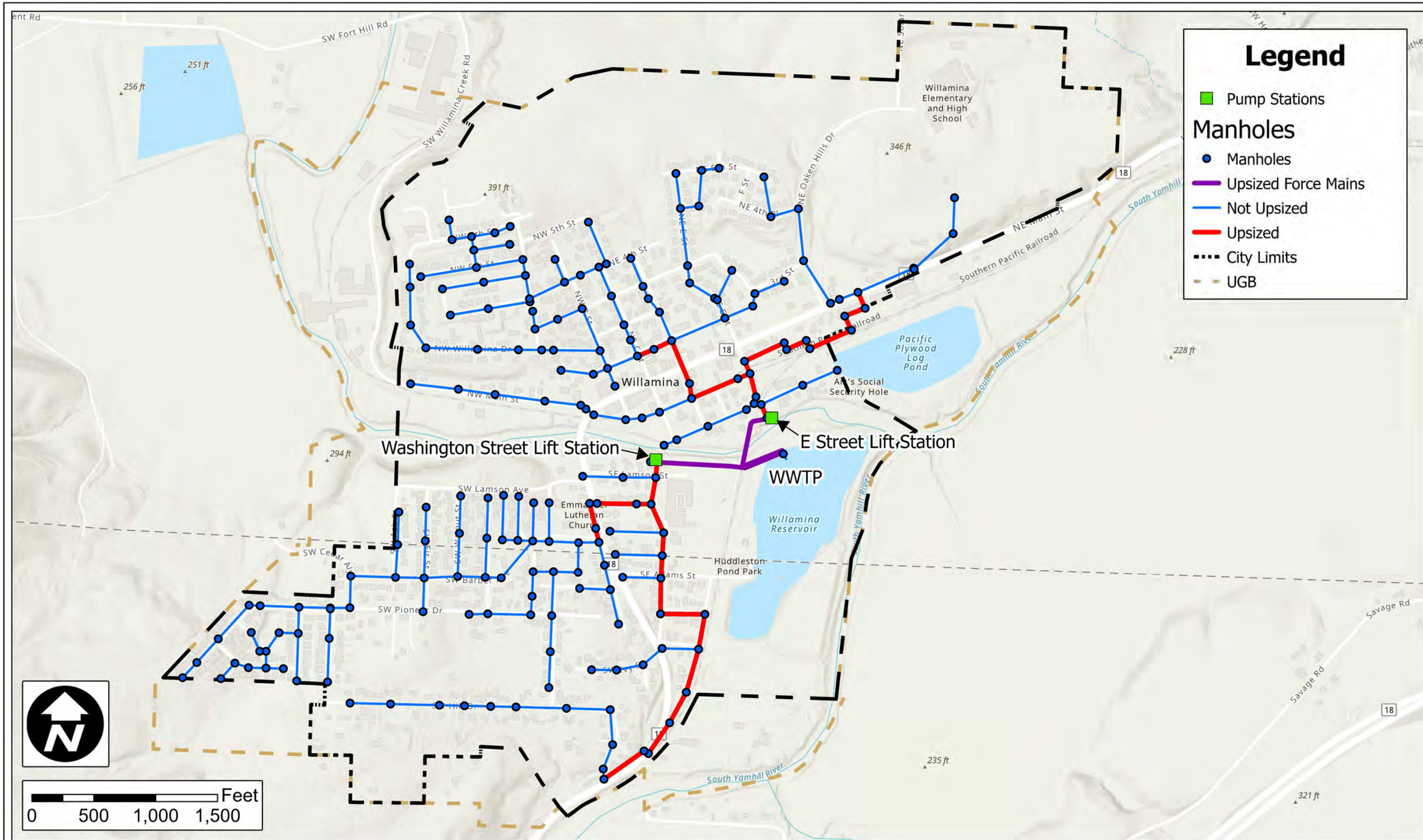


Figure 14a

City of Willamina

Alternative Option 1: Pipe Diameters

Willamina Figures

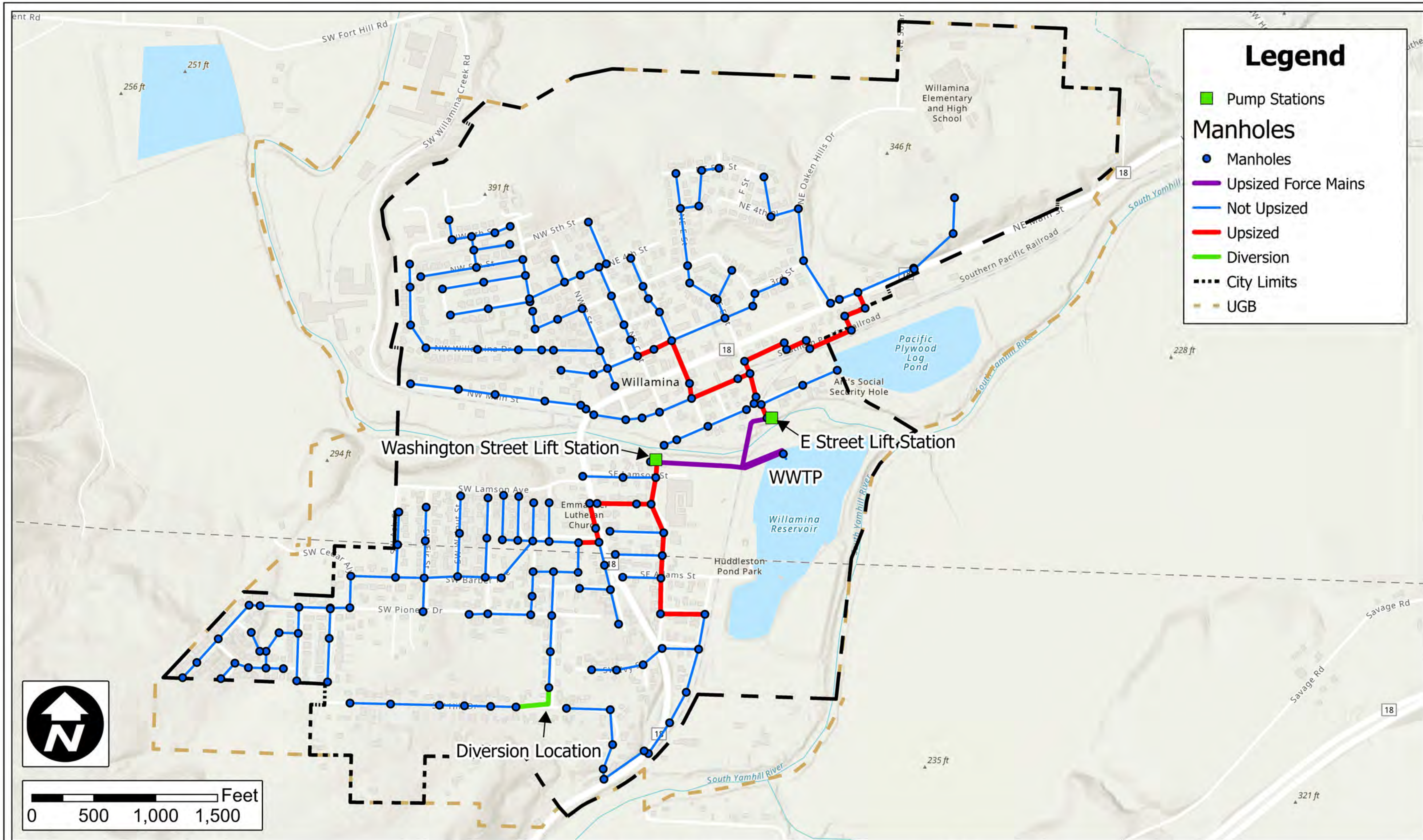


Figure 14b

City of Willamina

Alternative Option 2: Pipe Diameters + Diversion

Willamina Figures

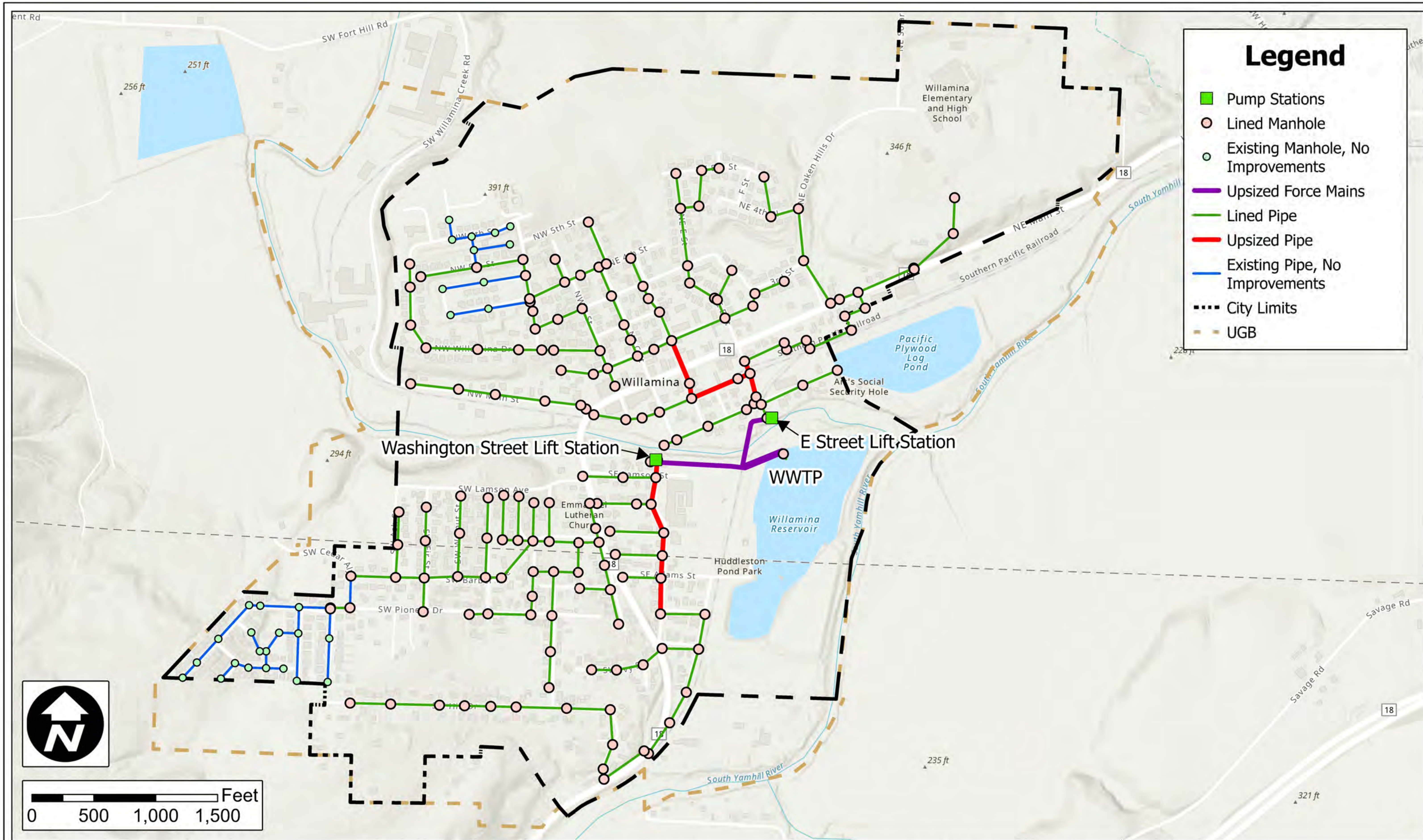


Figure 14c

City of Willamina

Alternative Option 3.1: Pipe Diameters, 20% Reduction

Willamina Figures

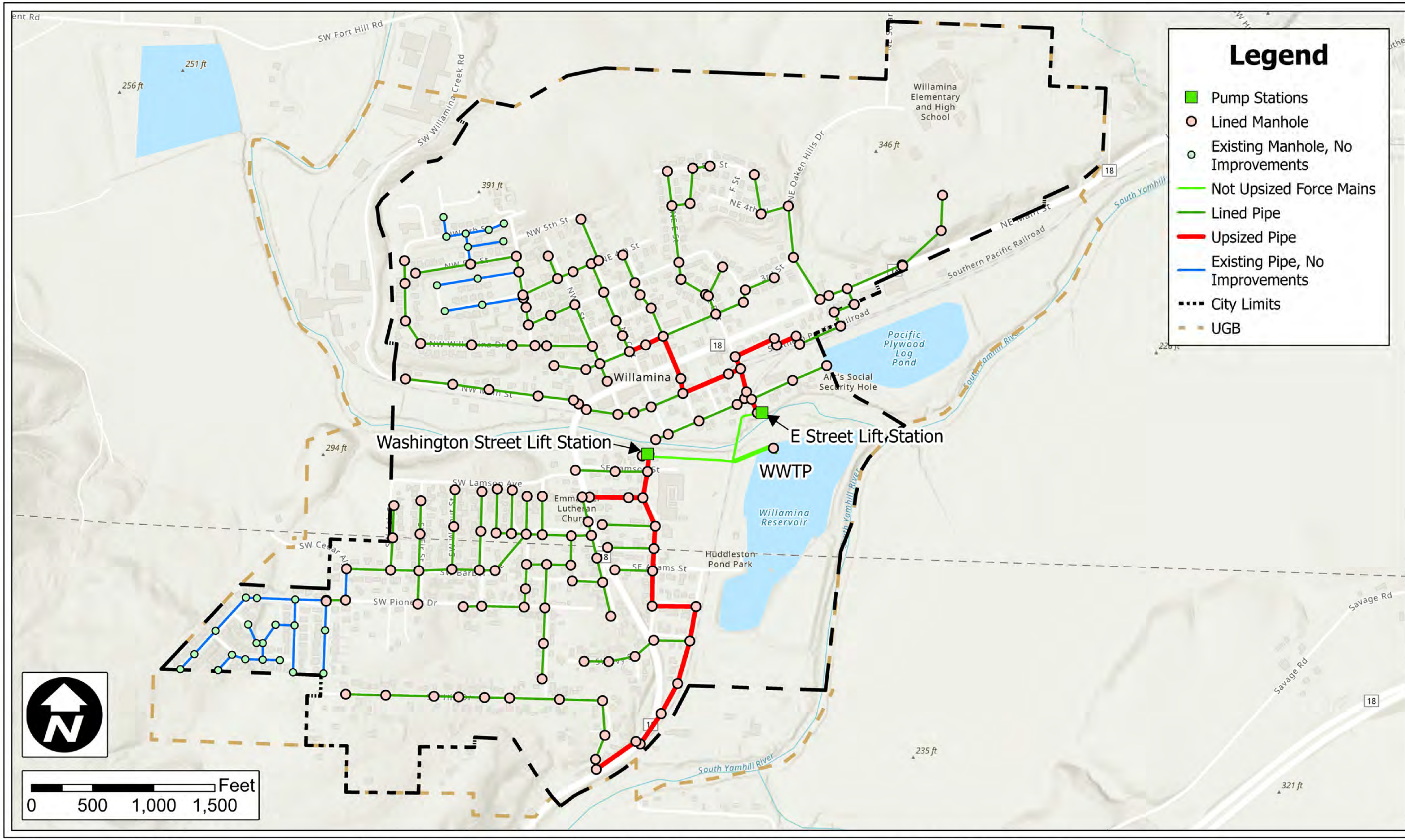


Figure 14d

City of Willamina

Alternative Option 3.2: Pipe Diameters, 50% Reduction

Willamina Figures

KELLER ASSOCIATES

New WWTP Lagoon #5

Wastewater Facilities Planning Study

Figure 15

City of Willamina, OR

Appendix B

Planning Documents

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Polk and Yamhill counties, Oregon

Map of project location

Local office

Oregon Fish And Wildlife Office

(503) 231-6179
(503) 231-6195

2600 Southeast 98th Avenue, Suite 100
Portland, OR 97266-1398

https://www.fws.gov/oregonfwo/articles.cfm?id=149489416

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Pacific Marten, Coastal Distinct Population Segment *Martes caurina* Wherever found There is **proposed** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/9081	Threatened

Birds

NAME	STATUS
Marbled Murrelet *Brachyramphus marmoratus* There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/4467	Threatened
Northern Spotted Owl *Strix occidentalis caurina* Wherever found There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/1123	Threatened

Streaked Horned Lark Eremophila alpestris strigata | Threatened

Wherever found

There is **final** critical habitat for this species. The location of the critical habitat is not available.

https://ecos.fws.gov/ecp/species/7268

Insects

NAME	STATUS
Fender's Blue Butterfly Icaricia icarioides fenderi Wherever found There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/6659	Endangered
Monarch Butterfly Danaus plexippus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Flowering Plants

NAME	STATUS
Kincaid's Lupine Lupinus sulphureus ssp. kincaidii Wherever found There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/3747	Threatened

Nelson's Checker-mallow Sidalcea nelsoniana Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7340	Threatened
Willamette Daisy Erigeron decumbens Wherever found There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/6270	Endangered

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)

Bald Eagle Haliaeetus leucocephalus

Breeds Jan 1 to Sep 30

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1626

Evening Grosbeak Coccothraustes vespertinus

Breeds May 15 to Aug 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Rufous Hummingbird selasphorus rufus

Breeds Apr 15 to Jul 15

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8002

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey

events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)

A week is marked as having no data if there were no survey events for that week.

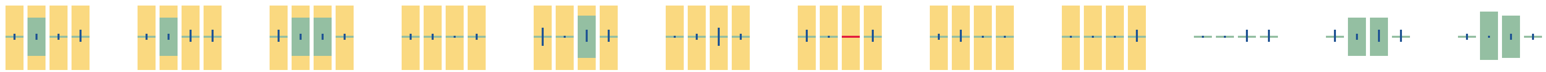
Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

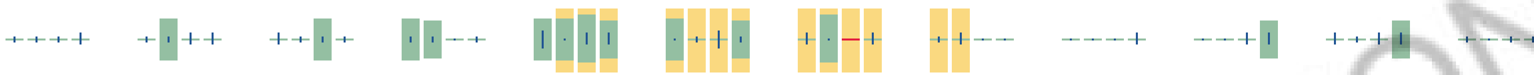
■ probability of presence ■ breeding season | survey effort – no data

SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

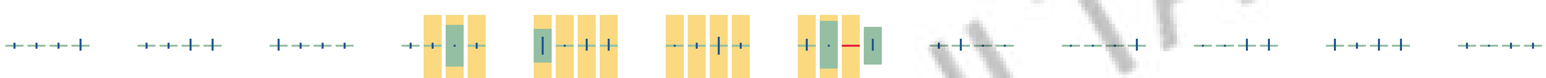
Bald Eagle
Non-BCC Vulnerable
(This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.)



Evening Grosbeak
BCC Rangewide (CON)
(This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Rufous Hummingbird
BCC Rangewide (CON)
(This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Coastal Barrier Resources System

Projects within the John H. Chafee Coastal Barrier Resources System (CBRS) may be subject to the restrictions on federal expenditures and financial assistance and the consultation requirements of the Coastal Barrier Resources Act (CBRA) (16 U.S.C. 3501 et seq.). For more information, please contact the local Ecological Services Field Office or visit the CBRA Consultations website. The CBRA website provides tools such as a flow chart to help determine whether consultation is required and a template to facilitate the consultation process.

THERE ARE NO KNOWN COASTAL BARRIERS AT THIS LOCATION.

Data limitations

The CBRS boundaries used in IPaC are representations of the controlling boundaries, which are depicted on the official CBRS maps. The boundaries depicted in this layer are not to be considered authoritative for in/out determinations close to a CBRS boundary (i.e., within the "CBRS Buffer Zone" that appears as a hatched area on either side of the boundary). For projects that are very close to a CBRS boundary but do not clearly intersect a unit, you may contact the Service for an official determination by following the instructions here:
https://www.fws.gov/service/coastal-barrier-resources-system-property-documentation

Data exclusions

CBRS units extend seaward out to either the 20- or 30-foot bathymetric contour (depending on the location of the unit). The true seaward extent of the units is not shown in the CBRS data, therefore projects in the offshore areas of units (e.g., dredging, breakwaters, offshore wind energy or oil and gas projects) may be subject to CBRA even if they do not intersect the CBRS data. For additional information, please contact CBRA@fws.gov.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

WETLAND INFORMATION IS NOT AVAILABLE AT THIS TIME
This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Oregon

Kate Brown, Governor

Department of Environmental Quality
Agency Headquarters/Water Quality
700 NE Multnomah Street, Suite 600
Portland, OR 97232
(503) 229-5696
FAX (503) 229-6124
TTY 711

11/4/2021

Jeff Brown
Jared Nunley
City of Willamina
411 NE C St
Willamina, OR 97396

RE: Request for Supplemental Information/Data
Willamina STP
NPDES Permit #101070, EPA # OR0022713
File # 97397

Dear Jeff Brown and Jared Nunley:

DEQ has scheduled your National Pollutant Discharge Elimination System (NPDES) permit (#101070) for renewal in 2023. DEQ received your permit renewal application on 11/02/2015 and has reviewed this application and the associated information that we have in your NPDES file. Based on this review, DEQ has determined that supplemental information is necessary to fully evaluate your facility's site specific conditions and proceed with the renewal of your permit. DEQ is requiring that you collect and submit this supplemental information as noted below.

A listing of the required information follows:

- Monthly Ammonia as N between December 1st 2021 – April 30th, 2022 and November 1st, 2022 – April 30th, 2023 (or until permit is renewed, whichever comes first).
- Monthly Alkalinity as CaCO3 between December 1st 2021 – April 30th, 2022 and November 1st, 2022 – April 30th, 2023 (or until permit is renewed, whichever comes first).

Ammonia must be analyzed with a quantitation limit no greater than 0.02 mg/L and Alkalinity must be analyzed with a quantitation limit no greater than 5 mg/L. Unless otherwise approved by DEQ in writing, the requested information must be submitted in electronic format via NetDMR by 5:00PM on the 15th of the following month (e.g. January's data would be submitted February 15th). The information must be submitted in an excel spreadsheet attached to the monthly DMR submission.

DEQ is requiring this information pursuant to Schedule F, Condition D.7 of your NPDES permit and OAR 340-045-0030(5)(b). While DEQ may consider timely requests for extensions or modifications to this request, as the permit holder you may be subject to certain actions if you do not submit the requested information to DEQ. These actions may include:

- Renewal with permit effluent limits based on conservative assumptions, default values
- Effluent limits without the consideration of a mixing zone
- Civil penalties

The laboratory quantitation limits (QLs) (adjusted for any dilutions) for analyses performed must be at or below the QLs specified in DEQ's list of quantitation limits (https://www.oregon.gov/deq/wq/Documents/001-LIST-QL.pdf) unless one of the conditions below is met.

i. The monitoring result shows a detect above the laboratory reported QL.

ii. The monitoring result indicates non-detect at a Detection Limit which is less than the QL.

iii. The QL has the lowest sensitivity of the analytical methods specified in 40 CFR 136

iv. Matrix effects are present that prevent the attainment of QLs and these matrix effects are demonstrated according to procedures described in EPA's "Solutions to Analytical Chemistry Problems with Clean Water Act Methods", March 2007. If using alternative methods and taking appropriate steps to eliminate matrix effects does not eliminate the matrix problems, DEQ may authorize in writing re-sampling or allow a higher QL to be reported.

Please contact Aliana Britson (britson.aliana@deq.state.or.us, (503) 229-6044) within two weeks of the date of this letter if you would like to request an extension or modifications to this request, or if you have questions regarding the information requested.

Sincerely,

Aliana Britson

Digitally signed by Aliana Britson
Date: 2021.11.04 09:11:43 -07'00'

Aliana Britson
Permit Developer
Oregon DEQ Portland Office

AB:tcm

cc: Permit correspondence file, Salem, DEQ

ec: Steven Nichols, Coos Bay, DEQ
Ranei Nomura, Salem, DEQ
Oregon Records Management System

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
WASTE DISCHARGE PERMIT

Department of Environmental Quality
Western Region – Salem Office
750 Front Street NE, Suite 120, Salem, OR 97301-1039
Telephone: (503) 378-8240

Issued pursuant to ORS 468B.050 and The Federal Clean Water Act

ISSUED TO:

City of Willamina
PO Box 629
Willamina, OR 97397

SOURCES COVERED BY THIS PERMIT:

Type of Waste	Outfall Number	Outfall Location
Treated Wastewater	001	R.M. 41.9

FACILITY TYPE AND LOCATION:

Aerated Lagoons
Adams and Lincoln St.
Willamina
Treatment System Class: Level II
Collection System Class: Level II

RECEIVING STREAM INFORMATION:

Basin: Willamette
Sub-Basin: Yamhill
Receiving Stream: South Yamhill River
LLID: 1231445452258-41.9-D
County: Yamhill

EPA REFERENCE NO: OR--002271-3

Issued in response to Application No. 973620 received January 25, 2008
This permit is issued based on the land use findings in the permit record.

Zach J. Loboy, Water Quality Manager
Western Region

December 29, 2010
Date

PERMITTED ACTIVITIES

Until this permit expires or is modified or revoked, the permittee is authorized to construct, install, modify, or operate a wastewater collection, treatment, control and disposal system and discharge to public waters adequately treated wastewaters only from the authorized discharge point or points established in Schedule A and only in conformance with all the requirements, limitations, and conditions set forth in the attached schedules as follows:

	Page
Schedule A - Waste Discharge Limitations not to be Exceeded	2
Schedule B - Minimum Monitoring and Reporting Requirements	4
Schedule D - Special Conditions	7
Schedule F - General Conditions	8

Unless specifically authorized by this permit, by another NPDES or WPCF permit, or by Oregon Administrative Rule, any other direct or indirect discharge of waste is prohibited, including discharge to waters of the state or an underground injection control system.

SCHEDULE A

1. Waste Discharge Limits not to be exceeded after permit issuance.

Treated Effluent Outfall 001:

(a) May 1- October 31: No discharge to waters of the State (unless approved in writing by the Department)

(b) November 1 – April 30:

	Average Effluent Concentrations		Monthly* Average	Weekly* Average	Daily* Maximum
Parameter	Monthly	Weekly	lb/day	lb/day	lbs
BOD_5	30 mg/L	45 mg/L	120	180	240
TSS	30 mg/L	45 mg/L	120	180	240

November 1 – April 30:

Other parameters	Limits
pH	May be no lower than 6.0 and no higher than 9.0
BOD_5 and TSS Removal Efficiency	May not be less than 85% monthly average for BOD_5 and 65% monthly average for TSS.
E. coli	Shall not exceed 126 organisms per 100 mL monthly geometric mean. No single sample shall exceed 406 organisms per 100 mL. (see note 1)
Total Residual Chlorine	Shall not exceed 0.21 mg/L daily maximum and 0.08 mg/L monthly average.

* Average dry weather design flow to the facility equals 0.22 MGD. Mass load limits have been calculated based on the average wet weather design flow of 0.48 MGD pursuant to OAR 340-41-120(9).

2. Mixing Zone

No wastes may be discharged or activities conducted that cause or contribute to a violation of water quality standards in OAR 340-041 applicable to the Oregon Yamhill sub-basin except as provided for in OAR 340-045-0080 and the following regulatory mixing zone:

> The regulatory mixing zone is that portion of the South Yamhill River contained within a band extending out twenty-five feet (25) from the Northwest Bank of the river and extending from a point ten (10) feet up stream of the outfall to a point one-hundred feet downstream from the outfall.. The Zone of Immediate Dilution (ZID) is defined as that portion of the regulatory mixing zone that is within ten (10) feet of the point of discharge.

3. Overflows

Raw sewage overflows are prohibited.

4. Groundwater

No activities may be conducted that could cause an adverse impact on existing or potential beneficial uses of groundwater. All wastewater and process related residuals are to be managed and disposed in a manner that will prevent a violation of the Groundwater Quality Protection Rules (OAR 340-040).

SCHEDULE B

1. **Minimum Monitoring and Reporting Requirements.**

The permittee must monitor the parameters as specified below at the locations indicated. The laboratory used by the permittee to analyze samples must have a quality assurance/quality control (QA/QC) program to verify the accuracy of sample analysis. If QA/QC requirements are not met for any analysis, the results must be included in the report, but not used in calculations required by this permit. When possible, the permittee must re-sample in a timely manner for parameters failing the QA/QC requirements, analyze the samples, and report the results.

a. Influent

Influent samples and measurements are taken just before the headworks. The composite sampler is located there.

Parameter	Minimum Frequency	Sample Type
Total Flow (MGD)	Daily	Measurement
Flow Meter Calibration	Annually	Verification
BOD_5	1 per week	Composite
TSS	1 per week	Composite
pH	2 per week	Grab

b. Treated Effluent Outfall 001

Effluent samples and measurements are taken just after the disinfection treatment. The composite sampler is located there.

Parameter	Minimum Frequency	Sample Type
Total Flow (MGD)	Daily	Measurement
Flow Meter Calibration	Annually	Verification
BOD_5	1 per week	Composite
TSS	1 per week	Composite
pH	2 per week	Grab
E. coli	1 per week	Grab
Pounds Discharged (BOD_5 and TSS)	1 per week	Calculation
Average Percent Removed (BOD_5 and TSS)	Monthly	Calculation
Temperature	2 per week	Grab
Quantity of Chlorine Used	Daily	Measurement
Chlorine Residual	Daily	Grab

c. Biosolids

Parameter		Minimum Frequency	Sample Type
Total solids,	% dry wt.	Annual	Composite **(see Note B2)**
Volatile solids,	% dry wt.	Annual	Composite **(see Note B2)**
NH_3-N,	% dry wt.	Annual	Composite **(see Note B2)**
NO_3-N,	% dry wt.	Annual	Composite **(see Note B2)**
TKN,	% dry wt.	Annual	Composite **(see Note B2)**
P,	% dry wt.	Annual	Composite **(see Note B2)**
K,	% dry wt.	Annual	Composite **(see Note B2)**
pH,	S.U.	Annual	Composite **(see Note B2)**
Total As	mg/kg	Annual	Composite **(see Note B2)**
Total Cd	mg/kg	Annual	Composite **(see Note B2)**
Total Cu	mg/kg	Annual	Composite **(see Note B2)**
Total Hg	mg/kg	Annual	Composite **(see Note B2)**
Total Mo	mg/kg	Annual	Composite **(see Note B2)**
Total Ni	mg/kg	Annual	Composite **(see Note B2)**
Total Pb	mg/kg	Annual	Composite **(see Note B2)**
Total Se	mg/kg	Annual	Composite **(see Note B2)**
Total Zn	mg/kg	Annual	Composite **(see Note B2)**
Locations where applied		Each occurrence	Date, volume, location
Process used to stabilize biosolids (required to meet federal pathogen and vector attraction reduction requirements Class B Biosolids)		Each occurrence	Measurement

2. **<u>Reporting Procedures</u>**

a. Monitoring results must be reported on approved forms. The reporting period is the calendar month. Reports must be submitted to the appropriate DEQ office by the 15th day of the following month.

b. State monitoring reports must identify the name, certificate classification and grade level of each principal operator designated by the permittee as responsible for supervising the wastewater collection and treatment systems during the reporting period. Monitoring reports must also identify each system classification as found on page one of this permit.

c. Monitoring reports must also include a record of the quantity and method of use of all sludge removed from the treatment facility and a record of all applicable equipment breakdowns and bypassing.

3. Report Submittals

a. For any year in which biosolids are land applied, a report must be submitted to DEQ by February 19 of the following year. The report describe solids handling activities for the previous year and includes, but is not limited to, the required information outlined in OAR 340-50-035(6)(a)-(e).

4. Notes

B1. The intensity of UV radiation passing through the water column will affect the system's ability to kill organisms. The UV disinfection system must include a UV intensity meter and sensor to track the reduction in intensity. The meter must be connected to a sensor located in the water column at a specified distance from the UV bulbs. This meter will measure the intensity of UV radiation in mWatts-seconds/cm^2. The daily UV radiation intensity must be determined by reading the meter each day. If more than one meter is used, the daily recording will be the average of all meter readings each day.

B2. Composite samples must be taken from reference areas in the sludge drying bed pursuant to **Test Methods for Evaluating Solid Waste, Volume 2: Field Manual, Physical/Chemical Methods,** third edition, chapter 9 (November 1986).

Inorganic pollutant monitoring must be conducted according to **Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,** second edition (1982) with Updates I and II and third edition (1986) with Revision I.

SCHEDULE D

Special Conditions

1. The permittee must submit an updated Biosolids Management Plan for DEQ review and approval at least 60 days before land application of biosolids.

2. All biosolids must be managed in accordance with the current DEQ approved biosolids management plan, and the site authorization letters issued by DEQ. Any changes in solids management activities that significantly differ from operations specified under the approved plan require the prior written approval of the DEQ.

3. The permittee must comply with Oregon Administrative Rules (OAR), Chapter 340, Division 49, "Regulations Pertaining To Certification of Wastewater System Operator Personnel" and accordingly:

   a. The permittee must have its wastewater system supervised by one or more operators who are certified in a classification and grade level (equal to or greater) that corresponds with the classification (collection and/or treatment) of the system to be supervised as specified on page one of this permit.

Note: A "supervisor" is defined as the person exercising authority for establishing and executing the specific practice and procedures of operating the system in accordance with the policies of the permittee and requirements of the waste discharge permit. "Supervise" means responsible for the technical operation of a system, which may affect its performance or the quality of the effluent produced. Supervisors are not required to be on-site at all times.

   b. The permittee's wastewater system may not be without supervision (as required by Special Condition 3.a. above) for more than thirty (30) days. During this period, and at any time that the supervisor is not available to respond on-site (i.e. vacation, sick leave or off-call), the permittee must make available another person who is certified in the proper classification and at grade level I or higher.

   c. The permittee is responsible for ensuring the wastewater system has a properly certified supervisor available at all times to respond on-site at the request of the permittee and to any other operator.

   d. The permittee must notify the Department of Environmental Quality in writing within thirty (30) days of replacement or re-designation of certified operators responsible for supervising wastewater system operation. The notice must be filed with the Water Quality Division, Operator Certification Program, 400 East Scenic Drive, Suite 307, The Dalles, OR 97058. This requirement is in addition to the reporting requirements contained under Schedule B of this permit.

   e. Upon written request, DEQ may grant the permittee reasonable time, not to exceed 120 days, to obtain the services of a qualified person to supervise the wastewater system. The written request must include justification for the time needed, a schedule for recruiting and hiring, the date the system supervisor availability ceased, and the name of the alternate system supervisor(s) as required by 3.b. above.

4. The permittee must notify the appropriate DEQ office in accordance with the response times noted in Schedule F of this permit, of any malfunction so that corrective action can be coordinated between the permittee and DEQ.

5. All raw sewage discharges/overflows must be reported within 24 hours to DEQ via the Oregon Emergency Response System (OERS) at 800-452-0311. Additional reporting requirements are contained in Schedule F of this permit.

SCHEDULE F

NPDES GENERAL CONDITIONS – DOMESTIC FACILITIES

SECTION A. STANDARD CONDITIONS

1. Duty to Comply with Permit
The permittee must comply with all conditions of this permit. Failure to comply with any permit condition is a violation of Oregon Revised Statutes (ORS) 468B.025 and the federal Clean Water Act and is grounds for an enforcement action. Failure to comply is also grounds for the Department to terminate, modify and reissue, revoke, or deny renewal of a permit.

2. Penalties for Water Pollution and Permit Condition Violations
The permit is enforceable by DEQ or EPA, and in some circumstances also by third-parties under the citizen suit provisions 33 USC §1365. DEQ enforcement is generally based on provisions of state statutes and EQC rules, and EPA enforcement is generally based on provisions of federal statutes and EPA regulations.

ORS 468.140 allows the Department to impose civil penalties up to $10,000 per day for violation of a term, condition, or requirement of a permit. The federal Clean Water Act provides for civil penalties not to exceed $32,500 and administrative penalties not to exceed $11,000 per day for each violation of any condition or limitation of this permit.
Under ORS 468.943, unlawful water pollution, if committed by a person with criminal negligence, is punishable by a fine of up to $25,000, imprisonment for not more than one year, or both. Each day on which a violation occurs or continues is a separately punishable offense. The federal Clean Water Act provides for criminal penalties of not more than $50,000 per day of violation, or imprisonment of not more than 2 years, or both for second or subsequent negligent violations of this permit.

Under ORS 468.946, a person who knowingly discharges, places, or causes to be placed any waste into the waters of the state or in a location where the waste is likely to escape into the waters of the state is subject to a Class B felony punishable by a fine not to exceed $200,000 and up to 10 years in prison. The federal Clean Water Act provides for criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment of not more than 3 years, or both for knowing violations of the permit. In the case of a second or subsequent conviction for knowing violation, a person shall be subject to criminal penalties of not more than $100,000 per day of violation, or imprisonment of not more than 6 years, or both.

3. Duty to Mitigate
The permittee must take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment. In addition, upon request of the Department, the permittee must correct any adverse impact on the environment or human health resulting from noncompliance with this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

4. Duty to Reapply
If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and have the permit renewed. The application must be submitted at least 180 days before the expiration date of this permit.

The Department may grant permission to submit an application less than 180 days in advance but no later than the permit expiration date.

5. Permit Actions
This permit may be modified, revoked and reissued, or terminated for cause including, but not limited to, the following:
a. Violation of any term, condition, or requirement of this permit, a rule, or a statute

b. Obtaining this permit by misrepresentation or failure to disclose fully all material facts
c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge
d. The permittee is identified as a Designated Management Agency or allocated a wasteload under a Total Maximum Daily Load (TMDL)
e. New information or regulations
f. Modification of compliance schedules
g. Requirements of permit reopener conditions
h. Correction of technical mistakes made in determining permit conditions
i. Determination that the permitted activity endangers human health or the environment
j. Other causes as specified in 40 CFR 122.62, 122.64, and 124.5
k. For communities with combined sewer overflows (CSOs):
   (1) To comply with any state or federal law regulation that addresses CSOs that is adopted or promulgated subsequent to the effective date of this permit
   (2) If new information, not available at the time of permit issuance, indicates that CSO controls imposed under this permit have failed to ensure attainment of water quality standards, including protection of designated uses
   (3) Resulting from implementation of the Permittee's Long-Term Control Plan and/or permit conditions related to CSOs.

The filing of a request by the permittee for a permit modification, revocation or reissuance, termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

6. Toxic Pollutants
The permittee must comply with any applicable effluent standards or prohibitions established under Oregon Administrative Rules (OAR) 340-041-0033 and 307(a) of the federal Clean Water Act for toxic pollutants, and with standards for sewage sludge use or disposal established under Section 405(d) of the Clean Water Act, within the time provided in the regulations that establish those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

7. Property Rights and Other Legal Requirements
The issuance of this permit does not convey any property rights of any sort, or any exclusive privilege, or authorize any injury to persons or property or invasion of any other private rights, or any infringement of federal, tribal, state, or local laws or regulations.

8. Permit References
Except for effluent standards or prohibitions established under Section 307(a) of the federal Clean Water Act and OAR 340-041-0033 for toxic pollutants, and standards for sewage sludge use or disposal established under Section 405(d) of the Clean Water Act, all rules and statutes referred to in this permit are those in effect on the date this permit is issued.

9. Permit Fees
The permittee must pay the fees required by Oregon Administrative Rules.

SECTION B. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

1. Proper Operation and Maintenance
The permittee must at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems that are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

2. <u>Need to Halt or Reduce Activity Not a Defense</u>
For industrial or commercial facilities, upon reduction, loss, or failure of the treatment facility, the permittee must, to the extent necessary to maintain compliance with its permit, control production or all discharges or both until the facility is restored or an alternative method of treatment is provided. This requirement applies, for example, when the primary source of power of the treatment facility fails or is reduced or lost. It is not a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

3. <u>Bypass of Treatment Facilities</u>
   a. Definitions
      (1) "Bypass" means intentional diversion of waste streams from any portion of the treatment facility. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, provided the diversion is to allow essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs b. and c. of this section.
      (2) "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
   b. Prohibition of bypass.
      (1) Bypass is prohibited and the Department may take enforcement action against a permittee for bypass unless:
         i. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
         ii. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that occurred during normal periods of equipment downtime or preventative maintenance; and
         iii. The permittee submitted notices and requests as required under General Condition B.3.c.
      (2) The Department may approve an anticipated bypass, after considering its adverse effects and any alternatives to bypassing, when the Department determines that it will meet the three conditions listed above in General Condition B.3.b.(1).
   c. Notice and request for bypass.
      (1) Anticipated bypass. If the permittee knows in advance of the need for a bypass, a written notice must be submitted to the Department at least ten days before the date of the bypass.
      (2) Unanticipated bypass. The permittee must submit notice of an unanticipated bypass as required in General Condition D.5.

4. <u>Upset</u>
   a. Definition. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operation error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventative maintenance, or careless or improper operation.
   b. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of General Condition B.4.c are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.
   c. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset must demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:
      (1) An upset occurred and that the permittee can identify the causes(s) of the upset;
      (2) The permitted facility was at the time being properly operated;
      (3) The permittee submitted notice of the upset as required in General Condition D.5, hereof (24-hour notice); and,

(4) The permittee complied with any remedial measures required under General Condition A.3 hereof.

d. Burden of proof. In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.

5. Treatment of Single Operational Upset

For purposes of this permit, A Single Operational Upset that leads to simultaneous violations of more than one pollutant parameter will be treated as a single violation. A single operational upset is an exceptional incident that causes simultaneous, unintentional, unknowing (not the result of a knowing act or omission), temporary noncompliance with more than one Clean Water Act effluent discharge pollutant parameter. A single operational upset does not include Clean Water Act violations involving discharge without a NPDES permit or noncompliance to the extent caused by improperly designed or inadequate treatment facilities. Each day of a single operational upset is a violation.

6. Overflows from Wastewater Conveyance Systems and Associated Pump Stations

a. Definitions

(1) "Overflow" means any spill, release or diversion of sewage including:

i. An overflow that results in a discharge to waters of the United States; and

ii. An overflow of wastewater, including a wastewater backup into a building (other than a backup caused solely by a blockage or other malfunction in a privately owned sewer or building lateral), even if that overflow does not reach waters of the United States.

b. Prohibition of overflows. Overflows are prohibited. The Department may exercise enforcement discretion regarding overflow events. In exercising its enforcement discretion, the Department may consider various factors, including the adequacy of the conveyance system's capacity and the magnitude, duration and return frequency of storm events.

c. Reporting required. All overflows must be reported orally to the Department within 24 hours from the time the permittee becomes aware of the overflow. Reporting procedures are described in more detail in General Condition D.5.

7. Public Notification of Effluent Violation or Overflow

If effluent limitations specified in this permit are exceeded or an overflow occurs that threatens public health, the permittee must take such steps as are necessary to alert the public, health agencies and other affected entities (e.g., public water systems) about the extent and nature of the discharge in accordance with the notification procedures developed under General Condition B.8. Such steps may include, but are not limited to, posting of the river at access points and other places, news releases, and paid announcements on radio and television.

8. Emergency Response and Public Notification Plan

The permittee must develop and implement an emergency response and public notification plan that identifies measures to protect public health from overflows, bypasses or upsets that may endanger public health. At a minimum the plan must include mechanisms to:

a. Ensure that the permittee is aware (to the greatest extent possible) of such events;
b. Ensure notification of appropriate personnel and ensure that they are immediately dispatched for investigation and response;
c. Ensure immediate notification to the public, health agencies, and other affected public entities (including public water systems). The overflow response plan must identify the public health and other officials who will receive immediate notification;
d. Ensure that appropriate personnel are aware of and follow the plan and are appropriately trained;
e. Provide emergency operations; and
f. Ensure that DEQ is notified of the public notification steps taken.

9. Removed Substances

Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters must be disposed of in such a manner as to prevent any pollutant from such materials from entering waters of the state, causing nuisance conditions, or creating a public health hazard.

SECTION C. MONITORING AND RECORDS

1. Representative Sampling
Sampling and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge. All samples must be taken at the monitoring points specified in this permit, and shall be taken, unless otherwise specified, before the effluent joins or is diluted by any other waste stream, body of water, or substance. Monitoring points may not be changed without notification to and the approval of the Department.

2. Flow Measurements
Appropriate flow measurement devices and methods consistent with accepted scientific practices must be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices must be installed, calibrated and maintained to insure that the accuracy of the measurements is consistent with the accepted capability of that type of device. Devices selected must be capable of measuring flows with a maximum deviation of less than ± 10 percent from true discharge rates throughout the range of expected discharge volumes.

3. Monitoring Procedures
Monitoring must be conducted according to test procedures approved under 40 CFR part 136, or in the case of sludge use and disposal, under 40 CFR part 503, unless other test procedures have been specified in this permit.

4. Penalties of Tampering
The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit may, upon conviction, be punished by a fine of not more than $10,000 per violation, imprisonment for not more than two years, or both. If a conviction of a person is for a violation committed after a first conviction of such person, punishment is a fine not more than $20,000 per day of violation, or by imprisonment of not more than four years, or both.

5. Reporting of Monitoring Results
Monitoring results must be summarized each month on a Discharge Monitoring Report form approved by the Department. The reports must be submitted monthly and are to be mailed, delivered or otherwise transmitted by the 15th day of the following month unless specifically approved otherwise in Schedule B of this permit.

6. Additional Monitoring by the Permittee
If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR part 136, or in the case of sludge use and disposal, under 40 CFR part 503, or as specified in this permit, the results of this monitoring must be included in the calculation and reporting of the data submitted in the Discharge Monitoring Report. Such increased frequency must also be indicated. For a pollutant parameter that may be sampled more than once per day (e.g., Total Chlorine Residual), only the average daily value must be recorded unless otherwise specified in this permit.

7. Averaging of Measurements
Calculations for all limitations that require averaging of measurements must utilize an arithmetic mean, except for bacteria which shall be averaged as specified in this permit.

8. Retention of Records
Records of monitoring information required by this permit related to the permittee's sewage sludge use and disposal activities shall be retained for a period of at least five years (or longer as required by 40 CFR part 503). Records of all monitoring information including all calibration and maintenance records, all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit and records of all data used to complete the application for this permit shall be retained for a period of at least

3 years from the date of the sample, measurement, report, or application. This period may be extended by request of the Department at any time.

9. Records Contents
Records of monitoring information must include:

a. The date, exact place, time, and methods of sampling or measurements;
b. The individual(s) who performed the sampling or measurements;
c. The date(s) analyses were performed;
d. The individual(s) who performed the analyses;
e. The analytical techniques or methods used; and
f. The results of such analyses.

10. Inspection and Entry
The permittee must allow the Department or EPA upon the presentation of credentials to:

a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit, and
d. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by state law, any substances or parameters at any location.

11. Confidentiality of Information
Any information relating to this permit that is submitted to or obtained by DEQ is available to the public unless classified as confidential by the Director of DEQ under ORS 468.095. The Permittee may request that information be classified as confidential if it is a trade secret as defined by that statute. The name and address of the permittee, permit applications, permits, effluent data, and information required by NPDES application forms under 40 CFR 122.21 will not be classified as confidential. 40 CFR 122.7(b).

SECTION D. REPORTING REQUIREMENTS

1. Planned Changes
The permittee must comply with OAR chapter 340, division 52, "Review of Plans and Specifications" and 40 CFR Section 122.41(l) (1). Except where exempted under OAR chapter 340, division 52, no construction, installation, or modification involving disposal systems, treatment works, sewerage systems, or common sewers may be commenced until the plans and specifications are submitted to and approved by the Department. The permittee must give notice to the Department as soon as possible of any planned physical alternations or additions to the permitted facility.

2. Anticipated Noncompliance
The permittee must give advance notice to the Department of any planned changes in the permitted facility or activity that may result in noncompliance with permit requirements.

3. Transfers
This permit may be transferred to a new permittee provided the transferee acquires a property interest in the permitted activity and agrees in writing to fully comply with all the terms and conditions of the permit and the rules of the Commission. No permit may be transferred to a third party without prior written approval from the Department. The Department may require modification, revocation, and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under 40 CFR Section 122.61. The permittee must notify the Department when a transfer of property interest takes place.

4. Compliance Schedule

Reports of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any compliance schedule of this permit must be submitted no later than 14 days following each schedule date. Any reports of noncompliance must include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirements.

5. Twenty-Four Hour Reporting

The permittee must report any noncompliance that may endanger health or the environment. Any information must be provided orally (by telephone) to DEQ or to the Oregon Emergency Response System (1-800-452-0311) as specified below within 24 hours from the time the permittee becomes aware of the circumstances.

a. Overflows.

(1) Oral Reporting within 24 hours.

i. For overflows other than basement backups, the following information must be reported to the Oregon Emergency Response System (OERS) at 1-800-452-0311. For basement backups, this information should be reported directly to DEQ.

a) The location of the overflow;
b) The receiving water (if there is one);
c) An estimate of the volume of the overflow;
d) A description of the sewer system component from which the release occurred (e.g., manhole, constructed overflow pipe, crack in pipe); and
e) The estimated date and time when the overflow began and stopped or will be stopped.

ii. The following information must be reported to the Department's Regional office within 24 hours, or during normal business hours, whichever is first:

a) The OERS incident number (if applicable) along with a brief description of the event.

(2) Written reporting within 5 days.

i. The following information must be provided in writing to the Department's Regional office within 5 days of the time the permittee becomes aware of the overflow:

a) The OERS incident number (if applicable);
b) The cause or suspected cause of the overflow;
c) Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the overflow and a schedule of major milestones for those steps;
d) Steps taken or planned to mitigate the impact(s) of the overflow and a schedule of major milestones for those steps; and
e) (for storm-related overflows) The rainfall intensity (inches/hour) and duration of the storm associated with the overflow.

The Department may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

b. Other instances of noncompliance.

(1) The following instances of noncompliance must be reported:

i. Any unanticipated bypass that exceeds any effluent limitation in this permit;
ii. Any upset that exceeds any effluent limitation in this permit;
iii. Violation of maximum daily discharge limitation for any of the pollutants listed by the Department in this permit; and
iv. Any noncompliance that may endanger human health or the environment.

(2) During normal business hours, the Department's Regional office must be called. Outside of normal business hours, the Department must be contacted at 1-800-452-0311 (Oregon Emergency Response System).

(3) A written submission must be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission must contain:

i. A description of the noncompliance and its cause;
ii. The period of noncompliance, including exact dates and times;

iii. The estimated time noncompliance is expected to continue if it has not been corrected;
iv. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance; and
v. Public notification steps taken, pursuant to General Condition B.7

(4) The Department may waive the written report on a case-by-case basis if the oral report has been received
within 24 hours.

6. Other Noncompliance

The permittee must report all instances of noncompliance not reported under General Condition D.4 or D.5, at the time monitoring reports are submitted. The reports must contain:

a. A description of the noncompliance and its cause;
b. The period of noncompliance, including exact dates and times;
c. The estimated time noncompliance is expected to continue if it has not been corrected; and
d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

7. Duty to Provide Information

The permittee must furnish to the Department within a reasonable time any information that the Department may request to determine compliance with the permit or to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit. The permittee must also furnish to the Department, upon request, copies of records required to be kept by this permit.

Other Information: When the permittee becomes aware that it has failed to submit any relevant facts or has submitted incorrect information in a permit application or any report to the Department, it must promptly submit such facts or information.

8. Signatory Requirements

All applications, reports or information submitted to the Department must be signed and certified in accordance with 40 CFR Section 122.22.

9. Falsification of Information

Under ORS 468.953, any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance, is subject to a Class C felony punishable by a fine not to exceed $100,000 per violation and up to 5 years in prison. Additionally, according to 40 CFR 122.41(k)(2), any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a federal civil penalty not to exceed $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

10. Changes to Indirect Dischargers

The permittee must provide adequate notice to the Department of the following:

a. Any new introduction of pollutants into the POTW from an indirect discharger which would be subject to section 301 or 306 of the Clean Water Act if it were directly discharging those pollutants and;
b. Any substantial change in the volume or character of pollutants being introduced into the POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.
c. For the purposes of this paragraph, adequate notice shall include information on (i) the quality and quantity of effluent introduced into the POTW, and (ii) any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

SECTION E. DEFINITIONS

1. *BOD* means five-day biochemical oxygen demand.
2. *CBOD* means five day carbonaceous biochemical oxygen demand
3. *TSS* means total suspended solids.
4. "*Bacteria*" includes but is not limited to fecal coliform bacteria, total coliform bacteria, and E. coli bacteria.
5. *FC* means fecal coliform bacteria.
6. *Total residual chlorine* means combined chlorine forms plus free residual chlorine
7. *Technology based permit effluent limitations* means technology-based treatment requirements as defined in 40 CFR Section 125.3, and concentration and mass load effluent limitations that are based on minimum design criteria specified in OAR Chapter 340, Division 41.
8. *mg/l* means milligrams per liter.
9. *kg* means kilograms.
10. m^3/d means cubic meters per day.
11. *MGD* means million gallons per day.
12. 24-hour *Composite sample* means a sample formed by collecting and mixing discrete samples taken periodically and based on time or flow. The sample must be collected and stored in accordance with 40 CFR part 136.
13. *Grab sample* means an individual discrete sample collected over a period of time not to exceed 15 minutes.
14. *Quarter* means January through March, April through June, July through September, or October through December.
15. *Month* means calendar month.
16. *Week* means a calendar week of Sunday through Saturday.
17. *POTW* means a publicly owned treatment works

Report

Willamina WWTP
Mixing Zone Study
Final Report
January 2010

State of Oregon
Department of Environmental Quality

Last Updated: 2/16/2010
By: Lori Pillsbury
DEQ09-LAB-0062-TR

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Table of Contents

State of Oregon
Department of
Environmental
Quality

Background 1
Project Summary 1
Quality Assurance / Quality Control 1
Environmental Mapping 1
Outfall Description 3
Mixing Zone / Receiving Water Conditions 3
Analytical Results 7
Conclusions 8
References 9
Appendix A – Field Data Sheet & Chain of Custody 10
Appendix B – Field Summary Sheet 12
Appendix C – Stream Description & Conductivity Mapping 14
Appendix D – Flow measurements 16

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Background

The City of Willamina operates a domestic wastewater treatment facility with an average dry weather design flow of 0.22 MGD. Under permit # 101070, the facility is permitted to discharge to the South Yamhill River from November 1 through April 30. The facility has a permitted mixing zone defined as *that portion of the South Yamhill River contained within a band extending out twenty-five (25) feet from the Northwest bank of the river and extending from a point ten (10) feet upstream of the outfall to a point one-hundred (100) feet downstream from the outfall. The Zone of Immediate Dilution (ZID) shall be defined as that portion of the allowable mixing zone that is within ten (10) feet of the point of discharge.*

In order to evaluate 7Q10 low flow conditions, this study was conducted just prior to the permitted discharge season. The facility was granted permission to discharge outside its normal discharge window. In an attempt to sample a representative discharge, the facility was encouraged to begin discharging a few days prior to the sampling date.

Project Summary

Laboratory staff conducted a field mixing zone survey of this site on October 20, 2009. The facility was discharging during the study at a flow rate of 22,000 gallons per day or 0.022 MGD.

Based on the Regulatory Mixing Zone Internal Management Directive (ODEQ, 2007) and permit staff best professional judgment, this facility meets the two criteria for a Level 1 study:

1. The discharge has no reasonable potential to exceed acute criteria other than potentially chlorine or ammonia and available dilution of greater than 20 times 25% of critical flow
2. The discharge not classified as a "Major".

This report contains data required for this level.

Quality Assurance / Quality Control

Samples were collected at the compliance location for outfall 001 and three in-stream locations on the South Yamhill River. All sampling was conducted following the QA/QC procedures outlined in the Quality Assurance Project Plan, Mixing Zone Studies, DEQ06-LAB-0041-QAPP. A complete sampling plan for this project is contained in the Sample and Analysis Plan (SAP), DEQ09-LAB-0062-SAP.

All sampling activities outlined in the SAP were conducted during this study. The outfall was visually located and a dye study was conducted for additional information on the effluent mixing dynamics.

A duplicate sample was collected at the upstream sampling location and met all applicable QA/QC criteria. In addition, a transfer blank was collected. No analytes were detected in the transfer blank above the laboratory's Level of Quantitation (LOQ). Due to a field sampling error, turbidity was not measured in the effluent.

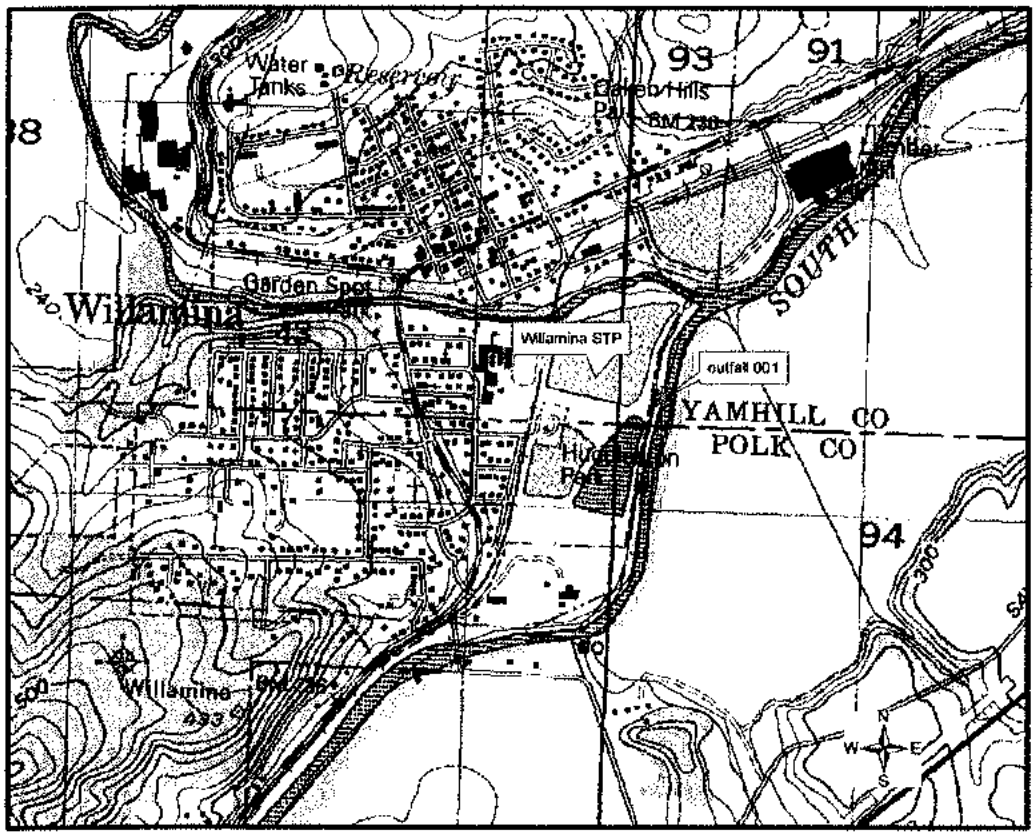
Environmental Mapping

This section of the report is intended to characterize and represent critical habitats, critical resources, and other beneficial uses of the receiving waterbody in the area surrounding the outfall. This portion was completed both in the field and through office research. A schematic of the field sampling area (drawn at the time of sampling) can be found in Appendix C.

The City of Willamina WWTP discharges into the South Yamhill River at RM 41.9 through Outfall 001. The outfall is contained within the Yamhill Sub-Basin of the Willamette Basin. Figure 1 shows the location of this outfall on the USGS Quad Map of the area. The South Yamhill River is currently included in the approved TMDL for the Yamhill basin for phosphorus from May 1 – October 31. Additional TMDL development is on-going in the basin. Based on the ODFW fish habitat maps and Division 41, Water Quality Standards, Figure 340A (Fish Use Designations, Willamette Basin) (ODEQ, 2010b), the South Yamhill River is designated as salmon and trout, rearing and migration habitat.

There are public access sites to this portion of the river. No drinking water intakes are located within ½ mile downstream of the outfall. No other NPDES discharges are located within ½ mile upstream or downstream of the outfall (based on information contained in DEQ Facility Profiler database and DEQ OLD database), accessed January 2010.

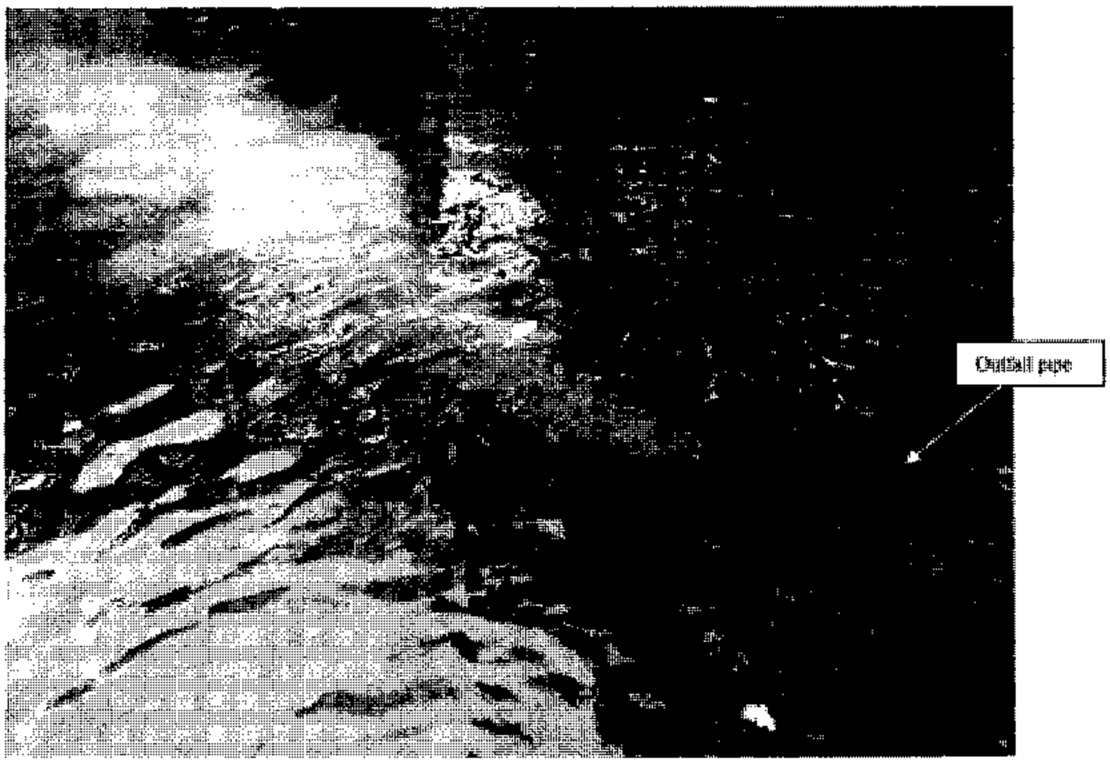
Figure 1 – USGS Quad Map of area surrounding Willamina WWTP



Outfall Description

The Willamina WWTP is permitted to discharge treated domestic wastewater through outfall 001 to the South Yamhill River. The outfall is a single port located approximately 12 feet from the left bank (looking downstream) of the creek. The pipe is eight inches in diameter with a six inch port on the end. The discharge flow is parallel to the receiving water flow. The pipe was completely submerged during the study in a water depth of 0.6 feet. Figure 2 shows the pipe and the discharge at the beginning of dye release.

Figure 2 – Outfall pipe at beginning of dye release



Mixing Zone / Receiving Water Conditions

The mixing zone for this facility is defined as *that portion of the South Yamhill River contained within a band extending out twenty-five (25) feet from the Northwest bank of the river and extending from a point ten (10) feet upstream of the outfall to a point one-hundred (100) feet downstream from the outfall. The Zone of Immediate Dilution (ZID) shall be defined as that portion of the allowable mixing zone that is within ten (10) feet of the point of discharge.*

South Yamhill River Stream Flow
Flow and depth measurements were collected during the field survey (see Appendix D for field sheet). Based on these measurements, the approximated discharge for the South Yamhill River at this location during the study was 58 cfs. This estimated discharge is slightly above the calculated 7Q10 discharge (40 cfs) provided by Western Region permit staff (Tim McFetridge) based on the closest USGS gauge at McMinnville, OR. Figure 3 provides a schematic and summary of the flow measurements. Table 1 summarizes relavant flow measurements, both river and effluent.

Conductivity Mapping (All conductivity measurements are temperature compensated to 25°C)
Conductivity mapping was completed during this field study. Figure 4 provides a visual representation of the conductivity data collected. The effluent conductivity measured during the study was 247 μmhos/cm and the background conductivity was 76 μmhos/cm. Measured conductivities remained elevated at greater than 5% over background 95 feet downstream of the outfall.

Figure 3 – Flow measurements

Site: upstream, S. Yamhill R

Stream Width		Cross Sectional Area			
80.0	ft	145.4	Sq.ft.	**LASAR #:**	

Stream Depth		Velocity (ft/sec)			
				Date:	10/20/09
2.80	Max	0.630	Max		
1.72	Avg	0.330	Avg	**Time:**	

Total Discharge		Max Cell Flow (%)			
				Personnel:	CK / LAP
57.98	cfs	9.6	Max		
		5.3	Avg		

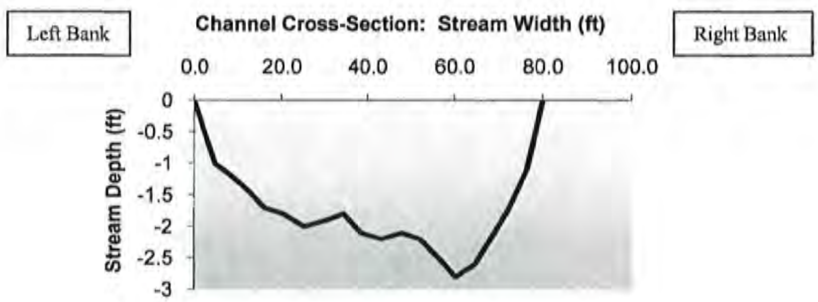


Table 1 – Summary of flow conditions (measured and calculated)

Average Dry Weather Design Flow	0.22 MGD
Facility Discharge (sampling date)	0.022 MGD
Stream Discharge (estimated at time of sampling)	58 cfs
7Q10 for receiving water (calculated)	40 cfs

Figure 4 – Conductivity mapping (all measurements in μmhos/cm)

Left Bank — Right Bank

wetted width: 80 feet

	Distance from left bank: @bank	12 feet	18 feet	25 feet	
100 feet DS	too deep to access				edge of RMZ
95 feet DS	90	90	89	Too deep to access	
85 feet DS	90	90	92	77	
75 feet DS	88	90	87	76	
60 feet DS	88	97	90	80	
40 feet DS	91	102	88	76	
35 feet DS	101	107	82	76	
15 feet DS	94	105	87	76	
10 feet DS	88	106	88	76	edge of ZID
At outfall	78	148	77	76	
	@bank	12 feet	18 feet	25 feet (Distance from left bank)	FLOW
Upstream				76	
Effluent (measured at compliance location)				247	

Dye Study

To evaluate the mixing in the receiving water visually, a dye study was conducted. The dye study visually supports the conductivity mapping which indicates that the effluent initially stays near the center and left bank of the stream, Figure 5.

Stream bottom / bank conditions at outfall (Figure 6)

Manning's roughness coefficient (n) is a measure of the friction at the stream bottom and can be estimated from the stream bottom type and channel morphology. The sediment type of the South Yamhill River at the discharge location was predominantly bedrock with large boulders. The average wetted width was 80 feet at the outfall. Water depth at the outfall pipe was approximately 0.6 feet.

Figure 5 – Dye study

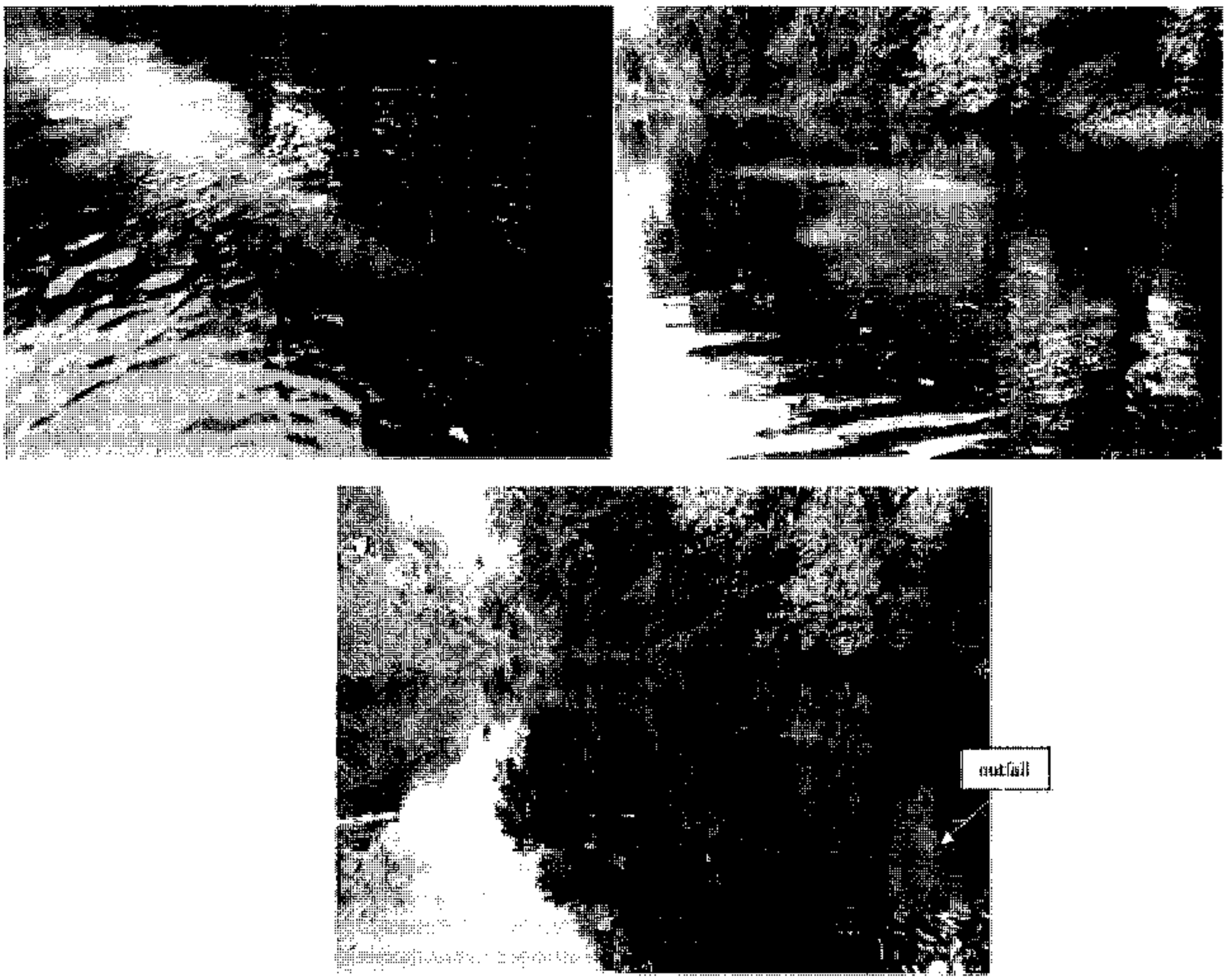


Figure 6 – Stream conditions upstream of outfall (looking upstream from outfall location)

Analytical Results

Water quality samples were collected at the outfall 001 compliance point and at three in-stream (South Yamhill River) locations, Table 2, Figure 7. Samples collected for BOD, nutrients (total nitrogen and phosphorus), and *E. coli* were transported to the ODEQ laboratory for analysis. Field parameters (pH, conductivity (temperature compensated to 25°C), dissolved oxygen, temperature, and turbidity) were measured by the field sampling crew. Data are summarized in Table 2 and Appendix A. A complete report for this sampling event can be found on the LASAR website (http://deq12.deq.state.or.us/lasar2/) under Case # 20090955 (ODEQ, 2009a).

Table 2 – Field Sampling Locations

Map ID	LASAR #	Station Name	Description
A	36096	Willamina STP – final effluent	effluent from plant, sampled at facility compliance point, outfall 001
B	36080	South Yamhill River, 50 feet US of Willamina outfall	Background / upstream location
C	NA	Outfall 001 – location in river	no samples at this location, outfall samples collected at location A at plant
D	36081	South Yamhill River, 10 feet DS of Willamina outfall	downstream edge of Zone of Immediate Dilution (ZID)
E	36082	South Yamhill River, 100 feet DS of Willamina outfall	downstream edge of regulatory mixing zone (RMZ)

Figure 7 – Overview of sampling locations including wastewater lagoons

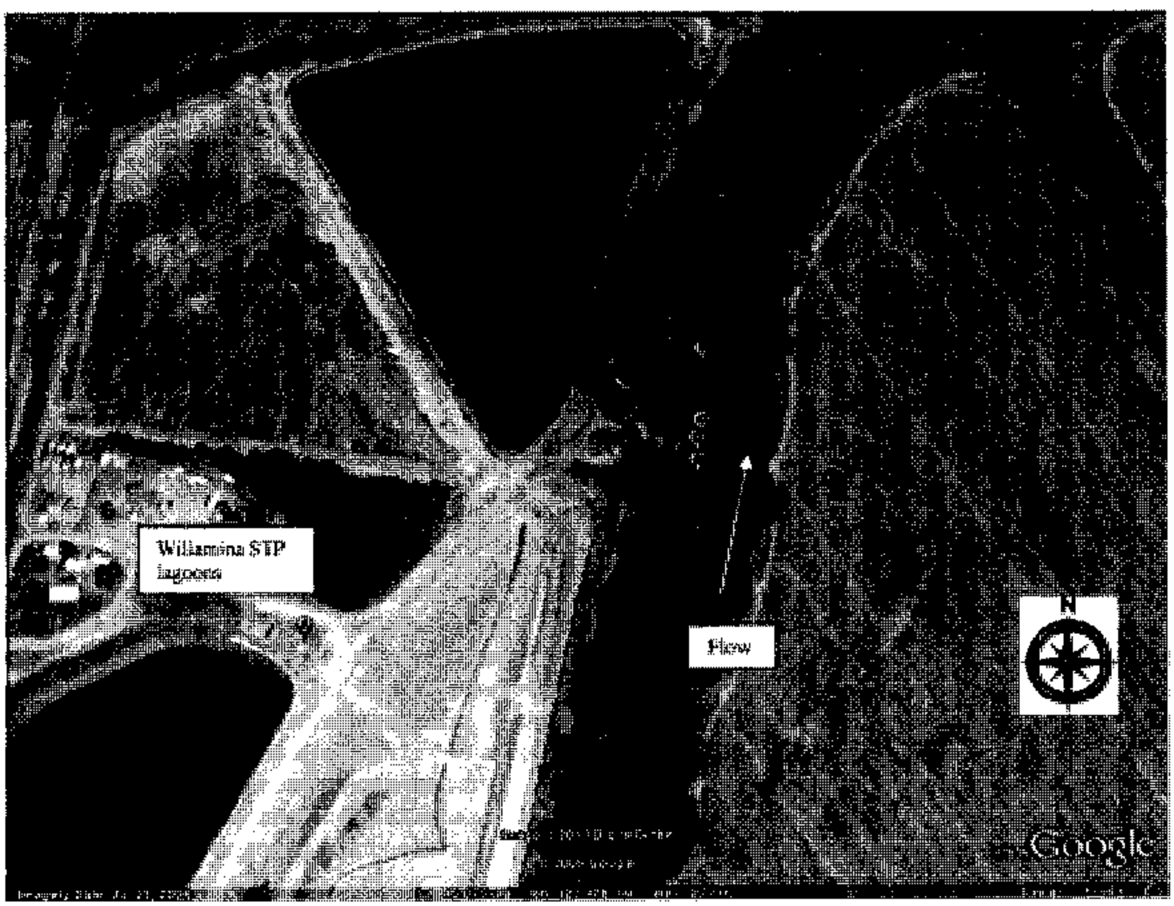


Table 2 – Summary of analytical results for sampling event dated October 20, 2009 (ODEQ, 2010a)

Parameter	Units	Acute Water Quality Criteria	Chronic Water Quality Criteria	Permit Limit [a]	Outfall 001 (plant discharge)	S Yamhill River, 50 feet US of Willamina outfall [b]	S Yamhill River, 10 feet DS of Willamina outfall	S Yamhill River, 100 feet DS of Willamina outfall
Conductivity	µmhos/cm				247	76	117	90
Dissolved Oxygen	mg/L	Cold water – Not less than 8.0 mg/L or 90% saturation			8.3	12.5	11.1	11.7
DO % saturation	%				84	118	107	111
pH	s.u.	$6.5 \leq pH \leq 8.5$		$6.0 \leq pH \leq 9.0$	7.3	7.5	7.3	7.5
Temperature	°C	18 °C (max) [d]			16.1	12.9	13.3	13.0
Turbidity	NTU	no more than 10% increase above background			NR	2	7	2
E. coli	MPN/100mL	406		406 (single sample)	6	46	58	56
Alkalinity	mg/L		20		56	22	30	24
Ammonia as N	mg/L	13.3 [c]	5.13 [c]		0.79	< 0.02	0.20	0.06
BOD_5	mg/L			45 (W) 30 (M)	2.7	3.2	1.9	3.0
Nitrate/Nitrite as N	mg/L				0.569	0.0328	0.162	0.0854
Total Kjeldahl Nitrogen (TKN)	mg/L				3.3	< 0.2	1.0	0.5
Total Organic Carbon (TOC)	mg/L				18	4	7	5
Total Phosphorus	mg/L				2.99	0.03	0.83	0.33
Total Suspended Solids (TSS)	mg/L			80 (W) 50 (M)	1	< 1	16	3

[a] Permit Limits are expressed as single sample limits unless otherwise specified, i.e. W = weekly average effluent concentrations; M = monthly average effluent concentrations. If no limit exists in permit, none is specified in this column.

[b] Duplicate samples collected at this location. All analytical parameters measured were within QA/QC range for a duplicate sample.

[c] Ammonia criteria based on upstream temperature and pH (EPA, 1999), salmon present, early life stages absent.

[d] Temperature standard based on the designated use of salmon and trout rearing and migration.

Conclusions

The samples collected during this study were in compliance with all applicable permit limits and water quality criteria.

Conductivity mapping - Conductivity measurements 95 feet downstream were greater than 5 % over background. Due to water depths, measurements were not collected any farther downstream.

Outfall pipe – The most recent permit evaluation states that *outfall 001 will be upgraded to a multi-port diffuser that will allow for better dilution of the effluent into the receiving stream.* The outfall pipe was observed to be a single port.

References

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Appendix A – Field Data Sheet & Chain of Custody

Oregon Department of Environmental Quality
Laboratory and Environmental Assessment Division Chain of Custody Record [1]

* Office Use Only *

Sampling Event Name [2]: *Willamina STP Mixing Zone Evaluation* | Sampling Event #: 20090955 | Page 1 of 2

Fund Code [3]: *37443* QAPP/SAP # [4]: DEQ09-LAB-0062-SAP Report Recipients [5]: *Lori Pillsbury, Paula Moon-Butzin, Tim McFetridge (WR)*

Sampling Event Collector (s) [6]: *Lori Pillsbury,* Colin Kambak Sampling Agency [6]: *DEQ*

Project Manager and Contact # [7]: *Paula Moon-Butzin, 503-693-5734* Expected Turnaround Time (Default 45 days) [8]: *Default*

Sample Information						Bottle Numbers [16]						
Item	LASAR ID # [10]	Station Name [11]	Subproject [12]	Date [13] / Time	QC Type [14] / Matrix [15]	P / R	C / OP	BOD / DO	STP / S	TM		
1	36096 ~~13344~~ HC 10/29/09	*Willamina STP, final effluent*	2011	10/20/09	S	—	—	—	STP 494	—		~~STP~~ 349
				1308	MUN EFF	R2020	—	—	S9653			
2	36080	*S. Yamhill R., 50 feet US of Willamina outfall*	2011	10/20/09	FP	P880	C1425	184	—	—		
				1435	SW	R647	—	—	—			
3	36081	*S. Yamhill R., 10 feet DS of Willamina outfall*	2011	10/20/09	S	P676	C1338	532	—	—		
				1430	MZ	R1335	—	—	—			
4	36082	*S. Yamhill R., 100 feet DS of Willamina outfall*	2011	10/20/09	S	P873	C1434	583	—	—		
				1425	SW	R126	—	—	—			
5	36080	*Field Duplicate, S. Yamhill R., 50 feet US of Willamina outfall*	2011	10/20/09	FD	P1102	C1438	592	—	—		
				1436	SW	R1807	—	—	—			
6	10000	*Transfer Blank*	2011	10/20/09	TSFB	P1430	—	—	—	—		
				12 10	SW	R2718	—	—	—			

Event Comments:

Chain of Custody [17]						
Relinquished By:	Agency/Company	Date/Time	Received by:	Agency/Company	Date/Time	Location
[illegible]	DEQ	10/20/09 [illegible]	[illegible]	ODEQ	10/20/09 [illegible]	In walk-In

Oregon Department of Environmental Quality

Laboratory and Environmental Assessment Division Water Quality Field Data Record [1]

* Office Use Only *

Sampling Event #: 20090955 Page 2 of 2

Sampling Event Name [2]: *Willamina STP Mixing Zone Evaluation*

Fund Code [3]: *37443* QAPP/SAP # [4]: DEQ09-LAB-0062-SAP

Report Recipients [5]: *Lori Pillsbury, Paula Moon-Butzin, Tim McFetridge (*

Sampling Event Collector (s) [6]: *Lori Pillsbury,* Colin Kamback

Sampling Agency [6]: *DEQ*

Project Manager and Contact # [7]: *Paula Moon-Butzin, 503-693-5734*

Expected Turnaround Time (Default 45 days) [8]: *Default*

Item	LASAR ID # [10]	Station Name [11]	Date [13] / Time	QC Type [14] / Elevation [15]	Temp [20] (C)	Cond. [21] (umhos)	pH [22] (SU)	Alk. [23] (mg/L)	DO [24] (mg/L)	DO Sat [25] (%)	Turb. [26] (NTU)	TRC (mg/L)		
1	36096 ~~13344~~ HC 10/29/09	*Willamina STP, final effluent*	10/20/09 1308	S <500	16.1	247	7.3	–	8.3	84	NR	<0.03		
					Item Comment:									
2	36080	*S. Yamhill R., 50 feet US of Willamina outfall*	10/20/09 1435	FP <500	12.9	76	7.5	–	12.5	118	2	–		
					Item Comment: N 45.07568 W 123.47813									
3	36081	*S. Yamhill R., 10 feet DS of Willamina outfall*	10/20/09 1430	S <500	13.3	117	7.3	–	11.1	107	7	–		
					Item Comment: N 45.07590 W 123.47779									
4	36082	*S. Yamhill R., 100 feet DS of Willamina outfall*	10/20/09 1425	S <500	13.0	90	7.5	–	11.7	111	2	–		
					Item Comment: N 45.07602 W 123.47775									
5	36080	*Field Duplicate, S. Yamhill R. 50 feet US of Willamina outfall*	10/20/09 1436	FD <500	12.9	76	7.5	–	12.5	118	1	–		
					Item Comment:									
6	10000	*Transfer Blank*	10/20/09 1210	TRB SW	NR	NR	NR	–	–	–	<1	–		
					Item Comment:									

	pH Meter #: Seanoke [29]	Initials	Time	Temp.	Meter Reading	Diff.	<0.1 SU (y/n)	QC [30] Check	Meter #	Initials	Date	Time	Meter Reading	True Value	Diff. or % Rec	Control Limit
Pre	7	LAP	0635	12.4	6.98	-0.08	Y	Cond. Low:	Seaoke	LAP	10/20/09	0630	151	147.7	2	≤ 7%
	4							Cond. High:	↓			↓	1412	1418	<1	≤ 7%
	10		↓	13.1	10.08	-0.07	Y	pH (LIS):								
Post	7		1505	7.5	6.97	-0.09	Y	Turb. Low:	50868			0625	4.58	4.58	–	≤ 5%
	4							Turb. Mid.:					49.6	49.5	<1	≤ 5%
	10	↓	↓	5.8	10.07	0.10	Y	Turb. High:	↓	↓	↓	↓	482	480	1	≤ 5%

Appendix B – Field Summary Sheet

Mixing Zone
Field Summary Sheet

General Facility Information

Facility Name: *Willamina STP*	**Address:** *PO Box 629 Willamina, OR*	**Date of Survey:** Oct 20 2009 **County:** *Yamhill*
Facility Contact: *Richard Haynes*	**Phone #:** *503-876-8542*	**IMD Study Level:** *1*
Receiving Waterbody: *South Yamhill River*	**NPDES Permit #:** *101070* **Expiration Date:** *04/30/2008*	**Facility Type:** IW / DW Major / Minor
Function of Facility (brief description): *Domestic wastewater treatment facility*		
Discharge Timing & Type: (i.e. seasonality of discharge, batch, continuous) *winter season discharge, Nov. 1 – April 30*		

Outfall Information

Outfall Designation: 001	**Flow at time of sampling:** 220000gal/day	**Water Depth @ outfall:** 1.5 feet	**River mile:**
Type of Outfall: (i.e. single, multi-port) Single	**Orientation of outfall (σ):** 0° (in degrees related to bottom of stream, 0° (H), 90° (V))	**Diameter of pipe:** 8" pipe → 6" port	**Latitude / Longitude:** N45.07590 W123.47779
Nearest bank to outfall (looking downstream): Left		**Outfall distance from nearest bank (looking downstream):** ~12 feet	
Discharge direction in relation to flow (i.e. perpendicular / horizontal): horizontal		**CORMIX Form completed:** Yes / No	

S Yamhill R

Sampling Locations – Data Collection

Parameter	Outfall	Site 1	Site 2	Site 3	Site 4
Description of Sample Site	@ facility	50 feet US of 001	10 feet DS of 001	100 feet DS of 001	
Latitude / Longitude	N45.07593 W123.47797	N45.07568 W123.47813	N45.07590 W123.47779	N45.07602 W123.47775	
River Mile					
Field Parameters collected	Y / N	Y / N	Y / N	Y / N	Y / N
Water Quality Samples collected	Y / N	Y / N	Y / N	Y / N	Y / N
Substrate Type					
Stream slope					
Stream Bottom Description (Manning's Roughness description)	X	large boulders/ sand →			

Mixing Zone
Field Summary Sheet

Other Data Collection

Conductivity Mapping Completed Yes / No
If Yes, attach field form with complete information
If No, provide explanation:

Velocity Transects Completed Yes / No
If Yes, attach form measurement form (Stream Discharge Field Sheet).
If No, provide explanation:

Macroinvertebrate Sampling Yes / No
If Yes, complete macroinvertebrate field forms & attach.

Photos Taken Yes / No
Take photos of al sampling locations including the outfall and outfall pipe if possible.

Ambient Weather Conditions
partly cloudy

Additional Notes:

dye study
completed

*** Manning's Roughness Coefficient – *n***

Description	*n*
Bare earth, straight	0.020 – 0.030
Bare earth, winding	0.040 – 0.05
Mountain streams, gravel, cobbles	0.040 – 0.050
Mountain streams, gravel, cobbles, boulders	0.050 – 0.70
Grass lined, weeds	0.050 – 0.06
Heavy brush, timber	0.10 – 0.12
Major rivers	0.030 – 0.035
Sluggish with pools	0.040 – 0.050

Appendix C – Stream Description & Conductivity Mapping

Mixing Zone
Stream Description & Conductivity Mapping Summary

Sampling Event: Willamina MZ	Receiving Waterbody: S. Yamhill R	Date of Survey: Oct 20 2009 County: Yamhill
Bank Full Width: 100'	Wetted Width: 80'	

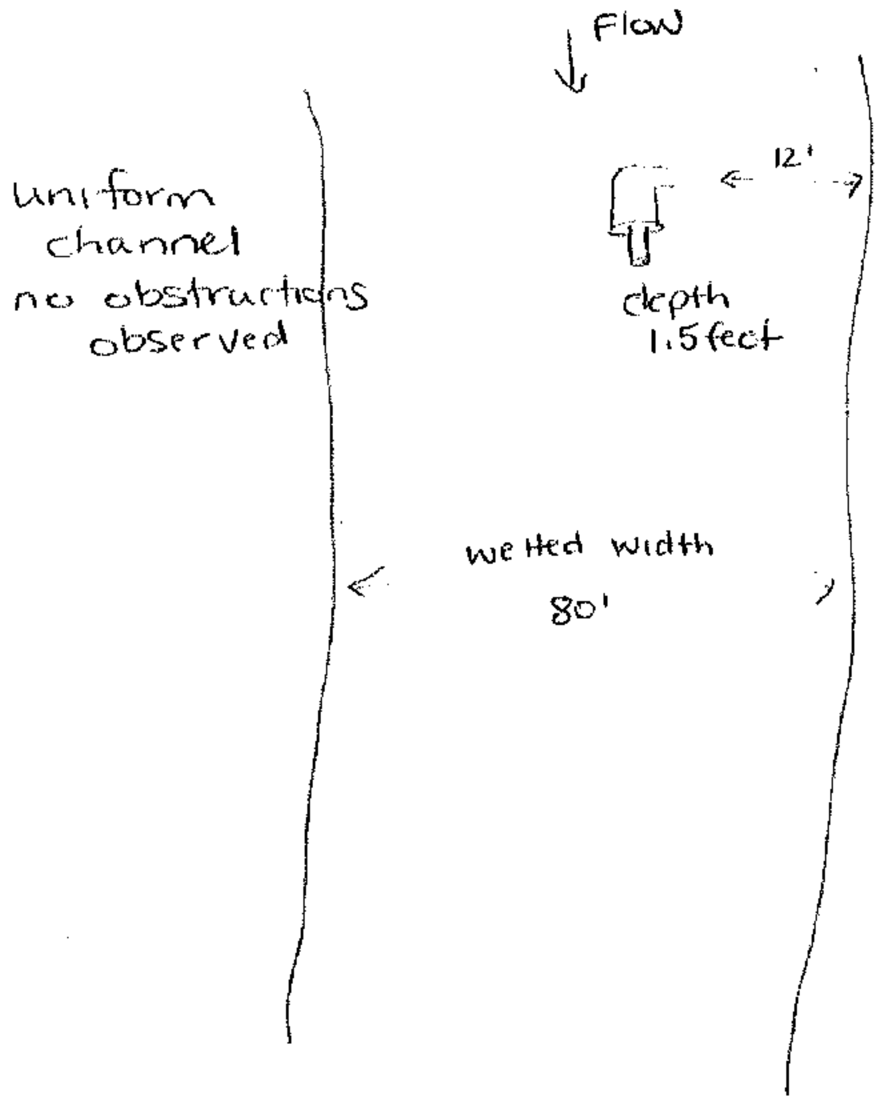
Conductivity Mapping
(include approximate location on stream sketch)

effluent SpC = 247 µmhos/cm

Location	Latitude/Longitude	Field Conductivity (µmhos/cm) Surface	Mid	Bottom	
upstream/background			76		
		Left	12' from L	18' from L	25' from L
@ outfall		78	148	77	76
10' DS	edge of ZID	88	106	88	76
15' DS		94	105	87	76
35' DS		101	107	82	76
40' DS		91	102	88	76
60' DS		88	97	90	80
75' DS		88	90	87	76
85' DS		90	90	92	77
95' DS		90	90	89	Too Deep

Mixing Zone
Stream Description & Conductivity Mapping Summary

Notes / Sketch (include other outfalls or inputs in the stream reach evaluated, note obstructions to flow observed):



Appendix D – Flow measurements

DEQ

Stream Discharge Field Sheet

Site: S Yamhill R US of Willamina outfall

LASAR #: ~~123456~~

Date: 10/20/2009

Time:

Meter Type: MMcB

Meter S/N:

Time Avg.(sec): 40

Personnel: CK/LAP

Tracking Information:

Report To:

Sampling Event:

Sampling Project:

Sub Project

Expedition:

Date Received:

Received By:

Date Released:

Observ.	TAPE (ft)	DEPTH (ft)	Velocity (ft/sec) Top (0.2)	Middle (0.6)	Bottom (0.8)	Velocity Coef.
L 1	0	0		0		1.00
2	4.8	1.0		0.09		1.00
3	8.6	1.2		0.18		1.00
4	12	1.4		0.33		1.00
5	16.1	1.7		0.42		1.00
6	20.5	1.8		0.41		1.00
7	25.2	2		0.45		1.00
8	30.5	1.9		0.62		1.00
9	34.5	1.8		0.63		1.00
10	38.6	2.1		0.57		1.00
11	43.2	2.2		0.53		1.00
12	48.0	2.1		0.52		1.00
13	52.2	2.2		0.60		1.00
14	56.4	2.5		0.54		1.00
15	60.3	2.8		0.46		1.00
16	64.7	2.6		0.12		1.00
17	68.2	2.2		0.05		1.00
18	72.5	1.7		0.06		1.00
19	76.5	1.1		0.02		1.00
20	80.0	0		0		1.00
21						1.00
22						1.00
23						1.00
24						1.00
25						1.00
26						1.00
27						1.00
28						1.00
29						1.00
30						1.00
31						1.00
32						1.00
33						1.00
34						1.00
35						1.00
36						1.00
37						1.00
38						1.00
39						1.00
40						1.00

Oregon DEQ Wastewater Pump Station Design Standards

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DEQ is a leader in restoring, maintaining and enhancing the quality of Oregon's air, land and water.

State of Oregon
Department of Environmental Quality

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v.2/10/2021

DEQ can provide documents in an alternate format or in a language other than English upon request. Call DEQ at 800-452-4011 or email deqinfo@deq.state.or.us.

Oregon DEQ Wastewater Pump Station Design Standards

1. General 1

1.1 Purpose 1

1.2 Applicability 1

1.3 Fee for DEQ Plan Review 1

1.4 General Design Criteria Requirements 2

1.5 General Recommendations 3

1.6 Design Report 3

1.7 Temporary Pumping Plan 4

1.8 Equipment Removal and Replacement 4

1.9 Site Selection and Improvements 4

1.10 Applicable Oregon Codes 5

2. Pump Station Design Components 5

2.1 Capacity 5

2.2 Common Pump Station Types 5

2.3 Wet Well 6

2.4 Motors 6

2.5 Piping 6

2.6 Valves 6

2.7 Design Velocities 7

2.8 Pipe Supports 7

2.9 Flow Meters 7

2.10 Vents and Drains 7

2.11 Pressure Gauges 8

2.12 Water Supply 8

3. Auxiliary Design Components 8

3.1 Alarms 8

3.2 Electrical 9

3.3 HVAC 10

3.4 Fire Protection 10

3.5 Hydrogen Sulfide Control 10

3.6 Variable Frequency Drives 12

3.7 Force Mains 13

3.8 Field Testing 14

4. O&M Manual 15

1. General

1.1 Purpose

This DEQ document provides recommendations and requirements regarding wastewater pump station design – which components should be considered by design engineers, and which must be provided for approval by DEQ. The objective of these standards is to benefit the design and construction of wastewater pump stations so that failures that cause spills or backups of sewage occur only under the most extreme circumstances. These guidelines supplement, but do not supercede, Oregon Administrative Rules 340-052 Appendix B.

There are many textbooks and standards to guide design of pump stations so as to achieve the functionality and reliability described herein; DEQ reviews each pump station design on a case-by-case basis which enables a customized approach toward achieving these objectives. These standards apply to rotodynamic pumps, such as centrifugal pumps and axial flow pumps. They do not apply to positive displacement pumps.

Wastewater utilities are encouraged to develop supplemental standards as necessary to address local needs. Conflicts between the utility's established standards and the information herein should be discussed with DEQ and resolved at the preliminary design phase, or earlier. In general, the more conservative approach is encouraged.

1.2 Applicability

These guidelines apply to the design of sewage pump stations where DEQ has review responsibility under state law. Thus they apply to all pump stations serving two or more homes on two or more tax lots, which is considered a common sewer system.

These guidelines also apply to private facilities, even if on a single tax lot, from which sewage flows cannot readily be halted in cases of equipment breakdown or overload, potentially causing a raw sewage overflow. Otherwise, private facilities are regulated by the plumbing code. These guidelines do not apply to pump stations at individual homes or factories, where sewage can readily be halted and the station can be removed from service without risk of a sewage overflow. This document does not apply to onsite sewage disposal systems, which follow state standards established in OAR 340-071 and OAR 340-073.

1.3 Fee for DEQ Plan Review

Technical activities fees are applicable for station reviews as set forth in OAR 340-045-0075 Table 70F. The fees can be found at the following link below, or by contacting the applicable regional plan review engineer. Alternatively DEQ can invoice the utility. Fee payment covers DEQ review of both report and plans for a given project.
https://www.oregon.gov/deq/Rulemaking%20Docs/340-045-0075WQFeeTables.pdf

1.4 General Design Criteria Requirements

General system requirements are presented below; requirements for specific components are described in Section 2 and Section 3.

A. A pumping system consisting of multiple pumps, with one spare pump to provide for system redundancy. Firm capacity is defined as pump station capacity with the largest pump out of service. Sewage overflows are prohibited as defined in the applicable NPDES permit.

B. Reliability: design consistent with EPA Class I reliability standards for mechanical and electrical components and alarms.

C. Solids handling: pumps must pass at least 2 ½-inch spheres, but should be capable of handling 3-inch spheres. Piping and valves must pass 3-inch spheres. Also, design so as to minimize pump clogging due to rags, disposable wipes, or other fibrous materials.

D. For variable-speed pumping systems, provide measurement of flow rate and run time.

E. Design for proper handling of grease and grit.

F. Provide sound attenuation for noise as appropriate for the facility’s location.

G. Provide structures of adequate size and interior/exterior clearances for ease of operation and maintenance of all systems and to meet applicable codes.

H. Provide corrosion control equipment as needed to adequately protect pump station piping and force mains. Materials of construction must be appropriate for exposure to corrosive constituents frequently present in wastewater.

I. Flood protection: set the elevation of the wet well rim and of the finished floor of associated buildings at least one foot above the 100-year flood plain, or any distance above the 500-year flood plain, whichever is higher; in addition, it’s necessary to meet local code requirements if they’re more stringent. NEMA ratings for electrical equipment must meet applicable electrical code requirements for proposed installation heights and environments.

J. Adequate provision for prevention of uplift of structures due to buoyancy.

K. Mechanical systems for heating and ventilating as required for station equipment and by applicable codes.

L. Plumbing systems for potable water, wet-well washdown, and drainage. Provide potable water cross-connection protection in accordance with Oregon Health Authority regulations.

M. Provide systems for lighting, security, and control.

N. Provide an independent second source of electrical power.

O. Provide complete system of alarms and telemetry to facilitate operation and maintenance, and notification of emergency conditions at the station at all hours.

P. Provide a dedicated alarm for sewage overflow, which must be designed with a separate connection to alarm telemetry, independent from main control power supply, and designed to operate during failure of main control system, i.e. the overflow alarm must function even if the primary power and control systems are lost.

Q. Separate dry wells from wet wells completely. Common walls must be gas-tight.

1.5 General Recommendations

Consider incorporating the following into design of the pump station:

A. A galvanic corrosion controls system which is designed, inspected, and tested by a corrosion control engineer.

B. Odor control equipment as recommended by an odor control evaluation of the upstream collection system, wet well, and discharge system.

C. For variable-frequency drive (VFD) systems, consider use of control algorithms in order to improve system performance parameters such as efficiency or clogging frequency.

D. When feasible, provide shelter for operator protection against the elements, particularly while working on electrical equipment.

E. At locations where severe property damage could result from sewage backups caused by a pump station failure, it is recommended that the design include a manhole with a low elevation lid or an overflow pipe in the sewage collection system that drains to a less damage-prone area.

1.6 Design Report

DEQ recommends that the design engineer prepare a design report. At a minimum, the report should contain the information below. The length and complexity of the report should correspond to the complexity of the proposed pump station including ancillary facilities.

A. Headloss calculations or spreadsheet; system head curve plotted against performance curve of selected pump. The curves should reflect both new and old pipe conditions.

B. Wet well buoyancy calculations.

C. Wet well and force main detention time calculations, based on initial conditions at station start-up and at buildout.

D. Description of sewage overflow point and predicted path of overflow.

E. Description of standby power and type of alarm telemetry proposed to assure EPA Reliability Class I with respect to sewage overflows.

F. A preliminary list of alarm elevations in the wet well.

G. Description: provide a general description of the new facilities. Also briefly define the parameters below:

1. Pump
    - type
    - drive type
    - capacity
    - motor HP
2. Level Monitoring
    - primary level control
    - secondary level control
3. Influent Sewer
    - time to overflow @ PIF once overflow alarm triggered

4. Electrical Power
    - main service size
    - auxiliary power type
    - auxiliary power output and fuel tank capacity
    - type of transfer switch
5. Control and Monitoring
    - type of alarm telemetry
    - EPA reliability class
6. Force Main
    - length, type
    - profile
    - discharge manhole location
    - number of air release valves
    - number of vacuum release valves
    - maximum detention time (for evaluation of need for sulfide control system = minimum month inflow/total volume within force main)
    - type of sulfide control system (if required)

1.7 Temporary Pumping Plan

A temporary pumping plan must be provided by the contractor and approved by the Owner in order to facilitate ongoing wastewater system operations during construction.

1.8 Equipment Removal and Replacement

The sewage pump station design, including doors, vaults, and roof access panels, should include the capability to remove or replace all mechanical and electrical equipment. Permanent monorails and hoists with a lift rating at least equal to the largest piece of equipment are recommended for sewage pump stations with large pumps and motors. For smaller pump stations, portable gantry-style hoists or truck-mounted hoists can be sufficient.

1.9 Site Selection and Improvements

Site access is required for maintenance personnel and equipment, and for visitors. Provisions must be made for adequate turning radius for vehicles such as a dump truck, backhoe, and crane truck which are required for removal of equipment; grade of access road must not be excessively steep. Access is recommended around the entire perimeter of the pump station for maintenance vehicles where feasible. For completely-buried stations, room must be provided to access hatches and vents with equipment, including adequate clearance from overhead power lines, to allow for safe operation of a crane. Parking space should be provided for at least two maintenance vehicles.

Above-grade equipment and piping should be protected by bollards. A concrete pad must be placed around vaults which is suitable for confined-space personnel-retrieval equipment. Vaults must be designed for expected vehicle loading (minimum H-20).

Note that for most projects, for DEQ plan approval a signed Land Use Compatibility Statement will be required, and the owner will need to gain an off-site wetland determination from the Oregon Department of State Lands prior to earth moving.

1.10 Applicable Oregon Codes

The pump station must conform to the most current version (at the time of project advertisement) of the Oregon codes below:

- Oregon Electrical Specialty Code (OESC)
  Based on NFPA 70, National Electrical Code
- Oregon Plumbing Specialty Code (OPSC)
  Based on Uniform Plumbing Code (UPC)
- Oregon Structural Specialty Code (OSSC)
  Based on International Building Code (IBC)
- Oregon Energy Efficiency Specialty Code (OEESC)
  Based on International Energy Conservation Code (IECC)
- Oregon Mechanical Specialty Code (OMSC)
  Based on International Mechanical Code (IMC) and
- International Fuel Gas Code (IFGC)

In addition, standards of the Oregon Occupational Health and Safety Administration (OR-OSHA) must be met during construction and operation of pump stations, force mains, and gravity collection systems.

2. Pump Station Design Components

2.1 Capacity

The firm capacity of a pump station must be at least equal to the peak hourly flow rate associated with the five-year, 24-hour storm in its tributary area. However it must be expandable to meet the projected peak hourly flow rate associated with full buildout of the tributary or service area. DEQ recommends that the initial installation have a firm capacity corresponding to the projected peak hourly flow 20 years beyond the date of startup. However if flowrate associated with ultimate buildout is lower, that value should be considered the future design capacity. Note that it may be acceptable to reduce the design firm capacity to as low as peak day flow and surcharge the collection system during peak hourly flow, rather than sizing it for peak hourly flow. Calculations demonstrating sufficient available storage must be submitted to DEQ for review and approval.

2.2 Common Pump Station Types

Wet well/dry well pump stations house the pumps below grade in a dry well adjacent to the wet well. The dry well should be provided with a sump pump and a float switch alarm.

Suction lift pump stations incorporate self-priming or vacuum-priming pumps which are located typically above-grade; a dry well is not required. Maximum suction lift must not exceed the pump manufacturer’s recommendations and must be based on a net positive suction head calculation with an adequate factor of safety (minimum 6 feet). Proper air release is also required. Any buried structure housing equipment or personnel must be physically separated from the wet well.

Submersible pump stations provide submersible pumps in the wet well with the electrical and control systems mounted above grade. Guide-rail assemblies must be provided to set and remove the pumps without entering the wet well. Check valves, isolation valves, meters, and auxiliary instrumentation must be located outside the wet well.

2.3 Wet Well

A. All pumps, fixtures, and miscellaneous metals in the wet well shall be explosion-proof and corrosion-proof, for use in Class 1, Division 1 environments. If the wet well is constructed of concrete, consider coating it for corrosion protection.

B. Design of inlet discharge location must provide for proper flow patterns to pumps' suctions. Refer to Hydraulic Institute standards. Design should provide a self-cleaning floor and/or a pumped floor scour valve or a recycle pump and pipe. For larger stations consider modeling the station using computational fluid dynamics.

C. Minimize the free fall of sewage into the wet well.

2.4 Motors

A. Motors installed below an elevation of 1 foot above the 100-year flood elevation must be submersible.

B. Motors shall be either Factory Mutual (FM) or Underwriter's Laboratories (UL) approved.

C. High efficiency motors are recommended (i.e. NEMA premium efficiency, or IEC IE3).

2.5 Piping

A. The standard for pump station wastewater piping is cement-mortar lined ductile iron pipe and fittings.

B. Discharge piping for stations containing three or more pumps should connect to the FM discharge manifold with wyes.

C. Piping less than two inches in diameter connected to wastewater piping must be 316 stainless steel or PVC. Screwed pipe must be minimum Schedule 80. Galvanized steel piping is not allowed except for seal water, tap water, and potable applications.

2.6 Valves

A. Discharge piping from each pump must contain an:

- Isolation valve. - Additional isolation valves may be required at piping manifolds, depending on design.
- Check valve - Locate check valve horizontally between pump and isolation valve. Ball check valves should not be used on sewage pumps.

B. Suction piping for dry pit pumps must contain an isolation valve.

C. Air and/or vacuum release valves may be required, as discussed under Item 3.7.3.

D. A surge analysis is required as discussed under Item 3.7.4. Results of this analysis will influence selection of many valve types listed above, and may require additional facilities to provide protection of the force main.

E. A system of pipes and valves for launching and retrieving pigs should be provided when pumps discharge into force mains which may accumulate solids or grease over time as discussed under Item 3.7.5.

2.7 Design Velocities

A. Piping and valves shall be in accordance with AWWA standards. Design fluid velocities shall be:

- Pump discharge lines including force mains: 3.5 – 8 fps
- Pump vertical discharge lines: 6 – 10 fps
- Pump suction lines: 3 – 5 fps

B. VFD pump systems must be designed to provide a flushing velocity in the force main of at least 3.5 fps during each pumping cycle and to maintain a fluid velocity of at least 2 fps in the force main.

2.8 Pipe Supports

A. Supports and restraints must be provided, adequately anchored for vertical and lateral support during hydraulic surges and earthquakes. Dead loads must not be transmitted to pump flanges.

B. Base supports should have a grouted base of at least 1-1/2 inches.

C. Base elbows should be installed on pedestals at vertical elbows, and should not be required to provide horizontal thrust restraint.

D. Use of rubber expansion joints to make up for poor workmanship can lead to increased vibration levels in pumping systems. Meeting ANSI/HI 9.6.4 vibration criteria should be a condition of equipment acceptance for all facilities.

2.9 Flow Meters

A. For stations driven with VFDs, DEQ requires a flow meter or a system which monitors pump operation and calculates flow rate. DEQ recommends a minimum full-scale accuracy of +/- 5%.

B. If provided, meters must be installed on the pump station force main inside the station, or in a shallow vault located in the yard. A drainable bypass around the meter is recommended.

2.10 Vents and Drains

A. Manual vents and drains must be provided at all high and low points, respectively, in a piping system and at all locations required to facilitate draining and filling equipment or piping.

B. A ¼-inch gauge cock must be installed on the top of the volute of dry-pit pumps to allow removal of air after servicing and prior to placing pumps back into service. The associated vent line should be plumbed to discharge to the wet well or sump pump.

C. Vaults containing valves and meters may drain by gravity to the wet well, however this would cause the vault to be a Class 1, Division 1 space.

2.11 Pressure Gauges

A pressure gauge or pressure transducer must be installed on the suction and discharge side of each pump that is installed in a dry well, and in the valve vault on the discharge side of each submersible pump. Discharge gauge range must be adequate to measure the pump shutoff head.

2.12 Water Supply

A. Water supply to the pump station is recommended. A reduced pressure backflow prevention device must be provided on the water service as required by OAR 333-061-070. If the backflow preventer is located outside of a structure, it must be insulated and heat traced. If water supply is not provided, then adequate parking space must be provided for a water truck.

B. Safety showers and eyewash stations must be provided wherever chemicals are used requiring such safety equipment.

3. Auxiliary Design Components

3.1 Alarms

Below is a list of wastewater pump station alarms which are required or recommended by DEQ; alarms **required** by DEQ are shown in **bold**.

In addition to a primary level measurement system, a secondary level measurement system is required for pump control and alarms for redundancy. The two systems should be independent, which will increase reliability of level measurement. Common instruments for the primary system are pressure transducers and ultrasonic devices; secondary systems commonly utilize float switches or a probe.

Pumping station alarms should be transmitted to a municipal facility that is staffed 24 hours a day, and should also identify the alarm condition. If such a facility is not available, the alarm must be transmitted to municipal offices during normal working hours and to the home of responsible persons in charge of the lift station during off-duty hours. A battery-powered backup power source must be provided for the alarm system.

Pump Wet Well Water Level Alarms

	Primary Level Measurement System	Secondary Level Measurement System
Overflow	**Required**	**Required**
HWL	**Required**	**Required**
Lag Pump On	Optional	Optional
LWL	Optional	Optional

A. Power Alarms
- power failure
- VFD fault
- emergency generator failure to start

B. Pump Operation Alarms
- vibration
- temperature (pump and motor bearings, motor windings)
- seal water pressure failure
- pump failure (via check valve fail to open, low amperage, etc.)
- surge control system failure
- fire
- intrusion
- loss of communication with pump station
- toxic gas detection

3.2 Electrical

A. Provide fail-safe design features. In general, development of fail-safe design features should consider the criticality of the pump station (while meeting EPA Class I reliability standards).

B. HOA: provide a separate motor starter control circuit for manual operation of pumps, and redundancy in case the circuit for automated control (primary circuit) fails, with wiring independent from the (primary) circuit, which typically utilizes a programmable logic controller.

C. Provide backup level measurement system for automated operation of alarms and control. (All alarms on primary system should be on backup system, however not all control points need alarms, as discussed above.)

D. Alarm circuits shall be normally energized (i.e., relays normally closed)

E. Control circuits shall be normally de-energized (i.e. relays normally open / energize to initiate control functions)

F. Standby generators must be of sufficient size to start and run the firm pumping capacity of the station, along with other electrical loads necessary to keep the station operational.

G. Pump station control systems should be kept operational with uninterruptible power supplies until a generator is brought on-line.

H. Permanent standby generators also require automatic transfer switches to transfer the electrical feed from the primary system to the standby generator when a power failure is detected.

I. If portable secondary power is proposed:

- The utility must attest to DEQ that it is feasible for the proposed facility and operations staff to respond to a power outage in time to prevent a sewerage overflow from the collection system or wet well.
- Generators should be trailer-mounted and a suitable towing vehicle should be available at all times.
- The pump station needs a proper electrical connection point for the generator.
- The utility should evaluate its sewage pump stations to determine the number and size of portable engine generators needed during a major regional power failure.
- Emergency sewage storage should be considered.

J. DEQ may accept a fuel-powered backup pump system as a means of satisfying DEQ requirements for a standby generator and a duplicate (largest) pump.

K. Fuel storage for both portable and permanent generators must be adequate to operate the pump station for a minimum of 24 hours at full load. Provide secondary containment as required by applicable codes.

L. Consultant should evaluate which fuel type is best considering reliability, cost of fuel and storage, maintenance requirements, fuel degradation, environmental impacts, and complexity of system design.

3.3 HVAC

- Ensure that electrical and instrumentation equipment is rated for expected extremes of temperature and humidity of the room (or enclosure) which will house it.
- Heating and/or insulation must be provided to prevent pipes and other water-containing equipment from freezing.
- Design must conform to the Oregon Energy Efficiency Specialty Code.
- Ventilation openings must be screened with mesh to prevent entry by animals and bugs.

3.4 Fire Protection

- Conform to the requirements of NFPA 820, “Standards for Fire Protection in Wastewater Treatment and Collection Facilities”, including installation of fire suppression systems, smoke detectors, fire extinguishers, and safety warning signs.
- Contact the local fire jurisdiction for its requirements, and contact the local water provider to determine fire flow availability.

3.5 Hydrogen Sulfide Control

3.5.1 Overview

Sewage collection design must seek to prevent corrosion, safety hazards, and odor associated with hydrogen sulfide and other gases. This discussion is limited to hydrogen sulfide. The hydrogen sulfide concentration of pumped sewage discharged from force mains into gravity sewers should not exceed 0.1 mg/l. The vapor phase equilibrium concentration at this level is extremely foul and may eventually corrode steel and concrete, and it can be a health hazard.

OR-OSHA regulations for entering confined spaces during construction and operation of sewage collection systems must be met, including OAR 437-002-0146, so field testing of atmospheric hydrogen sulfide concentration is needed. In general, it’s necessary to test the atmosphere for concentrations of gases in this order: 1. oxygen, 2. flammable gases, 3. toxic gases; refer to OR-OSHA. Note that a potential for elevated concentrations of flammable gases gives rise to more stringent requirements for electrical equipment, per electrical codes.

3.5.2 Testing

A hand-held multi-gas instrument could be used for testing and/or for monitoring in order to evaluate if a manhole is being subjected to elevated levels of hydrogen sulfide and thus at risk of excessive corrosion; if used for monitoring, the instrument would need to be mounted near the top of the manhole for the duration of the test, while logging data during this period.

Field testing may be required by DEQ as a condition of approval of plans, in order to evaluate if a manhole is being subjected to elevated levels of hydrogen sulfide and is at risk of excessive corrosion or of harboring hazardous conditions. DEQ's standard testing requirements are:

A. Pre-construction testing
    1. Testing for hydrogen sulfide concentration is not required
    2. Inspect discharge manhole for deterioration; DEQ recommends an assessment using a rating system like NASSCO's MACP (https://www.nassco.org/manhole-assessment-macp). If the level 1 assessment indicates a satisfactory condition (or the need for replacement) then a level 2 assessment isn't needed.
    3. DEQ also recommends inspecting the existing wet well for deterioration, if applicable
B. Post-construction testing

    Testing will be required unless:
    1. Detention time at ADWF is less than15 minutes, or
    2. Receiving manhole is armored, the next manhole downstream is armored, and the pipe in-between is armored (unless it's constructed of plastic).
C. Testing needs to be done using either a currently-available Hach kit for testing hydrogen sulfide concentration in liquids (Model HS-WR or HS-C) or by a hand-held monitor as mentioned above. Samples should be taken at the discharge manhole. Each sample should be dipped approximately one minute after the pump starts its normal pumping cycle. (Samples should be poured into the test bottle with a minimum of agitation to prevent low readings.) Each sample must be tested immediately at the site. A duplicate should be tested for confirmation. Samples must be taken weekly during June through August (12 tests). Test results must be reported to DEQ no later than September 15.
    1. For liquid-phase testing, if the average hydrogen sulfide concentration of the samples exceeds 0.1 mg/l, then the report shall include a proposal for effective control of hydrogen sulfide below 0.1 mg/l and an implementation schedule. For gas-phase testing the threshold which triggers the need for control is a concentration of 25 ppm.
    2. Testing again must be done following construction of a system for controlling sulfide, in order to confirm that concentrations are below the threshold values stated above.

3.5.3 Control of Hydrogen Sulfide

Hydrogen sulfide in wastewater force mains can be controlled by a variety of methods, as listed below. These methods involve liquid-phase treatment and they all rely on addition of a chemical to the wet well, with the exception of injection of air/oxygen into a force main:

- Chemical oxidation via addition of chlorine, hydrogen peroxide, or permanganate.
- Addition of nitrate, usually calcium nitrate or a proprietary product.
- Sulfur precipitation via addition of iron salts.
- Injection of air or oxygen into force main.
- Adjustment of pH to drive sulfide to nonvolatile ionic forms, or severe pH increase to deactivate sulfur-reducing bacteria.
- Biological approach such as bioaugmentation or enzyme blockers.

Each technique has financial and technical advantages and disadvantages, thus DEQ recommends that the design engineer evaluate options for each specific application. Wastewater characteristics and sewer configuration determine which option is most beneficial. The parameters to be considered include: wastewater flow rate, temperature, pH, oxidation reduction potential, biochemical oxygen demand, sewer detention time, wet well flushing, location of odor-releasing points (manholes, pump stations), and constraints imposed by downstream treatment processes.

3.5.4 Miscellaneous Considerations

A. If the utility believes that a hydrogen sulfide treatment system is not required, then justification must be provided to DEQ. If a treatment system is not installed as part of pump station construction, then future installation should be accommodated by providing piping and electrical connections, instrumentation I/O, space for chemical storage, and any other auxiliary components; and also the wet well should be protected by applying a corrosion-proof armoring (e.g. Raven 405 epoxy coating or equal) or a plastic liner, unless the wet well is fabricated of plastic.

B. Headworks: introduction of hydrogen sulfide into headworks can cause an unacceptable intensity of odor, and in extreme instances it can cause an unsafe condition for operators, and premature deterioration of equipment. The potential for these effects should be evaluated to determine if it's necessary to either reduce sulfide concentration upstream, or to ventilate and treat it.

C. Although DEQ recommends chemical addition systems, air injection systems are approvable however they should only be used on pipelines which are continuously ascending. Air systems must be designed for continuous injection, and must be installed without timers. A detailed evaluation of air delivery requirements should be made.

D. Another possible approach is to construct an inexpensive back drainage system to drain the entire force main automatically on a daily basis. This is only feasible on continuously-ascending force mains of moderate diameter and length, as the design of the wet well must be sized to contain force main volume in addition to incoming sewage.

3.6 Variable Frequency Drives

Variable frequency drives (VFDs) can provide numerous advantages to a pumping system. The primary potential advantage is lower energy use per unit volume of wastewater pumped. (This parameter is commonly termed "Specific Energy".) Note that this energy savings does not apply to static lift. It applies to losses due to friction (i.e. dynamic head); this is due to the affinity laws for rotodynamic pumps which relate flow rate, head and power to pump speed as follows: changes to flow rate vary linearly with changes to speed; changes to head vary proportionately to the square of changes to speed; and changes to shaft power are proportional to the cube of speed changes. For example, if the speed (and flowrate) of a pump operating with no static lift is reduced by 50 percent but operated twice as long, then only 25% of the energy is required. $[(0.5)^3 \times 2 = 0.25]$

Note that affinity laws generally apply to radial-flow pumps but may deviate from the relationships above for axial-flow and mixed-flow pumps. VFDs can provide additional advantages including: reduce hydraulic surges; "soft starting" of motor; change rotation of impeller to facilitate unclogging; change motor torque in response to monitored parameters.

3.7 Force Mains

3.7.1 Pipe

A. The standard for force main (FM) piping and fittings is cement-mortar lined ductile iron (DI), heavy-wall polyvinyl chloride (PVC) plastic, or high-density polyethylene (HDPE) although for air-injected FM piping the standard is plastic-lined DI, PVC, or HDPE. The required minimum diameter for force mains is 3 inches; a minimum diameter of 4 inches is recommended.

B. Force mains should be designed to facilitate temporary bypass via a connection with an isolation valve(s).

C. Isolation valves for buried service must be provided with a standard AWWA operating nut and protected from vehicular traffic.

D. Force mains should discharge into a separate manhole rather than into the receiving gravity sewer.

3.7.2 Trenches

Pipe trenches must meet the requirements of Oregon Standard Drawing RD300, current version. Provide adequate cover to prevent freezing.

It is necessary to meet OR-OSHA regulations when constructing trenches; the applicable regulation is OAR 437-003 (29 CFR 1926), Subdivision P (Excavations).

3.7.3 Air/Vacuum Valves and Vaults

Air release, air-vacuum release, or combination air release and vacuum valves must be of a type and brand manufactured for the specific purpose in sewage service and must be provided at critical locations in the pump station and force main. The valves must release air captured inside the piping system, and/or prevent collapse of the piping system because of vacuum conditions. Each valve must be provided with an isolation valve. The air release valve discharge piping in pump stations should be piped to the wet well.

3.7.4 Surge Analysis and Prevention

Pump and pipeline systems must be protected against damage from transient pressures. If it is not possible to ensure that the system is safe from excessive water hammer conditions with simple manual calculations, the system must be computer modeled. Include some method of checking model results before construction.

Reliability of surge protection facilities is critical. Routine inspection and maintenance must be incorporated into the utility’s standard operations. Where appropriate, redundancy must be provided for essential pieces of equipment. Adequate alarms must be provided.

3.7.5 Pig Launch Stations

Force mains less than 300 feet in length can be cleaned by conventional methods provided there is access from both the discharge manhole and the pump station. Otherwise, pig launch and retrieval systems must be provided. The pig launch system must utilize the station’s installed pumps and piping, unless otherwise approved by DEQ.

3.7.6 Thrust Restraint

Thrust forces in pressurized pipelines must be restrained as needed to prevent excessive movement or joint separation under all expected conditions.

3.7.7 Drainage

Blow-off drain valves should be installed at low points in force mains.

3.8 Field Testing

3.8.1 Pump Testing

Acceptability of factory test results are dependent on which Hydraulic Institute tolerance and acceptance grades are specified in the contract documents. It's difficult to apply these requirements to pump field testing, however field testing during startup is necessary. Test requirements will be specified in contract documents; standard tests are noted below. A copy of startup test data should be provided to DEQ within 30 days of startup, and should be included in the O&M manual. DEQ recommends these tests also be performed annually after startup in order to monitor reductions in performance due to impeller wear or misalignment.

Test Point	Measurement
Shutoff	Discharge pressure at zero flow
Design condition	Flow and pressure at design rating point
Secondary condition (optional)	Flow and pressure

DEQ also recommends these additional tests where applicable:

A. Test capacity while operating every possible combination of pumps consistent with design criteria.

B. Test at full speed. For VFD systems DEQ recommends also testing the design rating point at lower speeds, down to the minimum recommended speed.

C. Measure and record current draw for later operation comparison.

D. Measure and record vibration for later comparison. Verify that vibration meets requirements of contract documents and manufacturer's standard.

E. Test functionality of all alarm and control setpoints for both primary and secondary level measurement systems. DEQ recommends these tests be performed at least annually, to facilitate correct operation.

3.8.2 Force Main Testing

Hydrostatic Pressure Testing: Test all sewer force main pipe in sections of convenient length under a hydrostatic pressure equal to one and one-half times the working pressure, but at least 150 psi, measured at the highest point of the test section. Provide certifications of accuracy to the design engineer for gauges used in the test, from a testing laboratory approved by the design engineer.

A. Flushing – Flush prior to conducting hydrostatic tests and prior to installation of air release valves, pressure sustaining valves, and other appurtenances.

B. Backfill - Backfill the pipeline sufficiently to prevent movement of the pipe under pressure. Place all thrust blocks and allow time for the concrete to cure before testing. Where permanent blocking is not required, furnish and install temporary blocking and remove it after testing.

C. Filling Pipe - Fill the mains with water and allow to stand under pressure a sufficient length of time to allow the escape of air, and to allow the lining of the pipe to absorb water if applicable.

D. Time Test - Test by pumping the main up to the required pressure for at least 2 hours. Provide additional pumping during the test period to continuously maintain pressure within 5 psi of that required. There shall be no abrupt loss in pressure during the test period. During the test observe the section being tested to detect any visible leakage. Use a clean container to hold water for pumping up pressure on the main being tested.

E. Measure Quantity - Accurately determine the quantity of water required to maintain and restore the required pressure at the end of the test period by pumping through a positive displacement water meter approved by the design engineer.

F. Loss Formula - The quantity of water lost from the main must not exceed the number of gallons per hour determined by the formula:

$$L = \frac{SD(P)^{1/2}}{148{,}000}$$

Where:

L = allowable leakage in gallons per hour

S = length of pipeline tested in feet

D = nominal diameter of the pipe in inches

P = average test pressure during the leakage test in psi

G. Leakage - Correct all visible leakage regardless of the allowable leakage specified above. If the measured leakage exceeds the allowable amount specified above, or if pressure cannot be maintained as specified above, locate and repair the leaks and retest the pipeline until test requirements are met.

4. O&M Manual

The utility must not accept or allow operation of the pump station without an approved operations and maintenance manual per OAR 340-052. The manual must conform to DEQ guidelines, which are summarized below for pump stations. DEQ recommends submittal of a complete draft manual no later than the 50-percent construction point, but not less than 45 days prior to startup. DEQ expects submittal of a revised manual that conforms to DEQ comments prior to start up.

A. General

An operations and maintenance manual should provide guidance to operators for day-to-day operation of the station and also facilitate their responses to unexpected events.

B. Format

Use labelled tabs to separate various sections of the manual, and bind it in a 3-ring binder to accommodate future revisions. Provide a spine label. Enclose one copy into a large plastic envelope or baggie for storage at the pump station. All of the manufacturers' literature should be bound separately.

C. Contents

1. Table of Contents
2. Introduction and Use of Manual: Provide a brief narrative on the background of the facility and the intended use of the manual.
3. Description: see section 1.6.G.
4. Record Drawings: Include record drawings in the appendix. Also consider marking up record drawing(s) so as to denote locations of the discharge manhole, the wet well overflow point, the backflow preventer, and auxiliary equipment; and to show how the station is served with water and electricity.
5. Troubleshooting: Provide a troubleshooting guide for the electrical and mechanical components of the pump station.
6. Pump Operation and Control: Describe operation and control of the pump station including the level control system and alarm system. Include the following items:
   - General description
   - Setpoints for control and alarms for both primary and secondary level measurement systems
   - Screens (if applicable): include screenshot of main screen for operator interfacing and at least one shot of a screen for alarms, for setpoints, and for sensor ranges
7. Startup Data: Include forms with recorded startup test data (defined above). Plot startup data onto a graph which contains the pump performance curve and the engineer’s calculated system curve.
8. Operation and Control of Other Mechanical Systems: Describe other significant systems at the pump station, such as emergency power, telemetry, irrigation, sulfide controls, HVAC, and seal water, as applicable. Describe how these systems work, and their operation and maintenance requirements. Supplement with appropriate diagrams as necessary.
9. Safety Requirements: Although the manual should make reference to hazards and safe practices throughout, it is necessary to provide a separate section on safety. As a minimum the safety section should include information on specific hazards with electrical switchgear and confined spaces at the station and should refer to the safety training program and the standard safety procedures handbook followed by the sewer utility.
10. Emergencies: This is a separate section listing emergency phone numbers.
11. Maintenance of Equipment: Provide schedules that list periodic maintenance requirements for each equipment item. Include maintenance of force main, e.g. maintenance of air/vacuum valves.
12. Spare Parts Inventory: Include a list of critical replacement parts that may have long delivery times associated with them, and thus should be stored on-site. For critical parts which degrade in storage, identify supplier which can deliver items within necessary timeframes instead of storing them on-site.
13. Manufacturer's O&M Literature: In the manual, provide only a list of manufacturers / suppliers and phone contacts for ordering equipment and parts. Other cut-sheets and manufacturer's literature should be contained in a separate binder. (Do not send these to DEQ for review.)

National Pollutant Discharge Elimination System (NPDES)

Fact Sheet & Permit Evaluation Report

State of Oregon
Department of Environmental Quality

Water Quality
Western Region
750 Front St. #120
Salem, OR 97301-1039
(503) 378-8240
(800) 349-7677

City of Willamina WWTP

Source location	WWTP at intersection of Adam and Lincoln St. Willamina OR 97397
Permittee	City of Willamina P.O. Box 629 Willamina, OR 97397 *contact:* Jeff Brown, Lead Operator (541) 875-2242
Proposed action	Renew NPDES permit Application no. 973620 Received date: 1/25/2008
Source category	NPDES Minor Domestic
Permit writer	Paul Kennedy
File number	97397
Permit number	101070
Expires	4/30/2008

Introduction

The Federal Water Pollution Control Act of 1972, also known as the Clean Water Act, and Oregon Revised Statutes (ORS 468B.050) require a discharger to obtain a National Pollutant Discharge Elimination System (NPDES) permit to discharge wastewater to surface waters. The permit is designed to allow a discharge as long as it protects the designated beneficial uses of the receiving surface waters.

The State of Oregon has developed human health and aquatic life water quality criteria to protect these beneficial uses. The criteria fall into broad two categories, toxic and non-toxic. Toxic criteria deal with chemicals that have poisonous effects. Chlorine, for example, is commonly used to disinfect treated sewage. Chlorine is a powerful oxidizer that kills bacteria but is also harmful to other organisms at high enough levels. Non-toxic criteria deal with conditions or substances that can have harmful effects but are not poisonous. Dissolved oxygen, for example, must be sufficient to maintain aquatic life in a water body. Low enough levels can cause fish kills.

During permit development, DEQ evaluates whether water quality criteria are being or can be met by a discharge. DEQ gathers data on the discharge and on the receiving waters. It uses these data to model the discharge and the receiving water as well as to determine if there is a reasonable potential for the discharge to exceed water quality criteria. If there is a reasonable potential, then the permit sets limits on the discharge.

There are two categories of effluent limits for NPDES permits: 1) technology based effluent limits, and 2) water quality based effluent limits. Technology based effluent limits require a minimum level of treatment for industrial or municipal sources using available technology. Technology based effluent limits are developed by applying EPA guidelines for specific industrial categories. Water quality based effluent limits are independent of the available treatment technology.

Federal regulations and Oregon Administrative Rules allow DEQ to suspend all or part of the water quality standards in small, designated areas within receiving waters around a discharge. These small areas allow treated wastes and receiving waters to thoroughly mix and dilute the treated wastes. These are known as "allocated impact zones" or "mixing zones." Two mixing zones can be developed for each discharge: 1) The acute mixing zone, also known as the "zone of initial dilution" (ZID), and 2) the chronic mixing zone, usually referred to as "the mixing zone." The ZID must be designed to prevent lethality to organisms drifting through it and the mixing zone must be designed to protect the integrity of the entire water body.

In addition to limiting what is discharged into the receiving water, DEQ requires a discharger to monitor the discharge and report the monitoring results. DEQ may require additional studies and set special conditions unique to the discharge. There is also a set of standard requirements included in every NPDES permit that address reporting, the duty to reapply, operation, etc.

Both the permit applicant and the public can review and comment on the draft version of the NPDES permit. DEQ responds to each comment. The permit goes into effect (is "issued") upon signature by DEQ's authorized representative. The maximum term of a NPDES permit is five years from the date it was issued.

Facility

Facility: Background

City of Willamina owns and operates a wastewater treatment facility located in Willamina, Oregon

Wastewater is treated and discharged to South Yamhill River in accordance with National Pollutant Discharge Elimination System (NPDES) Permit number 101070. The Permit for the facility was renewed on May 13, 2003 and expired on April 30, 2008.

The Department received a renewal application on January 25, 2008. A permit renewal is necessary pursuant to provisions of Oregon Revised Statutes (ORS) 468B.050 and the Federal Clean Water Act to discharge to state waters. The Department proposes to renew this permit.

This permit evaluation report describes the basis and methodology used to develop the permit and proposes effluent limitations and special conditions necessary to carry out state and federal law.

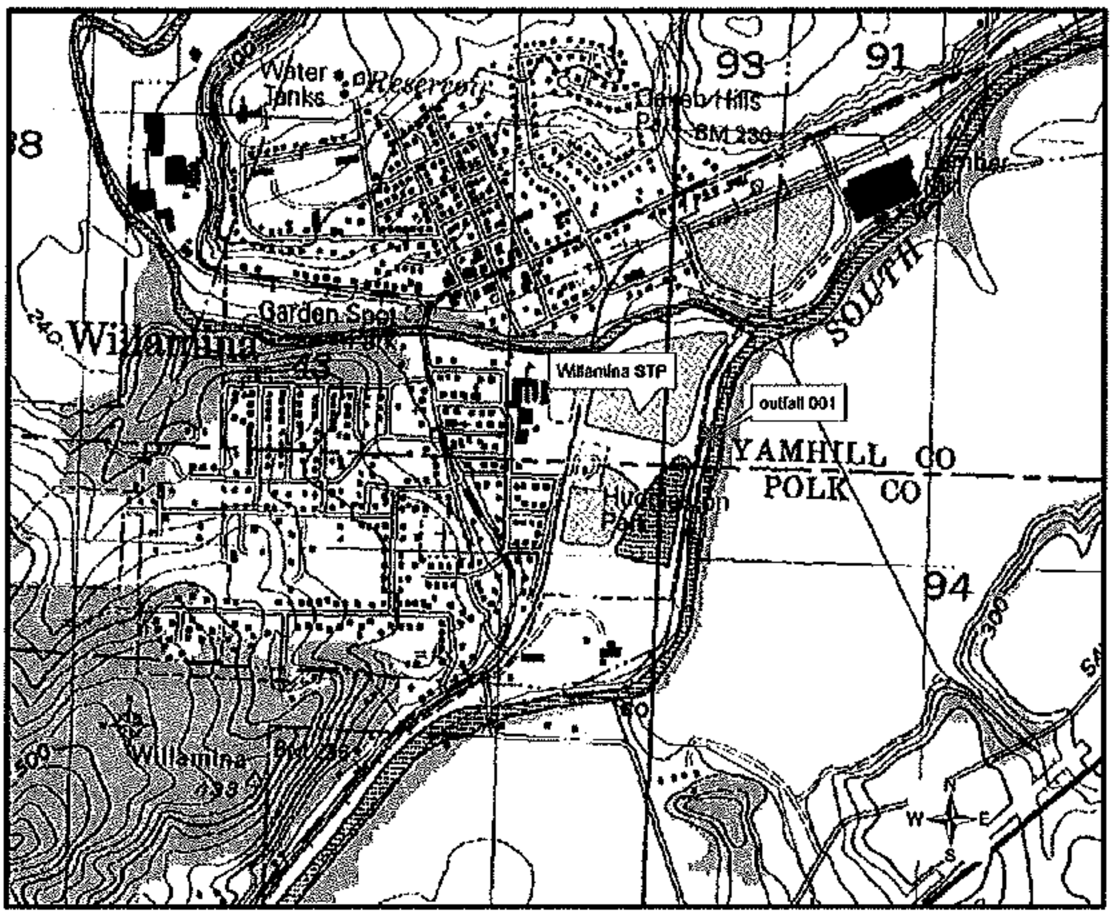

Figure 1. Location of Willamina's WWTP and Outfall 001.

Facility: Description

The wastewater treatment facility upgraded in 2003. The upgrades to the facility included the installation of a HPDE 60 ml impervious liner, and installing surface aerators in the two primary lagoons. The surface areas of the two primary aerated lagoons are 5.8 and 6.0 acres. Influent will flow through the head works and into the two primary ponds in series with transfer inlet piping to allow flow equilibrium between cells. Flow from the primary cells converge and flow into a transfer manhole which feeds into the third facultative lagoon through an extended existing inlet pipe. The third lagoon is a facultative lagoon and is 6.3 acres. The fourth lagoon was also added during the 2003 up grade and functions as a polishing lagoon (approx. 5 acres). The wastewater flows through the primary lagoons for treatment then into secondary for further treatment and sludge storage. Final effluent polishing occurs in the fourth cell prior to discharge to the Yamhill River.

The treated effluent is held during the dry-weather season (May 1- October 31). During the wet-weather season (November 1 – April 30), the effluent is released to a chlorine injection manhole where a chlorine solution is mixed with the liquid stream and through the use of a chemical induction mixer. The effluent is then de-chlorinated using sulfur dioxide injection to comply with in stream water quality toxicity standards. The effluent is discharged through a gravity fed outfall pipeline and diffuser into the South Yamhill River at RM 41.9.

Facility: Collections and Pump Stations

There are nine pump stations located throughout the city; 7 of the stations discharge to 2 main stations. These main pump 2 stations are constant speed pumps, so flows to the plant are intermittent as the pumps cycle on and off. Intermittent flow is not desirable from a treatment standpoint. The city hopes to rebuild the main pump station in the near future, incorporating variable speed pumps to even out the flow to the treatment plant. The pump stations are not equipped with emergency power. In the case of a power outage, city staff must run the stations with portable generators.

Facility: Treatment Plant Flows

The average dry weather design flow is 0.22MGD and the actual average dry weather flow, as calculated from May through August 2009 DMR data, is 0.088 MGD. The plant is operating at approximately 40% of treatment capacity (0.088 mgd/0.22 mgd ×100 = 40.0%).

Facility: Outfalls

The Willamina WWTP is permitted to discharge treated domestic wastewater through outfall 001 to the South Yamhill River. The outfall is a single port located approximately 12 feet from the left bank (looking downstream) of the creek and about 6" below water (October 2009). The pipe is eight inches in diameter with a six inch port on the end. The discharge flow is parallel to the receiving water flow.

Facility: Pollutants discharged

The proposed permit will regulate the following parameters: Five-day Biochemical Oxygen Demand (BOD_5), Total Suspended Solids (TSS), pH, BOD removal efficiency, TSS removal efficiency, E. coli bacteria and chlorine residual.

Facility: Mixing zone and zone of initial dilution

The allowable size of the mixing zone is based upon the size of the discharge relative to the receiving water, the beneficial uses of the receiving water, location of other discharges nearby, location of drinking water intakes, and other considerations. The City was granted a mixing zone into which it discharges effluent from the treatment plant. The regulatory mixing zone is defined as follows:
From an internal 2010 mixing review zone memo (**Attachment 1 Mixing Zone memo**) the Department established a zone of initial dilution (ZID) and a mixing zone (MZ) for the City of Willamina's outfall 001.

The mixing zone for this facility is defined as that portion of the South Yamhill River contained within a band extending out twenty-five (25) feet from the Northwest bank of the river and extending from a point ten (10) feet upstream of the outfall to a point one-hundred (100) feet downstream from the outfall. The Zone of Immediate Dilution (ZID) shall be defined as that portion of the allowable mixing zone that is within ten (10) feet of the point of discharge.

Facility: Sludge and Biosolids Management

Wastewater flows into two aerated lagoons then into a facultative sludge storage lagoon (FSL) system where sludge can be stored for approximately 10-20 years. The facultative storage lagoon is approximately 16,000,000 gallons.

Waste sludge accumulates in the treatment lagoon. Under normal conditions, a Biosolids Management Plan must be submitted 6 months prior to removing any biosolids from the lagoon. It is anticipated that the Biosolids dredged and removed from the (FSL) on a periodic basis and will be land applied. The city submitted a Biosolids Management Plan during the last permit renewal which was approved by the Department. A revised Biosolids Management Plan (BMP) is part of this permit renewal (**ATTACHMENT 2 BMP**). The BMP ensures compliance with the federal biosolids regulations (40 CFR Part 503).

Pathogen Reduction Class B Biosolid

Class B biosolid can be met by using one of three alternatives, the two primary alternatives used by this facility are Alt. 1) Monitor sewage sludge for fecal coliform 503.32(b)(2), and Alt. 2) Use Process to Significantly Reduce Pathogen (PSRP) 503.32(b)(3).

Alt. 1) Typically WWTPs make Class b biosolids by meeting pathogen reduction alternative 1) Monitor sewage sludge for fecal coliform 503.32(b)(2) requires that seven discrete samples of treated sewage sludge (biosolid) be collected and that the geometric mean fecal coliform density of these samples be less than 2 million MPN per dry gram biosolid (dry weight basis).

Alt. 2) Use Process to Significantly Reduce Pathogen (PSRP) 503.32(b)(3) considers sludge treated in one of the PSRPs listed in appendix B of the Part 503 to meet Class B biosolid criteria for pathogen reduction.

Vector Attraction Reduction

To show sludge stability this facility primarily uses one of the three following vector attraction reduction options:

Opt.1) The mass of volatile solid in the sewage sludge shall be reduced by a minimum of 38 % or more (40CFR 503.33 (b)(1)),

Opt. 2) When the 38% volatile solid reduction can not be met for an anaerobically sewage sludge, vector attraction can be demonstrated by digesting a portion of the previously anaerobically digested sludge in a laboratory in a bench scale unit for 40 additional days at a temperature between 30 and 37 degrees Celsius. When at the end of the 40 days, the volatile solids in the sewage sludge at the beginning of that period is reduced by less than 17 percent, vector attraction is achieved.

Opt. 6) Alkaline Stabilization 24 hour process, pH of sewage sludge shall be to 12 or higher by alkali addition and, without the addition of more alkali, shall remain at 12 or higher for two hours active mix and then at 11.5 or higher for an additional 22 hours.

For the past five (5) years, the average volatile solids reduction criteria for solids in the FSL have not been checked by the City wastewater treatment facility. Therefore, no current data is available.

Land Application

Biosolids can be land applied only on Department approved sites. The City of Willamina, last land applied biosolid in 2004. Since then all the sludge generated at the facility is stored in the facultative lagoon, which is believed to have about 10-20 years storage until these solids need to be removed.

No septage is received at the treatment facility.

Facility: Inflow and infiltration

DEQ uses the ratio of the maximum monthly average flow to the average dry weather flow to assess Inflow and Infiltration (I/I) because DEQ believes that I/I result from cumulative rainfall events. The highest monthly average flow since January 2008 was 0.327 million gallons per day (mgd) in January, 2009 and the maximum daily flow was 2.02 mgd in January, 2009. DEQ calculated a peaking factor (PF) of 9.2 using these data:

$$\frac{\text{Maximum monthly average flow}}{\text{Average dry weather flow}} = \text{PF}$$

$$\frac{2.02 \text{ mgd}}{0.22 \text{ mgd}} = 9.2$$

Peaking factors less than five indicate that the collection system is not significantly affected by inflow and infiltration (I/I). Local rainfall patterns and groundwater levels play a big role in I/I and a low value peaking factor does not necessarily mean that the collection system is in good condition.

Facility: Overflows

DEQ does not have any records of sewage overflows since the last permit renewal. The outfall 001 diffuser discharge flow capacity is 1.39 mgd, in the past the effluent levels at times have filled the lagoons to capacity according to the WWTP operator. Given the high peaking factor the operator must remain vigilant and not let high I/I overflow the lagoon system during peak winter storms.

Facility: Groundwater

All the lagoons in the Willamina's WWTP lagoons are lined with 60 mil- HPDE Liners. The facility preformed leak testing on these lagoons and found there were no groundwater concerns in 2007.The Department believes that there still are no groundwater concerns from lagoon leaks provided that the facility structures and underground piping are properly designed, operated, and maintained. DEQ has a prohibition on adverse impacts to groundwater in the proposed renewal permit.

Facility: Recycled Water

The City does not produce or use recycled water.

Facility: Stormwater

This renewal does not address stormwater because general NPDES permits for stormwater are not required for facilities with a design flow of less than 1 MGD, as is the case for the City of Willamina WWTP.

Facility: Pre-treatment

This facility does not have a pre-treatment program and none is required.

Facility: Compliance History

DEQ-WQ database: this facility was last inspected on August 26, 2008 and it was found to be operating in compliance with the permit, no violations noted. The facility was also inspected on December 18, 2007 and December 13th, 2004. Violations were noted during the 2007 inspection and addressed in Notice of Noncompliance (NON).

Notices of NonCompliance Issued 1998 to present									
Notices of NonCompliance Issued 1998 to present									
Program/Region	**Source Name**	**Staff Initials**	**Violation Date**	**NON Date**	**County**	**Location**	**Description**	**NON Class**	**Permit #**
WATER QUALITY, MUNICIPAL WESTERN REGION SALEM	WILLAMINA, CITY OF	BTM	6/30/2003	7/3/2003	YAMHILL	STABILIZATION LAGOONS, WILLAMINA	INSPECTION - WQ FILE FOR CITY WAS REVIEWED FOR 1999 TO PRESENT: FAILURE TO DO ANNUAL REPORT ON INFLOW & INFILTRATION REDUCTION PROGRAM	Class 2	101070
WATER QUALITY, MUNICIPAL WESTERN REGION SALEM	WILLAMINA, CITY OF	BTM	6/30/2003	7/3/2003	YAMHILL	STABILIZATION LAGOONS, WILLAMINA	WQ FILE REVIEWED FOR 1999 TO PRESENT: FAILURE TO TAKE COMPOSITE SAMPLES FOR INFLUENT & EFFLUENT BOD & TSS.	Class 2	101070
WATER QUALITY, MUNICIPAL WESTERN REGION SALEM	WILLAMINA, CITY OF	BTM	6/30/2003	7/3/2003	YAMHILL	STABILIZATION LAGOONS, WILLAMINA	WQ FILE REVIEWED FOR 1999 TO PRESENT: FAILURE TO MAKE AN ANNUAL REPORT OF INFLUENT & EFFLUENT FLOW METER CALIBRATION & REPORTING.	Class 2	101070
WATER QUALITY, MUNICIPAL WESTERN REGION SALEM	WILLAMINA, CITY OF	BTM	11/1/2002	7/3/2003	YAMHILL	STABILIZATION LAGOONS, WILLAMINA	NOVEMBER 2002 TO PRESENT: FAILURE TO REPORT WEEKLY FECAL COLIFORM CALENDAR WEEK OF 11/10/02	Class 2	101070
WATER QUALITY, MUNICIPAL WESTERN REGION SALEM	WILLAMINA, CITY OF	BTM	11/1/2003	7/3/2003	YAMHILL	STABILIZATION LAGOONS, WILLAMINA	NOVEMBER 2002 TO PRESENT: FAILURE TO MONITOR WEEKLY BOD & TSS CONCENTRATION & LOADING WEEK OF 11/10/02	Class 2	101070
WATER QUALITY, MUNICIPAL WESTERN REGION SALEM	WILLAMINA, CITY OF	BTM	11/1/2002	7/3/2003	YAMHILL	STABILIZATION LAGOONS, WILLAMINA	NOVEMBER 2002 TO PRESENT: FAILURE TO MONITOR PH DISCHARGE MORE THAN ONE DAY PER WEEK, WEEK OF 11/10/02	Class 2	101070
WATER QUALITY, MUNICIPAL	WILLAMINA, CITY OF	BTM	2/1/2003	7/3/2003	YAMHILL	STABILIZATION LAGOONS,	FEBRUARY 2003: FAILURE TO	Class 2	101070

WESTERN REGION SALEM						WILLAMINA	REPORT "CHLORINE USED" VALUE FOR 1/1/03		
WATER QUALITY, MUNICIPAL WESTERN REGION SALEM	WILLAMINA, CITY OF	BTM	2/1/2003	7/3/2003	YAMHILL	STABILIZATION LAGOONS, WILLAMINA	FEBRUARY 2003: FAILURE TO REPORT. REPORTED ONLY ONE PH MONITORING FOR INFLUENT & EFFLUENT FOR WEEK OF 1/19/03 WHEN TWO ARE REQUIRED.	Class 2	101070
WATER QUALITY, MUNICIPAL WESTERN REGION SALEM	WILLAMINA, CITY OF	BTM	2/1/2003	7/3/2003	YAMHILL	STABILIZATION LAGOONS, WILLAMINA	FEBRUARY 2003: FAILURE TO SAMPLE WEEKLY FECAL COLIFORM WEEK OF 2/16/03	Class 2	101070
WATER QUALITY, MUNICIPAL WESTERN REGION SALEM	WILLAMINA, CITY OF	BTM	3/1/2003	7/3/2003	YAMHILL	STABILIZATION LAGOONS, WILLAMINA	MARCH 2003: FAILURE TO SAMPLE WEEKLY FECAL COLIFORM WEEK OF 3/2/03	Class 2	101070
WATER QUALITY, DOMESTIC WESTERN REGION SALEM	WILLAMINA, CITY OF, JEFF BROWN	RVN	1/15/2006	9/20/2006	YAMHILL		WQ VIOLATION CLASS: 2 THE PERMITTEE VIOLATED 340-045-0015(5)(B), ORS 468B.025(2), ORS 68B.050 AND OAR 340-012-0055(2)(A). LOADING FOR BOD5 FOR JANUARY 2006 AND APRIL 2006.	Class 2	101070
WATER QUALITY, DOMESTIC WESTERN REGION SALEM	WILLAMINA, CITY OF, JEFF BROWN	RVN	4/15/2006	9/20/2006	YAMHILL		WQ VIOLATION CLASS: 2 THE PERMITTEE VIOLATED ORS 468B.025(2) BY FAILING TO COMPLY WITH THE CONDITIONS OF A WASTE DISCHARGE PERMIT ISSUED UNDER ORS 468B. THIS IS FOR THE MONTH OF JANUARY 2006 & APRIL 2006.	Class 2	101070
WATER QUALITY, DOMESTIC WESTERN REGION SALEM	WILLAMINA, CITY OF, MIKE PAUL	RVN	1/15/2007	3/16/2007	YAMHILL	WILLAMINA STP, WILLAMINA OR	WQ/D VIOLATION CLASS: 2 & 3 THE WEEK OF JANUARY 1, 2007 THE PERMITTEE FAILED TO COMPLY WITH THE SCHEDULE A-WASTE DISCHARGE	Class 2	101070

							LIMITATIONS, BOD LOADING AND BOD REMOVAL.		
Total Records: 15									

The City has not received a WL since 2007. The city monthly discharge monitoring reports (DMRs) have not been review by Department staff since the last NPDES inspection in 2007. During this NPDES permit draft the 2008 through 2010 DMRs reviewed for flow and temperature data and not for compliance.

Receiving stream

Receiving Stream: Description

That part of the Yamhill River into which the city's WWTP discharges treated, disinfected wastewater is termed waters of the State of Oregon. This region comprises the western Willamette Valley and Oregon Coast Mountains. Willamina's outfall is located on the South Yamhill River bank. The landform in the vicinity is made up of alluvial soils that are formed by the erosive weather forces on the coastal mountains and depositions from ancient Missoula floods.

Receiving Stream: Anti-degradation

DEQ concluded that an in-depth anti-degradation review was not needed in this case because the discharge is into an existing mixing zone (**ATTACHMENT 3 Anti Deg.**). This qualifies the discharge as not lowering water quality under Oregon Administrative Rule (OAR) 340-041-0004(3)-(5).

Recommendation: The Department is proposing to issue a NPDES permit with existing permit discharged mass load limits for BOD_5 and TSS.

Receiving Stream: 303(d) List

The section of the Yamhill River lying in the Willamette Basin, Yamhill Sub Basin and is water quality limited on the 303d list, for the following parameters.

The South Yamhill River is listed on the Department of Environmental Quality's (Department) 303 (d) list as being water quality limited during the winter/spring/fall for Fecal Coliform bacteria.

Receiving Stream: Beneficial Uses

Beneficial uses specified for fresh waters in the Willamette Basin, in which this facility is located, are:

- Industrial water supply
- Fish and aquatic life
- Wildlife and hunting
- Fishing
- Boating
- Water contact recreation
- Aesthetic quality
- Commercial navigation and transportation

Receiving Stream: Bacteria

The existing permit includes effluent limits based on E. coli bacteria. E. coli levels shall not exceed 126 organisms per 100 mL monthly geometric mean. No single sample shall exceed 406 organisms per 100 mL.

OAR Chapter 340 Division 041 Section 0009 also contains requirements regarding sewer overflows. These requirements are addressed in Schedule F (General Conditions) of the proposed permit. Regarding the general condition 6 found in Section B of Schedule F in this permit which prohibits overflows from wastewater conveyance systems, the Environmental Quality Commission (EQC) recognizes that it is impossible to design and construct a conveyance system that will prevent overflows under all storm conditions. The applicant is not seeking permit coverage for overflows and the permit does not authorize such discharges. The State of Oregon has determined that all wastewater conveyance systems should be designed to transport storm events up to a specific size to the treatment facility. Therefore, in exercising its enforcement discretion regarding Sanitary Sewer Overflows, the Department will consider the following:

(1) Whether the permittee has conveyance and treatment facilities adequate to prevent overflows except during a storm event greater than the one-in-five-year, 24-hour duration storm from November 1 through May 21 and except during a storm event greater than the one-in-ten-year, 24-hour duration storm from May 22 through October 31. In addition, DEQ will also consider using enforcement discretion for overflows that occur during a storm event less than the one-in-five-year, 24-hour duration storm from November 1 through May 21 if the permittee had separate sanitary and storm sewers on January 10, 1996, had experienced sanitary sewer overflows due to inflow and infiltration problems, and has submitted an acceptable plan to the Department to address these sanitary sewer overflows by January 1, 2010;

(2) Whether the permittee has provided the highest and best practicable treatment and/or control of wastes, activities, and flows and has properly operated the conveyance and treatment facilities;

(3) Whether the permittee has minimized the potential environmental and public health impacts from the overflow; and

(4) Whether the permittee has properly maintained the capacity of the conveyance system.

DEQ will review the permittee's determination of the one-in-five-year, 24-hour duration winter storm and the one-in-ten year, 24-hour duration summer storm as described above in the permit holder's facilities plan. In the event that a permit holder reports an overflow event associated with a storm event and DEQ does not have information from the permit holder sufficient to determine whether or not the storm event exceeds storm events as specified in OAR 340-041-0009(6) & (7), DEQ will perform the determination using the information contained in Figure 26 of the 1973 NOAA Atlas 2 entitled "Precipitation-Frequency Atlas of the Western United States, Volume X – Oregon". This figure is entitled "Isopluvials of 5-yr 24-hr precipitation in tenths of an inch". The Atlas can be obtained on line at http://hdsc.nws.noaa.gov/hdsc/pfds/other/or_pfds.html, however the file is very large. A scanned version of Figure 26 is available at: http://www.wrcc.dri.edu/pcpnfreq/or5y24.gif. DEQ will compare the information in this figure with rainfall data available from the National Weather Service, or other source as necessary.

Receiving Stream: Biological oxygen demand and Total suspended solids

Biological Oxygen Demand (BOD_5) is a measure of the oxygen used by microorganisms when they break down organic matter. If too much organic matter is in the water, then microorganisms use up all the available oxygen in the water. The result is water having no dissolved oxygen which fish and other organisms require for survival.

Total Suspended Solids (TSS) is a measure of organic and inorganic solid materials that are suspended in the water. High concentrations of suspended solids can lower water quality by absorbing light. Waters then become warmer and, because warmer water holds less oxygen than cooler water, aquatic life can suffer. If aquatic plants live in the water body, the suspended solids allow less light to reach their leaves and they will photosynthesize less. This also reduces the amount of oxygen in the water body because photosynthesis produces oxygen. Suspended solids affect aquatic life in other ways. They can clog fish gills, reduce growth rates, decrease resistance to disease, and prevent egg and larval development. Particles that settle out can smother fish eggs and those of aquatic insects, as well as suffocate newly hatched larvae. The material that settles also fills the spaces between rocks and makes these microhabitats unsuitable for various aquatic insects.

Oregon Administrative Rule (OAR 340-41-120(9)(d) allows winter mass lad limits of existing facilities to be based on design wet weather flow. The Department calculating winter mass loads during the last permit using Design Wet Weather Flow of 0.48 mgd.

The Willamette Basin criteria specify a minimum of secondary treatment by facilities having direct discharge as does Willamina WWTP. The existing year round BOD_5 concentration permit limits are 30 mg/L monthly average and 45 mg/L weekly average.

DEQ has assigned BOD_5 mass load limits for the Willamina WWTP facility based on the average design wet weather flow. Calculations are as follows:

$$\text{Flow} \times BOD_5 \text{ Concentration} \times \text{Conversion Factor} = BOD_5 \text{ Mass load limit}$$

$$\left(\frac{0..48 \times 10^6 \text{ gal}}{\text{day}}\right) \times \left(\frac{30 \times 10^{-3} \text{ g}}{\text{L}}\right) \times \left(\frac{2.2 \text{ lbs}}{10^3 \text{ g}}\right) \times \left(\frac{1 \text{ L}}{0.264 \text{ gal}}\right) = 120^* \text{ lbs/day (Monthly average)}$$

$$\left(\frac{120 \text{ lbs}}{\text{day}}\right) \times 1.5 = 180^* \text{ lbs/day (Weekly average)}$$

$$\left(\frac{120 \text{ lbs}}{\text{day}}\right) \times 2.0 = 240^* \text{ lbs/day (Daily maximum)}$$

*values rounded to 2 significant figures

Willamina WWTP. The existing year round TSS concentration permit limits are 50 mg/L monthly average and 80 mg/L weekly average.

DEQ has assigned TSS mass load limits for the Willamina WWTP facility based on the average design wet weather flow of 0.48 MGD. Calculations are as follows:

Flow × TSS Concentration × Conversion Factor = TSS Mass load limit

$$\left(\frac{0..48 \times 10^6 \text{ gal}}{\text{day}}\right) \times \left(\frac{50 \times 10^{-3} \text{ g}}{\text{L}}\right) \times \left(\frac{2.2 \text{ lbs}}{10^3 \text{ g}}\right) \times \left(\frac{1 \text{ L}}{0.264 \text{ gal}}\right) = 200^* \text{ lbs/day (Monthly average)}$$

$$\left(\frac{200 \text{ lbs}}{\text{day}}\right) \times 1.5 = 300^* \text{ lbs/day (Weekly average)}$$

$$\left(\frac{200 \text{ lbs}}{\text{day}}\right) \times 2.0 = 400^* \text{ lbs/day (Daily maximum)}$$

*values rounded to 2 significant figures

The calculated BOD_5 Mass load values 30 lbs/day (Monthly average), 45 lbs/day (weekly average), 240 lbs/day (Daily maximum) in the existing permit have not changed, therefore these limits will be rolled over into the renewed permit.

The calculated TSS Mass load values 50 lbs/day (Monthly average), 80 lbs/day (weekly average), 400 lbs/day (Daily maximum) in the existing permit have not changed, therefore these limits will be rolled over into the renewed permit.

The Code of Federal Regulations (CFR) secondary treatment standards require municipal dischargers to remove a minimum of 85 percent of BOD_5 and 65 percent TSS (40 CFR, Part 133). DEQ proposes percent removal efficiency limits to comply with these federal requirements.

Receiving Stream: pH

The pH is a measure of how acidic or basic a solution is. A solution is considered neutral at a pH of 7.0 standard units (s.u). The general purpose of an in-stream water quality pH standard is to protect aquatic life because most aquatic organisms can tolerate only a fairly narrow range - around 7.0 s.u.

The pH standard for fresh water quality in the Yamhill sub basin ranges from 7.0 to 8.5 (OAR 340-041-0225). DEQ did a Reasonable Potential Analysis (RPA) for the effects of the Willamina effluent pH on the pH of the receiving waters using the dilution at the edge of the mixing zone at low tide. The analysis showed no reasonable potential to exceed marine pH standards in the basin as long as effluent pH remained between 6.0 and 9.0 (**ATTACHMENT 5 pH RPA**). DEQ proposes pH limits of 6.0 to 9.0.

Receiving Stream Chlorine

Disinfection of the effluent with chlorine is the process the plant is designed to use in order to comply with the waste discharge limitations for bacteria. The current facility uses sodium hypochlorite solution to disinfect the treated wastewater. Chlorine is a known toxic substance and as such is subject to limitation under Oregon Administrative Rules. The rule (OAR 340-041-0033(2)) states in part that toxic substances shall not be discharged to waters of the state concentrations that adversely affect public health, aquatic life or other designated beneficial uses. In addition, concentrations of toxic substances shall not exceed the criteria listed in Table 20 which were based on criteria established by the EPA and published in Quality Criteria for Water (1986), unless otherwise noted.

However, OAR 340-041-0053(2)(b)(A) states that the Department may allow a designated portion of a receiving water to serve as a zone of dilution for wastewaters and receiving waters to mix thoroughly and this zone will be defined as a mixing zone. The Department may suspend all or part of the water quality standards, or set less restrictive standards, in the defined mixing zone, provided the water within the mixing zone is free of materials in concentrations that will cause acute toxicity to aquatic life as measured by the acute bioassay method and outside the boundary of the mixing zone is free of materials in concentrations that will cause chronic toxicity.

Furthermore, 40 CFR §122.44(d) states that permit limitations must control all pollutants or pollutant parameters which are or may be discharged at a concentration which will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard, including state narrative criteria for water quality. According to OAR 340-041, Table 20, chlorine concentrations of 11µg/L can result in chronic toxicity in fresh waters while 19 µg/L can result in acute chlorine toxicity in fresh waters.

The Willamina WWTP uses bisulfate to dechlorinate their disinfected wastewater to remove chlorine. DEQ did a Reasonable Potential Analysis (RPA) for the effects of the Willamina's effluent on Chlorine levels in the receiving waters that showed no reasonable potential for it to raise receiving waters chlorine above the acute or chronic criterion. There is residual chlorine limit in the permit (**ATTACHMENT 6 CL2 RPA and Attachment 7 CL2 Limit worksheet**).

The RPA analysis indicated that there is a reasonable potential for chlorine to cause acute and chronic toxicity within the receiving stream during the entire discharge season. A chlorine limit will be included in the permit:

Pollutant	Limitations
Total Chlorine Residual	Shall not exceed 0.21 mg/L daily maximum and 0.08 mg/L monthly average

In accordance with EPA Region X guidance for establishing water quality based effluent limits (WQBEL) below analytical detection limits; the Department is including the above limits in the permit but is using the promulgated Minimum Level (ML) as the "compliance evaluation level". Daily maximum concentrations below 0.10 mg/L will be considered in compliance with the limitation.

The proposed chlorine limits listed is for the current treatment facility. Chlorine compounds used for disinfection and dechlorination in this facility comply with the chlorine limits.

Receiving Stream: Ammonia

Ammonia is toxic to fish and aquatic organisms, even in very low concentrations. Ammonia toxicity varies with other water quality parameters: the higher the pH and the temperature, the more toxic the ammonia.

DEQ did a Reasonable Potential Analysis (RPA) for the effects of the Willamina's effluent on ammonia levels in the receiving waters that showed no reasonable potential for it to raise receiving waters ammonia above the acute or chronic criterion. Therefore, DEQ does not propose ammonia limits in this permit (**ATTACHMENT 8 NH3 RPA**).

Receiving Stream: Temperature and excess thermal load

Water temperatures affect the life cycles of aquatic species and are a critical factor in maintaining and restoring healthy salmonid populations. The purpose of the temperature criteria in OAR 340-041-0028 is to protect designated, temperature sensitive, beneficial uses (including salmonid life cycle stages) from adverse warming caused by human activities.

Oregon Administrative Rules (OAR 340-041-0028(4) limit the warming of fresh waters to 0.3°C or less. DEQ did a Reasonable Potential Analysis (RPA) for the potential effects of the Willamina effluent on the temperature of the receiving waters. The RPA showed no reasonable potential to warm the receiving waters above the criterion (**ATTACHMENT 4D Thermal Plume RPA**). Therefore, DEQ does not propose temperature limits in the permit.

Permit

Permit: Facility Classification

The plant operation and collection system classifications were re-evaluated to determine the appropriateness of the current operator certification requirements (**ATTACHMENT 9 OP Cert**). The plant is currently classified as Level I and the collection system as Level II. The re-evaluation does not result in any change to these classification levels. The plant must be supervised by one or more operators who hold valid certification at or above Level II (plant) and Level II (collection).

Permit: Limits (Schedule A)

The proposed effluent limits are summarized below.

BOD and TSS effluent treatment

November 1-April 30

Parameter	Average effluent concentration		Average effluent loading		
	Monthly	Weekly	Monthly	Weekly	Daily
BOD_5	30 mg/L	45 mg/L	120 lb/day	180 lb/day	240 lb/day
TSS	50 mg/L	80 mg/L	200 lb/day	300 lb/day	400 lb/day

Other parameters

Parameter	Limits
Removal efficiency (BOD and TSS)	May not be less than 85% monthly average for BOD and 65% monthly average for TSS
E. coli	Shall not exceed 126 organisms per 100 L monthly geometric mean. No single sample shall exceed 406 organisms per 100 mL.
pH	Must be within the range of 6.0 to 9.0

Permit: Required Monitoring (Schedule B)

The permittee is required to have a laboratory Quality Assurance/Quality Control program. DEQ recognizes that some tests do not accurately reflect the performance of a treatment facility due to quality assurance/quality control problems. These tests should not be considered when evaluating the compliance of the facility with the permit limitations.

In 1988, DEQ developed a monitoring matrix for commonly monitored parameters. Proposed monitoring frequencies for all parameters are based on this matrix and, in some cases, may have changed from the current permit. The proposed monitoring frequencies for all parameters correspond to those of facilities of similar size and complexity in the state. Refer to the table below for a summary of proposed monitoring and reporting requirements.

Parameter		Minimum Frequency	Sample Type
Influent			
Flow	total	daily	measurement
Flow	meter calibration	annual	verification
BOD_5	concentration	1 per 2 week	composite
TSS	concentration	1 per 2 week	composite
pH		2 per week	grab
Effluent			
Flow	total	daily	measurement
Flow	meter calibration	annual	verification
BOD_5,	concentration	1 per 2 week	composite
BOD_5,	pounds discharged	1 per 2 week	calculation
BOD_5,	average removal efficiency	monthly	calculation
TSS	concentration	1 per 2 week	composite
TSS	pounds discharged	1 per 2 week	calculation
TSS	average removal efficiency	monthly	calculation
pH		2 per week	grab
Bacteria	E. coli	1 per week	grab
Temperature		2 per week	grab
UV radiation	intensity	daily	reading
Biosolids			
Quantity & Location	where applied	each occurrence	record
Solids, total	% dry weight	When solids are removed	composite

Solids, volatile	% dry weight	When solids are removed	composite
Fecal coliform Bacteria	per unit dry weight	When solids are removed	grab minimum of 7 samples
Nutrients*	% dry weight	When solids are removed	composite
Nutrients* and Metals**	% dry weight ppm	When solids are removed	composite

* NH_4-N, NO_3-N, TKN, Total P, Total K

** As, Cd, Cu, Pb, Hg, Mo, Ni ,Se, Zn

Permit: Compliance Conditions (Schedule C)

N/A

Permit: Special Conditions (Schedule D)

Schedule D contains special conditions requiring the permittee to manage all biosolid in accordance to their Biosolids Management Plan (BMP), to retain DEQ certified staff to supervise the treatment and collection systems, no hydrogeologic or groundwater monitoring required during this permit cycle and a Department General Conditions notification.

Permit: Pre-treatment (Schedule E)

N/A

Permit: General Conditions (Schedule F)

All NPDES permits issued in the State of Oregon contain General Conditions that remain the same regardless of the type of discharge and the activity causing the discharge. They can be changed or modified only on a statewide basis.

Section A contains standard conditions which include compliance with the permit, assessment of penalties, mitigation of non-compliance, permit renewal application, enforcement actions, toxic discharges, property rights and referenced rules and statutes. Section B contains requirements for operation and maintenance of the pollution control facilities. This section includes conditions for proper operation and maintenance, duty to halt or reduce activity in order to maintain compliance, bypass of treatment facilities, upset conditions, treatment of single operational events, overflows from wastewater conveyance systems and associated pump stations, public notification of effluent violation or overflow, and disposal of removed substances. Section C contains requirements for monitoring and reporting. This section includes conditions for representative sampling, flow measurement, monitoring procedures, penalties of tampering, reporting of monitoring results, additional monitoring by the permittee, averaging of measurements, records retention, records contents, and inspection and entry. Section D contains reporting requirements and includes conditions for reporting planned changes, anticipated non-compliance, permit transfers, progress on compliance schedules, non-compliance which may endanger public health or the environment, other non-compliances, and other information. Section D also contains signatory requirements and the consequences of falsifying reports. Section E contains the definitions used throughout the permit.

The General Conditions were revised in 2008. A summary of the changes is as follows:

- There are additional citations to the federal Clean Water Act and CFR, including references to standards for sewage sludge use or disposal.
- There is additional language regarding federal penalties.
- Bypass language has been made consistent with the Code of Federal Regulations.
- Overflow language has been modified. Formerly the language stated that overflows in response to the five or ten year event would not violate the permit. Now it states that overflows are prohibited. DEQ will continue to exercise enforcement discretion with respect to overflows consistent with the provisions of the Bacteria Rule (OAR 340-041-0009).
- Reporting requirements regarding overflows have been made more explicit.
- Requirements regarding emergency response and public notification plans have been made more explicit.
- Language pertaining to duty to provide information has been made more explicit.
- Confidentiality of information is addressed.

Permit: Processing/Public Comment/Appeal Process

The beginning and end date of the public comment period to receive written comments regarding this permit, and the contact name and telephone number are included in the public notice. If the permittee is dissatisfied with the conditions of the permit when issued, they may request a hearing before the EQC or its designated hearing officer, within twenty days of the final permit being mailed. The request for hearing must be sent to the Director of DEQ. Any hearing held shall be conducted pursuant to regulations of DEQ.

ATTACHMENT 1

Mixing Zone Study

See separate document for the City of Willamina's Mixing Zone Study.

ATTACHMENT 2

Biosolid Management Plan

See separate document for the City of Willamina's Biosolid Management Plan.

Attachment 3

Antidegradation Review Sheet

ANTIDEGRADATION REVIEW SHEET
FOR A PROPOSED INDIVIDUAL NPDES DISCHARGE

1. What is the name of Surface Water that receives the discharge? **South Yamhill River.**

   Briefly describe the proposed activity:

   Is this review for a renewal OR new (circle one) permit application?
   Go to Step 2. **Renewal**

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2. Is this surface water an **Outstanding Resource Water** or **upstream** from an **Outstanding Resource Water**?
   Yes. Go to Step 5.
   No. Go to Step 3. **NO.**

3. Is this surface water a **High Quality Water**?
   Yes. Go to Step 8.
   No. Go to Step 4. **NO.**

4. Is this surface water a **Water Quality Limited Water**?
   Yes. Go to Step 13. **YES.**
   No. Go to Step 2. Note: The surface water must fall into one of three (3) categories: Outstanding Resource Water (Step 2), High Quality Water (Step 3), or Water Quality Limited Water (Step 4).

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13. Will the proposed activity result in a Lowering of Water Quality in the **Water Quality Limited Water**?
   Yes. Go to Step 14.
   No. Proceed with Permit Application. Applicant should provide basis for conclusion. Go to Step 24. **NO.**

24. On the basis of the Antidegradation Review, the following is recommended:

_X___ Proceed with Application to Interagency Coordination and Public Comment Phase.

____ Deny Application; return to applicant and provide public notice.

Action Approved

Section: ______________________________

Review Prepared By: ______________________________

Phone: ______________________________

Date Prepared: ______________________________

Please provide the following information and submit with the completed application form to:

Department of Environmental Quality
Water Quality Division—Surface Water Management
811 SW Sixth Avenue
Portland, Oregon 97204-1390

Name: ______________________________

Name of Company: ______________________________

Address: ______________________________

____

____

____

Phone: ______________________________

Fax: ______________________________

Attachment 4 Cold Water Spawning

Facility Name: Willamina WWTP **Date:** 8/10/2010

Enter data into white cells below:

7Q10 =	40	cfs
Ambient Temperature or Criterion	13	°C
Effluent Flow =	0.2	mgd
Effluent Temperature	20	°C
Allowable increase =	0.3	°C

25% of 7Q10 = **10.0** cfs

25% dilution = 33 dilution = (Qe+Qr)/Qe

ΔT at edge of MZ =	**0.21**	**°C**	**No Reasonable Potential**

Thermal Load Limit =	**N/A**	**Million Kcals**

Equation used to calculate ΔT at edge of MZ

$$\Delta T_{mz} = \frac{T_e + (S-1)T_a}{S} - T_a$$

Equation used to calculate thermal load limit

$$TLL = 3.7854 Q_e S \Delta T_{al} C_p \rho$$

Where:

Qe = Effluent Flow in mgd
S = Dilution
ΔT_{al} = Allowable temperature increase at edge of MZ (°C)
Cp = Specific Heat of Water (1 cal/g °C)
ρ = Density of Water (1 g/cm³)
3785.41 = Flow conversion from mgd to m³/day

Attachment 4B Migration Blockage Analysis

Facility Name: Willamina WWTP **Date:** 8/10/2010

Enter data into white cells below:

Dilution =	15	
Ambient Temperature or Criterion	16	°C
Effluent Temperature	20	°C
Allowable increase =	0.3	°C
Effluent Flow Rate =	0.2	mgd

ΔT at edge of MZ= 0.27 °C No Reasonable Potential

Thermal Load Limit = N/A Million Kcals

Equation used to calculate ΔT at edge of MZ

$$\Delta T_{mz} = \frac{T_e + (S-1)T_a}{S} - T_a$$

Equation used to calculate thermal load limit

$$TLL = 3.7854 Q_e S \Delta T_{al} C_p \rho$$

Where:

Q_e = Effluent Flow in mgd

S = Dilution

ΔT_{al} = Allowable temperature increase at edge of MZ (°C)

Cp = Specific Heat of Water (1 cal/g °C)

ρ = Density of Water (1 g/cm³)

3785.41 = Flow conversion from mgd to m³/day

Attachment 4C Thermal Shock

Facility Name: Willamina WWTP **Date:** 8/10/2010

Enter data into white cells below:

7Q10 =	40	cfs
Ambient Temperature or Criterion	13	°C
Effluent Flow =	0.2	mgd
Effluent Temperature	20	°C
Allowable increase =	0.5	°C

100% dilution = 130 dilution = (Qe+Qr)/Qe

ΔT at edge of MZ=	0.05	°C	No Reasonable Potential

Thermal Load Limit =	N/A	Million Kcals

Equation used to calculate ΔT at edge of MZ

$$\Delta T_{mz} = \frac{T_e + (S-1)T_a}{S} - T_a$$

Equation used to calculate thermal load limit

$$TLL = 3.7854 Q_e S \Delta T_{mz} C_p \rho$$

Where:

Qe = Effluent Flow in mgd
S = Dilution
ΔT_{mz} = Allowable temperature increase at edge of MZ (°C)
Cp = Specific Heat of Water (1 cal/g °C)
ρ = Density of Water (1 g/cm³)
3785.41 = Flow conversion from mgd to m³/day

Attachment 4D Thermal Plume

Facility Name: Willamina WWTP **Date:** 8/10/2010

Enter data into white cells below:

7Q10 =	40	cfs
Ambient Temperature or Criterion	16	°C
Effluent Flow =	0.2	mgd
Effluent Temperature	20	°C
Allowable increase =	0.3	°C

25% of 7Q10 = **10.0** cfs

25% dilution = **33** dilution = (Qe+Qr)/Qe

ΔT at edge of MZ = 0.12 °C **No Reasonable Potential**

Thermal Load Limit = N/A Million Kcals

Equation used to calculate ΔT at edge of MZ

$$\Delta T_{mz} = \frac{T_e + (S-1)T_a}{S} - T_a$$

Equation used to calculate thermal load limit

$$TLL = 3.7854 Q_e S \Delta T_a C_p \rho$$

Where:

Qe = Effluent Flow in mgd
S = Dilution
ΔT_a = Allowable temperature increase at edge of MZ (°C)
Cp = Specific heat of Water (1 cal/g °C)
ρ = Density of Water (1 g/cm^3)
3785.41 = Flow conversion from mgd to m^3/day

Calculation of pH of a mixture of two flows.
Based on the procedure in EPA's DESCON program (EPA, 1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington D.C.)

Attachment 5 pH RPA Willamina	RPA for pH	
INPUT	Lower pH Criteria	Upper pH Criteria
1. DILUTION FACTOR AT MZ BOUNDARY - (Qe+Qr)/Qe	2	2
2. UPSTREAM/BACKGROUND CHARACTERISTICS		
Temperature (deg C):	12.0	12.0
pH:	6.4	6.4
Alkalinity (mg CaCO3/L):	20.0	20.0
3. EFFLUENT CHARACTERISTICS		
Temperature (deg C):	14.8	22.3
pH:	7.3	7.5
Alkalinity (mg CaCO3/L):	25.0	25.0
4. APPLICABLE PH CRITERIA	6.5	8.5
OUTPUT		
1. IONIZATION CONSTANTS		
Upstream/Background pKa:	6.45	6.45
Effluent pKa:	6.42	6.37
2. IONIZATION FRACTIONS		
Upstream/Background Ionization Fraction:	0.47	0.47
Effluent Ionization Fraction:	0.87	0.94
3. TOTAL INORGANIC CARBON		
Upstream/Background Total Inorganic Carbon (mg CaCO3/L)	42.22	42.22
Effluent Total Inorganic Carbon (mg CaCO3/L):	28.71	26.68
4. CONDITIONS AT MIXING ZONE BOUNDARY		
Temperature (deg C):	13.40	17.15
Alkalinity (mg CaCO3/L):	22.50	22.50
Total Inorganic Carbon (mg CaCO3/L):	35.47	34.45
pKa:	6.43	6.40
pH at Mixing Zone Boundary:	**6.7**	**6.7**
Is there Reasonable Potential?	**No**	**No**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	**Reasonable Potential Analysis**				Facility Name =		**Willamina STP**			**Attachment 6**				11/3/2010	
2										**CL2 RPA Willamina**					
3	CORMIX OUTPUT?		n	(Y/N)		Low Flow Season Data									
4	Low Flow Dilution @ ZID =		1	(S)			7Q10 =	40	CFS						
5	Low Flow Dilution @ MZ =		1	(S)			1Q10 =	34	CFS						
6	High Flow Dilution @ ZID =		1	(S)			% dilution at ZID =	10	%						
7	High Flow Dilution @ MZ =		1	(S)			% dilution at MZ =	25	%						
8							pH * =	7.5	(6.5-9)						
9	Average Dry Weather Flow =		0.22	MGD			Temp * =	15	° C						
10	Average Wet Weather Flow =		*	MGD			Salmonids Present?	N	(Y/N)						
11							Fresh Water ?	Y	(Y/N)						
12	Confidence Level =	99	%												
13	Probability Basis =	95	%						WATER QUALITY						
14					Maximum		Maximum	Maximum	CRITERIA			REASONABLE			
15		# of	Highest	Coef. of	Effluent	Background	Conc. at	Conc. at	1 Hour	4 Day		POTENTIAL ?			
16	PARAMETER	Samples	Conc.	Variance	Conc.	Conc.	ZID	MZ	(CMC)	(CCC)					
17			mg/l		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l		ACUTE	CHRONIC		
18															
19	Low Flow Season														
20	CHLORINE	30	0.50	0.60	0.70	0.00	0.064	0.023	0.019	0.011		YES	YES		
22															
26															
27	* -NOTES :		If CORMIX data (S) is available, the flow data and % dilution is not necessary.												
28			Temperature must be between 0 and 30 ° C												
29			pH must be between 6.5 and 9												
30			Ammonia is total ammonia as NH3												
31															

Attachment 7

Permit Limits Calculation

Facility Name = **Willamina STP**

11/4/2010

CL2 Limits

Average Dry Weather Flow =	0.22 MGD
Average Wet Weather Flow =	* MGD

CORMIX OUTPUT?	N (Y/N)
Low Flow Dilution @ ZID =	* (S)
Low Flow Dilution @ MZ =	* (S)
High Flow Dilution @ ZID =	* (S)
High Flow Dilution @ MZ =	* (S)

Low Flow Season Data		
7Q10 =	40	CFS
1Q10 =	34	CFS
% dilution at ZID =	10	%
% dilution at MX =	25	%
pH =	7.5	(6.5-9)
Temp =	15	° C
Salmonids Present?	Y	(Y/N)
Fresh Water ?	Y	(Y/N)

PARAMETER	WATER QUALITY CRITERIA		Back Ground mg/l	Allocations		CV	# Samples /Mo	Acute LTA mg/l	Chronic LTA mg/l	Min LTA mg/l	95TH % LIMITS		99TH % LIMITS	
	1 Hour (CMC) mg/l	4 Day (CCC) mg/l		Acute mg/l	Chronic mg/l						Daily mg/l	Monthly mg/l	Daily mg/l	Monthly mg/l
Low Flow Season														
CHLORINE	0.019	0.011	0.00	0.209	0.334	0.6	30	0.07	0.18	0.07	0.14	0.08	0.21	0.09

NOTES :

If CORMIX data (S) is available, the flow data and % dilution is not necessary.
Temperature must be between 0 and 30 ° C
pH must be between 6.5 and 9

Facility Name: Willamina **Attachment 8 NH3 CL2 RPA** **Date:** 10/18/2010

Dilution Values? (Y/N)	y	calculated
Low Flow Dilution @ ZID (1Q10)	40	*
Low Flow Dilution @ MZ (7Q10)	40	#VALUE!
Low Flow Dilution @ MZ (30Q5)	*	*
High Flow Dilution @ ZID (1Q10)	*	*
High Flow Dilution @ MZ (7Q10)	*	*
High Flow Dilution @ MZ (30Q5)	*	*
Enter data below if no dilution data is available		
Data to estimate dilution	**Summer**	**Winter**
Effluent Flow (mgd) =	0.22	*
1Q10 (CFS) =	*	*
7Q10 (CFS) =	40	*
30Q5 (CFS) =	*	*
% dilution at MZ =	*	*
% dilution at ZID =	*	*

Confidence Level =	99%
Probability Basis =	95%

Summer data	Effluent	Stream	Mixed		
			ZID	MZ	
pH * =	8	7.5	7.5	7.5	(6.5-9)
Temp * =	15	13	13.1	13.1	° C
Alkalinity =	75	25			
Salmonids Present? (Y/N)	n/a	y			
Salmonid Spawning? (Y/N)	n/a	y			
Fresh Water ? (Y/N)	n/a	y			
Salinity (ppt)	*	*	*	*	
Winter data					
pH * =	*	*	*	*	(6.5-9)
Temp * =	*	*	*	*	° C
Alkalinity =	*	*			
Salmonids Present? (Y/N)	n/a	*			
Salmonid Spawning? (Y/N)	n/a	*			
Fresh Water ? (Y/N)	n/a	*			
Salinity (ppt)	*	*	*	*	

PARAMETER	# of Samples	Highest Conc. mg/l	Coef. of Variance	Calculated Maximum Conc. mg/l	Background Conc. mg/l	Maximum Conc. at ZID mg/l	Maximum Conc. at MZ mg/l	WQ CRITERIA Acute (CMC) mg/l	WQ CRITERIA Chronic (CCC) mg/l	REASONABLE POTENTIAL ? ACUTE	REASONABLE POTENTIAL ? CHRONIC
Low Flow Season											
AMMONIA - Freshwater	9	5.6	0.60	12.32	0.04	0.35	0.35	12.1	1.81	**NO**	**NO**

* -NOTES : < 10 samples use CV of .6
Temperature must be between 0 and 30 ° C
pH must be between 6.5 and 9
Ammonia is total ammonia as N

ATTACHMENT #9
Wastewater System Classification Worksheet for Operator Certification
City of Willamina

General Requirements (OAR 340-049-0015) - Each owner of a regulated wastewater system must have its system supervised by one or more operators who hold a valid certificate for the type of system, wastewater treatment or collection, and at a grade equal to or greater than the wastewater system classification as defined in OAR-340-049-0020 and 0025. DEQ will advise system owners of the classification of their systems as a permit action. **As the classification establishes the operator certificate type and grade required for compliance, it needs to be set <u>prior to</u> "start-up" of a new or upgraded and/or expanded facility.**

Wastewater treatment system classifications will be derived from the total points assigned based on criteria shown in OAR 340-049-0025 (see Classification Worksheet). Collection system classifications are based on <u>design</u> population or population equivalent to be served by a wastewater treatment system (see Worksheet).

Upon written notice to the wastewater system owner, DEQ may classify a wastewater treatment system higher than the classification based on accumulated points if the complexity of a treatment system is not reflected in the criteria(see Worksheet examples). If deemed appropriate, DEQ may classify a wastewater collection system higher than the classification based on population when a Class I by population will have significant pumping of sewage including STEP or other pumping that may warrant a Class II designation. In either case, designation must be consistent with the intent of the classification system (see OAR 340-049-0020(4) & (5)).

Classification of Wastewater Systems (OAR 340-049-0020) All wastewater systems regulated under OAR 340-049 will be classified by DEQ as wastewater treatment systems and/or wastewater collection systems, as appropriate, in accordance with the following classification system:

Wastewater Treatment Systems	Wastewater Collection Systems
Class I - 30 total points or less	Class I - 1,500 or less design population
Class II - 31-55 total points	Class II - 1,501 to 15,000 design population
Class III - 56-75 total points	Class III - 15,001 to 50,000 design population
Class IV - 76 or more points	Class IV - 50,001 or more design population

Definitions used in these regulations unless otherwise required by context (see OAR 340-049-0010):

"Average Dry Weather Flow" (ADWF) means the design average dry weather flow capacity of the wastewater treatment system in gallons per day or Million Gallons per Day (MGD), as approved by the Department.

"Industrial Waste" means liquid wastes from an industrial or commercial process discharged into a wastewater system for conveyance and treatment.

"NPDES Permit" means a waste discharge permit issued in accordance with requirements and procedures of the National Pollutant Discharge Elimination System authorized by Section 402 of the Federal Clean Water Act and OAR 340, Division 45.

"Population" means the design population of the wastewater system represented as the number of people or the population equivalent the system is designed to serve. Equivalent population ordinarily is determined based on 70 gallons per person per day average dry weather flow (ADWF) or 0.17 lbs. BOD5 per person per day, whichever is greater.

"Wastewater" or "sewage" means the water-carried human or animal waste from residences, buildings, industrial establishments or other places, together with such groundwater infiltration and surface water as may be present. The admixture of domestic and industrial waste or other by-products, such as sludge, is also considered wastewater or sewage.

"Wastewater Treatment System" or "Sewage Treatment System" means any structure, equipment or process for treating and disposing of, or recycling or reusing wastewater and sludge (including industrial waste) that is discharged to the wastewater system.

"Wastewater Collection System" or "Sewage Collection System" means the trunks, arterials, pumps, pump/lift stations, piping and other appurtenances necessary to collect and carry away wastewater or other liquid waste treatable in a community or private wastewater treatment facility.

"Wastewater System" means "Sewage Treatment Works" defined in ORS 448.405 as any structure, equipment or process required to collect, carry away and treat domestic waste and dispose of sewage as defined in ORS 454.010. Typically, components of a wastewater system include a wastewater collection system and a wastewater treatment system.

"WPCF Permit" means a Water Pollution Control Facilities permit to construct and operate a collection, treatment and/or disposal system with no discharge to navigable waters.

WW System Common Name: City of Willamina

Facility ID: 97397 **Location:** Lincoln Street, Willamina

Total Points (from page 3): 37.5 **WWT Class (check):** ☐ I ☒ II ☒ III ☐ IV

Design Population[1]**:** 1,960 **WWC Class (check):** ☐ I ☒ II ☐ III ☐ IV

Design ADWF load (Influent MGD) 0.22 **Design BOD load** ________

Classified by: Paul Kennedy **Date:** 10.18.2010

Date this classification filed with the Operator Certification office: ________

System start-up date for this classification (new, upgrade or expansion): n/a

Is this a change from a prior classification? (check): ☒ Yes ☐ No

Criteria for Classifying Wastewater Treatment Systems (OAR 340-049-0025)

(1) Design Population or Population Equivalent Points (10 Points Maximum)

☐ Less than 750	0.5 points
☒ 751 to 2000	1 point
☐ 2001 to 5000	1.5 points
☐ 5001 to 10,000	2 points
☐ Greater than 10,000	3 points plus 1 per 10,000
Point subtotal	1.0

(2) Average Dry Weather Flow (Design Capacity) Points (10 points Maximum)

☒ Less than 0.075 MGD	**0.5 point**
☐ Greater than 0.075 to 0.1 MGD	1 point
☐ Greater than 0.1 to 0.5 MGD	1.5 points
☐ Greater than 0.5 to 1.0 MGD	2 points
☐ Greater than 1.0 MGD	3 points plus 1 per 1 MGD
Point subtotal	0.5

(3) Unit Process Points (Check all that apply)

Preliminary Treatment and Plant Hydraulics:

☐ Comminution (includes shredders, grinders, etc.)	1 point
☐ Grit Removal, gravity	1 point
☒ Grit Removal, mechanical	**2 points**
☒ Screen(s), in-situ or mechanical	**1 point**
☒ Pump/Lift Station(s) (pumping of main flow)	**2 points**
☒ Flow Equalization (any type)	**1 point**
Point subtotal	6

Primary Treatment:

☐ Community Septic Tank(s)	2 points

[1] See "Population" definition. Use the design average daily per person load for Influent Flow or Influent BOD5, whichever is greater. This value is also used to determine the Collection System Classification.

☐ Clarifier(s)	5 points
☐ Flotation Clarifier(s)	7 points
☐ Chemical Addition System	2 points
☐ Imhoff Tank (or similar)	3 points
Point subtotal	0
Total Points Page 1	7.5

Unit Process Points – Continued (Check all that apply)

Secondary, Advanced, and Tertiary Treatment:

☐ Low Rate Trickling Filter(s) (no recirculation)	7 points
☐ High Rate Trickling Filter(s) (recirculation)	10 points
☐ Trickling Filter - Solids Contact System	12 points
☐ Activated Sludge (any type)	15 points
☐ Pure Oxygen Activated Sludge	20 points
☐ Activated Bio Filter Tower less than 0.1 MGD	6 points
☐ Activated Bio Filter Tower greater than 0.1 MGD	12 points
☐ Rotating Biological Contactors 1 to 4 shafts	7 points
☐ Rotating Biological Contactors, 5 or more shafts	12 points
☐ Stabilization Lagoons, 1 to 3 cells without aeration	5 points
☐ Stabilization Lagoons, 1 or more cells with primary aeration	7 points
☒ Stabilization Lagoons, 2 or more cells with full aeration	**9 points**
☐ Recirculating Gravel Filter	7 points
☐ Chemical Precipitation Unit(s)	3 points
☐ Pressure Filtration Unit(s)	4 points
☐ Nitrogen Removal, Biological or Chemical/Biological System	4 points
☐ Nitrogen Removal, Designed Extended Aeration Only	2 points
☐ Phosphorus Removal Unit(s)	4 points
☐ Effluent Microscreen(s)	2 points
☐ Chemical Flocculation Unit(s)	3 points
☐ Chemical Addition System(s) (6 points maximum)	@ 2 points
Point subtotal	9

Solids Handling:

☐ Anaerobic Primary Sludge Digester(s) w/o Mixing and Heating	5 points
☐ Anaerobic Primary Sludge Digester(s) with Mixing and Heating	7 points
☐ Anaerobic Primary and Secondary Sludge Digesters	10 points
☐ Sludge Digester Gas reuse	3 points
☐ Aerobic Sludge Digester(s)	8 points
☐ Sludge Storage Lagoon(s) (or tanks, basins etc.)	2 points
☐ Sludge Lagoon(s) with aeration	3 points
☐ Sludge Drying Bed(s)	1 point
☐ Sludge Air or Gravity Thickening	3 points
☐ Sludge Composting, In Vessel	12 points
☐ Sludge Belt(s) or Vacuum Press/Dewatering	5 points
☐ Sludge Centrifuge(s)	5 points
☐ Sludge Incineration	12 points
☐ Sludge Chemical Addition Unit(s) (alum, polymer, etc.)	2 points
☐ Non-Beneficial Sludge Disposal	1 point
☐ Beneficial Sludge Utilization	3 points

Point subtotal **0**

Disinfection:

- ☒ Liquid Chlorine Disinfection — **2 points**
- ☐ Gas Chlorine Disinfection — 5 points
- ☒ Dechlorination System — **4 points**
- ☐ Other disinfection systems incl. ultraviolet and ozonation — 5 points

Point subtotal **6**

Total Points Page 2 **15**

(4) Effluent Permit Requirement Points (Check as applicable):

- ☐ Minimum of secondary effluent limitations for BOD and/or TSS — 2 points
- ☐ Minimum of 20 mg/L BOD and/or Total Suspended Solids — 3 points
- ☐ Minimum of 10 mg/L BOD and/or Total Suspended Solids — 4 points
- ☐ Minimum of 5 mg/L BOD and/or Total Suspended Solids — 5 points
- ☐ Effluent limitations for effluent oxygen — 1 point

Point subtotal **0**

(5) Variation in Raw Waste Points. (6 points maximum) Points in this category will be awarded only when conditions are extreme to the extent that operation and handling procedure changes are needed to adequately treat waste due to variation of raw waste

- ☐ Recurring deviations or excessive variations 100% to 200% — 2 points
- ☐ Recurring deviations or excessive variations of more than 200% **or** conveyance and treatment of industrial wastes by Pretreatment program — 4 points
- ☐ Septage or other hauled waste (control and/or preliminary treatment) — 2 points

Point subtotal **0**

(6) Sampling and Laboratory Testing Points (check as applicable - maximum 11 points)

- ☒ Sample for BOD, Total Suspended Solids performed by outside lab — **2 points**
- ☐ BOD or Total Suspended Solids analysis performed at treatment plant — 4 points
- ☒ Bacteriological analysis performed by outside lab — **1 point**
- ☐ Bacteriological analysis performed at WWT plant lab — 2 points
- ☒ Nutrient, Heavy Metals or Organics analysis performed by outside lab — **3 points**
- ☐ Nutrient, Heavy Metals or Organics analysis performed at WWT plant — 5 points

Point subtotal **6**

(7) Points For Other Complexities Not Reflected Above: (see OAR 340-049 0020(4) & (5))

- ☐ Odor Control (2 points maximum) — 1 to 2 points
- ☐ Standby Power Units — @ 1 point
- ☒ Solids Composting or Land Application of Biosolids — **10 points**
- ☐ Alkaline Stabilization (3 points maximum) — 2 to 3 points
- ☐ Other Effluent Limits [ammonia, Cl2, temp., etc. (list or attach list)] — @ 1 point
- ☒ Pond(s) (advanced treatment polishing or irrigation holding) — **2 points**
- ☐ Effluent Land Disposal - Evaporation (surface or subsurface) — 2 to 4 points
- ☐ Effluent direct Reuse or Recycle — 6 points
- ☐ SCADA or similar for data (limited to extensive total process operation) — 2 to 6 points

☐ Chemical/Physical advanced waste treatment following secondary 10 points
☐ Chemical/Physical advanced waste treatment w/o secondary 15 points
☐ Biological or Chemical/Biological advanced waste treatment 12 points
☐ Reverse Osmosis, Electro-dialysis or Membrane Filtration techniques 15 points
☐ Other complexities (list or attach list): Groundwater Monitoring 5

Point subtotal **12**
Total Points Page 3 **18**

Total Accumulated Points (3 pages) 37.5

A COPY OF THIS COMPLETED WORKSHEET IS TO BE FILED WITH THE OPERATOR CERTIFICATION PROGRAM, WATER QUALITY DIVISION, PRIOR TO SYSTEM START-UP

Report

Willamina WWTP

Mixing Zone Study
Final Report

January 2010

State of Oregon
Department of Environmental Quality

Last Updated: 2/16/2010
By: Lori Pillsbury
DEQ09-LAB-0062-TR

Figure 3 – Flow measurements

Site: upstream, S. Yamhill R

Stream Width		Cross Sectional Area			
80.0	ft	145.4	Sq.ft.	LASAR #:	

Stream Depth		Velocity (ft/sec)			
				Date:	10/20/09
2.80	Max	0.630	Max		
1.72	Avg	0.330	Avg	Time:	

Total Discharge		Max Cell Flow (%)			
				Personnel:	CK / LAP
57.98	cfs	9.6	Max		
		5.3	Avg		

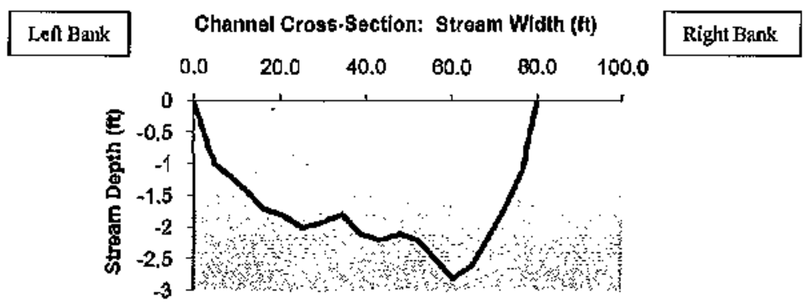


Table 1 – Summary of flow conditions (measured and calculated)

Average Dry Weather Design Flow	0.22 MGD
Facility Discharge (sampling date)	0.022 MGD
Stream Discharge (estimated at time of sampling)	58 cfs
7Q10 for receiving water (calculated)	40 cfs

Figure 4 – Conductivity mapping (all measurements in µmhos/cm)

Left Bank | Right Bank

Distance from left bank

wetted width: 80 feet

	@bank	12 feet	18 feet	25 feet	
100 feet DS	too deep to access				edge of RMZ
95 feet DS	90	90	89	Too deep to access	
85 feet DS	90	90	92	77	
75 feet DS	88	90	87	76	
60 feet DS	88	97	90	80	
40 feet DS	91	102	88	76	
35 feet DS	101	107	82	76	
15 feet DS	94	105	87	76	
10 feet DS	88	106	88	76	edge of ZID
At outfall	78	148	77	76	
	@bank	12 feet	18 feet	25 feet	
Upstream				76	
Effluent (measured at compliance location)				247	

Distance from left bank

FLOW

Dye Study

To evaluate the mixing in the receiving water visually, a dye study was conducted. The dye study visually supports the conductivity mapping which indicates that the effluent initially stays near the center and left bank of the stream, Figure 5.

Stream bottom / bank conditions at outfall (Figure 6)

Manning's roughness coefficient (*n*) is a measure of the friction at the stream bottom and can be estimated from the stream bottom type and channel morphology. The sediment type of the South Yamhill River at the discharge location was predominantly bedrock with large boulders. The average wetted width was 80 feet at the outfall. Water depth at the outfall pipe was approximately 0.6 feet.

Figure 5 – Dye study

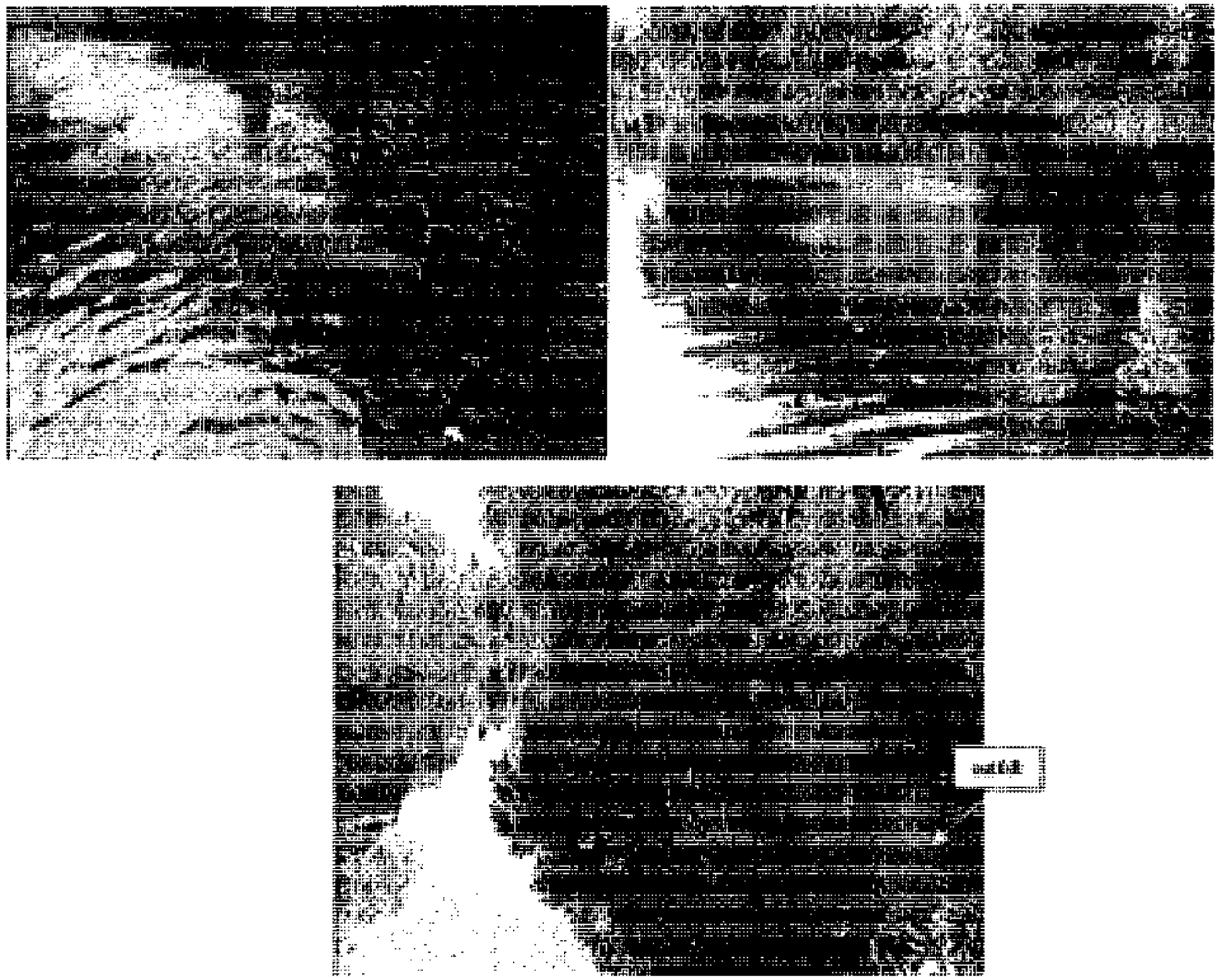


Figure 6 – Stream conditions upstream of outfall (looking upstream from outfall location)

Analytical Results

Water quality samples were collected at the outfall 001 compliance point and at three in-stream (South Yamhill River) locations, Table 2, Figure 7. Samples collected for BOD, nutrients (total nitrogen and phosphorus), and *E. coli* were transported to the ODEQ laboratory for analysis. Field parameters (pH, conductivity (temperature compensated to 25°C), dissolved oxygen, temperature, and turbidity) were measured by the field sampling crew. Data are summarized in Table 2 and Appendix A. A complete report for this sampling event can be found on the LASAR website (http://deq12.deq.state.or.us/lasar2/) under Case # 20090955 (ODEQ, 2009a).

Table 2 – Field Sampling Locations

Map ID	LASAR #	Station Name	Description
A	36096	Willamina STP – final effluent	effluent from plant, sampled at facility compliance point, outfall 001
B	36080	South Yamhill River, 50 feet US of Willamina outfall	Background / upstream location
C	NA	Outfall 001 – location in river	no samples at this location, outfall samples collected at location A at plant
D	36081	South Yamhill River, 10 feet DS of Willamina outfall	downstream edge of Zone of Immediate Dilution (ZID)
E	36082	South Yamhill River, 100 feet DS of Willamina outfall	downstream edge of regulatory mixing zone (RMZ)

Figure 7 – Overview of sampling locations including wastewater lagoons

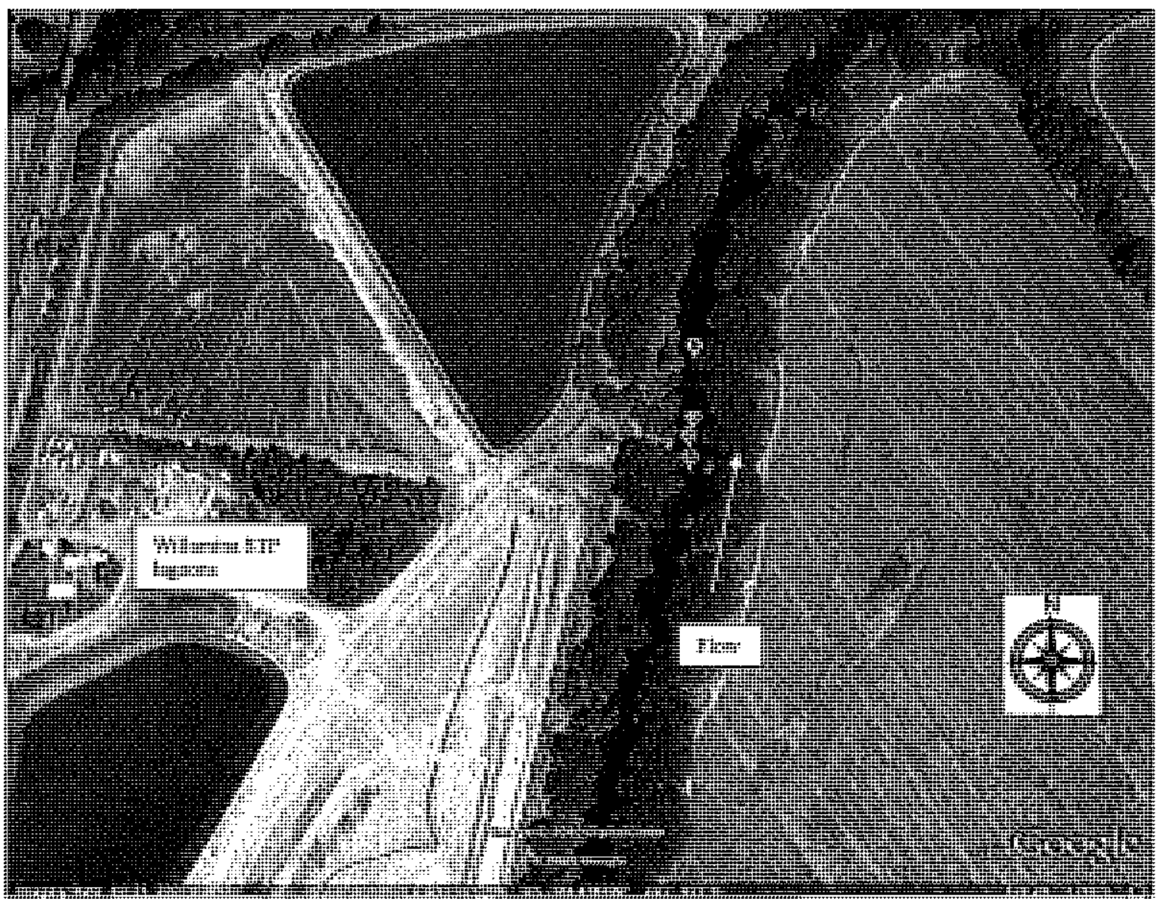


Table 2 – Summary of analytical results for sampling event dated October 20, 2009 (ODEQ, 2010a)

Parameter	Units	Acute Water Quality Criteria	Chronic Water Quality Criteria	Permit Limit [a]	Outfall 001 (plant discharge)	S Yamhill River, 50 feet US of Willamina outfall [b]	S Yamhill River, 10 feet DS of Willamina outfall	S Yamhill River, 100 feet DS of Willamina outfall
Conductivity	µmhos/cm				247	76	117	90
Dissolved Oxygen	mg/L	Cold water – Not less than 8.0 mg/L or 90% saturation			8.3	12.5	11.1	11.7
DO % saturation	%				84	118	107	111
pH	s.u.	$6.5 \leq pH \leq 8.5$		$6.0 \leq pH \leq 9.0$	7.3	7.5	7.3	7.5
Temperature	°C	18 °C (max) [d]			16.1	12.9	13.3	13.0
Turbidity	NTU	no more than 10% increase above background			NR	2	7	2
E. coli	MPN/100mL	406		406 (single sample)	6	46	58	56
Alkalinity	mg/L		20		56	22	30	24
Ammonia as N	mg/L	13.3 [c]	5.13 [c]		0.79	< 0.02	0.20	0.06
BOD_5	mg/L			45 (W) 30 (M)	2.7	3.2	1.9	3.0
Nitrate/Nitrite as N	mg/L				0.569	0.0328	0.162	0.0854
Total Kjeldahl Nitrogen (TKN)	mg/L				3.3	< 0.2	1.0	0.5
Total Organic Carbon (TOC)	mg/L				18	4	7	5
Total Phosphorus	mg/L				2.99	0.03	0.83	0.33
Total Suspended Solids (TSS)	mg/L			80 (W) 50 (M)	1	< 1	16	3

[a] Permit Limits are expressed as single sample limits unless otherwise specified, i.e. W = weekly average effluent concentrations; M = monthly average effluent concentrations. If no limit exists in permit, none is specified in this column.

[b] Duplicate samples collected at this location. All analytical parameters measured were within QA/QC range for a duplicate sample.

[c] Ammonia criteria based on upstream temperature and pH (EPA, 1999), salmon present, early life stages absent.

[d] Temperature standard based on the designated use of salmon and trout rearing and migration.

Conclusions

The samples collected during this study were in compliance with all applicable permit limits and water quality criteria.

Conductivity mapping - Conductivity measurements 95 feet downstream were greater than 5 % over background. Due to water depths, measurements were not collected any farther downstream.

Outfall pipe – The most recent permit evaluation states that *outfall 001 will be upgraded to a multi-port diffuser that will allow for better dilution of the effluent into the receiving stream.* The outfall pipe was observed to be a single port.

References

Environmental Protection Agency (EPA), 1999. 1999 Update of Ambient Water Quality Criteria for Ammonia (Freshwater), http://www.epa.gov/waterscience/criteria/ammonia/99update.pdf.

Oregon Department of Environmental Quality (ODEQ), 2009a. Laboratory Analytical Storage and Retrieval Database (LASAR), http://www.deq.state.or.us/news/databases.htm, Case # 20090955.

Oregon Department of Environmental Quality (ODEQ), 2009b. Oregon Administrative Rules, Division 41, http://www.deq.state.or.us/regulations/rules.htm.

Oregon Department of Environmental Quality (ODEQ), 2005. Reasonable Potential Analysis, Internal Management Directive, September 2005. http://www.deq.state.or.us/wq/pubs/imds/rpatoxics.pdf.

Oregon Department of Environmental Quality (ODEQ), 2007. Regulatory Mixing Zone, Internal Management Directive, December 2007. http://deq05/wq/wqpermits/PCGuidance.htm.

Oregon Department of Fish and Wildlife (ODFW), 2010. Fish Distribution Maps. http://nrimp.dfw.state.or.us/nrimp/default.aspx?pn=fishdistmaps., accessed January, 2010.

Appendix A – Field Data Sheet & Chain of Custody

Oregon Department of Environmental Quality
Laboratory and Environmental Assessment Division Chain of Custody Record [1]

Sampling Event Name [2]: *Willamina STP Mixing Zone Evaluation* | *Office Use Only* Sampling Event #: 20090955 Page 1 of 2

Fund Code [3]: 37443 QAPP/SAP # [4]: DEQ09-LAB-0062-SAP Report Recipients [5]: *Lori Pillsbury, Paula Moon-Butzin, Tim McFetridge (WR)*

Sampling Event Collector (s) [6]: *Lori Pillsbury,* Colin Kambak Sampling Agency [6]: *DEQ*

Project Manager and Contact # [7]: *Paula Moon-Butzin, 503-693-5734* Expected Turnaround Time (Default 45 days) [8]: *Default*

Item	LASAR ID # [10]	Station Name [11]	Sub-Project [12]	Date [13] / Time	QC Type [14] / Matrix [15]	P / R	C / DP	BOD / DO	STP / S	TM		
1	36096 ~~13344~~ HC 10/29/09	*Willamina STP, final effluent*	2011	10/20/09	S	–	–	–	STP 494	–		~~STP~~ 349
				1308	MUN EFF	R2020	–	–	S9453			
2	36080	*S. Yamhill R., 50 feet US of Willamina outfall*	2011	10/20/09	FP	P880	C1428	184	–	–		
				1435	SW	R647	–	–	–			
3	36081	*S. Yamhill R., 10 feet DS of Willamina outfall*	2011	10/20/09	S	P676	C1338	532	–	–		
				1430	MZ	R1335	–	–	–			
4	36082	*S. Yamhill R., 100 feet DS of Willamina outfall*	2011	10/20/09	S	P373	C1436	583	–	–		
				1425	SW	R126	–	–	–			
5	36080	*Field Duplicate, S. Yamhill R., 50 feet US of Willamina outfall*	2011	10/20/09	FD	P1102	C1438	592	–	–		
				1436	SW	R1807	–	–	–			
6	10000	*Transfer Blank*	2011	10/20/09	TSFB	P1430	–	–	–	–		
				1210	SW	R2718	–	–	–			

Event Comments:

Chain of Custody [17]

Relinquished By:	Agency/Company	Date/Time	Received by:	Agency/Company	Date/Time	Location
[illegible signature]	DEQ /	10/20/09 [illegible]	[illegible signature]	ODEQ	10/21/09 [illegible]	[illegible] walk-in

Oregon Department of Environmental Quality

Laboratory and Environmental Assessment Division Water Quality Field Data Record [1]

Sampling Event Name [2]: *Willamina STP Mixing Zone Evaluation* | * Office Use Only * Sampling Event #: 20090955 | Page 2 of 2

Fund Code [3]: 37443 | QAPP/SAP # [4]: DEQ09-LAB-0062-SAP | Report Recipients [5]: *Lori Pillsbury, Paula Moon-Butzin, Tim McFetridge (*

Sampling Event Collector (s) [6]: *Lori Pillsbury,* Colin Kambak | Sampling Agency [6]: *DEQ*

Project Manager and Contact # [7]: *Paula Moon-Butzin, 503-693-5734* | Expected Turnaround Time (Default 45 days) [8]: *Default*

Item	LASAR ID # [10]	Station Name [11]	Date [13] / Time	QC Type [14] / Elevation [15]	Temp [20] (C)	Cond. [21] (umhos)	pH [22] (SU)	Alk. [23] (mg/L)	DO [24] (mg/L)	DO Sat [25] (%)	Turb. [26] (NTU)	TRC (mg/L)		
1	36096 ~~13344~~	*Willamina STP, final effluent*	10/20/09	S	16.1	247	7.3	–	8.3	84	NR	<0.03		
	HL 10/29/09		1308	<500	Item Comment:									
2	36080	*S. Yamhill R. 50 feet US of Willamina outfall*	10/20/09	FP	12.9	76	7.5	–	12.5	118	2	–		
			1435	<500	Item Comment: N 45.07568 W 123.47813									
3	36081	*S. Yamhill R., 10 feet DS of Willamina outfall*	10/20/09	S	13.3	117	7.3	–	11.1	107	7	–		
			1430	<500	Item Comment: N 45.07590 W 123.47779									
4	36082	*S. Yamhill R., 100 feet DS of Willamina outfall*	10/20/09	S	13.0	90	7.5	–	11.7	111	2	–		
			1425	<500	Item Comment: N 45.07602 W 123.47775									
5	36080	*Field Duplicate, S. Yamhill R. 50 feet US of Willamina outfall*	10/20/09	FD	12.9	76	7.5	–	12.5	118	1	–		
			1436	<500	Item Comment:									
6	10000	*Transfer Blank*	10/20/09	TB	NR	NR	NR	–	–	–	<1	–		
			1210	SW	Item Comment:									

	pH Meter #: Seahorse [29]	Initials	Time	Temp.	Meter Reading	Diff.	<0.1 SU (y/n)	QC [30] Check	Meter #	Initials	Date	Time	Meter Reading	True Value	Diff. or % Rec	Control Limit
Pre	7	LAP	0635	12.4	6.98	-0.08	Y	Cond. Low:	Seahorse	LAP	10/20/09	0630	151	147.7	2	≤7%
	4							Cond. High:					142	148	<1	≤7%
	10			13.1	10.08	-0.07	Y	pH (LIS):								
Post	7		1505	7.5	6.97	-0.09	Y	Turb. Low:	50868			0625	4.58	4.55	–	≤5%
	4							Turb. Mid.:					49.6	49.5	<1	≤5%
	10			5.8	10.07	0.10	Y	Turb. High:					482	480	1	≤5%

Appendix B – Field Summary Sheet

Mixing Zone
Field Summary Sheet

General Facility Information

Facility Name: *Willamina STP*	**Address:** *PO Box 629 Willamina, OR*	**Date of Survey:** Oct 20 2009 **County:** *Yamhill*
Facility Contact: *Richard Haynes*	**Phone #:** *503-876-8542*	**IMD Study Level:** *1*
Receiving Waterbody: *South Yamhill River*	**NPDES Permit #:** *101070* **Expiration Date:** *04/30/2008*	**Facility Type:** IW / DW Major / Minor
Function of Facility (brief description): *Domestic wastewater treatment facility*		
Discharge Timing & Type: (i.e. seasonality of discharge, batch, continuous) *winter season discharge, Nov. 1 – April 30*		

Outfall Information

Outfall Designation: 001	**Flow at time of sampling:** 22000gal/day	**Water Depth @ outfall:** 1.5 feet	**River mile:**
Type of Outfall: (i.e. single, multi-port) Single	**Orientation of outfall (σ):** 0° (in degrees related to bottom of stream, 0° (H), 90° (V))	**Diameter of pipe:** 8" pipe → 6" port	**Latitude / Longitude:** N45.07590 W123.47779
Nearest bank to outfall (looking downstream): Left		**Outfall distance from nearest bank (looking downstream):** ~12 feet	
Discharge direction in relation to flow (i.e. perpendicular / horizontal): horizontal		**CORMIX Form completed:** Yes / No	

S Yamhill R.

Sampling Locations – Data Collection

Parameter	Outfall	Site 1	Site 2	Site 3	Site 4
Description of Sample Site	@ facility	50 feet US of 001	10 feet DS of 001	100 feet DS of 001	
Latitude / Longitude	N45.07533 W123.47747	N45.07568 W123.47813	N45.07590 W123.47771	N45.07602 W123.47775	
River Mile					
Field Parameters collected	Y / N	Y / N	Y / N	Y / N	Y / N
Water Quality Samples collected	Y / N	Y / N	Y / N	Y / N	Y / N
Substrate Type					
Stream slope					
Stream Bottom Description (Manning's Roughness description)		large boulders/ sand →			

Mixing Zone
Field Summary Sheet

Other Data Collection

Conductivity Mapping Completed Yes / No
If Yes, attach field form with complete information
If No, provide explanation:

Velocity Transects Completed Yes / No
If Yes, attach form measurement form (Stream Discharge Field Sheet).
If No, provide explanation:

Macroinvertebrate Sampling Yes / No
If Yes, complete macroinvertebrate field forms & attach.

Photos Taken Yes / No
Take photos of al sampling locations including the outfall and outfall pipe if possible.

Ambient Weather Conditions
partly cloudy

Additional Notes:

dye study completed

* Manning's Roughness Coefficient – *n*

Description	*n*
Bare earth, straight	0.020 – 0.030
Bare earth, winding	0.040 – 0.05
Mountain streams, gravel, cobbles	0.040 – 0.050
Mountain streams, gravel, cobbles, boulders	0.050 – 0.70
Grass lined, weeds	0.050 – 0.06
Heavy brush, timber	0.10 – 0.12
Major rivers	0.030 – 0.035
Sluggish with pools	0.040 – 0.050

Appendix C – Stream Description & Conductivity Mapping

Mixing Zone
Stream Description & Conductivity Mapping Summary

Sampling Event: Willamina MZ	Receiving Waterbody: S. Yamhill R	Date of Survey: Oct 20 2009 County: Yamhill
Bank Full Width: 100'	Wetted Width: 80'	

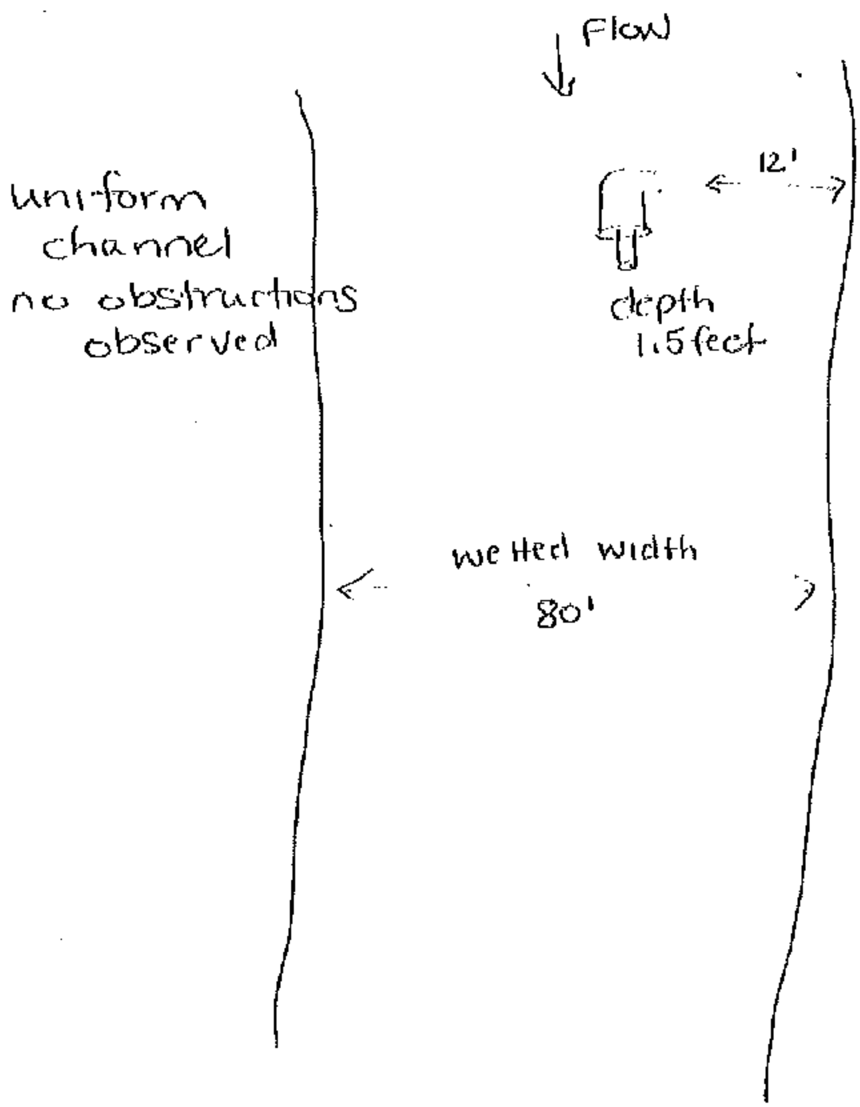
Conductivity Mapping
(include approximate location on stream sketch)

effluent SpC = 247 umhos/cm

Location	Latitude/Longitude	Field Conductivity (µmhos/cm)			
		Surface	Mid	Bottom	
upstream/background			76		
		Left	12' from L	18' from L	25' from L
@ outfall		78	148	77	76
10' DS	edge of ZID	88	106	88	76
15' DS		94	105	87	76
35' DS		101	107	82	76
40' DS		91.	102	88	76
60' DS		88	97	90	80
75' DS		88	90	87	76
85' DS		90	90	92	77
95' DS		90	90	89	Too Deep

Mixing Zone
Stream Description & Conductivity Mapping Summary

Notes / Sketch (include other outfalls or inputs in the stream reach evaluated, note obstructions to flow observed):



Appendix D – Flow measurements

DEQ

Stream Discharge Field Sheet

Site: S Yamhill R US of Willamina outfall

LASAR #: 423456

Date: 10/20/2009

Time:

Meter Type: MMcB

Meter S/N:

Time Avg.(sec): 40

Personnel: CK/LAP

Tracking Information:

Report To:

Sampling Event:

Sampling Project:

Sub Project

Expedition:

Date Received:

Received By:

Date Released:

L

Observ.	TAPE (ft)	DEPTH (ft)	Velocity (ft/sec) Top (0.2)	Middle (0.6)	Bottom (0.8)	Velocity Coef.
1	0	0		0		1.00
2	4.8	1.0		0.09		1.00
3	8.6	1.2		0.18		1.00
4	12	1.4		0.33		1.00
5	16.1	1.7		0.42		1.00
6	20.5	1.8		0.41		1.00
7	25.2	2		0.45		1.00
8	30.5	1.9		0.62		1.00
9	34.5	1.8		0.63		1.00
10	38.6	2.1		0.57		1.00
11	43.2	2.2		0.53		1.00
12	48.0	2.1		0.52		1.00
13	52.2	2.2		0.60		1.00
14	56.4	2.5		0.54		1.00
15	60.3	2.8		0.46		1.00
16	64.7	2.6		0.12		1.00
17	68.2	2.2		0.05		1.00
18	72.5	1.7		0.06		1.00
19	76.5	1.1		0.02		1.00
20	80.0	0		0		1.00
21						1.00
22						1.00
23						1.00
24						1.00
25						1.00
26						1.00
27						1.00
28						1.00
29						1.00
30						1.00
31						1.00
32						1.00
33						1.00
34						1.00
35						1.00
36						1.00
37						1.00
38						1.00
39						1.00
40						1.00

Appendix C

Pump Curves

FNW/Queen
PUMP
Division of Familian Northwest

2519 NE ARGYLE ST.
PORTLAND, OR 97211

(503) 287-7781
FAX: (503) 282-4735

July 28, 1999

JOB NAME: City of Willamina, Waste Water Treatment Plant Improvement Phase I

ENGINEER: HBH CONSULTING ENGINEERS

CONTRACTOR: I - 5 EXCAVATION

SUBMITTAL DATA

Conditions: Selection Based on 771 GPM @ 41' TDH

(2) **Fairbanks Morse Submersible Pumps**
Model 5432MV-4" 15 HP, 3 Phase 240 volt 1750 RPM UL listed for use in hazardous locations, with seal leak detection in the seal chamber not in the motor chamber Pump will be supplied with the following:

- 2 - 4" inch base/discharge elbows
- 2- 40 ft. Power and sensor cable
- 2- 22' - SS Lifting cables with S S Shackle Assembly
- 100'- 2" SS Guide Rail for 22 ft. well
- Seal Leak Sensors
- 2- SS Intermediate Guide rail brackets
- 1- 41x54" Duplex H20 Alum. Hatch.
- 4 - Level Float Switches for back up pump operation

2 - Spare mechanical seals
1- Stainless Steel Cable Holder

Options:
1 - 4" Galvanized steel vent with screen
1- 1000# Lifting Hoist and Socket
1- Spare: Socket

Submittals: FNW WILL NOT ACCEPT ANY PENALTY CHARGES FOR BEYOND COMPLETION DATE.

SUBMITTED BY:

FNW/QUEEN PUMP

Joanne Nylander/dm
Joanne Nylander
Municipal Sales

JN/dm

4" 5432
MV
SUBMERSIBLE

1765 RPM

NO. OF VANES
2

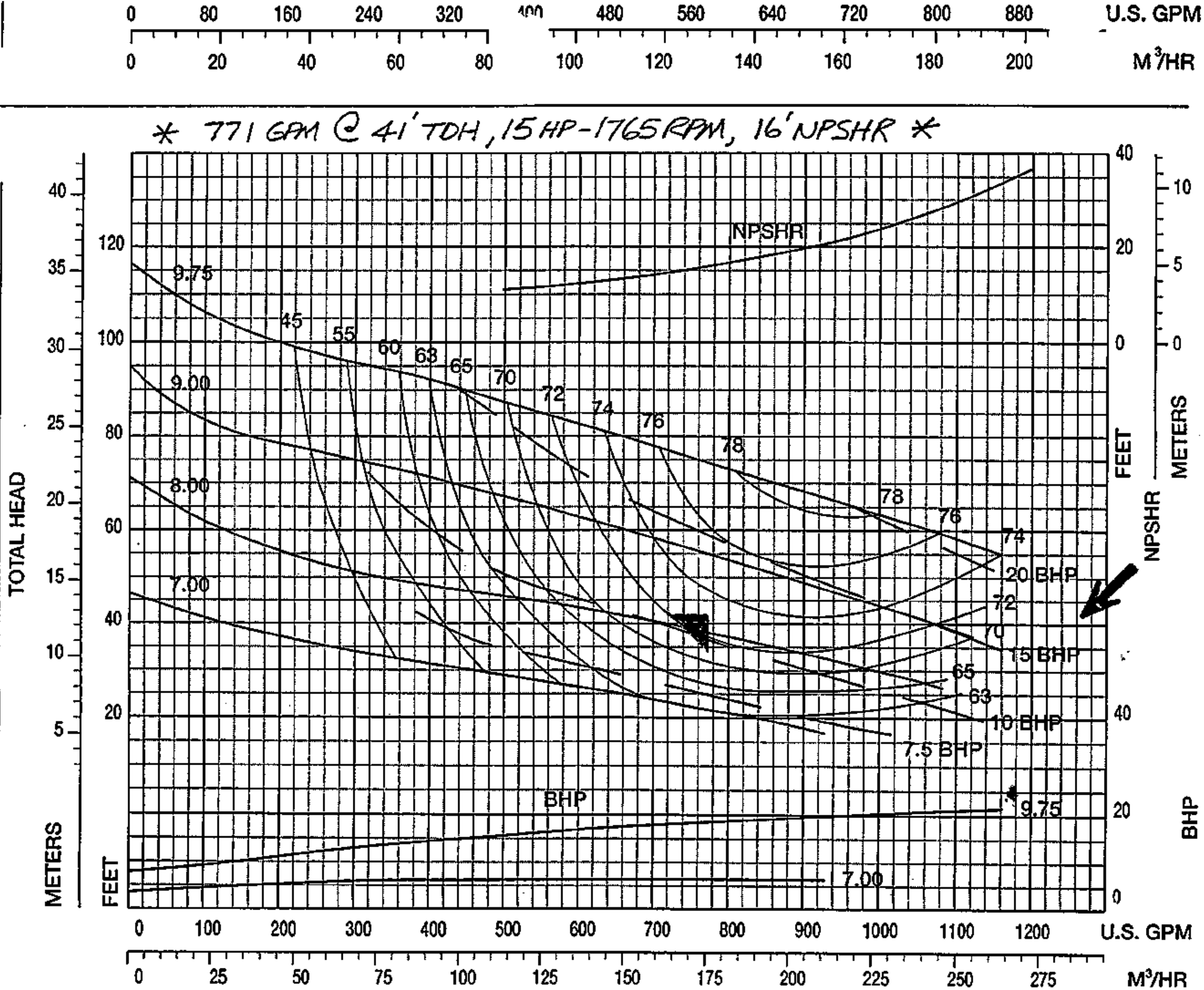
SUCTION SIZE
4"

IMPELLER
T4B1A

INLET AREA
26.22 SQ.IN.

MAX. SPHERE
3"

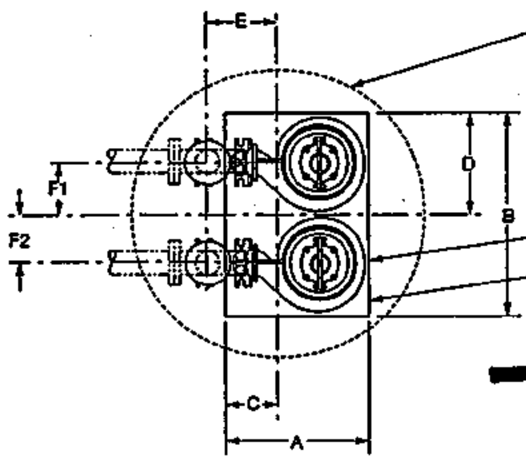
* 771 GPM @ 41' TDH, 15 HP-1765 RPM, 16' NPSHR *



* 73% HYDRAULIC EFF., 61.7% OVERALL EFFICIENCY *

Fairbanks Morse Pump

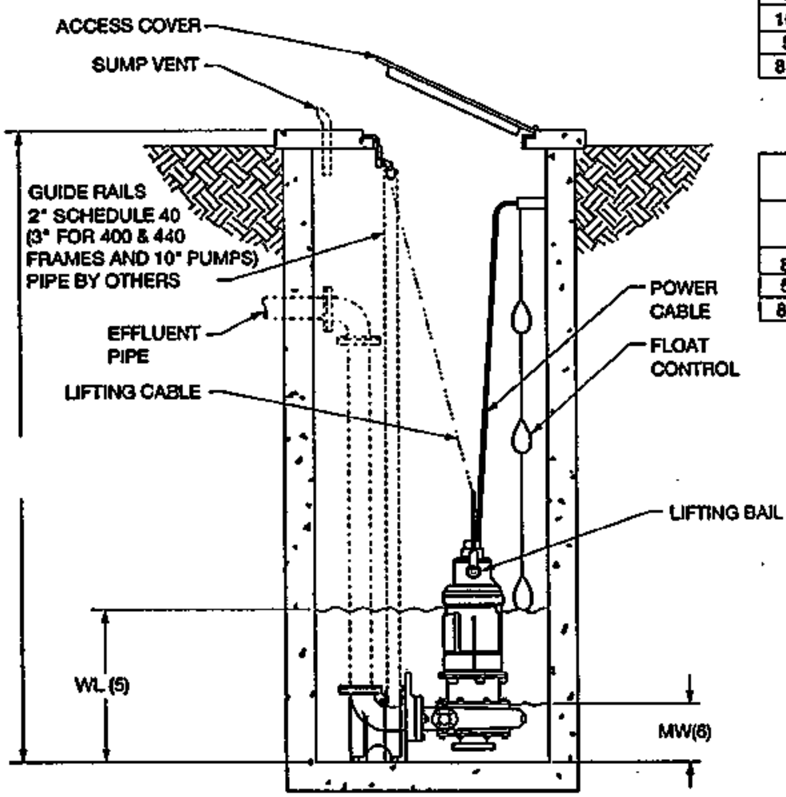
8/1/97



PLAN VIEW

PUMP	SUMP I.D.	A	B	C	D	E	F1	F2
4"D5432MV	60	30	42	11	21	15	10	10
~~4"D5433MV~~	~~60~~	~~30~~	~~48~~	~~11~~	~~24~~	~~15~~	~~11~~	~~11~~
6"D5433MV	72	36	60	11¾	30	17	13	13
4"D5434MV	66	42	54	13	27	18	13	13
6"D5434MV	96	42	76	21	38	26¼	18	18
8"D5434SMV(2)	84	40	68	20	34	26½	13½	13½
8"D5434LMV(3)	96	46	72	24	36	30½	18	18
4"D5435MV	72	36	60	18	30	22	12	12
8"D5435MV	96	58	86	20½	43	27	20	20
10"D5435MV	106	68	88	22	44	30⅝	22½	22½
5"D5436MV	R.T.F.							
8"D5436SMV	R.T.F.							

400 & 440 FRAME PUMPS REQUIRING HEAVY DUTY ELBOWS								
PUMP	SUMP I.D.	A	B	C	D	E	F1	F2
8"D5435MV	108	66	90	22⅝	43	30	21	21
5"D5436MV	R.T.F.							
8"D5436LMV	R.T.F.							

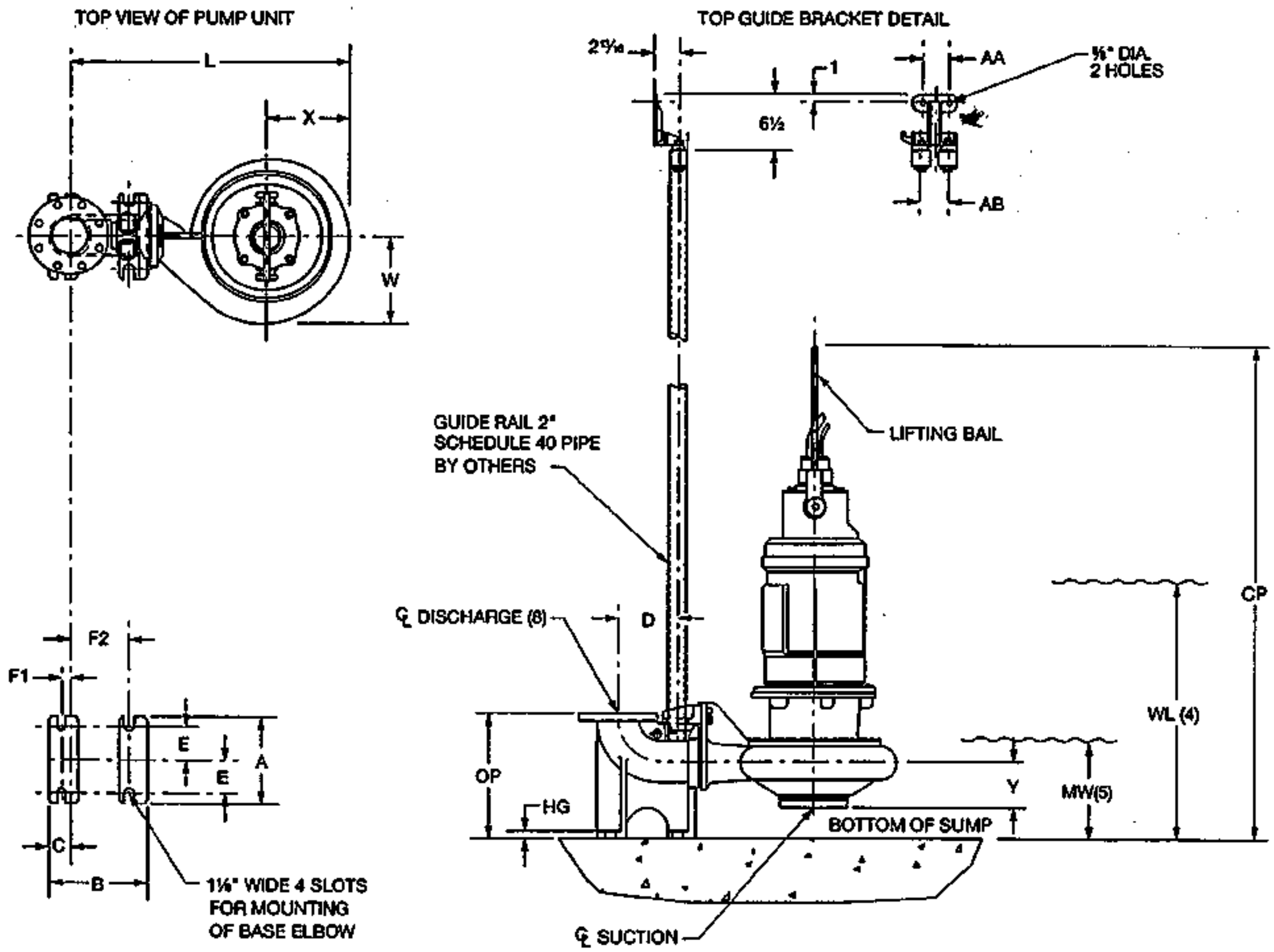


ELEVATION

NOTES:

(1) ALL DIMENSIONS ARE IN INCHES UNLESS NOTED.
(2) FOR USE WITH IMPELLER DESIGN T8D1A.
(3) FOR USE WITH IMPELLER DESIGNS T8D1D OR TAKC5W.
(4) 5400'S AND 5400K'S ARE DIMENSIONALLY IDENTICAL.
(5) RECOMMENDED LOW WATER LEVEL FOR CONTINUOUS OPERATION. 210 FRAME AND WATER JACKETED 250 THRU 440 FRAME UNITS CAN OPERATE CONTINUOUSLY AT "MW" WATER LEVEL.
(6) WATER LEVEL MAY BE DRAWN DOWN TO THIS LEVEL FOR SHORT TIME DUTY IN AIR MOTOR RATINGS. DRAW DOWN CAN OCCUR OVER A PERIOD OF 15 MINUTES.
(7) BASES ARE DESIGNED TO HAVE FULL CONTACT WITH GROUT OR A SOLE PLATE GROUTED IN PLACE.
(8) NOT FOR CONSTRUCTION, INSTALLATION, OR APPLICATION PURPOSES UNLESS CERTIFIED. DIMENSIONS SHOWN MAY VARY DUE TO NORMAL MANUFACTURING TOLERANCES.
(9) REFER TO BASIC PUMP DIMENSION DRAWING FOR WL AND MW DIMENSIONS.

DUPLEX IN-LINE, D5430MV, SUBMERSIBLE PULL-UP SINGLE DOOR ACCESS COVER	Fairbanks Morse Pump
	DWG NO 543MS037 REV NO 3



BOTTOM VIEW OF ELBOW

PUMP	MOTOR FRAME	DISCH	A	B	C	D	E	F1	F2	L	W	X	Y	AA	AB	CP	HG	MW	OP	WL
4" D5432MV	210T	4	10	11⅜	2⅜	6¾	4	1	7	31	9¾	9	5¼	3	3⅛	54⅝	⅞	11¾	15	32
~~4" D5432MV~~	~~250T~~	~~4~~	~~10~~	~~11⅜~~	~~2⅜~~	~~6¾~~	~~4~~	~~1~~	~~7~~	~~31~~	~~9¾~~	~~9~~	~~5¼~~	~~3~~	~~3⅛~~	~~58⅝~~	~~⅞~~	~~11¾~~	~~15~~	~~37~~
4" D5433MV	210T	4	10	11⅜	2⅜	6¾	4	1	7	32¾	10⅝	9¾	5¼	3	3⅛	54⅞	⅞	12	15	32
4" D5433MV	250T	4	10	11⅜	2⅜	6¾	4	1	7	32¾	10⅝	9¾	5¼	3	3⅛	58⅞	⅞	12	15	37
4" D5433MV	320T	4	10	11⅜	2⅜	6¾	4	1	7	32¾	10⅝	9¾	5¼	3	3⅛	67⅜	⅞	12	15	43
6" D5433MV	210T	6	14	14½	3¼	8	6	1¾	9¼	39⅝	12⅜	11¼	8½	3	3⅛	58⅞	1	16	20⅝	36
6" D5433MV	250T	6	14	14½	3¼	8	6	1¾	9¼	39⅝	12⅜	11¼	8½	3	3⅛	62⅞	1	16	20⅝	41
6" D5433MV	320T	6	14	14½	3¼	8	6	1¾	9¼	39⅝	12⅜	11¼	8½	3	3⅛	71⅜	1	16	20⅝	47

NOTES:

(1) DISCHARGE FLANGE IS 125# ANSI DRILLING UNLESS NOTED.
(2) ALL DIMENSIONS ARE IN INCHES UNLESS NOTED.
(3) 5400'S AND 5400K'S ARE DIMENSIONALLY IDENTICAL.
(4) RECOMMENDED LOW WATER LEVEL FOR CONTINUOUS OPERATION. 210 FRAME AND WATER JACKETED 250 THRU 440 FRAME UNITS CAN OPERATE CONTINUOUSLY AT "MW" WATER LEVEL.
(5) WATER LEVEL MAY BE DRAWN DOWN TO THIS LEVEL FOR SHORT TIME DUTY IN AIR MOTOR RATINGS. DRAW DOWN CAN OCCUR OVER A PERIOD OF 15 MINUTES.
(6) BASES ARE DESIGNED TO HAVE FULL CONTACT WITH GROUT OR A SOLE PLATE GROUTED IN PLACE.
(7) NOT FOR CONSTRUCTION, INSTALLATION, OR APPLICATION PURPOSES UNLESS CERTIFIED. DIMENSIONS SHOWN MAY VARY DUE TO NORMAL MANUFACTURING TOLERANCES.
(8) IF RISER PIPE IS NOT SAME SIZE AS THE DISCHARGE ELBOW, AN ECCENTRIC INCREASER MUST BE USED LIMITED TO TWO SIZES LARGER MAXIMUM.

UL LISTED

CUSTOMER				P.O. NO. 70 D D		Fairbanks Morse Pump
JOB NAME City of Willamina WWTP Ph I				TAG NAME		
PUMP SIZE AND MODEL 4" D5432MV	GPM 771	TDH 41	RPM 1750	ROTATION		BASIC PUMP D5432MV AND D5433MV PULL-UP SUBMERSIBLE FAIRBANKS MORSE MTR
MOTOR	HP 15	FRAME 210T	PHASE 3	HERTZ 60	VOLTS 230	ENCLOSURE Xproof
CERTIFIED FOR		CERTIFIED BY		DATE		DWG NO 543MS009 REV NO 5

210 Frame
Duty - One Hour in Air (14)

HP (1)	Full Load RPM 230/460V	Full Load Current (AMPS) 208 Volt	230 Volt	460 Volt	575 Volt	Power Cable 208 Volt (13) Dia (in.)	AGW Wire Sz.	230 Volt Dia. (in.)	AGW Wire Sz.	460 or 575V Dia. (in.)	AGW Wire Sz.	Conduit Inside Dia. (Inches) (12)	Code Letter	Efficiency % Full Load	3/4 Load	Power Factor % Full Load	3/4 Load
	3 Phase, 60 Cycle, 1.15 S.F., 40°C Insulation																
5	1760	15.5	15.0	7.5	6.1	.675	12	.675	12	.675	12	3-8NPT	J	75.1	71.0	83.1	82.1
7½	1760	24.6	21.2	10.6	8.9	.735	10	.735	10	.675	12	3-8NPT	H	83.2	82.4	81.7	77.4
10	1755	32.5	29.2	14.6	11.7	.985	8	.985	8	.675	12	3-8NPT	H	83.0	82.5	77.3	70.9
15	1750	48.6	42.2	21.1	16.9	1.125	6	.985	8	.735	10	3-8NPT	G	84.1	84.6	79.2	73.9
20	1735	60.6	53.2	26.6	22.1	1.270	4	1.125	6	.985	8	3-8NPT	E	83.9	85.8	83.8	82.0
5	1165	18.5	18.0	9.0	RTF	.675	12	.675	12	.675	12	3-8NPT	H	72.3	70.6	72.0	66.2
7½	1155	28.2	24.6	12.3	10.2	.985	8	.735	10	.675	12	3-8NPT	G	77.8	77.6	73.2	68.0
10	1155	36.0	33.0	16.5	13.8	1.125	6	.985	8	.735	10	3-8NPT	G	80.1	80.1	70.8	64.9
13	1130	RTF	42.0	21.0	16.1	RTF	RTF	.985	8	.735	10	3-8NPT	G	76.0	79.8	74.0	70.8
15	1155	55.4	48.4	24.2	RTF	1.270	4	1.125	6	.735	10	3-8NPT	F	82.7	83.7	72.4	66.3
3	RTF	RTF	11.4	5.7	RTF	RTF	RTF	RTF	RTF	RTF	RTF	3-8NPT	RTF	RTF	RTF	RTF	RTF
5	865	20.4	19.2	9.6	7.8	.675	12	.735	10	.675	12	3-8NPT	J	73.9	71.3	66.2	59.7
7½	850	RTF	27.6	13.8	11.9	RTF	RTF	.985	8	.675	12	3-8NPT	G	74.8	73.8	68.1	61.1
10	855	RTF	32.6	16.3	13.8	RTF	RTF	.985	8	.675	12	3-8NPT	RTF	RTF	RTF	RTF	RTF

210 Frame
Duty - Continuous in Air (14)

HP (1)	Full Load RPM 230/460V	Full Load Current (AMPS) 208 Volt	230 Volt	460 Volt	575 Volt	Power Cable 208 Volt (13) Dia (in.)	AGW Wire Sz.	230 Volt Dia. (in.)	AGW Wire Sz.	460 or 575V Dia. (in.)	AGW Wire Sz.	Conduit Inside Dia. (Inches) (12)	Code Letter	Efficiency % Full Load	3/4 Load	Power Factor % Full Load	3/4 Load
	3 Phase, 60 Cycle, 1.15 S.F., 40°C Insulation																
4.9	1765	15.2	14.6	7.3	RTF	.675	12	.675	12	.675	12	3-8NPT	J	75.0	71.0	83.0	82.0
7.3	1755	22.3	17.0	8.5	RTF	.735	10	.735	10	.675	12	3-8NPT	H	84.0	83.0	82.0	77.0
9.7	1760	31.6	28.4	14.2	11.4	.985	8	.985	8	.675	12	3-8NPT	H	83.0	82.1	76.5	69.0
14.6	1750	42.1	41.0	20.5	16.1	.985	8	.985	8	.735	10	3-8NPT	G	84.3	84.8	79.0	73.8
19.6	1735	61.4	52.2	26.1	20.8	1.350	4	1.125	6	.985	8	3-8NPT	E	84.5	86.0	84.0	81.5
4.9	1165	18.2	18.0	9.0	RTF	.675	12	.675	12	.675	12	3-8NPT	H	71.7	70.4	72.0	66.2
7.3	1155	29.0	24.4	12.2	9.9	.985	8	.735	10	.675	12	3-8NPT	G	78.0	78.0	73.0	68.0
9.7	1155	36.5	32.6	16.3	13.2	.985	8	.985	8	.735	10	3-8NPT	G	80.0	79.8	71.8	65.1
13.0	1130	RTF	42.0	21.0	RTF	RTF	RTF	.985	8	.735	10	3-8NPT	G	76.0	79.8	74.0	70.8
14.6	1150	RTF	47.3	23.6	RTF	RTF	RTF	1.125	6	.735	10	3-8NPT	F	83.0	84.0	72.0	66.0
2.9	RTF	RTF	11.5	5.8	RTF	RTF	RTF	.675	12	.675	12	3-8NPT	RTF	RTF	RTF	RTF	RTF
4.9	865	20.4	18.8	9.4	7.6	.675	12	.735	10	.675	12	3-8NPT	J	73.7	71.2	65.8	59.5
7.3	850	30.8	26.8	13.4	11.9	.985	8	.985	8	.675	12	3-8NPT	G	75.0	74.0	67.2	60.8
9.7	RTF	RTF	RTF	RTF	13.0	RTF	RTF	RTF	RTF	.675	12	3-8NPT	RTF	RTF	RTF	RTF	RTF

Notes:

(1) Ratings are for constant speed drivers. For use with variable frequency drives, contact Application Engineering.

(2) Above 210 frame motor technical data is based on UL Listed non-submerged application.

(3) RTF = Refer to Factory.

(4) Motor must have an operational moisture detection system or the warranty is voided.

(5) Moisture detection system installed must be compatible with the two moisture detecting probes in the motor and the remaining pump control system.

(6) Requirements of a complete moisture detection system are met by the installation of the standard pump controllers offered by Fairbanks Morse with the specified motor.

(7) All thermostats incorporated in this motor are automatic reset type and are current limited to 3 amps @ 125 volts, 1.5 amps @ 230 volts and 0.75 amps @ 460 volts, in the control circuitry.

(8) Thermal protectors will be installed in all motors regardless of horsepower or frame size.

(9) Thermostats are normally closed and connected in series with the holding coil of the magnetic switch. When motor temperature reaches a certain preset point, the thermostat will open and cause the holding coil in the magnetic switch to open thereby cutting the power to the motor.

(10) Thermostats connected to auxiliary signaling devices are available provided the device is approved by Fairbanks Morse.

(11) Control cable has an outside diameter of .482 inches and includes five #18 wire; two for thermostats two for moisture detectors and one ground.

(12) Need to add for threaded motor housing cover casting to accept conduit. Standard construction is without threads.

(13) Refer to factory for 208 volt cable sizes not shown.

(14) Refer to the Application & Reference section for definitions of duty ratings.

Typical Specifications
D5430MV (210-440 Frame)

General

Furnish and install a quantity of 2 Fairbanks Morse Pump 4 "Model D5430MV pull-up submersible pumping unit(s), UL Listed for explosion proof Class I, Division 1, Groups C and D hazardous locations. The pumps shall be clockwise rotation and connect to the discharge piping when lowered into place.

Conditions of Operation

Each pump shall provide the following hydraulic conditions:

Design Condition	Primary Condition	Secondary Condition
Capacity	771 GPM	____ GPM
Total Dynamic Head	41 TDH	____ TDH
Maximum Speed	1750 RPM	____ RPM
Efficiency (min. hydraulic)	73 %	____ %
Minimum Wire-to-Water Efficiency	____ %	
Shutoff Head	____ Feet	
NPSHR	____ Feet	
Minimum Spherical Solid Size	3 Inches	

inimum net positive suction head available (NPSHA) at the center line of the pump impeller is ____ feet at ____ GPM.

Liquid is Sewage with a maximum temperature of ____ ° F.

Impeller

Impeller shall be matched to its constant velocity equalizing pressure volute, and be of the one-piece, single suction, enclosed two-vane (or bladeless), radial flow design with large openings, blunt well-rounded leading edges thick hydrofoil shape tapered to the trailing edge, and a circular flow pattern to prevent the accumulation of solids and stringy material. It is to be balanced and secured to the shaft by means of a key and fastener. Wiper vanes are not allowed. Impeller waterways and clearance between the pump's full diameter impeller periphery and volute cutwater shall be capable of passing a ____ " solid sphere. Impeller shall be trimmed to specifically meet the conditions of operation [and be fitted with an axial (face-type), stainless steel wear ring with a minimum 300-350 Brinell hardness]. The impeller is adjustable by the use of shims to restore the wear ring clearance in the field.

Volute and Sliding Bracket

Volute is to be cast with extra thick walls made of close-grained cast iron conforming to ASTM A48, Class 30. It is to be one-piece, constant velocity equalizing pressure (except 4" 5435 which is specifically designed with a circular volute to minimize radial loads at low flows) with smooth fluid passages large enough to pass any size solid that can pass through the impeller. The volute shall have an integral tapered suction inlet area to direct flow to the impeller eye and have a centerline flanged discharge. Volute discharge shall be minimum ____" diameter as measured on the inside diameter of the discharge flange opening. [Volute shall be fitted with an axial (face-type), stainless steel wearing ring with a minimum 410-484 Brinell hardness.]

The sliding bracket assembly shall be a part of the pumping unit constructed so that when lowered to the discharge base/elbow, the knifing action of the vertical metal-to-metal seal provides a self-cleaning, non-clogging, non-sparking UL Listed explosion-proof assembly.

Guide Rail/Bracket

Two rails shall be provided to guide the pump when being raised or lowered in the sump and mount on the discharge base/elbow. Single rail or cable guide systems are not acceptable. The rails shall align the pump with the discharge elbow as it is lowered into place. A ductile iron upper rail guide bracket shall be furnished to support and align the rails at the top of the sump. For rail lengths greater than 20 feet, a stainless steel intermediate rail guide bracket shall be included.

Discharge Base

The installation shall include a rigid discharge base-elbow to support the total weight of the pumping unit. The base is to be bolted directly to the floor with the 90 degree elbow having a 125 lb. ANSI flange discharging vertically.

Motor

Pump(s) shall be driven by completely sealed, electric submersible squirrel cage induction motors with a maximum NEMA nameplate rating of 15 HP, 1.15 service factor, 1750 RPM, 240 volts, 3 -phase, 60 Hertz. The motor nameplate horsepower rating should exceed the brake horsepower requirements of the specified head and capacity conditions and have a minimum full load efficiency of ____%.

Submersible equipment shall be UL Listed for Class I, Division 1, Groups C and D explosion-proof hazardous locations as defined by the National Electric Code. All electrical parts shall be housed in an air-filled (or oil-filled in 210 frame construction) cast iron, watertight enclosure which is sealed by the use of O-rings and rabbeted joints with extra large overlaps.

The stator-winding and lead shall be insulated with moisture-resistant Class F insulation for continuous duty in 40 degree C ambient. The motor shall be designed for continuous duty capable of ten (10) starts per hour. Automatic reset, normally closed thermal overloads shall be imbedded in the motor windings to provide overheating protection. Motor winding thermostats must be connected to an electric controller per local and state codes and the National Electric Code.

Motor shaft shall be one-piece, 416 stainless steel. Carbon steel shafts or shaft sleeves are not acceptable. Rotor is to be dynamically balanced to meet NEMA vibration limits; all external hardware is to be stainless steel.

Cable leads are to enter at the top of the motor, and are to allow the cable-to-motor connection to be accomplished in the field without soldering. All power and control lead wires are to be double sealed as it enters the motor in such a manner that cable-wicking will not occur. This sealing system shall consist of a rubber grommet followed by epoxy that is high in adhesive qualities and has a low coefficient of expansion. Each cable wire is to have a small section of insulation removed to establish a window area of bare wire and each wire is to be untwisted and surrounded by epoxy potting material. A cable strain relief mechanism shall be an integral part of this sealing system. Cable sealing system shall be capable of withstanding an external pressure test of 1200 PSI as well as a cable assembly pull test as required by Underwriters Laboratories. Singular grommet or other similar sealing systems are not acceptable. Motor shall be supplied with 40 feet of multi-conductor type "SOW-A" or "W" power cable and control cable. Cable sizing shall conform to NEC specifications and be UL listed.

Power and control leads shall be terminated on a sealed terminal board. The terminal board and its bronze lugs shall be O-ring sealed.

Pump(s) shall be provided with two separate tandem-mounted mechanical seals to prevent the pumped liquid from entering the rotor/stator cavity area to ensure reliability of operation. The upper and lower seals are mounted to rotate in the same direction.

The upper seal is to be completely immersed in an oil bath and seals the oil chamber and the motor housing. The lower seal mating surfaces are to be immersed in the oil bath sealing the pump volute and the oil chamber. Each seal shall be held in contact by its own spring system and require neither maintenance nor adjustment, but shall be easily inspected and replaceable. The lower seal spring shall be protected from trash in the pumped fluid by a spring cover which extends over the entire length of the compressed seal spring. Pressure generated by the pump assists in sealing the mating surfaces of the lower seal.

Seal materials for the upper seal shall be stainless steel and Buna-N components, carbon rotating face and Ni-resist stationary face. Lower seal construction shall be stainless steel and Buna-N components, carbon (silicon carbide on 400 & 440 frames) rotating face and ceramic (tungsten carbide on 400 & 440 frames) stationary face [silicon carbide rotating face against tungsten carbide stationary face].

Two moisture detection probes shall be installed so that they will detect moisture in either the seal or stator cavity measuring resistivity between the probes. They shall be wired internally to the control cable connection at the top of the motor. Float type devices located in the rotor/stator area or single probe-to-ground moisture detectors measuring continuity are not acceptable. O-ring sealed inspection plugs shall be provided in the mechanical seal oil chamber for ease in inspection, draining and filling of oil.

The pump shall rotate on a grease lubricated-for-life thrust bearing (oil lubricated in 210 frame) and oil lubricated radial bearing with a minimum L10 life of ________ hours. Lower shaft bearings shall be locked in place to prevent shaft movement and to take thrust loads.

A heavy-duty stainless steel lifting bail shall be included and be of adequate strength to lift the entire pump and motor assembly.

Quality Assurance

Pumps and motors are to be engineered, manufactured and assembled in the United States under a written Quality Assurance program. This written Quality Assurance program shall have been in effect for at least five (5) years, and include a written record of periodic internal and external audits to confirm compliance with UL Quality Assurance specifications.

ISO-9001 Certification

Pumps and motors shall be manufactured by ISO-9001 certified companies only.

210 Frame Submersible Motors UL Listed Explosion Proof

Fairbanks Morse Pump submersible motors are manufactured to the highest standards. This rugged, Heavy duty design and construction is an integral part of the complete submersible pump system.

The motor consists of a heavy duty cast iron frame, oil filled, which houses a silicon steel laminated stator, a reliable die-cast rotor and 416 stainless steel one-piece shaft in a high efficiency motor design.

Two separate tandem-mounted mechanical seals protect the motor from the pumped liquid in this critical area for added assurance of product reliability. Standard seals consist of the inner seal using carbon against Ni-resist faces, with the outer seal using carbon against ceramic faces. Optional seal material include silicon carbide against tungsten carbide, and other materials.

Electric power and control cable assemblies are epoxy sealed at the motor's entry point to prevent wicking and to prevent moisture from entering the motor housing. Automatic-resetting thermostats are imbedded in the motor windings to protect from overheating.

The oil filled seal cavity and stator housing are fitted with dual moisture detectors to transmit a signal to a compatible controller when moisture is detected in this cavity. The seal cavity shall have two (2) plugged ports for filling and draining the oil.

Motors are constructed with Class F insulation and rated with a 1.15 service factor and continuous duty at 40 degree C ambient temperature. The motor enclosure is sealed using O-rings, and has rabbet fits with extra large overlaps.

UL Listed Motors

Fairbanks Morse submersible motors are Listed by Underwriters Laboratories, having met stringent testing and design standards for operation in Class I, Division 1, Group C and D hazardous locations, and feature explosion-proof construction.

UL approves the design of all motor fits, joints and openings to ensure required flame paths and properly sealed for severe environment. All materials used in construction are tested to ensure their proper, intended function.

UL Listed motors must pass a series of stringent tests, including:

* Hydrostatic test of the complete motor without failure.
* External pressure test of the cable connection to 1200 psi without leakage.
* Separate cable assembly pull test for the smaller control cable and the power cable.
* Load test to confirm the function of the built-in thermostats. These tests require the motor to run submerged, non-submerged and short time duty in air.
* Motors must pass a surface temperature test confirming the motor frame surface temperatures do not exceed 160 degrees C under operating conditions. Locked rotor tests are run on the motor while operating submerged, non-submerged, short time duty in air and non-submerged with cooling jacket, and required to be below the minimum allowable skin temperature of 160 degrees C.

UL Listing requires detailed inspection of design and construction. UL issues product review instructions so that local UL inspectors can inspect the product on a regular basis. These inspections are done at a minimum quarterly interval at the Fairbanks Morse manufacturing facility to monitor machining and assembly procedures and include:

* Detailed dimensional inspection of each motor component and the witness of the assembly of the complete motor.
* Witness of high voltage dielectric insulation test.
* Witness the no-load electrical running test.
* Review test logs of UL motors shipped since the previous inspection.
* Review calibration of motor test equipment.
* Check purchasing procedures for proper material control.

The stringent standards as defined and required by Underwriters Laboratories ensures a quality product.

SubGuard

Thermo/Moisture Control Panel

- Stand alone panel monitors moisture entering the oil cavity and winding over temperature
- If winding over temperature occurs, a red light will illuminate indicating high temperature.
- When moisture is detected between the probes, an amber light will illuminate indicating a seal leak.
- A test pushbutton is provided. When depressed, a yellow light will illuminate indicating the moisture control and wiring are operable
- Load contacts are provided for each fault condition to shut down motor and operate remote alarm.
- The starter must be wired to shut down the motor if winding over temperature occurs.
- NEMA 1 enclosure standard. NEMA 4 enclosure optional.
- Size: 12"x14"x10.25"
- UL listed.

Note: Basic components consisting of moisture detection relay, winding thermal and bearing temperature relays can be supplied loose for installation in customers panel. Lights and wiring are not included with this option.

Installation

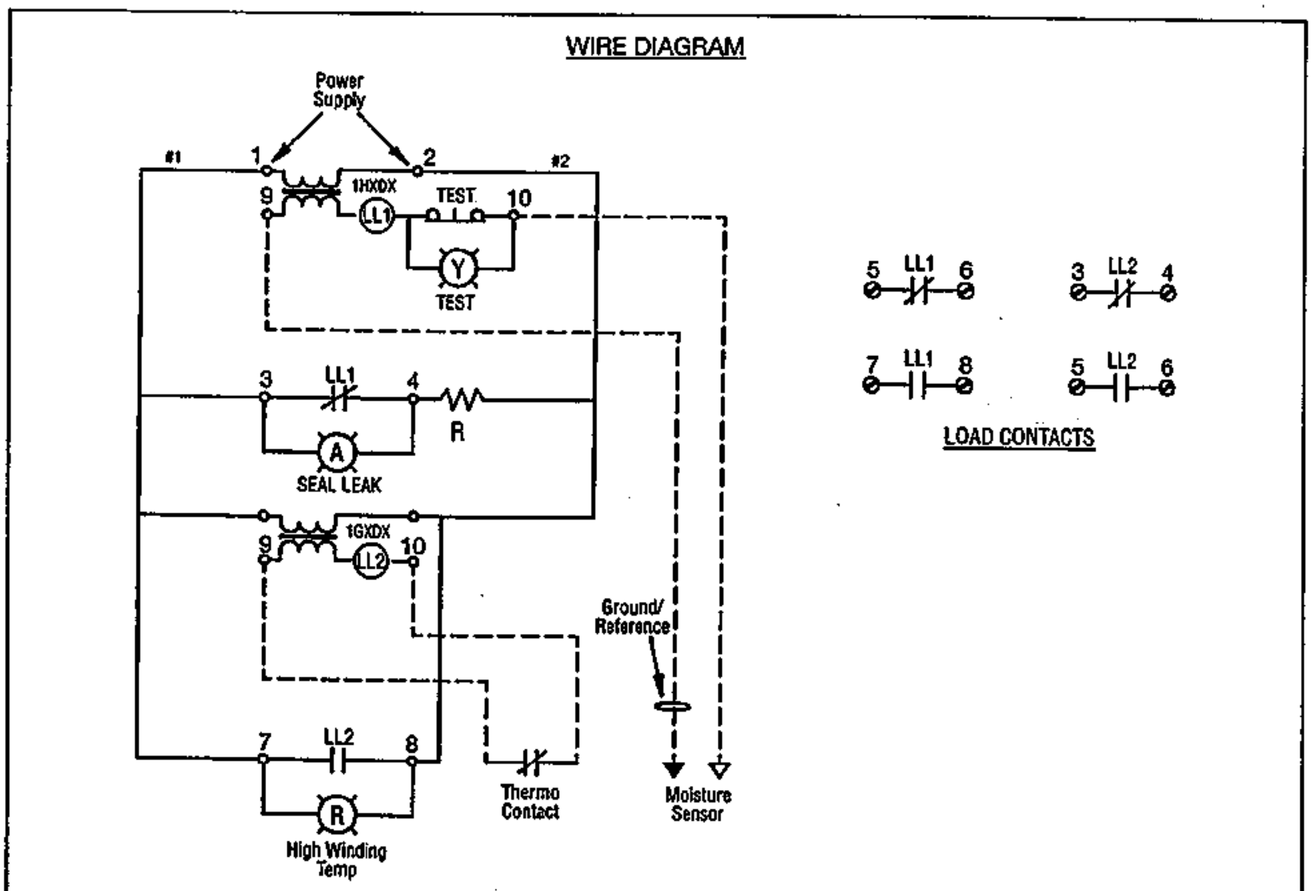
Connect power supply to terminals 1 and 2 of control "LL1". Connect moisture probe wires to terminals 9 and 10 of control "LL1". Connect the remote normally closed motor thermo contact leads to terminals 9 and 10 of control "LL2".

Operation

When moisture is detected between the probes, control "LL1" will energize and the amber light will illuminate indicating a seal leak. If over temperature is present, the remote thermo contacts will open, "LL2" will de-energize, and the red light will illuminate indicating high temperature.

Test Procedure

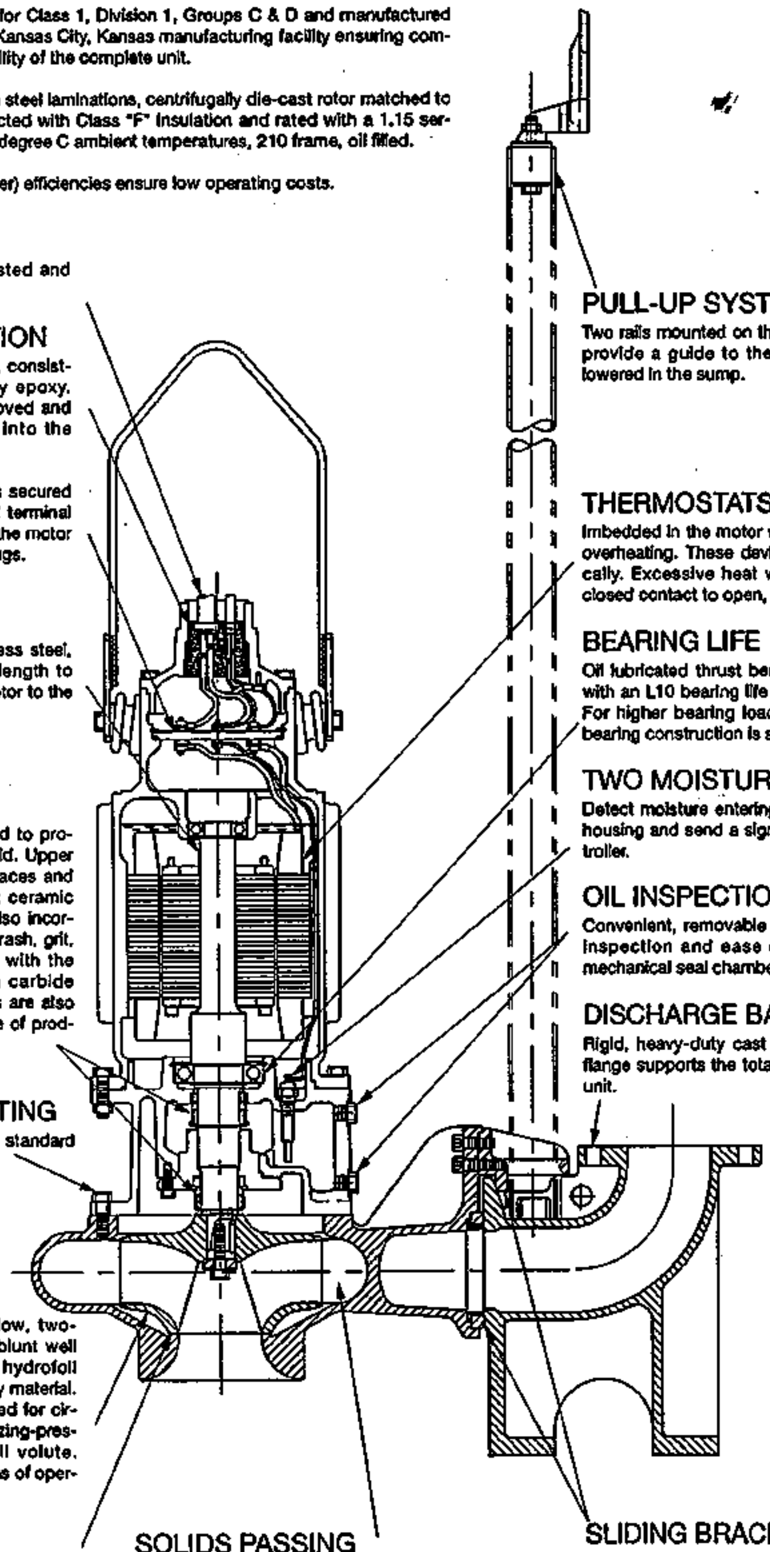
A Normally closed pushbutton and yellow light are provided as part of the "LL1" control for testing the moisture sensing components. A resistor has been provided and placed across the probes inside the motor to complete the test. When the test pushbutton is depressed, the light will illuminate indicating: (A) power is supplied to the control, (B) the control is operative, and (C) the wiring to the moisture sensing probes in the motor is intact.



Units are UL Listed, explosion-proof, for Class 1, Division 1, Groups C & D and manufactured by Fairbanks Morse in our dedicated Kansas City, Kansas manufacturing facility ensuring compatibility, quality assurance, and reliability of the complete unit.

Heavy cast iron motor housing, silicon steel laminations, centrifugally die-cast rotor matched to the stator for high efficiency. Constructed with Class "F" insulation and rated with a 1.15 service factor and continuous duty at 40 degree C ambient temperatures, 210 frame, oil filled.

High motor and hydraulic (wire-to-water) efficiencies ensure low operating costs.



CABLE

Power and control cable are UL Listed and MSA approved.

ELECTRICAL CONNECTION

Double-seal system with strain relief, consisting of rubber grommet followed by epoxy. Individual wires have insulation removed and epoxy potted to prevent wicking into the motor.

Wires are terminated with connectors secured to bronze lugs on the O-ring sealed terminal board. Stator and control leads from the motor are attached to the underside of the lugs.

SHAFT

Large diameter one-piece 416 stainless steel, precision machined over its entire length to ensure a tight fit of the impeller and rotor to the shaft.

MECHANICAL SEALS

Two separate seals, tandem mounted to protect the motor from the pumped liquid. Upper seal uses carbon against Ni-resist faces and the lower seal uses carbon against ceramic faces as standard. The lower seal also incorporates a protective cup to prevent trash, grit, or stringy material from interfering with the mechanical seal. Optional silicon carbide against tungsten carbide seal faces are also available to provide added assurance of product reliability.

STAINLESS STEEL BOLTING

External bolting is stainless steel as standard for ease of maintenance.

IMPELLER

Solids-handling enclosed radial flow, two-vane, or bladeless design, having blunt well rounded leading edges and thick hydrofoil shape to pass large solids and stringy material. One-piece cast impellers are designed for circular flow and matched to the equalizing-pressure, constant-velocity thick wall volute. Impeller is trimmed to meet conditions of operation.

WEAR RINGS

Impeller and volute may be fitted with axial wear rings of hardened 300-350 Bhn or higher stainless steel.

SOLIDS PASSING

Spherical solids which pass through the impeller and volute passageways can also pass between the volute cutwater and a full diameter impeller.

PULL-UP SYSTEM

Two rails mounted on the discharge base/elbow provide a guide to the pump when raised or lowered in the sump.

THERMOSTATS

Imbedded in the motor windings to protect from overheating. These devices are reset automatically. Excessive heat will cause the normally closed contact to open, stopping the motor.

BEARING LIFE

Oil lubricated thrust bearing and radial bearing with an L10 bearing life of 50,000 hours at BEP. For higher bearing load applications, optional bearing construction is available.

TWO MOISTURE DETECTORS

Detect moisture entering the oil cavity or stator housing and send a signal to a compatible controller.

OIL INSPECTION PLUGS

Convenient, removable O-ring sealed plugs for inspection and ease of changing oil in the mechanical seal chamber.

DISCHARGE BASE/ELBOW

Rigid, heavy-duty cast iron, with 125 lb. ANSI flange supports the total weight of the pumping unit.

SLIDING BRACKET ASSEMBLY

Non-sparking, UL Listed explosion-proof bronze. Constructed so when lowered onto the discharge base/elbow, a knifing action of the vertical metal-to-metal, self-cleaning non-clogging connection is secured.

CENTERLINE DISCHARGE, MODEL 5430MV
PULL-UP SUBMERSIBLE, 210 FRAME

Fairbanks Morse Pump

DWG NO DSUBM011 REV NO 3

Models D5430 MT, MV, W and WD

		Standard	Options
Type	Vertical, non-clog impeller, wet pit	✔	
Rotation	CW when viewed from driver end	✔	
Volute	Single, one-piece with flush connections, constant velocity	✔	
Nozzles	Bottom suction-side tangential discharge	✔	
Impeller	Single-suction, radial flow, enclosed non-clog	✔	
	Bladeless		✔
Wear Rings	End seal (axial) type wear rings		✔
Shaft	Integral motor, shims for impeller adjustment	✔	
Bearing Frame	Motor frame	✔	
Bearing Radial	Integral motor	✔	
Bearing Thrust	Integral motor	✔	
Lubrication-Seal	Oil	✔	
Motor	Submersible, constant speed, squirrel cage, 3 Ph. 60Hz, 230 or 460 Volt through 250 Frame (320, 360, 400 & 440 Frame, 460 volt only), 1.15 S.F. thermal protectors and moisture sensing probes	✔	
	Mechanical seals with S.S. Buna-N components, carbon rotating faced	✔	
	Upper mechanical seal stationary faces, ni-resist	✔	
	Lower mechanical seal stationary faces, ceramic, with protective cup	✔	
	Tungsten carbide rotating and stationary faces for mechanical seals		✔
	Silicone carbide rotating and stationary faces for mechanical seals		✔
	Various voltages		✔
	Continuous duty in air		✔
	Continuous duty in air with water cooling jacket		✔
	Viton O-rings and Elastomers		✔
Lifting Bail	Pull-up lifting bail (not supplied on WD pumps with 365 frame or smaller motors)	✔	
	D5430MT		
Discharge Coupling	Slip on flange type	✔	
Discharge Base	One piece flanged inlet and vertical discharge	✔	
Cable	Pull-up cable		✔
	D5430MV		
Volute	Single, one-piece with flush connections, constant velocity	✔	
Nozzles	Bottom suction-centerline discharge	✔	
Discharge Coupling	Pivot flange type	✔	
Discharge Base	One-piece flanged inlet and flanged vertical discharge	✔	
Cable	Pull-up cable		✔
	D5430WD		
Fronthead	Separate one piece casting (integral to volute on D5431), flanged for connection to suction elbow	✔	
Base Mount	Base and separate flanged suction elbow with cleanout	✔	
Rotation	Optional CCW when viewed from driver end		✔
	D5430W		
Pump Mount	One-piece, low profile for low liquid level pumping	✔	

	D5431 M & W			D5432 M & W				D5433 M & W			
Pump Size (Discharge Size)	2	3	4	2	3	4	8	3	4	5	6
Suction Size (Standard)	2	3	4	2	3	4	8	3	4	5	8
Nominal Wear Ring (Axial) Clearance	.015	.015	.020	.015	.015	.020	RTF	.015	.020	.020	.025
Impeller Fastener:											
Size	1/2-13	1/2-13	1/2-13	1/2-13	1/2-13	1/2-13	RTF	5/8-11	5/8-11	5/8-11	5/8-11
Tightening Torque (lbs.-ft.)	80	80	80	80	80	80	RTF	120	120	120	120
Impeller:											
Weight (lbs.)	17.8	18.0	21.8	28.0	40.0	41.2	RTF	47.4	65.9	70.0	73.8
Inlet Area (sq. inches)	9.28	13.20	23.49	14.91	20.39	26.22	RTF	23.52	37.50	46.43	52.88
Sphere Size (Maximum)	1 1/2	2	2 1/2 x 3	1 1/2	2	3	RTF	2	3	3 1/2	3
Max. Hydrostatic Test, PSI	65	65	65	90	90	90	RTF	125	125	125	125
Max. Casing Working, PSI	45	45	45	60	60	60	RTF	85	85	85	85
Nominal Casing Thickness	5/16	5/16	5/16	3/8	3/8	3/8	RTF	3/8	1/2	1/2	1/2
Max. Operating Temperature, °F (3)	104	104	104	104	104	104	104	104	104	104	104
Anchor Bolt Size, recommended	7/8	7/8	7/8	7/8	7/8	7/8	RTF	7/8	7/8	7/8	7/8
Dry Pit Submersible Options											
Suction Size (Optional)	—	4	6	—	4	~~6~~	—	4	6	8	6
Vent/Priming Tap	1/4	1/4	1/4	1/4	1/4	~~1/4~~	RTF	1/4	1/4	1/4	1/4
Volute Cleanout Diameter	—	1 1/2	2	—	4 1/2	~~2 7/8~~	N/A	2 1/4	2 7/8	4-1/4	4 7/8
Suction Elbow Cleanout Diameter (4)	2	3	4	2	3	~~4~~	N/A	3	4	5	6
Min. Round Opening to Install Pump	28	30	32	30	32	~~34~~	RTF	36	40	40	40
Weights											
Pump & Motor (5)											
210T	355	415	565	565	605	690	RTF	710	640	880	800
250T	—	—	—	—	—	~~865~~	RTF	920	860	1095	1020
320T	—	—	—	—	—	—	RTF	—	1260	1595	1530
360T	—	—	—	—	—	—	—	—	—	—	—
365T	—	—	—	—	—	—	—	—	—	—	—
400T	—	—	—	—	—	—	—	—	—	—	—
440T	—	—	—	—	—	—	—	—	—	—	—
MV or MT Base/Elbow Adder											
4" Elbow	80	80	80	80	80	80	—	80	80	—	—
6" Elbow	—	—	150	—	—	~~150~~	—	—	150	150	150
8" Elbow	—	—	230	—	—	~~200~~	230	—	—	230	230
10" Elbow	—	—	—	—	—	—	—	—	—	—	—
WD Base & Elbow Adder	5	20	60	5	20	~~85~~	N/A	90	115	75	115

(1) All dimensions are in inches.
(2) MV units are centerline volute discharge design.
(3) For UL Listing only.
(4) Suction elbow available on WD units only.
(5) For water jacketed motors add the appropriate following weight:
250 Frame = 85 lbs., 320 Frame = 230 lbs., 360 Frame = 245 lbs.,
365 Frame = 245 lbs., 400 Frame = 355 lbs., 440 Frame = 460 lbs.

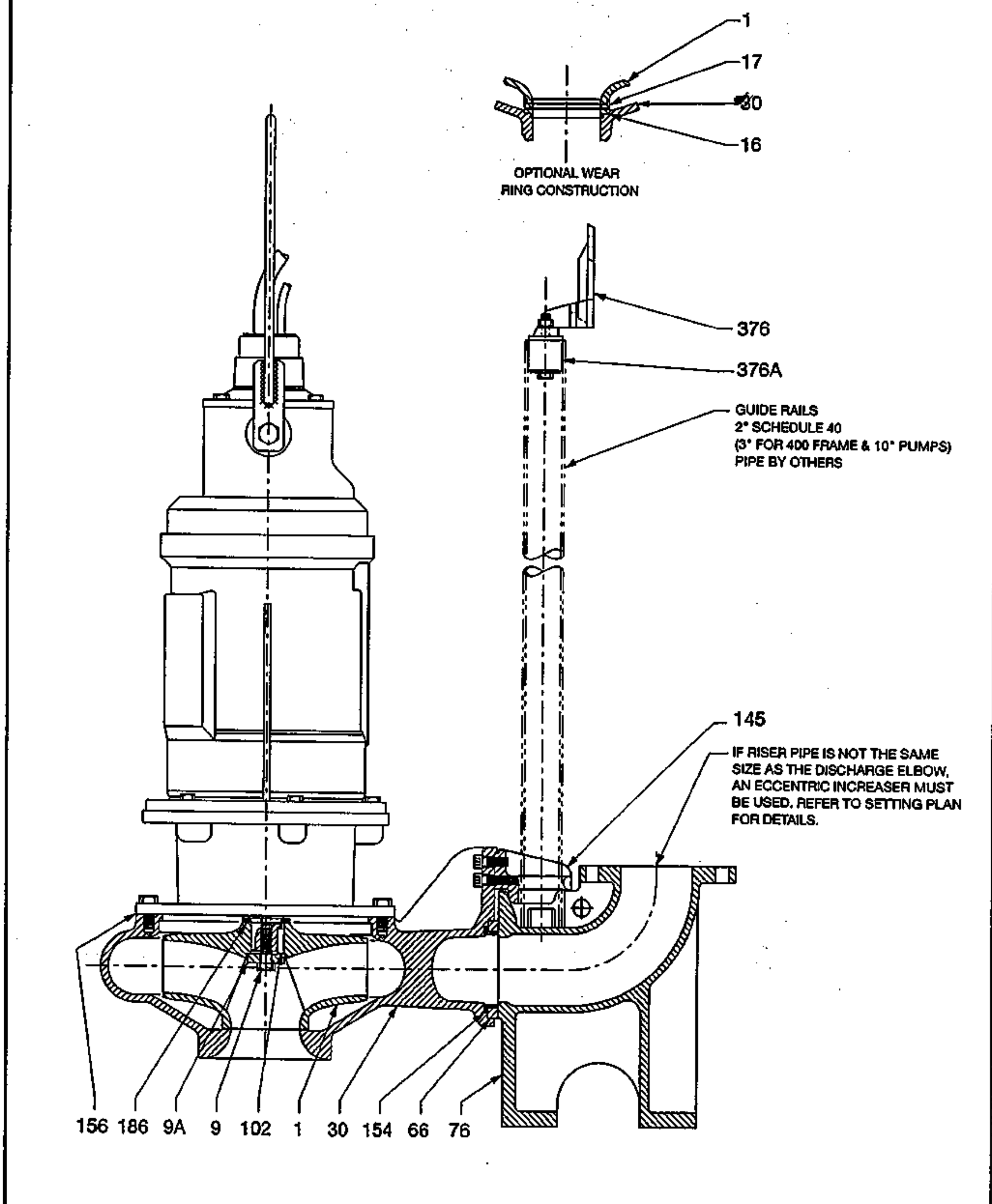
D5430 MT, MV, W and WD Standard Fitted (SF) Pumps

Ref. No.	Description	Material	Specification (1)
1	Impeller	Cast iron	A48-CL30
9	Capscrew, impeller	Steel	SAE Bolt Steel GR-8
9A	Washer, impeller	Steel	A108 GR12L14
15	Base (2)	Fabricated Steel (3)	A283 GR.D and A7 or A36
15	Base (4)	Cast iron	A48-CL30
30	Volute	Cast iron	A48-CL30
33	Fronthead	Cast iron	A48-CL30
44	Elbow, suction	Cast iron	A48-CL30
66	Ring, flange	Brass	B505 AL932
76	Base Elbow, discharge	Cast iron	A48-CL30
76A	Base, straight through discharge	Cast iron	A48-CL30
102	Key, impeller	Steel	A108 GR.1018
144	Flange, Adapter	Cast iron	A48-CL30
145	Bracket, guide	Brass	B584 AL836
145A	Bracket, guide	Brass	B584-AL836
154	Gasket, elbow	Tag board	F104
154A	Seal, flange	Rubber	Buna-N
156	Gasket, volute	Tag board	F104
186	Shim, impeller	Stainless Steel	A582 Type 303
202	Cover, volute handhole	Cast iron	A48-CL30
203	Gasket, volute handhole cover	Rubber	—
290	Cover, handhole suction	Cast iron	A48-CL30
291	Gasket, handhole	Rubber	—
376	Bracket, Upper Guide	Cast iron	A48-CL30
376A	Bushing, Upper Guide Bracket	Rubber	—
464	Suction Elbow, (combination base)	Cast iron	A48-CL30

Options to Basic Pumps

Ref. No.	Description	Material	Specification (1)
1	Impeller	Bronze	B584 AL 836
1	Impeller, bladeless ("K") (5)	Cast iron	A48-CL30
9	Capscrew, impeller	Stainless steel	304 Stainless steel
9A	Washer, impeller	Stainless steel	AISI-416
16	Wear ring, fronthead	Stainless steel	A743-CA40 (300-350 Brinell)
16	Wear ring, fronthead	Stainless steel	A743-CA40 MOD (410-484 Brinell)
17	Wear ring, impeller	Stainless steel	A743-CA40 (300-350 Brinell)
17	Wear ring, impeller	Stainless steel	A743-CA40 MOD (410-484 Brinell)

(1) All material designations are ASTM unless otherwise noted, and are for description of chemistry only.
(2) Base for WD (separate base and suction elbow) construction.
(3) Plate is A283 GR.D and channel in A7 or A36.
(4) Base is for W (tripod) constructions.
(5) Available only on 2", 3" and 4" D5431, D5432, 3", 4", and 5" D5433, 6" and 8" D5434 and 10" D5435.



ASSEMBLY, D5430MV, PULL-UP SUBMERSIBLE
THRU 365 FRAME FAIRBANKS MORSE MOTOR

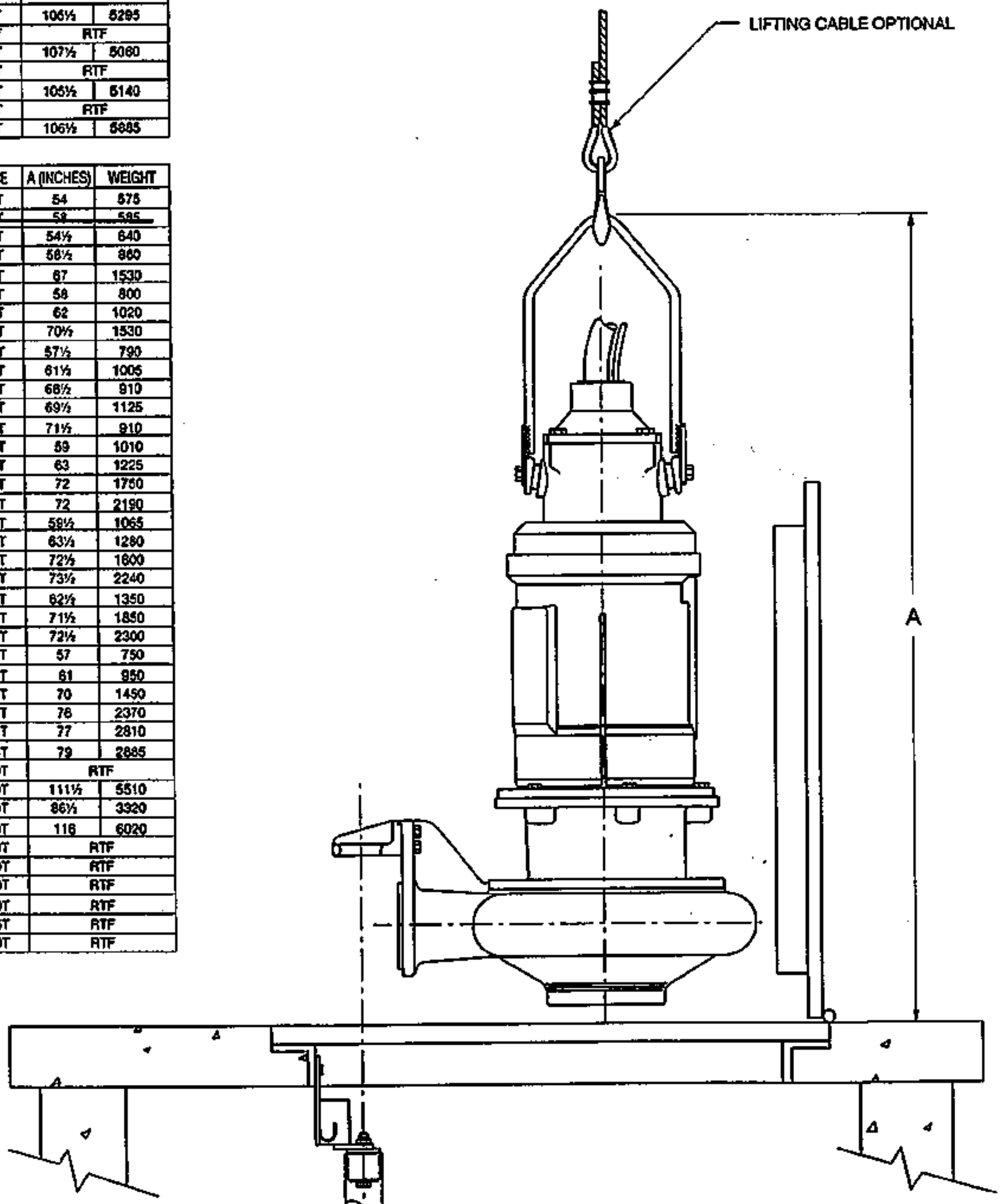
Fairbanks Morse Pump

DWG NO 543MA005 REV NO 3

"MT" PUMP MODEL	FRAME	A (INCHES)	WEIGHT
4" D5433MT	320T	68	1470
5" D5433MT	320T	67	1595
6" D5433MT	320T	71	1610
4" D5434MT	320T	69½	1660
4" D5434MT	360T	70	2140
4" D5434MT	365T	72	2215
6" D5434MT	360T	70	2235
6" D5434MT	365T	72	2310
8" D5435MT	400T	RTF	
10" D5435MT	400T	RTF	
5" D5436MT	320T	71½	1845
5" D5436MT	360T	72	2245
5" D5436MT	365T	74	2320
5" D5436MT	400T	RTF	
6" D5436MT	365T	77½	2620
6" D5436MT	400T	RTF	
6" D5436MT	440T	106½	5295
6" D5436LMT	400T	RTF	
6" D5436LMT	440T	107½	5060
8" D5436SMT	400T	RTF	
8" D5436SMT	440T	105½	5140
8" D5436MT	400T	RTF	
8" D5436MT	440T	106½	5885

"MT" PUMP MODEL	FRAME	A (INCHES)	WEIGHT
8" D5436SMV	320T	RTF	
8" D5436SMV	360T	RTF	
8" D5436SMV	365T	RTF	
8" D5436SMV	400T	RTF	
8" D5436SMV	440T	RTF	

"MV" PUMP MODEL	FRAME	A (INCHES)	WEIGHT
4" D5432MV	210T	54	575
~~4" D5433MV~~	~~360T~~	~~58~~	~~585~~
4" D5433MV	210T	54½	640
4" D5433MV	250T	58½	860
4" D5433MV	320T	67	1530
6" D5433MV	210T	58	800
6" D5433MV	250T	62	1020
6" D5433MV	320T	70½	1530
4" D5434MV	210T	57½	790
4" D5434MV	250T	61½	1005
4" D5434MV	320T	68½	910
4" D5434MV	360T	69½	1125
4" D5434MV	365T	71½	910
6" D5434MV	210T	59	1010
6" D5434MV	250T	63	1225
6" D5434MV	320T	72	1750
6" D5434MV	360T	72	2190
8" D5434SMV	210T	58½	1065
8" D5434SMV	250T	63½	1280
8" D5434SMV	320T	72½	1600
8" D5434SMV	360T	73½	2240
8" D5434LMV	250T	62½	1350
8" D5434LMV	320T	71½	1850
8" D5434LMV	360T	72½	2300
4" D5435MV	210T	57	750
4" D5435MV	250T	61	950
4" D5435MV	320T	70	1450
6" D5435MV	320T	76	2370
6" D5435MV	360T	77	2810
8" D5435MV	365T	79	2885
8" D5435MV	400T	RTF	
8" D5435MV	440T	111½	5510
10" D5435MV	360T	86½	3320
10" D5435MV	440T	116	6020
5"D5436MV	210T	RTF	
5"D5436MV	250T	RTF	
5"D5436MV	320T	RTF	
5"D5436MV	360T	RTF	
5"D5436MV	365T	RTF	
5"D5436MV	400T	RTF	



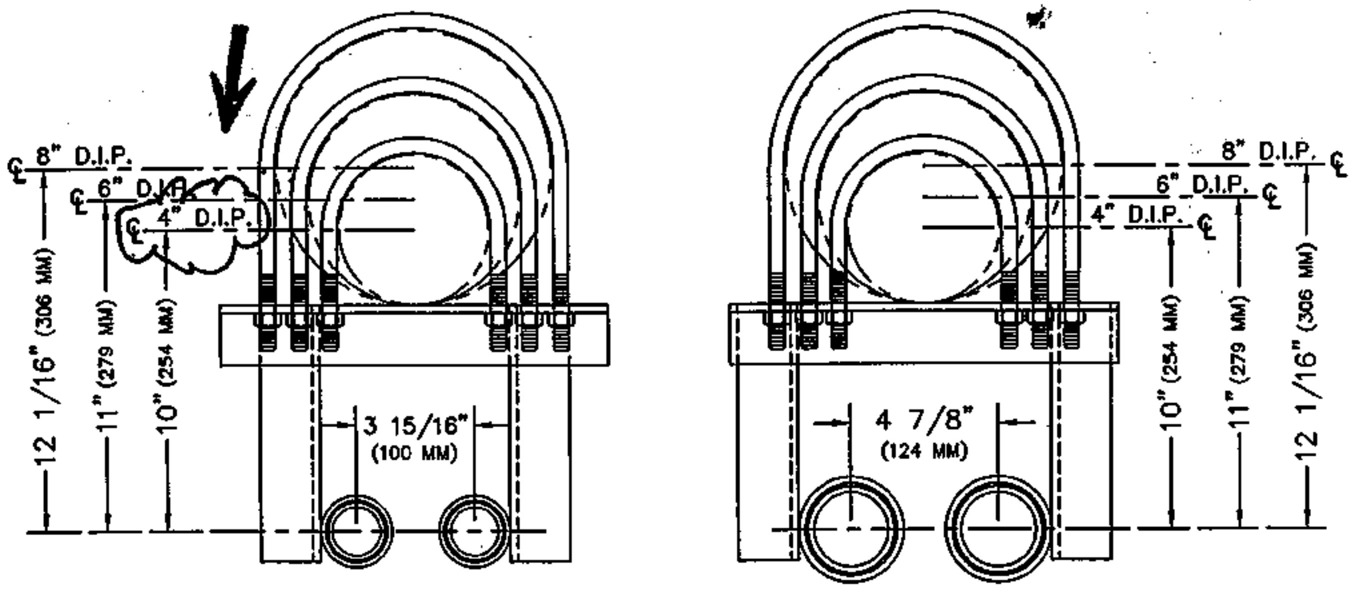
FMPC PUMP, MV (ALL) & MT (AS LISTED)
MINIMUM LIFT OUT CLEARANCE

Fairbanks Morse Pump

DWG NO 543MA141 | REV NO 4

GUIDE RAIL BRACKETS

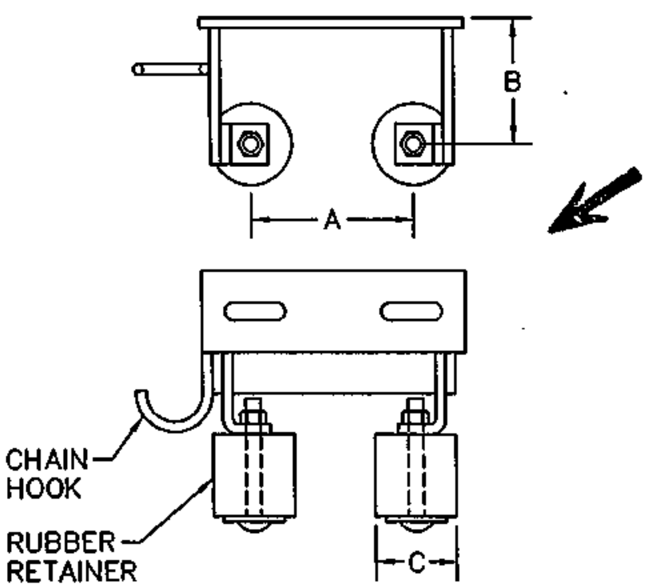
U.S.F. Fabrication makes guide rail brackets to specific dimensions to match all pump manufacturers.



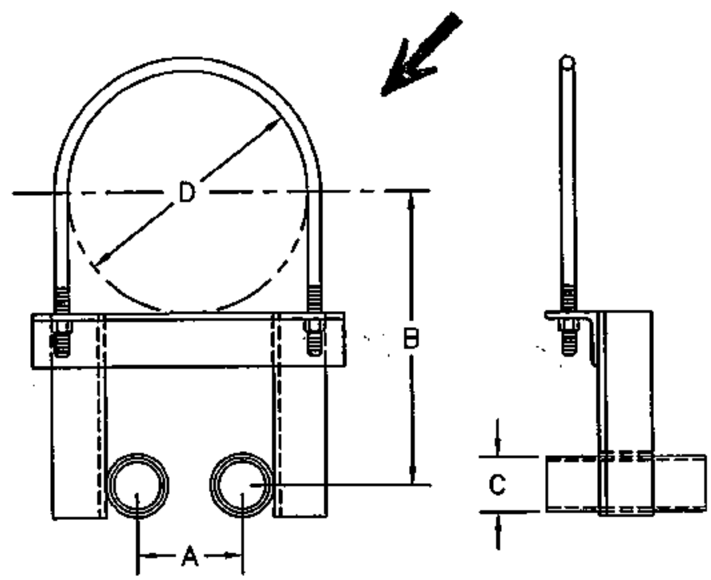
2" RAILS   3" RAILS

UNIVERSAL INTERMEDIATE GUIDE RAIL BRACKET

Our Universal brackets are designed to fit 4", 6" or 8" ductile iron pipes. They are available in stainless steel for 2" or 3" pump guide rails.



DOUBLE UPPER
GUIDE RAIL BRACKET

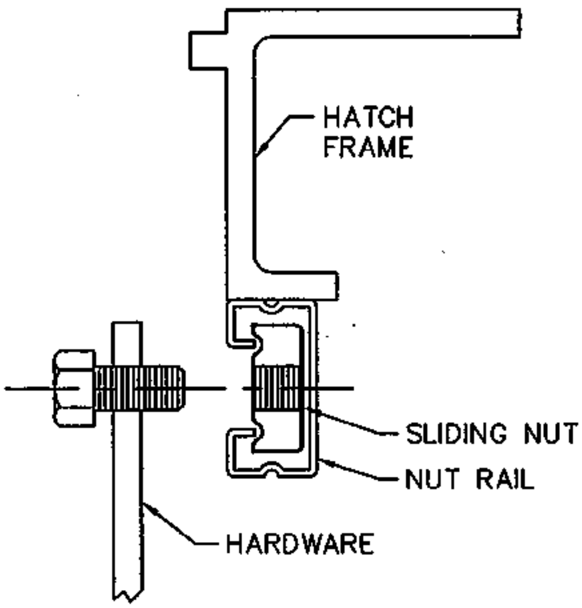


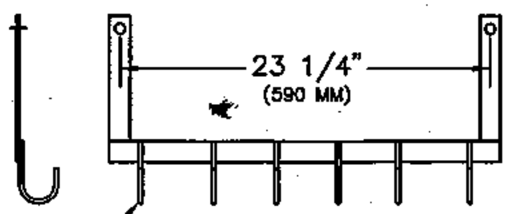
INTERMEDIATE
GUIDE RAIL BRACKET

GUIDE RAIL BRACKET:	MATERIAL:	DIMENSIONS:
☒ DOUBLE UPPER	☒ STAINLESS STEEL 304	A=______ C= 2" (GIVE PIPE SIZE)
☒ INTERMEDIATE	☐ STAINLESS STEEL 316	
	☐ OTHER ______	B=______ D= 4" (GIVE PIPE SIZE)

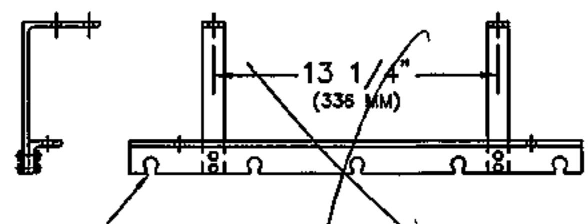
NUT RAIL & CABLE HOLDERS

The sliding nut in our nut rail option makes it easy to hang and align all your hardware.



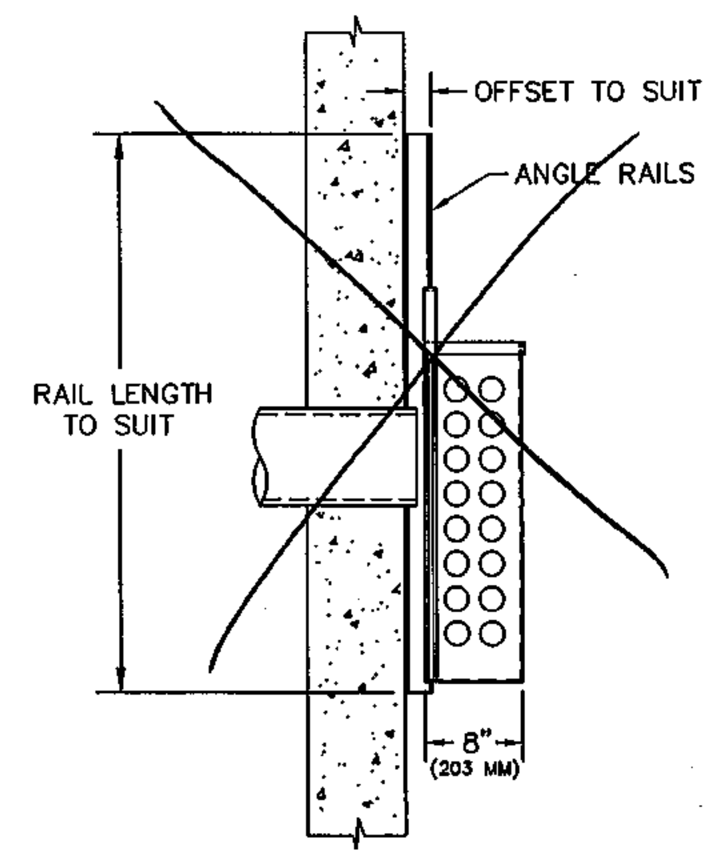


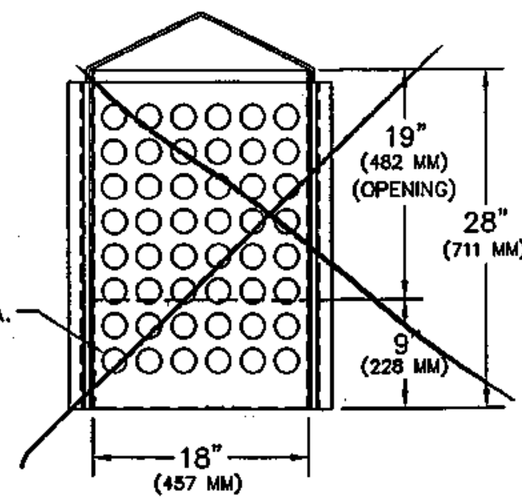
CABLE HOLDER
(CUSTOM SIZES AVAILABLE)



FLOAT HOLDER
(CUSTOM SIZES AVAILABLE)

DEBRIS BASKET WITH RAILS





STANDARD SIZE
(CUSTOM SIZES AVAILABLE)

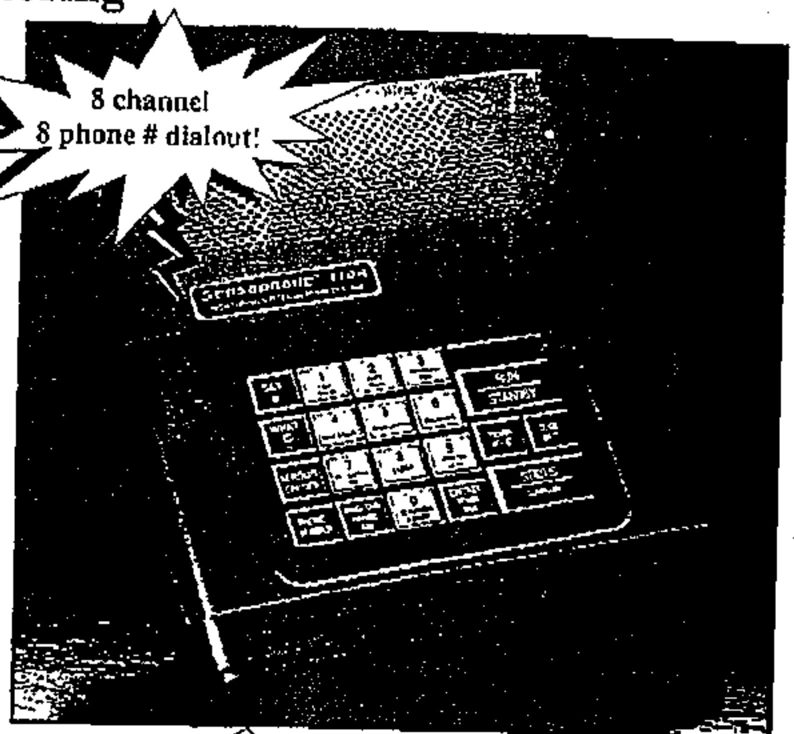
DEBRIS BASKET	MATERIAL:
☐ STANDARD (8 X 18 X 28)	☐ ALUMINUM
☐ OTHER ___ X ___ X ___ (DEEP, WIDE, HIGH)	☐ ST. STEEL 304
	☐ OTHER ______

RAILS	MATERIAL:
☐ LENGTH ______	☐ ALUMINUM
☐ BASIN DIA. ______	☒ ST. STEEL 304
☐ OFFSET	☐ OTHER ______

Sensaphone® 1108

Desktop Monitoring System

Environmental/Process monitoring over telephone lines with full programming capabilities



- ☐ The versatile Model 1108 is designed for programming flexibility
- ☐ Variable alarm recognition and "listen-in" time, with alarm disable, security code access, remote sensing, and other programming features
- ☐ Monitors power, temperature, and other important environmental conditions to protect computers, equipment, and processes
- ☐ Automatically contacts you at up to 8 locations if unsafe conditions occur
- ☐ Allows you to contact your system using any telephone, to receive status reports and listen-in to on-site sounds
- ☐ Helps you detect problems before they turn into disasters

Now you can protect your equipment and processes even when you can't be there - The Sensaphone 1108 monitors your computer rooms, equipment centers, offices, or any unattended facility to detect power failures, temperature extremes, intrusions, water incursion, sounds such as smoke and burglar alarms, and other conditions of your choice.
Alerts you immediately if problems arise - The Sensaphone 1108 automatically contacts you by phone to eight different phone numbers, to alert you of fe conditions. The system communicates in)ice-synthesized English, and even lets you "listen-in" to actual on-site sounds.

CONDITIONS MONITORED:
Temperature
Humidity
Electricity
Water Incursion
Smoke
Sound
Windows & Doors
...and more!

ALERT

UP TO 8 DIAL-OUT NUMBERS:
If unsafe conditions occur, the Sensaphone will automatically dial up to eight numbers in sequence to advise you of the problem. Numbers may be up to 32 digits each, with your choice of pulse or tone dial-out.

COMMUNICATES OVER STANDARD PHONE LINES:
Call-in for periodic status reports on all monitored conditions, using any telephone. The Sensaphone communicates in simple voice-synthesized English.

Phonetics, Inc.

See reverse side for a list of the Sensaphone's outstanding feat

Sensaphone® 1108

Ideal for a variety of applications - The Sensaphone is useful wherever there is a need for monitoring of temperature, humidity, or other conditions. Sensors and input devices are available to suit a wide range of applications.

- ☐ HVAC Equipment
- ☐ Computer rooms
- ☐ Refrigeration and freezers
- ☐ Health care centers
- ☐ Offices
- ☐ Warehouses
- ☐ Livestock and egg/poultry
- ☐ Home & property
- ☐ Greenhouses

...and many others!

BUILT-IN FEATURES

- ☐ 8 User-selectable inputs, temperature or dry-contact
- ☐ Microphone monitors high sound alarms and enables remote listen-in
- ☐ AC Power failure sensing with variable recognition time
- ☐ Battery condition monitor
- ☐ Clock

ADVANCED CAPABILITIES

- ☐ User Programmable: Alarm recognition time, Call delay, Inter-call delay, Message repetitions
- ☐ Temperature sensing in Fahrenheit (-20°F to 150°F), or Celsius (-29°C to 65°C)
- ☐ Individual temperature input calibration
- ☐ Nonvolatile memory for all programmed parameters

VERSATILE DIAL-OUT CAPABILITIES

- ☐ Alert sensors trigger pulse or tone dialout automatically
- ☐ Dials up to 8 numbers, up to 32 digits each
- ☐ Continues dialing numbers in sequence, until acknowledged
- ☐ Call Progress: Intelligently detects ringing or busy signal
- ☐ Intelligent dial out to beepers and pagers

EASY CONTROL ACCESS:

- ☐ Keypad for local programming and status report
- ☐ Unit can be called from any phone to verify status of all monitored conditions
- ☐ Local or remote enabling/disabling of all dial-out conditions
- ☐ Can share a single phone line with an answering machine, allowing full operation of both units
- ☐ Programmable security code access

SPECIFICATIONS

Size: 7½" W, 2" H, 8½" D
Batteries: (6) 1.5 Volt "D" cell alkaline (not included)
Telephone Interface: FCC approved RJ-11 plug-in modular connector with 6' cord
Operating Range: Unit should be kept between 32° F and 120° F.
Temperature Sensing Range: -20° F to 150° F with remote temperature sensor.
Shipping Weight: 4 lbs.

Technical data subject to change without notice.

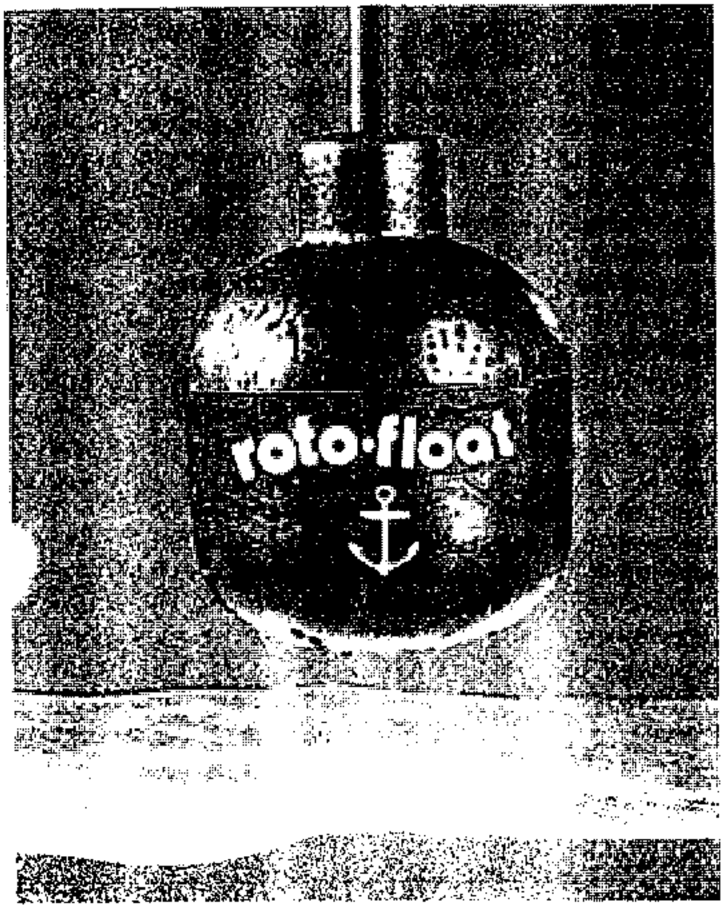
We'd like to show you how the Sensaphone 1108 can help you monitor your equipment and facilities. Give us a call to find out more! Or, listen to an actual Sensaphone report by calling 610-558-4591.

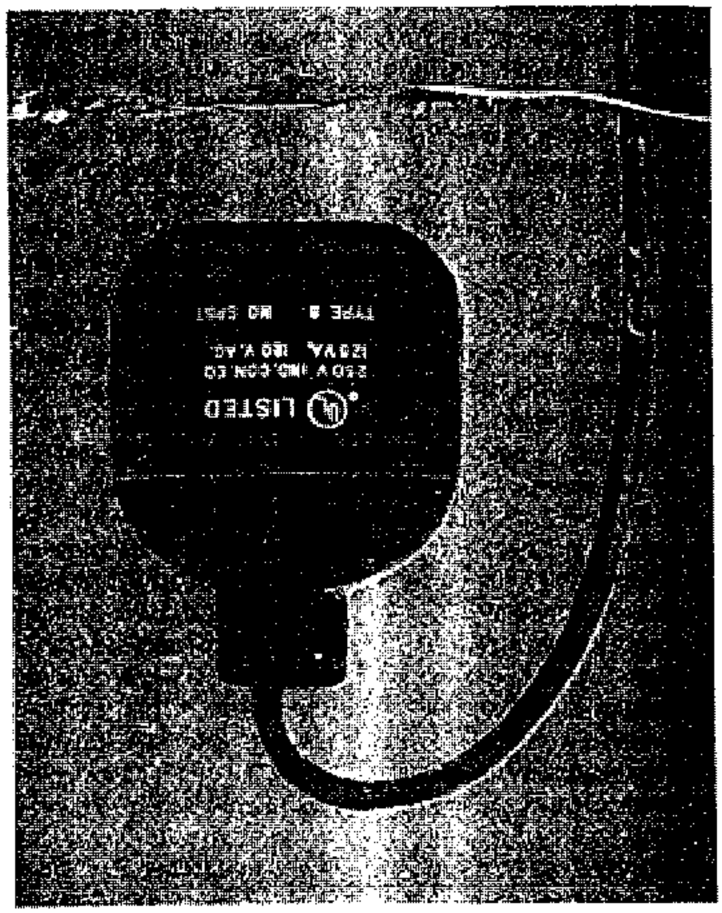
Phonetics Inc

anchor scientific inc.
Box 378, Long Lake, MN 55356 / 612-473-7115 / FAX 612-473-6002

roto·float
Type S - Suspended
Form 2700-B

TYPE S





The ROTO-FLOAT is a direct acting float switch. Each ROTO-FLOAT contains a single pole mercury switch which actuates when the longitudinal axis of the float is horizontal, and deactuates when the liquid level falls 1" below the actuation elevation.

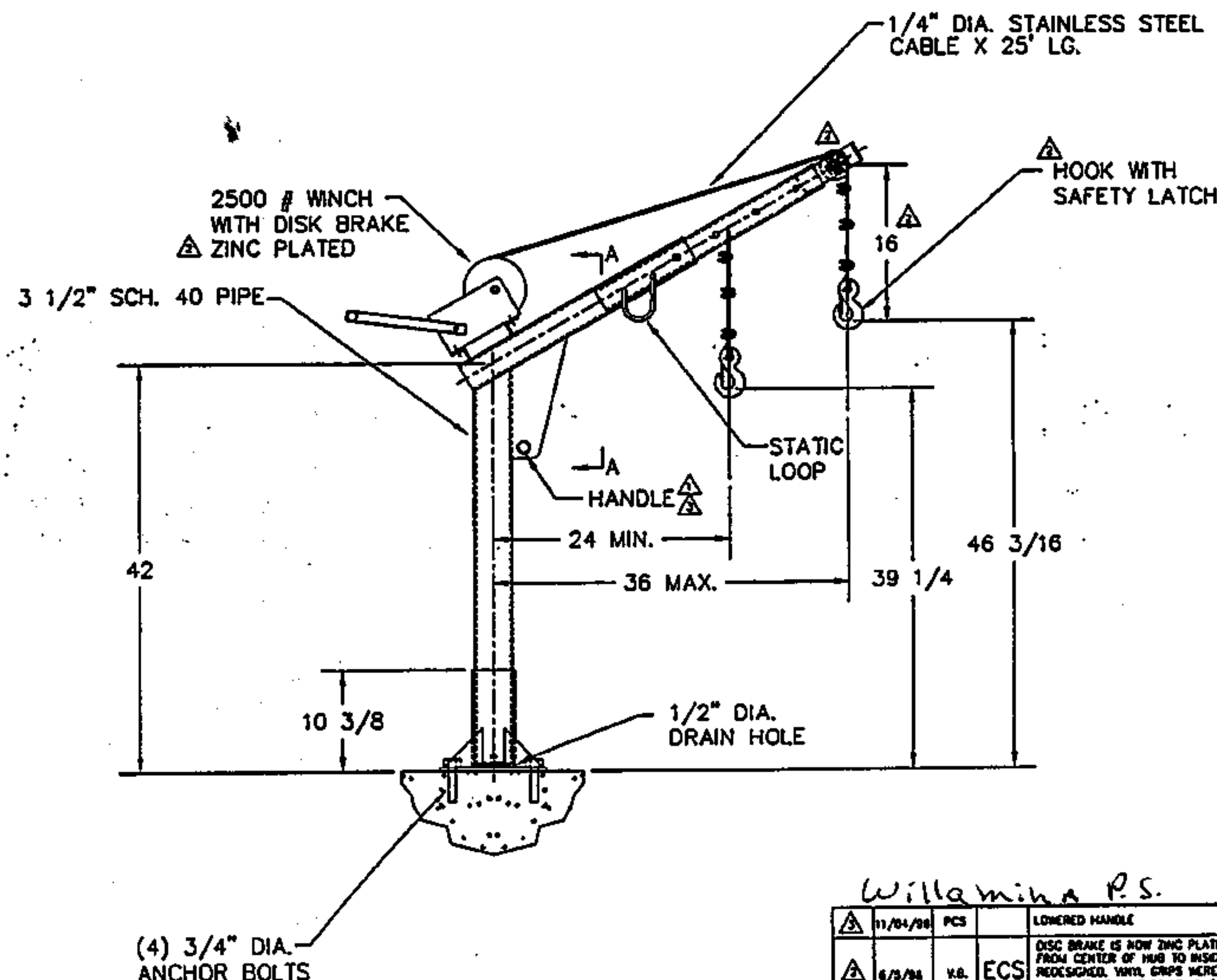
The float is a chemical resistant polypropylene casing with a firmly bonded electrical cable protruding. One end of the cable is permanently connected to the enclosed mercury switch and the entire assembly is encapsulated to form a completely water tight and impact resistant unit. Type S — Suspended has built in weight.

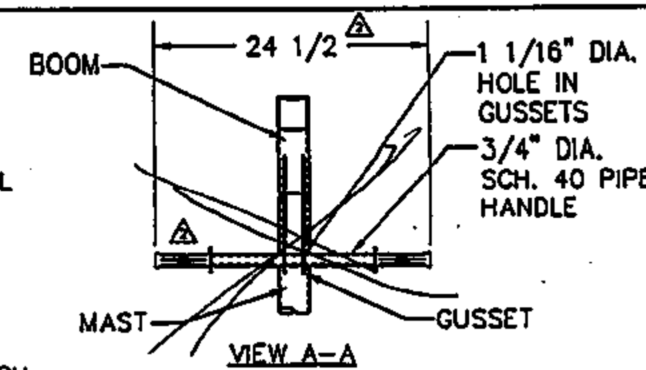
ROTO-FLOATS can be mounted on a support pipe (type P) or suspended from above (type S). Advantages of the ROTO-FLOAT are low cost, simplicity and reliability.

UL Listed
- Pilot Duty
- Industrial Control Equipment

,ABLE
P.V.C. type STO #18 conductors (41 strand) rated 600 volts • Various lengths available • See table of models • Non-standard lengths also available on special order.

Switch Arrangement	Cable Length	Suspended Type S Model No.	Ship. Wt.
Normally Open	20	S20NO	4#
	30	S30NO	4 1/2#
	40	S40NO	5 1/4#
Normally Closed	20	S20NC	4#
	30	S30NC	4 1/2#
	40	S40NC	5 1/4#





NOTE:

1– MATERIAL: STAINLESS STEEL
2– LOADING CAPACITY: 1000 LBS. APP.
3– SEE DWG. # 12652 SHEET 2 OF 2
FOR SOCKET DETAILS.

Willamina P.S.

REV.	DATE	BY	CHK.	DESCRIPTION
3	11/04/96	PCS		LOWERED HANDLE
2	6/3/96	V.B.	ECS	DISC BRAKE IS NOW ZINC PLATED, WIRE ROPE IS NOW 16" FROM CENTER OF HUB TO INSIDE RADIUS OF HOOK, HUB WAS REDESIGNED, VINYL GRIPS WERE PIPE CAPS, 3/4" DIA. PIPE X 24 1/2 LG. WAS 18 LG. & S.S. HOOK WAS CAST IRON.
1	3/19/96	PCS		REDESIGNED HANDLE

U.S.F. FABRICATION INC.
HIALEAH, FLORIDA

PORTABLE HOIST, FLOOR MOUNTED, STAINLESS STEEL
1000 LBS. CAPACITY – 24" TO 36" REACH

DWN. BY NKD	SCALE 1"=1'-0"	DATE 2/21/96	
CHK. BY ECS	DWG. NO. 12646		REV. 3

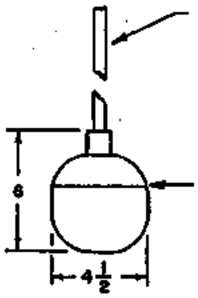
GENERAL DESCRIPTION:

THE ROTO–FLOAT IS A DIRECT ACTING FLOAT SWITCH. EACH ROTO–FLOAT CONTAINS A SINGLE POLE MERCURY SWITCH WHICH ACTUATES WHEN THE LONGITUDINAL AXIS OF THE FLOAT IS HORIZONTAL, AND DEACTUATES WHEN THE LIQUID FALLS 1" BELOW THE ACTUATION ELEVATION.

THE FLOAT IS A CHEMICAL RESISTANT POLPROPYLENE CASING WITH A FIRMLY BONDED ELECTRICAL CABLE PROTRUDING. ONE END OF THE CABLE IS PERMANENTLY CONNECTED TO THE GLASS ENCLOSED MERCURY SWITCH AND THE ENTIRE ASSEMBLY IS ENCAPSULATED TO FORM A COMPLETELY WATER TIGHT AND IMPACT RESISTANT UNIT.

ROTO–FLOATS CAN BE MOUNTED ON A SUPPORT PIPE, (TYPE P); OR SUSPENDED FROM ABOVE, (TYPE S). ADVANTAGES OF THE ROTO–FLOAT ARE LOW COST, SIMPLICITY AND RELIABILITY. VARIOUS CIRCUIT CONFIGURATIONS, OTHER THAN THE ONES LISTED BELOW, ARE AVAILABLE.

SPECIFICATIONS:



PVC TYPE STO, 2- #18 AWG 41 STRAND 600V, 60°C CONDUCTORS 20', 30', 40' LENGTHS STANDARD, OTHER LENGTHS AVAILABLE.
UL & CSA LISTED.

POLYPROPYLENE CASING CONTAINS HERMETICALLY SEALED MERCURY SWITCH.

USE: N.O. FOR PUMP OUT
N.C. FOR PUMP IN

- UL LISTED, IND. CONT. EQ.
  PILOT DUTY
  4.5 AMPS 120 VAC
  2.25 AMPS 240 VAC
- FLOAT COLOR
  N.O., BLACK
  N.C., RED
- MOUNTING ARRANGEMENT
  TYPE P - PIPE MOUNTED MODEL INCLUDES POLYPROPYLENE CLAMP

  TYPE S-SUSPENDED MODEL WITH STABILIZING WEIGHT.

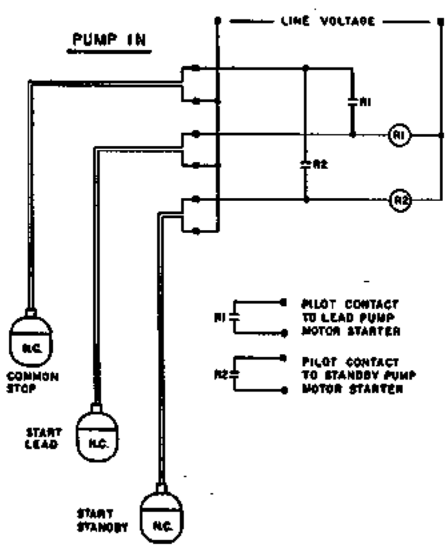
MODELS:

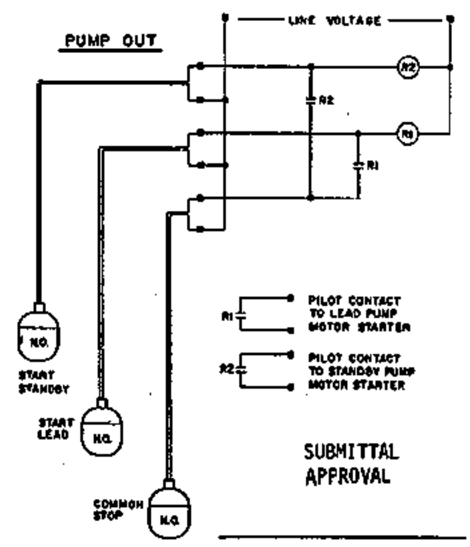
SWITCH ARRANGEMENT	CABLE LENGTH	SUSPENDED TYPE S		PIPE MOUNTED TYPE P	
		MODEL NO.	SHIP WT.	MODEL NO.	SHIP WT.
NORMALLY OPEN	20 30 40	S20NO S30NO S40NO	4# 4 ½# 5 ¼#	P20NO P30NO P40NO	2# 2 ¾# 3 ½#
NORMALLY CLOSED	20 30 40	S20NC S30NC S40NC	4# 4 ½# 5 ¼#	P20NC P30NC P40NC	2# 2 ¾# 3 ½#

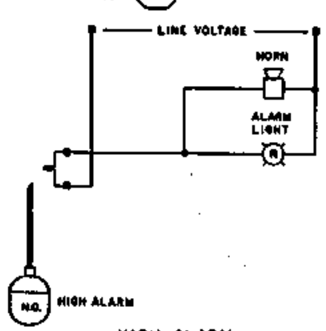
APPLICATIONS:

FOR USE IN CONTROLLING PUMPS OR OTHER MACHINES AND MEASURING ALARM LEVELS IN WATER, SEWAGE AND MANY OTHER LIQUIDS. ROTO–FLOATS MAY BE USED FOR PUMP IN OR PUMP OUT CONTROL, FOR LOW LEVEL CUTOUT, OR FOR LOW AND HIGH LEVEL ALARMS.

TYPICAL 2 PUMP CIRCUITS

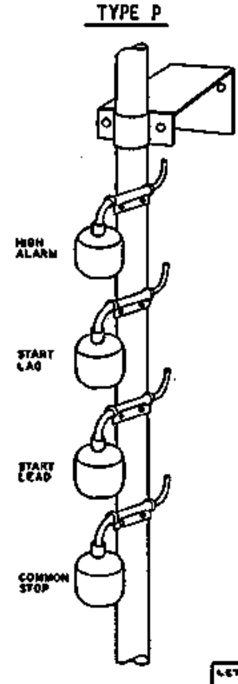


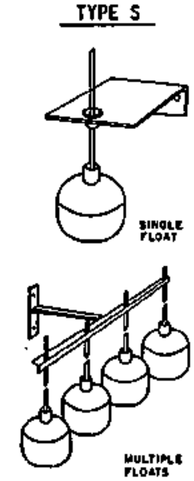




HIGH ALARM

TYPICAL MOUNTING





SEE ACCESSORY SHEET FOR HARDWARE

SUBMITTAL APPROVAL

NAME

DATE

IMPORTANT NOTE: Use in accordance with local electrical code and authority having jurisdiction. Do not use Roto-Floats in gasoline, volatiles or other combustibles.

This product contains mercury. Dispose of in accordance with Local, State and Federal Regulations so that mercury does not contaminate the environment.

LETTER	REVISIONS	DATE
A	4-81	

DWN BY	DATE
PD	1-9-74
CKD BY	DATE
JA	1-9-74
APPD BY	DATE
DS	4-30-76

PROJECT NAME: ROTO-FLOAT

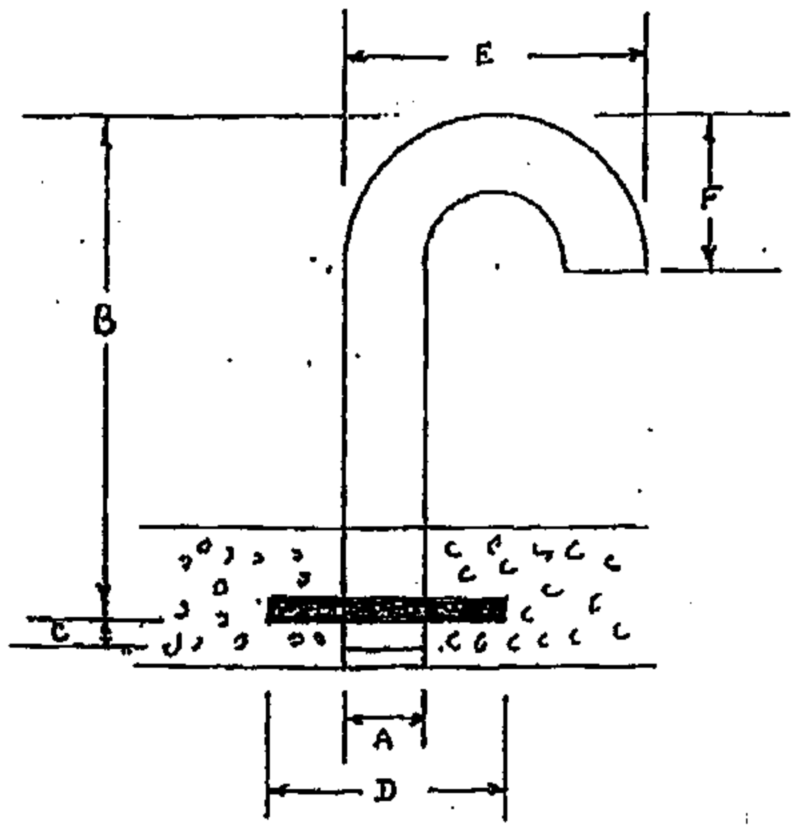
FACTORY ORDER NO.

anchor scientific inc.
Box 378, Long Lake, MN 55356
612/473-7115

SPECIFICATION DATA SUBMITTAL AND INSTRUCTION SHEET

DWG. NO. 174 - 4

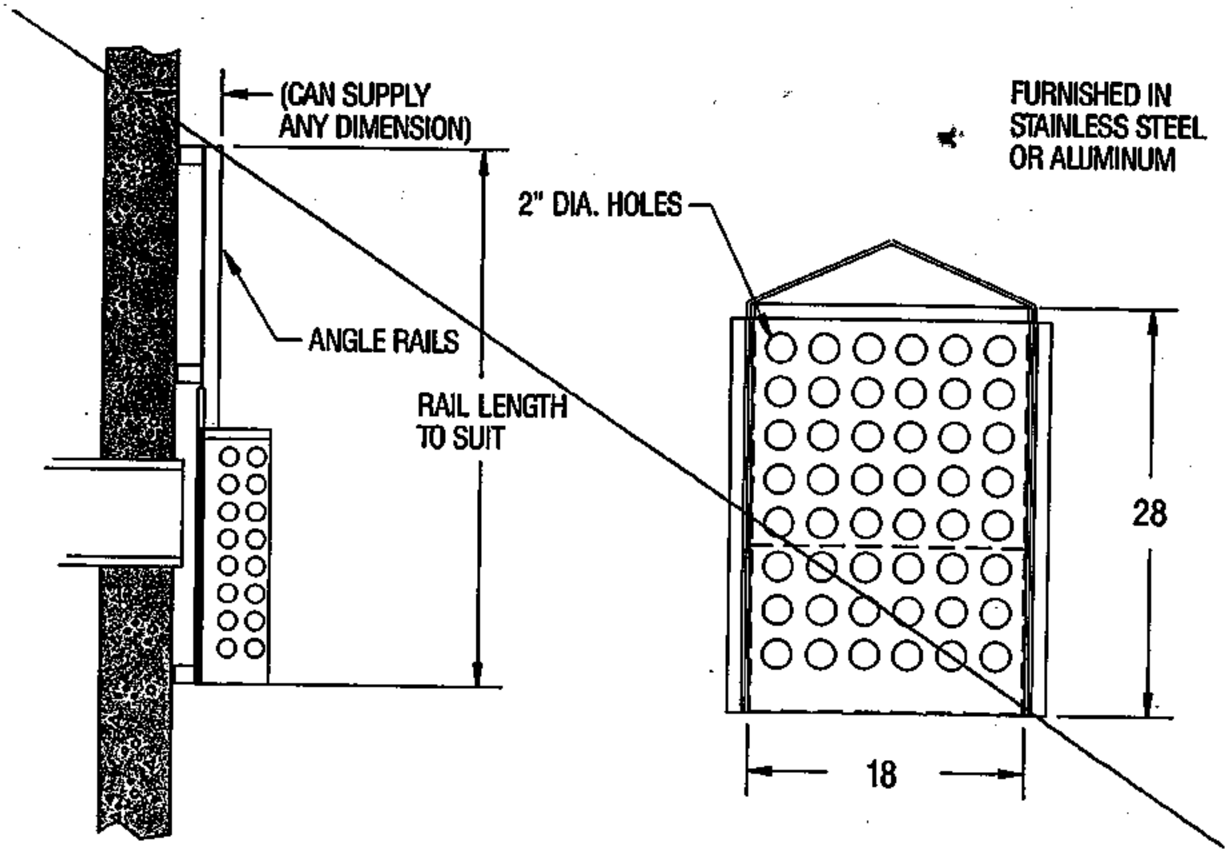
TEKNAFAB, INC.
TECHNICAL, FABRICATION & WELDING SERVICES



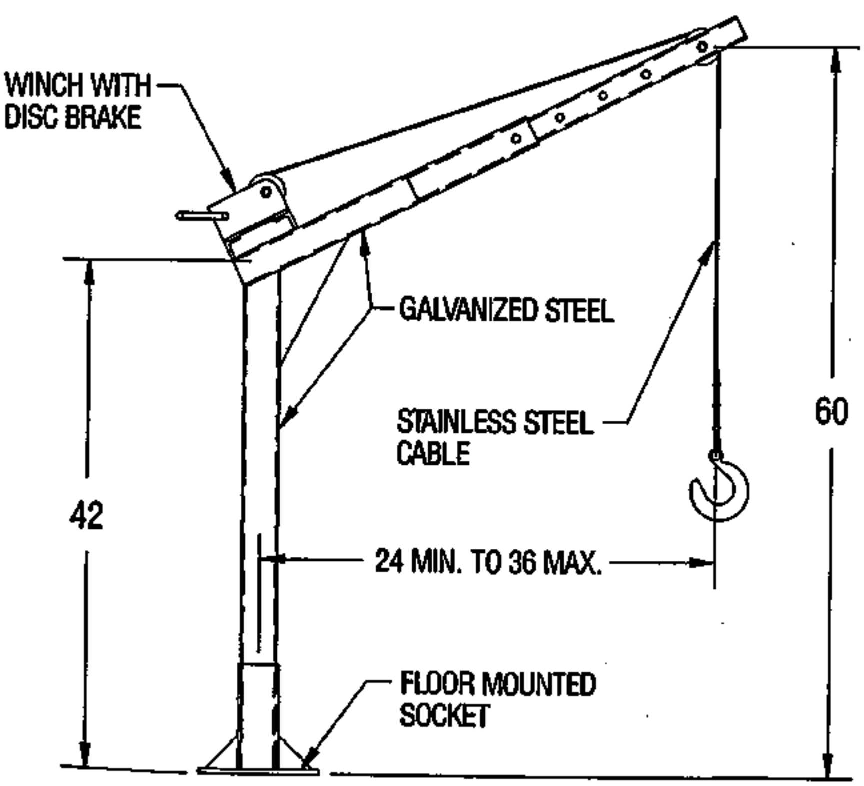
with - Screen.

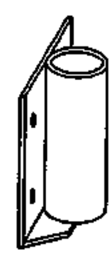
Vent Pipe dia.	Model No.	Dimensions					
		A	B	C	D	E	F
2"	TEP2VP	2.38	18.19	4	5	8.38	4.19
3"	TEP3VP	3.5	20.25	4	6	12.5	6.25
4"	TEP4VP	4.5	22.25	4	8	16.5	8.25
6"	TEP6VP	6.63	26.31	4	12	24.65	12.31
8"	TEP8VP	8.63	30.31	4	14	32.63	16.31
10"	TEP10VP	10.75	34.38	4	18	70.75	20.38

TRASH BASKET WITH RAILS

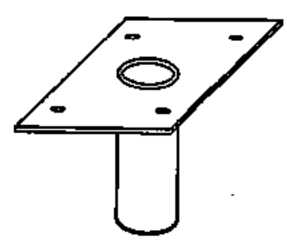


HOIST





WALL MOUNTED SOCKET

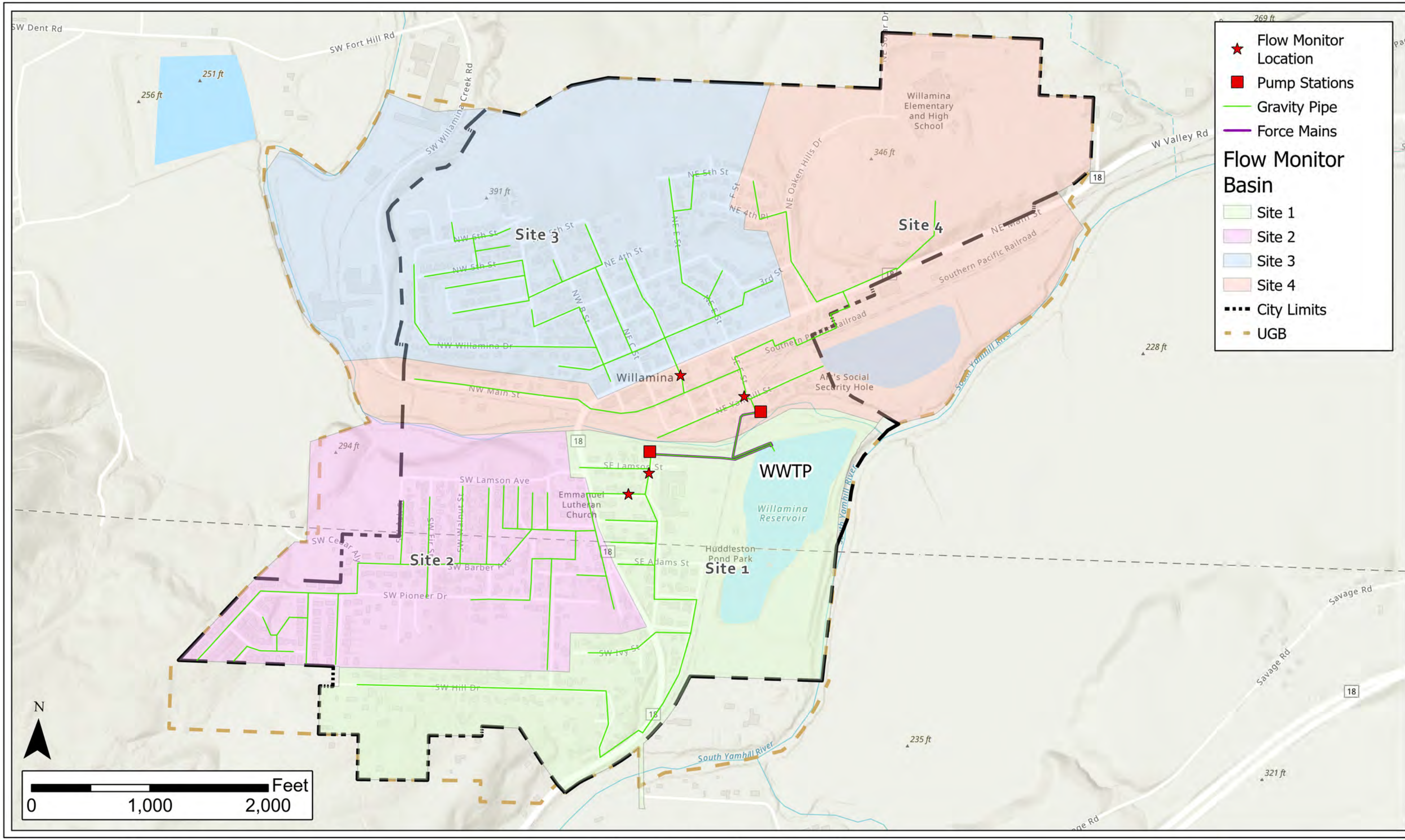


FLUSH MOUNTED SOCKET

500 LBS. LIFTING CAPACITY
1000 LBS. LIFTING CAPACITY

Appendix D

Model Calibration



Appendix D

City of Willamina

Flow Monitor Basin

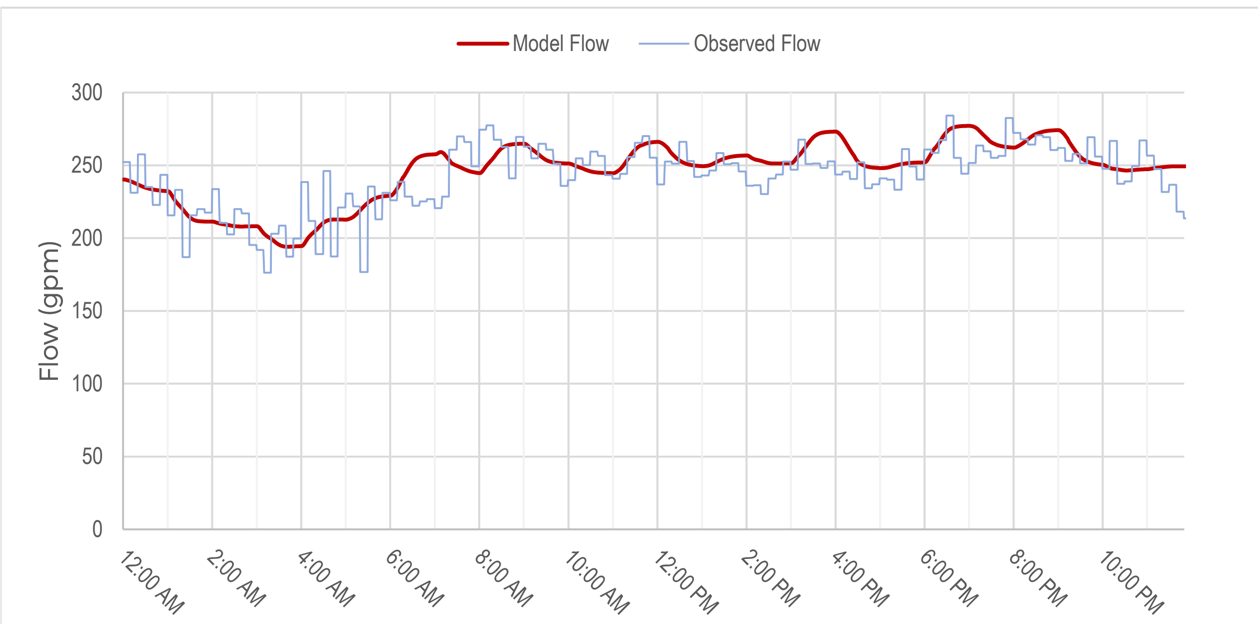
Willamina Figures

Client: City of Willamina
Project: WWFPS
Project No.: 213018-019

Model Calibration Results

Site Number:	**1**
Flow Monitoring Period:	**Dry Weather Flows**
Calibration Day:	**3/10/2023**

Parameter	Average Daily Flow (gpm)	Peak Flow (gpm)
Observed Data	242	284
Model Data	246	277
Difference	1.6%	-2.5%

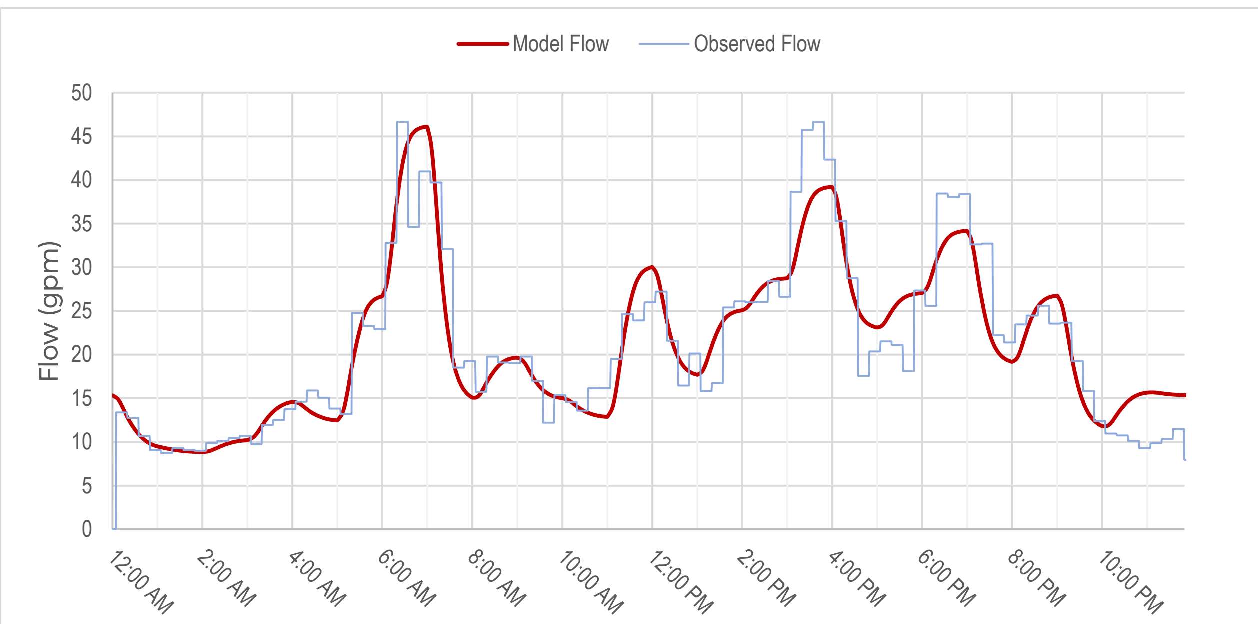


Client: City of Willamina
Project: WWFPS
Project No.: 213018-019

Model Calibration Results

Site Number: 2
Flow Monitoring Period: Dry Weather Flows
Calibration Day: 3/10/2023

Parameter	Average Daily Flow (gpm)	Peak Flow (gpm)
Observed Data	21	47
Model Data	21	46
Difference	0.0%	-1.2%

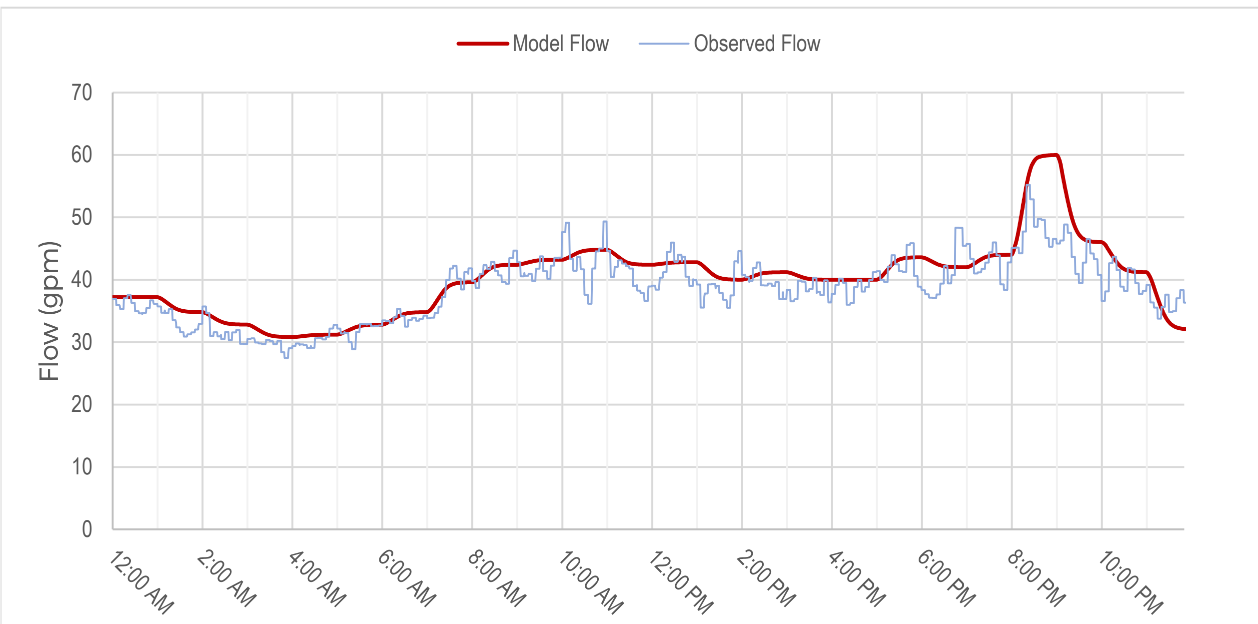


Client: City of Willamina
Project: WWFPS
Project No.: 213018-019

Model Calibration Results

Site Number: 3
Flow Monitoring Period: Dry Weather Flows
Calibration Day: 3/10/2023

Parameter	Average Daily Flow (gpm)	Peak Flow (gpm)
Observed Data	38	55
Model Data	40	60
Difference	4.2%	8.7%

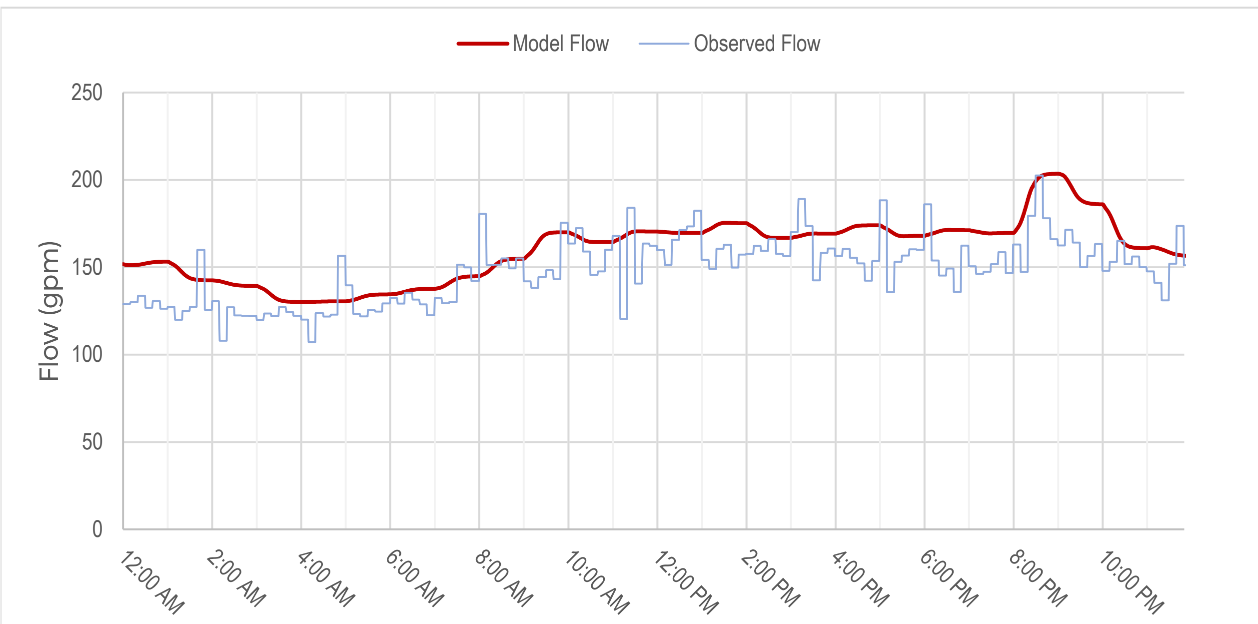


Client: City of Willamina
Project: WWFPS
Project No.: 213018-019

Model Calibration Results

Site Number:	**4**
Flow Monitoring Period:	**Dry Weather Flows**
Calibration Day:	**3/10/2023**

Parameter	Average Daily Flow (gpm)	Peak Flow (gpm)
Observed Data	148	203
Model Data	160	204
Difference	8%	0%

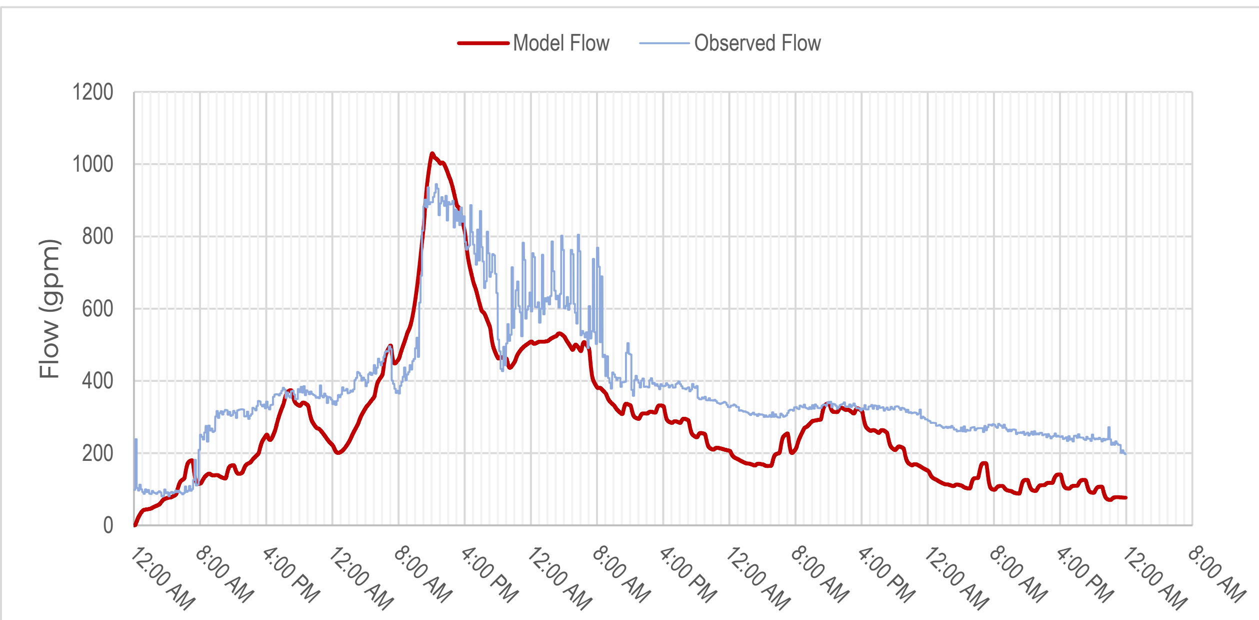


Client: City of Willamina
Project: WWFPS
Project No.: 213018-019

Model Calibration Results

Site Number: 1
Flow Monitoring Period: Wet Weather Period
Calibration Day: 2/28/2022 - 3/04/2022

Parameter	Average Daily Flow (gpm)	Peak Flow (gpm)
Observed Data	381	945
Model Data	290	1,030
Difference	-24%	9%

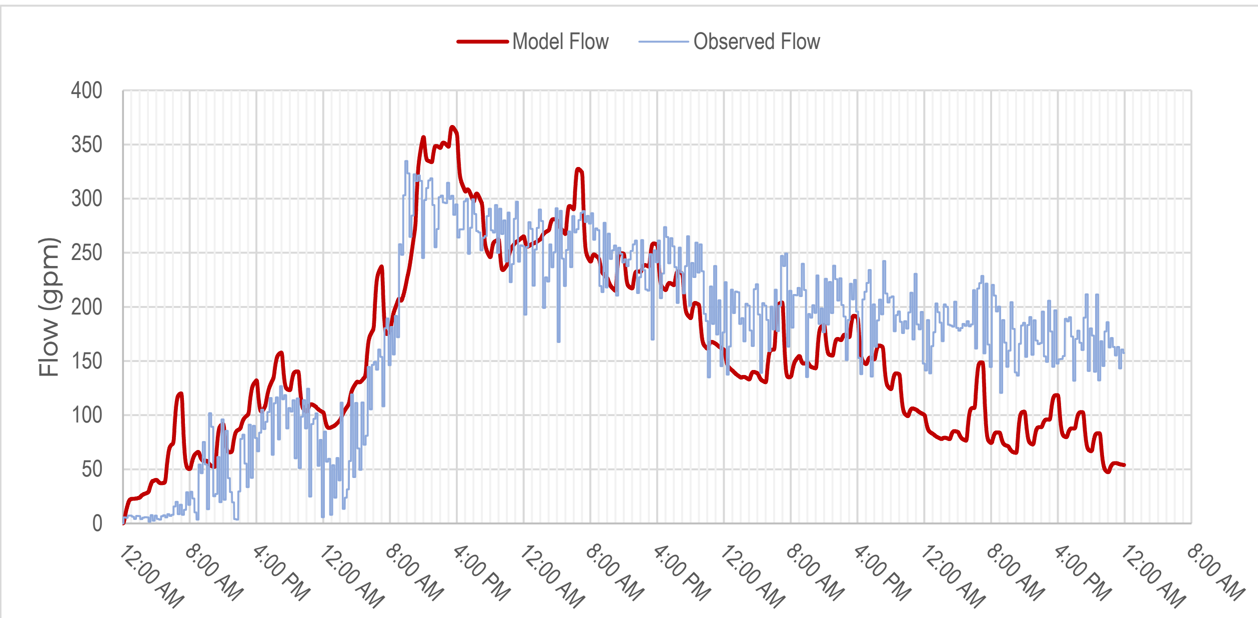


Client: City of Willamina
Project: WWFPS
Project No.: 213018-019

Model Calibration Results

Site Number: 2
Flow Monitoring Period: Wet Weather Period
Calibration Day: 2/28/2022 - 3/04/2022

Parameter	Average Daily Flow (gpm)	Peak Flow (gpm)
Observed Data	175	335
Model Data	158	366
Difference	-10%	9%

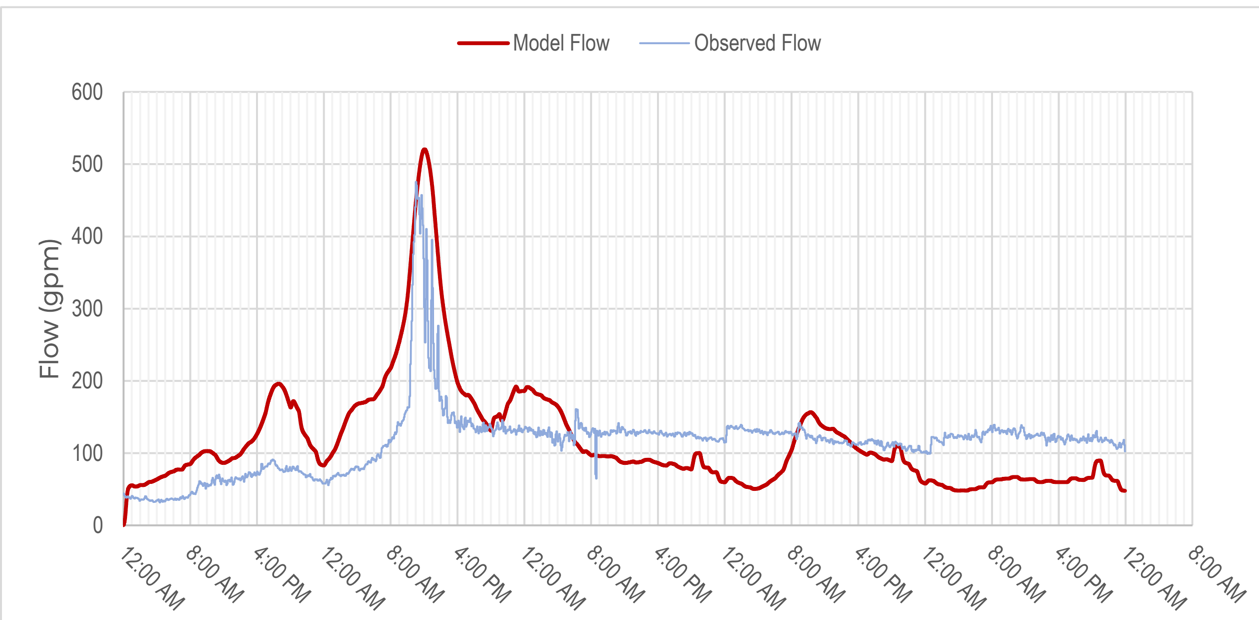


Client: City of Willamina
Project: WWFPS
Project No.: 213018-019

Model Calibration Results

Site Number: 3
Flow Monitoring Period: Wet Weather Period
Calibration Day: 2/28/2022 - 3/04/2022

Parameter	Average Daily Flow (gpm)	Peak Flow (gpm)
Observed Data	115	476
Model Data	118	521
Difference	3%	9%

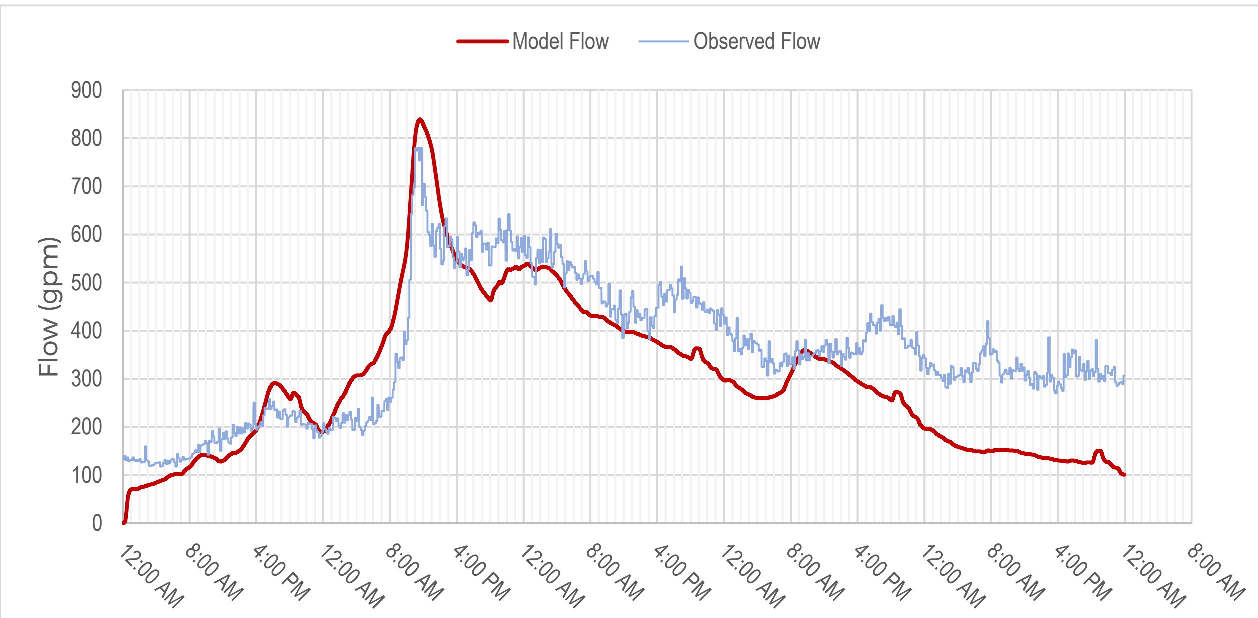


Client: City of Willamina
Project: WWFPS
Project No.: 213018-019

Model Calibration Results

Site Number: 4
Flow Monitoring Period: Wet Weather Period
Calibration Day: 2/28/2022 - 3/04/2022

Parameter	Average Daily Flow (gpm)	Peak Flow (gpm)
Observed Data	358	780
Model Data	299	839
Difference	-17%	8%



Appendix E

Willamina SSO

Oregon
Tina Kotek, Governor

Department of Environmental Quality
Western Region Salem Office
4026 Fairview Industrial Dr SE
Salem, OR 97302
(503) 378-8240
FAX (503) 373-7944
TTY 711

December 27, 2023

Bridget Meneley, City Manager
City of Willamina
411 NE C Street
Willamina, OR 97396

Re: Pre-enforcement notice
City of Willamina STP
2023-PEN-8885
NPDES Permit #101070, EPA ID OR0022713
File 97397
WQ-Yamhill County

Dear Ms. Meneley,

DEQ has reviewed the sanitary sewer overflow report received on December 13, 2023. The SSO you reported had 257,606 gallons spill on December 10, 2023. The overflow left the lift station at 453 Yamhill Street and affected the ground near this lift station and reached Willamina Creek.

City of Willamina staff reported this SSO to OERS within 24 hours of becoming aware of the SSO. The reported cause of the SSO was rainfall in excess of 5 years, 24 hours design storm with a reported rainfall of 2.0 inches in the 24 hours prior to the SSO. NOAA data for the Willamina area shows that the one-in-five year, 24 storm is 3.5 inches.

Violation

Based on this review DEQ has concluded the City of Willamina is responsible for the following violation of its permit and Oregon environmental law.

> Schedule F condition B6(b) of the permit prohibits all overflows. The SSO reached waters of the United States and therefore is a Class I violation per OAR 340-012-0055(1)(a).

Class I violations are considered to be the most serious violations; Class III violations are the least serious. Oregon Revised Statue 468B.025(2) requires compliance with your permit.

The discharge of improperly disinfected wastewater can pose a public health hazard. Contact with contaminated water can lead to ear or skin infections, and inhalation of contaminated water can cause respiratory diseases.

The violation listed in this notice is a Class I violation. Accordingly, this violation is being referred to DEQ's Office of Compliance and Enforcement for formal enforcement action. Formal enforcement action may result in assessment of a civil penalty and/or DEQ order. Civil penalties can be assessed for each day of violation.

If you believe any of the facts in this pre-enforcement notice are in error, you may provide information to me at the office at the address shown at the top of this letter. DEQ will consider the new information you submit and take appropriate action.

If you have any questions, please contact me in writing at brenda.kuiken@deq.oregon.gov or by phone at (503) 893-0924.

Sincerely,

Brenda Kuiken
WQ Compliance Specialist

cc: DEQ Salem Office file

ec: Ranei Nomura, Manager, Western Region DEQ
Oregon Records Management Solution
Jeff Brown, Public Works Director
Brenden Ashworth, Operator-In-Training

Appendix F

I & I Report Map

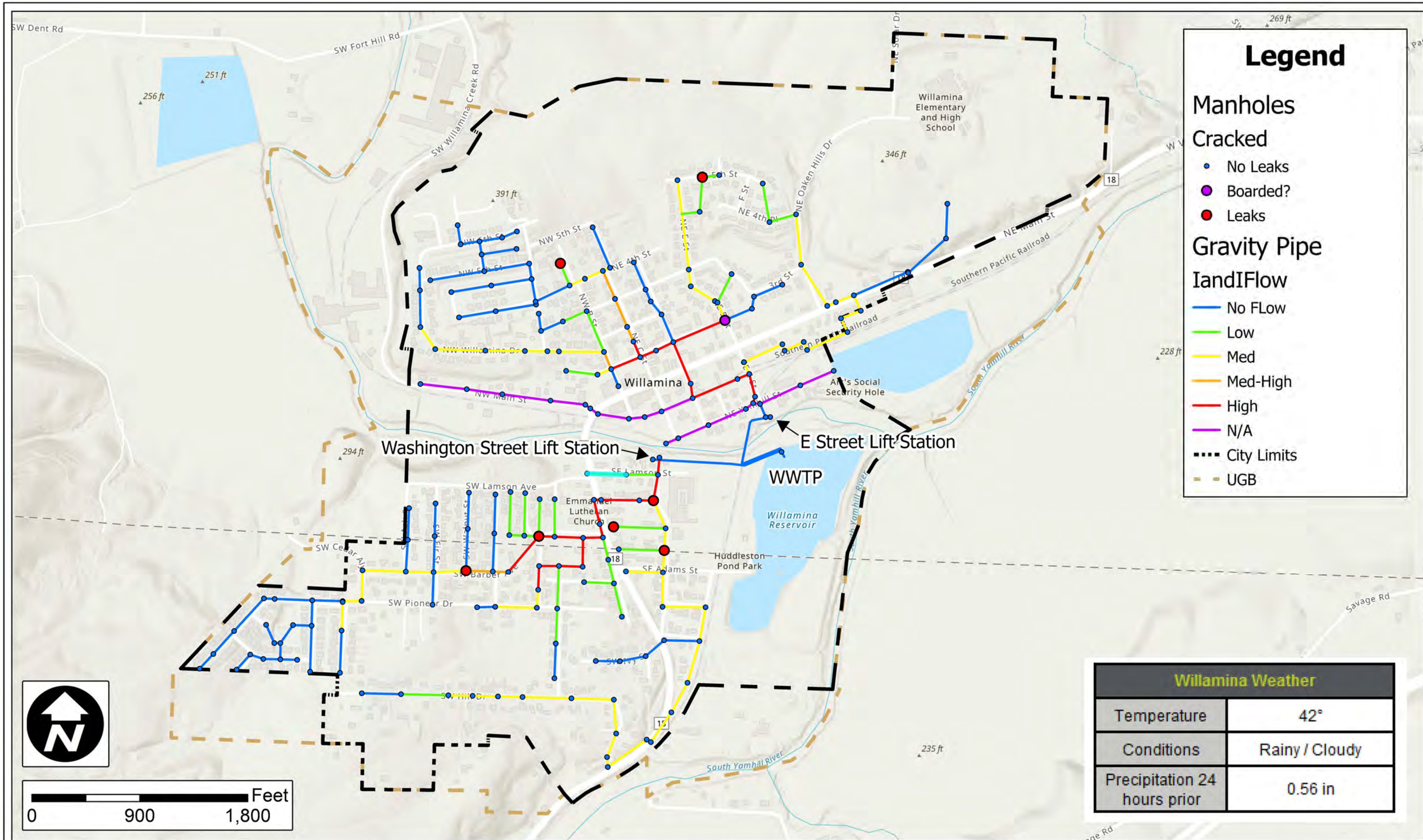


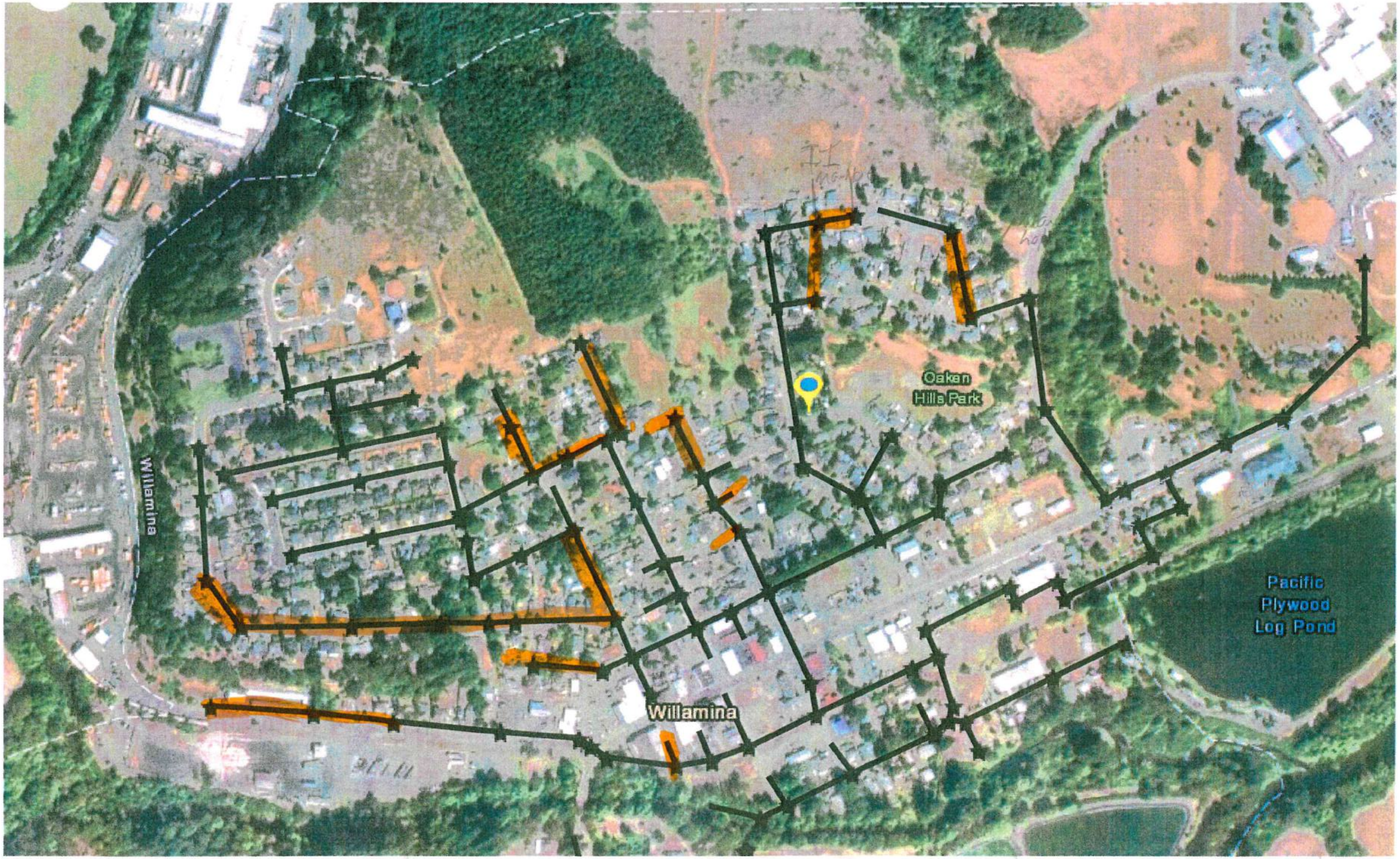
Figure 15

City of Willamina

Existing System Evaluation: Night-time I/I

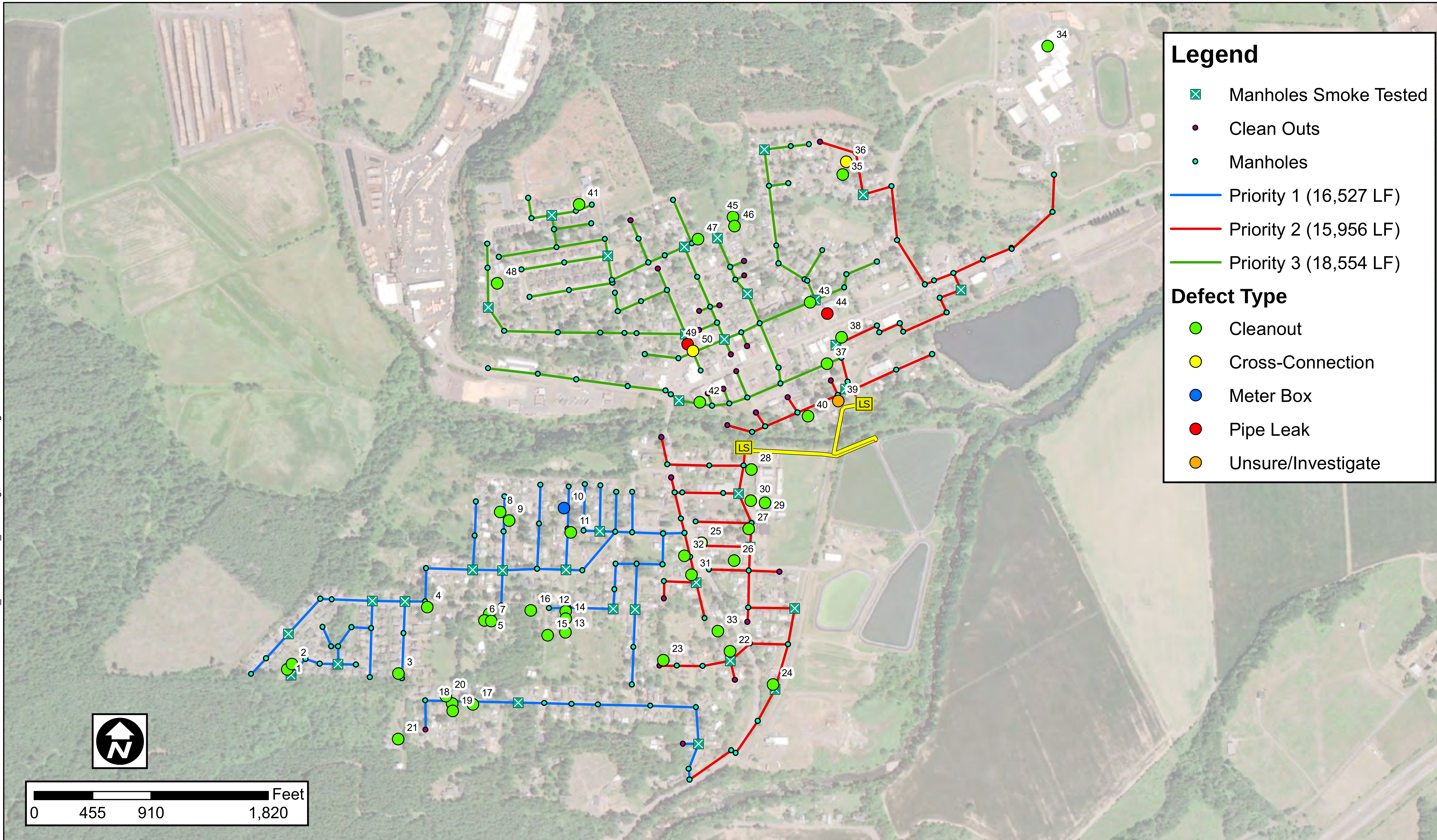
Willamina Figures

KELLER ASSOCIATES


Willamina
Oaken
Hills Park
Pacific
Plywood
Log Pond
Willamina

Appendix G

Smoke Testing



Document Path: J:\213018 - Willamina\019 - WWFP\SIb_PLAN\zGIS\b_MXDs\Fig X Smoke Testing Results.mxd

KELLER ASSOCIATES

Smoke Testing Manholes

Wastewater Facilities Planning Study

City of Willamina TIMBERTOWN U.S.A.

Figure X

City of Willamina

Picture ID #1
ADDRESS: 925 SW Pine Street
DESCRIPTION: Uncapped cleanout - cap cleanout

Picture ID #2
ADDRESS: 935 SW Pine Street
DESCRIPTION: Uncapped cleanout - cap cleanout

Picture ID #3
ADDRESS: 925 Bale Ave
DESCRIPTION: Cleanout cap broken - replace cap

Picture ID #4
ADDRESS: 975 Pioneer Avenue
DESCRIPTION: Uncapped cleanout - cap cleanout

Picture ID #5

ADDRESS: Field behind 875 Pioneer Avenue

DESCRIPTION: Cleanout cap broken - replace cap

Picture ID #6

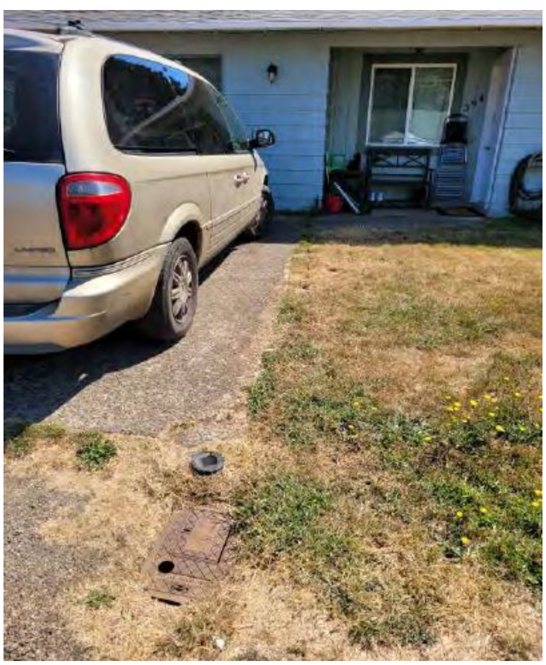
ADDRESS: Field behind 875 Pioneer Avenue

DESCRIPTION: Cleanout cap broken - replace cap

Picture ID #7

ADDRESS: Field behind 875 Pioneer Avenue
DESCRIPTION: Uncapped cleanout - cap cleanout

Picture ID #8
ADDRESS: 393 Fir Street
DESCRIPTION: Cleanout cap broken - replace cap



Picture ID #9
ADDRESS: 394 Fir Street

DESCRIPTION: Uncapped cleanout - cap cleanout

Picture ID #10
ADDRESS: 385 Oak Street
DESCRIPTION: Smoke from meter box - investigate

Picture ID #11
ADDRESS: 398 Oak Street
DESCRIPTION: Cleanout cap broken - replace cap


Picture ID #12
ADDRESS: 398 Oak Street
DESCRIPTION: Uncapped cleanout - cap cleanout

Picture ID #13
ADDRESS: 643 Pioneer Avenue
DESCRIPTION: Cleanout cap broken - replace cap

Picture ID #14
ADDRESS: 643 Pioneer Avenue
DESCRIPTION: Uncapped cleanout - cap cleanout

Picture ID #15
ADDRESS: 635 Pioneer Avenue
DESCRIPTION: Uncapped cleanout - cap cleanout

Picture ID #16
ADDRESS: 653 Pioneer Avenue
DESCRIPTION: Uncapped cleanout - cap cleanout

Picture ID #17
ADDRESS: 686 Pioneer Avenue
DESCRIPTION: Uncapped cleanout - cap cleanout

Picture ID #18
ADDRESS: 875 Hill Drive
DESCRIPTION: Uncapped cleanout - cap cleanout

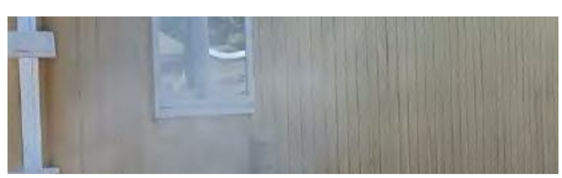
Picture ID #19
ADDRESS: 945 Hill Drive
DESCRIPTION: Uncapped cleanout - cap cleanout


Picture ID #20
ADDRESS: 945 Hill Drive
DESCRIPTION: Cleanout cap broken - replace cap

Picture ID #21
ADDRESS: 960 Hill Drive
DESCRIPTION: Uncapped cleanout - cap cleanout

Picture ID #22
ADDRESS: 1075 Hill Drive
DESCRIPTION: Uncapped cleanout - cap cleanout

Picture ID #23
ADDRESS: 130 Ivy Street
DESCRIPTION: Uncapped cleanout - cap cleanout



Picture ID #24

ADDRESS: 320 Ivy Street

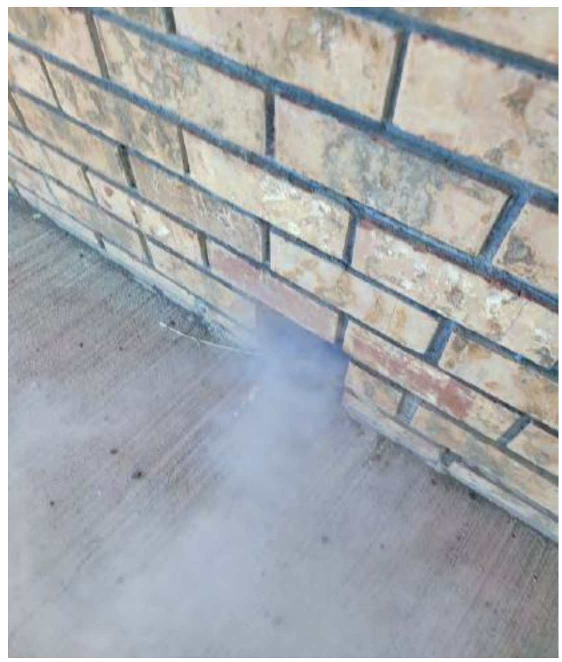
DESCRIPTION: Cleanout cap broken - replace cap

Picture ID #25

ADDRESS: 880 Lincoln Street

DESCRIPTION: Uncapped cleanout - cap cleanout

Picture ID #26
ADDRESS: 452 Main Street (Willamina Automotive)
DESCRIPTION: Uncapped cleanout - cap cleanout



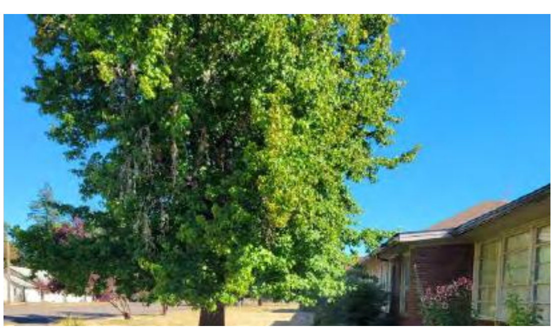
Picture ID #27
ADDRESS: 253 Polk Street
DESCRIPTION: Uncapped cleanout - cap cleanout

Picture ID #28
ADDRESS: 281 Barber Avenue
DESCRIPTION: Uncapped cleanout - cap cleanout

Picture ID #29
ADDRESS: West Valley Community Campus (266 Washington Street)
DESCRIPTION: Cleanout cap broken - replace cap

Picture ID #30
ADDRESS: West Valley Community Campus (266 Washington Street)
DESCRIPTION: Uncapped cleanout - cap cleanout

Picture ID #31
ADDRESS: West Valley Community Campus (266 Washington Street)
DESCRIPTION: Cleanout cap broken - replace cap



Picture ID #32
ADDRESS: 575 Main Street
DESCRIPTION: Uncapped cleanout - cap cleanout

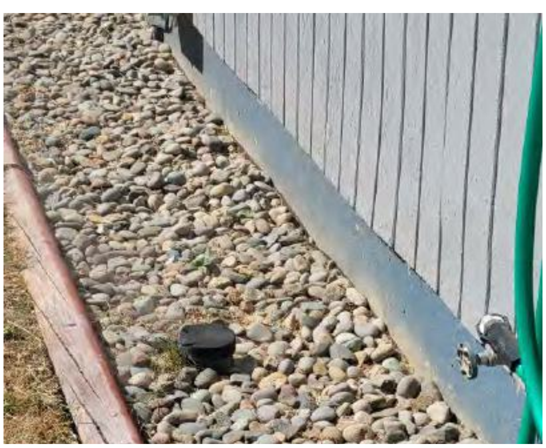
Picture ID #33
ADDRESS: 551 Main Street
DESCRIPTION: Uncapped cleanout - cap cleanout

Picture ID #34
ADDRESS: South End of Lincoln Street
DESCRIPTION: Uncapped cleanout - cap cleanout

Picture ID #35
ADDRESS: North Entrance of Elementary School
DESCRIPTION: Roof drain connected to sanitary sewer - reroute drain

Picture ID #36
ADDRESS: 780 F Street
DESCRIPTION: Uncapped cleanout - cap cleanout

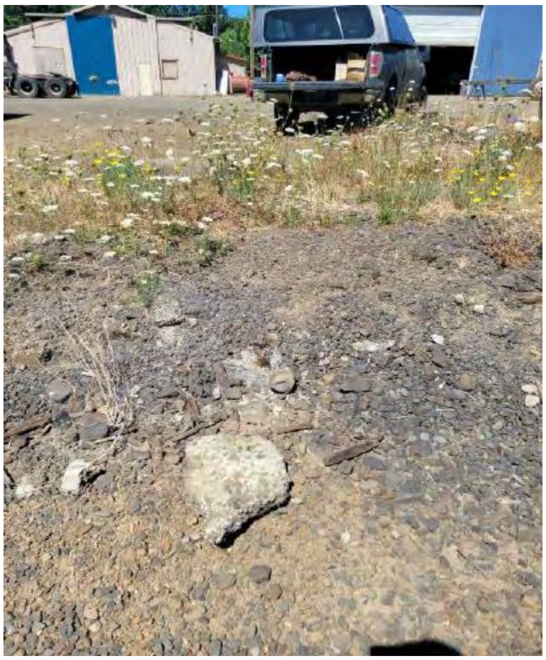
Picture ID #37
ADDRESS: 820 F Street
DESCRIPTION: Uncapped cleanout - cap cleanout



Picture ID #38

ADDRESS: 371 Main Street

DESCRIPTION: Smoke coming from ground, possible manhole, cleanout, or lateral leak - investigate



Picture ID #39

ADDRESS: 421 Main Street

DESCRIPTION: Uncapped cleanout - cap cleanout

Picture ID #40
ADDRESS: 435 Yamhill Street
DESCRIPTION: Vent pipe leaking from seal at bottom - seal

Picture ID #41
ADDRESS: 337 Yamhill Street
DESCRIPTION: Uncapped cleanout - cap cleanout

Picture ID #42
ADDRESS: 350 6th Street
DESCRIPTION: Cleanout cap broken - replace cap

Picture ID #43
ADDRESS: 115 Main Street (City of Willamina)
DESCRIPTION: Uncapped cleanout - cap cleanout


Picture ID #44
ADDRESS: 420 E Street
DESCRIPTION: Smoke coming out from ground - investigate


Picture ID #45
ADDRESS: E Street and Valley Highway (Scrub It Up Carwash)
DESCRIPTION: Uncapped cleanout - cap cleanout



Picture ID #46
ADDRESS: 318 D Street
DESCRIPTION: Uncapped cleanout - cap cleanout


Picture ID #47
ADDRESS: 318 D Street
DESCRIPTION: Uncapped cleanout - cap cleanout


Picture ID #48
ADDRESS: 212 4th Street
DESCRIPTION: Uncapped cleanout - cap cleanout

Picture ID #49
ADDRESS: 1st Street and B Street
DESCRIPTION: Smoke from ground and meter box - investigate

Picture ID #50

ADDRESS: 1st Street and B Street

DESCRIPTION: Smoke from storm drains - investigate connection and reroute drain

Appendix H

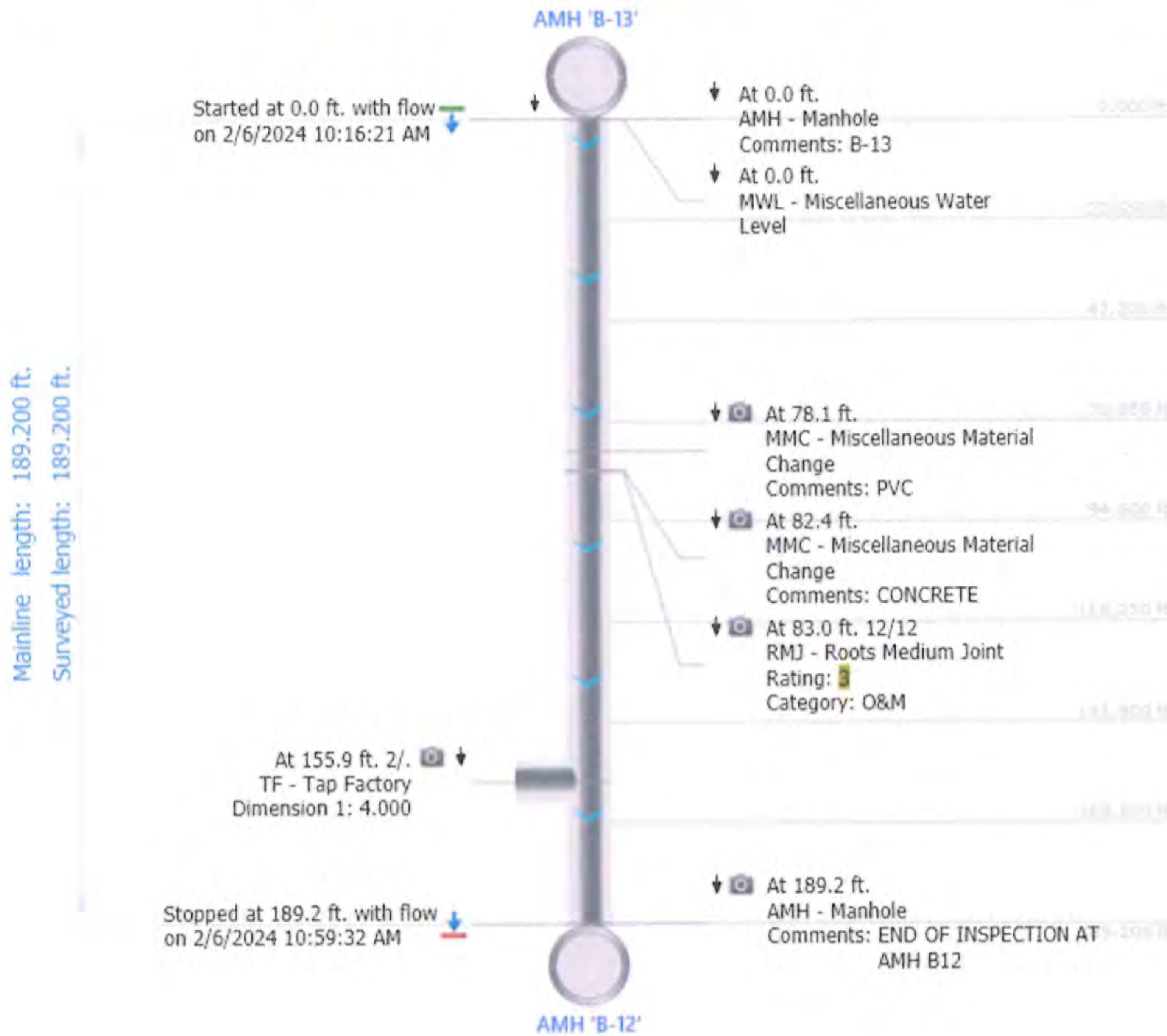
CCTV North Basin Results

OVW2
OVW1
OVW4
OVW5
OVW3
OVW6
Oaken Hills Park
B8-3-2
B8-3-1
B8-4
B5-4
B5-3
B8-5
B8-6
B11-1
OVW9
OVW8
B11
B10
B-12
OVW7
B10-2
B10-1
Willamina
B2-10
B2-8
B2-3
Pacific Plywood Log Pond

Ore Vac West
24150 SW Perrydale RD,
Amity OR 97101
Phone : 503-881-2331

Main Inspections Pipe Run and Map

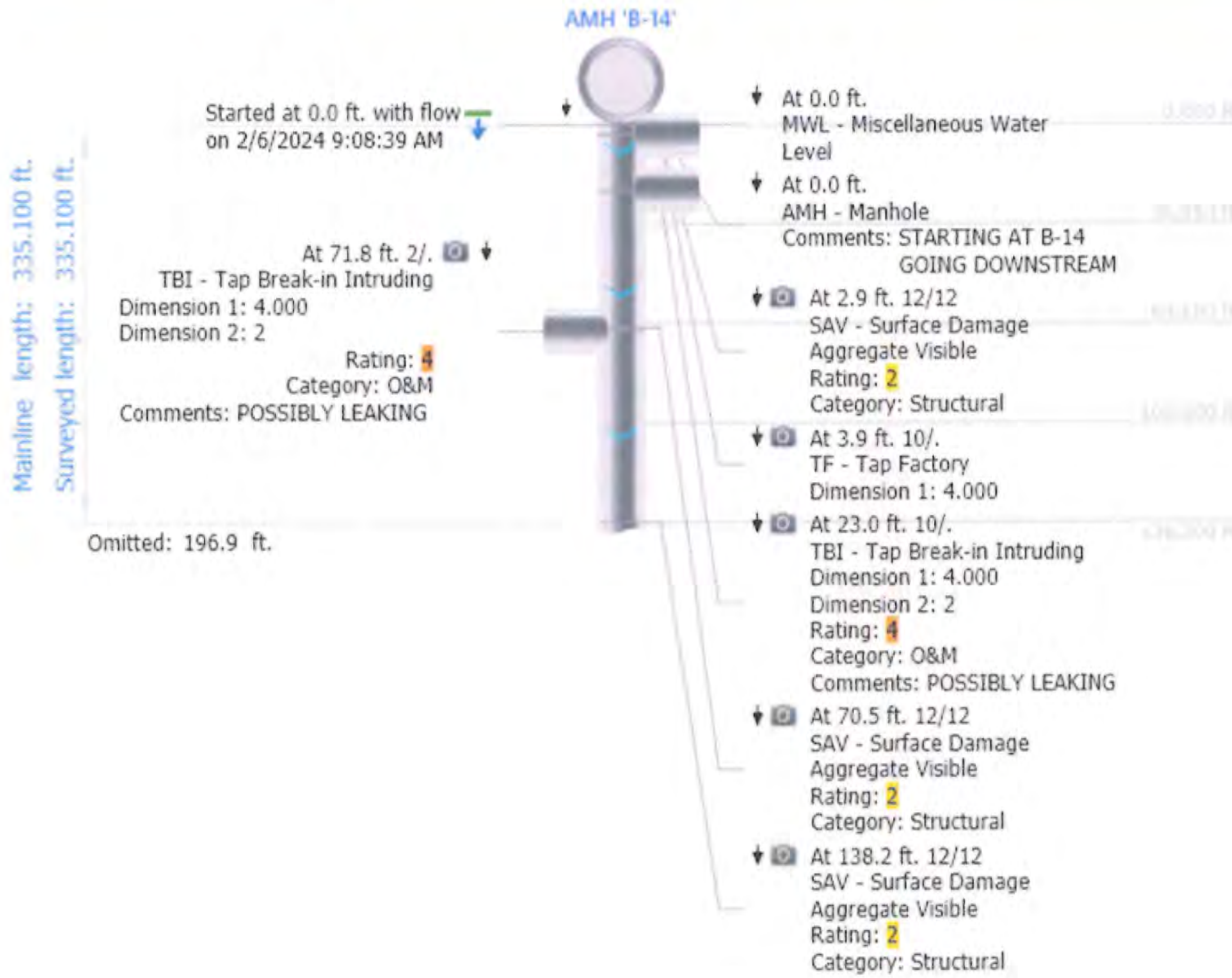
Project name:	Mainline ID:	City:	Street:
City of Willamina I&I	**B-13_B-12**	**WILLAMINA**	**318 NE WILLAMINA DR**
Start date/time:	Direction:	Weather:	Location code:
2/6/2024 10:16 AM	**D**	**3**	**B**
Shape:	Material:	Height:	Width:
C	**CP**	**8 in.**	



Ore Vac West
24150 SW Perrydale RD,
Amity OR 97101
Phone : 503-881-2331

Main Inspections Pipe Run and Map

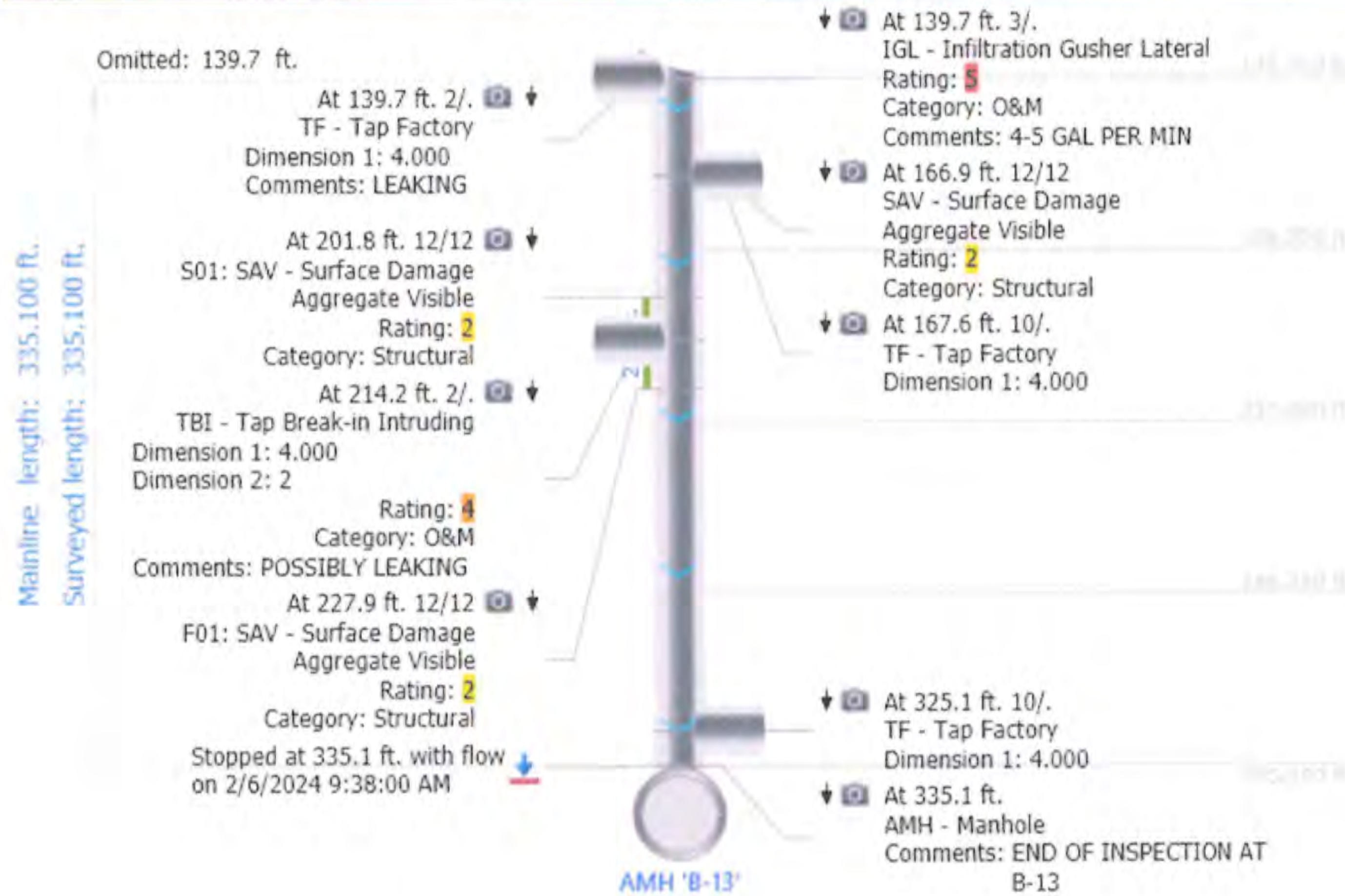
Project name:	Mainline ID:	City:	Street:
City of Willamina I&I	**B-14_B-13**	**WILLAMINA**	**432 NW WILLAMINA DR**
Start date/time:	Direction:	Weather:	Location code:
2/6/2024 9:08 AM	**D**	**3**	**B**
Shape:	Material:	Height:	Width:
C	**CP**	**8 in.**	



Project name:	Mainline ID:	Start date/time:	Direction:
City of Willamina I&I	**B-14_B-13**	**2/6/2024 9:08 AM**	**D**

Weather:

3



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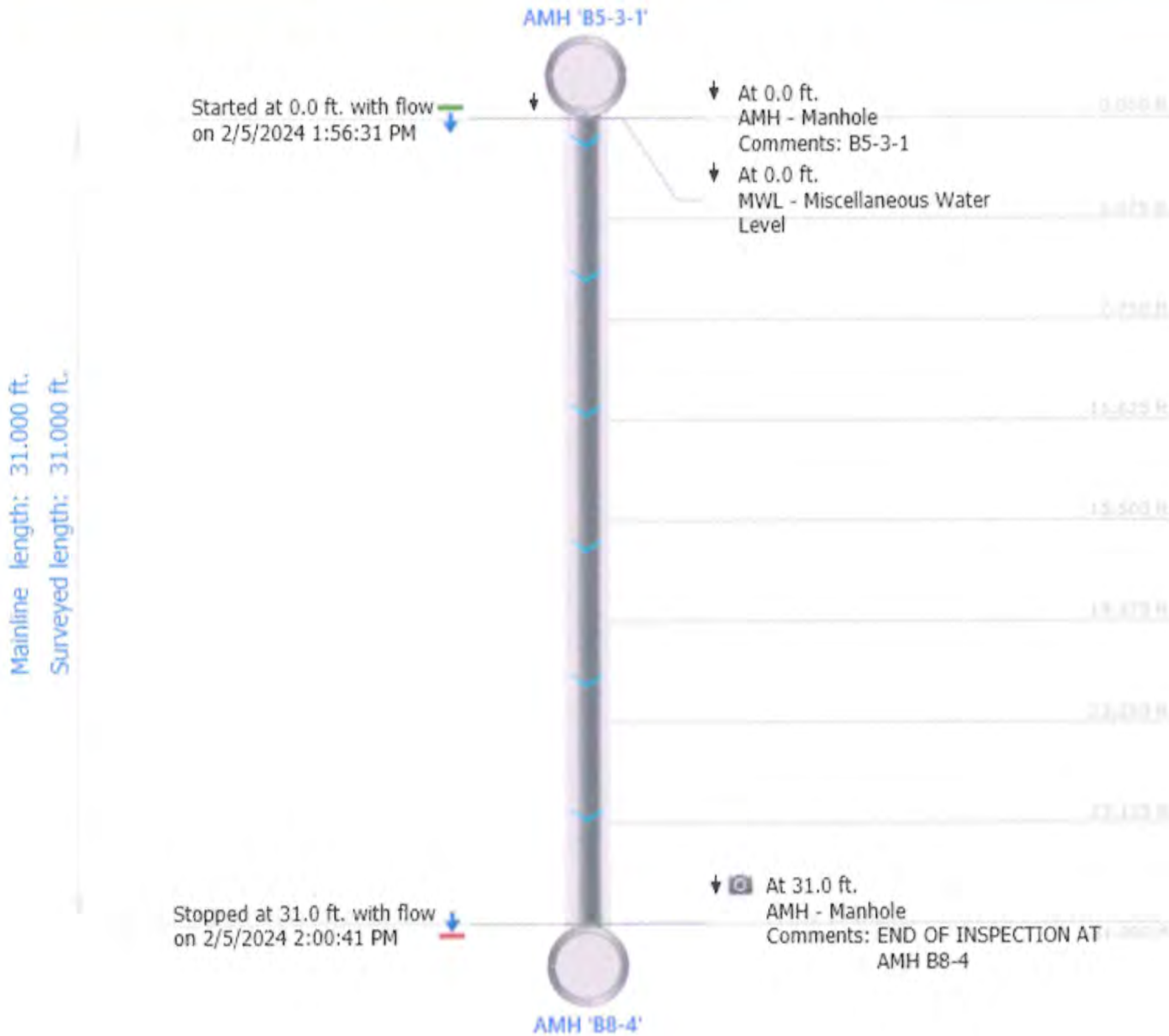
Amity OR 97101
Phone : 503-881-2331

Main Inspections Pipe Run

Project name:	Mainline ID:	City:	Street:
City of Willamina I&I	**B5-3-1_B8-4**	**WILLAMINA**	**NE C ST & NE 4TH ST**
Start date/time:	Direction:	Weather:	Location code:
2/5/2024 1:56 PM	**D**	**3**	**B**
Shape:	Material:	Height:	Width:
C	**CP**	**8 in.**	



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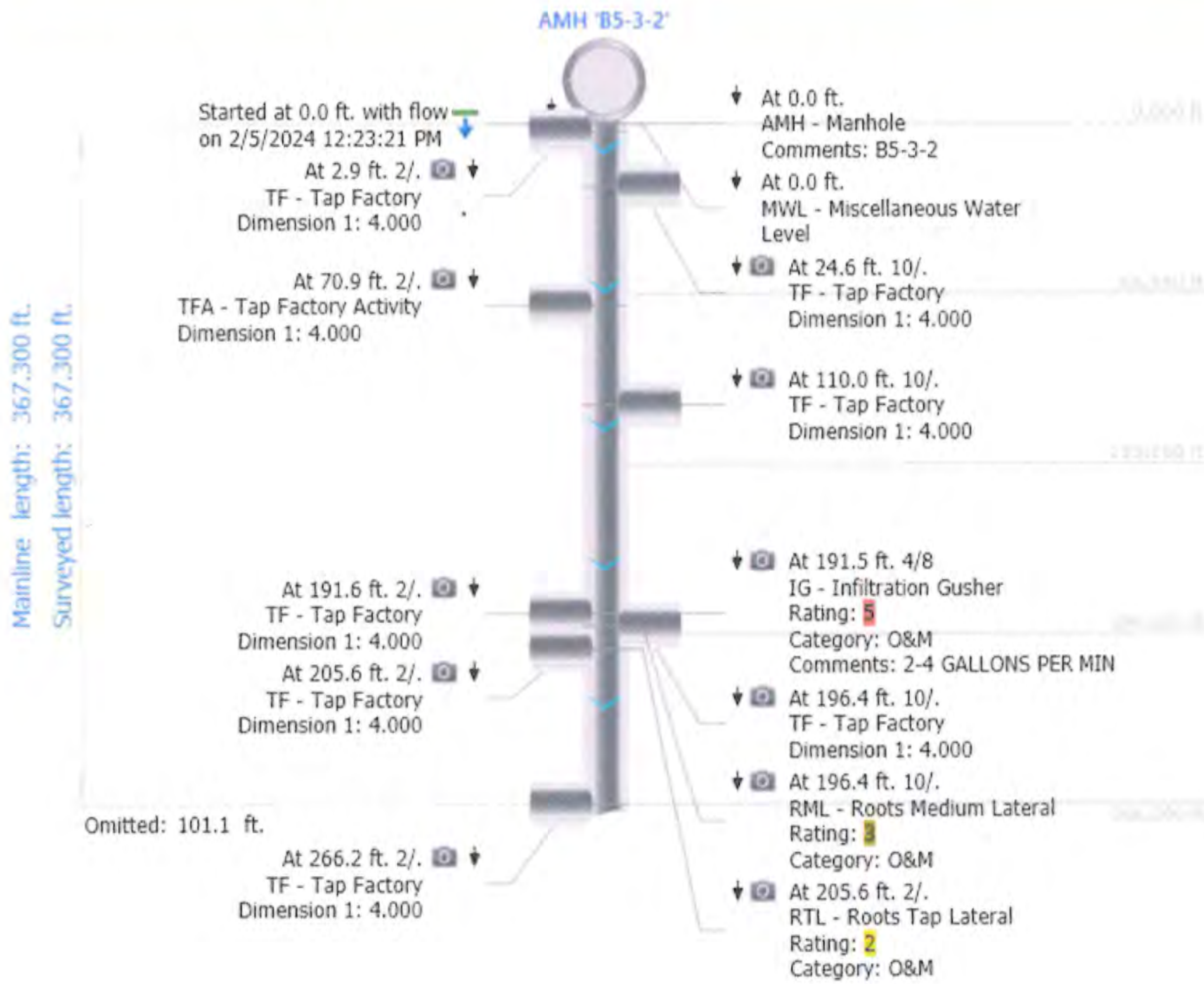
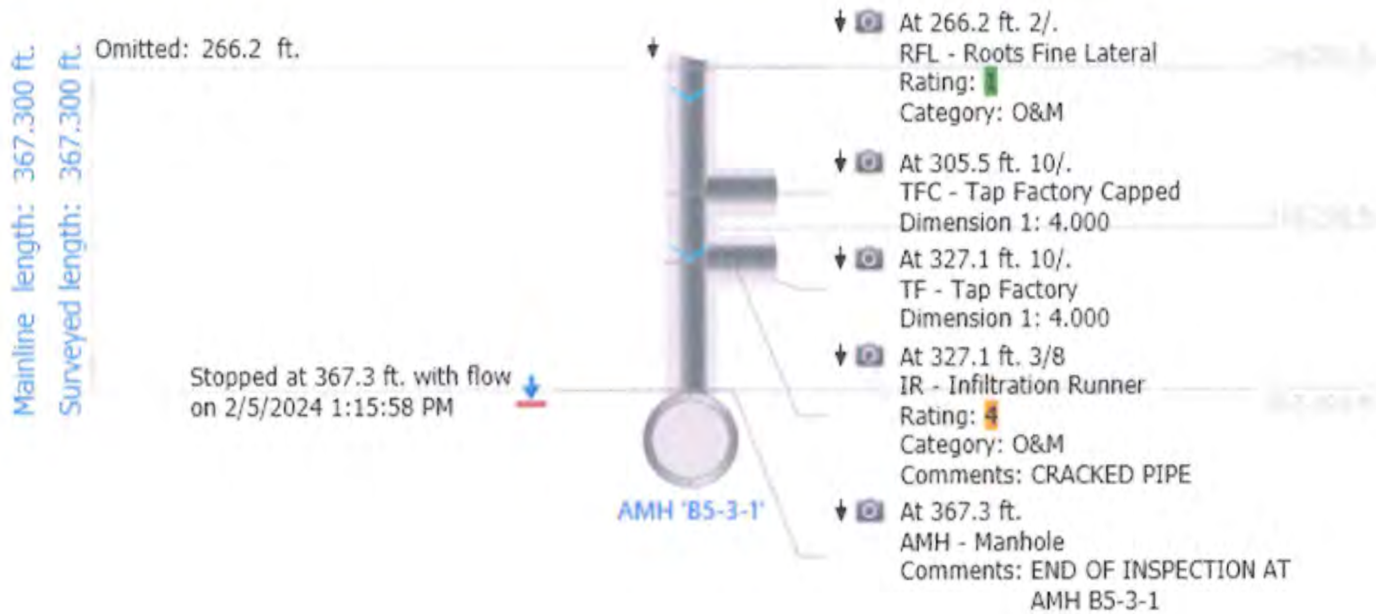
Main Inspections Pipe Run

Project name:	Mainline ID:	City:	Street:
City of Willamina I&I	**B5-3-2_B5-3-1**	**WILLAMINA**	**782 NE C ST**
Start date/time:	Direction:	Weather:	Location code:
2/5/2024 12:23 PM	**D**	**3**	**B**
Shape:	Material:	Height:	Width:
C	**CP**	**8 in.**	



Project name:	Mainline ID:	Start date/time:	Direction:
City of Willamina I&I	**B5-3-2_B5-3-1**	**2/5/2024 12:23 PM**	**D**

Weather:
3



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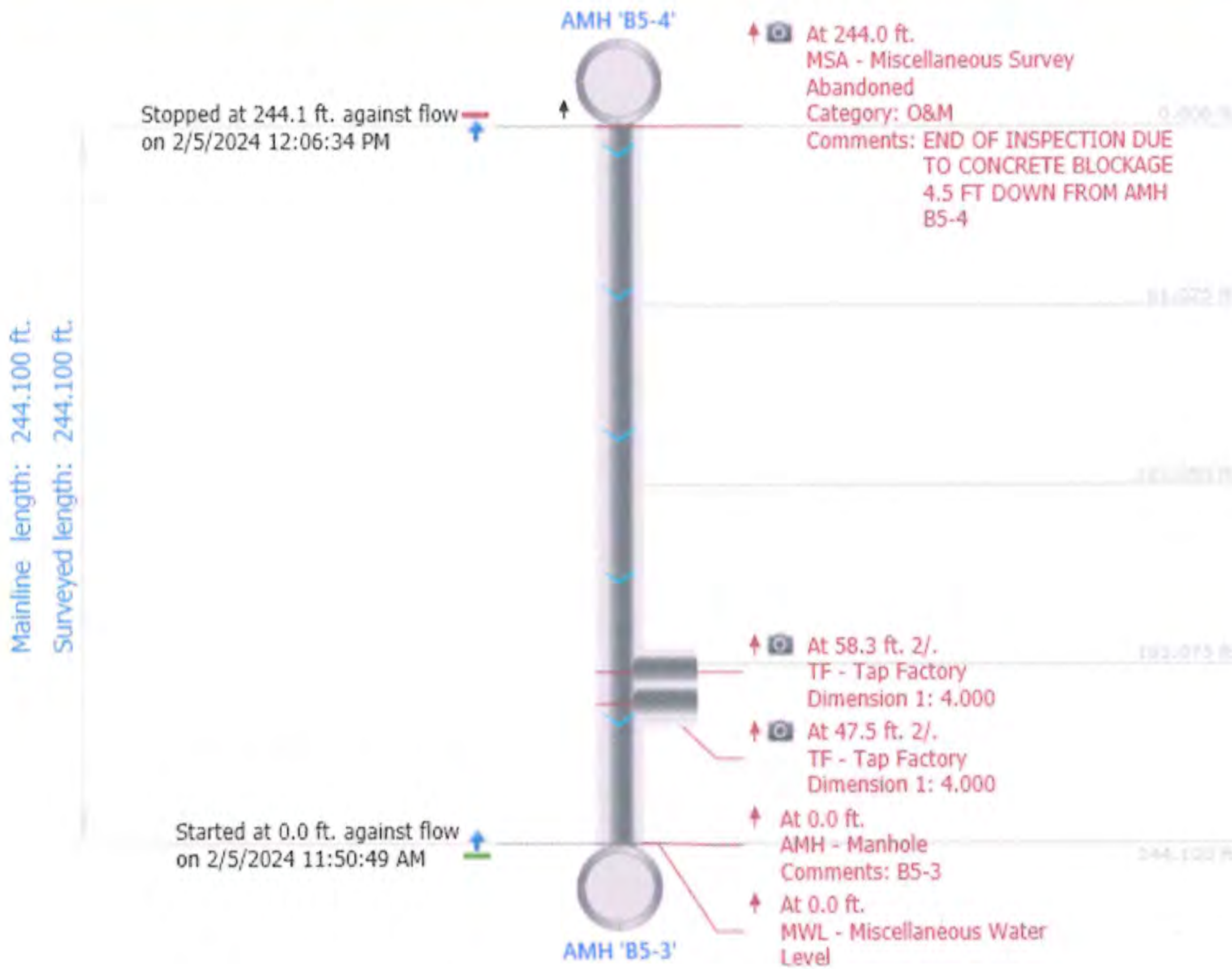
Main Inspections Pipe Run

Project name:	Mainline ID:	City:	Street:
City of Willamina I&I	**B5-4_B5-3.**	**WILLAMINA**	**NE D ST & 3RD ST**
Start date/time:	Direction:	Weather:	Location code:
2/5/2024 11:50 AM	**U**	**3**	**B**
Shape:	Material:	Height:	Width:
C	**CP**	**8 in.**	



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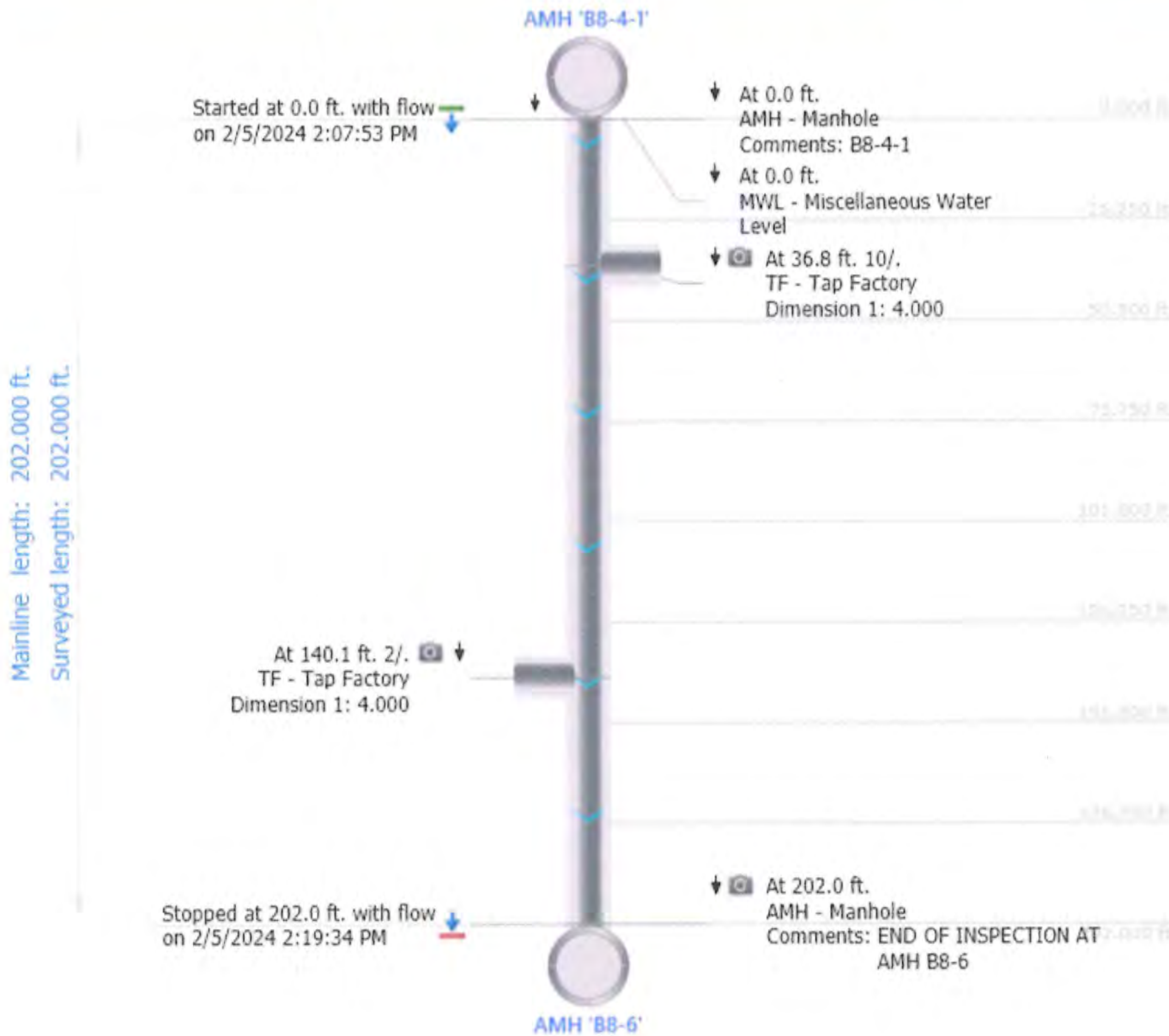
Main Inspections Pipe Run

Project name:	Mainline ID:	City:	Street:
City of Willamina I&I	**B8-4-1_B8-6**	**WILLAMINA**	**110 NE B ST**
Start date/time:	Direction:	Weather:	Location code:
2/5/2024 2:07 PM	**D**	**3**	**B**
Shape:	Material:	Height:	Width:
C	**CP**	**8 in.**	



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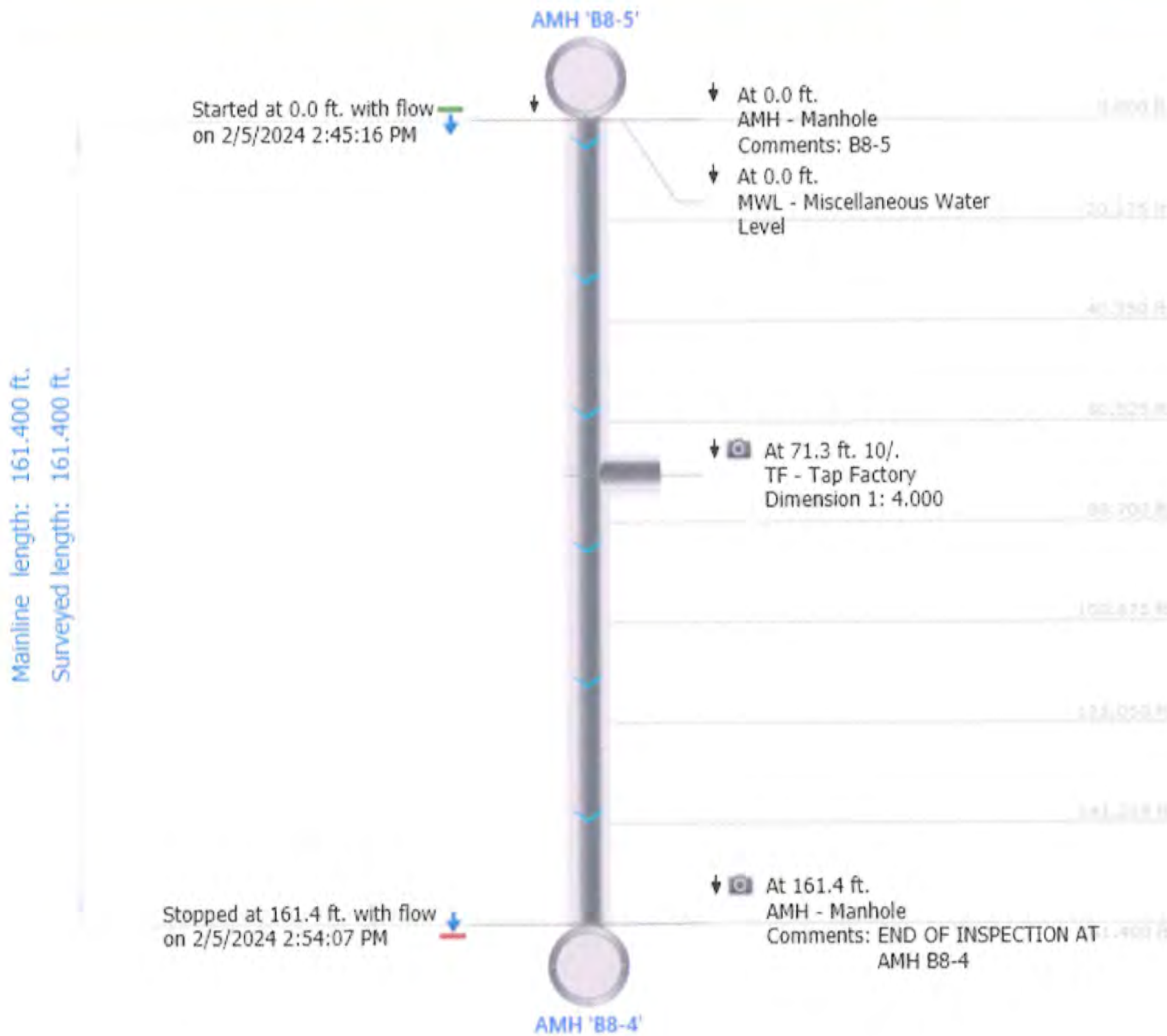
Main Inspections Pipe Run

Project name:	Mainline ID:	City:	Street:
City of Willamina I&I	**B8-5_B8-4**	**WILLAMINA**	**NE C ST**
Start date/time:	Direction:	Weather:	Location code:
2/5/2024 2:45 PM	**D**	**3**	**B**
Shape:	Material:	Height:	Width:
C	**CP**	**10 in.**	



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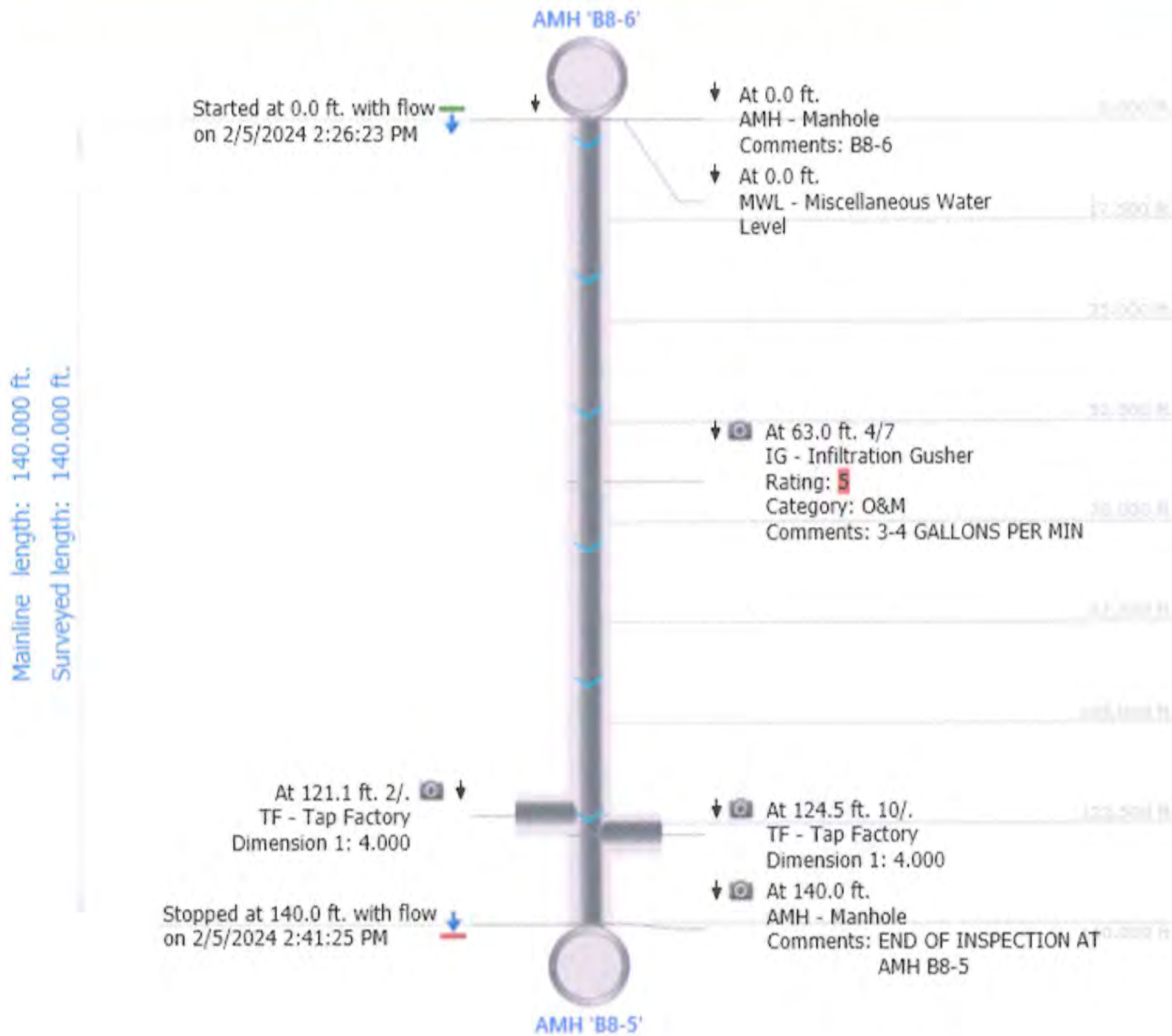
Main Inspections Pipe Run

Project name:	Mainline ID:	City:	Street:
City of Willamina I&I	**B8-6_B8-5**	**WILLAMINA**	**NE B ST & NE 4TH ST**
Start date/time:	Direction:	Weather:	Location code:
2/5/2024 2:26 PM	**D**	**3**	**B**
Shape:	Material:	Height:	Width:
C	**CP**	**10 in.**	



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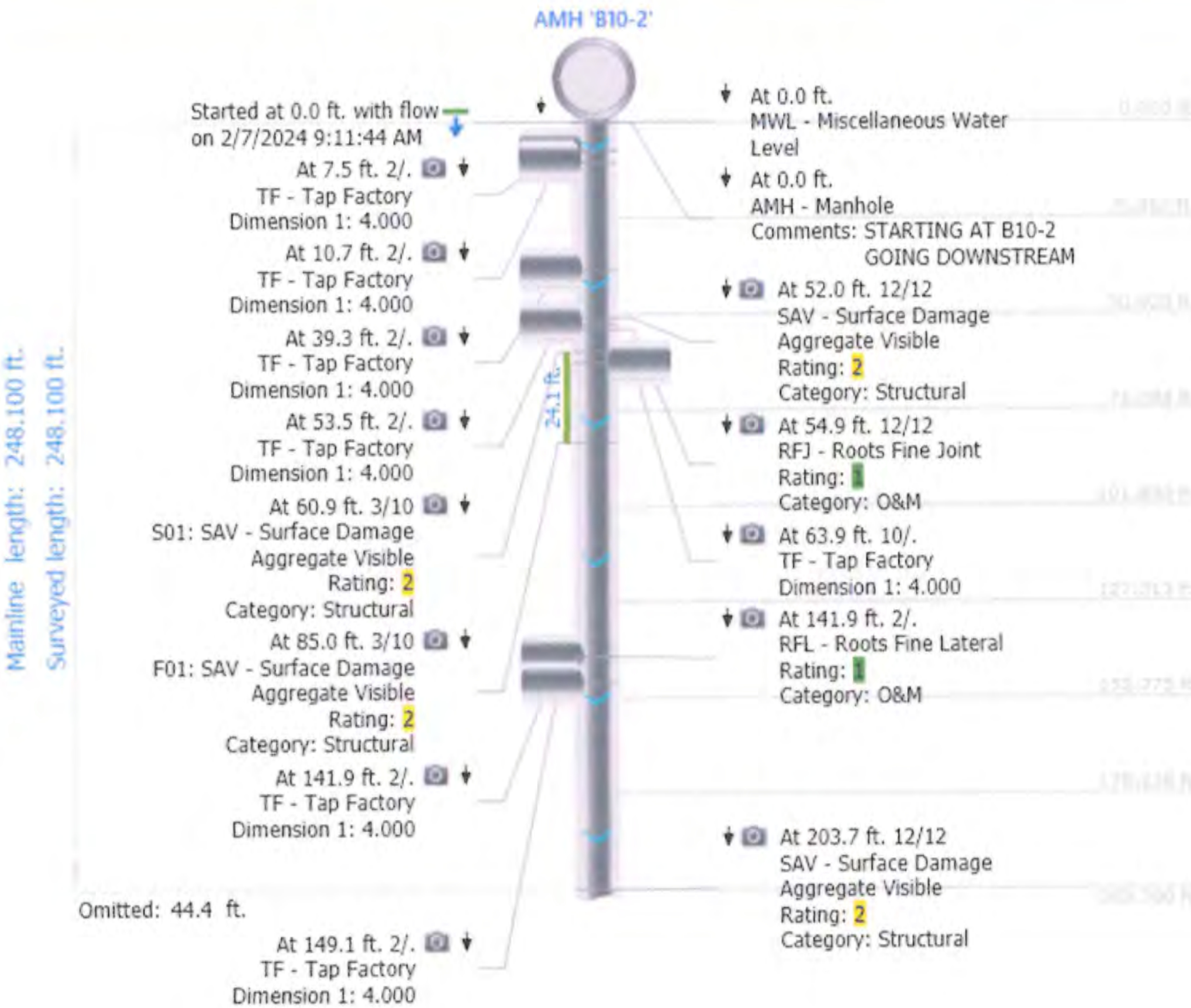
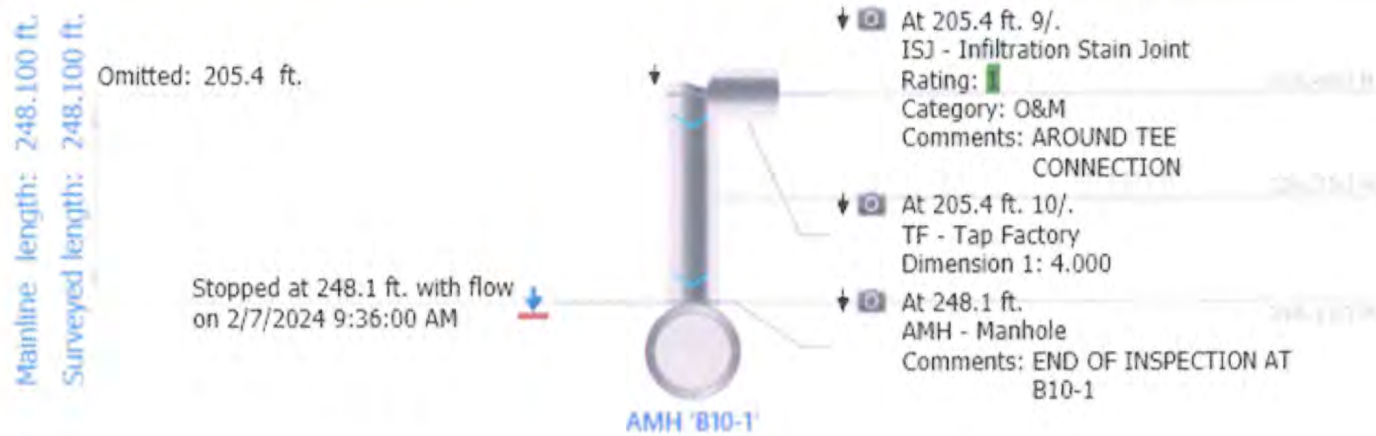
Main Inspections Pipe Run and Map

Project name:	Mainline ID:	City:	Street:
City of Willamina I&I	**B10-2_B10-1**	**WILLAMINA**	**199 NE 1ST STREET**
Start date/time:	Direction:	Weather:	Location code:
2/7/2024 9:11 AM	**D**	**3**	**B**
Shape:	Material:	Height:	Width:
C	**CP**	**8 in.**	



Project name:	Mainline ID:	Start date/time:	Direction:
City of Willamina I&I	**B10-2_B10-1**	**2/7/2024 9:11 AM**	**D**

Weather:
3



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Main Inspections Pipe Run and Map

Project name:	Mainline ID:	City:	Street:
City of Willamina I&I	**B-11_B-10**	**WILLAMINA**	**188 NW WILLAMINA DR**
Start date/time:	Direction:	Weather:	Location code:
2/6/2024 11:27 AM	**D**	**3**	**B**
Shape:	Material:	Height:	Width:
C	**CP**	**8 in.**	

AMH 'B-11'

Mainline length: 406.200 ft.
Surveyed length: 406.200 ft.

Started at 0.0 ft. with flow on 2/6/2024 11:27:27 AM

Omitted: 297.8 ft.

At 0.0 ft.
MWL - Miscellaneous Water Level

At 0.0 ft.
AMH - Manhole
Comments: STARTING AT B-11 GOING DOWNSTREAM

At 44.5 ft. 10/.
TF - Tap Factory
Dimension 1: 4.000

At 51.6 ft. 12/12
SAV - Surface Damage Aggregate Visible
Rating: 2
Category: Structural

At 52.6 ft. 9/.
RFJ - Roots Fine Joint
Rating: 1
Category: O&M

At 53.8 ft. 10/.
TFA - Tap Factory Activity
Dimension 1: 4.000

At 62.1 ft. 3/.
RFJ - Roots Fine Joint
Rating: 1
Category: O&M

At 107.2 ft. 12/12
SAV - Surface Damage Aggregate Visible
Rating: 2
Category: Structural

At 108.4 ft. 10/.
TF - Tap Factory
Dimension 1: 4.000

Project name:	Mainline ID:	Start date/time:	Direction:
City of Willamina I&I	**B-11_B-10**	**2/6/2024 11:27 AM**	**D**

Weather:
3

Mainline length: 406.200 ft.
Surveyed length: 406.200 ft.

Omitted: 191.7 ft.

At 191.7 ft. 12/12
SAV - Surface Damage Aggregate Visible
Rating: 2
Category: Structural

At 192.3 ft. 10/.
TF - Tap Factory
Dimension 1: 4.000

At 266.0 ft. 12/12
SAV - Surface Damage Aggregate Visible
Rating: 2
Category: Structural

At 266.5 ft. 10/.
TF - Tap Factory
Dimension 1: 4.000

At 323.4 ft. 10/.
TFA - Tap Factory Activity
Dimension 1: 4.000
Comments: POSSIBLY LEAKING

At 406.2 ft.
AMH - Manhole
Comments: END OF INSPECTION AT B-10

Stopped at 406.2 ft. with flow on 2/6/2024 11:51:58 AM

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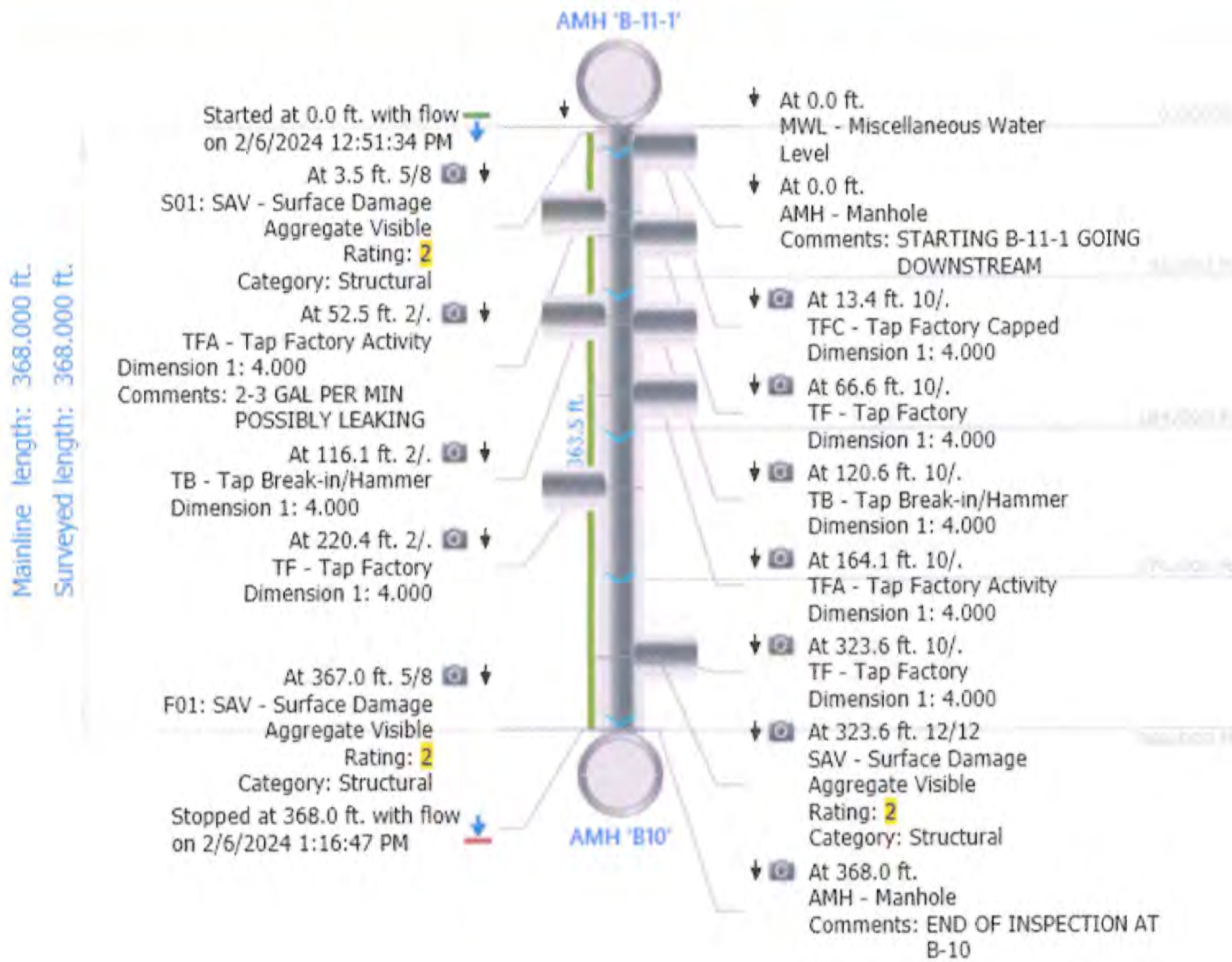
Main Inspections Pipe Run and Map

Project name:	Mainline ID:	City:	Street:
City of Willamina I&I	**B-11-1_B10**	**WILLAMINA**	**NW B ST & NW 3RD ST**
Start date/time:	Direction:	Weather:	Location code:
2/6/2024 12:51 PM	**D**	**3**	**B**
Shape:	Material:	Height:	Width:
C	**CP**	**8 in.**	



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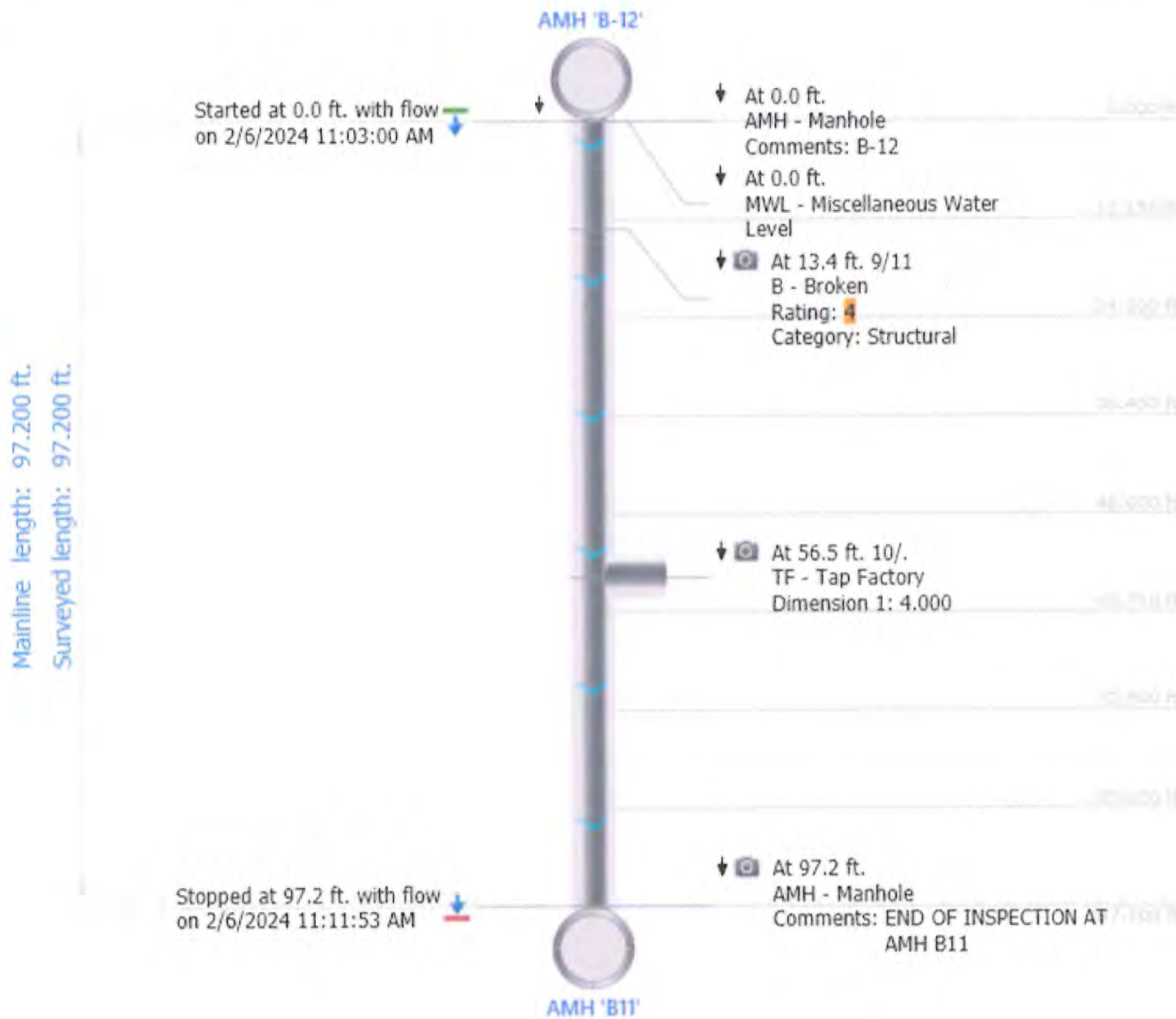
Main Inspections Pipe Run and Map

Project name:	Mainline ID:	City:	Street:
City of Willamina I&I	B-12_B11	WILLAMINA	CHURCHMAN ST & NW WILLAMINA DR
Start date/time:	Direction:	Weather:	Location code:
2/6/2024 11:03 AM	D	3	B
Shape:	Material:	Height:	Width:
C	CP	8 in.	



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Amity OR 97101
Phone : 503-881-2331

Main Inspections Pipe Run and Map

Project name:	Mainline ID:	City:	Street:
City of Willamina I&I	**B-14_B-13**	**WILLAMINA**	**432 NW WILLAMINA DR**
Start date/time:	Direction:	Weather:	Location code:
2/6/2024 9:08 AM	**D**	**3**	**B**
Shape:	Material:	Height:	Width:
C	**CP**	**8 in.**	

AMH 'B-14'

Started at 0.0 ft. with flow
on 2/6/2024 9:08:39 AM

Mainline length: 335.100 ft.
Surveyed length: 335.100 ft.

At 71.8 ft. 2/.
TBI - Tap Break-in Intruding
Dimension 1: 4.000
Dimension 2: 2
Rating: 4
Category: O&M
Comments: POSSIBLY LEAKING

Omitted: 196.9 ft.

At 0.0 ft.
MWL - Miscellaneous Water Level

At 0.0 ft.
AMH - Manhole
Comments: STARTING AT B-14 GOING DOWNSTREAM

At 2.9 ft. 12/12
SAV - Surface Damage Aggregate Visible
Rating: 2
Category: Structural

At 3.9 ft. 10/.
TF - Tap Factory
Dimension 1: 4.000

At 23.0 ft. 10/.
TBI - Tap Break-in Intruding
Dimension 1: 4.000
Dimension 2: 2
Rating: 4
Category: O&M
Comments: POSSIBLY LEAKING

At 70.5 ft. 12/12
SAV - Surface Damage Aggregate Visible
Rating: 2
Category: Structural

At 138.2 ft. 12/12
SAV - Surface Damage Aggregate Visible
Rating: 2
Category: Structural

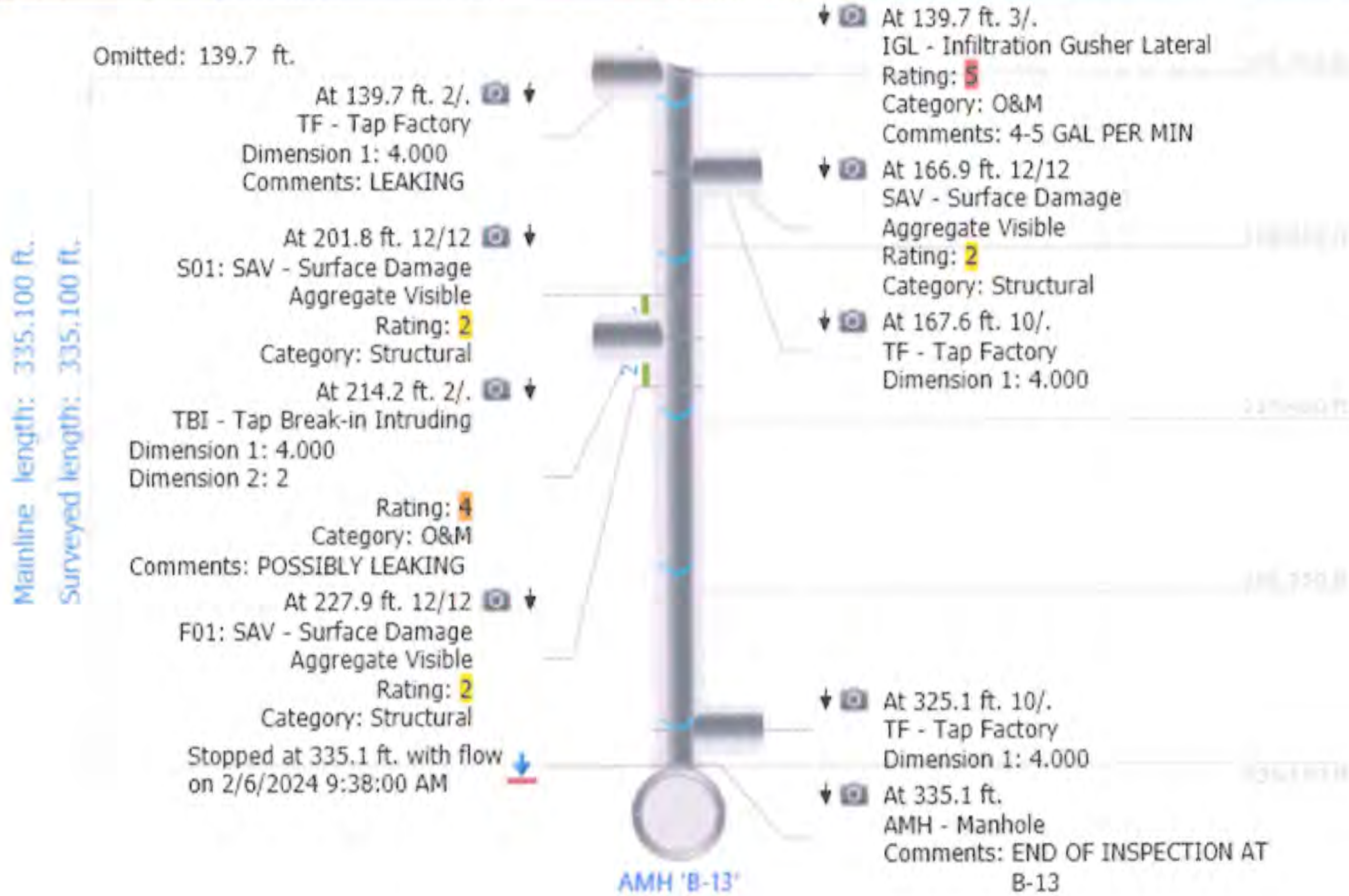
Project name: **City of Willamina I&I**

Mainline ID: **B-14_B-13**

Start date/time: **2/6/2024 9:08 AM**

Direction: **D**

Weather: **3**



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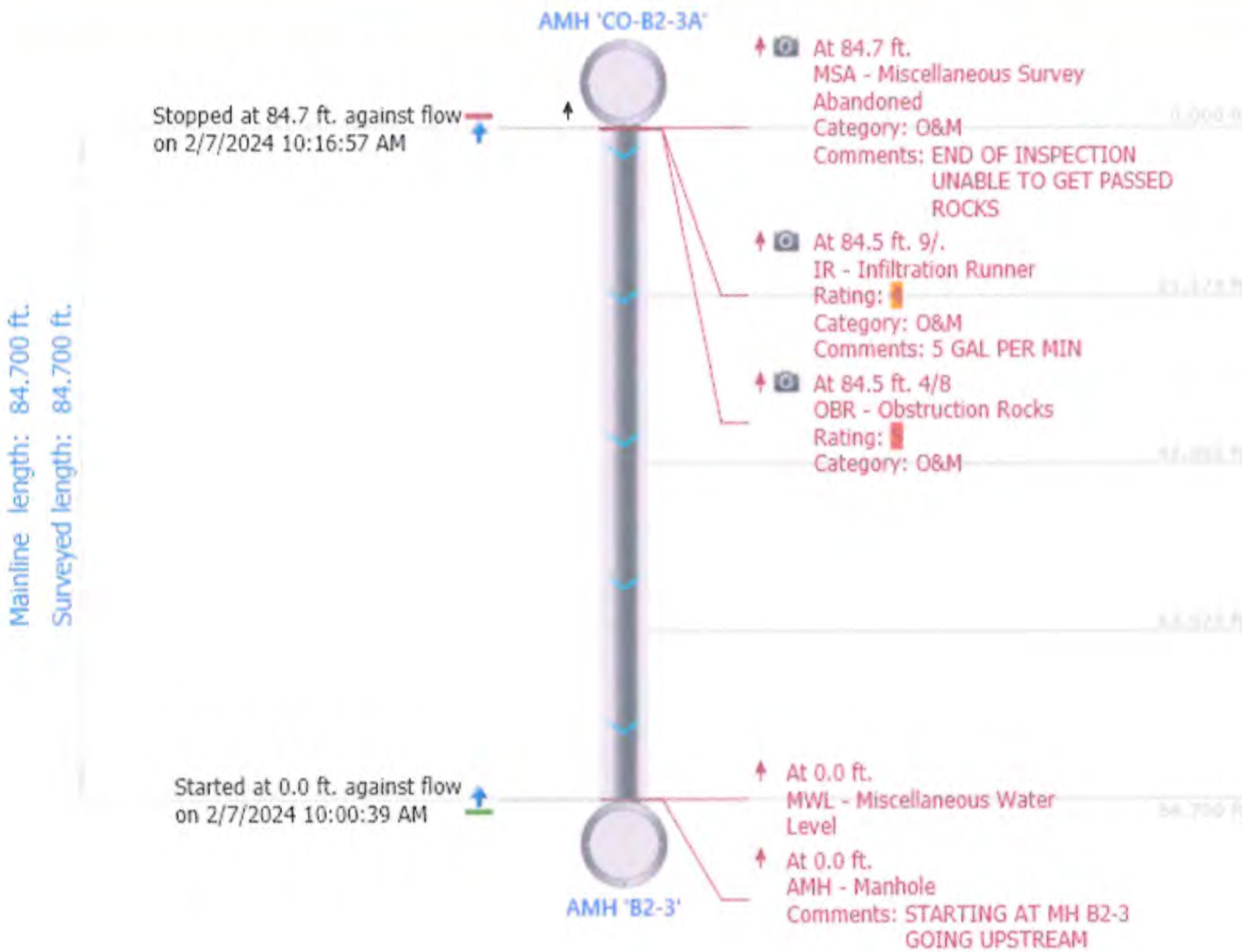
Main Inspections Pipe Run and Map

Project name:	Mainline ID:	City:	Street:
City of Willamina I&I	**CO-B2-3A_B2-3**	**WILLAMINIA**	**SE B ST**
Start date/time:	Direction:	Weather:	Location code:
2/7/2024 10:00 AM	**U**	**3**	**B**
Shape:	Material:	Height:	Width:
C	**CP**	**6 in.**	



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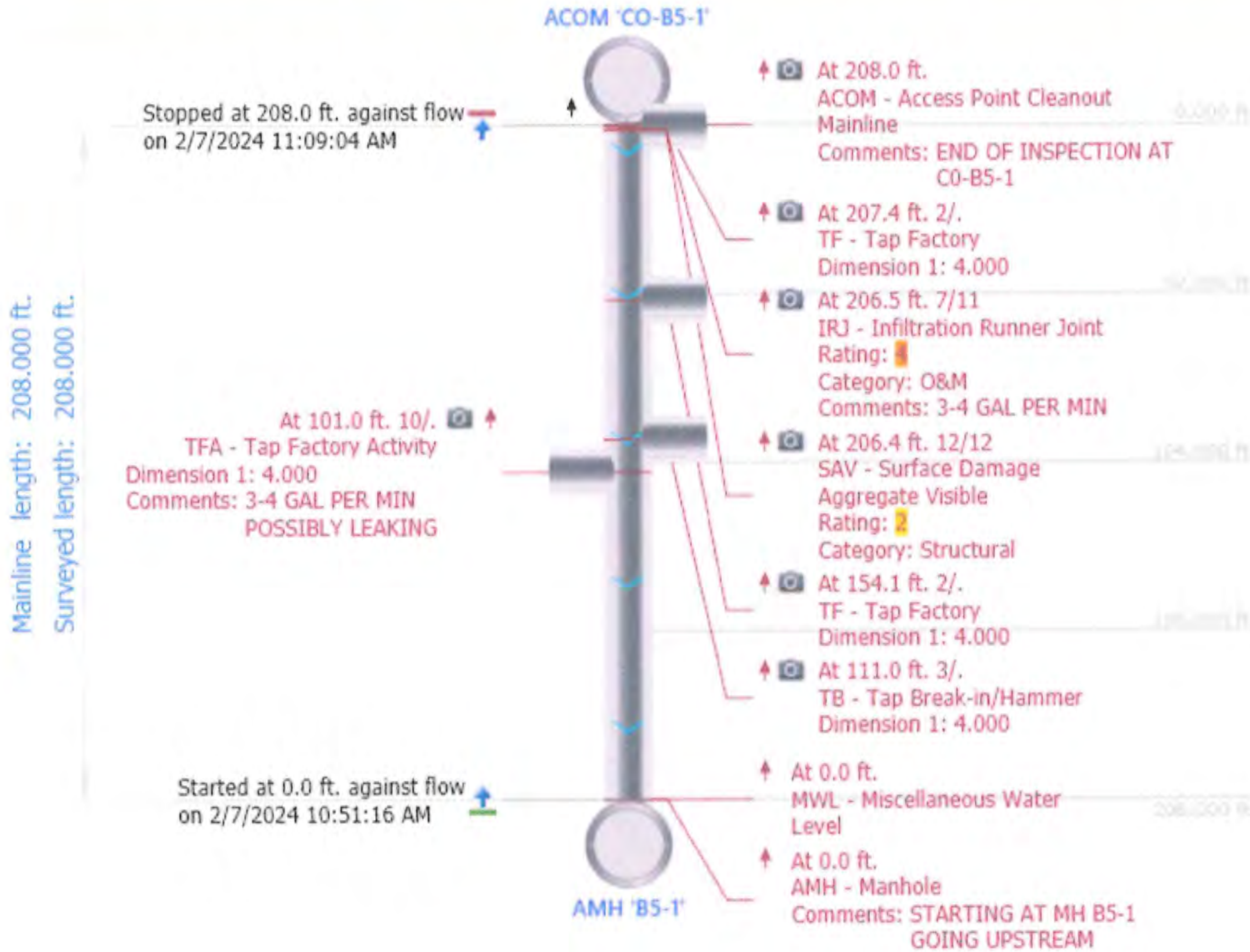
Amity OR 97101
Phone : 503-881-2331

Main Inspections Pipe Run and Map

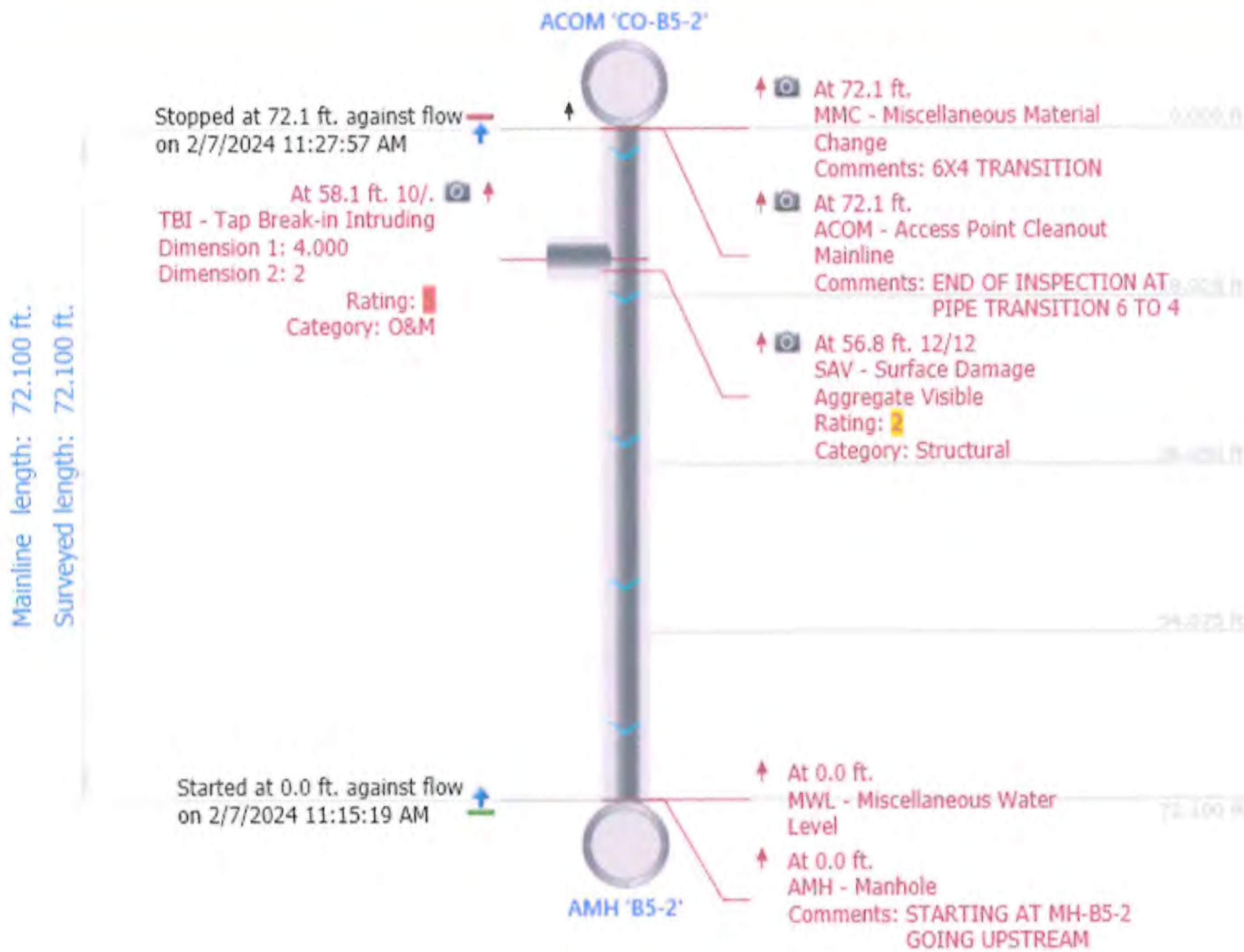
Project name:	Mainline ID:	City:	Street:
City of Willamina I&I	**CO-B5-1_B5-1**	**WILLAMINA**	**NE D ST**
Start date/time:	Direction:	Weather:	Location code:
2/7/2024 10:51 AM	**U**	**3**	**B**
Shape:	Material:	Height:	Width:
C	**CP**	**6 in.**	



Ore Vac West
24150 SW Perrydale RD,
Amity OR 97101
Phone : 503-881-2331

Main Inspections Pipe Run and Map

Project name:	Mainline ID:	City:	Street:
City of Willamina I&I	**CO-B5-2_B5-2**	**WILLAMINA**	**NE D ST**
Start date/time:	Direction:	Weather:	Location code:
2/7/2024 11:15 AM	**U**	**3**	**B**
Shape:	Material:	Height:	Width:
C	**CP**	**6 in.**	



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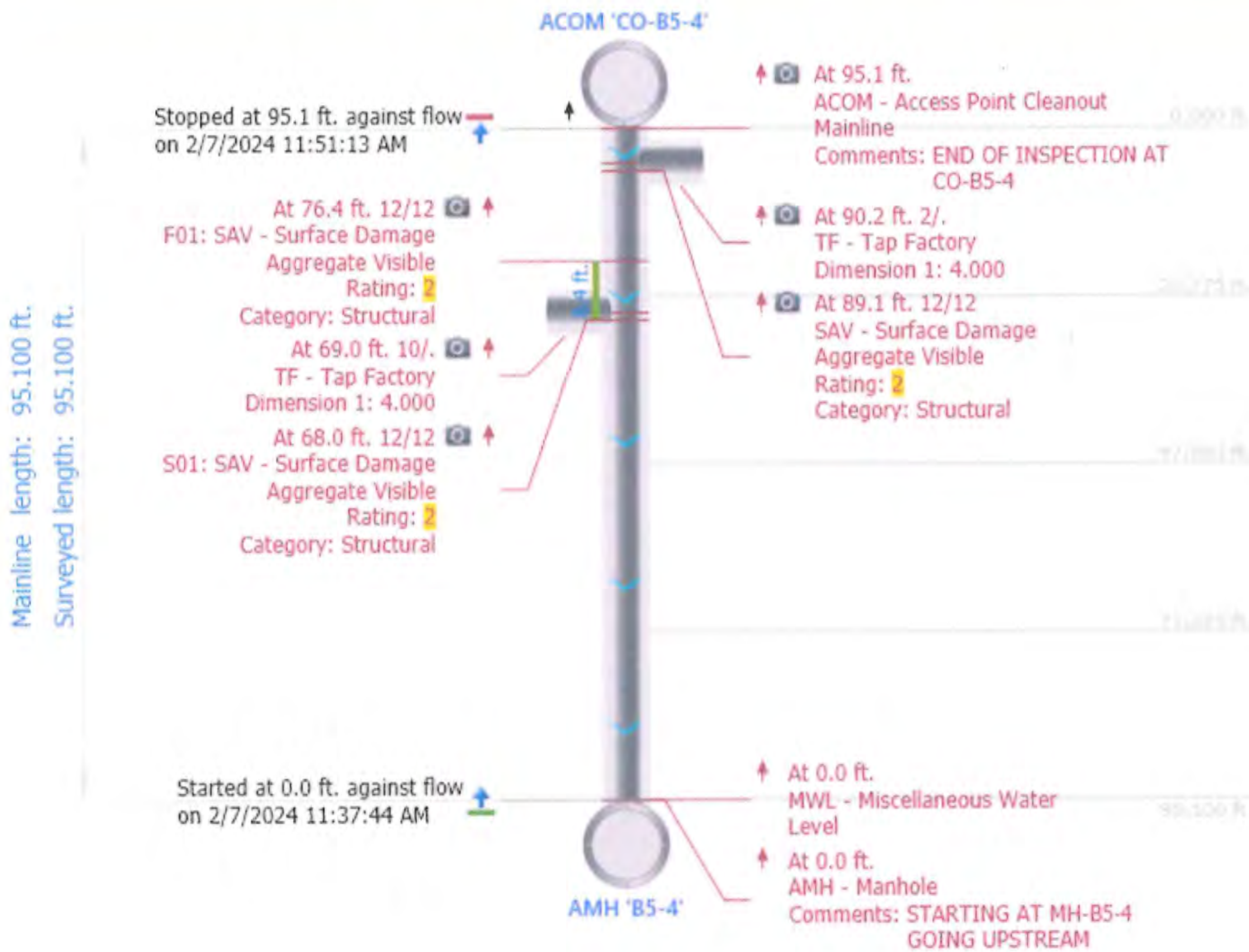
Amity OR 97101
Phone : 503-881-2331

Main Inspections Pipe Run and Map

Project name:	Mainline ID:	City:	Street:
City of Willamina I&I	**CO-B5-4_B5-4**	**WILLAMINA**	**NE D ST & NE 4TH ST**
Start date/time:	Direction:	Weather:	Location code:
2/7/2024 11:37 AM	**U**	**3**	**B**
Shape:	Material:	Height:	Width:
C	**CP**	**6 in.**	



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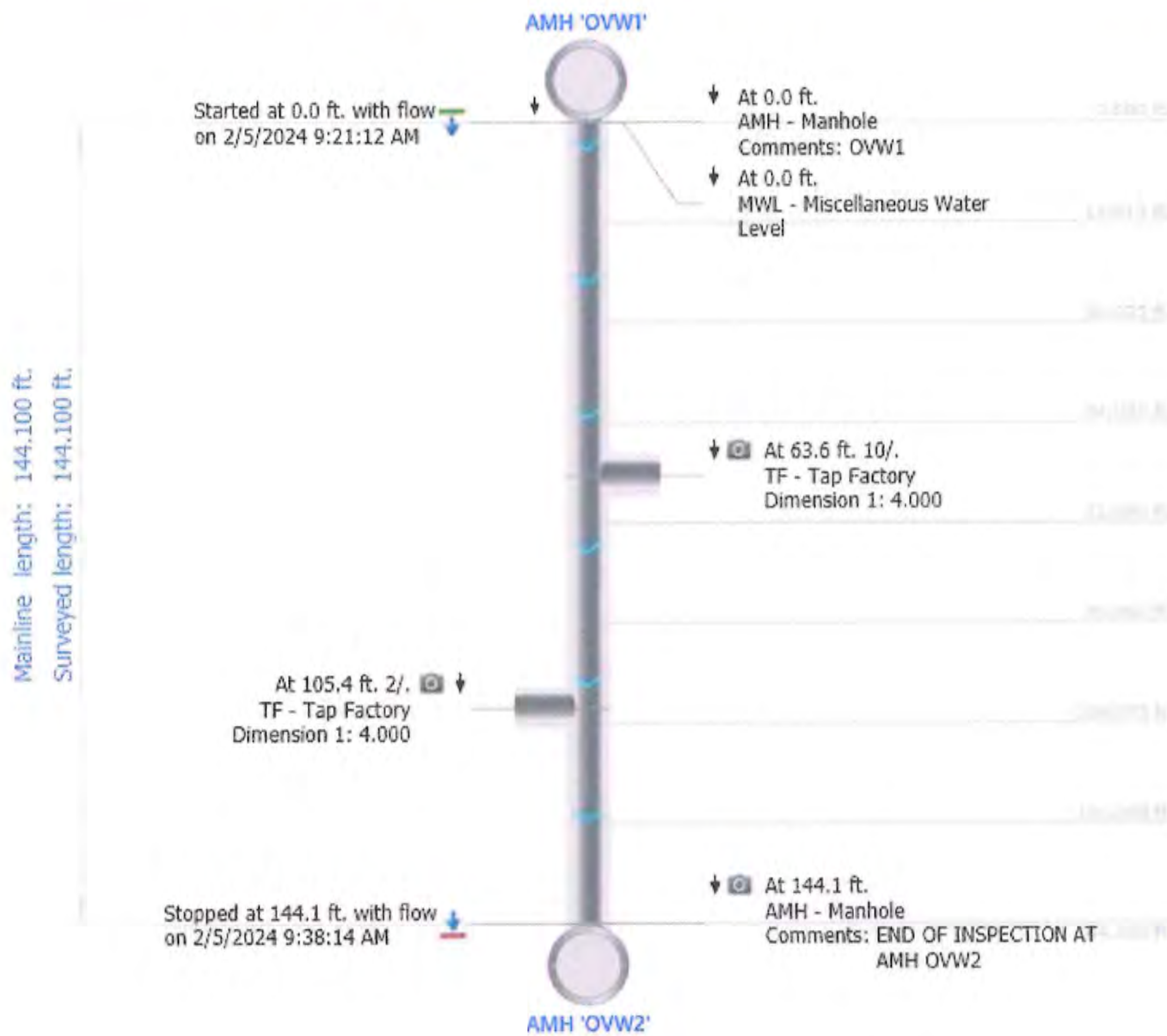
Main Inspections Pipe Run and Map

Project name:	Mainline ID:	City:	Street:
City of Willamina I&I	**OVW1_OVW2**	**Willamina**	**631 NE 5th St**
Start date/time:	Direction:	Weather:	Location code:
2/5/2024 9:21 AM	**D**	**3**	**B**
Shape:	Material:	Height:	Width:
C	**CP**	**8 in.**	



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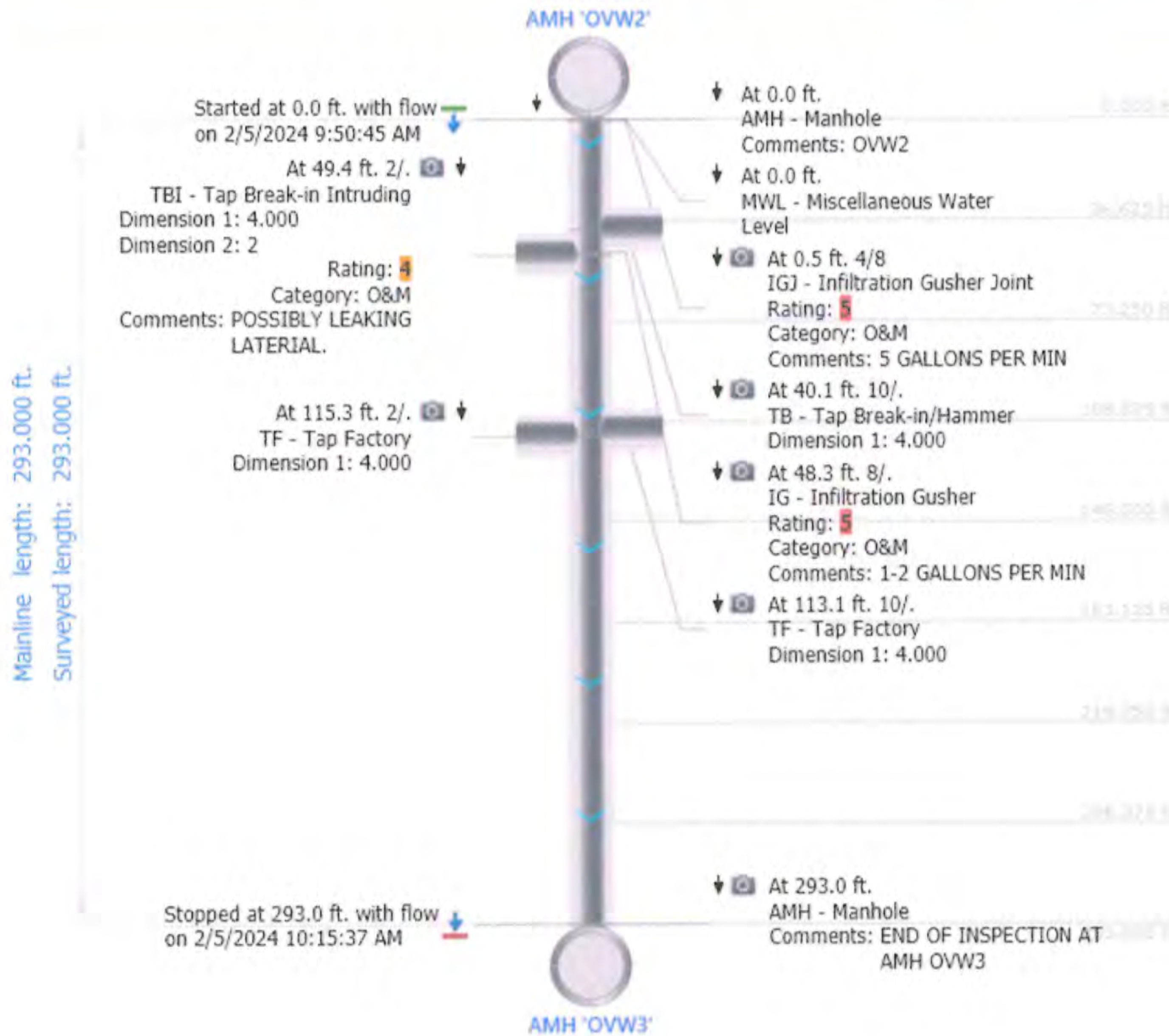
Amity OR 97101
Phone : 503-881-2331

Main Inspections Pipe Run and Map

Project name:	Mainline ID:	City:	Street:
City of Willamina I&I	**OVW2_OVW3**	**WILLAMINA**	**520 NE 5th St**
Start date/time:	Direction:	Weather:	Location code:
2/5/2024 9:50 AM	**D**	**3**	**B**
Shape:	Material:	Height:	Width:
C	**CP**	**8 in.**	



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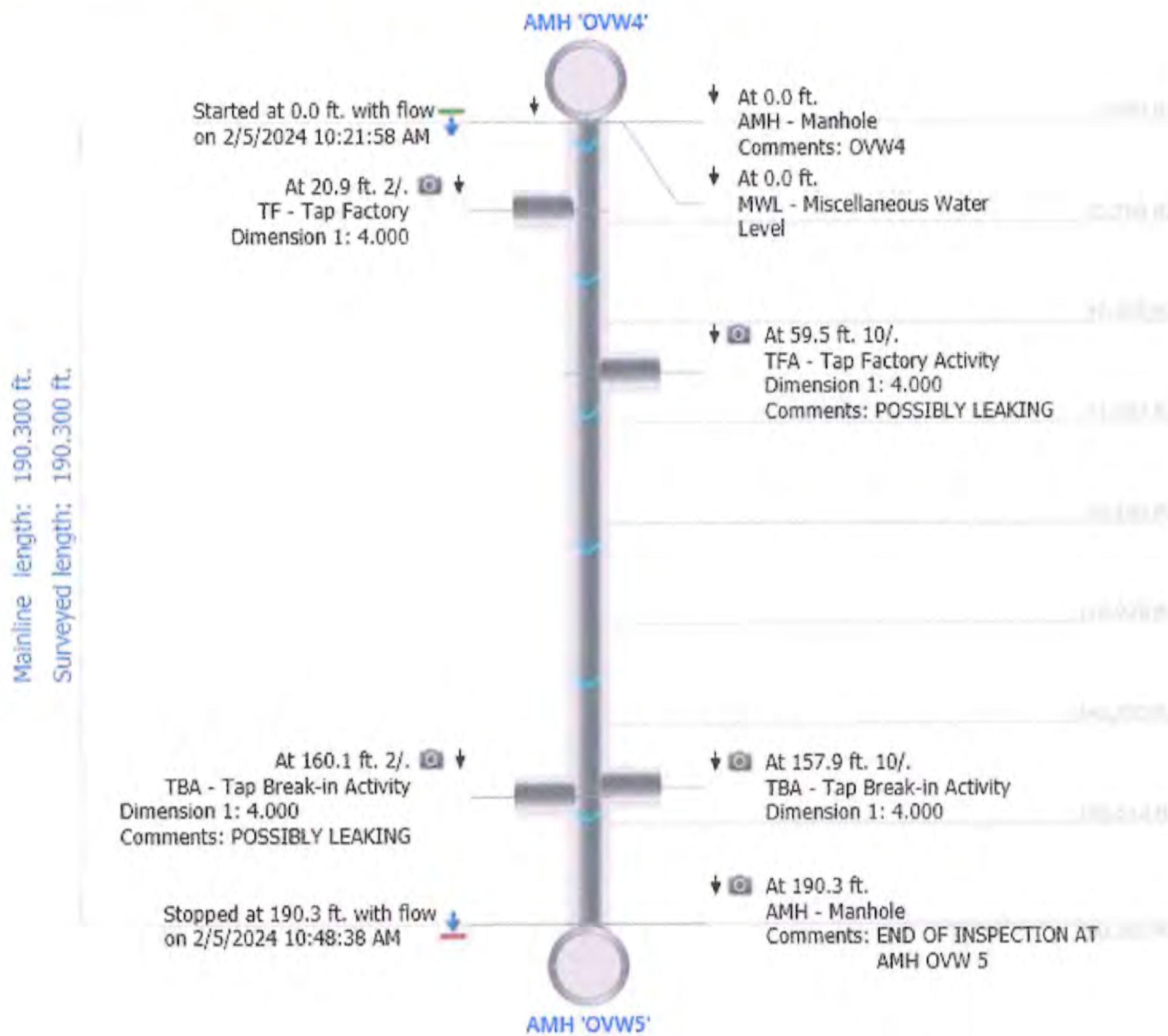
Amity OR 97101
Phone : 503-881-2331

Main Inspections Pipe Run and Map

Project name:	Mainline ID:	City:	Street:
City of Willamina I&I	**OVW4_OVW5**	**WILLAMINA**	**770 NE 5TH ST**
Start date/time:	Direction:	Weather:	Location code:
2/5/2024 10:21 AM	**D**	**3**	**B**
Shape:	Material:	Height:	Width:
C	**CP**	**8 in.**	



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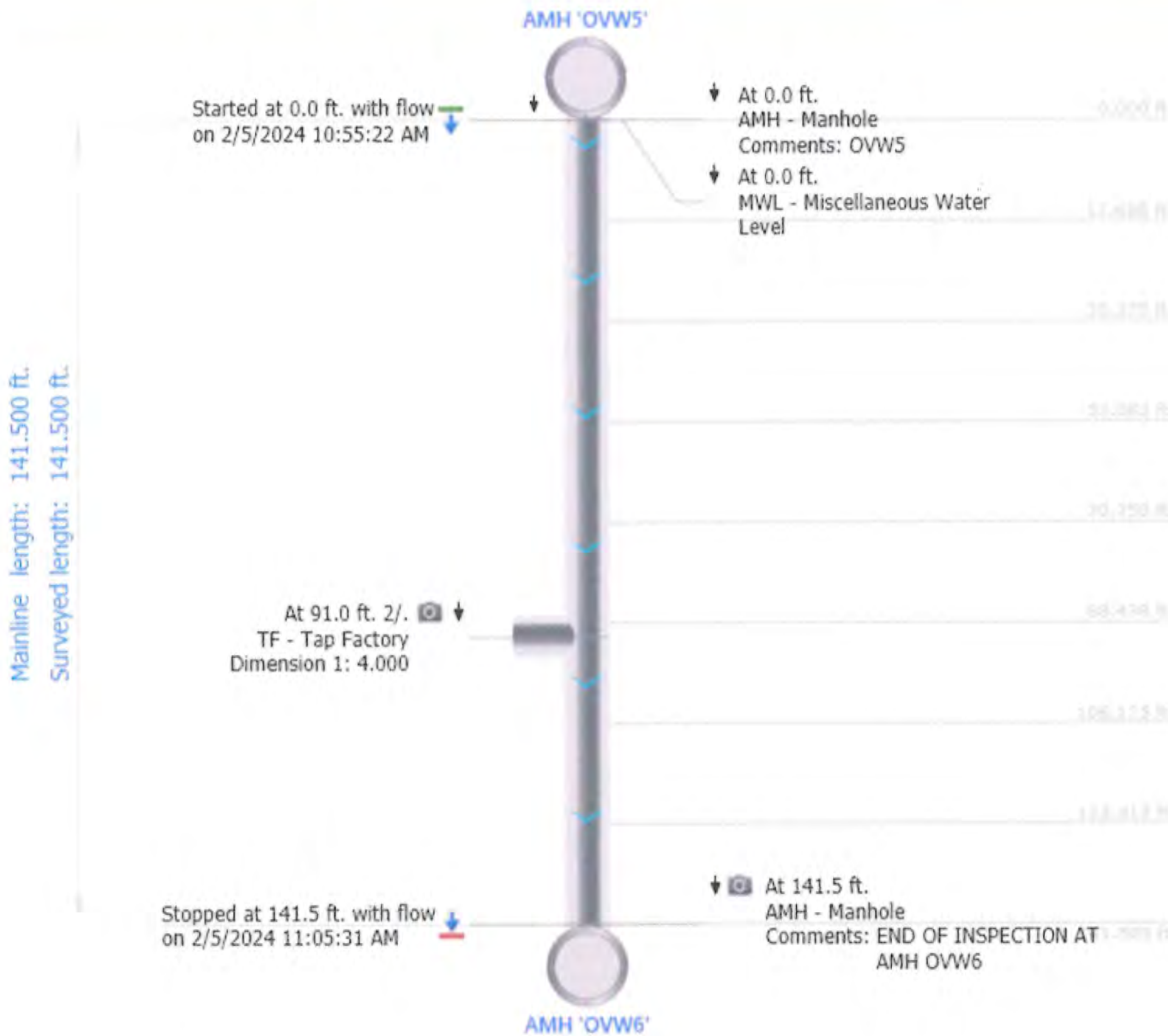
Phone : 503-881-2331

Main Inspections Pipe Run

Project name:	Mainline ID:	City:	Street:
City of Willamina I&I	**OVW5_OVW6**	**WILLAMINA**	**783 NE 5TH ST**
Start date/time:	Direction:	Weather:	Location code:
2/5/2024 10:55 AM	**D**	**3**	**D**
Shape:	Material:	Height:	Width:
C	**CP**	**8 in.**	



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Amity OR 97101
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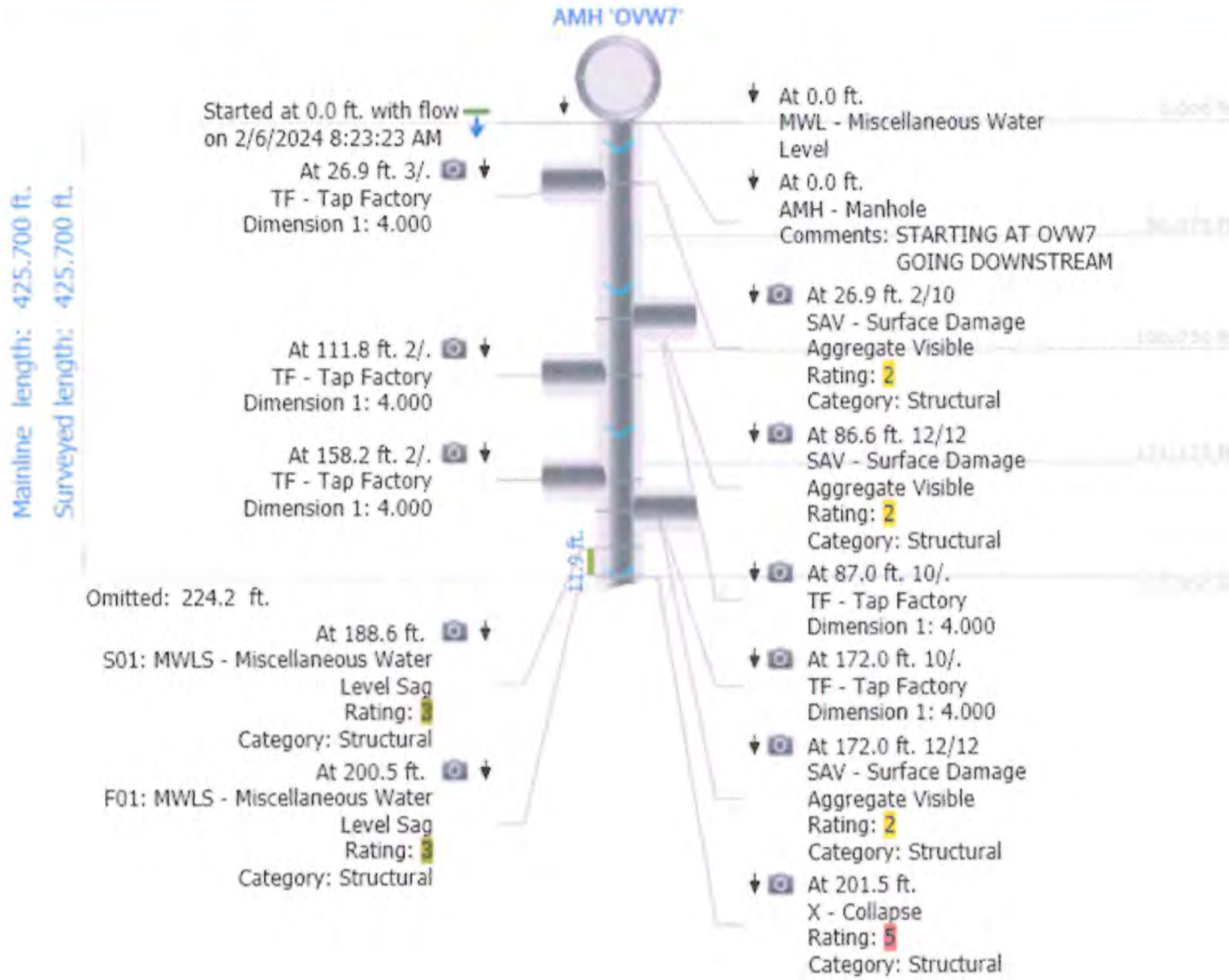
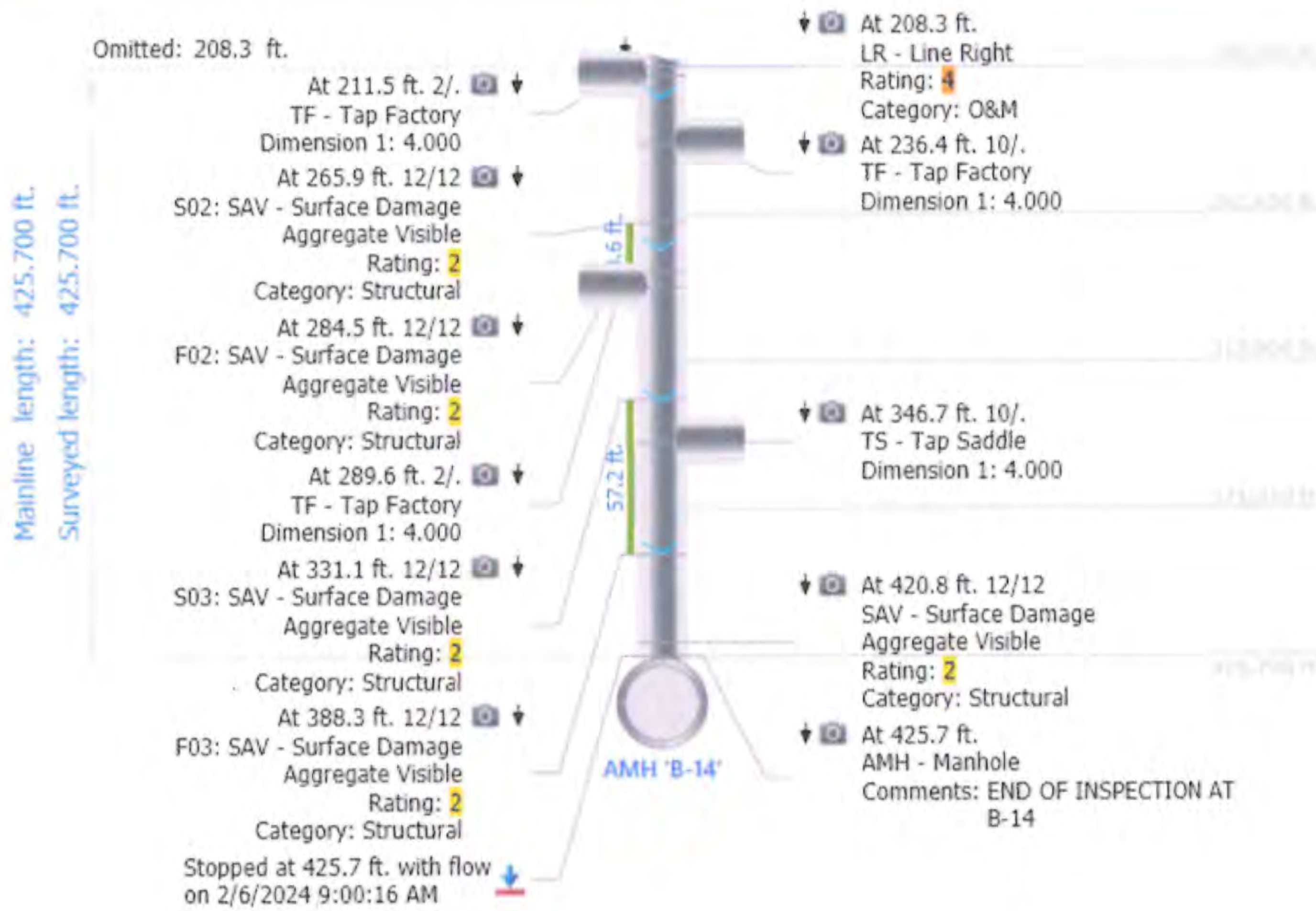
Main Inspections Pipe Run and Map

Project name:	Mainline ID:	City:	Street:
City of Willamina I&I	**OVW7_B-14**	**WILLAMINA**	**531 NW WILLAMINA DR**
Start date/time:	Direction:	Weather:	Location code:
2/6/2024 8:23 AM	**D**	**3**	**B**
Shape:	Material:	Height:	Width:
C	**CP**	**8 in.**	




Omitted: 208.3 ft.
Mainline length: 425.700 ft.
Surveyed length: 425.700 ft.
At 211.5 ft. 2/. TF - Tap Factory Dimension 1: 4.000
At 265.9 ft. 12/12 S02: SAV - Surface Damage Aggregate Visible Rating: 2 Category: Structural
At 284.5 ft. 12/12 F02: SAV - Surface Damage Aggregate Visible Rating: 2 Category: Structural
At 289.6 ft. 2/. TF - Tap Factory Dimension 1: 4.000
At 331.1 ft. 12/12 S03: SAV - Surface Damage Aggregate Visible Rating: 2 Category: Structural
At 388.3 ft. 12/12 F03: SAV - Surface Damage Aggregate Visible Rating: 2 Category: Structural
Stopped at 425.7 ft. with flow on 2/6/2024 9:00:16 AM
57.2 ft.
AMH 'B-14'
At 208.3 ft. LR - Line Right Rating: 4 Category: O&M
At 236.4 ft. 10/. TF - Tap Factory Dimension 1: 4.000
At 346.7 ft. 10/. TS - Tap Saddle Dimension 1: 4.000
At 420.8 ft. 12/12 SAV - Surface Damage Aggregate Visible Rating: 2 Category: Structural
At 425.7 ft. AMH - Manhole Comments: END OF INSPECTION AT B-14

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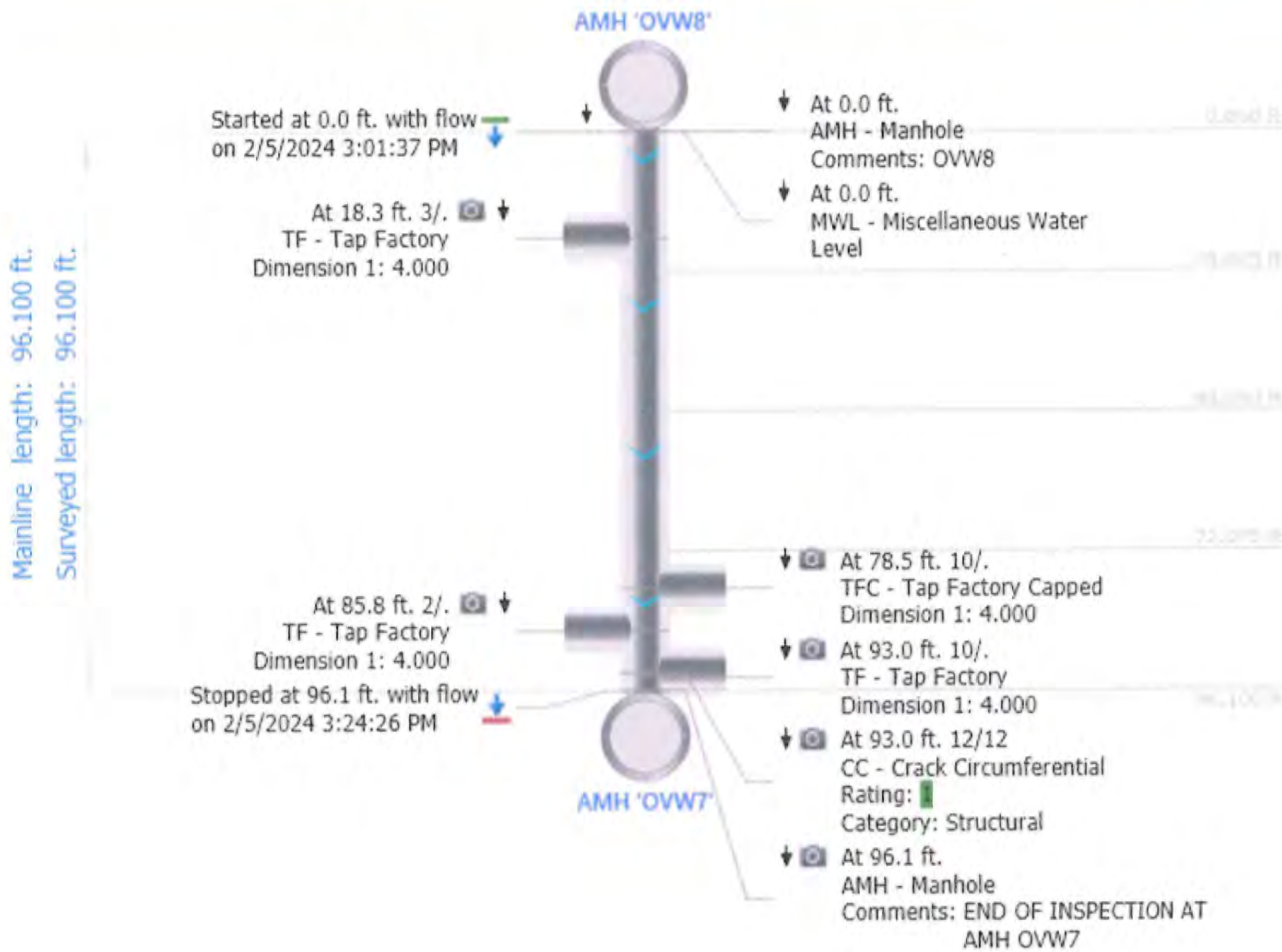
Main Inspections Pipe Run

Project name:	Mainline ID:	City:	Street:
City of Willamina I&I	**OVW8_OVW7**	**WILLAMINA**	**630 NW WILLAMINA DR**
Start date/time:	Direction:	Weather:	Location code:
2/5/2024 3:01 PM	**D**	**3**	**B**
Shape:	Material:	Height:	Width:
C	**CP**	**8 in.**	



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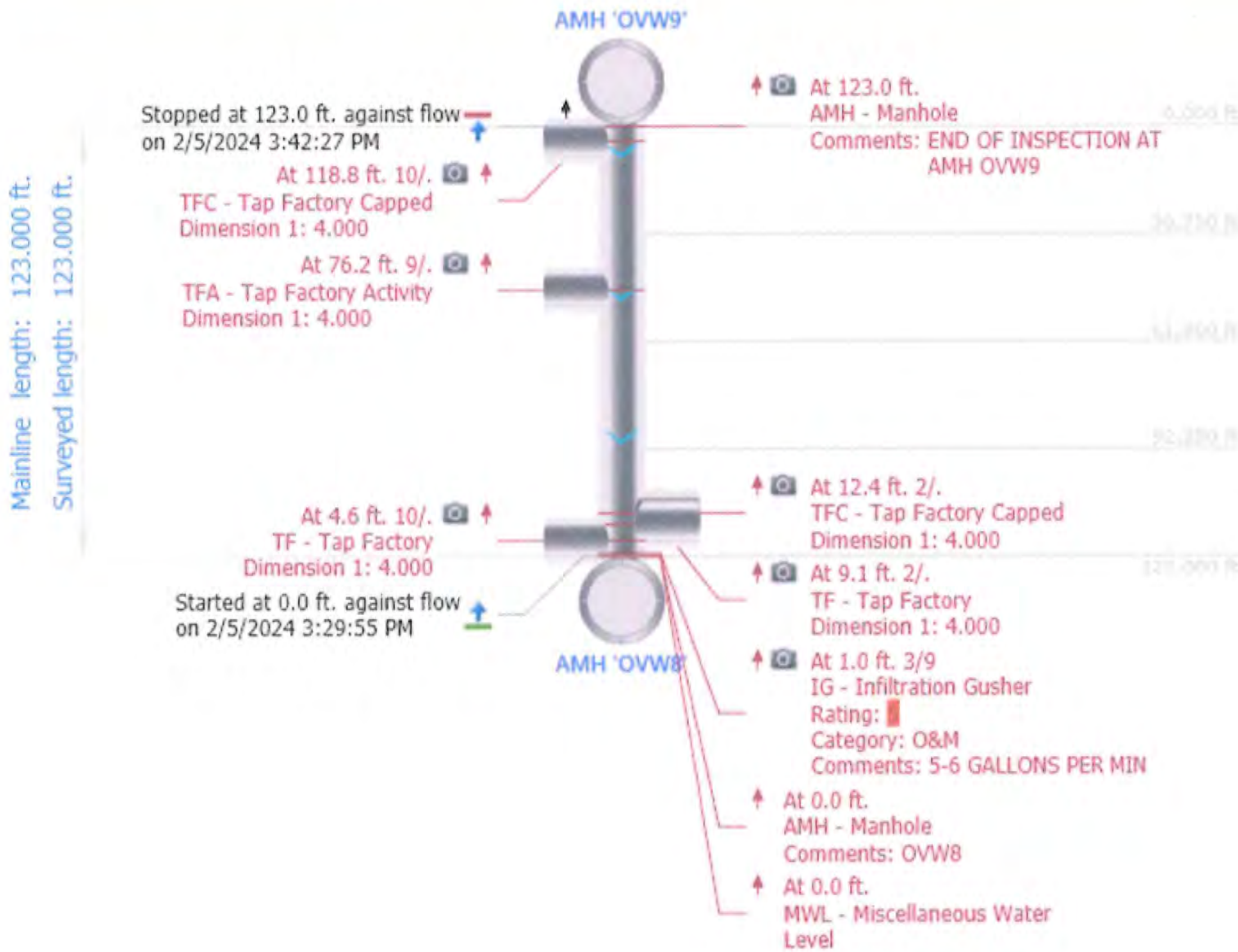
Phone : 503-881-2331

Main Inspections Pipe Run

Project name:	Mainline ID:	City:	Street:
City of Willamina I&I	**OVW9_OVW8**	**WILLAMINA**	**630 NW WILLAMINA DR**
Start date/time:	Direction:	Weather:	Location code:
2/5/2024 3:29 PM	**U**	**3**	**B**
Shape:	Material:	Height:	Width:
C	**CP**	**8 in.**	



Appendix I

Alternative Cost Estimates

Project Title:	Location:				
Appendix I, Alternative Cost Estimates	**Willamina Oregon, 97396**				
Project Identifier: **ALT. 1**					
General Line Item	**Estimated Quantity**	**Unit**	**Unit Price**	**Item Cost (Rounded)**	**Total Cost (2024 Dollars)**
Goods and Services					
10" Diameter Gravity Sewer Pipe Fully Installed (PVC)	2,537	LF	$ 350	$ 888,000	
12" Diameter Gravity Sewer Pipe Fully Installed (PVC)	2,999	LF	$ 390	$ 1,170,000	
15" Diameter Gravity Sewer Pipe Fully Installed (PVC)	1,339	LF	$ 410	$ 550,000	
18" Diameter Gravity Sewer Pipe Fully Installed (PVC)	377	LF	$ 450	$ 170,000	
48-inch Standard Precast Manhole	41	EACH	$ 12,000	$ 492,000	
Installing New Lateral Lines	122	EACH	$ 6,000	$ 735,000	
Lift Station	2	EACH	$ 1,276,000	$ 2,552,000	
Boring for Creek and Railway	300	LF	$ 1,000	$ 300,000	
12" Diameter Force Main Sewer Pipe Fully Installed (PVC)	2,000	EACH	$ 350	$ 700,000	
				Construction Subtotal	***$ 7,557,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 760,000	
Bonding			2.5%	$ 190,000	
Contractor Overhead and Profit			10%	$ 760,000	
Prevailing Wages			2.5%	$ 190,000	
AIS / BABA (if required by funding-IIJA/BIL, SRF, etc)			5%	$ 380,000	
Contingency			30%	$ 2,270,000	
				Total Construction Subtotal	***$ 12,107,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			13%	$ 1,580,000	
Engineering - Construction Contract Administration			4%	$ 490,000	
Engineering -- Inspection			8%	$ 970,000	
Permitting			LS	$ 10,000	
Geotechnical Investigation			LS	$ 20,000	
Surveying			LS	$ 30,000	
Environmental			LS	$ 10,000	
Legal, Administrative, and Funding			2.5%	$ 302,675	
				Total Project Costs (rounded)	**$ 15,520,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

Project Title:				Location:	
Appendix I, Alternative Cost Estimates				**Willamina Oregon, 97396**	
Project Identifier: **ALT. 2**					
General Line Item	**Estimated Quantity**	**Unit**	**Unit Price**	**Item Cost (Rounded)**	**Total Cost (2024 Dollars)**
Goods and Services					
8" Diameter Gravity Sewer Pipe Fully Installed (PVC)	394	LF	$ 330	$ 131,000	
10" Diameter Gravity Sewer Pipe Fully Installed (PVC)	1,183	LF	$ 350	$ 415,000	
12" Diameter Gravity Sewer Pipe Fully Installed (PVC)	2,861	LF	$ 390	$ 1,116,000	
15" Diameter Gravity Sewer Pipe Fully Installed (PVC)	1,339	LF	$ 410	$ 550,000	
18" Diameter Gravity Sewer Pipe Fully Installed (PVC)	377	LF	$ 450	$ 170,000	
Lift Station	2	EACH	$ 1,276,000	$ 2,552,000	
12" Diameter Force Main Sewer Pipe Fully Installed (PVC)	2,000	EACH	$ 350	$ 700,000	
Installing New Lateral Lines	91	EACH	$ 6,000	$ 546,000	
Boring for Creek and Railway	300	LF	$ 1,000	$ 300,000	
48-inch Standard Precast Manhole	37	EACH	$ 12,000	$ 444,000	
				Construction Subtotal	***$ 6,924,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 700,000	
Bonding			2.5%	$ 180,000	
Contractor Overhead and Profit			10%	$ 700,000	
Prevailing Wages			2.5%	$ 180,000	
AIS / BABA (if required by funding-IIJA/BIL, SRF, etc)			5%	$ 350,000	
Contingency			30%	$ 2,080,000	
				Total Construction Subtotal	***$ 11,114,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			13%	$ 1,450,000	
Engineering - Construction Contract Administration			4%	$ 450,000	
Engineering -- Inspection			8%	$ 890,000	
Permitting			LS	$ 10,000	
Geotechnical Investigation			LS	$ 20,000	
Surveying			LS	$ 30,000	
Environmental			LS	$ 10,000	
Legal, Administrative, and Funding			2.5%	$ 277,850	
				Total Project Costs (rounded)	**$ 14,252,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

Project Title:					**Location:**
Appendix I, Alternative Cost Estimates					**Willamina Oregon, 97396**
Project Identifier: **ALT. 3.1**					
General Line Item	**Estimated Quantity**	**Unit**	**Unit Price**	**Item Cost (Rounded)**	**Total Cost (2024 Dollars)**
Goods and Services					
10" Diameter Gravity Sewer Pipe Fully Installed (PVC)	3139	LF	$ 350	$ 1,099,000	
12" Diameter Gravity Sewer Pipe Fully Installed (PVC)	1752	LF	$ 390	$ 684,000	
15" Diameter Gravity Sewer Pipe Fully Installed (PVC)	1294	LF	$ 410	$ 531,000	
CCTV	37089	LF	$ 3	$ 112,000	
Additional Flow Monitoring / Smoke Testing	1	LS	$ 50,000	$ 50,000	
Cured-In-Place-Pipe	37089	LF	$ 100	$ 3,709,000	
Bypass Pumping	93	DAY	$ 2,000	$ 186,000	
Manhole Rehibilitation	179	EACH	$ 5,000	$ 895,000	
48-inch Standard Precast Manhole	34	EACH	$ 12,000	$ 408,000	
Installing New Lateral Lines	82	EACH	$ 6,000	$ 490,000	
Lift Station	2	EACH	$ 1,276,000	$ 2,552,000	
Boring for Creek and Railway	300	LF	$ 1,000	$ 300,000	
12" Diameter Force Main Sewer Pipe Fully Installed (PVC)	2000	EACH	$ 350	$ 700,000	
				Construction Subtotal	***$ 11,716,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 1,180,000	
Bonding			2.5%	$ 300,000	
Contractor Overhead and Profit			10%	$ 1,180,000	
Prevailing Wages			2.5%	$ 300,000	
AIS / BABA (if required by funding-IIJA/BIL, SRF, etc)			5%	$ 590,000	
Contingency			30%	$ 3,520,000	
				Total Construction Subtotal	***$ 18,786,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			13%	$ 2,450,000	
Engineering - Construction Contract Administration			4%	$ 760,000	
Engineering -- Inspection			8%	$ 1,510,000	
Permitting			LS	$ 10,000	
Geotechnical Investigation			LS	$ 20,000	
Surveying			LS	$ 30,000	
Environmental			LS	$ 10,000	
Legal, Administrative, and Funding			2.5%	$ 469,650	
				Total Project Costs (rounded)	**$ 24,046,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

Project Title:	Location:				
Appendix I, Alternative Cost Estimates	**Willamina Oregon, 97396**				
Project Identifier: **ALT. 3.2**					
General Line Item	**Estimated Quantity**	**Unit**	**Unit Price**	**Item Cost (Rounded)**	**Total Cost (2024 Dollars)**
Goods and Services					
10" Diameter Gravity Sewer Pipe Fully Installed (PVC)	1481	LF	$ 350	$ 519,000	
12" Diameter Gravity Sewer Pipe Fully Installed (PVC)	983	LF	$ 390	$ 384,000	
CCTV	40810	LF	$ 3	$ 123,000	
Additional Flow Monitoring / Smoke Testing	1	LS	$ 50,000	$ 50,000	
Cured-In-Place-Pipe	40810	LF	$ 100	$ 4,082,000	
Servicing Laterials and Cleanout	286	EACH	$ 4,500	$ 1,287,000	
Manhole Rehibilitation	179	EACH	$ 5,000	$ 895,000	
48-inch Standard Precast Manhole	15	EACH	$ 12,000	$ 180,000	
Installing New Lateral Lines	41	EACH	$ 6,000	$ 245,000	
Lift Station	2	EACH	$ 820,000	$ 1,640,000	
Bypass Pumping	93	DAY	$ 2,000	$ 186,000	
				Construction Subtotal	***$ 9,591,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 960,000	
Bonding			2.5%	$ 240,000	
Contractor Overhead and Profit			10%	$ 960,000	
Prevailing Wages			2.5%	$ 240,000	
AIS / BABA (if required by funding-IIJA/BIL, SRF, etc)			5%	$ 480,000	
Contingency			30%	$ 2,880,000	
				Total Construction Subtotal	***$ 15,351,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			13%	$ 2,000,000	
Engineering - Construction Contract Administration			4%	$ 620,000	
Engineering -- Inspection			8%	$ 1,230,000	
Permitting			LS	$ 10,000	
Geotechnical Investigation			LS	$ 20,000	
Surveying			LS	$ 30,000	
Environmental			LS	$ 10,000	
Legal, Administrative, and Funding			2.5%	$ 383,775	
				Total Project Costs (rounded)	**$ 19,655,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

Item	Alt 1	Alt 2	Alt 3.1	Alt 3.2
8" Diameter Gravity Sewer Pipe Fully Installed (PVC)	$ -	$ 131,000	$ -	$ -
10" Diameter Gravity Sewer Pipe Fully Installed (PVC)	$ 888,000	$ 415,000	$ 1,099,000	$ 519,000
12" Diameter Gravity Sewer Pipe Fully Installed (PVC)	$ 1,170,000	$ 1,116,000	$ 684,000	$ 384,000
15" Diameter Gravity Sewer Pipe Fully Installed (PVC)	$ 550,000	$ 550,000	$ 531,000	$ -
18" Diameter Gravity Sewer Pipe Fully Installed (PVC)	$ 170,000	$ 170,000	$ -	$ -
Lift Station	$ 2,552,000	$ 2,552,000	$ 2,552,000	$ 1,640,000
12" Diameter Force Main Sewer Pipe Fully Installed (PVC)	$ 700,000	$ 700,000	$ 700,000	$ -
Installing New Lateral Lines	$ 735,000	$ 546,000	$ 490,000	$ 245,000
48-inch Standard Precast Manhole	$ 492,000	$ 444,000	$ 408,000	$ 180,000
CCTV	$ -	$ -	$ 112,000	$ 123,000
Additional Flow Monitoring / Smoke Testing	$ -	$ -	$ 50,000	$ 50,000
Cured-In-Place-Pipe	$ -	$ -	$ 3,709,000	$ 4,082,000
Bypass Pumping	$ -	$ -	$ 186,000	$ 186,000
Servicing Laterals and Cleanouts	$ -	$ -	$ -	$ 1,287,000
Boring for Creek and Railway	$ 300,000	$ 300,000	$ 300,000	$ -
Manhole Rehibilitation	$ -	$ -	$ 895,000	$ 895,000
Construction Subtotal	**$ 7,557,000**	**$ 6,924,000**	**$ 11,716,000**	**$ 9,591,000**
Mobilization and Administration	$ 760,000	$ 700,000	$ 1,180,000	$ 960,000
Bonding	$ 190,000	$ 180,000	$ 300,000	$ 240,000
Contractor Overhead and Profit	$ 760,000	$ 700,000	$ 1,180,000	$ 960,000
Prevailing Wages	$ 190,000	$ 180,000	$ 300,000	$ 240,000
AIS / BABA (if required by funding-IIJA/BIL, SRF, etc)	$ 380,000	$ 350,000	$ 590,000	$ 480,000
Contingency	$ 2,270,000	$ 2,080,000	$ 3,520,000	$ 2,880,000
Engineering Design and Bid Phase Services	$ 1,580,000	$ 1,450,000	$ 2,450,000	$ 2,000,000
Engineering - Construction Contract Administration	$ 490,000	$ 450,000	$ 760,000	$ 620,000
Engineering -- Inspection	$ 970,000	$ 890,000	$ 1,510,000	$ 1,230,000
Permitting	$ 10,000	$ 10,000	$ 10,000	$ 10,000
Geotechnical Investigation	$ 20,000	$ 20,000	$ 20,000	$ 20,000
Surveying	$ 30,000	$ 30,000	$ 30,000	$ 30,000
Environmental	$ 10,000	$ 10,000	$ 10,000	$ 10,000
Legal, Administrative, and Funding	$ 302,675	$ 277,850	$ 469,650	$ 383,775
Total Estimated Project Cost	**$ 15,520,000**	**$ 14,252,000**	**$ 24,046,000**	**$ 19,655,000**

Appendix J

Willamina User Rate

Master Fee Schedule

City of Willamina

CITY OF WILLAMNA MASTER FEE SCHEDULE

Description	Fee
Administration-General	
Building Compliance Application	100.00
Business License Annual Renewal	75.00
Business License Initial Application	100.00
Business License Past Due	10.00/month up to 50.00
Business License Transfer or Assign	50.00
Color Copy of Zone Map	6.00/map
Copies-Black/White 11 by 17	1.00/page
Copies-Black/White 8 ½ by 11	.75/page
Copies-Black/White 8 ½ by 14	1.00/page
Copies-Color 11 by 17	1.50/page
Copies-Color 8 ½ by 14	1.25/page
Copies-Color 8 ½ by 11	1.00/page
Electronic Documents Sent by Email/FTP	15.00
Fax	1.50/page
General Records Search (City Staff)	25.00
Liquor License Application New	100.00
Liquor License Change of Ownership	75.00
Liquor License Renewal	35.00
Liquor License Special Event	35.00
Maps and Other Nonstandard Size Docs	25.00
Printed copy of any City Code	25.00
Scanned Copies to PDF to 11x17	1.25/page
Scanned Large Copies to PDF	Actual Cost
Public Record Request	
Public Records Request Digital File	15.00/CD/DVD or Copies
Public Records Request ref. ORS 192.440 *Plus the actual hourly cost for staff research fee and cost of copies	50.00*
Research Fee per hour (City Staff) Level 2	40.00/hour
Public Records Review (City Attorney) Level 3	215.00/hour
Municipal Court	
Fail to Appear for Trial	35.00
Returned Check	35.00
State Presumptive Class A - ORS 153.019	440.00
State Presumptive Class B - ORS 153.019	265.00

State Presumptive Class C - ORS 153.019	165.00
State Presumptive Class D - ORS 153.019	115.00
Traffic School Class A	NA
Traffic School Class B	150.00
Traffic School Class C	100.00
Traffic School Class D	75.00
Trial	35.00
Court Administrative Fee	25.00
Permits	
Event Permit	No charge
Sign Permit-Commercial/Industrial Zones-Staff Review	100.00
Sign Permit-Non Commercial/Industrial Zones-Staff Review	100.00
Planning	
All applications shall be assessed a 10% administration fee based on the application costs.	10% added
Annexations/Zone Change	2,500.00
Appeals to Council 50% of the Application Fee of action appealed	2,500.00
Code Interpretation	100.00
Comprehensive Plan Amendment/Zone Change	2,500.00
Conditional Use Permit	600.00
Construction Application Fee -5% of actual Construction Cost	2%
Lot Line Adjustment	350.00
Multiple Applications- Most expensive Application fee in full plus ½ of application fee for other applications	
Home Occupations-Staff Review-	100.00
Non-Conforming Use Determination-Planning Commission Review	600.00
Non-Conforming Use Determination-Staff Review	100.00
Partition	1,000.00
Plan Review Fee (pre-platted subdivision and infill lots)	2,500.00
Planned Unit Development (PUD)	1,800.00
Pre-Application Conference	450.00
Request for Land Use Approval Extension	600.00
Similar Use Determination	600.00
Site Plan Review	600.00
Subdivision – Final Plan	2,500.00
Subdivision-Preliminary Plat - $750 plus $450.00 per lot up to the maximum of	2,500.00

Temporary Mobile Home Placement	50.00
Variance Application	600.00
Lien Search	
Per Property Address	25.00
Public Safety Fee	
Ordinance 678 – Public Safety Fee per utility account July 2020 through June 2021	10.52
Ordinance 678 – Public Safety Fee per utility account July 2021 through June 2022	11.47
SDC System Development Charges – Single Family Dwelling Unit	
Water System Development Charge – Per Service	4,600.00
Sewer System Development Charge – Per Service	5,128.00
Transportation System Development Charge – Per Service	4,142.00
Storm-water System Development Charge – Per Service	433.00
Parks System Development Charge – Per Service	5,126.00
Total System Development Charges – Per Service	**19,429.00**
Connection Fees – Single Family Dwelling Unit	
Water Connection Fee– Per Service	550.00
Sewer Connection Fee– Per Service	150.00
Double Check Valve Includes Box– Per Service	250.00
Total Connection Fees – Per Service	**950.00**
Utility Billing	
***Pursuant to Resolution 17.18.011**	
Meter Size	**Base Rate by Size**
5/8	38.31
3/4	38.31
1	61.29
1 1/2	76.61
2	139.36
6	766.17
8	2,298.48
10	3,064.64
12	4,290.49
F-3/4	38.31
1-2	867.65
1-3/4	69.42
1-8	34.70

Utility Billing continued					
Rate	Description	Service	Base Amount	per 100 cubic ft.	15% surcharge
105	Apt > 4 Units	Water – Meter	153.29	4.60	22.99
109	Business	Water – Meter	76.63	4.60	11.49
111	Car Wash	Water – Meter	76.63	4.60	11.49
114	Willamina Lumber	Water – Meter	3,470.58	1.38	520.59
115	Meter - 2 inch	Water – Meter	153.24	4.60	22.99
123	Single Family (W1)	Water – Meter	38.31	4.60	5.75
300	Single Family (S1)	Sewer	67.10	0	10.06
304	Car Wash -Sewer (SCW)	Sewer	127.71	0	19.16
305	Grocery Store (SF)	Sewer	162.66	0	24.20
309	Vacation Rate (SH)	Sewer	21.05	0	3.16
310	Laundry Sewer (SL)	Sewer	335.08	0	50.26
312	Willamina Lumber (SLW)	Sewer	810.88	0	121.63
313	House/Cabins (SPS)	Sewer	193.25	0	28.99
315	Café/restaurant (ST1)	Sewer	160.81	0	24.12
317	Café/restaurant (ST3)	Sewer	214.47	0	32.17
318	Café/restaurant (ST4)	Sewer	101.90	0	15.29
321	Willamina Lumber New	Sewer	3,470.58	0	520.59
322	High School New	Water – Meter	766.17	4.60	0
901	Exterritorial Water Surcharge	Extraterritorial Water Service		15%	
1001	Exterritorial Sewer Surcharge	Extraterritorial Sewer Service		15%	
1201	Utility Rate	Utility Rate	3.00		
1300	NSF Check Fee	NSF Check Fee	35.00		
1901	Late Fee	Penalty	5.00		

The rate codes below have a base rate of $38.31 and commodity rate of $4.60 and extraterritorial charge of 15% not listed above.

103 Vacation Rate, 106 Duplex, 107 3-Plex, 108 4-Plex or Multi Units, 110 Rays Grocery, 111 Car Wash, 112 Group Home, 113 Laundry, 116 House Cabin, 117 3/4"Base Rate, 118 Café Restaurant, 119 Business -1, 120 Café Restaurant, 121 Café Restaurant (T4), 122 Café Restaurant (T6)

The rate codes below have a base rate of $67.10 and an extraterritorial charge of 15% not listed above.

301 Apartment/Duplex (SA), 302 Business -Sewer (SB), 303 Church - Sewer (SC), 308 Group Home (SGH), 314 Senior Rate (SS), 320 ST 6

VIOLATIONS OF THE MUNICIPAL CODE - CODE ENFORCEMENT	Penalty
Violation of the City of Willamina Municipal Code may result in the following fees or penalties. Each day that a violation exist is a separate offense. Title IX General Offenses *(this list does not include all offenses)*	
Ordinance 466 – Chapter 90 Animals – §90.03 Dog required to be on a leash - §90.99 Penalty	250.00
Ordinance 682 – Chapter 93 Nuisances - §93.07(B)(12) No parking of any type of vehicle in the front yard or yard areas adjacent to a street - §93.99 Penalty	300.00
Ordinance 670 – General Regulations – Amending Title IX – Chapter 91 Abandoned Vehicles	50.00
Ordinance 683 – Chapter 96 RV Parking - §96.02(A) Occupation of an RV not allowed without permit - §96.08 Penalty	150.00 1st 300.00 2+
Amended Ordinance 534 – Chapter 93 Nuisances – §93.07 Nuisances Affecting the Public Safety (B) (1) Unnecessary noise.	300.00
Ordinance 684 – Chapter 93 Nuisances - §93.06(B)(2) No accumulation of debris, rubbish, etc. on private property or sidewalks - §93.99 Penalty	300.00
Ordinance No. 673 – Title XIII, Chapter 132 - Offenses Against Public Peace – §132.09 Smoking in Public Places	100.00
Ordinance 676 – IX, Chapter 90 Animals – Picking up after your dog	300.00

Master Fee Schedule

City of Willamina

CITY OF WILLAMNA MASTER FEE SCHEDULE	
Description	**Fee**
Administration-General	
Building Compliance Application	100.00
Business License Annual Renewal	75.00
Business License Initial Application	100.00
Business License Past Due	10.00/month up to 50.00
Business License Transfer or Assign	50.00
Color Copy of Zone Map	6.00/map
Copies-Black/White 11 by 17	1.00/page
Copies-Black/White 8 ½ by 11	.75/page
Copies-Black/White 8 ½ by 14	1.00/page
Copies-Color 11 by 17	1.50/page
Copies-Color 8 ½ by 14	1.25/page
Copies-Color 8 ½ by 11	1.00/page
Electronic Documents Sent by Email/FTP	15.00
Fax	1.50/page
General Records Search (City Staff)	25.00
Liquor License Application New	100.00
Liquor License Change of Ownership	75.00
Liquor License Renewal	35.00
Liquor License Special Event	35.00
Maps and Other Nonstandard Size Docs	25.00
Printed copy of any City Code	25.00
Scanned Copies to PDF to 11x17	1.25/page
Scanned Large Copies to PDF	Actual Cost
Public Record Request	
Public Records Request Digital File	15.00/CD/DVD or Copies
Public Records Request ref. ORS 192.440 *Plus the actual hourly cost for staff research fee and cost of copies	0.00*
Research Fee per hour (City Staff) Level 2	40.00/hour
Public Records Review (City Attorney) Level 3	215.00/hour
Municipal Court	
Fail to Appear for Trial	35.00
Returned Check	35.00
State Presumptive Class A - ORS 153.019	440.00
State Presumptive Class B - ORS 153.019	265.00

State Presumptive Class C - ORS 153.019	165.00
State Presumptive Class D - ORS 153.019	115.00
Traffic School Class A	NA
Traffic School Class B	150.00
Traffic School Class C	100.00
Traffic School Class D	75.00
Trial	35.00
Court Administrative Fee	25.00
Permits	
Event Permit	No charge
Sign Permit-Commercial/Industrial Zones-Staff Review	100.00
Sign Permit-Non Commercial/Industrial Zones-Staff Review	100.00
Planning	
All applications shall be assessed a 10% administration fee based on the application costs.	10% added
Annexations/Zone Change	2,500.00
Appeals to Council 50% of the Application Fee of action appealed	2,500.00
Code Interpretation	100.00
Comprehensive Plan Amendment/Zone Change	2,500.00
Conditional Use Permit	600.00
Construction Application Fee -5% of actual Construction Cost	2%
Lot Line Adjustment	350.00
Multiple Applications- Most expensive Application fee in full plus ½ of application fee for other applications	
Home Occupations-Staff Review-	100.00
Non-Conforming Use Determination-Planning Commission Review	600.00
Non-Conforming Use Determination-Staff Review	100.00
Partition	1,000.00
Plan Review Fee (pre-platted subdivision and infill lots)	2,500.00
Planned Unit Development (PUD)	1,800.00
Pre-Application Conference	450.00
Request for Land Use Approval Extension	600.00
Similar Use Determination	600.00
Site Plan Review	600.00
Subdivision – Final Plan	2,500.00
Subdivision-Preliminary Plat - $750 plus $450.00 per lot up to the maximum of	2,500.00

Temporary Mobile Home Placement	50.00
Variance Application	600.00
Lien Search	
Per Property Address	25.00
Public Safety Fee	
Ordinance 678 – Public Safety Fee per utility account July 2020 through June 2021	10.52
Ordinance 678 – Public Safety Fee per utility account July 2021 through June 2022	11.47
SDC System Development Charges – Single Family Dwelling Unit	
Water System Development Charge – Per Service	4,600.00
Sewer System Development Charge – Per Service	5,128.00
Transportation System Development Charge – Per Service	4,142.00
Storm-water System Development Charge – Per Service	433.00
Parks System Development Charge – Per Service	5,126.00
Total System Development Charges – Per Service	**19,429.00**
Connection Fees – Single Family Dwelling Unit	
Water Connection Fee– Per Service	550.00
Sewer Connection Fee– Per Service	150.00
Double Check Valve Includes Box– Per Service	250.00
Total Connection Fees – Per Service	**950.00**
Utility Billing	
***Pursuant to Resolution 17.18.011**	
Meter Size	**Base Rate by Size**
5/8	40.23
3/4	40.23
1	64.36
1 1/2	80.44
2	146.33
6	804.48
8	2,413.41
10	3,217.88
12	4,505.02
F-3/4	40.23
1-2	911.04
1-3/4	72.90
1-8	36.44

Utility Billing continued					
Rate	Description	Service	Base Amount	per 100 cubic ft.	15% surcharge
105	Apt > 4 Units	Water – Meter	160.96	4.83	24.15
109	Business	Water – Meter	80.47	4.83	12.07
111	Car Wash	Water – Meter	80.47	4.83	12.07
114	Willamina Lumber	Water – Meter	3,644.11	1.45	546.62
115	Meter - 2 inch	Water – Meter	160.91	4.83	24.14
123	Single Family (W1)	Water – Meter	40.23	4.83	6.04
300	Single Family (S1)	Sewer	70.46	0	10.57
304	Car Wash -Sewer (SCW)	Sewer	134.10	0	20.12
305	Grocery Store (SF)	Sewer	170.80	0	25.62
309	Vacation Rate (SH)	Sewer	22.11	0	3.32
310	Laundry Sewer (SL)	Sewer	351.84	0	52.78
312	Willamina Lumber (SLW)	Sewer	851.43	0	127.72
313	House/Cabins (SPS)	Sewer	202.92	0	30.44
315	Café/restaurant (ST1)	Sewer	168.85	0	25.33
317	Café/restaurant (ST3)	Sewer	225.20	0	33.78
318	Café/restaurant (ST4)	Sewer	107.00	0	16.05
321	Willamina Lumber New	Sewer	3,644.11	0	546.62
322	High School New	Water – Meter	804.48	4.83	0
901	Exterritorial Water Surcharge	Extraterritorial Water Service		15%	
1001	Exterritorial Sewer Surcharge	Extraterritorial Sewer Service		15%	
1201	Utility Rate	Utility Rate	3.00		
1300	NSF Check Fee	NSF Check Fee	35.00		
1901	Late Fee	Penalty	5.00		

The rate codes below have a base rate of $40.23 and commodity rate of $4.83 and extraterritorial charge of 15% not listed above.

103 Vacation Rate, 106 Duplex, 107 3-Plex, 108 4-Plex or Multi Units, 110 Rays Grocery, 111 Car Wash, 112 Group Home, 113 Laundry, 116 House Cabin, 117 3/4"Base Rate, 118 Café Restaurant, 119 Business -1, 120 Café Restaurant, 121 Café Restaurant (T4), 122 Café Restaurant (T6)

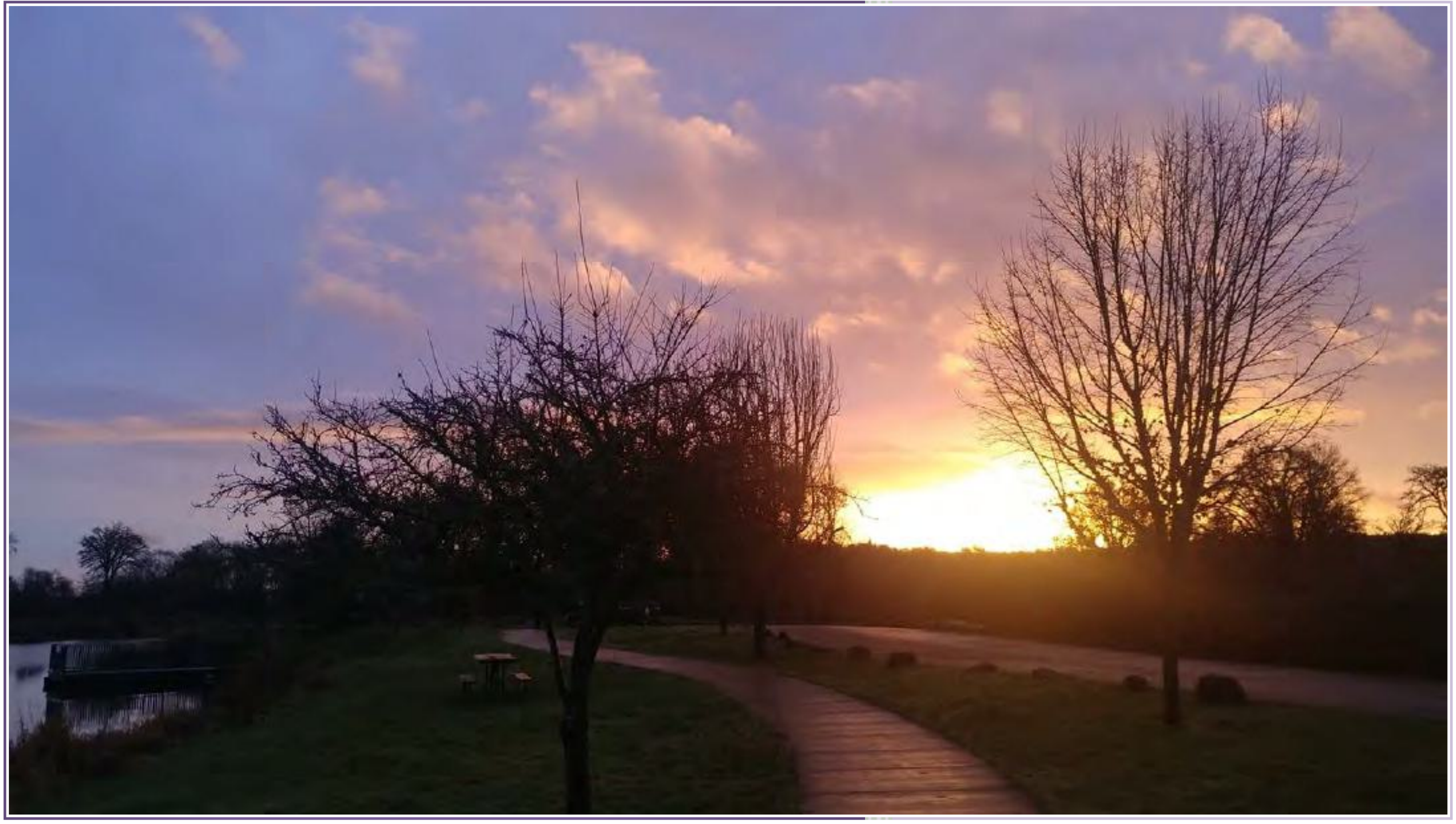
The rate codes below have a base rate of $70.46 and an extraterritorial charge of 15% not listed above.

301 Apartment/Duplex (SA), 302 Business -Sewer (SB), 303 Church - Sewer (SC), 308 Group Home (SGH), 314 Senior Rate (SS), 320 ST 6

VIOLATIONS OF THE MUNICIPAL CODE - CODE ENFORCEMENT	Penalty
Violation of the City of Willamina Municipal Code may result in the following fees or penalties. Each day that a violation exist is a separate offense. Title IX General Offenses *(this list does not include all offenses)*	
Ordinance 466 – Chapter 90 Animals – §90.03 Dog required to be on a leash - §90.99 Penalty	250.00
Ordinance 682 – Chapter 93 Nuisances - §93.07(B)(12) No parking of any type of vehicle in the front yard or yard areas adjacent to a street - §93.99 Penalty	300.00
Ordinance 670 – General Regulations – Amending Title IX – Chapter 91 Abandoned Vehicles	50.00
Ordinance 683 – Chapter 96 RV Parking - §96.02(A) Occupation of an RV not allowed without permit - §96.08 Penalty	150.00 1st 300.00 2+
Amended Ordinance 534 – Chapter 93 Nuisances – §93.07 Nuisances Affecting the Public Safety (B) (1) Unnecessary noise.	300.00
Ordinance 684 – Chapter 93 Nuisances - §93.06(B)(2) No accumulation of debris, rubbish, etc. on private property or sidewalks - §93.99 Penalty	300.00
Ordinance No. 673 – Title XIII, Chapter 132 - Offenses Against Public Peace – §132.09 Smoking in Public Places	100.00
Ordinance 676 – IX, Chapter 90 Animals – Picking up after your dog	300.00

2021-2022

CITY OF WILLAMINA ADOPTED BUDGET KENNA WEST, BUDGET OFFICER



Hampton Park at Sunrise

Photograph by Aileen Bono

Hampton Park, located in the heart of Willamina, offers a 0.6 mile (1500 step) walking path, playground, picnic areas, and a five acre fishing pond stocked with a variety of hatchery fish by the Oregon Department of Fish & Wildlife. Hampton Park is one of the few fishing ponds with both an on-land and on-water ADA compliant fishing dock. The Hampton Family and the employees of the Willamina Lumber Mill generously donate their time and financial support to continually upgrade and assist the City in maintaining this beautiful hidden gem.

Table of Contents

Budget Cover 2021_2022 1
Budget Message 3
City Of Willamina Budget Committee 10
ADOPTED Budget FY22 Summary 11
General Fund 14
Streets 22
Water 24
Water SDC 26
Wastewater 27
Wastewater SDC 29
Net Income Summary 30
Transfers 31
Capital Projects 32
Personnel 33
Budget Allocations 34
In Lieu of Franchise Fee 35
City of Willamina Organization Chart 36
Appendix 37
Budget Committee Agenda May 26, 2021 38
Budget Committee Meeting Minutes June, 10, 2020 39
EID Assessment Spreadsheet 2021 42
Budget Committee Affidavit 45
Budget Notice Bulletin May 19, 2021 46
Budget Notice Bulletin May 12, 2021 47
Budget Meeting Website Notice 2021 48

To: Budget Committee Members and Citizens of Willamina
From: Kenna L. West, City Manager and Budget Officer
Date: May 26, 2021

I present to you the proposed budget for the City of Willamina fiscal year beginning July 1, 2021 and ending June 30, 2022. This budget has been prepared to satisfy the legal requirements of the City of Willamina Charter and the State of Oregon local budget law.

SYNOPSIS

The proposed budget provides a financial plan for our beautiful City of Willamina for the Fiscal Year 2021-2022. Historically our City struggled to find the funds to maintain its assets, keep its water enterprise fund in a positive financial position, and provide services to its citizens. In the last three fiscal years the Council, current management, and staff have worked diligently to strengthen the financial position of the City, complete needed repairs and maintenance on its real properties and infrastructure, replace failed or failing equipment, and provide a consistently high level of service to its citizens. The many prior years of deferred maintenance and inability to purchase new equipment has caught up to the City and we are seeing increased equipment and infrastructure failures. We must continue to upgrade, maintain, and replace our infrastructure and equipment to avoid the unplanned for and expensive failures. Fortunately, due to our fiscally conscious work over the past three fiscal years (nearly four calendar years) our beautiful City is in a much better position to complete the work necessary to bring our infrastructure, facilities, and equipment up to essential levels.

Our intention remains, as always, to integrate the Council's goals with the City's expected resources to provide the most complete service to our community, while continuing to safeguard the future of the community, the City, and its infrastructure.

The City's total budget for Fiscal Year 2021-2022 is $4,754,175. There are two items of particular note in this fiscal year's budget. First, this is an approximately $140,000 increase from last fiscal year (approximately 2.8%). The City has residual CDBG funds for the water intake project and increases in restricted funds (SDC Funds) which account for this increase. In addition, City management has included "ARP funds" of approximately $225,000 in this Fiscal Year's budget. These are funds that are expected to be received from the federal government for infrastructure projects by July of 2021. Second, as expected when we entered the 2020-2021 Fiscal Year, we saw a decrease in water fund revenue due to the City's moratorium on water shut-off due to non-payment during the worst of the pandemic. This had a significant effect on the Water Fund's beginning balance for Fiscal Year 2021-2022.

The City's budgeted monies are reflected in seven different funds which include the General Fund, Street Fund, Water Fund, Wastewater Fund, Street SDC Fund, Water SDC Fund, and Wastewater SDC Fund. A full discussion of each fund, including projected revenue, proposed use of that revenue, and factors affecting the fund will be provided under the appropriate headings below.

BUDGET DOCUMENT EXPLANATION

The City of Willamina operates on a fiscal year beginning on July 1st and ending on June 30th. The purpose of our budget is to provide a document to explain how the City intends to use the resources entrusted to it by its citizens. As noted above, the City of Willamina has seven different funds including two enterprise funds.

Enterprise funds are those funds created to provide an accounting of the business activities of certain enterprise operations. These operations in the City of Willamina consist of the Water Fund and the Wastewater Fund. Enterprise operations are expected to function similar to private enterprise in that they should be self-sustaining, with all costs paid by user charges. Further, those revenues received by an enterprise fund are restricted and may only be spent for activities relating to that fund. Thus, all monies received for the Water Fund may only be used for water activities which may include administration of the water operations, operation of the water operations, maintenance of the system, expansion of the system, etc.

When reviewing the budget it is important to understand that each fund is separate and distinct from the other and must remain balanced. The revenues generated by each fund may only be expended for the purposes of that fund; except the General Fund revenues, which can be transferred to any other fund.

REVIEW OF FUNDS

General Fund

For a small city, Willamina provides a great number of services to its citizens. Some of these services include a library, cemetery, museum, municipal court, law enforcement and compliance officers, planning staff and services, and six parks as well as the staff and administration to manage these services and maintain the properties. All of these services, as well as maintenance and repairs to properties (other than Streets, Water and Wastewater infrastructure, and Water and Wastewater properties), are provided through those monies received into the General Fund.

Revenues are received into the General Fund mainly from property taxes, State revenue sharing, and franchise fees. The City of Willamina straddles the Yamhill County and Polk County line with citizens and properties in both counties. The total appraised taxable value of the property within the City of Willamina (both Counties) increased from $103,485,860 in FY 2019-2020 to $110,219,376 in FY 2020-2021. We estimate that the General Fund will receive a total of approximately $450,000 in property taxes for City operations for FY 2021-2022. With our focus on economic development and livability, we have had an increase in home starts in our beautiful City over the last three years…somewhat surprisingly, we continued to see an increase in home starts during the last fiscal year. We had expected a decrease in home starts due to the pandemic, however, our continued focus on economic development, livability, and most recently our Development Code update and the addition of an outstanding Planning Clerk kept our home starts and construction strong in our beautiful City! With the City Council's continued direction to focus on infrastructure, livability, and economic development, we expect to see home starts continue to rise over the coming fiscal year.

Our largest franchise holders delayed rate increases and/or instituted a moratorium on shut-offs in Fiscal Year 2020-2021, thus, their profits were reduced and so too were the City's collected franchise fees. This adversely affected the beginning balance for the City for Fiscal Year 2021-2022. Some of our franchise holders put in place rate increases for the coming fiscal year, while others have not. Most of our franchise holders have returned to shut-offs for non-payment, but we still expect to see reduced franchise fees for Fiscal Year 2021-2022. Based on these circumstances we expect to receive approximately $93,500.00 from this revenue stream in FY 2021-2022.

Our beginning fund balance is projected to be $48,027 which is approximately $300,000 less than last fiscal year. As we expected, we had reduced revenue from our franchise holders and we had significant increased expenses in response to the COVID19 pandemic. The City drew heavily from it's contingency fund to provide grants to our businesses and community members, pay for additional services to our community members, provide remote access for citizens, Council, and City employees, create an outdoor IT Hub for our students and community members, and purchase disinfectant/masks/plexiglass and put in place other physical safety measures. In all, these costs were approximately $75,100 which are reimbursable from Coronavirus Relief Funds. These CRF monies were not fully received and receipted in until after the budget numbers were completed by City management. Thus, this $75,100 is not taken into account in the beginning fund balance. In addition, the City had the opportunity return our Senior Deputy and the drug dog to our contract. This was considered and authorized by the City Council due to the public safety needs of our community. With the return of our Senior Deputy, we saw an increase in our Yamhill County Sheriff's Contract of approximately $11,000. With the franchise fee losses, the increased YCSO contract fees, the significant funds the City put into the community through grants and other assistance, and the funds that have not yet been fully receipted in, our contingency fund, which is the bulk of our beginning fund balance, was depleted.

In Fiscal Year 2018-2019, one business utilized the Downtown Loan Fund in the sum of $5,322 leaving $19,678 in that account. In Fiscal Year 2019-2020 the Economic Improvement District borrowed $6,000 from the Downtown Loan Fund leaving $13,678 available in that account. With the payments (principal and interest) made from these borrowers we are able to allocate $14,678 in the Downtown Loan Fund for FY 2021-2022.

Personnel services are distributed in the General Fund and other funds based on the anticipated assignment of duties of employees. Due to the expected revenue reductions from the COVID19 pandemic, the City reduced one employee from full-time to part-time. That employee then chose to leave the City's employ. Due to a stronger than expected property tax revenue, and a reduction in salary for that position due to a reduction in duties, the City was able to hire a full-time employee to replace the employee that left.

We contract with the Yamhill County Sheriff's Office for the City's law enforcement needs. The contract fee for Fiscal Year 2021-2022 is $338,454.09. This contract is paid through a combination of General Fund monies (approximately $239,454) and a Public Safety Fee (approximately $99,000). The City's portion of that contract payment has increased by almost

$40,000 due to the increased wages/benefits granted to the deputies as part of their last union negotiations.

The City was asked to donate funds for FY 2021-2022 to a number of non-profit and/or public service organizations. Because of our reduced franchise fees and with expected maintenance and projects in our parks and cemetery, we are not able to allocate funds to those organizations. It is our hope that in coming years, as the economy begins to rebuild from the COVID19 pandemic, and a majority of the the many deferred maintenance projects are completed, that the City will be able to allocate funds for donation.

Street Fund

The Street Fund had consistent funding from the State's gas tax revenue sharing the last few years and, under current management, was more active including the repaving or patching of over 20 different streets in the City. As we expected, due to fewer people driving to and from work, we saw a decrease in revenue to the Street Fund in Fiscal Year 2020-2021. With the State opening up more and people once again driving to and from work, we expect to see a return in the State's shared revenues to a level more similar to that received in prior years.

In Fiscal Year 2020-2021 the City had two Small City Allotment grants within the budget document. This was simply due to overlapping project timing. We completed the Lamson Street project just as we entered the 2020-2021 fiscal year; and we hope to complete the Barber Avenue project just as we end the 2020-2021 fiscal year.

City management will be applying for a Small City Allotment grant for Fiscal Year 2021-2022, but that grant cycle had not opened as of the completion of this budget document. Therefore we are uncertain as to which street project or how much we will be requesting. Thus, you will see that we did not allocate revenue from the Small City Allotment grant (SCA) for Fiscal Year 2021-2022. City management hopes the City will receive the SCA for Fiscal Year 2021-2022. If so, those funds will be receipted in to this budget via a supplemental budget.

Most of the City's streets were left on deferred maintenance or patched for many years. This means that the cost to repair exceeds $100,000 per street. With the City receiving only $170,000 in Street Funds from the State, City management must carefully and strategically plan for the use of those limited funds. City management will continue to utilize the Street funds to the fullest extent possible in order to bring our streets back to a serviceable condition after many years of deferred maintenance.

Water Fund

As noted above, the Water Fund is an enterprise fund. Such funds are expected to be self-sustaining with all costs paid by user charges. Prior to the current management, the water fund was not self-sustaining and, indeed, was in a negative revenue status for decades. Due to the negative revenue status, the water infrastructure was placed on deferred maintenance and much needed work was not completed. That has set the City up for a situation where there are more than $15 million worth of projects that must be completed and yet, until the changes brought about by current management, there were no funds available to complete those projects. City management and the water operations personnel have worked diligently to increase efficiency and reduce costs, which in conjunction with properly scheduled water rate increases, has put the Water Fund into a positive revenue position. We are very proud to have moved this Fund into a positive position and kept it in a positive position, even while completing much needed deferred maintenance and beginning the absolutely necessary $6.2 million water intake / school main line project.

City management is extremely happy to report that the outstanding loan from many years ago owed to the Wastewater Fund from the Water Fund was paid off last fiscal year! This loan was required to be repaid at the sum of $60,000 per year so that it was repaid within three years. This enhanced payment scheduled was due to prior management's failure to make those payments in years past as required by the loan conditions.

Due to the Water Fund's negative revenue status, the City fell significantly behind on the standard wage scale for our water operations employees. Based on a review of similar sized cities in our region with similar water operations, the City, through the union negotiation process, completed a wage adjustment for all public works employees including water operations employees.

As with many small cities, our water infrastructure is aging and needs significant repairs and upgrades. In addition, deferred maintenance over the years has taken a toll on our infrastructure. Our master plan recommends significant water infrastructure repairs and upgrades with costs expected over $15 million. The largest and most necessary repair is the moving of the City's water intake and placement of a main water line to the school. This project is estimated to cost approximately $6.2 million. The City is unable to fund these repairs and upgrades without assistance from outside sources. The City received $495,000 in grant funds for the design of this necessary project. The design is currently at approximately 40% complete and the City has applied for an additional $300,000 in grant funds to complete the design phase. The City is concurrently seeking grant funds for the construction phase. To complete the construction phase, the City will need to find grant or low-interest loan funds of approximately $5.4 million.

The Water Fund lost approximately $60,000 due to the moratorium on shut-offs over the last year and a half. However, City staff worked diligently to decrease expenses while still completing necessary maintenance and providing services to our community. By decreasing expenses and increasing efficiencies the City was able to keep the Water Fund in a positive revenue position. With this continued conservative fiscal policy, a return to payment enforcement, and the reopening of the State, we expect this Fund to remain self-sustaining even as we proceed with the much needed water infrastructure projects.

Wastewater Fund

As with the Water Fund, the Wastewater Fund is an enterprise fund and is expected to be self-sustaining with all costs paid by user charges. Historically, the Wastewater Fund has been self-sustaining and has ended each fiscal year with a positive ending balance.

All public works positions underwent a wage adjustment this year. This will result in increased payroll and benefit expenses. The Wastewater Fund is in a good position to continue operating with these increased expenses.

Although not currently a part of this budget document, the wastewater facility is in need of a new Master Plan. The current plan is drastically outdated and the City will be receiving estimates on the cost of a Wastewater Master Plan. Should those estimates be within the expected cost range, then City management may request this funding through a supplemental budget.

We will continue to conservatively manage the Wastewater Fund monies and with this continued fiscally responsible stewardship this fund should remain self-sustaining.

Equipment Purchases

For many years the City was unable to replace equipment as needed, leaving it with old, outdated, failing, or failed equipment which made it difficult or impossible to maintain the City's infrastructure. In Fiscal Year 2019-2020, we implemented a plan to replace failing or failed equipment to make certain that the City's infrastructure continued to operate. We purchased a new tractor, and a demo model street sweeper under this plan.

Due to pandemic related revenue reductions, the City had expected to not replace equipment in Fiscal Year 2020-2021. However, the Public Works Director's vehicle was failing and was no longer safe for it's intended use as the sanding vehicle and had to be replaced. In addition, the water operator's vehicle failed and it would have cost significantly more to repair the vehicle than it was worth. Therefore, that vehicle too had to be replaced in Fiscal Year 2020-2021. These were unexpected expenses for this last fiscal year.

During Fiscal Year 2021-2022, the City plans to replace the wastewater operator's vehicle. This vehicle is failing and the costs to repair are mounting up to the point where it is going to cost more to repair the vehicle than to replace it. City management continues to plan for equipment replacement on an annual basis to avoid the unexpected cost of replacement due to failure.

SYSTEM DEVELOPMENT CHARGES (SDC) FUNDS

SDC Funds are system development charges collected from developers who create the need for expansion of current infrastructure systems. These funds are expected to continue to grow and will be available when the infrastructure systems require expansion. The City of Willamina has three SDC Funds---Street, Water, and Wastewater.

Street SDC Fund

In the last two years, with our focus on economic development, the City has seen an increase in housing starts and developers showing an interest in buildable property in Willamina with a resultant increase in our SDC Fund. We expect to see continued increases in housing starts and, thus, we project that the Street SDC charges for FY 2021-2022 will continue to increase.

Water SDC Fund

We project that the Water SDC charges, similar to the Street SDC charges, for FY 2021-2022 will continue to increase.

Wastewater SDC Fund

We project that the Wastewater SDC charges, similar to the Street SDC charges, for FY 2021-2022 will continue to increase.

CLOSING COMMENTS

The past two years have been difficult for our community with lay-offs, business closures, and economic insecurity due to the COVID19 pandemic. City management, in the FY 2020-2021 budget approved by the City Council, allocated significant funds to the Community Assistance fund line. Because our City has not had decades of consistent management to be able to build up reserves, this was not a large fund, but the monies were put to use to help our community through support to the Willamina Food Pantry, grants to our community members and businesses, reallocation of staff and supplies to the delivery of food to our vulnerable populations, and reallocation of staff and supplies to deliver books and media material to our homebound vulnerable populations. As we move forward with expected reopening in the coming months, we expect that we will see some of our community members return to work and more stabilization of our businesses and economy. Therefore, although City management continues to allocate funds to the Community Assistance, Community Events, and Community Projects line items; it is not as much as in the prior fiscal year.

City management continues to remain prudent and strategic in our budget practices and pursuits to allow us to maintain our city service levels, prepare for our long-term needs, while also supporting our community as our economy begins to recover. City Council's focus on economic development, livability, and infrastructure repairs, in the last few years has placed our beautiful City in a good position to weather the economic difficulties due to the pandemic and return to a growing, thriving, healthy community.

Sincerely,

Kenna L. West

Kenna L. West
City Manager and Budget Officer

City Of Willamina
Budget Committee for the
Fiscal Year 2021-2022

Budget Committee	First Name	Last Name
City of Willamina Mayor	Robert	Burr
City of Willamina City Councilor	Rita	Baller
City of Willamina City Councilor	Barry	Wilson
City of Willamina City Councilor	Craig	Johnson
City of Willamina City Councilor	Theresa	McKnight
City of Willamina City Councilor	Roberta	Lawson
City of Willamina City Councilor	April	Wooden
Budget Committee	Laurie	Toney
Budget Committee	Phillip	Lybarger
Budget Committee	Monique	Keeling
Budget Committee	Katie	Vinson
Budget Committee	Dawn	Owings
Budget Committee	Jaime	VanDenBosch
Budget Committee	Gregg	Kruchok
City Manager & Budget Officer	Kenna	West
Finance Manager	Scott	Clark
Deputy City Recorder	Bridget	Meneley

Budget	FY19 Actual	FY 20 Actual	FY21 Amended	FY22 Proposed	FY22 Approved	FY22 Adopted
10 General	**148,296**	**76,727**	-	-	-	-
1 Resource	**962,625**	**1,081,470**	**1,329,548**	**1,376,872**	**1,376,872**	**1,376,872**
1 Fund Balance			377,863	48,027	48,027	48,027
1 General Revenue	**781,424**	910,700	752,545	1,055,825	1,055,825	1,055,825
3 City Services				35,000	35,000	35,000
8 Transfer In	**181,201**	170,770	199,140	238,020	238,020	238,020
2 Requirement	**(814,329)**	**(1,004,743)**	**(1,329,548)**	**(1,376,872)**	**(1,376,872)**	**(1,376,872)**
2 Administration	**(263,192)**	(272,511)	(452,938)	(311,164)	(311,164)	(311,164)
3 City Services	**(264,587)**	(361,785)	(350,158)	(384,547)	(384,547)	(384,547)
4 Public Safety	**(270,358)**	(365,447)	(422,925)	(433,250)	(433,250)	(433,250)
6 Capital Outlay	**(16,192)**	(5,000)	(51,000)	-	-	-
9 Contingency	**-**	-	(48,027)	(244,411)	(244,411)	(244,411)
9 Reserves	**-**	-	(4,500)	(3,500)	(3,500)	(3,500)
20 Streets	**8,624**	**(92,819)**	-	-	-	-
1 Resource	**205,412**	**243,778**	**325,808**	**179,190**	**179,190**	**179,190**
1 Fund Balance			115,808	9,190	9,190	9,190
1 Revenue	**205,412**	243,778	210,000	170,000	170,000	170,000
2 Requirement	**(196,788)**	**(336,597)**	**(325,808)**	**(179,190)**	**(179,190)**	**(179,190)**
2 Street Operations	**(118,923)**	(120,233)	(181,994)	(131,296)	(131,296)	(131,296)
6 Capital Outlay	**-**	(11,500)	(25,000)	-	-	-
7 Grant	**(61,906)**	(186,812)	(100,000)	-	-	-
8 Transfer Out	**(15,960)**	(18,051)	(9,624)	(15,926)	(15,926)	(15,926)
9 Contingency	**-**	-	(9,190)	(31,968)	(31,968)	(31,968)

21 Street SDC	**28,175**	**24,000**	-	-	-	-
1 Resource	**33,000**	**24,000**	**205,000**	**215,000**	**215,000**	**215,000**
1 Fund Balance			195,000	200,000	200,000	200,000
1 Revenue	**33,000**	24,000	10,000	15,000	15,000	15,000
2 Requirement	**(4,825)**	**-**	**(205,000)**	**(215,000)**	**(215,000)**	**(215,000)**
6 Capital Outlay	**(4,825)**	-	(5,000)	(5,000)	(5,000)	(5,000)
9 Contingency	**-**	-	(200,000)	(210,000)	(210,000)	(210,000)
30 Water	**93,131**	**86,408**	-	-	-	-
1 Resource	**789,446**	**884,192**	**1,400,162**	**1,321,458**	**1,321,458**	**1,321,458**
1 Fund Balance			207,620	250,000	250,000	250,000
1 Revenue	**776,243**	870,989	1,179,339	1,058,458	1,058,458	1,058,458
8 Transfer In	**13,203**	13,203	13,203	13,000	13,000	13,000
2 Requirement	**(696,315)**	**(797,784)**	**(1,400,162)**	**(1,321,458)**	**(1,321,458)**	**(1,321,458)**
2 Water Operations	**(494,726)**	(479,013)	(579,556)	(599,281)	(599,281)	(599,281)
6 Capital Outlay	**(230)**	(110,412)	(494,062)	(535,458)	(535,458)	(535,458)
7 Debt Service	**(52,813)**	(66,000)	(60,994)	(59,000)	(59,000)	(59,000)
8 Transfer Out	**(148,546)**	(142,359)	(159,365)	(117,099)	(117,099)	(117,099)
9 Contingency	**-**	-	(106,185)	(10,620)	(10,620)	(10,620)
31 Water SDC	**1,875**	**1,581**	-	-	-	-
1 Resource	**20,328**	**14,784**	**77,576**	**76,373**	**76,373**	**76,373**
1 Fund Balance			69,576	64,373	64,373	64,373
1 Revenue	20,328	14,784	8,000	12,000	12,000	12,000
2 Requirement	**(18,453)**	**(13,203)**	**(77,576)**	**(76,373)**	**(76,373)**	**(76,373)**
6 Capital Outlay	**(5,250)**	-	-	(5,000)	(5,000)	(5,000)
8 Transfer Out	**(13,203)**	(13,203)	(13,203)	(13,000)	(13,000)	(13,000)
9 Contingency	**-**	-	(64,373)	(58,373)	(58,373)	(58,373)

40 Wastewater	**90,617**	**91,369**	-	-	-	-
1 Resource	**736,828**	**751,496**	**1,378,949**	**1,565,023**	**1,565,023**	**1,565,023**
1 Fund Balance		-	638,679	819,273	819,273	819,273
1 Revenue	**653,076**	666,926	655,700	730,750	730,750	730,750
8 Transfer In	**83,752**	84,570	84,570	15,000	15,000	15,000
2 Requirement	**(646,211)**	**(660,127)**	**(1,378,949)**	**(1,565,023)**	**(1,565,023)**	**(1,565,023)**
2 Wastewater Operation	**(361,325)**	(374,523)	(457,525)	(498,850)	(498,850)	(498,850)
6 Capital Outlay	**(38,533)**	(39,741)	(12,000)	(35,000)	(35,000)	(35,000)
7 Debt Service	**(169,658)**	(175,503)	-	(175,000)	(175,000)	(175,000)
8 Transfer Out	**(76,695)**	(70,360)	(90,151)	(104,995)	(104,995)	(104,995)
9 Contingency	-	-	(819,273)	(751,178)	(751,178)	(751,178)
41 Wastewater SDC	**(6,460)**	**(4,570)**	-	-	-	-
1 Resource	**27,500**	**20,000**	**29,829**	**20,259**	**20,259**	**20,259**
1 Fund Balance		-	19,829	5,259	5,259	5,259
1 Revenue	27,500	20,000	10,000	15,000	15,000	15,000
2 Requirement	**(33,960)**	**(24,570)**	**(29,829)**	**(20,259)**	**(20,259)**	**(20,259)**
6 Capital Outlay	(10,208)	-	-			
8 Transfer Out	(23,752)	(24,570)	(24,570)	(15,000)	(15,000)	(15,000)
9 Contingency	-	-	(5,259)	(5,259)	(5,259)	(5,259)
Grand Total	364,258	182,696	-	-	-	-

Budget	FY19 Actual	FY 20 Actual	FY21 Amended	FY22 Proposed	FY22 Approved	FY22 Adopted
10 General	**148,296**	**76,727**	**-**	**-**	**-**	**-**
1 Resource	**962,625**	**1,081,470**	**1,329,548**	**1,376,872**	**1,376,872**	**1,376,872**
1 Fund Balance			377,863	48,027	48,027	48,027
1 General Revenue	**781,424**	910,700	752,545	1,055,825	1,055,825	1,055,825
10-10- General						
10-10-4001 Property Tax	382,506	419,966	380,000	450,000	450,000	450,000
10-10-4002 Property Tax Prior	14,919	4,924	4,000	4,000	4,000	4,000
10-10-4003 Interest on Taxes	224	167	100	100	100	100
10-10-4110 State Cigarette Tax	2,445	2,422	2,000	1,600	1,600	1,600
10-10-4111 State Revenue Sharing	26,172	26,750	20,000	22,000	22,000	22,000
10-10-4112 State Liquor Tax	37,538	34,699	32,000	42,000	42,000	42,000
10-10-4113 State Marijuana Tax	4,522	7,961	6,000	2,800	2,800	2,800
10-10-4501 Business Licenses	5,598	7,300	5,000	6,000	6,000	6,000
10-10-4511 Lien Searches	5,154	1,853	1,500	1,200	1,200	1,200
10-10-4571 OLCC License Fee	315	210	200	300	300	300
10-10-4600 Franchise Fees Centurylink	579	510	500	300	300	300
10-10-4601 Franchise Fees NW Natural	12,655	13,113	13,000	13,000	13,000	13,000
10-10-4602 Franchise Fees PGE	63,080	55,115	57,000	56,000	56,000	56,000
10-10-4603 Franchise Fees Wave Broadband	9,966	8,451	8,000	7,000	7,000	7,000
10-10-4604 Franchise Fees Western ORWaste	6,214	6,634	5,000	5,200	5,200	5,200
10-10-4605 Franchise Fees OnlineNW	3,683	10,836	7,000	12,000	12,000	12,000
10-10-4700 Reimbursment - FEMA	-		-	-	-	-
10-10-4701 Rent - Center Market	2,200	-	-	-	-	-
10-10-4816 Donations	-	200	200	200	200	200
10-10-4818 Community Project Revenue	-	-	-	-	-	-
10-10-4900 Interest Income	35,807	35,943	17,500	14,000	14,000	14,000
10-10-4901 Miscellaneous Income	326	521	500	500	500	500
10-10-4905 Sale of City Assets	-	1,000	100	1,000	1,000	1,000
10-10-49XX ARP Funds			-	225,000	225,000	225,000
10-14- Court						
10-14-4507 Court Fines and Fees	2,371	2,522	1,800	2,000	2,000	2,000
10-14-4508 Court Costs Assessed	-		50	-	-	-
10-17- Planning						
10-17-4583 Planning Fees	54,240	24,790	25,000	20,000	20,000	20,000
10-17-4584 Engineering Fees Planning	-	2,523	-	-	-	-

Budget	FY19 Actual	FY 20 Actual	FY21 Amended	FY22 Proposed	FY22 Approved	FY22 Adopted
10-17-4585 Development Fees Planning	-	-	-	-	-	-
10-18- Public Safety						
10-18-4506 Code Enforcement Fines	2,500	-	100	100	100	100
10-18-4506 Public Safety Fee	-	90,665	99,000	99,000	99,000	99,000
10-19- Street Lights						
10-19-4822 Street Lights Fee	19,120	21,598	29,500	29,500	29,500	29,500
10-19-4823 Utility Fee	9,528	7,709	-	-	-	-
10-60- DT Loan						
10-60-4010 EID Business Taxes	8,037	8,714	8,983	9,700	9,700	9,700
10-60-4755 Downtown Loan Interest Pay	20	126	125	125	125	125
10-60-4758 Downtown Loan Princ Pay	280	1,986	1,100	1,100	1,100	1,100
10-65- Library						
10-65-4560 Fines	822	755	-	-	-	-
10-65-4705 CCRLS Formula Payment	18,488	18,792	18,087	22,400	22,400	22,400
10-65-4708 CCRLS Lost Book	166		-	-	-	-
10-65-4711 CCRLS Net Lending	-	8,486	4,000	4,000	4,000	4,000
10-65-4714 CCRLS Rural Patron	-	20	-	-	-	-
10-65-4811 Ready To Read Grant	1,000	1,842	1,000	1,000	1,000	1,000
10-65-4812 Grant	3,000	20,000	-	-	-	-
10-65-4816 Donations	422	600	100	100	100	100
10-65-4901 Miscellaneous Income	503	311	100	100	100	100
10-67- Museum						
10-67-4816 Donations	-	20,512	2,500	1,000	1,000	1,000
10-68- Cemetery						
10-68-4588 Sale of Internment Rights	-	-	1,500	1,500	1,500	1,500
10-81- Grant						
10-81-4810 Grant Revenue		40,174	-	-	-	-
10-81-4812 Grant Rev Grant Young Mem - Website	-	-	-	-	-	-
10-81-4814 OR Dept of Fish & Wildlife	22,658		-	-	-	-
10-81-4816 Grant Revenue Ford Family Foun	1,365	-	-	-	-	-
10-81-4817 Grant West Valley Visitor Assn	23,000	-	-	-	-	-
3 City Services				35,000	35,000	35,000
10-66- Parks						
10-66-4910 Park Fee				35,000	35,000	35,000
8 Transfer In	**181,201**	170,770	199,140	238,020	238,020	238,020

Budget	FY19 Actual	FY 20 Actual	FY21 Amended	FY22 Proposed	FY22 Approved	FY22 Adopted
10-90- Transfer						
10-90-9130 In Lieu of Franchise Fee	22,128	22,648	36,136	40,750	40,750	40,750
10-90-9140 In Lieu of Franchise Fee	19,490	20,008	32,785	36,538	36,538	36,538
10-90-9610 Overhead Allocation	139,583	128,114	130,219	160,732	160,732	160,732
10-90-9630 Transfer In-Interfund Loan 30	-	-	-	-	-	-
10-98- Prior Period						
10-99-9914 Prior Period Expense	-	-	-	-	-	-
2 Requirement	**(814,329)**	**(1,004,743)**	**(1,329,548)**	**(1,376,872)**	**(1,376,872)**	**(1,376,872)**
2 Administration	**(263,192)**	(272,511)	(452,938)	(311,164)	(311,164)	(311,164)
10-12- Admin						
10-12-5115 Bank Charges	(1,508)	(995)	(1,200)	(1,200)	(1,200)	(1,200)
10-12-5119 Discrepencies	-	-	(50)	(50)	(50)	(50)
10-12-5123 Merchant Fees	-	(0)	(200)	(200)	(200)	(200)
10-12-5124 Payroll Processing Fees	(3,078)	(3,599)	(3,800)	(3,800)	(3,800)	(3,800)
10-12-5126 Postage	(1,434)	(1,691)	(2,500)	(2,500)	(2,500)	(2,500)
10-12-5137 Supplies	(16,990)	(14,999)	(25,000)	(20,000)	(20,000)	(20,000)
10-12-5200 Contract Services	(17,751)	(10,592)	(17,000)	(17,000)	(17,000)	(17,000)
10-12-5201 Audit Services	(14,000)	(14,720)	(15,000)	(15,000)	(15,000)	(15,000)
10-12-5203 Legal Services	(3,071)	(3,237)	(19,000)	(15,000)	(15,000)	(15,000)
10-12-5207 Insurance	(20,667)	(22,852)	(28,000)	(28,000)	(28,000)	(28,000)
10-12-5209 Cleaning Services	(5,140)	(4,920)	(5,500)	(5,000)	(5,000)	(5,000)
10-12-5230 Printing and Publishing	(4,979)	(5,551)	(9,500)	(7,500)	(7,500)	(7,500)
10-12-5233 Technology Services	(8,791)	(8,969)	(10,000)	(9,000)	(9,000)	(9,000)
10-12-5234 Technology Back up	(4,800)	(4,800)	(7,000)	(7,000)	(7,000)	(7,000)
10-12-5235 Software Maintenance	(14,400)	(13,200)	(15,000)	(15,000)	(15,000)	(15,000)
10-12-5320 Dues, License, Permits	(5,980)	(7,026)	(9,500)	(9,000)	(9,000)	(9,000)
10-12-5342 Conference/Seminar/Training	(4,910)	(3,064)	(5,000)	(3,000)	(3,000)	(3,000)
10-12-5344 Travel	(1,000)	(2,703)	(4,000)	(2,000)	(2,000)	(2,000)
10-12-5355 Miscellaneous Expense	-		(200)	(200)	(200)	(200)
10-12-5413 Telephone	(9,049)	(4,956)	(6,000)	(6,000)	(6,000)	(6,000)
10-12-5415 Utilities	(8,764)	(8,987)	(12,000)	(12,000)	(12,000)	(12,000)
10-12-5504 Repairs - Maintenance	(7,495)	(18,840)	(10,000)	(10,000)	(10,000)	(10,000)
10-12-5600 Equipment	(3,537)	(6,526)	(16,000)	(8,000)	(8,000)	(8,000)
10-12-5606 Equipment Lease	(4,629)	(2,946)	(4,200)	(4,200)	(4,200)	(4,200)
10-12-5818 Community Project	-	(128)	(2,000)	-	-	-

Budget	FY19 Actual	FY 20 Actual	FY21 Amended	FY22 Proposed	FY22 Approved	FY22 Adopted
10-12-5819 Community Assistance	-	(3,482)	(13,000)	(10,000)	(10,000)	(10,000)
10-12-5820 Community Event	-	(2,339)	(1,500)	(3,000)	(3,000)	(3,000)
10-13- Council						
10-13-5307 Community Project	(960)	(370)	-	(200)	(200)	(200)
10-13-5310 Stipend	(4,660)	(4,800)	(5,000)	(5,000)	(5,000)	(5,000)
10-13-5342 Conference/Seminar/Training	(1,525)	(1,710)	(800)	(500)	(500)	(500)
10-13-5344 Travel	-	(600)	(200)	(200)	(200)	(200)
10-13-5350 Volunteer Appreciation	(650)		-	-	-	-
10-13-5355 Council Expense	(953)	(1,151)	(1,000)	(500)	(500)	(500)
10-70- Admin PR						
10-70-5000 Salary - Wages	(213,020)	(225,689)	(226,000)	(246,500)	(246,500)	(246,500)
10-70-5002 Admin Allocated Payroll	211,110	230,142	175,812	246,886	246,886	246,886
10-70-5020 Payroll Tax	(16,201)	(16,615)	(15,000)	(17,000)	(17,000)	(17,000)
10-70-5040 Benefits	(64,064)	(69,776)	(64,000)	(64,000)	(64,000)	(64,000)
10-70-5060 PERS	(10,053)	(10,260)	(9,000)	(9,000)	(9,000)	(9,000)
10-70-5090 Workers Comp	(242)	(563)	(2,100)	(1,500)	(1,500)	(1,500)
10-99-9995 Pension Expense	-	-	-			
10-71- PW PR						
10-71-5000 Salary - Wages	(156,932)	(196,493)	(241,000)	(230,000)	(230,000)	(230,000)
10-71-5001 PW Allocated Payroll	236,402	283,930	295,300	324,000	324,000	324,000
10-71-5020 Payroll Tax	(10,150)	(13,157)	(12,000)	(12,000)	(12,000)	(12,000)
10-71-5040 Benefits	(57,068)	(57,754)	(65,000)	(62,000)	(62,000)	(62,000)
10-71-5060 PERS	(11,783)	(14,812)	(15,000)	(15,000)	(15,000)	(15,000)
10-71-5090 Workers Comp	(469)	(1,711)	(4,300)	(5,000)	(5,000)	(5,000)
10-72- PW Expense						
10-72-5120 Gas - Oil	(3,308)	(2,353)	(5,500)	(5,000)	(5,000)	(5,000)
10-72-5137 Supplies	(5,394)	(6,635)	(7,300)	(7,000)	(7,000)	(7,000)
10-72-5140 Uniforms - Towels	(360)	(290)	(500)	(500)	(500)	(500)
10-72-5200 Contract Services	(96)	(243)	(200)	(200)	(200)	(200)
10-72-5203 Legal Services	-	(494)	(200)	(200)	(200)	(200)
10-72-5207 Insurance	(12,000)	(12,500)	(14,500)	(22,200)	(22,200)	(22,200)
10-72-5233 Technology Services	(375)	(100)	(3,700)	(2,000)	(2,000)	(2,000)
10-72-5320 Dues, License, Permits	(770)	(353)	(1,000)	(600)	(600)	(600)
10-72-5342 Conference/Seminar/Training	(979)	(1,506)	(3,500)	(2,000)	(2,000)	(2,000)
10-72-5344 Travel	(299)	-	(500)	(200)	(200)	(200)

Budget	FY19 Actual	FY 20 Actual	FY21 Amended	FY22 Proposed	FY22 Approved	FY22 Adopted
10-72-5415 Utilities	(9,216)	(8,898)	(10,000)	(10,000)	(10,000)	(10,000)
10-72-5504 Repairs - Maintenance	(3,824)	(7,752)	(8,000)	(6,000)	(6,000)	(6,000)
10-72-5507 Equipment Maintenance	(144)	(2,567)	(1,500)	(2,000)	(2,000)	(2,000)
10-72-5600 Equipment	(2,920)	(7,808)	(13,500)	(4,000)	(4,000)	(4,000)
10-72-9615 PW Expense Allocation	39,686	51,499	48,400	61,900	61,900	61,900
3 City Services	**(264,587)**	(361,785)	(350,158)	(384,547)	(384,547)	(384,547)
10-17- Planning						
10-17-5203 Legal Services - Planning	(431)	(270)	(500)	(3,000)	(3,000)	(3,000)
10-17-5204 Engineering Services	(7,370)	(19,701)	(33,000)	(20,000)	(20,000)	(20,000)
10-17-5214 Planning Services	(17,211)	(52,759)	(45,000)	(25,000)	(25,000)	(25,000)
10-17-5230 Printing and Publishing	-	-	(1,000)	(1,000)	(1,000)	(1,000)
10-17-5342 Conference/Seminar/Training	(20)	(266)	(1,000)	(1,000)	(1,000)	(1,000)
10-19- Street Lights						
10-19-5400 Street Lights	(18,849)	(16,999)	(29,500)	(29,500)	(29,500)	(29,500)
10-60- DT Loan						
10-60-5758 Downtown Loan	(5,322)	(6,000)	(13,678)	(14,678)	(14,678)	(14,678)
10-60-5900 EID Tax Disbursement	(8,037)	(8,714)	(8,983)	(9,700)	(9,700)	(9,700)
10-65- Library						
10-65-5000 Salary - Wages	(39,683)	(48,550)	(56,000)	(56,000)	(56,000)	(56,000)
10-65-5020 Payroll Tax	(3,201)	(3,194)	(3,400)	(3,600)	(3,600)	(3,600)
10-65-5040 Benefits	(16,567)	(17,562)	(21,000)	(20,000)	(20,000)	(20,000)
10-65-5060 PERS	(1,858)	(1,599)	(1,800)	(1,800)	(1,800)	(1,800)
10-65-5090 Workers Comp	(31)	(31)	(2,100)	(2,200)	(2,200)	(2,200)
10-65-5100 Books Children	(1,825)	(1,274)	(3,900)	(4,200)	(4,200)	(4,200)
10-65-5101 Audio Visual Children	(460)	(274)	(1,100)	(1,000)	(1,000)	(1,000)
10-65-5102 Audio Visual Adult	(792)	(349)	-	-	-	-
10-65-5103 Audio Visual Lost Replacement	-		-	-	-	-
10-65-5106 Books Adults	(2,156)	(813)	-	-	-	-
10-65-5107 Books Lost Replacement	-		-	-	-	-
10-65-5111 Special Program	(1,025)	(528)	(900)	(1,000)	(1,000)	(1,000)
10-65-5112 Special Program Adult	(492)	(20)	-	-	-	-
10-65-5126 Postage	(187)	(116)	(100)	(100)	(100)	(100)
10-65-5137 Supplies	(2,177)	(3,723)	(3,000)	(2,000)	(2,000)	(2,000)
10-65-5200 Contract Services	(735)	(601)	(500)	(500)	(500)	(500)
10-65-5209 Cleaning Services	-		-	-	-	-

Budget	FY19 Actual	FY 20 Actual	FY21 Amended	FY22 Proposed	FY22 Approved	FY22 Adopted
10-65-5233 Technology Services	(1,731)	(1,281)	(1,000)	(1,000)	(1,000)	(1,000)
10-65-5320 Dues, License, Permits	(522)	(913)	(1,000)	(1,000)	(1,000)	(1,000)
10-65-5321 Subscriptions	(402)	(133)	(100)	(100)	(100)	(100)
10-65-5342 Conference/Seminar/Training	(260)	(591)	(500)	(500)	(500)	(500)
10-65-5344 Travel	-	(75)	(100)	(100)	(100)	(100)
10-65-5350 Parking Lot Lease	(498)	(504)	(510)	(510)	(510)	(510)
10-65-5360 Pers Payout	-		-	-	-	-
10-65-5413 Telephone	(2,479)	(237)	(300)	(300)	(300)	(300)
10-65-5415 Utilities	(3,781)	(4,694)	(5,500)	(5,500)	(5,500)	(5,500)
10-65-5504 Repairs - Maintenance	(3,471)	(1,489)	(3,000)	(3,000)	(3,000)	(3,000)
10-65-5600 Equipment	(80)	(1,436)	(1,250)	(1,000)	(1,000)	(1,000)
10-65-5606 Equipment Lease	(1,946)	(765)	(1,600)	(1,600)	(1,600)	(1,600)
10-65-5912 Grant Expense Ready to Read	(997)	(1,418)	(1,000)	(1,000)	(1,000)	(1,000)
10-65-5913 Grant Expense	(2,912)	(14,118)	-	-	-	-
10-65-6000 Capital Outlay	-	-	-	-	-	-
10-66- Parks						
10-66-5000 Salary - Wages	(25,497)	(24,916)	(33,500)	(36,400)	(36,400)	(36,400)
10-66-5001 PW Allocated Payroll	(2,363)	(28,393)	(2,953)	(3,240)	(3,240)	(3,240)
10-66-5020 Payroll Tax	(2,569)	(3,146)	(3,200)	(2,000)	(2,000)	(2,000)
10-66-5040 Benefits	(4,300)	(14,661)	(15,000)	(9,000)	(9,000)	(9,000)
10-66-5060 PERS	(1,599)	(1,992)	(2,200)	(2,000)	(2,000)	(2,000)
10-66-5090 Workers Comp	(1,492)	(2,123)	(2,400)	(2,400)	(2,400)	(2,400)
10-66-5120 Gas - Oil	(993)	(1,832)	(1,800)	(1,800)	(1,800)	(1,800)
10-66-5137 Supplies	(1,493)	(1,496)	(1,000)	(100)	(100)	(100)
10-66-5140 Uniforms - Towels	(743)	(879)	(900)	(900)	(900)	(900)
10-66-5200 Contract Services	(4,239)	(4,250)	(5,000)	(3,000)	(3,000)	(3,000)
10-66-5413 Telephone	(738)	(758)	(750)	(750)	(750)	(750)
10-66-5415 Utilities	(2,905)	(3,375)	(5,500)	(5,000)	(5,000)	(5,000)
10-66-5504 Repairs - Maintenance	(2,811)	(962)	(2,500)	(2,000)	(2,000)	(2,000)
10-66-5510 Landscape Maintenance	-	(432)	(500)	(500)	(500)	(500)
10-66-5512 Pond Aquatic Weed Control	-	-	(8,500)	(8,500)	(8,500)	(8,500)
10-66-5600 Equipment	(738)		(2,500)	(1,000)	(1,000)	(1,000)
10-66-6000 Capital Outlay	(3,852)	-	(1,500)	(50,000)	(50,000)	(50,000)
10-66-6001 Grant Capital Expense		-	-	-	-	-
10-66-9615 PW Expense Allocation	(397)	(5,150)	(484)	(619)	(619)	(619)

Budget	FY19 Actual	FY 20 Actual	FY21 Amended	FY22 Proposed	FY22 Approved	FY22 Adopted
10-67- Museum						
10-67-5000 Salary - Wages	-	-	-	-	-	-
10-67-5020 Payroll Tax	-	-	-	-	-	-
10-67-5090 Workers Comp	-	-	-	-	-	-
10-67-5137 Supplies	-	(321)	(400)	(400)	(400)	(400)
10-67-5200 Contract Services	(516)	(347)	(500)	(500)	(500)	(500)
10-67-5233 Technology Services	(450)	(650)	(600)	(400)	(400)	(400)
10-67-5310 Stipend	(2,400)	(2,900)	(3,600)	(3,600)	(3,600)	(3,600)
10-67-5320 Dues, License, Permits	(68)	(93)	(100)	(100)	(100)	(100)
10-67-5413 Telephone	(1,873)	(241)	(300)	(300)	(300)	(300)
10-67-5415 Utilities	(3,355)	(4,226)	(4,500)	(4,500)	(4,500)	(4,500)
10-67-5504 Repairs - Maintenance	(529)	(3,179)	(3,500)	(3,500)	(3,500)	(3,500)
10-67-5601 Collection Acquisiton	-	(60)	(300)	(300)	(300)	(300)
10-67-5606 Equipment Lease	-	-	-	-	-	-
10-67-5820 Events	-	(479)	(750)	(750)	(750)	(750)
10-67-6000 Capital Outlay	-	(10,930)	-	-	-	-
10-68- Cemetery						
10-68-5200 Contract Services	-	(320)	(500)	(6,500)	(6,500)	(6,500)
10-68-5320 Dues, License, Permits	-	-	(100)	(100)	(100)	(100)
10-68-5510 Landscape Maintenance	(2,085)	(1,856)	(1,500)	(1,500)	(1,500)	(1,500)
10-68-5513 Portable Restroom	-	(473)	(1,000)	(1,000)	(1,000)	(1,000)
10-68-5920 Capital Outlay			-	(20,000)	(20,000)	(20,000)
10-81- Grant						
10-81-5912 Grant Exp Green GrowthDeptStor	-		-	-	-	-
10-81-5915 Grant Exp ODFW-Huddleston Pond	(21,708)	-	-	-	-	-
10-81-5915 Grant Expense	-	(30,347)	-	-	-	-
10-81-5916 Grant Exp Ford Family Found	(1,365)	-	-	-	-	-
10-81-5917 Grant Exp West Valley Visitor	(26,000)	-	-	-	-	-
4 Public Safety	**(270,358)**	(365,447)	(422,925)	(433,250)	(433,250)	(433,250)
10-14- Court						
10-14-5105 Bad Debt	-	-	(29,500)	-	-	-
10-14-5200 Contract Services	-	-	-	-	-	-
10-14-5211 Muni Court Judge	(2,550)	(1,550)	(3,000)	(3,000)	(3,000)	(3,000)
10-14-5306 State Assessment	(591)	(57)	(200)	(200)	(200)	(200)
10-14-5313 County Jail Assessment	(176)	(16)	(100)	(100)	(100)	(100)

Budget	FY19 Actual	FY 20 Actual	FY21 Amended	FY22 Proposed	FY22 Approved	FY22 Adopted
10-14-5320 Dues, License, Permits	-		(100)	(100)	(100)	(100)
10-14-5342 Conference/Seminar/Training	-	-	-	-	-	-
10-14-5344 Travel	-		-	-	-	-
10-18- Public Safety						
10-18-5000 Salary - Wages	(27,824)	(28,919)	(29,000)	(41,000)	(41,000)	(41,000)
10-18-5020 Payroll Tax	(2,118)	(2,199)	(2,200)	(2,500)	(2,500)	(2,500)
10-18-5040 Benefits	(8,883)	(13,584)	(15,000)	(15,000)	(15,000)	(15,000)
10-18-5060 PERS	(1,316)	(1,343)	(1,350)	(1,350)	(1,350)	(1,350)
10-18-5090 Workers Comp	(20)	(16)	(100)	(100)	(100)	(100)
10-18-5120 Gas - Oil	(911)	(680)	(800)	(800)	(800)	(800)
10-18-5137 Supplies	(291)	(633)	(500)	(500)	(500)	(500)
10-18-5217 Police Services Contract	(199,457)	(289,043)	(309,700)	(339,000)	(339,000)	(339,000)
10-18-5233 Technology Services	-	(250)	(500)	(500)	(500)	(500)
10-18-5302 Dues YCOM	(24,087)	(24,523)	(26,000)	(26,000)	(26,000)	(26,000)
10-18-5342 Conference/Seminar/Training	(454)	(616)	(625)	(500)	(500)	(500)
10-18-5413 Telephone	(649)	(1,059)	(1,250)	(600)	(600)	(600)
10-18-5504 Repairs - Maintenance	(1,031)	(959)	(3,000)	(2,000)	(2,000)	(2,000)
10-18-5507 Equipment Maintenance	-		-	-	-	-
10-18-5900 Grant Expense			-	-	-	-
6 Capital Outlay	**(16,192)**	(5,000)	(51,000)	-	-	-
10-80- Capital						
10-80-6001 Capital Outlay - Website	(2,715)	-	-	-	-	-
10-80-6003 Capital Outlay - City Hall Siding	(5,071)	-	-	-	-	-
10-80-6010 Capital Outlay	(8,406)	(5,000)	(51,000)	-	-	-
9 Contingency	**-**	-	(48,027)	(244,411)	(244,411)	(244,411)
10-99- Fund Balance						
10-99-9900 Contingency	-	-	(48,027)	(244,411)	(244,411)	(244,411)
9 Reserves	**-**	-	(4,500)	(3,500)	(3,500)	(3,500)
10-67- Museum						
10-67-9990 Reserve for Future	-	-	(4,500)	(3,500)	(3,500)	(3,500)

Budget	FY19 Actual	FY 20 Actual	FY21 Amended	FY22 Proposed	FY22 Approved	FY22 Adopted
20 Streets	**8,624**	**(92,819)**	**-**	**-**	**-**	**-**
1 Resource	**205,412**	**243,778**	**325,808**	**179,190**	**179,190**	**179,190**
1 Fund Balance			115,808	9,190	9,190	9,190
1 Revenue	**205,412**	243,778	210,000	170,000	170,000	170,000
20-10- Streets						
20-10-4115 State Highway Revenue	155,412	156,010	110,000	170,000	170,000	170,000
20-81-4850 Grant Income	-	87,768	100,000	-	-	-
20-81- Grants						
20-81-4850 Grant Small Cities Allotment	50,000		-	-	-	-
2 Requirement	**(196,788)**	**(336,597)**	**(325,808)**	**(179,190)**	**(179,190)**	**(179,190)**
2 Street Operations	**(118,923)**	(120,233)	(181,994)	(131,296)	(131,296)	(131,296)
20-11- Street Ops						
20-11-5001 PW Allocated Payroll	(24,666)	(36,005)	(21,824)	(32,102)	(32,102)	(32,102)
20-11-5002 Admin Allocated Payroll	(24,138)	(32,427)	(12,993)	(24,461)	(24,461)	(24,461)
20-11-5090 Workers Comp	(2,266)	(2,900)	(4,700)	(3,200)	(3,200)	(3,200)
20-11-5120 Gas - Oil	(966)	(816)	(2,000)	(1,000)	(1,000)	(1,000)
20-11-5137 Supplies	(543)	(60)	(500)	(500)	(500)	(500)
20-11-5140 Uniforms - Towels	(210)	(303)	(500)	(500)	(500)	(500)
20-11-5200 Contract Services	-	-	-	-	-	-
20-11-5204 Engineering Services	(11,004)	(1,315)	(7,000)	(2,000)	(2,000)	(2,000)
20-11-5233 Technology Services	-	-	(500)	(500)	(500)	(500)
20-11-5243 Conference/Seminar/Training			-	(1,000)	(1,000)	(1,000)
20-11-5344 Travel			-	(1,500)	(1,500)	(1,500)
20-11-5413 Telephone	(337)	(303)	(400)	(400)	(400)	(400)
20-11-5415 Utilities	-	-	-	-	-	-
20-11-5504 Repairs - Maintenance	(2,907)	(2,820)	(2,000)	(8,000)	(8,000)	(8,000)
20-11-5521 Sidewalk Maintenance	(1,464)	(8,532)	(2,000)	-	-	-
20-11-5522 Street Maintenance	(44,183)	(27,075)	(105,000)	(6,000)	(6,000)	(6,000)
20-11-5523 Traffic Control	(1,058)	(1,148)	(2,000)	(2,000)	(2,000)	(2,000)
20-11-5600 Equipment	(1,040)	-	(17,000)	(42,000)	(42,000)	(42,000)
20-90-9615 PW Expense Allocation	(4,141)	(6,531)	(3,577)	(6,133)	(6,133)	(6,133)
6 Capital Outlay	**-**	(11,500)	(25,000)	-	-	-
20-80- Capital						
20-80-6000 Capital	-	(11,500)	(25,000)	-	-	-

Budget	FY19 Actual	FY 20 Actual	FY21 Amended	FY22 Proposed	FY22 Approved	FY22 Adopted
7 Grant	**(61,906)**	(186,812)	(100,000)	-	-	-
20-81- Grants						
20-81-5909 Grant Expense	(61,906)	(186,812)	(100,000)	-	-	-
20-81-5915 Grant Exp ODOT E Main Sidewalk	-	-	-	-	-	-
8 Transfer Out	**(15,960)**	(18,051)	(9,624)	(15,926)	(15,926)	(15,926)
20-90- Transfer						
20-90-9610 Overhead Allocation	(15,960)	(18,051)	(9,624)	(15,926)	(15,926)	(15,926)
9 Contingency	**-**	-	(9,190)	(31,968)	(31,968)	(31,968)
20-98- Prior Period	**-**	**-**	**-**			
20-99- Fund Balance						
20-99-9900 Contingency	-	-	(9,190)	(31,968)	(31,968)	(31,968)
21 Street SDC	**28,175**	**24,000**	**-**	**-**	**-**	**-**
1 Resource	**33,000**	**24,000**	**205,000**	**215,000**	**215,000**	**215,000**
1 Fund Balance			195,000	200,000	200,000	200,000
1 Revenue	**33,000**	24,000	10,000	15,000	15,000	15,000
21-10- SDC						
21-10-4421 System Development Charges	33,000	24,000	10,000	15,000	15,000	15,000
2 Requirement	**(4,825)**	**-**	**(205,000)**	**(215,000)**	**(215,000)**	**(215,000)**
6 Capital Outlay	**(4,825)**	-	(5,000)	(5,000)	(5,000)	(5,000)
21-10- SDC						
21-80-6000 Capital Outlay	(4,825)	-	(5,000)	(5,000)	(5,000)	(5,000)
9 Contingency	**-**	-	(200,000)	(210,000)	(210,000)	(210,000)
21-99- Fund Balance						
21-99-9900 Contingency	-	-	(200,000)	(210,000)	(210,000)	(210,000)

Budget	FY19 Actual	FY 20 Actual	FY21 Amended	FY22 Proposed	FY22 Approved	FY22 Adopted
30 Water	**93,131**	**86,408**	**-**	**-**	**-**	**-**
1 Resource	**789,446**	**884,192**	**1,400,162**	**1,321,458**	**1,321,458**	**1,321,458**
1 Fund Balance			207,620	250,000	250,000	250,000
1 Revenue	**776,243**	870,989	1,179,339	1,058,458	1,058,458	1,058,458
30-10- Water						
30-10-4330 Water Revenue	737,588	741,650	715,000	810,000	810,000	810,000
30-10-4332 New Connection Fee	6,050	4,400	2,000	3,500	3,500	3,500
30-10-4337 Double Check Valve	2,400	1,600	500	1,200	1,200	1,200
30-10-4350 Recovery Bad Debt	1,354	482	100	100	100	100
30-10-4581 Penalty And Fees	2,600	6,664	5,000	100	100	100
30-10-4582 Non-sufficient Check Fees	125	153	125	100	100	100
30-10-4600 Business Oregon Grant	13,063	-	-			
30-10-4610 Business Oregon Loan	13,063	-	-			
30-10-4905 Sale of City Assets	-	-	-			
30-81- Water						
30-81-4800 Grants	-	116,040	456,614	243,458	243,458	243,458
8 Transfer In	**13,203**	13,203	13,203	13,000	13,000	13,000
30-90- Transfer						
30-90-9231 Debt Service Transfer	13,203	13,203	13,203	13,000	13,000	13,000
30-90-9732 Close Debt Fund Loan from WW	-	-	-	-	-	-
2 Requirement	**(696,315)**	**(797,784)**	**(1,400,162)**	**(1,321,458)**	**(1,321,458)**	**(1,321,458)**
2 Water Operations	**(494,726)**	(479,013)	(579,556)	(599,281)	(599,281)	(599,281)
30-11- Water						
30-11-5000 Salary - Wages	(58,207)	(62,502)	(68,000)	(82,000)	(82,000)	(82,000)
30-11-5001 PW Allocated Payroll	(112,488)	(119,101)	(143,387)	(153,904)	(153,904)	(153,904)
30-11-5002 Admin Allocated Payroll	(100,454)	(107,265)	(85,368)	(117,274)	(117,274)	(117,274)
30-11-5020 Payroll Tax	(4,315)	(4,442)	(4,800)	(4,800)	(4,800)	(4,800)
30-11-5040 Benefits	(9,142)	(10,465)	(10,500)	(10,500)	(10,500)	(10,500)
30-11-5060 PERS	(7,373)	(6,993)	(8,000)	(10,500)	(10,500)	(10,500)
30-11-5090 Workers Comp	(2,152)	(2,928)	(3,700)	(3,800)	(3,800)	(3,800)
30-11-5105 Bad Debt	(2,919)	(1,266)	(2,500)	(1,000)	(1,000)	(1,000)
30-11-5108 Chemicals	(19,898)	(15,442)	(18,000)	(18,000)	(18,000)	(18,000)
30-11-5120 Gas - Oil	(2,681)	(2,069)	(2,500)	(2,000)	(2,000)	(2,000)
30-11-5123 Merchant Fees	(4,008)	(3,947)	(4,500)	(4,500)	(4,500)	(4,500)

Budget	FY19 Actual	FY 20 Actual	FY21 Amended	FY22 Proposed	FY22 Approved	FY22 Adopted
30-11-5126 Postage	-	-	(200)	(200)	(200)	(200)
30-11-5137 Supplies	(2,436)	(2,618)	(3,500)	(2,000)	(2,000)	(2,000)
30-11-5140 Uniforms - Towels	(1,775)	(1,895)	(1,800)	(1,800)	(1,800)	(1,800)
30-11-5200 Contract Services	(2,589)	(10,866)	(13,000)	(1,500)	(1,500)	(1,500)
30-11-5204 Engineering Services	(16,705)	(4,896)	(20,000)	(20,000)	(20,000)	(20,000)
30-11-5230 Printing and Publishing	(2,952)	(3,036)	(3,500)	(3,500)	(3,500)	(3,500)
30-11-5233 Technology Services	-	(1,298)	(1,000)	(1,000)	(1,000)	(1,000)
30-11-5250 System Analysis	(3,679)	(2,465)	(3,000)	(5,000)	(5,000)	(5,000)
30-11-5320 Dues, License, Permits	(963)	(3,031)	(2,500)	(1,500)	(1,500)	(1,500)
30-11-5342 Conference/Seminar/Training	-	(345)	(1,500)	(500)	(500)	(500)
30-11-5344 Travel	(279)	-	(100)	(100)	(100)	(100)
30-11-5355 Miscellaneous Expense	-	-	-	-	-	-
30-11-5413 Telephone	(3,642)	(3,170)	(3,500)	(3,500)	(3,500)	(3,500)
30-11-5415 Utilities	(44,640)	(43,346)	(41,000)	(41,000)	(41,000)	(41,000)
30-11-5504 Repairs - Maintenance	(4,056)	(3,749)	(15,000)	(15,000)	(15,000)	(15,000)
30-11-5530 System Maintenance & Equipment	(56,843)	(27,990)	(75,000)	(50,000)	(50,000)	(50,000)
30-11-5531 Distribution Maintenance	(4,983)	(3,274)	-	-	-	-
30-11-5535 New Connection Equipment	-	-	-	-	-	-
30-11-5600 Equipment	(6,662)	(5,137)	(16,000)	(10,000)	(10,000)	(10,000)
30-11-5605 Hydrant Replacement	-	(3,876)	(4,200)	(5,000)	(5,000)	(5,000)
30-90-9615 PW Expense Allocation	(18,885)	(21,602)	(23,501)	(29,403)	(29,403)	(29,403)
6 Capital Outlay	**(230)**	(110,412)	(494,062)	(535,458)	(535,458)	(535,458)
30-80- Capital						
30-80-6000 Capital Outlay	-	(21,319)	(23,000)	(292,000)	(292,000)	(292,000)
30-80-6001 Capital Outlay Intake	(230)	(89,093)	(471,062)	(243,458)	(243,458)	(243,458)
30-80-6002 Capital-GIS Mapping of System	-	-	-	-	-	-
7 Debt Service	**(52,813)**	(66,000)	(60,994)	(59,000)	(59,000)	(59,000)
30-82- Debt						
30-82-8030 Debt Principal	(19,203)	(32,676)	(27,851)	(27,000)	(27,000)	(27,000)
30-82-8035 Debt Interest	(33,610)	(33,324)	(33,143)	(32,000)	(32,000)	(32,000)
30-90-9750 Debt Service	-	-	-	-	-	-
8 Transfer Out	**(148,546)**	(142,359)	(159,365)	(117,099)	(117,099)	(117,099)
30-90- Transfer						
30-90-9040 Interfund Loan	(60,000)	(60,000)	(60,000)	-	-	-
30-90-9110 In Lieu of Franchise Fee	(22,128)	(22,648)	(36,136)	(40,750)	(40,750)	(40,750)

Budget	FY19 Actual	FY 20 Actual	FY21 Amended	FY22 Proposed	FY22 Approved	FY22 Adopted
30-90-9610 Overhead Allocation	(66,418)	(59,711)	(63,229)	(76,349)	(76,349)	(76,349)
30-98- Prior Period						
30-99-9914 Prior Period Expense	-	-	-	-	-	-
9 Contingency	**-**	-	(106,185)	(10,620)	(10,620)	(10,620)
30-99- Fund Balance						
30-99-9900 Contingency	-	-	(106,185)	(10,620)	(10,620)	(10,620)
31 Water SDC	**1,875**	**1,581**	**-**	**-**	**-**	**-**
1 Resource	**20,328**	**14,784**	**77,576**	**76,373**	**76,373**	**76,373**
1 Fund Balance			69,576	64,373	64,373	64,373
1 Revenue	20,328	14,784	8,000	12,000	12,000	12,000
31-10- SDC						
31-10-4431 System Development Charges	20,328	14,784	8,000	12,000	12,000	12,000
2 Requirement	**(18,453)**	**(13,203)**	**(77,576)**	**(76,373)**	**(76,373)**	**(76,373)**
6 Capital Outlay	**(5,250)**	-	-	(5,000)	(5,000)	(5,000)
31-80- Capital						
31-80-6000 Capital Outlay	(5,250)	-	-	(5,000)	(5,000)	(5,000)
8 Transfer Out	**(13,203)**	(13,203)	(13,203)	(13,000)	(13,000)	(13,000)
31-90- Transfer						
31-90-9750 Debt Service Transfer	(13,203)	(13,203)	(13,203)	(13,000)	(13,000)	(13,000)
9 Contingency	**-**	-	(64,373)	(58,373)	(58,373)	(58,373)
31-99- Fund Balance						
31-99-9900 Contingency	-	-	(64,373)	(58,373)	(58,373)	(58,373)

Budget	FY19 Actual	FY 20 Actual	FY21 Amended	FY22 Proposed	FY22 Approved	FY22 Adopted
40 Wastewater	**90,617**	**91,369**	**-**	**-**	**-**	**-**
1 Resource	**736,828**	**751,496**	**1,378,949**	**1,565,023**	**1,565,023**	**1,565,023**
1 Fund Balance		-	638,679	819,273	819,273	819,273
1 Revenue	**653,076**	666,926	655,700	730,750	730,750	730,750
40-10- Wastewater						
40-10-4340 Wastewater Revenue	649,681	665,726	655,000	730,000	730,000	730,000
40-10-4342 New Connection Fee	-	1,200	600	750	750	750
40-10-4350 Recovery Bad Debt	1,650	-	100	-	-	-
40-10-4905 Sale of City Assets	1,745	-	-	-	-	-
8 Transfer In	**83,752**	84,570	84,570	15,000	15,000	15,000
40-90- Transfer						
40-90-9241 Debt Service Transfer	23,752	24,570	24,570	15,000	15,000	15,000
40-90-9530 interfund Loan	60,000	60,000	60,000	-	-	-
40-90-9610 Close Debt Fund Cash	-		-	-	-	-
2 Requirement	**(646,211)**	**(660,127)**	**(1,378,949)**	**(1,565,023)**	**(1,565,023)**	**(1,565,023)**
2 Wastewater Operation	**(361,325)**	(374,523)	(457,525)	(498,850)	(498,850)	(498,850)
40-11- Wastewater						
40-11-5000 Salary - Wages	(33,047)	(44,239)	(50,000)	(50,000)	(50,000)	(50,000)
40-11-5001 PW Allocated Payroll	(96,883)	(100,431)	(127,136)	(134,754)	(134,754)	(134,754)
40-11-5002 Admin Allocated Payroll	(86,519)	(90,450)	(77,451)	(105,151)	(105,151)	(105,151)
40-11-5020 Payroll Tax	(3,556)	(2,994)	(3,200)	(3,200)	(3,200)	(3,200)
40-11-5040 Benefits	(18,141)	(16,410)	(18,600)	(10,000)	(10,000)	(10,000)
40-11-5060 PERS	(1,993)	(1,985)	(2,500)	(2,000)	(2,000)	(2,000)
40-11-5090 Workers Comp	(1,850)	(2,125)	(3,200)	(3,000)	(3,000)	(3,000)
40-11-5105 Bad Debt	(2,335)	(1,038)	(2,500)	(1,000)	(1,000)	(1,000)
40-11-5108 Chemicals	(10,871)	(4,253)	(10,000)	(10,000)	(10,000)	(10,000)
40-11-5120 Gas - Oil	(1,462)	(1,627)	(3,000)	(3,000)	(3,000)	(3,000)
40-11-5123 Merchant Fees	(4,008)	(3,947)	(4,000)	(4,000)	(4,000)	(4,000)
40-11-5126 Postage	-	-	(200)	-	-	-
40-11-5137 Supplies	(1,088)	(2,212)	(3,600)	(2,500)	(2,500)	(2,500)
40-11-5140 Uniforms - Towels	(2,241)	(2,794)	(2,800)	(2,800)	(2,800)	(2,800)
40-11-5200 Contract Services	(6,677)	(17,310)	(22,000)	(15,000)	(15,000)	(15,000)
40-11-5204 Engineering Services	(4,656)	(53)	(3,000)	(3,000)	(3,000)	(3,000)
40-11-5230 Printing and Publishing	(2,952)	(3,036)	(3,500)	(3,500)	(3,500)	(3,500)

Budget	FY19 Actual	FY 20 Actual	FY21 Amended	FY22 Proposed	FY22 Approved	FY22 Adopted
40-11-5233 Technology Services	-	(2,668)	(3,500)	(2,000)	(2,000)	(2,000)
40-11-5250 System Analysis	(2,835)	(2,760)	(4,000)	(4,000)	(4,000)	(4,000)
40-11-5320 Dues, License, Permits	(3,520)	(3,249)	(5,000)	(4,000)	(4,000)	(4,000)
40-11-5342 Conference/Seminar/Training	-	(1,844)	(3,000)	(2,000)	(2,000)	(2,000)
40-11-5344 Travel	-	(186)	(500)	(200)	(200)	(200)
40-11-5413 Telephone	(3,677)	(3,799)	(4,000)	(3,000)	(3,000)	(3,000)
40-11-5415 Utilities	(31,900)	(32,479)	(35,000)	(35,000)	(35,000)	(35,000)
40-11-5504 Repairs - Maintenance	(8,960)	(11,396)	(15,000)	(40,000)	(40,000)	(40,000)
40-11-5540 Treatment System Maintenance	(11,202)	(2,733)	(15,000)	(15,000)	(15,000)	(15,000)
40-11-5541 Collection Mainttenance	-	-	-	-	-	-
40-11-5600 Equipment	(4,686)	(289)	(15,000)	(15,000)	(15,000)	(15,000)
40-90-9615 PW Expense Allocation	(16,265)	(18,216)	(20,838)	(25,745)	(25,745)	(25,745)
6 Capital Outlay	**(38,533)**	(39,741)	(12,000)	(35,000)	(35,000)	(35,000)
40-80- Capital						
40-80-6000 Capital Outlay	(38,533)	(39,741)	(12,000)	(35,000)	(35,000)	(35,000)
7 Debt Service	**(169,658)**	(175,503)	-	(175,000)	(175,000)	(175,000)
40-82- Debt						
40-82-8040 Debt Principal	(109,193)	(120,081)	-	(120,000)	(120,000)	(120,000)
40-82-8045 Debt Interest	(60,465)	(55,422)	-	(55,000)	(55,000)	(55,000)
8 Transfer Out	**(76,695)**	(70,360)	(90,151)	(104,995)	(104,995)	(104,995)
40-90- Transfer						
40-90-9110 In Lieu of Franchise Fee	(19,490)	(20,008)	(32,785)	(36,538)	(36,538)	(36,538)
40-90-9531 Transfer from WasterWater SDC			-			
40-90-9610 Overhead Allocation	(57,205)	(50,352)	(57,366)	(68,457)	(68,457)	(68,457)
40-98- Prior Period	**-**	**-**	**-**	**-**	**-**	**-**
9 Contingency	**-**	-	(819,273)	(751,178)	(751,178)	(751,178)
40-99- Fund Balance						
40-99-9900 Contingency	-	-	(819,273)	(751,178)	(751,178)	(751,178)

Budget	FY19 Actual	FY 20 Actual	FY21 Amended	FY22 Proposed	FY22 Approved	FY22 Adopted
41 Wastewater SDC	**(6,460)**	**(4,570)**	**-**	**-**	**-**	**-**
1 Resource	**27,500**	**20,000**	**29,829**	**20,259**	**20,259**	**20,259**
1 Fund Balance		**-**	**19,829**	**5,259**	**5,259**	**5,259**
1 Revenue	**27,500**	**20,000**	**10,000**	**15,000**	**15,000**	**15,000**
41-10- Resources						
41-10-4441 System Development Charges	27,500	20,000	10,000	15,000	15,000	15,000
2 Requirement	**(33,960)**	**(24,570)**	**(29,829)**	**(20,259)**	**(20,259)**	**(20,259)**
6 Capital Outlay	**(10,208)**	**-**	**-**			
41-10- Capital						
41-80-6000 Capital Outlay	(10,208)	-	-			
8 Transfer Out	**(23,752)**	**(24,570)**	**(24,570)**	**(15,000)**	**(15,000)**	**(15,000)**
41-90- Transfer						
41-90-9750 Debt Service Transfer	(23,752)	(24,570)	(24,570)	(15,000)	(15,000)	(15,000)
41-90-9751 Transfer to Wastewater			-			
9 Contingency	**-**	**-**	**(5,259)**	**(5,259)**	**(5,259)**	**(5,259)**
41-99- Fund Balance						
41-99-9900 Contingency	-	-	(5,259)	(5,259)	(5,259)	(5,259)
Grand Total	**364,258**	**182,696**	**-**	**-**	**-**	**-**

Net Income	FY19 Actual	FY 20 Amended	FY21 Adopted	FY22 Proposed
10 General	148,296	7,947	(28,836)	199,884
1 General Revenue	781,424	918,433	752,545	1,055,825
2 Administration	(263,192)	(324,996)	(253,438)	(311,164)
3 City Services	(264,587)	(400,565)	(315,158)	(349,547)
4 Public Safety	(270,358)	(374,600)	(410,925)	(433,250)
6 Capital Outlay	(16,192)	(5,000)	(1,000)	-
8 Transfer In	181,201	194,675	199,140	238,020
20 Streets	8,624	(48,317)	(14,118)	22,778
1 Revenue	205,412	347,200	110,000	170,000
2 Street Operations	(118,923)	(141,127)	(114,494)	(131,296)
6 Capital Outlay	-	(11,500)	-	-
7 Grant	(61,906)	(220,000)	-	-
8 Transfer Out	(15,960)	(22,890)	(9,624)	(15,926)
21 Street SDC	28,175	15,000	5,000	10,000
1 Revenue	33,000	25,000	10,000	15,000
6 Capital Outlay	(4,825)	(10,000)	(5,000)	(5,000)
30 Water	93,131	(31,429)	(41,935)	(239,380)
1 Revenue	776,243	1,213,375	1,179,339	1,058,458
2 Water Operations	(494,726)	(527,224)	(543,056)	(599,281)
6 Capital Outlay	(230)	(519,600)	(471,062)	(535,458)
7 Debt Service	(52,813)	(60,994)	(60,994)	(59,000)
8 Transfer In	13,203	13,203	13,203	13,000
8 Transfer Out	(148,546)	(150,189)	(159,365)	(117,099)
31 Water SDC	1,875	(3,203)	(5,203)	(6,000)
1 Revenue	20,328	15,000	8,000	12,000
6 Capital Outlay	(5,250)	(5,000)	-	(5,000)
8 Transfer Out	(13,203)	(13,203)	(13,203)	(13,000)
40 Wastewater	90,617	(6,732)	195,594	(68,095)
1 Revenue	653,076	642,500	655,700	730,750
2 Wastewater Operation	(361,325)	(435,704)	(442,525)	(498,850)
6 Capital Outlay	(38,533)	(41,000)	(12,000)	(35,000)
7 Debt Service	(169,658)	(175,502)	-	(175,000)
8 Transfer In	83,752	84,570	84,570	15,000
8 Transfer Out	(76,695)	(81,596)	(90,151)	(104,995)
41 Wastewater SDC	(6,460)	(9,570)	(14,570)	-
1 Revenue	27,500	20,000	10,000	15,000
6 Capital Outlay	(10,208)	(5,000)	-	
8 Transfer Out	(23,752)	(24,570)	(24,570)	(15,000)
Grand Total	364,258	(76,304)	95,932	(80,813)

Transfers	FY21 Adopted	FY22 Proposed
10 General	**199,140**	**238,020**
8 Transfer In	**199,140**	**238,020**
10-90-9130 In Lieu of Franchise Fee	36,136	40,750
10-90-9140 In Lieu of Franchise Fee	32,785	36,538
10-90-9610 Overhead Allocation	130,219	160,732
10-90-9630 Transfer In-Interfund Loan 30	-	-
10-99-9914 Prior Period Expense	-	-
20 Streets	**(9,624)**	**(15,926)**
8 Transfer Out	**(9,624)**	**(15,926)**
20-90-9610 Overhead Allocation	(9,624)	(15,926)
30 Water	**(146,162)**	**(104,099)**
8 Transfer In	**13,203**	**13,000**
30-90-9231 Debt Service Transfer	13,203	13,000
30-90-9732 Close Debt Fund Loan from WW	-	-
8 Transfer Out	**(159,365)**	**(117,099)**
30-90-9040 Interfund Loan	(60,000)	-
30-90-9110 In Lieu of Franchise Fee	(36,136)	(40,750)
30-90-9610 Overhead Allocation	(63,229)	(76,349)
30-99-9914 Prior Period Expense	-	-
31 Water SDC	**(13,203)**	**(13,000)**
8 Transfer Out	**(13,203)**	**(13,000)**
31-90-9750 Debt Service Transfer	(13,203)	(13,000)
40 Wastewater	**(5,581)**	**(89,995)**
8 Transfer In	**84,570**	**15,000**
40-90-9241 Debt Service Transfer	24,570	15,000
40-90-9530 interfund Loan	60,000	-
40-90-9610 Close Debt Fund Cash	-	-
8 Transfer Out	**(90,151)**	**(104,995)**
40-90-9110 In Lieu of Franchise Fee	(32,785)	(36,538)
40-90-9531 Transfer from WasterWater SDC	-	
40-90-9610 Overhead Allocation	(57,366)	(68,457)
40-99-9914 Prior Period Expense Loan to Water	-	-
41 Wastewater SDC	**(24,570)**	**(15,000)**
8 Transfer Out	**(24,570)**	**(15,000)**
41-90-9750 Debt Service Transfer	(24,570)	(15,000)
41-90-9751 Transfer to Wastewater	-	
	-	
Grand Total	**-**	**-**

Capital Projects	FY21 Amended	FY22 Proposed
10 General	**(51,000)**	**-**
10-80-6010 Capital Outlay	(51,000)	-
20 Streets	**(25,000)**	**-**
20-80-6000 Capital	(25,000)	-
21 Street SDC	**(5,000)**	**(5,000)**
21-80-6000 Capital Outlay	(5,000)	(5,000)
30 Water	**(494,062)**	**(535,458)**
30-80-6000 Capital Outlay	(23,000)	(292,000)
30-80-6001 Capital Outlay Intake	(471,062)	(243,458)
31 Water SDC	**-**	**(5,000)**
31-80-6000 Capital Outlay	-	(5,000)
40 Wastewater	**(12,000)**	**(35,000)**
40-80-6000 Capital Outlay	(12,000)	(35,000)
41 Wastewater SDC	**-**	
41-80-6000 Capital Outlay	-	
Grand Total	**(587,062)**	**(580,458)**

2021-22

Personnel Service	**Salary**	**Taxes**	**Benefits**	**PERS**	**Work Comp**	**Total**	**To Allocate**
Admin PR	246,500	17,000	64,000	9,000	1,500	**338,000**	338,000
Library	56,000	3,600	20,000	1,800	2,200	**83,600**	
Museum	-	-	-	-	-	**-**	
Public Safety	41,000	2,500	15,000	1,350	100	**59,950**	
Parks	36,400	2,000	9,000	2,000	2,400	**51,800**	
PW PR	230,000	12,000	62,000	15,000	5,000	**324,000**	324,000
Sewer	50,000	3,200	10,000	2,000	3,000	**68,200**	
Water	82,000	4,800	10,500	10,500	3,800	**111,600**	-
Grand Total	**741,900**	**45,100**	**190,500**	**41,650**	**18,000**	**1,037,150**	662,000

Employees	**FTE**	**Count**
10-18 Public Safety		
Code Enforcement	1.0	1
Officer 10-65 Library		
Senior Librarian Volunteer	0.8	1
Coordinator 10-66 Parks	0.4	1
Utility Operator 1		
10-70 Admin PR	1.0	1
City Manager	1.0	1
City Recorder	1.0	1
Accountant	1.0	1
10-71 PW PR		
Office Admin 1 (Utility Billing)	1.0	1
Office Coorinator 1	1.0	1
Public Works Director	1.0	1
Utility Operator 1	1.0	1
30-11 Water		
Water Plant Operator	1.0	1
40-11 Sewer		
Sewer Plant Operator	1.0	1
Grand Total	12.2	13

Budget Allocations	FY22 Proposed
Admin PR	-
10-70-5002 Admin Allocated Payroll	246,886
20-11-5002 Admin Allocated Payroll	(24,461)
30-11-5002 Admin Allocated Payroll	(117,274)
40-11-5002 Admin Allocated Payroll	(105,151)
Debt Service	-
30-90-9231 Debt Service Transfer	13,000
31-90-9750 Debt Service Transfer	(13,000)
40-90-9241 Debt Service Transfer	15,000
41-90-9750 Debt Service Transfer	(15,000)
In Lieu of Franchise	-
10-90-9130 In Lieu of Franchise Fee	40,750
10-90-9140 In Lieu of Franchise Fee	36,538
30-90-9110 In Lieu of Franchise Fee	(40,750)
40-90-9110 In Lieu of Franchise Fee	(36,538)
Overhead	-
20-90-9610 Overhead Allocation	(15,926)
30-90-9610 Overhead Allocation	(76,349)
40-90-9610 Overhead Allocation	(68,457)
10-90-9610 Overhead Allocation	160,732
PW Expense	-
10-66-9615 PW Expense Allocation	(619)
10-72-9615 PW Expense Allocation	61,900
20-90-9615 PW Expense Allocation	(6,133)
30-90-9615 PW Expense Allocation	(29,403)
40-90-9615 PW Expense Allocation	(25,745)
PW Payroll	-
10-66-5001 PW Allocated Payroll	(3,240)
10-71-5001 PW Allocated Payroll	324,000
20-11-5001 PW Allocated Payroll	(32,102)
30-11-5001 PW Allocated Payroll	(153,904)
40-11-5001 PW Allocated Payroll	(134,754)
Grand Total	-

City of Willamina
Budget 2019-20

In Lieu of Franchise Fee

	Revenue	Rate	Fee
General			40,750
General			36,538
Water	815,000	5%	(40,750)
Wastewater	730,750	5%	(36,538)

Enter Values

Values to Budget

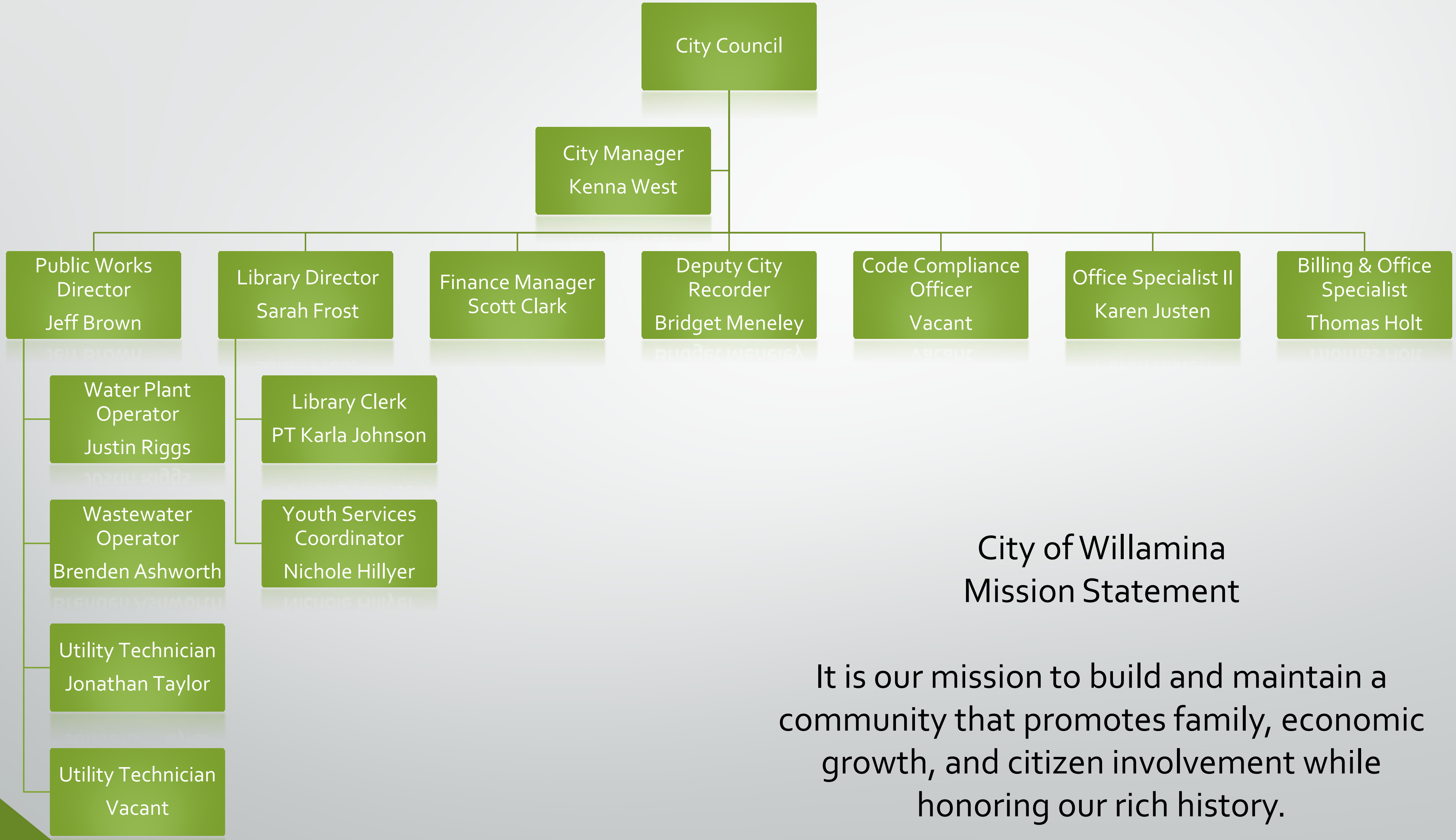
Allocations

	Available Revenue		10-12, 10-13 Admin Allocation	10-70 Admin PR Allocation		10-71 PW Payroll	10-72 PW Shared Expense	Total
General , City only 10-10	633,200	27%	59,318	91,114	1%	3,240	619	
Street	170,000	7%	15,926	24,462	10%	32,103	6,133	
Water 30-10	815,000	35%	76,349	117,274	48%	153,904	29,403	
Wastewater	730,750	31%	68,457	105,151	42%	134,754	25,745	
All Funds	2,348,950	100%	220,050	338,000	100%	324,000	61,900	943,950
PW Only	1,715,750		160,732	246,886		324,000	61,900	
						with parks mg	with parks	

Administrati	10-12	213,650
Council	10-13	6,400
		220,050

30-90-9040 Interfund Loan	Paid in Full
40-90-9530 interfund Loan	-

City of Willamina Organization Chart



City of Willamina
Mission Statement

It is our mission to build and maintain a community that promotes family, economic growth, and citizen involvement while honoring our rich history.

APPENDIX

Mayor Robert Burr

Council Members:

Rita Baller, Council President
Craig Johnson
Roberta Lawson
Theresa McKnight
Barry Wilson
April Wooden

City Management:

City Manager: *Kenna L. West*
Finance Manager: *Scott Clark*
Public Works Director: *Jeff Brown*
Library Director: *Sarah Frost*

WILLAMINA BUDGET COMMITTEE MEETING AGENDA

Public attendance will only be allowed via our virtual platform.
Dial-in number (US): (669) 900-6833
Access code: 398609
Online meeting ID: 975 7752 9601
Join the online meeting: https://zoom.us/j/97577529601?pwd=VFFpMlVjRThXUFY2enZiSXBBd3Q0Zz09

WEST VALLEY FIRE DISTRICT
825 NE Main St.
WEDNESDAY, MAY 26, 2021
6:00 PM

Governing Body:

City of Willamina Mayor	Bob	Burr
City of Willamina City Council	Rita	Baller
City of Willamina City Council	Barry	Wilson
City of Willamina City Council	Craig	Johnson
City of Willamina City Council	Theresa	McKnight
City of Willamina City Council	Roberta	Lawson
City of Willamina City Council	April	Wooden

Staff:

City Manager	Kenna	West
Finance Manager	Scott	Clark
Deputy City Recorder	Bridget	Meneley

Budget Committee Members:

Budget Committee	Laurie	Toney
Budget Committee	Phillip	Lybarger
Budget Committee	Monique	Keeling
Budget Committee	Katie	Vinson
Budget Committee	Dawn	Owings
Budget Committee	Jaime	VanDenBosch
Budget Committee	Gregg	Kruchok

I. Roll Call
II. Selection of Chairperson
III. Approval of the Minutes from June 10, 2020 Budget Committee Meeting
IV. Public Hearing
   a. The Budget Committee will conduct a Public Hearing on possible uses of State Revenue Sharing Funds in the FY 2021-2022 Proposed Budget
V. Presentation of the Budget Message
VI. FY 2021-2022 Budget Deliberations
VII. FY 2021-2022 Budget Approval – Motion to approve the property tax amount and the budget
VIII. Adjourn

Persons with hearing, visual or manual impairments who wish to participate in the meeting should contact the City of Willamina at least 48 hours prior to the meeting date in order that appropriate communication assistance can be arranged. The City of Willamina Council Chambers are accessible to the disabled. Please let us know if you need any special accommodations to attend this meeting.

City Of Willamina
Minutes of the One A Year Meeting of the City of Willamina Budget Committee
June 10, 2020
6:00 PM

Location of Meeting:
West Valley Fire Station
825 NE Main St
Willamina, Oregon 97396

Present at Meeting:
Mayor Ila Skyberg
Council President Rita Baller
Council Bob Burr
Councilor Craig Johnson
Councilor Theresa McKnight
Councilor Roberta Lawson
City Manager Kenna West
Deputy City Recorder Debbie Bernard
Budget Committee Chair Laurie Toney
Budget Committee Member Phillip Lybarger
Budget Committee Vern Holstad
Budget Committee Katie Vinson
Budget Committee Dawn Owings
Budget Committee Jaime VanDenBosch
Budget Committee Gregg Kruchok
Herb Swett, The Bulletin

Absent from Meeting: Councilor April Wooden

Chair Laurie Toney called the 2020-2021 Budget Committee Meeting to order at 6:00 PM on June 10, 2020 at West Valley Fire District. Chair Toney Led in the flag salute. Deputy City Recorder Bernard called for the roll, and a quorum was present.

I. Approval of Agenda

The agenda for the meeting was distributed and unanimously approved.

II. Review of Previous Minutes

The minutes of the previous meeting were reviewed and unanimously approved.

III. Consideration of Open Issues

1. Selection Of Chairperson
   Chair Laurie Toney
   Chair Toney called for the 2020-2021 Budget Committee Chair nominations.

MOTION: Budget Committee Member Owings nominated Laurie Toney to continue as Chair. Councilor Burr seconded the motion. Motion carried by Councilors and Burr, Baller, McKnight, Lawson, Johnson and Budget Committee Members Toney, Holstad, Vinson, Kruchock, Owings, VanDenBosch, and Lybarger all in favor.

2. Approval Of The Minutes From May 21, 2019 Budget Committee Meeting
   Chair Laurie Toney
   Chair Toney called for nominations for the 2020-2021 Chair.
   MOTION: Budget Committee Member VanDenBosch nominated Laurie Toney to continue as Chair. Budget Committee Member Owings seconded the motion. Motion carried by Councilors and Burr, Baller, McKnight, Lawson, Johnson and Budget Committee Members Toney, Holstad, Vinson, Kruchock, Owings, VanDenBosch, and Lybarger all in favor

3. Public Hearing
   Chair Laurie Toney
   Chair Toney read the public hearing script and opened and closed the public hearing.

4. Adjournment
   Chair Laurie Toney
   Chair Toney called for a motion to adjourn at 6:20 PM.
   MOTION: Councilor Burr moved to adjourn. Budget Committee Member Owings seconded the motion. Motion carried by Councilors and Burr, Baller, McKnight, Lawson, Johnson and Budget Committee Members Toney, Holstad, Vinson, Kruchock, Owings, VanDenBosch, and Lybarger all in favor.

   Comments:

   City Manager West commented on the reason for a short meeting and the continuation of the Public Hearing. She said the budget document was not yet ready for the budget committee; however, due to legal notice for the meeting, the budget committee needed to meet; elect the Chair, and approve the minutes from the previous year. Manager West noted that the committee would not talk about the budget until the next meeting on June 17, 2020.

   Budget Committee Member Vern Holstad asked if he could comment on wages at the next meeting. City Manager West responded and said no. She explained that their Union negotiates employees' wages. Member Holstad is looking for what he called a "level wage."

IV. Agenda and Time of Next Meeting

The next meeting will be held at 6:00 PM on June 17, 2020 at:
West Valley Fire
825 NE Main St.

Willamina, Oregon, Oregon 97392

The agenda for the next meeting is as follows: 2020-2021 Budget Committee Public Hearing on possible uses of State Revenue Sharing Funds in the FY 2020-2021 Proposed Budget.

The meeting was adjourned at 6:20 PM by Budget Committee Chair Laurie Toney.

Minutes prepared by Debbie Bernard and submitted by Deputy City Recorder, Bridget Meneley

Minutes approved by Chair Laurie Toney

***DRAFT *** WILLAMINA ECONOMIC IMPROVEMENT DISTRICT
FY 2021/2022 EID ASSESSSMENT

Properties in the City of Willamina which are zoned "commercial" or "industrial" assessed as follows:

***Fully benefited commercial property** – ¼ of 1.0% of assessed value*;
***Commercial properties on side streets** – 1/8 of 1.0% of assessed value;*
***Commercial properties in industrial area** – 1/8 of 1.0% of assessed value; and*
***Commercial properties that also include resident property** – prorated*.
(Assessed values are the latest available from the County Assessor's Offices as of 5/24/2021)
The Willamina Business Group recommended a maximum amount billed to any one person of $500,
And a minimum amount to any one person of $50.00 (See Ord #659, adopted 12/10/2015)

Addresses updated 05/24/20

Ordinance 685 passed by the City Council of the City of Willamina 12/08/2020 renewing District through 12/31/2025

Mailing Address	Tax Lot No.	Assessed Value	Tax Amount	Short Name	Owner	Rate	Situs Address	Yamhill County Assessor's Account Number
121 NE MAIN ST WILLAMINA OR 97396	R6701DA 03800	$ 24,541.00	$ 30.68	Skyberg's back storage/parking lot	Skyberg, Randall	Side Street -1/8	0 N B Street	242035
121 NE MAIN ST WILLAMINA OR 97396	R6701DA 03001	$ 12,264.00	$ 15.33	Skyberg's storage lot behind the thriftstore	Skyberg, Randall	Side Street -1/8	0 N B Street	
41100 SW TINDLE CREEK RD WILLAMINA OR 97396	R6701DA 03000	$ 66,835.00	$ 62.66	Non-Profit Tina Miller Thrift Store	Vinson, Katie & Meredith Schaefer*	Com-Full Ben.	105 NW Main St	241884
41100 SW TINDLE CREEK RD WILLAMINA OR 97396	R6701DA 02300	$ 300,430.00	$ 500.00	Willamina Merchants/Apartments	Wildwood Services, Katie Vinson*	Com-Full Ben. 1/2 Res	110 NE Main St	242204
487 SW MT JEFFERSON ST MCMINNVILLE OR 97128	R6701AC 13500	$ 422,542.00	$ 500.00	Willamina Select Market	Barpol, Johal*	Com-Full Ben.	112 NW 1st St	241955
121 NE MAIN ST WILLAMINA OR 97396	R6701DA 03200	$ 129,453.00	$ 323.63	Skyberg's Lumber & Hardware	Skyberg, Randall & Ila	Com-Full Ben.	121 NE Main St	242197
PO BOX 867 WILLAMINA OR 97396	R6701DA 02400	$ 26,307.00	$ 50.00	Shirley's Hair	Currier, Shirley **	Com-Full Ben. 1/2 Res	130 NE Main St	242124
121 NE MAIN ST WILLAMINA OR 97396	R6701DA 03300	$ 82,310.00	$ 102.89	Skyberg's Lumber & Hardware/Appartment	Skyberg, Randall	Com-Full Ben. 1/2 Res	131 NE Main St	242044
PO BOX 349 WILLAMINA OR 97396	R6701AC 13600	$ 314,074.00	$ 354.40	Coyote Joe's	Frownfelter Trusts*	Com-Full Ben.	142 NW Main St	241973
1232 NW OAKMONT CT MCMINNVILLE OR 97128	R6701AC 13300	$ 76,482.00	$ 95.60	Augie F	Frownfelter Trusts*	Side Street -1/8	149 NW 1st St.	241143
1232 NW OAKMONT CT MCMINNVILLE OR 97128	R6701AC 13400	$ 19,044.00	$ 50.00	Augie F	Frownfelter Trusts*	Com-Full Ben.	NW Main St	241447
41100 SW TINDLE CREEK RD WILLAMINA OR 97396	R6701DA 02500	$ 95,471.00	$ -	Wildwood Hotel, LLC. Café & Hotel	Haller, Matthew (Yamhill County shows Katie V. & Meredith Kendal-Shaefer)*	Com-Full Ben.	150 NE Main St	241982
PO Box 5998 Portland, Oregon 97228	R6701DA 03500	$ 107,030.00	$ 133.79	Greg Kruchok	Kruchok, Greg	Com-Full Ben. 1/2 Res	157 NE Main St	241964
PO BOX 998 WILLAMINA OR 97378	R6701DA 02600	$ 17,473.00	$ 43.68	Center Market	Raman Inc., Singh, Badahur	Com-Full Ben.	180 NE Main St	242099
PO BOX 998 WILLAMINA OR 97396	R6701DA 02700	$ 113,560.00	$ 283.90	Center Market	Raman Inc., Singh, Badahur	Com-Full Ben.	180 NE Main St	242142
1656 Sagewood St, Richland WA 99352	R6701DA 03600	$ 140,510.00	$ 351.28	Dillons Bar & Grill	Kelly, Danile (Yamhill County shows Lori L. Samander as the owner)	Com-Full Ben.	181 NE Main St	241946
PO BOX 97 WILLAMINA OR 97396	R6701DA 04400 A01	$ 100,530.00	$ 125.66	PEP - Pacific Pride Property	Jenne, Ralph	Side Street -1/8	182 NE C St	504046
PO BOX 97 WILLAMINA OR 97396	R6701DA 04400	$ 22,982.00	$ 28.73	PEP - Vacant Lot	Petroleum Energy Products c/o Jenne, Ralph	Side Street -1/8	Lots 5 & 6 Block 4; next to 182 NE C St	242268
PO Box 557 Willamina Oregon 97396	R6701DD 00500	$ 214,124.00	$ -	Skyberg	Skyberg, Randall & Ila	Res-Com Full Ben. (Currently 100% Res)	188 SE Main St	239682
439 NE CENTER ST SHERIDAN OR 97378	R6701DA 04700	$ 108,657.00	$ 135.82	Piontek Bakery	Piontek, Ken	Side Street -1/8	212 NE D St	239227
PO BOX 37 WILLAMINA OR 97396	R6701DA 01300	$ 222,927.00	$ 500.00	Quick Check Records Inc	Burr, Robert*	Com-Full Ben.	212 NE Main St	242151

PO BOX 37 WILLAMINA OR 97396	R6701DA 01400	$ 26,604.00	$ -	Lot 6 - Block 3 next to 212 NE Main	Burr, Robert*	Com-Full Ben.	Lot 6 - Block 3; next to 212 NE Main	242231
PO BOX 97 WILLAMINA OR 97396	R6701DA 03700	$ 87,244.00	$ 109.06	PEP - Office	Jenne, Ralph	Side Street -1/8	241 NE C Street	24220
PO Box 482 Willamina Oregon 97396	R6701DB 00600	$ 52,984.00	$ -	Hair Salon	Vinson, Katie*	Com-Full Ben.	245 SW Lamson St	241811
39195 SW Oak Lane Willamina, Oregon 97396	R6701AC 13800	$ 36,270.00	$ 90.68	O'Neil Construction - Office	O'Neil, Brian	Com-Full Ben.	250 NW Main Street	
39195 SW Oak Lane Willamina, Oregon 97396	R6701AC 13900	$ 39,615.00	$ 99.04	O'Neil Construction - lot	O'Neil, Brian	Com-Full Ben.	250 NW Main Street	
PO Box 482 Willamina Oregon 97396	R6701DA 01500	$ 55,289.00	$ -	Retail space/Massage	Vinson, Katie*	Com-Full Ben.	252 NE Main St	242366
6113 SE 45TH AVE, PORTLAND, OR 97206	R6701DA 01700	$ 104,006.00	$ 130.01	Odd Fellows Pizza and Apts.	Harding, Karen	Com-Full Ben. 1/2 Res	282 NE Main St	242106
39201 COAST CREEK RD. WILLAMINA OR 97396	R6701DA 01600	$ 18,553.00	$ 46.38	Small Building next to Odd Fellows at 282 NE Main	Harding, Karen	Com-Full Ben.	Small Building next to Odd Fellows at 282 NE Main	242133
PO BOX 195 WILLAMINA OR 97396	R6701DB 00701	$ 55,015.00	$ 137.54	Willamina Saw Service	Pratt, Charles E	Com-Full Ben.	285 SW Main St	480465
PO BOX 219 WILLAMINA OR 97396	R6701DD 01400	$ 124,247.00	$ 155.31	House/Buisness (old piano place)	Grisson, Jeffrey & Brandianne	Com -Full Ben. 1/2 Res	286 SE Main st	239824
740 SE MEADOWS LOOP SHERIDAN OR 97378	R6701DA 04500	$ 108,297.00	$ 270.74	Best Stop Market	B D Badla, LLC C/O Gurmit Kaur	Com-Full Ben.	313/317 NE Main St	238870
25850 Salmon River Hwy Willamina OR 97396	R6701DA 00500	$ 314,400.00	$ 500.00	Hofenbrendl Realty	Hofenbrendl, Barb*	Com-Full Ben.	322 NE Main St	238790
1425 SW Hayter St, Dallas, OR 97338	R6701DB 01501	$ 112,987.00	$ 141.23	House/Buisness	A Blair Family Properties LLC.	Res-Com Full Ben.	329 SW Main St	482485
	R6701DA 02200			Previously owned by the City & was exempt; we are working on this with the County.	Civic Center	Side Street -1/8	340 N B St.	242311
PO BOX 130 WILLAMINA OR 97396	R6701DA 02100	$ 16,774.00	$ 50.00	Kendall	Kendall, Matthew K	Side Street -1/8	352 NE B St	242302
2710 NE CORA DR MADRAS OR 97741	R6701DA 05100	$ 122,022.00	$ 500.00	Slow Train	Maben Family Trust, c/o Roberta Maben*	Com-Full Ben.	371 NE Main St	240251
PO BOX 37 WILLAMINA OR 97396	R6701DA 01000	$ 12,018.00	$ -	Lot 2 Block 3 near the Library	Burr, Robert*	Side Street -1/8	Near 382 NE 1st St.	241866
2710 NE CORA DR MADRAS OR 97741	R6701DA 05000	$ 99,706.00	$ -	Vacant Building/Risseeuw Logging	Maben Family Trust, c/o Roberta Maben*	Com-Full Ben.	391 NE Main St	239414
PO BOX 10 WILLAMINA, OR 97396	R6701DA 05200	$ 119,760.00	$ 149.70	H&R Block/Exp	Peterson Living Trust, George & Linda Peterson Trustees.	Com -Full Ben. 1/2 Res	421 NE Main St	240144
PO Box 203 Willamina, Oregon 97396	R6701AD 10000	$ 283,094.00	$ 500.00	Car Wash/Video Store	IAJR LLC*	Com-Full Ben.	450 NE Main St	239049
3620 NW WESTSIDE RD MCMINNVILLE, OR 97128	R6701DA 05300	$ 61,424.00	$ 153.56	G&M Insurance	Gregport Land & Investments	Com-Full Ben.	451 NE Main St	239986
PO Box 87, Sasakwa, OK 74867	R6701DD 03200	$ 164,832.00	$ 412.08	Willamina Automotive	Priester, Levi (Yamhill County shows Randy Brown as the owner)	Com-Full Ben.	452 SE Main St	240812
3825 N Eagle Rock Rd, Kingman, AZ 86409-3334	R6701DA 06400	$ 256,876.00	$ 321.10	Hampton Industrial Saw	Lake, Clarence R & Sharron V	Indus-1/8	460 NE Yamhill St	243668
3825 N Eagle Rock Rd, Kingman, AZ 86409-3334	R6701DA 06400	$ 58,746.00	$ 73.43	MH - Caretaker Building fo 460 NE Yamhill	Lake, Clarence R & Sharron V	Indus-1/8	550 NE Yamhill St	523837
1650 NW SUNDIAL RD TROUTDALE OR 97060	R6701DB 00200	$ 606,741.00	$ 500.00	Walsh Trucking	Walsh Holdings LLC, Cal Clarke*	Indus-1/8	499 NW Main St	239076
DG RETAIL LLC 100 MISSION RIDGE ATTN: TAX DEPATMENT GOODLETTSVILLE TN 37072	R6701DA 09900	$ 779,164.00	$ 500.00	Dollar General	Dollar General*	Com-Full Ben.	511 NE Main St	712102

ATTN: TAX DEPATMENT GOODLETTSVILLE TN 37072	R6701DA 05800		$ -	Dollar General	Dollar General*	Com-Full Ben.	511 NE Main St	
DG RETAIL LLC 100 MISSION RIDGE ATTN: TAX DEPATMENT GOODLETTSVILLE TN 37072	R6701DA 06000		$ -	Dollar General	Dollar General*	Com-Full Ben.	511 NE Main St	
ATTN: TAX DEPATMENT GOODLETTSVILLE TN 37072	R6701DA 06200	$ 129,612.00	$ -	Dollar General	Dollar General*	Com-Full Ben.	621 NE Main St	239389
ATTN: TAX DEPATMENT GOODLETTSVILLE TN 37072	R6701DA 06101		$ -	Dollar General	Dollar General*	Com-Full Ben.	621 NE Main St	
2801 THIRD ST TILLAMOOK OR 97141	R6701AD 08900	$ 970,835.00	$ 500.00	Willamina Shell	Tall Timer Investment*	Com-Full Ben.	692 NE Main St***	238825
PO Box 303 Willamina, Oregon	R6701BD 05700	$ 358,098.00	$ 500.00	Storage Units - Storage Etc	Attebery, Martin W.*	Com-Full Ben.	864 NW Main Street	
	Total Polk County	**$ -**	**$ -**		***Property(ies) assessed at maximum of $500**			
	Total Yamhill County	**$ 7,792,759.00**	**$ 9,419.21**		****Property(ies) assessed at minimum of $50**			
		$ 7,792,759.00	***$ 9,419.21***		*****Tax Lot #R6701AD 09000 has been combined with R6701AD 08900 (Willamina Shell)**			
		Total Assesed Values	*Total Tax*					

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00 "EXHIBIT A"

Notice of Budget Committee Meeting

A public meeting of the Budget Committee of the City of Willamina, Yamhill County and Polk County, State of Oregon, on the budget for the fiscal year July 1, 2021 to June 30, 2022, will be held at West Valley Fire District Station 8, 825 NE Main Street, Willamina, Oregon. The meeting will take place on Tuesday, May 26, 2021 at 6:00pm. The purpose of the meeting is to receive comment from the public on the budget. This is a public meeting where deliberations of the Budget Committee with take place. The meeting can be attended via remote access, the link and phone number are on the City of Willamina website at www.willaminaoregon.gov. An additional meeting will be held at 6:00pm on June 2, 2021 at West Valley Fire District Station 8, 825 NE Main Street, Willamina, Oregon. A copy of the budget document may be inspected or obtained on or after May 26, 2021 on the City of Willamina website www.willaminaoregon.gov or at the City of Willamina City Hall at 411 NE "C" Street, between the hours of 8:00am and 4:00pm
NR Published May 11, 18, 2021

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AFFIDAVIT OF PUBLICATION

STATE OF OREGON } **ss.**
County of Yamhill

I, Bibb Haviland Moore
being first duly sworn, depose and say that I am the Legal Clerk, of the NEWS-REGISTER, a newspaper of general circulation as defined by O.R.S. 193.010 and O.R.S. 193.020 published two times each week at McMinnville, County of Yamhill, State of Oregon, and that **City of Willamina - Public Hearing May 26, 2021 Budget Committee Meeting- - May 11, 18, 2021**
Subscribed and sworn before me this **5/25/2021** .

Bibb Haviland Moore

Connie Janene Crafton

Notary Public for Oregon
My Commission Expires 08/12/2023

OFFICIAL STAMP
CONNIE JANENE CRAFTON
NOTARY PUBLIC - OREGON
COMMISSION NO. 990349
MY COMMISSION EXPIRES AUGUST 12, 2023

UPDATES FROM THE CHIEF:

Studies Show Decline in Volunteer Fire Fighter Numbers

Finding volunteer firefighters for Oregon's rural towns is not easy. Signs, advertisements, and requests for volunteers are posted everywhere, but the time commitment away from one's family, mandated training, and travel requirements make it difficult for many. This has led to a decline in the number of volunteer firefighters over the past few decades. The National Fire Protection Association (NFPA) released a study on April 16, 2019, that revealed a staggering number of citizens are unable to help their towns and communities fulfill the needed numbers to fight fires adequately and safely in the United States. The study has shown that in 1983 there were 884,000 volunteer firefighters across the United States. As of 2017 those numbers have decreased to 682,000, a difference of 202,000 over 34 years.

Here in Oregon the numbers are very similar. There have been two separate volunteer firefighter availability studies performed in 2004 and 2011 by the NFPA. These studies compare and agree with what the national studies have indicated; that there is evident decrease in volunteer firefighter retention throughout the state. In the 2004 study, there were a total of 330 fire departments surveyed. From that survey it was determined that 27 percent of the fire departments which served communities of 2,500 or less were staffed primarily or completely by volunteers. These fire departments were able to send only two to four firefighters to a house fire taking place around mid-day. Even in the communities where there was a population of 10,000 or more, there were less than four career firefighters able to respond to a mid-day fire. The numbers of emergency medical responders available were even less.

The 2011 study also surveyed a total of 330 fire departments. From that survey it was determined that communities of less than 50,000 people who had an all-volunteer or primarily volunteer fire departments could have some career firefighters respond alongside the volunteers, which slightly increased the firefighters' safety margin.

A standard for the Organization and Deployment of Fire Suppression Operations for Volunteer Fire Departments, established in 2011, calls for a minimum of four trained firefighters on-incident before an interior fire attack can occur. This standard is known as NFPA 1720. In Oregon, the 2011 survey conveyed that in populations under 10,000, the average number of volunteer firefighters available for a mid-day fire was one to two available.

Sheridan, SW Polk and West Valley Fire Districts response capabilities align with those noted in these studies. The number of volunteers at each of these agencies has been declining for decades. Each district is struggling to find and retain volunteer firefighters because the commitment takes away from family time, requires extensive training and is increasingly regulated. If you can help your community, please visit your fire district website and fill out an application.

Sheridan Fire District
Ballston, Buell and Sheridan • sheridanfd.org

SW Polk Rural Fire District
Bridgeport, Rickreall and Salt Creek• swpolkfd.org

West Valley Fire District
Grand Ronde and Willamina • westvalleyfd.org

Services

Need help around your house or property? Yard clean-up, debris hauling, odd jobs. No job too small. Integrity, dependable, reasonable rates. 541-731-9944. (0602)

Flawless pressure washing: Soft house wash, driveways, walkways, patios, vinyl fencing, etc. 503-488-0017. (c)

Auto Car Detailing: Full detailing, interior and exterior, for cars, trucks, boats, and RVs. Offering one-year and five-year ceramic coating and glass water repellent treatments. Call Brian, 971-237-9649. (c)

K&D Mobile Roadside Assistance Service. Lockouts, jump starts, tire changes, gas calls. Call 503-864-5513. (0616)

Employment

Myers Woodline has several great mill jobs for people who will come to work every day, on time, and put in a solid day. Drug testing required. Apply in person at 355 SW Mill St, Sheridan. (c)

Rentals

Apartment for rent: 3+ bedrooms, 1 bath, 1,600 sq. ft. in historic downtown Sheridan building. Incredible view. Six month lease required. $1,400 per month, plus $1,000 refundable security deposit. Water and garbage included. Background and credit check. Call 541-709-0993 for appointment. (26)

Bulletin Board Classifieds
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or call: 503-687-3000

Meeting Notice

NOTICE OF
BUDGET COMMITTEE MEETING

A public meeting of the Budget Committee of the City of Willamina, Yamhill County and Polk County, State of Oregon, on the budget for the fiscal year July 1, 2021, to June 30, 2022, will be held at West Valley Fire District Station 8, 825 NE Main Street, Willamina, Oregon. The meeting will take place on Tuesday, May 26, 2021, at 6:00 pm. The purpose of the meeting is to receive comment from the public on the budget. This is a public meeting where deliberations of the Budget Committee will take place. The meeting can be attended via remote access, the link and phone number are on the City of Willamina website at www.willaminaoregon.gov.

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American Red Cross Blood Drive Set May 25

An American Red Cross blood drive will be held from 12:30-5:30 p.m. on Tuesday May 25, at the VFW Hall, 771 E. Main Street in Willamina. The sponsor code will be WillaminaSheridan.

All who give blood before May 31 will automatically be entered for a chance to win a travel trailer camper, powered by Suburban Propane.

Notice Pubished in The Bulletin Board Vol. 7, No. 13 May 19, 2021

Services

Need help around your house or property? Yard clean-up, debris hauling, odd jobs. No job too small. Integrity, dependable, reasonable rates. 541-731-9944. (0602)

Flawless pressure washing: Soft house wash, driveways, walkways, patios, vinyl fencing, etc. 503-488-0017. (c)

Auto Car Detailing: Full detailing, interior and exterior, for cars, trucks, boats, and RVs. Offering one-year and five-year ceramic coating and glass water repellent treatments. Call Brian, 971-237-9649. (c)

K&D Mobile Roadside Assistance Service. Lockouts, jump starts, tire changes, gas calls. Call 503-864-5513. (0616)

The Bulletin Board
Open noon-6 p.m.
Monday-Friday

Garage Sales

Garage sale: May 14 and 15, 9 a.m.-4 p.m., 610 SE Sheridan Road. Jewelry, beads, household items, kitchen items. Some vintage items, other miscellaneous. Good prices on decent stuff. (12)

Firewood

Wednesday, May 12, 1-4 p.m. Free wood (mostly cabinet end cuttings) while supplies last at 18520 SW Rock Creek Road in Sheridan. (12)

Friday at 6pm is the deadline for placing classified ads in The Bulletin Board.

Employment

Myers Woodline has several great mill jobs for people who will come to work every day, on time, and put in a solid day. Drug testing required. Apply in person at 355 SW Mill St, Sheridan. (c)

Meeting Notice

NOTICE OF
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Miscellaneous

For sale: Weslow treadmill with little use, $125; Yamaha Electone organ, $50. 503-876-5224.

Bulletin Board Classifieds
Only 20¢ per word
Email: bulletin@wavecable.com
or call: 503-687-3000

Rentals

Apartment for rent: 3+ bedrooms, 1 bath, 1,600 sq. ft. in historic downtown Sheridan building. Incredible view. Six month lease required. $1,400 per month, plus $1,000 refundable security deposit. Water and garbage included. Background and credit check. Call 541-709-0993 for appointment. (26)

Hometown Days Organizers to Meet

Organizers of Sheridan's Hometown Days event will meet at 6 p.m. on Friday, May 14 at the Monroe Event Center.

Following a committee vote, "A Day at the Farm" has been selected as the theme for this year.

Fire District to Form Stakeholders Group

The Sheridan Fire District is accepting applications for a stakeholder group that will help determine the future direction of fire and emergency medical services in the local area.

The stakeholder group will represent the constituents of Sheridan, both in the city limits and rural areas.

Those interested in participating can go to sheridanfd.org/volunteers and fill out a stakeholder group application. Applications may be returned to the station or emailed to ctalley@sheridanfd.org by Friday, May 28.

Notice Published in The Bulletin Board Vol. 7, No. 11 May 12, 2021

Willamina

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NOTICE OF BUDGET COMMITTEE MEETING

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https://zoom.us/j/97577529601?pwd=VFFpMlVjRThXUFY2enZiSXBBd3Q0Zz09

Meeting ID: 975 7752 9601
Passcode: 398609

Dial by your location
+1 669 900 6833 US (San Jose)
+1 253 215 8782 US (Tacoma)
Meeting ID: 975 7752 9601
Passcode: 398609

Find your local number: https://zoom.us/u/acHhU8kvdE

OPEN RECRUITMENTS

Utility Technician II. The City of Willamina has opened a position for a full-time permanent Utility Technician II. This position is a part of the Public Works Department and reports directly to the Public Works Director. The beginning hourly wage for this position is $15.72 per hour. The City provides excellent health benefits, generous vacation/holiday/personal days, an assigned City vehicle, an assigned City cell phone, and a supportive work environment. The Position Description and City of Willamina job application can be accessed via the links at the bottom of this page. This recruitment closes on June 11, 2021. The City of Willamina is an Equal Employment Opportunity employer.

Budget meeting
Notice posted
to Website 05.04.21

xpress BILL PAY

City of Willamina
Public Works
Department

Emergency Phone Number: 503-437-6998

Willamina City Hall Information:

411 NE C Street
Willamina, OR 97396
Phone: 503-876-2242

CALENDER

May 2021

S	M	T	W	Th	F	S
25	26	27	28	29	30	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	1	2	3	4	5

< Apr Jun >

Read more

48

Presented by:

DONOVAN enterprises, inc.

September

2021

Water, Wastewater, Stormwater, Transportation, and Parks System Development Charge Update

Final Report

Prepared for:

Willamina

Donovan Enterprises, Inc.
9600 SW Oak Street, Suite 335
Tigard, Oregon 97223-6596
☎ 503.517.0671

City of Willamina
2021 Water, Wastewater, Stormwater, Transportation, and Parks
SDC Methodology Update

Table of Contents

Introduction/History of the Project 1
Analytical Process for the Methodology Updates 2
SDC Legal Authorization and Background 4
  Reimbursement Fee Methodology 5
  Improvement Fee Methodology 5
  Methodology for the Granting of Credits, Discounts, and Exemptions 8
    SDC Credits Policy 8
    SDC Discount Policy 8
    Partial and Full SDC Exemption 9
Water SDCs 9
  Water Capital Improvement Plan 9
  Water Customers Current and Future Demographics 12
    Existing Water Demand and Population Growth 12
    Estimated Demand per Equivalent 5/8” or 3/4” Water Meter 12
    Projected Demands 12
  Reimbursement Fee Calculations 13
  Improvement Fee Calculations 15
  Water SDC Model Summary 16
  Water SDCs in Neighboring Communities 18
Wastewater SDCs 20
  Wastewater Capital Improvement Plan 20
  Wastewater Customers Current and Future Demographics 22
    Existing Wastewater Demand and Population Growth 22
    Forecasted EDUs 22
  Reimbursement Fee Calculations 23
  Improvement Fee Calculations 25
  Wastewater SDC Model Summary - Residential 26
  Wastewater SDCs in Neighboring Communities 27

Stormwater SDCs 29
Stormwater Capital Improvement Plan 29
Stormwater Customers Current and Future Demographics 31
Existing Stormwater Demand and Population Growth 31
Forecasted Equivalent Service Units (ESUs) 31
Reimbursement Fee Calculations 33
Improvement Fee Calculations 33
Stormwater SDC Model Summary 34
Stormwater SDCs in Neighboring Communities 35
Transportation SDCs 36
Transportation Capital Improvement Plan 36
Transportation System Current and Future Demand 39
Existing Transportation Demand 39
Forecasted Transportation Demand 40
Reimbursement Fee Calculations 41
Improvement Fee Calculations 42
Transportation SDC Model Summary 45
Transportation SDCs in Neighboring Communities 51
Parks SDCs 52
The 2003 Parks Master Plan 52
Existing and Projected Future Demand for Parks and Trails 53
Reimbursement Fee Calculations 55
Parks CIP 56
SDC Eligibility of Parks CIP 58
Improvement Fee Calculations 60
Parks SDC Model Summary 60
Parks SDCs in Neighboring Communities 61
Conclusions and Recommendations 63
Neighboring Communities' SDCs 64
Appendix A – PSU Coordinated Population Forecast for Willamina 65
Appendix B – Historical Price Movements in the Engineering News Record Construction Cost Index 66

Introduction/History of the Project

The City of Willamina conducts periodic updates to its Comprehensive Plan and its various Public Facility Plans to provide orderly and sustainable growth of municipal infrastructure. A key component to funding these public facilities is the system development charge (SDC) program. The purpose of this study is to update the schedule of SDCs for current demographic and demand data along with a newly adopted City-wide capital improvement plan (CIP). The new City-wide CIP was adopted by the City Council on September 14, 2021 via Resolution No. 21-22-005. The City is also proposing to update and formalize SDC methodologies for its water, wastewater, stormwater, transportation, and parks SDCs. The City currently does not charge an SDC for stormwater and parks.

SDCs are one-time charges for new development—designed to recover the costs of infrastructure capacity needed to serve new development. This section describes the policy context and project scope upon which the body of this report is based. It concludes with a numeric overview of the calculations presented in subsequent sections of this report for water, wastewater, stormwater, transportation, and parks SDCs.

In August of 2021, the City hired Donovan Enterprises, Inc. to review and update the water, wastewater, stormwater, transportation, and parks SDC fees. With this review and update, the City has stated a number of objectives:

- Review the basis for charges to ensure they are consistent with the currently adopted SDC methodologies and where appropriate, propose changes and or methodology enhancements;
- Address specific policy, administrative, and technical issues which had arisen from application of the existing SDCs;
- Determine the most appropriate and defensible fees, ensuring that development is paying its way;
- Consider possible revisions to the structure or basis of the charges which might improve equity or proportionality to demand;
- Provide clear, orderly documentation of the assumptions, and results, so that City staff could, by reference, respond to questions or concerns from the public.

This report provides the documentation of that effort and was done in close coordination with City staff and available facilities planning documents. The SDC updates comply with Willamina Municipal Code (WMC) chapter 33.15 – 33.30.

Table 1 gives a component breakdown for the current and proposed residential equivalent SDCs for water, wastewater, stormwater, transportation, and parks.

Table 1 - Component Breakdown of the Proposed Residential Equivalent SDCs

Line Item Description	Service Unit	Proposed	Current	Difference
Water:	per 5/8" or 3/4" water meter			
Reimbursement fee		$14	$ -	$14
Improvement fee		4,367	1,848	2,519
Administration fee @5%		219	-	219
Total		$4,600	$1,848	$2,752
Wastewater:	per 5/8" or 3/4" water meter			
Reimbursement fee		$628	$ -	$628
Improvement fee		4,256	2,500	1,756
Administration fee @ 5%		244	-	244
Total		$5,128	$2,500	$2,628
Stormwater:	per Equivalent Residential Unit			
Reimbursement fee		$ -	$ -	$ -
Improvement fee		412	-	412
Administration fee @ 5%		21	-	21
Total		$433	$ -	$433
Transportation:	per detached SF residence			
Reimbursement fee		$70	$ -	$70
Improvement fee		3,875	3,000	875
Administration fee @ 5%		197	-	197
Total		$4,142	$3,000	$1,142
Parks:	per detached SF residence			
Reimbursement fee		$432	$ -	$432
Improvement fee		4,450	-	4,450
Administration fee @ 5%		244	-	244
Total		$5,126	$ -	$5,126
Total SDCs:				
Reimbursement fee		$1,144	$ -	$1,144
Improvement fee		17,360	7,348	10,012
Administration fee @ 5%		925	-	925
Total		$19,429	$7,348	$12,081

Analytical Process for the Methodology Updates

The essential ingredient in the development of an SDC methodology is valid sources of data. For this project, the consultant team has relied on a number of data sources. The primary sources have been the newly formulated and adopted capital improvement plans for water, wastewater, stormwater, transportation, and parks. We have supplemented these data sources with City utility billing records, certified census data, and other documents that we deemed helpful, accurate, and relevant to this study.

Table 2 contains a bibliography of the key documents/sources that we relied upon to facilitate our analysis and hence the resulting SDCs.

Table 2 - Data Sources for the Calculation of SDCs

Service	Master Plan Document and/or Corroborating Source Documentation
Water	• City of Willamina Water CIP; September, 2021; Resolution no. 21-22-005 • City of Willamina Comprehensive Annual Financial Report for the Fiscal Year Ended June 30, 2020 • City of Willamina Water System Fixed Asset Schedule; June 30, 2020; City Records • City of Willamina Utility Billing records for fiscal 2019-2020 • Water meters in service per City Staff; effective January 1, 2021
Wastewater	• City of Willamina Wastewater CIP; September, 2021; Resolution no. 21-22-005 • City of Willamina Comprehensive Annual Financial Report for the Fiscal Year Ended June 30, 2020 • Willamina wastewater system fixed asset schedule; June 30, 2020; City records • City of Willamina Utility Billing System – wastewater system active accounts and Equivalent Dwelling Units in service report; January 1, 2021 • City of Willamina monthly wastewater flows to lagoons reports • Portland State University, College of Urban Affairs, Population Research Center; Certified census for Willamina, Oregon; June, 2020
Stormwater	• City of Willamina Comprehensive Plan 2015 update • Willamina Residential Buildable Lands Inventory Analysis; September, 2021; Mid-Willamette Valley Council of Governments
Transportation	• City of Willamina Comprehensive Plan 2015 update • City of Willamina draft 2020 Transportation System Plan • City of Willamina transportation system fixed asset schedule; June 30, 2020; City records • U.S. Bureau of the Census; American Community Survey: ✓ City of Willamina dwelling units; 2019 estimated ✓ City of Willamina number of employees; 2019 estimated • Trip Generation Manual; Institute of Transportation Engineers; 10th Edition
Parks	• City of Willamina Parks CIP; September, 2021; Resolution no. 21-22-005 • City of Willamina parks system fixed asset schedule; June 30, 2020; City records • U.S. Bureau of the Census; American Community Survey: ✓ City of Willamina population; 2019 estimated ✓ City of Willamina dwelling units; 2019 estimated ✓ City of Willamina number of employees; 2019 estimated • Oregon Department of Parks and Recreation; A guide to Community Park and Recreation Planning for Oregon Communities; April, 2013

The data sources shown in Table 2 were used to formulate the two (2) components of the SDCs. These components are the reimbursement and improvement fees. A brief definition of the two components is:

- *The reimbursement fee* considers the cost of existing facilities, prior contributions by existing users of those facilities, the value of the unused/available capacity, and generally accepted ratemaking principles. The objective is future system users contribute no more than an equitable share to the cost of existing facilities. The reimbursement fee can be spent on capital costs or debt service related to the systems for which the SDC is applied.
- *The improvement fee* portion of the SDC is based on the cost of planned future facilities that expand the system's capacity to accommodate growth or increase its level of performance. In developing an analysis of the improvement portion of the fee, each project in the respective service's capital improvement plan is evaluated to exclude costs related to correcting existing system deficiencies or upgrading for historical lack of capacity. An example is a facility which improves system capacity to better serve current customers. The costs for this type of project must be eliminated from the improvement fee calculation. Only capacity increasing/level of performance costs provide the basis for the SDC calculation. The improvement SDC is calculated as a function of the estimated number of additional equivalent residential units to be served by the City's facilities over the planning period. Such a fee represents the greatest potential for future SDC changes. The improvement fee must also provide a credit for construction of a qualified public improvement.

SDC Legal Authorization and Background

SDCs are authorized by Oregon Revised Statute (ORS) 223.297-314. The statute is specific in its definition of system development charges, their application, and their accounting. In general, an SDC is a one-time fee imposed on new development or expansion of existing development and assessed at the time of development approval or increased usage of the system. Overall, the statute is intended to promote equity between new and existing customers by recovering a proportionate share of the cost of existing and planned/future capital facilities that serve the developing property. Statute further provides the framework for the development and imposition of SDCs and establishes that SDC receipts may only be used for capital improvements and/or related debt service.

Finally, two cost basis adjustments are potentially applicable to both reimbursement and improvement fees: fund balance and compliance costs. In this study, the project team as paid attention to this detail to align future infrastructure costs to those responsible for paying those costs. The reasons for this attention are as follows:

- *Fund Balances* - To the extent that SDC revenue is currently available in fund balance, that revenue should be deducted from its corresponding cost basis. For example, if the city has wastewater improvement fees that it has collected but not spent, then those unspent improvement fees should be deducted from the wastewater system's improvement fee cost basis to prevent charging twice for the same capacity.
- *Compliance Costs* - ORS 223.307(5) authorizes the expenditure of SDCs on "the costs of complying with the provisions of ORS 223.297 to 223.314, including the costs of developing system development charge methodologies and providing an annual accounting of system development charge expenditures." To avoid spending monies for compliance that might otherwise have been spent on growth-related projects, this report includes an estimate of compliance costs in its SDCs.

Reimbursement Fee Methodology

The reimbursement fee represents a buy-in to the cost, or value, of infrastructure capacity within the existing system. Generally, if a system were adequately sized for future growth, the reimbursement fee might be the only charge imposed, since the new customer would be buying existing capacity. However, staged system expansion is needed, and an improvement fee is imposed to allocate those growth-related costs. Even in those cases, the new customer also relies on capacity within the existing system, and a reimbursement component is warranted.

In order to determine an equitable reimbursement fee to be used in conjunction with an improvement fee, two points should be highlighted. First, the cost of the system to the City's customers may be far less than the total plant-in-service value. This is due to the fact that elements of the existing system may have been contributed, whether from developers, governmental grants, and other sources. Therefore, the net investment by the customer/owners is less. Second, the value of the existing system to a new customer is less than the value to an existing customer, since the new customer must also pay, through an improvement fee, for expansion of some portions of the system.

The method used for determining the reimbursement fee accounts for both of these points. First, the charge is based on the net investment in the system, rather than the gross cost. Therefore, donated facilities, typically including local facilities, and grant-funded facilities, would be excluded from the cost basis. Also, the charge should be based on investments clearly made by the current users of the system, and not already supported by new customers. Tax supported activities fail this test since funding sources have historically been from general revenues, or from revenues which emanate, at least in part, from the properties now developing. Second, the cost basis is allocated between used and unused capacity, and, capacity available to serve growth. In the absence of a detailed asset by asset analysis, it is appropriate to allocate the cost of existing facilities between used and available capacity proportionally based on the forecasted population growth as converted to equivalent dwelling units over the planning period. This approach reflects the philosophy, consistent with the City's updated master plans, that facilities have been sized to meet the demands of the customer base within the established planning period.

Improvement Fee Methodology

There are three basic approaches used to develop improvement fee SDCs: "standards driven", "improvements-driven", and "combination/hybrid" approaches. The "standards-driven" approach is based on the application of Level of Service (LOS) standards for facilities. Facility needs are determined by applying the LOS standards to projected future demand, as applicable. SDC-eligible amounts are calculated based on the costs of facilities needed to serve growth. This approach works best where level of service standards has been adopted but no specific list of projects is available. The "improvements-driven" approach is based on a specific list of planned capacity increasing capital improvements. The portion of each project that is attributable to growth is determined, and the SDC-eligible costs are calculated by dividing the total costs of growth-required projects by the projected increase in projected future demand, as applicable. This approach works best where a detailed master plan or project list is available, and the benefits of projects can be readily apportioned between growth and current users. Finally, the combination/hybrid-approach includes elements of both the "improvements driven" and "standards-driven" approaches. Level of Service standards may be used to create a list of planned capacity-increasing projects, and the growth required portions of projects are then used as the basis for determining SDC eligible costs. This approach works best where levels of service have been identified and the benefits of individual projects are not easily apportioned between growth and current users.

In the past, the City has utilized the "improvements-driven" approach for the calculation of SDCs. This study continues to use this method and has relied on the capital improvement plans that are incorporated in the master plans, and plan updates for the water, wastewater, stormwater, parks, and transportation systems.

For this SDC update, the improvement fee represents a proportionate share of the cost to expand the systems to accommodate growth. This charge is based on the capital improvement plans established by the City for the municipal services. The costs that can be applied to the improvement fees are those that can reasonably be allocable to growth. Statute requires that the capital improvements used as a basis for the charge be part of an adopted capital improvement schedule, whether as part of a system plan or independently developed, and that the improvements included for SDC eligibility be capacity or level of service expanding. The improvement fee is intended to protect existing customers from the cost burden and impact of expanding a system that is already adequate for their own needs in the absence of growth.

The key step in determining the improvement fee is identifying capital improvement projects that expand the system and the share of those projects attributable to growth. Some projects may be entirely attributable to growth, such as a wastewater collection line that exclusively serves a newly developing area. Other projects, however, are of mixed purpose, in that they may expand capacity, but they also improve service or correct a deficiency for existing customers. An example might be a water distribution reservoir that both expands water storage capacity and corrects a chronic capacity issue for existing users. In this case, a rational allocation basis must be defined.

The improvement portion of the SDC is based on the proportional approach toward capacity and cost allocation in that only those facilities (or portions of facilities) that either expand the respective system's capacity to accommodate growth or increase its respective level of performance have been included in the cost basis of the fee. As part of this SDC update, City Staff and their engineering consultants were asked to review the planned capital improvement lists in order to assess SDC eligibility. The criteria in Figure 1 were developed to guide the City's evaluation:

Figure 1 - SDC Eligibility Criteria

City of Willamina

Steps Toward Evaluating

Capital Improvement Lists for SDC Eligibility

ORS 223

1. Capital improvements mean the facilities or assets used for:
    a. Water supply, transmission, storage, and distribution
    b. Wastewater collection, transmission, treatment, and disposal
    c. Stormwater, conveyance, detention, treatment, and disposal
    d. Parks, open space, and trails/connections
    e. Transportation – intersection improvements, street reconstruction and widening, roadway enhancement, and bike/ped expansion

    This definition DOES NOT ALLOW costs for operation or routine maintenance of the improvements;
2. The SDC improvement base shall consider the cost of projected capital improvements needed to increase the capacity of the systems to which the fee is related;
3. An increase in system capacity is established if a capital improvement increases the "level of performance or service" provided by existing facilities or provides new facilities.

Under the City' approach, the following rules will be followed.

1. Repair costs are not to be included;
2. Replacement costs will not be included unless the replacement includes an upsizing of system capacity and/or the level of performance of the facility is increased;
3. New regulatory compliance facility requirements fall under the level of performance definition and should be proportionately included;
4. Costs will not be included which bring deficient systems up to established design levels.

In developing the improvement fee, the project team in consultation with City staff evaluated each of its CIP projects to exclude costs related to correcting existing system deficiencies or upgrading for historical lack of capacity. Only capacity increasing/level of performance costs were used as the basis for the SDC calculation, as reflected in the capital improvement schedules developed by the City. The improvement fee is calculated as a function of the estimated number of projected additional Equivalent Residential Units for water, wastewater, stormwater, and parks over the planning horizon.

We measure demand for transportation facilities in PM Peak Hour Vehicle Trips. An industry standard for allocating demands on a transportation system is to proportion the costs based on the relative number of trips created by a development. Trips are technically referred to as PMPHVTs, and trip rates are published by the Institute of Transportation Engineers (ITE) for various land uses. Once the future costs to serve growth have been segregated (i.e., the numerator), they can be divided into the total number of new PMPHVTs that will use the capacity derived from those investments (i.e., the denominator).

Methodology for the Granting of Credits, Discounts, and Exemptions

SDC Credits Policy

ORS 223.304 requires that credit be allowed for the construction of a "qualified public improvement" which is required as a condition of development approval, is identified in the Capital Improvement Plan, and either is not located on or contiguous to property that is the subject of development approval or is located on or contiguous to such property and is required to be built larger or with greater capacity than is necessary for the particular development project. The credit for a qualified public improvement may only be applied against an SDC for the same type of improvement and may be granted only for the cost of that portion of an improvement which exceeds the minimum standard facility size or capacity needed to serve the particular project. For multi-phase projects, any excess credit may be applied against SDCs that accrue in subsequent phases of the original development project. In addition to these required credits, the City may, if it so chooses, provide a greater credit, establish a system providing for the transferability of credits, provide a credit for a capital improvement not identified in the Capital Improvement Plan, or provide a share of the cost of an improvement by other means.

The City has adopted a policy for granting SDC credits and has codified this policy in the Willamina Municipal Code (WMC) §33.27. The adopted SDC credit policy consists of the following items:

WMC §33.27

A. A system development charge shall be imposed when a change of use of a parcel or structure occurs, but credit shall be given for the computed system development charge to the extent that prior structures existed, and services were established on or before July 1, 1991. The credit so computed shall not exceed the calculated system development charge. No refund shall be made on account of this credit.

B. A credit shall be given for the costs of a qualified public improvement which is located partially on and partially off the parcel that is the subject of the development approval. The credit shall be given only for the cost of the portion of the improvement not located on or wholly contiguous to the property. The credit provided for by this division shall be only for the improvement fee charges for the type of improvement being constructed and shall not exceed the improvement fee even if the cost of the capital improvement exceeds the applicable improvement fee.

C. Credit shall not be transferable from one development to another, except in compliance with standards adopted by the City Council.

D. Credit shall not be transferable from one type of capital improvement to another.

SDC Discount Policy

The City, at its sole discretion may discount the SDC rates by choosing not to charge a reimbursement fee for excess capacity, or by reducing the portion of growth-required improvements to be funded with SDCs. A discount in the SDC rates may also be applied on a pro-rata basis to any identified deficiencies, which must be funded from sources other than improvement fee SDCs. The portion of growth-required costs to be funded with SDCs must be identified in the CIP. Because discounts reduce SDC revenues, they increase the amounts that must come from other sources, such as user fees or general fund contributions, in order to acquire the facilities identified in the updated master plan(s).

Partial and Full SDC Exemption

The City may exempt certain types of development, from the requirement to pay SDCs. Exemptions reduce SDC revenues and, therefore, increase the amounts that must come from other sources, such as user fees and property taxes. As in the case of SDC credits, the City has articulated a policy relative to partial and full SDC exemption. This SDC exemption policy is codified in WMC §33.26, and is as follows:

A. Structures and uses established and existing on or before July 1, 1991, are exempt from system development charges imposed by this subchapter, except water and sewer charges, to the extent of the structure or use then existing and to the extent of the parcel of land as it is constituted on that date. Structures and uses affected by this division shall pay the water or sewer charges pursuant to the terms of this subchapter upon the receipt of a permit to connect to the water or sewer system.

B. Additions to single-family dwellings that do not constitute the addition of a dwelling unit, as defined by the State Uniform Building Code, are exempt from all portions of the system development charge.

C. An alteration, addition, replacement, or change in use that does not increase the parcel's or structure's use of the public improvement facility is exempt from all portions of the system development charge.

Water SDCs

Water Capital Improvement Plan

As discussed in the introduction of this report, the City Council adopted a new City-wide CIP on September 14, 2021. For this water SDC update, the water CIP was reviewed for accuracy with City Staff and where appropriate amended. This amendment process consisted of two steps. The first step was to eliminate master plan projects that City Staff deemed unnecessary at the current time due to the very long lead times anticipated for their development. The second step in the CIP amendment process was to eliminate the cost of planned projects (or portions of projects) that have been funded and constructed since the adoption of the last water master plan. In this case, the planned future costs are deducted from the CIP. The actual costs spent on these projects were capitalized by the City, and now reside in the water system fixed asset inventory (i.e., balance sheet assets). These historical costs will be included in the reimbursement fee calculations.

The amended water system CIP now consists of future projects that remain a 20-year priority for the City, and only consists of projects yet to be completed. The resulting CIP that was used for this SDC update is shown in summary form in Table 3.

Table 3 – Adopted 2021 Water System Capital Improvement Plan

			Funding Sources							
ID#	Item Description	June, 2021 Est.	City	SDCs	Urban Renewal	State/ODOT	Federal Grants	LID or Utility	Developer	Total
Priority 1 Improvements										
1B	Rezoning 5th Street and Pacific Hills Drive	$ 1,166,000	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
1C	8-inch loop between Main Street and Willamina Drive	479,000	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
1D	Rehab and Install Control Valves between Existing Zones	127,000	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
1E	Additional Fire Hydrants	70,000	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
1F	Reservoir Improvements	1,227,000	91.00%	9.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
1G	Booster Station Improvements - Hill Drive	84,000	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
1H	Water Treatment Plant Improvements	973,000	91.00%	9.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
1I	Interim Intake Improvements	Completed	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
1L	WTPFPS	150,000	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
1N	Leak Detection Study	12,000	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
	Subtotal priority 1 improvements	$ 4,288,000	$ 3,940,000	$ 348,000	$ -	$ -	$ -	$ -	$ -	$ 4,288,000
Water System Improvement Projects										
1A	10-inch Main to High School and Associated Rezoning	$ 1,519,830	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	100%
1G	Booster Station Improvements - 6th Street	766,935	37.00%	0.00%	0.00%	0.00%	63.00%	0.00%	0.00%	100%
1J	Long-term Intake Improvements	428,200	91.00%	9.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
1K	Raw Water Improvements	428,200	91.00%	9.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
1M	WMCP Update	-	50.00%	50.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
1P	12-Inch Main from RWPS to WTP	1,949,800	91.00%	9.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
N/A	SCADA and Controls Upgrade	163,600	91.00%	9.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
N/A	Misc. WSI Items	813,400	91.00%	9.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
	Subtotal water system improvement projects	$ 6,069,965	$ 3,726,478	$ 340,488	$ -	$ -	$ 2,002,999	$ -	$ -	$ 6,069,965
Additional Panning Costs for Water System Improvement Projects										
N/A	Engineering	$ 396,833	79.00%	21.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
N/A	Survey	21,600	79.00%	21.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
N/A	Environmental Review	22,200	79.00%	21.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
N/A	Water Rights Update	11,300	79.00%	21.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
N/A	Geotechnical Study	21,600	79.00%	21.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
N/A	Flood Study	26,800	79.00%	21.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
N/A	Permitting	50,300	79.00%	21.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
N/A	Amendment 01	-	79.00%	21.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
N/A	Amendment 02	275,812	79.00%	21.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
N/A	Amendment 03	74,019	79.00%	21.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
	Subtotal planning costs	$ 900,464	$ 711,367	$ 189,097	$ -	$ -	$ -	$ -	$ -	$ 900,464

Table 3 – Adopted 2021 Water System Capital Improvement Plan Continued

			Funding Sources							
ID#	Item Description	June, 2021 Est.	City	SDCs	Urban Renewal	State/ODOT	Federal Grants	LID or Utility	Developer	Total
Priority 2 Improvements										
2A	8-inch Main along Fir Street	$ 481,000	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
2B	8-inch Main along Oak Street	477,000	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
2C	Additional Fire Hydrants	20,000	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
2D	Water Treatment Plant Improvements	75,000	91.00%	9.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
2E	10 Year WMP Update	150,000	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
2F	WMCP Progress Report	10,000	50.00%	50.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
N/A	10 Year WMCP Update	25,000	50.00%	50.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
	Subtotal priority 2 improvements	$ 1,238,000	$ 1,063,750	$ 174,250	$ -	$ -	$ -	$ -	$ -	$ 1,238,000
Priority 3 Improvements										
3A	8-inch Main along Willamina Drive	$ 491,000	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
3B	8-inch Loop along Maple Street	264,000	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
3C	8-inch Main along Ivy Street	165,000	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
3D	8-inch Loop from Yamhill Street to Highway 18 and 6-inch Ma	514,000	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
3E	8-inch Main along SW Hill Drive	178,000	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
3F	8-inch Loop from E Street to 4th Place	130,000	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
3G	8-inch Loop from Adams Street to Jackson Street	143,000	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
3H	8-inch Loop from Willow Lane	108,000	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
3I	8-inch loop from E Street to Highway 18	350,000	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
3J	Additional Fire Hydrants	6,000	87.00%	13.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
3K	Rehab Control Valves between Existing Zones	59,000	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
3L	Reservoir Improvements	344,000	91.00%	9.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
3M	Booster Station Improvements	511,000	91.00%	9.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
3N	20 Year WMP	150,000	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
N/A	15 Year WMCP Progress Report	10,000	50.00%	50.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
3O	20 Year WMCP Update	25,000	50.00%	50.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
	Subtotal priority 3 improvements	$ 3,448,000	$ 3,202,770	$ 245,230	$ -	$ -	$ -	$ -	$ -	$ 3,448,000
Transportation System Total		$ 15,944,429	$ 12,644,365	$ 1,297,065	$ -	$ -	$ 2,002,999	$ -	$ -	$ 15,944,429

Water Customers Current and Future Demographics

Existing Water Demand and Population Growth

Current Willamina water demands are based on historical customer billing records, and actual water sales and water meters in service as of January 1, 2021. Projected demands are estimated based on a forecasted population growth rate of 0.98 percent per year within the City's existing urban growth boundary. This annual population growth factor is based on the population forecasts prepared by the Population Research Center at Portland State University (June, 2020).

Estimated Demand per Equivalent 5/8" or 3/4" Water Meter

The City principally serves single-family residential customers and to a lesser extent, small commercial and industrial customers. Single-family residential water services generally have a consistent daily pattern of water use whereas water demands for multifamily residences, commercial and industrial users may vary significantly from service to service depending on the number of multifamily units per service or the type of commercial enterprise. When projecting future water demands based on population change, the water needs of nonresidential and multi-family residential customers are represented by comparing the water use volume at these services to the average single-family residential water service. A method to estimate this relationship is to calculate "equivalent dwelling units (EDUs)". In the case of Willamina, the standard residential unit of demand is the rated capacity (in gallons per minute) of the 5/8" and 3/4" water meter. As of January 1, 2021, the City had 879 active water meters in service, 822 of which were 5/8" x 3/4" and 3/4" x 3/4" meters serving single family residential customers. The City also serves one very large industrial customer, Hampton Lumber, Inc. which represents 26% of total water sales in calendar 2020. The process for calculating equivalent ¾" meters is shown below in Table 4.

Table 4 – Estimated ¾" Equivalent Meters in Service as of January 1, 2021

Meter Size	Accounts*	2020 Usage Gallons*	Water EDUs	
Residential	822	42,741,655	822	64%
Commercial	27	3,418,375	66	5%
Industrial (excluding lumber mill)	4	1,591,579	31	2%
Church/school	15	363,199	7	1%
Community service	9	1,359,370	26	2%
Lumber mill	2	17,816,597	343	26%
Total	879	67,290,775	1,294	100%

* - City of Willamina utility billing system records

Projected Demands

The planning horizon for the master plan is approximately 20 years, through the year 2040. That is the forecast horizon that is used for the water SDC update. In the 2014 master plan, an estimated number of EDUs per acre for each land use type was established based on (then) current water demands by customer class and total developed land area by land use type. Land use type is analogous to customer class, which is to say the land use or zoning of a particular property reflects the type of water service, such as residential or commercial, provided to that property. The estimated number of potential EDUs per acre was applied to developable land within the existing water service area to estimate water demand.

For this SDC update, the project team did not use the old master plan strategy to forecast future water demand based on land use. With the benefit of actual water sales and meters in service, and a population growth forecast that is predicated on existing growth trends for the City a forecast of future equivalent ¾" meters was developed. Based upon these decision rules, the forecast of equivalent meters in use for this water SDC update are shown below in Table 5.

Table 5 – Forecast of Equivalent ¾" Meters for the 2021 Water SDC Update Study

	2020	CAGR[1]	2040
Total number of 3/4" meter equivalents 2020	1,294		
Compound annual growth in Willamina population		0.98%	
Projected number of 3/4" meter equivalents 2040			1,574
Projected growth in 3/4" meter equivalents			280

[1] Compound Annual Growth Rate

Reimbursement Fee Calculations

As discussed earlier in this report, the reimbursement fee represents a buy-in to the cost, or value, of infrastructure capacity within the existing system. In theory, this should be a simple calculation. Simply go to the Utility's balance sheet, find the book value of assets in service, and divide that cost by the number of forecasted new connections to the water system. That is a simple calculation, and it is wrong. In order to determine an equitable reimbursement, we have to account for some key issues of rate equity;

- First, the cost of the system to the City's existing customers may be far less than the total plant-in-service value. This is due to the fact that elements of the existing system may have been contributed, whether from developers, governmental grants, and other sources.
- Second, the value of the existing system to a new customer is less than the value to an existing customer, since the new customer must also pay, through an improvement fee, for expansion of some portions of the system.
- Third, the accounting treatment of asset costs generally has no relationship to the capacity of an asset to serve growth. In the absence of a detailed asset by asset analysis detailed in the balance sheet (or fixed asset schedule), a method has to be used to allocate cost to existing and future users of the asset. Generally, it is industry practice to allocate the cost of existing facilities between used and available capacity proportionally based on the forecasted population growth as converted to equivalent dwelling units (i.e., equivalent ¾" meters) over the planning period.

- Fourth, the Oregon SDC statute has strict limitations on what type of assets can be included in the basis of the reimbursement fee. ORS 223.299 specifically states that a "capital improvement" does not include costs of the operation or routine maintenance of capital improvements. This means the assets on the balance sheet such as certain vehicles and equipment used for heavy repair and maintenance of infrastructure cannot be included in the basis of the reimbursement fee.

For this water SDC methodology update, the following discrete calculation steps were followed to arrive at the recommended water reimbursement fee.

Step 1: Calculate the original cost of water fixed assets in service. From this starting point, eliminate any assets that do not conform to the ORS 223.299 definition of a capital improvement. This results in the **adjusted original cost of water fixed assets**.

Step 2: Subtract from the adjusted original cost of water fixed assets in service the accumulated depreciation of those fixed assets. This arrives at the **modified book value of water fixed assets in service**.

Step 3: Subtract from the modified book value of water assets in service any grant funding or contributed capital. This arrives at the **modified book value of water fixed assets in service net of grants and contributed capital**.

Step 4: Subtract from the modified book value of water fixed assets in service net of grants and contributed capital any principal outstanding on long term debt used to finance those assets. This arrives a **gross water reimbursement fee basis**.

Step 5: Subtract from the gross water reimbursement fee basis the fund balance held in the Water Reimbursement SDC fund (if available). This arrives at the **net water reimbursement fee basis**.

Step 6: Divide the net water reimbursement fee basis by the sum of existing and future EDUs to arrive at the **unit net reimbursement fee**.

The actual data that was used to calculate the total water reimbursement fee is shown below in Table 6.

Table 6 - Calculation of the Water Reimbursement Fee

Line Item Descriptions		Amount
Utility Plant-in-Service (original cost):[1]		
1400 Land	$	122,298
1410 Systems		1,708,039
1420 Land Improvments		388
1430 Buildings		605,516
1440 Equipment		167,698
1460 Vehicles		Eliminated
Total Utility Plant-in-Service	$	2,603,939
Accumulated depreciation[1]		
1400 Land	$	-
Source of supply		1,414,471
Treatment		388
Storage		343,563
Transmission and distribution		115,995
Water Rights		Eliminated
Total accumulated depreciation	$	1,874,416
Book value of water utility plant-in-service @ June 30, 2020	$	729,523
Eliminating entries:		
Principal outstanding on bonds, notes, and loans payable:		
Series 2000 water revenue bonds		708,093
Developer Contributions		-
Grants, net of amortization		-
Total eliminating entries		708,093
Net basis in utility plant-in-service available to serve future customers	$	21,430
Estimated existing and future 3/4" Meter Equivalents (MEs)		1,574
Calculated reimbursement fee - $ per 3/4" ME	$	14

[1] Source: Willamina Accounting Summary Report - Capitalized Assets as of June 30, 2020

Improvement Fee Calculations

The calculation of the water improvement fee is more streamlined than the process used to calculate the water reimbursement fee. This study continues to use the improvements-driven method and has relied on the 2021 water system capital improvement plan. Under this methodology, only three steps are required to arrive at the improvement fee. These steps are:

Step 1: Accumulate the future cost of planned improvements needed to serve growth. This arrives at **the gross improvement fee basis**.

Step 2: Subtract from the gross improvement fee basis the fund balance held in the Water Improvement SDC Fund. This arrives at **the net water improvement fee basis**.

Step 3: Divide the net water improvement fee basis by the forecasted number of growth equivalent ¾" meters over the planning period. This arrives at **the total water improvement fee**.

The actual data that was used to calculate the total water improvement fee is shown below in Table 7.

Table 7 - Calculation of the Water Improvement Fee

Project Description	Total Cost	SDC Ineligible	SDC Eligible
Priority 1 Improvements	$ 4,288,000	$ 3,940,000	$ 348,000
Water System Improvement Projects	6,069,965	5,729,477	340,488
Additional Planning Costs for Water System Improvement Projects	900,464	711,367	189,097
Priority 2 Improvements	1,238,000	1,063,750	174,250
Priority 3 Improvements	3,448,000	3,202,770	245,230
	$ 15,944,429	$ 14,647,364	$ 1,297,065
	100%	92%	8%

Total Improvement Fee Eligible Costs for Future System Improvements	$ 1,297,065
less: Water improvement SDC Fund balance as of June 30, 2020	74,360
Adjusted Improvement Fee Eligible Costs for Future System Improvements	$1,222,705
Total Growth in 3/4" Meter Equivalents (20 year forecast)	280
Calculated Water Improvement Fee SDC per Meter Equivalent	$4,367

Water SDC Model Summary

The 2021 water SDC update was done in accordance with Willamina Municipal Code Chapter 33, and with the benefit of adopted plan updates for water services. We recommend the City update the SDC charge to reflect the current capital improvement program. A comparison of the proposed and current water SDCs for the average single-family residential customer is shown below in Table 8.

Table 8 - Proposed and Current Water SDCs for a 5/8" or 3/4" Meter

Water SDC Components	Proposed	Current	Difference
Reimbursement fee	$ 14		$ 14
Improvement fee	4,367	1,848	2,519
Administration fee at 5%	219	-	219
Total water SDC	$ 4,600	$ 1,848	$ 2,752

For water meters larger than ¾", the project team has developed a schedule of SDCs based on the general design criteria for meters that are installed in the Willamina water service area. This criterion is from the standard approach of using American Water Works Association design criteria for displacement and compound water meters.

The resulting schedule of water SDCs for the array of potential meter sizes is shown below in Table 9.

Table 9 - Proposed Schedule of Water SDCs by Potential Water Meter Size

	AWWA Rated	Flow Factor	Proposed Schedule of Water SDCs			
Meter Size	Flow (GPM)*	Equivalence	Reimbursement	Improvement	Administration	Total
0.625"x 0.75" - Displacement Multi-jet	30	1.00	$ 14	$ 4,367	$ 219	$ 4,600
0.75"x 0.75" - Displacement Multi-jet	30	1.00	14	4,367	219	4,600
1.00 inch - Displacement Multi-jet	50	1.67	23	7,278	365	7,666
1.50 inch - Displacement Class I Turbine	100	3.33	47	14,555	730	15,332
2.00 inch - Displacement or Class I & II Turbine	160	5.33	75	23,289	1,168	24,531
3.00 inch - Displacement	300	10.00	140	43,666	2,190	45,996
4.00 inch - Displacement or Compound	500	16.67	233	72,777	3,650	76,661
6.00 inch - Displacement or Compound	1000	33.33	467	145,555	7,300	153,321
8.00 inch - Compound	1600	53.33	747	232,887	11,680	245,314

* - AWWA Manual of Practice M3; Safety Practices for Water Utilities; Table 2-2 Total Quantities Registered per Month by Meters Operating at Varying Percentages of Maximum Capacity

Water SDCs in Neighboring Communities

Shown below in Figures 2 is a chart that compares the current and proposed water SDC for a single-family customer in Willamina to the same charge in similar communities in Yamhill County.

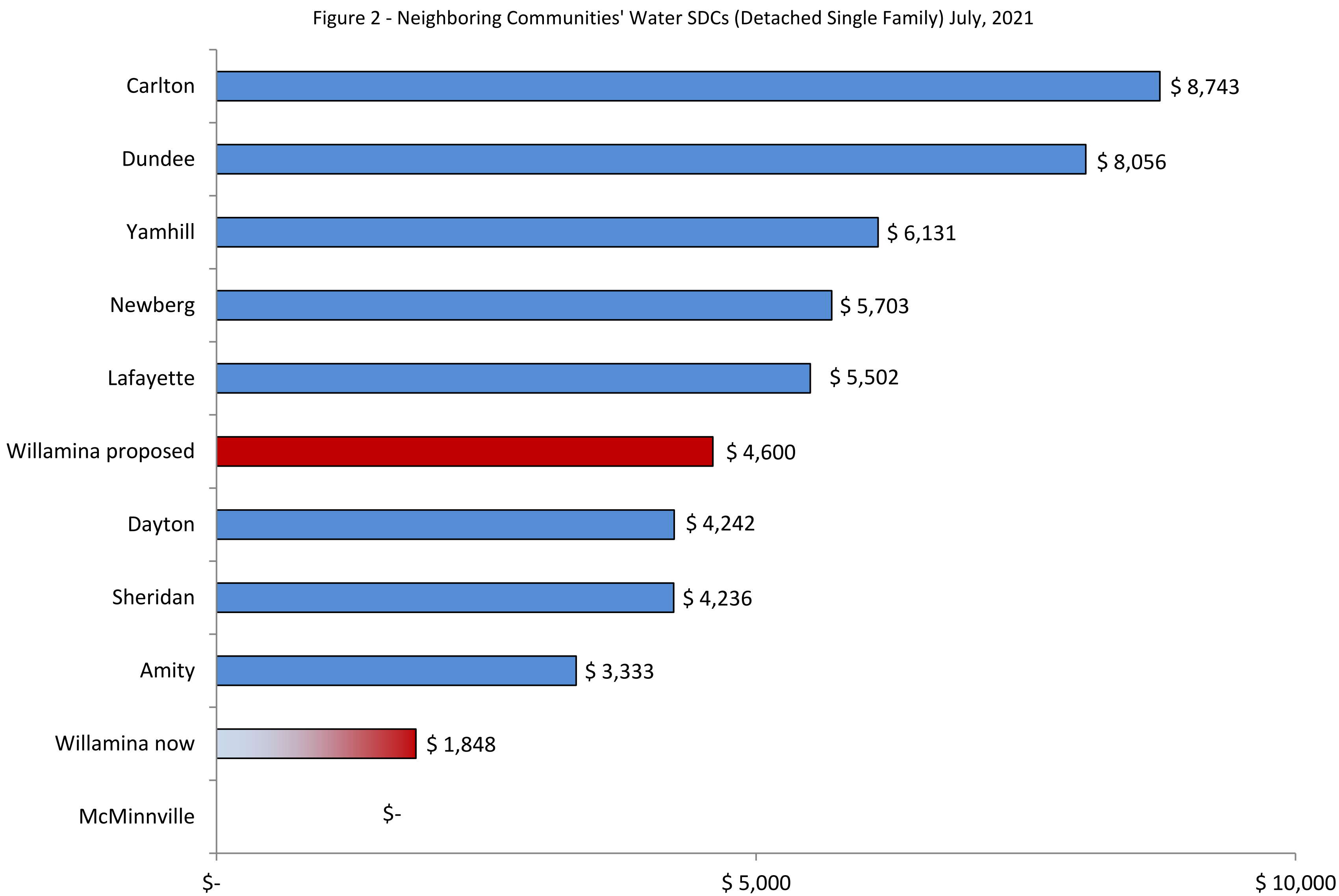


Figure 2 - Neighboring Communities' Water SDCs (Detached Single Family) July, 2021
Carlton
$ 8,743
Dundee
$ 8,056
Yamhill
$ 6,131
Newberg
$ 5,703
Lafayette
$ 5,502
Willamina proposed
$ 4,600
Dayton
$ 4,242
Sheridan
$ 4,236
Amity
$ 3,333
Willamina now
$ 1,848
McMinnville
$-
$-
$ 5,000
$ 10,000

Wastewater SDCs

Wastewater Capital Improvement Plan

As in the case of the water SDCs, the principal sources of data for the wastewater system CIP are the 2021 capital improvement plans for wastewater treatment, pumping stations, and collection systems. City Staff have periodically updated these plans for current development conditions. With the assistance of City Staff, the project team has summarized the wastewater system CIPs for this SDC update. The 2021 wastewater system CIP is shown in Table 10.

Table 10 - 2021 Wastewater System CIP

ID#	Item Description	June, 2021 Est.	City	SDCs	Urban Renewal	State/ODOT	Federal	LID or Utility	Developer	Total
			Funding Sources							
Sewer System Improvements										
1A	South Lift Station	$ 283,000	50.00%	50.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
1B	E Street	279,000	75.00%	25.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
1C	SW Hill Drive	347,000	92.00%	8.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
2A	WWTP Ammonia Control	-	91.00%	9.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
2B	WWTP Temperature Control	-	91.00%	9.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
2C	Sludge Cleanout	1,000,000	91.00%	9.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
2D	Lagoon Relining	1,000,000	91.00%	9.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
2E	WWFPS	139,700	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
2F	Upgrading Main Lines and Manholes	7,041,000	91.00%	9.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
2G	Purple Pipe to Football Fields	3,116,000	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
		13,205,700								
Sewer System Total		$ 13,205,700	$ 12,013,300	$ 1,192,400	$ -	$ -	$ -	$ -	$ -	$ 13,205,700

Wastewater Customers Current and Future Demographics

Existing Wastewater Demand and Population Growth

Current Willamina wastewater demands documented in monthly wastewater flow reports are based on Average Annual Dry Weather Flows (AADWF) to the City's facultative treatment lagoon systems. These flows are expressed in million gallons per day (MGD) figures. For the purpose of this wastewater SDC update, the project team had to translate these MGD figures into standard billing units used for charging out SDCs. In this case, those standard billing figures are expressed in EDUs. In the wastewater industry, an EDU is typically defined as the amount of wastewater a single-family residential customer contributes to the wastewater system during an average month in the winter, where winter is defined as November through April. We have estimated the winter average water consumption for the single-family residential customer class. For the winter period November, 2019 through April, 2020, we estimate the average single-family residential customer contributes 3,591 gallons of water to the wastewater system in the average winter month. This figure translates to 118 gallons per day.

Forecasted EDUs

With this historical consumption data in hand, the project team was able to calculate the number of EDUs relative to the AADWF data from the wastewater treatment system monitoring data that gets reported to the Oregon Department of Environmental Quality on a monthly basis. The EDU calculation methodology is shown in Table 11.

Table 11 - Forecast of Current and Future Wastewater EDUs

	2019	2040	Growth	CAGR[1]
Population Forecast	2,439	2,996	557	0.9842%
Average Dry Weather Flow (ADWF) Monthly MG[2]	4.3144	5.2996	0.9852	0.9842%
Observed Willamina EDU				
Winter average Kgal per month - Single Family Residential[3]	3.5909	3.5909		
Gallons per day - SFR	118.06	118.06		
Estimated EDUs based on ADWF and observed Willamina SFR winter average metered water consumption	1,201	1,476	274	0.9842%

1 CAGR - Compounded Annual Growth Rate

2 Source: City of Willamina Discharge Monitoring Reports 2020

3 Source: City of Willamina utility billing system records

Reimbursement Fee Calculations

The wastewater reimbursement fee methodology mirrors that used for the water reimbursement fee. The methodological steps in its construction are restated here.

Step 1: Calculate the original cost of wastewater fixed assets in service. From this starting point, eliminate any assets that do not conform to the ORS 223.299 definition of a capital improvement. This results in the **adjusted original cost of wastewater fixed assets**.

Step 2: Subtract from the adjusted original cost of wastewater fixed assets in service the accumulated depreciation of those fixed assets. This arrives at the **modified book value of wastewater fixed assets in service**.

Step 3: Subtract from the modified book value of wastewater assets in service any grant funding or contributed capital. This arrives at the **modified book value of wastewater fixed assets in service net of grants and contributed capital**.

Step 4: Subtract from the modified book value of wastewater fixed assets in service net of grants and contributed capital any principal outstanding on long term debt used to finance those assets. This includes the principal balance on the Clean Water State Revolving loan that has yet to be repaid. This arrives a **gross wastewater reimbursement fee basis**.

Step 5: Subtract from the gross wastewater reimbursement fee basis the fund balance held in the Wastewater Reimbursement SDC fund (if available). This arrives at the **net wastewater reimbursement fee basis**.

Step 6: Divide the net wastewater reimbursement fee basis by future EDUs to arrive at the **unit net reimbursement fee**.

The actual data that was used to calculate the total wastewater reimbursement fee is shown below in Table 12.

Table 12 - Calculation of the Wastewater Reimbursement Fee

Line Item Descriptions		Amount
Utility Plant-in-Service (original cost):[1]		
1400 Land	$	426,426
1410 Systems		3,560,287
1420 Land Improvements		388
1430 Buildings		313,738
1440 Equipment		325,855
1460 Vehicles		Eliminated
Total Utility Plant-in-Service	$	4,626,694
Accumulated depreciation[1]		
1400 Land	$	-
1410 Systems		2,234,161
1420 Land Improvements		388
1430 Buildings		121,704
1440 Equipment		288,782
1460 Vehicles		Eliminated
Total accumulated depreciation	$	2,645,035
Book value of wastewater utility plant-in-service @ June 30, 2020	$	1,981,659
Eliminating entries:		
Principal outstanding on bonds, notes, and loans payable:		
Series 1999 OECDD loan no. G99003		181,588
Series 2003 OECDD loan no. G03004		873,744
Developer Contributions		-
Grants, net of amortization		-
Total eliminating entries		1,055,332
Net basis in utility plant-in-service available to serve future customers	$	926,327
Estimated existing and future EDUs		1,476
Calculated reimbursement fee - $ per EDU	$	628

[1] Source: Willamina Accounting Summary Report - Capitalized Assets as of June 30, 2020

Improvement Fee Calculations

The calculation of the wastewater improvement fee also follows the logic that was used to calculate the water improvement fee. As in the case of water, this study continues to use the improvements-driven method, and has relied on the capital improvement plans, and plan updates for the wastewater treatment, pump stations, and collection systems. Under this methodology, only three steps are required to arrive at the improvement fee. These steps are:

Step 1: Accumulate the future cost of planned improvements needed to serve growth. This arrives at **the gross improvement fee basis**.

Step 2: Subtract from the gross improvement fee basis the fund balance held in the Wastewater Improvement SDC Fund. This arrives at **the net wastewater improvement fee basis**.

Step 3: Divide the net wastewater improvement fee basis by the forecasted number of growth EDUs over the planning period. This arrives at **the total wastewater improvement fee**.

The actual data that was used to calculate the total wastewater improvement fee is shown below in Table 13.

Table 13 - Calculation of the Wastewater Improvement Fee

Pjt. #	Project Description	Total Cost	SDC Ineligible	SDC Eligible	Checksum	Checksum Error
1A	South Lift Station	$ 283,000	$ 141,500	$ 141,500	$ 283,000	$ -
1B	E Street	279,000	209,250	69,750	279,000	-
1C	SW Hill Drive	347,000	319,240	27,760	347,000	-
2A	WWTP Ammonia Control	-	-	-	-	-
2B	WWTP Temperature Control	-	-	-	-	-
2C	Sludge Cleanout	1,000,000	910,000	90,000	1,000,000	-
2D	Lagoon Relining	1,000,000	910,000	90,000	1,000,000	-
2E	WWFPS	139,700	-	139,700	139,700	-
2F	Upgrading Main Lines and Manholes	7,041,000	6,407,310	633,690	7,041,000	-
2G	Purple Pipe to Football Fields	3,116,000	3,116,000	-	3,116,000	-
	Total	$ 13,205,700	$ 12,013,300	$ 1,192,400	$ 13,205,700	$ -

Total Improvement Fee Eligible Costs for Future System Improvements	$ 1,192,400
less: Sewer improvement fee SDC Fund balance as of June 30, 2020	24,829
Adjusted Improvement Fee Eligible Costs for Future System Improvements	1,167,571
Total Growth in Sewer EDUs (20 year forecast)	274
Calculated Wastewater Improvement Fee SDC per Meter Equivalent	$ 4,256

Wastewater SDC Model Summary - Residential

The 2021 wastewater SDC update was done in accordance with Willamina Municipal Code Chapter 33, and with the benefit of adopted capital improvement plans and plan updates for wastewater services. We recommend the City update the SDC charge to reflect the current capital improvement program. A comparison of the proposed and current wastewater SDCs for the average single-family residential customer is shown below in Table 14.

Table 14 - Proposed and Current Wastewater SDCs for a 3/4" Meter

Sewer SDC Components	Proposed	Current	Difference
Reimbursement fee	$ 628	$ -	$ 628
Improvement fee	4,256	2,500	1,756
Administration fee at 5%	244	-	244
Total water SDC	$ 5,128	$ 2,500	$ 2,628

For water meters larger than ¾", the schedule of wastewater SDC uses the same flow factors that were developed for the water SDCs (i.e., AWWA standards for displacement and compound meters). The complete proposed schedule of wastewater SDCs by potential meter size are shown in Table 15.

Table 15 - Proposed Schedule of Residential Wastewater SDCs by Potential Water Meter Size

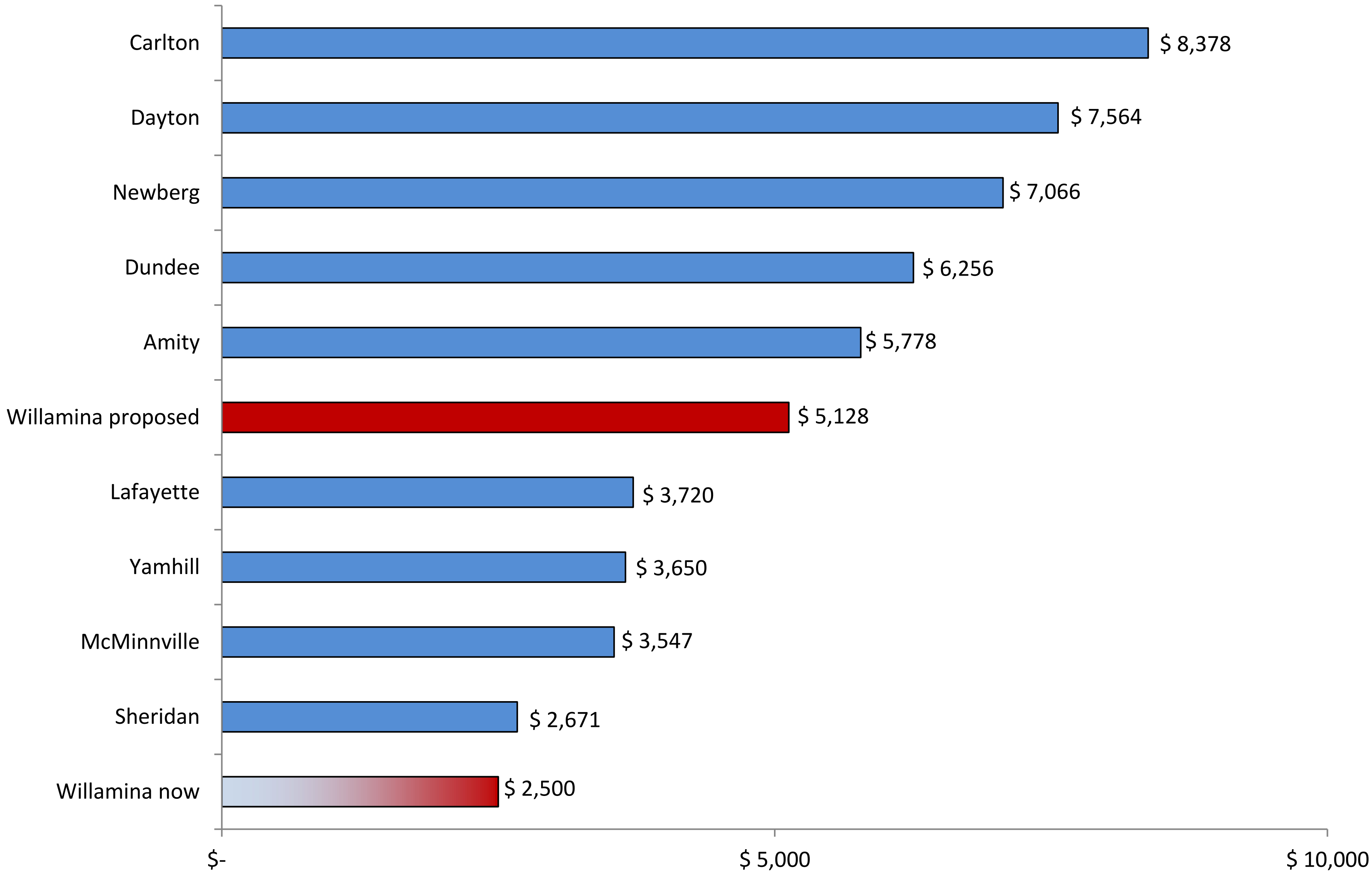
Meter Size	AWWA Rated Flow (GPM)*	Flow Factor Equivalence	Proposed Schedule of Wastewater SDCs Reimbursement	Improvement	Administration	Total
0.625"x 0.75" - Displacement Multi-jet	30	1.00	$ 628	$ 4,256	$ 244	$ 5,128
0.75"x 0.75" - Displacement Multi-jet	30	1.00	628	4,256	244	5,128
1.00 inch - Displacement Multi-jet	50	1.67	1,047	7,093	407	8,547
1.50 inch - Displacement Class I Turbine	100	3.33	2,093	14,187	813	17,093
2.00 inch - Displacement or Class I & II Turbine	160	5.33	3,349	22,699	1,301	27,349
3.00 inch - Displacement	300	10.00	6,280	42,560	2,440	51,280
4.00 inch - Displacement or Compound	500	16.67	10,467	70,933	4,067	85,467
6.00 inch - Displacement or Compound	1000	33.33	20,933	141,867	8,133	170,933
8.00 inch - Compound	1600	53.33	33,493	226,987	13,013	273,493

* - AWWA Manual of Practice M3; Safety Practices for Water Utilities; Table 2-2 Total Quantities Registered per Month by Meters Operating at Varying Percentages of Maximum Capacity

Wastewater SDCs in Neighboring Communities

Shown below in Figures 3 is a chart that compares the current and proposed wastewater SDC for a single-family customer in Willamina to the same charge in similar communities in Yamhill County.

Figure 3 - Neighboring Communities' Wastewater SDCs (Detached Single Family) July, 2021



Stormwater SDCs

Stormwater Capital Improvement Plan

The principal source of data for the stormwater system CIP is the 2021 City-wide CIP. City Staff have periodically updated these plans for current development conditions. With the assistance of City Staff, the project team has summarized the 2021 stormwater system CIPs for this SDC update. The 2021 stormwater system CIP is shown in Table 16.

Table 16 - 2021 Stormwater System CIP

ID#	Item Description	June, 2021 Est.	City	SDCs	Urban Renewal	State/ODOT	Federal	LID or Utility	Developer	Total
			Funding Sources							
Storm System Improvements										
1	Prototype storm CIP	$ 8,100,000	90.99%	9.01%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
2			0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0%
4			0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0%
5			0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0%
6			0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0%
7			0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0%
8			0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0%
9			0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0%
	Stormwater System Total	$ 8,100,000	$ 7,370,000	$ 730,000	$ -	$ -	$ -	$ -	$ -	$ 8,100,000

Stormwater Customers Current and Future Demographics

Existing Stormwater Demand and Population Growth

The City does not currently charge a stormwater SDC on new development based upon impervious surface. For this analysis, we are assuming the average amount of impervious area on a single family residential developed lot within the City is 2,500 square feet. This equates to one "equivalent service unit" or ESU. SDCs are then calculated as a function of ESUs meaning that each property's fee is calculated as follows:

$$Estimated\ Impervious\ Surface\ \div 2{,}500\ square\ feet\ = Number\ of\ ESUs$$

The number of ESUs is then multiplied by the unit rate to determine the SDC amount. The number of ESUs currently connected to the City's system is 2,938 as estimated from comprehensive plan land use designations and developed parcels as estimated from data provided by the City's planning consultants (Mid-Willamette Valley Council of Governments). In order to determine the future capacity requirements of the City's stormwater system, each basin plan and facility plan forecasts the amount of additional impervious surface through the planning period. This forecast is based on future land use conditions and the corresponding runoff coefficients assigned to these various land uses. The future growth in ESUs within each of the City's existing basins and planning areas is based on these specific land use and impervious surface projections.

Forecasted Equivalent Service Units (ESUs)

With current stormwater demand estimated at 2,938 ESUs, the project team was able to calculate the number of ESUs at buildout using the City's Comprehensive Plan out to 2040. These inventories are predicted on the currently approved urban growth boundary (UGB) of the City. As discussed above, the forecast is based on the future land use conditions and the corresponding runoff coefficients assigned to the Comprehensive Plan land use designations. The forecast eliminates lands that are constrained from future development due to severe slopes, wetlands, and riparian corridors.

- *Residential lands* – Based on conversations with City planning staff, the planning standard used to calculate future residential land needs for the City is six (6) dwelling units per acre for single-family residential, seven (7) dwelling unit per acre for two-family residential, and 14 dwelling units per acre for multifamily residential. For the calculation of build out impervious surface contributions from residential lands, the project team has also used these planning standards.
- *Commercial lands* – In consultation with the City's engineering staff, the project team has applied a uniform runoff coefficient of .90 (i.e., 90%) to all commercial lands within the UGB. This average value was used based on analysis of general commercial land uses over a range of soils. The data sources for this analysis included the National Resource Conservation Service's Hydrologic manual, Oregon Department of Transportation Department's design standards for stormwater facilities, and the Caltrans Storm Water Quality Handbook SWPPP/WPCP Preparation Manual.
- *Industrial lands* – Also in consultation with City engineering staff, a uniform runoff value of .85 (i.e., 85%) was applied to all industrial lands in the UGB. The same data sources used to arrive at the commercial runoff coefficient was used for the derivation of the industrial value.

The growth ESU forecast methodology is shown in Table 17.

Table 17 - Forecast of Growth in Stormwater ESUs

ZD Code	Zoning District Description	Gross Acres		Total V + R	Dwelling Units	Dwelling Units	Impervious Surface			ESUs
		Vacant	Redevelopable	In City Limits[1]		per Gross Acre	Coverage	Acres	Square Feet	
C-1	General Commercial	3.74	-	3.74			90%	3.36	146,509.05	58.60
C-2	Commercial Residential	2.25	-	2.25			90%	2.02	88,017.97	35.21
C-3	Commercial Industrial	0.99	-	0.99			90%	0.89	38,909.35	15.56
HI	Heavy Industrial	-	-	-						
M-1	Industrial	24.11	-	24.11			85%	20.50	892,817.96	357.13
P	Public Open Space	-	-	-			0%	-	-	-
PAI	Public Assembly Institutional	-	-	-			55%	-	-	-
R-1	Single-Family Residential	79.08	13.19	92.27	553.61	6	2500 sq. ft.	31.77	1,384,024.29	553.61
R-2	Two-Family Residential	39.00	38.29	77.30	541.07	7	2500 sq. ft.	31.05	1,352,665.27	541.07
R-3	Multi-Family Residential	13.44	11.40	24.84	347.69	14	1500 sq. ft.	11.97	521,540.53	208.62
SR	Suburban Residential	-	-	-			-	-	-	-
No Zone[2]		18.70	-	18.70			-	-	-	-
		181.31	62.87	244.19				101.57	4,424,484.41	1,769.79

1 Source - Mid-Willamette Valley Council of Governments estimates; August 31, 2021

2 Roads, rights of way polygons, easements

Reimbursement Fee Calculations

The City does not have a fixed assets inventory for storm and surface water management infrastructure. Historically, trunk drainage system investment costs have been treated as a component cost of street improvement. Hence these costs will be reflected in the streets/transportation reimbursement fee. For this 2021 stormwater SDC analysis, the project team has assumed a zero (0) stormwater reimbursement fee.

Improvement Fee Calculations

The calculation of the stormwater improvement fee also follows the logic that was used to calculate the water improvement fee. As in the case of water, this study continues to use the improvements-driven method, and has relied on the capital improvement plans, and plan updates for the stormwater systems. Under this methodology, only three steps are required to arrive at the improvement fee. These steps are:

Step 1: Accumulate the future cost of planned improvements needed to serve growth. This arrives at **the gross improvement fee basis**.

Step 2: Subtract from the gross improvement fee basis the fund balance held in the Stormwater Improvement SDC Fund. This arrives at **the net stormwater improvement fee basis**.

Step 3: Divide the net stormwater improvement fee basis by the forecasted number of growth EDUs over the planning period. This arrives at **the total stormwater improvement fee**.

The actual data that was used to calculate the total stormwater improvement fee is shown below in Table 18.

Table 18 - Calculation of the Stormwater Improvement Fee

Project Description	Total Cost	SDC Ineligible	SDC Eligible
Stormwater Master Plan CIP: [1]			
Prototype storm CIP	$ 8,100,000	$ 7,370,000	$ 730,000
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
Total	$8,100,000	$7,370,000	$730,000
Total Improvement Fee Eligible Costs for Future System Improvements			$730,000
less: Stormwater improvement SDC fund balance June 30, 2020			-
Adjusted Improvement Fee Eligible Costs for Future System Improvements			$730,000
Total growth ESUs			1,770
Calculated stormwater Improvement Fee SDC per EDU			$412
Calculated stormwater Improvement Fee SDC per square foot of Impervious surface			$0.1648

[1] Allocations from City staff

Stormwater SDC Model Summary

The 2021 stormwater SDC methodology update was done in accordance with Willamina Municipal Code Chapter 33, and with the benefit of adopted capital improvement plans and plan updates for stormwater services. We recommend the City implement the stormwater SDC charge and methodology to reflect the current capital improvement program. The proposed stormwater SDCs for the average single-family residential customer is shown below in Table 19.

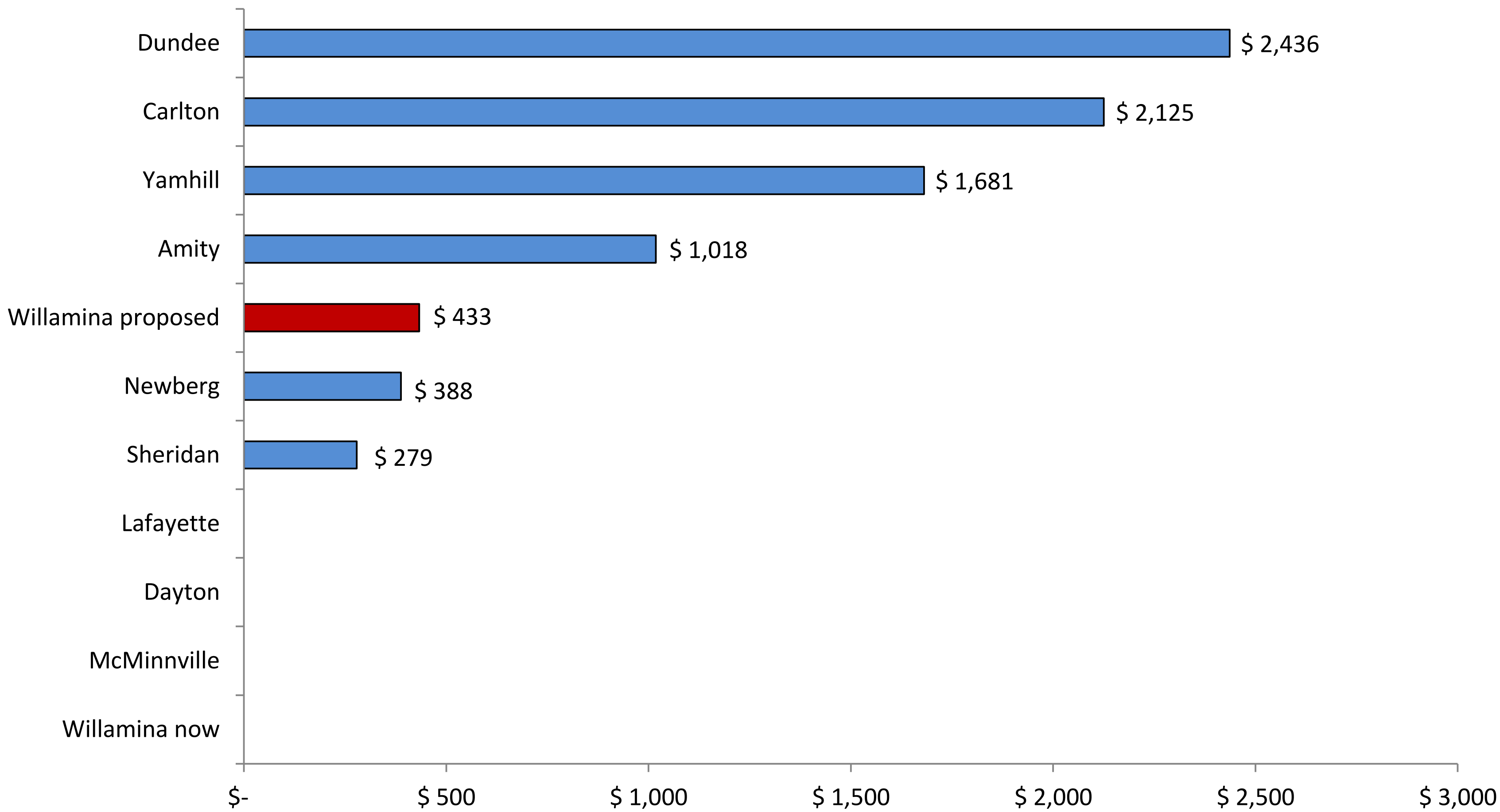
Table 19 - Proposed Stormwater SDCs per ESU and per Square Foot of Impervious Surface

Line Item Description	Per ESU	Per Sq. Foot of Impervious Surface
Proposed SDC components:		
Reimbursement fee	$ -	$ -
Improvement fee	412	0.1648
Administration fee at 5%	21	0.0082
Total proposed stormwater SDC	$ 433	$ 0.1730

Stormwater SDCs in Neighboring Communities

Shown below in Figures 4 is a chart that compares the current and proposed stormwater SDC for a single-family customer in Willamina to the same charge in similar communities in Yamhill County.

Figure 4 - Neighboring Communities' stormwater SDCs (Detached Single Family) July, 2021



Transportation SDCs

Transportation Capital Improvement Plan

The principal source of data for the transportation system CIP is the current 2020 Transportation System Plan (TSP) update in concert with the City's 2021 collector street CIP. At the time of this SDC study, the City's TSP is in the final stages of completion. This TSP update is funded from the proceeds of a Transportation Growth Management (TGM) grant. The TGM program is jointly managed by the Oregon Department of Transportation (ODOT) and the Department of Land Conservation and Development (DLCD). TGM is primarily funded by federal transportation funds, with additional funding provided by the State of Oregon. The primary categories of transportation system improvements are:

- Collector street improvements
- Pedestrian improvements
- Roadway improvements
- Bicycle improvements
- Bridge improvements
- Miscellaneous transportation improvements

With the assistance of City Staff, the project team has summarized the 2021 transportation system CIP for this SDC update. The 2021 transportation system CIP is shown in Table 20.

Table 20 - 2021 Transportation System CIP

ID#	Item Description	June, 2021 Est.	City	SDCs	Urban Renewal	State/ODOT	Federal	LID or Utility	Developer	Total
			Funding Sources							
Collector Street Improvements:										
S-3	SW Hill Dr	$ 753,000	92.00%	8.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
S-4	SW Oak St	426,000	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
S-6	SW Walnut St	608,000	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
S-7	Spruce St	409,000	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
S-8a	NE Yamhill St (West Section)	548,000	85.00%	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
S-8b	NE Yamhill ST (East Section)	506,000	85.00%	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
S-9	2nd St	413,000	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
S-10a	NW 3rd St	507,000	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
S-10b	3rd St	212,000	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
S-11	Upper C St	339,000	20.00%	80.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
S-12	E St	624,000	50.00%	50.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
S-13	NE 3rd St	1,099,000	85.00%	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
S-14	SW Maple St	384,000	95.00%	5.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
S-15	Oaken Hills Dr	829,000	50.00%	50.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
	Subtotal street improvements	$ 7,657,000	$ 6,256,910	$ 1,400,090	$ -	$ -	$ -	$ -	$ -	$ 7,657,000
Pedestrian Improvements:										
P-33	OR 18/Main Street sidewalks	1,504,000	16.67%	66.67%	0.00%	0.00%	0.00%	0.00%	16.67%	100%
P-1	Pedestrian crossing Main st. to Adams st.	137,000	16.67%	66.67%	0.00%	0.00%	0.00%	0.00%	16.67%	100%
P-2	Pedestrian crossing Main st. to Lamson st.	202,000	16.67%	66.67%	0.00%	0.00%	0.00%	0.00%	16.67%	100%
P-33	Pedestrian crossing - Triangle West	94,000	16.67%	66.67%	0.00%	0.00%	0.00%	0.00%	16.67%	100%
P-4	Pedestrian crossing - Triangle East	332,000	16.67%	66.67%	0.00%	0.00%	0.00%	0.00%	16.67%	100%
P-5	Pedestrian crossing - Main st. / B	207,000	16.67%	66.67%	0.00%	0.00%	0.00%	0.00%	16.67%	100%
P-6	Pedestrian crossing Main st. / C	324,000	16.67%	66.67%	0.00%	0.00%	0.00%	0.00%	16.67%	100%
P-7	Pedestrian crossing 3rd st. / C	56,000	16.67%	66.67%	0.00%	0.00%	0.00%	0.00%	16.67%	100%
P-8	Pedestrian crossing Main st. / E	320,000	16.67%	66.67%	0.00%	0.00%	0.00%	0.00%	16.67%	100%
P-9	Pedestrian crossing 3rd st. / E	57,000	16.67%	66.67%	0.00%	0.00%	0.00%	0.00%	16.67%	100%
P-10	Pedestrian crossing Main st. / Oaken	838,000	16.67%	66.67%	0.00%	0.00%	0.00%	0.00%	16.67%	100%
P-11	Pedestrian crossing 4th st. / Oaken	74,000	16.67%	66.67%	0.00%	0.00%	0.00%	0.00%	16.67%	100%
P-12	Pedestrian crossing Solar / Oaken	51,000	16.67%	66.67%	0.00%	0.00%	0.00%	0.00%	16.67%	100%
	Subtotal pedestrian improvements	$ 4,196,000	$ 699,333	$ 2,797,333	$ -	$ -	$ -	$ -	$ 699,333	$ 4,196,000

Table 20 - 2021 Transportation System CIP Continued

ID#	Item Description	June, 2021 Est.	City	SDCs	Urban Renewal	State/ODOT	Federal	LID or Utility	Developer	Total
			Funding Sources							
Roadway Improvements:										
R-1	Roadway traffic calming Main st./ Adams st.	21,000	15.00%	85.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
R-2	Roadway improvement - Triangle	568,000	15.00%	85.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
R-3	Roadway - Main st. / Oaken st.	60,000	15.00%	85.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
	Subtotal roadway improvements	$ 649,000	$ 97,350	$ 551,650	$ -	$ -	$ -	$ -	$ -	$ 649,000
Bicycle Improvements:										
B-1	City-wide bicycle improvements	213,000	16.67%	66.67%	0.00%	0.00%	0.00%	0.00%	16.67%	100%
B-2	Bicycle improvements - Yamhill	49,000	16.67%	66.67%	0.00%	0.00%	0.00%	0.00%	16.67%	100%
B-3	Bicycle improvements - Main st., E st., Oaken st.	646,000	16.67%	66.67%	0.00%	0.00%	0.00%	0.00%	16.67%	100%
B-4	Bicycle improvements - Oaken st.	134,000	16.67%	66.67%	0.00%	0.00%	0.00%	0.00%	16.67%	100%
B-5	Bicycle improvements - 1st st.	62,000	16.67%	66.67%	0.00%	0.00%	0.00%	0.00%	16.67%	100%
	Subtotal bicycle improvements	$ 1,104,000	$ 184,000	$ 736,000	$ -	$ -	$ -	$ -	$ 184,000	$ 1,104,000
Bridge Improvements:										
BR-1	Bridge - pre-fab pedestrian bridge	566,000	16.67%	33.33%	0.00%	33.33%	0.00%	0.00%	16.67%	100%
BR-2	Bridge - cantilever rail bridge	778,000	0.00%	0.00%	0.00%	0.00%	50.00%	0.00%	50.00%	100%
	Subtotal bridge improvements	$ 1,344,000	$ 94,333	$ 188,667	$ -	$ 188,667	$ 389,000	$ -	$ 483,333	$ 1,344,000
Miscellaneous transportation Improvements:										
	Miscellaneous - mini mobility hub	140,000	15.00%	85.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100%
	Subtotal miscellaneous	$ 140,000	$ 21,000	$ 119,000	$ -	$ -	$ -	$ -	$ -	$ 140,000
Transportation System Total - Dollars		$ 15,090,000	$ 7,352,927	$ 5,792,740	$ -	$ 188,667	$ 389,000	$ -	$ 1,366,667	$ 15,090,000
Transportation System Total - Percent			49%	38%	0%	1%	3%	0%	9%	100%

Transportation System Current and Future Demand

Existing Transportation Demand

Demand for transportation facilities is measured in PM peak-hour vehicle trips (PMPHVTs). One PMPHVT represents one person beginning or ending a vehicular trip at a certain property during the afternoon rush hour. As part of the 2020 TSP planning effort, the City's consulting transportation engineers measured actual trip counts at four (4) key intersections throughout the City to estimate the current PMPHVTs for the City. Based on the observed data on October 29, 2020 the TSP team estimate the transportation system was serving 2,832 PMPHVTs. The intersections that were studied and the trip direction and movement totals are shown below in Table 21.

Table 21 - 2020 TSP Observed Trip Counts on October 29, 2020

City of Willamina

2020 Existing Conditions PM Peak Hour Vehicle Trips[1]

No.	2021 TSP Study Intersection	East	West	North	South		Direction Totals	TSP Checksum
1	NE Main Street & NE Oaken Hills Drive:							759
	Left	50			51		101	
	Right		51		59		110	
	Through	272	276				548	
2	NE C Street & NE Main Street:							712
	Left	5	2	5	16		28	
	Right	7	10	3	21		41	
	Through	310	332	1	-		643	
3	S Main Street & NE Main Street"							768
	Left	109		40			149	
	Right	65			96		161	
	Through			208	250		458	
4	S Main Street & SW Barbe Avenue/SE Barber Avenue							593
	Left	46	1	23	1		71	
	Right	23	-	5	63		91	
	Through	-	-	191	240		431	
							2,832	2,832
	Movement Totals	887	672	476	797	2,832		

[1] Source: City of Willamina Draft 2021 Transportation System Plan; Technical Memorandum; DKS Engineers; December 23, 2020; Observed Tip Counts on October 29, 2020

As discussed earlier in this report, an industry standard for allocating demands on a transportation system is to proportion the costs based on the relative number of trips created by a development. Trip rates are published by the Institute of Transportation Engineers (ITE) for various land uses. This SDC Update adopts the use of PMPHVTs as contained in the current ITE Trip Generation Manual, 10th Edition, as the basis for the trip generation standards. In addition, this update incorporates the number of shared trips and pass-by trips. This factor is an estimate of how many of the trips specific to the subject land use are linked to other destinations, where the actual trip is shared by multiple destinations or multiple stops on the same trip.

Forecasted Transportation Demand

The TSP engineering team estimate the City's transportation system will serve 4,260 PMPHVTs by 2045. These estimates imply growth of 1,428 PMPHVTs from 2020 (observed counts) to 2045. The TSP future demand forecast is shown below in Table 22 and in graphical form in Figure 5.

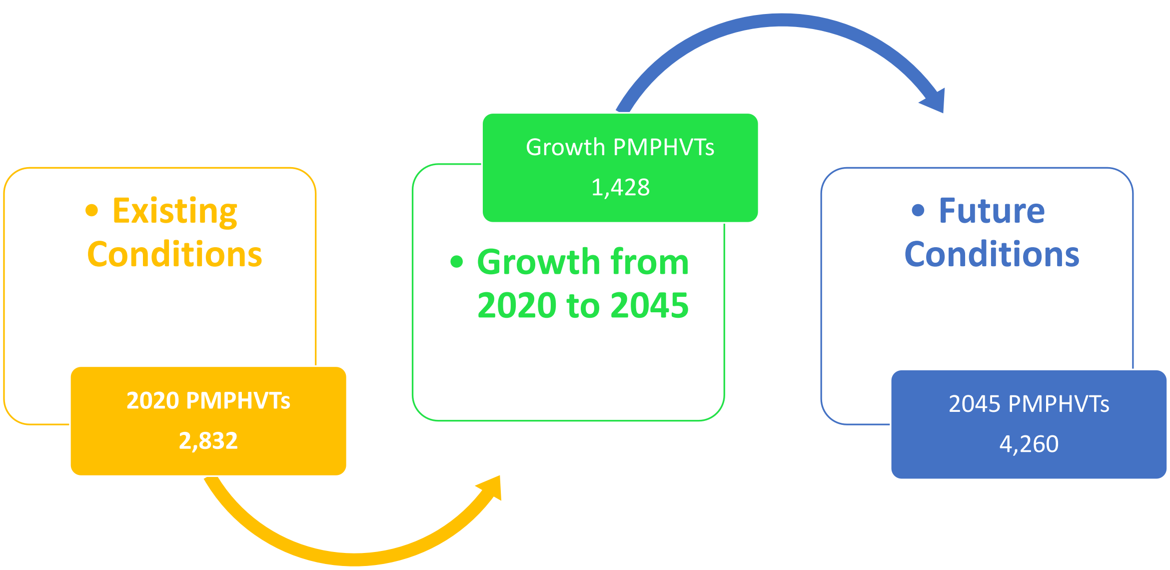
Table 22 – Forecasted Future Transportation System Demand Expressed in PMPHVTs

City of Willamina
2045 Future Conditions PM Peak Hour Vehicle Trips[1]

No.	2021 TSP Study Intersection	East	West	North	South		Direction Totals	TSP Checksum
1	NE Main Street & NE Oaken Hills Drive:							1,140
	Left	75			75		150	
	Right		75		90		165	
	Through	410	415				825	
2	NE C Street & NE Main Street:							1,070
	Left	5	5	5	25		40	
	Right	10	15	5	30		60	
	Through	465	500	5	-		970	
3	S Main Street & NE Main Street"							1,155
	Left	165		60			225	
	Right	100			145		245	
	Through			310	375		685	
4	S Main Street & SW Barbe Avenue/SE Barber Avenue							895
	Left	70	5	35	5		115	
	Right	35	-	5	95		135	
	Through	-	-	285	360		645	
							4,260	4,260
	Movement Totals	1,335	1,015	710	1,200	4,260		

[1] Source: City of Willamina Draft 2021 Transportation System Plan; Technical Memorandum; DKS Engineers; December 23, 2020

Figure 5 - Existing and Future Transportation System Demand Expressed in PMPHVTs



Reimbursement Fee Calculations

The transportation reimbursement fee methodology mirrors that used for the water reimbursement fee. The methodological steps in its construction are restated here.

Step 1: Calculate the original cost of transportation fixed assets in service. From this starting point, eliminate any assets that do not conform to the ORS 223.299 definition of a capital improvement. This results in the **adjusted original cost of transportation fixed assets**.

Step 2: Subtract from the adjusted original cost of transportation fixed assets in service the accumulated depreciation of those fixed assets. This arrives at the **modified book value of transportation fixed assets in service**.

Step 3: Subtract from the modified book value of transportation assets in service any grant funding or contributed capital. This arrives at the **modified book value of transportation fixed assets in service net of grants and contributed capital**.

Step 4: Subtract from the modified book value of transportation fixed assets in service net of grants and contributed capital any principal outstanding on long term debt used to finance those assets. This arrives a **gross transportation reimbursement fee basis**.

Step 5: Subtract from the gross transportation reimbursement fee basis the fund balance held in the Transportation Reimbursement SDC fund (if available). This arrives at the **net transportation reimbursement fee basis**.

Step 6: Divide the net transportation reimbursement fee basis by the sum of existing and future ELNDTs to arrive at the **unit net reimbursement fee**.

The actual data that was used to calculate the total transportation reimbursement fee is shown below in Table 23.

Table 23 - Calculation of the Transportation Reimbursement Fee

Line Item Description	Amount
Original Cost of transportation infrastructure[1]	
1420 Land Improvements	$ 522,623
1430 Buildings	70,711
1440 Equipment	22,657
1460 Vehicles	eliminated
Subtotal original cost	615,991
Accumulated Depreciation[1]	
1420 Land Improvements	270,168
1430 Buildings	21,796
1440 Equipment	22,228
1460 Vehicles	eliminated
Subtotal accumulated depreciation	314,192
Book value of transportation infrastructure	$ 301,799
Gross reimbursement cost basis	$ 301,799
Eliminating entries:	
Street reimbursement SDC fund balance	-
Principal outstanding on bonds, notes, and loans payable	-
Grants, net of amortization	-
Developer contributions	-
Subtotal eliminating entries	-
Net reimbursement cost basis	$ 301,799
Estimated existing and future PMPHVTs at 2045	4,260
Transportation reimbursement fee per PMPHVT	$ 71

[1] Source: Willamina Accounting Summary Report - Capitalized Assets as of June 30, 2020

Improvement Fee Calculations

The calculation of the transportation improvement fee also follows the logic that was used to calculate the water improvement fee. As in the case of water, this study continues to use the improvements-driven method, and has relied on the capital improvement plans, and plan updates for the transportation infrastructure. Under this methodology, only three steps are required to arrive at the improvement fee. These steps are:

Step 1: Accumulate the future cost of planned improvements needed to serve growth. This arrives at **the gross improvement fee basis**.

Step 2: Subtract from the gross improvement fee basis the fund balance held in the Transportation Improvement SDC Fund. This arrives at **the net transportation improvement fee basis**.

Step 3: Divide the net transportation improvement fee basis by the forecasted number of growth PM PHVTs over the planning period. This arrives at **the total transportation improvement fee**.

The actual data that was used to calculate the total transportation improvement fee is shown below in Table 24.

Table 24 - Calculation of the Transportation Improvement Fee

Pjt. #	Project Description	Total Project Costs	SDC Ineligible Costs	SDC Eligible Costs
Collector Street Improvements:				
S-3	SW Hill Dr	753,000	692,760	60,240
S-4	SW Oak St	426,000	426,000	-
S-6	SW Walnut St	608,000	608,000	-
S-7	Spruce St	409,000	409,000	-
S-8a	NE Yamhill St (West Section)	548,000	465,800	82,200
S-8b	NE Yamhill ST (East Section)	506,000	430,100	75,900
S-9	2nd St	413,000	413,000	-
S-10a	NW 3rd St	507,000	507,000	-
S-10b	3rd St	212,000	212,000	-
S-11	Upper C St	339,000	67,800	271,200
S-12	E St	624,000	312,000	312,000
S-13	NE 3rd St	1,099,000	934,150	164,850
S-14	SW Maple St	384,000	364,800	19,200
S-15	Oaken Hills Dr	829,000	414,500	414,500
Pedestrian Improvements:				
P-33	OR 18/Main Street sidewalks	1,504,000	501,333	1,002,667
P-1	Pedestrian crossing Main st. to Adams st.	137,000	45,667	91,333
P-2	Pedestrian crossing Main st. to Lamson st.	202,000	67,333	134,667
P-33	Pedestrian crossing - Triangle West	94,000	31,333	62,667
P-4	Pedestrian crossing - Triangle East	332,000	110,667	221,333
P-5	Pedestrian crossing - Main st. / B	207,000	69,000	138,000
P-6	Pedestrian crossing Main st. / C	324,000	108,000	216,000
P-7	Pedestrian crossing 3rd st. / C	56,000	18,667	37,333
P-8	Pedestrian crossing Main st. / E	320,000	106,667	213,333
P-9	Pedestrian crossing 3rd st. / E	57,000	19,000	38,000
P-10	Pedestrian crossing Main st. / Oaken	838,000	279,333	558,667
P-11	Pedestrian crossing 4th st. / Oaken	74,000	24,667	49,333
P-12	Pedestrian crossing Solar / Oaken	51,000	17,000	34,000
Roadway Improvements:				
R-1	Roadway traffic calming Main st./ Adams st.	21,000	3,150	17,850
R-2	Roadway improvement - Triangle	568,000	85,200	482,800
R-3	Roadway - Main st. / Oaken st.	60,000	9,000	51,000
Bicycle Improvements:				
B-1	City-wide bicycle improvements	213,000	71,000	142,000
B-2	Bicycle improvements - Yamhill	49,000	16,333	32,667
B-3	Bicycle improvements - Main st., E st., Oaken st.	646,000	215,333	430,667
B-4	Bicycle improvements - Oaken st.	134,000	44,667	89,333
B-5	Bicycle improvements - 1st st.	62,000	20,667	41,333
Bridge Improvements:				
BR-1	Bridge - pre-fab pedestrian bridge	566,000	377,333	188,667
BR-2	Bridge - cantilever rail bridge	778,000	778,000	-
Miscellaneous transportation Improvements:				
	Miscellaneous - mini mobility hub	140,000	21,000	119,000
	Transportation System Totals	$ 15,090,000	$ 9,297,260	$ 5,792,740

Total Improvement Fee Eligible Costs for Future System Improvements	5,792,740
less: Transportation SDC Fund balance as of June 30, 2020	204,000
Adjusted Improvement Fee Eligible Costs for Future System Improvements	5,588,740
Estimated PMPHVTs added over 25 years	1,428
Transportation improvement fee per PMPHVT	$ 3,914

Transportation SDC Model Summary

The 2021 transportation SDC update was done in accordance with Willamina Municipal Code Chapter 33, and with the benefit of adopted capital improvement plans and plan updates for transportation services. The proposed transportation SDCs per PMPHVT is shown below in Table 25.

Table 25 - Proposed Transportation SDCs per PMPHVT

Reimbursement fee	$	71
Improvement fee		3,914
Administration fee @ 5%		199
Total transportation SDC	$	4,184

To charge the appropriate SDC, the City must estimate how many PMPHVTs will be generated by the development in question. That number can then be multiplied by $4,184 to determine the amount of SDC owed by new development projects.

The number of PMPHVTs that a property will generate is a function of the increase in scope and scale of activities that will occur on that property. By “scope of activities,” we mean land use. For example, a new single-family residence will generate trip-ends differently from a new retail store of the same size. By “scale of activities,” we mean some measure of quantity. For residential land uses, the number of dwelling units is an appropriate measure of scale. For many commercial and industrial land uses, building floor area is the best measure. For example, a 20,000-square-foot store is likely to generate twice the number of trip-ends as a 10,000-square-foot store of the same type. Table 26 presents proposed transportation SDCs per unit of scale for land uses in the 9th edition of Trip Generation Manual, published by the Institute of Transportation Engineers (ITE):

Table 26 - Proposed Transportation SDCs by ITE Code

ITE Code	Land Use	Total Trip Ends	Diverted/Linked Trips	Pass-by Trips	Diverted/Linked and pass-by Trip Adjustment	Primary Trip Ends	Improve.	Reimb.	Compliance	Total SDC	Basis for Calculating a Customer's SDC
Port and Terminal (Land Uses 000-099)											
010	Waterport/Marine Terminal*	17.15	0.00%	0.00%	-	17.15	67,133	1,218	3,418	71,768	Berth
021	Commercial Airport	5.75	0.00%	0.00%	-	5.75	22,506	408	1,146	24,059	Average flights per day
022	General Aviation Airport	1.57	0.00%	0.00%	-	1.57	6,145	111	313	6,569	Employee
030	Intermodal Truck Terminal	1.87	0.00%	0.00%	-	1.87	7,319	133	373	7,825	1,000 square feet of gross floor area
090	Park-an-Ride Lot with Bus Service	0.43	0.00%	0.00%	-	0.43	1,683	31	86	1,799	Parking space
093	Light Rail Transit Station with Parking	1.24	0.00%	0.00%	-	1.24	4,853	88	247	5,188	Parking space
Industrial (Land Uses 100-199)											
110	General light industrial	0.63	0.00%	0.00%	-	0.63	2,466	45	126	2,636	1,000 square feet of gross floor area
120	General heavy industrial	0.68	0.00%	0.00%	-	0.68	2,662	48	135	2,845	1,000 square feet of gross floor area
130	Industrial park	0.40	0.00%	0.00%	-	0.40	1,566	28	80	1,674	1,000 square feet of gross floor area
140	Manufacturing	0.67	0.00%	0.00%	-	0.67	2,622	48	133	2,803	1,000 square feet of gross floor area
150	Warehousing	0.19	0.00%	0.00%	-	0.19	744	13	38	795	1,000 square feet of gross floor area
151	Mini-warehouse	0.17	0.00%	0.00%	-	0.17	665	12	34	711	1,000 square feet of gross floor area
154	High-Cube transload & short-term warehouse	0.10	0.00%	0.00%	-	0.10	391	7	20	418	1,000 square feet of gross floor area
155	High-Cube fulfillment center warehouse	1.37	0.00%	0.00%	-	1.37	5,362	97	273	5,732	1,000 square feet of gross floor area
156	High-Cube Parcel hub warehouse	0.64	0.00%	0.00%	-	0.64	2,505	45	128	2,678	1,000 square feet of gross floor area
157	High-Cube cold storage warehouse	0.12	0.00%	0.00%	-	0.12	470	9	24	502	1,000 square feet of gross floor area
160	Data center	0.09	0.00%	0.00%	-	0.09	352	6	18	377	1,000 square feet of gross floor area
170	Utilities	2.27	0.00%	0.00%	-	2.27	8,885	161	452	9,498	1,000 square feet of gross floor area
180	Specialty trade contractor	1.97	0.00%	0.00%	-	1.97	7,711	140	393	8,243	1,000 square feet of gross floor area
Residential (Land Uses 200-299)											
210	Single family detached housing	0.99	0.00%	0.00%	-	0.99	3,875	70	197	4,142	Dwelling unit
220	Apartment	0.56	0.00%	0.00%	-	0.56	2,192	40	112	2,343	Dwelling unit
221	Low-Rise Apartment	0.44	0.00%	0.00%	-	0.44	1,722	31	88	1,841	Dwelling unit
222	High-Rise Apartment	0.36	0.00%	0.00%	-	0.36	1,409	26	72	1,506	Dwelling unit
225	Off-Campus studen apartment	0.25	0.00%	0.00%	-	0.25	979	18	50	1,046	Dwelling unit
231	Mid-Rise residential w/1st-floor commercial	0.36	0.00%	0.00%	-	0.36	1,409	26	72	1,506	Dwelling unit
232	High-Rise Residential w/1st-floor commercial	0.21	0.00%	0.00%	-	0.21	822	15	42	879	Dwelling unit
240	Mobile home park	0.46	0.00%	0.00%	-	0.46	1,800	33	92	1,925	Dwelling unit
251	Senior Adult Housing - Detatched	0.30	0.00%	0.00%	-	0.30	1,174	21	60	1,255	Dwelling unit
252	Senior Adult Housing - Attached	0.26	0.00%	0.00%	-	0.26	1,018	18	52	1,088	Dwelling unit
253	Congregate Care Facility	0.18	0.00%	0.00%	-	0.18	705	13	36	753	Dwelling unit
254	Assisted living	0.26	0.00%	0.00%	-	0.26	1,018	18	52	1,088	Bed
255	Continuing Care Retirement Community	0.16	0.00%	0.00%	-	0.16	626	11	32	669	Unit
260	Recreational Homes	0.28	0.00%	0.00%	-	0.28	1,096	20	56	1,172	Dwelling unit
265	Timeshare	0.63	0.00%	0.00%	-	0.63	2,466	45	126	2,636	Dwelling unit
270	Residential Planned Unit Development	0.69	0.00%	0.00%	-	0.69	2,701	49	137	2,887	Dwelling unit

Table 26 - Proposed Transportation SDCs by ITE Code (Continued)

ITE Code	Land Use	Total Trip Ends	Diverted/Linked Trips	Pass-by Trips	Diverted/Linked and pass-by Trip Adjustment	Primary Trip Ends	Improve.	Reimb.	Compliance	Total SDC	Basis for Calculating a Customer's SDC
Lodging (Land Uses 300-399)											
310	Hotel	0.60	0.00%	0.00%	-	0.60	2,348	43	120	2,511	Room
311	All Suites Hotel	0.36	0.00%	0.00%	-	0.36	1,409	26	72	1,506	Room
312	Business Hotel	0.32	0.00%	0.00%	-	0.32	1,252	23	64	1,339	Occupied Room
320	Motel	0.38	0.00%	0.00%	-	0.38	1,487	27	76	1,590	Room
330	Resort Hotel	0.41	0.00%	0.00%	-	0.41	1,605	29	82	1,716	Room
Recreational (Land Uses 400-499)											
411	Public park	0.11	0.00%	0.00%	-	0.11	431	8	22	460	Acre
416	Campground/Recreational Vehicle Park	0.98	0.00%	0.00%	-	0.98	3,836	70	195	4,101	Acre
420	Marina	0.21	0.00%	0.00%	-	0.21	822	15	42	879	Berth
430	Golf course	2.91	0.00%	0.00%	-	2.91	11,390	207	580	12,176	Hole
431	Miniature Golf Course	0.33	0.00%	0.00%	-	0.33	1,292	23	66	1,381	Hole
432	Golf Driving Range	1.25	0.00%	0.00%	-	1.25	4,893	89	249	5,230	Tees/Driving Position
433	Batting Cages	2.22	0.00%	0.00%	-	2.22	8,689	158	442	9,289	Cage
434	Rock climbing gym	1.64	0.00%	0.00%	-	1.64	6,419	116	327	6,862	1,000 square feet of gross floor area
435	Multipurpose Recreational Facility	3.58	0.00%	0.00%	-	3.58	14,012	254	713	14,980	1,000 square feet of gross floor area
436	Trampoline park	1.50	0.00%	0.00%	-	1.50	5,871	107	299	6,276	1,000 square feet of gross floor area
437	Bowling Alley	1.30	0.00%	0.00%	-	1.30	5,088	92	259	5,440	Bowling lane
440	Adult Cabaret	2.93	0.00%	0.00%	-	2.93	11,468	208	584	12,260	1,000 square feet of gross floor area
444	Movie Theater with Matinee - Friday pm peak hou	6.17	0.00%	0.00%	-	6.17	24,149	438	1,229	25,817	1,000 square feet of gross floor area
445	Multiplex Movie Theater - Friday pm peak hour	4.91	0.00%	0.00%	-	4.91	19,218	349	978	20,545	1,000 square feet of gross floor area
452	Horse Racetrack	0.06	0.00%	0.00%	-	0.06	235	4	12	251	Seat
453	Automobile Racetrack - Saturday peak hour	0.28	0.00%	0.00%	-	0.28	1,096	20	56	1,172	Attendee
454	Dog Racetrack	0.15	0.00%	0.00%	-	0.15	587	11	30	628	Attendee
460	Arena*	0.47	0.00%	0.00%	-	0.47	1,840	33	94	1,967	1,000 square feet of gross floor area
462	Professional baseball stadium	0.15	0.00%	0.00%	-	0.15	587	11	30	628	Attendee
465	Ice Skating Rink	1.33	0.00%	0.00%	-	1.33	5,206	94	265	5,565	1,000 square feet of gross floor area
466	Snow Ski Area	26.00	0.00%	0.00%	-	26.00	101,764	1,846	5,181	108,791	Slopes
470	Bingo hall	0.82	0.00%	0.00%	-	0.82	3,209	58	163	3,431	Attendee
473	Casino/Video Lottery Establishment	13.49	0.00%	0.00%	-	13.49	52,800	958	2,688	56,446	1,000 square feet of gross floor area
480	Amusement Park	3.95	0.00%	0.00%	-	3.95	15,460	280	787	16,528	Acre
482	Water slide park Saturday peak hour generator	22.92	0.00%	0.00%	-	22.92	89,709	1,627	4,567	95,903	Acre
488	Soccer Complex	16.43	0.00%	0.00%	-	16.43	64,307	1,167	3,274	68,747	Field
490	Tennis Courts	4.21	0.00%	0.00%	-	4.21	16,478	299	839	17,616	Court
491	Racquet/Tennis Club	3.82	0.00%	0.00%	-	3.82	14,951	271	761	15,984	Court
492	Health/Fitness Club	3.45	0.00%	0.00%	-	3.45	13,503	245	687	14,436	1,000 square feet of gross floor area
493	Athletic Club	6.29	0.00%	0.00%	-	6.29	24,619	447	1,253	26,319	1,000 square feet of gross floor area
495	Recreational Community Center	2.31	0.00%	0.00%	-	2.31	9,041	164	460	9,666	1,000 square feet of gross floor area

Table 26 - Proposed Transportation SDCs by ITE Code (Continued)

ITE Code	Land Use	Total Trip Ends	Diverted/Linked Trips	Pass-by Trips	Diverted/Linked and pass-by Trip Adjustment	Primary Trip Ends	Improve.	Reimb.	Compliance	Total SDC	Basis for Calculating a Customer's SDC
Institutional (Land Uses 500-599)											
501	Military Base	0.39	0.00%	0.00%	-	0.39	1,526	28	78	1,632	Employee
520	Elementary School	1.37	0.00%	0.00%	-	1.37	5,362	97	273	5,732	1,000 square feet of gross floor area
522	Middle School/Junior High School	1.19	0.00%	0.00%	-	1.19	4,658	84	237	4,979	1,000 square feet of gross floor area
530	High School	0.97	0.00%	0.00%	-	0.97	3,797	69	193	4,059	1,000 square feet of gross floor area
534	Private School (K-8) - pm peak hour generator	6.53	0.00%	0.00%	-	6.53	25,558	464	1,301	27,323	1,000 square feet of gross floor area
536	Private School (K-12) - pm peak hour generator	5.50	0.00%	0.00%	-	5.50	21,527	391	1,096	23,013	1,000 square feet of gross floor area
537	Charter elementary school	4.96	0.00%	0.00%	-	4.96	19,413	352	988	20,754	1,000 square feet of gross floor area
537	School district office	2.04	0.00%	0.00%	-	2.04	7,985	145	406	8,536	1,000 square feet of gross floor area
540	Junior/Community College	1.86	0.00%	0.00%	-	1.86	7,280	132	371	7,783	1,000 square feet of gross floor area
550	University/College	1.17	0.00%	0.00%	-	1.17	4,579	83	233	4,896	1,000 square feet of gross floor area
560	Church	0.49	0.00%	0.00%	-	0.49	1,918	35	98	2,050	1,000 square feet of gross floor area
561	Synagogue - Friday	2.92	0.00%	0.00%	-	2.92	11,429	207	582	12,218	1,000 square feet of gross floor area
562	Mosque - Friday	4.22	0.00%	0.00%	-	4.22	16,517	300	841	17,658	1,000 square feet of gross floor area
565	Day Care Center	11.12	56.00%	0.00%	6.23	4.89	19,150	347	975	20,473	1,000 square feet of gross floor area
566	Cemetary	0.46	0.00%	0.00%	-	0.46	1,800	33	92	1,925	Acres
571	Prison	2.91	0.00%	0.00%	-	2.91	11,390	207	580	12,176	1,000 square feet of gross floor area
575	Fire and rescue station	0.48	0.00%	0.00%	-	0.48	1,879	34	96	2,008	1,000 square feet of gross floor area
580	Museum	0.18	0.00%	0.00%	-	0.18	705	13	36	753	1,000 square feet of gross floor area
590	Library	8.16	0.00%	0.00%	-	8.16	31,938	579	1,626	34,143	1,000 square feet of gross floor area
Medical (Land Uses 600-699)											
610	Hospital	0.97	0.00%	0.00%	-	0.97	3,797	69	193	4,059	1,000 square feet of gross floor area
620	Nursing Home	0.59	0.00%	0.00%	-	0.59	2,309	42	118	2,469	1,000 square feet of gross floor area
630	Clinic	3.28	0.00%	0.00%	-	3.28	12,838	233	654	13,724	1,000 square feet of gross floor area
640	Animal Hospital/Veterinary Clinic	3.53	0.00%	0.00%	-	3.53	13,816	251	703	14,770	1,000 square feet of gross floor area
650	Free-Standing emergency room	1.52	0.00%	0.00%	-	1.52	5,949	108	303	6,360	1,000 square feet of gross floor area
Office (Land Uses 700-799)											
710	General office building	1.15	0.00%	0.00%	-	1.15	4,501	82	229	4,812	1,000 square feet of gross floor area
712	Small office building	2.45	0.00%	0.00%	-	2.45	9,589	174	488	10,251	1,000 square feet of gross floor area
714	Corporate Headquarters Building	0.60	0.00%	0.00%	-	0.60	2,348	43	120	2,511	1,000 square feet of gross floor area
715	Single Tenant Office Building	1.71	0.00%	0.00%	-	1.71	6,693	121	341	7,155	1,000 square feet of gross floor area
720	Medical-dental office building	3.46	0.00%	0.00%	-	3.46	13,542	246	689	14,478	1,000 square feet of gross floor area
730	Government Office Building	1.71	0.00%	0.00%	-	1.71	6,693	121	341	7,155	1,000 square feet of gross floor area
731	State Motor Vehicles Department	5.20	0.00%	0.00%	-	5.20	20,353	369	1,036	21,758	1,000 square feet of gross floor area
732	United States Post Office	11.21	0.00%	0.00%	-	11.21	43,876	796	2,234	46,905	1,000 square feet of gross floor area
733	Government Office Complex	2.82	0.00%	0.00%	-	2.82	11,037	200	562	11,800	1,000 square feet of gross floor area
750	Office park	1.07	0.00%	0.00%	-	1.07	4,188	76	213	4,477	1,000 square feet of gross floor area
760	Research and development center	0.49	0.00%	0.00%	-	0.49	1,918	35	98	2,050	1,000 square feet of gross floor area
770	Business park	0.42	0.00%	0.00%	-	0.42	1,644	30	84	1,757	1,000 square feet of gross floor area

Table 26 - Proposed Transportation SDCs by ITE Code (Continued)

ITE Code	Land Use	Total Trip Ends	Diverted/Linked Trips	Pass-by Trips	Diverted/Linked and pass-by Trip Adjustment	Primary Trip Ends	Improve.	Reimb.	Compliance	Total SDC	Basis for Calculating a Customer's SDC
Retail (Land Uses 800-899)											
810	Tractor Supply Store	1.40	0.00%	0.00%	-	1.40	5,480	99	279	5,858	1,000 square feet of gross floor area
811	Construction Equipment Rental Store	0.99	0.00%	0.00%	-	0.99	3,875	70	197	4,142	1,000 square feet of gross floor area
812	Building Materials and Lumber Store	2.06	0.00%	0.00%	-	2.06	8,063	146	410	8,620	1,000 square feet of gross floor area
813	Free Standing Discount Super Store	4.33	0.00%	29.00%	1.26	3.07	12,033	218	613	12,864	1,000 square feet of gross floor area
814	Variety Stoe	6.84	0.00%	34.00%	2.33	4.51	17,669	321	899	18,889	1,000 square feet of gross floor area
815	Free Standing Discount Store	4.83	35.25%	17.00%	2.52	2.31	9,027	164	460	9,650	1,000 square feet of gross floor area
816	Hardware/Paint Store	2.68	29.50%	26.00%	1.49	1.19	4,668	85	238	4,990	1,000 square feet of gross floor area
817	Nursery (Garden Center)	6.94	0.00%	0.00%	-	6.94	27,163	493	1,383	29,039	1,000 square feet of gross floor area
818	Nursery (Wholesale)	5.18	0.00%	0.00%	-	5.18	20,275	368	1,032	21,674	1,000 square feet of gross floor area
820	Shopping Center	3.81	15.86%	34.00%	1.90	1.91	7,477	136	381	7,993	1,000 square feet of gross leasable area
823	Factory Outlet Center	2.29	0.00%	0.00%	-	2.29	8,963	163	456	9,582	1,000 square feet of gross floor area
840	Automobile Sales (New)	2.43	0.00%	0.00%	-	2.43	9,511	173	484	10,168	1,000 square feet of gross floor area
841	Automobile Sales (Used)	3.75	0.00%	0.00%	-	3.75	14,678	266	747	15,691	1,000 square feet of gross floor area
842	Recreational Vehicle Sales	0.77	0.00%	0.00%	-	0.77	3,014	55	153	3,222	1,000 square feet of gross floor area
843	Automobile Parts Sales	4.91	13.00%	43.00%	2.75	2.16	8,456	153	430	9,040	1,000 square feet of gross floor area
848	Tire Store	3.98	3.33%	28.00%	1.25	2.73	10,697	194	545	11,435	1,000 square feet of gross floor area
849	Tire Superstore	2.11	0.00%	0.00%	-	2.11	8,259	150	420	8,829	1,000 square feet of gross floor area
850	Supermarket	9.24	25.25%	36.00%	5.66	3.58	14,014	254	713	14,982	1,000 square feet of gross floor area
851	Convenience Market	49.11	6.47%	51.00%	28.23	20.88	81,743	1,483	4,161	87,387	1,000 square feet of gross floor area
853	Convenience Market with Gasoline Pumps	49.29	17.80%	66.00%	41.31	7.98	31,253	567	1,591	33,411	1,000 square feet of gross floor area
854	Discount Supermarket	8.38	23.20%	21.00%	3.70	4.68	18,302	332	932	19,566	1,000 square feet of gross floor area
857	Discount Club	4.18	0.00%	37.00%	1.55	2.63	10,307	187	525	11,019	1,000 square feet of gross floor area
858	Farmers market - weekday pm peak hour	179.84	0.00%	0.00%	-	179.84	703,894	12,769	35,833	752,496	Acres
860	Wholesale Market	1.76	0.00%	0.00%	-	1.76	6,889	125	351	7,364	1,000 square feet of gross floor area
861	Sporting Goods Superstore	2.02	0.00%	0.00%	-	2.02	7,906	143	402	8,452	1,000 square feet of gross floor area
862	Home Improvement Superstore	2.33	6.00%	42.00%	1.12	1.21	4,742	86	241	5,070	1,000 square feet of gross floor area
863	Electronics Superstore	4.26	33.00%	40.00%	3.11	1.15	4,502	82	229	4,813	1,000 square feet of gross floor area
864	Toy/Children's Superstore	5.00	0.00%	0.00%	-	5.00	19,570	355	996	20,921	1,000 square feet of gross floor area
865	Baby Superstore	1.82	0.00%	0.00%	-	1.82	7,123	129	363	7,615	1,000 square feet of gross floor area
866	Pet Supply Superstore	3.55	0.00%	0.00%	-	3.55	13,895	252	707	14,854	1,000 square feet of gross floor area
867	Office Supply Superstore	2.77	0.00%	0.00%	-	2.77	10,842	197	552	11,590	1,000 square feet of gross floor area
868	Book Superstore	15.83	0.00%	0.00%	-	15.83	61,959	1,124	3,154	66,237	1,000 square feet of gross floor area
869	Discount Home Furnishing Superstore	1.57	0.00%	0.00%	-	1.57	6,145	111	313	6,569	1,000 square feet of gross floor area
872	Bed and Linen Superstore	2.22	0.00%	0.00%	-	2.22	8,689	158	442	9,289	1,000 square feet of gross floor area
875	Department Store	1.95	0.00%	0.00%	-	1.95	7,632	138	389	8,159	1,000 square feet of gross floor area
876	Apparel Store	4.12	0.00%	0.00%	-	4.12	16,126	293	821	17,239	1,000 square feet of gross floor area
879	Arts and Crafts Store	6.21	0.00%	0.00%	-	6.21	24,306	441	1,237	25,984	1,000 square feet of gross floor area
880	Pharmacy/Drugstore without Drive-Through	8.51	4.67%	53.00%	4.91	3.60	14,100	256	718	15,074	1,000 square feet of gross floor area
881	Pharmacy/Drugstore with Drive-Through	10.29	13.00%	49.00%	6.38	3.91	15,305	278	779	16,361	1,000 square feet of gross floor area
882	Marijuana Dispensary	21.83	0.00%	0.00%	-	21.83	85,443	1,550	4,350	91,342	1,000 square feet of gross floor area
890	Furniture Store	0.52	10.33%	53.00%	0.33	0.19	746	14	38	798	1,000 square feet of gross floor area
895	Beverage container recycling depot -PM peak hr	10.10	0.00%	0.00%	-	10.10	39,531	717	2,012	42,261	1,000 square feet of gross floor area
897	Medical Equipment Store	1.24	0.00%	0.00%	-	1.24	4,853	88	247	5,188	1,000 square feet of gross floor area
899	Liquor store	16.37	0.00%	0.00%	-	16.37	64,072	1,162	3,262	68,496	1,000 square feet of gross floor area

Table 26 - Proposed Transportation SDCs by ITE Code (Continued)

ITE Code	Land Use	Total Trip Ends	Diverted/Linked Trips	Pass-by Trips	Diverted/Linked and pass-by Trip Adjustment	Primary Trip Ends	Improve.	Reimb.	Compliance	Total SDC	Basis for Calculating a Customer's SDC
Services (Land Uses 900-999)											
911	Walk-in Bank	12.13	0.00%	0.00%	-	12.13	47,477	861	2,417	50,755	1,000 square feet of gross floor area
912	Drive-in Bank	20.45	9.24%	35.00%	9.05	11.40	44,633	810	2,272	47,714	1,000 square feet of gross floor area
918	Hair Salon	1.45	0.00%	0.00%	-	1.45	5,675	103	289	6,067	1,000 square feet of gross floor area
920	Copy, Print and Express Ship Store	7.42	0.00%	0.00%	-	7.42	29,042	527	1,478	31,047	1,000 square feet of gross floor area
925	Drinking Place	11.36	0.00%	0.00%	-	11.36	44,463	807	2,263	47,533	1,000 square feet of gross floor area
926	Food Cart Pod	3.08	0.00%	0.00%	-	3.08	12,055	219	614	12,887	Food Cart
930	Fast Casual Restaurant	14.13	0.00%	0.00%	-	14.13	55,305	1,003	2,815	59,123	1,000 square feet of gross floor area
931	Quality Restaurant	7.80	13.50%	44.00%	4.49	3.32	12,975	235	661	13,871	1,000 square feet of gross floor area
932	High-Turnover (Sit Down) Restaurant	9.77	17.25%	43.00%	5.89	3.88	15,200	276	774	16,250	1,000 square feet of gross floor area
933	Fast-food restaurant without drive-through	28.34	17.25%	43.00%	17.07	11.27	44,092	800	2,245	47,136	1,000 square feet of gross floor area
934	Fast-food restaurant with drive-through	32.67	9.06%	50.00%	19.29	13.38	52,356	950	2,665	55,971	1,000 square feet of gross floor area
935	Fast-food restaurant with drive-through and no ind	42.65	0.00%	89.00%	37.96	4.69	18,363	333	935	19,630	1,000 square feet of gross floor area
936	Coffee/donut shop without drive-through	36.31	17.25%	43.00%	21.88	14.43	56,492	1,025	2,876	60,392	1,000 square feet of gross floor area
937	Coffee/donut shop with drive-through	43.38	0.00%	89.00%	38.61	4.77	18,677	339	951	19,966	1,000 square feet of gross floor area
938	Coffee/donut kiosk	83.33	0.00%	89.00%	74.16	9.17	35,877	651	1,826	38,354	1,000 square feet of gross floor area
939	Bread/Donut/Bagel Shop without Drive-Through W	28.00	0.00%	0.00%	-	28.00	109,592	1,988	5,579	117,159	1,000 square feet of gross floor area
940	Bread/Donut/Bagel Shop with Drive-Through Winc	19.02	0.00%	0.00%	-	19.02	74,444	1,350	3,790	79,584	1,000 square feet of gross floor area
941	Quick Lubrication Vehicle Shop	8.70	0.00%	0.00%	-	8.70	34,052	618	1,733	36,403	Servicing Position
942	Automobile Care Center	3.11	0.00%	0.00%	-	3.11	12,173	221	620	13,013	1,000 sq. ft. of occupied gross leasable area
943	Automobile Parts and Service Center	2.26	0.00%	0.00%	-	2.26	8,846	160	450	9,456	1,000 square feet of gross floor area
944	Gasoline/service station	109.27	23.00%	42.00%	71.03	38.24	149,689	2,715	7,620	160,025	1,000 square feet of gross floor area
945	Gasoline/service station with convenience market	88.35	31.22%	56.00%	77.06	11.29	44,186	802	2,249	47,237	1,000 square feet of gross floor area
947	Self-Service Car Wash	5.54	0.00%	0.00%	-	5.54	21,684	393	1,104	23,181	Wash stall
948	Automated Car Wash	13.60	0.00%	0.00%	-	13.60	53,230	966	2,710	56,906	Wash stall
949	Car Wash and Detail Center	14.20	0.00%	0.00%	-	14.20	55,579	1,008	2,829	59,416	1,000 square feet of gross floor area
950	Truck Stop	22.73	0.00%	0.00%	-	22.73	88,965	1,614	4,529	95,108	1,000 square feet of gross floor area
960	Super Convenience Market/Gas Station	69.28	0.00%	0.00%	-	69.28	271,162	4,919	13,804	289,885	1,000 square feet of gross floor area
970	Winery	7.31	0.00%	0.00%	-	7.31	28,611	519	1,457	30,587	1,000 square feet of gross floor area

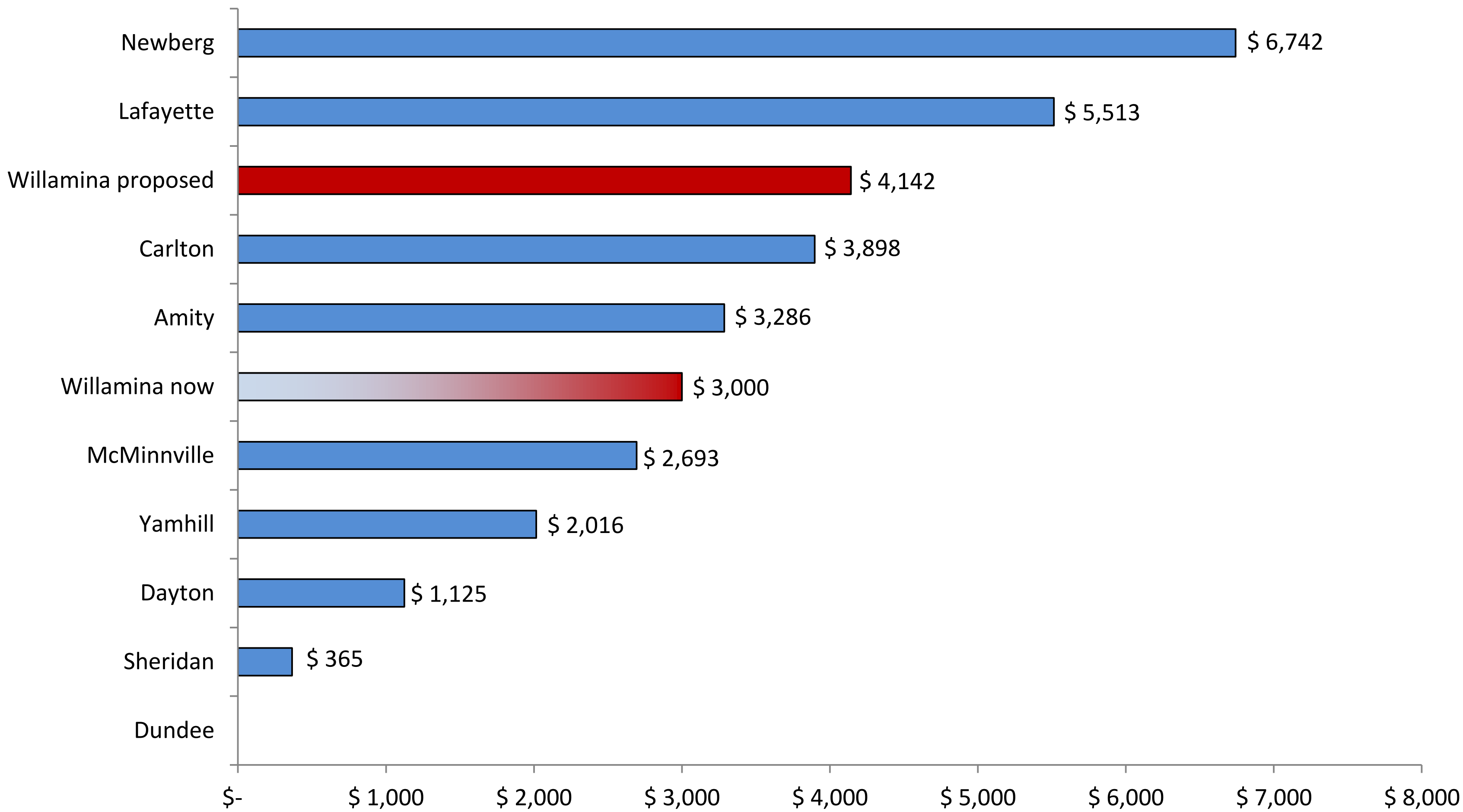
* No ITE PM peak hour trip generation for this code/category, the trip generation shown is ITE weekday average divided by ten.

Source: ITE, Trip Generation Manual, 10th edition
PM peak vehicle trips expressed in trip ends on a weekday, peak hour of adjacent street traffic, one hour, between 4:00 pm and 6:00 pm unless otherwise noted

Transportation SDCs in Neighboring Communities

Shown below in Figures 6 is a chart that compares the current and proposed transportation SDC for a single-family customer in Willamina to the same charge in similar communities in Yamhill County.

Figure 6 - Neighboring Communities' transportation SDCs (Detached Single Family) July, 2021



Parks SDCs

The 2003 Parks Master Plan

In 2003, the City completed a parks master plan that established parks and recreation needs assessments through the year 2023. That needs assessment relied on levels of service (LOS) to determine the adequacy/needs for current and future parks and trails infrastructure. To determine adequacy, park and recreation providers typically measure existing parklands and facilities and compare them against established standards, typically LOS Standards. LOS standards are measures of the amount of public recreation parklands and facilities being provided to meet that jurisdiction's basic needs and expectations. For example, the amount of parkland currently needed in a particular jurisdiction may be determined by comparing the ratio of existing developed park acres per 1,000 residents (by all providers within the jurisdiction) to the jurisdiction's desired level of parks relative to population. The gap between the two ratios is the currently needed park acreage. As the population grows, the objective is to provide enough additional acreage to maintain the jurisdiction's desired ratio of park acres to 1,000 residents. These ratios can provide insight and act as tools to determine the amount of parkland or trails needed to meet current and future recreation needs.

The City does not currently charge a parks SDC on new development. For this parks SDC creation, the project team reviewed recommended parks and trails LOS (by parks classification) for the City based on the 2013-2017 Statewide Comprehensive Outdoor Recreation Plan (SCORP). The SCORP recommended Oregon LOS guidelines were developed after reviewing the National Recreation and Parks Association (NRPA) guidelines and the results from the 2014 statewide average guidelines survey. The recommended Plan LOS by parks category are shown below in Table 27.

Table 27 – Parks and Recreation LOS Standards for Willamina

Parkland Type	Average Planning LOS Guidelines in Oregon (Acres /1,000 population)	NRPA Standard LOS Guidelines (Acres /1,000 population)	Recommended Oregon LOS Guidelines (Acres /1,000 population)
Pocket Parks	0.16	0.25 to 0.5	0.25 to 0.5
Urban Plaza Parks	0.18	None	0.1 to 0.2
Neighborhood Parks	1.27	1.0 to 2.0	1.0 to 2.0
Community Parks	2.76	5.0 to 8.0	2.0 to 6.0
Regional Parks	8.99	5.0 to 10.0	5.0 to 10.0
Nature Parks	2.74	None	2.0 to 6.0
Special Use Parks	0.38	None	None
Totals	-	6.25 to 10.5 developed	6.25 to 12.5

A "trail" includes multi-use, pedestrian, and soft surface trails that accommodate a variety of activities such as walking, running, biking, dog walking, rollerblading, skateboarding, and horseback riding. Multi-use trails are designed for use by pedestrians, bicyclists, skateboarders, wheelchairs, and other non-motorized vehicle users. Such trails may be located within parks or along existing streets and roadways as part of the citywide transportation system. For trails, the statewide average planning LOS Guidelines are at 0.62 miles per 1,000 residents and the SCORP recommended LOS for Oregon is anywhere between

0.5 to 1.5 miles of trails per resident. For this park SDC study, we established a minimum trails LOS of 0.5 miles per 1,000 residents with both the current population and a population projection for 2040.

Having established the LOS standards for park lands and trails, the next step is to compare the City's current parks and trails inventory to the standard and analyze the surpluses/deficiencies by parks category. That data is shown below in Table 28.

Table 28 - Existing Parks and Trails LOS Surplus/Deficiency

	Acres Available				Recommended LOS[1]				
Classification and Park Name	Gross	Net	Linear Miles	Current Level of Service[1]	Low	High	LOS Surplus or (Deficiency)	% Capacity Remaining	
Pocket Parks:									
Triangle Park	0.03	0.03							
Garden Spot Park	0.30	0.30							
	0.33	0.33		0.136	0.250	0.500	(0.114)	**Zero**	✓
Neighborhood Parks:									
Tina Miller Memorial Park	0.35	0.35		0.144	1.000	2.000	(0.856)	**Zero**	✓
Community Parks:									
Oaken Hills Memorial Park	4.25	4.25							
Lamson Park	10.90	4.50							
	15.15	8.75		3.588	2.000	6.000	1.588	**79%**	✓
Greenways/Natural Areas									
Hampton Pond at Huddleston Park	13.20	6.60							
	13.20	6.60		2.706	2.000	6.000	0.706	**35%**	✓
Subtotal Parks	29.03	16.03		6.57	5.25	14.50	1.32	**25%**	
Bike and Pedestrian Crossings			-	0.000	0.500	1.500	(0.500)	**Zero**	✓

Notes:

[1] Oregon Parks and Recreation Department 2013-18 Statewide Comprehensive Outdoor Recreation Plan (SCORP); 2020 estimated population; level of service expressed in units per 1,000 residents 2,439

As the data in Table 28 shows, currently, the City is "park deficient" in all park categories except community parks and greenways/natural areas.. This will impact the calculation of the parks SDC reimbursement fee in that the current LOS implies 75% of the City's current parks and trails capacity is being absorbed by the City's current population.

Existing and Projected Future Demand for Parks and Trails

Growth should be measured in units that most directly reflect the source of demand. In the case of parks, the most applicable units of growth are population and, where appropriate, employees (or new jobs). ORS 223.29 to 223.314 allow local governments to impose parks and recreation SDCs on non-residential development as well as on residential development. The Willamina program imposes parks and recreation SDCs on new residential development and does not impose SDCs on non-residential development.

However, the units in which demand is expressed may not be the same as the units in which SDC rates are charged. Many SDCs, for example, are charged on the basis of new dwelling units. Therefore, conversion is often necessary from units of demand to units of payment. For example, using an average number of residents per household, the number of new residents can be converted to the number of new dwelling units.

Parks and recreation facilities benefit City residents, businesses, non-resident employees, and visitors. The methodology used to update the City's parks and recreation SDCs establishes the required connection between the demands of growth and the SDC by identifying specific types of park and recreation facilities and analyzing the proportionate need of residents and employees for each type of facility. The SDCs to be paid by a development meet statutory requirements because they are based on the nature of the development and the extent of the impact of that development on the types of park and recreation facilities for which they are charged.

The parks and recreation SDCs are calculated based on the specific impact a development is expected to have on the City's population. For facilities that benefit residents, an SDC may be charged for residential development.

Table 29 contains existing and projected population, housing units, and employment for the City. The data in this table establishes the units of demand and the units of payment for the reimbursement and improvement parks SDCs.

Table 29 - Existing and Projected Population, Housing Units, and Employment

		2019 Census Est.	2020 PSU Est.	2040 Projected	Analysis of Growth Units	Analysis of Growth CAGR*
1	Population	2,439		2,996	557	0.98%
	Single family residential	2,188		2,688	500	
	Multi-family residential	251		308	57	
2	Total Housing Units	971		1,193	222	
	Single family residential	856		1,051	195	
	Multi-family residential	115		141	26	
	Number of persons per Housing Unit	2.51				
	Single family residential	2.56				
	Multi-family residential	2.18				
3	Employment	1,054		1,295	241	1.03%
	Employment to population ratio	43.21%				

Data Sources and Notes:

1 Current population source: U.S. Census Bureau, 2020 American Community Survey 5-year summary, Table DP05; 2040 projection per Population Research Center, Portland State University, June 30, 2017

2 Current Housing units source: U.S. Census Bureau, 2020 American Community Survey 5-year summary, Table DP04, Table B25024, B25033; 2040 projection based on 2019 number of persons per occupied housing unit

3 Current employment source: U.S. Census Bureau, 2020 American Community Survey 5-year summary, Table DP03; 2040 projection based on 2019 employment to population ratio

* CAGR - Compound Annual Growth Rate

Reimbursement Fee Calculations

As we discussed above, the City is park deficient in all park categories except community parks and greenways/natural areas. This has adversely impacted the calculation of the parks SDC reimbursement fee in that the current LOS implies 75% of the City's current parks and trails capacity is being absorbed by the City's current population. That mean only 25% of the system's-built capacity is available to serve growth. The calculated parks reimbursement fee calculations are shown below in Table 30.

Table 30 - Calculation of the Parks Reimbursement Fee

		Book Value		Capacity Remaining to Serve Growth		Residential		Non-Residential
Utility Plant-in-Service:[1]								
1400 Land	$	60,308	$	15,195	$	15,195	$	-
1420 Land Improvements		218,906		55,155		55,155		-
1430 Buildings		80,462		20,273		20,273		-
1440 Equipment		6,263		1,578		1,578		-
1460 Vehicles		7,547		1,902		1,902		-
Total Utility Plant-in-Service	$	373,486	$	94,103	$	94,103	$	-
Eliminating entries:								
Principal outstanding on bonds, notes, and loans payable				-		-		-
Grants and contributions				-		-		-
Total eliminating entries				-		-		-
Net basis in utility plant-in-service available to serve future customers				94,103		94,103		-
Future Demand Units:								
Growth in population (People)						557		
Growth in occupied housing units:								
Single family residential						195		
Multi-family residential						26		
Growth in employment (Employees)								241
Unit reimbursement fee Parks SDCs:								
Per person						$169		
Per occupied housing unit:								
Single family residential						$432		
Multi-family residential (per unit)						$369		
Per employee								$0

[1] Source: Willamina Accounting Summary Report - Capitalized Assets as of June 30, 2020

Parks CIP

The 2021 Parks and Open Space CIP lays out a very specific and prioritized capital improvement plan for the City through 2040. The CIP identifies future costs for new parks and trails, and the future costs for improvements to the City's existing parks inventory. The total CIP from the Plan is shown below in Table 31.

Table 31 - 2021 Parks CIP

ID#	Item Description	June, 2021 Est.	Pocket Parks	Neighborhood Parks	Community Parks	Greenways & Natural Areas	Bike, Ped, Trails	Other
			Park Category					
Park Improvements								
1	Oaken Hills	$ 332,713	$ -	$ -	$ 332,713	$ -	$ -	$ -
2	Garden Spot	6,100	6,100	-	-	-	-	-
3	Lamson	165,600	-	-	165,600	-	-	-
4	Triangle Park	12,500	12,500	-	-	-	-	-
5	City Hall/Tina Miller	10,800	-	10,800	-	-	-	-
6	Hampton Park - Huddleston Pond	2,800,000	-	-	-	2,800,000	-	-
7	New Splash Pad Park Northwest Side of Oaken Hills	608,716	-	-	608,716	-	-	-
8	New Black Water Dog Park	2,108,300	-	-	2,108,300	-	-	-
9	New Pocket Park between 1st Street and E Street	238,872	238,872	-	-	-	-	-
10	Universal Pathway	-	-	-	-	-	-	-
	Total Priority Improvements	$ 6,283,601	$ 257,472	$ 10,800	$ 3,215,329	$ 2,800,000	$ -	$ -

SDC Eligibility of Parks CIP

For purposes of this SDC study, each of the City's park facilities falls into one of the following five categories:

- Pocket parks
- Neighborhood parks
- Community parks
- Greenways/Natural areas
- Bike and pedestrian pathways

Table 32 compares the current inventory of facilities in each category with that category's adopted level of service. That comparison leads to a determination of surplus or deficiency for each category. Projects are eligible for improvement fee funding only to the extent that the projects will benefit future users. Therefore, only the categories with no deficiency (community parks) are eligible for improvement fee funding. The eligibility percentages of the remaining parks categories are reduced to reflect the level of deficiency.

Table 32 - Calculation of Parks CIP SDC Eligibility

Classification	LOS (units/1,000 population) [1, 2]	Inventory Units	Parks Inventory at: Current [2]	Parks Inventory at: Planned Additions [3]	Parks Inventory at: Planned 2040	Level of Service Analysis: Current need	Level of Service Analysis: Surplus / (Deficiency)	Parks SDC Eligibility: Growth Need	Parks SDC Eligibility: Growth %
Pocket Parks	0.25	Acres	0.33	0.42	0.75	0.61	(0.28)	0.14	33.31%
Neighborhood Parks	1.00	Acres	0.35	2.65	3.00	2.44	(2.09)	0.56	21.05%
Community Parks	2.00	Acres	8.75	-	5.99	4.88	3.87	1.11	12.73%
Greenways/Natural Areas	2.00	Acres	6.60	-	5.99	4.88	1.72	1.11	16.88%
Subtotal Parks	5.00		16.03	3.06	15.73	12.80	3.23	2.92	
Bike and Pedestrian Pathways	0.50	Miles	-	1.50	1.50	1.22	(1.22)	0.28	18.59%

[1] PSU service area population estimate 2020 — 2,439

Level of Service expressed in units per 1,000 residents — 2.44

Estimated 2040 service population per PSU — 2,996

Level of Service expressed in units per 1,000 residents — 3.00

[2] 2014 Parks and Recreation Needs Assessment; page 10

[3] Planned additions to attain 2013-17 SCORP level of service

Improvement Fee Calculations

The improvement fee is the cost of capacity-increasing capital projects per unit of growth that those projects will serve. The unit of growth, the number of new residents, is the basis of the fee. In reality, the capacity added by many projects serves a dual purpose of both meeting existing demand and serving future growth. To compute a compliant SDC rate, growth-related costs must be isolated, and costs related to current demand must be excluded. We have used the “capacity approach” to allocate costs to the improvement fee basis. Under this approach, the cost of a given project is allocated to growth in proportion to the growth-related capacity that projects of a similar type will create. The capacity analysis of the parks CIP is shown numerically in Table 32. Table 33 lays out the capacity approach to deriving the parks improvement fee.

Table 33 - Calculation of the Parks Improvement Fee

			<---------- Funding Sources for Parks CIP ---------->				
Classification	Total MP CIP	SDC Eligible %	Existing Users	Total SDC	Residential	Non-Residential	
Pocket Parks	257,472	33.31%	171,707	85,765	85,765	-	
Neighborhood Parks	10,800	21.05%	8,527	2,273	2,273	-	
Community Parks	3,215,329	12.73%	2,806,026	409,303	409,303	-	
Greenways/Natural Areas	2,800,000	16.88%	2,327,457	472,543	472,543	-	
Trails	-	18.59%	-	-	-	-	
Total	$ 6,283,601	15.44%	$ 5,313,717	$ 969,884	$ 969,884	$ -	

	Total SDC	Residential	Non-Residential
Future parks master plan capacity-expanding costs	$ 969,884	$ 969,884	$ -
Adjustments to improvement fee basis:			
Parks improvement fee SDC fund balance	-	-	-
Adjusted future parks master plan capacity-expanding costs	$ 969,884	$ 969,884	$ -
Future Demand Units:			
Growth in population (People)		557	
Growth in occupied housing units:			
Single family residential		195	
Multi-family residential		26	
Growth in employment (Employees)			
Unit improvement fee Parks SDCs:			
Per person		$ 1,741	
Per occupied housing unit:			
Single family residential		$ 4,450	
Multi-family residential (per unit)		$ 3,800	
Per employee			

Parks SDC Model Summary

The 2021 parks SDC update was done in accordance with Willamina Municipal Code Chapter 33, and with the benefit of the adopted parks CIP. We recommend the City update the SDC charge reflect the current capital improvement program. The complete proposed schedule of parks SDCs is shown below in Table 34.

Table 34 - Proposed Parks SDCs

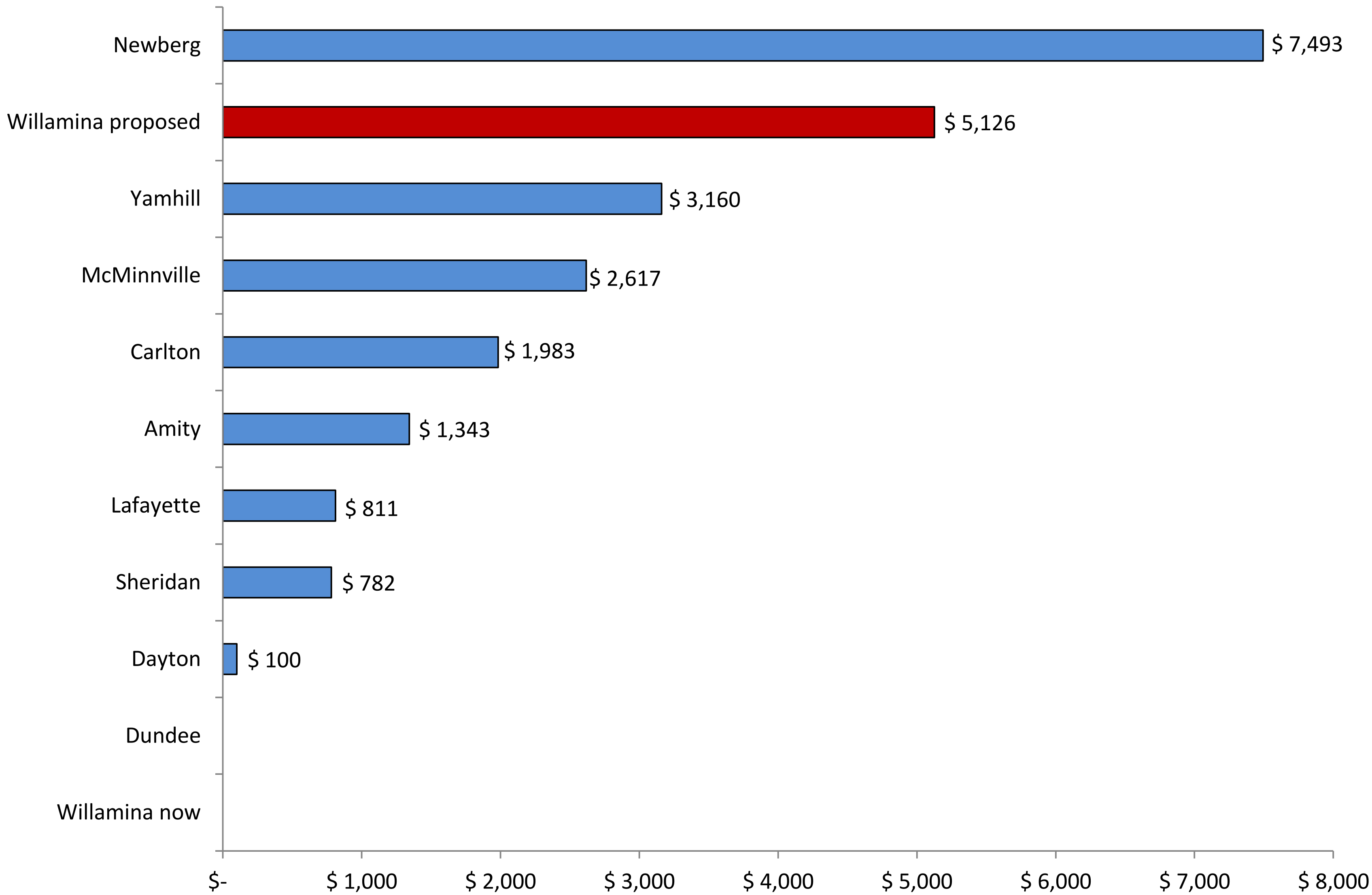
Customer Classification	Number of Dwelling Units	Proposed Schedule of Parks SDCs: Reimbursement	Improvement	Administration	Total
Detached single family	1	$ 432	$ 4,450	$ 244	$ 5,126
Mobil/manufactured home	1	432	4,450	244	5,126
Multifamily - $/dwelling unit	1	369	3,800	208	4,377
Duplex	2	738	7,600	417	8,754
Tri-plex	3	1,106	11,400	625	13,132
Four-plex	4	1,475	15,200	834	17,509
Apartment complex	*	*	*		*
Condominium complex	*	*	*		*
Retirement/Assisted Living cc	*	*	*		*
Business - $/FTE Employee		$ -	$ -	$ -	$ -

* - multiply the number of dwelling units by the corresponding detached multi-family per dwelling unit fee component

Parks SDCs in Neighboring Communities

Shown below in Figures 7 is a chart that compares the current and proposed Parks SDC for a single-family customer in Willamina to the same charge in similar communities in Yamhill County.

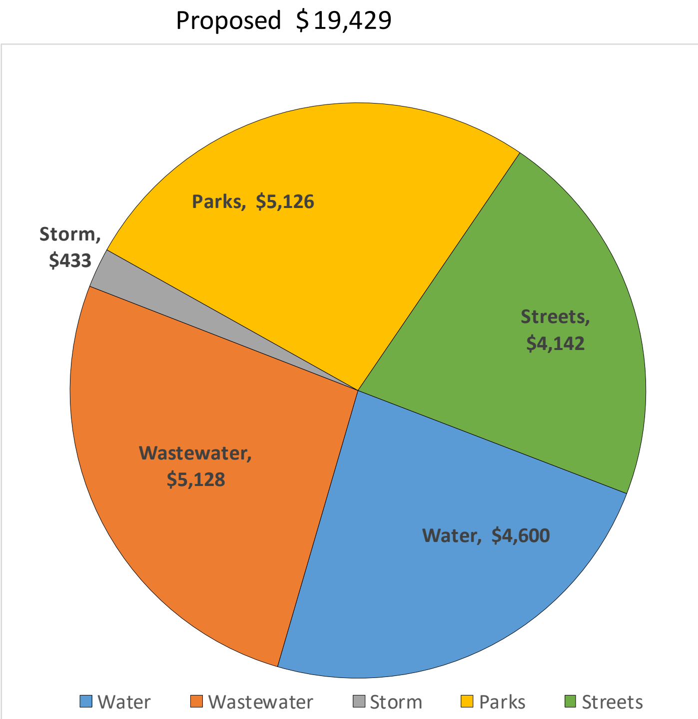
Figure 7 - Neighboring Communities' Parks SDCs (Detached Single Family) July, 2021

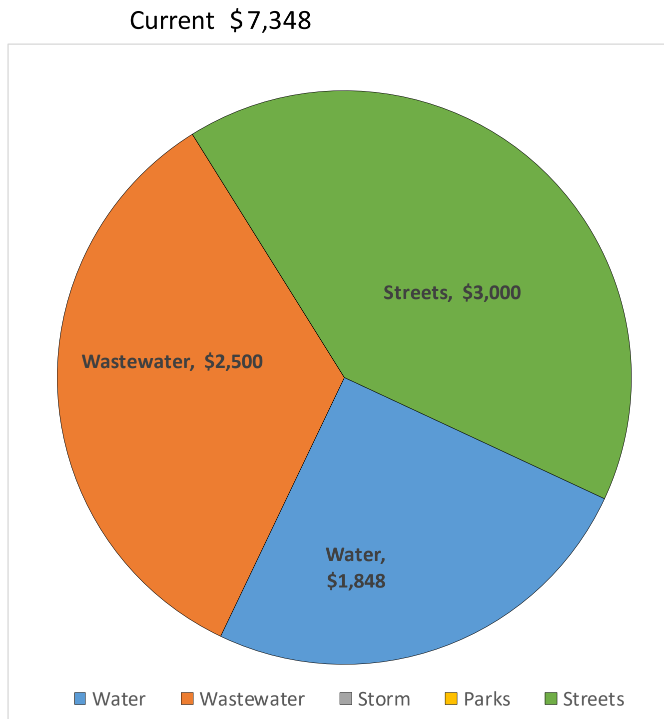


Conclusions and Recommendations

The 2021 SDC update was done in accordance with WMC Chapter 33, and with the benefit of adopted plans and plan updates for municipal services. A graphic side by side comparison of the proposed and current schedule of SDCs is shown blow in figure 8.

Figure 8 - Proposed and Current Schedule of SDCs





Finally, we recommend the City adopt a policy of reviewing its suite of SDCs every five years. Between the review dates, the city should apply a cost adjustment index to the SDC rates annually to reflect changes in costs for land and construction. This policy should be codified in the Willamina Municipal Code (WMC §33.31). We suggest the City consider the following language for that section of the WMC:

1. Notwithstanding any other provision, the dollar amounts of the SDC set forth in the SDC methodology report shall on January 1st of each year be adjusted to account for changes in the costs of acquiring and constructing facilities. The adjustment factor shall be based on:

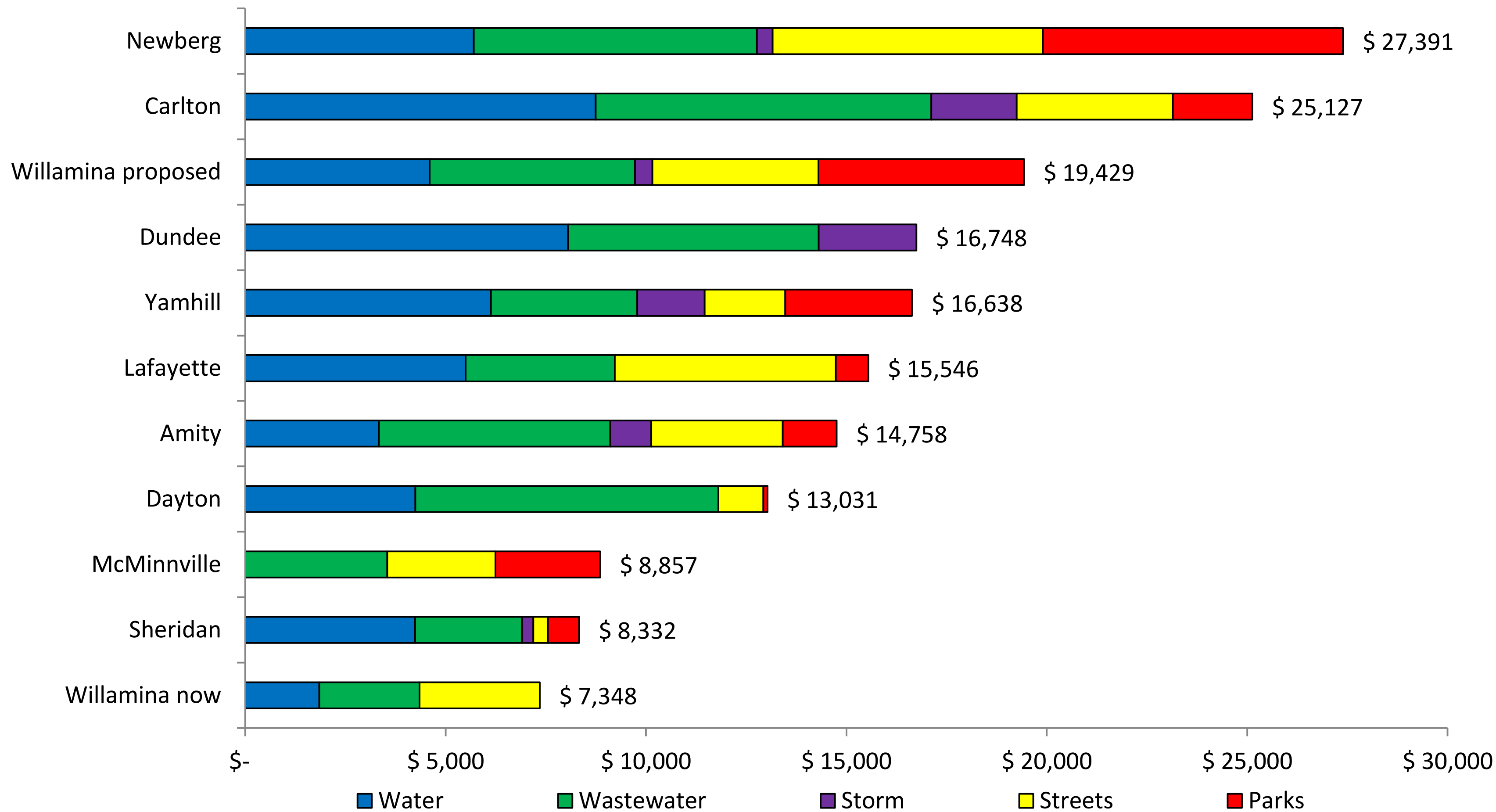
   a. The change in construction costs according to the Engineering News Record (ENR) Construction Cost Index (CCI) (20 City Average).

   b. The system development charges adjustment factor shall be used to adjust the system development charges, unless they are otherwise adjusted by the city based on a change in the costs of materials, labor, or real property; or adoption of an updated methodology.

Neighboring Communities' SDCs

Shown below in Figure 9 is a chart that compares the current SDCs for a single-family customer in Willamina to the same charges in similar communities in Yamhill County and Oregon.

Figure 9 - Neighboring Communities' SDCs (Detached Single Family) July, 2021



Appendix A – PSU Coordinated Population Forecast for Willamina

Figure 1. Yamhill County and Sub-Areas—Historical and Forecast Populations, and Average Annual Growth Rates (AAGR)

Area	Population (2000)	Population (2010)	AAGR (2000-2010)	Population (2020)	Population (2045)	Population (2070)	AAGR (2010-2020)	AAGR (2020-2045)	AAGR (2045-2070)
Yamhill County	**84,992**	**99,193**	*1.6%*	**105,911**	**134,702**	**167,672**	*0.6%*	*1.0%*	*0.9%*
Amity	1,481	1,623	*0.9%*	1,733	2,083	2,468	*0.6%*	*0.7%*	*0.7%*
Carlton	1,514	2,007	*2.9%*	2,329	3,313	4,577	*1.5%*	*1.4%*	*1.3%*
Dayton	2,244	2,708	*1.9%*	2,778	3,488	4,325	*0.2%*	*0.9%*	*0.9%*
Dundee	2,672	3,162	*1.7%*	3,139	4,195	5,477	*-0.1%*	*1.2%*	*1.1%*
Gaston (Yamhill)	110	154	*3.4%*	154	189	227	*0.0%*	*0.8%*	*0.7%*
Lafayette	2,597	3,753	*3.8%*	4,146	6,554	9,721	*1.0%*	*1.8%*	*1.6%*
McMinnville	26,709	32,527	*2.0%*	34,564	44,539	56,047	*0.6%*	*1.0%*	*0.9%*
Newberg	18,558	22,572	*2.0%*	24,877	34,929	47,258	*1.0%*	*1.4%*	*1.2%*
Sheridan	5,581	6,210	*1.1%*	6,102	7,232	8,389	*-0.2%*	*0.7%*	*0.6%*
Willamina (Yamhill)	1,128	1,180	*0.5%*	1,247	1,425	1,590	*0.5%*	*0.5%*	*0.4%*
Yamhill City	805	1,024	*2.4%*	1,090	1,430	1,823	*0.6%*	*1.1%*	*1.0%*
Outside UGBs	21,593	22,273	*0.3%*	23,752	25,326	25,771	*0.6%*	*0.3%*	*0.1%*

Figure 1 Sources: U.S. Census Bureau, 2000 and 2010 Censuses; Forecast by Population Research Center (PRC). Note: For simplicity each UGB is referred to by its primary city's name.

Table 2. Historical and forecasted population and AAGR in Polk County and its sub-areas.

	Historical			Estimates		Forecast			
	2000	2010	AAGR (2000-2010)	2020	AAGR (2010-2020)	2045	2070	AAGR (2020-2045)	AAGR (2045-2070)
Polk County	62,380	75,403	1.9%	83,805	1.1%	128,783	189,106	1.7%	1.5%
Outside UGBs	13,807	14,055	0.2%	15,057	0.7%	20,076	25,926	1.2%	1.0%
Larger Sub-Areas									
Dallas	13,260	15,432	1.5%	17,201	1.1%	27,568	43,635	1.9%	1.8%
Independence	6,353	8,867	3.3%	9,851	1.1%	18,636	30,695	2.6%	2.0%
Monmouth	7,210	8,474	1.6%	10,022	1.7%	16,527	24,034	2.0%	1.5%
Salem (part)*	20,013	26,716	2.9%	29,768	1.1%	43,222	60,836	1.5%	1.4%
Smaller Sub-Areas									
Falls City	999	971	-0.3%	1,000	0.3%	1,429	1,983	1.4%	1.3%
Willamina (part)*	739	888	1.8%	905	0.2%	1,324	1,998	1.5%	1.6%

Sources: U.S. Census Bureau; PRC Estimates; Forecast by Population Research Center (PRC).

	Population Estimates		
	2020	2045	CAGR
Willamina (Yamhill)	1,247	1,425	0.54%
Willamina (Polk)	905	1,324	1.53%
Willamina total	2,152	2,749	0.98%

Appendix B – Historical Price Movements in the Engineering News Record Construction Cost Index

HOW ENR BUILDS THE INDEX: 200 hours of common labor at the 20-city average of common labor rates, plus 25 cwt of standard structural steel shapes at the mill price prior to 1996 and the fabricated 20-city price from 1996, plus 1.128 tons of portland cement at the 20-city price, plus 1,088 board ft of 2 x 4 lumber at the 20-city price.

ENR'S CONSTRUCTION COST INDEX HISTORY (1990-2020)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG.	Annual Percent Change
2021	11628	11699	11750	11849	11990	12112	12237	12464						
2020	11392	11396	11397	11412	11418	11436	11439	11455	11499	11539	11579	11626	11466	1.46%
2019	11206	11213	11228	11228	11230	11268	11293	11311	11539	11326	11381	11381	11300	2.16%
2018	10878	10889	10959	10971	11013	11069	11116	11124	11170	11183	11184	11186	11062	3.04%
2017	10531	10559	10667	10678	10692	10703	10789	10826	10823	10817	10870	10873	10736	3.84%
2016	10132	10181	10242	10279	10315	10337	10379	10385	10403	10434	10442	10530	10338	3.02%
2015	9972	9962	9972	9992	9975	10039	10037	10039	10065	10128	10092	10152	10035	2.33%
2014	9664	9681	9702	9750	9796	9800	9835	9846	9870	9886	9912	9936	9807	2.72%
2013	9437	9453	9456	9484	9516	9542	9552	9545	9552	9689	9666	9668	9547	2.56%
2012	9176	9198	9268	9273	9290	9291	9324	9351	9341	9376	9398	9412	9308	2.63%
2011	8938	8998	9011	9027	9035	9053	9080	9088	9116	9147	9173	9172	9070	3.08%
2010	8660	8672	8671	8677	8761	8805	8844	8837	8836	8921	8951	8952	8799	2.67%
2009	8549	8533	8534	8528	8574	8578	8566	8564	8586	8596	8592	8641	8570	3.13%
2008	8090	8094	8109	8112	8141	8185	8293	8362	8557	8623	8602	8551	8310	4.30%
2007	7880	7880	7856	7865	7942	7939	7959	8007	8050	8045	8092	8089	7967	2.78%
2006	7660	7689	7692	7695	7691	7700	7721	7722	7763	7883	7911	7888	7751	4.10%
2005	7297	7298	7309	7355	7398	7415	7422	7479	7540	7563	7630	7647	7446	4.65%
2004	6825	6862	6957	7017	7065	7109	7126	7188	7298	7314	7312	7308	7115	6.28%
2003	6581	6640	6627	6635	6642	6694	6695	6733	6741	6771	6794	6782	6695	2.39%
2002	6462	6462	6502	6480	6512	6532	6605	6592	6589	6579	6578	6563	6538	3.09%
2001	6281	6272	6279	6286	6288	6318	6404	6389	6391	6397	6410	6390	6342	1.94%
2000	6130	6160	6202	6201	6233	6238	6225	6233	6224	6259	6266	6283	6221	2.67%
1999	6000	5992	5986	6008	6006	6039	6076	6091	6128	6134	6127	6127	6060	2.35%
1998	5852	5874	5875	5883	5881	5895	5921	5929	5963	5986	5995	5991	5920	1.64%
1997	5765	5769	5759	5799	5837	5860	5863	5854	5851	5848	5838	5858	5825	3.61%
1996	5523	5532	5537	5550	5572	5597	5617	5652	5683	5719	5740	5744	5622	2.76%
1995	5443	5444	5435	5432	5433	5432	5484	5506	5491	5511	5519	5524	5471	1.18%
1994	5336	5371	5381	5405	5405	5408	5409	5424	5437	5437	5439	5439	5408	3.78%
1993	5071	5070	5106	5167	5262	5260	5252	5230	5255	5264	5278	5310	5210	4.53%
1992	4888	4884	4927	4946	4965	4973	4992	5032	5042	5052	5058	5059	4985	3.10%
1991	4777	4773	4772	4766	4801	4818	4854	4892	4891	4892	4896	4889	4835	2.18%
1990	4680	4685	4691	4693	4707	4732	4734	4752	4774	4771	4787	4777	4732	

Appendix K

Detailed Project Summary

Project Title:	Location:
Willamina Lift Stations Replacement Cost	**Willamina Oregon, 97396**
Project Identifier: **213018** Need for Project: The current lift stations are below capacity and require new lift stations. Objective: This project provides two (2) new lift stations (up to 2,000 gpm) to meet future capacity as well as the electrical, mechanical, and force main to the lagoons to account for the current deficit of capacity. Design Considerations: Design considerations include providing two lift stations to meet current flows with the increased firm capacity to prevent SSO.	Costs provided reflect two lift stations fully built with force main and boring included.

General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2024 Dollars)
Goods and Services					
CMU 15 x 25 Building With Wood Truss Full Design	2	EACH	$ 384,000	$ 768,000	
Pumps	6	EACH	$ 115,000	$ 690,000	
Electrical	2	EACH	$ 100,000	$ 200,000	
Mechanical Piping, Valves, and Misc On Site	2	EACH	$ 120,000	$ 240,000	
VFD's	2	EACH	$ 60,000	$ 120,000	
Additional Manholes 48" Precast Sanitary Sewer Manhole	2	EACH	$ 12,000	$ 24,000	
Bypass Pumping	50	DAY	$ 1,000	$ 50,000	
Generator	2	EACH	$ 70,000	$ 140,000	
Flow Meter	4	EACH	$ 10,000	$ 40,000	
Site Improvement (Fence, Gate, Signage, and etc.)	2	EACH	$ 100,000	$ 200,000	
HVAC Complete	2	EACH	$ 40,000	$ 80,000	
12" Diameter Force Main Sewer Pipe Fully Installed (PVC)	2,000	LF	$ 350	$ 700,000	
Boring for Creek and Railway	300	LF	$ 1,000	$ 300,000	
				Construction Subtotal	***$ 3,552,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 360,000	
Bonding			2.5%	$ 90,000	
Contractor Overhead and Profit			10%	$ 360,000	
Prevailing Wages			2.5%	$ 90,000	
AIS / BABA (if required by funding-IIJA/BIL, SRF, etc)			5%	$ 180,000	
Contingency			30%	$ 1,070,000	
				Total Construction Subtotal	***$ 5,702,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			13%	$ 750,000	
Engineering - Construction Contract Administration			4%	$ 230,000	
Engineering -- Inspection			8%	$ 460,000	
Permitting			LS	$ 10,000	
Geotechnical Investigation			LS	$ 20,000	
Surveying			LS	$ 30,000	
Environmental			LS	$ 10,000	
Legal, Administrative, and Funding			2.5%	$ 142,550	
				Total Project Costs (rounded)	**$ 7,355,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

Project Title:	Location:
Upsize Gravity Mains	**Willamina Oregon, 97396**

Project Identifier:

213018

Need for Project:
The collection system is undercapacity and upsizing is required

Objective:
Up size the collection system to prevent SSO and as a part of this, the inclusion of a diversion will help mitigate the overall amount of pipe required to be upsized.

Design Considerations:
Design considerations include upsizing the collection system to achieve unconstrained pipes and prevent SSO and back flooding.

General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2024 Dollars)
Goods and Services					
8" Diameter Gravity Sewer Pipe Fully Installed (PVC)	394	LF	$ 330	$ 131,000	
12" Diameter Gravity Sewer Pipe Fully Installed (PVC)	1,199	LF	$ 390	$ 468,000	
15" Diameter Gravity Sewer Pipe Fully Installed (PVC)	1,339	LF	$ 410	$ 550,000	
18" Diameter Gravity Sewer Pipe Fully Installed (PVC)	377	LF	$ 450	$ 170,000	
Installing New Lateral Lines	74	EACH	$ 6,000	$ 444,000	
48-inch Standard Precast Manhole	29	EACH	$ 12,000	$ 348,000	
				Construction Subtotal	***$ 2,111,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 220,000	
Bonding			2.5%	$ 60,000	
Contractor Overhead and Profit			10%	$ 220,000	
Prevailing Wages			2.5%	$ 60,000	
AIS / BABA (if required by funding-IIJA/BIL, SRF, etc)			5%	$ 110,000	
Contingency			30%	$ 640,000	
				Total Construction Subtotal	***$ 3,421,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			13%	$ 450,000	
Engineering - Construction Contract Administration			4%	$ 140,000	
Engineering -- Inspection			8%	$ 280,000	
Permitting			LS	$ 10,000	
Geotechnical Investigation			LS	$ 20,000	
Surveying			LS	$ 30,000	
Environmental			LS	$ 10,000	
Legal, Administrative, and Funding			2.5%	$ 85,525	
				Total Project Costs (rounded)	**$ 4,447,000**

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Project Title:	Location:
Upsize Gravity Trunklines	**Willamina Oregon, 97396**

Project Identifier:

213018

Need for Project:

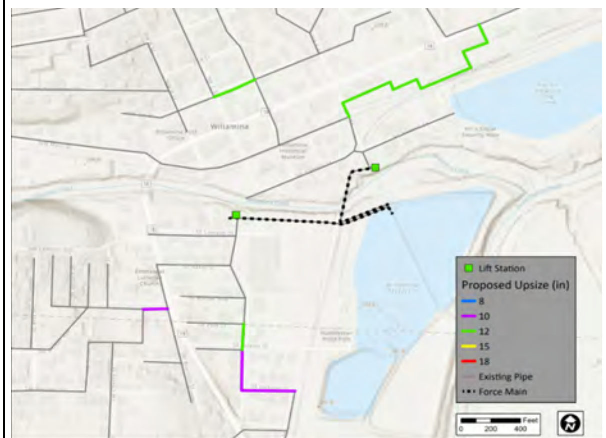
The collection system is undercapacity and upsizing is required.

Objective:

Up size the collection system to prevent restriction in the system.

Design Considerations:

Design considerations include upsizing the collection system to achieve unconstrained pipes and prevent SSO and back flooding.



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2024 Dollars)
Goods and Services					
10" Diameter Gravity Sewer Pipe Fully Installed (PVC)	1,183	LF	$ 350	$ 415,000	
12" Diameter Gravity Sewer Pipe Fully Installed (PVC)	1,663	LF	$ 390	$ 649,000	
Installing New Lateral Lines	17	EACH	$ 6,000	$ 102,000	
48-Inch Standard Precast Manhole	8	EACH	$ 12,000	$ 96,000	
				Construction Subtotal	***$ 1,262,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 130,000	
Bonding			2.5%	$ 40,000	
Contractor Overhead and Profit			10%	$ 130,000	
Prevailing Wages			2.5%	$ 40,000	
AIS / BABA (if required by funding-IIJA/BIL, SRF, etc)			5%	$ 70,000	
Contingency			30%	$ 380,000	
				Total Construction Subtotal	***$ 2,052,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			13%	$ 270,000	
Engineering - Construction Contract Administration			4%	$ 90,000	
Engineering -- Inspection			8%	$ 170,000	
Permitting			LS	$ 10,000	
Geotechnical Investigation			LS	$ 20,000	
Surveying			LS	$ 30,000	
Environmental			LS	$ 10,000	
Legal, Administrative, and Funding			2.5%	$ 51,300	
				Total Project Costs (rounded)	**$ 2,704,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

Project Title:	Location:
Lagoon #5	**Willamina Oregon, 97396**

Project Identifier:

213018

Need for Project:
The lagoon storage is insufficient.

Objective:
This project provides a new lagoon and transfer pump stgation

Design Considerations:
Design considerations include providing storage to meet requirements and the pump station to meet peak flows with firm capacity.

General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2024 Dollars)
Goods and Services					
Piping to New Storage Lagoon (10")	200	LF	$ 280	$ 56,000	
Site Excavation and Grading	30,342	CY	$ 20	$ 607,000	
New Lagoon HPDE Liner	122,645	SF	$ 2	$ 283,000	
Clearing and Grubbing	1	LS	$ 10,000	$ 10,000	
Gravel Road	611	SY	$ 12	$ 8,000	
Mechanical Materials and Installation	1	%	10%	$ 6,000	
Pond #3 to Pond #4 & #5 Transfer Pump Station	1	EACH	$ 250,000	$ 250,000	
Mechanical Materials and Installation	1	%	40%	$ 100,000	
Electrical Materials and Installation	1	%	15%	$ 38,000	
				Construction Subtotal	***$ 1,358,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 140,000	
Bonding			2.5%	$ 40,000	
Contractor Overhead and Profit			10%	$ 140,000	
Prevailing Wages			2.5%	$ 40,000	
AIS / BABA (if required by funding-IIJA/BIL, SRF, etc)			5%	$ 70,000	
Contingency			30%	$ 410,000	
				Total Construction Subtotal	***$ 2,198,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			13%	$ 290,000	
Engineering - Construction Contract Administration			4%	$ 90,000	
Engineering -- Inspection			8%	$ 180,000	
Permitting			LS	$ 10,000	
Geotechnical Investigation			LS	$ 20,000	
Surveying			LS	$ 30,000	
Environmental			LS	$ 10,000	
Legal, Administrative, and Funding			2.5%	$ 54,950	
				Total Project Costs (rounded)	**$ 2,883,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

Project Title:	Location:
Aeration System and Blowers	**Willamina Oregon, 97396**

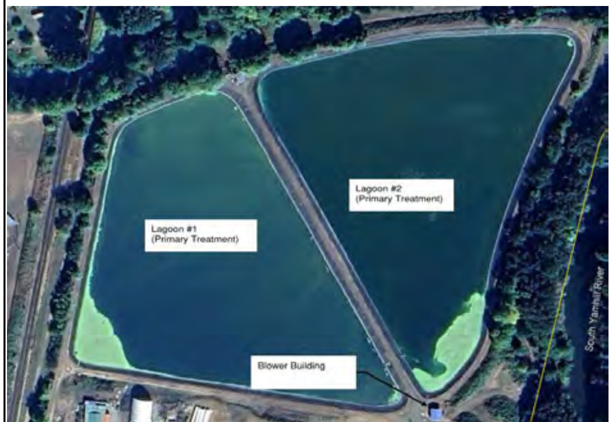
Project Identifier:

213018

Need for Project:
The aeration system is at the end of its useful life and has inadequate capacity.

Objective:
This project provides a new aeration system for the two aerated lagoons and blowers.

Design Considerations:
Design considerations include providing airflow for adequate treatment.



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2024 Dollars)
Goods and Services					
New ADS Aeration System	1	LS	$ 765,000	$ 765,000	
Pond Dredging/Solids Removal	48,400	CY	$ 11	$ 533,000	
Generator	1	EACH	$ 75,000	$ 75,000	
Mechanical Materials and Installation	1	%	40%	$ 306,000	
Electrical Materials and Installation	1	%	15%	$ 115,000	
				Construction Subtotal	***$ 1,794,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 180,000	
Bonding			2.5%	$ 50,000	
Contractor Overhead and Profit			10%	$ 180,000	
Prevailing Wages			2.5%	$ 50,000	
AIS / BABA (if required by funding-IIJA/BIL, SRF, etc)			5%	$ 90,000	
Contingency			30%	$ 540,000	
				Total Construction Subtotal	***$ 2,884,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			13%	$ 380,000	
Engineering - Construction Contract Administration			4%	$ 120,000	
Engineering -- Inspection			8%	$ 240,000	
Permitting			LS	$ 10,000	
Geotechnical Investigation			LS	$ 20,000	
Surveying			LS	$ 30,000	
Environmental			LS	$ 10,000	
Legal, Administrative, and Funding			2.5%	$ 72,100	
				Total Project Costs (rounded)	**$ 3,767,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

Project Title:	Location:
Chlorine Contact Chamber	**Willamina Oregon, 97396**

Project Identifier:

213018

Need for Project:

The Chlorine Contact Basin does not meet required contact times, and is located in the way of future modifications to Lagoon #3 and #4.

Objective:

This project provides a new chlorine contact basin and disinfection system.

Design Considerations:

Design considerations include sizing the basin and disinfection system to provide disinfection at required contact times.

General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2024 Dollars)
Goods and Services					
Excavation	259	CY	$ 20	$ 6,000	
Pump Station	1	EACH	$ 180,000	$ 180,000	
Concrete Chlorine Contact Basin	80	CY	$ 1,300	$ 104,000	
New Onsite Hypochlorite Generation	1	LS	$ 252,000	$ 252,000	
Electrical Materials and Installation	1	%	15%	$ 38,000	
SCADA/Electrical/Controls	1	%	15%	$ 38,000	
Mechanical Materials and Installation	1	%	15%	$ 38,000	
				Construction Subtotal	***$ 656,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 70,000	
Bonding			2.5%	$ 20,000	
Contractor Overhead and Profit			10%	$ 70,000	
Prevailing Wages			2.5%	$ 20,000	
AIS / BABA (if required by funding-IIJA/BIL, SRF, etc)			5%	$ 40,000	
Contingency			30%	$ 200,000	
				Total Construction Subtotal	***$ 1,076,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			13%	$ 140,000	
Engineering - Construction Contract Administration			4%	$ 50,000	
Engineering -- Inspection			8%	$ 90,000	
Permitting			LS	$ 10,000	
Geotechnical Investigation			LS	$ 20,000	
Surveying			LS	$ 30,000	
Environmental			LS	$ 10,000	
Legal, Administrative, and Funding			2.5%	$ 26,900	
				Total Project Costs (rounded)	**$ 1,453,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

Project Title:	Location:
Discharge Piping to Outfall	**Willamina Oregon, 97396**

Project Identifier:

213018

Need for Project:

The discharge piping from the contact basin needs to be rerouted and upsized to reduce headloss.

Objective:

This project provides new discharge piping and manholes.

Design Considerations:

Design considerations include sizing the pipe to provide adequate capacity.

General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2024 Dollars)
Goods and Services					
Manhole	2	EACH	$ 5,230	$ 11,000	
New Piping From CCC to Sample MH (14")	390	LF	$ 308	$ 121,000	
Mechanical Materials and Installation	1	%	15%	$ 19,000	
Electrical Materials and Installation	1	EACH	$ 10,000	$ 10,000	
				Construction Subtotal	***$ 161,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 20,000	
Bonding			2.5%	$ 10,000	
Contractor Overhead and Profit			10%	$ 20,000	
Prevailing Wages			2.5%	$ 10,000	
AIS / BABA (if required by funding-IIJA/BIL, SRF, etc)			5%	$ 10,000	
Contingency			30%	$ 50,000	
				Total Construction Subtotal	***$ 281,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			13%	$ 40,000	
Engineering - Construction Contract Administration			4%	$ 20,000	
Engineering -- Inspection			8%	$ 30,000	
Permitting			LS	$ 10,000	
Geotechnical Investigation			LS	$ 20,000	
Surveying			LS	$ 30,000	
Environmental			LS	$ 10,000	
Legal, Administrative, and Funding			2.5%	$ 7,025	
				Total Project Costs (rounded)	**$ 449,000**

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Project Title:	Location:				
Miscellaneous Plant Priority 1 Improvements	**Willamina Oregon, 97396**				
Project Identifier: **213018**	Costs provided reflect new transfer piping between lagoons, SCADA and backup power, spray guns, and effluent flow meter.				
General Line Item	**Estimated Quantity**	**Unit**	**Unit Price**	**Item Cost (Rounded)**	**Total Cost (2024 Dollars)**
Goods and Services					
New Lagoon #1 to #2 Piping (18")	605	LF	$ 355	$ 215,000	
New Lagoon #1 and #2 to #3 Piping (16")	175	LF	$ 332	$ 59,000	
Manhole	2	EACH	$ 5,230	$ 11,000	
Effluent Flow Meter	1	EACH	$ 10,000	$ 10,000	
SCADA	1	LS	$ 100,000	$ 100,000	
Backup Power Generator	1	EACH	$ 60,000	$ 60,000	
Spray Guns	2	EACH	$ 1,400	$ 3,000	
Mechanical Materials and Installation	1	%	15%	$ 42,000	
				Construction Subtotal	***$ 500,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 50,000	
Bonding			2.5%	$ 20,000	
Contractor Overhead and Profit			10%	$ 50,000	
Prevailing Wages			2.5%	$ 20,000	
AIS / BABA (if required by funding-IIJA/BIL, SRF, etc)			5%	$ 30,000	
Contingency			30%	$ 150,000	
				Total Construction Subtotal	***$ 820,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			13%	$ 110,000	
Engineering - Construction Contract Administration			4%	$ 40,000	
Engineering -- Inspection			8%	$ 70,000	
Permitting			LS	$ 10,000	
Geotechnical Investigation			LS	$ 20,000	
Surveying			LS	$ 30,000	
Environmental			LS	$ 10,000	
Legal, Administrative, and Funding			2.5%	$ 20,500	
				Total Project Costs (rounded)	**$ 1,131,000**

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Project Title:	Location:
Headworks	**Willamina Oregon, 97396**

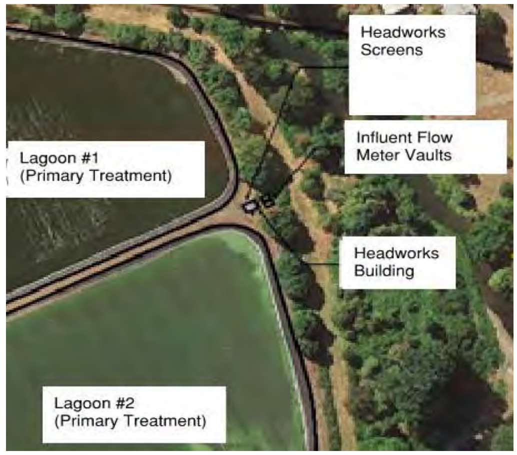
Project Identifier:

213018

Need for Project:
The current headworks screen is inoperable and the structure as well as the transfer piping is undersized.

Objective:
This project provides a new headworks structure, manual and mechanical screens, and upsized transfer piping to the aerated lagoons.

Design Considerations:
Design considerations include providing screens to meet current and piping/channels to meet required hydraulic capacity requirements.



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2024 Dollars)
Goods and Services					
New Mechanical Headworks Screen	1	LS	$ 165,000	$ 165,000	
New Manual Headworks Screen	1	LS	$ 50,000	$ 50,000	
New Concrete Channel	1	CY	$ 50,000	$ 50,000	
Mechanical Materials and Installation	1	%	40%	$ 66,000	
Electrical Materials and Installation	1	%	15%	$ 25,000	
SCADA/Electrical/Controls	1	%	15%	$ 25,000	
New Lagoon #1 and #2 Piping (24")	360	LF	$ 474	$ 171,000	
New Lagoon #1 Piping (18")	50	LF	$ 355	$ 18,000	
Lagoon Penetration	1	EACH	$ 5,000	$ 5,000	
Flow Meter	2	EACH	$ 10,000	$ 20,000	
Manhole	3	EACH	$ 5,230	$ 16,000	
Generator	1	EACH	$ 40,000	$ 40,000	
				Construction Subtotal	***$ 651,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 70,000	
Bonding			2.5%	$ 20,000	
Contractor Overhead and Profit			10%	$ 70,000	
Prevailing Wages			2.5%	$ 20,000	
AIS / BABA (if required by funding-IIJA/BIL, SRF, etc)			5%	$ 40,000	
Contingency			30%	$ 200,000	
				Total Construction Subtotal	***$ 1,071,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			13%	$ 140,000	
Engineering - Construction Contract Administration			4%	$ 50,000	
Engineering -- Inspection			8%	$ 90,000	
Permitting			LS	$ 10,000	
Geotechnical Investigation			LS	$ 20,000	
Surveying			LS	$ 30,000	
Environmental			LS	$ 10,000	
Legal, Administrative, and Funding			2.5%	$ 26,775	
				Total Project Costs (rounded)	**$ 1,448,000**

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Project Title:	Location:
Combine Lagoon 3 & 4	**Willamina Oregon, 97396**

Project Identifier:

213018

Need for Project:

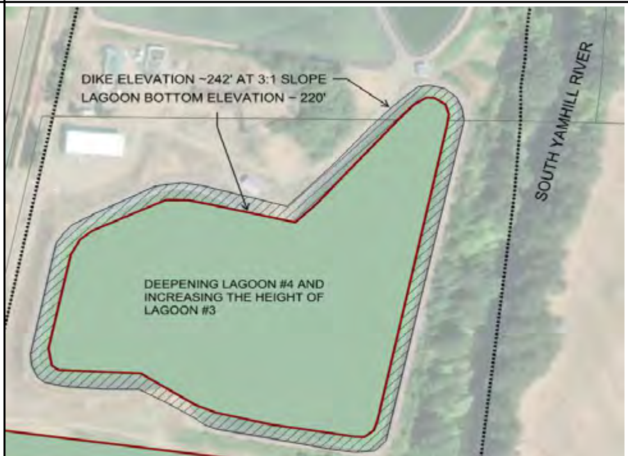
The lagoon storage is insufficient.

Objective:

This project provides additional storage as needed by combining Lagoons #3 and #4 after the construction of Lagoon #5.

Design Considerations:

Design considerations include providing storage to meet requirements and the pump station to meet peak flows with firm capacity.



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2024 Dollars)
Goods and Services					
Piping Demo/Reconfiguration	1	LS	$ 10,000	$ 10,000	
Site Excavation and Grading	21,015	CY	$ 20	$ 421,000	
New Lagoon HPDE Liner	525,572	SF	$ 2	$ 1,209,000	
Pump Station	1	EACH	$ 180,000	$ 180,000	
Clearing and Grubbing	1	LS	$ 20,000	$ 20,000	
Gravel Road	889	SY	$ 12	$ 11,000	
Mechanical Materials and Installation	1	%	10%	$ 1,000	
				Construction Subtotal	***$ 1,852,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 190,000	
Bonding			2.5%	$ 50,000	
Contractor Overhead and Profit			10%	$ 190,000	
Prevailing Wages			2.5%	$ 50,000	
AIS / BABA (if required by funding-IIJA/BIL, SRF, etc)			5%	$ 100,000	
Contingency			30%	$ 560,000	
				Total Construction Subtotal	***$ 2,992,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			13%	$ 390,000	
Engineering - Construction Contract Administration			4%	$ 120,000	
Engineering -- Inspection			8%	$ 240,000	
Permitting			LS	$ 10,000	
Geotechnical Investigation			LS	$ 20,000	
Surveying			LS	$ 30,000	
Environmental			LS	$ 10,000	
Legal, Administrative, and Funding			2.5%	$ 74,800	
				Total Project Costs (rounded)	**$ 3,887,000**

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Project Title:					Location:
Lagoon Liner Improvements					**Willamina Oregon, 97396**
Project Identifier: **213018**					Cost provided to replace existing lagoon liners.
General Line Item	**Estimated Quantity**	**Unit**	**Unit Price**	**Item Cost (Rounded)**	**Total Cost (2024 Dollars)**
Goods and Services					
Lagoon Liner	705,585	SF	$ 2.30	$ 1,623,000	
				Construction Subtotal	***$ 1,623,000***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ 170,000	
Bonding			2.5%	$ 50,000	
Contractor Overhead and Profit			10%	$ 170,000	
Prevailing Wages			2.5%	$ 50,000	
AIS / BABA (if required by funding-IIJA/BIL, SRF, etc)			5%	$ 90,000	
Contingency			30%	$ 490,000	
				Total Construction Subtotal	***$ 2,643,000***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			13%	$ 350,000	
Engineering - Construction Contract Administration			4%	$ 110,000	
Engineering -- Inspection			8%	$ 220,000	
Permitting			LS	$ 10,000	
Geotechnical Investigation			LS	$ 20,000	
Surveying			LS	$ 30,000	
Environmental			LS	$ 10,000	
Legal, Administrative, and Funding			2.5%	$ 66,075	
				Total Project Costs (rounded)	**$ 3,460,000**

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Project Title:				Location:	
Facility Planning Study Update				**Willamina Oregon, 97396**	
Project Identifier: **213018**				Cost provided to update the WWFPS.	
General Line Item	**Estimated Quantity**	**Unit**	**Unit Price**	**Item Cost (Rounded)**	**Total Cost (2024 Dollars)**
Goods and Services					
WWFPS Update	1	LS		$ -	
				Construction Subtotal	***$ -***
Additional Elements (estimated % of above)					
Mobilization and Administration			10%	$ -	
Bonding			2.5%	$ -	
Contractor Overhead and Profit			10%	$ -	
Prevailing Wages			2.5%	$ -	
AIS / BABA (if required by funding-IIJA/BIL, SRF, etc)			5%	$ -	
Contingency			30%	$ -	
				Total Construction Subtotal	***$ -***
Plans and Contract Documents					
Engineering Design and Bid Phase Services			13%	$ -	
Engineering - Construction Contract Administration			4%	$ -	
Engineering -- Inspection			8%	$ -	
Permitting			LS	$ -	
Geotechnical Investigation			LS	$ -	
Surveying			LS	$ -	
Environmental			LS	$ -	
Legal, Administrative, and Funding			2.5%	$ -	
				Total Project Costs (rounded)	**$ 150,000**

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